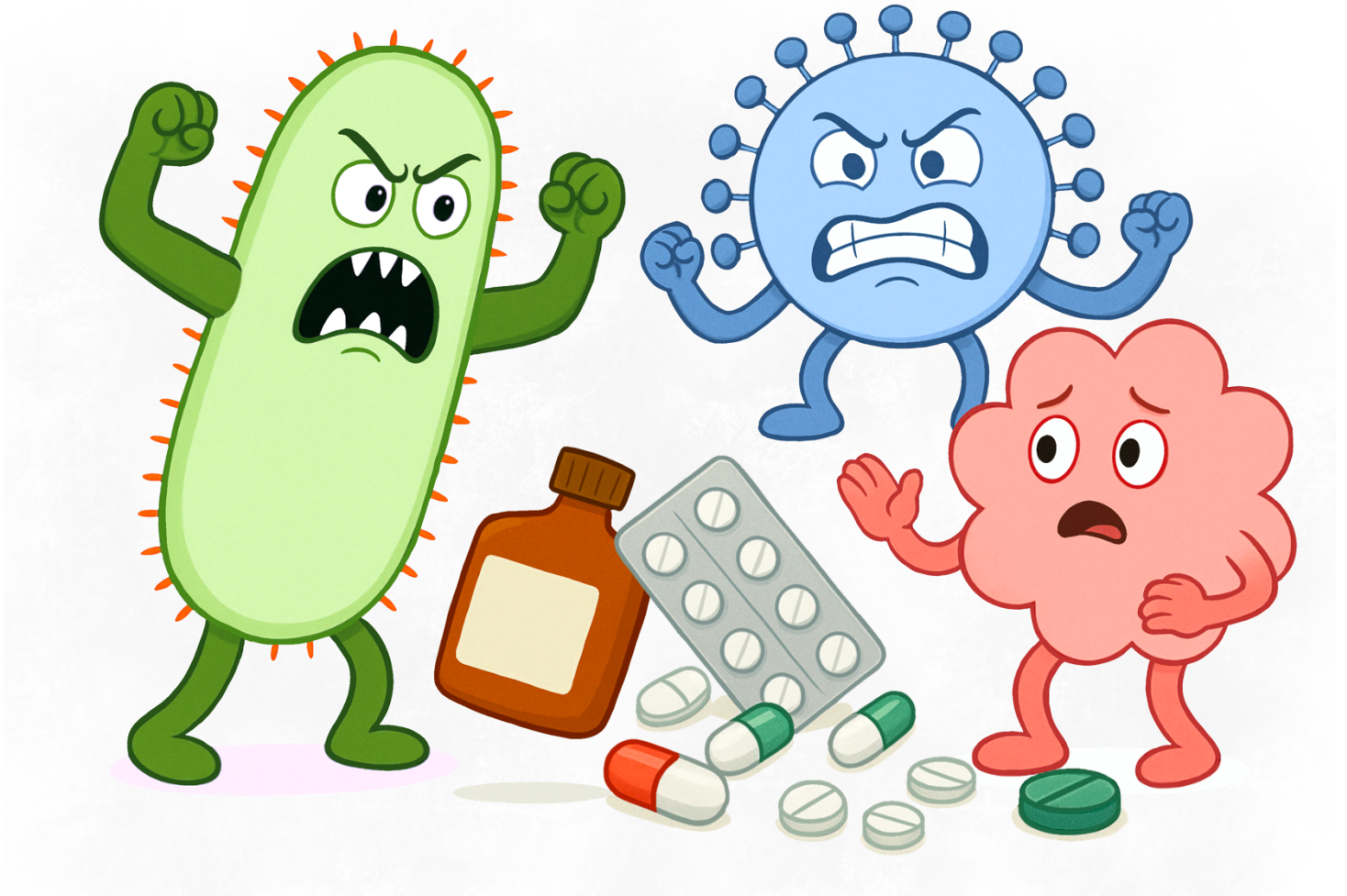




Pharmacology Answer Key (3&4)

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Midterm 3:

Section 1 – Antibiotic Drugs

1) Name all the beta-lactam antibiotic groups:

Penicillins, Cephalosporins, Carbapenems and Monobactams

2) A patient is treated with Vancomycin. Which side effect is most likely to occur with this drug?

a) Diarrhea

b) Ototoxicity

c) Alopecia

d) Hypertension

3) Clavulanate, sulbactam and tazobactam are examples of:

a) Beta-lactam antibiotics

b) Peptidoglycans

c) Beta-lactam inhibitors

d) Narrow-spectrum antibiotics

4) Name two different third-generation cephalosporins:

Ceftriaxone, Ceftazidime

5) Penicillin G can be used to treat which disease:

a) Syphilis

b) Gonorrhea

c) Lyme disease

d) Mycoplasma

6) A woman is being treated for a chlamydial infection. She experiences severe erythema on her skin after she was outside in the sun. Which antibiotic is most likely responsible for this adverse effect?

a) Mupirocin

b) Clindamycin

c) Doxycycline

d) Azithromycin

7) Aminoglycosides exhibit concentration-dependent killing. What does this mean?

This means that their bacterial killing efficacy increases with higher drug concentrations. The higher the peak concentration, the more effective the killing of bacteria, regardless of the duration above the minimum inhibitory concentration (MIC).

8) Clindamycin is active against gram-positive cocci and is useful in treating infections caused by gram-positive cocci and anaerobes resistant to penicillin and other drugs. It causes a higher rate of which condition?

- a) Pseudomembranous colitis**
- b) Severe headache
- c) Erythema of the skin
- d) Liver failure

9) Route of administration of Mupirocin.

- a) Topical**
- b) Oral
- c) Intravenous
- d) Intramuscular

10) A man is being treated for a bacterial infection and is experiencing severe pain in his right heel. He is found to have an inflamed Achilles tendon. Which antibiotic is most likely to give such an adverse effect?

- a) Trimethoprim
- b) Daptomycin
- c) Ciprofloxacin**
- d) Rifaximin

11) A woman has been traveling in Asia and is experiencing severe diarrhea. She is given a drug that is not absorbed by the gut. Which agent is this woman probably taking?

- a) Trimethoprim
- b) Levofloxacin
- c) Nitrofurantoin
- d) Rifaximin**

12) What is the mechanism of action of fluoroquinolones?

Fluoroquinolones inhibit bacterial DNA gyrase and topoisomerase IV, enzymes essential for DNA replication and transcription. This prevents bacterial cell division and leads to cell death.

13) What is the mechanism of action of trimethoprim?

Trimethoprim inhibits bacterial dihydrofolate reductase, an enzyme involved in folic acid synthesis. This blocks the production of tetrahydrofolate, necessary for nucleotide synthesis and bacterial DNA replication.

Section 2 – Antifungal drugs

1) Place in correct box:

Yeast	Molds
Aspergillus spp. Mucormycosis Dermatophytes	Cryptococcus neoformans Pneumocystis jirovecii Candida Spp.

2) What are the adverse effects of Amphotericin B?

Fever, chills, nausea and vomiting, thrombophlebitis, hematopoietic disorders, hypotension, acute liver failure, cardiac arrhythmias.

3) Match the route of administration with the correct azole derivative.

- | | |
|------------------|-----------------------------|
| 1) Clotrimazole | a) Oral or IV |
| 2) Fluconazole | b) Oral (capsule or liquid) |
| 3) Itraconazole | c) Topical |
| 4) Ketoconazole | d) Topical |
| 5) Efinaconazole | e) Oral or topical |

Answer: 1d/c, 2a, 3b, 4e, 5c/d

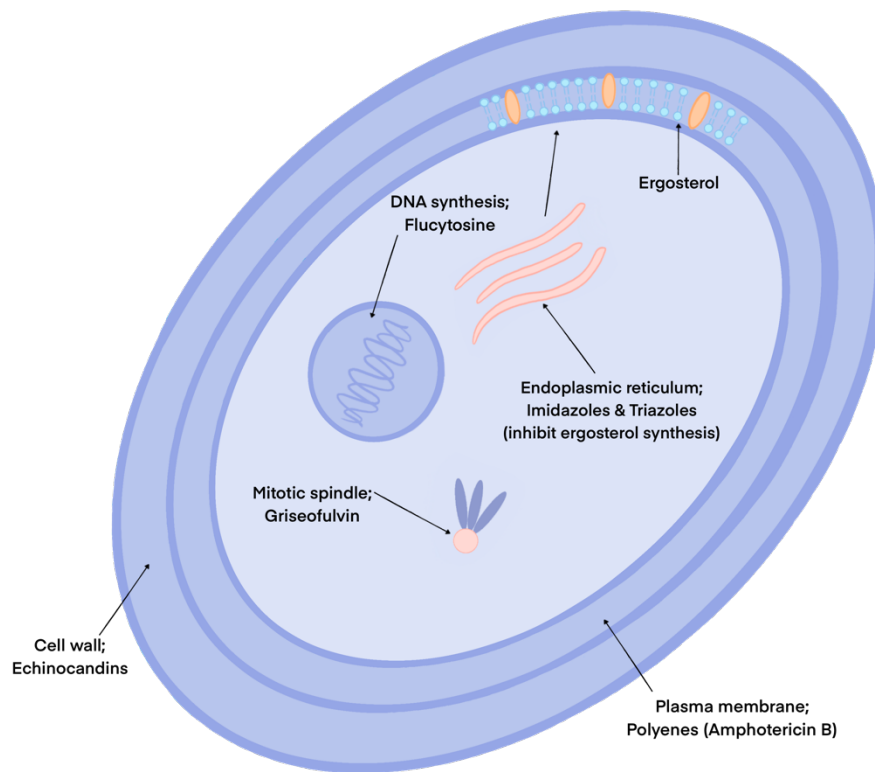
4) What is the mechanism of terbinafine?

- a) Inhibit ergosterol synthesis
- b) Inhibit mycelial growth
- c) Inhibit fungal cell wall synthesis
- d) Disrupt microtubule function

5) Why cannot caspofungin be administered orally?

Because of the poor bioavailability.

6) Fill in the correct drug and where they inhibit the fungal cell, by the arrows.



Section 3 – Antiviral drugs

1) What type of herpes virus cause the different infections?

Varicella-zoster virus (VZV) cause chickenpox and shingles.

Herpes simplex virus (HSV) causes infection of the genitals, lips and mouth, and conjunctiva (very rarely cause fatal encephalitis).

Cytomegalovirus (CMV) usually presents as retinitis, esophagitis and colitis in immunocompromised patients

2) Match the herpes drug with the correct type of administration:

- | | |
|----------------|-------------------------|
| 1) Acyclovir | a) Oral (topical cream) |
| 2) Famciclovir | b) IV |
| 3) Ganciclovir | c) IV, Ophthalmic gel |
| 4) Cidofovir | d) Oral, IV, Topical |

Answers: 1d, 2a, 3c, 4b

3) Foscarnet:

- a) can treat CMV, VZV and HSV
- b) do not need activation by a cellular/viral kinase
- c) is administered IV
- d) all of the above**

4) What is HAART an abbreviation for, and what does it mean?

Highly active antiretroviral therapy, it is a multidrug treatment that improves the survival on HIV positive patients by combining drugs from different classes.

5) What are the typical adverse effects if NRTIs?

- a) Metabolic alkalosis, headache, dizziness
- b) Weight loss, fever, dizziness
- c) Lactic acidosis, hepatic steatosis, lipodystrophy**
- d) Headache, weakness, fever

6) Which drug is an HIV protease inhibitor?

- a) Darunavir**
- b) Rilpivirine
- c) Efavirenz
- d) Nevirapine

7) What is PrEP and who should use it?

PrEP is a pre exposure prophylaxis that should be used by people who are at high risk of infection, for example; IVDU, unprotected MSM.

8) What is the drug combination in Epclusa?

- a) Sofosbuvir/Velpatasvir**
- b) Sofosbuvir/Ribavirin
- c) Velpatasvir/Peginterferon alfa
- d) Peginterferon alfa/Ribavirin

Section 4 – Antiparasitic drugs

1) What anaerobic bacteria can be treated by Metronidazole?

- a) Giardia Lamblia, Trichomonas vaginalis
- b) Helicobacter pylori, C. difficile, Bacteroides fragilis**
- c) C. difficile, Giardia Lamblia, Cryptosporidium parvum
- d) None of the above

2) What is the mechanism of action of Chloroquine in treatment of malaria?

- a) Unclear
- b) Form free radicals that attack heme
- c) Destroy all gametocytic forms
- d) Prevent degradation of heme**

3) What drugs should be used to treat Toxoplasmosis?

Pyrimethamine + Sulfadiazine or Spiramycin (fetal)

4) Choose the false match of drug and protozoan infection:

- a) Melarsoprol – Late African trypanosomiasis brucei (sleeping sickness)
- b) Melarsoprol – Leishmanias**
- c) Pentamidine – Pneumocystis jiroveci
- d) Pentamidine – Early African trypanosomiasis brucei (sleeping sickness)

5) Why do a lot of helminth infections go untreated?

Many infections go untreated because the cost of the drug treatment is so high.

Midterm 4:

Section 1 – Anticancer and Immunomodulating Drugs

1. Which drug can reduce adverse effects from Methotrexate?

- a) Uridine triacetate
- b) Leucovorin**
- c) Mannitol
- d) Prednisone

2. Name the 4 drugs in ABVD combination therapy used to treat Hodgkin disease.

- A – Adriamycin (Doxorubicin)
- B – Bleomycin
- V – Vinblastine
- D – Dacarbazine

3. Fill out the table

	Methotrexate	Cyclophosphamide	Paclitaxel
Type of chemotherapeutic drug	DNA synthesis Inhibitor	Alkylating agent	Mitotic Inhibitor
Mechanism of Action	Inhibit dihydrofolate reductase	Attaches to two guanine residues in the DNA strand → Cell arrest	Promote polymerization and inhibit disassembly of microtubules
Cell cycle	S Phase	Non-specific	Metaphase M Phase
Indication	Fast dividing cancer; - Choriocarcinoma - ALL Autoimmune disease - Rheumatoid Arthritis	Both fast dividing and slow dividing cells - CLL - Burkitt lymphoma Autoimmune disease	Fast dividing cancer cells - Metastatic ovarian cancer - Non-small cell lung carcinoma

4. Which of the following drugs is the most cardiotoxic?

- a) Vincristine
- b) Bleomycin
- c) Cyclosporine
- d) Doxorubicin**

5. What are the most emetic anticancer drugs?

Cisplatin and Nitrosourea drugs

6. Name 2 drugs causing severe pulmonary damage

Bleomycin and Busulfan

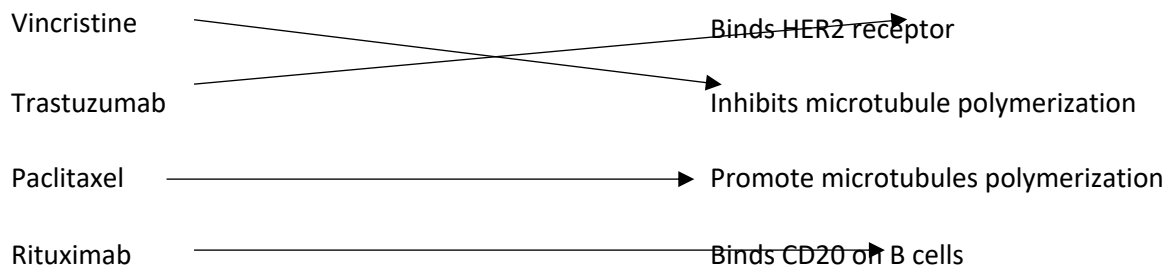
7. What are the adverse effects caused by Cisplatin?

- a) Nephrotoxicity, Oropharyngeal candidiasis, Pulmonary edema, Emesis
- b) Neurotoxicity, Osteoporosis, Psoriasis, Emesis
- c) Nephrotoxicity, Ototoxicity, Peripheral neuropathy, Emesis**
- d) Neurotoxicity, Osteoporosis, Pneumonia, Emesis

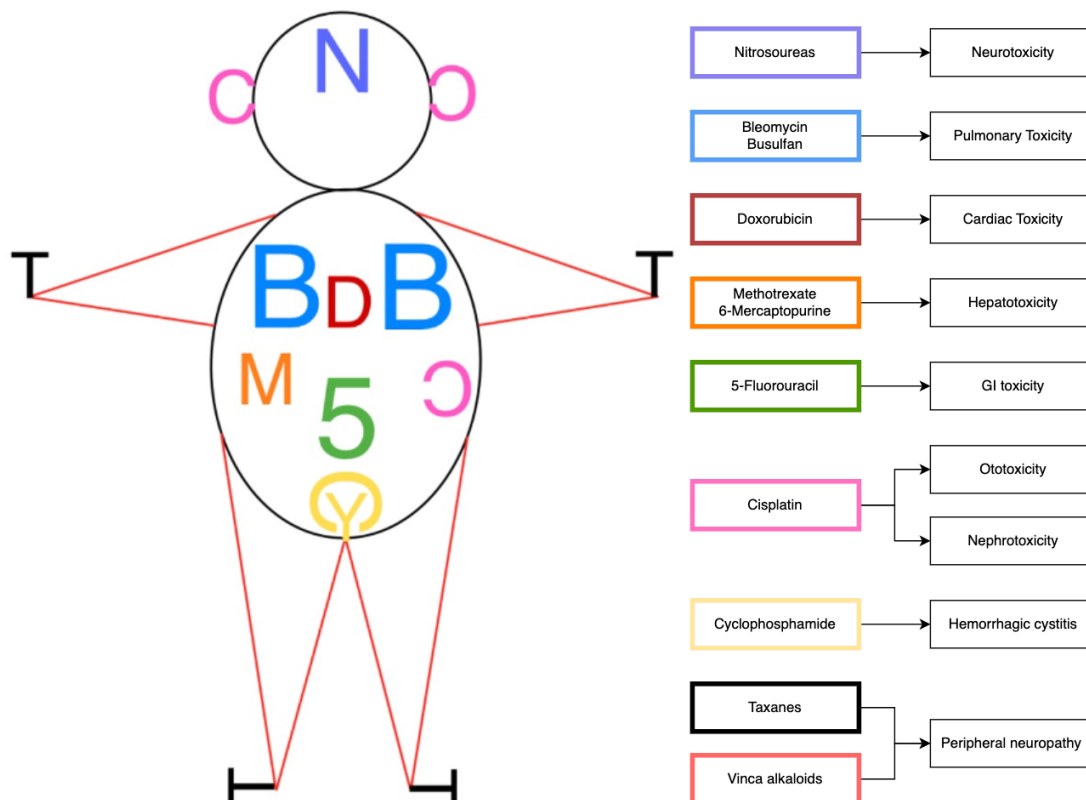
8. What is the difference between Tacrolimus and Sirolimus?

Complex with Tacrolimus binds with calcineurin and inhibit production of IL-2. Complex with Sirolimus bind to mTOR and inhibit effect IL-2 has on cellular responses.

9. Match drug and mechanism of action



10. Fill out the drugs and toxicities in the "CHEMO-MAN"



Section 2 – Hypothalamic and Pituitary Drugs

1. What is the main clinical use of cosyntropin?

- a) Treat hyperthyroidism
- b) Diagnose adrenal insufficiency**
- c) Induce ovulation
- d) Lower prolactin levels

2. Match the drug with the class:

Drug	Class
A. Pegvisomant	1. Dopamine agonist
B. Cabergoline	2. Vasopressin receptor agonist
C. Desmopressin	3. Growth hormone receptor antagonist

A3,B1,C2

3. What is the primary difference between the effects of GnRH when given pulsatile vs. continuous?

Pulsatile GnRH administration stimulates the release of gonadotropins (LH and FSH) from the pituitary, promoting normal reproductive function.

Continuous GnRH administration leads to downregulation of GnRH receptors on the pituitary, resulting in decreased gonadotropin release and inhibition of reproductive function.

4. which of the following is a dopamine agonist used to treat hyperprolactinemia?

- a) Oxytocin
- b) Desmopressin
- c) Cabergoline**
- d) Octreotide

5. The liver produces IGF-1 in response to stimulation from growth hormone, which promotes growth and cell proliferation.

6. Match the hormone with the function

Hormone	Function
A. Vasopressin	1. Uterine contractions and milk ejection
B. Oxytocin	2. Water reabsorption via V2 receptors
C. Prolactin	3. Stimulates lactation

A2,B1,C3

Section 3 – Thyroid and Parathyroid Drugs

1. Methimazole is used in the treatment of hyperthyroidism because it ...

- a) Inhibit secretion of TSH
- b) Inhibit biosynthesis of thyroglobulin
- c) Inhibit thyroperoxidase and therefore reducing I₂ available for production of thyroid hormones**
- d) Inhibit uptake of I⁻ into the thyroid gland

2. A woman with hyperthyroidism is pregnant in the 1st trimester. Which drug should be prescribed?

- a) Methimazole
- b) PTU**
- c) Radioactive iodine
- d) Lugol Solution

3. 43-year-old woman comes to the GP due to intermittent episodes of heart palpitations and chest pain over the last weeks. On examination you notice irregular heart rhythm, excessive sweating and fine tremor of both hands. Which drug can reduce her symptoms?

- a) Propranolol**
- b) Amiodarone
- c) Thyroxine
- d) Epinephrine

4. Fill out the table for thioamides

Clinical Indication	Adverse Effects
Graves' Disease Thyrotoxicosis	<u>Agranulocytosis</u> Maculopapular rash Transient Leukopenia Fatal liver failure Birth defects in 1 st trimester

5. A 78-year-old woman comes to the ER due to progressively worsening pain and swelling of the left side of her face. She has had several fractures during the last years and is therefore undergoing treatment for osteoporosis. Which drug can be responsible for her symptoms?

- a) Calcitonin
- b) Zoledronic Acid**
- c) Calcitriol
- d) Teriparatide

6. Fill out the table with ↑ and ↓

	Bone	Intestine	Kidney		Blood	
	Bone resorption	Ca ²⁺ absorption	Ca ²⁺ reabsorption	PO ₄ ³⁻ reabsorption	Serum Ca ²⁺	Serum PO ₄ ³⁻
Calcitriol	-	↑	↑	↑	↑	↑
PTH	↑	-	↑	↓	↑	↓
Calcitonin	↓	↓	↓	↓	↓	↓

7. Cinacalcet decrease PTH level by

- a) Inhibiting parafollicular cells of the thyroid gland
- b) Indirectly by increasing Ca²⁺ reabsorption in the distal convoluted tubule
- c) Inhibiting expression of the PTH gene
- d) **Activating calcium-sensing receptors in the parathyroid gland**

8. A 68-year-old man presents with bone pain and hearing impairment. He reports that his helmet has recently become too tight. X-rays reveal findings consistent with Paget disease of bone. Which of the following is the most appropriate first-line treatment?

- a) **Zoledronic acid**
- b) Calcitriol
- c) Teriparatide
- d) Strontium Ranelate

9. What is the most appropriate treatment for a patient with Vitamin D deficiency and chronic kidney disease?

- a) Ergocalciferol
- b) Cholecalciferol
- c) **Calcitriol**
- d) Calcium carbonate

Section 4 – Drugs for Diabetes

1. Insulin is produced by the ____**beta**____ cells, while glucagon is produced by the ____**alpha**____ cells in the pancreas.

2. Which of the following is not an effect of insulin?

- A. Promotes glucose uptake in skeletal muscle
- B. Inhibits glycogenolysis
- C. Promotes gluconeogenesis**
- D. Stimulates glycogen synthesis

3. Match the insulin preparation to its classification:

- | | |
|-------------|--------------------------------|
| A. Aspart | 1. Short-acting insulin |
| B. Regular | 2. Intermediate-acting insulin |
| C. Isophane | 3. Long-acting insulin |
| D. Glargine | 4. Rapid-acting insulin |

A4,B1,C2,D3

4. Which of the following drugs is a sulfonylurea (second generation)?

- A. Tolbutamide
- B. Chlorpropamide
- C. Glipizide**
- D. Repaglinide

5. Name two GLP-1 receptor agonists used in diabetes management.

Exenatide, Liraglutide (also accepted: Lixisenatide, Albiglutide, Dulaglutide)

6. Which oral drug is associated with rare cases of lactic acidosis and should be avoided in patients with renal dysfunction?

- A. Glipizide
- B. Metformin**
- C. Sitagliptin
- D. Rosiglitazone

7. _____ and _____ are SGLT2 inhibitors that promote renal glucose excretion.

Dapagliflozin, Empagliflozin (also accepted: Canagliflozin)

Section 5 – Adrenal Steroid Drugs

1. Which of the following drugs have NO mineralocorticoid receptor activity?

- a) Prednisone
- b) Dexamethasone**
- c) Cortisone
- d) Hydrocortisone

2. A patient on long-term corticosteroids suddenly stops taking them and presents with hypotension and abdominal pain. What condition is this, and what is the 1st line treatment?

Adrenal crisis, 1st line therapy is large doses of hydrocortisone

Question 3-5

A 30-year-old woman comes to the clinic complaining of weight gain, acne, and irregular menstrual cycles. She also reports muscle weakness, especially when climbing stairs or getting up from a chair. On examination you observe central obesity, moon face and stretch marks on the abdomen.

3. What is the most likely diagnosis in her case?

Cushing Syndrome (Cushing Disease)

4. Which test can help determine the cause of her symptoms?

- a) Dexamethasone suppression test**
- b) Serum TSH
- c) Serum aldosterone
- d) Serum cortisol

5. What would you suspect if she has low cortisol level after high dose dexamethasone?

- a) Exogenous glucocorticoid administration
- b) Adrenal adenoma
- c) Pituitary adenoma**
- d) Ectopic ACTH production

6. Which of the following has the *least* mineralocorticoid activity?

- a) Hydrocortisone
- b) Prednisone
- c) Fludrocortisone
- d) Dexamethasone**

7. What is the primary mechanism of action of glucocorticoids in inflammatory conditions?

- a) Inhibit phospholipase A₂**
- b) Inhibit cyclooxygenase (COX) enzymes
- c) Inhibit maturation of B cells
- d) Increased breakdown of macrophages

8. Which of the following is NOT an adverse effect of glucocorticoids

- a) Osteoporosis
- b) Decreased wound healing
- c) Hypotension**
- d) Depression

9. A patient with Cushing syndrome has low serum ACTH and high cortisol. Which is the most likely cause?

- a) Adrenal adenoma**
- b) Ectopic ACTH secretion
- c) Pituitary adenoma
- d) Long-term steroid therapy

Section 6 – Drugs Affecting fertility and Reproduction

1. Aromatase inhibitors like _____**Anastrozole**_____ and _____**Letrozole**_____ are used in the treatment of breast cancer.

2. Which drug is a 5 α -reductase inhibitor used to treat BPH?

- a) Leuprolide
- b) Finasteride**
- c) Flutamide
- d) Anastrozole

3. Why are LARCs considered more effective than daily contraceptive pills?

- a. They release higher hormone doses
- b. They don't alter cervical mucus
- c. They eliminate user compliance issues**
- d. They increase sperm motility

4. What drug is not an example of an antiandrogenic drug?

- a. Flutamide
- b. Finasteride
- c. Leuprolide
- d. Danazol**

5. What is the mechanism of action of aromatase inhibitors like anastrozole?

- a. Increase estrogen production
- b. Block conversion of androgens to estrogens**
- c. Stimulate ovulation
- d. Inhibit LH release from pituitary

6. Match drug with primary usage

Drug	Primary Use
a) Mifepristone	1) Emergency contraception
b) Ulipristal acetate	2) Medical abortion
c) Leuprolide	3) Prostate cancer treatment
d) Anastrozole	4) Breast cancer treatment

A2,B1,C3,D4

