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科目：神經科學
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國立臺灣大學 103 學年度碩士班招生考試試題

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1. Define the following terms (3 points each)

    (a) Arachnoid membrane

    (b) Dorsal root ganglia

    (c) Visual acuity

    (d) Photoreceptor

    (e) Neuromuscular junction

2. Please describe the signal transduction mechanisms in taste cells for (a) salt tastant (5 points), and (b) sweet tastant. (5 points)

3. Please describe the signal transduction mechanisms of vertebrate olfactory receptor cells. (5 points)

4. Please describe the causes of a basal ganglia associated neurodegenerative disease. (5 points)

5. Please describe the major descending spinal tracts and their origins for motor control. (5 points)

6. If you are a student in the Graduate Institute of Brain and Mind Sciences and your research project requires an Alzheimer's disease risk gene-x1553 to be over-expressed and knocked down in hippocampal neurons. Please describe how you would carry out the research project step by step. (10 points)

7. Classify neurons based on (a) the number of neurites (axons and dendrites) that extend from the soma (b) the presence or absence of dendritic spines, (c) connections, (d) axon length, and (e) neurotransmitter. (10 points)

8. Draw an action potential (label x- and y-axis), point out identifiable part of action potential, and explain how an action potential is generated in neurons. (10 points)

9. Explain how neurotransmitter is synthesized, stored, released, recovered and degraded. (10 points)

10. Explain how circadian rhythms are produced. (10 points)

11. Define the symptoms and three hypotheses of schizophrenia. (10 points)

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