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BOTULINUM A TOXIN REDUCES THE EXPRESSION OF VANILLOID AND CANNABINOID RECEPTORS IN "IN VITRO" PRIMARY HUMAN SMOOTH MUSCLES CELL CULTURE: PRELIMINARY RESULTS

Hypothesis / aims of study

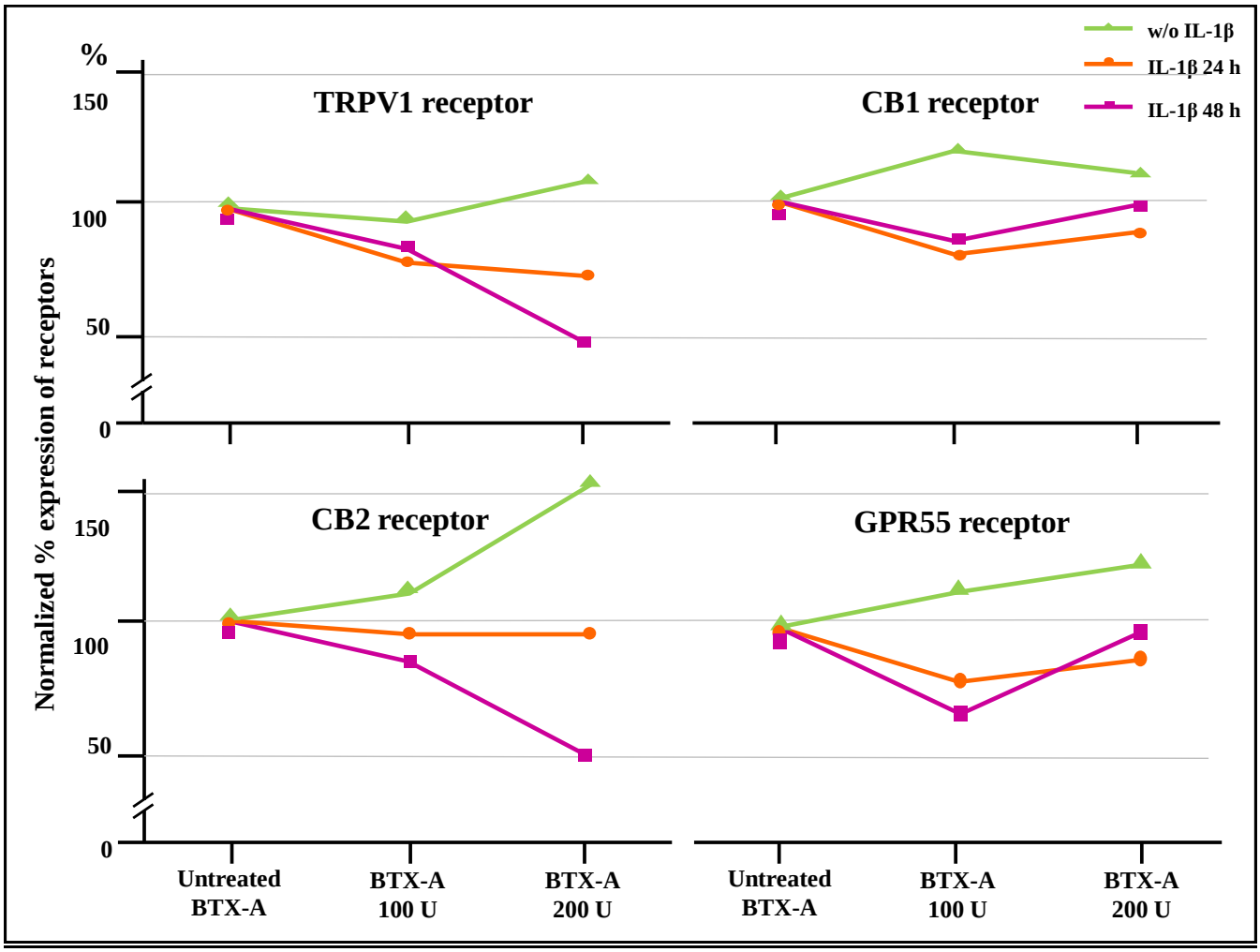
It has been observed that botulinum A toxin (BTX-A) can have positive effect in pain modulation. We investigated the effects of BTX-A on the expression of TRPV1 and cannabinoid receptors type 1 (CB1), type 2 (CB2) and GPR55 in “in vitro” primary cultures of Human Smooth Muscle Cells (HSMC).

Study design, materials and methods

HSMC cultures were: a) pre-treated with 10ng/ml IL-1β to induce inflammation for 24h and 48h, followed by BTX-A at different dosages (100U and 200U) for 24h; b) treated with BTX-A alone (100U and 200U) for 24h. Untreated HSMC were used as control. Cytofluorimetric-analysis evaluated presence and expression of receptors on treated and untreated HSMC.

Results

Pre-treatment of HSMC with 10ng IL-1β increased the expression of all receptors. Addition of BTX-A 100U and 200U for 24h significantly reduced the expression of receptors in stimulated HSMC (Figure).



Interpretation of results

BTX-A reduces TRPV1 and cannabinoid receptors’ expression in inflammed HSMC. Particularly, the reduced expression is more evident for TRPV1 and CB2, with BTX-A 200U, in IL-1β pre-treated HSMC for 48h.

Concluding message

Interactions exists between two pain-related receptors: cannabinoids and TRPV1. These interactions arise at molecular level and in physiological processes (inflammation and pain). The observed clinical effect of BTX-A on pain, can be partially explained by its activity on TRPV1 and cannabinoid receptors.

References
1. Activation of CB1 inhibits NGF-induced sensitization of TRPV1 in adult mouse afferent neurons
2. The role of the peripheral cannabinoid system in the pathogenesis of detrusor overactivity evoked by increased intravesical osmolarity in rats.
3. Cannabinoid CB1 receptors are expressed in the mouse urinary bladder and their activation modulates afferent bladder activity.

Disclosures
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