RINH Invited Speaker Form
Please complete as much as you can

Name & job title:	Dr David Berry, Associate Professor
Institution:	University of Vienna
Talk title:	Exploring gut microbiota function at the single cell level using stable isotope probing
Date:	July 7th, 2016
Seminar Abstract: (provide URL if easier)	The gut microbiota is essential for human nutrition and health. In recent years, sequencing-based approaches such as metagenomics and metatranscriptomics have greatly expanded our understanding of the composition and metabolic potential of the gut microbiota. Now, new tools are needed to determine the actual activities of the microbes in these communities. Stable isotope-based approaches are powerful tools to reveal microbial function in situ. This talk will focus on how microbes can be studied at the single cell level using molecular methods combined with two powerful chemical imaging tools: nano-scale secondary ion mass spectrometry (NanoSIMS) and Raman microspectroscopy. In this talk, I will discuss how isotope probing can be used to identify the microbes that are utilizers of specific compounds such as host- and diet-derived nutrients. I will introduce a recently developed method to determine the general activity of cells using heavy water (D2O). In this approach, active cells, irrespective of their physiology, incorporate D into their biomass, which can then be detected with Raman microspectroscopy or NanoSIMS. D-incorporation a highly sensitive marker and activity can be detected before a single cell division. This can be combined with fluorescence in situ hybridization for the identification of active microbes. Additionally, labeled cells can subsequently be sorted using optical tweezers, allowing for targeted single cell genomics. I will give examples will be given of how these techniques can be used to study gut microbiota utilization of a range of compounds, including mucosal proteins, host-derived amino acids, and dietary and mucosal sugars, polysaccharides, and glycans. Future directions for these exciting new techniques will also be highlighted.
Speaker Biography: (provide URL if easier)	http://www.microbial-ecology.net/people/david-berry

Image:	

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