P5.08.

The influence of estrogen on trigeminal nociception in ovariectomized rats

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Migraine is essential in scientific research, since about 10% of population is concerned. Its pathomechanism is not clearly known, but the activation of the trigeminal system is essential. Strong sexual dimorphism with a suspected hormonal background is present since ¾ of migraineurs are female. Estrogen may have a key role here but the exact influence of estrogen on trigeminal pain sensation has not been established yet. We examined, how trigeminal activation evoked by unilaterial formalin injection into the upper lip of adult rats changes in two groups: ovariectomized females without (ovx) and with pretreated with estrogen (ovx+E). Four hours after formalin injection, caudal trigeminal nucleus (TNC) was removed for c-Fos immunohistochemistry to determine local neuronal activity of the second order trigeminal neurons. In both groups formalin caused a significant increase in c-Fos immunoreactivity in the TNC compared to the untreated side. In ovx animals the ipsilateral c-Fos increase was significantly lower compared to the animals in the ovx+E group. Our results indicate that estrogen or its depletion can modulate the trigeminal activation. In this experimental setting the lack of estrogen had an antinociceptive effect. Estrogen receptors are present in all areas relevant in nociception, including TNC, thus estrogen may influence neuronal activity evoked by pain in TNC.