1. Iodoacetamide covalently modifies cystein side chains and, in doing so, inhibits the enzyme glyceraldehydes 3 phosphate dehydrogenase. When iodoacetamide is added to yeast cytoplasmic extracts and glucose is added, hexose phosphates tend to build up. Why?

   If G3P Dehydrogenase stops working, G3P concentrations rise. Since both the TIM and Aldolase reactions are somewhat to very unfavorable (in the glycolysis direction), they will readily run “backwards”, ultimately fusing two G3P into one FBP. The Glucose to G6P, G6P to F6P and F6P to FBP reactions are favorable to neutral (in the forward direction) and thus at equilibrium glucose levels are low and FBP levels are high. Thus if glucose (and ATP) is present and G3P Dehydrogenase is inhibited, the lowest energy, most stable molecule is FBP.

2. $^{14}$C-labeled glyceraldehydes 3 phosphate was added to a yeast extract. After a time, fructose 1,6-bisphosphate was recovered that contained $^{14}$C in positions 3 and 4. Where was the label located in the G3P, and how did it get to these positions in FBP?

   If G3P is labeled at the 1 position (the carbonyl carbon), some of it will be converted by TIM into 1 phospho-dihydroxyacetone (DHAP) with the label in position 3 (i.e. the carbon lacking the phosphate). Aldolase will then link the 3-labeled DHAP with the 1-labeled G3P by directly linking the two labeled carbons (look at the reaction and you will see that it is the 1 position of G3P that bonds to the 3 position of DHAP). This produces a hexose with labels at what are now the 3 and 4 positions.