Magnetic resonance imaging of infected mouse brains allows non-invasive screening of differences in the virulence of clinical *Cryptococcus neoformans* strains

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Introduction

- Outcome of infection: host ↔ pathogen
- Survival studies
 - Provide only limited information
 - No insights in the disease manifestation / progression
- **Aim of the study**
 - Assess virulence of different cryptococcal strains using non-invasive imaging techniques

Methodology

- ***Cryptococcus neoformans* clinical strains:** serotype A, MAT α , 10 strains
- **Animal model:** Intravenous injection (tail vein) of 50 000 fungal cells in female Balb/C mice, n=3 per strain
- **Preclinical imaging:** 9.4T MRI (Bruker Biospin), 3D T2-weighted brain scans (RARE)
- **Image processing:** MeVisLab, ITK-SNAP, ParaView

Results

MRI scans of mice infected with different clinical *Cryptococcus neoformans* strains show **differences in the onset and presentation of brain disease**.

3D models and the corresponding volume quantifications show:

- Progression of disease
 - ≈ development of hyperintense **lesions** in the brain
 - ≈ **increase in total brain and ventricle volume**, suggesting brain edema.
- The **pattern** of lesion development, accumulation of CSF or hyperintensities of the meninges differs between the strains.

Conclusions

- MRI provides information on disease manifestation and progression in a **non-invasive** way.
- Infection with different *C. neoformans* strains results in **differences in the disease presentation**.
- Future work will focus on potential links between the disease development and *in vitro* strain characteristics.

This project is partially funded by the European ERA-NET project CryptoView.