

Medicinal Chemistry 562
-Midterm 1-
October 21, 2019

Key

Student name: _____

1. Overall drug absorption can be influenced by a number of factors which include:

- A. The pKa of functional groups on the drugs
- B. The lipophilicity of the drugs
- C. The molecular weight of the drugs
- D. A, B, and C
- E. A and B

2. What is true about drug targets in oncology?

- A. They include receptors, enzymes, DNA, and antigens
- B. The targets exist in cancer cells and normal cells
- C. The targets are typically activated by oncology drugs
- D. A and B
- E. A and C

3. Which of the following are true about mutagenesis?

- A. It is believed to be the initiating event in cancer
- B. It can cause inactivation of oncogenes
- C. It is a primary cause of drug resistance
- D. A and B
- E. A and C

4. Chemotherapy is a major type of therapy for treating cancer patients. As discussed in class, other major types of therapy for treating cancer patients are:

- A. Surgery
- B. Radiation
- C. Bone marrow or stem cell transplantation
- D. A and B
- E. A, B, and C

5. Drug resistance is an important issue in the treatment of cancer patients with chemotherapy. As discussed in class, drug resistance arises from:

- A. Metastasis
- B. Clonal selection
- C. Apoptosis
- D. A and B
- E. B and C

6. Premedications are often given with chemotherapy drugs. As discussed in class, what is a major reason for giving patients premedications?

- A. Prevention of allergic reactions
- B. Prevention of nausea and vomiting
- C. Prevention of metastases
- D. A, B, and C
- E. A and B

7. White blood cells (leukocytes) include many subtypes. Which are true about them?

- A. They include neutrophils which help fight infection(s)
- B. They include the lymphocytes which also help fight infections or tumor cells
- C. They include the macrophages
- D. A and B
- E. A, B, and C

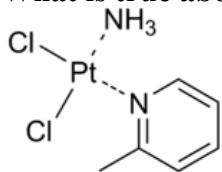
8. What is true about DNA?

- A. It utilizes the bases adenine, guanine, thymine, and cytosine
- B. It is more stable than RNA
- C. It utilizes a ribose sugar
- D. A and B
- E. A and C

9. As discussed in class, this is an old alkylating agent that is now used mainly for myeloablation prior to a bone marrow or stem cell transplant. PK monitoring is also importance for its use because it can enter the CNS. What is my name?

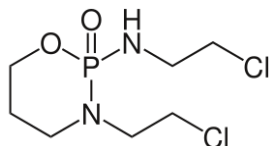
- A. Cisplatin
- B. Methotrexate
- C. Busulfan
- D. Dacarabazine
- E. 5-Fluorouracil

10. Below is the structure of an anticancer agent that has been evaluated in clinical trials. What is true about this agent?



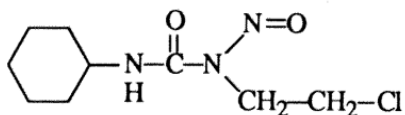
- A. It's a platinum alkylating agent
- B. It likely causes myelosuppression
- C. It likely causes nausea and vomiting
- D. A and B
- E. A, B, and C

11. Ifosfamide (Ifex), a useful anti-cancer drug, and is shown below. What is true about this agent?



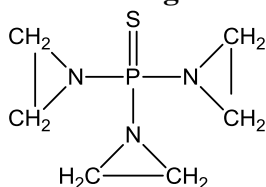
- A. It requires bioactivation by P450
- B. It can form an aziridine ion
- C. It likely causes some hepatotoxicity
- D. A and B
- E. A, B, and C

12. Lomustine is an older anticancer agent and is shown below. What is true about this agent?



- A. It's an example of a nitrosourea drug
- B. It possesses a positive charge at physiological pH of 7
- C. It's useful for glioblastoma (type of brain cancer) as it can readily enter the CNS
- D. A and B
- E. A and C

13. The drug Thiotepea is shown below. Which of the following are true about this agent?



- A. It can be converted to TEPA which is inactive
- B. It will not enter the CNS
- C. It can react with DNA multiple times
- D. A, B, and C
- E. B and C

14. 5-Fluorouracil (5-FU) is an old but important oncology agent. It belongs to a large class of anticancer drugs called antimetabolites. As discussed in class, 5-FU directly inhibits this enzyme.

- A. Dihydrofolate reductase (DHFR)
- B. Thymidylate synthetase (TS)
- C. Ribonucleotide reductase (RR)
- D. Topoisomerase I (Topo I)
- E. A and B

15. Polymorphic metabolism is an important aspect of the clearance of 5-FU. As discussed in class, what enzyme is important in this polymorphism?

- A. Dihydrofolate reductase (DHFR)
- B. Thymidylate synthetase (TS)
- C. Ribonucleotide reductase (RR)
- D. Dihydropyrimidine dehydrogenase (DPD)
- E. A and B

16. Methotrexate (MTX) is another important oncology agent that belongs to the antimetabolite class of drugs. What endogenous molecule does MTX mimic?

- A. Uracil
- B. Folate (or folic acid)**
- C. Vitamin B6
- D. Ribose
- E. ATP

17. Which is also true about MTX?

- A. It directly inhibits dihydrofolate reductase
- B. It directly inhibits thymidylate synthetase
- C. It can be trapped inside of cells by polyglutamation
- D. A and B
- E. A and C**

18. Leucovorin is a useful agent in cases of MTX overdose or in cases of intentional high dose of MTX. What exactly does Leucovorin do?

- A. It reactivates dihydrofolate reductase
- B. It bypasses the folate cycle
- C. It substitutes for methenyl tetrahydrofolate
- D. A and B
- E. B and C**

19. Abraxane (nab-paclitaxel) is a newer formulation of paclitaxel. As discussed in class, which of the following is true about this agent?

- A. It is formulated by pre-binding the paclitaxel to serum albumin
- B. It causes fewer (or less severe) infusion reactions compared to the Taxol formulation of paclitaxel
- C. It would not be expected to cause myelosuppression
- D. A and B**
- E. A and C

20. A useful regimen for treating colorectal cancer is FOLFIRI. What is true about this regimen?

- A. The regimen includes folinic acid, 5-fluorouracil (5-FU), and irinotecan
- B. The regimen will likely cause peripheral neuropathy
- C. The regimen will likely cause myelosuppression
- D. A and B
- E. A and C**

21. Cabazitaxel (Jevtana) is the most recently approved taxane type drug. Which of the following are true about this agent?

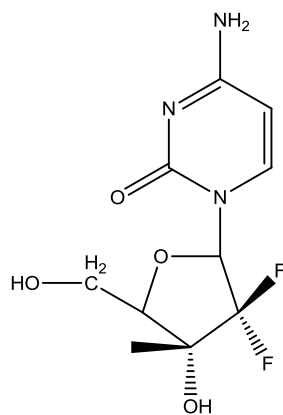
- A. It targets the microtubules**
- B. It inhibits metastases
- C. It typically causes myelosuppression but not peripheral neuropathy
- D. A and B
- E. A, B, and C

22. RNA differs from DNA in several ways. These include:

- A. RNA utilizes uracil but DNA does not
- B. RNA utilizes ribose sugar but DNA does not
- C. RNA can exist in the nucleus and the cytosol of cells
- D. A and B
- E. A, B, and C

23. Gemcitabine is a useful oncology agent and is shown below. It was first approved for treating pancreatic cancer. What is also true about this agent?

- A. It can inhibit ribonucleotide reductase (RR)
- B. It's a mimic of uracil (uridine)
- C. It belongs to the class of anti-mitotic agents and targets the microtubules (tubulin proteins)
- D. A and B
- E. A and C



Gemcitabine

24. The vinca alkaloids and the taxanes are important oncology agents. What is true about these anticancer drugs?

- A. They are all anti-mitotic agents and target the microtubules (tubulin proteins)
- B. They all can cause myelosuppression and peripheral neuropathy
- C. They can be administered by the IV and PO routes
- D. A, B, and C
- E. A and B

25. What is true about the administration of some anticancer drugs?

- A. Improper administration can lead to extravasation injury
- B. Dose frequency can be dictated by neutrophil counts not half-life of the drug
- C. Components in the drug formulation can contribute or cause some side effects
- D. A, B, and C
- E. B and C