Anti-itch properties of a 0.05 % hypochlorous acid gel in a chronic mouse model of atopic dermatitis – implications for direct effect on neurons

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Abstract

Recent reports in humans indicate that a topical hypochlorous acid formulation leads to relief in itch in atopic dermatitis patients. It is unclear by which exact mechanism this is achieved. Thus we tested a 0.05% hydrogel formulation in a chronic mouse model of house dust mite induced itch, as well as in vitro effects of hypochlorous acid on dorsal root ganglia (DRG) sensory neurons.

NC/Nga mice were sensitized with house dust mite (HDM) allergen twice weekly and treated topically twice a day with hypochlorous acid in a preventive as well as in a therapeutic setting. We measured scratching behaviour of the mice throughout the study.

The topical administration of hypochlorous acid in a preventive manner led to significantly reduced scratching bouts during the whole observation period of 12 weeks. When administered after full development of lesions, hypochlorous acid reduced scratching behavior nearly to the same extent as a 0.1% betamethasone dipropionate ointment. When DRG were excised from these mice after termination of the study, neurons responded to a lesser extent to pruritic stimuli like histamine and IL-31, compared to vehicle treated mice. Interestingly, the response to the stimuli was also reduced in total, in an in vitro setting: When DRG sensory neurons from untreated BALB/c mice were pre-incubated with 0.0001% hypochlorous acid, the response rate to various stimuli (e.g. histamine, IL-31, endothelin, serotonin and compound 48/80) was significantly reduced.

Taken together, these data indicate a significant anti-itch potential of hypochlorous acid, possibly due to a direct reduction of sensory response.

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