

考試科目	神經生物學	系所別	神經科學研究所	考試時間	2月3日(五) 第四節
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一、選擇題(共 30 分)：單複選混合，每題 3 分

1. Which of the following movement disorders is caused by imbalanced dopamine in the brain?

- (A) Parkinson's disease
- (B) Huntington's disease
- (C) Tourette's syndrome
- (D) Restless legs syndrome
- (E) None of above

2. People with damaged Broca's area will be difficult to

- (A) understand what you said.
- (B) walk coordinatly.
- (C) talk to you.
- (D) recognize your face.
- (E) all of above

3. Which type of the following cells is responsible for color vision?

- (A) rod cells
- (B) cone cells
- (C) bipolar cells
- (D) hair cells
- (E) none of above

4. Which of the following statement about "Alzheimer's disease" is correct?

- (A) AD only occurs in people older than 60 years of age.
- (B) Most AD cases are sporadic.
- (C) AD patients often show progressively declined cognitive function.
- (D) Senile plaques can be detected on the skin of AD patients.
- (E) none of the above

5. How does neurotransmitters be released in a regular basis?

- (A) by exocytosis
- (B) by diffusion
- (C) through transporters
- (D) through channels
- (E) all of above

6. Which of the following neurotransmitters is synthesized in the cell body?

- (A) Nitric oxide
- (B) opioid
- (C) dopamine
- (D) endorphin
- (E) none of above

7. Whose properties of the following channels determine the threshold of an action potential?

- (A) calcium channels
- (B) potassium channels
- (C) sodium channels
- (D) chloride chennels
- (E) sodium-potassium pumps

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<p>8. Which of the followings can be a function of the <u>cytoskeleton</u> in neurons?            (A) cell movement            (B) retrograde transport            (C) transcription regulation            (D) cell shape maintenance            (E) all of above</p> <p>9. Which of the following molecules can NOT be essential for learning and memory?            (A) NMDA receptors            (B) AMPA receptors            (C) kinases            (D) calcium channel            (E) none of above</p> <p>10. Which of the followings can NOT be a proper description for the myelin sheath?            (A) it wraps around the whole neuron.            (B) it insulates axons to prevent signal decline.            (C) it allows electrical impulses to transmit quickly.            (D) it protects axons from degeneration.            (E) none of above</p> <p>二、解釋名詞 (共 30 分): 每題 6 分</p> <ol style="list-style-type: none"> <li>the organ of Corti</li> <li>cell assembly theory</li> <li>optogenetics</li> <li>constructive validity</li> <li>basal ganglia-thalamo-cortical loop</li> </ol> <p>三、問答題 (共 40 分): 每題 20 分</p> <ol style="list-style-type: none"> <li>Psychiatric diagnosis is substantially increased following the COVID-19 pandemic, which becomes a heavy burden of the world. Understanding the pathogenesis of psychiatric disorders may benefit development of novel therapeutics and promote mental health of individual. Studies have implicated dysregulated neurotransmission in schizophrenia. Please (1) provide evidence to illustrate what neurotransmitters are deregulated and associated to the symptoms of schizophrenia (10%); and (2) explain how these symptoms can be ameliorated by modulation of neurotransmission? (10%)</li> <li>(1) Please illustrate the olfactory sensory system in mammalian. (10%)            (2) Comparing to vision and audition, why do we need a variety of olfactory receptors? (5%)            (3) Many COVID-19 victims report a symptom of smell loss. However, ACE2 (the receptors for SARS-CoV-2) are not expressed in olfactory sensory neurons (Cooper et al., 2020, Neuron). Please speculate a possible pathological mechanism for COVID-induced olfactory impairment. (5%)</li> </ol>					
備註	<p>一、作答於試題上者，不予計分。            二、試題請隨卷繳交。</p>				