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S-9: BIOSYNTHETIC APPROACHES TO NOVEL AMINOCYCLITOL-CONTAINING NATURAL PRODUCTS

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The C7N aminocyclitol family of natural products is a relatively new class of microbial secondary metabolites that demonstrate significant biological activities. A number of its members are widely used to combat diseases in humans and plants. Originally, this class of compounds was narrowly associated with potent sugar-hydrolase inhibition, but recent discoveries indicate a broader array of chemical structures and biological activities. In addition, a number of synthetic or semi-synthetic C7N aminocyclitols have been shown to have a variety of biological activities, such as anti-inflammation and immunomodulation, whereas others hold potential for anti-cancer and anti-viral applications. Despite their intriguing structures and biological activities, relatively little is known about their biosynthesis. Our group has been studying the biosynthesis of this class of secondary metabolites and recently has identified a number of biosynthetic gene clusters of this class of compounds. Functional analysis of these biosynthetic gene clusters has provided significant insights about their formation in nature. Results of in silico investigation also suggest a wide distribution of this class of natural products across different classes of microorganisms, including cyanobacteria and fungi. Using genetic approaches, further discovery efforts of aminocyclitol-containing natural products is currently underway.

Matt Suffness Young Investigator Award