Work Smart

Question 1 of 200

Which of the following is true regarding poisoning/overdose?

(Please select 1 option)

- Aspirin causes acidosis due to hypoventilation
- Chlormethiazole causes hyperthermia and hypertension
- Ethylene glycol causes a metabolic alkalosis and renal failure
- Methanol causes a metabolic acidosis with an increased anion gap **Correct**
- Phenobarbitone causes a metabolic acidosis

Aspirin causes hyperventilation, which may result in a respiratory alkalosis; a massive overdose may cause a metabolic acidosis.

Phenobarbitone and chlormethiazole both suppress the central nervous system causing:

- Hypoventilation (and therefore a respiratory acidosis)
- Hypotension, and
- Hypothermia.

Ethylene glycol causes a metabolic acidosis.

Methanol is metabolised to formaldehyde and formic acid, resulting in a metabolic acidosis.
Work Smart

Question 2 of 200

Which of the following is correct regarding lead poisoning?

(Please select 1 option)

- Can only result from lead ingestion
- **Causes a peripheral neuropathy due to demyelination**
- Causes adrenal suppression
- Commonly presents with diarrhoea
- Is associated with a macrocytic anaemia

Lead can also be absorbed through the skin and by inhalation.

It is associated with iron deficiency and a microcytic anaemia.

The most common gastrointestinal symptoms are abdominal colic and constipation.
A farmer on treatment for depression is admitted acutely one hour following an intentional overdose of an unidentified substance.

On examination he is bradycardic, hypotensive, disorientated, hypersalivating, and has small pupils.

Which of the following is he most likely to have ingested?

(Please select 1 option)

- A tricyclic antidepressant (TCA)
- An organophosphate insecticide  □ Correct
- Cyanide
- Paracetamol
- Paraquat

Hypersalivation and miosis are the specific clues to acetylcholine overactivity.

The patient has occupational access to organophosphate insecticides.

Pupils tend to be dilated with TCA overdose. Paracetamol, cyanide, and paraquat should not affect pupils.
A study has been designed to investigate whether a certain drug plus physiotherapy treatment is better than drug treatment alone in the management of rheumatoid arthritis.

After randomising the patients, a small proportion of the drug plus physiotherapy group decide to drop out of the study or omit some treatment sessions specified in the research protocol.

What is the correct way of analysing the subsequent data?

(Please select 1 option)

- Assume the patients have withdrawn their consent
- Exclude these patients from all analysis
- Extend the trial recruitment to make up the numbers
- Include these patient outcomes in the drug plus physiotherapy group  □ Correct
- Interview the patients and report their group separately

This is the principle of 'intention to treat'.

It is possible that the physiotherapy intervention was harmful to the patients and this is why they left.

Intention to treat helps to reduce bias by sticking to the original allocation of treatment and analysing the patient in that treatment group even if they do not recieve the treatment.
A new drug is being studied to find the most appropriate dose in a dose response study. Small doses of the drug lead to a linear increase in serum drug concentration. At higher doses there is an exponential rise in serum drug concentration.

Which of the following best describes the pharmacokinetic properties of this new drug?

(Please select 1 option)

- First order kinetics
- First pass effect
- Long plasma half life
- Saturation kinetics
- Zero order kinetics

The description of the kinetics of this new drug show that with small doses there is a linear response (first order kinetics) to dosing but this becomes saturated and the serum concentration of the drug rises sharply (zero order kinetics).

Drugs following zero order kinetics continue to be metabolised at a steady rate, independent of the concentration of the substrate. The plot of metabolism against time is linear.

Drugs which have saturation kinetics initially follow a linear line, but then their metabolism slows down leading to a plateau of the line, for example due to enzyme depletion. Small doses in the drug then lead to large increases in plasma concentration.
This response is typical of drugs such as phenytoin (saturates liver metabolism).

Answer Statistics

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Times answered: 7971

Test Analysis

Correct Incorrect Partially Correct

Score: 50%
Total Answered: 20
Work Smart

Question 5 of 200

Which of the following medications can cause hypomagnesaemia?

(Please select 1 option)

- Aminophylline  ✗ Incorrect answer selected
- Amitriptyline
- Cisplatin  ✗ This is the correct answer
- Co-trimoxazole
- Lithium

Most of the body's magnesium is intracellular with only 1% being extracellular, in blood and interstitial fluid. This means that blood magnesium levels do not necessarily correspond with whole body magnesium status.

Causes of hypomagnesaemia include:

- Drugs including cisplatin, diuretics, cyclosporine, and cardiac glycosides
- Malabsorption syndromes
- Diarrhoea
- Hypercalcaemia
- Alcohol
- Metabolic acidosis
- Renal diseases - pyelonephritis, glomerulonephritis, acute tubular necrosis, and interstitial nephritis.
Profound hypomagnesaemia can cause tetany, seizures, and cardiac arrhythmias and needs to be treated intravenously.

Lithium can cause hypermagnesaemia.

Answer Statistics

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Times answered: 7780

Test Analysis

Correct Incorrect Partially Correct

Score: 50%

Total Answered: 20
Work Smart

Question 2 of 70

A 35-year-old man is admitted following a serious attempt at paracetamol overdose. Despite efforts to treat him he develops liver failure.

Which of the following is most likely with the ensuing liver failure?

(Please select 1 option)

- Better prognosis in older patients
- Better prognosis in those with high alcohol consumption
- Hypoglycaemia rarely happens within 12 hours of onset of encephalopathy
- It is harmful to give N-acetylcysteine
- Lactic acidosis is recognised complication

Use of intravenous N-acetylcysteine reduces morbidity and mortality in fulminant hepatic failure.

Severe hypoglycaemia affects 40% of patients with fulminant liver failure, which exacerbates encephalopathy.

It may develop rapidly and recur with sepsis.

Lactic acidosis is due to decreased hepatic lactate clearance, compounded by poor peripheral perfusion and increased lactate production.

The prognosis is poor in those with
- Blood PH less than 7.0
- Prolonged prothrombin time (more than 100s) and
- Serum creatinine more than 300 uM.

Mortality is greater if the patient is more than 40 years of age.

Answer Statistics

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Test Analysis

Correct Incorrect Partially Correct

Score: 50%
Total Answered: 2
A 63-year-old female presents with dry mouth of three months duration. She is taking medication for hypertension, stress incontinence and reflux oesophagitis. Which of the following is most likely to be responsible for her dry mouth?

(Please select 1 option)

- Oxybutinin

Oxybutinin is an effective treatment for detrusor instability and is a parasympathetic muscarinic antagonist. Consequently dry mouth is a problem in up to 70% of cases.

Bendroflumethiazide, the thiazide diuretic, at a dose of 2.5 mg per day is not associated with dry mouth.

Cimetidine is an H2 antagonist and is not associated with dry mouth.

Doxazosin is an alpha-blocker used as an anthihypertensive and is associated with a dry mouth in less than 5% of patients.

Hydralazine is a vasodilator and is not commonly linked to a dry mouth.
Work Smart

Question 7 of 200

Which of the following is true of the antibiotic combination quinupristin and dalfopristin?

(Please select 1 option)

- Administered orally
- Effective against multi-resistant S. aureus
- Effective against resistant mycobacterium TB
- Indicated in subjects with chronic renal impairment
- Particularly effective in the treatment of pseudomonas infection in cystic fibrosis

Quinupristin and dalfopristin are a synergistic combination of a streptogramin A and B respectively. They are effective against Gram positive aerobes and are particularly useful against resistant Strep. pneumoniae and Staph. aureus.

They can only be administered via a central line.
Work Smart

Question 8 of 200

Which of the following is not a cause of drug-induced hepatitis?

(Please select 1 option)

- Amiodarone
- Ethambutol ✅ Correct
- Isoniazid
- Methyldopa
- Pyrazinamide

Side effects of ethambutol are largely confined to visual disturbances in the form of:

- Loss of acuity
- Colour blindness, and
- Restriction of visual fields.

It does not cause hepatitis and is renally excreted.

Some causes of drug-induced hepatitis include:

- Isoniazid
- Amiodarone
- Pyrazinamide, and
- Methyldopa.
A 63-year-old man was found collapsed. A department of psychiatry outpatient card was found in his jacket, together with a bottle of procyclidine tablets. He was febrile (38.2°C), conscious but unresponsive to commands. The blood pressure was 160/105 mmHg and there was marked muscle rigidity.

What is the most likely diagnosis?

(Please select 1 option)

- Acute catatonic schizophrenia
- Bacterial meningitis
- Cerebral malaria
- Neuroleptic malignant syndrome **Correct**
- Procyclidine overdose

The symptoms are typical of neuroleptic malignant syndrome (NMS).

NMS is characterised by:

- Fever
- Muscular rigidity
- Altered mental status
Autonomic dysfunction.

Procyclidine is used to treat the Parkinsonian side effects of neuroleptics; its presence in the patient’s pocket implies that he was taking neuroleptics.

Signs of procyclidine overdose include:

- Agitation
- Confusion
- Sleeplessness lasting up to 24 hours or more
- Pupils are dilated and unreactive to light.

Visual and auditory hallucinations and tachycardia have also been reported.

Further Reading:

BMJ Best Practice: Neuroleptic Malignant Syndrome
Work Smart

Question 10 of 200

An 18-year-old woman is admitted after taking drugs at a night club.

Which of the following features suggest she had taken Ecstasy (MDMA)?

(Please select 1 option)

- A pyrexia of 40°C  □ This is the correct answer
- Hypernatraemia
- Hypokalaemia
- Metabolic acidosis
- Respiratory depression  □ Incorrect answer selected

Features of the amphetamine MDMA abuse include:

- hyponatraemia
- tachycardia
- hyperventilation, and
- hyperthermia.
Malignant hyperpyrexia (MH) is characterised by increased temperature and muscle rigidity during anaesthesia, which results from abnormal skeletal muscle contraction and increased metabolism.

The predisposing gene is thought to be on chromosome 19, close to the gene for the ryanodine/dihydropyridine receptor complex.

Known triggering agents include the volatile anaesthetic agents and suxamethonium. Patients show different sensitivity to the triggering agents and the reaction can be delayed by several hours.

Intravenous dantrolene (up to 10 mg/kg) is the only available specific treatment and care must be taken when administering as the solution has a pH of 9-10.

The prognosis of malignant hyperpyrexia is good when the appropriate treatment is instigated early, mortality being less than 5% (prior to dantrolene the mortality was 80%).

Serum creatine kinase elevation and myoglobinuria are suggestive but not diagnostic of MH.
Myoglobin and creatine kinase are both known to increase after giving suxamethonium to normal patients.

Contracture tests using caffeine and halothane are the investigations of choice.

Muscle biopsies may appear histologically normal.

Answer Statistics

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Times answered: 8541

Test Analysis

Correct Incorrect Partially Correct
Score: 33.33%
Total Answered: 3
Work Smart

Question 11 of 200

Which of the following is NOT a feature of cannabinoids?

(Please select 1 option)

- 9-tetrahydrocannabinol is the active constituent of the resin
- Bioavailability after oral administration is about 80%
- Inhibits eicosanoid synthesis
- Lowers intraocular pressure
- Naloxone blocks the antinociceptive actions of cannabinoids

Cannabinoids are derived from the resin of cannabis sativa, and 9-tetrahydrocannabinol (9-THC) is its most important pharmacologically active constituent.

Oral bioavailability of THC, whether given in the pure form or as THC in marijuana, is low and extremely variable, ranging between 5% and 20%, with effects occurring 0.5-3 hours later. Bioavailability of THC in a marijuana cigarette or pipe also rarely exceeds 10-20%.

Naloxone and other opioid receptor antagonists block the analgesic actions of cannabinoids.

Synthetic cannabinoids reduce arachidonic acid-induced inflammation by inhibiting eicosanoid production.
Work Smart

Question 12 of 200

Which of the following would be expected to reduce maternal mortality when given in eclampsia?

(Please select 1 option)

- Insulin and dextrose infusion
- Low dose dopamine infusion
- Magnesium infusion (Correct)
- Phenytoin infusion
- Salbutamol infusion

Magnesium has been shown significantly to reduce maternal mortality in eclampsia and a favourable outcome may also be expected in pre-eclampsia.

None of the other agents has been associated with a reduced mortality in eclampsia.
Work Smart

Question 13 of 200

Which of the following drugs is most likely to cause drug-induced lupus erythematosus (DILE) syndrome?

(Please select 1 option)

- Baclofen
- Isoniazid
- Methotrexate
- Procainamide
- Sulphasalazine

A recessive gene is responsible for the activity of hepatic N-acetyl transferase resulting in slow or fast (intermediate and fast groups get lumped together) acetylation.

45% of the United Kingdom population are slow acetylators.

Drugs affected include:

- isoniazid
- hydralazine
- dapsone
- procainamide, and
- sulphasalazine.
Slow acetylators have increased risk of isoniazid-induced peripheral neuropathy, and hydralazine or procainamide-induced systemic lupus erythematosus (SLE).

At least 38 drugs currently in use can cause DILE. However, most cases have been associated with these three:

- procainamide
- hydralazine, and
- quinidine.

The risk for developing lupus-like disease from any of the other 35 drugs is low or very low; with some drugs only one or two cases have been reported.

- Isoniazid (INH) - low risk
- Sulfasalazine - low risk.

Further Reading:
ADAM Medical Encyclopedia. Systemic Lupus Erythematosus.
Work Smart

Question 14 of 200

Which one of the following drugs works by inhibiting the tumour necrosis factor?

(Please select 1 option)

- Cyclosporin

- **Infliximab**  Correct

- Methotrexate

- Montelukast

- Sulfasalazine

Montelukast works as a leukotriene receptor antagonist and is used in the treatment of asthma.

Etanercept and infliximab inhibit TNF and are licensed in the treatment of rheumatoid arthritis.

Infliximab is given with methotrexate and is associated with the development of tuberculosis.
Work Smart

Question 15 of 200

A 75-year-old man was admitted after being found collapsed in a garden shed surrounded by a number of empty containers.

On clinical examination the patient had small pupils, a heart rate of 50 beats per minute, and was frothing at the mouth.

Which of the following is the most likely diagnosis?

(Please select 1 option)

- Creosote poisoning
- Glyphosate poisoning
- Organophosphorus poisoning - Correct
- Paraquat poisoning
- Pyrethroid poisoning

The patient has cholinergic features with a relative bradycardia, small pupils and increased salivation. This is highly suggestive of organophosphorus poisoning which is an anticholinesterase, thus prolonging the effects of acetylcholine.

Paraquat is associated with nausea, vomiting, and diarrhoea with ulceration.

Creosote is a petroleum based substance and would not have such an effect.

Glyphosate herbicides produce nausea, vomiting, and diarrhoea with a caustic effect in the mouth.
Pyrethroid is an insecticide and poisoning is rare but associated with coma, convulsions and pulmonary oedema.
An 85-year-old woman presented with bilateral osteoarthritis of the knees. She had no history of previous gastrointestinal disease.

Which of the following is the most appropriate initial treatment for her?

(Please select 1 option)

- Celecoxib
- Dihydrocodeine
- Naproxen  
  - Incorrect answer selected
- Paracetamol  
  - This is the correct answer
- Glucosamine

NICE guidelines recommend formulating individualised management plans for patients with osteoarthritis. Behavioural change, such as exercise, weight loss and suitable footwear should be encouraged. Comorbidities which compound the effect of osteoarthritis symptoms should be identified and their treatment optimised.

Paracetamol and/or topical NSAIDs (for knee or hand OA) should be offered before considering oral NSAIDs.

If symptoms are not controlled with the above strategies, oral NSAIDs or COX-2 inhibitors (but not etoricoxib) can be used. A proton pump inhibitor should be co-prescribed. The lowest effective dose should be prescribed for the shortest period possible. If the patient is already taking low-dose aspirin,
an alternative analgesic should be considered.

Treatments which are not recommended include rubefacients, intra-articular hyaluronan, electro-acupuncture and chondroitin or glucosamine products.

Adjuvants which can be used include opioid analgesics, topical capsaicin and intra-articular corticosteroids. Application of heat or cold packs, or TENS, can be considered if other strategies are ineffective. Manipulation and stretching can be helpful, particularly for hip osteoarthritis. Bracing/joint supports can be used for patients with biomechanical joint pain or instability.

Patients should be referred for joint surgery if they have already been offered all of the core treatments or if they have refractory joint symptoms which have a substantial impact on their quality of life. If there is a clear history of mechanical locking, referral for arthroscopic lavage and debridement should be considered.

Reference:

2. NICE. Osteoarthritis (CG177).
A 24-year-old man presented twelve hours after a staggered overdose of dihydrocodeine 1.2 g and paracetamol 30 g. He has 3 mm pupils, a Glasgow coma scale (GCS) score of 14, respiratory rate of 14, and blood pressure of 100/60 mmHg.

Which one of the following is the most appropriate management?

(Please select 1 option)

- 500 ml of 10% glucose intravenously over four hours
- Intravenous flumazenil
- Intravenous N-acetylcysteine  
  - This is the correct answer
- Intravenous naloxone  
  - Incorrect answer selected
- Oral activated charcoal

This patient's GCS is reasonable and the opiate-like effects seem minimal (no evidence of respiratory depression). Intravenous naloxone is therefore not currently required, but the patient should be closely monitored.

However, this patient has received a significant dose of paracetamol, over a staggered period, conferring a high risk of hepatic toxicity. The 12 hour delay makes the absorptive effects of charcoal limited and although it would be useful as gastric emptying may be delayed it is not as important in this patient as the paracetamol antidote. The paracetamol level is not used to guide treatment in the
setting of a staggered overdose, and N-acetylcysteine should be given without delay to reduce the risk of liver failure.

There is no evidence of hypoglycaemia or benzodiazepine overdose so neither dextrose or flumazenil are required.
Work Smart

Question 17 of 200

A 30-year-old male presented with a paranoid psychosis accompanied by visual hallucinations which resolved over the next three days.

Which one of the following is the most likely diagnosis?

(Please select 1 option)

- [ ] Alcohol withdrawal  □ This is the correct answer
- [ ] Diazepam dependence
- [ ] Fluoxetine overdose
- [ ] Heroin withdrawal
- [ ] Smoking cannabis  □ Incorrect answer selected

The key points in the history are that, firstly, these are visual hallucinations and secondly that they resolve over 72 hours. Of all the options given, alcohol withdrawal is the most likely. The fact that this patient has paranoid psychosis makes it even more likely.

Symptoms typically present about 8 hours after a significant fall in blood alcohol levels. The peak is on day two, and by day five the symptoms are significantly better. Minor withdrawal symptoms appear 6-12 hours after cessation of alcohol and include:

- Insomnia
- Fatigue
- Tremor
- Anxiety
- Nausea
- Vomiting
- Headache
- Sweating
- Palpitations
- Anorexia
- Depression, and
- Craving.

Alcoholic hallucinosis can appear 12-24 hours after stopping alcohol and includes visual, auditory and tactile hallucinations. Withdrawal seizures can appear 24-28 hours after cessation and are generalised tonic-clonic seizures. Alcohol withdrawal delirium ('delerium tremens') can appear 48-72 hours after cessation. Mortality without treatment is approximately 35%.

Benzodiazepines can cause a protracted withdrawal syndrome, with symptoms persisting for 6 months or more. It is characterised by anxiety, irritability, insomnia and sensory disturbance. In severe cases it can resemble mania and schizophrenia.

Fluoxetine overdose typically causes few symptoms, but can be associated with arrhythmias.

Heroin withdrawal has significant physical symptoms, including tremors, cramps, muscle and bone pain, rhinitis, tachycardia and diarrhoea and vomiting, in addition to psychiatric symptoms.

Cannabis use causes relaxation, euphoria, short-term memory loss and dry mouth and eyes. A withdrawal syndrome is recognised but not well defined. Long-term use has been linked with paranoia and schizophrenia, but these symptoms do not resolve quickly and visual hallucinations are unlikely.

Further Reading:

NICE. *Alcohol-use disorders: diagnosis and management of physical complications (CG100).*
A 43-year-old woman with atopic dermatitis (atopic eczema) presented with an acute generalised exacerbation of her disease.

She was admitted to hospital but failed to improve with emollients, topical betamethasone 17-valerate, and oral antihistamine.

Which one of the following drugs is the most appropriate treatment?

(Please select 1 option)

- Acitretin
- Amoxicillin
- Colchicine
- Cyclosporin □ This is the correct answer
- Dapsone □ Incorrect answer selected

Cyclosporin is a well used drug in the treatment of atopic dermatitis (AD). It is usually at doses of 2-5 mg/kg.

The pathophysiology of AD is complex but the T lymphocytes are involved and it is known that there is an increased production of cytokines particularly IL-4.

Cyclosporin is a suppressor of T cells and in that respect works very well in atopic dermatitis and psoriasis. The side effects of hypertension and renal toxicity limit its use.

These patients are seen monthly to have their blood pressure and urea and electrolytes checked.
Work Smart

Question 19 of 200

Which of the following is true of cutaneous anthrax?

(Please select 1 option)

- Causes a black eschar which overlies pus
- Is very likely to occur in subjects exposed to anthrax spores
- Lesions are associated with marked oedema
- Lesions are usually painful and tender
- Mortality is approximately 20% despite antibiotic therapy

Anthrax is caused by *Bacillus anthracis* a Gram positive rod.

Cutaneous anthrax is caused by direct contact of the bacteria into an open wound (usually touching an infected animal). Cutaneous anthrax is associated with a black eschar without pus, tends to be painless and to have widespread oedema.

Without antibiotics, mortality is of the order of 20%, but with antibiotics, mortality is low, which contrasts with pulmonary anthrax.

Further Reading:

Work Smart

Question 20 of 200

Which of the following is a feature of vancomycin-resistant enterococci?

(Please select 1 option)

- Are commonly vancomycin-dependent

- Cause resistant infective diarrhoea

- High dose ampicillin is the treatment of choice

- May be found in healthy community volunteers not recently hospitalised

- Produce an enzyme that inactivates vancomycin

Only some strains are vancomycin-dependent. An explanation for this curious process is that there is an inability to produce cell walls because the vancomycin-sensitive precursor genes have been turned off and the resistant ones only appear in the presence of vancomycin.

When they cause clinical problems they are usually urinary tract infections (UTI), bacteraemia, wound infections, neonatal infections, endocarditis, etc. rather than resistant infective diarrhoea.

Ampicillin is the treatment of choice only if the MIC (minimum inhibitory concentration) of ampicillin is not too high. Anecdotal evidence exists for its use in *E. faecalis* endocarditis. (20 g/day).

Vancomycin-resistant enterococci may be found in healthy community volunteers not recently hospitalised. Two percent in the United Kingdom general practice, 28% in Belgium. Community reservoir in meat, poultry and perhaps cheese.
Vancomycin-resistant enterococci alter peptidoglycan precursors used to build cell walls. Vancomycin binds to D-ala-D-ala but the resistant enterococci have D-ala-D-lac or D-ala terminating precursors. They acquire genes that produce enzymes to change the precursors.

Reference:
A 25-year-old male homosexual is admitted with dyspnoea and weight loss of two months duration.

He is diagnosed with *Pneumocystis jiroveci* as a consequence of HIV infection.

Which of the following concerning *Pneumocystis jiroveci* is true?

(Please select 1 option)

- Elevated serum antibodies to *P. jiroveci* are helpful diagnostically
- It is always associated with x ray changes
- It is best treated with intravenous pentamidine
- It is caused by a bacterium
- May have an extra pulmonary presentation

Although rare, *Pneumocystis jiroveci* can present in a number of extrapulmonary locations. These include the central nervous system, bone marrow, lymph nodes, eyes, thyroid and gastrointestinal tract. This can result in pancytopenia, retinal cotton wool spots and thyroid masses.

There is polyclonal B-cell activation in AIDS.

5-15% have a normal chest radiograph.

It is best treated with intravenous cotrimoxazole not intravenous pentamidine.

It is caused by a fungus, not a bacterium.
Work Smart

Question 22 of 200

Which of the following concerning diamorphine elixir for the relief of pain in terminal patients is correct?

(Please select 1 option)

- Analgesia is enhanced if cocaine is added
- Constipation is a characteristic sequel to treatment
- Dependence occurs rapidly
- Initial sedation typically continues whilst the drug is administered
- The same amount of pain relief is produced as when the same dose is given via intramuscular injection

Sedation occurring in the first few days typically wears off, leaving the patient alert.

Hallucinations also tend to occur.

An aperient should always be added to the treatment regime.

Addiction is not a problem.

An intramuscular injection is three times more effective than the same oral dose.

(Cornwall Trainers)
Question 23 of 200

Which of the following relate to dopa-decarboxylase inhibitors?

(Please select 1 option)

- Enhance the effect of levodopa on the substantia nigra
- Have anticholinergic activity
- Prevent L-dopa associated dyskinesias
- Reduce the extracerebral complications of L-dopa therapy
- Should not be given in combination with dopamine agonists

Dopa-decarboxylase inhibitors prevent the systemic metabolism of levodopa which leads to higher central nervous system (CNS) levels. The effect itself is not enhanced, only the concentration of available levodopa.

Dyskinesias are a CNS effect of levodopa.

Dopa-decarboxylase inhibitors reduce the extracerebral complications of L-dopa therapy. These include nausea, vomiting, postural hypotension and cardiac arrhythmias.

When given in combination with dopamine agonists dyskinetic movements are more likely.
Work Smart

Question 5 of 70

Which of the following micro-organisms is generally sensitive to benzylpenicillin?

(Please select 1 option)

- **Bordetella pertussis**
- **Cryptococcus neoformans**
- **Legionella pneumophila**
- **Mycoplasma pneumoniae**
- **Streptococcus pneumoniae**

Penicillin binds to specific penicillin-binding proteins (PBPs) in the cell wall, mainly of Gram-positive organisms.

Penicillin resistance is usually due to the production of altered PBPs, which reduce binding of penicillin, or beta-lactamases which cleave the beta lactam ring.

Penicillin is mainly useful for group A *Strep.*, Group B *Strep.*, meningococcal and pneumococcal infections, although anthrax is also sensitive.

Pneumococci with modified PBPs are an increasing problem.

*Copyright © 2011 Dr Colin Melville*
A 19-year-old girl presents with an overdose of paracetamol.

Which of the following statements is correct?

(Please select 1 option)

- Acetylcystine should routinely be given if the presentation is within the first 12 hours of overdose
- Because she is over the age of 6, she is unlikely to develop significant toxicity
- Hospitalisation will be needed for at least five days
- Liver function tests should be monitored
- The mortality in those with an AST of >350 IU/l is 4%

Treatment with N-acetylcysteine (NAC) is given according to a standard nomogram. NAC may be useful up to 36 hours following ingestion.

Children under the age of 6 are unlikely to develop significant toxicity, but adolescents have a higher incidence of toxic plasma levels following ingestion, and a higher incidence of abnormal aspartate transaminase (AST) >1000 IU/L.

Even after serious hepatotoxicity, the mortality rate is under 0.5%.

The occasional patient may require liver transplantation.

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Work Smart

Question 25 of 200

In which of the following would the first drug be associated with increased pharmacological action of the second drug?

(Please select 1 option)

- □ Erythromycin : theophylline  This is the correct answer
- □ Phenytoin : ethinyloestradiol
- □ Ranitidine : corticosteroid
- □ Rifampicin : warfarin  Incorrect answer selected
- □ Valproate : thyroxine

Erythromycin would inhibit the metabolism of theophylline.

Ranitidine unlike cimetidine is not an enzyme inhibitor.

Phenytoin would speed up metabolism of ethinyloestradiol making the pill less effective.

Rifampicin is a well recognised enzyme inducer.

Valproate in combination with carbamazepine has been shown to reduce endogenous T4 concentrations, but not in isolation.
Work Smart

Question 25 of 200

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Valproate in combination with carbamazepine has been shown to reduce endogenous T4 concentrations, but not in isolation.
In considering the management of convulsions select the correct statement from the list below.

(Please select 1 option)

- Hypoglycaemia should always be considered  □ Correct
- If the fit lasts longer than five minutes, then PR diazepam should be given
- Paraldehyde is best given intramuscularly
- Phenobarbitone is a useful therapy in school age children
- When associated with fever, antibiotics should always be given to cover the possibility of meningitis

Status epilepticus is traditionally defined as continuous convulsion lasting longer than 30 minutes, or the occurrence of serial convulsions between which there is no return of consciousness.

It may be generalised (tonic clonic, absent) or partial (simple, complex, or with secondary generalisation). Generalised tonic clonic seizures predominate.

There are three major sub-types:

- prolonged febrile seizures.
- idiopathic status epilepticus (no underlying central nervous system [CNS] lesion or insult).
- symptomatic (longstanding neurological disorder or metabolic abnormality).

The most common cause in a child less than 3 years is a prolonged febrile seizure. Sleep deprivation
and drug withdrawal can also precipitate it.

The relationship between neurological outcome and duration of status epilepticus is unknown in children and adults. In the animal model, 60 minutes of constant seizure activity is associated with pathological changes, even when metabolic homeostasis is maintained.

Cell death thus results in increased metabolic demands from continually discharging neurones. Vulnerable areas include the hippocampus, the mid to low cerebellum, middle cortical areas, and thalamus.

Approximately 20 minutes of status epilepticus produces regional oxygen sufficiency deficiency promoting cell damage and necrosis. This is, therefore, used as the threshold in children.

Initial management begins with ABC.

Remember "DEFG" (Don't Ever Forget Glucose): Hypoglycaemia should be excluded as it is easily and rapidly treatable (if present 3-5 ml/kg of 10% dextrose is given by IV infusion), and blood obtained for full blood count, electrolytes including calcium and magnesium, glucose, creatinine, anticonvulsant levels. Blood and urine may be obtained for toxicology. Arterial blood gases should be done, and consideration given to lumbar puncture.

First line anticonvulsant therapy would be lorazepam/diazepam given IV if possible. If seizures persist then phenytoin may be given as a loading dose followed by an infusion.

Phenobarbitone may be used as first line in infants. Paraldehyde can be given as a dilute solution intravenously, or administered rectally or IM. The latter two routes can produce tissue damage and sloughing, so these should be reserved for exceptional circumstances.

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Question 27 of 200

You are an occupational health physician and have been asked by an anxious employee about contraindications to pertussis immunisation.

Which of the following is a contraindication?

(Please select 1 option)

- Cow's milk protein intolerance.
- Eczema
- Fever to 39.5°C following the first dose.  □ This is the correct answer
- Hydrocephalus  □ Incorrect answer selected
- Redness of >2.5cm at the injection site after the first dose.

True contraindications to pertussis immunisation include:

- Acute illness - until recovered
- Previous reaction to pertussis:
  - Local: an extensive area of redness and swelling which becomes indurated, involving most of the anterolateral surface of the thigh or a major part of the circumference of the upper arm
  - General: fever equal to or more than 39.5°C within 48 hours of vaccine, anaphylaxis, bronchospasm, laryngeal oedema, generalised collapse, prolonged hypo responsiveness, prolonged inconsolable or high-pitched screaming of more than four hours, convulsions or
encephalopathy occurring within 72 hours.

A personal family history of allergy is not a contraindication, nor are stable neurological conditions such as cerebral palsy or spina bifida.

In patients who have had a previous reaction, immunisations should be completed with DT vaccine, and acellular vaccine considered.

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Work Smart

Question 28 of 200

You are considering starting a patient on griseofulvin.

Which of the following statements concerning its pharmacology is true?

(Please select 1 option)

- [ ] It is active against aspergillus
- [x] It is active against Candida albicans
- [ ] It is associated with drug-induced Stevens-Johnson syndrome
- [ ] It should not be used in renal failure
- [ ] It used for a maximum of two weeks

Many drugs are implicated in causing Stevens-Johnson syndrome.

Griseofulvin is not active against Candida albicans. It is active against trichophytons (tinea) and other dermatophytes.

It is metabolised in the liver (note also it's an enzyme inducer). Only 0.1-0.2% excreted in urine.

Treatment with griseofulvin is often needed for a long period, sometimes years, depending on the rate of nail growth.

Further Reading:

A 68-year-old lady with mitral valve disease and atrial fibrillation is taking warfarin. Lately her INR has fallen and the dose of warfarin has had to be increased.

Which of the following new treatments may account for this change?

(Please select 1 option)

- Allopurinol
- Amiodarone
- Clarithromycin
- Sertraline
- St John's wort

Drugs that are metabolised in the liver can induce hepatic microsomal enzymes. Induction of enzymes by one drug can gradually increase the rate of metabolism of another, resulting in lower plasma concentrations and a reduced effect.

St John's wort is an enzyme inducer and therefore can increase the metabolism of warfarin and make it less effective. All the other options enhance the effect of warfarin.

Allopurinol can interact with warfarin to enhance the anticoagulant effect of warfarin.

Amiodarone inhibits metabolism of coumarins (enhanced anticoagulant effect).

Clarithromycin enhances anticoagulant effect of coumarins. This is because warfarin is metabolised by the same CYP3A isozyme as clarithromycin. Clarithromycin, known to inhibit CYP3A, and a drug
primarily metabolised by CYP3A may be associated with elevations in drug concentrations that could increase or prolong both therapeutic and adverse effects of the concomitant drug.

Sertraline may interact with warfarin to enhance the anticoagulant effect.

Further Reading:

Work Smart

Question 30 of 200

A 30-year-old man presents to the Emergency department with a history of drug overdose. He is known to be repeatedly admitted with similar episodes of self-harm. On this occasion he is drowsy and has prominent hypersalivation.

Which of the following agents, found on his person, is the likely cause?

(Please select 1 option)

- Chlormethiazole [Correct]
- Cocaine
- Dosulepin
- L-dopa
- Solvent cannister

Hypersalivation is seen with:

- Parasympathomimetic agents
- Insecticides
- Arsenic
- Strychnine
- Chlormethiazole, and
- Clozapine.

Solvent abuse may cause an acneiform rash around the buccal cavity.
Cocaine abuse leads to hypertension and nasal septum perforation.
The other agents are anticholinergic and would cause dry mouth in overdose.

Answer Statistics

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Times answered: 8647

Test Analysis

Correct Incorrect Partially
Correct

Score: 45.71%
Total Answered: 35

Feedback
A 74-year-old man with a 30-year history of psoriasis presented with generalised erythroderma of three days duration.

Examination reveals him to be shivering but otherwise well. He was treated as an inpatient with emollients and attention to fluid replacement and temperature control but failed to improve after five days.

Which of the following is the most appropriate next treatment?

(Please select 1 option)

- Oral hydroxychloroquine
- Oral methotrexate □ This is the correct answer
- Oral prednisolone □ Incorrect answer selected
- Topical coal tar
- Topical Dithranol

Erythroderma is an emergency as patients are susceptible to profound dehydration, infection, and hypothermia.

Methotrexate would be the only correct treatment for someone with erythrodermic psoriasis.

Steroids could lead to unstable pustular psoriasis and would not generally work.

Hydroxychloroquine has little effect on psoriasis.
Topical coal tar and Dithranol are good treatments for chronic plaque psoriasis, but are highly irritant and would make the erythroderma much more inflamed and deteriorate his condition.

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**Answer Statistics**

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**Test Analysis**

Correct Incorrect Partially Correct

Score: 45.71%
Total Answered: 35
A previously fit 30-year-old female presents with a four day history of intractable pruritus and urticaria. Which is the most appropriate initial management?

(Please select 1 option)

- Chlorpheniramine **Correct**
- Prednisolone
- Ranitidine
- Topical hydrocortisone
- Topical mepyramine

Urticaria is a common condition and usually responds very well to systemic antihistamines which are the correct first line treatment.

Oral steroids can be given for severe cases but only as a last resort.

Topical steroids/topical antihistamines have no effect.

Next question  Go to summary

Answer Statistics
A diagnosis of diabetes mellitus is being considered in 32-year-old woman who is 16 weeks pregnant. Her body mass index (BMI) was 22 kg/m² (18-25).

A 75 g oral glucose tolerance test (OGTT) revealed:

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Which of the following is the most appropriate step in the management of this patient?

(Please select 1 option)

- Glipizide therapy
- Insulin therapy
- Low calorie diet and exercise  □ This is the correct answer
- Metformin therapy  □ Incorrect answer selected
- Repeat her oral glucose tolerance test in four weeks

In England and Wales, 2.5% of pregnancies involve women with diabetes. Approximately 87% of these are due to gestational diabetes, 7.5% type 1 diabetes and 5% type 2 diabetes. There are a number of risks to both mother and fetus, including miscarriage, pre-eclampsia, preterm labour,
stillbirth, congenital malformations, macrosomia, birth injury, perinatal mortality, and neonatal hypoglycaemia.

Risk factors for gestational diabetes are:

- BMI >30 kg/m²
- previous macrosomic baby (>4.5 kg)
- previous gestational diabetes
- first-degree relative with diabetes, and
- ethnic origin (South Asian, Caribbean, Middle Eastern).

Screening with fasting plasma glucose, random blood glucose, glucose challenge tests, and urinalysis is recommended for any women with one of these risk factors. The 2-hour 75 g oral glucose tolerance test is used to definitively diagnose gestational diabetes. This is performed at 16-18 weeks in women who have been affected in a previous pregnancy (with home BM monitoring prior to this, and a repeat test at 28 weeks if this is normal) and 24-28 weeks for women with any other risk factor.

If it is safely achievable, women with gestational diabetes should aim to keep fasting blood glucose between 3.5-5.9 mmol/L and one hour postprandial blood glucose below 7.8 mmol/L during pregnancy. It is important to note HbA₁c should not be routinely used to monitor glycaemic control in the second and third trimesters.

Most gestational diabetes will respond to changes in diet and exercise. Only 10-20% of women need oral hypoglycaemia agents or insulin therapy. Women should therefore be given dietary advice, and those with a pre-pregnancy BMI of >27 should be advised to restrict calorie intake and exercise for at least 30 minutes daily.

Hypoglycaemic therapy should be considered for women in whom diet and exercise fails to maintain blood glucose targets during a period of 1-2 weeks. If there is any evidence of fetal macrosomia, therapy should be initiated immediately. Treatment should be tailored to the individual patient, but in general may include oral hypoglycaemics (metformin and glibenclamide) and insulin. There is insufficient evidence regarding long-acting insulin analogues, and isophane insulin therefore remains the first choice for long-acting insulin during pregnancy. Insulin aspart and lispro are safe rapid-acting analogues.

Women with insulin-treated gestational diabetes should be advised of the risk of hypoglycaemia (which they may be unaware of) and provided with a concentrated glucose solution.

During labour and birth, capillary blood glucose would be monitored on an hourly basis in patients with diabetes and maintained between 4 and 7 mmol/L. This may require the use of a sliding scale.

In this patient, diet and exercise has not yet been trialled, and there is no mention of foetal macrosomia. Metformin can then be started if glycaemic control is not achieved within 1-2 weeks. Waiting another four weeks to instigate therapy exposes both mother and foetus to potential harm.
Insulin can be used if glycaemic control is not achieved with metformin.

Glipizide is not used in pregnancy.

References:

NICE. Diabetes in pregnancy: management of diabetes and its complications from preconception to the postnatal period (NG3).
Work Smart

Question 6 of 70

A 50-year-old lady suffers with migraine. She smokes 20 cigarettes a day.

She has found that paracetamol 1 g was not always effective in relieving her pain.

Which of the following factors is the most likely to account for this problem?

(Please select 1 option)

- Altered volume of distribution
- Delayed gastric emptying □ Correct
- First pass metabolism
- Hepatic enzyme induction
- Reduced gut blood flow

Paracetamol absorption is reduced during migraine attacks and reduced absorption is associated with increased nausea.

There is evidence that delayed gastric emptying is to blame¹.

In fact the paracetamol absorption technique is used to study gastric emptying².

Enzyme induction with cigarette smoking does affect paracetamol metabolism. Its importance however, is in toxicity. Smokers would be classified as in a high risk for paracetamol overdose and are assessed using a different time - paracetamol level curve.

Reference:


**Answer Statistics**

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Times answered: 8944

**Test Analysis**

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Score: 50%

Total Answered: 6
A youth worker, aged 40, presents to the Emergency Department with vomiting. On detailed questioning, he states that he has taken about 36 paracetamol tablets two hours previously. He is vomiting profusely with a blood pressure of 90/60 mmHg.

Which of the following measures would be the most appropriate immediate step in the management of this patient?

(Please select 1 option)

- Coagulation screen
- IV fluids  □ Correct
- IV N-acetyl cysteine
- Oral methionone
- Paracetamol levels

The most pressing issue in this patient is resuscitation as he is vomiting and is hypotensive. It is unusual to see such hypotension in paracetamol overdose but is feasible in a massive overdose and usually associated with lactic acidosis.

It is too early to carry out paracetamol levels as these should be carried out at four hours.

Although he states that he has taken 18 g of paracetamol this may not be the case and he may not require N-acetyl cysteine. You can wait. In fact the benefit of N-acetyl cysteine is maximum as long as it is given within eight hours of ingestion. Its benefit extends up to 24 hours.
An elevated international normalised ratio (INR) gives an indication of hepatocellular damage and again this will not be seen at presentation of paracetamol overdose.

Further Reading:

Work Smart

Question 35 of 200

Which of the following reactions is involved in the metabolism of paracetamol under normal conditions?

(Please select 1 option)

- Acetylation
- Conjugation to glucuronic acid
- Conjugation to glutathione
- Cytochrome p450 dependent oxidation
- Hydrolysis

Paracetamol is conjugated to glucuronic acid and sulphate under normal conditions.

In overdose these processes become saturated and the drug is then conjugated with glutathione.

If the glutathione supply is depleted then a toxic metabolite is formed.
Work Smart

Question 7 of 70

Which one of the following is a recognised treatment option in poisoning?

(Please select 1 option)

- Ethanol for isopropyl alcohol poisoning
- Glucagon for cocaine poisoning
- Methylene blue for cyanide poisoning
- N-acetylcysteine in paraquat poisoning
- Pralidoxime in sarin (nerve gas) poisoning

Sarin is an organophosphorus.

Pralidoxime reactivates acetyl cholinesterase enzyme. It should be used in the first few hours.

Ethanol reduces the formation of toxic metabolites produced after ingestion of methanol and ethylene glycol, but not isopropyl alcohol.

Glucagon is used in symptomatic beta blocker overdose.

N-acetylcysteine is used in paracetamol overdose.

Methylene blue is the antidote for serious methaemoglobinaemia.
A 58-year-old man has a history of obesity, gastro-oesophageal reflux disease, low back pain, and IHD. He presents with large, itchy weals over the trunk and limbs and a sensation of tightness in the throat. Which one of the following drugs is the most likely to have triggered this skin eruption?

(Please select 1 option)

- Aspirin  □ Correct
- GTN (nitrate) spray
- Omeprazole
- Paracetamol
- Simvastatin

In hypersensitive patients aspirin can cause:

- angioedema
- bronchospasm, and
- urticaria (skin rashes).
A young woman has acne and is taking oral medication. She develops polyarthritis and has raised liver enzyme tests.

Investigations show:

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Which of the following drugs is she most likely to have been prescribed?

(Please select 1 option)

- [ ] Erythromycin
- Isotretinoin
- [ ] Minocycline
- Oxytetracycline
- Trimethoprim
All other drugs listed above can be used in the treatment of acne. All of these can cause hepatotoxicity, and therefore raised alanine aminotransferase (ALT) and aspartate aminotransferase (AST).

Minocycline is the only drug listed which can account for the polyarthritis and antinuclear antibody (ANA), due to its ability to cause drug-induced lupus erythematosus.

Classically, drug-induced lupus erythematosus is characterised by

- Systemic disease with a lower incidence of nephritis
- Lack of cutaneous involvement and
- The presence of antihistone antibodies

The most commonly associated drugs have historically been procainamide and hydralazine, although their use is now decreasing. Medications associated more recently include the anti-TNF alpha agents, statins and minocycline.

Minocycline is unusual in that it seems to be associated with the development of long term immunological memory, and therefore exacerbation of symptoms within 12-24 hours of rechallenge.

Minocycline has been well documented as a cause of drug-induced systemic lupus erythematosus (SLE). Characteristically, the erythrocyte sedimentation rate (ESR) and C reactive protein (CRP) are both markedly elevated, the ANA is strongly positive and there is a hypergammaglobulinaemia.

Anti-dsDNA antibodies are usually negative; antihistone antibodies are positive in 95% of drug-induced lupus (but also 50-80% of idiopathic SLE). A strongly positive ANA is a risk factor for developing drug-induced lupus, but a negative ANA would not exclude the diagnosis.

Drug-induced lupus is defined as a lupus-like syndrome temporally related to continuous drug exposure which resolves after discontinuation of the offending drug.

There are several features which distinguish drug-induced lupus from idiopathic SLE:

- Males and females are equally affected in drug-induced lupus, whereas idiopathic SLE affects females nine times more frequently.
- Caucasians are affected by drug-induced lupus more commonly than Afro-Caribbeans, whereas the inverse is true of idiopathic SLE.
- In addition, the age of onset is typically older in drug-induced lupus, but this depends on the age at drug exposure.
- Fever, arthralgia, serositis and ANA occur at least as frequently in drug-induced lupus as idiopathic SLE.
- Haematological, renal and central nervous system (CNS) involvement, and double-stranded DNA autoantibodies are rare.
The pathogenesis of drug-induced lupus is unclear. Factors that influence drug metabolism, such as acetylator status, have been implicated. In addition, lupus-inducing drugs have been shown to generate a variety of cytotoxic products on exposure to MPO released from activated neutrophils.

The time taken for symptoms to resolve after stopping minocycline is highly variable, from a few days to two years. Typically, no further treatment is required but there are situations where corticosteroids or disease modifying antirheumatic drugs (DMARDs) are required to aid resolution.

Reference:

A 64-year-old man has terminal cancer with hepatic metastases. He is treated with oral morphine (Oramorph) solution for pain relief.

Which is the most important pharmacokinetic factor in determining the appropriate timing between doses?

(Please select 1 option)

- Bioavailability
- First pass metabolism
- Gastric emptying
- **Plasma half-life**
- Renal clearance

Morphine undergoes extensive first pass metabolism in the liver. However, it is the plasma half-life which defines the timing of the doses.

An increased dose may be required if the patient develops tolerance to the morphine dose.
A 24-year-old man presents with a headache that has been present for nine months. He has headache almost every day, mainly frontal, sometimes with nausea.

Current medication includes paracetamol, brufen and codeine with only transient relief of symptoms. He has a history of depression. Examination was normal.

What is the most likely diagnosis?

(Please select 1 option)

- Analgesic misuse headache [Correct]
- Cluster headache
- Frontal brain tumour
- Headache due to depression
- Migraine

This is one of the commonest causes of chronic daily headache (the commonest is chronic tension type headache).

It is commonly caused by the chronic use of analgesics such as codeine phosphate and paracetamol.

Treatment consists of reducing the amount of analgesics gradually until stopped.
A 26-year-old male epileptic is admitted with temperature and rash.

Over the last one week, a rash has developed and he has become increasingly ill. Recently he has had some problems with epileptic control and has commenced carbamazepine with valproate.

Examination reveals an unwell patient with a temperature of 39°C, a diffuse erythematous, painful rash with evidence of some lateral sliding of these erythematous areas on palpation.

There is also blistering and inflammation of the oral cavity.

Which is the likely diagnosis?

(Please select 1 option)

- Erythema elevatum diutinum
- Exfoliative dermatitis
- Pustular psoriasis
- Toxic epidermal necrolysis
- Toxic shock syndrome

This patient's presentation and clinical description suggests a diagnosis of toxic epidermal necrolysis (TEN) due to carbamazepine therapy.

TEN is a severe mucocutaneous exfoliative disease with an uncertain pathogenesis and a high mortality rate.
It is difficult to say whether it is another variant of Stevens-Johnson syndrome and treatment of both are similar.

It is often idiopathic but may be associated with:

- viral infections
- leukaemia
- lymphoma, and
- drugs (in particular sulphonamides and anticonvulsants).

The suggested association with carbamazipine in this case makes toxic shock syndrome due to *Staph. aureus* remote which, like pustular psoriasis, would not be expected to affect the mucous membranes.
Work Smart

Question 42 of 200

You are asked to advise on analgesia for a 44-year-old woman with acute intermittent porphyria who has undergone wisdom teeth extraction.

Which of the following drugs is safe for use in her treatment?

(Please select 1 option)

- Cephalexin
- Cetirizine
- Diclofenac
- Erythromycin
- Ibuprofen

Many drugs may induce acute porphyric crises thus great care must be taken when prescribing for patients with acute porphyria.

Drugs unsafe for use in acute porphyria include

- Barbiturates
- Tricyclic antidepressants
- Monoamine oxidase inhibitor (MAOIs)
- Amphetamines
- Anabolic steroids
- Hormone replacement therapy
- Benzodiazepines
Diuretics
- Captopril
- Cephalosporins
- Erythromycin
- Isoniazid
- Sulphonamides
- Sulphonylureas
- Theophylline
- Antihistamines
- Nifedipine
- Verapamil
- Amiodarone
- Simvastatin.

Ibuprofen is safe for use in acute intermittent porphyria, but diclofenac should be avoided.
A 58-year-old woman presented with unsteadiness and ataxia and gave a recent history of nausea and epigastric pain for which she had been prescribed an antacid and cimetidine.

She was an epileptic and had been well controlled with phenytoin for eight years. She had been also been prescribed amitriptyline for depression, was receiving post-menopausal hormone replacement therapy and was self-medicating with St John's wort.

Which of the following drugs is most likely to be responsible for her presentation?

(Please select 1 option)

- Amitriptyline
- Antacid
- Cimetidine  □ Correct
- Estradiol
- St John's wort

This patient has developed phenytoin toxicity which has been precipitated by cimetidine which inhibits cytochrome P450 metabolism of phenytoin.

Phenytoin concentration is reduced by St John's wort and is unaffected by amitriptyline which would however reduce seizure threshold; antacids may reduce phenytoin absorption and oestradiol metabolism may be increased by phenytoin.
Work Smart

Question 43 of 200

A 60-year-old male is brought to the Emergency Department in the early hours of the morning after being found unconscious in the street.

On examination, he was drowsy but localised to painful stimuli. There was no evidence of head injury or meningism.

Investigations revealed:

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<td>Potassium</td>
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<td>Plasma osmolality</td>
<td>385 mosmol/kg</td>
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Which is the most likely explanation for his presentation?

(Please select 1 option)

- [ ] Diazepam poisoning
- [x] Ethanol poisoning  □ This is the correct answer
This man is intoxicated.

He has a normal acid base balance, slight hyponatraemia reflecting dilution, and very high osmolality reflecting the presence of ethanol.

Methanol would produce an acidosis.

Diazepam is not an osmolyte nor would the other agents produce this picture.
A 30-year-old man is admitted three hours after taking an overdose of amitriptyline and diazepam. On examination he was drowsy with a Glasgow coma scale of 8; he had a pulse of 140 beats per minute, a blood pressure of 114/88 mmHg, and dilated pupils. His oxygen saturation was 90% on room air.

Which is the most appropriate initial action for this patient?

(Please select 1 option)

- Activated charcoal
- CT head scan
- ECG ✅ Correct
- IV atenolol
- IV flumazenil

Obviously this patient with a markedly reduced GCS needs basic resuscitation. However, the most appropriate initial action specifically for his overdose would be to get the investigations (arterial blood gases and ECG) done as quickly as possible, as the latter may show QRS widening and merit treatment.

Gastric decontamination with lavage and activated charcoal is used if the patient presents within one hour of overdose.

Treatment with bicarbonate is also advocated as this patient displays features of severe TCA...
overdose. The aim is to get the pH >7.4.

He does not need a CT scan as the symptoms are typical of tricyclic overdose.

Flumazenil is not appropriate for this patient as the symptoms are mostly of TCA overdose nor is IV atenolol appropriate for the arrhythmias. A number of studies have shown that in cases of mixed benzodiazepine and tricyclic overdose, flumazenil can unmask the convulsant properties of TCAs and increase the severity of arrhythmias induced by them.

The arrhythmias induced by TCAs often respond to sodium bicarbonate, but if they do not, intravenous glucagon can be used. Adrenaline and magnesium sulphate can also be used.
A 40-year-old ex-footballer presents requesting treatment for alcoholism and is prescribed disulfiram.

What is the mode of action of disulfiram?

(Please select 1 option)

- Decreases severity of alcohol withdrawal
- Helps alcoholics to drink safely
- Inhibits acetaldehyde dehydrogenase activity [Correct]
- Inhibits alcohol dehydrogenase activity
- Reduces the desire for alcohol

Alcohol is mainly metabolised in the liver to acetaldehyde by alcohol dehydrogenase.

Acetaldehyde is then oxidised to acetate by acetaldehyde dehydrogenase (AcDH).

Disulfiram irreversibly inhibits the oxidation of acetaldehyde by competing with the cofactor nicotinamide adenine dinucleotide (NAD) for binding sites on (AcDH).

The increased acetaldehyde levels are thought to produce the unpleasant side effects associated with acetaldehyde syndrome such as headaches, nausea, flushing etcetera.
Partial opioid agonists (for example, buprenorphine), when used in association with morphine, may produce a reduction in the analgesic effect due to partial antagonism.

Partial agonists are those compounds which can activate receptors but are unable to elicit the maximal response. Buprenorphine acts as one by having high affinity for, but low activity at, mu receptors. Its high affinity means it can displace full opioid agonists (such as morphine) from the mu receptor, and therefore they cannot exert their fully opioid effect (i.e. buprenorphine is acting as an antagonist in this sense).

This is an aspect of pain management that needs to be considered when using combination therapies.
A 60-year-old woman presents with raised, erythematous lesions on the limbs and blistering in the mouth and eyes. She had been taking a number of drugs prescribed by her GP.

Which may be responsible for her presentation?

(Please select 1 option)

- Nifedipine
- Paracetamol
- Paroxetine
- Prednisolone
- **Sulfasalazine**  □ Correct

This is a typical case of Stevens-Johnson syndrome.

Stevens-Johnson syndrome (SJS) is an immune-complex-mediated hypersensitivity complex that is a severe expression of erythema multiforme. It is now known also as erythema multiforme major.

SJS typically involves the skin and the mucous membranes. While minor presentations may occur, significant involvement of:

- oral
- nasal
- eye
- vaginal
- urethral
- gastrointestinal (GI), and
- lower respiratory tract mucous membranes

may develop in the course of the illness.

GI and respiratory involvement may progress to necrosis.

SJS is a serious systemic disorder with the potential for severe morbidity and even death.

The drugs most closely associated with causing Stevens-Johnson syndrome are:

- antibacterials
- sulfonamides
- anticonvulsants (oxicam)
- non-steroidal anti-inflammatory agents (piroxicam and tenoxicam)
- chloramezalone, and
- allopurinol.
Question 47 of 200

A 55-year-old male presented six hours after taking an overdose of lithium tablets which had been prescribed for a bipolar affective disorder.

On examination he was tremulous, had suffered a convulsion and had a Glasgow coma scale of 12/15. His serum lithium concentration was 5.0 mmol/L (0.5-1.0)

Which of the following options is the most appropriate management of this patient?

(Please select 1 option)

- Activated charcoal
- Forced alkaline diuresis
- Furosemide 100 mg intravenously twice daily
- Haemodialysis  □ Correct
- Measure lithium concentration in two hours

The patient has a severe lithium overdose as reflected by markedly elevated lithium concentrations and features of impaired consciousness, tremor, and seizures.

Lithium has a narrow therapeutic range (0.5-1.0 mmol/L), and toxic effects are seen at levels above 1.0 mmol/L. Toxicity is more likely where there is electrolyte imbalance, or renal impairment. Some drugs also impair lithium excretion, in particular thiazide diuretics, ACE inhibitors, and NSAIDs.

At levels of 1-2 mmol/L lithium toxicity results in:
• anorexia
• vomiting
• ataxia
• dysarthria
• blurring of vision
• coarse tremor
• diarrhoea
• drowsiness, and
• muscle weakness.

Higher levels, as seen here, result in severe toxicity which is characterised by:

• circulatory failure
• coma
• convulsions
• hyper-reflexia
• oliguria
• psychosis, and
• death (in severe cases).

Mild to moderate toxicity (levels less than 2 mmol/L) can be treated with normal saline fluid resuscitation. Severe cases require haemodialysis. Sodium bicarbonate used to alkalinise urine has been suggested to increase lithium excretion, but there is little evidence of benefit. 10% of patients who survive severe lithium toxicity will be left with a neurological deficit.

Activated charcoal does not bind lithium effectively and is therefore ineffective except where co-ingestion of other poisons is suspected.

Furosemide is likely to decrease lithium excretion and is therefore inappropriate.

Measuring lithium concentration in two hours would be negligent because treatment needs to be initiated immediately.
Work Smart

Question 48 of 200

An 18-year-old female presents 12 weeks into an unplanned pregnancy.

She had been diagnosed with epilepsy six years ago which was well controlled on sodium valproate and had been taking the combined oral contraceptive pill for three years.

Which of the following is correct concerning this patient?

(Please select 1 option)

- Lamotrigine should be substituted for sodium valproate
- She should be advised to have a termination of her pregnancy
- Sodium valproate interaction with the oral contraceptive increased the risk of pregnancy
  Incorrect answer selected
- The dose of sodium valproate should be increased
- There is an increased risk of a neural tube defect in her fetus

This patient has become pregnant on valproate. This therapy has controlled her seizures and should not be changed now.

However, there is an increased risk of neural tube defects associated with valproate and this could have been reduced by folate therapy early in pregnancy (NTD’s occur in the first month of pregnancy).

Valproate is not an enzyme inducer and unlike other anticonvulsants would not speed up metabolism of the OCP.
It is entirely up to the individual whether she wishes to pursue the pregnancy or not.

Answer Statistics

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| 2 | 2% |
| 3 | 18% |
| 4 | 3% |
| 5 | 70% |

Times answered: 9850

Test Analysis

Correct Incorrect Partially Correct

Score: 45.83%
Total Answered: 48

Feedback
Work Smart

Question 11 of 70

A 62-year-old female presents with deteriorating arthralgia associated with longstanding rheumatoid arthritis. She was prescribed celecoxib in place of naproxen.

Which of the following concerning celecoxib is correct?

(Please select 1 option)

1. Anti-inflammatory effects of celecoxib are superior to those of naproxen
2. Celecoxib acts by inhibiting a different enzyme than naproxen
3. Celecoxib has a lower level of anti-platelet activity than naproxen
4. Celecoxib is associated with reduced hepatotoxicity compared with naproxen
5. Co-treatment with diuretic can be given more safely than with naproxen

Celecoxib is a selective cyclo-oxygenase(COX)-2 inhibitor differing from the other non-steroidal anti-inflammatory drugs (NSAIDs) such as naproxen which affects both COX-1 and COX-2.

COX-1 is involved in platelet aggregation and inhibition of this by the NSAIDs produces its beneficial cardiovascular effects. However platelet aggregation is not affected by COX-2.

Naproxen and celecoxib have been shown to be as effective at reducing inflammation. One of the benefits of celecoxib is its reduced incidence of upper gastrointestinal side effects.

As with the non-specific NSAIDS, hepatotoxicity may occur with the COX-2 specific inhibitors resulting in cholestatic, hepatocellular or mixed liver injury. Rates seem to be comparable between
the traditional NSAIDs and the COX-2 selective inhibitors.

Co-administration of diuretics and COX-2 inhibitors should be avoided if possible, as COX-2 inhibitors may reduce the antihypertensive and diuretic effects of diuretics. This may be due to impaired prostaglandin synthesis, which results in salt and water retention. In addition, COX-2 inhibitors have nephrotoxic effects which can be exacerbated by diuretics.

Rofecoxib (Vioxx) has been withdrawn due to its increased cardiovascular events compared with naproxen. The cardiovascular effects of the COX-2 inhibitors remains under study, and care should be taken before prescribing them to patients with a past medical history of significant cardiovascular disease.

References:

Work Smart

Question 49 of 200

An 18-year-old woman presents three days after allegedly taking 50 paracetamol tablets (25 g).

Which of the following tests measured at this time point would be most helpful in determining the outcome?

(Please select 1 option)

- ALT concentration
- Bilirubin concentration
- Creatinine concentration
- Paracetamol concentration
- Prothrombin time ☑ Correct

The patient has ingested a seriously toxic dose of paracetamol.

The best determinant of this risk at 72 hours would be a prolonged prothrombin time.

Paracetamol concentrations would be rather meaningless at this point in time, and irrespective, she should be treated with N-acetylcysteine.

There are four phases of paracetamol overdose.

Phase 1 (0-24 hours):

- asymptomatic
- anorexia
• nausea or vomiting
• malaise, and
• subclinical rise in serum aspartate transaminase (AST) - 12 hours post ingestion.

Phase 2 (18-72 hours):

• right upper quadrant abdominal pain, anorexia, nausea, vomiting, and
• continued rise in serum transaminases levels (note this is the time slot for our patient with the alanine transaminase [ALT] rises).

Phase 3 (72-96 hours):

• centrilobular hepatic necrosis with continued abdominal pain
• jaundice
• coagulopathy
• hepatic encephalopathy
• nausea and vomiting
• renal failure, and
• fatally rising international normalised ratio/prothrombin time (INR/PT) from three days.

Phase 4 (four days to three weeks):

• complete resolution of symptoms, and
• complete resolution of organ failure.

Answer Statistics

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Times answered: 9016

Test Analysis

Correct | Incorrect | Partially
A 16-year-old girl is brought to the Emergency Department after having taken drugs at a rave.

Which of the following suggests that she has taken Ecstasy (MDMA)?

(Please select 1 option)

- Hypernatraemia
- Metabolic acidosis
- Pin-point pupils
- Pyrexia  □ This is the correct answer
- Respiratory depression  □ Incorrect answer selected

The features of Ecstasy overdose include:

- hyperthermia
- hypertension
- hyponatraemia due to polydipsia associated with syndrome of inappropriate antidiuretic hormone (SIADH), and
- respiratory alkalosis.

Pin-point pupils suggest opiates.
Work Smart

Question 51 of 200

A 60-year-old man who has been prescribed lisinopril for hypertension presents with an irritating cough.

What is the mechanism responsible for ACE-induced cough?

(Please select 1 option)

- Angiotensin I accumulation
- Asthma
- Bradykinin accumulation □ Correct
- Laryngeal irritation
- Renin accumulation

The enzyme ACE is also responsible for the metabolism of bradykinin in mast cells.

The accumulation of this substance is responsible for the cough found in up to 30% of subjects taking ACE-inhibitors.

This phenomenon is not seen in subjects taking angiotensin receptor blockers such as losartan.
Infliximab is a monoclonal antibody to tumour necrosis factor (TNF) alpha. It is recommended by NICE for adults with rheumatoid arthritis who have both the following:

- active rheumatoid arthritis as measured by disease activity score greater than 5.1 on at least two occasions one month apart, and
- undergone trials of two disease-modifying anti-rheumatic drugs including methotrexate (unless contraindicated); defined as six months of therapy with two months at standard dose (unless toxicity has limited treatment).

Before starting therapy and throughout treatment, patients should be evaluated carefully for tuberculosis as there have been reports of the onset or reactivation of TB including miliary TB and some unusual extrapulmonary TB.

Infliximab should normally be used in combination with methotrexate and requires intravenous
infusion in a hospital setting.

If a patient is intolerant of methotrexate, adalimumab (humanised anti-TNF antibody) and etanercept (anti-TNF receptor antibody) are alternatives to infliximab which can be given as monotherapy.

Response to treatment is assessed at six months, and only continued if there is an improvement in disease activity score of 1.2 points or more. Treatment is typically initiated with the least expensive drug, and the other agents only used if there is toxicity.

In addition, infliximab has a role to play in refractory Crohn’s disease.

Some other monoclonal antibodies in clinical use include:

- **Digibind** - Digoxin-binding antibody for treatment of overdoses (increases clearance).
- **Abciximab** - Glycoprotein IIbIIIa receptor (for unstable angina).
- **Pexelizumab** - Anti-C5 (complement) - anti-inflammatory: reduces myocardial infarction and death following coronary artery bypass graft (CABG) and angioplasty.

Reference:

NICE. Adalimumab, etanercept and infliximab for the treatment of rheumatoid arthritis (TA130).
Work Smart

Question 12 of 70

A 60-year-old retired nurse with idiopathic Parkinson's disease presented with motor oscillations and on-off periods. She had received Co-Beneldopa for 5 years. Selegiline was added to her treatment.

Which one of the following enzymes does Selegiline act on to cause this adjuvant action?

(Please select 1 option)

- Catechol-0-methyltransferase
- Dopa decarboxylase
- Dopamine hydroxylase
- Monoamine oxidase
- Tyrosine hydroxylase

Selegiline is a MAO-B inhibitor.
Work Smart

Question 53 of 200

A 17-year-old female presents with three headaches over a six month period. She describes the headaches as severe, right-sided and lasting for twelve hours and associated with nausea and photophobia. Each is preceded by spots before her eyes.

What is the most appropriate initial treatment for this patient?

(Please select 1 option)

- Diclofenac at the onset of the next attack
- Ergotamine suppository at the onset of the next attack
- Paracetamol plus metoclopramide at the onset of the next attack  ☑ Incorrect answer
- Prophylaxis with propranolol
- Sumatriptan at the onset of the next attack  ☐ This is the correct answer

This history is consistent with a migraine.

NICE guidelines state that an oral triptan and an NSAID or paracetamol should be used for the acute treatment of migraine. If these are not tolerated or ineffective, non-oral preparations of metoclopramide, prochlorperazine, NSAIDs or triptans can be used.

Prophylactic topiramate or propranolol can be used if the attacks are numerous or debilitating. Topiramate is associated with foetal malformations, and therefore it should be offered in conjunction with appropriate contraception.
Reference:
NICE. Headaches (CG150).

Answer Statistics

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Times answered: 8311

Test Analysis

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Score: 47.17%

Total Answered: 53

Feedback
Question 54 of 200

A 55-year-old female presents with tremor of the hands which has been present for approximately five years.

She has a past medical history which includes anxiety and she receives salbutamol for asthma.

Examination revealed titubation and an upper limb postural tremor.

What is the most likely diagnosis?

(Please select 1 option)

- Anxiety disorder
- Benign essential tremor  ☑️ Correct
- Multiple sclerosis
- Parkinson's disease
- Salbutamol induced tremor

Anxiety and drugs (for example, salbutamol, sodium valproate, theophylline, amiodarone) are commonly associated with tremor of the limbs.

However, head tremor (titubation) is unusual. Essential tremor is the commonest cause of head tremor, and can be reduced with propranolol.

Parkinson's disease is associated with rest tremor but not titubation.

Multiple sclerosis is associated with titubation and intention tremor.
A 16-year-old male presents with a five year history of absence seizures with three recent generalised convulsions.

Which one of the following drugs, given as monotherapy, is most likely to control his seizures?

(Please select 1 option)

- Clonazepam
- Ethosuximide
- Gabapentin
- Sodium Valproate
- Topiramate

Absences, generalized tonic clonic seizures and myoclonus are features of primary generalized epilepsy. The treatment of choice includes sodium valproate, lamotrigine and topiramate.

Clonazepam is useful in myoclonus, ethosuximide in isolated absences and gabapentin in partial seizures.

Valproate would be the most appropriate first line agent.
A 30-year-old female was commenced on carbamazepine for partial complex seizures and was also advised to discontinue her moderate alcohol consumption.

Therapeutic concentrations of carbamazepine were achieved within four days with a dose of 200 mg daily but the dose needed to be increased to 400 mg daily within two weeks to achieve a therapeutic plasma concentration.

Which one of the following is likely to account for this observation?

(Please select 1 option)

- Auto-induction of carbamazepine metabolism
- Auto-inhibition of carbamazepine metabolism
- Cessation of alcohol intake
- Concomitant prescription of the oral contraceptive pill
- Reduced bioavailability of carbamazepine

Alcohol is a liver enzyme inducer therefore stopping the alcohol should increase the activity of the carbamazepine not reduce its activity.

It is well recognised that carbamazepine is a P450 enzyme inducer but it is less well appreciated that it causes auto-induction and so would require increase in dose to maintain the same therapeutic concentration.

Further Reading:
A 15-year-old girl was admitted eight hours after taking an overdose of diazepam 30 mg and methotrexate 400 mg which her mother had been prescribed for rheumatoid arthritis.

On examination her Glasgow coma score (GCS) was 14, respiratory rate is 14 and saturations 96% on air.

Which one of the following is the most appropriate action?

(Please select 1 option)

- Treat with flumazenil
- Perform immediate gastric lavage
- Treat with activated charcoal
- Treat with folinic acid
- Urgent liver function tests

Methotrexate is a folic acid antagonist which can result in multi-organ failure in overdose. Folinic acid is the antidote and should be given intravenously as soon as possible, regardless of the liver function tests.

It is too late to consider gastric lavage or activated charcoal.

Flumazenil is a benzodiazepine receptor antagonist which is usually only given for patients with depressed respiratory function in the context of a benzodiazepine overdose.
Question 56 of 200

A 17-year-old girl presents following an overdose of paracetamol, her parents having found her with empty packets of paracetamol.

She states that she has taken ten tablets, three hours earlier.

Which is the most appropriate step in this patient’s management?

(Please select 1 option)

- Administer oral activated charcoal 50 g
- Give N-Acetylcysteine intravenously
- Measure plasma paracetamol concentration at four hours after ingestion  □ Correct
- Transfer to young person's psychiatric unit immediately
- Take no immediate action

Current guidance suggests that this patient should have blood paracetamol levels (plus U+E, LFT, bicarbonate, FBC, INR) taken at four hours. Her level should be measured against the risk algorithm (available in the BNF for Children and on Toxbase).

Consider administration of activated charcoal if more than 150 mg/kg paracetamol has been taken within one hour of presentation to hospital.

Further Reading:

College of Emergency Medicine. [Paracetamol Overdose](#).


Answer Statistics

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Times answered: 9535

Test Analysis

Correct Incorrect Partially
Correct

Score: 48.21%

Total Answered: 56
Work Smart

Question 57 of 200

A 52-year-old woman takes lithium carbonate for manic depression and also takes codeine and diclofenac prescribed by her GP for osteoarthritis.

Which one of the following statements is correct?

(Please select 1 option)

- Codeine will reduce the bioavailability of lithium
- The analgesic effect of codeine will be reduced by co-administration of diclofenac
- The nephrotoxicity of diclofenac will be increased in this patient
- Plasma lithium concentration will be increased by codeine
- Plasma lithium concentrations will be raised by diclofenac

Diclofenac decreases renal lithium clearance and increases lithium concentrations.

Codeine and diclofenac are frequently co-prescribed.
A 17-year-old girl presents after having ingested 50 of her mother's fluoxetine tablets, approximately five hours previously.

Which one of the following clinical features is compatible with this history?

(Please select 1 option)

- Heart rate of 30 beats per minute
- Pupillary constriction
- QRS duration of 120 ms (<100)
- Respiratory rate of six breaths per minute
- Vomiting  □ Correct

Unlike the tricyclic antidepressants, fluoxetine, like many of the SSRIs are safe in overdose and cause very few adverse effects.

Rarely, reports would suggest that tachycardia can occur together with:

- tremor
- drowsiness
- nausea, and
- vomiting.

Pupillary constriction or respiratory suppression suggests opiates.
Prolonged QRS complex is consistent with TCA overdose.

Answer Statistics

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Times answered: 9494

Test Analysis

Correct Incorrect Partially Correct

Score: 48.28%
Total Answered: 58

Feedback
A 45-year-old male attends for an insurance medical and is in good health. Examination was normal but investigations reveal that he has a serum urate concentration of 0.55 mmol/L (0.25-0.45).

Which of the following is the most appropriate management for this patient?

(Please select 1 option)

- Lifestyle advice  Correct
- Start allopurinol
- Start colchicine
- Start diclofenac
- Start prednisolone

The most appropriate treatment for this asymptomatic man with an isolated slightly elevated urate is lifestyle advice with an appropriately reduced purine diet, increased exercise and reduced alcohol consumption.
Work Smart

Question 60 of 200

A 52-year-old man presented to the emergency unit with a two day history of increasing breathlessness, productive cough and fever. He was previously fit and well with no past history of note. He was not a cigarette smoker.

On examination he was febrile, temperature was 38.5°C, pulse rate 100/ minute and regular, blood pressure 120/80 mmHg and respiratory rate of 25 breaths/ minute.

Investigations showed:

<table>
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<tr>
<th>Test</th>
<th>Result</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hb</td>
<td>150 g/L</td>
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<tr>
<td>WBC</td>
<td>18.5 ×10⁹/L</td>
<td>(4-11)</td>
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<tr>
<td>Platelets</td>
<td>350 ×10⁹/L</td>
<td>(150-400)</td>
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<tr>
<td>Serum sodium</td>
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<td>Serum potassium</td>
<td>4.5 mmol/L</td>
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<td>Serum urea</td>
<td>5.1 mmol/L</td>
<td>(2.5-7.5)</td>
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<tr>
<td>Serum creatinine</td>
<td>110 µmol/L</td>
<td>(60-110)</td>
</tr>
<tr>
<td>PaO2</td>
<td>9.0 kPa</td>
<td>(11.3-12.6)</td>
</tr>
</tbody>
</table>

Chest x ray showed right middle lobe consolidation.

What is the most appropriate choice of antibiotics?

(Please select 1 option)

- Amoxicillin  □ Correct
This gentleman has community-acquired pneumonia.

Community-acquired pneumonia (CAP) is defined as symptoms and signs consistent with an acute lower respiratory tract infection associated with new radiological signs consistent with consolidation, not explained by another cause.

The severity of each case of CAP should be assessed using the CURB-65 tool in conjunction with clinical judgment. Patients score 1 point for each of:

- confusion
- urea >7 mmol/L
- respiratory rate ≥30/min
- blood pressure: systolic <90 or diastolic ≤60 mmHg, and
- age ≥65 years.

A CURB-65 score of 0 or 1 (as in this case) are at low risk of death and can be treated at home if the social circumstances are compatible.

A score of 2 usually indicates inpatient treatment is required, but hospital-supervised outpatient treatment can be considered.

Patients who have a CURB-65 score of 3 or more are at high risk of death.

Those with scores of 4 and 5 should be considered for treatment in a critical care unit (HMU, ITU).

In the majority of patients CAP should be confirmed by chest radiography before the commencement of antibiotics. However, if patients are critically unwell they should be treated for the presumptive diagnosis. Antibiotic treatment should be initiated within four hours of presentation.

- Low severity CAP (CURB 0-1) can be treated with amoxicillin 500 mg TDS PO.
- CURB 2 CAP should be treated with amoxicillin 500 mg-1g TDS and clarithromycin 500 mg BD. Alternatives are available if patients are allergic to any of the above combinations.
- High severity CAP (CURB 3-5) should be treated as soon as possible with co-amoxiclav 1.2 g TDS and clarithromycin 500 mg BD.

The oral route is recommended in those with low and moderate severity CAP. Patients treated with
parenteral antibiotics initially should be switched to an oral regimen once clinical improvement is seen and the patient has been afebrile for at least 24 hours.

For most patients with uncomplicated CAP seven days of antibiotic treatment is recommended. For those with high severity pneumonia where an organism has not been identified, 7-10 days treatment is indicated and extended to 14-21 days where clinically needed.

Further Reading:

Question 61 of 200

A 33-year-old female is admitted with erythema multiforme (EM) and erythematous lesions of the mouth and eyes.

Which one of the following drugs may account for her presentation?

(Please select 1 option)

- Diazepam
- Fluoxetine
- Mebeverine
- Oral contraceptive
- Sulfasalazine **Correct**

Many drugs have been implicated in the development of erythema multiforme, and the Stevens-Johnson syndrome subtype.

Most commonly associated is allopurinol.

Also associated are:

- recent drugs - nevirapine, lamotrigine, sertraline, pantoprazole, tramadol
- antibiotics - sulphamides, co-trimoxazole, penicillin, cephalosporins, fluoroquinolones, vancomycin
- NSAIDs - piroxicam, fenbufen, ibuprofen, ketoprofen, naproxen, tenoxicam, diclofenac, sulindac
- anti-TB - rifampicin, ethambutol, isoniazid, pyrazinamide
• anticonvulsants - barbiturates, carbamazepine, phenytoin, valproate, lamotrigine
• antifungals - fluconazole, nystatin, griseofulvin, and
• antidepressants - lamotrigine, sertraline.

Of the options given, sulphasalazine is the most commonly associated.

Reference:
Patient.info. Erythema Multiforme.
A 20-year-old man presented after ingesting a drug at a party. Investigations revealed a serum creatine kinase of 10,000 IU/L (NR 24-195).

Which one of the following drugs is most likely to have been responsible?

(Please select 1 option)

- Cannabis
- Diazepam
- Ecstasy (MDMA)  Correct
- Gamma hydroxybutyrate (GHB)
- Ketamine

Symptoms of an acute MDMA toxic reaction include:

- Agitation
- Tachycardia
- Hypertension
- Dilated pupils
- Trismus, and
- Sweating.

More severe cases may be characterised by:
• Hyperthermia
• Disseminated intravascular coagulation (DIC)
• Rhabdomyolysis, and
• Acute renal failure.

In more severe cases, elevated creatine kinase levels are often present, with levels as high as 555,000 IU/L being reported.

Neither GHB nor ketamine are associated with elevated CK levels.

Phencyclidine (PVP) is another drug which may cause an elevated CK in overdose.

Answer Statistics

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Times answered: 9180

Test Analysis

Correct Incorrect Partially
Correct
A 75-year-old male is diagnosed with a Lewy body dementia.

Which of the following drugs would be contraindicated for this patient?

(Please select 1 option)

- Chlormethiazole
- Donepezil
- Haloperidol  □ Correct
- L-Dopa
- Selegiline

Diffuse Lewy body disease is the third commonest cause of dementia (after Alzheimer’s disease and vascular dementia). It presents with cognitive Impairment, visual hallucinations, and parkinsonism.

A common manifestation of the disease is severe neuroleptic treatment intolerance, which can be fatal.
Work Smart

Question 64 of 200

A 64-year-old woman presented 10 hours after ingestion of 12 g of quinine sulphate.

Which of the following is the most common characteristic clinical feature in this situation?

(Please select 1 option)

- Blindness  □ This is the correct answer
- Bradycardia  □ Incorrect answer selected
- Hyperacusis
- Hyperglycaemia
- Hypotension

The major toxic effects of quinine are on the nervous system, in particular the optic and auditory nerve. It is also particularly toxic on retinal photoreceptor cells, and causes vasoconstriction and spasm of the retinal artery. Blurred vision can proceed to complete blindness, which is characteristic of overdose. Initial signs are narrowing of the retinal arterioles on fundoscopy. Later there is retinal oedema, and the pupils become dilated and unresponsive to light.

Effects on the auditory nerve may cause tinnitus and deafness, but not hyperacusis.

Initially quinine causes generalised stimulation of the central nervous system, leading to tachycardia, fever, delirium and tachypnoea. In severe overdose it can then cause myocardial depression, peripheral vasodilatation and widened QRS with prolonged QTc and risk of VT, torsade and VF.

In addition, renal failure, haemolytic anaemia and gastrointestinal disturbance can develop. At very
high plasma levels, sinoatrial block and high-degree atrioventricular block may be seen. Hypotension may occur secondary to quinine's alpha-blocking effect, but is not as characteristic as blindness.

Additional features include:

- nausea
- vomiting
- headache
- seizures
- fatigue
- tremor, and
- ataxia.

Hyperglycaemia is not characteristic.

Management is with activated charcoal and gastric lavage, if presentation is early enough. Bradycardia can be treated with atropine or pacing. Bicarbonate is considered for a prolonged QRS (>120 ms), aiming for a pH of 7.45-5. Haemodialysis can also be used to clear the quinine. There is no specific treatment for visual disturbance.

Answer Statistics

1 24%
2 32%
3 23%
4 8%
5 12%

Times answered: 8747

Test Analysis

Correct Incorrect Partially Correct
A 17-year-old woman presented six hours after taking 30 g of paracetamol.

Which of the following factors is most likely to predict an increased risk of hepatotoxicity from the paracetamol?

(Please select 1 option)

- Anorexia nervosa  □ Correct
- Consumption of 20 units of alcohol since taking the paracetamol
- Gilbert's disease
- Ingestion of amitriptyline with the paracetamol
- Smoking 20 cigarettes per day

The MHRA updated its guidelines on the treatment of paracetamol overdose in 2012. Previously, healthcare professionals were advised to assess for risk factors of hepatotoxicity and therefore were two lines on the treatment nomogram (one for patients with risk factors, and one for those without). A review found that the evidence base to support the use of risk factors was poor and inconsistent, and that many of the risk factors were imprecise and difficult to determine with sufficient certainty in clinical practice.

All patients with a timed plasma paracetamol level on or above a single treatment line joining points of 100 mg/L at 4 hours and 15 mg/L at 15 hours after ingestion should receive acetylcysteine based on the new treatment nomogram, regardless of risk factors for hepatotoxicity.
However, it is still important to know what the risk factors for hepatotoxicity are. These include:

- malnourished patients (anorexia nervosa/bulimia nervosa)
- patients taking enzyme inducing drugs (e.g. carbamazepine, phenytoin, rifampicin and St John's wort)
- patients with induced liver enzymes due to chronic ethanol abuse
- human immunodeficiency virus (HIV) positive patients.

It is true that tobacco smoking induces CYP1A2 (one of the P450 enzymes). However, it is not currently included in the list of high-risk situations.

Reference:

Question 66 of 200

A 72-year-old female is diagnosed with giant cell arteritis and is treated with prednisolone 60 mg per day.

What is the most appropriate treatment for the prevention of steroid induced osteoporosis?

(Please select 1 option)

- Alendronic acid  □ Correct
- Calcium
- Raloxifene
- Tibolone
- Vitamin D

Oral glucocorticoids are associated with significant increase in fracture risk, from doses as low as 5mg daily. Loss of bone-mineral density is greatest in the first few months of glucocorticoid therapy, but fracture risk declines rapidly after stopping. There is an increased risk of fracture over and above the effect of low bone mineral density.

Patients older than 65 years are considered at high risk of osteoporotic fractures as those with a prior fragility fracture, and they should commence on bone-protective therapy at the time of starting glucocorticoid therapy. Measurement of bone density is not required before starting therapy. In patients younger than 65 years without risk factors, DEXA scan is recommended for assessment of fracture risk.
General measures to reduce bone loss include use of the lowest dose of glucocorticoids possible, and steroid-sparing agents. Dietary calcium should be increased and physical activity, with smoking and alcohol minimised. Daily intake 1,500 mg of calcium and 800U of vitamin D3 is recommended. Bone-protective therapy which can be used includes:

- alendronate
- alfacalcidol
- calcitonin
- calcitriol
- cyclic etidronate, and
- risedronate.

Bisphosphonates are generally considered first line. If unsuitable, then calcitriol or strontium ranelate may be considered.

Raloxifene is an selective oestrogen receptor modulator (SERM) that has oestrogenic actions and anti-oestrogenic actions on the uterus and breast. It can be used in the prevention of postmenopausal osteoporosis where bisphosphonates are not suitable, but not commonly in steroid-induced osteoporosis.

Tibolone is a form of hormone-replacement therapy which can be used in post-menopausal women. However, it should not be considered first-line therapy, and is only used where other therapies are contra-indicated, not tolerated, or there is a lack of response.
A 51-year-old female has rheumatoid arthritis. She states that she is allergic to penicillin and co-trimoxazole. Therefore, which of the following drugs is contraindicated?

(Please select 1 option)

- Azathioprine
- Ciclosporin
- Gold therapy
- Methotrexate
- Sulphasalazine

Both co-trimoxazole and sulphasalazine contain sulphonamide groups and hence an allergy to co-trimoxazole would be a contraindication to the use of sulphasalazine.

Co-trimoxazole is a mixture of trimethoprim and sulfamethoxazole.

Sulphasalazine is a combination of 5-aminosalicylic acid and sulfapyridine. It is commonly used in the treatment of inflammatory bowel disease, and can also be used in rheumatoid and psoriatic arthritis.

Azathioprine is a purine analogue which is commonly used as a steroid-sparing agent.

Ciclosporin is a calcineurin inhibitor, used for the prevention of transplant rejection.
Gold therapy was previously used as a disease modifying agent in rheumatoid arthritis, but this has now been replaced by methotrexate which is a dihydrofolate reductase inhibitor.

Answer Statistics

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Times answered: 8911

Test Analysis

Correct Incorrect Partially Correct

Score: 52.24%
Total Answered: 67
A 17-year-old male presents to the Emergency Department after an overdose of alcohol and paracetamol. He complained of abdominal discomfort and an intravenous infusion of N-Acetylcysteine was commenced. Fifteen minutes later he developed breathlessness, reported feeling flushed and developed a tachycardia.

What is the cause of this reaction?

(Please select 1 option)

- A disulfiram-like (antabuse) reaction has occurred
- The patient has developed pulmonary oedema
- The patient has had a panic attack
- The patient has received an overdose of N-Acetylcysteine
- The patient has received N-Acetylcysteine previously

This patient is having an acute hypersensitivity reaction the most common, dose independent adverse drug reaction. It is caused by previous exposure and being sensitised to the drug. The initial exposure induces the production of antibodies of Ig E class, subsequent exposure induces an immunological reaction - anaphylaxis. Some drugs can produce a similar pseudoallergic reaction on first exposure.

The majority of dose-related adverse reactions occur within the first hour of the initial infusion of
acetylcysteine. The MHRA now recommends extending the time of the initial infusion from 15 minutes to 60 minutes in order to reduce the incidence of adverse reactions. Even if a patient has a history of a previous reaction to intravenous acetylcisteine, the benefits outweigh the risks and patient should receive treatment. Any 'hypersensitivity-like' reactions are more likely to be anaphylactoid in nature (i.e. not immunologically mediated) and therefore may not occur on repeated exposure.

Reference:
A 18-year-old female is brought to the Emergency department unconscious after having taken an overdose.

On examination she has a Glasgow coma score of 6, a respiratory rate of 8 breaths per minute, a heart rate of 52 beats per minute and her blood pressure is 84/62 mmHg. Her pupils are small but are reactive to light, muscle tone is reduced and plantar responses are flexor.

Which of the following is she most likely to have taken in overdose?

(Please select 1 option)

- Diazepam
- Dihydrocodeine
- Diphenhydramine
- Ecstasy (MDMA)
- Methanol

Dihydrocodeine is an opiate analgesic and when taken in overdose has a number of toxic effects. It acts as a respiratory depressant leading to reduced respiratory rate. It can cause bradycardia and hypotension in large doses. Pupillary constriction is a diagnostic feature in opiate overdose.

It is also a central nervous system depressant and therefore causes coma in overdose.

Benzodiazepines and antihistamines tend not to have the same cardiorespiratory effects as opiates.

MDMA is a stimulant and can cause delirium, convulsions and ventricular arrhythmias.
Diazepam would be less likely here due to the bradycardia and the hypotension.

Answer Statistics

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Answered: 8684

Test Analysis

Correct Incorrect Partially Correct

Score: 52.17%

Total Answered: 69
Work Smart

Question 15 of 70

A 50-year-old male has a blood pressure of 160/90 mmHg on two consecutive days. You decide that you are going to initiate drug therapy. Which of the following statements regarding your decision is correct?

(Please select 1 option)

- ACE inhibitors should not be used as first line treatment in Afro-Caribbean patients
  - This is the correct answer

- An alpha-blocker would be a first line agent in this patient

- If the patient is non-caucasian a beta-blocker would be an appropriate first line treatment

- Potassium monitoring is not required if an ACE inhibitor is prescribed without the addition of spironalactone

- Spironalactone would be an appropriate second line agent in this patient
  - Incorrect answer selected

ACE inhibitors have low efficacy in black patients in the clinical trials of ACE inhibitors.

According to the British Hypertension Society guidelines (J Hum Hypertension 2003;17:81-86) first line treatment in black patients and patients older than 55 years of age should be with a diuretic or a calcium channel blocker.

An alpha blocker or spironalactone should only be used as an adjunct treatment in resistant hypertension.
A 48-year-old female with rheumatoid arthritis has the following full blood count results:

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<th>Value</th>
<th>Normal Range</th>
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<tbody>
<tr>
<td>Haemoglobin</td>
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<td>(120-165)</td>
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<tr>
<td>Platelets</td>
<td>470 ×10⁹/L</td>
<td>(150-450)</td>
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<tr>
<td>White Cell Count</td>
<td>9.0 ×10⁹/L</td>
<td>(4-10)</td>
</tr>
<tr>
<td>MCV</td>
<td>102 fL</td>
<td>(83-95)</td>
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</table>

Which drug is she likely to be taking?

(Please select 1 option)

- Ciclosporin
- Hydroxychloroquine
- Leflunomide
- Methotrexate - Correct
- Myocrisin

Leflunomide is associated rarely with anaemia, thrombocytopenia and eosinophilia. Ciclosporin may be associated with a mild anaemia. Methotrexate may be associated with haematopoietic suppression, leading to profound, and sometimes sudden leucopenia and thrombocytopenia.
Myocrisin may also rarely lead to blood disorders, pancytopaenia and leucopenia. The elevated platelet count here probably relates to the rheumatoid arthritis itself as a late component of the acute phase response.

Macrocytosis is seen as a consequence of long term methotrexate therapy. Co-existent B12 or folate deficiency or thyroid disease should be excluded.
A 29-year-old female who is 22 weeks pregnant is noted to have a blood pressure of 150/90 mmHg on three separate occasions. Urine protein is negative.

Which of the following would be the first line treatment?

(Please select 1 option)

- Alpha methyldopa Correct
- Atenolol
- Magnesium sulphate
- Ramipril
- Salbutamol

Beta blockers are safe in the third trimester of pregnancy but are generally not used due to fears of intrauterine growth retardation.

Generally one would favour labetalol in these circumstances, given that there is an evidence base for its use, but it is not given as an option.

Magnesium sulphate is a recognised treatment for pre-eclampsia, a condition which is not described here. ACE inhibitors are not in the recommendations.

Nifedipine may be used second line.

There is good evidence that methyldopa is effective and safe for both mother and baby in pregnancy.
An 82-year-old lady had a history of a red facial rash and has suffered with venous eczema of the legs. She was treated for acne rosacea.

On examination, she was noted to have blue-grey discolouration of both legs.

Which drug is most likely to have caused this?

(Please select 1 option)

- Amiodarone
- Ciprofloxacin
- **Doxycycline**
- **Minocycline**
- Oxytetracycline

This patient has developed skin pigmentation of her legs as a side effect of treatment of her acne rosacea.

Tetracyclines are commonly used treatment for acne rosacea. Long-term use of minocycline in particular has been associated with non-dose dependent blue-grey pigmentation of skin in the lower legs, and mucosal pigmentation. This is more common in the elderly. On biopsy, intracellular pigment is seen in the dermis and the subcutaneous tissue and stains positively for melanin and iron. If not extensive, hyperpigmentation may partially regress after minocycline is discontinued. If it persists, alexandrite laser therapy can be effective.
Amiodarone can also cause a blue-grey slate discolouration of the skin, typically in sun exposed areas. You would therefore expect the face to be affected, and also amiodarone is not a treatment for acne rosacea which has been mentioned in this question to lead you to the correct answer.

Hypersensitivity to the sun has been described with ciprofloxacin, but discolouration as in this scenario is not recognised.

Oxytetracycline and doxycycline can lead to photosensitivity, but skin pigmentation seems to be specific to minocycline rather than a class effect of the tetracyclines.

Reference:

Work Smart

Question 17 of 70

A 45-year-old female with chronic schizophrenia was recently converted to a new antipsychotic agent. She presented two weeks later with a sore throat and fever.

Her full blood count shows:

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<tr>
<td>Platelets</td>
<td>$135 \times 10^9$/L</td>
<td>(150-400)</td>
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</tbody>
</table>

What drug is she likely to have commenced?

(Please select 1 option)

- Clozapine  

- Haloperidol

- Olanzapine

- Quetiapine

- Risperidone

Clozapine is associated with agranulocytosis and granulocytopenia in approximately 1-2% of patients, which can result in fatal sepsis. The mechanism through which this happens remains unclear.
In order to safeguard against harm a UK Clozaril Patient Monitoring System ensures strict monitoring of all patients on this treatment. A white cell count with differential is checked prior to treatment, then weekly for the first 18 weeks, then two weekly from week 18 to 52, and then four weekly after one year of clozapine with stable blood results. They are then checked for four weeks after discontinuation of treatment.

Olanzapine has been associated with agranulocytosis in the form of case reports in the literature. However, unlike clozapine, this link is not well established.

None of the other medications listed are commonly associated with agranulocytosis.
An 82-year-old male with longstanding Alzheimer's dementia presents as his carers are concerned about his increased episodes of aggression. Physically he is well.

Which is the most appropriate treatment for his aggressive outbursts?

(Please select 1 option)

- **Diazepam**
- **Quetiapine**
- **Risperidone**
- **Temazepam**
- **Valproate**

Ideally, aggression in Alzheimer's disease should be managed with non-drug approaches, aiming to identify and avoid triggers and finding behavioural techniques which manage the symptoms. However, sometimes drug treatment is required.

Atypical neuroleptics, such as quietapine, and haloperidol are not recommended as there is an increased risk of death or stroke. There is also concern that these agents may contribute to cognitive decline, and it is recognised that symptoms often relapse after cessation of haloperidol. However, risperidone has been tested in this setting and is licensed for six weeks treatment of persistent aggression in those with moderate to severe Alzheimer's disease, providing that non-pharmacological alternatives have been tried and there is a risk of harm.
Valproate has been widely used for its calming effects in this situation, but there is little evidence of the efficacy of valproate.

Benzodiazepines are not recommended, as they can impair alertness and increase daytime sleepiness (thereby increasing the risk of falls), and are also associated with worsening cognitive decline.

Reference:

Low-dose antipsychotics in people with dementia

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Times answered: 8795
Question 72 of 200

A 29-year-old woman is receiving subcutaneous Clexane (low-molecular weight heparin [LMWH]) for the treatment of pulmonary embolism. She is 30 weeks pregnant and develops bruising on her lower arms.

The blood pressure in the left lateral position is 125/75 mmHg.

What is the most appropriate test for this patient?

(Please select 1 option)

- Factor Xa levels
- APTT □ Incorrect answer selected
- Platelet count □ This is the correct answer
- Serum albumin
- Serum potassium

This is likely to be heparin-induced thrombocytopenia (HIT).

Long term LMWH treatment has been associated with low platelet counts and this is the test which is likely to provide you with the most information.

There are two forms of heparin-induced thrombocytopenia. Type-1 occurs within the first couple of days of treatment, and resolves spontaneously. It is a direct effect of heparin on platelet activation.

Type 2 HIT is more concerning. It is an immune-mediated disorder which is caused by antibodies to the heparin-platelet factor 4 complex. It typically occurs later in treatment, and in its most severe form
can be fatal. It should be suspected if the platelet count falls by more than 50% from baseline, even if the total count remains over 150. It can result in arterial and venous thrombosis. Treatment is to stop heparin treatment immediately. Neither warfarin or platelet transfusions should be given.

Clexane may cause hyperkalaemia, but this is unlikely to cause bruising.

Albumin levels may increase in pregnancy but serum albumin may be low due to haemodilution. Again, this would not usually be associated with bruising.

Activated partial thromboplastin time (APTT) is not useful in monitoring LMWH activity, although APTT may be prolonged in high dose Clexane treatment. APTTT is increased in intravenous heparin treatment, and is used to adjust doses.

Factor Xa levels can be used to monitor efficacy of treatment with low-molecular weight treatment but the suggestion of bruising here points more to HIT for which Xa levels would not be a useful guide.
Question 73 of 200

A 90-year-old man with chronic leukaemia presents with gout which his general practitioner treats with allopurinol.

How does allopurinol prevent the accumulation of uric acid?

(Please select 1 option)

- By competing for its transporter to the kidney
- By enhancing its solubility
- By inhibiting purine breakdown and synthesis
- By inhibiting pyrimidine synthesis
- By inhibiting the inflammatory response it causes

Allopurinol is an isomer of hypoxanthine and as such is a purine analogue. It acts by inhibiting xanthine oxidase thereby blocking the oxidation of hypoxathine and xanthine. This reduces the production of uric acid.

In addition, the build up of hypoxanthine and xanthine results in their conversion to adenosine and guanosine. This causes feedback inhibition of amidophosphoribosyl transferase, which is the rate-limiting enzyme of purine biosynthesis.

Allopurinol therefore reduces both purine breakdown and synthesis.
A 33-year-old woman with a history of alcoholism and self-neglect, presents with an episode of blood streaked vomiting. This is attributed to minor Mallory-Weiss tear.

She is admitted to hospital and given an intravenous infusion of 5% dextrose. Her serum potassium concentration is noted the following day to have fallen to 1.9 mmol/L (normal range 3.5-4.9, 3.9 on admission).

What is the likely mechanism for the fall in potassium concentration?

(Please select 1 option)

- Cortisol release in response to stress increasing renal potassium loss
- Decompensated liver failure causing aldosterone secretion
- Intracellular re-uptake in response to re-feeding with glucose  □ Correct
- Metabolic acidosis increasing renal potassium excretion
- Potassium levels falling following gastric loss in vomiting

Refeeding syndrome is potentially fatal, and occurs when previously malnourished patients are given a carbohydrate load. When malnourished, the body uses endogenous fuel stores for energy and maintains serum electrolytes by redistribution from intracellular spaces. Exogenously administered glucose results in insulin release, and subsequent difficulty for the body in trying to convert to exogenous fuel sources. This results in rapid uptake of glucose, potassium, phosphate and magnesium into cells, with dramatic falls in the extracellular concentrations. Additionally, for reasons which are not well understood, the body begins to retain fluid resulting in expansion of the
extracellular space.

As a result of these fluid and electrolyte changes, there is an increase in cardiac work which can precipitate acute heart failure. There is also an increase in the respiratory quotient, which can cause dyspnoea and tachypnoea and in extreme cases respiratory failure. Nausea and diarrhoea is also common due to gut intolerance.

None of the other options are causes of hypokalaemia in this setting.
Work Smart

Question 74 of 200

Which of the following most accurately describes the mechanism of action of the bisphosphonates?

(Please select 1 option)

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<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>Calcium resorption in the distal tubule</td>
</tr>
<tr>
<td>☐</td>
<td>Fibroblast proliferation in bone marrow</td>
</tr>
<tr>
<td>☐</td>
<td>Improved vascular supply to bone marrow</td>
</tr>
<tr>
<td>☐</td>
<td>Inhibition of osteoclast activity</td>
</tr>
<tr>
<td>☐</td>
<td>Upregulation of osteoblast activity</td>
</tr>
</tbody>
</table>

The mechanism of action of farnesyl diphosphate synthase within osteoclasts. In doing this they interfere with geranylgeranylation (attachment of the lipid to regulatory proteins), which causes osteoclast inactivation. This leads to reduced bone turnover, increased bone mass, and improved mineralisation.

Reference:

Question 75 of 200

A 21-year-old man who has a past history of IV drug abuse presents 12 hours after taking an overdose of 480 mg of codeine and 30 g of paracetamol.

His blood pressure is 100/60 mmHg and he has pin-point pupils.

What is the most appropriate management for this patient?

(Please select 1 option)

- 500ml 10% glucose IV over four hours
- 1 litre normal saline IV over six hours
- IV naloxone
- IV flumazenil
- Start N-acetylcysteine

This patient presents 12 hours after taking a potentially fatally toxic dose of paracetamol.

In the circumstances provided in this question where there is an absence of data relating to pulse rate (as he is probably not in shock), respiratory rate (reflecting respiratory depression) or blood glucose, the most appropriate intervention at this 12 hour time-point would be N-acetylcysteine.

The urgency of treatment is underlined by the fact that the incidence of hepatotoxicity is worse if treatment is delayed.

Trials of N-acetylcysteine suggest that the incidence of hepatotoxicity is 1% in those treated within eight hours as opposed to 46% in those treated after 16 hours.
Question 76 of 200

A 16-year-old male is brought to the Emergency department with a Glasgow coma scale (GCS) rating of 3/15.

Within 10 minutes he regained consciousness with a GCS of 15/15, is sitting up and talking.

What is he likely to have taken?

(Please select 1 option)

- Inhaled solvent glue  [Correct]
- Smoked heroin
- Smoked marijuana
- Snorted cocaine
- Taken ecstasy

This patient was markedly comatose on arrival but quickly regains consciousness. This suggests a short acting (probably) inhaled anaesthetic-like agent - glue.

Marijuana would not be expected to produce this level of coma and the effects of cocaine would last much longer.

The inhaled solvents, due to their lipophilicity, are rapidly absorbed through the lungs and then quickly distributed to the brain and other organs. The effects therefore appear within minutes of inhalation.

It's much less common to get such a low GCS with just smoking heroin, you tend to see this with...
intravenous drug use. Also, the recovery is far less rapid (unless you give the patient naloxone, which you are not told here).

Typical substances that are inhaled include toluene, aromatic hydrocarbons and butane.

Answer Statistics

<p>| | | | | | |</p>
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<td>5</td>
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Times answered: 8878

Test Analysis

CorrectIncorrectPartially
Correct

Score: 51.32%
Total Answered: 76
A 72-year-old man presents with painful lumps in his feet and is diagnosed with gout. Following initial treatment with non-steroidal anti-inflammatory agents he is started on allopurinol. How does allopurinol work?

(Please select 1 option)

- Increases urinary uric acid excretion
- Inhibits cyclooxygenase II
- Inhibits macrophage tubular formation
- Inhibits nitric oxide synthase
- **Inhibits xanthine oxidase**

Allopurinol inhibits xanthine oxidase, the enzyme involved in the conversion of purines into uric acid.
A 51-year-old man presents with wheals and urticaria. He takes a variety of medications.

Which drug is the most likely to have caused this reaction?

(Please select 1 option)

- Aspirin  
- Glyceryl trinitrate
- Omeprazole
- Paracetamol
- Simvastatin

The most likely cause of an urticarial eruption from this list would be aspirin.

Other drugs frequently associated with urticaria include:

- non-steroidal anti-inflammatory drugs (NSAIDs)
- penicillin
- angiotensin-converting enzyme (ACE) inhibitors
- thiazides, and
- codeine.

Further Reading:

Medscape. Urticaria
Work Smart

Question 21 of 70

A 42-year-old man presents with gingival hypertrophy.

Which of his cardiac medications is likely to be responsible?

(Please select 1 option)

- Amlodipine  □ This is the correct answer
- Atenolol
- Digoxin
- GTN  □ Incorrect answer selected
- Simvastatin

Calcium channel blockers and drugs like phenytoin and cyclosporin are associated with gingival hypertrophy.
Which of the following is the most appropriate anticonvulsant for the treatment of an eclamptic fit?

(Please select 1 option)

- Diazepam
- Lorazepam
- Magnesium sulphate
- Phenytoin
- Thiopentone

Magnesium sulphate (MgSO₄) is the most effective agent for the treatment of eclampsia and prophylaxis in severe pre-eclampsia. It can be given intramuscularly (4 g loading, 10 g immediately and then 5 g every 4 hours in alternating buttocks) or intravenously (4 g followed by maintenance infusion 1-2 g/hour).

Forty percent remains protein bound, whereas free magnesium ions diffuse into the extravascular extracellular space, and across the placenta and foetal membranes into the foetus and amniotic fluid. If levels are carefully monitored, toxicity is low; the first sign is often the loss of the patellar reflex.

The mechanism of action is thought to involve interaction with NMDA receptors.

Reference:

Question 79 of 200

Which of the following is the drug of choice for the treatment of *Chlamydia trachomatis* infection during pregnancy?

(Please select 1 option)

- **Amoxicillin**  □ This is the correct answer
- Cephazolin
- Clindamycin
- Metronidazole  □ Incorrect answer selected
- Tetracycline

*Chlamydia* infection in the non-pregnant state is usually treated with a tetracycline (doxycycline 100 mg BD for seven days), or with azithromycin 1 g in a single dose. Erythromycin and ofloxacin can be used if the first line treatments are contraindicated.

During pregnancy, tetracycline therapy is contraindicated because of its incorporation into fetal bones and teeth. Treatment options are therefore erythromycin or amoxicillin or azithromycin. Only amoxicillin fits from the options listed above.

Reference:

British Association for Sexual Health and HIV. [Guidelines](https://www.bashh.org/guidelines).
Work Smart

Question 80 of 200

A 45-year-old male takes lithium for a bipolar affective disorder.

Which of the following drugs would be contraindicated in conjunction with lithium?

(Please select 1 option)

- Atenolol
- Bendroflumethiazide [This is the correct answer]
- Codeine phosphate
- Flucloxacillin
- Thyroxine [Incorrect answer selected]

Caution should be exercised when taking lithium and diuretics as the latter may reduce renal clearance of lithium and increase serum lithium concentrations.

Non-steroidal anti-inflammatory drugs (NSAIDs) also increase lithium concentrations.

Metronidazole, angiotensin-converting enzyme inhibitors (ACEis) and calcium channel blockers also increase serum lithium concentrations.

Next question  Go to summary
A 22-year-old male is admitted after drinking engine coolant in an apparent suicide attempt after finding his wife in bed with the postman.

Investigations reveal:

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<tr>
<th>Parameter</th>
<th>Value</th>
<th>Normal Range</th>
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<td>pO₂</td>
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<td>(11.3-12.6)</td>
</tr>
<tr>
<td>pCO₂</td>
<td>3.2 kPa</td>
<td>(4.7-6.0)</td>
</tr>
<tr>
<td>Standard bicarbonate</td>
<td>2.2 mmol/L</td>
<td>(20-28)</td>
</tr>
<tr>
<td>Serum calcium</td>
<td>1.82 mmol/L</td>
<td>(2.2-2.6)</td>
</tr>
</tbody>
</table>

After replacing calcium which of the following is the most urgent treatment for this man?

(Please select 1 option)

- ☐ 8.4% bicarbonate infusion
- ☐ Alcohol infusion
- ☐ Fomepizole infusion
- ☐ Gastric lavage
- ☐ Haemodialysis
Engine coolant contains ethylene glycol. Ingestion of as little as 30-60 ml is capable of causing death. Traditional management of poisoning includes the use of ethanol, with or without haemodialysis. Activated charcoal is not indicated and gastric lavage may be beneficial only in the first hour after ingestion.

However fomepizole has recently been approved for use and is a competitive inhibitor of alcohol dehydrogenase. However it is very expensive and the evidence supporting its use over alcohol is lacking. Also, this patient already has a severe metabolic acidosis.

In these circumstances, antidotal therapy to block alcohol dehydrogenase with ethanol or 4-MP alone is insufficient to treat the poisoning. Data suggest that a severe lactic acidosis needs initial correction and in this patient the most appropriate treatment would be IV fluids with bicarbonate to correct the metabolic acidosis.

Then haemodialysis is probably required.
A 71-year-old man with a history of chronic renal impairment and atrial fibrillation for which he takes warfarin, presents with an acutely tender and red left big toe. Investigations reveal:

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
<th>Normal Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum creatinine</td>
<td>200 µmol/L</td>
<td>(50-100)</td>
</tr>
<tr>
<td>Serum urate</td>
<td>0.5 mmol/L</td>
<td>(0.12-0.42)</td>
</tr>
</tbody>
</table>

Which of the following is the most appropriate treatment for this man's presentation?

(Please select 1 option)

- Allopurinol
- Colchicine
- Diclofenac
- Paracetamol
- Prednisolone  □ Correct

This man presents with acute gout, has chronic renal impairment, AF and takes warfarin.

Non-steroidal anti-inflammatory drugs (NSAIDs) would be the treatment of choice but may cause a deterioration in renal function and would be associated with an increased risk of bleeding in the elderly.
The adverse effects of colchicine (especially gastrointestinal symptoms) would be more likely in the elderly and should probably be avoided in those with renal impairment of this degree.

Thus steroids are probably the best option.

Allopurinol may well precipitate/exacerbate acute gout and is used once the acute attack has settled following adequate treatment.

This is a classic MRCP question since it is hard to answer this by just looking in textbooks. Steroids are the last resort choice where NSAIDs and colchicine are deemed too dangerous to use and that is a matter of judgement applied by physicians. There is plenty of evidence for their efficacy.
A 62-year-old female with colonic carcinoma is treated with chemotherapy and is receiving ondansetron for intractable nausea and vomiting.

Which of the following best describes the pharmacological actions of ondansetron?

(Please select 1 option)

- Anticholinergic
- Cannabinoid
- Dopaminergic antagonists
- H1 antihistamine
- 5-HT3 antagonist  
  □ Correct

Ondansteron is a selective 5-HT3 antagonist both centrally and peripherally and as such is a potent antiemetic.

Further Reading:

Hain TC. Emesis.
Work Smart

Question 84 of 200

Which of the following pharmacological agents acts through the opening of potassium channels?

(Please select 1 option)

- Amiloride  Incorrect answer selected
- Glibenclamide
- Lidocaine
- Nicorandil  This is the correct answer
- Phenytoin

Nicorandil is a potent potassium channel activator. It relaxes vascular smooth muscle through membrane hyperpolarisation via increased transmembrane potassium conductance and, like nitrates, through an increase in intracellular cyclic guanosine monophosphate (GMP).

Glibenclamide blocks potassium channels.

Amiloride inhibits the action of aldosterone on the distal convoluted tubule producing potassium reabsorption.
Work Smart

Question 22 of 70

A 41-year-old female is brought into the Emergency department after taking an uncertain quantity of paracetamol two hours previously and trying to hang herself.

She becomes agitated and insists that she wants to go home immediately. You judge that she is at high risk of suicide.

Which of the following is the most appropriate course of action for this patient?

(Please select 1 option)

- Ask her to sign a 'discharge against medical advice' form and let her go
- Call the duty psychiatrist, but let the patient go if she insists and the duty psychiatrist does not arrive in time to see her
- Call the hospital security services, restrain her and sedate her
- Detain her under section 5(2) of the Mental Health Act
- Detain the patient under common law, seeking the help of hospital security services

This patient has taken an unknown quantity of paracetamol tablets, and continues to have suicidal ideation. In situations such as these you need to assess whether the patient has capacity.

Taking a paracetamol overdose in itself does not mean the patient has no capacity, but often capacity is lacking. The chance of suffering severe consequences if a paracetamol overdose goes untreated is high. Often, therefore these patients do not possess the level of capacity required for a decision of this importance. Family should be involved if possible.
In cases such as this the patient, if found to lack capacity, should be held under common law until the appropriate time to take a blood sample (four hours after the overdose).

Psychiatric team advice can be sought, but they need the patient to be 'medically fit' to be able to do a full assessment. In general this means they must have completed all treatment necessary (for example, NAC infusion) prior to mental health assessment.

Allowing self-discharge in this situation would be inappropriate.

Sedation is inappropriate in this situation.

Section 5(2) of the Mental Health Act is used for patients who are already admitted to the hospital who have a mental illness, to allow compulsory detention for up to 72 hours. Formal assessment under the Mental Health Act should be undertaken as soon as possible. It is not used in the Emergency department.

References:

NICE. Self-harm in over 8s: short-term management and prevention of recurrence (CG16).
Work Smart

Question 85 of 200

A 52-year-old woman with a three year history of sero-positive erosive rheumatoid arthritis has recently commenced methotrexate therapy initiated at the rheumatology clinic.

Which one of the following agents should she also be receiving in conjunction with her methotrexate?

(Please select 1 option)

- Folic acid  □ Correct
- Omeprazole
- Thiamine
- Vitamin C
- Zinc supplements

Methotrexate is a chemotherapeutic agent as well as being an immunosuppressant used as a disease-modifying antirheumatic drug (DMARD). It acts through inhibition of dihydrofolate reductase thus depleting folate concentrations.

To reduce the impact of folate deficiency a dose of 5 mg of folic acid weekly* is recommended in conjunction with methotrexate taking the agent at least two days prior to commencing the methotrexate. Its action in arthritides is not entirely understood but may relate to both anti-inflammatory as well as immunomodulation.

*Some local variations may exist regarding dose and frequency of folate therapy. Please be aware of your local guidelines.
A 36-year-old man attends clinic for advice. He is currently taking methotrexate 7.5 mg weekly. His wife is fit and well, with no past medical history of note and not taking any medication apart from the oral contraceptive pill.

They are keen to start a family and want to know about continued contraception and whether there is a need to stop methotrexate.

Which of the following would you advise?

(Please select 1 option)

- They can dispense with contraception now and the husband can continue with the methotrexate
- They can dispense with contraception now but the husband needs to stop taking methotrexate
- They should continue with adequate contraception for at least four weeks after the husband stops the methotrexate
- They should continue with adequate contraception for at least three months after the husband stops the methotrexate  □ Correct
- They should continue with adequate contraception for at least one year after the husband stops the methotrexate

Methotrexate is teratogenic and, according to the British National Formulary (BNF), the manufacturers advise effective contraception during, and for at least three months, after stopping methotrexate. Fertility may be reduced during treatment, but this usually reverses upon stopping.
Advice regarding reduced fertility and potential teratogenicity applies to both females and males who are taking methotrexate.

There is little published information on the potential teratogenicity following paternal exposure to methotrexate. There have, however, been reports of alterations of the spermatozoa and oligospermia following exposure to methotrexate. These seem to be reversible on cessation of treatment.

The National Patient Safety Agency (NPSA) state on their patient held record that: "It is recommended that men wait six months after finishing their treatment, before trying to father a child as sperm can be affected". Paternal exposure to methotrexate is not regarded as an indication for termination of pregnancy, however.
Question 86 of 200

A 34-year-old nulliparous woman attends clinic because she wants to start a family as soon as possible. She is currently receiving weekly methotrexate for rheumatoid arthritis, but her rheumatologist has suggested that she would be able to stop taking it soon.

Assuming that there are no other contraindications to her becoming pregnant, how long should she wait before stopping the oral contraceptive pill (OCP) and trying to conceive in relation to her discontinuing methotrexate treatment?

(Please select 1 option)

- She can stop the OCP at the same time as she stops methotrexate
- She should continue the OCP for at least two weeks after stopping methotrexate
- She should continue the OCP for at least one month after stopping methotrexate
- She should continue the OCP for at least three months after stopping methotrexate

Correct

- She should continue the OCP for at least one year after stopping methotrexate

Methotrexate is teratogenic and, according to the British National Formulary (BNF), the manufacturers advise effective contraception during, and for at least three months, after stopping methotrexate (both males and females).

Fertility may be reduced during treatment, but this usually reverses upon stopping.

The National Patient Safety Agency (NPSA) state on their patient held record that: 'It is recommended that you wait three months after finishing your treatment, before trying to become pregnant'. This
advice should be given to both men and women - men should also not try to father a child whilst on methotrexate.
A 55-year-old male who is being treated with lithium for a bipolar disorder has a long history of hypertension for which he is receiving escalating doses of medication. On his most recent visit to clinic his blood pressure was noted to be 166/102 mmHg and a new antihypertensive was added to his current antihypertensive therapy.

Five days later he presents with features of lithium toxicity including tremor, nausea and weakness.

The addition of which of the following drugs was likely to have precipitated the lithium toxicity?

(Please select 1 option)

- Doxazosin
- Hydralazine
- Irbesartan
- Minoxidil
- Moxonidine

The precipitation of lithium toxicity by diuretics is well appreciated. Yet ACE inhibitors and angiotensin antagonists are also capable of precipitating lithium toxicity through reduced lithium clearance.

Other drugs that may precipitate lithium toxicity include:

- NSAIDs
- Tetracycline
- Phenytoin,
• Ciclosporin.

Answer Statistics

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Times answered: 8959

Test Analysis

Score: 51.72%
Total Answered: 87

Feedback
A 16-year-old female is admitted with a severe paracetamol overdose. She is treated with IV N-acetylcysteine (NAC).

By replenishing which of the following compounds does N-acetylcysteine function as an antidote in paracetamol overdose?

(Please select 1 option)

- Arginine
- Cysteine
- Cystine
- Glutathione  □ Correct
- Methionine

Paracetamol is predominantly metabolised to glucuronide and sulphate conjugates, which are excreted in the urine.

Hepatotoxicity is related to the conversion of a small proportion of the ingested dose to N-acetyl-p-benzoquinoneimine.

In therapeutic doses N-acetyl-p-benzoquinoneimine is detoxified by conjugation with glutathione in the liver, but once the protective intracellular glutathione stores are depleted hepatic and renal damage may ensue.

NAC and methionine replenishes glutathione stores in the liver and may also act through its
sulphhydryl (-SH) group as a direct reducing agent.

Reference:

Which of the following are correct concerning an intention to treat analysis?

(Please select 1 option)

- It is a study comparing the effects of treatment with placebo or active treatment and also a similar group of non-study participants
- It is a study that analyses all patients randomised to the study □ This is the correct answer
- It is a study where all included patients are treated with the active drug □ Incorrect answer
- It is a study where all non-compliant patients are removed from analysis
- It is a variation of a meta-analysis analysing specifically studies employing double blind placebo controlled trials

When one considers a randomised study, although the principles of double blind placebo controlled may apply, the actual preferential fall out of patients, for instance treated with placebo as they do not perceive a benefit, may itself introduce bias.

Thus, intention to treat studies would argue that one should commit all patients that originally participate in the study to analysis.

The advantages of this approach are that it maintains treatment groups that are similar apart from random variation. This is the reason for randomisation, and the feature may be lost if analysis is not performed on the groups produced by the randomisation process.

Secondly, it permits for non-compliance and deviations from policy by clinicians.
Oseltamivir (Tamiflu), like its predecessor zanamivir (Relenza) functions as an antiviral through inhibition of the enzyme neuraminidase, thus slowing viral replication down rather than directly killing the virus particle.

This slowing down of replication is important in permitting time for the body's own immune system to deal with the virus.

Unlike inhaled zanamivir, oseltamivir is administered orally.

However, viral replication is rapid and to be effective the drug must be given as early as possible after the development of symptoms of flu and preferably within 48 hours.
Work Smart

Question 91 of 200

During an outbreak of influenza A, which of the following may provide appropriate prophylaxis for healthcare workers?

(Please select 1 option)

- Amantadine
- Ganciclovir
- Lamivudine
- Oseltamivir – Correct
- Zidovudine

Oseltamivir (Tamiflu) may be used in the prophylactic treatment of healthcare workers during flu epidemics.

However, long-term treatment does run a risk of resistance.
Work Smart

Question 24 of 70

Which of the following does N-acetylcysteine replenish?

(Please select 1 option)

- [ ] Cystathionine
- [ ] Cytochrome P450
- [ ] Glucuronyl transferase
- [x] Glutathione  Correct
- [ ] Sulfatase

Acetylcysteine, the N-acetyl derivative of the naturally occurring amino acid L-cysteine, is a mucolytic agent and sulfhydryl donor acting as an antidote for paracetamol overdosage.
Work Smart

Question 92 of 200

Which term best describes the affinity of a drug for its receptor?

(Please select 1 option)

- Efficacy
- Intrinsic activity
- Potency
- Selectivity
- Therapeutic effect

Affinity is the measure of the net molecular attraction between a drug (or neurotransmitter or hormone) and its receptor.

The receptor's affinity for binding a drug determines the concentration of drug required to form a significant number of drug-receptor complexes.

Affinity and intrinsic activity are determinants of potency.

Efficacy contributes both to potency and to the maximum effect of the agonist. Efficacy is a measure of the efficiency of the drug-receptor complex in initiating the signal transduction process.
A 45-year-old woman has, approximately four hours ago, taken an unknown quantity of amitriptyline tablets that were being prescribed for her depression. She is feeling drowsy, agitated and has a dry mouth.

An ECG shows wide QRS complexes with arrhythmias.

Blood gas analysis revealed:

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<th>Value</th>
<th>Range</th>
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</tr>
<tr>
<td>PaCO₂</td>
<td>4 kPa</td>
<td>(4.7-6.0)</td>
</tr>
</tbody>
</table>

What is the most appropriate treatment?

(Please select 1 option)

- Activated charcoal
- Gastric lavage
- Haemodialysis
- Intravenous insulin
- Intravenous sodium bicarbonate  ☑ Correct
There is no specific antidote for tricyclic antidepressant poisoning.

Management is initially by assessing ABCs and treating as appropriate. You should then check U&Es, looking specifically for hypokalaemia, and ABG looking for acidosis. Hypokalaemia should be corrected. ECG should be done to assess the QRS interval.

Gastric lavage should only be considered if it is within one hour a potentially fatal overdose. 50 g of charcoal can be given if it is within one hour of ingestion.

50 ml of 8.4% sodium bicarbonate should be given if the pH is less than 7.1, QRS interval is more than 0.16 s, or there are cardiac arrhythmias or hypotension.

Antiarrhythmics should be avoided.

Hypotension should be treated with intravenous fluids, and inotropes can be considered.

In the case of cardiac arrest, prolonged resuscitation may be successful.

Patients who display signs of toxicity should be monitored for a minimum of 12 hours.

Reference:
An 18-year-old Asian girl was found to be pregnant after missing her last menstrual period despite her appropriate use of the oral contraceptive pill for the last two years.

She was found also to have been taking additional medication prescribed by a specialist two months ago.

Which of the following accounts for the pill failure?

(Please select 1 option)

- Cimetidine
- Erythromycin
- Isoniazid
- Ketoconazole
- Rifampicin  Correct

Rifampicin is a hepatic drug-metabolising enzyme inducer.

Thus it enhances the metabolism of oral contraceptive pills, decreasing its effectiveness and resulting in pill failure.
A 35-year-old man with a known history of epilepsy presents with a skin rash, lymphadenopathy and gingival hypertrophy.

Which of the following medications is most likely to be responsible for his symptoms?

(Please select 1 option)

- Carbamazapine
- Lamotrigine
- Lorazepam
- Phenytoin

Common side effects of phenytoin include gingival hyperplasia, coarsening of the facies, and hirsutism.

Phenytoin is linked to a hypersensitivity syndrome manifested by fever, rash, and lymphadenopathy.

Patients receiving phenytoin may develop pseudolymphoma or, rarely, malignant lymphoma and mycosis-fungoides-like lesions.
Community-acquired pneumonia is most commonly caused by *Strep. pneumoniae*, hence the use of a beta-lactam antibiotic because of the increased incidence of atypical organisms such as *Mycoplasma*. A macrolide such as erythromycin is also recommended.

Augmentin is contraindicated as it is penicillin-based.

Ciprofloxacin has poor cover against *Strep. pneumoniae* and metronidazole is used for anaerobic infections.

In this case a credible alternative for beta-lactam sensitivity is not mentioned and the best choice, because of clinical necessity since severe pneumonia can be fatal if treated with antibiotics that are...
not effective, is to go with the only cephalosporin and macrolide combination that is offered.

The chance of cross reactivity of penicillin allergy with beta-lactams is only 10%. A rash is not a contraindication for this.

If the patient has a documented anaphylactic reaction specifically to penicillin then this case would need to be discussed between the medical and microbiology consultants before the prescription was given. Different trusts have different policies regarding this and consequently it is highly unlikely you will be tested on this.

Answer Statistics

Times answered: 9289

Test Analysis

Score: 52.08%
Work Smart

Question 97 of 200

A 31-year-old woman in her third pregnancy is receiving low molecular weight heparin (LMWH) at treatment doses due to a pulmonary embolism three months prior to conception. She is currently at 31 weeks gestation.

All fetal scans have been normal, and her blood pressure is 126/80 mmHg in the left lateral position.

Which of the following statements is correct?

(Please select 1 option)

- Breastfeeding is safe
- Clexane treatment needs no monitoring in pregnancy
- It is safe for her to receive NSAIDs perinatally
- Prothrombin time is an indicator of anti-factor Xa activity
- The dose of Clexane should be increased in the third trimester

There is no recommendation that the dose of LMWH should be increased in the third trimester. The dose of enoxaparin is altered in pregnancy, but not doubled. The exact dose depends on the weight of the patient, and can be seen in the British National Formulary (BNF).

Increases in prothrombin time and activated clotting time (ACT) are not linearly correlated with increasing LMWH anti-thrombotic activity and therefore are unsuitable and unreliable for monitoring LMWH activity.

Nonsteroidal anti-inflammatory drug (NSAID) treatment increases the risk of haemorrhage in both
mother and fetus.

It is not known whether unchanged enoxaparin sodium is excreted in human breast milk. The oral absorption of enoxaparin sodium is unlikely. However, as a precaution, lactating mothers receiving enoxaparin sodium should be advised to avoid breastfeeding.

The Royal College of Obstetricians and Gynaecologists (RCOG) have produced guidelines on *Reducing the Risk of Thrombosis and Embolism During Pregnancy and the Puerperium* which are recommended for further reading on this topic.
A 19-year old girl has been brought to the Emergency department by her friends following a night out at a party. Her friends comment that she has been talking to herself about 'irrelevant things'. She seems agitated and restless.

On examination, her reflexes are increased and an electrocardiogram (ECG) demonstrates ventricular ectopics.

What kind of substance abuse do you suspect at this point?

(Please select 1 option)

- Alcohol
- Barbituate
- Cannabis
- Ecstasy  □ Correct
- Glue sniffing

This is a case of ecstasy overdose.

Ecstasy (3,4-methylenedioxymethamphetamine, MDMA) stimulates the central nervous system.

It causes:

- Increased alertness and self-confidence
- Euphoria
• Extrovert behaviour
• Increased talkativeness with rapid speech
• Lack of desire to eat or sleep
• Tremor
• Dilated pupils
• Tachycardia, and
• Hypertension.

More severe intoxication is associated with:

• Excitability
• Agitation
• Paranoid delusions
• Hallucinations with violent behaviour
• Hypertonia, and
• Hyperreflexia.

Convulsions, rhabdomyolysis, hyperthermia, and cardiac arrhythmias may also develop.

In severe cases of MDMA poisoning the following are also observed:

• Hyperthermia
• Disseminated intravascular coagulation
• Rhabdomyolysis
• Acute renal failure, and
• Hyponatraemia

Hepatic damage has also been reported.

Rarely, poisoning due to amphetamines may result in intracerebral and subarachnoid haemorrhage and acute cardiomyopathy; these complications may be fatal.

Hyperthyroxinaemia may be found in chronic amphetamine users.
A 34-year-old man with a known history of Crohn's disease was admitted to hospital with abdominal pain and features of perforation.

He underwent laparotomy and a perforation of the terminal ileum was found with free faecal fluid in the abdominal cavity. He was transferred to the intensive care unit (ITU).

Together with traditional antimicrobial and supportive ITU therapy, which of the following therapeutic measures is most likely to improve this patient's outcome?

(Please select 1 option)

- High-dose intravenous corticosteroids
- Low-dose intravenous corticosteroids
- Recombinant anti-endotoxin antibody
- Recombinant human antithrombin III
- Recombinant human tissue-factor pathway inhibitor

The use of corticosteroids in sepsis remains controversial.

Meta-analyses of all the trials of high-dose steroids (for example, methylprednisolone 1 g) have confirmed that there is either no benefit, or even that there is an adverse effect in septic patients. However, more recent randomised controlled trials have suggested that there is a benefit in sepsis when lower physiological doses of steroids are given.

The precise mechanism is not fully understood, although it is well known that septic patients have low
The production of recombinant human anticoagulants has gathered pace in recent years and several products have been tested. There have been randomised clinical trials of recombinant human antithrombin III (Kyber Sept trial), activated protein C (PROWESS trial) and tissue-factor pathway inhibitor (OPTIMIST trial). Of these, only recombinant activated protein C has shown any significant survival benefit at 28 days. However, subsequent studies have failed to demonstrate a survival benefit, and have shown an increased bleeding risk. Activated protein C is therefore no longer recommended for the treatment of sepsis.

Answer Statistics

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Times answered: 7519
A middle-aged lady presents with cervical and inguinal lymphadenopathy. She is also experiencing pins and needles in a glove and stocking distribution, and has gum hypertrophy. She has a previous history of epilepsy and is on regular medication.

Which of the following drugs is most likely to cause her symptoms?

(Please select 1 option)

- Carbamazepine
- Phenobarbitone
- Phenytoin  
  - Correct
- Sodium valproate
- Vigabatrin

Recognised side effects of phenytoin include

- Drowsiness
- Ataxia
- Confusion
- Blurred vision
- Dizziness
- Nystagmus
- Permanent cerebellar ataxia
- Peripheral neuropathy
• Rashes
• Gum hypertrophy
• Thickening of the facial features
• Lymphadenopathy
• Chorea
• Sleep disturbance.

Remarkable side effects of other anti-epileptic drugs are:

• Drowsiness
• Blurred vision
• Dizziness
• Leukopenia
• SIADH and rash (carbamazepine)
• Liver toxicity (sodium valproate)
• Severe rash (lamotrigine)
• Retinal damage (vigabatrin)
• Aplastic anaemia (felbamate).
The nurse bleeped you because an obese patient is feeling nauseated and is vomiting. He is also complaining of seeing green and yellow halos.

He has recently been treated with a standard intravenous bolus of digoxin for fast atrial fibrillation. His creatinine clearance is normal. Digoxin toxicity is suspected.

What do you think is the cause of his symptoms?

(Please select 1 option)

- Decreased hepatic excretion
- Decreased protein binding
- Decreased renal clearance
- Decreased volume of distribution
- Increased half life

Digoxin is concentrated in tissues and therefore has a large apparent volume of distribution. Serum digoxin concentrations are not significantly altered by large changes in fat tissue weight so that its distribution space correlates best with lean (that is, ideal) body weight, not total body weight.

In this case a higher dose than necessary was given due to calculation on the patient total body weight, resulting in digoxin toxicity. In other words his distribution space had been overestimated. Ideal body weight should be used, rather than total body weight, when calculating doses.

Approximately 25% of digoxin in the plasma is bound to protein.
A 56-year-old man with septic shock is fully ventilated, on continuous veno-venous haemofiltration receiving noradrenaline, vancomycin and ciprofloxacin.

He has a mean arterial pressure (MAP) of 60 mmHg which is then not improved after changing from noradrenaline to adrenaline. There is no evidence of myocardial dysfunction.

Which of the following would be the most appropriate next step in managing this patient?

(Please select 1 option)

- ACTH stimulation test
- Activated protein C
- Change of inotropes
- Hydrocortisone  □ Correct
- Nitric oxide

The Surviving Sepsis Campaign (a partnership of the Society of Critical Care Medicine, the European Society of Intensive Care Medicine, and the International Sepsis Forum) has teamed up with the Institute for Healthcare Improvement to develop severe sepsis bundles. A 'bundle' is a group of interventions related to a disease process that, when executed together, result in better outcomes than when implemented individually.

Sepsis Resuscitation Bundle:

Should begin immediately, but must be accomplished within the first six hours of presentation.
1. Serum lactate measured.
2. Blood cultures obtained prior to antibiotic administration.
3. From the time of presentation, broad-spectrum antibiotics administered within three hours for ED admissions and one hour for non-ED ICU admissions.
4. In the event of hypotension and/or lactate > 4 mmol/l (36 mg/dl):
   - Deliver an initial minimum of 30 ml/kg of crystalloid (or colloid equivalent).
   - Apply vasopressors for hypotension not responding to initial fluid resuscitation to maintain mean arterial pressure (MAP) > 65 mm Hg.
5. In the event of persistent hypotension despite fluid resuscitation (septic shock) and/or lactate > 4 mmol/l (36 mg/dl):
   - Achieve central venous pressure (CVP) of > 8 mm Hg.
   - Achieve central venous oxygen saturation (ScvO2) of > 70%.

Sepsis Management Bundle:
To be accomplished as soon as possible may be completed within twenty-four hours of presentation.

1. Steroids administered for septic shock in accordance with a standardised ICU policy. ACTH stimulation test not required prior to this.
2. Glucose control maintained > lower limit of normal, but < 150 mg/dl (8.3 mmol/l).
3. Inspiratory plateau pressures maintained < 30 cm H2O for mechanically ventilated patients.

Drotrecogin alpha (activated protein C) used to be recommended by NICE for the treatment of severe sepsis. However, in October 2011 the company withdrew this from the market following the results of the PROWESS-SHOCK study, which showed there was no statistically significant reduction in 28-day all-cause mortality in patients with septic shock.

Nitric oxide is a non-proven therapy in adult respiratory distress syndrome (ARDS), but is less likely to be effective in this situation.

Reference:
A patient has just received intravenous ceftazidime. He immediately became flushed and wheezy, with a blood pressure of 80/40 mmHg.

Which of the following is the most appropriate immediate management for this patient?

(Please select 1 option)

- Chlorphenamine 10 mg IV
- Adrenaline 0.2 ml of 1:1000 IV
- Adrenaline 0.5 mg IV
- Adrenaline 0.5 mg IM
- Hydrocortisone 100 mg IV

Immediate treatment of anaphylaxis includes cessation of whatever caused it.

Then give oxygen, fluids and adrenaline 0.5mg intramuscularly.

Checking concentrations of adrenaline is very important especially in high pressure situations. Intravenous adrenaline is potentially hazardous unless diluted appropriately, and should only be used in cardiac arrest situations unless the clinician has experience of using it regularly.
Question 104 of 200

A 79-year-old male with critical ischaemia of his foot is awaiting below knee amputation and has lower limb pain despite IV paracetamol.

He is awake and lucid with normal observations.

His full blood count shows:

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<tr>
<th>Test</th>
<th>Value</th>
<th>Normal Range</th>
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<tr>
<td>Haemoglobin</td>
<td>120 g/L</td>
<td>(130-180)</td>
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<tr>
<td>White cell count</td>
<td>$14.0 \times 10^9$/L</td>
<td>(4-11)</td>
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<tr>
<td>Platelets</td>
<td>$67 \times 10^9$/L</td>
<td>(150-400)</td>
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Which of the following is the next most appropriate option for pain relief?

(Please select 1 option)

- Diclofenac 50 mg per oram
- Epidural analgesia
- A single shot femoral nerve block
- Morphine PCA
- **Tramadol**  ☑️ **Correct**

Of the options given, tramadol is the best and follows the WHO analgesic ladder.
In a 79-year-old arteriopath diclofenac is best avoided for fear of renal damage. It is now contraindicated for use in those with heart disease which must be assumed in a patient with limb ischaemia.

Epidural analgesia may confer benefits, especially pre-operatively for below knee amputation and would be appropriate if the operation were to be delayed. However with platelets of $67 \times 10^9$/L most anaesthetists would be reluctant to site one.

Femoral nerve block is a relatively simple procedure which may help, but will give incomplete cover (not much effect on ischaemic foot pain) and will only provide transient pain relief.

A morphine PCA would be appropriate if the patient was unable to take analgesia orally or if oral opiates proved ineffective. A PCA is generally only used for a short period but would be suitable for pain relief before and after the amputation as the delay before surgery should be short.
Question 105 of 200

A 57-year-old woman develops a blistering rash around the midriff and is diagnosed with herpes zoster.

She is treated with aciclovir.

Through inhibition of which of the following does aciclovir function?

(Please select 1 option)

- Integrase
- Polymerase ✅ Correct
- Protease
- Reverse transcriptase
- Thymidine kinase

Aciclovir is a synthetic purine nucleotide analogue and as such is a specific inhibitor of herpes virus DNA polymerase.
A 57-year-old woman develops a blistering rash around the midriff and is diagnosed with Herpes zoster. She is treated with aciclovir.

Which of the following is responsible for the activation of aciclovir?

(Please select 1 option)

- Integrase
- Polymerase
- Protease
- Reverse transcriptase
- Thymidine kinase

This is a variation on the aciclovir theme.

Aciclovir acts through inhibition of viral deoxyribonucleic acid (DNA) polymerase but it is a pro-drug and first requires phosphorylation by thymidine kinase.
A 55-year-old woman, who has a history of atrial fibrillation and is receiving warfarin and digoxin, informs you that she has been feeling down of late and has been self medicating with St John's wort which she obtained from a health shop.

Which of the following interactions may be expected between St John's Wort and her current medication?

(Please select 1 option)

- Digoxin concentrations are unlikely to be affected
- INR is likely to be increased
- INR is likely to be reduced  □ Correct
- INR is likely to be unaffected
- There is an increased risk of digoxin toxicity

St John's wort is now commonly taken for depressive symptoms, yet it is a liver enzyme inducer and therefore has interactions with medications typically reducing the efficacy.

In this regard, St John's wort may reduce the efficacy of warfarin, requiring increased dose to maintain the INR and it may also reduce the efficacy of digoxin.
Work Smart

Question 26 of 70

Which of the following drugs interacts with cranberry juice?

(Please select 1 option)

- Amiodarone
- Digoxin
- Propranolol
- Simvastatin
- Warfarin  Correct

Questions on this theme have appeared on previous examinations.

Warfarin interacts with cranberry juice. Simvastatin interacts with grapefruit juice.

Reference:

Work Smart

Question 107 of 200

A 56-year-old female who is taking warfarin for atrial fibrillation and has had a stable INR of between 2.0-2.5 over the last one year is noted to have an INR on the last visit of 7.8 (<1.4).

Consumption of which of the following may be responsible for this?

(Please select 1 option)

- Carrot juice
- Cranberry juice □ Correct
- Oil of evening primrose
- Orange juice
- St John's wort

Cranberry juice has been recognised to be responsible for a deranged INR, it being postulated that it inhibits cytochrome p450.

St John's wort induces cytoP450 and therefore reduces INR.
A 28-year-old female returns from a trip to Bangladesh with a fever, diarrhoea and rash. She is diagnosed with typhoid fever. However, she has a 1-month-old infant and wishes to continue to breast feed. Which of the following antibiotics is the most appropriate therapy for her?

(Please select 1 option)

- Ceftriaxone  □ This is the correct answer
- Chloramphenicol
- Ciprofloxacin  □ Incorrect answer selected
- Cotrimoxazole
- Gentamicin

Typhoid fever is best treated with quinolones, chloramphenicol or cotrimoxazole. However, with breast feeding chloramphenicol is relatively contraindicated as are quinolones due to potential risk even if small.

Cotrimoxazole is safe in breast feeding except with infants less than 2 months due to possible risk of increased bilirubin.

In pregnancy or children the drug of choice is parenteral ceftriaxone.

Reference:
Question 108 of 200

Which of the following antiemetics functions through inhibition of neurokinin (NK)1 receptor?

(Please select 1 option)

- Aprepitant
  - This is the correct answer
- Domperidone
- Hyoscine
  - Incorrect answer selected
- Granisetron
- Ondansetron

Aprepitant is a neurokinin receptor blocker used in the prevention of chemotherapy induced nausea.

Ondansetron and granisetron are 5HT3 antagonists.

Hyoscine is an anticholinergic/antihistaminergic.

Domperidone is an antidopaminergic agent.

Further Reading:

CenterWatch. [Emend (aprepitant)]
A 59-year-old male presents with a three day history of marked muscle aches and weakness.

He has ischaemic heart disease for which he takes a number of drugs including simvastatin and has been taking these drugs for a number of years without any problem. On this occasion his CPK confirms a diagnosis of rhabdomyolysis with a level of 4200 IU/L (<200).

Which of the following health supplements is he most likely to have taken that would have contributed to the statin-induced rhabdomyolysis?

(Please select 1 option)

- Cod liver oil capsules
- Cranberry juice
- Ginseng
- Grapefruit juice
- Vitamin C

Grapefruit juice significantly increases serum concentrations of some statins. This is achieved by reducing the CYP3A4-mediated first-pass metabolism in the small intestine. Concomitant use of atorvastatin and large amounts of grapefruit juice should be avoided, or the dose of atorvastatin should be reduced accordingly. CYP3A4 is a member of the cytochrome P450 system.

Whilst an interaction is increasingly being recognised between cranberry juice and warfarin, there has as yet been no interaction with other drugs metabolised via the P450 system.
No interaction has been shown between statins, omega-3 fish oils, ginseng or vitamin C.

Reference:

Answer Statistics

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Times answered: 8431

Test Analysis

Correct Incorrect Partially Correct

Score: 51.38%

Total Answered: 109
A 16-year-old female is admitted after taking an overdose of her mother’s propranolol tablets approximately two hours ago.

On examination she is drowsy and has a pulse of 40 beats per minute with a blood pressure of 80/40 mmHg. She is treated with activated charcoal, IV fluids and IV atropine but her bradycardia and hypotension fail to respond.

Which of the following would be the most appropriate next stage in her management?

(Please select 1 option)

- IV adrenaline
- IV amiodarone
- **IV glucagon**  Correct
- IV phenytoin
- Insertion of temporary pacemaker

In those in whom initial atropine is unsuccessful, IV glucagon is a recommended treatment for beta-blocker overdose, with some evidence indicating improvement in bradycardia and blood pressure.
Work Smart

Question 111 of 200

A 39-year-old male is receiving cisplatin based chemotherapy as therapy for lymphoma.

Which of the following is a typical side effect of cisplatin?

(Please select 1 option)

- Cerebellar ataxia
- Haemorrhagic cystitis
- Optic neuritis
- Ototoxicity
- Rhabdomyolysis

Typical side effects of cisplatin include:

- Marrow toxicity
- Ototoxicity
- Peripheral neuropathy
- Nephrotoxicity
- Alopecia, and
- Changes in taste.

Although optic neuritis is described it is not a typical side effect.
Work Smart

Question 28 of 70

A 25-year-old male presents after being bitten on the hand by a terrier. The wound appears deep and is associated with swelling.

After the wound is cleaned and he has received tetanus immunisation.

Which of the following antibiotic regimes would be most appropriate for this patient?

(Please select 1 option)

- Co-amoxiclav oral  □ Correct
- Doxycycline oral
- Flucloxacillin oral
- Penicillin G IM
- Trimethoprim oral

The use of prophylactic antibiotics in dog bites is controversial although evidence supports their use in deep wounds, bites to the hands, and signs of infection. Additionally, immune compromise should be considered as an indication together with involvement of deep structures such as joints or tendons or in the presence of prosthetic joints.

Co-amoxiclav is recommended as first-line treatment for all cat or human bites and other complicated animal bites. You should also note that the treatment of animal bites, particularly of the hand, may not be limited to antibiotics alone and you may need to seek the advice of a plastic surgeon about debridement or tendon repair.
Further Reading:

1. NHS Choices. Bites, human and animal - Treatment.

Answer Statistics

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Times answered: 5594

Test Analysis

Correct|Incorrect|Partially Correct

Score: 57.14%
Total Answered: 28
Work Smart

Question 29 of 70

A 36-year-old female presents with a six month history of having problems sleeping at night.

She has been woken on numerous occasions by her legs which are irritable and feel that they are being tugged. She needs to keep moving them. This urge lasts variable periods and she finds little relief from rubbing the legs. No abnormalities are noted on examination of her legs.

Which of the following is the most appropriate treatment for this patient?

(Please select 1 option)

- Amitriptyline
- Gabapentin
- Psychiatric referral
- Ropinirole - Correct
- Venlafaxine

This patient has features of restless legs syndrome.

Typically there is an uncomfortable sensation in the legs and a feeling of needing to move them. The exact aetiology is unknown.

Although no specific tests exist for the diagnosis it is based on the international restless legs syndrome study group four basic criteria for diagnosing RLS:

1. A desire to move the limbs, often associated with paraesthesias or dysaesthesias
2. Symptoms that are worse or present only during rest and are partially or temporarily relieved by activity
3. Motor restlessness, and
4. Nocturnal worsening of symptoms.

Treatment depends on the severity of the problem and the most appropriate treatment here would be ropinirole, which is the one agent, in the options, licensed for this purpose. Pramipexole and rotigotine are also licensed for moderate to severe restless legs.

Answer Statistics

1. 29%
2. 16%
3. 7%
4. 42%
5. 5%

Times answered: 10442

Test Analysis

Correct Incorrect Partially Correct
A 52-year-old woman who complains of exertional breathlessness presents to the clinic as she is desperate to stop smoking. She has had a number of unsuccessful attempts to stop smoking over the years and has tried nicotine patches.

Which of the following would be an appropriate choice to assist in her attempts at smoking cessation?

(Please select 1 option)

- Acupuncture
- Hypnotism
- Nicotine gum
- Nortriptyline
- Varenicline  □ Correct

Varenicline (Champix) is an oral anti-smoking agent with dual action, reducing the craving for cigarettes and also making the smoking of cigarettes less pleasurable. Action on Smoking and Health (ASH) have released guidance on its use. It appears to be effective and safe with the main side effect being nausea.

Varenicline appears to be more effective in clinical trials than either bupropion or placebo and is prescribed for 12 weeks in the first instance with further 12 week course if craving still persists.

Reference:

NICE. Varenicline for smoking cessation (TA123).
Question 30 of 70

A 45-year-old female attends the clinic complaining of headache and vomiting for five days. She has a history of scleroderma complicated by stage V chronic kidney disease.

On examination, she is tachycardic and has a blood pressure of 240/130 mmHg. Fundoscopy reveals grade 3 hypertensive retinopathy.

Which of the following is a centrally acting antihypertensive agent?

(Please select 1 option)

- Diazoxide
- Hydralazine
- Minoxidil
- Moxonidine
- Sodium nitroprusside

Moxonidine is centrally acting and is licensed for mild to moderate hypertension not controlled by beta blockers, ACE inhibitors, calcium channel antagonists and thiazides. It is a selective agonist at the imidazoline subtype 1 receptor. This receptor subtype is found in the medulla oblongata, and by acting on it moxonidine causes a decrease in sympathetic nervous system activity and therefore a decrease in blood pressure.

The other drugs listed are vasodilators in action.

Diazoxide and sodium nitroprusside can be used intravenously in hypertensive emergencies.
Minoxidil is reserved for when hypertension is resistant to other treatments; it causes fluid retention and oedema, however, it is effective in combination with a beta blocker and loop diuretic.

Hydralazine can be given orally also in combination with a diuretic and beta blocker. Side effects include reflex tachycardia and fluid retention.

Score: 56.67%
Total Answered: 30
A 55-year-old woman is attending clinic a number of months after having had a myocardial infarction. She has been commenced on appropriate drugs to reduce cardiovascular risk and has made dietary modifications for healthy living. Recently, however, she complains of muscle aches and pains and is found to have an elevated CPK.

Consumption of which of the following is likely to have contributed to increased statin-associated myotoxicity?

(Please select 1 option)

- Carrot juice
- Cranberry juice
- Garlic cloves
- **Grapefruit juice**  □ Correct
- Omega-3 fish oils

Grapefruit juice significantly increases serum concentrations of some statins. This is achieved by reducing the CYP3A4-mediated first-pass metabolism in the small intestine. Concomitant use of atorvastatin and large amounts of grapefruit juice should be avoided, or the dose of atorvastatin should be reduced accordingly. CYP3A4 is a member of the cytochrome P450 system.

Whilst a interaction is increasingly being recognised between cranberry juice and warfarin, there has as yet been no interaction with other drugs metabolised via the P450 system.
No interaction has been shown between statins, carrot juice, garlic or omega-3 fish oils. According to NICE CG172, patients should no longer be advised omega-3 supplementation to prevent another MI, although your knowledge about that is not tested in this question.

Reference:

1. NICE. Myocardial infarction: cardiac rehabilitation and prevention of further MI (CG172).
A 59-year-old male with type 2 diabetes is attending the foot clinic regularly. He has a neuropathic ulcer complicated by osteomyelitis. A deep wound swab has grown *Staphylococcus aureus* and *Escherichia coli*.

He also takes warfarin for atrial fibrillation.

Which of the following antibiotics will reduce the anticoagulant effect of warfarin?

(Please select 1 option)

- Ciprofloxacin
- Co-trimoxazole
- Erythromycin
- Metronidazole
- **Rifampicin**  □ Correct

The anticoagulant effect of warfarin can be affected by drugs, which induce or inhibit the action of enzymes involved in the metabolism of warfarin.

Rifampicin is known to induce the action of such enzymes, therefore increasing the metabolism of warfarin and so reducing its anticoagulant effect.

Erythromycin and ciprofloxacin inhibit the effect of these enzymes, therefore enhancing the anticoagulant effect of warfarin.

Metronidazole and co-trimoxazole inhibit the clearance of the active S isomer of warfarin, therefore
enhancing its anticoagulant effect.
A 60-year-old lady develops a fracture of the wrist following a fall; dual energy x ray absorptiometry (DEXA) scan reveals osteoporosis in lumbar spine and hip.

She has been commenced on once weekly alendronate 70 mg weekly and also takes a Calcichew tablet.

By what mechanism does the bisphosphonate function in the treatment of osteoporosis?

(Please select 1 option)

- Enhancing the absorption and action of vitamin D
- Enhancing the absorption of calcium from the gut
- Enhancing the survival and function of osteoblasts
- Enhancing the survival and function of osteoclasts
- Reducing the survival and function of osteoclasts  □ Correct

The mechanism of action of bisphosphonates involves the inhibition of farnesyl diphosphate synthase within osteoclasts. In doing this they interfere with geranylgeranylation (attachment of the lipid to regulatory proteins), which causes osteoclast inactivation. This leads to reduced bone turnover, increased bone mass and improved mineralisation.

Bisphosphonates licensed for the prevention and treatment of osteoporosis include alendronate, risedronate and ibandronate.

The bisphosphonates zoledronate and pamidronate are used for the treatment of metastatic bone
disease and short term management of hypercalcaemia.

Reference:
Question 114 of 200

A 30-year-old patient with learning difficulties is admitted as a medical emergency. The patient complains of headache, anorexia and vomiting. On examination she is febrile with a temperature of 38°C, pulse 110 bpm and is clinically jaundiced.

Investigations reveal:

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<tr>
<th>Test</th>
<th>Result</th>
<th>Normal Range</th>
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<tbody>
<tr>
<td>Bilirubin</td>
<td>60 µmol/L</td>
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<tr>
<td>Albumin</td>
<td>28 g/L</td>
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<tr>
<td>AST</td>
<td>400 IU/L</td>
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<tr>
<td>Alkaline phosphatase</td>
<td>400 IU/L</td>
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<td>Prothrombin time</td>
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She was commenced on a new medication within the last three months.

Which do you suspect may be contributing to the presentation?

(Please select 1 option)

- Cabergoline
- Carbamazepine (Incorrect answer selected)
- Lamotrigine
- Metformin
- Sodium valproate (This is the correct answer)
Sodium valproate can occasionally have an idiosyncratic response leading to severe or even fatal hepatic toxicity.

This is more common if the patient has a metabolic or degenerative disorder, organic brain disease or severe seizures associated with mental retardation. Usually this reaction occurs within the first three months of therapy.

Carbamazepine can be associated with jaundice occasionally, however the history of mental retardation and short history of drug use point to sodium valproate as the cause.

Lamotrigine can disrupt liver function tests (LFTs).

Metformin and cabergoline do not affect liver function however caution is advised when using these drugs in patients with hepatic disease.

Answer Statistics

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Times answered: 8288

Test Analysis

Correct Incorrect Partially
Correct 8%
Incorrect 32%
Partially 12%
Correct 4%
Partially 45%
Question 115 of 200

A 17-year-old boy is admitted with a severe paracetamol overdose following an argument with his girlfriend.

He is treated with intravenous N-acetylcysteine.

Paracetamol is normally metabolised to harmless compounds except in overdose.

Which of the following compounds is the toxic metabolite that accumulates during paracetamol overdose and is reduced by treatment with N-acetylcysteine?

(Please select 1 option)

- Glucuronide
- Homocysteine
- Methionine
- N-acetyl-p-benzoquinoneimine
- N-hydroxyacetaminophen

Paracetamol is predominantly metabolised to glucuronide and sulphate conjugates which are excreted in the urine.

Routledge et al. state¹:

"hepatotoxicity is related to the conversion of a small proportion of the ingested dose to N-acetyl-p-benzoquinoneimine. In therapeutic doses N-acetyl-p-benzoquinoneimine is detoxified
by conjugation with glutathione in the liver, but once the protective intracellular glutathione stores are depleted hepatic and renal damage may ensue."

NAC and methionine replenish glutathione stores in the liver and may also act through its sulphhydryl (-SH) group as a direct reducing agent.

Reference:

Work Smart

Question 33 of 70

A 60-year-old female suffers from bipolar affective disorder and is being treated with lithium. She also has a long history of hypertension for which she is on treatment.

During a recent clinic visit her blood pressure was noted to be 170/94 mmHg and a new antihypertensive agent was added. A week later she presents with features of lithium toxicity including tremor, nausea and weakness.

The addition of which one of the following drugs was likely to have precipitated the lithium toxicity?

(Please select 1 option)

- Doxazosin
- Hydralazine
- Lisinopril  □ Correct
- Minoxidil
- Moxonidine

The precipitation of lithium toxicity by diuretics is well appreciated. Yet ACE inhibitors [log-in required for full text] and angiotensin antagonists are also capable of precipitating lithium toxicity through reduced lithium clearance.

Other drugs that may precipitate lithium toxicity include:

- NSAIDs
- Tetracycline
Phenytoin, and
Ciclosporin.

Answer Statistics

1 7%
2 13%
3 66%
4 7%
5 7%

Times answered: 8408

Test Analysis

Correct Incorrect Partially Correct

Score: 60.61%
Total Answered: 33

Feedback
Work Smart

Question 116 of 200

A 22-year-old car mechanic comes to see your nurse, the morning after a fight in a pub. He sustained a deep laceration to his knuckle, allegedly in self-defence, from his assailant's tooth.

After the wound is cleaned and he has received tetanus immunisation, which of the following antibiotic regimens would be most appropriate for this patient?

(Please select 1 option)

- Co-amoxiclav oral  □ Correct
- Doxycycline oral
- Flucloxacillin oral
- Penicillin G IM
- Trimethoprim oral

There is little research into this area but human bites are notorious for causing infection.

This type of closed fist injury is very susceptible to deep infection because the tendon can be infected at the point of injury and then when the hand relaxes, it slips back into its sheath and is impossible to clean fully.

Broad spectrum antibiotics, typically co-amoxiclav, are used. The possibility of blood borne viruses should also be considered here, and he should be offered testing for hepatitis B, C and HIV if appropriate. In patients who are penicillin allergic, doxycycline plus metronidazole is a typical first choice regimen.
Further Reading:
Patient.info. Human and Animal Bites.

Answer Statistics

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Times answered: 6059

Test Analysis

Correct Incorrect Partially
Correct

Score: 52.59%

Total Answered: 116

Feedback
Work Smart

Question 117 of 200

A 70-year-old man presents with an episode of syncope.

On subsequent investigation he is found to have marked postural hypotension. He has been taking felodipine for hypertension for a number of years and he also takes aspirin. On further questioning he appears to have taken up a new healthier lifestyle on his seventieth birthday.

Which of the following health supplements is he most likely to have taken that would have contributed to the calcium-channel blocker induced hypotension?

(Please select 1 option)

- Cod liver oil capsules
- Cranberry juice
- Ginseng
- Grapefruit juice
- Vitamin C

Multiple studies have demonstrated this interaction between grapefruit juice and felodipine. Felodipine is normally metabolised in the GI tract and liver by CYP3A4. Grapefruit juice contains bergamottin which INHIBITS CYP3A4, thereby increasing the bioavailability of felodipine and the risk of toxicity.

Further Reading:

Sica DA. Interaction of grapefruit juice and calcium channel blockers. *Am J Hypertens.* 2006;19:768-
### Answer Statistics

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Times answered: 7110

### Test Analysis

Correct | Incorrect | Partially Correct | Score: 52.14%

Total Answered: 117
A 48-year-old man is admitted with nausea and excessive drowsiness after taking an antihistamine tablet. He has previously used the antihistamine but on this occasion he has recently been drinking large amounts of grapefruit juice for his health.

Grapefruit juice is suspected of causing a drug interaction in this man.

Which of the following liver enzyme systems is affected by grapefruit juice?

(Please select 1 option)

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<tr>
<td>Cytochrome p450 3A4</td>
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<td>Glucuronidation</td>
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<td>Glutathione S-transferase</td>
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<td>Glycine decarboxylase</td>
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<td>Sulfation</td>
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Bergamottin is a constituent of grapefruit juice and is metabolised by the cytochrome p450 3A4 pathway.
Work Smart

Question 34 of 70

Which of the following antiemetics functions through antagonism of the 5-hydroxytryptamine 3A receptor?

(Please select 1 option)

- Aprepitant
- Domperidone
- Hyoscine
- Metoclopramide
- Ondansetron  ☑ Correct

Ondansetron is a serotonin 5-HT3 receptor antagonist used mainly to treat nausea and vomiting following chemotherapy.

Its effects are thought to be on both peripheral and central nerves. One part is to reduce the activity of the vagus nerve, which is a nerve that activates the vomiting center in the medulla oblongata, the other is a blockage of serotonin receptors in the chemoreceptor trigger zone.

It does not have much effect on vomiting due to motion sickness.

This drug does not have any effect on dopamine receptors or muscarinic receptors.
Work Smart

Question 35 of 70

Which of the following antiemetics functions as a cholinergic muscarinic antagonist?

(Please select 1 option)

- Aprepitant
- Domperidone
- Hyoscine
- Metoclopramide
- Ondansetron

Scopolamine is named after the genus *Scopolia*.

The name 'hyoscine' is from the scientific name for henbane, *Hyoscyamus niger*.

It acts as a competitive antagonist at muscarinic acetylcholine receptors; it is thus classified as an anticholinergic or as an antimuscarinic drug.
Work Smart

Question 36 of 70

Which of the following cytotoxic agents acts by inhibiting purine synthesis?

(Please select 1 option)

- Bleomycin
- Cisplatin  ■ Incorrect answer selected
- Doxorubicin
- Methotrexate  ■ This is the correct answer
- Vincristine

Methotrexate inhibits dihydrofolate reductase, thereby inhibiting the production of tetrahydrofolate required for thymidine and purine synthesis. It is therefore cytotoxic during the S-phase of the cell cycle, and has a greater toxic effect on rapidly dividing cells.

Bleomycin acts by inducing DNA strand breaks.

Cisplatin crosslinks DNA, initiating DNA repair mechanisms and subsequently apoptosis.

Doxorubicin inhibits the action of topoisomerase II, which is required for DNA transcription.

Vincristine is a vinca alkaloid, which disrupts microtubules and thereby arrests mitosis in metaphase.
A 29-year-old man is starting a chemotherapy regime that includes cisplatin.

Which of the following is the mechanism of action of cisplatin?

(Please select 1 option)

- Causes crosslinking in DNA  
- Degrades preformed DNA
- Inhibits purine synthesis
- Reduces the formation of microtubules
- Stabilises DNA-topoisomerase II complex

By crosslinking DNA in various ways, Cisplatin makes it impossible for rapidly dividing cells to duplicate their DNA for mitosis.
Question 120 of 200

A 42-year-old man presented with confusion following a seizure.

He has a history of epilepsy and is also known to the community psychiatry team.

Examination reveals that he has a temperature of 37°C, BP 138/84 mmHg, coarse tremor and a pulse of 90 bpm. On examination he has brisk reflexes, and 7 beats of nystagmus on lateral gaze.

Which of the following is the most likely underlying diagnosis?

(Please select 1 option)

- Benzodiazepine overdose
- Carbamazepine toxicity
- Lithium toxicity - This is the correct answer
- Neuroleptic malignant syndrome - Incorrect answer selected
- Tricyclic overdose

The tremor, seizure and confusion should raise the possibility of lithium toxicity which is the condition that best fits this clinical picture.

Lithium toxicity occurs at levels above 1.4 mmol/L and can result in:

- Anorexia
- Diarrhoea
- Vomiting
Ataxia
• Nystagmus
• Dysarthria
• Confusion, and
• Seizures.

In therapeutic range it can be associated with a fine tremor, which can become coarser in toxicity. If allowed to progress, toxicity will result in coma with hyperreflexia and increased tone. Neurological damage can be irreversible. AV block can also occur, commonly first degree but complete heart block is also seen.

Generally, treatment is supportive and attention must be paid to electrolytes, fluid balance, renal function and seizure control. Toxbase should be consulted, as bowel irrigation can be used in significant recent overdose. Diuretics should be avoided. Haemodialysis may be required, and benzodiazepines can control agitation.

Benzodiazepine overdose presents with:

• Somnolence
• Diplopia
• Ataxia
• Impaired motor function
• Anterograde amnesia
• Delirium
• Aggression
• Hallucinations
• Nausea and
• Vomiting.

In severe overdose there can be:

• Coma
• Apnoea
• Hypothermia
• Hypotension
• Bradycardiac and
• Cardiac arrest.

Carbamazine overdose presents with:

• Drowsiness
• Slurred speech
• Ataxia
• Hallucinations
• Nausea
• Vomiting
• Tremor
• Blurred vision
• Seizures
• Oliguria, and
• Bullous skin lesions.

The presence of nystagmus and hyperreflexia in this case make lithium more likely (but they do share a number of features in toxicity).

Neuroleptic malignant syndrome results in rigidity, fever, autonomic instability, delirium and elevated plasma creatinine phosphokinase.

Tricyclic antidepressants are very toxic in overdose and result in:

• Tachycardia
• Somnolence
• Dry mouth
• Nausea and vomiting
• Urinary retention
• Confusion
• Agitation, and
• Headache.

Severe cases result in hypotension, dysrhythmias (sinus tachycardia, QT prolongation, widening of the QRS), hallucinations and seizures.

Further Reading:
Medscape. Lithium Toxicity.

Answer Statistics

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Times answered: 8733
Work Smart

Question 121 of 200

A 29-year-old man who is a keen amateur photographer with his own development studio presented to the Emergency department with confusion. His partner said he had been under a great deal of stress recently and she found him foolishly drinking a developer solution with a poison symbol on it. He is hypoxic and hypotensive.

The local poisons unit suggests a diagnosis of cyanide poisoning.

Which of the following would be the most appropriate treatment?

(Please select 1 option)

- Desferrioxamine
- Dicobalt EDTA [Correct]
- Gastric lavage with Fuller’s earth
- Haemodialysis
- Penicillamine

Potassium ferricyanide is used chiefly for blueprints in photography, for staining wood, in calico printing, and in electroplating.

Kelocyanor (dicobalt EDTA), given by intravenous injection has been proven to be of use when administered to seriously ill victims of confirmed cyanide poisoning. It is itself toxic, however, and can kill if used wrongly.

HSE knows of several cases of inappropriate use resulting in hospital treatment. Its administration is
beyond the scope of first aid and a recommendation has been made in the past that a 'Kelocyanor kit' should be kept by users of cyanide and transported to hospital with the patient.

Unfortunately we are aware of cases where this has misled doctors to treat patients for cyanide poisoning when this diagnosis was not correct.

Reference:
Health and Safety Executive. Cyanide poisoning - Recommendations on first aid treatment for employers and first aiders.
A 72-year-old lady presented three hours after taking an overdose of a sustained-release propranolol preparation.

She has a pulse of 40 bpm and a BP of 90/60 mmHg. She was given atropine by the Emergency Department staff but there has been little response.

Which of the following is the most appropriate treatment?

(Please select 1 option)

- Activated charcoal
- Fluid boluses, atropine, and vasopressors [Correct]
- Haemodialysis
- N-acetylcysteine
- Salbutamol

The mainstay of management for beta blocker overdose is supportive measures: fluid resuscitation, vasopressors, and atropine. After that you may move to external cardiac pacing to maintain sufficient cardiac output.

Monitor for hyperkalaemia.

Activated charcoal can be given if less than 1 hour since ingestion.

Glucagon was previously recommended but now an alternative is high dose insulin euglycaemic therapy.
Glucagon for the treatment of symptomatic beta blocker overdose
A patient is suspected of having taken a substance with anticholinesterase effects.

Which of the following combinations of signs, if present, would be the most likely to confirm this effect?

(Please select 1 option)

- Bradycardia and miosis  □ Correct
- Bradycardia and mydriasis
- Bradycardia and urinary retention
- Tachycardia and diarrhoea
- Tachycardia and lacrimation

An acetylcholinesterase inhibitor or anticholinesterase is a chemical that inhibits the cholinesterase enzyme from breaking down acetylcholine (ACh), so increasing both the level and duration of action of the neurotransmitter acetylcholine.

ACh can stimulate postganglionic receptors to produce effects such as:

- Salivation
- Lacrimation
- Defecation
- Micturition
- Sweating
Miosis
• Bradycardia, and
• Bronchospasm.

Muscarine produces these effects, and hence they are referred to as muscarinic effects, and the postganglionic receptors are called muscarine receptors.

SLUD (Salivation, Lacrimation, Urination, Defecation - and emesis) is a syndrome of pathological effects indicative of massive discharge of the parasympathetic nervous system.

Unlikely to occur naturally, SLUD is usually encountered only in cases of drug overdose or exposure to nerve gases. Nerve gases irreversibly inhibit the enzyme acetylcholinesterase; this results in a chronically high level of acetylcholine at cholinergic synapses throughout the body, thus chronically stimulating acetylcholine receptors throughout the body.
A 23-year-old man with known peanut allergy presented to the Emergency department with anaphylaxis. He has a swollen face and lips.

His BP is 90/60 mmHg, pulse 110 bpm and he is wheezy.

Which of the following formulations of adrenaline should be given?

(Please select 1 option)

- 0.5 ml of 1:10000 adrenaline IM
- 0.5 ml of 1:1000 adrenaline IM — This is the correct answer
- 5 ml of 1:1000 adrenaline IM
- 10 ml of 1:10000 adrenaline IV
- Nebulised adrenaline

For adults, a dose of 0.5 mL adrenaline 1:1000 solution (500 micrograms) should be administered intramuscularly, and repeated after about five minutes in the absence of clinical improvement or if deterioration occurs after the initial treatment especially if consciousness becomes - or remains - impaired as a result of hypotension.

The intramuscular (IM) route for adrenaline is the route of choice for most healthcare providers. There is a much greater risk of causing harmful side effects by inappropriate dosage or misdiagnosis of anaphylaxis when using IV adrenaline.

Adult EpiPen which allergy sufferers can carry with them contains 0.3 mg or 0.15 mg adrenaline in a
1:1000 dilution for intramuscular (IM) injection.

Answer Statistics

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Times answered: 9969

Test Analysis

Correct Incorrect Partially Correct

Score: 52.42%
Total Answered: 124

Feedback
Work Smart

Question 125 of 200

A 35-year-old man carrying a medical emergency card indicating a history of acute intermittent porphyria is brought to the Emergency department by the police. He has been violent with acute psychosis.

Which of the following sedatives is recommended for use in this circumstance?

(Please select 1 option)

- Chloral hydrate
- This is the correct answer
- Diazepam
- Haloperidol □ Incorrect answer selected
- Phenobarbitone

Diazepam, haloperidol and chlorpromazine are safe for use in patients with AIP. However, chlorpromazine is the one which is recommended for the management of the psychiatric symptoms and can also reduce nausea. Diazepam is usually used for the management of seizures in these patients rather than as a sedative.

Haloperidol is not recommended as a first line.

Phenobarbitone can precipitate attacks of AIP and is therefore contraindicated in these patients.

The [European Porphyria Network](https://www.eurpp.org) website contains a lot of useful information including recommended treatment for an acute attack and a list of medications thought to be safe for use in AIP.
A 45-year-old lady with a history of depression presented to the Emergency department drowsy. Her repeat prescription says she is taking diazepam and dosulepin, and the ambulance crew say that she has taken an overdose of her medication. Her BP is 140/80 mmHg, pulse 130 bpm, respiratory rate 7 per minute and O₂ sats 98% on air.

Which of the following is the most appropriate next action?

(Please select 1 option)

- Give flumazenil
- Give naloxone
- Obtain an ECG **Correct**
- Refer for urgent haemodialysis
- Start N-acetylcysteine infusion

This is a tricky case and will catch those who go for the first answer they see that is reasonable.

The urge is quickly to treat the drowsy patient with respiratory depression with some sort of antidote, but there needs to be a diagnostic step first.

Tricyclic antidepressants can cause fatal arrhythmias and seizures which are very difficult to manage.

An electrocardiogram (ECG) would immediately indicate if there is a risk of significant tricyclic toxicity by showing a wide QRS complex or abnormal axis deviation.
A 51-year-old lady enquires about taking hormone replacement therapy (HRT).

Which of the following is the most compelling indication for taking HRT?

(Please select 1 option)

- Control flushing
- Prevent Alzheimer's disease
- Prevent ischaemic heart disease
- Prevent osteoporosis
- Reverse vaginal atrophy

The indications for HRT have been a matter of great debate over recent years. Relieving the symptoms of menopause is the most compelling indication. There has been discussion about whether it also results in the other benefits set out in the question stem but the evidence is mixed.
Work Smart

Question 128 of 200

A 60-year-old lady presented with heartburn. She is known to have osteoporosis and has been taking alendronate for a number of years.

Which of the following is the most likely cause of her symptoms?

(Please select 1 option)

- Achalasia
- Calcification of lower oesophageal sphincter
- Crush fracture
- Ischaemic heart disease
- Oesophagitis  ☑️ Correct

"Oral bisphosphonates seem to induce serious esophagitis in some patients, may result in gastritis and cause diarrhoea. When used as recommended, serious esophageal complications are few. Patients with known esophageal disease (e.g. achalasia, stricture, Barrett's esophagus, severe reflux and scleroderma) should avoid taking oral bisphosphonates."

Interestingly, when patients get GI side effects with bisphosphonates, treatment with PPIs is usually ineffective and the only way of alleviating is by stopping the bisphosphonate.

Reference:

Work Smart

Question 129 of 200

A 55-year-old man on treatment for hypertension, epilepsy and gastro-oesophageal reflux disease presented with an urticarial skin eruption. A drug reaction is suspected since he has recently started a new drug.

Which of the following medications is most likely to be responsible?

(Please select 1 option)

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<tbody>
<tr>
<td>🌟 Aspirin</td>
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<td></td>
<td>Atorvastatin</td>
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<tr>
<td></td>
<td>Omeprazole</td>
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<td></td>
<td>Paracetamol</td>
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<tr>
<td></td>
<td>Sodium valproate</td>
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</table>

Urticaria is one of the most common dermatologic problems seen by primary care physicians and often a source of frustration for patient and physician alike. Pinpointing the cause may be challenging—or impossible—because of the many and varied triggers.

Patients with aspirin sensitivity can present with either mucosal reactions (the aspirin triad of nasal polyposis, sinusitis, and asthma) or cutaneous reactions (urticaria or anaphylaxis).

Further Reading:

Question 130 of 200

A 30-year-old lady who suffers from migraine complains that taking the recommended dose of paracetamol during an attack fails to relieve her headache.

She has no other significant past medical history. She is a smoker of 15 cigarettes per day and also drinks alcohol 16 units per week.

Which of the following factors most likely explains the lack of efficacy of paracetamol in this lady?

(Please select 1 option)

- Bacterial overgrowth
- Delayed gastric emptying
- First pass metabolism
- p450 enzyme induction
- p450 enzyme inhibition

"When salicylate absorption from effervescent aspirin tablets was studied during migraine, the rate of absorption was found to be reduced relative to that found in non-migrainous volunteers and in the same patients when headache-free. There is evidence that this reduced rate of absorption is caused by gastrointestinal stasis and reduced rate of gastric emptying. Patients in whom aspirin absorption was delayed were more likely to take longer to respond and to require additional treatment."¹

Metoclopramide may be useful in accelerating gastric emptying.

The same has also been shown with paracetamol absorption.²
Reference:

Work Smart

Question 131 of 200

A 35-year-old woman with known seafood allergy presented after developing an itchy rash at a restaurant. She had widespread urticaria which spared her neck and face.

On examination, her blood pressure was 130/70 mmHg, pulse 95 bpm, respiratory rate 24/min and O₂ saturation 99% on air.

Intravenous hydrocortisone and intramuscular antihistamine have been given.

What is the next most appropriate step in the management of this patient?

(Please select 1 option)

- Inhaled adrenaline

- Intramuscular adrenaline

- Intravenous adrenaline

- Observe

- Subcutaneous adrenaline

Where there is a history of a typical allergic reaction, as here, current United Kingdom resuscitation guidelines suggest adrenaline if there is:

- Stridor
- Wheeze
- Respiratory distress, or
- Clinical evidence of shock.
A literature review in the BMJ includes a copy of the algorithm and a discussion of the evidence for adrenaline¹.

Reference:

Work Smart

Question 37 of 70

A 65-year-old man has locally advanced pancreatic cancer and has been paying privately for treatment with erlotinib (Tarceva) for the past nine months. It has worked effectively for that period but a recent CT scan showed further growth in the tumour.

Which of the following mechanisms best explains this resistance to treatment with erlotinib?

(Please select 1 option)

- Development of antibodies to erlotinib
- Lack of autophosphorylation at binding site
- Malabsorption
- Mutation in the ATP binding pocket of the EGFR kinase domain
- Reduced expression of EGFR

Erlotinib specifically targets the epidermal growth factor receptor (EGFR) tyrosine kinase (which is required for the conformational change) and binds in a reversible fashion to the adenosine triphosphate binding site.

For the signal to be transmitted, two members of the EGFR family need to come together to form a homodimer. These then use the molecule of adenosine triphosphate (ATP) to autophosphorylate each other, which causes a conformational change in their intracellular structure, exposing a further binding site for binding proteins that cause a signal cascade to the nucleus. By inhibiting the ATP, autophosphorylation is not possible and the signal is stopped.
A key issue with EGFR-directed treatments is that after a period of 8-12 months, the cancer cells become resistant to the treatment. This most commonly occurs due to a mutation in the ATP binding pocket of the EGFR kinase domain. This prevents the binding of erlotinib (Tarceva).

Some IGR-1R inhibitors are in various stages of development (based either around tyrphostins such as AG1024 or AG538 or pyrrolo[2,3-d]-pyrimidine derivatives such as NVP-AEW541).

Score: 56.76%
Total Answered: 37
A 24-year-old promising athlete is diagnosed with chronic fatigue syndrome.

Which of the following treatments is indicated?

(Please select 1 option)

- Graded exercise therapy
- Group therapy
- Prednisolone
- Seroxat
- Thyroxine

NICE have published guidance on the diagnosis and management of Chronic fatigue syndrome/myalgic encephalomyelitis (or encephalopathy) (CG53). To confirm a diagnosis of fatigue the following main features need to be present:

- It must be new in onset, persistent or recurrent and unexplained by other conditions.
- It should be characterised by post-exertional malaise.
- It should result in a substantial reduction in activity level.

Associated symptoms include:

- Hypersomnia or insomnia
- Muscle or joint pain without inflammation
• Painful lymph nodes without lymphadenopathy
• Headaches
• Cognitive dysfunction.

Red flag symptoms which suggest another diagnosis include:

• Significant weight loss
• Inflammatory arthropathy or connective tissue disease
• Localising or focal neurological signs.

The diagnosis of CFS is one of exclusion, and features must have been present for at least four months in an adult.

Clinicians should check:

• Full blood count (FBC)
• Urea and electrolytes (U&Es)
• Urinalysis
• Liver function tests (LFTs)
• Thyroid function
• Erythrocyte sedimentation rate (ESR)
• C reactive protein (CRP)
• Blood glucose
• Creatinine
• Gluten sensitivity calcium
• Creatinine kinase, and
• Ferritin.

Initial treatment should focus on management of symptoms, and minimising their impact on daily activities. Patients must be encouraged to continue work and studies. Any therapy should be person-centred and should aim to improve the patient's capacity to manage their symptoms.

The majority of research evidence is for cognitive behavioural therapy (CBT) and/or graded exercise therapy and these should be offered to all people with mild or moderate CFS.

In addition, patients should be given tailored sleep management advice including how to introduce rest periods into their daily routine. Relaxation techniques should be offered for the management of pain, sleep problems, stress and anxiety.

There is no research evidence to support the experience of some patients with CFS that they are more intolerant of drug treatment. In addition, there is insufficient evidence to recommend the use of complementary therapies or vitamin supplementation.

The following drugs should not be used:
Referral to specialist CFS care should be offered within six months of presentation to people with mild CFS, within three to four months for moderate CFS and immediately for severe CFS.

If chronic pain is a predominant feature, referral to a pain management clinic should be considered. Amitriptyline should be considered for patients with poor sleep or pain.

Patients should be advised that relapses and setbacks are to be expected.

Answer Statistics

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Times answered: 8942
A 55-year-old gentleman has been taking methotrexate 7.5 mg weekly for seronegative erosive rheumatoid arthritis with considerable clinical and symptomatic improvement. He has been on this dose for three months.

His most recent investigations, performed two days ago, reveal the following:

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
<th>Reference Range</th>
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<tbody>
<tr>
<td>Haemoglobin</td>
<td>129 g/L</td>
<td>(120-165)</td>
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<tr>
<td>White cell count</td>
<td>5.3 ×10⁹/L</td>
<td>(4-11)</td>
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<tr>
<td>Platelets</td>
<td>183 ×10⁹/L</td>
<td>(150-400)</td>
</tr>
<tr>
<td>Urea</td>
<td>4.2 mmol/L</td>
<td>(2.5-7.5)</td>
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<tr>
<td>Creatinine</td>
<td>88 µmol/L</td>
<td>(60-110)</td>
</tr>
<tr>
<td>Alkaline phosphatase</td>
<td>92 U/L</td>
<td>(60-110)</td>
</tr>
<tr>
<td>AST</td>
<td>22 U/L</td>
<td>(1-31)</td>
</tr>
<tr>
<td>ALT</td>
<td>15 U/L</td>
<td>(5-35)</td>
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</table>

When should the next FBC be performed?

(Please select 1 option)

- One week
- Two weeks
- One month □ This is the correct answer
Six months

Incorrect answer selected

One year

His results are normal and he is receiving a stable dose of methotrexate.

The most appropriate time interval for monitoring his full blood count (FBC) according to current UK guidance would therefore be in one month.

Clinicians are recommended to check FBC fortnightly until 6 weeks after the last dose increase. Provided it is stable, it can be checked monthly thereafter until the dose and disease is stable for one year.

Thereafter, monitoring is guided by clinical judgement. If white cell count is less than 3.5, neutrophils less than 2 or platelets less than 150, methotrexate should be withheld pending discussion with the specialist team. An MCV greater than 105 fL warrants checking B12, folate and TSH and treating any abnormality. If these are normal, discuss with the specialist team.

Liver function tests should be checked three monthly. If there is an unexplained decrease in albumin, or AST/ALT twice the upper limit of normal, the specialist team should be informed.

Urea, creatinine and electrolytes should be checked six monthly. If the estimated glomerular filtration rate falls below 50 mL/minute, methotrexate should be withheld until the result has been discussed with the specialist team.

In addition to this monitoring, any clinical signs of toxicity should be monitored for. If the patient develops rash, oral ulceration, nausea, vomiting or diarrhoea, methotrexate should be withheld until discussed with the specialist team. Any new or increasing dyspnoea or dry cough should be urgently discussed with secondary care, and methotrexate withheld. A sore throat or abnormal bruising should be investigated with an FBC, and methotrexate withheld until the results available.

Reference:

NICE Clinical Knowledge Summaries. Methotrexate monitoring requirements.
A 45-year-old male is being treated with imatinib for chronic myeloid leukaemia (CML).

To which of the following classes does imatinib belong?

(Please select 1 option)

- [ ] Angiogenesis inhibitor
- [ ] Epidermal growth factor inhibitor
- [ ] Interferon
- [ ] Proteosome inhibitor
- [x] Signal transduction inhibitor  

Imatinib is a tyrosine kinase inhibitor which is fairly specific for the bcr/abl protein. It blocks the active site, which has a number of downstream effects. The result is reduced cell proliferation, reduced cell motility, decreased adhesion and increased apoptosis.

NICE recommend that imatinib should be used to treat people in the accelerated or blast crisis phase of CML. It is also indicated in the treatment of gastrointestinal stromal tumours.
A 55-year-old lady has recently commenced on 20 mg of leflunomide daily for sero-negative rheumatoid arthritis.

At baseline, prior to commencing the drug, her AST was 33 U/L (1-31) and her ALT was 40 U/L (5-35).

She attends for routine blood monitoring. Her FBC is normal but her liver function tests (LFTs) reveal:

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Normal Range</th>
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<tbody>
<tr>
<td>AST</td>
<td>58 U/L</td>
<td>(1-31)</td>
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<tr>
<td>ALT</td>
<td>71 U/L</td>
<td>(5-35)</td>
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<tr>
<td>Alkaline phosphatase</td>
<td>100 U/L</td>
<td>(45-105)</td>
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<tr>
<td>Bilirubin</td>
<td>12 µmol/L</td>
<td>(1-22)</td>
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</table>

What is the most appropriate management option for this patient?

(Please select 1 option)

- [ ] Continue leflunomide and monitor LFTs in one month
- [ ] Continue leflunomide and monitor LFTs in two weeks
- [x] Reduce the dose and recheck LFTs in one week
- [ ] Stop leflunomide and commence washout procedure
- [ ] Stop the leflunomide and repeat tests in two weeks
Leflunomide is associated with serious hepatotoxicity.

Increased aminotransferases are commonly seen in association with therapy occurring in 15-20% of cases (less than a twofold rise).

However, more serious elevation (greater than threefold) is seen in less than 5%.

Generally, most hepatic events occur within the first six months of use. It is recommended liver function tests (LFTs) be checked monthly for six months and, if stable, two monthly thereafter.

If aspartate aminotransferase (AST) or alanine aminotransferase (ALT) is between two and three times the upper limit of normal, and the leflunomide dose is more than 10 mg daily, the dose should be reduced to 10 mg and LFTs rechecked weekly until normalised. If the ALT and AST are returning to normal, the patient should be left on 10 mg per day. If the LFTs remain elevated, leflunomide should be stopped and discussed with the specialist team.

If the AST or ALT is more than three times the upper limit of normal, the LFTs should be rechecked within 72 hours. If they remain more than three times the reference range, leflunomide should be stopped and washout considered (cholestyramine and activated charcoal). It is important to note that the half life of leflunomide is usually two weeks (mean 1-4) therefore if a rapid response is required, washout should be considered.

Current UK guidance also recommends frequent monitoring for patients on leflunomide. Full blood count (FBC) should be checked monthly for six months and, if stable, two monthly thereafter.

White cell count less than 3.5, neutrophils less than 2 or platelets less than 150 should be discussed with the specialist team, and leflunomide withheld until this has taken place.

Monitoring should be continued at least monthly in the long term if leflunomide is co-prescribed with any other immunosuppressant or potentially hepatotoxic agent.

In addition, signs of leflunomide toxicity should be monitored. If the patient develops a rash or itch dose reduction should be considered, with or without the addition of antihistamines. If severe, leflunomide should be stopped and washout considered.

Hair loss, headaches and gastrointestinal upset may also warrant dose reduction or washout.

A blood pressure of greater than 140/90 mmHg should be treated as per NICE guidelines. If it remains elevated, stop leflunomide and consider washout.

Weight should be monitored, and a weight loss of greater than 10% should be identified. If no other cause can be found, consider dose reduction or washout.

If there is increasing shortness of breath, pneumonitis should be considered and leflunomide should be stopped.

Reference:
### Answer Statistics

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Times answered: 9032

### Test Analysis

- Correct
- Incorrect
- Partially Correct

Score: 51.85%

Total Answered: 135

### Feedback
Question 136 of 200

A 24-year-old female who has previously suffered with severe depression presents with secondary amenorrhoea.

She is found to have a prolactin of 645 mU/L (normal 50-350).

Which of the drugs which she takes may cause this?

(Please select 1 option)

- Becotide
- Montelukast
- Omeprazole
- **Risperidone** □ Correct
- Sertraline

Antipsychotic medications, in particular the typical antipsychotics and risperidone, are known to elevate prolactin levels. This is due to their ability to block dopamine D2 receptors. By doing so they block dopamine’s action on the pituitary. This reduces inhibition of prolactin secretion, thereby causing hyperprolactinaemia.

Symptoms of this include:

- amenorrhoea
- galactorrhoea
- infertility
• loss of libido, and
• erectile dysfunction.

Sertraline is not thought to exert dopamine antagonist effects and thus does not commonly result in hyperprolactinaemia, but some cases have been reported in the literature.

The other medications on her list have not been commonly associated with hyperprolactinaemia.
Work Smart

Question 137 of 200

A 58-year-old male presents with painful breast tissue.

Six weeks previously he was treated for atrial fibrillation and had a number of drugs commenced.

Which one of the following drugs may have caused this problem?

(Please select 1 option)

- Aspirin
- Digoxin
- Flecainide
- **Spironolactone**
- Warfarin

This is a tricky question, as both spironolactone and digoxin are associated with gynaecomastia. However, spironolactone is more commonly associated with the condition, and should therefore be picked as the 'single best answer'. In the setting of atrial fibrillation spironolactone may be used if the patient is thought to be in heart failure (which is fairly common with atrial fibrillation). In addition, spironolactone has been shown to reduce the recurrence rate of atrial fibrillation following cardioversion and so it is possible it would be started for this reason.

Spironolactone causes gynaecomastia by several mechanisms. It can block androgen production by inhibiting enzymes in the testosterone synthetic pathway, and can also block receptor binding of testosterone and dihydrotestosterone. In addition, it displaces oestradiol from sex hormone binding
globulin (SHBG), which increases free oestrogen levels.

The mechanism of digoxin-induced gynaecomastia is thought to be a direct action at oestrogen receptors.
A 75-year-old patient being treated for heart failure presents with hyperkalaemia, the potassium being 6.9 mmol/L (3.5-5.0). He was recently commenced on amiloride.

The interaction of amiloride with which of his drugs listed below is likely to have caused the hyperkalaemia?

(Please select 1 option)

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<td>☐</td>
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<td>☐</td>
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<tr>
<td>☐</td>
<td>Metolazone</td>
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<tr>
<td>☐</td>
<td>Perindopril</td>
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<td>☐</td>
<td>Warfarin</td>
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</table>

The co-administration of a potassium-sparing diuretic and an ACE inhibitor, in this case Perindopril, may result in profound hyperkalaemia, as has occurred in this patient. Thus patients on both these drugs should have their potassium monitored closely.

Metolazone may result in profound hypokalaemia.
Question 39 of 70

Whilst hospitalised after a hip replacement, a patient with acute intermittent porphyria has a tonic clonic seizure. The seizure was thought to have been due to alcohol withdrawal. The patient required large amounts of analgesia.

Six days post-operatively she suffers a porphyric attack.

Which of the following drugs on her prescription is likely to have been responsible?

(Please select 1 option)

- Aspirin  
  - Incorrect answer selected
- Augmentin
- Oramorph
- Paracetamol
- Sodium valproate  
  - This is the correct answer

AIP is an autosomal dominant disease resulting from defects in production or activity of the enzyme porphobilinogen (PBG) deaminase. Attacks may be precipitated by fasting, and by many drugs, such as:

- phenobarbitone
- alcohol
- sulphonylureas, and
- oestrogens.
Amoxicillin and opiates are thought to be safe in porphyria.

Further Reading:
Medscape. Acute Intermittent Porphyria.
Work Smart

Question 139 of 200

A firm 2-3 cm mass is palpable in the upper outer quadrant of the right breast of a 52-year-old woman. There are no palpable axillary lymph nodes.

A wide local excision with axillary node dissection is performed and the breast lesion is found to have positive immunohistochemical staining for HER2/neu (c-erb B2). Staining for oestrogen and progesterone receptors is negative.

Which of the following additional treatment options is most appropriate, based upon these findings?

(Please select 1 option)

- Radical mastectomy
- St John's wort
- Tamoxifen
- Trastuzumab [Correct]
- Vancomycin

This is an infiltrating ductal carcinoma.

The lack of oestrogen receptor staining suggests a poor response to hormonal therapy with tamoxifen.

The positive C-erb B2 (HER2/neu) staining suggests that trastuzumab (Herceptin) may be effective.
A 35-year-old business man presents with anxiety and palpitations after 'snorting' cocaine. The patient denies any prior use and has also consumed some alcohol.

On examination, he is distressed and sweating with a temperature of 38°C, pulse of 138 beats per minute (regular) and a blood pressure of 216/110 mmHg. His ECG reveals a sinus tachycardia.

Which of the following is the most appropriate initial treatment for this man?

(Please select 1 option)

- Dantrolene
- Diazepam  □ Correct
- Lidocaine
- Propranolol
- Verapamil

Cocaine abuse is quite common and neurological and cardiovascular side effects predominate.

Delirium, hyperthermia, arrhythmias, myocardial and cerebral infarction are reported.

In this patient, the first consideration should be to establish adequate ventilation and support the circulation, and also to remove any residual cocaine from the nostrils.

Generally, the toxic effects of cocaine are short-lived and relate to sympathetic stimulation, as in this case with tachycardia, pyrexia and hypertension.
Initial treatment of cocaine poisoning involves intravenous administration of diazepam to control agitation, and cooling measures for hyperthermia.

Sedation with diazepam may also be appropriate initial therapy for hypertension and tachycardia in this situation since the excessive sympathetic tone is largely centrally mediated.

Control of anxiety and agitation with diazepam when combined with rapid cooling may also decrease heat production in hyperthermic patients.

If further treatment is required, an intravenous nitrate is particularly useful for associated coronary artery spasm.

Further Reading:
BMJ Best Practice. Cocaine overdose.
Work Smart

Question 141 of 200

A 45-year-old female is admitted with fatigue, nausea and weight loss. She is known to have abused alcohol for many years and has previously developed delirium tremens. She stopped drinking alcohol two days ago.

On examination, she is thin, alert and orientated. She is slightly icteric, with features of chronic liver disease but there is no flapping tremor. Pulse is 88 bpm regular, blood pressure is 106/74 mmHg and temperature is 37°C.

She is treated with IV thiamine.

Which of the following agents would be recommended for the prevention of acute alcohol withdrawal?

(Please select 1 option)

- IM haloperidol
- IV diazepam
- Oral diazepam
- Oral quetiapine
- Oral lorazepam

This patient with features of alcoholic chronic liver disease would be regarded at high risk of developing acute alcohol withdrawal, particularly in view of her past history of delirium tremens.

Benzodiazepines are appropriate agents in preventing acute alcohol withdrawal and oral agents such as lorazepam and diazepam are recommended.
Patients with liver cirrhosis are at risk of hepatic encephalopathy with benzodiazepines. However, it is not known that she has cirrhosis and the potential for alcohol withdrawal is a real risk. She should therefore be given benzodiazepines and monitored closely for any signs of encephalopathy. In hepatic impairment benzodiazepines with a shorter half life (e.g. lorazepam and oxazepam) are preferred.

Answer Statistics

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</table>

Times answered: 7439

Test Analysis

Correct Incorrect Partially Correct

Score: 52.48%
Total Answered: 141
A 38-year-old male is admitted with an hour history of chest pain, confusion and agitation commencing shortly after taking a recreational drug.

On examination, he is confused, has a temperature of 38.3°C and a blood pressure of 188/102 mmHg.

Which of the following drugs is most likely to be responsible for his presentation?

(Please select 1 option)

- Cocaine [Correct]
- Ecstasy (MDMA)
- Gamma hydroxybutyrate (GHB)
- LSD
- Opiates

In this scenario, the young male presents with confusion and agitation following drug abuse. The most likely agent is cocaine.

Through central effects, cocaine induces sweating, pyrexia and also adrenergic mediated hypertension. It may also be responsible for coronary and cerebral artery spasm causing infarction.

Reference:

A 52-year-old accountant presents with a five hour history of confusion and agitation. He is known to have an alcohol problem but has avoided all alcohol for the last three days.

On examination, he is sweating, agitated, and disorientated. He claims to see things on the walls. His temperature is 37.5°C, pulse 110 bpm regular and blood pressure is 152/74 mmHg. FBC and U&Es are both normal.

Investigations reveal:

| Plasma glucose | 4.6 mmol/L | (3.6-6) |

Which of the following agents would be the most appropriate treatment for this man?

(Please select 1 option)

- IV haloperidol
- Oral lorazepam □ This is the correct answer
- IV phenobarbital
- IV phenytoin
- Oral diazepam □ Incorrect answer selected

This is a typical history of delirium tremens (DTs).

In the UK it is estimated 24% of adults drink in a hazardous way, which is highest in the North East,
North West and Yorkshire and Humber. Approximately 20% of patients admitted to hospital for illnesses unrelated to alcohol are drinking at potentially hazardous levels, and it is therefore important to ask all patients about their alcohol use. An abrupt reduction in alcohol intake in a person who has been drinking excessively for a prolonged period of time, for example as occurs on admission to hospital, may result in the development of alcohol withdrawal.

Symptoms typically present about 8 hours after a significant fall in blood alcohol levels. The peak is on day two, and by day five the symptoms are significantly better. Minor withdrawal symptoms appear 6-12 hours after cessation of alcohol and include: insomnia, fatigue, tremor, anxiety, nausea, vomiting, headache, sweating, palpitations, anorexia, depression and craving. Alcoholic hallucinosis can appear 12-24 hours after stopping alcohol and includes visual, auditory and tactile hallucinations. Withdrawal seizures can appear 24-48 hours after cessation and are generalised tonic-clonic seizures. Alcohol withdrawal delirium (‘delerium tremens’) can appear 48-72 hours after cessation.

This patient has delirium tremens, which should be treated as a medical emergency. The signs of altered mental status alert you to the fact that this is different from simple alcohol withdrawal. These signs can include hallucinations (auditory, visual, olfactory), confusion, delusions and severe agitation. Seizures can also occur. Delirium tremens is a hyperadrenergic state, and is often associated with tachycardia, hyperthermia, hypertension, tachypnoea, tremor and mydriasis. Patients at increased risk are those with a previous history of delirium tremens or alcohol withdrawal seizures, those with a co-existing infection or abnormal liver function, and older patients. It is a clinical diagnosis.

Delirium tremens should be treated with oral lorazepam as first-line treatment. If the symptoms persist, or the medication is refused, parenteral lorazepam, haloperidol or olanzapine should be given. Intensive care may be required.

If delirium tremens develops during treatment for acute withdrawal, the reducing regime should be reviewed.

The mortality rate can be up to 35% if untreated, which reduces to 5% with early recognition and treatment.

In patients with alcohol withdrawal seizures, a quick-acting benzodiazepine should be given (such as lorazepam). Phenytoin should not be given.

Patients who are at high-risk of alcohol withdrawal but have no or only mild symptoms are typically given a reducing dose of chlordiazepoxide (a long-acting benzodiazepine) over 5-7 days. Diazepam is an alternative. Chlormethiazole may also be offered as an alternative, but is rarely used as if used with alcohol there is a risk of fatal respiratory depression, especially in patients with liver cirrhosis.

In addition, you should not forget the importance of giving high-potency B vitamins, specifically thiamine (e.g. pabrinex) to all patients with a history of high alcohol intake to reduce the risk of Wernicke’s encephalopathy.
Reference:

1. NICE. Alcohol-use disorders: physical complications (CG100).

Answer Statistics

<p>| | | | | | |</p>
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<thead>
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Times answered: 8122

Test Analysis

Correct Incorrect Partially Correct

Score: 52.5%
Total Answered: 40
A 70-year-old man has Parkinson’s disease. He is started on treatment with L-dopa and dopa decarboxylase inhibitor therapy. However, he continues to have troublesome tremor.

Which of the following drugs would be most likely to help?

(Please select 1 option)

- Amantadine
- Benzhexol [This is the correct answer]
- Propranolol [Incorrect answer selected]
- Ropinirole
- Selegiline

Anticholinergic drugs such as benzhexol remain the treatment of choice in parkinsonian tremor.

L-dopa, selegiline and dopamine agonists are less effective in tremor.

Amantadine can be used as monotherapy in early disease for tremor or bradykinesia, but it has a weak and short-lived benefit. Evidence for efficacy is poor.

Propranolol is the treatment of choice in essential tremor.

Reference:

Work Smart

Question 144 of 200

In a chronic disease which has no known effective treatment, a new treatment is known to be effective in animal models and shows promise in short term studies in patients.

There are some theoretical concerns about toxicity involving liver and bone marrow although no cases have been observed in studies so far.

Which is the most appropriate next step in the drug's development?

(Please select 1 option)

- Case-control study
- No further studies should be done and drug development should be stopped
- Open study
- Randomised double blind placebo controlled study - Correct
- Randomised single blind placebo controlled study

The story that is described is of an early drug development that has gone through phase I trials (normal volunteers) and phase II studies (more normal volunteers but it also mentions 'studies in patients').

The next step in the development of this drug is a phase III study - where the drug's efficacy and safety should be tested against a placebo.

Broadly, the development of a new drug can be divided into pre-clinical and clinical trials.

Pre-clinical development first involves identifying the target thought to be important in disease. Drug
candidates are then identified, and their properties optimised. Pre-clinical safety studies are then conducted to determine dosage, ensure safety and study pharmacokinetic properties. These involve both computer and animal models. All information gathered from pre-clinical testing is submitted to the regulatory authorities, prior to moving to the clinical phase of drug development.

Clinical trials have a number of phases:

- In phase I the drug is usually given to healthy volunteers to determine its safety and pharmacokinetic properties in humans.
- In phase II a small group of patients (typically 100-250) are given the drug to evaluate its efficacy, optimum dose, safety and side effects (as these may be different in patients compared to healthy volunteers). If these trials are successful, larger clinical trials can be planned.
- Phase III trials typically involve more than 1000 patients, and are used to determine efficacy and side effects. If successful the drug must be registered by the authorities prior to being released to the market.

It is important to note the majority of drugs identified in early pre-clinical trials will never make it to market, as they are not shown to have a significant effect or they are associated with significant toxicity.

Post-marketing studies then continue to determine the long term and chronic toxicities. UK practitioners are requested to report any side effects via the yellow card scheme.

Further Reading:

Phrma.org. Drug Discovery and Development
Work Smart

Question 1 of 30

A clinical trial assessing a new lipid-lowering therapy for stroke allocates 1000 patients to active treatment and another 1000 patients to placebo.

Results demonstrate that number needed to treat (NNT) is 20 for the prevention of the primary endpoint.

Which of the following best describes the results?

(Please select 1 option)

- 20 patients in the treatment group were protected from stroke
- 20 extra patients in the placebo group had a stroke
- For 1000 patients treated with active therapy, there would be 20 fewer strokes
- For 1000 patients treated with active therapy, there would be 50 fewer strokes
- For every 1000 patients treated with active therapy there would be 100 fewer strokes

This prevention study for stroke reveals that 20 patients need to be treated to prevent one event.

Thus if you treat a 1000 patients then you will expect to have 50 fewer strokes.

Further Reading:

Altman DG. Confidence Intervals for the Number Needed to Treat. BMJ. 1998;317:1309.
Question 145 of 200

A 16-year-old female attends the Emergency department 15 hours after ingesting approximately 30 g of paracetamol and 2 g of dihydrocodeine.

On examination, she is drowsy with a Glasgow coma scale of 15. Her pulse is 100 beats per minute, blood pressure is 110/66 mmHg and she has pinpoint pupils, with saturations of 96% on air.

What is the most appropriate treatment for this patient?

(Please select 1 option)

- 10% Dextrose infusion
- Activated charcoal by mouth
- Gastric lavage
- N-acetylcysteine intravenously  □ Correct
- Naloxone intravenously

This patient has taken a significant overdose of paracetamol, and is presenting late at 15 hours.

She is at risk of hepatocellular damage and needs to be commenced on an infusion of intravenous N-acetylcysteine immediately. It is continued for 30 hours and sometimes beyond this, depending on results of prothrombin time, liver function tests, urea and electrolytes, and glucose.

Activated charcoal is given to patients presenting within one hour of overdose.

Flumazenil is reserved for reversal of benzodiazepine-induced respiratory depression.
Naloxone is used for opiate-induced respiratory depression.
A 62-year-old man who has recently had his medication for hypertension altered presents with flushing, stridor, shortness of breath and hypotension.

He comes to the Emergency Department and receives intravenous hydrocortisone, intramuscular adrenaline, and intravenous antihistamine. After a slow recovery, he is discharged home for planned review at the allergy clinic.

Which of the following medications is most likely to be responsible for his presentation?

(Please select 1 option)

- Amlodipine
- Atenolol
- Bendroflumethiazide
- Doxazosin
- Ramipril - Correct

This man has presented with anaphylaxis.

Whilst angio-oedema may be hereditary or idiopathic, it is also associated with use of both ACE inhibitors and angiotensin receptor blockers (ARB). Given that he has recently increased his antihypertensive medication, presentation with angio-oedema associated with ACE inhibitor therapy seems the most likely explanation.

He should cease ramipril therapy and not commence either ACE inhibitors or ARBs in the future.
Further Reading:

Answer Statistics

Times answered: 5751

Test Analysis

Score: 53.42%
Total Answered: 146
A 71-year-old man with a history of hypertension, type 2 diabetes and erectile dysfunction comes to the clinic for review complaining of blue vision.

He takes amlodipine and ramipril for hypertension, digoxin for atrial fibrillation, sitagliptin and metformin for diabetes, and sildenafil for erectile dysfunction.

Which of the following is most likely to be responsible for his blue vision?

(Please select 1 option)

- Amlodipine
- Digoxin
- Metformin
- Sildenafil
- Sitagliptin

Digoxin is associated with yellow/green visual disturbance.

Sildenafil is a PDE-5 inhibitor, but at high dose it inhibits the activity of PDE-6, which is essential for the functioning of retinal rods cells. Inhibition of the enzyme leads to patients reporting blue tinged vision, particularly in low light conditions.

The condition may be improved by reducing the dose of sildenafil, but of course this may limit efficacy with respect to improving erectile dysfunction.
Work Smart

Question 148 of 200

You have a 23-year-old female patient who suffers from complex partial epilepsy.

When she comes to her clinic appointment she tells you she is worried because her fit frequency has increased and wants more medication. On examination you also notice that she has a significant fungal infection. Medication includes the oral contraceptive pill.

Which of the following agents is likely significantly to increase her risk of getting pregnant?

(Please select 1 option)

- [ ] Fluconazole
- [ ] Ketoconazole
- [ ] Lamotrigine
- [ ] Levetiracetam
- [ ] **Phenytoin**  □ Correct

Phenytoin is a potent enzyme inducer of the cytochrome P450 system; as such it reduces plasma levels of agents which undergo hepatic metabolism, including sex steroids given in the oral contraceptive pill.

Fluconazole and ketoconazole are all inhibitors of the CYP450 system and would lead to increased levels of other agents.

Studies have shown a modest decrease in the plasma concentration of levonorgestrel when taking lamotrigine, but less effect on ovulation.
Levetiracetam does not alter the pharmacokinetics of the oral contraceptive.
A 45-year-old woman presents to the oncology clinic with metastatic carcinoma of the breast. She wants to take an active role in deciding on the optimal chemotherapy regime for herself, and wants to discuss the relative advantages of capecitabine versus 5-fluorouracil (5-FU).

What would you advise her about capecitabine?

(Please select 1 option)

- Can be orally administered  \(\square \) Correct
- Has a greater period of progression free survival than 5-FU
- Is associated with less blood dyscrasias than 5-FU
- Is not dependent on renal function
- Is not usually associated with diarrhoea

The major difference between capecitabine and 5-FU is that capecitabine is an oral prodrug of 5-FU. The final step in metabolism to 5-FU is thymidine phosphorylase, higher activity of thymidine phosphorylase occurring in tumour tissues.

Evidence suggests that efficacy of capecitabine versus 5-FU is broadly similar, with minor, insignificant differences occurring in progression free survival in comparative studies across a range of primary tumour types.

Whilst activation of capecitabine to 5-FU occurs after a number of steps, metabolites are still renally excreted, so in this sense, no significant advantage over 5-FU is conferred.
A 24-year-old IV drug abuser presents with jaw spasm to the Emergency Department. She says she re-used a heroin needle a few days ago and a couple of her sites look infected.

She has suffered recurrent admissions with pneumonia over the past two years and has been using heroin for the past four years.

On examination, she is pyrexial 37.8°C. She has jaw spasm, significant neck stiffness and looks in pain. Examination of her groin and left antecubital fossa reveals discharging sinuses from where she has injected heroin previously.

Investigations show:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Normal Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hb</td>
<td>114 g/L</td>
<td>135-180</td>
</tr>
<tr>
<td>WCC</td>
<td>10.8 ×10^9/L</td>
<td>4-10</td>
</tr>
<tr>
<td>PLT</td>
<td>179 ×10^9/L</td>
<td>150-400</td>
</tr>
<tr>
<td>Na</td>
<td>139 mmol/L</td>
<td>134-143</td>
</tr>
<tr>
<td>K</td>
<td>4.5 mmol/L</td>
<td>3.5-5</td>
</tr>
<tr>
<td>Cr</td>
<td>129 μmol/L</td>
<td>60-120</td>
</tr>
</tbody>
</table>

She is given immunoglobulin.

Which of the following antibiotic treatments is most appropriate in addition?

(Please select 1 option)

- Chloramphenicol
This woman is suffering from tetanus as a result of infection via a contaminated drug injecting needle.

Initial management of choice is anti-tetanus immunoglobulin, followed in this case by the addition of systemic antibiotics, either metronidazole or benzylpenicillin, and debridement of any wound if required.

Diazepam, neuromuscular blockade, and intubation may all be required during the acute phase.

Over the longer term, muscle spasms and ankle clonus can persist for many months.
A 29-year-old woman who has a history of epilepsy comes to the clinic complaining of worsening hair loss. She has generalised tonic clonic seizures and has been taking her medication for the past two to three years. Her epilepsy is currently well controlled.

Which of the following medications is she most likely to be taking?

(Please select 1 option)

- ☐ Carbamazepine
- ☐ Gabapentin
- ☐ Lamotrigine
- ☑ Valproate
- ☐ Vigabatrin

Up to 12% of patients taking sodium valproate report significant hair loss in clinical trials. Of course, as hair loss is relatively common, other causes of hair loss should be excluded before changing anti-epileptic medication.

Carbamazepine hair loss is recognised, but is only seen in around 6% of patients.

Limited data suggest zinc or selenium supplementation may be associated with reduced hair loss, but these data are somewhat controversial.
A 17-year-old woman is admitted by emergency ambulance. She has apparently taken a large overdose of her father's anti-hypertensive medication after he refused to allow her to see her boyfriend who is 21.

On admission to the Emergency department she is hypotensive, with a BP of 80/55 mmHg, and a pulse of 28.

Investigations show

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<table>
<thead>
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</thead>
<tbody>
<tr>
<td>Hb</td>
<td>121 g/L</td>
<td>(135-180)</td>
</tr>
<tr>
<td>WCC</td>
<td>7.8 ×10^9/L</td>
<td>(4-10)</td>
</tr>
<tr>
<td>PLT</td>
<td>191 ×10^9/L</td>
<td>(150-400)</td>
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<tr>
<td>Na</td>
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<td>(134-143)</td>
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<tr>
<td>K</td>
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<tr>
<td>Cr</td>
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<td>(60-120)</td>
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<tr>
<td>Gluc</td>
<td>2.8 g/dL</td>
<td>(7.0-11.0)</td>
</tr>
</tbody>
</table>

Her rate increases to 35 after 3 mg of atropine, but little improvement in BP is seen.

Which of the following is the next most appropriate step?

(Please select 1 option)

- Further 1 mg atropine
- IM adrenalin
Glucagon is the conventional antidote for beta-blocker overdose, the most likely cause of this patient's presentation. It reverses hypoglycaemia, and improves myocardial contractility and heart rate by stimulating production of cyclic AMP.

Doses of glucagon used are much higher than those conventionally used for reversing hypoglycaemia in diabetes, with a bolus of 3-10 mg being required, then 2-5 mg/hr by infusion.
A 62-year-old man presents with extreme fatigue, weight loss and night sweats. He has been feeling very unwell for the past few months and has taken early retirement from his job. He has problems eating because he feels constantly full.

On examination his BP is 142/82 mmHg, his pulse is 85 and regular, he looks pale. He has gross hepatosplenomegaly.

Investigations show:

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Reference Range</th>
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<tbody>
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<td>Hb</td>
<td>89 g/L</td>
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</tr>
<tr>
<td>WCC</td>
<td>25.0 ×10^9/L</td>
<td>(4-11)</td>
</tr>
<tr>
<td></td>
<td>Increased neutrophils, basophils and eosinophils</td>
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</tr>
<tr>
<td>PLT</td>
<td>171 ×10^9/L</td>
<td>(150-400)</td>
</tr>
<tr>
<td>Na</td>
<td>139 mmol/L</td>
<td>(135-146)</td>
</tr>
<tr>
<td>K</td>
<td>4.8 mmol/L</td>
<td>(3.5-5)</td>
</tr>
<tr>
<td>Cr</td>
<td>137 μmol/L</td>
<td>(79-118)</td>
</tr>
</tbody>
</table>

He starts imatinib therapy but is unable to tolerate it due to diarrhoea, which fails to resolve with a series of interventions.

Which of the following is the most appropriate next treatment for him?

(Please select 1 option)
There has been some debate as to whether patients who are intolerant of imatinib should be trialled on another kinase inhibitor such as dasatinib or nilotinib. Previous NICE guidance suggested that conventional therapy with interferon alpha and cytarabine was appropriate. Cytogenetic improvement is seen in around 70% of patients treated with dual therapy for three months or longer.

However, as of January 2012, NICE Guidance (TA241) recommends use of nilotinib in patients who are Philadelphia chromosome positive and who are intolerant of imatinib. Dasatinib is not recommended.
Question 152 of 200

A 49-year-old woman with a history of hypertension comes to the clinic for review. She has noticed that she has become jaundiced and is concerned one of her medications may be responsible. She has recently had a second anti-hypertensive added to her regime, and is taking an antibiotic for a respiratory tract infection.

Investigations show

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
<th>Normal Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemoglobin</td>
<td>123 g/L</td>
<td>(115-160)</td>
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<tr>
<td>White cell count</td>
<td>6.2 ×10⁹/L</td>
<td>(4-11)</td>
</tr>
<tr>
<td>Platelets</td>
<td>195 ×10⁹/L</td>
<td>(150-400)</td>
</tr>
<tr>
<td>Serum sodium</td>
<td>138 mmol/L</td>
<td>(135-146)</td>
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<tr>
<td>Serum potassium</td>
<td>4.0 mmol/L</td>
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</tr>
<tr>
<td>Creatinine</td>
<td>105 µmol/L</td>
<td>(79-118)</td>
</tr>
<tr>
<td>Alanine aminotransferase</td>
<td>85 U/L</td>
<td>(5-40)</td>
</tr>
<tr>
<td>Alkaline phosphatase</td>
<td>420 U/L</td>
<td>(39-117)</td>
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<tr>
<td>Bilirubin</td>
<td>189 µmol/L</td>
<td>(&lt;17)</td>
</tr>
</tbody>
</table>

Which of the following medications is the most likely cause?

(Please select 1 option)

- Amlodipine
Amoxicillin clavulanate is an important cause of cholestatic jaundice.

Other common drugs associated with cholestatic jaundice include:

- Chlorpromazine
- Ciprofloxacin
- Ofloxacin
- Cimetidine
- Phenytoin
- Naproxen
- Captopril
- Erythromycin, and
- Azithromycin.

In this case the co-amoxiclav should be withdrawn, and the combination avoided in future.

Because of cholestatic jaundice, prescription of co-amoxiclav is not recommended for longer than 14 days.
A 44-year-old woman is taking lithium for bipolar disorder. She also suffers from hypertension and angina and recently underwent a medication review at her GP. She also suffers from osteoarthritis of her knees and has suffered a recent respiratory tract infection.

Over the past few days she has become increasingly drowsy, with ataxia, dizziness and slurred speech. A lithium level is measured at 4 mmol/l.

Which of the following is most likely to have resulted in her presentation with lithium toxicity?

(Please select 1 option)

- Amoxicillin
- Atenolol
- Paracetamol
- Ramipril - Correct
- Verapamil

ACE inhibitors are known to increase serum lithium levels, as are dihydropyridine calcium antagonists.

Atenolol, in contrast, is a relatively safer option for the treatment of hypertension in association with long term lithium use.

Verapamil in combination with lithium leads to neurotoxicity; this is independent of any increase in serum lithium levels.
If patients have poorly controlled hypertension and they are taking lithium, it may be better to discuss the case with the psychiatrist to see if they can be changed to another mood stabilising agent, such as sodium valproate.

**Answer Statistics**

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Times answered: 5539

**Test Analysis**

Correct Incorrect Partially Correct

Score: 54.25%
Total Answered: 153
Question 154 of 200

A 42-year-old woman was taking an antibiotic for a urinary tract infection when she suffered a left Achilles tendon rupture whilst playing badminton. She is very fit, exercising and doing stretching work up to four times per week, and feels the antibiotic may have been responsible.

Which of the following antibiotics is the most likely cause?

(Please select 1 option)

- Amoxicillin
- Cephalexin
- Co-amoxiclav
- Ofloxacin
- Trimethoprim

The whole class of quinolone antibiotics is associated with case reports of tendon rupture. This may in part be related to decreased cellular proliferation and tendon fibroblast turnover.

In animal models where quinolones are continued post tendon rupture, it is associated with delayed healing.

Juvenile toxicity models also show increased rates of tendon abnormalities, and for this reason use of quinolones is not recommended in children or in pregnancy.
Question 4 of 30

A 28-year-old car mechanic is admitted to the hospital having taken an overdose of methanol after splitting up from his wife.

On admission to the Emergency department he is drowsy and intoxicated. His BP is 134/82 mmHg, and he has a tachycardia with a pulse of 95.

Investigations show:

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemoglobin</td>
<td>140 g/L</td>
<td>(135-177)</td>
</tr>
<tr>
<td>White cell count</td>
<td>8.1 ×10^9/L</td>
<td>(4-11)</td>
</tr>
<tr>
<td>Platelets</td>
<td>190 ×10^9/L</td>
<td>(150-400)</td>
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<tr>
<td>Serum sodium</td>
<td>137 mmol/L</td>
<td>(135-146)</td>
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<tr>
<td>Serum potassium</td>
<td>4.2 mmol/L</td>
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<tr>
<td>Bicarbonate</td>
<td>17 mmol/L</td>
<td>(22-30)</td>
</tr>
<tr>
<td>Creatinine</td>
<td>130 μmol/L</td>
<td>(79-118)</td>
</tr>
</tbody>
</table>

Which of the following is the most appropriate antidote for methanol poisoning?

(Please select 1 option)

- Atenolol [Incorrect answer selected]
- Ethanol [This is the correct answer]
- Glucagon
Methanol, like ethanol, is metabolised by alcohol dehydrogenase to form formaldehyde. Formaldehyde is then further metabolised by aldehyde dehydrogenase to formic acid. Formate formation leads to a severe metabolic acidosis, and crystals forming within the eye can lead to so called 'snow field' cataract formation.

Inhibition of metabolism of methanol by alcohol dehydrogenase with either ethanol or fomepizole is the treatment of choice.
Work Smart

Question 155 of 200

You are investigating a new anti-platelet agent which may have additional effects on top of clopidogrel. To investigate the effects of the new therapy you need to be aware of the mode of action of clopidogrel.

Which of the following best describes the action of clopidogrel?

(Please select 1 option)

- 5HT-2 receptor inhibition
- Cox-1 inhibition
- Cox-2 inhibition
- Glycoprotein IIb IIIa inhibition
- Inhibition of the platelet ADP receptor  

Clopidogrel inhibits the platelet ADP receptor, which leads to decreased propensity to platelet aggregation and is complementary to cyclo-oxygenase inhibition, which is the action of aspirin.

Aspirin is weakly selective for the COX-1 enzyme. Specific COX-2 inhibitors were developed, e.g. rofecoxib, as analgesics and were thought to be associated with reduced risk of peptic ulceration but post-marketing data suggested they were increased with a significantly increased risk of heart attack or stroke and so many have been withdrawn from the market.

5HT-2 receptor inhibition also reduces platelet aggregation; one example is sarpogrelate developed primarily as an alternative to aspirin because of its lower risk of haemorrhage.
Glycoprotein IIb IIIa inhibitors are used in patients with unstable angina/NSTEMI, an example being abciximab.
You are asked to see a 27-year-old woman on the oncology ward. She has been admitted for a course of chemotherapy and has been taking high dose steroids for a few days. The nurses report that she is very agitated and talks about trying to open the window of her room and jump out from the fourth floor.

You review her notes and see that she admits to drinking a few glasses of wine per week and has smoked cannabis on a few occasions.

On examination her BP is 145/88 mmHg, her pulse is 80 and regular and she looks agitated and upset.

Investigations show:

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemoglobin</td>
<td>121 g/L</td>
<td>(115-165)</td>
</tr>
<tr>
<td>White cell count</td>
<td>16.2 ×10⁹/L</td>
<td>(4-11)</td>
</tr>
<tr>
<td>Platelets</td>
<td>200 ×10⁹/L</td>
<td>(150-400)</td>
</tr>
<tr>
<td>C-reactive protein</td>
<td>9 nmol/L</td>
<td>(&lt;10)</td>
</tr>
<tr>
<td>Sodium</td>
<td>140 mmol/L</td>
<td>(135-146)</td>
</tr>
<tr>
<td>Potassium</td>
<td>3.9 mmol/L</td>
<td>(3.5-5)</td>
</tr>
<tr>
<td>Creatinine</td>
<td>92 μmol/L</td>
<td>(79-118)</td>
</tr>
</tbody>
</table>

Which of the following is the most likely diagnosis?

(Please select 1 option)

- Alcohol withdrawal
Cannabinoid-related psychosis

Corticosteroid-related psychosis  □ This is the correct answer

Manic depressive psychosis

Personality disorder

Corticosteroid-related psychosis is seen within a few days of starting high dose oral or intravenous corticosteroids, although some patients have been diagnosed with the condition up to 12 weeks or more after commencing therapy.

Symptoms which are seen include:

- agitation
- hypomania, and
- suicidal intent.

Given the close proximity of her symptoms to the onset of steroid therapy this is much more likely to be the diagnosis than cannabis or alcohol related psychiatric disorder.

In severe cases, typical or atypical antipsychotics or benzodiazepines to manage agitation may be required.
Work Smart

Question 6 of 30

A patient is treated with hydralazine for the management of her blood pressure. Unfortunately she suffers profound hypotension after only five doses of medication.

Which of the following characteristics does she most likely possess?

(Please select 1 option)

- CYP 2D6 polymorphism
- Fast acetylation
- HLA-DR2 genotype
- G6-PD deficiency
- Slow acetylation — Correct

Slow acetylators often experience toxicity from drugs such as isoniazid, sulfonamides, procainamide, and hydralazine, whereas fast acetylators may not respond to isoniazid and hydralazine in the management of tuberculosis and hypertension.

Sulphonamides are now rarely used due to problems with blood dyscrasias.

Patients with G6-PD deficiency suffer from toxicity when they are prescribed drugs which are also oxidising agents, such as anti-malarials.
A 45-year-old publican is brought to the Emergency department by ambulance. He is extremely agitated and says that he can see a number of dogs at the door of the side room and they are barking fiercely. On further questioning his wife tells you that he drinks some eight to ten pints of beer and glasses of wine and whisky each day. They have recently had an argument about his drinking and he has not touched any alcohol for the past 12-18 hours.

On examination he is agitated and sweating, his BP is 145/84 mmHg, his pulse is 85 and regular. He has changes consistent with chronic liver disease and is tender in the right upper quadrant of his abdomen.

Investigations show:

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemoglobin</td>
<td>101 g/L</td>
<td>(135-177)</td>
</tr>
<tr>
<td>White cell count</td>
<td>8.3 ×10^9/L</td>
<td>(4-11)</td>
</tr>
<tr>
<td>Platelets</td>
<td>151 ×10^9/L</td>
<td>(150-400)</td>
</tr>
<tr>
<td>Sodium</td>
<td>138 mmol/L</td>
<td>(135-146)</td>
</tr>
<tr>
<td>Potassium</td>
<td>4.0 mmol/L</td>
<td>(3.5-5)</td>
</tr>
<tr>
<td>Creatinine</td>
<td>90 µmol/L</td>
<td>(79-118)</td>
</tr>
<tr>
<td>Alanine aminotransferase</td>
<td>92 IU/L</td>
<td>(5-40)</td>
</tr>
<tr>
<td>Bilirubin</td>
<td>54 µmol/L</td>
<td>(&lt;17)</td>
</tr>
</tbody>
</table>

Which of the following is the most likely diagnosis?
Alcoholic hallucinosis is known to appear some 12-24 hours after the last alcoholic drink has been taken and hallucinations may be visual, auditory or tactile in nature.

More minor withdrawal symptoms which patients experience may include:

- a degree of agitation and restlessness
- sweating
- nausea and vomiting, and
- feelings of depression.

Withdrawal seizures are seen 24-48 hours after alcohol withdrawal, and two to three days after stopping drinking withdrawal delirium (delirium tremens 'DTs') is seen.

Management includes the use of anti-withdrawal medication such as chlordiazepoxide, and thiamine replacement.
A 68-year-old man with a history of type 2 diabetes, chronic renal failure and epilepsy is admitted to the Emergency department with anorexia, nausea, and increasing lethargy.

He also developed tremor and nystagmus, with truncal ataxia and strange choreoathetoid movements. He takes BD mixed insulin for his diabetes, phenytoin for his epilepsy, ramipril and amlodipine for his hypertension.

On examination his BP is 159/88 mmHg, his pulse is 90. He has bilateral crackles on auscultation of his chest consistent with fluid overload.

Investigations reveal:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Normal Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemoglobin</td>
<td>105 g/L</td>
<td>(135-177)</td>
</tr>
<tr>
<td>White cells</td>
<td>7.8 ×10⁹/L</td>
<td>(4-11)</td>
</tr>
<tr>
<td>Platelets</td>
<td>182 ×10⁹/L</td>
<td>(150-400)</td>
</tr>
<tr>
<td>Sodium</td>
<td>139 mmol/L</td>
<td>(135-146)</td>
</tr>
<tr>
<td>Potassium</td>
<td>5.7 mmol/L</td>
<td>(3.5-5)</td>
</tr>
<tr>
<td>Creatinine</td>
<td>231 µmol/L</td>
<td>(79-118)</td>
</tr>
<tr>
<td>HbA₁c</td>
<td>53 mmol/mol</td>
<td>(&lt;35)</td>
</tr>
<tr>
<td>Phenytoin levels</td>
<td>Within the therapeutic range</td>
<td></td>
</tr>
</tbody>
</table>

Which of the following is the most likely reason for his phenytoin toxicity?

(Please select 1 option)

- [ ] Decreased GI absorption of phenytoin
This patient has renal failure, a state in which drugs that are usually highly protein bound, such as phenytoin, lose some of their affinity for protein binding. This results in increased availability of free drug at any given dose, which then increases the risk of toxicity.

Because laboratory assays for phenytoin usually measure total drug concentration, this gives a degree of false reassurance.

In patients with renal failure, dose reduction of phenytoin is therefore required.

Other drugs where this may be a problem include sodium valproate and warfarin.

Answer Statistics

Times answered: 5425

Test Analysis

Correct Incorrect Partially Correct
A 61-year-old man presents to the emergency department complaining of lethargy and muscle weakness. He has begun therapy for hypertension with bendroflumethiazide a few weeks earlier. Blood testing reveals a potassium of 2.5 mmol/l.

Which of the following is the most likely cause of his hypokalaemia?

(Please select 1 option)

- Increased sodium within the ascending loop of Henle
- Increased sodium within the descending loop of Henle
- Increased sodium within the distal collecting duct
- Increased sodium within the distal convoluted tubule
- Increased sodium within the proximal convoluted tubule

Thiazides block sodium reabsorption in the proximal segment of the distal convoluted tubule. This promotes increased delivery of sodium to the distal segment of the distal convoluted tubule. There the aldosterone sensitive sodium potassium exchange pump is presented with increased luminal sodium, which leads to increased excretion of potassium and hydrogen ions.

Often thiazide diuretics are combined in the treatment of hypertension with an ACE inhibitor or angiotensin receptor blocker (ARB), in which case hypokalaemia does not normally present itself as a problem.
Work Smart

Question 158 of 200

A 20-year-old student comes to the clinic complaining of dysuria and minor scrotal swelling and pain. He has also noticed a purulent urethral discharge.

On examination his temperature is 37.5°C, his scrotum is mildly swollen and tender and you can express a mucopurulent discharge from his urethral meatus.

Investigations show:

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
<th>Normal Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemoglobin</td>
<td>139 g/L</td>
<td>(135-177)</td>
</tr>
<tr>
<td>White cell count</td>
<td>8.8 x10^9/L</td>
<td>(4-11)</td>
</tr>
<tr>
<td>Platelets</td>
<td>269 x10^9/L</td>
<td>(150-400)</td>
</tr>
<tr>
<td>Serum sodium</td>
<td>141 mmol/L</td>
<td>(135-146)</td>
</tr>
<tr>
<td>Serum potassium</td>
<td>4.5 mmol/L</td>
<td>(3.5-5)</td>
</tr>
<tr>
<td>Creatinine</td>
<td>85 µmol/L</td>
<td>(79-118)</td>
</tr>
<tr>
<td>Urinary chlamydial antigen</td>
<td>Positive</td>
<td></td>
</tr>
</tbody>
</table>

Which of the following is the most appropriate anti-microbial therapy for him?

(Please select 1 option)

- Azithromycin 1 g as single dose  [Correct]
- Ciprofloxacin 500 mg BD for 7 days
- Minocycline 100 mg daily for 9 days
Norfloxacin 400 mg daily for 7 days
Penicillin V 500 mg BD for 7 days

The answer is azithromycin 1 g as a single dose.

In a student population where compliance may well be a problem, giving a single dose of antibiotics for the treatment of *Chlamydia* is the most sensible option.

Other options for treatment of *Chlamydia* include minocycline, although doxycycline causes less gastrointestinal disturbance. Ofloxacin 200 mg BD for seven days is also considered a potential option according to SIGN guidelines.

He should also be referred to the GUM clinic for screening for other sexually transmitted infections.

### Answer Statistics

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<td>4</td>
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<td></td>
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</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Times answered: 5805

### Test Analysis

Correct Incorrect Partially
Correct
Work Smart

Question 159 of 200

A 76-year-old man is reviewed in clinic having recently been diagnosed with severe heart failure (HF) associated with very limiting breathlessness. He was formerly a heavy smoker with a medical history of COPD. His lung function test demonstrates mild to moderate obstructive airways disease and he has 5% airways reversibility.

On clinical examination his heart rate is 95 bpm and BP 156/90 mmHg. No wheeze is present. He has an elevated JVP +5 cms but no clinical signs of fluid congestion. He is already taking aspirin 75 mg od, ramipril 10 mg od, furosemide 40 mg od and simvastatin 40 mg nocte.

You decide to add in a beta-blocker as the next step.

Which would be the most appropriate choice?

(Please select 1 option)

- Atenolol 25 mg od
- Bisoprolol 5 mg od
- Bisoprolol 1.25 mg od
- Carvedilol 6.25 mg bd
- Carvedilol 12.5 mg bd

NICE recommends β blockers in all HF patients.

In chronic obstructive pulmonary disease (COPD) patients with HF, cardioselective β blockers appear safer at
lower doses than higher doses or non-selective $\beta$ blockers (refs in DTB article).

Bisoprolol 5 mgs is too high an initial starting dose, a low dose can always be titrated up later, if tolerated.

Carvedilol though effective treatment for heart failure is not selective and therefore carries a greater risk of causing bronchospasm.

Atenolol though cardioselective has no clinical evidence for prognostic benefit in heart failure.

The patient should be closely monitored for deterioration in lung function post-administration.
Work Smart

Question 160 of 200

A 53-year-old woman is started on a capecitabine based regime for the treatment of metastatic carcinoma.

Which of the following is true of capecitabine?

(Please select 1 option)

- [x] It is a way to deliver 5 fluorouracil orally
- [ ] Capecitabine is more effective than IV agents
- [ ] Diarrhoea is rarely seen with therapy
- [ ] It is a way to deliver cisplatin orally
- [ ] It is not effective in the treatment of colon carcinoma

The answer is that it is a way to deliver 5 fluorouracil orally.

Capecitabine is a prodrug, which is metabolised to produce 5-fluorouracil, a chemotherapeutic agent used intravenously in the treatment of cancer. Damage to rapidly dividing cells in the GI tract leads to symptoms of diarrhoea and vomiting as a result of capecitabine treatment. Studies of efficacy suggest no major differences in clinical remission when capecitabine is compared to 5-fluorouracil given IV.
Work Smart

Question 161 of 200

A 74-year-old woman with chronic renal failure is admitted to the unit with infective endocarditis. You elect to begin treatment with IV benzylpenicillin and gentamicin.

On examination her temperature is 38.2°C, and she has a pansystolic murmur loudest at the left sternal edge, her BP is 125/82 mmHg, her pulse is 80 bpm and regular and she weighs 80 kg.

Investigations show:

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemoglobin</td>
<td>105 g/L</td>
<td>(115-165)</td>
</tr>
<tr>
<td>White cell count</td>
<td>7.0 ×10⁹/L</td>
<td>(4-11)</td>
</tr>
<tr>
<td>Platelets</td>
<td>202 ×10⁹/L</td>
<td>(150-400)</td>
</tr>
<tr>
<td>Serum sodium</td>
<td>138 mmol/L</td>
<td>(135-146)</td>
</tr>
<tr>
<td>Serum potassium</td>
<td>4.8 mmol/L</td>
<td>(3.5-5)</td>
</tr>
<tr>
<td>Creatinine</td>
<td>190 µmol/L</td>
<td>(79-118)</td>
</tr>
<tr>
<td>Creatinine clearance</td>
<td>29 ml/min</td>
<td>(&gt;60)</td>
</tr>
</tbody>
</table>

Which of the following is likely to represent the most appropriate dosing regime for the gentamicin?

(Please select 1 option)

- 0.75 mg/kg BD
- 1 mg/kg BD
- 1 mg/kg TDS
This is a tricky question, but highlights some important points for clinical practice.

Aminoglycosides, such as gentamicin, have limited tissue distribution and are renally cleared. High plasma concentrations can cause ototoxicity and nephrotoxicity, and dosing therefore needs to be carefully planned and monitored. Where gentamicin is concerned both ototoxicity and nephrotoxicity are potential concerns.

There are two commonly used regimens for dosing gentamicin. Both require the patient's body weight to ensure accurate dosing. For patients who are over their ideal body weight, this value rather than the patient's actual weight should be used. Ideal body weight can be calculated using age, sex and height on a number of online applications.

The most commonly used dosing regimen in the UK is the once daily regime, which is thought to be associated with reduced toxicity whilst being effective against gram-negative infections. It is not recommended for patients with a creatinine clearance of less than 60 ml/min. The dose used is 7 mg/kg IV every 24 hours. Levels should be monitored for patients on this regimen for 3 days or more, with a level taken 6-14 hours following the third dose. A nomogram is then used to determine whether the interval between doses should be altered.

Patients with creatinine clearance of less than 60 ml/min are usually given a reduced dose of gentamicin with a multiple-daily dosing regimen. This may also be recommended by microbiologists for the treatment of serious gram-negative infections such as Pseudomonas. Dosing is dependent on creatinine clearance:

- >60 ml/min - 1.5-1.7 mg/kg IV every 8 hours
- 40-60 ml/min - 1.2-1.5 mg/kg IV every 12 hours
- 20-40 ml/min - 1.2-1.5 mg/kg IV every 12-24 hours
- <20 ml/min - 2 mg/kg loading dose then discuss with microbiology and pharmacy

On this regimen monitoring is typically initiated after the 3rd or 4th dose, which allows a steady-state to be reached. Peak levels should be taken 30 minutes following the end of the infusion, and a trough level taken before the next dose. The desired trough level is less than 2 micrograms/ml, with a peak level of 5-8 micrograms/ml.

In this case, this lady has a creatinine clearance of 29 ml/min. As such the 7 mg/kg regimen is not appropriate. She should receive 1.2-1.5 mg/kg every 12-24 hours, so 1.5 mg/kg OD is the most correct here.

Three other drugs which require therapeutic monitoring are phenytoin, warfarin and clozapine.
Phenytoin is a highly effective anti-epileptic but is associated at toxic levels with neurological dysfunction including dizziness and nystagmus. Most warfarin therapy is directed towards a narrow therapeutic window between an INR of 2-3. Ineffective anticoagulation and excess coagulation can both be associated with significant adverse effects. Clozapine is effective in the treatment of psychotic disorders but is associated with blood cell dyscrasias, for this reason regular monitoring of full blood count is recommended.

Whereas monitoring of gentamicin and phenytoin involves PK monitoring (measuring the level of the drug in plasma), monitoring of warfarin and clozapine is essentially pharmacodynamic monitoring, looking for either over anticoagulation or abnormalities in the white blood cell count.

Reference:
University of California, School of Pharmacy. Aminoglycoside Dosing and Monitoring.
A 23-year-old woman presents to the Emergency department with low grade fever and dysuria. Her only medication is the oral contraceptive pill.

On examination her temperature is 37.8°C, and she has suprapubic and left loin tenderness consistent with a urine infection and possible pyelonephritis.

Investigations show:

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemoglobin</td>
<td>125 g/L</td>
<td>(115-165)</td>
</tr>
<tr>
<td>White cell count</td>
<td>12.8 (\times 10^9)/L</td>
<td>(4-11)</td>
</tr>
<tr>
<td>Platelets</td>
<td>209 (\times 10^9)/L</td>
<td>(150-400)</td>
</tr>
<tr>
<td>Serum sodium</td>
<td>139 mmol/L</td>
<td>(135-146)</td>
</tr>
<tr>
<td>Serum potassium</td>
<td>3.9 mmol/L</td>
<td>(3.5-5)</td>
</tr>
<tr>
<td>Creatinine</td>
<td>82 (\mu)mol/L</td>
<td>(79-118)</td>
</tr>
</tbody>
</table>

Which of the following antibiotics do SIGN guidelines recommend for this patient? 

(Please select 1 option)

- Amoxicillin
- Ciprofloxacin **This is the correct answer**
- Co-trimoxazole
- Nitrofurantoin
Upper urinary tract infection is one area where resistance to antimicrobials is increasing.

For this reason trimethoprim and amoxicillin are not recommended for treatment of upper urinary tract infections, and even resistance to quinolones such as ciprofloxacin is now beginning to prove problematic.

Nitrofurantoin is not used for the treatment of upper urinary tract infections because of difficulty in achieving sufficient plasma concentration, and co-trimoxazole is a second line choice due to problems with blood dyscrasias.

HPA suggests patients started on ciprofloxacin should have urine sent for culture and patients admitted to hospital if there is no response to treatment in 24 hours.

Reference:
SIGN. Management of suspected bacterial urinary tract infection in adults.
Work Smart

Question 163 of 200

A mother brings her 3-year-old child to the Emergency department because she is complaining of earache. You collect her from the waiting room where she is happily playing with toys. This is the second episode over the past year.

On examination her temperature is 37.4°C and her right ear drum is pink and bulging consistent with otitis media.

According to the SIGN national guidelines, how will you manage the child?

(Please select 1 option)

- Advise paracetamol and or ibuprofen to relieve her pain  □ Correct
- Prescribe clarithromycin for the child and advise her to start it immediately
- Prescribe penicillin V for the child and advise she starts it immediately
- Prescribe penicillin V for the child and advise she starts it in 24 hours if the pain does not improve
- Refer to the ENT surgeons as this is the second episode

Advise her to take paracetamol and or ibuprofen to relieve her pain.

SIGN guidelines point out that in children without significant systemic features of infection such as fever and generalised illness apart from pain, there is no significant benefit of antibiotics. The guidelines state that if all children were treated with antibiotics, then the number needed to treat (NNT) would be 17 to avoid one clinical failure.
Unfortunately practice in the management of otitis media in children varies considerably in children across the world, from 31% in the Netherlands to 98% in the USA and Australia.

Additionally, for a very common condition, the number of well conducted clinical trials is small. This is one area which could have benefited from better randomised controlled trials of antibiotics at the outset, but on available evidence, rationalisation of antibiotic use to guard against the development of resistance is sensible.

Reference:
SIGN. Diagnosis and management of childhood otitis media in primary care.
A 49-year-old woman presents to the Emergency department with right sided pleuritic chest pain. She has had two previous pulmonary emboli (PE) and is on lifelong warfarin therapy.

On examination she is short of breath and in pain. Her BP is 105/70 mmHg and her pulse is 92. Auscultation of the chest is normal. She has a swollen left leg, but she tells you this is chronic since an extensive DVT a few years earlier.

Investigations reveal:

<table>
<thead>
<tr>
<th>Investigation</th>
<th>Value</th>
<th>Normal Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemoglobin</td>
<td>125 g/L</td>
<td>(115-165)</td>
</tr>
<tr>
<td>White cell count</td>
<td>7.2 ×10⁹/L</td>
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<tr>
<td>Platelets</td>
<td>203 ×10⁹/L</td>
<td>(150-400)</td>
</tr>
<tr>
<td>Serum sodium</td>
<td>137 mmol/L</td>
<td>(135-146)</td>
</tr>
<tr>
<td>Serum potassium</td>
<td>4.2 mmol/L</td>
<td>(3.5-5)</td>
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<tr>
<td>INR</td>
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<td>(2-3)</td>
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<tr>
<td>CXR</td>
<td>No focal changes</td>
<td></td>
</tr>
<tr>
<td>CTPA</td>
<td>Subsegmental pulmonary emboli</td>
<td>-</td>
</tr>
<tr>
<td>PaO₂</td>
<td>8.2 kPa</td>
<td>(10-13.3)</td>
</tr>
<tr>
<td>PaCO₂</td>
<td>4.2 kPa</td>
<td>(4.8-6.1)</td>
</tr>
</tbody>
</table>
In this situation, where she is anticoagulated yet has sustained a further PE, there are two potential choices, either to consider increasing her INR target to 3-4, or considering an IVC filter.

Contraindications to anticoagulation where an IVC filter may be considered include:

- Haemorrhagic stroke
- Recent neurosurgery or other major surgery
- Major trauma, and
- Evidence of active internal bleeding.

Other contraindications include:

- Pregnancy
- Frequent falls, and
- Poor potential compliance with warfarin.

In these situations an IVC filter may be the most appropriate option. Given her young age and the potential for further PEs, a filter may be considered ahead of increased warfarin dose.

IVC filters may also be considered for prophylaxis in patients who have a diagnosis of cancer or who have a DVT and are about to undergo surgery. In this case, anticoagulation may result in more problems than filter placement.

A previous relative contraindication to filter placement was the need to undergo MRI, but now, MRI proof filters are available and this is no longer a problem.

Reference:

A 72-year-old woman comes to the Emergency department complaining of nausea and vomiting. Apparently she saw the on-call GP a few days earlier and was prescribed clarithromycin for a respiratory tract infection.

Past medical history of note includes COPD for which she takes high dose Seretide, tiotropium and oral theophylline, ischaemic heart disease for which she takes ramipril, amlodipine and indapamide and chronic renal failure.

On examination her BP is 132/70 mmHg, and her pulse is 105 (atrial fibrillation). She has bibasal crackles consistent with mild LVF.

Investigations show:

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<tr>
<td>Creatinine</td>
<td>145 µmol/L</td>
<td>(79-118)</td>
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Which of the following medications is likely to have resulted in her presentation?

(Please select 1 option)

- Amlodipine
This question illustrates the potential dangers of polypharmacy. She has been prescribed clarithromycin which leads to a significant increase in the theophylline AUC, precipitating toxicity with atrial fibrillation, nausea and vomiting.

In reality theophylline is a reasonably ineffective option in the treatment of COPD and in a patient with a history of ischaemic heart disease, risk of arrhythmias is increased.

Clarithromycin is a potent inhibitor of CYP3A4, and as such may interfere significantly with metabolism of a number of medications, including theophylline, simvastatin, and cyclosporine as the most important drug interactions.

The effect of warfarin and digoxin may also be potentiated by clarithromycin.

Reference:
electronic Medicines Compendium (eMC). Klaricid XL 500 mg tablets - Interactions
Question 166 of 200

You are asked to see a 42-year-old man who complains of a cough at night. He also tells you that he has wheeze when he has a cold, and he smokes 20 cigarettes per day. He works as a landscaper on a housing development.

On examination his BP is 152/91 mmHg, his pulse is 70 and his BMI is 21. There is no significant wheeze.

You assess him at intermediate risk of having a diagnosis of asthma.

According to BTS guidelines, which FEV1/FVC ratio triggers asthma therapy?

(Please select 1 option)

- 0.5
- 0.6
- 0.7  This is the correct answer
- 0.8
- 0.9  Incorrect answer selected

Features described by the BTS guidelines as increasing the likelihood of asthma include:

- worse symptoms at night and in the early morning
- nocturnal cough or wheeze
- symptoms after exercise
- allergen exposure
- beta blockers or
- aspirin.

A history of asthma or atopy in the family and wheeze on examination also increase the likelihood of an asthma diagnosis.

Prominent dizziness or tingling of the hands and feet associated with shortness of breath may be a pointer towards hyperventilation, and chronic cough without wheeze is also a pointer against a diagnosis of asthma.

Where the FEV1/FVC is greater than 0.7, referral for specialist advice is recommended if significant chest disease is suspected.

Reference:
British Thoracic Society. Asthma guideline.
Work Smart

Question 167 of 200

A 17-year-old boy is diagnosed with asthma and comes to the clinic for review. He is currently managed with 100 mcg BD of inhaled beclomethasone and salbutamol PRN.

His mother wants to enrol him in a class teaching the Buteyko technique.

What would you advise about its success?

(Please select 1 option)

- It is associated with improved FEV1
- It is associated with improved FVC
- It is associated with improved symptoms  
- It should not be recommended to adults who require inhaled steroids
- Patients enrolled tend to use more short acting beta agonists

The Buteyko technique controls chronic hyperventilation, as such patients perceive less symptoms of shortness of breath, and their use of short acting bronchodilators is reduced.

This does not however have any impact on lung function including FEV1 and FVC.

It may be particularly valuable in patients who complain of symptoms of shortness of breath significantly in excess of those expected when you review their lung function.

Reference:

British Thoracic Society. Asthma guideline.
A 72-year-old woman comes to the Emergency department. She takes warfarin, an anticoagulant for chronic atrial fibrillation, and is usually on a stable warfarin dose of 5 mg every morning. She has had a number of trips to the GP over past weeks for management of her hypertension, a respiratory tract infection, and for treatment of depression.

On examination her BP is 142/72 mmHg, her pulse is 80 bpm and regular, she has extensive bruising over her arms and legs.

Investigations show:

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Which of the following medications is most likely to have caused an increased propensity to bruising?

(Please select 1 option)

- Azithromycin
- Digoxin
Warfarin is subject to both pharmacodynamic and pharmacokinetic interactions which may lead to increased INR.

Pharmacodynamic interactions are those which may increase the propensity to bleeding without actually altering the absorption, metabolism, distribution or excretion of warfarin. Examples include concomitant use of clopidogrel or aspirin in combination with warfarin, or concomitant use of acute therapies like 2b3a receptor antagonists.

Pharmacokinetic interactions are those which impact on the absorption, metabolism, distribution or excretion of the drug.

Fluoxetine is a CY-P450 enzyme inhibitor. Both inhibitors and inducers of CYP450 enzymes may lead to changes in the anti-coagulant effect of warfarin.

Co-prescription of antibiotics often inadvertently leads to increases in INR; examples of antibiotic P450 inhibitors include clarithromycin and erythromycin.
Work Smart

Question 169 of 200

You are examining the mechanisms of various agents used in either platelet inhibition or anticoagulation in the management of cardiovascular disease.

Which of the following correctly describes a mechanism of action associated with warfarin therapy?

(Please select 1 option)

- 2b3a receptor inhibition
- Cyclo-oxygenase inhibition
- P2Y12 inhibition
- Reduced levels of factor X
- Selective COX-2 inhibition

Warfarin inhibits production of factors II, VII, IX and X, and it does this by restricting the activity and availability of vitamin K. This accounts for vitamin K administration being the treatment for warfarin toxicity.

2b3a receptor inhibitors are used in the treatment of acute coronary syndrome and they inhibit platelet aggregation.

P2Y12 is an adenosine diphosphate (ADP) dependent receptor involved in platelet aggregation which is inhibited by clopidogrel.

Cyclo-oxygenase inhibition is the mechanism of action of aspirin.

Selective COX-2 inhibitors have fallen out of favour due to potential increased risk of cardiovascular
Question 8 of 30

A 21-year-old nurse comes to the clinic requesting contraception. She works shifts including nights, and so often wakes up at odd times of the day. She has recently married and may want to start a family during the next two years.

Her mother suffered a DVT three years ago, aged 50.

On further questioning she has some problems with libido and has heard that progesterone only based preparations may impact on this. On examination she looks well, her BMI is 21 kg/m², and her BP is 100/70 mmHg.

Which of the following is likely to be the most appropriate medication for her?

(Please select 1 option)

- Combined oral contraceptive pill

- Diaphragm

- Mirena coil

- Progesterone implant

- Progesterone only pill

The fact that her mother was older than 45 when she had her DVT means this is less relevant when assessing this lady's VTE risk with the combined pill.

For the progesterone only pill, it must be taken within three hours of the time the pill was taken on the previous day; given she works shifts this is likely to have a significant impact and increase the
chances of a missed pill.

The time window for a missed pill with respect to the combined pill is 12 hours.

Given that she may decide to start a family at any time, the progesterone implant or Mirena coil do not seem to be ideal options, and progesterone only preparations may be associated with a reduced libido.

The diaphragm has a higher failure rate and should definitely not be the first choice in this patient.

The primary action of the combined oral contraceptive pill is inhibition of ovulation, although there are also alterations to the cervical mucus and endometrium which may contribute to effectiveness.

In contrast the progesterone only pill does not necessarily affect ovulation and its primary mode of action is on cervical mucus and implantation.

Long acting progesterone preparations prevent proliferation of the endometrium, thicken cervical mucus and suppress ovulation in some women.

The major risk of the combined oral contraceptive pill is thromboembolic disease; with respect to long acting progesterone, the major concerns are around irregular menstrual bleeding and changes in libido.

Reference:

1. NICE. Long-acting reversible contraception (CG30).
2. Faculty of Sexual & Reproductive Healthcare. UKMEC Summary sheets: common reversible methods.
Work Smart

Question 9 of 30

A 22-year-old woman attends the GP concerned that she has a positive pregnancy test. She maintains that she never missed a pill over the course of the last three months.

Which of the following, when taken concurrently with the combined contraceptive pill, is most likely to increase the risk of pregnancy?

(Please select 1 option)

- Cimetidine
- Erythromycin
- Fluconazole
- Fluoxetine
- St John's wort  □ Correct

St John's wort is a potent CYP-450 inducer, and use can lead to rapid decreases in sex steroids administered as the combined pill.

- Fluconazole is a 2C9 inhibitor
- Fluoxetine a 2C19 inhibitor
- Erythromycin a 3A4 inhibitor
- Cimetidine an inhibitor of 1A2 and 2D6.

As such all four of the other potential choices should not affect contraceptive effectiveness because they do not lead to a decrease in sex steroid levels.
Potent enzyme inducers which may cause significantly decreased pill effectiveness include rifampicin and carbamazepine.

Other antibiotics such as the tetracyclines which may be used in this population for example in the treatment of acne, are known to lead to decreased pill efficacy.

### Answer Statistics

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Times answered: 5467

### Test Analysis

Correct Incorrect Partially Correct

Score: 22.22%
Total Answered: 9
Work Smart

Question 10 of 30

You are discussing the optimal medication for use in a patient who needs to withdraw from heroin. He seems motivated and would like to try tablet therapy. He failed to stay clean during the last month, having used street heroin on up to five occasions.

Which of the following is the most effective in preventing use of heroin?

(Please select 1 option)

- Buprenorphine
- Buprenorphine and naloxone combination tablets  □ This is the correct answer
- Codeine phosphate
- Dihydrocodeine
- Morphine  □ Incorrect answer selected

Buprenorphine is a partial opiate agonist which binds mu and kappa opiate receptors in the brain. A partial agonist occupies and modulates the receptor without exerting the euphoric effects that would be gained by injecting IV heroin, a full agonist, because it does not exert the full effect.

Naloxone is an opioid antagonist which binds at mu opioid receptors. This means that it blocks the action of opioid agonists such as morphine.

The purpose of combining buprenorphine and naloxone for the treatment of opioid action is that it prevents addicts from achieving a high if they try to create an IV preparation from the tablets for injection.
Further Reading:
NHS Scotland. Buprenorphine/Naloxone 2 mg/0.5 mg, 8/2 mg sublingual tablet (Suboxone®).

Answer Statistics

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Times answered: 5502

Test Analysis

Correct Incorrect Partially Correct

Score: 20%
Total Answered: 10
Question 170 of 200

A 52-year-old Afro-Caribbean gentleman is diagnosed with hypertension after having three blood pressure measurements greater than 160/100 mmHg.

On examination his BMI is 24 kg/m², and he looks well. There is no significant past medical history of note.

According to the NICE guidelines, which of the following is the most appropriate to prescribe first line for this patient?

(Please select 1 option)

- Amlodipine  □ Correct
- Atenolol
- Diltiazem
- Ramipril
- Valsartan

Patients of African origin are more likely to have low renin hypertension. This means that they are more likely to respond to initial therapy with either a calcium antagonist or diuretic, usually a thiazide. A number of studies have shown that although both amlodipine and diltiazem are well tolerated, amlodipine is more effective in reducing systolic and diastolic blood pressures over a range of doses widely used in clinical practice.

Thiazides and beta blockers have been implicated in a meta-analysis as being associated with
increased risk of developing insulin resistance, but given his BMI is in the normal range this is unlikely to be a significant problem.

In contrast those patients of Caucasian origin who tend to have higher levels of renin respond much more readily to angiotensin-converting enzyme (ACE) inhibition, or if they fail to tolerate an ACE inhibitor because of cough, to an angiotensin receptor blocker. For these patients, ACE inhibition is seen by NICE as the first line treatment.

Combination therapies were designed originally around the ABCD guidelines from the British Hypertension Society, but because of the analysis which suggested increased risk of diabetes when beta blockade is combined with a thiazide, the combination of these two is no longer recommended.

Following the ASCOT study however, the ACE inhibitor calcium antagonist combination has been the one preferred by many clinicians.

Reference:

NICE. Hypertension (CG127).
An 18-year-old woman is brought to the Emergency department with shortness of breath, stridor, and an urticarial rash.

On examination her BP is 90/50 mmHg and she has a tachycardia of 95 beats per minute. You give her hydrocortisone and an IV fluid challenge but her BP fails to improve. You decide to administer adrenalin.

Which of the following is the most appropriate method of administration and dosage?

(Please select 1 option)

- [ ] 0.5 ml of 1:1000 adrenalin IM  □ Correct
- [ ] 0.5 ml of 1:10000 adrenalin IV
- [ ] 1 mcg/min IV adrenalin infusion
- [ ] 1 ml of 1:10000 adrenalin IM
- [ ] 4 mcg/min IV adrenalin infusion

Multimodal therapy involving use of an IV corticosteroid, IV antihistamine and fluid loading is usually employed in the treatment of anaphylaxis.

IV corticosteroids are designed to modulate downstream release of cytokines from inflammatory cells, they reduce the duration and severity of anaphylaxis.

IV antihistamine is designed to block the effects of histamine on the vascular tree, which ameliorates hypotension, and on the airways, reducing shortness of breath and stridor. Fluid loading is designed
to raise blood pressure.

Adrenalin is used for its alpha-agonist effects that include increased peripheral vascular resistance and reversed peripheral vasodilatation, systemic hypotension, and vascular permeability.

Beta-agonist effects include bronchodilatation, chronotropic cardiac activity, and positive inotropic effects.

IM administration is preferred because of a superior safety profile with respect to cardiac adverse events compared with the IV route, although 1:10000 adrenalin IV may be used in a life-threatening situation.

Reference:

Work Smart

Question 172 of 200

You are asked to review a 71-year-old woman who comes to the clinic complaining that her hearing is not as good as it was after a prolonged period of treatment in hospital for infective endocarditis.

On examination you find that she has significant sensorineural hearing impairment and you suspect this may be gentamicin related.

What is the mechanism of ototoxicity associated with gentamicin?

(Please select 1 option)

- Cell wall integrity disruption
- DNA toxicity
- Interruption of cell division
- Nitric oxide reduction
- Oxygen free radical generation

Gentamicin is toxic to cochlear hair cells, and it is known to disrupt mitochondrial protein synthesis, which leads to increased oxygen free radical generation via inducible nitric oxide synthase activity.

Peroxynitrite radicals are formed, which then leads to apoptosis.

It is thought that aminoglycosides take longer to clear from inner ear fluids, which may account for the site specific toxicity seen with this class of antibiotics.

A switch from BD dosing to OD dosing has reduced the susceptibility of patients to toxicity, and once daily regimes are now the preferred method of gentamicin administration.
Peak (one hour post dose), and trough, (pre-dose levels) are assayed to determine dose adjustments. A dose of 3 mg/kg/day is the usual starting level in adults with normal renal function. Gentamicin may be used in patients with impaired renal function, but dose level and interval between doses needs to be adjusted to avoid toxicity.
A 77-year-old woman comes to the clinic for review. She has suffered a previous Colles' fracture, and has a history of a previous left leg DVT.

She takes a range of medication including omeprazole for severe reflux oesophagitis. A T score was measured at -4.2, and she was unable to tolerate weekly alendronate due to symptoms of indigestion.

Which of the following is the most appropriate alternative for her?

(Please select 1 option)

- Daily calcium and vitamin D
- Daily strontium ranelate
- Monthly ibandronate
- Monthly risedronate
- Six monthly denosumab

Six monthly denosumab is correct because it is effective in managing osteoporosis in this patient type. This patient falls into the severe osteoporosis range and definitely requires therapy in excess of calcium and vitamin D.

Whilst bisphosphonates can be given monthly, they still cause oesophagitis and are not appropriate here.

Denosumab is a rank ligand inhibitor leading to inhibition of osteoclast activity. It is given by six monthly subcutaneous injection and is associated with a 40% reduction in the risk of hip fracture over
three years. It is recommended in NICE guidance on Osteoporotic fractures - denosumab (TA204) for this patient type.

Daily calcium and vitamin D are incorrect because they are less effective than bisphosphonates in the treatment of osteoporosis.

Strontium ranelate is incorrect because it is associated with increased risk of deep vein thrombosis.

Monthly ibandronate is incorrect because it is still associated with symptoms of oesophagitis.

Monthly risedronate is incorrect because it is still associated symptoms of oesophagitis.

Answer Statistics

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Times answered: 6180

Test Analysis

CorrectIncorrectPartially
Correct
Work Smart

Question 173 of 200

A 10-year-old child presents with a respiratory tract infection. You decide to treat him empirically with a broad spectrum antibiotic.

The child is taking no other medication, has no other co-morbidity factors and has no known detected allergies.

Which of the following antibiotics is contraindicated in this patient?

(Please select 1 option)

- Amoxicillin
- Clarithromycin
- Erythromycin
- Flucloxacillin
- Minocycline  □ Correct

Tetracyclines can bind to calcium and deposit on growing bones and teeth. This may cause staining and occasionally dental hypoplasia.

Therefore, tetracyclines should not be given to children under the age of 12 or to pregnant or breastfeeding women.

However, doxycycline can be used (unlicensed) for the treatment of anthrax in children.
Answer Statistics

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Times answered: 6359

Test Analysis

Correct Incorrect Partially Correct

Score: 54.91%
Total Answered: 173

Feedback

Question Navigator
A patient is prescribed ciprofloxacin 500 mg twice daily for the treatment of cystitis.

In which of the following conditions should ciprofloxacin be used with caution?

(Please select 1 option)

- Asthma
- Diabetes
- Epilepsy
- Glaucoma
- Heart failure

Quinolones should be used with caution in patients with a history of epilepsy or conditions that predispose to seizures, in glucose-6-phosphate dehydrogenase (G6PD) deficiency, myasthenia gravis (risk of exacerbation), and in children or adolescents.

The CSM has warned that quinolones may induce convulsions in patients with or without a history of convulsions; taking non-steroidal anti-inflammatory drugs (NSAIDs) at the same time may also induce them.

It should also be noted that ciprofloxacin is contraindicated in pregnancy.
Work Smart

Question 174 of 200

A patient is taking bendroflumethiazide for hypertension.

Which of the following is likely to increase whilst on bendroflumethiazide therapy?

(Please select 1 option)

- Magnesium
- Potassium
- Sodium
- Uric acid  □ Correct
- White cell count

Hydrochlorothiazide and other thiazide diuretics may cause metabolic disturbances especially at high doses. They may provoke hyperglycaemia and glycosuria in diabetic and other susceptible patients. They may cause hyperuricaemia and precipitate attacks of gout in some patients.

Thiazide diuretics may be associated with electrolyte imbalances including hypochloraemic alkalosis, hyponatraemia, and hypokalaemia.

Hypokalaemia intensifies the effect of digitalis on cardiac muscle and treatment with digitalis or its glycosides may have to be temporarily suspended. Patients with cirrhosis of the liver are particularly at risk from hypokalaemia.

Hyponatraemia may occur in patients with severe heart failure who are very oedematous, particularly with large doses used with restricted salt in the diet.
The urinary excretion of calcium is reduced. Hypomagnesaemia has also occurred.

Adverse changes in plasma lipids have also been noted but their clinical significance is unclear.
Mrs HV is taking an antidepressant. Her husband recently passed away and she was diagnosed as being clinically depressed.

Since taking the antidepressants, she has been complaining of drowsiness, confusion and fatigue.

Depletion of which of the following electrolytes may be causing Mrs HV’s symptoms?

(Please select 1 option)

- Chloride
- Magnesium
- Phosphate
- Potassium
- Sodium

The Committee on Safety of Medicines (CSM) have reported that hyponatraemia is associated with all types of antidepressants; however it has been reported more frequently with selective serotonin reuptake inhibitors (SSRIs) than with other antidepressants.

Hyponatraemia should be considered in all patients who develop drowsiness, confusion or convulsions whilst taking an antidepressant.
You would like to prescribe a selective serotonin reuptake inhibitor (SSRI) for a 14-year-old girl who has been diagnosed as being clinically depressed.

After much debate and intervention from various healthcare professionals, it was decided to prescribe her fluoxetine.

For which one of the following parameters should the patient be closely monitored, especially at the beginning of treatment?

(Please select 1 option)

- Coldness of extremities
- Hostility  □ This is the correct answer
- Hyperglycaemia
- Prothrombin time  □ Incorrect answer selected
- Tachycardia

Children and adolescents need to be monitored carefully. The use of antidepressants has been linked with suicidal thoughts and behaviour. Where necessary patients should be monitored for suicidal behaviour, self harm or hostility, particularly at the beginning of treatment or when the dose is changed.

The balance of risks and benefits for the treatment of depressive illness in individuals under the age of 18 years is considered unfavourable for citalopram, escitalopram, paroxetine and sertraline.
Clinical trials have failed to show efficacy and have shown an increase in harmful outcomes.

Only fluoxetine has shown to be effective in treating depressive illness in children, but careful monitoring for the above sign is required.

Reference:

1. Electronic Medicines Compendium (eMC). Fluoxetine 20 mg Capsules.

Answer Statistics

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Times answered: 7148

Test Analysis

Correct Incorrect Partially
Correct
Mr VU is taking amitriptyline for depressive illness. He comes to see you at a routine outpatient appointment and informs you that he has been experiencing some side effects with his amitriptyline therapy.

Which of the following is the most commonly recognised side effect of this drug?

(Please select 1 option)

- Gout
- Hypokalaemia
- Renal stones
- Taste disturbances
- Urinary retention

Many adverse effects of amitriptyline and similar tricyclic antidepressants are caused by their antimuscarinic actions.

Antimuscarinic effects are relatively common and occur before an antidepressant effect is obtained. They include:

- Dry mouth
- Constipation occasionally leading to paralytic ileus
- Urinary retention
- Blurred vision and disturbances in accommodation
- Increased intraocular pressure, and
- Hyperthermia.

Tolerance is often achieved if treatment is continued and adverse effects may be less troublesome if treatment is begun with small doses and then increased gradually, although this may delay the clinical response.

Drowsiness may also be common, although a few tricyclic antidepressants possess little or no sedative potential and may produce nervousness and insomnia.

Other neurological adverse effects include:

- Headache
- Peripheral neuropathy
- Tremor
- Ataxia
- Epileptiform seizures
- Tinnitus, and
- Occasional extrapyramidal symptoms including speech difficulties (dysarthria).

Confusion, hallucinations, or delirium may occur, particularly in the elderly, and mania or hypomania, and behavioural disturbances (particularly in children) have been reported.

Gastrointestinal complaints include:

- Sour or metallic taste
- Stomatitis, and
- Gastric irritation with nausea and vomiting.

Orthostatic hypotension and tachycardia can occur in patients without a history of cardiovascular disease, and may be particularly troublesome in the elderly.

Hypersensitivity reactions, such as urticaria and angioedema, and photosensitisation have been reported and, rarely, cholestatic jaundice and blood disorders, including:

- Eosinophilia
- Bone marrow depression
- Thrombocytopenia
- Leucopenia, and
- Agranulocytosis.

Endocrine effects include testicular enlargement, gynaecomastia and breast enlargement, and galactorrhoea. Sexual dysfunction may also occur.

Changes in blood sugar concentrations may also occur, and, very occasionally, hyponatraemia
associated with inappropriate secretion of antidiuretic hormone.

Other adverse effects that have been reported are increased appetite with weight gain (or occasionally anorexia with weight loss). Sweating may be a problem.
Work Smart

Question 175 of 200

A patient is prescribed warfarin for prophylaxis of DVT.

Which vitamin does warfarin antagonise?

(Please select 1 option)

- A
- B6
- C
- D
- K  □ Correct

Warfarin inhibits hepatic vitamin K epoxide reductase, which is an enzyme that converts vitamin K to its active form (hydroquinone).

This results in the impairment of the hepatic synthesis of vitamin K dependent clotting factors (II [prothrombin], VII, IX, and X).
A patient on your ward is prescribed warfarin as she has recently been diagnosed with atrial fibrillation. Her desired INR is 2.5.

On the morning ward round, you take the patient's INR which comes back as 5.2 from the laboratory. There are no signs of bleeding.

Which would be your next course of action?

(Please select 1 option)

- Decrease the dose of warfarin
- Do nothing, as there are no signs of bleeding
- Increase the dose of warfarin
- Omit the warfarin
- Start a heparin infusion

The main adverse effect of all oral anticoagulants is haemorrhage.

Checking the INR and omitting doses when appropriate is essential; if the anticoagulant is stopped but not reversed, the INR should be measured two to three days later to ensure that it is falling.

The following recommendations are based on the result of the INR and whether there is major or minor bleeding; the recommendations apply to patients taking warfarin:

- Major bleeding - omit warfarin; give phytomenadione (vitamin K1) 5-10 mg by slow intravenous
injection; give dried prothrombin complex (factors II, VII, IX, and X) 30-50 units/kg (if dried prothrombin complex unavailable, fresh frozen plasma 15 mL/kg can be given but is less effective).

- INR 8.0, no bleeding or minor bleeding - omit warfarin and give phytomenadione (vitamin K1) 2.5-5 mg by mouth using the intravenous preparation orally [unlicenced use], or 0.5-1 mg by slow intravenous injection (if complete reversal required 5-10 mg by slow intravenous injection); repeat dose of phytomenadione if INR still too high after 24 hours; restart warfarin when INR less than 5.0.

- INR 5.0-8.0, no bleeding - omit warfarin; minor bleeding - omit warfarin and give phytomenadione (vitamin K1) 1-2.5 mg by mouth using the intravenous preparation orally [unlicenced use]; restart warfarin when INR less than 5.0.

- Unexpected bleeding at therapeutic levels - always investigate possibility of underlying cause, for example, unsuspected renal or gastrointestinal tract pathology.
Work Smart

Question 176 of 200

Mr YB is a patient who regularly attends the anticoagulant clinic.

He is very concerned as he has been recently started on a new drug by his GP. He asks you whether it would enhance the anticoagulant effect.

Which of the following may increase the potential for bleeding in patients taking warfarin?

(Please select 1 option)

- Carbamazepine

- Clopidogrel [Correct]

- Griseofulvin

- Phenobarbitone

- St. John's wort

Clopidogrel does not appear to have a clinically relevant effect on the pharmacokinetics or pharmacodynamics of warfarin.

However, the concurrent use of clopidogrel with warfarin increases the bleeding risk.

All other drugs in the options are C-P450 enzyme inducers so would decrease the anticoagulant effect.

Reference:

Question 17 of 30

Which of the listed medications has a thiazide-like action?

(Please select 1 option)

- Acetazolamide
- Bumetanide
- Furosemide
- Metolazone
- Triamterene

Metolazone is an example of a diuretic with a thiazide-like action.

Bumetanide and furosemide are loop diuretics, blocking reabsorption of sodium at the loop of Henle.

Acetazolamide is a carbonic anhydrase inhibitor and has no relation to thiazide-like action.

Triamterene is a potassium-sparing diuretic with no thiazide-like activity.
Work Smart

Question 18 of 30

A 50-year-old man returns to your clinic three weeks after Botox treatment for horizontal forehead furrows. He now complains that his eyebrows are drooping (eyebrow ptosis).

What is the cause of his complaint?

(Please select 1 option)

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>☒</td>
<td>Increased forehead skin laxity</td>
</tr>
<tr>
<td>☐</td>
<td>Paralysis of corrugators</td>
</tr>
<tr>
<td>☒</td>
<td>Paralysis of frontalis</td>
</tr>
<tr>
<td>☐</td>
<td>Paralysis of procerus</td>
</tr>
<tr>
<td>☐</td>
<td>Paralysis of zygomaticus major</td>
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</tbody>
</table>

Botox is a neurotoxin derived from the bacteria, *Clostridium botulinum*. It blocks neuromuscular transmission inhibition of acetylcholine release at the presynaptic membrane. The end result is that the muscle contraction is inhibited.

The action of Botox is not permanent because collateral axonal sprouting establishes new neuromuscular junctions, restoring muscle function.

Botox does not affect skin laxity, hence this answer option is wrong.

Corrugator and procerus are both muscles that depress the eyebrow, therefore paralysis of these muscles would cause the opposite to eyebrow ptosis, hence paralysis of corrugators and paralysis of procerus are wrong.
Zygomaticus major elevates and retracts the angle of mouth and does not affect the eyebrows, hence paralysis of zygomaticus major is wrong.

Frontalis is a quadrilateral muscle found on the forehead that elevates the eyebrows; hence paralysis of this muscle can lead to eyebrow ptosis.

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<td>5</td>
<td>6%</td>
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</table>

Times answered: 5391

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Score: 16.67%
Total Answered: 18
An 88-year-old woman is admitted with swollen legs and increased abdominal swelling. She is commenced on intravenous furosemide and responds well.

You note that she has been on oral furosemide at home.

Which of the following best explains the reason for the response to intravenous drugs?

(Please select 1 option)

- Decreased protein binding of furosemide
- Increased bioavailability  [Correct]
- Increased effect on the loop of Henle
- Increased first pass metabolism
- Increased plasma volume

This lady has a lot of gut oedema secondary to right heart failure which would reduce the absorption of oral furosemide. Intravenous furosemide would have a much better bioavailability and thus therapeutic effect.

Protein binding of drugs may be reduced in elderly patients. This may be due to malnutrition. In this case scenario, however, furosemide is poorly absorbed from the gut.

Intravenous furosemide would have a more pronounced effect on the loop of Henle due to increased bioavailability of the drug when given intravenously due to poor absorption secondary to gut oedema as stated above.
Furosemide undergoes about 40% first pass metabolism, which may be reduced as a result of liver congestion. It is also conjugated to glucuronic acid in the kidney.

The increased plasma volume is likely secondary to heart failure itself.

Reference:

Question 19 of 30

An 82-year-old lady presents with a fall and a Colles' fracture.

She is commenced on alendronate.

Which of the following is the mechanism of the therapeutic effect of this drug?

(Please select 1 option)

- Decreasing the effect of endogenous parathyroid hormone
- Improved calcium absorption from the kidney
- Inhibition of osteoblast activity
- **Inhibition of osteoclast activity**
- Stimulation of osteoblast activity

Alendronate inhibits osteoclast activity and this prevents the breakdown of bone and thus bone loss.

Bisphosphonates do not exhibit these therapeutic effects.

Alendronate's therapeutic effect is not associated with change in osteoblast activity.
Work Smart

Question 178 of 200

An 84-year-old lady is treated for a chest infection in hospital. On admission her creatinine kinase (CK) level was normal. Three days later she is found to be in renal failure and has a CK of 8000 mmol/L.

She is taking simvastatin, aspirin, bisoprolol and St John's wort.

Which of the following drugs would be the most likely cause?

(Please select 1 option)

- Ciprofloxacin
- Clarithromycin  ☑ Correct
- Co-amoxiclav
- Doxycycline
- Metronidazole

There is a significant drug interaction between clarithromycin and simvastatin. Clarithromycin strongly inhibits CYP3A4 - the enzyme responsible for simvastatin metabolism which can lead to rhabdomyolysis and renal failure.

Macrolide antibiotics and hydroxymethylglutaryl coenzyme A (HMG-CoA) reductase inhibitors should never be administered together.

There can be a very rare interaction between ciprofloxacin and simvastatin that can give rise to rhabdomyolysis. The question, however, states the 'most likely' cause for the presentation and that
would certainly be clarithromycin.

Co-amoxiclav does not inhibit CYP4A4 and does not have a significant interaction with statins.

There is no interaction between doxycycline and simvastatin.

There is a moderate interaction that exists between simvastatin and metronidazole and patients should be closely monitored for symptoms of peripheral neuropathy.

Reference:

Work Smart

Question 179 of 200

An 86-year-old lady is admitted with parkinsonism.

Exposure to which of the following drugs is the most likely cause?

(Please select 1 option)

- Buprenorphine
- Cyclizine
- Metoclopramide  □ Correct
- Phenytoin
- Trimethoprim

Metoclopramide is a dopamine receptor antagonist that can induce parkinsonism. It can also worsen control in patients with idiopathic Parkinson's disease to its antagonistic effect on dopamine receptors.

Buprenorphine is an opioid agonist and does not cause parkinsonism.

It is very rare for cyclizine to induce parkinsonism. Cyclizine is a histamine receptor antagonist.

There have been only two case reports of phenytoin-induced parkinsonism that resolved after discontinuation of phenytoin.

Trimethoprim does not cause extrapyramidal side effects.

Of the options given, metoclopramide is far more likely to cause extrapyramidal side effects.
Reference:
Miss L is a 25-year-old woman attending the general medical clinic. For the last six months she has felt generally fatigued and has noticed abdominal bloating and occasional diarrhoea. She has multiple symptoms that have been troubling her for the last few years and her GP would like some advice on diagnosis and management.

She has also been troubled by large, painful mouth ulcers that can be so severe that she is unable to eat. She says that she has had mouth ulcers since she was a teenager and gets them at least once per week.

She complains of joint pains affecting her hands and knees, and reports one brief episode of swelling of the right knee that resolved after a week or so of painkillers.

Last year, she was seen urgently by the ophthalmologists when she developed an acutely red and painful left eye associated with blurred vision and photophobia. She cannot remember what the diagnosis was, but was treated with steroid drops and this has not bothered her since.

On further questioning, you find out that she has also been seen in the GUM clinic complaining of painful vulval ulceration. Swabs and blood samples were taken, but no diagnosis was reached. The symptoms have recurred twice since the first episode two years ago.

You read the referral letter from her GP who describes an episode of erythema nodosum last year. He also mentions that she was treated for a DVT following a trip to Cyprus when she was 17.

What is the likely unifying diagnosis?

(Please select 1 option)

- Behçet's disease
- Brucellosis

This is the correct answer
The combination of venous ulceration, iritis, mouth ulceration and arthritis is typical of Behçet's disease.

Behçet's syndrome is a systemic vasculitis with an unknown aetiology, which affects small and large vessels (venous and arterial). More than 60% of patients are HLA-B51, and there is an increased prevalence in the Mediterranean countries. It is commonly associated with mucocutaneous manifestations (oro-genital ulceration, erythema nodosum), ocular disease, gastrointestinal involvement and neurological features. Venous thrombosis is a common complication, but arterial occlusion can also occur.

The International Study Group criteria for classification of Behçet's disease requires the presence of recurrent oral ulceration (minor aphthous, major aphthous or herpetiform ulceration observed by physician or patient, which have recurred at least three times in a 12 month period), and two of the following:

- Recurrent genital ulceration - aphthous ulceration or scarring, observed by physician or patient
- Eye lesions - anterior uveitis, posterior uveitis, or cells in vitreous on slit lamp examination; or retinal vasculitis observed by ophthalmologist
- Skin lesions - erythema nodosum observed by physician or patient, pseudofolliculitis or papulopustular lesions; or acneiform nodules observed by the physician in post-adolescent patients not on corticosteroid treatment
- Positive pathergy test - read by physician at 24-48 hours

Pathergy is the non-specific hyper-reactivity of the skin following minor trauma, and is specific to Behçet's disease. It involves intradermal injection of skin with a 20-gauge needle under sterile conditions. It is considered positive if an erythematous sterile papule develops within 48 hours.

Brucellosis is an infective condition which presents most commonly with fever and malaise. It does not fit with the above scenario.

This presentation is not typical of Crohn's disease - one would expect a history of diarrhoea, abdominal pain and/or PR bleeding.

Fibromyalgia presents with pain and tenderness in a number of muscles. Extra-articular features such as genital ulceration are not seen.

Whilst a number of the features described in this scenario could fit with systemic lupus erythematosus
(SLE) and/or antiphospholipid syndrome the history of oral and genital ulceration is much more typical of Behçet's disease.

Reference:
A child-bearing woman asked you about the use of angiotensin converting enzyme (ACE) inhibitor in pregnancy.

Choose the best answer in response to her query.

(Please select 1 option)

- ACE inhibitors are listed as FDA rating B; they can be used in pregnancy
- ACE inhibitor should be changed to angiotensin receptor blocker before conception
- **ACE inhibitor should be withheld during the first trimester; it is otherwise safe in the second and third trimester**
- ACE inhibitor should not be used during pregnancy
- The drugs can be continued until second trimester because ACE inhibitor has not been shown to be teratogenic

Avoidance of ACE inhibitors at any stage of pregnancy is recommended.

Contrary to previous teaching, a United States study (including 29,507 infants born between 1985 and 2000, 209 of whom were exposed to ACE inhibitors in the first trimester only) showed a significant increase in major (in particular, cardiovascular) congenital malformation.

Advising that the drugs can be continued until second trimester is therefore incorrect. As a result of this study (published in the New England Journal of Medicine) the FDA changed their ratings of ACE inhibitors to category C for the first trimester and category D during the second and third trimesters.
Category C states: 'Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks'.

Category D states: 'There is positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience or studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks'.

Second and third trimester exposure to ACE inhibitors must be avoided because of the association with serious adverse fetal effects, notably oligohydramnios, in utero death, and neonatal anuria and renal failure.

The same probably applies to angiotensin receptor blocker and direct renin inhibitor (aliskiren).
Work Smart

Question 181 of 200

During the evaluation of a patient who developed hyperkalaemia, you went through the drug chart.

Which of the following items can be continued without the worry of worsening hyperkalaemia?

(Please select 1 option)

- Cyclosporine
- Digoxin
- Ibuprofen
- Spironolactone
- Thyroxine  □ Correct

Thyroxine does not cause nor exacerbate hyperkalaemia.

Translocation of potassium from the cells into the extracellular space can occur from digoxin overdose due to its dose-dependent Na-K-ATPase pump inhibition.

Other common mechanisms include impaired urinary potassium excretion, notably hypoaldosteronism.
A 62-year-old woman presents with a one year history of worsening bilateral, anterior knee pain. The pain is increased by climbing stairs. Both knees are stiff for five to 10 minutes in morning. There is no history of knee swelling. The pain is partially controlled by paracetamol 1 g up to four times a day. She has a history of diabetes, and angina.

On examination, she is overweight. There is crepitus and during active and passive movement of both knees. There is no knee effusion. A recent knee x ray shows joint space narrowing in the medial tibio-femoral joint.

What is the next step in her management?
(Please select 1 option)

- Acupuncture
- Oral NSAIDs
- Rest
- Topical NSAIDs ✔️ Correct
- Transcutaneous electrical nerve stimulation (TENS)

This lady has osteoarthritis.

NICE guidelines recommend formulating individualised management plans for patients with osteoarthritis.

Behavioural change, such as exercise, weight loss and suitable footwear should be encouraged.
Comorbidities which compound the effect of osteoarthritis symptoms should be identified and their treatment optimised.

Paracetamol and/or topical NSAIDs (for knee or hand OA) should be offered before considering oral NSAIDs.

If symptoms are not controlled with the above strategies, oral NSAIDs or COX-2 inhibitors (but not etoricoxib) can be used. A proton pump inhibitor should be co-prescribed. The lowest effective dose should be prescribed for the shortest period possible. If the patient is already taking low-dose aspirin, an alternative analgesic should be considered.

Treatments which are not recommended include rubefacients, intra-articular hyaluronan, electroacupuncture and chondroitin or glucosamine products.

Adjuvants which can be used include opioid analgesics, topical capsaicin and intra-articular corticosteroids.

Application of heat or cold packs, or TENS, can be considered if other strategies are ineffective. Manipulation and stretching can be helpful, particularly for hip osteoarthritis. Bracing/joint supports can be used for patients with biomechanical joint pain or instability.

Patients should be referred for joint surgery if they have already been offered all of the core treatments or if they have refractory joint symptoms which have a substantial impact on their quality of life.

If there is a clear history of mechanical locking, referral for arthroscopic lavage and debridement should be considered.

Reference:

2. NICE. Osteoarthritis (CG177).
A 27-year-old patient presented to his GP with persistent cough and weight loss. He had night sweats.

He was diagnosed with TB and referred to the respiratory clinic. He was started on treatment. His urine became orange in colour.

Which one of the following drugs causes this?

(Please select 1 option)

- Ciprofloxacin
- Ethambutol
- Isoniazide
- Pyrazinamide
- Rifampicin

It is very important to be aware of side effects of drugs especially those for TB.

Patients should be warned about this. It can also be used to confirm compliance.

Orange staining occurs to contact lenses.
A 44-year-old immigrant from Romania presents to the emergency department with a headache, neck stiffness and gradually worsening confusion over the past few days.

You understand from his relative that he also has a chronic cough and has lost a significant amount of weight recently.

On examination he is pyrexial 37.8°C, his BP is 134/72 mmHg, pulse is 85 and regular. He has marked neck stiffness and photophobia.

Investigations show:

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<tr>
<td>White cell count</td>
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</tr>
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<td>CXR</td>
<td>fibrosis suspicious of tuberculosis</td>
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<tr>
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<td></td>
</tr>
<tr>
<td>PCR</td>
<td>positive for tuberculosis</td>
<td></td>
</tr>
</tbody>
</table>
Which of the following is the correct duration of four drug therapy?

(Please select 1 option)

- [ ] 1 month
- [ ] 2 months  □ This is the correct answer
- [ ] 6 months  □ Incorrect answer selected
- [ ] 10 months
- [ ] 18 months

Whilst 12 months of therapy is recommended for the treatment of TB meningitis, it is still only an initial two months of four drug therapy which is needed. A glucocorticoid is usually added with a reducing dose schedule over two to three weeks.

All of the other options are incorrect because no matter what the location of infection, two months of four drug therapy is the standard, before reducing this to two drugs.

The exception is multi-drug resistant tuberculosis, where patients are commenced initially on five or more agents.

Answer Statistics

Times answered: 6747

Test Analysis

Correct Incorrect Partially Correct

1 1% 20% 36%
2 20% 27% 16%
3 20% 27% 16%
4 20% 27% 16%
5 20% 27% 16%
You are investigating the properties of a novel oral TNF-alpha antagonist in late stage clinical trials.

Which of the following would be an expected property of this agent?

(Please select 1 option)

- Decreased endothelial reactivity
- Decreased HDL cholesterol
- Decreased insulin sensitivity
- Decreased protein catabolism
- Increased acute phase protein production

Increased levels of TNF-alpha are known to result in protein catabolism, weight loss, and muscle weakness: all features of disseminated carcinoma where TNF-alpha is elevated. As such an antagonist of TNF-alpha would be expected to result in decreased protein catabolism.

Chronic inflammatory disorders including those associated with elevated tumour necrosis factor (TNF) are noted to be associated with increased arteriolar stiffness and decreased endothelial reactivity.

TNF-alpha elevation is also known to be associated with increased insulin resistance and associated lipid abnormalities such as decreased high-density lipoprotein (HDL) cholesterol.

Increased acute phase protein production is a feature of chronic inflammation; as such, a TNF-alpha
antagonist is recognised to reduce this.
Question 184 of 200

A 52-year-old man has been started on regular diclofenac for back pain. He is concerned as over the past few days he has been suffering from deteriorating vision.

On examination his BP is 142/82 mmHg, pulse is 72 and regular. There is bilateral decreased visual acuity and loss of colour vision. The rest of the neurological examination is unremarkable.

Which of the following is most likely to have occurred?

(Please select 1 option)

- Cataract formation
- Closed angle glaucoma
- Open angle glaucoma
- Optic neuritis
- Retinal detachment

Optic neuritis is described as being rarely associated with diclofenac therapy. A range of other CNS side effects has also been noted on the summary of product characteristics, these include headache, dizziness, vertigo and in rare circumstances drowsiness.

Cataract formation would not lead to loss of colour vision or to a sudden deterioration in sight over the course of a few days.

Glaucoma and retinal detachment are not thought to be associated with diclofenac treatment.
Work Smart

Question 23 of 30

A 71-year-old man is treated for paroxysmal atrial fibrillation with 200 mg of amiodarone per day.

He is finding extreme problems with photosensitivity and wants to discontinue the medication.

Which of the following is true of amiodarone therapy?

(Please select 1 option)

- It has a half life of 36 hours so stopping the medication will be associated with an immediate improvement
- Photosensitivity is a rare occurrence
- Purple skin discoloration is seen independent of photosensitivity
- Skin sensitivity can be prevented by using a sun block
- Thyroid dysfunction is seen more commonly in patients who experience photosensitivity

Photosensitivity is seen very commonly in those patients who are prescribed amiodarone therapy. It is distinct from the slate grey skin discoloration which can occur with prolonged amiodarone use and can be prevented by using a total sun block preparation.

The half life of amiodarone has a mean of around 50 days, and may be as short as 20 days in some individuals and as long as 100 days in others. Slate grey or blue skin appearance is the commonest pigmentation change seen in association with treatment.

The incidence of amiodarone induced thyroid dysfunction has no relationship at all to photosensitivity.
A 67-year-old man presents to the Emergency department with uncontrolled nausea and vomiting. He has a long history of COPD for which he takes high dose Seretide and theophylline tablets and has recently been prescribed some antibiotics by his GP for an exacerbation.

On examination his BP is 142/72 mmHg, his pulse is 92 and regular. Auscultation of the chest reveals wheeze and coarse crackles.

Investigations show:

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<td>Creatinine</td>
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Which of the following antibiotics is he most likely to have been prescribed?

(Please select 1 option)

- Amoxicillin
- Azithromycin
- Cefuroxime
This patient is showing symptoms of theophylline toxicity, and the most likely cause of toxicity is co-prescription of a CYP3A4 inhibitor. Of the options listed, only clarithromycin is a potent 3A4 inhibitor. Azole antibiotics, amiodarone, fluoxetine and cimetidine are other examples.

Azithromycin is a macrolide but is not a significant inhibitor of 3A4. Whilst case reports exist of azithromycin precipitating drug accumulation it is much less likely to do so than clarithromycin or erythromycin.

Amoxicillin, doxycycline and cephalosporins should not lead to theophylline accumulation.
Work Smart

Question 186 of 200

A 57-year-old man with a history of stable coronary artery disease comes to the clinic for review.

He suffered an inferior myocardial infarction some seven years earlier, but has been troubled with only relatively minor chest pain since this time.

He takes a number of medications for control of blood pressure, cholesterol and his angina. On examination his BP is 145/72 mmHg, pulse is 70 and regular. His chest is clear and there is no ankle swelling.

He tells you that he has been buying sildenafil over the internet for erectile dysfunction.

Which of the following medications would concern you most with respect to possible drug interaction?

(Please select 1 option)

- Atorvastatin
- Bisoprolol
- Indapamide
- Nicorandil  □ Correct
- Ramipril

Sildenafil leads to significant hypotension with nitrates and drugs such as nicorandil which act as nitrate donors. As such it is contraindicated for use with these agents.

Atorvastatin, bisoprolol, indapamide and ramipril are all commonly prescribed in patients with erectile dysfunction and no significant interaction with PDE-5 inhibitors is recognised.
Alpha blockers may lead to hypotension in patients prescribed sildenafil and caution is therefore advised where co-prescription is considered.

Sildenafil is metabolised via the CYP3A4 pathway, as such caution is also advised when co-prescribing agents such as erythromycin and increased consumption of grapefruit juice.

### Answer Statistics

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Times answered: 5445

### Test Analysis

Correct Incorrect Partially Correct

Score: 56.99%
Total Answered: 186
Work Smart

Question 24 of 30

A 68-year-old woman comes to the cardiology clinic for review.

She complains of pitting oedema of both ankles and is concerned that some of her medication for heart disease or hypertension may be responsible.

On examination her blood pressure is 142/72 mmHG, pulse is 78 and regular. Her chest is clear, but there is pitting oedema of both lower legs, which she says gets worse towards the end of each day.

Which of the following medications is most likely to be responsible?

(Please select 1 option)

- Diltiazem [Correct]
- Indapamide
- Isosorbide dinitrate
- Nicorandil
- Ramipril

Diltiazem, like dihydropyridine calcium channel antagonists is associated with ankle swelling due to peripheral venous dilatation.

Swelling is seen to worsen during the course of the day, and is recognised to improve when patients keep their legs up.

Peripheral oedema is not a common problem in patients prescribed nitrates such as isosorbide dinitrate or nitrate donors such as nicorandil.
It is not reported with indapamide, a thiazide-like diuretic, or with ramipril, an ACE inhibitor.
Work Smart

Question 187 of 200

A 55-year-old gentleman is suffering with erectile dysfunction.
He has a past medical history of type 2 diabetes and angina.

Which of the following medications would be a contraindication to prescribing sildenafil?

(Please select 1 option)

- Clopidogrel
- GTN spray used once per month
- Metoprolol
- Nicorandil
- Propranolol

The phosphodiesterase 5 inhibitors should be avoided in patients taking nitrates or nicorandil. This is due to vasodilatation potentially causing hypotension and precipitating a myocardial event.

The gentleman using a GTN spray less than once per week could be prescribed sildenafil, although it is worth warning him that should he have chest pain requiring the Emergency department after having taken sildenafil, he should warn his health care providers so that they can avoid nitrates whilst treating his symptoms.

Myocardial infarction is a contraindication to the use of sildenafil; however cardiovascular disease (that is, angina) requires cautious prescribing.

Other patients in which PPD5 inhibitors should be used with caution are those with risk of priapism,
such as sickle cell or multiple myeloma.

None of the other drugs, aspirin, clopidogrel, ACE inhibitors and beta blockers are contraindications to the use of sildenafil.

Answer Statistics

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Times answered: 6746

Test Analysis

Correct Incorrect Partially
Correct

Score: 56.68%
Total Answered: 187
Work Smart

Question 188 of 200

A 64-year-old gentleman consults you in clinic because he is having trouble putting his shoes on due to swelling.

He has COPD, hypertension and angina.

Which medication is likely to be causing this problem?

(Please select 1 option)

- **Diltiazem**  [Correct]
- Eplerenone
- Isosorbide mononitrate
- Nicorandil
- Propranolol

Diltiazem, as with nearly all the calcium channel blockers, causes gravitational/ankle oedema.

Eplerenone is an aldosterone antagonist and therefore is used to treat ankle oedema.

Isosorbide mononitrate commonly causes headaches and hypotension.

Nicorandil rarely causes angioedema, but not ankle swelling.

Propranolol does not cause ankle oedema although it may worsen decompensated heart failure, so is usually avoided until the patient has been diuresed appropriately.
A 16-year-old boy reports palpitations, excessive sweating and tremor occurring almost daily when he walks past a car park where he was mugged four weeks ago. He is finding the symptoms very troublesome and has started missing school to avoid the car park.

Which of the following psychiatric illnesses does he have?

(Please select 1 option)

- **Adjustment disorder** [This is the correct answer]
- **Agoraphobia** [Incorrect answer selected]
- **Anorexia nervosa**
- **Cynophobia**
- **Generalised anxiety disorder**

Adjustment disorder occurs within three months of an identifiable stressor and lasts six months from the withdrawal of the stressor. The patient will show either distress in excess of that expected or a disruption of their day to day life.

The criteria for diagnosing generalised anxiety disorder are anxiety/tension, occasionally accompanied by physical symptoms, on more days than not for more than six months. It is more a diagnosis of exclusion however, as it may be due to prescription medication or another psychiatric illness.

Anxiety disorders can be treated with selective serotonin reuptake inhibitors (SSRIs) or monoamine...
oxidase inhibitor (MAOI).

Benzodiazepines and beta blockers can be used on a PRN basis for patients who suffer with panic attacks.

Cognitive behavioural therapy can also be of help.

Anorexia nervosa is an eating disorder with altered body image.

Agoraphobia is phobia of open spaces.

Cynophobia is phobia of dogs.
A 46-year-old lady with rheumatoid arthritis whose regular medications include methotrexate, folic acid, Adcal-D3, ibuprofen and paracetamol attends the GP surgery with a sore throat.

On examination she has enlarged tonsils with pus, tender cervical lymphadenopathy and a fever of 38.5°C. There is no cough.

Which of the following options represents the most appropriate management plan?

(Please select 1 option)

- Admit the patient to hospital as an emergency with suspected neutropaenic sepsis
- Commence benzylpenicillin 500 mg QDS for 10 days
- Give the patient advice about self-management of sore throat and advise to return if she does not improve in the next five days
- Send an urgent venous blood sample for full blood count and commence benzylpenicillin 500 mg QDS for 10 days
- Send an urgent venous blood sample for full blood count and give the patient advice about self-management of sore throat

Marrow failure in patients taking methotrexate can present with fever and sore throat. A full blood count to exclude this serious complication of methotrexate therapy is required. However, there are clear signs of tonsillitis making this the most likely diagnosis.

The patient meets the Centor criteria for antibiotic treatment of sore throat and as she is on immunosuppressant medication treatment with antibiotics would be reasonable.
The Centor criteria indicate that tonsillitis is more likely to be bacterial in origin if four of the following features are present:

- Anterior cervical adenopathy
- Tonsillar exudates
- Fever and
- Absence of cough.

Methotrexate must be stopped in the setting of infection and should only be restarted once all symptoms have resolved.

If the full blood count showed significant cytopenia hospital admission may be warranted, but otherwise the patient can be managed in the community.
A 69-year-old male patient is commenced on azathioprine treatment by a dermatologist for pemphigus vulgaris.

After he has been on treatment for six months you receive a letter from the dermatology department asking for your help with monitoring his treatment.

Which of the following statements reflects current best practice with regard to monitoring patients on long term azathioprine treatment?

Note:

- FBC: Full bloodcount
- LFT: Liver function tests
- U&E: Urea and electrolytes.

(Please select 1 option)

- FBC and LFT every 3 months
- FBC, LFTs and U&E every 3 months  □ Correct
- FBC every 6 months, U&E and LFT every 12 months
- FBC, LFT and U&E every 6 months
- FBC, LFT and U&E every 12 months

Current guidelines from the British Association of Dermatologists and the British National Formulary
suggest monitoring FBC, LFTs and U&E every three months once patients are established and stable on azathioprine treatment.

Each hospital trust differs, and some recommend these should be monitored monthly. Some also monitor U&Es less frequently, but in general all three should be done at least 3 monthly. It is important to note this is only patients on established therapy - at the initiation of therapy bloods need to be monitored much more closely.

Bone marrow suppression and hepatotoxicity are well recognised and serious complications of azathioprine therapy.

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Times answered: 5534
A previously well 92-year-old patient with a history of hypertension presents to the Emergency department with a right sided hemiplegia and dysphasia.

An urgent CT carried out 1.5 hours after the onset of symptoms shows a cerebral infarction affecting the left hemisphere.

Up to how many hours after the onset of symptoms can alteplase be given in the treatment of this patient?

(Please select 1 option)

- 3 hours
- 4.5 hours  ✔️ Correct
- 6 hours
- 9 hours

According to NICE guidelines on the diagnosis and initial management of stroke and transient ischaemic attacks, thrombolysis with alteplase can be given up to 4.5 hours from the known onset of symptoms as long as a haemorrhagic stroke is excluded and there are no contraindications to thrombolysis.

It should be remembered that the benefits of thrombolysis diminish with time.

Reference:
1. NICE. *Alteplase for treating acute ischaemic stroke (TA264).*
2. NICE. *Stroke and transient ischaemic attack in over 16s (CG68).*

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Times answered: 6281

**Test Analysis**

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Score: 57.29%

Total Answered: 192
A 17-year-old male was found by the police in an acutely confused state in the early hours of the morning.

He was taken to the local Emergency department where he is a frequent attender with a history of schizophrenia and deliberate self-harm. He is found to be have dilated pupils and was somewhat agitated with visual hallucinations and a sinus tachycardia of 110 beats per minute on electrocardiogram.

He later told the nursing staff that he had taken some acid of unknown quantity because the voice had told him to, so that he can be protected against other people poisoning him. He was observed overnight in hospital where he became less agitated and his heart rate had returned to normal. Prior to discharge, he was reviewed by the on-call psychiatric team and his anti-psychotic medication was changed to olanzapine.

A week later, his mother found him semiconscious in his flat. His admission electrocardiogram showed a sinus tachycardia of 115 beats per minute, his pupils were dilated and he had a temperature of 39°C. His muscle tone was globally increased and his reflexes brisk throughout with equivocal plantars. He had a palpable bladder and was catheterised.

Investigations showed:

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<td>Protein ++</td>
<td>Blood +++</td>
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What is the most likely cause for his biochemical abnormalities?
(Please select 1 option)

- [ ] Amphetamine overdose     - [x] Incorrect answer selected
- [ ] Neuroleptic malignant syndrome - [x] This is the correct answer
- [ ] Rhabdomyolysis
- [ ] Serotonin syndrome
- [ ] Urinary tract infection

Neuroleptic malignant syndrome is a potentially fatal idiosyncratic reaction to neuroleptic drugs that antagonise the central dopamine D2 receptors or result in dopamine depletion. It is rarer with the newer anti-psychotic drugs such as olanzapine, but can occur. It results in an elevated temperature set-point, impairment of normal thermal homeostasis, extrapyramidally-induced muscular rigidity and rhabdomyolysis, altered mental status and autonomic dysfunction.

Diagnosis can be made if neuroleptics have been taken within 1-4 weeks, temperature above 38°C, muscle rigidity and five of the following features:

- Altered mental status
- Tachycardia
- Hypotension or hypertension
- Tremor
- Incontinence
- Diaphoresis or sialorrhoea
- Increased creatine phosphokinase or urinary myoglobin
- Metabolic acidosis
- Leucocytosis, and
Exclusion of other illnesses.

This patient does have rhabdomyolysis, but the over-riding cause is neuroleptic malignant syndrome. Rhabdomyolysis is isolation is most commonly seen following trauma or following prolonged immobilisation.

Urinary tract infection would not explain all the signs seen above.

Many of the features of serotonin syndrome are the same as those of neuroleptic malignant syndrome, but the medications this patient is on make the latter more likely.

Amphetamine overdose could lead to the symptoms described above, but the stem given should lead you more towards the use of neuroleptics rather than amphetamines.
Question 193 of 200

A 76-year-old man attended the outpatient clinic for a routine follow up appointment. He had presented to hospital with acute dyspnoea six months previously and had been diagnosed with severe aortic regurgitation. During his admission he had undergone aortic valve replacement with a mechanical valve.

During the consultation he does not report any residual dyspnoea or ankle swelling. His INR is stable and is checked regularly by his general practitioner. His only complaint is of difficulty sleeping, which he says started when his wife died suddenly one year previously. He wakes at 4 am and has difficulty getting back to sleep. He lives alone and has no enjoyment in life since the death of his wife. In recounting his wife's death he is very tearful and says that he often cries without any apparent reason.

What would be the best choice of antidepressant in this case?

(Please select 1 option)

- Amitriptyline
- Citalopram  
- Fluoxetine  
- St John's wort
- Venlafaxine

Warfarin has a narrow therapeutic index which is affected by a number of drugs, primarily through the
cytochrome P450 isoenzyme system. Selective serotonin re-uptake inhibitors (SSRIs) may enhance the anticoagulant effect of warfarin, as may the serotonin and noradrenaline re-uptake inhibitor (SNRI) venlafaxine. However, current data suggests that sertraline and citalopram appear to be the safest antidepressants to prescribe with warfarin. Fluvoxamine and fluoxetine appear to pose the highest potential risk. The remaining antidepressants appear to lie somewhere in between.

St John's wort (Hypericum perforatum), a herbal antidepressant available over the counter in the United Kingdom, reduces the anticoagulant effect of warfarin and concomitant use should be avoided. In cases of true depression, as here, an antidepressant is indicated.

Tricyclic antidepressants are used much less frequently now, as safer antidepressants have been introduced. Their use in cardiac patients is associated with a number of potential complications, due to antimuscarinic and quinidine-like properties. There is a dose-dependent increase in the plasma half-life of warfarin.

Venlafaxine has been reported to enhance warfarin, and it must be used with caution in patients with cardiac disease. As with tricyclics, NICE recommends that it should not be used in patients with a high risk of serious cardiac arrhythmias or a recent myocardial infarction.

Reference:

Ezetimibe reduces the absorption of cholesterol through the gut.

Although its exact mechanism of action is unclear, it probably downregulates proteins in the brush border of enterocytes to reduce lipid absorption. Unlike bile acid sequestrants, ezetimibe is systemically absorbed.

Ezetimibe is a useful medication for patients who are:

- intolerant of statins
- failing targets on statins alone, and
- have a history of serious adverse events with statin use.

When used as a monotherapy at a dose of 10 mg daily, ezetimibe reduces LDL cholesterol by around 20%. Increasing the dose further generally does not improve efficacy.
When used in conjunction with statins much greater LDL cholesterol reductions are seen.

**Answer Statistics**

1  6%
2  57%
3  10%
4  12%
5  15%

Times answered: 6638

**Test Analysis**

Correct Incorrect Partially Correct

Score: 15.38%

Total Answered: 26

**Feedback**
Work Smart

Question 194 of 200

A 29-year-old man comes to the Emergency Department for review. He returned from a holiday in Spain two weeks earlier, and now complains of fevers, joint pains, pain passing urine and gritty eyes. There is no past medical history of note.

On examination his temperature is 37.9 °C, BP is 110/70, pulse is 70 and regular. There is joint pain affecting his left knee, right ankle and both feet, with limitation of movement. He also complains of low back pain on forward flexion. He has a psoriatic type rash affecting both feet and conjunctivitis.

Investigations:

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Which of the following is the most appropriate initial intervention?

(Please select 1 option)

- Doxycycline

Incorrect answer selected
The answer is Naproxen. The clinical picture as described here is of reactive arthritis, which may have occurred as a result of chlamydial infection, although in about 10% of patients a preceding infection is not identified. Initial therapy of choice for the condition is NSAIDs. Other interventions such as corticosteroids are second line therapies. Antibiotics should be used where the causative infection is identified and is still active, and may shorten the duration of symptoms.

Prednisolone may be considered if the response to NSAIDs is poor. There is limited experience with second line agents such as methotrexate and sulphasalazine, although small case series suggest a benefit.

Where there is significant joint effusion, aspiration can be considered. This is especially important if only one joint is involved, as septic arthritis should be excluded as a cause.
The answer is Herpes simplex. Fludarabine has the greatest effect on T cell function. There is inhibition of cytokine-induced activation of STAT-1 and STAT-1-dependent gene transcription, which results in decreased peripheral blood T cell counts. These occur early in treatment and persist for up to two years after discontinuation of therapy. A greater impact is seen on CD4+ T cells than CD8+ T cells or NK cells. Decreased B cell and monocyte counts are also seen. This alteration in T cell function leads to increased susceptibility to the herpes family of viruses, including herpes simplex and varicella zoster virus.

Chlorambucil is most associated with increased risk of common bacterial infections including pseudomonas, staphylococcus and streptococcus. Increased risk of fungal infections is also seen.
TNF-alpha inhibitors used in the treatment of rheumatoid arthritis and inflammatory bowel disease are particularly associated with tuberculosis reactivation.

Answer Statistics

1 32%
2 18%
3 17%
4 7%
5 26%

Times answered: 2250

Test Analysis

Score: 14.81%
Total Answered: 27
Question 195 of 200

A 67-year-old man is reviewed in oncology following surgery to remove a gastrointestinal stromal tumour (GIST). He had been losing weight over the past few months, suffering from night sweats, nausea, and early satiety, and an endoscopy had identified the tumour. A decision is made to commence adjuvant imatinib therapy.

Which of the following represents the mode of action of imatinib?

(Please select 1 option)

- Alkylating agent
- Nucleoside analogue
- mTOR inhibitor
- Serine threonine kinase inhibitor
- Tyrosine kinase inhibitor

The answer is Tyrosine kinase inhibitor. Imatinib is a small molecule protein-tyrosine kinase inhibitor that inhibits the activity of the Bcr-Abl tyrosine kinase (TK), as well the KIT and PDGFR receptors. It was primarily developed for the treatment of chronic myeloid leukaemia, although now it has also proved useful in the treatment of a range of other myeloproliferative disorders including gastrointestinal stromal tumours. Studies suggest that in high risk patients it may reduce rate of recurrence after surgery.

Examples of alkylating agents include chlorambucil and cyclophosphamide, used as part of conventional chemotherapy regimens but not classically in the treatment of GISTs. Nucleoside
analogues interfere with DNA replication and are primarily used as anti-virals including in the treatment of HIV, Hepatitis B and C. mTOR inhibitors are also used in the treatment of cancer, an example is everolimus, which is most commonly used in combination with exemestane for the treatment of metastatic breast cancer. A number of serine threonine kinase inhibitors are currently in development for the treatment of various malignancies.

Further reading

Answer Statistics

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| 4 | 4% |
| 5 | 90% |

Times answered: 2273

Test Analysis

Correct Incorrect Partially Correct

Score: 56.92%

Total Answered: 195
A 54-year-old electrician is reviewed in the rheumatology clinic. He has been managed for psoriasis and severe psoriatic arthritis on methotrexate for the past nine months, but his symptoms are failing to improve despite this, NSAIDs and intermittent courses of oral corticosteroids. A decision is made to commence adalimumab therapy.

Which of the following correctly reflects the MoA of this treatment?

(Please select 1 option)

- Costimulation blockade
- IL-1 inhibition
- IL-6 inhibition
- IL-21 inhibition
- TNF alpha inhibitor

The answer is TNF alpha inhibitor. Adalimumab is a human monoclonal antibody that forms high affinity, stable complexes with both the soluble and transmembrane bioactive forms of human TNF-α, which prevents the binding of TNF-α to its receptors. It is used in the treatment of conditions such as rheumatoid arthritis and psoriasis / psoriatic arthritis, where TNF-alpha driven inflammation is known to play a major role. As with other agents acting via this pathway, screening for latent TB should be undertaken before therapy is initiated.

Costimulation blockade is the target for abatacept, a fusion protein consisting of CTLA-4 and the Fc portion of IgG, which binds to CD80 and CD86 and prevents T-cell activation. IL-1 and IL-6 inhibitors are both used the treatment of arthritis, examples include canakinumab and siltuximab. IL-21 is an inflammatory cytokine which is elevated in acute viral infection. The application of IL-21 antagonists in
new onset Type 1 diabetes is currently being evaluated.
A 23-year-old man who presented to the gastroenterology clinic with bloody diarrhoea has been diagnosed with inflammatory bowel disease after endoscopy and biopsy. Although he has improved significantly with the combination of mesalazine and prednisolone, he now requires a steroid sparing agent, and it is recommended that he start azathioprine.

Which of the following tests should be undertaken before starting azathioprine?

(Please select 1 option)

- Catechol o-methyl transferase (COMT) activity
- Chest radiograph
- Serum folate
- Quantiferon gamma test
- Thiopurine methyl transferase (TPMT) activity

The correct answer is TPMT activity. TPMT is the main enzyme responsible for metabolising the active metabolite of azathioprine, (6-mercaptopurine). Naturally occurring polymorphisms which reduce TPMT activity are recognised, and these are associated with significant azathioprine toxicity (especially bone marrow suppression), and testing is therefore recommended before initiating therapy with azathioprine. In patients with reduced TPMT activity, half dose therapy or an alternative can be given.

COMT is responsible for degradation of adrenaline, nor-adrenaline and dopamine, and as such is not relevant in this case. Chest radiograph and quantiferon gamma testing can be considered as
screening tests for tuberculosis, which should be done before initiation of anti-TNF therapy. Serum folate should be checked prior to starting methotrexate if folate deficiency is suspected.
A 32-year-old woman who has a history of Crohn's disease which is managed with a stable dose of azathioprine as her only medication comes to the clinic for review. She has not had a flare of her disease for more than 2 years, and is wishing to try for a baby. Her Crohn's is quiescent, with no significant abdominal pain, and bowel opening 2-3 times per day with normal motion. Clinical examination is unremarkable with a BMI of 23, and routine bloods including FBC and LFTs are normal.

Which of the following is the most appropriate course of action with respect to her medication?

(Please select 1 option)

- Continue azathioprine
- Stop azathioprine
- Switch to infliximab
- Switch to mesalazine
- Switch to prednisolone

The answer is Continue azathioprine. Due to the difficulties of running trials which include pregnant women, there is no high-quality evidence that azathioprine is linked with congenital malformations when used in pregnancy. A small increase in atrial defects was seen in women who took the drug in pregnancy for inflammatory bowel disease versus controls with IBD alone in a retrospective case control study, but there were possible confounding factors. Low birth weight, miscarriage and premature delivery have been noted, but may be due to active disease rather than azathioprine.
Current UK guidelines therefore state that azathioprine is considered to be low risk in pregnancy, and it is felt the benefit outweighs the risk as having active disease during pregnancy is likely to have a greater detrimental impact on foetal development. There is less evidence to support use of infliximab in pregnancy, but it is also considered to be low-risk, however as this lady has stable disease it is not indicated. Corticosteroids are considered safe in pregnancy, as the amounts crossing the placenta are low, but the effects on the mother should be considered and again it is not indicated here as the disease is stable. Mesalazine is thought to be a relatively safe option in pregnancy, although it may be associated with low birth weight and increased risk of pre-term delivery. As this lady's disease is stable on azathioprine, you would not risk a flare by changing her medication at this point.

Reference & Further Reading:
A 19-year old student is diagnosed with bipolar disorder and is started on olanzapine. Which of the following is the most common side effect that she may experience?

(Please select 1 option)

- Cardiac arrhythmia
- Elevated transaminases
- Thrombocytopaenia
- Urinary retention
- Weight gain  □ Correct

The answer is weight gain. Weight gain can be clinically significant, and in the trials was seen regardless of the patient's baseline BMI. Approximately 65% of patients treated with olanzapine experienced some degree of weight gain, and so it is important to discuss management strategies for this with patients prior to initiating therapy.

All of the other side effects listed are also seen with olanzapine therapy, although arrhythmias and urinary retention are uncommon. Raised transaminases are seen in between 1 in 10 and 1 in 100 of patients treated, and thrombocytopaenia is rare.

Reference & Further Reading
A 24-year-old woman comes to the dermatology clinic for review. She has a number of medical problems including arthritis, epilepsy and mild hypertension, and is concerned about a rash that she has developed on both shins. Her current medication includes lamotrigine, indapamide, methotrexate, amlodipine, and the combined oral contraceptive pill. On examination her BP is 138/82, pulse is 80 and regular. There is a rash with raised red/purple erythematous lesions on both shins. Her BMI is 24.

Which of the following is the most likely cause of the rash on her shins?

(Please select 1 option)

- Amlodipine
- Combined oral contraceptive pill
- Indapamide
- Lamotrigine
- Methotrexate

The answer is Combined oral contraceptive pill. This patient has erythema nodosum (EN), of which the contraceptive pill and pregnancy are very well recognised causes. Other drugs described as being associated with erythema nodosum include sulphonamides, salicylates, other nonsteroidal anti-inflammatory drugs, bromides and iodides. The rash usually resolves on cessation of therapy. With combined oral contraceptive pill use EN is reported in 3-10% of women, however it's much rarer in women who use the progesterone only pill.

The other options listed are not usually associated with erythema nodosum. The most common non-
The pharmacological causes of erythema nodosum are sarcoid and tuberculosis.

Answer Statistics

1  5%
2  47%
3  7%
4  27%
5  15%

Times answered: 2257

Test Analysis

Correct Incorrect Partially Correct

Score: 57.07%
Total Answered: 198
Question 30 of 30

A 19-year-old Chinese man presents to the Emergency Department with a severe rash. He was reviewed in the neurology clinic seven days earlier where he was diagnosed with partial epilepsy and started on carbamazepine therapy. He has a fever and sore throat with severe mucocutaneous ulceration. There is a generalised skin rash affecting the torso, arms and legs which he says began as erythematous patches, but there are now many vesicles, a number of which appear to have been de-roofed to form ulcers.

Which of the following HLA types is he likely to have?

(Please select 1 option)

- HLA A 30  □ Incorrect answer selected
- HLA A 3101
- HLA B 1502  □ This is the correct answer
- HLA B 5701
- HLA B 5801

The answer is C), HLA B 1502. This man presents with Stevens Johnson syndrome (SJS), which is now well described in association with certain HLA types when carbamazepine is prescribed. HLA-B1502 has been shown to be a high-risk HLA type, and is present in about 10% of individuals of Han Chinese and Thai origin. Some guidelines therefore suggest HLA screening of this population prior to commencing carbamazepine treatment.

HLA A 3101 is the high risk HLA type for SJS in patients of Japanese and European origin. SJS in
patients with A 3101 is generally less severe versus 1502, therefore screening isn't generally recommended. HLA A 30 is associated with a fixed drug eruption reaction in conjunction with co-trimoxazole prescribing, B5701 with hypersensitivity to abacavir and flucloxacillin liver hypersensitivity, and B 5801 is associated with hypersensitivity to allopurinol.

Answer Statistics

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Times answered: 2285

Test Analysis

Correct
Incorrect
Partially
Correct

Score: 13.33%
Total Answered: 30
Question 199 of 200

A 29-year-old woman who is known to have one episode of severe allergy to egg protein in childhood comes to the vaccination clinic for review. She is travelling with her partner to South America and inquires about which vaccinations she is able to have.

Which of the following vaccinations should definitely be avoided?

(Please select 1 option)

- Hepatitis A
- MMR
- Recombinant influenza vaccine
- Typhoid
- Yellow fever

The answer is yellow fever. Yellow fever vaccine contains significant amounts of egg protein and as such should be avoided in patients with egg anaphylaxis.

If travel to a country where a yellow fever vaccination certificate is needed is planned, it is crucial that documentary evidence as to why vaccination is contraindicated. You should also counsel patients about avoiding travel to areas where the incidence of yellow fever is known to be high.

The MMR vaccine can be safely given to individuals who have a severe egg allergy, as the vaccine is grown on chick cells and not the egg white or yolk.

Egg protein is not involved in the production process for Hepatitis A, typhoid or recombinant influenza.
Further reading:

Recommended Immunization Schedule for Adults Aged 19 Years or Older, by Vaccine and Age Group

Answer Statistics

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Times answered: 2961

Test Analysis

Correct Incorrect Partially Correct

Score: 57.29%

Total Answered: 199
Question 200 of 200

Which of the following is the mechanism of action of Ivabradine?

(Please select 1 option)

- L-Type calcium channel blocker
- Beta blocker
- Alpha blocker
- If channel inhibitor  □ This is the correct answer
- Sodium channel blocker  □ Incorrect answer selected

Ivabradine is a novel agent which blocks the I<sub>F</sub> channel in the sinoatrial node, resulting in a reduced heart rate. It is used as an anti-anginal agent as a second-line alternative to the rate-slowing calcium-channel blockers verapamil and diltiazem.

L-Type calcium channels are found in the cardiac muscle cells as well as skeletal and smooth muscle cells, and are blocked by verapamil and diltiazem.

Labetalol and atenolol are both beta blockers which can be used in the treatment of angina.

Sodium channel blockers, such as flecainide, are anti-arrhythmics which can be used in the treatment of tachyarrhythmias such as AF.

Alpha blockers, such as doxazosin, are mainly used to treat hypertension but can also be used in the
management of lower urinary tract symptoms.

References & Further Reading:

Cardiovascular Pharmacology Concepts