Urinary Excretion of Acid Glycosaminoglycans and Its Relationship to Proteinuria

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Dear Sir,

Acid glycosaminoglycans (AGAG) have been implicated in the selective glomerular filtration of proteins, but so far their specific function has remained elusive. In 1978, Kanwar and Farquhar [1] reported the presence of AGAG in the glomerular basement membrane (GBM). Further studies showed that heparan sulfate (Hep-S04) was the major AGAG present in the GBM; hyaluronic acid was found in trace amounts [2]. A heparan sulfate containing proteoglycan was found in the GBM by Par-thasarathy and Spiro [6]. These negatively charged AGAG have been postulated to be responsible for the charge barrier of the glomerular filter [1].

In patients with idiopathic nephrotic syndrome, Alport's syndrome and, in many cases, diabetes – all clinical entities showing proteinuria – an altered excretion of AGAG was reported by several authors.

For this study we examined not only quantitative but also qualitative changes of urinary excretion of AGAG in controls and patients with diabetes mellitus, Alport's syndrome, idiopathic nephrotic syndrome and glomerulonephritis.

The urinary AGAGs were separated by one-dimensional electrophoresis on cellulose acetate by a method modified from Wessler[3]. Quantification was performed according to Calatroni [4]; details will be reported elsewhere.

Table I. Urinary excretion of various AGAGs (µg/g creatinine)

Table I lists the urinary concentration of total AGAG, chondroitin-sulfate (Cho-S04), Hep-S04, and an unidentified AGAG or AGAG-protein-complex, all normalized to the creatinin excretion. The AGAG fractions are also expressed as percent of total excretion.

A pronounced shift towards an increased excretion of Hep-S04 was found in all cases of nephrotic disease with proteinuria.

The children with diabetes, none of them presenting with clinical signs of kidney involvement, did not differ from the controls in the amount of total AGAG and Hep-S04 excreted. However, children with mucopolysaccharidoses (MPS IH, MPS IS, MPS IH/S, MPS II, MPS IIIA, MPS IIIB, MPS IV, MPS VI – for a description of these syndromes see [5] who had an excretion 10 times higher than the controls (total AGAG: 202.349 µg/g creatinine) showed no signs of proteinuria. Patients with idiopathic nephrotic syndrome excreted in 5 of 9 cases about 8% of their AGAG as a fraction which is neither Cho-S04, Hep-S04, dermatan sulfate, keratan sulfate and hyaluronic acid. Thus the causal relationship of AGAG excretion and renal disease with proteinuria remains rather improbable. It remains to be shown whether the AGAG fraction

detected in urine of patients with INS is influencing the glomerular permeability for macromolecules.

Group	Total AGAG	Cho-S04	Hep-S04	Undefined complex
Alport's syndrome (n = 9)	13.162(100%)	9.923(75%)	3.239(25%)	
Glomerulonephritis (n = 10)	16.22 (100%)	11.674(72%)	4.546(28%)	
Diabetes mellitus (n = 12)	16.454(100%)	13.87 (84%)	2.584(16%)	
Control (n = 15)	19.462(100%)	16.664(86%)	2.798(14%)	
INS'-(n = 4)	42.862(100%)	30.66 (72%)	12.202(28%)	
INS' + (n = 5)	32.016 (100%)	23.712 (74%)	5.792 (18%)	2.51 (8%)

INS = Idiopathic nephrotic syndrome.

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Announcement

Nils-Alwall Prize Awards 1985

Invitation for Submissions for the Nils-Alwall Prize 1986

At its 18th Meeting, held in Mainz, FRG, on September 25, 1985, the Arbeitsgemeinschaft für Klinische Nephrologie e.V. awarded the Nils-Alwall Prize of DM 15,000.- for 1985 divided equally between:

Mr. Udo Hildebrand, Nephrological Centre of Niedersachsen, Hann.-Münden, FRG, for his work entitled: 'Central Production of a Pyrogen-Free and Endotoxin-Free Substitution Fluid for Hemo-filtration and Peritoneal Dialysis' and

Dr. Wilfried Kramer, Centre for Internal Medicine of the University of Giessen, FRG, for his work entitled: 'Determinatio der linksventrikulären Funktion bei chronisch dialysepflichtiger Niereninsuffizienz: ätiologische, klinische und therapeutische Aspekte'.

The Arbeitsgemeinschaft für Klinische Nephrologie e. V. (FRG and West-Berlin) would be pleased to receive submission of papers from candidates for the Nils-Alwall Prize. This Prize is awarded to young scientists engaged in clinical research in German-speaking regions in the field of nephrology, with particular emphasis on activities involving dialysis or similar methods of extracorporeal elimination or kidney transplants.

The award comprises the Nils-Alwall Medal, a certificate, and prize money of DM 15,000.-. The prize may be awarded to up to three nominees.

Candidates up to 45 years of age are required to submit either non-published work, work published up to 1 year before submission, or a summary of original extended research work (but not a habilitation thesis. If this work involved patients, it must explicitly confirm that all relevant ethical principles have been observed (Helsinki Agreement 1964, Tokyo Agreement 1975).