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Development of a reverse lectin ELISA for detecting fucosylated forms of α1-acid glycoprotein associated with hepatocellular carcinoma

Eva Astrom
Linköping University, Sweden

Altered fucosylation of glycoproteins is associated with development of hepatocellular carcinoma (HCC). Lectins have been commonly used to assay changes in fucosylation of plasma glycoproteins. In the present study, a recombinantly engineered form of the fucose binding lectin *Aleuria aurantia* (AAL) consisting of a single binding site for fucose (S2), was used to construct a reverse lectin ELISA method. Microtiter plates coated with the S2 lectin were used to capture glycoproteins from plasma samples followed by antibody detection of S2-bound fucosylated α1-acid glycoprotein (S2-bound AGP). The method was used to compare the level of S2-bound AGP in serum samples from a small cohort of patients with hepatitis, cirrhosis or HCC. Using the reverse S2 lectin ELISA it was shown that the levels of S2-bound AGP was significantly higher in HCC patients compared to non-cancer patients and that there was also a significant elevation of S2-bound AGP in HCC patients compared to cirrhosis patients. There was no correlation between the level of S2-bound AGP and total AGP concentration. The performance of S2-bound AGP in differentiating HCC from cirrhosis samples or hepatitis samples was compared to other markers. A combination of S2-bound AGP, α-fetoprotein and AGP concentration showed performances giving area under receiver operating curves of 0.87 and 0.95, respectively.

eva.i.astrom@liu.se