

Please explain the following terms: (5 points each)

1. Angiogenesis
2. iPSC
3. G-proteins
4. 3'UTR
5. Telomere
6. Synaptonemal complex
7. Proteasome
8. Transcriptome
9. Autocrine
10. Non-coding RNAs

Assay questions: (10 points each)

11. Please describe the mechanism involved in the post-transcriptional regulation for eukaryotic gene expression.
12. Please describe the biological functions of intracellular Calcium ions and explain how cells maintain the Calcium ion homeostasis.
13. From 2020, the most severe health issue that impacts our daily life is the COVID-19 pandemic. The COVID-19 pandemic is caused by the transmission of SARS-CoV-2 virus. As of 24 October 2021, over 243 million confirmed cases and over 4.9 million deaths have been reported since the start of the pandemic. Please describe the life cycle of SARS-CoV-2, including how it enters human cells and replicates itself.
14. What are the normal biological functions of proto-oncogenes? Please describe the possible genetic changes that can turn proto-oncogenes into oncogenes, and use an example to explain why oncogenes can cause cancer.
15. LSer, who is a graduate student in Department of Life Science, is currently studying the effect of drug X on the differentiation of neural progenitor cells (YY cell). However, when he treated YY cells with 50nM drug X, he found that X could not induce the differentiation of YY cells to become neurons. Instead the treatment of drug X resulted in the death of YY cells. If you were LSer, what hypothesis would you make based on this observation? And what experiments would you propose to do for testing your hypothesis?

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