

## GLYCOPROFILING OF SERUM N-GLYCANS: A POTENTIAL AGEING BIOMARKER

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In humans, the ageing process seems to be primarily under genetic control. Age-dependent diseases develop on this background as a consequence of other factors. Due to the rapidly increasing number of elderly people in many countries, there is a need for innovative treatments for age-related diseases. It is well known that the N-linked glycans of glycoproteins play important biological roles by influencing the functions of glycoproteins. Although many studies reported the importance of the structural changes of glycans during development, little information is available on these changes during ageing.

Our group very recently developed methodology (DSA-FACE) for measuring of N-glycan to generate profiles of N-linked sugar proteins. The technique makes use of classical DNA-sequencing technology. Parameters derived from the sugar-profiles obtained this way are used to calculate our marker value. By using DSA-FACE, we have profiled the total N-glycome of human sera ranging from 30 to 60 years old. After analysis, we found that the concentrations of N-linked sugar structures change during ageing. These changes of N-glycans are independent of the modification of immunoglobulin glycosylation. In addition, we examined the serum N-glycan profile of mouse C57BL/6J and rat F344 during their ageing. In agreement with previous reports, the N-glycoprofile in serum revealed species-specificity. As caloric restriction (CR) is a well-know condition retarding ageing and increasing maximum life span in rodents and other animal models, we used the procedure of CR to identify and validate the serum N-glycome as an ageing biomarker. We found clear differential age-related changes of the N-glycan profiles between the CR and AL animals. In a similar way, the N-glycan profile may be especially interesting for testing the effects of dietary compounds and/or medications on the global health status of an animal, including humans. Eventually, N-glycoprofiling could be used as an ageing biomarker to predict the condition of human and animal health. The identification of N-glycoprofile as ageing biomarkers to measure age-related changes can be of great value to people in general, for prevention of ageing-related diseases through development of anti-ageing medicines.