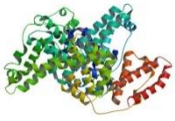
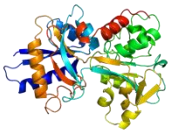
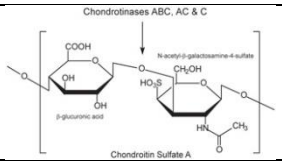
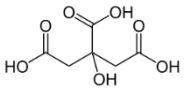
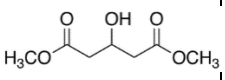
Name: _____Date: _____ Class: _____

Calcium Oxalate Worksheet

Inhibitor	bovine serum albumin (BSA)	Transferrin (Tf)	chondroitin sulfate A (C_4S)	citric acid (CA)	dimethyl hydroxyglutaric acid (DHG)
Protein/ Simple Molecule	Protein	Protein	Simple Structure	Simple Structure	Simple Structure
Description	Protein derived from cows	Iron-binding blood plasma glycoprotein	Usually found attached to proteins	Natural preservative	Found in urine of people with certain deficiencies
Structure					
MW	66,463	78,000	463.37	192.12	176.17
pH of solution/ pKa	pH of 1% solution: 5.2-7	pKa 6.2	pKas in range of -3.7 to -1.9	Three pKas in range of 3.15-5.19	pKas in the range of -3.1 to 3.79
H-bond acceptor	N/A	N/A	15	7	5
H-bond donor	N/A	N/A	8	4	3

1. What does a calcium oxalate crystal look like without any inhibitors? Draw.

2. Draw what happens to the calcium oxalate crystal when each inhibitor is added.

bovine serum albumin (BSA)	Transferrin (Tf)	chondroitin sulfate A (C_4S)	citric acid (CA)	dimethyl hydroxyglutaric acid (DHG)

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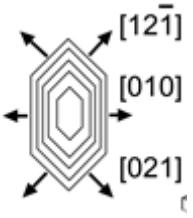
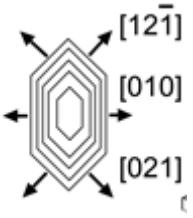
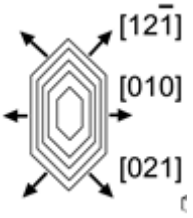
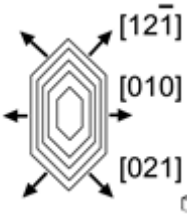
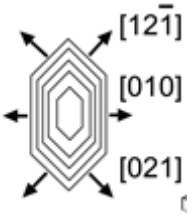
Inhibitor	bovine serum albumin (BSA)	Transferrin (Tf)	chondroitin sulfate A (C_4S)	citric acid (CA)	dimethyl hydroxyglutaric acid (DHG)
Mark on the crystal where each molecule binds					

3. **Compare groups of inhibitors. (two groups: proteins and simple structures)**
   Which were the most effective at blocking growth? Speculate why one would be more effective.

4. **Compare inhibitors within their own group. Which ones were the most effective?**
   Explain why this might be.

5. **Do the crystals have different shapes when inhibitors are added? What might cause these different shapes? (Think about how steps grow on a crystal surface in all directions but at different rates. How does an inhibitor affect those rates?)**

6. **Of all the inhibitors used today, which do you think would be the best choice as a possible drug? Why?**