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The Experience in Lectins Application to Assess Changes in the Carbohydrate Composition of Murine Thymocytes Glycocalyx in the Early and Late Apoptotic Stages

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The apoptosis process is an important element in the maturation and differentiation of T-lymphocytes. The work is devoted to the analysis of changes in the composition of CBA mice thymocytes glycocalyx oligosaccharides during the hydrocortisone induced apoptosis. A panel of 23 fluoresceinisothiocyanate-labeled lectins specific for mannose, mannose and glucose, galactose, N-acetyl-D-galactosamine, N-acetyl-D-glucosamine, fucose and N-acetylneuraminic acid residues was used. Flow cytometry was the method for evaluation the binding of lectins to thymocytes of intact mice, as well as mice after administration of hydrocortisone. Based on the results of TMRM and 7-AAD staining, the cells were divided into living thymocytes, cells in early and late apoptosis. It has been established that living cells carry carbohydrates on the surface of glycocalyx containing terminal residues of galactose and N-acetyl-D-galactosamine. With the transition of thymocytes to late apoptosis, the binding of all lectins increases, except for fucose-specific. The external glycocalyx structures of living thymocytes are low in density and contain groups of oligosaccharides with N-acetyl-D-galactosamine and D-galactose in the terminal position. The near-membrane layer of glycocalyx is characterized by a high density and a wide variety of oligosaccharide structures that persist at the stage of late apoptosis of thymocytes. The results indicate nonuniform density and heterogeneity of oligosaccharides in glycocalyx, a significant part of which is lost in early apoptosis.

Keywords: thymocytes, apoptosis, lectins, glycocalyx carbohydrates