***Supplementary material 1***

**Sub study on itch elicitation by von Frey filaments**

**Methods**

Touch-evoked itch, in this case elicited by the use of von Frey filaments, is generally termed “alloknesis” or “hyperknesis” dependent on whether the applied stimuli provokes itch under normal circumstances (which would be the case for a 50 um tip filament von Frey filaments 1). These sensory aberrations, often referred to collectively as *itch-associated dysesthesias* manifests secondarily to an itch provocation (or in patients suffering from acute or chronic itch) and are generally thought be spinally mediated. In the present study, sensitivity to touch-evoked itch was probed in the eight predetermined areas at baseline and after each itch provocation, respectively, using a method devised for ease of use and swiftness. A number of previous studies have used similar sets of von Frey filaments to evoke comparable magnitudes of itch and pain as those here presented 2–5

To initially select the von Frey filament intensities that most optimally evoked itch, a pilot study was conducted in a subgroup of 11 subjects. Here, the entire set of 20 calibrated von Frey filaments (North Coast Medical, Gilroy, CA, USA) with exerted forces ranging from 0.078 mN to 2.9 N was applied over 2 series of stimuli (1–2 s of skin contact) with ascending intensity on the volar forearms. For each stimulus the subjects were asked to rate the intensity of itch and pain on a NRS (as outlined in the methods section). Instructions similar to those previously described where provided for the sensory descriptors. This gave rise to a stimulus-response curve for itch and pain across the 20 von Frey filaments from which the 3 most consistent and highest rated itch inducing filaments were selected (see Fig. S1 below). Data from the initial pilot experiment were tested by subgrouping the 3 intensities eliciting the highest itch ratings and comparing these to the force groups below and above this level.

**Results**

Of the 20 applied von Frey forces 9.8, 13.7, and 19.6 mN performed significantly better in terms of itch elicitation than filaments exerting lower or higher forces (P < 0.01), see Fig. S1. Consequently, subsequent assessments were performed with these three filaments. On average, von Frey filaments ≤ 58.8 mN induced more itch than pain and filaments ≥ 78.1 mN induced more pain than itch, however, both sensations were rated relatively low throughout all exerted forces, with a peak itch intensity of NRS 1.2 ± 0.3 for itch at 13.7 mN and peak pain NRS of 2.0 ± 0.1 at 2.9 N. These results are also on par with previous findings 2–5 although contradictory evidence exists 6. Notice that since these sensory scores in response to von Frey stimuli were only obtained on the volar forearm a different optimal range could apply for e.g. the chin.

**Figure S1**:Responsiveness to 3 stimuli with 20 weight calibrated von Frey filaments. Subjects (n=11) were instructed to rate the itch and pain intensity evoked by each von Frey stimuli. The three most consistently itch-inducing filaments (gray rectangle) were chosen for further assessments. N reports of itch/pain (right y-axis) indicate how many subjects reported the sensations at a cut-off of > 5 .For mean itch and pain intensity “zero”-ratings are included.

**References**

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