

Entomopathogenic Filamentous Fungi: Source of Progesterone 11-Hydroxylases for Sustainable And Green Hydroxysteroid Synthesis

In the world of pharmaceuticals, steroids play a crucial role, particularly for their anti-inflammatory properties. However, producing these valuable compounds efficiently remains a significant challenge. A new research project is set to tackle this issue by exploring a largely untapped resource: entomopathogenic filamentous fungi (EFF). These fungi, known for their ability to infect insects, could hold the key to revolutionizing steroid production.

One of the critical steps in synthesizing many steroid medications is a process called 11-hydroxylation. This reaction adds a hydroxyl group to steroid compounds, making them more effective as drugs. Despite its importance, only eight fungal enzymes capable of this transformation have been identified so far, and none come from EFF. This project aims to change that by identifying and expressing progesterone 11-hydroxylases from EFF in *Saccharomyces cerevisiae*, a well-studied yeast.

The project has two main objectives:

- **Identify and Express New Enzymes:** Researchers will isolate 11-hydroxylases from various EFF strains and express them in yeast to study their activity on a wide range of steroid compounds.
- **Comparative Analysis:** The team will compare these newly identified enzymes with existing ones to better understand their selectivity and effectiveness.

A Promising Future

By combining traditional biocatalysis with modern genetic techniques, this research could lead to more sustainable and cost-effective methods for producing steroid derivatives. The findings will not only enhance our understanding of how fungi metabolize steroids but also provide valuable resources for other researchers in the field.

With a dedicated team experienced in steroid transformations and enzyme expression, this project stands at the forefront of biotechnological innovation. As we unlock the secrets of these remarkable fungi, we may soon see a new era in steroid production—one that is greener, more efficient, and better suited to meet the growing demands of the pharmaceutical industry.