

New Organic Catalyst Should Improve Drug Development, Lower Costs

October 3 2008

(PhysOrg.com) -- Chemists at Oregon State University have developed a new “organocatalyst” that will play a major role in new drug development, greatly reducing costs while making the process more efficient, effective and environmentally friendly.

This catalyst, named “Hua Cat” after one of the researchers who helped create it, should soon be commercially available for use in the field of “chiral” chemistry – the basis for about 90 percent of all new drug development, and applicable to medications used in everything from heart disease to cancer. This is already a \$500 million industry with rapid growth, and has been projected to surpass \$5 billion within five years.

Discussions are already under way with an Oregon company for commercial production of the compound, and a major pharmaceutical brand has already expressed interest. The findings were just published in *Organic Letters*, a professional journal, based on work that was originally supported by the National Institutes of Health. Current support for this work has been obtained through the Oregon Venture Fund, a new commercialization program that chose Hua Cat as one of its first funding recipients.

“We invented this almost out of necessity, because we were working on a natural product called lycopodine in which no existing catalyst was effective and we needed something new,” said Rich Carter, an associate professor of chemistry at OSU. “It was only after we developed it that we realized the potential it had for the whole field of drug development.

The advance should be of considerable value to the pharmaceutical industry, it's really pretty exciting.”

Catalysts are chemical compounds that help facilitate other chemical reactions without themselves being consumed – in industrial production, they can be used over and over. Most medicinal drugs are based on what are called chiral molecules, which are like two mirror images that fit together, similar to a lock and key, or a right hand shaking another person's right hand. To create such drugs, molecules are often induced to become chiral through the use of a catalyst.

Existing approaches to create these chiral compounds often use toxic metals, which are extremely expensive and sometimes difficult to dispose of as waste. By contrast, an "organocatalyst" such as the one just discovered at OSU is more environmentally friendly and works better with most pharmaceutical drugs, which are also organic molecules. In this case, the catalyst is also far more effective, more stable and less costly to produce. Much of this work was done by Hua Yang, an OSU postdoctoral research associate.

Advances in chiral chemistry have been recognized as extremely important, and were the basis for the 2001 Nobel Prize in chemistry.

“The Hua Cat compound should be significantly cheaper than existing compounds in widespread use for drug development,” Carter said. “It's derived from what essentially are amino acids, soaps and cleaning solvents, which are very inexpensive. And it works better, providing solubility that's more than 10 times higher than related compounds now being used.”

“The improved solubility and unique chemical reactivity should revolutionize this field,” he continued. “We're grateful to the OSU Venture Fund and its private donor support in getting the innovation this

far.”

Further research is needed to develop methods for large scale production of the compound, researchers said.

Provided by Oregon State University

Citation: New Organic Catalyst Should Improve Drug Development, Lower Costs (2008, October 3) retrieved 19 April 2024 from <https://phys.org/news/2008-10-catalyst-drug.html>

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