MEDWAY
ACADEMY
LEARN MEDICINE THE SMART WAY

QUESTION BANK

SEMESTER 3

MSK MODULE

PHARMACOLOGY

Pharma 1 - Management of Muscle Pain

Part 1: MCQs (Choose the correct answer):

1. A 34-year-old man is given a neuromuscular blocking agent before an emergency operation. The nicotinic receptor at the motor end plate, on which this drug acts, is composed of which of the following?

A. Two peptides (one α and one β subunit)
B. Three peptides (two α and one δ subunit)
C. Four peptides (two α one β and one δ subunit)
D. A G-protein coupled receptor with seven transmembrane domains
E. A voltage-gated sodium channel

2. Which of the following drugs relaxes skeletal muscle by acting directly on the muscle fibre itself?

A. Baclofen
B. Atracurium
C. Succinylcholine
D. Dantrolene
E. Tizanidine

3. A 45-year-old man undergoing abdominal surgery receives atracurium. The neuromuscular block produced by this drug is due to which of the following?

A. Competition with acetylcholine for nicotinic receptors at the motor end plate
B. Persistent depolarization of the motor end plate
C. Inhibition of acetylcholine release from the motor nerve ending
D. Inhibition of calcium release from the sarcoplasmic reticulum
E. Blockade of voltage-dependent sodium channels from inside the nerve

4. A 50-year-old woman is given a competitive neuromuscular blocker before an operation. Which of the following muscles is the last to be paralyzed?

A. Muscles of the face
B. Muscles of the limbs
C. Muscles of the trunk
D. Intercostal muscles
E. The diaphragm

5. A 62-year-old woman is being prepared for cardiac bypass surgery. Before she is intubated, she is given a skeletal muscle relaxant that causes her to have muscle fasciculation prior to muscle relaxation. Which of the following drugs was most likely administered?

A. Atracurium
B. Succinylcholine
C. Botulinum toxin
D. Dantrolene E. Baclofen

6. In the same patient, the initial muscle twitches produced by this drug are best explained by which of the following?

A. Depolarization of the end plate that is not followed by repolarization
B. Competitive antagonism at the nicotinic receptors
C. Desensitization of the nicotinic receptor to acetylcholine
D. Increased release of acetylcholine from the nerve ending
E. Inhibition of acetylcholineesterase at the end plate

7. A 30-year-old man attends the emergency department with a dislocated shoulder that must be reduced under a short period of skeletal muscle relaxation. Which of the following is another accepted indication for the same group of drugs?

A. Chronic spasticity in multiple sclerosis
B. Endotracheal intubation
C. Treatment of malignant hyperthermia
D. Myofascial trigger point pain
E. Chronic low back pain

8. A 26-year-old woman undergoing surgery is given an inhalant anaesthetic together with an IV dose of succinylcholine. Within minutes she develops a heart rate of 124/min, generalized muscle rigidity and an increasing core body temperature. Which of the following best explains her condition?

A. Sudden and prolonged release of Ca2+ from the sarcoplasmic reticulum
B. Excessive blockade of the nicotinic receptors at the motor end plate
C. Inhibition of acetylcholine release from cholinergic nerve endings
D. Accumulation of lactate secondary to respiratory depression
E. A hypersensitivity reaction to para-aminobenzoic acid (PABA)

9. In the same patient, which of the following is the drug of choice?

A. Baclofen orally
B. Dantrolene intravenously
C. Neostigmine intravenously
D. Diazepam intravenously
E. Atracurium intravenously

10. A 29-year-old man receiving haloperidol develops muscular rigidity, hyperthermia and autonomic instability, and neuroleptic malignant syndrome is diagnosed. In addition to withdrawal of the offending drug, which of the following is most appropriate?

A. Succinylcholine
B. Dantrolene
C. Cyclobenzaprine
D. Botulinum toxin
E. Celecoxib

11. A 33-year-old man is maintained on oral dantrolene for a spastic muscle condition. Which of the following side effects should be monitored during therapy?

A. Liver damage
B. Nephrotic syndrome
C. Aplastic anaemia
D. Tinnitus
E. Peptic ulceration

12. A 27-year-old man with painful spasm of the back muscles is given a drug that is a synthetic GABA derivative and inhibits both monosynaptic and polysynaptic spinal reflexes. Which of the following drugs was given?

A. Mephenesin
B. Baclofen
C. Dantrolene
D. Succinylcholine
E. Procaine

13. Which of the following central skeletal muscle relaxants depresses polysynaptic spinal reflexes ONLY?

A. Diazepam
B. Baclofen
C. Mephenesin
D. Dantrolene
E. Succinylcholine

14. A 58-year-old man has severe pain following multiple fractures and is given morphine. This drug relieves pain by which of the following mechanisms?

A. Facilitating the opening of potassium channels, causing hyperpolarization that inhibits calcium channel opening and transmitter release
B. Irreversible inhibition of cyclooxygenase in the CNS by acetylation
C. Blocking voltage-dependent sodium channels from inside the nerve fibre
D. Inhibition of phospholipase A2 through the expression of lipocortin
E. Blocking the release of acetylcholine from cholinergic nerve endings

15. A 24-year-old man is brought to the emergency department after taking an unknown drug. He is drowsy, with a respiratory rate of 6/min, constipation and pinpoint pupils. Which of the following groups of analgesics is most likely responsible?

A. Opioid analgesics
B. Non-selective NSAIDs
C. Central skeletal muscle relaxants
D. Amide local anaesthetics
E. Corticosteroids

16. A 40-year-old woman has an inflamed shoulder joint following a strain. Arachidonic acid is released from the membrane phospholipids of the injured cells by the action of which of the following enzymes?

A. Cyclooxygenase (COX)
B. Lipoxygenase (LOX)
C. Phospholipase A2
D. Thromboxane A2 synthetase
E. Prostacyclin synthetase

17. A 30-year-old asthmatic patient is prescribed zafirlukast. This drug acts by which of the following mechanisms?

A. Inhibition of lipoxygenase
B. Blockade of leukotriene receptors
C. Irreversible inhibition of COX-1
D. Selective inhibition of COX-2
E. Inhibition of phospholipase A2

18. Which of the following cyclooxygenase isoenzymes is present ONLY in the CNS, where it stimulates prostaglandins causing pain and fever?

A. COX-1
B. COX-2
C. COX-3
D. Lipoxygenase
E. Phospholipase A2

19. A 70-year-old man suffers a myocardial infarction (MI). He is admitted to the cardiac intensive care unit and is given aspirin and a β-blocker. A catheterization procedure is scheduled. The patient's wife, who is a pharmacy technician, wants to know why the patient is being given aspirin and not another nonsteroidal anti-inflammatory drug (NSAID). What is the difference between aspirin and the other NSAIDs?

A. Aspirin only inhibits COX-2
B. Aspirin irreversibly inhibits COX-1 and COX-2
C. Aspirin is a weak base
D. Aspirin has less gastrointestinal adverse effects
E. Aspirin has no antithrombotic (anti-platelet) activity

20. In the same patient, which of the following laboratory findings is expected after aspirin administration?

A. Prolonged prothrombin time (PT) only
B. Prolonged partial thromboplastin time (PTT) only
C. Increased bleeding time with no effect on PT or PTT
D. Prolongation of both PT and PTT with a normal bleeding time
E. No change in bleeding time, PT or PTT

21. A mother asks for aspirin as an antipyretic for her 6-year-old boy who has a viral febrile illness. Aspirin should be avoided in this child because of the risk of which of the following?

A. Reye syndrome
B. Malignant hyperthermia
C. Aplastic anaemia
D. Hepatic necrosis
E. Premature closure of the ductus arteriosus

22. A full-term neonate is found to have a patent ductus arteriosus. Which of the following drugs is used to close it?

A. Indomethacin
B. Celecoxib
C. Acetaminophen
D. Prostaglandin E2
E. Dantrolene

23. A 68-year-old hypertensive man taking ibuprofen for chronic muscle pain develops ankle oedema and a rise in his blood pressure. This is best explained by which of the following?

A. Decreased renal blood flow with sodium and water retention
B. Increased renal synthesis of vasodilator prostaglandins
C. Selective inhibition of thromboxane A2 in the platelets
D. Inhibition of leukotriene synthesis in the kidney
E. Suppression of the hypothalamic-pituitary-adrenal axis

24. A 65-year-old man had been recently diagnosed with osteoarthritis. Six months ago, the patient suffered from peptic ulcer disease that healed after triple antiulcer therapy. Which of the following nonsteroidal anti-inflammatory drugs would be most appropriate for this patient?

A. Indomethacin
B. Ibuprofen
C. Piroxicam
D. Ketorolac
E. Celecoxib

25. Which of the following is the advantage of specific cyclooxygenase-2 (COX-2) inhibitors?

A. Decreased gastro-intestinal side effects
B. Decreased vasoconstrictor activity
C. Increased anti-inflammatory activity
D. Increased inhibition of platelet aggregation
E. Less cardiovascular side effects

26. A 72-year-old woman with ischaemic heart disease asks whether she may take celecoxib for her knee pain. The increased risk of cardiovascular events with selective COX-2 inhibitors is best explained by which of the following?

A. Endothelial PGI2 synthesis is reduced while platelet TXA2 production is preserved
B. Platelet TXA2 synthesis is reduced while endothelial PGI2 production is preserved
C. Irreversible acetylation of platelet cyclooxygenase
D. Increased renal blood flow leading to hypotension
E. Increased synthesis of leukotrienes in the endothelium

27. A 40-year-old woman with a coagulation disorder and a history of gastric ulcer develops fever and mild muscle aches. Which of the following drugs is the most appropriate choice for her?

A. Acetaminophen, because it does not affect platelet function
B. Aspirin, because it is a weak acid
C. Indomethacin, because it is a semiselective NSAID
D. Ketorolac, because it is a potent analgesic
E. Naproxen, because it is cardioprotective at low doses

28. A 22-year-old man is admitted after ingesting a large dose of paracetamol. Which of the following complications is most likely to occur?

A. Significant hepatic necrosis
B. Tinnitus and hyperventilation
C. Aplastic anaemia
D. Nephrotic syndrome
E. Malignant hyperthermia

29. A 38-year-old woman has severe systemic lupus erythematosus and is treated with long-term corticosteroid therapy. Which of the following bone diseases is she most likely to develop?

A. Paget disease of bone
B. Rickets
C. Osteochondritis
D. Osteoporosis
E. Osteomalacia

30. A patient with acute myositis is given a corticosteroid, which decreases the synthesis of BOTH prostaglandins and leukotrienes. This is due to which of the following actions?

A. Inhibition of phospholipase A2 through the expression of lipocortin
B. Irreversible inhibition of cyclooxygenase by acetylation
C. Selective inhibition of COX-2 only
D. Blockade of the leukotriene receptors
E. Inhibition of thromboxane A2 synthetase

31. A 45-year-old man on long-term prednisolone for myositis stops the drug abruptly and develops malaise, myalgia, arthralgia, fever and a shock-like state. Which of the following explains this presentation?

A. Suppression of ACTH with adrenal cortical atrophy
B. Hypoglycaemia due to decreased gluconeogenesis
C. Hyperkalaeamic acidosis
D. Rebound synthesis of leukotrienes
E. A direct toxic effect on skeletal muscle

32. Which of the following is the only local anesthetic that causes vasoconstriction and may result in an increase in blood pressure?

A. Bupivacaine
B. Cocaine
C. Benzocaine
D. Lidocaine
E. Tetracaine

33. A 32-year-old woman receives an infiltration of lidocaine before suturing a wound. This drug produces its effect by which of the following mechanisms?

A. Blocking voltage-dependent sodium channels from inside the nerve fibre
B. Blocking voltage-dependent potassium channels from outside the nerve fibre
C. Blocking nicotinic receptors at the motor end plate
D. Inhibiting the release of calcium from the sarcoplasmic reticulum
E. Inhibiting prostaglandin synthesis at the site of injury

34. During a nerve block, the nerve fibres that are most sensitive to blockade by local anaesthetics have which of the following characteristics?

A. Smaller diameter and high firing rates
B. Smaller diameter and low firing rates
C. Larger diameter and high firing rates
D. Larger diameter and low firing rates
E. Heavy myelination with a low firing rate

35. A 44-year-old man requires incision and drainage of a large infected abscess of the thigh. The local anaesthetic infiltrated around the inflamed area gives poor anaesthesia. Which of the following is the most likely explanation?

A. Extracellular acidity ionizes the base, so it cannot pass into the nerve
B. Extracellular alkalinity ionizes the base, so it cannot pass into the nerve
C. The drug is rapidly metabolized by liver amidases
D. Inflammation decreases the local blood flow and traps the drug
E. Inflammatory prostaglandins directly block sodium channels

36. A dentist adds adrenaline to a lidocaine solution before infiltration. Which of the following is the benefit of this combination?

A. Decreased systemic absorption with a prolonged effect and less toxicity
B. Increased systemic absorption with a more rapid onset of action
C. Conversion of the drug into its unionized form
D. Prevention of allergic dermatitis
E. Reversal of the cardiotoxicity of the local anaesthetic

37. A 28-year-old woman develops a severe headache on the second day after spinal anaesthesia for a caesarean section. This complication is most likely due to which of the following?

A. Leakage of cerebrospinal fluid
B. Sacral parasympathetic block
C. Septic meningitis
D. Respiratory paralysis
E. Bradycardia with hypotension

38. A 35-year-old man develops allergic dermatitis after repeated application of a local anaesthetic ointment. This type of hypersensitivity reaction occurs mainly with which of the following, and through which mechanism?

A. Esters, through the formation of para-aminobenzoic acid (PABA)
B. Amides, through the formation of para-aminobenzoic acid (PABA)
C. Esters, through metabolism by liver amides
D. Amides, through metabolism by plasma esterases
E. Both groups equally, through the release of leukotrienes

39. A 26-year-old woman with cerebral palsy complains of severe pain associated with spasms in her leg muscles. Which of the following drugs is used in cerebral palsy to reduce skeletal muscle spasticity by an action on cholinergic nerve endings?

A. Baclofen
B. Botulinum toxin
C. Dantrolene
D. Diazepam
E. Tubocurarine

40. In the same patient, the drug is injected locally into the affected muscles. Which of the following describes its mechanism of action?

A. It blocks the release of acetylcholine from the vesicles of the nerve ending
B. It competes with acetylcholine for the nicotinic receptors
C. It inhibits the release of Ca2+ from the sarcoplasmic reticulum
D. It inhibits monosynaptic and polysynaptic spinal reflexes
E. It blocks voltage-dependent sodium channels in the motor nerv

Part 2 : essay (short answer):

1. Skeletal muscle relaxants:

A. Classify the skeletal muscle relaxants, giving one example of each group.

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B. Define spasmolytics and mention their possible sites of action.

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2. A 26-year-old woman undergoing surgery is given an inhalant anaesthetic together with an IV dose of succinylcholine. Within minutes she develops a heart rate of 124/min, muscle rigidity and an increasing core body temperature.

A. What is the mechanism of action of succinylcholine?

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B. Explain the two phases of the block produced by this drug.

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C. What is your diagnosis, and what is the drug of choice for this condition and its mechanism?

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D. Mention two other measures in the management of this condition.

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3. Dantrolene:

A. Mention its mechanism of action.

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B. Mention two of its therapeutic uses.

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C. Mention its three characteristic side effects (3D).

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4. A 26-year-old woman with cerebral palsy complains of severe pain associated with spasms in her leg muscles.

A. Name one central skeletal muscle relaxant that may be used, and state its action on the spinal reflexes.

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B. Name the drug that reduces spasticity by an action on cholinergic nerve endings, and mention its mechanism.

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C. Mention two other FDA-approved uses of this drug.

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5. Complete the following:

A. Benzodiazepines inhibit ..... and ..... spinal reflexes, while mephenesin depresses ..... spinal reflexes only.

B. Baclofen is a synthetic ..... derivative.

C. All NSAIDs are reversible COX inhibitors EXCEPT ..... which inhibits COX irreversibly by .....

D. Direct skeletal muscle relaxants act by ..... and the only member of this group is .....

6. Eicosanoid pharmacology:

A. Define autacoids.

B. Trace the metabolism of arachidonic acid, mentioning the two main enzymes and the products of each pathway.

C. Mention the site of action of corticosteroids, NSAIDs and zileuton on this pathway.

7. Compare between the effects of prostaglandins (PGs) and the effects of NSAIDs:

Point of comparison	Effects of PGs	Effects of NSAIDs
Pain and fever		
Gastric and duodenal mucosa		
Renal blood flow		
Uterus		
Ductus arteriosus		

8. A 70-year-old man is admitted to the cardiac intensive care unit after a myocardial infarction and is given aspirin together with a β-blocker.

A. Why is aspirin preferred to the other NSAIDs in this situation?

B. Mention its effect on the bleeding time, the prothrombin time (PT) and the partial thromboplastin time (PTT).

C. Mention three side effects of aspirin.

9. A 65-year-old man recently diagnosed with osteoarthritis suffered from peptic ulcer disease six months ago.

A. Which group of NSAIDs is the most appropriate for him? Give an example and explain why.

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B. Compare this group with the non-selective COX inhibitors:

Point of comparison	Non-selective COX inhibitors	Selective COX-2 inhibitors
Antiplatelet aggregatory action		
Gastric mucosal damage		
Cardiotoxicity		

10. Give reason for each of the following:

A. Paracetamol (acetaminophen) is not considered a true NSAID.

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B. Non-selective NSAIDs cause peptic ulceration.

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C. NSAIDs may cause oedema and hypertension.

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D. Selective COX-2 inhibitors carry an increased risk of cardiovascular events.

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E. Local anaesthetics are less effective when injected into an inflamed area or an abscess.

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F. An α1 agonist is added to local anaesthetic solutions.

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11. Corticosteroids used in muscle inflammation:

A. Mention their cellular and biochemical mechanisms as anti-inflammatory drugs.

B. Mention four of their side effects.

C. How can steroidal toxicity be minimized?

12. A 32-year-old woman presents with a right distal radius fracture. She received a local anaesthetic "Novocain" (procaine) injection before the orthopedic manipulation.

A. What is the mechanism of action of procaine?

B. Classify local anaesthetics according to their chemical structure, giving examples and the route of metabolism of each group.

C. Mention the methods of administration of local anaesthetics.

D. Mention two side effects of local anaesthetics and two side effects of spinal anaesthesia.

1 C - Four peptides (two α, one β and one δ subunit) Slide 8 (The nicotinic receptor is a membrane ion channel receptor composed of 4 peptides; acetylcholine combines with the 2 α subunits to open the channel)

2 D - Dantrolene Slide 6 & 14 (Direct SMR = dantrolene; peripheral SMR act on the end plate and central SMR in the CNS/spinal cord)

3 A - Competition with acetylcholine for nicotinic receptors Slide 9 & 10 (Competitive NMB: atracurium / mivacurium block postsynaptic Ach nicotinic receptors by competition, inducing paralysis)

4 E - The diaphragm Slide 10 (Relaxation starts in the face, then limbs, trunk, intercostals and lastly the diaphragm; recovery occurs in reverse order)

5 B - Succinylcholine Slide 9 & 11 (The only depolarizing NMB; produces initial muscle twitches - fasciculations - followed by paralysis)

6 A - Depolarization not followed by repolarization Slide 11 (Phase 1 = depolarization block, so initial twitches then flaccid paralysis)

7 B - Endotracheal intubation Slide 12 (Uses of NMB - cases needing a short period of relaxation: intubation, orthopedic manipulations, E.C.T. and caesarian section)

8 A - Sudden prolonged release of Ca2+ from the sarcoplasmic reticulum Slide 13 (Malignant hyperthermia: an idiosyncrasy reaction - muscular rigidity, hyperthermia and lactic acidosis)

9 B - Dantrolene intravenously Slide 13 & 14 (Drug of choice as a direct relaxant by decreasing Ca2+ release; plus cooling and correction of acidosis)

10 B - Dantrolene Slide 14 (Used in spastic muscle conditions, malignant hyperthermia and neurologic malignant syndrome)

11 A - Liver damage Slide 14 (Side effects of dantrolene = 3D: Drowsiness, Diarrhea, liver Damage)

12 B - Baclofen Slide 15 (A synthetic GABA derivative; inhibits monosynaptic and polysynaptic spinal reflexes)

13 C - Mephenesin Slide 15 (Depresses polysynaptic spinal reflexes ONLY, unlike benzodiazepines and baclofen)

14 A - Opening of potassium channels - hyperpolarization Slide 17 (Opiates facilitate the opening of K channels, causing hyperpolarization that inhibits Ca channel opening and transmitter release)

15 A - Opioid analgesics Slide 18 (Side effects: sedation, respiratory depression, constipation, nausea and mitosis - pinpoint pupils)

16 C - Phospholipase A2 Slide 19 & 20 (Eicosanoids are synthesized from arachidonic acid, released by the action of phospholipase A2 from membrane phospholipids)

17 B - Blockade of leukotriene receptors Slide 20 (Zafirlukast = LT receptor blocker, while zileuton is a LOX inhibitor)

18 C - COX-3 Slide 23 (COX-1 constitutive: stomach, kidney, platelets, respiratory tract; COX-2 inducible: CNS and peripheral tissues; COX-3 ONLY in the CNS - pain and fever)

19 B - Aspirin irreversibly inhibits COX-1 and COX-2 Slide 20 & 25 (All NSAIDs are reversible COX inhibitors EXCEPT aspirin, which is irreversible by acetylation)

20 C - Increased bleeding time with no effect on PT or PTT Slide 25 & 26 (Aspirin and NSAIDs increase bleeding time but have no effect on PT or PTT)

21 A - Reye syndrome Slide 25 (Side effects of aspirin: gastric ulceration, bleeding, hyperventilation, tinnitus and Reye syndrome)

22 A - Indomethacin Slide 21 & 26 (PGs maintain the patency of the ducts arterioles, so NSAIDs close a patent ductus - indomethacin is used for this purpose)

23 A - Decreased renal blood flow with Na+ and water retention Slide 21, 23 & 26 (PGs increase renal blood flow; NSAIDs decrease RBF - Na+ and water retention, hypertension and even nephropathy)

24 E - Celecoxib Slide 24 & 27 (COX-2 selective inhibitors spare the gastric mucosa from the corrosive effects of COX-1 inhibition - lower incidence of ulcers and bleeding)

25 A - Decreased gastro-intestinal side effects Slide 27 & 28 (COX-2 selective: potent anti-inflammatory, lower incidence of gastric upset, no effect on platelet aggregation, but increased CV risk)

26 A - Endothelial PGI2 is reduced while platelet TXA2 is preserved Slide 28 (The thromboxane / prostacyclin imbalance hypothesis: COX-1 of the platelet still makes TXA2 - vasoconstrictor and pro-aggregatory)

27 A - Acetaminophen Slide 24 & 32 (Acetaminophen does not affect platelet function or increase bleeding time; give it to patients with coagulopathy or a history of gastric ulcers)

28 A - Significant hepatic necrosis Slide 32 (The characteristic toxicity of acetaminophen with high doses)

29 D - Osteoporosis Slide 35 (Corticosteroid side effects include osteoporosis with vertebral fractures and aseptic hip necrosis)

30 A - Inhibition of phospholipase A2 through lipocortin Slide 20 & 34 (Steroids act above the branch point, so both PGs and LTs decrease; they also decrease the expression of COX-2)

31 A - Suppression of ACTH with cortical atrophy Slide 35 (Suppression of ACTH: cortical atrophy, malate, myalgia, arthralgia and fever - may result in a shock state with abrupt withdrawal; hence dose tapering)

32 B - Cocaine Slide 38 (An ester local anaesthetic; the only one producing vasoconstriction)

33 A - Blocking voltage-dependent Na channels from inside the nerve Slide 39 (The free unionized base passes the neuronal membrane - ionized active form inside - blocks Na channels - membrane stabilization)

34 A - Smaller diameter with high firing rates Slide 39 (Nerve fibre sensitivity: the most sensitive fibres are of smaller diameter and have high firing rates; recovery is in reverse order)

35 A - Extracellular acidity ionizes the base Slide 40 (Acidity, e.g. inflammation or abscess - ionization of the base - not lipid soluble - cannot pass inside the nerve - inactive)

36 A - Decreased absorption, prolonged effect and less toxicity Slide 40 (Coadministration of α1 agonists decreases local anaesthetic absorption into the systemic circulation)

37 A - Leakage of cerebrospinal fluid Slide 42 (Side effects of spinal anaesthesia: hypotension with bradycardia, headache due to CSF leakage, respiratory paralysis, septic meningitis and urinary retention)

38 A - Esters, through PABA formation Slide 42 (Hypersensitivity in the form of allergic dermatitis occurs with the esters via PABA formation)

39 B - Botulinum toxin Slide 5 & 43 (Local injection therapy for spasticity conditions and pain management; upper limb spasticity is an FDA-approved use)

40 A - Blocks the release of acetylcholine from the vesicles Slide 43 (The toxin blocks Ach release from the vesicles at the motor end plate, so stimulation is blocked)
N.B. In Q1 the number of subunits follows the lecture (4 peptides: 2 α, one β, one 6 - Slide 8); most standard texts describe the receptor as pentameric. Answer as given in the lecture.