Novel urinary glycan profiling by lectin array serves as the biomarkers for predicting renal prognosis in patients with IgA nephropathy

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Abstract

In IgA nephropathy (IgAN), IgA1 molecules are characterized by galactose deficiency in *O*-glycans. Here, we investigated the association between urinary glycosylation profile measured by 45 lectins at baseline and renal prognosis in 142 patients with IgAN. The primary outcome was estimated glomerular filtration rate (eGFR) decline (>4 mL/min/1.73 m^2/year), or eGFR≥30% decline from baseline, or initiation of renal replacement therapies within 3 years. During follow-up (3.4 years, median), 26 patients reached the renal outcome (Group P), while 116 patients were with good renal outcome (Group G). Multivariate logistic regression analyses revealed that lectin binding signals of *Erythrina cristagalli* (ECA) (odds ratio [OR] 2.84, 95% confidence interval [CI] 1.11-7.28) and *Narcissus pseudonarcissus* (NPA) (OR 2.32, 95% CI 1.11-4.85) adjusted by age, sex, eGFR, and urinary protein were significantly associated with the outcome, and they recognize Gal(β1-4)GlcNAc and high-mannose including Man(α1-6)Man, respectively. The addition of two lectin-binding glycan signals to the interstitial fibrosis/tubular atrophy score further improved the model fitness (Akaike's information criterion) and incremental predictive abilities (c-index, net reclassification improvement, and integrated discrimination improvement). Urinary *N*-glycan profiling by lectin array is useful in the prediction of IgAN prognosis, since ECA and NPA recognize the intermediate glycans during *N*-glycosylation of various glycoproteins.

Keywords: IgA nephropathy, glycan, renal prognosis, biomarker, lectin