Researchers discover how opium poppies synthesize morphine

13 July 2015

Researchers have discovered how opium poppies synthesize morphine, a key step toward the reassembly of the pathway to morphine in microorganisms such as yeast.

The gene we've isolated actually consists of a natural fusion between two ancestral genes, which encodes the gateway enzyme in the formation of morphine," says Farrow. "It's really interesting to see these fused genes in a metabolic pathway. It provides us with a new tool to search for something missing in other plants as well."

The findings were published July 1 in Nature Chemical Biology, and detail the missing step to morphine biosynthesis.

Next steps

Facchini says the isolation of this gene, among many other things, is a key step toward the reassembly of the pathway to morphine in microorganisms such as yeast.

"These efforts could lead to the development of alternative production systems for painkillers such as morphine, codeine and oxycodone," says Facchini, professor of biological sciences in the Faculty of Science and an internationally recognized expert on the opium poppy. "It's satisfying to know that my research has the potential to help people. But finding the last known step is really just the beginning of a new pathway of inquiry," Facchini says.

He likens this discovery to a box of Lego building blocks without a set of instructions - where the blocks are the genes along the pathway. One of the next steps will be to "write the instruction manual" based on still unknown information about how the genes work, which is crucial to reconstructing the pathway in another organism. "You can certainly snap a few pieces together, but you're not going to
build a complex toy without a lot of knowledge and skill."

**More information:** Stereochemical inversion of (S)-reticuline by a cytochrome P450 fusion in opium poppy, *Nature Chemical Biology* (2015) [DOI: 10.1038/nchembio.1879]

Provided by University of Calgary


*This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.*