

Finding new ways to make drugs

November 18 2014



Professor Mick Sherburn outside the Research School of Chemistry

Chemists have developed a revolutionary new way to manufacture natural chemicals and used it to assemble a scarce anti-inflammatory drug with potential to treat cancer and malaria.

The breakthrough could lead to new and cheaper ways to produce rare drugs in large quantities.

"We took [small molecules](#) and clipped them together like Lego," said lead researcher Professor Michael Sherburn, from the Research School of Chemistry.

"The building blocks are carefully designed in such a way that the first reaction generates a product perfectly primed for the second. It's quite magical. This means you can efficiently build large and [complex molecules](#)."

Medicines of this type have traditionally been made in a cumbersome way. Chemists take a related molecule and renovate it. This is a lengthy process, with unwanted structural features being ripped out and replaced.

"This leads to a lot of waste," Professor Sherburn said.

The group trialed their innovative new method by making pseudopterosin, a powerful anti-inflammatory and analgesic [drug](#), which is currently only available in tiny quantities extracted from fan coral found in the Bahamas.

The work began as blue-sky research, with the researchers trying to work out a way to make supposedly impossible molecules of cross-conjugated hydrocarbons.

Before trying the experiments the team ran simulations on the Raijin supercomputer, which indicated that their method had potential.

"Ours is an empowering and enabling technique, allowing a smarter and faster way to make important substances," said Dr Chris Newton, who did the research in the laboratory as a PhD student.

"The pseudopterosin synthesis is the tip of the iceberg. We are well on the way to efficient syntheses of other important drugs.

"There is a potential for industrial-scale manufacture, too, which will take the pressure off species which are being harvested for drugs," he said.

The research is published in *Nature Chemistry*.

More information: "Pseudopterosin synthesis from a chiral cross-conjugated hydrocarbon through a series of cycloadditions" *Nature Chemistry* (2014) [DOI: 10.1038/nchem.2112](https://doi.org/10.1038/nchem.2112)

Provided by Australian National University

Citation: Finding new ways to make drugs (2014, November 18) retrieved 9 April 2024 from <https://phys.org/news/2014-11-ways-drugs.html>

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