Ginsenosides Modulate the Intestinal Motility by Acting on Interstitial Cells of Cajal

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Although ginsenosides have a variety of physiological or pharmacologocal function in various regions, there are only a few reports on effects of ginsenosides in gastrointestinal (GI) motility. So, we studied the modulation of pacemaker activities by ginseng total saponins in interstitial Cells of Cajal (ICC) with whole cell patch-clamp technique. Externally applied ginseng total saponins (GTS) produced membrane depolarization in current-clamp mode and increased tonic inward pacemaker currents in voltage-clamp mode. The application of flufenamic acid or niflumic acid abolished the generation of pacemaker currents but only flufenamic acid inhibited the GTS-induced tonic inward currents. And, the tonic inward currents by GTS did not inhibited by intracellular application of GDP-β-S.

The pretreatment with Ca^{2+} free solution, U-73122, an active phospholipase C inhibitor, and thapsigargin, a Ca^{2+}-ATPase inhibitor in endoplasmic reticulum, abolished the generation of pacemaker currents and suppressed the GTS-induced action. However, chelerythrine and calphostin C, protein kinase C inhibitors did not block the GTS-induced effects on pacemaker currents. Also, we found GTS increased the spontaneous $[Ca^{2+}]_i$ oscillations in cultured ICC.

These results suggest that ginsenosides modulate the pacemaker activities in ICC and the ICC can be targets for ginsenosides and their interaction can affect on intestinal motility.