**Inhibitory effect of ammonium alginate on the pathological progression of chronic kidney disease due to salt loading**

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**Background and aims.** Chronic kidney disease (CKD) is a chronic condition which causes renal impairment and renal function decline due to hypertension and other factors, ultimately leading irreversibly to end-stage renal failure. CKD patients are reported to have impaired excretory function, and elevated blood pressure exacerbates the disease due to Na+ loading.1) Therefore, a novel solution to excessive salt intake is required to prevent the progression of CKD.

Ammonium alginate (AAL) has been reported to excrete Na+ by the ion-exchange reaction between Na+ and NH4+, namely salt elimination effect.2) Hence, we investigated the inhibitory effect of AAL on the pathogenesis of CKD in the salt-overloaded one-kidney ureteral ligation (UUO) model mice.

**Methods.** The UUO model mice were prepared by ligating their left ureters. NaCl and AAL were fed to them (**Figure 1**) to evaluate the effects of AAL on the salt elimination and improvement of inflammation and fibrosis pathology. In addition, body weight and blood biochemical parameters were evaluated to investigate the safety of AAL.

**C57BL/6J (6-week)**

**Normal diet or 5% AAL containing diet**

**Water or 1% NaCl aqueous solution**

**6**

**(week)**

**8**

**Figure 1.** UUO model mice (6-week-old C57BL/6J male mice) were fed a normal diet or a diet containing 5% AAL. Each group was given either normal water or a 1% NaCl solution to drink ad libitum. The mice were dissected and evaluated two weeks later.

**Results.** In the salt-loading UUO model mice, AAL showed a salt elimination effect that suppressed urinary Na+ excretion and increased fecal Na+ excretion. In the UUO model mice, AAL suggested to suppress renal impairment, inflammation, fibrosis and activation of renin-angiotensin system. Furthermore, in the salt-loading UUO model mice, AAL administration showed negligible change in the body weight and the blood biochemistry parameters, suggesting that the AAL may be safe *in vivo*.

**Conclusion/Discussion.** These results suggest that AAL has a nephroprotective and suppressing abilities of pathological progression of CKD in the salt-loading UUO model mice due to the salt elimination effect. In the future, further study using another CKD model mice and the detailed investigations to clarify the mechanism of the anti-inflammatory and anti-fibrotic effects of AAL should be conducted.

**References:**

1. H. A. Koomans et al (1985) Hypertension 7: 714-721
2. Y. Fujiwara et al (2021) Heliyon 7: e06551