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Estrogen modulation of visceral nociception

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A large body of literature supports the idea that estrogen modulates nociceptive responses in pelvic pain syndromes; however, whether this hormone is pro- or anti-nociceptive remains unresolved. The DRG is an important site of visceral afferent convergence and cross-sensitization. Within the context of our hypothesis visceral nociception and nociceptor sensitization appear to be regulated by purinergic $P2X_3$ and vanilloid TRPV1 receptors and 17β-estradiol modulates DRG neurons response to ATP/ α,β-meATP and capsaicin suggesting that visceral afferent nociceptors are modulated by estrogen in the DRG.

17-β estradiol (E2), the most common form of estrogen act on functional properties of $P2X_3$ and TRPV1 receptors in DRG neurons *in vitro*. DRG neurons from Wt, ERαKO and ERβKO knock-out mice responded to $P2X_3$ and TRPV1 activation. We also studied the long-term (chronic) exposure to E2 on sensory neurons that mimics the temporal pattern of circulating E2 levels in cycling female rodents which is equivalent to an E2 primal action on animal reproductive behavior.

The localization of ER in DRG neurons and the attenuation of ATP/capsaicin- induce $[Ca^{2+}]i$ strongly suggest that E2 modulates visceral pain processing peripherally. Moreover, E2 appears to have different actions on nociceptive signaling depending on the input. E_2 attenuated the ATP-induced $[Ca^{2+}]i$ responses and interfered with the μ-opioid receptors (MOP) attenuation of this flux. Based on our data we can propose that E2 can gate primary afferent response to increase or decrease nociception.

Biography

Victor Chaban is Director of Clinical and Translational Research Center; "Accelerating Excellence in Translational Science" (AXIS) at Charles R. Drew University of Medicine and Science (CDU) and Associate Professor of Medicine at the Department of Medicine, University of California, Los Angeles (UCLA). He serves as Co-Leader of Research Education, Training and Career Development Program of UCLA Clinical and Translational Science Institute. His area of expertise includes endocrine regulations of nociception as well as gender difference in pain perception. He serves as Editor for International Journal of Research in Nursing and as Executive Editor of Journal of Autacoids.

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