

一、選擇題 (單選正確答案)；每題 5 分，共 50 分 ※ 注意：請於試卷內之「選擇題作答區」依序作答。

1. A 55-year-old man is seen in the clinic 5 months after undergoing right artery stent placement due to unstable angina. His father died at age 52 from coronary artery disease. The patient follows a healthy diet and exercise plan and is compliant with his current medication regimen. BMI is 30 kg/m<sup>2</sup>. Physical examination is unremarkable. After extensive discussion with the patient, evolocumab is added to his treatment plan. Which of the following is expected as an immediate result of this treatment?

  - A. Decreased hepatocyte cholesterol synthesis
  - B. Decreased low-density lipoprotein receptor lysosomal degradation
  - C. Stimulation of lipoprotein lipase transcription
  - D. Stimulation of low-density lipoprotein receptor translocation
2. A 60-year-old woman undergoes hip replacement surgery. The patient has a history of advanced hip osteoarthritis that limits her activities. She has no other medical conditions and no known drug allergies. After appropriate preoperative evaluation, total hip arthroplasty is performed under general anesthesia. The intraoperative course is uncomplicated, and after recovery from anesthesia, patient-controlled intravenous morphine is started for pain control. Several minutes later, the patient reports generalized itching. Physical examination reveals hypotension, tachycardia, and mild bilateral wheezing but no rashes. Which of the following drug effects is most likely responsible for this patient's current condition?

  - A. Decreased sympathetic output
  - B. Formation of drug-IgE complex
  - C. Direct mast cell degranulation
  - D. Increased 5-lipoxygenase activity
3. A 66-year-old man comes to the hospital for follow-up monitoring of type 2 diabetes mellitus. He was diagnosed with diabetes 7 years ago and follows a strict diet to control his blood sugar level. The patient takes no medications. Blood pressure is 139/88 mm Hg and pulse is 70/min. Physical examination shows decreased lower-extremity sensation with a 10-g monofilament. His most recent hemoglobin A1c is 7.4% (normal < 5.6). Serum creatinine is 1.0 mg/dL and serum potassium is 3.8 mEq/L. Further laboratory evaluation reveals increased urinary albumin excretion, but a conventional urinalysis is within normal limits in addition to starting antihyperglycemic treatment, which of the following is the best pharmacotherapy for this patient?

  - A. Carvedilol
  - B. Hydrochlorothiazide
  - C. Lisinopril
  - D. Terazosin
4. A 40-year-old man is hospitalized due to severe epigastric pain radiating to his back. He does not drink alcohol. Temperature is 37.8 C, blood pressure is 114/69 mm Hg, and pulse is 85/min. BMI is 34 kg/m<sup>2</sup>. The patient appears restless.

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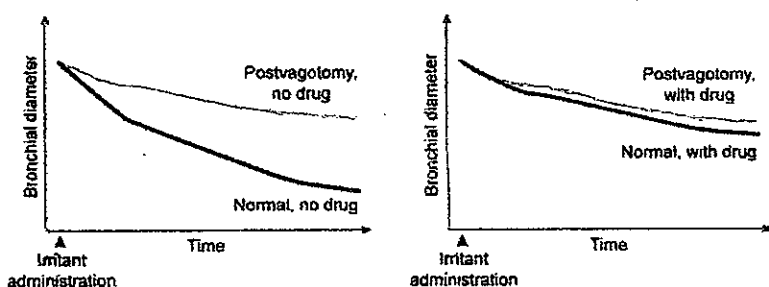
Physical examination shows significant epigastric tenderness. Laboratory results are as follows:

Serum chemistry	level
Glucose	120 mg/dL
Creatinine	1.2 mt/dL
Cholesterol	300 mg/dL
Triglycerides	1,260 mg/dL
Amylase	410 U/L

Administration of intravenous fluids and analgesics is begun. In addition, insulin is administered to rapidly reduce the elevated lipid levels. This medication is likely to improve this patient's condition by stimulating which of the following enzymes?

- A. AMP-activated protein kinase
- B. Hormone-sensitive lipase
- C. HMG-CoA reductase
- D. Lipoprotein lipase

5. A pharmaceutical researcher is studying a new drug for treatment of asthma that works by reversing irritant-induced bronchoconstriction. Laboratory guinea pigs are divided into 2 groups: a postvagotomy (complete transection of the vagus nerve) group and a normal study group. Both groups are exposed to irritants without receiving the study medication, and changes in bronchial diameters are recorded. Subsequently, both groups are exposed again to the irritants but are also given the study drug.



The study drug is most likely similar to which of the following medications?

- A. Albuterol
- B. Nifedipine
- C. Ipratropium
- D. Theophylline

6. A 55-year-old woman presents to the emergency department after vomiting a substance that resembled "coffee grounds". She reports that she now feels lightheaded as well. Her past medical history is significant for deep venous thrombosis, for which she takes warfarin, and occasional joint pain, for which she takes aspirin. Her blood pressure is 90/63 mm Hg and her pulse is 110/min. Which of the following substances would provide the fastest reversal of warfarin's effects?

- A. Vitamin K

- B. Protamine
- C. Fresh frozen plasma
- D. Aminocaproic acid

7. A 60-year-old woman suffers from a month of progressive right chest and back pain. The patient also noticed a right breast lump several months ago. Which has grown over time. She has no prior medical issues and has had no cancer screenings. Physical examination reveals a hard, 5-cm right breast mass, enlarged axillary lymph nodes, and point tenderness along the right-sided ribs and 10<sup>th</sup> thoracic vertebra. Biopsy of the breast mass shows hormone receptor-positive, Her2-negative, invasive ductal carcinoma. Skeletal survey demonstrates lytic lesions of the ribs and thoracic vertebrae. As part of the treatment regimen, the patient receives a medication that is a potent inhibitor of cyclin-dependent kinase. Which of the followings is the most likely dose-limiting toxicity of this medication?

- A. Bone marrow suppression
- B. Peripheral neuropathy
- C. Cardiomyopathy
- D. Immune-mediated toxicity

8. A 43-year-old man comes to the clinic due to depression. He feels sad and unmotivated, sleeps 12 hours a day, and has increased appetite, poor concentration at work, and fleeting thoughts of suicide. The patient has no medical history and laboratory evaluation is unremarkable. Major depressive disorder is diagnosed and antidepressant medication administered. Several weeks after starting the medication, the patient's depressive symptoms are mildly improved, but he is now distressed by a significant decrease in libido and impaired sexual performance. He is considering stopping the medication and requests an alternate treatment. Which of the following drugs is most appropriate for this patient?

- A. Bupropion
- B. Imipramine
- C. Sertraline
- D. Trazodone

9. A 18-year-old woman comes to hospital due to intermittent dry cough, wheezing and shortness of breath. She has been experiencing these symptoms with running. Her symptoms have been limiting her ability to complete running but usually resolve after several minutes of rest. Medical history includes childhood asthma that has not required treatment for the past 5 years. The patient is prescribed a medication that reduces bronchoconstriction by inhibiting the interaction of inflammatory mediators with cell surface receptors. Which of the following drugs is most likely used in this patient?

- A. Allopurinol
- B. Fluticasone
- C. Dextromethorphan
- D. Montelukast

10. A 35-year-old man has sleep problems. Over the last year, he has had increasing difficulty falling asleep at night and is exhausted during the day. The patient does not use alcohol, tobacco, or illicit drugs. He has a family history of heart disease

and depression. The patient has failed a number of nonpharmacological approaches, including cognitive-behavioral therapy for insomnia. He requests pharmacologic treatment and is prescribed a short course of zolpidem. Which of the following is the most likely mechanism of action of this mechanism?

- A. Serotonin receptor agonism
- B. Melatonin receptor agonism
- C. GABA receptor agonism
- D. Histamine receptor antagonism

二、選擇題 (單選正確答案)；每題 2 分，共 30 分 ※ 注意：請於試卷內之「選擇題作答區」依序作答。

11. A prespecified substudy of the EMPEROR-Preserved trial evaluated the safety and efficacy of empagliflozin vs placebo in heart failure with preserved ejection fraction (HFpEF) patients with left ventricular ejection fraction (LVEF) 41% to 49% vs patients with LVEF  $\geq$  50%. Which of the following was significantly more frequent in patients with LVEF  $\geq$  50%?

- A. History of type 2 diabetes
- B. History of atrial fibrillation or flutter
- C. Baseline use of renin-angiotensin-aldosterone (RAAS) inhibitor
- D. Mean N-terminal pro-B-type natriuretic peptide (NT-proBNP) concentration

12. For which patients with COPD does the Global Initiative for Chronic Obstructive Lung Disease (GOLD) recommend adding an inhaled corticosteroid (ICS) to dual bronchodilation therapy with a long-acting  $\beta$ -agonist (LABA) and a long-acting muscarinic antagonist (LAMA)?

- A. Patients with dyspnea or exacerbations and a blood eosinophil count  $>$  100 cells/ $\mu$ L
- B. Patients with exacerbations and a blood eosinophil count  $>$  100 cells/ $\mu$ L
- C. Patients with dyspnea or exacerbations and a blood eosinophil count  $>$  300 cells/ $\mu$ L
- D. Patients with exacerbations and a blood eosinophil count  $>$  300 cells/ $\mu$ L

13. George is a 68-year-old man who presents to the emergency department (ED) with acute onset left-sided weakness and dysarthric speech. He is diagnosed with a right-sided basal ganglia hemorrhage. His blood pressure (BP) is 210/100 mm Hg. He takes apixaban 5 mg twice daily for thromboprophylaxis following pulmonary embolism. He last took his apixaban 4 hours before the onset of symptoms this morning.

What is the most appropriate next step regarding bleeding management in this patient?

- A. Treat with supportive measures (eg, intravenous fluids, blood products, bleeding source control)
- B. Treat with idarucizumab
- C. Treat with andexanet alfa
- D. Treat with emergent dialysis

14. Catherine is a 72-year-old woman with atrial fibrillation and a history of a non-ST-segment elevation myocardial infarction 18 months ago. She presented to the emergency department with stomach pain and dizziness and was subsequently diagnosed with a gastrointestinal (GI) bleed. She is tachycardic, but her blood pressure is normal. By her report, she took the last dose of her DOAC (rivaroxaban 2.5 mg) 8 hours ago. Her hemoglobin is stable after she was transfused 1 unit of packed red blood cells.

What is the most appropriate next step regarding bleeding management in this patient?

- A. Treat with supportive measures (eg, intravenous fluids, blood products, bleeding source control)
- B. Treat with idarucizumab
- C. Treat with andexanet alfa
- D. Treat with emergent dialysis

15. You are a member of the healthcare team seeing a 40-year-old woman who is worried about the risk for anaphylaxis associated with COVID-19 messenger ribonucleic acid (mRNA) vaccines. What can you tell her?

- A. Anaphylaxis occurs in about 100 cases/1 million doses of vaccine
- B. Death caused by reactions to the COVID-19 mRNA vaccines is rare but does occur
- C. The lifetime risk for any anaphylaxis is between 2% and 5%
- D. Rates of mortality because of anaphylaxis have been consistently rising in the United States

16. Which novel triple-therapy regimen was approved in 2019 for treatment of H pylori infection in adults?

- A. Clarithromycin- nitroimidazole-levofloxacin
- B. Omeprazole – rifabutin – amoxicillin
- C. Lansoprazole – amoxicillin – clarithromycin
- D. Vonoprazan – amoxicillin – clarithromycin

17. Cardiogenic shock is broadly described in two different categories: acute myocardial infarction (AMI) acute decompensation of chronic cardiomyopathy (ADCC).

Which of the following best describes the mechanisms regarding the development of cardiogenic shock?

- A. The primary mechanism in AMI is congestion due to the reduced ejection fraction
- B. The primary mechanism in ADCC is hypotension due to the reduced ejection fraction
- C. In AMI, ventricular failure leads to a vascular response with hypotension and low systemic vascular resistance (SVR)
- D. In ADCC, the ventricular failure leads to lower SVR than in AMI because of reduced cardiac output

18. A 55-year-old man is admitted to ICU for an anterior ST segment elevation myocardial infarction associated with a cardiogenic shock. The echocardiography shows a severe reduction of the ejection fraction (20%) and no evidence of mechanical complication. He had percutaneous coronary intervention (PCI) of the left anterior descending artery in its proximal portion. The shock is refractory to vasopressors. What is the best next step in the management of this patient, considering ESC guidelines for AMI related cardiogenic shock?

- A. Intravenous inotropes
- B. Intravenous diuretics
- C. Routine IABP
- D. Short-term percutaneous mechanical circulatory support (MCS)

19. A 60-year-old man is admitted to ICU due to a decompensated heart failure. His echocardiography reveals a low output with an ejection fraction of 20%. There is no evidence of an acute coronary syndrome. What is the best way to manage this patient to improve organ perfusion, based on evidence from randomized controlled trials?

- A. Vasopressors
- B. Diuretics
- C. Oxygen therapy
- D. Intra-aortic balloon pump (IABP)

20. A 70-year-old patient taking carbidopa/levodopa 25/100 mg three times a day for PD is experiencing end-of-dose "wearing off." Carbidopa/levodopa is the only medication she takes for PD and adherence is excellent. The best next step is to:

- A. add tolcapone.
- B. consider surgery.
- C. add trihexyphenidyl.
- D. increase carbidopa/levodopa to four times daily.

21. A 52-year-old male patient presents to his primary care physician and reports bothersome heartburn symptoms for the last 4 months with occasional regurgitation. The patient reports that the heartburn symptoms are occurring most days of the week. The patient is also happy to report that he has lost 11 kg in the last several months despite making few changes in his diet or lifestyle. What is the most appropriate recommendation for management of the patient's heartburn symptoms?

- A. Initiate omeprazole 20 mg daily
- B. Encourage lifestyle modifications initially
- C. Recommend endoscopy
- D. Initiate omeprazole 20 mg twice daily

22. A 38-year-old woman experiencing frequent typical GERD symptoms was initiated on omeprazole once daily. The patient is reporting that her symptoms are less frequent and milder since initiating PPI therapy but her symptoms remain bothersome. Which of the following is the best recommendation?

- A. Change to ranitidine 150 mg twice daily
- B. Refer the patient for ambulatory reflux monitoring
- C. Increase omeprazole to twice daily
- D. Initiate antacid as needed for breakthrough symptoms
- E. Add baclofen 10 mg twice daily

## 23. Clinical information from medical record:

Name: Peter

Age: 65

History: Hypertension x 15 years; hyperlipidemia x 10 years; depression x 20 years; obesity

Family history: Father; myocardial infarction at age 49 years

Clinical data:

BP = 125/75 mmHg

Heart rate = 74 bpm

BMI = 28 kg/m<sup>2</sup>

Test results:

Total cholesterol = 205 mg/dL

LDL-C = 130 mg/dL; HDL-C = 35 mg/dL; TG = 200 mg/dL; HbA1c = 6.1%

Current Rx:

Amlodipine/olmesartan 5/20 mg once daily; citalopram 10 mg once daily

**Clinician:** Good morning! So nice to meet you, Peter. I'm Dr. Lin.

**Patient:** Hello, dear.

**Clinician:** Now if I understand correctly, you were a patient of Dr. Huang.

**Patient:** Yes, I was.

**Clinician:** The pharmacist left a note that you're running out of your medications. Is that correct?

**Patient:** Yes, that's correct. I'll run out of the blood pressure pills real soon. I take one of every day.

**Clinician:** All right. Are you still taking the citalopram for depression?

**Patient:** Yes, but I've got enough refills on those.

**Clinician:** And what about your cholesterol medication?

**Patient:** Well, I haven't really been taking that one. My neighbor and I got to talking -- she's a very smart lady -- and she was telling me that those statins can be bad for your blood sugar ... can actually cause diabetes. Dr. Huang once told me that I have pre-diabetes and I don't want to mess with that. My father had diabetes. It was tough on him. He had a heart attack when he was only 49.

For a patient who is not willing to take a statin because of the risk of developing type 2 diabetes (T2D), on what key points should that patient be educated and reassured?

- A. Statins do not increase the risk for T2D
- B. Statins can increase the risk for T2D, but the risk is small and the reduction in risk for atherosclerotic cardiovascular disease (ASCVD) is greater
- C. Statins can increase the risk for T2D, but we can manage this risk by choosing only low-intensity statins
- D. Avoid statin therapy and emphasize the importance of lifestyle modifications

24. Terry is a 59-year-old Caucasian female who has been treated with thyroid hormone replacement therapy for the last ten years for Hashimoto's thyroiditis. She states that she always takes her thyroid medication with breakfast and her refill records show that she always refills her T4 on the 30th of the month. She has no other pertinent medical history. Two months ago she started medication for iron-deficiency anemia (iron sulfate 325 mg po TID with meals). Today's TSH level is 28 mIU/L (nl 0.4–4.0 mIU/L) despite her regular Synthroid dose of 125 mcg orally each morning. The most likely explanation of this patient's laboratory findings is

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- A. noncompliance
- B. drug interaction.
- C. pregnancy.
- D. improper diagnosis.

25. Marry is a 66-year-old postmenopausal woman with newly diagnosed metastatic breast cancer to the lung (ER/PR positive; HER2-negative). This was found on a chest X-ray and was confirmed by CT scan and biopsy. She is otherwise asymptomatic from her cancer and feels well. Which of the following regimens would be best to treat her cancer at this time?

- A. Letrozole plus palbociclib
- B. Lapatinib plus capecitabine
- C. Trastuzumab
- D. Paclitaxel

三、綜合簡答題，共 20 分 ※ 注意：請於試卷內之「非選擇題作答區」標明題號依序作答。

**Rheumatoid arthritis in adults: Management**

By National Institute for Health and Care Excellence (Great Britain) <https://www.nice.org.uk/guidance/ng100>, 2018 (accessed Jan 10, 2022)

Here is part of information adapted form the NICE guideline for the management of rheumatoid arthritis.

**1. Treat-to-target strategy**

1.1. Treat active RA in adults with the aim of achieving a target of remission or low disease activity if remission cannot be achieved (treat-to-target). Achieving the target may involve trying multiple conventional disease-modifying anti-rheumatic drugs (cDMARDs) and biological DMARDs with different mechanisms of action, one after the other.

① **1.2. Consider making the target remission rather than low disease activity for people with an increased risk of radiological progression (presence of anti-CCP antibodies or erosions on X-ray at baseline assessment).**

1.3. In adults with active RA, measure C-reactive protein (CRP) and disease activity (using a composite score such as DAS28) monthly in specialist care until the target of remission or low disease activity is achieved.

**2. Communication and education**

2.1. Explain the risks and benefits of treatment options to adults with RA in ways that can be easily understood. Throughout the course of their disease, offer them the opportunity to talk about and agree all aspects of their care, and respect the decisions they make.

2.2. Offer verbal and written information to adults with RA to improve their understanding of the condition and its management, and counter any misconceptions they may have.

2.3. Adults with RA who wish to know more about their disease and its management should be offered the opportunity to take part in existing educational activities, including self-management programs.

1. What are the conventional disease-modifying anti-rheumatic drugs used for the management of RA? Please specify the name, mechanism, common adverse effects, and monitoring parameters of each medication. (8 points)
2. Translate the underlined sentence (marked with ① ahead of the sentence) in Chinese. (2 points)
3. In addition to biological markers and radiological images, what are other approaches that healthcare professionals can use to evaluate the activity of RA? Please specify the approaches along with the way how healthcare professionals use them (4 points).

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4. Communication between patients and healthcare providers is important to the management of RA.
- (1) How do you know if patients take medications as prescribed by their healthcare providers? (2 points)
  - (2) In addition to providing clear information about RA and its management, please indicate two approaches that pharmacists can address to help patients counter misconceptions in the RA self-management program. (2 points) How do you evaluate the impact of the two approaches on patient outcomes? (2 points)

試題隨卷繳回