



Universität
Basel

Research Project

HFSP Fellowship Stipend: Annika Nichols

Third-party funded project

Project title HFSP Fellowship Stipend: Annika Nichols

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Organisation / Research unit

Departement Biozentrum / Cell and Developmental Biology (Schier)

Department

Project Website <https://schierlab.biozentrum.unibas.ch>

Project start 01.10.2019

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Status Completed

The neuronal and genetic regulation of sleep and arousal in zebrafish

Humans spend approximately one third of their lives asleep, but the genetic and neural circuits underlying this state are poorly understood. Sleep and wake are two disparate physiological and neural states. Therefore, arousing- and sleep-promoting circuits must interact to ensure that the correct state is efficiently established and maintained. To better understand sleep and arousal regulation in vertebrates, I will use two approaches to identify circuits and genes underlying these processes in zebrafish.

Aim 1: Restless leg syndrome (RLS) is a sensorimotor disorder that causes leg movements especially during periods of rest or sleep and is a leading cause of insomnia. Genes linked to RLS provide an entry point into the circuits that promote arousal and disrupt sleep. Zebrafish homolog knockouts of the RLS-linked genes *Meis1* and *Skor1* induce hyperactivity and sleep fragmentation. I will identify what circuit changes underlie these phenotypes.

Aim 2: I will develop a novel and non-invasive neuronal activity recording system to identify sleep- or wake-active cells. This system will convert neuronal activity into patterns of CRISPR/Cas9-mediated editing of a DNA barcode during inducible time windows. I will combine single-cell RNA-sequencing and activity recording to identify neurons that regulate sleep and wake.

Together, these aims will identify sleep and arousal circuits and provide the foundation for my long-term goal of understanding how sleep and wake states are generated and maintained.

Financed by

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