Gastrin-releasing peptide modulates the pacemaker function of interstitial cells of Cajal

Noriyuki Kaji¹, Kazuhisa Kishi¹, Tamaki Kurosawa¹, Masatoshi Hori¹

¹*Dept. of Vet. Pharmacol., Grad. Sch. of Agri. & Life Sci., The Univ. of Tokyo*

Aim: Gastrin-releasing peptide (GRP) is a neuropeptide, which regulates wide range of biological processes. The aim of this study is to clarify the effect of GRP signaling on the interstitial cells of Cajal (ICC), an intestinal pacemaker cell.

Method: Immunofluorescence and RT-PCR was performed to identify the expression of GRP and GRPR. Maclurins spontaneous contraction was measured by using organ bath system. Ca^{2+} imaging was performed to assess the pacemaker function of ICC. Neuromedine C and [D-Phe6]-bombesin(6-13)OMe was used as a GRPR agonist and antagonist, respectively.

Result: GRP was expressed in the enteric neuron at the level of myenteric plexus. GRPR mRNA was expressed in the FACS-sorted ICC. The frequency of spontaneous contraction in the antrum was increased by GRPR agonist. In contrast, the frequency of spontaneous contraction in the ileum was decreased by GRPR agonist. GRPR antagonist slightly increased the frequency of spontaneous contraction. The frequency of Ca^{2+} oscillation of ileal ICC was decreased by GRPR agonist and increased by GRPR antagonist.

Conclusion: GRP released from enteric neuron modulates the frequency of Ca^{2+} oscillation in ICC. GRP may have role in the regulation of basal rhythm of intestinal motility.