7. (11 pts) The major enzyme in the digestion of starch is **pancreatic amylase** (specific name) that is secreted by **acinai cells of the pancreas** (gland and type of cells; 2 pts).

The glycosidase named above is specific for **α-1,4-glycosidic bonds** (type of bond) but does not hydrolyze the **α-1,6-glycosidic** bonds that form branch points in starch amylpectin.

The two primary end-products of starch digestion by this enzyme are **limit dextrin** and **maltose**. Because the starch-digesting enzyme cannot hydrolyze the branch points of amylpectin, there also will be some "branched" disaccharide formed called **isomaltoose**.

The disaccharidases that complete carbohydrate digestion are located **brush border**.

The two primary disaccharidases involved in starch digestion are **maltase** and **isomaltase (α-dextrinase)**.

8. (6 pts) Following digestion and absorption, blood concentrations of glucose increase. In response to this increase, the **B-cells** (type of cell) located in the **Islets of Langerhans** of the pancreas release the hormone insulin into the blood. Insulin lowers blood glucose by stimulating glucose uptake by adipose tissue and muscle cells. Specifically, insulin stimulates which glucose transporter?

   **GLUT 4**

Briefly (one or two sentences; 3 pts), explain how insulin "activates" this transporter.

- Binds to cell membrane
- Stimds ribosomes to syn. GLUT 4
- Transporters move to golgi apparatus where they are packaged
- Storad in vesicles
- Insulin stim translocation from vesicles to cell membrane where they transport glucose into the cell-

9. (3 pts) There are several isoforms glucose transporters that are not dependent on insulin. They differ primarily in their pK values and affinity for glucose. Explain (short answer) what is unique and physiologically important for the two transporters found in the brain, red blood cells, blood-placental barrier, and blood-brain barrier. You don't have to distinguish between the two; what properties do both share and why is this important?

   Can bind glucose and transport it across the membrane even at very low concns.

   Assures that these tissues are not starved.