

Eavesdropping on bacterial conversations: are bacterial signal molecules a universal cue for the recruitment of benthic organisms in the sea?



PML supervisor: Dr Karen Tait (ktait@pml.ac.uk)
PML Applications: Dr Tom Vance, Anna Yunnice
Plymouth University supervisors: Dr Anthony Knights, Dr Louise Firth

Scientific background

Currently, many anti-foulants are toxic chemicals which have wider implications for the health of marine communities. Research has provided tantalising evidence that a group of bacterial-derived signal molecules may be used as a settlement cue by a diverse range of marine benthic organisms from the smallest bacteria to larger fauna and flora. That a bacterial signal is used as a universal cue for settlement by a remarkably wide range of evolutionary diverse benthic species would lead to a paradigm shift in our understanding of benthic community ecology and pave the way for the development of non-toxic methods to control unwanted growth of benthic species. This project will:

1. Determine the behavioural response of a range of benthic species to bacterial signal molecules
2. Quantify the influence of the signal on settlement in field conditions.
3. Determine if disruption to bacterial signalling can be used to minimise the effects of biofouling

Research methodology and Training

The project will use methods developed in our previous work to study the effect of bacterial signals on the settlement behaviour of benthic species (e.g. barnacles, bryozoans, tunicates or mussels). We will also vary substrata, light levels, the presence of adult species and hydrodynamic conditions to determine the relative importance of bacterial signal molecules to settlement. Commercially available compounds will be used to determine if signal-blocking can be used as a means of biofouling control.



The student will be hosted at Plymouth Marine Laboratory (Supervisors Karen Tait, Anna Yunnice and Tom Vance) and registered at the University of Plymouth (Supervisors Louise Firth, Antony Knights). Thorough training in methods and techniques will be provided including experimental design and statistical analyses, culturing of bacterial strains, spores and larvae and image analysis. This project will require field work for animal collection and experiments. The student will also have access to the training provided by the Aries DTP programme.

Person specification

Honours or Masters degree (e.g. 2.i or above) in a relevant subject (e.g. marine biology, ecology, microbiology).



Registered Office:
Prospect Place, The Hoe,
Plymouth, PL1 3DH,
United Kingdom

T +44 (0)1752 633100
F +44 (0)1752 633101
W www.pml.ac.uk
E forinfo@pml.ac.uk

Patron: James Cameron
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