

## Sialic acid expression in rat kidney urinary tubule after experimental polymicrobial sepsis

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Investigations have demonstrated that sialic acid play an important role in maintaining the structure and functionality of the kidney tubular wall. In several studies, performed on some renal pathologies, morpho-functional changes of the tubules showed a correlation with altered expression of sialic acid. In sepsis, morpho-functional changes in the tubules and proteoglycans alteration were also observed; no data are available on the expression of sialic acid in these kidney components. Therefore, the aim of this study was to evaluate the expression of sialic acid in the different tubular regions of the kidney in the early stages of an experimental animal model of polymicrobial sepsis. For this purpose experiments were performed on adult male rats which were randomly assigned to two groups: 1) sham-operated (n=15); 2) Caecal Ligation and Puncture (CLP) (clinically relevant model of polymicrobial infection that mimics human sepsis) (n=19). The groups were divided into 3 subgroups related to 3 time points after CLP or sham-operated: t1=0 h, t2=3 h and t3=7 h. For evidence of sepsis TNF- $\alpha$  plasma level was measured and microbiology of peritoneal fluid was examined with bacteriologic techniques. Urinary protein levels were measured to test the functional damage of the kidney. Sialic acid in glomerular barrier were investigated using MAA, SNA and PNA lectins, in addition to the use of enzymatic and chemical treatments to characterize different glycosidic linkages of the sialoderivatives and to obtain information on their structure. The results showed plasma TNF- $\alpha$  level significantly increased after the CLP induction when compared to sham-operated animals. Bacteriologic techniques revealed a polymicrobial infection after the CLP. The proteinuria was significantly increased in CLP group. Lectin histochemistry showed an increase of sialic acids with linkage  $\alpha$ -2,3 and a decrease with linkage  $\alpha$ -2,6 in the tubules of septic rats with respect to the control ones. Sialic acids with acetylic groups were in major amount in sepsis group. These findings suggest a correlation between sialic acids altered expression and the characteristics morpho-functional changes in the kidney tubules during sepsis. Moreover, the increase of acetylated sialic acids could be a compensatory response in attempt to impede desialylation by bacterial sialidase and/or probably the action of circulating proinflammatory molecules, such as TNF- $\alpha$ .

Keywords: sialic acid, lectins, sepsis, kidney tubules.