※注意：「請依題號」順序作答

請於試卷內之 「非選擇題作答區」標明題號依序作答。

一、單選題 (每題 2 分，共 12 分)

1. About ***cyclooxygenase (COX) inhibitors***, which of the following is **NOT CORRECT**?

(A) Aspirin irreversibly suppresses COX by acetylating its arachidonic binding site.
(B) The metabolite of Acetaminophen N-acetyl-p-benzoquinoneimine (NAPQI) is toxic to the liver.
(C) Indomethacin induces uterine contraction and maintains the patency of fetal ductus arteriosus.
(D) Ibuprofen may induce stomachache and renal injury.

2. About ***anti-mycobacterial drugs***, which of the following is **NOT CORRECT**?

(A) Isoniazid is a prodrug. It is activated by mycobacterial catalase KatG to interfere with the synthesis of mycolic acid.
(B) Rifampin targets bacterial DNA-dependent RNA polymerase. In addition to tuberculosis, we may also use it treat other bacterial deep infections including meningitis, osteomyelitis, endocarditis, etc.
(C) Pyrazinamide might cause hyperuricemia.
(D) Ethambutol is metabolized in the liver to generate orange metabolite, which is excreted in the kidney. Hepatotoxicity is its most common side effect.

3. About ***gastric acid suppressors***, which of the following is **NOT CORRECT**?

(A) Pantoprazole permanently blocks acid secretion by killing gastric parietal cells.
(B) Simultaneous intake of $NaHCO_3$ with milk might cause milk-alkali syndrome.
(C) Long-term use of Cimetidine might cause gynecomastia in men.
(D) Misoprostol mimics the activity of PGE_1 to protect gastric mucosa and to reduce acid production, so we could use it to relieve the gastric toxicity of NSAIDs.

4. About drugs modulating ***gastrointestinal motility***, which of the following is **NOT CORRECT**?

(A) Metoclopramide antagonizes the activity of dopamine D_2 receptor to increase gastrointestinal motility and to reduce vomiting.
(B) Mosapride increases the activity of serotonin 5-HT_4 receptor to increase intestinal motility.
(C) Loperamide antagonizes the activity of opioid receptors to increase intestinal motility, so it could be used to relieve constipation.
(D) Hyoscine antagonizes the activity of muscarinic cholinergic receptors to reduce intestinal motility, so it could be used to relieve abdominal cramping pain.

5. Which of the following is **NOT CORRECT**?

(A) Mesalamine (5-Aminosalisylic acid) needs to be absorbed at the duodenum to exert its therapeutic effect on the inflammatory bowel disease.
(B) Vedolizumab targets integrin $\alpha_4\beta_7$, which is responsible for intestine-specific T cell targeting. So Vedolizumab reduces inflammation in ulcerative colitis and Crohn's disease.
(C) Entecavir inhibits the activity of RNA-dependent DNA polymerase in hepatitis B virus (HBV), so it stops HBV replication but could not remove the virus from infected hepatocytes.
(D) We could cure chronic hepatitis C by prudently combining direct-acting antivirals (DAAs) including molecules suppressing proteases (NS3/4A), RNA replication complex (NS5A) and / or RNA-dependent RNA polymerase (NS5B).

見背面

6. About ***sedatives & hypnotics***, which of the following is **NOT CORRECT**?

(A) Using Diazepam in patients with chronic obstructive pulmonary disease (COPD) might result in CO_2 retention.
(B) Lorazepam overdose frequently causes acute renal failure, which is never seen in Phenobarbital intoxication.
(C) Ramelteon mimics the effect or melatonin to activate melatonin MT_1 & MT_2 receptors in the hypothalamus.
(D) Suvorexant antagonizes orexin OR_1 & OR_2 receptors to induce sleep.

二、是非題 (每題 1 分，共 8 分)

1. Celecoxib preferably targets COX-2 rather than COX-1, so it has less gastric toxicity compared to non-selective non-steroid anti-inflammatory drugs (NSAIDs).
2. To ensure adequate blood levels of anti-tuberculosis drugs, frequent dosing is mandatory. So Isoniazid should be taken as 100mg three times per day instead of 2,100mg once per week.
3. Famotidine mimics the structure of histamine, so it antagonizes the activity of histamine H2 receptor via competitive inhibition.
4. In contrast to Metoclopramide, Domperidone could penetrate through the blood brain barrier. So Domperidone could also be used to treat epilepsy.
5. The serotonin-norepinephrine reuptake inhibitor (SNRI) Venlafaxine is effective in both depression and anxiety disorders.
6. Unlike Alprazolam, which activates opioid receptors, Zolpidem induces sleep by blocking both histamine H2 receptors and GABAB receptors.
7. Both Allopurinol and Febuxostat reduces hyperuricemia by inhibiting xanthine oxidase, but their mechanisms of action are different.
8. Ondansetron antagonizes the activity of serotonin 5-HT3 receptor to stop vomiting. It is widely used to prevent chemotherapy-induced hyperemesis.

三、複選題 (每題 2 分，共 20 分)

1. 抗心衰竭用藥 entresto 的作用機制為何？

(A) 含有 irbesartan，可減少 aldosetrone 產生，降低交感神經活性
(B) 含有 valsartan，可減少 aldosetrone 產生，降低交感神經活性
(C) 含有 sacubitril，可抑制腦啡肽酶 (neprilysin)
(D) 含有 LBQ651，可增加 BNP

2. 以下降血壓藥藥物，何者需注意使用後容易產生高血鉀（hyperkalemia）副作用？

(A) Prazosin
(B) Atenolol
(C) Candesartan
(D) Spironolactone

3. 初期心衰竭治療，可利用以下哪些藥物來減少心臟前負荷（preload）？

(A) Nitroglycerin
(B) Methyldopa
(C) Clonidine
(D) Enalapril

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4. Rivaroxaban 常用來預防非瓣膜性心房顫動（nonvalvular atrial fibrillation）病患中風，其藥理作用機制為？

(A) Inhibit thrombin
(B) Inhibit factor X activation
(C) Factor Xa inhibitor
(D) Prevent the conversion of prothrombin to thrombin

5. Ranolazine 和 mexiletine 皆能對心臟鈉離子管道產生調節作用，請問以下描述的藥物作用機制何者正確？

(A) Ranolazine 能抑制心肌之緩慢不活化鈉離子管道，治療心絞痛
(B) Ranolazine 可抑制冠狀動脈上之緩慢不活化鈉離子管道，治療心絞痛
(C) Mexiletine 能抑制可抑制冠狀動脈上之緩慢不活化鈉離子管道，治療 LQT3 心律不整病患
(D) Mexiletine 能抑制可抑制心肌之緩慢不活化鈉離子管道，治療 LQT3 心律不整病患

6. 服用抗心律不整藥物可能對心電圖參數的影響，以下何者正確？

(A) Class Ic 鈉離子管道抑制劑會延長 QRS 期間
(B) 鉀離子管道抑制劑會延長 QT 期間
(C) 鈣離子管道抑制劑會延長 PR 期間
(D) Adenosine 會延長 PR 期間

7. Amiodarone 和 dronedarone 雖然都是同一類型的抗心律不整藥物，但作用的異同特性，以下何者正確？

(A) Dronedarone 主要用在沒有心衰竭的心房顫動或心房撲動病患
(B) Amiodarone 對嚴重心室心律不整或上心室心律不整皆有療效
(C) Dronedarone 會導致肺纖維化、增加心衰竭病患死亡
(D) Amiodarone 可能會引發甲狀腺功能過度高亢或功能不足

8. 為預防心肌梗塞或中風復發，以下用藥機制何者正確？

(A) 給予 warfarin 抑制 factor Xa 來預防血栓栓塞發生
(B) 給予 clopidogrel 抑制 P2Y12 receptor 來預防血栓栓塞發生
(C) 給予 rivaroxaban 抑制 factor X 活化來預防血栓栓塞發生
(D) 給予 aspirin 抑制 COX1 來預防血栓栓塞發生

9. 發生出血不止，以下止血的用藥方法何者正確？

(A) Heparin 使用過量導致出血，可用 tranexamic acid
(B) Alteplase 使用過量導致出血，可用 tranexamic acid
(C) Warfarin 使用過量導致出血，可用 vitamin K1
(D) Dabigatran 使用過量導致出血，可用 idarucizumab

10. 治療高血脂合併高血壓病患之用藥，下列何者錯誤？

(A) 給予 statins 活化 HMG-CoA reductase 來減緩粥狀動脈硬化
(B) 給予 beta blockers 來降低心臟輸出調降血壓，也能降血脂
(C) 給予 hydrochlorothiazide 調降血壓，同時也能降血脂
(D) 給予 aliskiren 調降血壓，血脂會增高

四、問答題 (每題 10 分，共 20 分)

1. 有關嗎啡(morphine)的藥理知識：

(1) 仍為至今無可取代的止痛藥，為什麼?
(2) 但考慮到很多使用上的那些問題，有效無副作用的止痛藥仍是臨床上未滿足的需求 (unmet medical need)?
(3) 其止痛機制為何?

見背面

2. 最近一家生技公司股票竄升，因為他們 的一個 first-in-class 治療產後憂鬱症的藥物臨床試驗達標，宣稱該藥品是 $GABA_A$ receptor 的 positive allosteric modulator，請問：

(1) 甚麼是 $GABA_A$ receptor 的 positive allosteric modulator

(2) 臨床上已經在使用的 $GABA_A$ receptor 的 positive allosteric modulators，用於治療那些疾病，使用上有哪些副作用與禁忌？該藥的機制勢必與之有別。

五、試述下列藥物的作用機制與臨床用途 (每題 2 分，共 20 分)

1. Lamivudine
2. Ceftriaxone
3. Sitagliptin
4. Sumatriptan
5. Flunisolide
6. Bromocriptine
7. Edrophonium
8. Buspirone
9. Valproate
10. Rasagiline

六、試述下列藥物的作用機制與臨床用途 (每題 2 分，共 20 分)

1. Adalimumab
2. Teriparatide
3. Goserelin
4. Artesunate
5. Carbergoline
6. Tocilizumab
7. Abatacept
8. Mifepristone
9. Denosumab
10. Finasteride

試題隨卷繳回