

Report Option - Nitrogen Cycling Bacteria and Microbial Ecology Advanced Methods

Paper: Schramm, *et al.*, "Structure and Function of a Nitrifying Biofilm as Determined by In Situ Hybridization and the Use of Microelectrodes," in *Applied and Env. Microbiology*, 1996, p. 4641-47.

Section One – Big Picture:

- a. Using your text, thoroughly summarize and describe the specific processes and microorganisms that are the aim of study in this paper. For processes, “thorough” means as much detail as I include in lecture and using the correct vocabulary; for microorganisms, “thorough” means describing phenotypic traits and classification/phylogeny.
- b. What community is the subject of this study and what features of this community make it a good place to study the target processes and microorganisms? Relate your answer to all processes and microorganisms described in the part a.

Section Two – FISH Methods:

- a. Using your textbook, explain what basic FISH stands for, is and how it works. Next, name and describe ALL FISH probes in this paper and indicate PRECISELY what they bind/target. Using your text and other sources that you cite, compare/contrast basic FISH with any TWO of the following more advanced methods: FISH-MAR, ISRT-FISH, CARD-FISH.
- b. Which table and/or figure is about FISH-related methods/results and what do each convey in terms of their take-home message about nitrogen cycling and ecology?

Section Three – Microelectrode Methods:

- a. Using your textbook, explain what microelectrodes are and how they work. Describe microelectrodes used in the paper, for what purpose, and what controls are employed. Which table and/or figure is about microelectrode-related methods/results and what do each convey in terms of their take-home message about nitrogen cycling and ecology?
- b. Design your own experiment using microelectrodes to study any other important PAIR of environmentally important prokaryotes who live and eat together. Your description must describe all of the following: the target reactions (relate to microelectrode design/selection), target microorganisms, and a logical natural habitat where you will conduct this study.