Exam Date & Time: 23-May-2022 (10:00 AM - 01:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

Computer Aided Drug Design [PCH-BP807ET]

Marks: 75 **Duration: 180 mins.**

I Multiple Choice Questions (MCQs)

Answer all the questions. Section Duration: 30 mins

1) Which of the following method is widely used for gene expression profiling

1)	Gene knockout screening		2)	RNA interference		3)	Surface Plasmon resonance		4)	DNA microarrays		(1)

2) Which of the following drug design approach is not a ligand based approach

1)	QSAR studies		2)	Pharmacophore Modelling		3)	3D similarity search		4)	Molecular Docking		(1)

3) Development sulfonylurea drugs like tolbutamide for treatment of diabetes is a classical example of

1)	Structure based drug design approach		2)	SOSA approach		3)	Me too Drug approach		4)	Serendipity		(1)

4) Which of the following functional groups can be considered as structural alerts used to detect compounds with potential mutagenicity and carcinogenicity

1)	ring epoxides		2)	alkylnitrosamines		3)	arylamine function		4)	all of the above		(1)

5) Binding site for a protein target is selected on the basis of which of the following

1)	Site score		2)	Druggability score		3)	Binding site volume		4)	All of the above		(1)

6) Which of the following is not a method used for conformational analysis

1)	Scaffold hopping		2)	Systematic search		3)	Random search		4)	Simulated annealing/Molecular dynamics		(1)

7) Which of the following is not divide and conquer approach for in situ de novo drug design

1)	fragment-linking		2)	Ligand Morphing		3)	ligand-growing		4)	Lattice based methods	

(1)

8) π-substituent hydrophobicity constant is

1)	Measure of hydrophobic substituent constant of unsubstituted chemical species.		2)	Measure of how hydrophobic a Hydrogen is relative to substitution		3)	Measure of how hydrophobic a substituent is relative to Hydrogen		4)	Measure of hydrophobic constant of an unsubstituted molecule	

(1)

9) The conversion from drug Tolbutamide to Chlorpropamide is strategically aimed

1)	To increase lipid solubility		2)	To prevent metabolic oxidation		3)	To increase protein binding		4)	None of the above.	

(1)

10) Benzoic acid having electron donating substituent will have

1)	Higher Kx value than benzoic acid		2)	σX for an electron withdrawing substituent will be negative		3)	Equal Kx like substituted Benzoic acid		4)	Smaller Kx value than benzoic acid	

(1)

11) The antineoplastic drug 5-Fluorouracil is an example for

1)	Ring isosteric replacement		2)	Non-classical isosteric replacement		3)	Divalent isosteric replacement		4)	Monovalent isosteric replacement	

(1)

12) Following is an electronic parameter in QSAR

1)	Dipole moment		2)	Verloop parameter		3)	MolRef		4)	B and C.	

(1)

13) What does MR represent in a QSAR equation?

1)	Molar refractivity is a steric factor		2)	Molar refractivity is an electronic factor		3)	Molar refractivity is a hydrophobic factor		4)	Molar refractivity is a stereoelectronic factor	

(1)

14) Molecular weight and Partition coefficient as Log P of drug like compound as per Lipinski Rule of 5 is

(1)

1)	100 and 1		2)	300 and 3		3)	700 and 7		4)	500 and 5	

15) AMBER is the force field used for the simulation for the following:

1)	Proteins		2)	Nucleic acids and Proteins		3)	Amino acids and Proteins		4)	Carbohydrates		(1)

16) Ligand based pharmacophore program is called as:

1)	Ligand Scout		2)	SPORES		3)	Pharma Gist		4)	GOLD		(1)

17) Micro array provides massive amount of data about the following:

1)	Gene activity in the presence of certain biological samples under specific conditions		2)	Protein activity in the presence of certain biological samples under specific conditions		3)	Protein activity in the absence of certain biological samples under specific conditions		4)	Gene activity in the absence of certain biological samples under specific conditions		(1)

18) The most abundant data in Bioinformatics consists of the following:

1)	Poly Peptides		2)	RNA		3)	Oligo peptides.		4)	DNA		(1)

19) Molecular dynamics can be used to generate a variety of different conformations by 'heating' the molecule to

(1)

1)	400 K		2)	600 K		3)	800 K		4)	900 K	

20) Quantum mechanics describes molecules in terms of interactions among the following.

1)	Nuclei and molecular geometry		2)	Electrons and Molecular geometry		3)	Nuclei and Electrons		4)	Nuclei, Electrons and Molecular geometry		(1)

II Long Answers

Answer all the questions.

1) Explain briefly the various methods used for lead discovery (10)

2) With a case study explain the development of antihypertensive drug analogues to Clonidine using bioisosteric replacement strategy. (5)

A)

B) Taking Benzoic acid and its derivatives as example, explain Hammett substituent constant as an electronic parameter in QSAR (5)

III Short Answers

Answer all the questions.

1) Explain rule of 5 and other rule based filters for Lead-Likeness and Drug-Likeness screening (5)

2) What is molecular docking? What are the different types of molecular docking and explain the different types of protein-ligand docking (5)

3) What are the various types of softwares used in drug discovery program? Explain QSAR softwares (5)

4) Define Molecular dyamics, Molecular mechanics and Local and Global energy minima (3)

4A)

4B) How is Bioinformatics useful in new drug discovery program? (2)

5) Write the principle involved in Quantum mechanics (2)

A)

B) What is Schrodinger equation and when do we apply approximation and enlist the various approximations? (3)

6) What is HTS? Give its principle and applications in chemoinformatics (3)

A)

B) What are the fundamental steps involved in the generation of pharmacophore model (2)

7) Explain ring bioisosters with examples (5)

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