E47   Estimation of Human Age Using N-Glycan Profiles From Bloodstains

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After attending this presentation, attendees will learn the importance of glycans in human age estimation and that a bloodstain could be used to predict the age of an offender who committed a crime even few years ago, which represents valuable progress in the field of forensic science.

This presentation will impact the forensic science community by providing findings demonstrating that the analysis of the N-glycan profile could be a useful tool in forensics for determining human age estimation from dried bloodstains found at the crime scene.

Protein glycosylation is the most common epiproteomic modification that is involved in numerous physiological and pathological processes. Previous studies reported strong associations between human plasma N-glycans and age, prompting this study to evaluate the potential application of this biological phenomenon in the field of forensics.

Blood from 526 blood donors from different parts of Croatia was collected on bloodstain cards during the period of 2004-2007 and stored at +4°C for 6-9 years. Glycosylation profiles of the bloodstains were analyzed using Hydrophilic Interaction Liquid Chromatography/Ultra Performance Liquid Chromatography (HILIC/UPLC). The statistically significant correlation between N-glycan profiles of bloodstains and chronological age was found and the statistical model that can be used for the age prediction was designed (Age=75.59–5.15 x (GP4)2+17.07 x GP6–5.30 x (GP10)2–16.56 x GP16+20.07 x GP20–7.54(GP20)2+16.47 x GP22).

$$Age = 75.59 - 5.15 \times (GP4)^2 + 17.07 \times GP6 - 5.30 \times (GP10)^2 - 16.56 \times GP16 + 20.07 \times GP20 - 7.54(GP20)^2 + 16.47 \times GP22$$

This model explains 47.78% of variation in age, with the prediction error of 9.07 years. This study's findings demonstrate that the analysis of the N-glycan profile could be a useful tool in forensics, providing human age estimation from dried bloodstains found at the crime scene.

Glycans, Age, Bloodstain

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