Dynein Heavy Chain, Encoded by Two Genes in Agaricomycetes, Is Required for Nuclear Migration in Schizophyllum commune.

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Abstract

The white-rot fungus Schizophyllum commune (Agaricomycetes) was used to study the cell biology of microtubular trafficking during mating interactions, when the two partners exchange nuclei, which are transported along microtubule tracks. For this transport activity, the motor protein dynein is required. In S. commune, the dynein heavy chain is encoded in two parts by two separate genes, dhc1 and dhc2. The N-terminal protein Dhc1 supplies the dimerization domain, while Dhc2 encodes the motor machinery and the microtubule binding domain. This split motor protein is unique to Basidiomycota, where three different sequence patterns suggest independent split events during evolution. To investigate the function of the dynein heavy chain, the gene dhc1 and the motor domain in dhc2 were deleted. Both resulting mutants were viable, but revealed phenotypes in hyphal growth morphology and mating behavior as well as in sexual development. Viability of strain Δdhc2 is due to the higher expression of kinesin-2 and kinesin-14, which was proven via RNA sequencing.

Involved units

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Topics

RNA-Seq data analysis and modeling

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