Nina Carl

Nuclear identity and nuclear migration in *Schizophyllum commune*

Within the kingdom of fungi, the Dikarya (Ascomycetes and Basidiomycetes) show specifc development. One of the long-standing puzzles is the establishing of nuclear identify through the prolonged multi-nuclear life stage. Preceding the assortment of the two different nuclei for the formation of sexual spores during meiosis, a pronounced and fast nuclear migration process takes places. Here, as well, the nuclear identity must be kept and the migrating nucleus undergoes multiple mitotic events. Genetic evidence collected from the 1920s suggested that even in matings of dikaryons with a new monokaryon, the nuclear pair of a dikaryon can be newly composed by splitting the association previously found in the dikaryon and re-assorting two new nuclei for building a new dikaryon. Again, nuclear migration is necessary during this step.

The nuclear migration in basidiomycetes has been clocked with up to 4 cm/h, translating into 10 µm per sec, a movement that is at the upper limit of transport along microtubules. We have previously analyzed components involved in this process, establishing labelled nuclei (histone 2B fused to GFP), microtubule and actin staining by immunofluorescence and LifeAct, dissecting the mating cascade of events, the involvement of Ras, and the specific two-gene encoded dynein in *Schizophyllum.* The fungus is genetically tractable and, as the only higher basidiomycete model, allows for knock-out mutations.

To address both long-standing questions, we would like to investigate dynein binding proteins (the genome does not contain sequences for some of the proteins involved in nuclear migration in ascomycetes), and to address the potential markers for nuclear identity. While the former question would allow to identify specific evolutionary constraints for nuclear migration and dynein function in higher basidiomycetes, the latter has not been answered for either ascomycetes or basidiomycetes so far.

Supervisor

Erika Kothe

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