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Commentary on the Glial Cell's Role in Antinociceptive Differential Effects of Oxytocin upon Female and Male Rats

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Description

The pain hypersensitivity brought on by noxious and benign stimuli typically involved the inflammatory process causing hypersensitivity. Specific medications, especially non-steroidal anti-inflammatory drugs, cannot be used to manage pain in certain patients with systemic disorders. Consequently a complementary therapy is required. In preclinical and clinical trials, oxytocin has proven to be a potent analgesic. The purpose of this study was to examine how Glial cells contribute to oxytocin-induced analgesia and how sex affects this response. The study showed that a sexual dimorphism involving spinal glia activation determines oxytocin-mediated analgesia. The study concluded that Oxytocin could be used preferentially to treat pain in men with a high inflammatory component, since treating pain in men and women requires distinct approaches.

Dissimilarity between pain and related responses is observed if we compare males and females [1]. Females display more sensibility and lengthy temporal summation to pain compared to males, and males present relatively more pain modulation [2]. Riveting attention has been focused on the glial cells' role in pain and maintenance processes due to their different distribution along the nervous system, their sexual hormones influence, and their reactivity to injuries [3]. Moreover, the literature claims that females required more important doses to reach an analgesic effect [4,5]. In this context, it is claimed that new molecules and doses are related to sex.

In this regard, beyond the well-known function of the neuropeptide oxytocin upon pregnancy, maternal and social behavior in the last years it has been consistently shown that oxytocin at spinal dorsal horn level (the first relay at central nervous system where the incoming peripheral nociceptive stimuli can be modulated) block incoming nociceptive input. Briefly, electrophysiological, behavioral, and molecular data support the contention that this antinociceptive effect is mediated by activation of the Oxytocin Receptor (OTR). Accordingly, clinical data support the potential use of this neuropeptide as an analgesic (REFS). However, dimorphic sexual differences in the effect of this neuropeptide have also been observed (i.e., females are less prone to the oxytocin's antinociceptive effect), and to reach similar effects preclinical data suggest that higher doses of this neuropeptide is required to obtain a similar antinociceptive effect in females.

Study by Abarca ABS, et al. describes the oxytocin analgesic relationship with glial cells. At this point, it is essential to highlight the importance of different doses to treat similar level of pains in males or females. The problem is that in the medical practice the same doses of analgesic in males and females is the standard, but we need to emphasize that physiological differences exist [6].

Oxytocin is a hormone that has a potent analgesic effect in experimental, preclinical, and clinical studies. Oxytocin also showed a dimorphic sexual effect, and females showed a lower antinociceptive effect [6-9]. Nevertheless, the previous works used the same dose to compare male vs female's effects. Also, a well-established relationship in dose-response was rationalized and relating a more important analgesic effect with higher doses due to the different pathways activating Gq or Gi proteins to trigger the oxytocin receptor (4-7). This commentary was focused on the experimental rat model study by Abarca ABS, et al. to analyze the difference in the analgesic response to Oxytocin between male and female rats in terms of behavioural, electrophysiological and molecular events [6]. The study emphasized that hypersensitivity was longer in female rats and concluded that spinal oxytocin substantially prevented induced hypersensitivity in male rats involving spinal Glial cells activation.

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