1133-92-270 **Rafik Neme*** (rn2419@cumc.columbia.edu), 710 West 168th Street, Office 712, Dept of Biochemistry and Molecular Biophysics, New York, NY 10032, and **Jaspreet Khurana**, **Derek Covert**, **Masahico Saito**, **Natasha Jonoska** and **Laura F Landweber**. *Topological, evolutionary and molecular insights from ciliate genome rearrangements.* Preliminary report.

Ciliates are unicellular eukaryotes with two different types of nuclei. Their nuclei have partitioned genetic inheritance (micronucleus) from the instructions that cells need to function, i.e. transcription (macronucleus). During sexual conjugation, ciliates exchange micronuclear material, and destroy their macronucleus. Following conjugation, the cell regenerates the macronucleus by editing a copy of the micronucleus. In Oxytricha trifallax this process involves the selective removal of more than 90% of the genome, and approximately one third of the remaining material undergoes drastic rearrangements. Rearrangements can be studied as topological problems, assuming that the remodeling reactions (breaking, folding, ligation) alter DNA topology. We explore the molecular functions that carry out DNA remodeling in O. trifallax and their relatives. Using evolutionary and comparative genomics, we are able to combine ideas about the origin and function of these genes, with mathematical approaches to understand possible relationships between the topology of the DNA, its functional elements, and the molecular evolutionary forces shaping this complex system. (Received July 28, 2017)