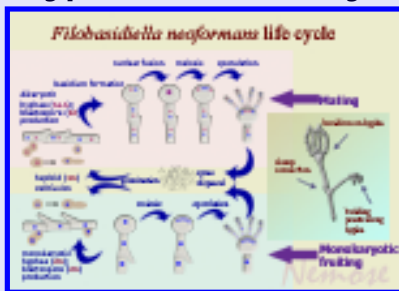


<http://www.MetaPathogen.com>:

Cryptococcus neoformans

cellular organisms - Eukaryota - Fungi/Metazoa group - Fungi - Dikarya - Basidiomycota - Agaricomycotina - Tremellomycetes - Tremellales - Tremellaceae - Filobasidiella - Filobasidiella/*Cryptococcus neoformans* species complex - *Filobasidiella neoformans*

- Brief facts
- *Cryptococcus* life cycle diagram



- Developmental stages (life cycle)
- Tissues
- Mating types
- References

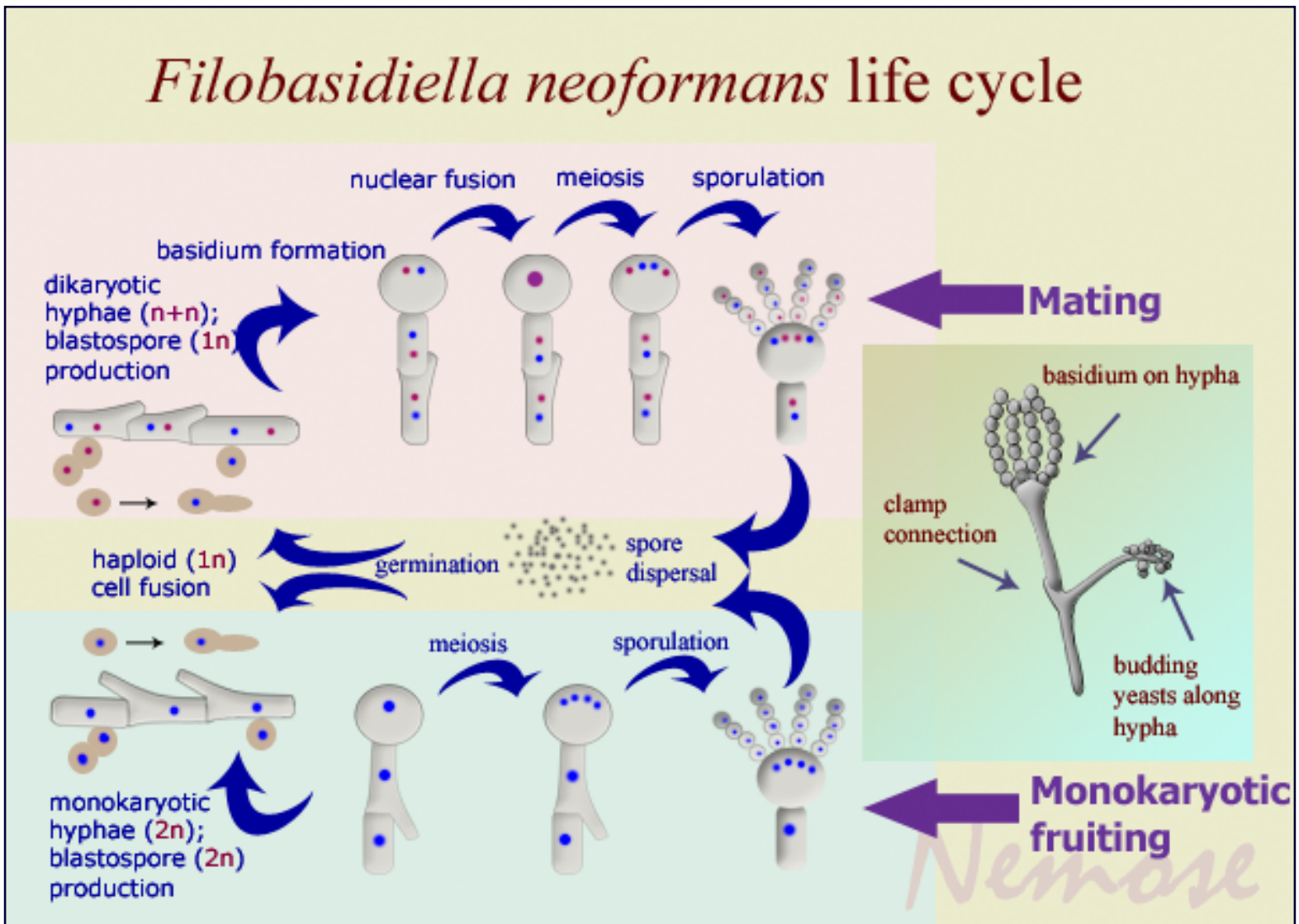
Brief facts

- *Cryptococcus neoformans* (**anamorph**) or *Filobasidiella neoformans* (**teleomorph**) is an encapsulated fungus that usually grows as a yeast and replicates by budding. It is distributed worldwide and is often found in soil contaminated by avian feces.
- *F. neoformans* is a causative agent of **cryptococcosis**, also known as **Busse-Buschke disease**, a disease that ranges from asymptomatic infection of airways to severe meningitis. The most common route of introduction of the

infection is inhalation of fungal spores. The crucial factor of the disease outcome is believed to be not the pathogen's virulence but the immune status of the host. The emergence of the HIV virus promoted *C. neoformans* from a little-known pathogen to a common killer of immunocompromized patients.

- The fungus has the following essential virulence factors: synthesis of the pigment melanin, development of polysaccharide capsule which helps it to withstand phagocytosis by alveolar macrophages, ability to grow at human temperature (37-39°C), and ability to cross blood-brain barrier. Serotypes can be distinguished by antigen testing and molecular fingerprinting.

Filobasidiella neoformans life cycle



Developmental stages

Life Cycle Stages

- parasexual

parasexuality is a form of reproduction in fungi which enables mitotic recombination without meiosis, and usually involves reduction of a diploid to a haploid through whole-chromosome loss; in *C. neoformans*, in contrast to other fungi with parasexual cycles, meiosis occurs not only during mating but also during monokaryotic fruiting, resulting in recombinant haploid spores

- **monokaryotic fruiting**

the diploid hyphal cells are produced by fusion of haploid nuclei within single mating type; resulting filaments are mononucleate with unfused **clamp connections** (a short branches connecting one cell to the previous cell in hyphae), i. e. diploidization occurs early in filamentation before formation of the fruiting structures; monokaryotic fruiting predominates in mating type α

- **mating**

after fusion of cells from different mating types, the resulting hyphal cells contain two nuclei and are linked by fused **clamp connections**; the diploidization occurs from fusion of the nuclei inside of the fruiting structures

- **asexual**

- **vegetative growth**

- **budding yeast**

a most common form of the fungus isolated from patients or from the environment

- filamentous growth

form of growth which precedes sporulation; during this phase fusion of $1n$ nuclei within one mating type might occur and lead to **monokaryotic fruiting**

Tissues

- basidium

a terminal fruiting structures inside which the meiosis takes place; each basidium produces four tetrads of haploid spores

- basidiospore

haploid spores emerging from the basidium

- mycelium

filamentous form of the fungus

- unicellular organism

budding yeast form of the fungus

Mating types

- mating type

- a

less virulent mating type

- mating type

α

more virulent type; this type constitutes approximately 96% of all clinical isolates and in co-infections with both mating types is usually the one to enter the central nervous system

References

PubMed articles

- Lin X, Heitman J. The biology of the *Cryptococcus neoformans* complex. *Nat Rev Microbiol.* 2005 Oct; 3(10):753-64. **PMID: 16704346**
- Idnurm A et al. Deciphering the model pathogenic fungus *Cryptococcus neoformans*. *Nat Rev Microbiol.* 2005 Oct; 3(10):753-64. **PMID: 16132036**

Websites

- [Wikipedia: *Cryptococcus neoformans*](#)
- [eMedicine: Cryptococcosis](#)



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