Turkish Journal of Medical Sciences

Turkish Journal

of

Medical Sciences

Investigation of Various Terminal Carbohydrate Structures in Apolipoproteins of Human Serum Chylomicrons and VLDL

Tayfun GÜLDÜR[1]
Tülay İLERİ[1]
Ramazan YILMAZ[2]
[1]Department of Biochemistry, Faculty of Veterinary Medicine, Fırat University, Elazığ-
[2]Department of Biology, Faculty of Science, İnönü University, Malatya-Turkey

Keywords
Authors

medsci@tubitak.gov.tr

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Abstract: The roles of terminal carbohydrate moieties of serum glycoproteins in their recognition and uptake by receptors and in their rapid removal from the circulation are well established. However, little is known about the detailed structure of the terminal glycan chains in apolipoproteins and their compatibility with the known ligand specificity of carbohydrate recognition systems. The carbohydrate moieties of apolipoproteins in human serum chylomicrons and VLDL were examined. Chylomicrons and VLDL were isolated from the serum by ultracentrifugation for $1.6x10^{6}$ g.min and $5.5x10^{7}$ g.min respectively. The top 1.5cm fraction containing chylomicrons or VLDL was recovered. Following delipidization, apolipoproteins were subjected to SDS-PAGE and consequently blotted onto nitrocellulose membranes. Digoxigenin-labeled lectins, each of which recognizes a specific sugar sequence, were incubated with apolipoproteins immobilized on a Western blot membrane in order to investigate some of the terminal carbohydrate structures commonly found in carbohydrate chains of glycoproteins. Sialic acids linked a (2-6) or a (2-3) to galactose and Galb(1-4)GlcNAc structures were detected in both apo B-100 of VLDL and B-48 of chylomicrons. However, terminal mannose, a (1-3), a (1-6) or a (1-2) linked to mannose was found only in apo B-100 of VLDL. Apo E in both lipoprotein fractions was found to contain only sialic acid linked a (2-6) to galactose whereas none of the carbohydrate structures investigated were detected in apo C. The compatibility of the glycans found in apolipoproteins with the known ligand specificities of carbohydrate recognition systems was evaluated.

Key Words: Lipoprotein, apolipoprotein, glycoprotein, carbohydrate sequence.

Turk J Med Sci 2000; **30**(5): 459-464.
Full text: pdf
Other articles published in the same issue: Turk J Med Sci,vol.30,iss.5.