اسئلة الوزاري

6- Botulinum toxin causes paralysis by:
a- Inhibiting choline acetyltransferase b- Blocking transport of choline into neurons
c- Blocking release of acetylcholine from storage vesicles d- Inhibiting acetylcholinesterase
e- Blocking the synapse at ganglia

11- Which one of the following is the neurotransmitter agent normally released in the sinoatrial node of the heart in response to blood pressure increase?
a- Dopamine b- Acetylcholine c- Epinephrine
d- Glutamate e- Norepinephrine

16- The nature of the muscarinic receptor M3 _____
a- Tyrosine kinase receptor b- Gi coupled GPCR c- Gs coupled GPCR
d- Gq coupled GPCR e- Ion-channel receptor

18- All the following are major indications to the use of Cholinergic agents EXCEPT:
a- Glaucoma b- Xerostomia c- Asthma
d- Myasthenia gravis e- Postoperative bladder retention

19- Which of the following therapies are necessary for managing organophosphate compound poisoning?
a- Atropine b- Pralidoxime (2-PAM) c- Diazepam
d- Maintenance of airway and oxygen supply e- All of the above

26- Which of the following is the primary second-messenger process in the contraction of the ciliary muscle when focusing on near objects?
a- cAMP (cyclic adenosine monophosphate) b- NO (nitric oxide)
c- Depolarizing influx of sodium ions via a channel d- IP3 (inositol 1,4,5-trisphosphate)
e- cGMP (Cyclic guanosine monophosphate)

33- Ecothiophate is an irreversible-cholinesterase inhibiting agents. All of the followings regarding ecothiophate are produced EXCEPT:
a- Generalized cholinergic effects. b- Dyspnea. c- Mydriasis.
d- Decrease the Intraocular pressure. e- Convulsions

35- Following surgical intervention necessitating the administration of NMB for skeletal muscle relaxation, a patient manifests mild skeletal muscle paralysis in the postoperative phase, Which pharmacological intervention holds promise for counteracting this adverse effect of NMBs?
a- Pilocarpine b- Bethanechol c- Neostigmine
d- Atropine e- Tiotropium

44- Which muscarinic receptor subtype mostly expressed in the cerebral cortex?
a- M1 b- M2 c- M3 d-M4 e- M5

45- The cholinergic agonists can be used in the following conditions EXCEPT:
a- Glaucoma b- Atonic bladder c- Myasthenia gravis
d- non-obstructive urinary retention. e- motion sickness

46- Which laboratory parameter should be monitored closely during Pralidoxime therapy in organophosphate poisoning?
a- Serum electrolytes. b- Liver function tests. c- Serum acetylcholine levels.
d- Blood oxygen level. e- Serum-acetylcholinesterase levels

13. All the following are major indications for the use of muscarinic agonists, EXCEPT:
a) Postoperative bladder retention
b) Xerostomia
c) Myasthenia gravis
d) Asthma
e) Glaucoma

14. Nerve agents can inhibit cholinesterase enzymes. Which of the following symptoms would you expect to see in a patient exposed to nerve gas?
a) Urinary retention
b) Increased blood pressure
c) Increased intestinal motility and diarrhea
d) Mydriasis
e) Tachycardia

28. All of the following statements are correct, EXCEPT:
a) Bethanechol lacks muscarinic actions but does have strong nicotinic activity
b) Carbachol is a synthetic ester of choline
c) Carbachol has a longer duration of action than acetylcholine
d) Bethanechol is used postoperatively to stimulate the atonic bladder
e) Carbachol has both muscarinic as well as nicotinic actions

29. Regarding the cholinergic system, which of the following is NOT a direct-acting cholinergic agent?
a) Physostigmine
b) Acetylcholine
c) Bethanechol
d) Carbachol
e) Pilocarpine

30. Which of the following drugs or classes of drugs will be useful in treating the symptoms of myasthenia gravis?
a) Sympathomimetic agents
b) Anticholinesterase agents
c) Muscarinic antagonists
d) Muscarinic agonists
e) Nicotinic antagonists

44. In Alzheimer's disease, there is a deficiency of cholinergic neuronal function in the brain. Theoretically, which of the following strategies will be useful in treating the symptoms of Alzheimer's disease?
a) Inhibiting cholinergic receptors in the brain
b) Inhibiting the release of acetylcholine in the brain
c) Increasing the release of acetylcholine in the brain

d) Inhibiting the acetylcholinesterase enzyme in the brain
e) Activating the acetylcholinesterase enzyme in the brain

59. There are different types of neurons in the body. All of the following are cholinergic neurons, EXCEPT:
a) Sympathetic preganglionic neuron
b) Sympathetic postganglionic neuron
c) Parasympathetic postganglionic neuron
d) Parasympathetic preganglionic neuron
e) Somatic neuron

60. Muscarinic receptors belong to the class of G-protein-coupled receptors. All of the following act as second messengers for these receptors, EXCEPT:
a) cAMP
b) Inositol-1,4,5-trisphosphate
c) Diacylglycerol
d) Sodium
e) Calcium

61. Acetylcholine is a quaternary ammonium direct-acting cholinergic agent. It is not used clinically because:
a) Its low volume of distribution
b) It is highly toxic
c) Short duration of action
d) Poorly absorbed
e) It is costly

62. Different cholinomimetic drugs can be used in the treatment of Alzheimer's disease. Which of the following is NOT used now?
a) Galantamine
b) Donepezil
c) Rivastigmine
d) Tacrine
e) All the above

65. Cholinergic effects can be achieved by inhibition of acetylcholinesterase. Which of the following has central effects?
a) Neostigmine
b) Edrophonium
c) Pyridostigmine
d) Physostigmine
e) All the above

66. Organophosphate compounds are extremely toxic. Concerning these agents:
a) They bind reversibly with AChE
b) Can be treated with neostigmine

c) Galantamine is an example of these agents
d) Pralidoxime is used as an antidote
e) Have therapeutic use

67. A 40-year-old male presents to the emergency room with pinpoint pupils, salivation, lacrimation, tremors, and red tears. Plasma cholinesterase level was 40% of normal. The patient is suffering from:
a) Atropine overdose
b) Organophosphorus poisoning
c) Pilocarpine overdose
d) Nicotine poisoning
e) Opioid toxicity

اسئلة تجميع للجابتر الرابع من مختلف الجامعات (امتحان المد)

- **Which of the following best describes the mechanism of action of cholinergic agonists?**

A) They inhibit the effects of acetylcholine
B) They block muscarinic receptors
C) They mimic the effects of acetylcholine, activating cholinergic receptors
D) They decrease the synthesis of acetylcholine

- **Cholinergic agonists that act on the heart primarily act on which type of receptors?**

A) Alpha-adrenergic receptors
B) Beta-adrenergic receptors
C) Muscarinic receptors
D) Nicotinic receptors

- **Selective activation of muscarinic receptors in the eye by cholinergic agonists leads to:**

A) Miosis (pupillary constriction)
B) Mydriasis (pupillary dilation)
C) Relaxation of ciliary muscles
D) Decreased aqueous humor production

- **Activation of cholinergic receptors in the gastrointestinal tract by cholinergic agonists primarily results in:**

A) Increased gastrointestinal motility and secretions
B) Decreased gastrointestinal motility and secretions
C) Decreased sphincter tone
D) Decreased gastric acid secretion

- **Which cholinergic agonist is commonly used to reverse the effects of nondepolarizing neuromuscular blocking agents during surgery?**

A) Neostigmine
B) Bethanechol

C) Pilocarpine
D) Carbachol

- **Cholinergic agonists that selectively activate muscarinic receptors in the urinary tract are used to:**

A) Treat urinary incontinence
B) Induce uterine contractions
C) Relieve constipation
D) Increase salivary secretion

- **Which direct-acting cholinergic agonist is used to treat glaucoma and is the drug of choice for emergency lowering of intraocular pressure?**

A) Acetylcholine
B) Bethanechol
C) Carbachol
D) Pilocarpine
E) None of the above

- **Which of the following cholinergic agonists is primarily used to increase salivary and sweat gland secretions in the management of xerostomia due to Sjögren's syndrome?**

A) Edrophonium
B) Bethanechol
C) Pilocarpine
D) Neostigmine

- **Which of the following adverse effects may occur due to non-selective activation of muscarinic receptors by cholinergic agonists?**

A) Hypertension
B) Bronchospasm
C) Tachycardia
D) Constipation

- **The actions of acetylcholine on the heart mimic the effects of:**

A) Sympathetic stimulation
B) Adrenaline
C) Vagal stimulation
D) Dopamine
E) None of the above

- **Which subtype of muscarinic receptor is found on gastric parietal cells?**

A) M1
B) M2
C) M3
D) M4
E) M5

- **Bethanechol stimulates which of the following?**

A) Detrusor muscle of the bladder
B) Trigone muscle of the bladder
C) Sphincter muscles of the bladder
D) All of the above
E) None of the above

- **Carbachol has profound effects on both the cardiovascular and GI systems due to its activity on:**

A) M1 receptors
B) M2 receptors
C) Nicotinic receptors
D) Ganglionic receptors
E) None of the above

- **Which cholinergic agonist is structurally related to acetylcholine and has a longer duration of action?**

A) Bethanechol
B) Carbachol
C) Pilocarpine
D) Acetylcholine
E) None of the above

- **Which drug has muscarinic activity and is used to promote salivation in patients with xerostomia?**

A) Bethanechol
B) Carbachol
C) Pilocarpine
D) Acetylcholine
E) None of the above

- **The effects of muscarinic agonists can be blocked by which drug?**

A) Atropine
B) Epinephrine
C) Dopamine
D) Norepinephrine
E) None of the above

- **Which of the following drugs is an ester of carbamic acid and lacks nicotinic actions?**

A) Acetylcholine
B) Bethanechol
C) Carbachol
D) Pilocarpine
E) None of the above

- **Which drug is primarily used to stimulate intestinal motility?**

A) Bethanechol
B) Pilocarpine
C) Carbachol
D) Acetylcholine
E) None of the above

- **Which adverse effect is commonly associated with pilocarpine use?**

A) Hypotension
B) Bradycardia
C) Bronchoconstriction
D) Diarrhea
E) Profuse sweating

- **Which of the following is NOT a true statement regarding direct-acting cholinergic drugs?**

A) Pilocarpine is beneficial in xerostomia
B) Bethanechol is used for an overactive bladder
C) Carbachol is used as a miotic agent in glaucoma
D) Acetylcholine eye drops are used as a miotic agent in ophthalmic surgery
E) Pilocarpine is useful in emergency treatment of glaucoma

1. Which of the following is a direct-acting cholinergic agonist?
    - a) Atropine
    - b) Donepezil
    - c) Pilocarpine
    - d) Neostigmine
2. Which cholinergic agonist is commonly used to treat glaucoma by promoting miosis (constriction of the pupil) and decreasing intraocular pressure?
    - a) Bethanechol
    - b) Edrophonium
    - c) Physostigmine
    - d) Pilocarpine
3. Which cholinergic agonist is used to increase gastrointestinal motility and treat urinary retention?
    - a) Neostigmine
    - b) Bethanechol
    - c) Pyridostigmine
    - d) Donepezil
4. Which of the following cholinergic agonists is used to diagnose and differentiate between myasthenia gravis and cholinergic crisis?
    - a) Bethanechol
    - b) Edrophonium
    - c) Physostigmine
    - d) Pilocarpine

5. Which cholinergic agonist is used to reverse the effects of neuromuscular blocking agents after surgery?
    - a) Neostigmine
    - b) Bethanechol
    - c) Pyridostigmine
    - d) Donepezil
6. Which cholinergic agonist is used in the treatment of Alzheimer's disease to improve cognitive function?
    - a) Edrophonium
    - b) Bethanechol
    - c) Donepezil
    - d) Pilocarpine
7. Which cholinergic agonist is used in the treatment of myasthenia gravis to improve muscle strength?
    - a) Pilocarpine
    - b) Neostigmine
    - c) Physostigmine
    - d) Edrophonium
8. Which cholinergic agonist can cross the blood-brain barrier and is used in the treatment of Alzheimer's disease?
    - a) Physostigmine
    - b) Pilocarpine
    - c) Donepezil
    - d) Bethanechol
9. Which of the following cholinergic agonists is used as an antidote for anticholinergic toxicity and for the treatment of glaucoma?
    - a) Bethanechol
    - b) Atropine
    - c) Pilocarpine
    - d) Neostigmine
10. Which cholinergic agonist is used to treat atonic bladder and urinary retention?

- a) Neostigmine
- b) Bethanechol
- c) Edrophonium
- d) Pyridostigmine

11. Which cholinergic agonist is commonly used to reverse the anticholinergic effects of medications in overdose situations?

- a) Pilocarpine
- b) Bethanechol
- c) Physostigmine
- d) Neostigmine

12. Which cholinergic agonist is used in the treatment of postoperative and neurogenic ileus?

- a) Bethanechol
- b) Edrophonium
- c) Neostigmine
- d) Pyridostigmine

13. Which cholinergic agonist is used to enhance neuromuscular transmission in myasthenia gravis?

- a) Edrophonium
- b) Neostigmine
- c) Pyridostigmine
- d) Donepezil

14. Which cholinergic agonist is used in the treatment of Alzheimer's disease to increase acetylcholine levels in the brain?

- a) Bethanechol
- b) Pilocarpine
- c) Donepezil
- d) Physostigmine

15. Which cholinergic agonist is used to stimulate salivary and lacrimal gland secretion and to treat xerostomia?

- a) Bethanechol
- b) Neostigmine
- c) Pilocarpine
- d) Pyridostigmine

- **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?**

A. Malathion
B. Ipratropium
C. Physostigmine
D. Muscarinic antagonists
E. Nicotinic antagonists

- **Which drug is useful in treating sinus bradycardia?**

A. Pilocarpine
B. Atropine
C. Cisatracurium
D. Neostigmine
E. Succinylcholine

- **A patient with asthma was prescribed a β2 agonist for acute relief of bronchospasm but did not respond to treatment. Which drug is the most likely next option for this patient?**

A. Atropine
B. Ipratropium
C. Oxybutynin
D. Physostigmine
E. None of the above

- **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
E. None of the above

- **Which of the following drugs is susceptible to abuse?**

A. Tropicamide
B. Atropine
C. Scopolamine
D. Bethanechol
E. 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?**

A. Darifenacin
B. Solifenacin
C. Tolterodine
D. Oxybutynin
E. 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. Trospium
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

Multiple Choice Questions (MCQs):

1. **All the following are major indications for the use of muscarinic agonists, EXCEPT:**
    - A) Postoperative bladder retention
    - B) Xerostomia
    - C) Myasthenia gravis
    - D) Asthma
    - E) Glaucoma
2. **Nerve agents can inhibit cholinesterase enzymes. Which of the following symptoms would you expect to see in a patient exposed to nerve gas?**
    - A) Urinary retention
    - B) Increased blood pressure
    - C) Increased intestinal motility and diarrhea
    - D) Mydriasis
    - E) Tachycardia
3. **All of the following statements are correct, EXCEPT:**
    - A) Bethanechol lacks muscarinic actions but does have strong nicotinic activity
    - B) Carbachol is a synthetic ester of choline
    - C) Carbachol has a longer duration of action than acetylcholine
    - D) Bethanechol is used postoperatively to stimulate the atonic bladder
    - E) Carbachol has both muscarinic as well as nicotinic actions
4. **Regarding the cholinergic system, which of the following is NOT a direct-acting cholinergic agent?**
    - A) Physostigmine
    - B) Acetylcholine
    - C) Bethanechol
    - D) Carbachol
    - E) Pilocarpine
5. **Which of the following drugs or classes of drugs will be useful in treating the symptoms of myasthenia gravis?**
    - A) Sympathomimetic agents
    - B) Anticholinesterase agents
    - C) Muscarinic antagonists
    - D) Muscarinic agonists
    - E) Nicotinic antagonists
6. **In Alzheimer's disease, there is a deficiency of cholinergic neuronal function in the brain. Theoretically, which of the following is useful in treating the symptoms of Alzheimer's disease?**
    - A) Inhibiting cholinergic receptors in the brain
    - B) Inhibiting the release of acetylcholine in the brain
    - C) Increasing the release of acetylcholine in the brain
    - D) Inhibiting the acetylcholinesterase enzyme in the brain
    - E) Activating the acetylcholinesterase enzyme in the brain
7. **There are different types of neurons in the body. All the following are cholinergic neurons EXCEPT:**
    - A) Sympathetic preganglionic neuron
    - B) Sympathetic postganglionic neuron
    - C) Parasympathetic postganglionic neuron

    - D) Parasympathetic preganglionic neuron
    - E) Somatic neuron
8. **Muscarinic receptors belong to the class of G-protein-coupled receptors. All the following act as second messengers for these receptors EXCEPT:**
    - A) cAMP
    - B) Inositol-1,4,5-trisphosphate
    - C) Diacylglycerol
    - D) Sodium
    - E) Calcium
9. **Acetylcholine is a quaternary ammonium direct-acting cholinergic agent. It is NOT used clinically because:**
    - A) It has a low volume of distribution
    - B) It is highly toxic
    - C) It has a short duration of action
    - D) It is poorly absorbed
    - E) It is costly
10. **Different cholinomimetic drugs can be used in the treatment of Alzheimer's disease. Which of the following is NOT used?**

- A) Galantamine
- B) Donepezil
- C) Rivastigmine
- D) Tacrine
- E) All of the above

11. **A 40-year-old male presents to the emergency department with pinpoint pupils, salivation, lacrimation, tremors, and red tears. Plasma cholinesterase level was 40% of normal. The patient is suffering from:**

- A) Atropine overdose
- B) Organophosphorus poisoning
- C) Pilocarpine overdose
- D) Nicotine poisoning
- E) Opioid toxicity

12. **Cholinergic effects can be achieved by inhibition of acetylcholinesterase. Which of the following has central effects?**

- A) Neostigmine
- B) Edrophonium
- C) Pyridostigmine
- D) Physostigmine
- E) All of the above

13. **Organophosphate compounds are extremely toxic. Concerning these agents:**

- A) They bind reversibly with acetylcholinesterase (ACHE)
- B) They can be treated with neostigmine
- C) Galantamine is an example of these agents
- D) Pralidoxime is used as an antidote
- E) They have therapeutic use

- Which of the following is a direct-acting cholinergic agonist?
A) Neostigmine
B) Atropine
C) **Pilocarpine**
D) Edrophonium
E) Physostigmine

2- A patient with xerostomia (dry mouth) is prescribed a cholinergic drug. Which of the following drugs is most likely prescribed?
A) **Pilocarpine**
B) Neostigmine
C) Atropine
D) Physostigmine
E) Donepezil

3- What is the primary clinical use of bethanechol?
A) Treatment of myasthenia gravis
B) Relief of bronchospasm in asthma
C) **Stimulation of the bladder in nonobstructive urinary retention**
D) Increasing heart rate in bradycardia
E) Inhibition of excessive salivation

4- Why is carbachol resistant to hydrolysis by acetylcholinesterase (AChE)?
A) It is a quaternary amine that blocks AChE binding
B) It lacks an ester functional group
C) **It is a carbamate ester, which is hydrolyzed slowly by esterases**
D) It binds irreversibly to AChE
E) It is rapidly metabolized by the liver before reaching AChE

STUDY QUESTIONS

Choose the ONE best answer.

4.1 Botulinum toxin blocks the release of acetylcholine from cholinergic nerve terminals. Which is a possible effect of botulinum toxin?

A. Skeletal muscle paralysis
B. Improvement of myasthenia gravis symptoms
C. Increased salivation
D. Reduced heart rate

Correct answer = A. Acetylcholine released by cholinergic neurons acts on nicotinic receptors in the skeletal muscle cells to cause contraction. Therefore, blockade of ACh release causes skeletal muscle paralysis. Myasthenia gravis is an autoimmune disease where antibodies are produced against nicotinic receptors and inactivate nicotinic receptors. A reduction in ACh release therefore worsens (not improves) the symptoms of this condition. Reduction in ACh release by botulinum toxin causes reduction in secretions including saliva (not increase in salivation), causing dry mouth and an increase (not reduction) in heart rate due to reduced vagal activity.

4.2 A patient develops urinary retention after an abdominal surgery. Urinary obstruction was ruled out in this patient. Which strategy would be helpful in promoting urination?

A. Activating nicotinic receptors
B. Inhibiting the release of acetylcholine
C. Inhibiting cholinesterase enzyme
D. Blocking muscarinic receptors

Correct answer = C. Activation of muscarinic receptors in the detrusor muscle of the urinary bladder can promote urination in patients where the tone of detrusor muscle is low. Inhibiting cholinesterase enzyme increases the levels of acetylcholine, and acetylcholine can increase the tone of the detrusor muscle. There are no nicotinic receptors in the detrusor muscle; therefore, activation of nicotinic receptors is not helpful. Inhibiting the release of acetylcholine or blocking muscarinic receptors worsens urinary retention.

4.3 Which of the following drugs could theoretically improve asthma symptoms?

A. Bethanechol
B. Pilocarpine
C. Pyridostigmine
D. Atropine

Correct answer = D. Muscarinic agonists and drugs that increase acetylcholine levels cause constriction of bronchial smooth muscles and could exacerbate asthma symptoms. Bethanechol and pilocarpine are muscarinic agonists, and pyridostigmine is a cholinesterase inhibitor that increases levels of acetylcholine. Atropine is a muscarinic antagonist and therefore does not exacerbate asthma. Theoretically, it should relieve symptoms of asthma (not used clinically for this purpose).

4.4 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

Correct answer = B. Muscarinic agonists (for example, pilocarpine) contract the circular smooth muscles in the iris sphincter and constrict the pupil (miosis). Anticholinesterases (for example, neostigmine, physostigmine) also cause miosis by increasing the level of ACh. Muscarinic antagonists, on the other hand, relax the circular smooth muscles in the iris sphincter and cause dilation of the pupil (mydriasis).

4.5 In Alzheimer disease, there is a deficiency of cholinergic neuronal function in the brain. Theoretically, which strategy is useful in treating symptoms of Alzheimer disease?

A. Inhibiting cholinergic receptors in the brain
B. Inhibiting the release of acetylcholine in the brain
C. Inhibiting the acetylcholinesterase enzyme in the brain
D. Activating the acetylcholinesterase enzyme in the brain

Correct answer = C. Because there is already a deficiency in brain cholinergic function in Alzheimer disease, inhibiting cholinergic receptors or inhibiting the release of ACh worsens the condition. Activating the acetylcholinesterase enzyme increases the degradation of ACh, which also worsens the condition. However, inhibiting the acetylcholinesterase enzyme helps to increase the levels of ACh in the brain and thereby relieve the symptoms of Alzheimer disease.

4.6 An elderly female who lives in a farmhouse was brought to the emergency room in serious condition after ingesting a liquid from an unlabeled bottle found near her bed, apparently in a suicide attempt. She presented with diarrhea, frequent urination, convulsions, breathing difficulties, constricted pupils (miosis), and excessive salivation. Which of the following is correct regarding this patient?

A. She most likely consumed an organophosphate pesticide.
B. The symptoms are consistent with sympathetic activation.
C. Her symptoms can be treated using an anticholinesterase agent.
D. Her symptoms can be treated using a cholinergic agonist.

Correct answer = A. The symptoms are consistent with that of cholinergic crisis. Since the elderly female lives on a farm and the symptoms are consistent with a cholinergic crisis (usually caused by cholinesterase inhibitors), it may be assumed that she has consumed an organophosphate pesticide (irreversible cholinesterase inhibitor). Assuming that the symptoms are caused by organophosphate poisoning, administering an anticholinesterase agent or a cholinergic agonist will worsen the condition. The symptoms are not consistent with that of sympathetic activation, as sympathetic activation will cause symptoms opposite to that of cholinergic crisis seen in this patient.

4.7 A patient who received a nondepolarizing neuromuscular blocker (NMB) for skeletal muscle relaxation during surgery is experiencing mild skeletal muscle paralysis after the surgery. Which drug could reverse this effect of NMBs?

A. Pilocarpine
B. Bethanechol
C. Neostigmine
D. Atropine

Correct answer = C. Neuromuscular blockers act by blocking nicotinic receptors on the skeletal muscles. Increasing the levels of ACh in the neuromuscular junctions can reverse the effects of NMBs. Therefore, neostigmine, a cholinesterase inhibitor, could reverse the effects of NMBs. Pilocarpine and bethanechol are preferentially muscarinic agonists and have no effects on the nicotinic receptors. Atropine is a muscarinic antagonist and has no effects on nicotinic receptors.

4.8 A 60-year-old female who had a cancerous growth in the neck region underwent radiation therapy. Her salivary secretion was reduced due to radiation and she suffers from dry mouth (xerostomia). Which drug would be most useful in treating xerostomia in this patient?

A. Acetylcholine
B. Pilocarpine
C. Echothiophate
D. Atropine

Correct answer = B. Salivary secretion may be enhanced by activating muscarinic receptors in the salivary glands. This can be achieved in theory by using a muscarinic agonist or an anticholinesterase agent. Pilocarpine is a muscarinic agonist administered orally for this purpose. Acetylcholine has similar effects as that of pilocarpine; however, it cannot be used therapeutically as it is rapidly destroyed by cholinesterase in the body. Echothiophate is an irreversible cholinesterase inhibitor, but it cannot be used therapeutically because of its toxic effects. Atropine is a muscarinic antagonist and worsens dry mouth.

4.9 A 40-year-old male presents to his family physician with drooping eyelids, difficulty chewing and swallowing, and muscle fatigue even on mild exertion. Which agent could be used to diagnose myasthenia gravis in this patient?

A. Atropine
B. Edrophonium
C. Pralidoxime
D. Echothiophate

Correct answer = B. The function of nicotinic receptors in skeletal muscles is diminished in myasthenia gravis due to the development of antibodies to nicotinic receptors (autoimmune disease). Any drug that increases levels of ACh in the neuromuscular junction can improve symptoms in myasthenia gravis. Thus, edrophonium, a reversible cholinesterase inhibitor with a short duration of action can temporarily improve skeletal muscle weakness in myasthenia gravis, serving as a diagnostic tool. Atropine is a muscarinic antagonist and has no role in skeletal muscle function. Pralidoxime is a drug that is used to reverse the binding of irreversible cholinesterase inhibitors with cholinesterase enzyme and helps to reactivate cholinesterase enzyme. Hence, pralidoxime will not be useful in improving skeletal muscle function in myasthenia gravis.

4.10 Atropa belladonna is a plant that contains atropine (a muscarinic antagonist). Which of the following drugs or classes of drugs will be most useful in treating poisoning with belladonna?

A. Malathion
B. Physostigmine
C. Muscarinic antagonists
D. Nicotinic antagonists

Correct answer = B. Atropine is a competitive muscarinic receptor antagonist that causes anticholinergic effects. Muscarinic agonists or any other drugs that increase the levels of ACh are able to counteract effects of atropine. Thus, anticholinesterases such as malathion and physostigmine can counteract the effects of atropine, in theory. However, since malathion is an irreversible inhibitor of acetylcholinesterase, it is not used for systemic treatment in patients. Muscarinic antagonists worsen the toxicity of atropine. Nicotinic antagonists can worsen the toxicity by acting on parasympathetic ganglionic receptors and thus reducing the release of ACh.

اسئلة من احد الدكاترة جابتر ٤ و ٥

Quiz 1

Pharmacology I

لأولى – G1الشعبة الأولى3 – G1الصيدلة - الثالثة - الدراسة الصباحية - 3

Question Type	The Question	Question Mark
Multiple Choices	1) A patient with Alzheimer disease needs treatment for overactive bladder. Which drug is the best choice for this patient?	0.3
Options	A) Darifenacen	Incorrect
	B) Solifenacin	Incorrect
	C) Tolterodine	Incorrect
	D) Oxybutynin	Incorrect
	E) Trospium	**Correct**
Multiple Choices	2) Muscarinic receptors are classified as:	0.3
Options	A) Ligand-gated ion channels	Incorrect
	B) Enzyme- linked receptors	Incorrect
	C) G protein-coupled receptors	**Correct**
	D) Intracellular receptors	Incorrect
	E) None of the above	Incorrect
Multiple Choices	3) Muscarinic receptors show a weak affinity for which of the following?	0.3
Options	A) Acetylcholine	Incorrect
	B) Nicotine	**Correct**
	C) Muscarine	Incorrect
	D) Pilocarpine	Incorrect
	E) Bethanechol	Incorrect
Multiple Choices	4) The following is the drug of choice for emergency lowering of intraocular pressure:	0.3
Options	A) Acetylcholine	Incorrect
	B) Bethanechol	Incorrect
	C) Carbachol	Incorrect
	D) Pilocarpine	**Correct**
	E) None of the above	Incorrect
Multiple Choices	5) Which adverse effect is commonly associated with pilocarpine use?	0.3
Options	A) Hypotension	Incorrect
	B) Bradycardia	Incorrect
	C) Bronchoconstriction	Incorrect
	D) Diarrhea	Incorrect
	E) Profuse sweating	**Correct**
Multiple Choices	6) The therapeutic use of bethanechol is primarily targeted at:	0.3
Options	A) Lowering blood pressure	Incorrect
	B) Stimulating salivation	Incorrect
	C) Relieving constipation	**Correct**
	D) Treating asthma	Incorrect

	E) None of the above	Incorrect
Multiple Choices	7) Which of the following cholinomimetics is used in the treatment of atropine intoxication?	0.3
Options	A) Neostigmine	Incorrect
	B) Carbochol	Incorrect
	C) Physostigmine	**Correct**
	D) Scopolamine	Incorrect
	E) All of the above	Incorrect
Multiple Choices	8) The symptoms of excessive stimulation of muscarinic receptors include all of the following EXCEPT:	0.3
Options	A) Abdominal cramps, diarrhea	Incorrect
	B) Increased salivation, excessive bronchial secretion	Incorrect
	C) Miosis, bradycardia	Incorrect
	D) Weakness of all skeletal muscles	**Correct**
	E) All of the above	Incorrect
Multiple Choices	9) The following cholinomimetic has both muscarinic as well as nicotinic actions:	0.3
Options	A) Bethanechol	Incorrect
	B) Carbachol	Incorrect
	C) Acetylcholine	Incorrect
	D) Methacholine	Incorrect
	E) b and c	**Correct**
Multiple Choices	10) A 79-year-old man with Alzheimer's disease is found to have significant elevation of liver function tests on routine follow-up examination. Which of the following medications should be maintained at current doses in this patient?	0.3
Options	A) Donepezil	Incorrect
	B) Galantamine	Incorrect
	C) Rivastigmine	Incorrect
	D) Tacrine	**Correct**
	E) Tacrolimus	Incorrect
Multiple Choices	11) Sarin is a volatile nerve agent that inhibits cholinesterase enzymes. Which of the following symptoms would you expect to see in a patient exposed to sarin?	0.3
Options	A) Urinary retention	Incorrect
	B) Tachycardia	Incorrect
	C) Constriction of pupils	**Correct**
	D) Dilation of the pupils	Incorrect
	E) Dry mouth	Incorrect
Multiple Choices	12) All the following statements about Edrophonium is correct EXCEPT:	0.3

Options	A) It is the prototype irreversible AchE inhibitor	Correct
	ıas a short duration of action due to rapid renal elimin	Incorrect
	C) It is used in the diagnosis of myasthenia gravis	Incorrect
	n reversing the effects of non-depolarizing neuromusc	Incorrect
	olinesterase inhibitor therapy to differentiate choliner	Incorrect
Multiple Choices	13) Nicotinic receptors are located in all the following EXCEPT:	0.3
Options	A) CNS	Incorrect
	B) The adrenal medulla	Incorrect
	C) Autonomic ganglia	Incorrect
	D) Postganglionic parasympathetic neuron	Correct
	E) The neuromuscular junction in skeletal muscles	Incorrect
Multiple Choices	14) All of the following are adverse effects of physostigmine EXCEPT:	0.3
Options	A) It may lead to convulsions	Incorrect
	B) It can cause contraction of GI smooth muscles	Incorrect
	C) It can cause mydriasis	Correct
	skeletal muscle twitches, fasciculations, and skeletal n	Incorrect
	E) Bradycardia and hypotension	Incorrect
Multiple Choices	15) Which is a possible effect can occur from toxicity with botulinum toxin?	0.3
Options	A) Skeletal muscle paralysis	Correct
	B) Improvement of myasthenia gravis symptoms	Incorrect
	C) Increased salivation	Incorrect
	D) Reduced heart rate	Incorrect
	E) Bronchoconstriction	Incorrect
Multiple Choices	16) Chronic long-term therapy of myasthenia gravis is usually accomplished with:	0.3
Options	A) Edrophonium	Incorrect
	B) Neostigmine	Incorrect
	C) Pyridostigmine	Correct
	D) Physostigmine	Incorrect
	E) Echothiophate	Incorrect
Multiple Choices	17) ..... is used to assist in the diagnosis of asthma due to its bronchoconstricting properties.	0.3
Options	A) Bethanecol	Incorrect
	B) Methacholine	Correct
	C) Carbachol	Incorrect
	D) Nicotine	Incorrect
	E) Ipratropium	Incorrect
Multiple Choices	18) Atropine causes:	0.3
Options	A) Bradycardia, hypotension and bronchoconstriction	Incorrect
	hycardia, little effect on blood pressure and bronchod	Correct
	in contractile strength, conduction velocity through t	Incorrect
	) Tachycardia, hypertensive crisis, and bronchodilatio	Incorrect
	E) Diarrhea and abdominal cramps	Incorrect

Multiple Choices	19) Antimuscarinic drugs should be avoided in:	0.3
Options	A) Paralytic ileus	Incorrect
	B) Atony of the urinary bladder	Incorrect
	C) Glaucoma	Incorrect
	D) Bradycardia and A.V. block	Incorrect
	E) All of the above	**Correct**
Multiple Choices	20) A 58-year-old man with Parkinson's disease presents to the clinic for follow-up. Recently, he has experienced an increase in his resting tremor and rigidity. He was wondering if there is a medication that could help these symptoms. What anticholinergic is the most appropriate treatment?	0.3
Options	A. Benztropine	**Correct**
	B. Bromocriptine	Incorrect
	C. Ipratropium	Incorrect
	D. Scopolamine	Incorrect
	E. Tropicamide	Incorrect
Multiple Choices	21) Atropine produces the following actions EXCEPT:	0.3
Options	A) Tachycardia	Incorrect
	B) Dry mouth	Incorrect
	C) Mydriasis	Incorrect
	D) Urinary incontinence	**Correct**
	E) Raised intraocular pressure	Incorrect
Multiple Choices	22) 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. Which drug was most likely used?	0.3
Options	A) Acetylcholine	Incorrect
	B) Pilocarpine	Incorrect
	C) Tropicamide	**Correct**
	D) Bethanechol	Incorrect
	E) Timolol	Incorrect
Multiple Choices	23) 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?	0.3
Options	A) Atropine	Incorrect
	B) Ipratropium	Incorrect
	C) Tiotropium	**Correct**
	D) Trospium	Incorrect

	E) Pilocarpine	Incorrect
Multiple Choices	24) Which of the following is antimuscarinic drug had selectively to muscarinic M3 receptors in urinary bladder?	0.3
Options	A) Oxybutynin	Incorrect
	B) Solifenacin	Correct
	C) Fesoterodine	Incorrect
	D) Tolterodine	Incorrect
	E) Trospium	Incorrect
Multiple Choices	25) Which of the following drugs is antispasmodic drug to relax GI tract?	0.3
Options	A) Bethanechol	Incorrect
	B) Carbachol	Incorrect
	C) Ipratropium	Incorrect
	D) Atropine	Correct
	E) Tiotropium	Incorrect
Multiple Choices	26) 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?	0.3
Options	A) Cisatracurium	Correct
	B) Pancuronium	Incorrect
	C) Vecuronium	Incorrect
	D) Rocuronium	Incorrect
	E) All of them can be used	Incorrect
Multiple Choices	27) Prolonged apnea can occur with which of the following drugs:	0.3
Options	A) Succinyl choline	Incorrect
	B) Gallamine	Incorrect
	C) Mivacurium	Incorrect
	D) Pancuronium	Incorrect
	E) A and C	Correct
Multiple Choices	28) Which of the following statements about scopolamine is accurate?	0.3
Options	A) It has no CNS effects.	Incorrect
	B) It does not affect short-term memory.	Incorrect
	opolamine's stimulant effects are observed at lower d	Incorrect
	ıration of action compared to atropine is due to its fas	Incorrect
	E) It can produce euphoria and is prone to abuse	Correct

Multiple Choices	29) A 50-year farmer was spraying an insecticide; he then lost consciousness, and he showed increased sweating and salivation. He was brought to the emergency room, his heart rate was 45, and his blood pressure was 80/40 mm Hg. Which of the following treatment is indicated	0.3
Options	A) Norepinephrine	Incorrect
	B) Atropine	**Correct**
	C) Physostigmine	Incorrect
	D) Edrophonium	Incorrect
	E) None of the above	Incorrect
Multiple Choices	30) Ganglionic receptors are selectively blocked by:	0.3
Options	A) Tubocurarine	Incorrect
	B) Mecamylamine	**Correct**
	C) Pancuronium	Incorrect
	D) Low dose nicotine	Incorrect
	E) B and D	Incorrect

1. Location of nicotinic receptor family in autonomic nervous system except

A. Ganglia of sympathetic nervous system
B. Adrenal medulla
C. Somatic nerve terminal
D. Ganglia of parasympathetic nervous system
E. Sweat gland

2. Hemicholinium inhibits which of the following step of Ach neurotransmission

A. Synthesis
B. Storage
C. Release
D. Binding
E. Degradation

3. Release of Ach from nerve ending can be inhibited by

A. Black widow toxin
B. Botulinum toxin
C. Bethanechol
D. Edrophonium
E. All the above

4. Possible mechanism(s) of action of muscarinic M2 receptor

A. Activates phospholipase C
B. Inhibit Adenylyl cyclase and open K channel
C. Inhibit phospholipase C
D. Activate Adenylyl cyclase which lead to activation of Ca channel
E. A and B

5. All the followings are parasympathetic action except

A. Negative chronotropy and ionotropy
B. Increase GI peristalsis movement
C. Contraction of detrusor muscle, relaxation of trigone and sphinctor
D. Thick viscous salivery secretion
E. Stimulation of tears

6. Cholinergic agonist indicated for Alzheimer's Disease

A. Physostigmine
B. Pilocarpine
C. Bethanechol
D. Edrophonium
E. Donepezil

7. Cholinomimetics indicated topical insecticide.

A. Echothiopate
B. Malathion
C. Physostigmine
D. Pralidoxime
E. Carbachol

15 About pralidoxime

1. It has anticholinesterase activity.
2. It can reverse both peripheral and central effects
3. It can overcome the toxicity for irreversible AchE inhibitors only of the sentence(s) is/are true

Which statmetnt (s) is/are true

A. 1 Only
B. 2 Only
C. 3 Only
D. 1 and 2 only
E. 1 and 3 only

8. All the following are major indications to the use of Cholinergic agents EXCEPT:

A. Glaucoma
B. Xerostomia
C. Myasthenia gravis
D. Asthma
E. Postoperative bladder retention

9. Ecothiopate is an irreversible cholinesterase inhibiting agents. All the followings regarding ecothiopate are produced EXCEPT:

A. Decrease the Intraocular pressure.
B. Generalized cholinergic effects.
C. Dyspnea.
D. Mydriasis.
E. Convulsions

10. Both muscarinic and nicotinic cholinergic agonist

A. Bethanechol
B. Carbachol
C. Pilocarpine
D. Tacrine
E. A and B

11. Drug indicated for diagnosis of myasthenia gravis

A. Bethanechol
B. Edrophonium
C. Physostigmine
D. Pyridostigmine
E. Rivastigmine

12. Indicated as antidote of atropine

A. Edrophonium
B. Physostigmine
C. Pyridostigmine
D. Neostigmine
E. All the above

13. True about organophosphorus toxicity

A. Pralidoxime is effective as antidote but before aging is taking place
B. Diazepam is also administered to reduce the persistent convulsion
C. Atropine symptomatically reverse all cholinergic toxicity from organophosphorus
D. A and B
E. All the above are true

14. A pharmacy student is reviewing the effects of acetylcholine (ACh) on different vascular structures. He notes that ACh causes vasodilation, despite the absence of direct parasympathetic innervation of blood vessels. What is the key mediator of this vasodilation?

A. Calcium
B. Nitric oxide (NO)
C. Angiotensin II
D. Cyclic AMP (cAMP
E. Diacyl glycerol