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# REGIONAL CENTRE FOR BIOTECHNOLOGY

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## Seminar series

# Reconstruction and systems analysis of plant cell wall deconstruction network in filamentous fungus *Neurospora crassa*

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Trieste, Italy

Wednesday, January 8th, 2014

3:00 PM

ATPC Seminar Hall

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# Abstract

A principal barrier in economical production of lignocellulosic biofuel is the enzyme costs required for conversion of plant biomass polysaccharides into simple fermentable sugars. Filamentous fungi are an excellent source of hydrolytic enzymes degrading lignocellulose. *Neurospora crassa* is a model filamentous fungus that can degrade and grow on lignocellulosic plant biomass. A system level understanding of the mechanisms employed by *Neurospora* to degrade plant cell wall and the regulation of associated genes can guide the rational design of hypersecretion strains. Towards this goal, we have reconstructed the first comprehensive network of biochemical reactions in *Neurospora* for plant cell wall deconstruction. Our reconstruction effort involved the integration of five heterogeneous data types to generate a feature matrix capturing the combined information. Using the feature matrix, we have devised a simple method for assigning annotation confidence scores to genes in the network. Experiments were performed to generate RNAseq data for *Neurospora* grown in different nutrient conditions. Biclustering of RNAseq data in different nutrient conditions revealed environment-specific gene modules. Subsequent analysis of RNAseq data within the network context shed new insights on regulation of genes coding for plant cell wall degrading enzymes in *Neurospora*.

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