UNIVERSITY OF MINNESOTA
Driven to Discover℠

Biosynthetic Route to Serofendic Acid

IP Status: Issued US Patent / US 10,633,680

Cost effective route to potent neuroprotectant compound

A new biosynthetic pathway leads to synthesis of serofendic acid, a potent neuroprotectant compound. The process begins by using a Streptomyces host bacteria to synthesize ent-atiserenoic acid (EAA), a precursor molecule in synthesizing serofendic acid with high yields. Serofendic acid has been shown to be an effective neuroprotectant that protects various cell types (neurons, cardiomyocytes, epithelial cells) from reactive oxygen species that can cause apoptosis. Neuroprotectants may be able to treat diseases such as Parkinson's, Alzheimer's, ALS and Huntington's disease. This biosynthetic pathway opens up cost-effective options for further research.

Biosynthetic pathway offers options not possible with other microbes

Chemical synthesis of serofendic acid is too expensive for feasible commercialization, and often requires 15 or more steps and results in less than 10% yield. Standard microbial organisms (yeast and E. coli), used in isolating other natural compounds, don't work for serofendic acid. Therefore, researchers are recreating pathways in microbial hosts such as Streptomyces, which appear to have unique capabilities for making certain types of natural products. This new biosynthetic pathway offers both a shorter and higher yielding synthesis of serofendic acid. It is also much more cost effective than the typical purification methods from fetal calf serum. The process harnesses microbe pathways to make EAA in a more cost effective manner. In addition, it may be used to create other "natural products" for pharmaceutical and agricultural products related molecules, that weren't possible using yeast or E. coli.

Phase of Development

- Pilot Scale Demonstration. We have completed pilot scale demonstration up to 3 Liter fermentation to produce gram quantities of eAA that can be converted to Serofendic Acid or analogs by chemical methods.

Benefits

- Makes EAA much more efficiently and at higher yields than chemical synthesis methods alone
- Pathway creates novel compounds not feasible in E. coli or yeast, or through chemical synthesis
- Cost effective

Features

- Synthesizes serofendic acid precursor
- Uses Streptomyces host bacteria
- Synthesizes ent-atiserenoic acid (EAA) precursor
- Neuroprotectant compound

Applications

Technology ID
20160338

Category
Life Sciences/Human Health
Life Sciences/Industrial Biotech
Life Sciences/Pharmaceuticals
Life Sciences/Research Tools

View online

- Serofendic acid derivatives
- Neuroprotective drugs
- Treating diseases such as Parkinson's, Alzheimer's, ALS and Huntington's disease.
- Research
- Preventing reactive oxygen species (ROS)-induced apoptosis in epithelial cells, neurons, cardiomyocytes, etc.

Researchers

Mike Smanski, PhD
Assistant Professor, Biochemistry, Molecular Biology, and Biophysics
External Link (cbs.umn.edu)

Interested in Licensing?

The University relies on industry partners to further develop and ultimately commercialize this technology. The license is for the sale, manufacture or use of products claimed by the patents. Please contact us to share your business needs and licensing and technical interests in this technology.

References

1. Dimitri Perusse and Michael J. Smanski(2019) , https://doi.org/10.1039/C9MD00145J, https://pubs.rsc.org/en/journals/journalissues/md#!recentarticles&adv, 10, 951–960
2. Szu-Yi Hsu, Dimitri Perusse, Thomas Hougard, and Michael J. Smanski(2019) , https://doi.org/10.1021/acssynbio.9b00261, https://pubs.acs.org/journal/asbcd6, 8, 10, 2397–2403