



KENYATTA UNIVERSITY
SUPPLEMENTARY/SPECIAL EXAMINATION 2020/2021
EXAMINATION FOR THE DEGREE OF BACHELOR OF PHARMACY

PPB 330: PHARMACOLOGY III

AUGUST-SEPTEMBER 2021

TIME: 2 HOURS

INSTRUCTIONS:

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This examination consists of THREE sections; A, B and C.

Answer ALL questions.

Answer each section in a separate answer booklet

SECTION A PPB 331: RENAL SYSTEM & ELECTROLYTES REGULATION

1. The diuretic action of chlorthalidone is via blockade of
 - A. $\text{Na}^+ - \text{K}^+ - \text{Cl}^-$ cotransporter
 - B. $\text{Na}^+ - \text{Cl}^-$ symporter
 - C. $\text{Na}^+ - \text{H}^+$ antiporter
 - D. $\text{Na}^+ - \text{K}^+$ ATPase
 - E. $\text{Na}^+ - \text{Cl}^-$ antiporter
2. Which pharmacokinetic property of thiazide diuretic is **FALSE**?
 - A. Most undergo little hepatic metabolism
 - B. Chlorthalidone half-life is 40 hours
 - C. Metolazone is efficacious in low GFR
 - D. Their oral bioavailability averages 30%
 - E. All can be administered orally

3. The following are the indications of vasopressin agonists **EXCEPT**...
- A. abdominal distension
 - B. septic shock
 - C. nephrogenic diabetes insipidus
 - D. bedwetting in children
 - E. bleeding esophageal varices
4. How does non-steroidal anti-inflammatory drugs reduce the diuretic action of loop diuretics?
- A. It enhances salt and water reabsorption in distal tubule
 - B. It decreases GFR through afferent arteriole vasoconstriction.
 - C. It blocks excretion of furosemide at the proximal tubules
 - D. It blocks its action in ascending limb of loop of Henle
 - E. It increases aldosterone secretion
5. 60-year-old patient complains of paraesthesia and occasional nausea associated with one of her drugs. She is found to have hyperchloremic metabolic acidosis. She is probably taking is
- A. acetazolamide for glaucoma
 - B. amiloride for oedema associated with aldosteronism
 - C. furosemide for severe hypertension and heart failure
 - D. hydrochlorothiazide for hypertension
 - E. mannitol for cerebral oedema
6. A 58-year-old woman with lung cancer has abnormally low serum osmolality and hyponatremia. An appropriate drug to treat her would be
- A. amiloride
 - B. desmopressin
 - C. ethacrynic acid
 - D. chlorthalidone
 - E. tolvaptan

7. The following drug reduces urine volume in both pituitary origin as well as renal diabetes insipidus and is orally active.
- A. Conivaptan
 - B. Vasopressin
 - C. Carbamazepine
 - D. Hydrochlorothiazide
 - E. Chlorpropamide
8. An alcoholic male has developed hepatic cirrhosis. Which one of the following drugs should be prescribed to control the ascites and edema?
- A. Hydrochlorothiazide
 - B. Acetazolamide.
 - C. Spironolactone.
 - D. Furosemide.
 - E. Chlorthalidone.
9. The drug that is contraindicated in a patient with hyperkalemia is
- A. acetazolamide
 - B. amiloride
 - C. chlorothiazide
 - D. ethacrynic acid
 - E. chlorthalidone
10. Which of the following diuretics would be most useful in the acute treatment of a comatose patient with cerebral oedema?
- A. Acetazolamide
 - B. Lixivaptan
 - C. Isosorbide
 - D. Furosemide
 - E. Mannitol
11. Explain the role of the following in renal pharmacology;
- a) Aldosterone (3 marks)
 - b) Carbonic anhydrase (3 marks)

13. Describe the mechanism of counter current multiplier system. (3 marks)
14. Explain why tolvaptan is clinically better in the management of the congestive heart failure when compared to furosemide. (4 marks)
15. Regarding diuretics;
- c) Giving two drug examples from each group, describe two pharmacological differences between loop and thiazide diuretics. (3 marks)
 - d) Outline four complications that arise from clinical use of loop diuretics. (4 marks)
 - e) Name four clinical uses of thiazide diuretics. (2 marks)
16. Identifying the site of action in the nephron, describe the mechanism of action of the following urinary acting drugs; (8 marks)
- a) Dapagliflozin
 - b) Triamterene

SECTION B PPB 332: GASTROINTESTINAL SYSTEM

1. A couple celebrating their 40th wedding anniversary are given a trip to Lagos. Due to past experiences while traveling, they ask their doctor to prescribe an agent for diarrhoea. Which of the following would be effective?

- A. Omeprazole.
- B. Loperamide.
- C. Famotidine
- D. Diphenoxylate
- E. Lorazepam

2. Famotidine differs from cimetidine in the following respect:

- A. It is less potent
- B. It is shorter acting
- C. It does not have antiandrogenic action
- D. It produces more CNS side effects
- E. It does not affect insulin secretion

3. The following is true of aluminium hydroxide gel EXCEPT:

- A. It can be used long-term
- B. Its acid neutralizing capacity decreases on storage
- C. It interferes with absorption of phosphate in the intestine
- D. It causes loose motions as a side effect
- E. It causes constipation as a side effect

4. The success of oral rehydration therapy of diarrhea depends upon the following process in the intestinal mucosa:

- A. Sodium pump mediated Na^+ absorption
- B. Potassium coupled Na^+ absorption
- C. Glucose coupled Na^+ absorption
- D. Bicarbonate coupled Na^+ absorption
- E. Passive Na^+ diffusion secondary to nutrient absorption

5. A 55-year-old woman with type 1 diabetes of 40 years duration complains of severe bloating and abdominal distress, especially after meals. Evaluation is consistent with diabetic gastroparesis. Which of the following is a prokinetic drug that could be used in this situation?

- A. Bismuth subsalicylate
- B. Cimetidine
- C. Loperamide
- D. Metoclopramide
- E. Mesalamine

6. Which antiemetic selectively blocks levodopa induced vomiting without blocking its antiparkinsonian action:

- A. Metoclopramide
- B. Hyoscine
- C. Promethazine
- D. Domperidone
- E. Ondansetron

7. The preferred drug for controlling an acute exacerbation of ulcerative colitis is:

- A. Prednisolone
- B. Sulfasalazine
- C. Mesalazine
- D. Vancomycin
- E. Methylprednisolone

8. A patient is receiving treatment prior to chemotherapy to help reduce her anticipatory nausea and vomiting. Which of the following is the likely drug administered.

- A. Palonosetron
- B. Ondansetron
- C. Lorazepam
- D. Dolasetron
- E. Diazepam

9. 24-year-old man with a 7-year history of Crohn's disease was suffering from persistent diarrhea, abdominal pain, and signs of systemic inflammation. The patient's physician proposed treatment with an immunoglobulin-based agent that inhibits tumor necrosis factor (TNF). Which of the following drugs fits this description?

- A. Cyclosporine
- B. Filgrastim
- C. Infliximab
- D. Sulfasalazine
- E. Interferon

10. A patient has steatorrhea due to pancreatic insufficiency secondary to cystic fibrosis. Which of the following drugs usually is considered the most reasonable and usually effective drug for managing the steatorrhea?

- A. Sulfasalazine
- B. Cimetidine
- C. Bile salts
- D. Metoclopramide
- E. Pancrelipase

11. A patient being cared for by the gastroenterology clinic is being treated with sulfasalazine. After 3 weeks a blood work up shows elevated liver enzymes and red blood cell count. He complains of weakness and has pale skin. Explain the cause of the patient's symptoms. (4 marks)

12. An opioid abuser, seeking something to self-administer for subjective responses, gets a large amount of diphenoxylate and consumes it all at once. He is not likely to do this again because he experiences a host of unpleasant systemic responses. What is the most possible cause for the patient's experience? (3 marks)

13. Match the laxatives with appropriate examples (2 marks)

- | | |
|---------------------------|---------------------|
| i) Bulk forming laxatives | A. Senna |
| ii) Emollients | B. Methyl cellulose |
| iii) Osmotic laxatives | C. Mineral oil |
| iv) Stimulant laxatives | D. Sorbitol |

14. List the FOUR afferent signals to the vomiting center. (2 marks)

15. Outline why sodium bicarbonate should not be used in the long-term management of gastroesophageal reflux disease (GERD). (2 marks)

16. On your first day on a general medicine clerkship you encounter a patient who is taking a proton pump inhibitor, bismuth, metronidazole, and tetracycline. Explain the purpose for administering this drug combination? (3 marks)

17. Including an example in each class, list FIVE classes of drugs that cause diarrhoea. (5 marks)

18. Explain the mechanism of selectivity of esomeprazole to parietal cells. (4 marks)

19. Describe the rationale of combining Magnesium hydroxide and Aluminium hydroxide. (2 marks)

20. A male patient to be seen in the general medicine clinic is being treated with a number of prescription drugs, one of which is misoprostol. Explain the purpose for administering misoprostol? (3 mark)

SECTION C PPB 333: ENDOCRINE SYSTEM

1. A 27-year-old woman is diagnosed with hypercorticism. To determine whether cortisol production is independent of pituitary gland control glucocorticoid is administered. Which of the following glucocorticoids is the best for this indication?

- A. Dexamethasone
- B. Hydrocortisone
- C. Methylprednisolone
- D. Prednisone
- E. Betamethasone

2. A 3-year-old boy with failure to thrive and metabolic disturbances was found to have a mutation resulting in a deficiency in growth hormone. Which of the following drugs is most likely to improve his metabolic function and promote his growth?

- A. Atosiban
- B. Bromocriptine
- C. Mecermin
- D. Octreotide
- E. Somatropin

3. The hypothalamic hormone somatostatin is:

- A. A single peptide joined by one disulfide bond
- B. A mixture of two distinct peptides joined by one disulfide bond
- C. A mixture of several peptides with two disulfide bonds
- D. A glycoprotein
- E. Dopamine

4. A 40-year-old female is undergoing infertility treatment. Which of the following drugs might be included in her treatment regimen?

- A. Cabergoline.
- B. Follitropin.
- C. Methimazole.
- D. Vasopressin.
- E. Abarelix

5. Which of the following best describes a glucocorticoid response element?
- A. A protein regulator that controls the interaction between an activated steroid receptor and DNA
 - B. A short DNA sequence that binds tightly to RNA polymerase
 - C. A small protein that binds to an unoccupied steroid receptor protein and prevents it from becoming denatured
 - D. A specific nucleotide sequence that is recognized by a steroid hormone receptor-hormone complex
 - E. The portion of the steroid receptor that binds to DNA
6. The Na^+ retaining action of aldosterone is exerted on the:
- A. Proximal convoluted tubule
 - B. Ascending limb of loop of Henle
 - C. Cortical diluting segment
 - D. Distal convoluted tubule
 - E. Glomerulus body
7. For therapeutic use, growth hormone is obtained from:
- A. Recombinant DNA technique
 - B. Human cadaver pituitaries
 - C. Bovine pituitaries
 - D. Porcine pituitaries
 - E. Chemical synthesis
8. The most prominent action of bromocriptine is:
- A. Dopamine D_1 agonism
 - B. Dopamine D_1 antagonism
 - C. Dopamine D_2 agonism
 - D. Dopamine D_2 antagonism
 - D. Alpha adrenergic antagonism

9. A patient with an endocrine disorder develops lactic acidosis, and nearly dies, as a result of an uncommon but serious adverse response to therapy with an "endocrine" drug. Which of the following was the most likely cause of this severe problem?

- A. Insulin glargine, prescribed for Type 1 diabetes mellitus
- B. Levothyroxine, prescribed to maintain euthyroid status following thyroidectomy
- C. Metformin, prescribed for Type 2 diabetes mellitus
- D. Propylthiouracil, prescribed for hyperthyroidism
- E. Spironolactone, prescribed for an adrenal cortical tumor

10. The insulin receptor is a:

- A. Ion channel regulating receptor
- B. Tyrosine protein kinase receptor
- C. G-protein coupled receptor
- D. Nuclear receptor
- E. Ligand gated receptor

11. Contrast effects of pulsatile and chronic administration of GnRH agonists on gonadotropin release following. (2 marks)

12. Write the insulin preparation/class with the characteristics given: (5 marks)

- i) Proline at position B28 has been moved to B29, and lysine at position B29 has been moved to B28. does not affect half life, reducing propensity to form dimers. Hence longer shelf life. _____
- ii) Prepared by precipitating insulin-zinc complexes with protamine slow absorption and extended duration of action. _____
- iii) Formulated by substituting a lysine for asparagine at B3 and glutamic acid for lysine at B29. difference in down stream pathways IRS. _____
- iv) Useful for IV therapy in the management of diabetic ketoacidosis (DKA) _____
- v) Has a 14-carbon fatty acid added to the A chain and an amino acid removed from the B chain. Fatty acid side chain that enhances association to albumin. _____

13. Describe the indirect pharmacodynamic actions of growth hormone. (2 marks)

14. List FOUR adverse effects of troglitazone. (2 marks)
15. Describe the mechanism of action of the following drugs (4 marks)
- i) Pegvisomant
 - ii) Fludrocortisone
16. Explain the process of insulin secretion from the islets of langerhans. (2 marks)
17. Describe pharmacokinetics of metformin. (4 marks)
18. Describe the major effects of betamethasone on:
- (i) Carbohydrate metabolism (3 marks)
 - (ii) Bone (3 marks)
 - (iii) Fat metabolism (3 marks)