Anticipatory postural adjustments (APAs) ensure body equilibrium. In our day to day life we make different voluntary movements; we reach for our phone, we walk into the tube etc. These movements cause perturbations to our equilibrium, however through appropriately shifting the body's centre of gravity and mass, we can complete these movements without destabilising our body. These shifts is what we call APAs. Unfortunately our ability to perform quickly and appropriately, decreases with age.

Postural instability is still an untreated symptom of Parkinson's disease. In Parkinson's disease (PD), postural instability is one of the most prevalent symptoms. Due to incomplete understanding and subclinical symptoms, diagnosis can be delayed. Additionally, research shows that medication can cause an increase in postural instability. For all these reasons, understanding APAs becomes essential. Human research has mainly focused on characterising postural adjustments using force plates and measuring pressure, unfortunately with limitations. However, animal models could potentially overcome these limitations and provide us with a deeper understanding.

**Ongoing research: Behaviour**

Furthermore, we will be manipulating the behaviour of the mouse on the same platform by pharmacologically stimulating different brain areas (of interest) using ACh-e inhibition. Additionally, we will employ the same manipulation over different time points during behaviour to compare any differences.

**Importance for Parkinson's disease**

Understanding APAs could offer a better quality of life for Parkinson's patients. It could lead to better and more targeted treatment strategies both in the form of therapy and medication. It could also lead to the potential of earlier diagnosis, when knowing to look for more subtle, subclinical symptoms like postural equilibrium disturbances.

**The anatomy of APAs**

In order to further understand the anatomy of APAs, we use viral techniques to determine neuronal communication within brain areas of interest. This information helps us understand the brain areas involved and specific neurons' characteristics, which then leads us to a better understanding of the overall circuitry.

**Behavioural assay to characterise APAs in mice**

Since the system in charge of our equilibrium is well preserved over different species, we chose to use a mouse model to further research APAs. In order to make our research translational, we build a mouse force plate platform. The mouse force plate consists of four force sensors (FSs) embedded in the floor. The FSs measure the pressure each limb puts on its corresponding sensor (in volts). Mice are trained to stand still on the FSs and initiate locomotion when the door opens.