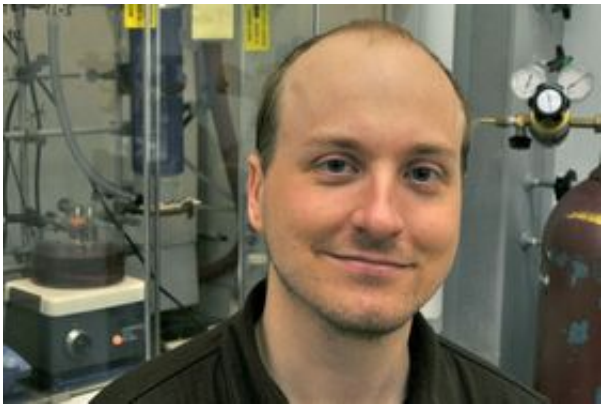
Chemists devise new way to prepare molecules for drug testing

August 15 2013



Assistant Professor of Chemistry Mark R. Biscoe

(Phys.org) —James Bond had his reasons for ordering his martinis "shaken, not stirred." Similarly, drug manufacturers need to make sure the molecules in a new drug are arranged in an exact manner, lest there be dire consequences. Specifically, they need to be wary of enantiomers, mirror-image molecules composed of the same atoms, but arranged differently.

"One mirror image could be therapeutic while another could be poisonous," said Dr. Mark R. Biscoe, assistant professor of chemistry at The City College of New York. The classic case is thalidomide, a drug marketed in the 1950s and 1960s to treat morning sickness, which resulted in serious birth defects.

Professor Biscoe led a team of researchers at CCNY that developed a new method for preparing libraries of single-enantiomer molecules for therapeutic and toxicity studies that is faster and potentially less costly than methods now used in the pharmaceutical industry. Their findings were reported in *Nature Chemistry*.

Currently, drug developers typically rely on a chiral resolution process whereby compounds with roughly equal parts of the two enantiomers are separated into the individual enantiomers. Bioenzymatic processes can also be employed to generate single-enantiomer molecules. These strategies are wasteful and costly, Professor Biscoe explained.

He and colleagues found that a metal such as palladium could be employed to achieve a cross-coupling reaction with a single-enantiomer molecule without impacting the integrity of the mirror image formed in the product. By doing so, they could isolate one mirror image for evaluation as a drug candidate.

"By using a single-enantiomer partner in a cross-coupling reaction, we can rapidly generate a diverse library of biologically active molecules for use in drug screening," he said.

More information: www.nature.com/nchem/journal/v … full/nchem.1652.html

Provided by City College of New York

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