1. Both methotrexate (MTX) and 5-fluorouracil (5-FU) are important anti-cancer agents.

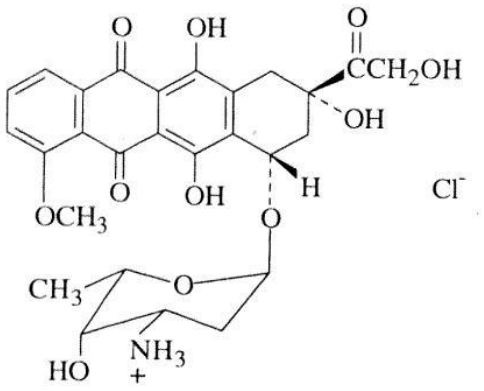
To what specific class or type of anti-cancer agent does MTX belong?

To what specific class or type of anti-cancer agent does 5-FU belong?

Both of the drugs can inhibit thymidylate synthetase (TS). The inhibition of TS by 5-FU is direct. Explain this mechanism.

The inhibition of TS by MTX is indirect.
Explain this mechanism.

2. The structure below is a member of an important class of anticancer agent.



To what specific class or type of anti-cancer agent does this drug belong?

What is its mechanism(s) of ant-cancer activity?

Use of the agent is associated with an important toxicity that limits its use. Name this toxicity.

Circle the atoms in the molecule that lead to this important toxicity.

Name the drug that can be used to reduce this toxicity.

3. A hypothetical new drug called "Onconib" was just approved by FDA.

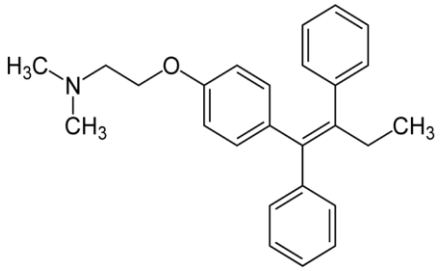
To what specific class or type of anti-cancer agent does this drug belong?

If this drug is useful for Ph+ tumors, would this drug likely be useful for liquid tumors or solid tumors?

QT prolongation is generally not a common problem with this class or type of cancer drug. True or False?

Cytochrome P-450 enzymes (CYP450) generally participate in the metabolism of this class or type of cancer drug. True or False?

4. Tamoxifen (Tam) is an older anti-cancer agent and is shown below.



To what specific class or type of anti-cancer agent does this drug belong?

Tamoxifen is metabolized to a very active metabolite. What is the name of this metabolite?

Show the structure of this active metabolite by modifying the structure above. (Hint: There are structural changes involved.)

Which two cytochrome P-450 enzymes participate in the metabolism of Tamoxifen?

Does polymorphic metabolism play a role in the metabolism of Tamoxifen. Yes or no?