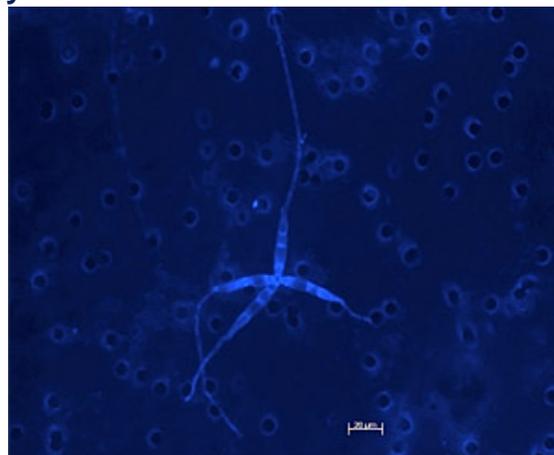


Edgcomb Laboratory: Deep Marine Subsurface Eukaryotes

Marine sediments cover more than two thirds of the Earth's surface and have been estimated to contain as much as one-third of Earth's prokaryotic biomass (Whitman *et al.*, 1998). Despite this, relatively little is known about this deep biosphere, and essentially nothing is known about the presence of microbial eukaryotes in sediments deeper than a few centimeters. Through consumption of dissolved organic matter and by selective grazing in subsurface horizons where bacterial and/or archaeal numbers are high, protists and fungi may significantly impact carbon cycling in the marine subsurface.

The first analyses of eukaryotic small subunit ribosomal RNA gene (18S rRNA) sequences obtained from deep marine subsurface sediments, the first metagenome, and a cultivation study based on those samples show that fungi dominate eukaryotic life in the buried marine subsurface. Novel fungi continue to be reported from deep marine environments, and there is fossil evidence of filamentous structures highly suggestive of fungi within carbonate-filled vesicles within the upper oceanic crust. In collaboration with J. Biddle at U.Del, and A. Teske at UNC Chapel Hill, our group used RNA-based approaches to investigate microbial eukaryote (protist and fungi) communities in deep subsurface samples from around the globe to determine whether fungi dominate the eukaryotic communities in all deep subsurface samples. This study produced intriguing results suggesting that fungi are metabolically active in the subsurface sediment cores studied. We are pursuing a more detailed understanding of the metabolic activities of fungi in the deep marine subsurface and their ecological impact with collaborator Gaetan Burgaud at University of Brest, France, and his postdoc Vanessa Redou. This study involves eukaryote focused transcriptomics, culture studies, and analysis of metabolic activities of cultured isolates from several oceanic provinces.



[Enlarge Image](#)

(Gaetan Burgaud)

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Mail: Woods Hole Oceanographic Institution, 266 Woods Hole Road, Woods Hole, MA 02543, USA.

E-Contact: info@whoi.edu; press relations: media@whoi.edu, tel. (508) 457-2000

Problems or questions about the site, please contact webdev@whoi.edu