UNIVERSITY OF MINNESOTA
Driven to Discover℠

Performance-enhancing plasmids for natural product discovery

Novel plasmids that encode microorganisms to overproduce targeted natural products.

IP Status: Provisional Patent Application Filed

Applications

- Natural product discovery
- Drug development

Key Benefits & Differentiators

- **Enhanced Efficiency:** Decreases the number of manipulations that are required to turn on silent biosynthetic gene clusters responsible for natural product production
- **Increased Yield:** Production levels of some natural products have increased by 3-6 fold

Technology Overview

Natural products are an important class of chemicals that serve as the foundation for the development of many pharmaceuticals and agrochemicals. These compounds are often derived from microorganisms, but their discovery and production are hindered by inefficient, labor-intensive processes to activate specific biosynthetic gene clusters. Traditional methods rely on complex genetic manipulations and prolonged cell culture times, significantly limiting the speed and scalability of natural product discovery.

Researchers at the University of Minnesota have developed novel plasmids that enhance the production of key classes of natural products. These plasmids are introduced into libraries of microorganisms and cultured, enabling the microorganisms to naturally overproduce compounds encoded in their genome. This innovative approach reduces the need for complex genetic manipulations and accelerates the discovery of new molecules while increasing the yield of targeted natural products. By focusing on the overproduction of key biosynthetic intermediates, this method improves both the efficiency and scalability of natural product research and production.

Phase of Development

TRL: 3-4
Plasmids enhancing the production of monoterpenes, sesquiterpenes, and diterpenes have been developed.

Desired Partnerships

This technology is now available for:

- License
- Sponsored research
- Co-development

Technology ID
2024-016

Category
Life Sciences/Biologics
Life Sciences/Biochemicals & Small Molecules
Life Sciences/Pharmaceuticals
Life Sciences/Research Tools

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Researchers

- **Michael Smanski, PhD** Associate Professor, Department of Biochemistry, Molecular Biology, and Biophysics

References

1. Szu-Yi Hsu, Jihaeng Lee, Adam Sychla, Michael J. Smanski(2023) , https://www.sciencedirect.com/science/article/abs/pii/S1096717623000319?via%3Dihub, Metabolic Engineering, 77, 1-11