Diversity of N cycle bacteria in wetland ecosystems
PhD position at Microbiology, IWWR

For over a century it was believed that we knew all N cycle bacteria. However, the last ten years showed us, that our understanding of the microbial nitrogen cycle and the major players involved is far from complete. Spectacular discoveries such as anaerobic ammonium oxidation (anammox), ammonium oxidation by crenarchaea, the interaction between these two groups, nitrate reduction to dinitrogen gas by foraminifera, nitrite-oxidizing phototrophs, nitrite-dependent anaerobic methane oxidation (N-DAMO), hyperthermophilic N2-fixing methane-producing archaea, and genome sequencing of several N-cycle organisms provide examples that there is an enormous biodiversity and metabolic capability of nitrogen conversions hidden in the microbial world of which we know only very little to date. This impression is corroborated by the advancement of molecular methods and new sequence technologies that indeed show how much we still have to uncover of the vast majority of functional microbial diversity in the environment.

The ERC and ALW have funded the N cycle research at IWWR with the aim to obtain a fundamental understanding of the ecological importance of various N cycle bacteria. Such understanding contributes directly to our environment and economy because the N cycle bacteria form a new opportunity for nitrogen removal from wastewater: cheaper, with lower carbon dioxide emissions than existing technology.

Project 5 Environmental detection of N cycle bacteria in N loaded wetland ecosystems. At the moment we know very little of how and to what extent the different groups of nitrogen cycle bacteria contribute to the biogeochemical cycling of nitrogen. We provided evidence for the presence of anammox bacteria in oxygen limited marine ecosystems, based on nutrient profiles, 16S rRNA gene clone libraries, FISH, 15N activity tests, and ladderane lipid analysis. It is now estimated that anammox bacteria might contribute more than 50% to global, present day nitrogen losses from the oceans. Also in freshwater wetland ecosystems high ammonium and low oxygen concentrations may prevail, but the presence, activity and interaction of anammox with plants in the rhizosphere of such ecosystems has never been investigated. Here we will use large scale wetland experiments in the Nijmegen phytotron with different nitrogen feeding regimes. State of the art ecogenomics methods will be employed, to determine the presence and contribution of N cycle bacteria to nitrogen budget and cycling in these large scale experiments. These experiments may also be used to enrich and characterize new anammox bacteria. The properties of these new wetland anammox bacteria will be compared to those of wastewater treatment systems and of those from marine ecosystems.

Expected qualifications of the PhD Student
- M.Sc. degree with a relevant background in, for example; (molecular) cell biology, microbiology, biochemistry or biotechnology
- Enthusiasm, perseverance, patience and courage
- Independent and well-structured working style
- Excellent communication skills and a team spirit.
- Excellent computer and software skills
- Fluency in English.

The salary will be between EURO 2.042 and 2.612 gross per month on a full-time basis, depending on qualifications and experience. PhD positions a 1.5 + 2.5 year contract is available after yearly evaluation. Benefits are according to central Radboud University Nijmegen package. For PhD positions a 1.5 + 2.5 year contract is available with yearly evaluation. Benefits are according to central Radboud University Nijmegen package.

Applications should include a cover letter, curriculum vitae and two outstanding references. The application can be sent to the following address, until 16 March 2009
Radboud University, Personnel Department, Vacancy number: 62.10.09 PO Box 9010, 6500 GL Nijmegen, The Netherlands

More information:
For more information on the vacancy you can contact:
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