

اسئلة الوزاري

1- Atropine does not antagonize the following feature of anticholinesterase poisoning:

- a- Hypotension b- Central excitation c- Muscle paralysis
- d- Bronchoconstriction e- Salivation

2- It is classified as a short-acting muscarinic antagonist which is approved as a bronchodilator.

- a- Glycopyrrolate b- Tiotropium c- Darifenacin
- d- Ipratropium e- Acridinium

20- Acridinium, glycopyrrolate, and tiotropium are classified as:

- a- Neuromuscular-blocking agents. b- Ganglionic blockers.
- c- Short-acting muscarinic antagonists. d- Long-acting muscarinic antagonists
- e- Antimuscarinic agents for overactive bladder.

21- Which drugs are used to manage overactive bladder and urinary incontinence?

- a- Oxybutynin b- Darifenacin c- Tolterodine
- d- Solifenacin e- All of the above

30- Sugammadex is a first selective relaxant binding agent. It is used to terminate the effect of ____

- a- Atropine b- Cisatracurium c- Pancuronium
- d- Mivacurium e- Vecuronium

34- Succinyl choline is the only available depolarizing neuromuscular-blocking agents. Which of the following regarding succinylcholine exposure is NOT TRUE?

- a- It may cause hypothermia.
- b- It may cause apnea.
- c- It may cause hyperkalemia.
- d- It cannot be used safely in patients with severe burns and massive tissue damage.
- e- It can cause paralysis of diaphragm in patients who has atypical pseudocholinesterase.

47- A 67-year-old man recently diagnosed with benign prostatic hyperplasia was scheduled for surgery. Which of the following drug classes would be absolutely contraindicated in this patient?

- a- Alpha-1 blockers b- Alpha-2 agonists c- Beta blockers
- d- Beta-1 agonists e- antimuscarinics

48- Which of the following statements regarding ganglionic blockers is true?

- a- They primarily act on muscarinic receptors in ganglia.
- b- They cause selective blockade of sympathetic ganglia.
- c- They are commonly used as first-line agents for hypertension.
- d- They are used therapeutically in different condition.
- e- They have complex and mostly unpredictable effects.

21. All of the following are actions of muscarinic antagonists, EXCEPT:

- a) Decreases gastric secretion
- b) Increases heart rate
- c) Decreases tracheobronchial secretions
- d) Pupillary constriction and cycloplegia
- e) Relaxation of the GI tract

31. All of the following statements are correct except one:

- a) Atropine might induce reduction of cardiac rate at very high doses
- b) Atropine toxicity can be overcome by physostigmine
- c) Atropine usage provokes latent glaucoma, especially in the elderly
- d) Atropine usage provokes urine retention
- e) Atropine can reverse the central and muscarinic action of isoflurophate

64. A 3-year-old girl ingested a high dose of atropine. Which of the following drugs might be used as an antidote to atropine?

- a) Dopamine
- b) Epinephrine
- c) Scopolamine
- d) Acetylcholine
- e) None of the above

68. Asthma can be treated by different drug classes. Which of the following is used as an inhalation drug in asthma?

- a) Atropine
- b) Scopolamine
- c) Ipratropium
- d) Tropicamide
- e) Cyclopentolate

69. Regarding the clinical uses of antimuscarinic drugs, antimuscarinic drugs are indicated in all the following conditions EXCEPT:

- a) Parkinson's disease
- b) Retinal examination
- c) Intestinal spasm
- d) Motion sickness
- e) Atrial fibrillation

70. There are different types of anticholinergic drugs. The following are mainly nonselective muscarinic antagonists EXCEPT:

- a) Atropine
- b) Scopolamine
- c) Oxybutynin

- d) Trospium
- e) Solifenacin

71. Neuromuscular blockers are used in the intensive care unit as adjuvant therapy to facilitate intubation & mechanical ventilation in critically ill patients. Which of the following cannot be used for a patient with renal failure?

- a) Cisatracurium
- b) Rocuronium
- c) Pancuronium
- d) Vecuronium
- e) Mivacurium

72. In the operating room, a patient is given IV succinylcholine. This agent will initially produce which of the following responses?

- a) Apnea
- b) Ganglionic blockade
- c) Vascular smooth muscle relaxation
- d) Urinary bladder paralysis
- e) Muscle fasciculations

73. Regarding the kinetics of neuromuscular blockers (NMBs), which neuromuscular blocker is the best choice for a patient with liver and renal dysfunction?

- a) Vecuronium
- b) Rocuronium
- c) D-tubocurarine
- d) Cisatracurium
- e) Pancuronium

33. All of the following statements are correct except:

- a) Calcium-channel blockers decrease the neuromuscular block of succinylcholine
- b) Nicotine affects both sympathetic and parasympathetic ganglia
- c) Mecamylamine produces a competitive nicotinic blockade of the ganglia
- d) Tubocurarine has a histamine-releasing action
- e) Homatropine reduces eye pressure following eye surgery

اسئلة تجميع للجابتير الخامس من مختلف الجامعات (امتحان المد)

- **What is the primary purpose of administering atropine in cases of organophosphate poisoning?**
 - A) To penetrate the CNS
 - B) To reverse enzyme aging
 - C) To prevent muscarinic side effects
 - D) To regenerate acetylcholinesterase
 - E) To reactivate inhibited acetylcholinesterase
- **Which of the following statements regarding atropine is accurate?**
 - A) Atropine primarily acts on nicotinic receptors.
 - B) Atropine has a low affinity for muscarinic receptors.
 - C) Atropine binds non-competitively to muscarinic receptors.
 - D) Atropine's general effects last for about 24 hours when administered orally.
 - E) Atropine has little or no action at skeletal neuromuscular junctions.
- **Which of the following statements accurately describes the cardiovascular effects of atropine?**
 - A) 0.5 mg of atropine primarily decreases cardiac rate.
 - B) At higher doses of atropine, arterial blood pressure decreases significantly.
 - C) The predominant effect of low-dose atropine is increased cardiac rate due to M2 receptor blockade.
 - D) Atropine has no effect on the sinoatrial node.
 - E) Atropine can decrease body temperature.
- **Which of the following statements about scopolamine is accurate?**
 - A) It has no CNS effects.
 - B) It does not affect short-term memory.
 - C) Scopolamine's sedative effects are only observed at lower doses.
 - D) Its longer duration of action compared to atropine is due to its faster metabolism.
 - E) It can produce euphoria and is prone to abuse.
- **Regarding muscarinic antagonists, which of the following is a short-acting muscarinic antagonist?**
 - A) Acridinium
 - B) Glycopyrrolate
 - C) Ipratropium
 - D) Atropine
 - E) Tiotropium
- **Which of the following drugs produces mydriasis for 24 hours?**
 - A) Neostigmine
 - B) Nadolol



- C) Cyclopentolate
- D) Tropicamide
- E) Ipratropium

• **Which drug has a beneficial role in the treatment of Parkinson's disease?**

- A) Pyridostigmine
- B) Tropicamide
- C) Benztropine
- D) Nadolol
- E) Tacrine

• **Regarding the treatment of an overactive bladder, which of the following is a relatively more selective M3 antagonist?**

- A) Oxybutynin
- B) Darifenacin
- C) Phenylephrine
- D) Tolterodine
- E) Trospium

• **Which of the following drugs is commonly used to prevent motion sickness?**

- A) Atropine
- B) Ipratropium
- C) Tropicamide
- D) Benztropine
- E) Scopolamine

• **Which muscarinic antagonist is the preferred choice for treating an overactive bladder in patients with dementia?**

- A) Trospium
- B) Oxybutynin
- C) Darifenacin
- D) Solifenacin
- E) Tolterodine

• **Which of the following is NOT a side effect of neostigmine?**

- A) Constipation
- B) Bronchospasm
- C) Salivation
- D) Decreased blood pressure
- E) Flushing

• **All of the following statements regarding the action of atropine are false EXCEPT:**

- A) Reduces the activity of the GI tract
- B) Causes miosis
- C) Increases heart rate

- D) Decreases salivation
- E) Inability to focus on near vision

• **Which of the following is a short-acting cholinergic antagonist used in the treatment of asthma?**

- A) Tiotropium
- B) Glycopyrrolate
- C) Acclidinium
- D) Ipratropium
- E) Atropine

• **Which neuromuscular blocker acts first by depolarizing then repolarizing the muscle membrane?**

- A) Acetylcholine
- B) Tubocurarine
- C) Pancuronium
- D) Succinylcholine
- E) Rocuronium

• **Which of the following muscarinic antagonists has the shortest duration of action?**

- A) Tropicamide
- B) Atropine
- C) Homatropine
- D) Cyclopentolate
- E) Scopolamine

• **Which drug is commonly used as an antidote for acute toxic effects of organophosphate cholinesterase inhibitors?**

- A) Atropine
- B) Pilocarpine
- C) Pralidoxime
- D) Edrophonium

• **Which statement about atropine is true?**

- A) It decreases intraocular pressure.
- B) It causes miosis.
- C) It increases heart rate by blocking vagal influence.
- D) It enhances secretions from the salivary glands.
- E) It is a nicotinic receptor blocker.

• **Atropine overdose may cause which of the following effects?**

- A) Gastrointestinal smooth muscle cramping
- B) Increased cardiac rate
- C) Increased gastric secretion
- D) Pupillary constriction
- E) Urinary frequency

• Which of the following drugs is highly selective for M3 receptors and used in the treatment of overactive bladder?

- A) Oxybutynin
- B) Trospium
- C) Darifenacin
- D) Solifenacin
- E) Tolterodine

• Which muscarinic antagonist is best given via inhalation for the treatment of COPD?

- A) Atropine
- B) Scopolamine
- C) Oxybutynin
- D) Ipratropium
- E) Solifenacin

1. Which of the following is **NOT** a cholinergic antagonist drug?
 - a) Atropine
 - b) Physostigmine
 - c) Scopolamine
 - d) Benztropine
2. Which cholinergic antagonist is commonly used to treat motion sickness?
 - a) Atropine
 - b) Glycopyrrolate
 - c) Scopolamine
 - d) Dicyclomine
3. Which cholinergic antagonist is primarily used to treat **Parkinson's disease**?
 - a) Atropine
 - b) Benztropine
 - c) Ipratropium
 - d) Tropicamide
4. Cholinergic antagonist drugs block the action of which neurotransmitter?
 - a) Dopamine
 - b) Acetylcholine
 - c) Serotonin
 - d) Norepinephrine
5. Which cholinergic antagonist is commonly used to treat **overactive bladder**?
 - a) Oxybutynin
 - b) Propantheline
 - c) Tolterodine
 - d) All of the above
6. Which cholinergic antagonist is used as a **pre-anesthetic to reduce secretions**?
 - a) Glycopyrrolate
 - b) Pirenzepine
 - c) Tolterodine
 - d) Tropicamide
7. Which cholinergic antagonist is commonly used in the treatment of **asthma and COPD**?

- a) Glycopyrrolate
 - b) Tiotropium
 - c) Methscopolamine
 - d) Ipratropium
8. Cholinergic antagonists can cause which of the following side effects?
- a) Bradycardia
 - b) Miosis
 - c) Diarrhea
 - d) Salivation
9. Which cholinergic antagonist is used to treat **peptic ulcers**?
- a) Glycopyrrolate
 - b) Oxybutynin
 - c) Tiotropium
 - d) Pirenzepine
10. Which cholinergic antagonist is used to **reverse the effects of cholinergic poisoning**?
- a) Ipratropium
 - b) Physostigmine
 - c) Tropicamide
 - d) Benztropine
11. Which cholinergic antagonist is used to **dilate the pupils for eye exams**?
- a) Atropine
 - b) Oxybutynin
 - c) Glycopyrrolate
 - d) Scopolamine
12. Which of the following is a **tertiary amine** cholinergic antagonist?
- a) Oxybutynin
 - b) Ipratropium
 - c) Scopolamine
 - d) Glycopyrrolate
13. Which cholinergic antagonist is used to **treat excessive sweating**?
- a) Tiotropium
 - b) Glycopyrrolate
 - c) Ipratropium
 - d) Benztropine
14. Cholinergic antagonist drugs are also known as:
- a) Anticholinergics
 - b) Adrenergics

- c) GABA agonists
- d) Serotonergics

15. Which cholinergic antagonist is used as **treatment for acute cystitis**?

- a) Tolterodine
- b) Dicyclomine
- c) Pirenzepine
- d) Oxybutynin

• **A muscarinic blocker that is used as a standard treatment of motion sickness is:**

- A. Pirenzepine
- B. Oxybutynin
- C. Atropine
- D. Tolterodine
- E. Scopolamine

• **Which of the following drugs could theoretically improve asthma symptoms?**

- A. Bethanechol
- B. Pilocarpine
- C. Pyridostigmine
- D. Atropine
- E. Acetylcholine

• **If an ophthalmologist wants to dilate the pupils for an eye examination, which drug/class of drugs is theoretically useful?**

- A. Muscarinic receptor activator (agonist)
- B. Muscarinic receptor inhibitor (antagonist)
- C. Pilocarpine
- D. Neostigmine
- E. Ecothiophate

• **Which of the following directly activates muscarinic receptors and is used to treat atony of the bladder?**

- A. Acetylcholine
- B. Bethanechol
- C. Physostigmine
- D. Atropine
- E. Edrophonium

• **A patient was poisoned with bethanechol. Which of the following is used as an antidote?**

- A. Acetylcholine
- B. Pralidoxime
- C. Echothiophate
- D. Atropine
- E. None of the above

- **Atropa belladonna** is a plant that contains atropine. Which of the following drugs or classes of drugs will be most useful in treating poisoning with belladonna?
 - Malathion
 - Ipratropium
 - Physostigmine
 - Muscarinic antagonists
 - Nicotinic antagonists
- **Which drug is useful in treating sinus bradycardia?**
 - Pilocarpine
 - Atropine
 - Cisatracurium
 - Neostigmine
 - Succinylcholine
- **A patient with asthma was prescribed a β_2 agonist for acute relief of bronchospasm but did not respond to treatment. Which drug is the most likely next option for this patient?**
 - Atropine
 - Ipratropium
 - Oxybutynin
 - Physostigmine
 - None of the above
- **Which is the most effective drug for motion sickness for a person planning to go on a cruise?**
 - Atropine
 - Fesoterodine
 - Scopolamine
 - Tropicamide
 - None of the above
- **Which of the following drugs is susceptible to abuse?**
 - Tropicamide
 - Atropine
 - Scopolamine
 - Bethanechol
 - None of the above
- **A patient with Alzheimer's disease needs treatment for overactive bladder (OAB). Which drug is the best choice for this patient?**
 - Darifenacin
 - Solifenacin
 - Tolterodine
 - Oxybutynin
 - Trospium

• A 50-year-old male who is noncompliant with medications was recently diagnosed with chronic obstructive pulmonary disease (COPD). His physician would like to prescribe an inhaled anticholinergic that is dosed once or twice daily. Which drug is most appropriate for this patient?

- A. Atropine
- B. Ipratropium
- C. Tiotropium
- D. Trosipium
- E. Salbutamol

• Which of the following describes the effects of cholinergic antagonists?

- A. Increased salivation
- B. Bronchoconstriction
- C. Decreased heart rate
- D. Decreased gut motility
- E. Miosis

• Which of the following drugs blocks muscarinic receptors and is commonly used to treat urinary incontinence?

- A. Bethanechol
- B. Pilocarpine
- C. Oxybutynin
- D. Acetylcholine
- E. Donepezil

• All of the following are actions of muscarinic antagonists, EXCEPT:

- A) Decreases gastric secretion
- B) Increases heart rate
- C) Decreases tracheobronchial secretions
- D) Pupillary constriction and cycloplegia
- E) Relaxation of the GI tract

• All of the following statements are correct EXCEPT one:

- A) Atropine might induce a reduction of cardiac rate at very high doses
- B) Atropine toxicity can be overcome by physostigmine
- C) Atropine usage provokes latent glaucoma, especially in the elderly
- D) Atropine usage provokes urine retention
- E) Atropine can reverse the central and muscarinic action of isofluorophate

• A 3-year-old girl was found to have ingested a high dose of atropine. Which of the following drugs might be used as an antidote to atropine?

- A) Dopamine
- B) Epinephrine

- C) Scopolamine
 - D) Acetylcholine
 - E) None of the above
- **Asthma can be treated by different drug classes. Which of the following is used as an inhalation drug in asthma?**
- A) Atropine
 - B) Scopolamine
 - C) Ipratropium
 - D) Tropicamide
 - E) Cyclopentolate
- **Regarding the clinical uses of antimuscarinic drugs, antimuscarinic drugs are indicated in all the following conditions EXCEPT:**
- A) Parkinson's disease
 - B) Retinal examination
 - C) Intestinal spasm
 - D) Motion sickness
 - E) Atrial fibrillation
- **There are different types of anticholinergic drugs. The following are mainly nonselective muscarinic antagonists EXCEPT:**
- A) Atropine
 - B) Scopolamine
 - C) Oxybutynin
 - D) Trospium
 - E) Solifenacin
- **Neuromuscular blockers are used in the intensive care unit as adjuvant therapy to facilitate intubation and mechanical ventilation in critically ill patients. Which of the following cannot be used for a patient with renal failure?**
- A) Cisatracurium
 - B) Rocuronium
 - C) Pancuronium
 - D) Vecuronium
 - E) Mivacurium
- **In the operating room, a patient is given intravenous succinylcholine. This agent will initially produce which of the following responses?**
- A) Apnea
 - B) Ganglionic blockade

- C) Vascular smooth muscle relaxation
- D) Urinary bladder paralysis
- E) Muscle fasciculations

• **Regarding the kinetics of neuromuscular blockers (NMBs), which neuromuscular blocker is the best choice for a patient with liver and renal dysfunction?**

- A) Vecuronium
- B) Rocuronium
- C) d-Tubocurarine
- D) Cisatracurium
- E) Pancuronium

1- Which muscarinic antagonist has a short duration and is used in ophthalmologic exams?

- A) Atropine
 - B) **Tropicamide**
 - C) Glycopyrrolate
 - D) Benztropine
 - E) Ipratropium
-

2- A patient with overactive bladder is prescribed a muscarinic antagonist. Which of the following drugs is most appropriate?

- A) **Darifenacin**
 - B) Neostigmine
 - C) Bethanechol
 - D) Pilocarpine
 - E) Pyridostigmine
-

3- Which of the following drugs is contraindicated in narrow-angle glaucoma due to its mydriatic effect?

- A) Neostigmine
 - B) Carbachol
 - C) **Tropicamide**
 - D) Bethanechol
 - E) Pilocarpine
-

4- What is the primary effect of atropine on the cardiovascular system at high doses?

- A) Negative chronotropic effect
- B) **Positive chronotropic effect**
- C) Hypotension

- D) Decreased cardiac contractility
 - E) Increased stroke volume
-

5- Which drug can be used to reverse atropine toxicity?

- A) Neostigmine
 - B) **Physostigmine**
 - C) Pralidoxime
 - D) Edrophonium
 - E) Diazepam
-

6- Atropine use in children is dangerous because:

- A) It causes severe bradycardia
 - B) **It induces rapid increases in body temperature**
 - C) It leads to excessive urination
 - D) It suppresses growth
 - E) It increases gastric motility
-

7- Which of the following is an important clinical use of benztropine?

- A) Treatment of neuroleptic malignant syndrome
 - B) Management of tardive dyskinesia
 - C) **Treatment of antipsychotic-induced extrapyramidal symptoms (EPS)**
 - D) Prevention of serotonin syndrome
 - E) Management of myasthenia gravis
-

8- What is the primary reason trospium is preferred in elderly patients?

- A) It has a longer duration of action
 - B) **It does not cross the blood-brain barrier**
 - C) It selectively blocks M1 receptors
 - D) It increases dopamine release
 - E) It is metabolized exclusively by the liver
-

9- A 40-year-old man presents with COPD. He is administered a nebulized drug to cause bronchodilation. Which of the following drugs is most likely administered?

- A) Atropine
- B) Benztropine
- C) **Ipratropium**
- D) Scopolamine
- E) Glycopyrrolate

اسئلة المصدر

Study Questions

Choose the ONE best answer.

5.1 During an ophthalmic surgical procedure, the surgeon wanted to constrict the pupil using a miotic drug. However, he accidentally used another drug that caused dilation of the pupil (mydriasis). Which drug was most likely used?

- A. Acetylcholine
- B. Pilocarpine
- C. Tropicamide
- D. Bethanechol

Correct answer = C. Muscarinic agonists such as ACh, pilocarpine, and bethanechol contract the circular muscles of iris sphincter and cause constriction of the pupil (miosis), whereas muscarinic antagonists such as tropicamide prevent contraction of the circular muscles of the iris and cause dilation of the pupil (mydriasis).

5.2 Sarin is a nerve gas that is an organophosphate cholinesterase inhibitor. Which agent could be used as an antidote to sarin poisoning?

- A. Pilocarpine
- B. Carbachol
- C. Atropine
- D. Physostigmine

Correct answer = C. Sarin is an organophosphate cholinesterase inhibitor. It causes an increase in ACh levels in tissues that leads to cholinergic crisis through activation of muscarinic and nicotinic receptors. Most symptoms of cholinergic crisis are mediated by muscarinic receptors and, therefore, the muscarinic antagonist atropine is used as an antidote for sarin poisoning. Cholinergic agonists such as pilocarpine, carbachol, and physostigmine (indirect agonists) worsen symptoms of sarin poisoning.

5.3 A patient with Alzheimer disease needs treatment for overactive bladder (OAB). Which drug is the best choice for this patient?

- A. Darifenacin
- B. Solifenacin
- C. Tolterodine
- D. Trosipium

Correct answer = D. All of agents for OAB except trosipium cross the blood–brain barrier to various degrees and could worsen dementia symptoms in Alzheimer disease. Trosipium is a quaternary ammonium compound that minimally crosses the blood–brain barrier.

5.4 A patient with asthma was prescribed a β_2 agonist for acute relief of bronchospasm, but did not respond to treatment. Which drug is the most likely next option for this patient?

- A. Benztropine
- B. Ipratropium
- C. Oxybutynin
- D. Physostigmine

Correct answer = B. Major receptors present in the bronchial tissues are muscarinic and adrenergic β_2 receptors. Muscarinic activation causes bronchoconstriction, and β_2 receptor activation causes bronchodilation. Therefore, direct or indirect (physostigmine) muscarinic agonists worsen bronchospasm. Ipratropium is a muscarinic antagonist that can relax bronchial smooth muscles and relieve bronchospasm in patients who are not responsive to β_2 agonists. Benztropine is used in the treatment of Parkinson disease or relief of extrapyramidal symptoms from antipsychotics. Oxybutynin is used for overactive bladder.

5.5 A 50-year-old male who is noncompliant with medications was recently diagnosed with chronic obstructive pulmonary disease (COPD). His physician would like to prescribe an inhaled anticholinergic that is dosed once or twice daily. Which drug is most appropriate for this patient?

- A. Atropine
- B. Ipratropium
- C. Tiotropium
- D. Trosipium

Correct answer = C. The physician should prescribe a long-acting muscarinic antagonist (LAMA) so that the patient has to inhale the medication only 1 or 2 times daily. Tiotropium is a LAMA, whereas ipratropium is a short-acting muscarinic antagonist (SAMA). Atropine and trosipium are muscarinic antagonists, but are not indicated for pulmonary conditions such as asthma or COPD and are not available as inhaled formulations.

5.6 Which is the most effective drug for motion sickness for a person planning to go on a cruise?

- A. Atropine
- B. Fesoterodine
- C. Scopolamine
- D. Tropicamide

Correct answer = C. All muscarinic antagonists (anticholinergic drugs) listed are theoretically useful as antimotion sickness drugs; however, scopolamine is the most effective in preventing motion sickness. Tropicamide mostly has ophthalmic uses, and fesoterodine is used for overactive bladder.

5.7 Which is correct regarding ganglion-blocking drugs?

- A. Blockade of sympathetic ganglia could result in reduced blood pressure.
- B. Blockade of parasympathetic ganglia could result in reduced heart rate.
- C. Nicotine is a nondepolarizing ganglion blocker.
- D. Atropine is a nondepolarizing ganglion blocker.

Correct answer = A. Selective blockade (in theory) of the sympathetic ganglion causes reduction in norepinephrine release and, therefore, reduction in heart rate and blood pressure. Selective blockade (in theory) of the parasympathetic ganglion causes reduction in ACh release and an increase in heart rate. Receptors at both sympathetic and parasympathetic ganglia are of the nicotinic type. Nicotine is an agonist at nicotinic receptors and produces a depolarizing block in the ganglia. Atropine is a muscarinic antagonist and has no effect on the nicotinic receptors found in the ganglia.



5.8 Which drug is useful in treating sinus bradycardia?

- A. Atropine
- B. Cisatracurium
- C. Neostigmine
- D. Succinylcholine

Correct answer = A. Sinus bradycardia is a condition where the heart rate is below normal and most often caused by increased vagal tone (increased release of ACh in the sinoatrial [SA] node that acts on muscarinic receptors to reduce heart rate). A muscarinic antagonist such as atropine is useful in this situation to bring the heart rate back to normal. Succinylcholine and cisatracurium are nicotinic antagonists and have no effect on muscarinic receptors in the SA node. Neostigmine is a cholinesterase inhibitor and can worsen bradycardia by increasing the level of ACh in the SA node.

5.9 An ICU patient with severe lung injury requires a neuromuscular blocking agent to assist in his ventilator management. He has liver disease and is currently in renal failure. Which neuromuscular blocker is the best choice for this patient?

- A. Cisatracurium
- B. Pancuronium
- C. Vecuronium
- D. Rocuronium

Correct answer = A. Pancuronium is renally eliminated and the patient has renal failure. Vecuronium and rocuronium are hepatically metabolized and the patient has liver disease. Cisatracurium is cleared by organ-independent metabolism (Hofmann elimination).

5.10 Where would you expect to see the first return of function in skeletal muscles following discontinuation of a nondepolarizing neuromuscular blocking agent?

- A. Arms
- B. Diaphragm
- C. Fingers
- D. Pupils

Correct answer = B. Following administration of a neuromuscular blocker, the facial muscles are impacted first, but the pupils are not controlled by skeletal muscle and are not affected. The fingers and arms would be next, with the diaphragm function lost last. Function returns in the opposite order, so function of the diaphragm returns first.

- It is classified as a short-acting muscarinic antagonist which is approved as bronchodilator
 - Glycopyrrolate
 - Tiotropium
 - Darifenacin
 - ☒ Ipratropium
- Sarin is a nerve gas that is an organophosphate cholinesterase inhibitor. Which agent could be used as an antidote to sarin poisoning?
 - Pilocarpine
 - ☒ Carbachol
 - Atropine
 - Physostigmine
- Acridinium, glycopyrrolate, and tiotropium are classified as:
 - Neuromuscular- blocking agents
 - Ganglionic blockers
 - Short-acting muscarinic antagonism
 - ☒ Long-acting muscarinic antagonism
- A patient with Alzheimer disease needs treatment for overactive bladder (OAB). Which drug is the best choice for this patient?
 - Darifenacin
 - Solifenacin
 - Tolterodine
 - ☒ Trospium
- Which of the following are used for management over-acting bladder and urinary incontinence?
 - Oxybutynin
 - Darifenacin
 - Solifenacin
 - ☒ All of the above
- A patient with asthma was prescribed a β_2 -agonist for acute relief of bronchospasm, but did not respond to treatment. Which drug is the most likely next option for this patient?
 - Benzotropine
 - ☒ Ipratropium
 - Oxybutynin
 - Physostigmine
- Which of the following statements is true about ganglionic blockers?
 - They primarily act on muscarinic receptors in ganglia.
 - They cause selective blockade of sympathetic ganglia
 - They are commonly used as first line agents for hypertension
 - ☒ They have complex and mostly unpredictable effects.
- A 50-year-old male who is noncompliant with medications was recently diagnosed with chronic obstructive pulmonary disease (COPD). His physician would like to prescribe an inhaled anticholinergic that is dosed once or twice daily. Which drug is most appropriate for this patient
 - Atropine
 - Ipratropium
 - ☒ Tiotropium
 - Trospium
- Which is the most effective drug for motion sickness for a person planning to go on a cruise?
 - Atropine
 - Fesoterodine
 - ☒ Scopolamine
 - Tropicamide
- Which is correct regarding ganglion-blocking drugs?
 - ☒ Blockade of sympathetic ganglia could result in reduced blood pressure.
 - Blockade of parasympathetic ganglia could result in reduced heart rate.
 - Nicotine is a nondepolarizing ganglion blocker.
 - Atropine is a nondepolarizing ganglion blocker
- Which drug is useful in treating sinus bradycardia?
 - ☒ Atropine
 - Cisatracurium
 - Neostigmine
 - Succinylcholine
- An ICU patient with severe lung injury requires a neuromuscular blocking agent to assist in his ventilator management. He has liver disease and is currently in renal failure. Which neuromuscular blocker is the best choice for this patient?
 - ☒ Cisatracurium
 - Pancuronium
 - Vecuronium
 - Rocuronium
- Where would you expect to see the first return of function in skeletal muscles following discontinuation of a nondepolarizing neuromuscular blocking agent?
 - Arms
 - ☒ Diaphragm
 - Fingers
 - Pupils
- Atropine doesn't antagonize the following feature of anticholinesterase poisoning:
 - Central excitation
 - ☒ Muscle paralysis
 - Bronchoconstriction
 - Salivation
- During an ophthalmic surgical procedure, the surgeon wanted to constrict the pupil using a miotic drug. However, he accidentally used another drug that caused dilation of the pupil (mydriasis). Which drug was most likely used?
 - Acetylcholine
 - Pilocarpine
 - ☒ Tropicamide
 - Bethanechol