# Birla Institute of Technology and Sciences Pilani, Pilani Campus

**PHA G539 Principles of Drug Discovery**

**Comprehensive Exam** **Closed Book** **II Semester 2022-2023**

**Date: 17/5/2023** **Duration: 90 min** **Max. Marks: 20**

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**Instructions:**

1. Figures in parenthesis indicate maximum marks
2. Draw Diagrams wherever necessary

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1. Integrins are heterodimeric cell-surface adhesion molecules found on all nucleated cells.

   (i) Explaining the entire signaling cascade involved in activating platelet activation via integrins. [5]

   (ii) Describe the structure of basement membrane giving details of all the cell adhesion molecules involved. [4]

2. Proteases are a class of enzymes that catalyzes proteolysis.

   (i) What is the mechanism of proteolysis performed by aspartic acid family proteases? [3]

   (ii) Explain any one case study of development of proteases as a target for drug discovery. [2]

3. Explain in detail:

   (i) The function of transfer RNA in protein synthesis [3]

   (ii) Different assays to determine SLCs as drug targets [3]

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1. Non-coding RNAs (ncRNAs) are an emerging class of drug targets that have gained attention in recent years due to their critical roles in various biological processes. [4+4=8]

   (i) Explain the process of translation in detail.

   (ii) Epigenetic modifications of ncRNA, can regulate their expression and function. How can this knowledge be used in the development of epigenetic therapies targeting ncRNAs?

2. The activity of integrins is tightly regulated by a variety of mechanisms, including changes in their expression levels, post-translational modifications, and interactions with extracellular and intracellular molecules. [2+4=6]

   (i) Giving example explain the role of post-translational modifications in the regulation of integrin function

   (ii) Discuss the link between integrin dysregulation and cancer.

3. (i) You are working on evaluating the potential of Solute carriers (SLCs) as drug target. Design all sets of experiments needed to confirm the role of SLC in any neurological disorder. [4]

   (ii) Give any example of drug approved for cancer which exploits SLCs. Explain how SLCs are involved in it. [2]