Faculty of Biology
Keynote Lecture

JOHANNES GUTENBERG UNIVERSITÄT MAINZ

Invitation to the Keynote Lecture Faculty of Biology

Prof. Dr. Rob Martienssen

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RNA interference guides epigenetic inheritance and reproductive strategy in plants

Abstract: Epigenetic modifications that arise during plant and animal development, such as DNA and histone modification, are mostly reset during gamete formation, but some are inherited epigenetically from the germline. Small RNAs guide these epigenetic modifications, and some are also inherited by the next generation. Pseudouridine (Ψ) is the most abundant RNA modification and novel assays to detect Ψ in short RNA sequences demonstrate its presence in mouse and Arabidopsis microRNAs and their precursors. We also detect substantial enrichment in germline small RNAs, namely epigenetically activated siRNAs (easiRNAs) in Arabidopsis pollen, and piwi-interacting piRNAs in mouse testis. In pollen, pseudouridylated easiRNAs are localized to sperm cells, and we found that Exportin-t is required for transport of easiRNAs and for the triploid block: a form of chromosome dosage-dependent seed lethality that is epigenetically inherited from pollen. We speculate that the function of Ψ may be to help distinguish self- from non-self (viral) RNA during early development. The Lemnaceae (duckweeds) are flowering plants that can adopt either clonal or sexual reproductive strategies. Sequencing of the genomes and epigenomes of the Lemnaceae has revealed that they have lost many components of the RNAi pathway, and that they readily form viable triploids in interspecific hybrids. Subsequently, these triploids can only reproduce clonally. Sequencing also provides clues as to how these clonal aquatic macrophytes might one day ameliorate the adverse effects of climate change.

Thursday, 01 February 2023, 2 pm

Host: Prof. Dr. Shuqing Xu

The keynote lecture will be presented at the
Biozentrum 1, HS BZ1, 00.187, Hanns-Dieter-Hüsch-Weg 15, Ground Floor