Format: Abstract

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A novel CB receptor GPR55 and its ligands are involved in regulation of gut movement in rodents.

Lin XH[1], Yuece B, Li YY, Feng YJ, Feng JY, Yu LY, Li K, Li YN, Storr M.

Author information

Abstract

BACKGROUND: This study was to investigate the effects of the novel cannabinoid receptor - G protein-coupled receptor 55 (GPR55) - and its ligands O-1602 and **cannabidiol** (CBD) on gastrointestinal (GI) motility in rodents.

METHODS: Lipopolysaccharide (LPS) was used in vivo to produce the **model** of septic ileus. The intestinal motility was measured by recording myoelectrical activity of jejunum in rats, and by measuring GI transit with a charcoal marker in mice, in presence of O-1602 or CBD. Inflammatory response was assessed serologically and histologically. The expression and distribution of GPR55 in the different parts of rat intestine were investigated by real-time PCR and immunohistochemistry. In vitro, the effects of the drugs on the GI movement were investigated by measuring the contraction of the intestinal muscle strips in organ bath, and the intracellular responses of the muscle cells with microelectrode technique.

KEY RESULTS: G protein-coupled receptor 55 was expressed in different parts of rat intestine. Lipopolysaccharide significantly inhibited the intestinal motility, increased inflammatory cytokines and GPR55 expression. Pretreatment with CBD normalized LPS-induced hypomotility and improved the inflammatory responses serologically and histologically. Both O-1602 and CBD counteracted LPS-induced disturbances of the gut contraction, but had no effect on the membrane potential of the muscle cells, while cannabinoid type 1 receptor antagonist AM251 and cannabinoid type 2 receptor antagonist AM630 increased the potential.

CONCLUSIONS & INFERENCES: G protein-coupled receptor 55 existed throughout the whole intestine of rats. O-1602 or CBD selectively normalized the motility disturbances. Possible mechanisms involved systemic anti-inflammation and the regulation of myoelectrical activity of the intestine.

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