A close relationship between networks of interstitial cells of Cajal and gastrointestinal transit in vivo

Kamizaki Moe¹, Kazuhisa Kishi¹, Noriyuki Kaji², Satoshi Iino³, Masatoshi Hori¹

¹Dept. Veterinary Pharmacol. The Univ. of Tokyo, ²Dept. Pharmacol. Azabu Univ., ³Dept. Morphological and Physiological Sciences Univ. of Fukui

【Background & Aim】The interstitial cells of Cajal (ICCs) form ICC networks in the same area of myenteric plexus region in the gastrointestinal (GI) tract (ICC-MP). ICC-MP are involved in the generation of electrical pacemaker activity which in turn regulates GI motility. In this study, we examined the contribution of the ICC-MP to GI transit in vivo using W/W mice with c-Kit mutation-mediated partial ICC deficiency.

【Methods】GI transit was measured by a ¹³C-octanoic acid breath test, a migration of orally administered dyes and a bead expulsion assay. The ICC networks were detected by immunohistochemical staining for c-Kit antibody.

【Results】The gastric emptying capacity was normal in W/W mice. On the other hand, the small intestinal transit capacity of W/W mice was significantly reduced. Similarly, the colonic transit time was also significantly delayed in W/W mice. Immunohistochemical staining of the GI muscular layer revealed the formation of c-Kit-positive ICC-MP in the wild type mice, with ICC-MP in W/W mice forming normally only in the gastric antrum and significantly reduced in the ileum and colon. Anoctamine 1 (Ano1) was also detected to be consistent with the altered c-Kit expression in W/W mice.

【Conclusion】The ICC-MP may contribute to gastrointestinal transit as a powerful drive function in vivo.