Involvement of α-melanocyte-stimulating hormone-thromboxane A₂ system in spontaneous scratching in mice with atopy-like dermatitis

Tsugunobu Andoh¹, Chihiro Akasaka¹, Kyoko Shimizu², Jung-Bum Lee³, Yoko Yoshihisa², Tadamichi Shimizu²


α-Melanocyte-stimulating hormone (α-MSH) is an endogenous peptide hormone that is involved in cutaneous pigmentation. Recent our study has demonstrated that α-MSH elicits scratching, an itch-related response, in mice. In this study, we investigated whether α-MSH was involved in spontaneous scratching in mice with atopy-like dermatitis (AD-mice). α-MSH and the prohormone convertase 2, which is the key processing enzyme for the production of α-MSH, were distributed mainly in keratinocytes in AD-mice. In primary cultures of mouse keratinocytes and dorsal root ganglion (DRG) neurons, α-MSH receptors (MC1R and MC5R) mRNAs were expressed. MC1R antagonist agouti-signaling protein inhibited spontaneous scratching in mice with atopy-like dermatitis. In mice, α-MSH elicited itch-associated responses, which were inhibited by TP thromboxane (TX) receptor antagonist. In mouse keratinocytes, α-MSH increased the production of TXA₂, which was decreased in mouse keratinocytes treated with siRNA for MC1R and/or MC5R. α-MSH increased intracellular Ca²⁺ ion concentration in DRG neurons and keratinocytes. These results suggested that α-MSH-TXA₂ system is involved in spontaneous scratching in AD-mice.