

## **Identification of the meiotic life cycle stage of *Trypanosoma brucei* in the tsetse fly.**

### **ABSTRACT**

Elucidating the mechanism of genetic exchange is fundamental for understanding how genes for such traits as virulence, disease phenotype, and drug resistance are transferred between pathogen strains. Genetic exchange occurs in the parasitic protists *Trypanosoma brucei*, *T. cruzi*, and *Leishmania major*, but the precise cellular mechanisms are unknown, because the process has not been observed directly. Here we exploit the identification of homologs of meiotic genes in the *T. brucei* genome and demonstrate that three functionally distinct, meiosis-specific proteins are expressed in the nucleus of a single specific cell type, defining a previously undescribed developmental stage occurring within the tsetse fly salivary gland. Expression occurs in clonal and mixed infections, indicating that the meiotic program is an intrinsic but hitherto cryptic part of the developmental cycle of trypanosomes. In experimental crosses, expression of meiosis-specific proteins usually occurred before cell fusion. This is evidence of conventional meiotic division in an excavate protist, and the functional conservation of the meiotic machinery in these divergent organisms underlines the ubiquity and basal evolution of meiosis in eukaryotes.

**Keyword:** *Trypanosoma brucei*; Tsetse; Meiosis.