Is the pleasure of scratching an itch encoded in cutaneous sensory nerves? – Evidence from a neuronopathy patient.

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Abstract

Background: Itch is "an unpleasant sensation of the skin leading to the desire to scratch". In chronic itch, the itch/scratch cycle is reinforced by the intense pleasure and reward gained from scratching – despite negative consequences. It is hypothesised here that the pleasure derived from scratching is mediated by (or contributed to) by a class of c-fibers coding for the rewarding (pleasant) properties of touch - C-tactile afferents.
Methods: Psychophysical and physiological responses to acute itch and scratching were obtained from healthy subjects, and compared to responses from IW, a participant with large-fibre sensory neuronopathy below C3, but intact A-delta and c-fibre function.

Results: In the forearm, IW's responses to thermal QST measures, and physiological responses to histamine iontophoresis (wheal and axon reflex flare) match healthy subjects. IW perceived both Histamine & Cowage induced itch, although self-reported peak intensities were lower than for controls and required a greater dose to elicit a comparable itch percept. Rough, scratching touch was rated significantly more intense on itchy skin by both Healthy Subjects and IW and improved touch localisation in IW (which is typically low). Scratching an itch on the forearm is pleasurable – even for IW - despite the lack of large myelinated fibres.
Conclusions: Preferential activation of mechanosensitive Aδ and/or C fibre afferents with *high threshold* stimuli is integral to the pleasure of scratching an itch. This raises the question: in itch-states, is nociceptor activation perceived as more pleasant, or are other c-fibres (such as C-LTMs) signaling increased pleasantness?

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