

Factors determining uniparental inheritance in the green alga *C. reinhardtii*.

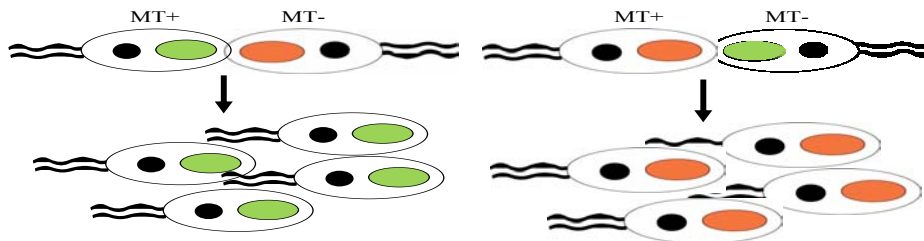
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The long term objective of this project is to discover and characterize the genes and processes involved in specifically destroying the chloroplast genome of the mt- parent in the mating of the green alga *Chlamydomonas reinhardtii*. This process results in uniparental inheritance in contrast to what is generally observed in sexual reproduction. This specific blockage to transmission of genetic characters from one of the parents has long been known in *Chlamydomonas* and has been observed in many organisms. Still the process is still poorly characterized but a framework for further investigation has been laid in recent years, with whole genome sequencing, with the development of tagged insertional mutagenesis and with powerful methods for recovery and characterization of mutants.

The objective of the pilot project reported here was to test the premises for a larger scale project identifying and characterizing the major players in the process of uniparental chloroplast inheritance in *C. reinhardtii*. Basic strains were obtained from the Chlamydomonas Genetics Center. These strains were mated with a collection of insertional mutants made in the laboratory of E. Fernández at the University of Córdoba. This cross was used to identify tagged mt+ mutants that do not destroy chloroplast genes from their mt- mating partner.

From 6200 mutants screened 105 isolated exhibited abnormal chloroplast inheritance. These isolates were purified, their mating type (mt+ or mt-) determined by PCR and the isolates stored at -152 °C. Only a part of the isolates has been retested in a second round of mating and roughly 1/3 of them are clearly abnormal in their pattern of inheritance and therefore useful for further analysis. The location of the insertion mutations in these strains will be determined by DNA isolation, ligase-mediated PCR and limited sequencing. The results will then be compared to the genome sequence and gene information on *C. reinhardtii* allowing deduction of the probable identity and role of the factors involved.

Increased understanding of these basic processes among eukaryotic organisms will lead to further understanding of comparable processes in other organisms and of the role and evolution of uniparental inheritance.



Uniparental inheritance in *Chlamydomonas reinhardtii*. Chloroplasts are inherited only from MT+ („mother“) and chloroplasts from MT- („father“) are destroyed.