Journal of Glycobiology
ISSN: 2168-958X
OPEN ACCESS Freely available online
Short Communication

A Note on Glycoconjugates in the Endothelium of the Blood Vessels

Heldin Joanne*

Department of Biotechnology, Cairo University, Giza, Egypt

DESCRIPTION

Glycoconjugates are carbohydrates that are covalently attached to other biological molecules, such as amino acids (to make peptidoglycans), proteins (glycopeptides and glycoproteins), lipids (glycolipids and lipopolysaccharides) and other small molecules (glycosides). The shape of these molecules performs a variety of functions in connective tissue, including cell-cell communication and protein-protein cross-linking. Types of complex carbohydrates: Proteoglycans, glycoproteins, glycolipids.

Vascular Endothelium (EC) constitutes the inner layer (endothelium) of blood vessels and forms the interface between blood and the walls of blood vessels. EC senses the shear stress generated by the flow of blood and transmits signals inside the cell, triggering a cellular response. The EC response to shear stress is closely associated with the regulation of vascular tone, blood coagulation and fibrinolysis, angiogenesis and vascular remodeling. EC also controls the regulation of vascular barriers, the passive diffusion and active transport of substances from the blood. Therefore, EC plays an important role in the constitutive function of blood vessels and it is thought that excessive activation and dysfunction of EC leads to the development of vascular diseases such as restenosis, atherosclerosis and cancer.

Glycoprotein

Glycoprotein is a protein that contains oligosaccharide chains (glycans) covalently attached to the polypeptide side chain. Carbohydrates bind to proteins as co-translational or post-translational modifications [1-2]. This glycosylation of proteins is important for physicochemical and biological properties such as protein folding, stability, targeting, dynamics and ligand binding [3-4]. Vascular endothelial cadherin, which contains seven potential N-glycosylation sites is endothelial-specific and belongs to the endothelial adhesion junction. Human VE cadherin was purified from cultured Human Umbilical Vein Endothelial Cells (HUVEC) and its glycosylation pattern was analyzed to enable further functional studies. Treatment of the entire cell with sialidase to remove sialic acid on the cell surface changed the immunofluorescence of VE cadherin from a continuous reticulated aggregate to a non-uniformly scattered aggregate [5-7]. These results indicate that cell surface sialic acid may play a role in the organization of VE cadherin.

Glycosphingolipids

Glycosphingolipids (GSL) consists of a glycan structure linked to a lipid tail containing sphingolipid ceramide. GSL is widely used in low nucleophilic organisms and cell membranes in higher eukaryotes [8]. GSL is often used as an important development marker molecule and has been proposed to have significant biological functions. The expression profile of GSL in HUVEC was examined after activation by normal conditions and inflammatory stimulation. Inflammatory cytokines such as IFN-γ (Interferon gamma) and IL1 (Interleukin-1) are known to alter the expression of cell surface molecules in ECS. IFN-γ has a significant effect on surface expression of GSL, in particular large neutral GSL, (globotetrasylceramide), but IFNγ does not change the total amount of GSL. In contrast, IL1 increases the cell content of neutral and acidic GSL, but does not change its surface expression. EC is thought to play an important role in the etiology of Hemolytic Uremic Syndrome (HUS).

Proteoglycans

Proteoglycans (PGs) are heavily glycosylated proteins these macromolecules composed of specific core proteins that have been replaced by covalent bonds with the glycosaminoglycan chain the chains are long linear carbohydrate polymer that are negatively charged. Proteoglycans provide hydration and for the tissue it enables to withstand compressional forces.

REFERENCES

1. Li SJ, Haga JH, Chien SJ. Molecular basis of the effects of shear stress on vascular endothelial cells. J Biomech. 2005;38(10):1949-1971.
2. Aird WC. Phenotypic heterogeneity of the endothelium: I. Structure, function, and mechanisms. Circ Res. 2007;100(2):158-173.
3. Geyer H, Geyer R, Schnittler M, Schnittler HJ. Characterization of human vascular endothelial cadherin glycans. Glycobiology. 1999;9(9):915-925.
4. Chacko BK, Scott DW, Chandler RT, Patel RP. Endothelial surface N-glycans mediate monocyte adhesion and are targets for anti-

Correspondence to: Heldin Joanne, Department of Biotechnology, Cairo University, Giza, Egypt, E-mail: joanne@Heldin.edu

Received: 04-Mar -2022, Manuscript No. JGB-22-16718; **Editor assigned:** 07-Mar-2022, PreQC No. JGB-22-16718 (PQ); **Reviewed:** 21-Mar-2022, QC No. JGB-22-16718; **Revised:** 25-Mar-2022, Manuscript No. JGB-22-16718(R); **Published:** 31-Mar-2022, DOI: 10.35248 /2168-958X.22.11.186.

Citation: Joanne H (2022) A Note on Glycoconjugates in the Endothelium of the Blood Vessels. J Glycobiol. 11:186.

inflammatory effects of peroxisome proliferator-activated receptor - γ ligands. J Biol Chem. 2011;286(44):38738-38747.

5. Scott DW, Chen J, Chacko BK, Traylor Jr JG, Orr AW, Patel RP. Role of endothelial N-glycan mannose residues in monocyte recruitment during atherogenesis. Arterioscler Thromb Vasc Biol. 2012;32(8):e51-e59.

6. Lingwood CA. Glycosphingolipid functions. Cold Spring Harb Perspect Biol. 2011;3(7):1-26.

7. Rajesh M, Kolmakova A, Chatterjee S. Novel role of lactosylceramide in vascular endothelial growth factor-mediated angiogenesis in human endothelial cells. Circ Res. 2005;97(8): 796-804.

8. Schaefer L, Schaefer RM. Proteoglycans: From structural compounds to signaling molecules. Cell Tissue Res. 2010;339(1):237-246.