

一、是非題 (每題 1 分，共 20 分)，請在答案卡上作答，是 (O) 請填 A，非 (X) 請填 B

1. Drug administration dose affects bioavailability and half-life of drug.
2. The effect of inverse agonist in patients is mimic to that of antagonist.
3. The receptor binding affinity of partial agonist is lower than that of full agonist.
4. Sodium bicarbonate is an important component of the management of aspirin overdose. The main action is to overcome metabolic acidosis upon aspirin overdose.
5. To establish the efficacy of new drugs, double-blind and crossover techniques are often used in phase 3 clinical trial.
6. The duration of action of EGF that acts via receptor tyrosine kinase is often limited by down-regulation.
7. The G proteins coupled to GPCR receptors have the abilities to bind and hydrolyze GTP.
8. Atrial natriuretic peptide acts on a transmembrane receptor to increase intracellular cAMP level.
9. Patients with edema offer a larger volume of distribution to gentamicin than is predicted by body weight.
10. In drug biotransformation, phase 1 reactions usually convert the parent drug to a less polar metabolites.
11. Hepatic CYP3A4 alone is responsible for the metabolism of over 50% of the drugs in the liver.
12. In drug biotransformation, UDP-glucuronosyl transferases can convert prodrug minoxidil to a very efficacious vasodilator.
13. Codeine treatment in patients with ultra-rapid metabolizer phenotype of CYP2D6 increases antitussive effect and drowsiness risk.
14. Benralizumab is a monoclonal antibody targeting IL-5 receptor for use in asthma.
15. Montelukast is a commonly used drug in asthma, especially for treating children.
16. Diazepam does not produce sedation at the doses required to reduce muscle tone.
17. Dantrolene is a direct-acting muscle relaxant and is given orally for treating malignant hyperthermia.
18. Aspirin and tolmetin are not used to treat acute gouty episodes.
19. Febuxostat is a non-purine xanthine oxidase inhibitor and is well tolerated in patients with allopurinol intolerance.
20. Lorcaserin is an inhibitor of GI lipase and is used for obesity treatment.

二、單選題(每題 2 分，共 20 分)，請在答案卡上作答

21. A 74-year-old male was transferred to hospital for an urgent myocardial infarction (MI) after he woke from sleep with severe chest pain. After the relief of the pain in MI, his doctor applied warfarin to prevent thromboembolic events after-MI. Which of the following genes is the major source of Pharmacokinetic (PK) variation to warfarin?
(A) VKORC1
(B) CYP2C9
(C) CYP2D6
(D) CYP2C19
22. A 38-year-old male has been diagnosed with complex partial seizures. His doctor would like to apply carbamazepine. Prior to initiating carbamazepine therapy, what kind of gene testing should be performed in patient to prevent drug-induced Stevens Johnson syndrome (SJS)?
(A) HLA-B38
(B) HLA-DQB1
(C) HLA-B*5701
(D) HLA-B*1502
23. One 57-year-old male has been diagnosed with metastatic colon cancer. The physician intends to use panitumumab. What kind of gene testing should be confirmed to ensure the efficiency of panitumumab?

見背面

- (A) VEGFR expression & mutant-type KRAS
(B) VEGFR expression & wild-type KRAS
(C) EGFR expression & wild-type KRAS
(D) EGFR expression & mutant-type KRAS
24. How does alendronate work to reduce osteoclast number in the body?
(A) ATP-dependent potassium channels
(B) Inhibits HMG-CoA reductase activity
(C) Inhibits farnesyl pyrophosphate synthase activity
(D) Ca²⁺-sensing receptor
25. What class of drug is “Linagliptin”?
(A) α -glucosidase inhibitor
(B) glucagon-like peptide-1 (GLP-1) agonist
(C) dipeptidyl peptidase-4 (DPP-4) inhibitor
(D) biguanide
26. Which of the following statements is **NOT** true about the mechanism of action (MOA) of opioid analgesics?
(A) Morphine administration induces adenylyl cyclase activity, leading to an increase in the formation of cAMP.
(B) Most of the potent analgesics currently in use act through the mu-opioid receptor.
(C) Morphine shows inhibitory effects on calcium influx.
(D) Potassium channels have been reported to be involved in several actions of morphine following mu-receptor activation.
27. Which of the following acne agents is known to be a “potent teratogen” and should NOT be used in pregnancy or in women who may become pregnant?
(A) Benzoyl peroxide 5% gel
(B) Metronidazole 0.75% gel
(C) Clindamycin 1% solution
(D) Isotretinoin 20 mg soft gelatin capsule
28. How does finasteride work to treat androgenic alopecia?
(A) Inhibits androgen receptor
(B) Inhibits 5 α -reductase
(C) Inhibits progesterin receptor
(D) Inhibits estrogen receptor
29. Which of the following agents is **NOT** an immune checkpoint inhibitor?
(A) Pembrolizumab
(B) Nivolumab
(C) Ipilimumab
(D) Aldesleukin
30. Which medication would benefit a 60-year-old female patients recently diagnosed with amyotrophic lateral sclerosis?
(A) Riluzole
(B) Glatiramer
(C) Pramipexole
(D) Galantamine

三、複選題(每題 4 分，共 20 分)，請在答案卡上作答

31. Which mechanism of the drug is correct for the treatment of dyslipidemia?
- (A) Cholestyramine can bind bile acids in the intestine to prevent their reabsorption.
 - (B) Statins can reduce cholesterol synthesis in the liver via enhancing HMG-CoA reductase.
 - (C) Fibrates can lower plasma triglycerides via the activation of PPAR-alpha and the increase of lipoprotein lipase.
 - (D) Niacin can lower plasma triglycerides via the activation of PPAR-gamma and the increase of lipoprotein lipase.
 - (E) Evolocumab can increase the number of LDL receptors on liver cells to increase the clearance of LDL cholesterol via inhibiting PCSK9.
32. Which is the correct mechanism of the drugs used for the treatment of heart failure?
- (A) Digoxin can produce positive inotropic effect via inhibit sodium pump.
 - (B) Entresto is a combination drug composed by neprilysin inhibitor (sacubitril) and an AT1 receptor blocker (valsartan).
 - (C) Furosemide can reduce preload by inhibiting the reabsorption of sodium and chloride in the ascending loop of Henle in the kidney with the adverse effects including ototoxicity and hypokalemia.
 - (D) Carvedilol can inhibit α - and β -adrenergic receptors to reduce the afterload and cardiac workload for the treatment of heart failure.
 - (E) Eplerenone is an aldosterone antagonist to treat heart failure for reducing preload.
33. Which is correct for the corresponding mechanism of the antiarrhythmic drug?
- (A) Verapamil can be used to treat paroxysmal supraventricular tachycardia (PSVT) via blocking T-type calcium channel.
 - (B) Mexiletine is the drug of choice for LQT3 via the action to facilitate the inactivation of sodium channel.
 - (C) Flecainide is useful for treating severe ventricular arrhythmia via blocking cardiac sodium channel.
 - (D) Amiodarone can be used to treat WPW syndrome and ventricular arrhythmia via blocking potassium channel with the concern of many adverse effects including hypothyroidism or hyperthyroidism.
 - (E) Esmolol can increase the effective refractory period and slow cardiac conduction via blocking β 1-adrenergic receptor.
34. Which is correct for the action mechanism of antithrombotic drug?
- (A) Apixaban is a novel oral anticoagulant acting through inhibiting Xa.
 - (B) Heparin is an oral anticoagulant acting through inhibiting thrombin.
 - (C) Aspirin is an antiplatelet drug acting through irreversibly inhibiting COX2.
 - (D) Warfarin is an oral anticoagulant acting through inhibiting Vitamin K epoxide reductase.
 - (E) Abciximab is an oral antiplatelet drug acting through inhibiting GPIIb-IIIa.
35. Which is the correct hemodynamic benefit of the antihypertension drug?
- (A) Short acting calcium channel blocker can be used to reduce afterload as well as to increase cardiac collateral circulation in the hypertensive patient subjected to acute myocardial infarction.
 - (B) Losartan is an AT1 receptor blocker that can lower blood pressure via reducing aldosterone secretion and producing vasal relaxation.
 - (C) Propranolol is a non-selective β blocker that can reduce cardiac output via decreasing cardiac contraction and renin secretion in hypertensive patient with high or normal renin.
 - (D) Methyldopa can directly activate α 2 adrenergic receptor to lower blood pressure without affecting preload.
 - (E) Pindolol is a β 1 blocker with intrinsic sympathetic activity to prevent hypotension.

四、問答題(共 20 分)，請在答案卷上作答

1. Please briefly describe the properties and mechanisms of action of the following drugs (10%)
 - (a) Spikevax (Elasomeran)
 - (b) Keytruda (Pembrolizumab)
 - (c) Kymriah (Tisagenlecleucel)
 - (d) Tagrisso (Osimertinib)
 - (e) Paxlovid (Nirmatrelvir/Ritonavir)
2. Paracetamol (acetaminophen) is the drug used to treat pain and fever. However, the most serious adverse effect of overdose is fatal liver necrosis. Please describe the first-pass effect for Paracetamol in human liver and the mechanism for the adverse effect for fatal liver necrosis. (5%)
3. For the treatment of COVID-19, the "Guidelines for Clinical Management" issued by the CDC of the Ministry of Health and Welfare recommend the use of Tocilizumab to treat the severe patients with virus infection. Please explain the reasons and mechanisms. (5%)

五、問答題(共 20 分)，請在答案卷上作答

1. Please answer the following questions regarding the description of positive allosteric modulators (PAMs) (8%)
 - a. What is the difference between PAMs and partial agonists
 - b. What is the difference between PAMs and inverse agonists?
 - c. Name a clinically used GABA_A receptor PAMs and its clinical indications
 - d. By definition, will this GABA_A receptor PAM increase the expression or the function of GABA_A receptors
2. Please answer the following questions regarding the opioid crisis (opioid overdose epidemic) (7%)
 - a. What is the problem about opioid crisis?
 - b. How to rescue opioid overdose using the pharmacological approach? What is the rationale of this pharmacotherapy
 - c. Parenteral suboxone is suggested to be beneficial to opioid overdose. However, parenteral suboxone is not as good choice for heroin addict. Why?
3. Please name three clinical indications for drugs acting on the dopaminergic system and the respective action mechanisms of these drugs. (5%)

試題隨卷繳回