



# SFB 680

## Molecular Basis of Evolutionary Innovations

Molekulare Grundlagen evolutionärer Innovationen

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#### **Evolution of centromeres in budding yeasts**

Centromeres are loci on the chromosome where the kinetochore complex is assembled during mitosis, and their determination is essential for faithful segregation of chromosomes. While the budding yeast *S.cerevisiae* are short "point centromeres" with a well-defined sequence identity, the fission yeast *S.pombe* has larger "regional centromeres", several kilobases long, characterised by inverted repeats that bracket a core region. In higher eukaryotes, centromeres are typically much larger. It is determined that centromere determination and maintenance is at least partly epigenetic. We recently analysed centromeres in three closely related *Candida* species. The very closely related *C.albicans* and *C.dubliniensis* have centromeres that are conserved in their chromosomal location but entirely diverged in their sequence. In both these species there is no sequence feature that is common to all centromeres. However, in another close relative, *C.tropicalis*, we find centromeres that have the characteristic inverted-repeat configuration of the "regional centromeres" in *S.pombe* and other eukaryotes. It is the first hemiascomycetous yeast and most primitive eukaryote in which such centromeres have been found. There appears to be evolutionary pressure to maintain this inverted-repeat structure. We also find suggestions that recombination occurs frequently near the centromere. We suggest that the *Candida* species are a useful model to study the evolution of centromeres. In the context of this work, we also discuss some issues relating to reliable sequence alignment of non-coding DNA. (joint work with the experimental lab of Kaustuv Sanyal, JNCASR, Bangalore)

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**Institute for Genetics, Zùlpicher Str. 47a, Lecture Hall, 4th floor**

Host: Michael Lässig

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