

Introductory Remarks to Symposium 23

Neuroepigenetics: Epigenomic adaptations in CNS development

Tanja Vogel and Geraldine Zimmer-Bensch, Freiburg and Aachen

Brain development and adult neuronal functions depend on properly executed transcriptional programs that include adaptive spatio-temporal adjustment of gene regulation integrating external information. This involves chemical modifications of DNA and chromatin, which all cells contributing to the CNS exploit for their proper development, function and adaptation, and which is termed neuroepigenetics, a recently emerging field of research.

Dissecting the impact of neuroepigenetic mechanisms on cellular processes will help to understand functional principles of the most complex organ system of the human body in health and disease.

Notably, the plasticity of epigenetic processes allows for the flexibility required for the developing and adult CNS to constantly adapt to a continuously changing environment. Communication with either the local microenvironment or signals from the periphery elicits adaptations in gene transcription that subsequently orchestrate cell physiological processes. Thus, epigenetic modifications are promising candidates for how environmental signals leave traces at the chromatin level that mediate adaptive short-term but also long-lasting changes in gene expression in CNS cells.

This symposium will discuss up- and downstream mechanisms of adaptive epigenomic remodeling in neurodevelopment, ranging from DNA methylation, histone modifications to adaptation of the 3D genomic architecture. We feature the most relevant and recent molecular mechanisms that control the development from neural stem cells to mature neuronal networks. Deepening our knowledge in this particular area is of major importance, as numerous neurodevelopmental and neuropsychiatric diseases have an environmental and epigenetic contribution in addition to genetic predisposition. As such, this symposium covers not only important questions of the basic neurosciences, but also has implications for arising potential for treating CNS diseases.

Symposium 23

Friday, March 24, 2023
08:30 - 10:30, Lecture Hall 105

Chairs: Tanja Vogel and Geraldine Zimmer-Bensch,
Freiburg and Aachen

- 08:30 **Opening Remarks**
Tanja Vogel
- 08:35 Annalisa Izzo, Freiburg
EPIGENETIC MECHANISMS INVOLVED IN
CEREBRAL CORTEX DEVELOPMENT (S23-1)
- 09:00 Geraldine Zimmer-Bensch, Aachen
CELL TYPE - SPECIFIC FUNCTIONS OF THE
DNA METHYLTRANSFERASE 1 IN CORTICAL
INTERNEURON DEVELOPMENT (S23-2)
- 09:25 Boyan Bonev, Munich
JOINT EPIGENOME PROFILING REVEALS CELL
TYPE-SPECIFIC GENE REGULATORY PROGRAMS
IN HUMAN CORTICAL ORGANOID (S23-3)
- 09:50 Tran Tuoc, Bochum
EPIGENOME REGULATION IN NEOCORTEX
EXPANSION AND GENERATION OF NEURONAL
SUBTYPES (S23-4)
- 10:15 Camilla Fullio, Freiburg
SPATIO-TEMPORAL DOT1L-MEDIATED REGU-
LATION OF BASAL PROGENITOR CELLS DU-
RING MOUSE CORTICAL DEVELOPMENT (S23-5)
- 10:25 **Concluding Remarks**

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