

Estrogen and pain: a study in aromatase knock-out mice using the formalin model.

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Abstract

In order to study the role of gender and estrogens on inflammatory pain, we compared sensitivity to formalin injected in the lip between male and female estrogen-deficient aromatase knock-out mice (ArKO) and their wild-type littermates (WT). No difference in nociceptive behaviour was observed between male and female WT mice. By contrast, lip rubbing was significantly more pronounced in ArKO than in WT females during the second “tonic” pain phase. ArKO males did not differ significantly from their WT littermates regarding phases 1 and 2, but they displayed a third phase of pain behaviour 36 minutes after the formalin injection.

Furthermore, the influence of inflammatory pain on estrogen receptor (ER α) expression was assessed by immunohistochemistry in the trigeminal nucleus caudalis in those mice. Four hours after formalin injection, a significant down-regulation of the receptors expression appeared in WT female mice in laminae I-III of the injected-side while an inversed tendency was observed in males WT. ER α expression was not changed in ArKO males and females mice.

Altogether, our results confirm estrogen role in pain modulation in male and female mice, their total absence having globally a pro-nociceptive effect but also suggest that underlying control mechanisms of pain differ between both sexes.