BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI, PILANI CAMPUS
COMPREHENSIVE EXAMINATION: I SEMESTER: 2023-24
ANIMAL CELL TECHNOLOGY
CLOSED BOOK

Maximum Marks: 20M
Maximum Time: 60min **Date: 15/12/2023**

Part-A

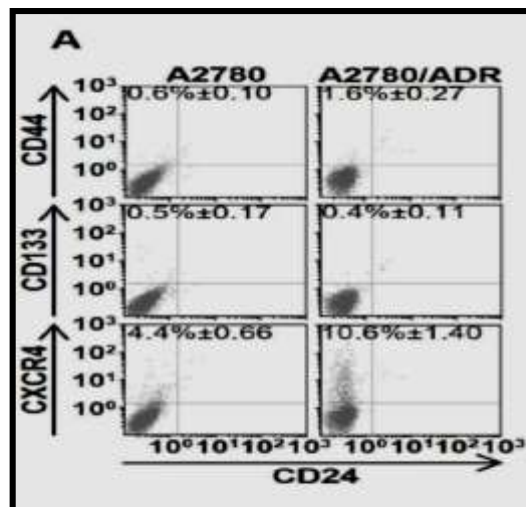
Q1. If you have to construct a retroviral vector for Gene X so that it can be easily transferred iPSCs that will be used for treatment purposes, how will you design and assemble such construct? Explain with a flow chart. [2M]

Q2. As a research scholar you have been given a task of creating a lymphoblastoid cell line. So you went ahead with infecting primary human B cells with EBV. But still after few passages you found out that the cells are dying. Troubleshoot your experiment with justification? [**2**M]

Q3. You work with liver cancer cells isolated from patients. You like to check the invasive property and angiogenesis stimulating potential of these cells *in vitro* or *ex vivo.* You are also interested in studying the effect of a drug Sorafenib, a RTK inhibitor on the invasive and angiogenesis properties of newly isolated patient derived pancreatic cancer cell. Based on the knowledge gained in ACT, design the most suitable experiment(s) to assess these properties. [3M]

Q4. Your friend has joined a company where he was assigned a job to produce and generate monoclonal antibody. As a student of ACT you got really excited and told your friend that you are aware of this technique. Can you schematically design a protocol for generation of monoclonal antibody and share with your friend? [3M]

Q5. The following flow cytometry histogram analysis shows profile of different genetic markers in A2780 compared to the resistant cell type- A2780/ADR. A) What can you conclude from the given figure with respect to the markers? B) Can you enumerate schematically the probable experimental procedure followed for generation of the flow cytometric data. What would you use as a positive control for the experiment performed? [2+3=5M]



Part-B

Q1. Normal cells have a limited number of cell division cycles whereas cancer cells are immortalized. Briefly explain the molecular reason for this. [0.5M]

Q2. Label 6 components in the given diagram and mention their main features. [1.5M]

Q3. Many people used flame in the laminar flow hood for microbial culture but not for culturing animal cells. Why? [1M]

Q4. Draw a labelled schematic diagram representing a bioreactor with process control used scaling up the manufacturing of proteins from a cultured animal cells. [1M]

Q5. Can you use micro carriers for scaling up number of cells in culture flasks (as used by you) in the lab. Justify you answer. [1M]

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