Can the mechanical forces produced during an acute yogic stretching session upregulate the expression of *PIEZO1* in human peripheral blood mononuclear cells (PBMC)?: Preliminary results of a pilot study

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Background: Piezo channels have been described as sensors that serve to detect and transduce mechanical forces (i.e., mechanotransduction) in multiple inter- and intracellular signaling pathways. Studies have shown that immune cells exposed to mechanical pressure enhance their defensive functions, for example, by rapidly migrating through tissues.
Objective: To conduct a pilot three-arm RCT to gather preliminary data on the impact of an acute intervention of yogic stretching on the expression of *PIEZO1*, a mechanosensitive ion channel gene.
Methods: 30 Participants, 40-60 years old, yoga naïve, and relatively sedentary, were recruited during 2020-2021. Participants were randomized into 3 groups (intense and mild stretching and a control group) after in-person screening and baseline blood sample collection. Those randomized to both stretching groups received a one-on-one 1-hour yogic stretching session at the same location and time of the day; stretching was supporting by props (blocks and mats) and were video-recorded. Heart rate and calories were monitored using a Polar H10 chest sensor. After the intervention, 6 blood samples were obtained at different time points using CPT™ tubes and processed according to standard protocols. In addition, we performed an exploratory gene expression Area Under the Curve (AUC) analysis of *PIEZO1* in peripheral blood mononuclear cells (PBMCs) obtained at baseline and 4-time points post the intervention.
Results: Longitudinally, both yogic stretching groups had a higher heart rate (HR) during the practice (median; intense: 90.7; mild: 95; control: 72.90) and expended more calories than the control group (mean ± SEM; Intense: 260 ± 30; Mild: 302 ± 43; control: 137 ± 9.5). An increase of the AUC in the longitudinal expression of the *PIEZO1* gene was observed in both yogic stretching groups (mean ± SEM; Intense: 6.5 ± 0.84; Mild: 5.2 ± 0.72; control: 4.8 ± 0.24).
Conclusion: These preliminary findings support that it is feasible to evaluate the acute effect of the physical component of yoga on the expression of PIEZO1, an essential mechanosensitive ion channel protein complex involved in the detection of mechanical cues (i.e., mechanical forces). These results warrant further analyses and translational research to determine the effect of yogic stretching in other tissues utilizing mechanosensitive channels (e.g., Piezo 1 and 2 in the skin and connective tissue's resident cells) and its relevance to proprioception.