

HEALTH & ENVIRONMENT Seminar Series 2012

New horizons for beneficial plant-bacterial interactions to promote agricultural biotechnology

Fergal O'Gara, University College Cork, Irland

AIT Austrian Institute of Technology
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Konrad-Lorenz-Straße 24, 3430 Tulln

Abstract

Microorganisms play a pivotal role in contributing to the fertility of soils and thereby help drive sustainable global food production. The soil environment is characterized by remarkable microbial biodiversity that helps drive the key biotransformations in nutrient cycles such as nitrogen and phosphorous that are necessary to sustain plant growth. Furthermore naturally occurring microbial communities are involved in promoting 'suppressive soils' keeping microbial pathogens in check during food cultivation and production. While many microbes live as free-living members of the soil community, rhizosphere or plant associated bacteria such as *Pseudomonas* have evolved as sophisticated plant-microbe 'interactomes' with bi-directional signalling a common feature of such interactions. In our programme we are using systems based molecular strategies to dissect the nature of these prokaryotic-eukaryotic interactions. Specifically we are investigating the molecular mechanisms underpinning key beneficial traits involved in the biological control of pathophyths and nutrient mobilizing traits such as P-solubilization. Genomic technology and strategies are helping to dissect and evaluate the nature and regulation of key genes and pathway involved in these PGPR traits. Of particular interest is the novel role of secretion systems in developing and maintaining effective PGPR systems. Ultimately the new information emerging will facilitate progress towards exploiting synthetic biology approaches to developing more effective bioproducts for application in agricultural biotechnology.

Biosketch

Professor Fergal O'Gara is Director of the Biomerit Reserch Centre, a Biotechnology centre of excellence at University College Cork (UCC). He is also Emeritus Professor of Microbiology at the University. He graduated from National University of Ireland Galway.(NUIG) with a PhD in Microbiology



in 1974. He spent 3 years working as a research Scientist at the University of California and joined UCC in 1977. He was appointed Professor and chair of Microbiology at UCC in 2002 and served as head of Department until 2009.

His research interests focus on the genetic and molecular biology of microbe-host interactions in medical and environmental biotechnology. His research programme is funded by national and international agencies and industry. He has published widely in international molecular biology and microbiology journals (230 major papers) and was awarded a Doctor of Science degree (DSc) in 1991 by the National University of Ireland (NUI) in recognition of his published works. He is an elected member of the Royal Irish Academy (RIA) and served as Vice-President from 2008-2011.

Professor O'Gara serves on a number of European Science bodies. He has participated as Biotechnology advisor to UNIDO and a number of other international government organisations. He has acted as chairperson of the EU Madam-Curie training programme and chair of the European Food Safety Authority's (EFSA) panel on GMOs. He is a member of the European Environmental Research Organisation (EERO). He also acts as Editor for a number of international scientific journals.

Prof. Fergal O'Gara BSc PhD DSc MRIA
Director, BIOMERIT Research Centre,
Microbiology Department,
National University of Ireland, Cork (UCC)
Cork, Ireland.

E-mail: f.ogara@ucc.ie

Web: <http://www.ucc.ie/biomerit>