

P293

Involvement of Mechanosensitive Channels TRPV1, TRPV4, and ASIC3 at Zusanli (ST36) Acupoint : Possible Acupuncture Responding Channels?

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Backgrounds:

Acupuncture is an ancient therapy used for over thousands of years and gained scientific approval recently. It involves mechanostimulation after needling at acupoints. Although many proposed theories as endomorphin release or neural inhibition by adenosine after local ATP release, the link between mechanostimulation and following biological response is limited. TRPV1, TRPV4 and ASIC3 are suggested as mechanosensitive channels. Therefore we seek if they are involved during acupuncture.

Materials and Methods:

We compared Zusanli (ST36) acupoint with non-acupoint using western blot. Effects of manual acupuncture and agonist injection at ST36 on CFA induced mouse were tested by withdraw time of radial heat.

Results:

TRPV1 was abundant in muscle and connective tissue of ST36, whereas TRPV4 and ASIC3 showed abundance at connective tissue. Second, TRPV1 agonist injected show similar effect as manual acupuncture.

Conclusion:

Our results revealed TRPV1, TRPV4, and ASIC3 were anatomically abundant at ST36 and TRPV1 resulted in similar acupuncture analgesic effect when stimulated. Interestingly, TRPV1, TRPV4, and ASIC3 can ATP release after stimulation. Thus, we suggest neuronal response to acupuncture is mediated directly by TRPV1 activation or indirectly by ATP release from tissues nearby. We stress the possibility of TRPV1, TRPV4 and ASIC3 as acupuncture responding channels. This can lead to create a new therapy by agonist injection and to the physiological identity of acupoints.