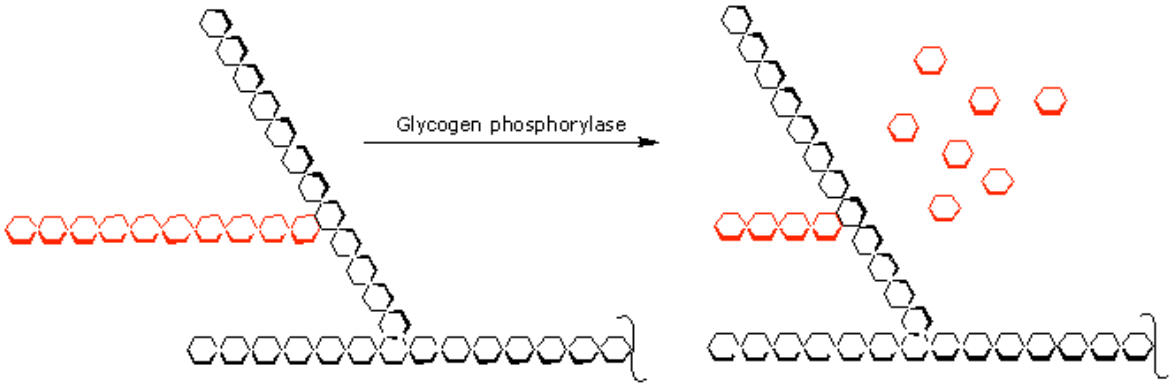
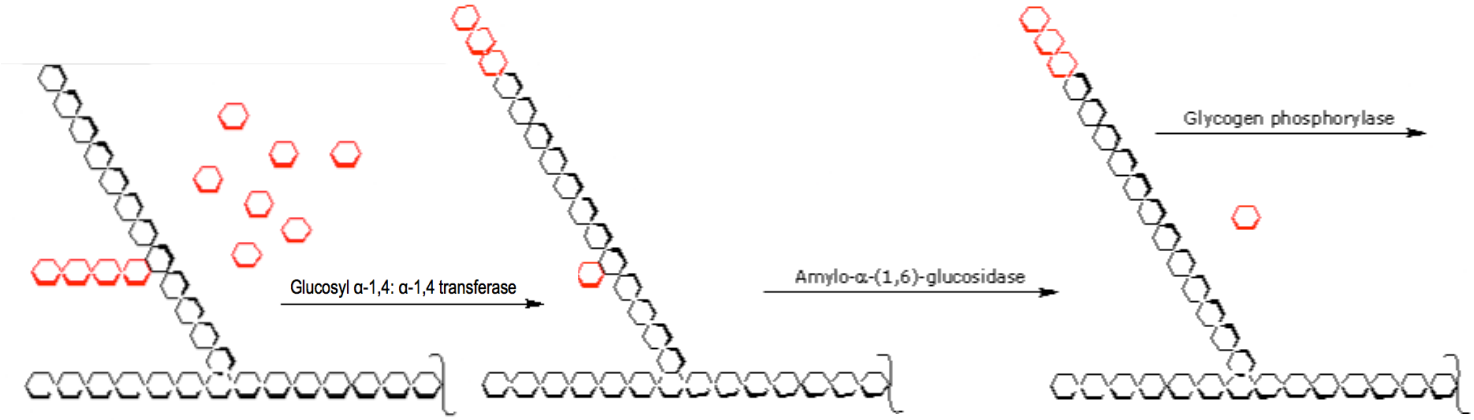
CONCEPT: GLYCOGEN METABOLISM

- Glycogen phosphorylase – breaks down glycogen by removing subunits from nonreducing end via phosphorolysis
    - □ Breaks off glucose subunits as glucose 1-phosphate, which must be converted to glucose 6-phosphate
        - Phosphoglucomutase ($\Delta G \sim 0$) – glucose 1-phosphate → glucose 6-phosphate
    - □ Glucagon, epinephrine, and AMP lead to the phosphorylation and activation of glycogen phosphorylase
        - Phosphorylase kinase b adds 2 phosphate groups when stimulated by glucagon, epinephrine, and AMP
    - □ Glucose allosterically regulates, exposes phosphate groups to make them easier to remove
    - □ Due to extensive branching, many phosphorylases can work simultaneously to rapidly deliver a lot of glucose



- Debranching enzyme – transfers 3 sugars from one branch to another, then removes branch point glucose
    - □ Hydrolyzing the α-1,6 bond produces the only glucose in glycogenolysis



- High blood glucose: insulin up→ glycogen breakdown low, glycogen synthesis up, glycolysis up
- Low blood glucose: glucagon up, glycogen breakdown up, glycolysis and glycogen synthesis down
- Glycogen phosphorylase and glycogen synthase are phosphorylated and dephosphorylated together
    - □ The two enzymes are affected in the opposite ways (activation/deactivation) by these chemical modifications