

1. Define the following terms (3 points each)
  - (a) Optogenetics
  - (b) Excitotoxicity
  - (c) Neuroplasticity
  - (d) Clock genes
  - (e) Neurotrophins
  - (f) Telencephalon
  - (g) Nonassociative learning
  - (h) Dark adaptation
2. Please describe (a) what is Hypothalamic-Pituitary-Adrenal Axis? (b) how does it regulate the stress response? (8 points)
3. Please design an experiment to evaluate the role of dopamine signaling in motivation and learning. (8 points)
4. What is long-term potentiation (LTP)? (8%)
5. Please name three voltage-dependent ionic channels, describing their characteristics and functions. (12%)
6. Describe the three major types of neurotransmitters and their examples. (12 points)
7. Describe the patterns of communication in the nervous system. (8 points)
8. Describe the postnatal development of human brain based on the maturation age of distinct brain regions. (8 points)
9. What will you propose to do to provide the mechanistic insights for human brain disorders such as autism and schizophrenia? Please make sure that you provide rationales for each experiment you will plan to do or each question you will plan to address. (12 points)

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