NUS National University of Singapore | Department of Biological Sciences, Faculty of Science

SEMINAR

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Giant enzymes in algae

By **Severin Sasso**
Institute of General Botany and Plant Physiology, Friedrich Schiller University Jena, Germany



Over the last few years, the full genome sequences of around 40 different algae have become available. The majority of sequenced species are unicellular. Many genomes encode large polyketide synthases (PKSs) and non-ribosomal peptide synthetases (NRPSs) (E. Shelest et al., BMC Genomics 16, 1015 (2015)). Polyketides and non-ribosomal peptides are well-known from many bacteria and fungi, where these compounds often possess potent bioactivities. While PKSs and NRPSs may be involved in toxin biosynthesis in some bloom-forming algae, they are also predicted in some harmless algae. For example, the genome of the model species *Chlamydomonas reinhardtii* harbors a gene, PKSA, which encodes a huge type I PKS with a predicted size of ~24,000 amino acid residues (2.3 MDa). Our goal is to experimentally verify giant enzymes and the corresponding polyketides and non-ribosomal peptides in sequenced algae, and to unravel their biological function. The results of ongoing experimental investigations will be presented.

[*1] Shelest, E., Heimerl, N., Fichtner, M. & Sasso, S. (2015), Multimodular type I polyketide synthases in algae evolve by module duplications and displacement of AT domains in trans, BMC Genomics 16, 1015.*

Artwork by Ann Nee, DBS, NUS