

## **IHS Fellowship report**



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### **Crosstalk between sex hormones and amylin signalling in the trigeminovascular System**

**Fellowship from April 2021 to September 2022**

**King's College London, UK**

**Mentor: Jan Hoffmann**

#### **Overview**

The project aimed to investigate the effect of sex hormones (and its receptors) in the modulation of trigeminal nociceptive transmission. Moreover, the influence of sex hormones on the effects of amylin and CGRP in trigeminal nociceptive signalling was evaluated. To achieve this, we carried out electrophysiological recording *in vivo* from neurons in the trigeminocervical complex that are activated by dural electrical stimulation.

#### **Summary of research**

We recorded neuronal activity in male and female rats with extracellular electrodes placed within the trigeminocervical complex and examined the effects of targeting the AMY<sub>1</sub> receptor on ongoing spontaneous and dural-evoked firing rates of central trigeminovascular neurons. The selective AMY<sub>1</sub> receptor agonist pramlintide and AMY<sub>1</sub> receptor antagonist AC187 were used for the present study. The different stages of the oestrous cycle were identified and assigned by a blinded experimenter through two Cresyl violet-stained vaginal smears. Compared to males, intravenous administration of pramlintide significantly augmented the ongoing spontaneous activity and dural-evoked neuronal responses in the trigeminocervical complex, only during phases of the female oestrous cycle that are characterised by falling oestrogen levels, whereas this effect was not observed in the high-oestrogen phases. Moreover, compared to vehicle, intravenous administration of AC187 significantly decreased the ongoing spontaneous and dural-evoked firing

rates of central trigeminovascular neurons in males and females. Biochemical studies are ongoing.

## **Results**

We aimed to characterise the effects of sex hormones in the modulation of nociceptive transmission in the trigeminovascular system. We uncovered female-specific nociceptive mechanisms relevant for migraine, and this allowed me to attend two international conferences (Migraine Trust International Symposium and European Headache Congress) where I got the opportunity to present preliminary results and create new collaborations.

## **Conclusion**

Working in a world-renown institute and high-profile research group was a great experience, which allowed me to acquire new research skills, broaden my scientific knowledge and expose me to translational neuroscience research. Furthermore, being the recipient of this fellowship has given me visibility as early career researcher, which has resulted in being invited to present at different international meetings and being part of scientific committees. Finally, this opportunity allowed me to work with Dr Jan Hoffmann, an excellent mentor, who let me bring and develop my own ideas, and with whom I have built a strong scientific collaboration.

One year is a very short period I was fortunate that I chose a lab that had most experimental techniques already implemented, and the project animal licenses approved. I recommend to future Fellows to try to learn some of the techniques before the fellowship starts. Write a proposal that is precise and clear and, most importantly, be innovative.



