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Glycoprofiling of seminal plasma: Hopes and drawbacks for male infertility testing

Mirosława Ferens-Sieczkowska
Medical University of Wrocław, Poland

Conception problems affect about 15% of couples in developed countries. A male factor is considered crucial or co-existing in at least half of these cases, but evaluation of the reasons of male decreased reproductive potential is fairly not sufficient. Andrologists claim urgently for reliable diagnostic and prognostic biomarkers, as well as molecular targets for potential treatments. Considering the importance of carbohydrate-protein interactions in different aspects of fertilization, also male infertility becomes a field of interest for glycobiology. Interestingly, both sperm and seminal plasma glycomes of fertile men contain substantial amounts of immunomodulatory glycoepitopes, usually rare in normal body fluids. These motifs include LeX, bisecting GlcNAc and high-mannose type glycans. It has been hypothesized that this unusual glycosylation profile is engaged in receiving maternal immune privilege during fertilization and pregnancy. If this hypothesis is true, at least some cases of infertility may be related to incorrect glycosylation patterns within male reproductive tract. Our research is thus focused on the comparison of seminal plasma glycomes of fertile and infertile male subjects. Although we have found significant alterations in fucosylation, sialylation and high-mannose glycan content, these results are still far from diagnostically valuable conclusions. The main challenge is the complexity of seminal plasma, consisting of secretions of testes, epididymis and different accessory glands. Some experimental data suggest that their glycosylation pathways are not necessarily identical. Regarding also extreme inter-individual variability, it seems that successful search for infertility glycobiomarkers require careful selection of candidate glycoproteins, representing particular parts of male reproductive tract.

Biography

Mirosława Ferens-Sieczkowska is an Associate Professor in the Department of Chemistry and Immunochemistry, Medical University of Wrocław, Poland. She graduated with honors from the Science Division, University of Wrocław, and received her PhD in Biochemistry from the same University. During her work in the Institute of Biochemistry and Molecular Biology, University of Wrocław, she focused her interest on plant biochemistry, especially the structure and function of plant lectins. Currently she is appointed in Medical University of Wrocław and her interests turned into the field of glycobiology, protein-carbohydrate interactions and the impact of altered and impaired glycosylation on disease etiology.

miroslawa.ferens-sieczkowska@am.wroc.pl

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