



# BIOLOGY COLLOQUIUM

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Hosted by Graduate Students' Society



## Volvocine green algae inviting you to 200 MYA time travel for evolution of female-male and multicellularity

By Hisayoshi Nozaki

*Department of Biological Sciences, Graduate School of Science, University of Tokyo, Japan*

Female-male gamete size dimorphism is recognized in most multicellular taxa including plants, animals, fungi, brown algae, red algae and green algae, and has been a major topic of biological sciences. However, such dimorphism is not recognized in many unicellular species because they produce morphologically identical "isogametes." The evolution of female and male gametes differing in size ("anisogamy") with transition to multicellularity occurred in isogamous ancestors belonging to various, independent eukaryotic lineages. Among these lineages, the volvocine green algae are a unique model lineage by which we can elucidate the transitions to both anisogamy and multicellularity. This is because of the fact that the volvocine algae contain rich source of closely related members from isogamous unicellular *Chlamydomonas* to oogamous multicellular *Volvox* that represent gradual evolutionary steps during these 200 MY (Herron et al. 2009, PNAS).

We recently illuminated origin of female-male and initial transition to multicellularity, based on molecular genetic and genome data from model volvocine strains and unique volvocine strains that we originally established from samples collected in our field collections. The following three topics will be given in the seminar talk.

1. The simplest multicellular organism unveiling the initial transition to multicellularity
2. Origin of female and male from isogamy: a new male-specific gene "OTOKOGI"
3. Evolution of homothallism based on new strains from field-collected samples of *Volvox* in Lake Biwa, Japan