

Department of Medicinal Chemistry Seminar Series

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Department of Medicinal Chemistry

Omics-Guided Discovery and Biosynthesis of Plant Peptides

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Plants biosynthesize peptide natural products via the ribosomal pathway. Plant peptides are cyclized via head-to-tail-macrocyclization, disulfide bonds or crosslinks between aromatic amino acid side chains and other amino acids. The latter aromatic side-chain-derived macrocycles were recently connected to a copper-dependent plant protein family called the BURP-domain (named after founding members BNM2, USPL, RD22 and PG1 β) and, therefore, these ribosomally synthesized and post-translationally modified peptides (RiPPs) are termed burpitides. Several characterized burpitide cyclases encode their substrate within the same polypeptide as the catalytic domain, which enables gene-guided discovery of burpitides from plant genomes and transcriptomes. In addition, large-scale plant metabolomics can be combined with sequencing-based approaches for burpitide discovery. Here, I present omics-guided discovery of burpitides and the elucidation of their underlying biosynthetic pathways across the plant kingdom.