

Anita Mac Nelly

Expression control and biosynthesis of dehalogenating enzymes from anaerobic soil bacteria in response to the interaction with aerobic halogenating fungi

The interaction between aerobic, lignin-degrading fungi and anaerobic bacteria in the course of halogenation and dehalogenation of organic compounds is the main focus in our research group. Lignin-degrading fungi of boreal forests show the ability to produce chlorinated organic compounds which can be subsequently dechlorinated under anoxic conditions by a heterogeneous group of soil bacteria. The key enzymes of the anaerobic dechlorination are reductive dehalogenases. It was shown very recently that the expression of the dehalogenase-related genes is controlled by the availability of the respective chlorinated substrate. To examine the functionality of this special microbial food chain following issues will be studied in more detail:

- 1) The ecological niche of dechlorinating bacteria in forest soil with respect to hot spots of lignin-degradation.
- 2) The induction of the reductive dehalogenase gene expression in response to the occurrence of chlorinated organic compounds formed upon fungal lignin-degradation.
- 3) The molecular mechanism of the signal transduction from substrate recognition to dehalogenase gene expression. Established techniques for the investigation of the tetrachloroethene (PCE) reductive dehalogenase found in *Desulfitobacterium* spec. will serve as basis for the characterization of transcriptional regulation of reductive dehalogenases genes.

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Start of PhD

November 1, 2009

Doctoral Disputation

May 16, 2015