

〈原 著〉

Paraben 類による Stinging の薬理学的考察

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Pharmacological Studies of Stinging Caused by Parabens

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Abstract

p-Hydroxybenzoic acid esters (parabens) have been widely used as preservatives for cosmetic products, and it was recently recognized that parabens often induced stinging on the human facial skin. We have found that parabens reversibly contract the ileum smooth muscle isolated from guinea pigs in a similar manner as with many other pain inducers. Whether this ileum smooth muscle contraction effect of parabens could be applied to the evaluation of stinging activities was investigated in this study. The order of contraction potency was methyl < propyl < butyl parabens, and butyl paraben showed dose-dependent contractions in a concentration from 10^{-5} M to 10^{-3} M. Paraben-induced contraction was confirmed not to be mediated by autacoids, such as histamine, acetylcholine, 5-hydroxytryptamine, substance P, bradykinin and prostaglandin-like substances. It was also found that the paraben-induced contraction involved Ca^{2+} channels activation as many other pain inducers did in excitable tissues including smooth muscles. The smooth muscle contraction induced by parabens was depressed by anti-stinging substances in human, such as POE (24) cholesterol, glyceryl monooleate, glycyrrhizin, α -bisabolol and Ca^{2+} entry blockers, and was enhanced by glyceryl monostearate, a stinging-enhancer. *o*-Hydroxybenzoic acid esters, which are the isomer of parabens and known to cause severe stinging in human, strongly contracted the smooth muscle.

These results suggest that this *in vitro* method using the ileum smooth muscle quantitatively correlates with stinging activities, and may be substituted for the direct assay using human facial skin for evaluating the stinging inducers activities.

Key words

1. stinging
2. parabens
3. pain
4. smooth muscle contraction
5. autacoids