Introductory Remarks to Symposium 8

Neuronal circuits underlying biological timekeeping

Pamela Menegazzi, Dirk Rieger and Koustubh Vaze, Würzburg

We live in a rhythmic environment. In order to keep synchronized with the external world most living organisms have evolved endogenous clocks, which are necessary to track and to anticipate periodical changes in the environment. Different organisms need to cope with different environments but their endogenous clocks share extremely conserved gears. All endogenous clocks need to be able to perceive, and synchronize to, environmental stimuli. The neuronal circuits that allow this synchronization are referred to as input pathways. Environmental information is processed by a master clock in the brain, normally composed by heterogeneous clusters of neurons, which act in synchrony as a unique pacemaker to generate the rhythmic neuronal outputs.

Numerous studies aimed to dissect the molecular and neuronal mechanisms of timekeeping. At the present day, one of the most alive topic of discussion in chronobiological research deals with the understanding of how endogenous pacemakers can be so simple and yet so complex. The clock needs to be highly plastic in order to be able to cope with fluctuations in the environmental conditions and at the same time needs to be robust not to be affected by sudden changes of no biological importance.

The speakers we have invited will all provide insights into this direction.
Kristin Tessmar-Raible will discuss the mechanisms through which the nervous system can perceive light and the way through which this information can be encoded in order to drive lunar and circadian rhythms. The importance of light for synchronizing endogenous clocks will be further discussed by Maite Ogueta Gutierrez whose research focuses on inputs and outputs of the clock neuronal circuits in D. melanogaster. We will have a look at the putative mechanisms through which neuronal activity affects the molecular clock as well as behavioral rhythms with the talk of Virginie Sabado. Finally, Bharath Ananthasubramanian will further discuss the dichotomy (robustness versus flexibility) of brain pacemaker circuits by analyzing with computational approaches the complexity of the mammalian circadian clock.

Symposium 8

Thursday, March 23, 2017
11:30 – 13:30, Lecture Hall 105

Chair: Pamela Menegazzi, Dirk Rieger and Koustubh Vaze, Würzburg

11:30 **Opening Remarks**

11:35 Kirstin Tessmar-Raible, Vienna, Austria
SEA, MOON AND SEASONS: THE IMPACT OF LIGHT ON ANIMAL PHYSIOLOGY AND BEHAVIOR (S8-1)

12:00 Maite Ogueta Gutierrez, Münster
LIGHT RESETTING OF THE CIRCADIAN CLOCK OF *DROSOPHILA* (S8-2)

12:25 Virginie Sabado, Geneva, Switzerland
NEURAL CORRELATES OF CIRCADIAN BEHAVIOUR IN *DROSOPHILA MELANOGASTER* (S8-3)

12:50 Bharath Ananthasubramaniam, Berlin
COMPUTATIONAL MODELING REVEALS DESIGN PRINCIPLES UNDERLYING ROBUSTNESS AND SENSITIVITY OF THE MASTER NEURONAL CLOCK IN MAMMALS (S8-4)

13:15 Thordis Arnold, Kassel
IPSI- AND CONTRALATERAL LIGHT INPUT PATHWAYS TO THE CIRCADIAN CLOCK OF THE MADEIRA COCKROACH *RHYPAROBIA MADERAE* (S8-5)

13:25 **Concluding Remarks**