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Opinion

Sodium/Glucose Cotransport and Treatment of Diabetes

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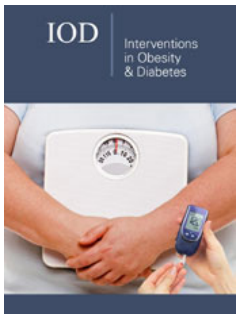

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Opinion

There are two ways for glucose uptake depending on metabolic needs and glucose availability. These ways included passive (facilitated diffusion) and secondary active transport. Passive transport is movement of substances from high to low concentration. On the other hand active transport is movement of substances against its concentration gradient, unlike passive transport, the cell expends energy. In passive process, as a result of impermeability of plasma membrane for polar substance as glucose, the cellular uptake of glucose is accomplished by special carrier proteins called glucose transporters. The most significant carrier proteins are GLUT1-4. GLUT1 and GLUT3 are located in the plasma membrane, and they are responsible for maintaining rate of glucose uptake. GLUT2 is located in the plasma membranes of hepatocytes, pancreatic beta cells and it responsible for glucose sensing. GLUT4 transporters are insulin sensitive, they found in muscle and adipose tissue. During carbohydrate breakdown high level of glucose concentration according to absorption. This means there is a concentration gradient allowing the diffusion of glucose into the cells. Active transport can be divided into two categories. Primary active transport uses ATP as source of chemical energy to move molecules across a membrane against their gradient as sodium-potassium pump.

On the other hand, in secondary active transport (cotransport), molecules moved according to electrochemical such as sodium-glucose pump. In sodium-glucose pump, the movement of the sodium ions down their gradient is combined with the uphill transport of other substances by a shared carrier protein (a cotransporter). Sodium ions move down through gradient, while glucose molecules move up by the action of carrier protein. The carrier protein uses the energy of the sodium gradient to drive the transport of glucose molecules. Active sodium-glucose transporters play a role to glucose metabolism and represent novels targets for the management of diabetes. Sodium-glucose cotransporter is essential for intestinal glucose absorption. SGLT inhibitors are technologically advanced to inhibit glucose reabsorption pathway and cause glycosuria, thus reducing glucose concentrations.