

# Nociceptive and non-nociceptive stimulation in the upper central nervous system

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## Abstract

Oxytocin is known as a social bonding hormone, but it also functions as an anxiolytic or analgesic neurotransmitter. When oxytocin regulates pain or anxiousness centrally as a neurotransmitter, it is secreted by neurons and directly projected to targeted regions. Although the function of oxytocin at the spinal level is well studied, its effects at the supraspinal level are poorly understood. We aimed to investigate the effect of oxytocin at the supraspinal level in vivo using C57BL/6J (wild-type [WT]), oxytocin-deficient (*Oxt*<sup>-/-</sup>), oxytocin receptor-deficient (*Oxtr*<sup>-/-</sup>), and oxytocin receptor-Venus (*Oxtr*<sup>Venus/+</sup>) mice lines.

Response thresholds in *Oxtr*<sup>-/-</sup> mice in Hargreaves and von-Frey tests were significantly lower than those in WT mice, whereas open field and light/dark tests showed no significant differences. Moreover, response thresholds in *Oxt*<sup>-/-</sup> mice were raised to those in WT mice after oxytocin administration. Following the Hargreaves test, we observed the co-localisation of c-fos with Venus or the oxytocin receptor in the periaqueductal gray (PAG), medial amygdala (MeA), and nucleus accumbens (NAc) regions in *Oxtr*<sup>Venus/+</sup> mice. Furthermore, in the PAG, MeA, and NAc regions, the co-localisation of oxytocin with c-fos and gamma-aminobutyric acid was much stronger in *Oxtr*<sup>-/-</sup> mice than in WT mice. However, following von-Frey test, the same findings were observed only in the MeA and NAc regions.

Our results suggest that oxytocin exerts its analgesic effect on painful stimulation via the PAG region and a self-protective effect on unpleasant stimulation via the MeA and NAc regions.

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## Biography

Hidehisa Saito finished his PhD in Newcastle University, UK in 2012. Part of his PhD project was qualitative study on patients' experiences with blow-out fractures of the orbit. Since then he became interested in qualitative research methodologies. particularly in Oral and Maxillofacial

Surgery. He works now as Head of Clinical Sciences, College of Dentistry, Ibn Sina University for Medical and Pharmaceutical Sciences, Baghdad-Iraq He joined IADR 2010. From 2010-2016 he worked as Iraqi Division Secretary. On August 2016 he was elected as President of Iraqi Division. .