SFB 960-/RCB – Kolloquium

Dienstag, 31. Mai 2022,
14.00 Uhr, H 52

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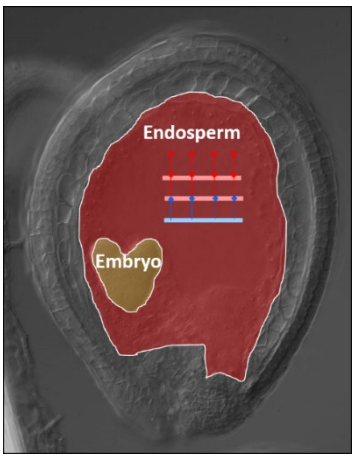
Potsdam-Golm Science Park

“ Epigenetic basis of endosperm evolution and its consequences for angiosperm diversity “

Transposable elements (in short transposons), are repetitive genetic sequences with the potential ability to mobilize and insert at new positions in the genome. This ability has promoted genetic innovations on an evolutionary scale. One example that I will discuss in my seminar is the transposon-driven evolution of the endosperm, a nutritive seed tissue supporting embryo growth and providing the major source of calories for the human population. The endosperm is a developmental innovation of flowering plants that allowed to couple fertilization with the provision of nutrients to the developing seed. The endosperm is formed after fusion of one of the two sperm cells with the central cell, while the second sperm cell fuses with the egg cell to give rise to the embryo. We identified a MADS-box transcription factor as a major regulator of endosperm development. Strikingly, the DNA-binding motifs targeted by this transcription factor are located in Helitron transposons and have likely been dispersed in the genome through Helitron transposition. Our data show that transposons are intrinsically linked to endosperm development, not only by enforcing specific epigenetic landscapes, but also by serving as important sources of *cis*-regulatory elements. This provides a showcase of molecular domestication of transposons and the generation of regulatory networks driven by transposon activity. We propose that the evolution of type I MADS-box transcription factors and the dispersal of their binding sites through transposon activity were the major drivers underpinning endosperm evolution in flowering plants. I will furthermore discuss the consequences when these regulatory networks become deregulated. We found that interspecies hybridizations result in the deregulation of these endosperm-specific networks, leading to endosperm developmental failure and seed arrest. This reveals a key role for the endosperm in establishing hybridization barriers and thus promoting speciation of flowering plants.



Host: Prof. Dr. Klaus Grasser, LS Zellbiologie und Pflanzenbiochemie

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