

## **Physiological Implication of the Guanylin Peptide Family in the Regulation of Water and Electrolyte Homeostasis**

Masamitsu Nakazato, M.D., Ph.D.  
Third Department of Internal Medicine  
Miyazaki Medical College

### Summary

Uroguanylin, originally isolated from human and rat urine, is a new natriuretic peptide. Its plasma level is increased in association with renal impairment and fluid retention in patients with renal diseases. We measured uroguanylin concentrations in patients on hemodialysis (HD, n = 76) and those on continuous ambulatory peritoneal dialysis (CAPD, n = 10) using a sensitive radioimmunoassay. Plasma concentrations of immunoreactive (ir)-uroguanylin in the patients on HD and CAPD ( $212.0 \pm 17.4$  and  $245.3 \pm 39.5$  fmol/ml) were significantly higher than the value for the normal controls ( $5.0 \pm 0.3$  fmol/ml). Plasma ir-uroguanylin levels before the start of regular HD were correlated with predialysis excess weight based on their dry weights ( $r = 0.33$ ,  $p < 0.01$ ) and with dialysis duration ( $r = 0.26$ ,  $P < 0.05$ ). The plasma levels in patients with HD, for whom high-flux membranes were used, were decreased at the end of regular HD as compared with the prior levels ( $p < 0.05$ ), but not in those who underwent HD with conventional membranes. These findings suggest that the plasma ir-uroguanylin level is related to the patient's volume status as well as renal impairment. Moreover, we studied uroguanylin in the stomach. Uroguanylin messenger RNA and the peptide are present in rat stomach, but the cellular source has not been identified. We separated gastric mucosal cells by size into seven fractions and enriched endocrine cells using counterflow elutriation. Double-staining showed that uroguanylin and histamine are colocalized in enterochromaffin-like (ECL) cells that release histamine, leading to the stimulation of gastric acid secretion from parietal cells. Uroguanylin is synthesized in ECL cells. These findings should contribute to elucidating the physiological functions of ECL cells and the cyclic GMP-mediated gastric ion transport mechanism.