Exercise – Concept mapping "Glucose Transporters."

Directions: Prepare an overview map and an expanded map of the passage below. Work alone or in teams.

We will discuss:

1. Were the grouping terms easy to identify?

2. Did you find several ways of grouping?

3. Did the topic become more organized in your own mind?

This review summarizes recent advances concerning the structure, function, and regulation of the Glut proteins. Facilitative glucose transport is mediated by members of the Glut protein family that belong to a much larger superfamily of 12 transmembrane segment transporters. Six members of the Glut family have been described thus far. These proteins are expressed in a tissue- and cell-specific manner and exhibit distinct kinetic and regulatory properties that reflect their specific functional roles. Glut1 is a widely expressed isoform that provides many cells with their basal glucose requirement. It also plays a special role in transporting glucose across epithelial and endothelial barrier tissues. Glut2 is a high-Km isoform expressed in hepatocytes, pancreatic beta cells, and the basolateral membranes of intestinal and renal epithelial cells. It acts as a high-capacity transport system to allow the uninhibited (non-rate-limiting) flux of glucose into or out of these cell types. Glut3 is a low-Km isoform responsible for glucose uptake into neurons. Glut4 is expressed exclusively in the insulin-sensitive tissues, fat and muscle. It is responsible for increased glucose disposal in these tissues in the postprandial state and is important in whole-body glucose homeostasis. Glut5 is a fructose transporter that is abundant in spermatozoa and the apical membrane of intestinal cells. Glut7 is the transporter present in the endoplasmic reticulum membrane that allows the flux of free glucose out of the lumen of this organelle after the action of glucose-6-phosphatase on glucose 6-phosphate.