**A person sitting at a desk with a computer

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alloknesis

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Summary of the protocol

This protocol describes the concept of alloknesis, a brief overview of the mechanism behind it and the assessment technique applied to quantify it.

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# Introduction

The term alloknesis, first coined by LaMotte et al. in 19881–4, represents one of the mechanical itch dysesthesias, that describe dysfunctional sensory states, in which itch is evoked by light tactile stimuli (e.g. from clothing or touch), or by stimuli which normally would only induce mild itching 1,5–8. Alloknesis (“allo”, and “knesis”, an ancient Greek word for itching) is described as a pruriceptive sensation or a scratching behavior evoked by a stimulus that is normally non itchy, such as light stroking of the skin with a cotton swab or a brush (Fig. 1) 1,9. This concept reflects a similar dysfunctional state evoked by pain and termed allodynia, in which pain is cause by a stimulus that normally does not provoke pain 10,11. Often, alloknesis represents a symptom in acute itch, chronic itch conditions such as neuropathic itch and atopic dermatitis but could also be induced experimentally in healthy volunteers 1,10,11. The primary cause of alloknesis is the sensitization of itch signaling pathways inducing amplified response to pruritogens and increased reactivity to other types of stimuli1,11–13. Moreover, also the dysregulation of the inhibitory systems in the spinal cord seems to contribute to alloknesis11. In humans, the intensity of alloknesis is often assessed by using brush strokes 1,14, as illustrated below under the section “protocol”.

A diagram of strength and strength

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Fig. 1: Graphical representation of the alloknesis phenomenon. The curve represents the stimulus-response curve, that is the association between the intensity of the applied stimulus (x-axis) and the itch response (Y-axis) under normal condi­tions and when dysesthesias are present. Created with BioRender.com and adapted from Andersen et al. 1with inspiration from Sandkühler J 13.

# Experimental Setup

Somedic SENSELab Brush no. 5 is used to determinate the intensity of alloknesis.

LabBench System

The NRS values are collected by LabBench program.

Computer-assisted Visual Analog Scale (COVAS)

# Protocol

Alloknesis will be measured using a standardized sensory brush (SENSELab Brush-05, Somedic AB, Hörby, Sweden) exerting a force of in the range of 200 +/- 100 mN. The investigator should perform 3 stimulations, in different directions, along the diagonals of the area of interest (AOI). Each stimulation consists of a set of 3 brush strokes (2-3 cm in length) in short succession (approximately 1 s in between) over the treated/control areas. The strokes are applied by keeping the brush perpendicular to the skin with a speed of 3-6 cm/sec. After each set of 3 brush strokes, the participant rates the sensation induced by the brush on a NRS scale from 0 to 10 (0 = “no itch”; 10 = “worst imaginable itch”). Alternatively, the COVAS system can be used for ratings.

## Instruction to subjects

During the experiment instructions to the subject will be shown on the secondary monitor.

## INSTRUCTION to experimenter

# Analysis

To perform statistical analysis, a total average will be calculated. Data output documented in source as NRS value between 0 (no itch) and 10 (maximal itch). An integer value or a decimal value (one digit) can be selected and stored.

# Discussion

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# Authors

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| Image | Silvia Lo Vecchio  Expert on Alloknesis and Itch  Contribution  Written |
| Image | Kristian Hennings  Profile  Contribution  Implemented the LabBench Protocol etc. |