Human mast cell mediator cocktail excites neurons in human and guinea-pig enteric nervous system.

Abstract:
Neuroimmune interactions are an integral part of gut physiology and involved in the pathogenesis of inflammatory and functional bowel disorders. Mast cells and their mediators are important conveyors in the communication from the innate enteric immune system to the enteric nervous system (ENS). However, it is not known whether a mediator cocktail released from activated human mast cells affects neural activity in the ENS. We used the Multi-Site Optical Recording Technique to image single cell activity in guinea-pig and human ENS after application of a mast cell mediator cocktail (MCMC) that was released from isolated human intestinal mucosa mast cells stimulated by IgE-receptor cross-linking. Local application of MCMC onto individual ganglia evoked an excitatory response consisting of action potential discharge. This excitatory response occurred in 31%, 38% or 11% neurons of guinea-pig submucous plexus, human submucous plexus, or guinea-pig myenteric plexus, respectively. Compound action potentials from nerve fibres or fast excitatory synaptic inputs were not affected by MCMC. This study demonstrates immunoneural signalling in the human gut and revealed for the first time that an MCMC released from stimulated human intestinal mast cells induces excitatory actions in the human and guinea-pig ENS.

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