

## Mapping subpopulations of EphA4-expressing cells involved in spinal cord circuits controlling locomotion

To understand how the brain functions, it is essential to gain knowledge about the brain's most central components; the neuronal networks. Local neuronal networks called central pattern generators (CPGs) are essential in coordinating rhythmic behaviors such as walking, breathing and swimming. The studies in the Kullander lab are focused around neuronal networks in the spinal cord that control the timing and pattern of walking movements. These networks have been found to be defective in mice that lack certain axon guidance molecules. In this project, we will study mice lacking the axon guidance molecule EphA4. These mice are unable to move their limbs in an alternating fashion, and instead jump like kangaroos, suggesting that neurons expressing EphA4 are an important part of the neuronal circuits that control locomotion.

The EphA4 gene is expressed in a fairly large number of neurons in the spinal cord. In order to understand which of these neurons that are responsible for the hopping phenotype, mice that lack EphA4 in certain populations of neurons have been generated in the lab using the Cre-LoxP system. In one part of the project, the walking behavior of two different mice lines will be studied by gait analysis. Another part of the project deals with mapping the expression of the Cre-recombinase gene in the two different Cre-expressing mouse lines. This will be done by combining Cre-expressing mice with reporter mice (Tau<sup>mGFP/nlsLacZ</sup>). These mice will express GFP (green fluorescent protein) and bGal (beta-galactosidase) only in neurons that have Cre protein. This information will be important for the identification and characterisation of the EphA4-expressing neurons that are involved in spinal cord locomotor circuits.

You will be part of an active and vibrant research environment with members of variable background, but mostly consisting of molecular biologists and neuroscientists. At present, our group consists of 2 principal investigators, 7 post-docs, 5 PhD students and a varying number of project and exam students. You will learn a number of general molecular biology methods and get insight into more specialized methods such as electrophysiology, mouse genetics and behavior. The projects are designed together with you to fit your background and to introduce you to novel methods and knowledge areas. As part of our group you are expected to have a curiosity-driven, enthusiastic and motivated work-style, and you will be participating in all our activities including seminars, group meetings, publication preparation work and planning of projects.

If you would like to know more about this project or if you want to visit us in person, please contact [klas.kullander@neuro.uu.se](mailto:klas.kullander@neuro.uu.se) or Anna.Vallstedt@neuro.uu.se

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