THE MECHANISM OF GLUCOSE TRANSPORTERS THROUGH THE MEMBRANE

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https://doi.org/10.5281/zenodo.7881223

Abstract. *This article discusses the mechanisms of membrane transport of glucose transporters. Glucose can be taken up and metabolized in cells. For most mammals, glucose is readily imported by the membrane transporter diff Glut (SLC2A) family facilitators. A person has 14 Glut equipment. For at least half of them, the main physiological substrate is unclear or unknown. Glucose transporter isoforms are Gluts 1-4, which regulate glucose homeostasis and have kinetic planning.*

Keywords: *glucose transporters, insulin, beta cells, easy diffusion, physiological substrate, glucose homeostasis, kinetic planning.*

INTRODUCTION. The end products of carbohydrate hydrolysis in the gastrointestinal tract are only three substances: glucose, fructose and galactose. At the same time, glucose accounts for almost 80% of the total amount of these monosaccharides. After absorption in the intestines, most of the fructose and almost all of the galactose is converted to glucose in the liver. Consequently, only small amounts of fructose and galactose are present in the blood. As a result of the transformation processes, glucose becomes the only representative of carbohydrates transported to all cells of the body.

Glucose transporters are located in the plasma membrane they bind to the plasma and ensure cross-validation through the lipid bilayer. They can be divided into two classes: sodium-glucose cotransporters or symporters (sglts) and facile glucose transporters (gluts).

Sodium-glucose cotransporters (sglts) are expressed in cells in the intestine and proximal tubules of the kidney. These forces mediate the active charge of glucose against an electrochemical gradient. In the intestinal cavity or nephrons, glucose is transported against its concentration gradient by another transport mechanism. The family of sglts in humans consists of 12 members involved in glucose, anion, fatty acid loading and control. The two members responsible for the glucose load are SGLT1 and SGLT2.

METHODS. SGLT1 is 664 amino acids long and serves as the primary glucose transporter in the intestine. SGLT2 is located in the cells of the proximal lining, where it controls glucose efflux by allowing and protecting glucose reabsorption from uptake.

Glucose transporters (gluts) are a family of 14 glucose transporters. They are safe for both transport and loading of glucose in cells. It involves the easy diffusion of glucose to transport it into the cell along a concentration gradient. These have one substrate binding site that affects the interior of the cell, which affects the core site. Glucose binding to scavengers produces conformational changes that allow glucose to bind to each other across the membrane.

The GLUT family is divided into three subgroups, the first of which includes GLUT1 to GLUT4. GLUT1 is expressed at a high rate directly in red blood cells and the hematoencephalic barrier. It is necessary for the timely supply of glucose necessary for it in all cells.

GLUT2 is required in the posterior tubule, pancreas, liver and intestine. Facilitating hepatic uptake of glucose for glycolysis and release of glucose produced by gluconeogenesis. In the pancreas, glucose is transported via GLUT2 to the intracellular environment of bidirectional beta support, which helps the blood yolk feed.

GLUT3 is mainly a network in the nerve that is responsible for most of the glucose loading. It is also present in the placenta. GLUT 4 is expressed in adipose tissue, on the heart and in the skeletal body.

RESULTS: 1. Different types of cells have different mechanisms for transporting glucose across the cell membrane.

2. All glucose transport mechanisms are mediated by transporter proteins located in the cell membrane.

3. There are two main types of glucose transporter proteins: glut and sglt.

4. The glut mechanism is based on passive transport of glucose across the membrane, while the sglt mechanism is active and requires energy for glucose transport.

5. Different types of glut proteins vary in their rate of glucose transport and sensitivity to inhibitors.

6. Some cells are able to regulate the amount of glut proteins in their membrane depending on the glucose level in the body.

7. One of the most studied glucose transport mechanisms is the glut4 mechanism, which is regulated by insulin and plays a role in blood glucose control.

8. Certain pathological conditions, such as diabetes, can lead to impaired glucose transport mechanisms across the cell membrane.

9. Understanding glucose transport mechanisms helps to unravel the basics of glucose metabolism and may lead to the development of new treatments for glucose-related disorders.

DISCUSSION. Before glucose can be used by tissue cells, it must be transported across cell membranes into the cytoplasm. However, glucose cannot freely diffuse through the pores in cell membranes, because the maximum molecular weight of the particles should average 100, while the molecular weight of glucose is 180. However, glucose can enter cells relatively easily due to the facilitated diffusion mechanism.

By piercing through the lipid membrane of cells, carrier proteins, the number of which in the membrane is quite large, can interact with glucose. In this bound form, glucose can be transported by a carrier protein from one side of the membrane to the other and separated there; if the concentration of glucose is higher on one side of the membrane than on the other, then glucose will be transported to where its concentration is lower, and not in the opposite direction. The transport of glucose across cell membranes in most tissues differs sharply from that observed in the gastrointestinal tract or in renal tubular epithelial cells.

In both cases mentioned, glucose transport is mediated by an active sodium transport mechanism coupled. Active sodium transport provides energy for glucose uptake against a concentration gradient. This sodium-coupled active mechanism of glucose transport occurs only in specialized epithelial cells adapted for the active process of glucose absorption. In other cell membranes, glucose is transported only from areas of high concentration to areas of low

concentrations by a facilitated diffusion mechanism, which is made possible by the special properties of the glucose transport protein located in the membrane.

CONCLUSION. *Overall, nutrient metabolites, such as sugars, are transported through the blood vessels to the organs. Endothelial cells that line the walls of small vessels control nutrient metabolism. These endothelial cells, especially those located in the area of the blood-brain barrier, contain many GLUT proteins. The proper functioning of the brain is highly dependent on glucose, and its cells are especially sensitive to a decrease in its content.*

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