DRUG DISCOVERY & DEVELOPMENT

Drug Discovery & Development
Advantage Business Media
100 Enterprise Drive
Rockaway, NJ, 07866

Email the editor

E-mail to a colleague

Printer Friendly Format

Reed Life Science News

Nanoscale Propellers Could Aid Drug Delivery

Chemists at the University of Illinois at Chicago have created a theoretical blueprint for assembling a nanoscale propeller with molecule-sized blades. The ability to pump liquids at the cellular scale opens up new possibilities, such as precisely targeting medicines and regulating flow into and out of cells. But designing this molecular machinery has proven difficult. The work is featured in Research Highlights in the July 12 issue of *Nature* and was described in the June 28 cover story of *Physical Review Letters*.

Using classical molecular dynamics simulations, Petr Král, assistant professor of chemistry at UIC, and his laboratory coworkers were able to study realistic conditions in this microscopic environment to learn how the tiny propellers pump liquids. Previous research has looked at how molecular devices rotate in flowing gases, Král and his group are the first to look at molecular propeller pumping of liquids, notably water and oils. Král's group found that at the molecular level, the chemistry of the propeller's blades and their sensitivity to water play a big role in determining whether the propeller pumps efficiently or just spins with little effect. If the blades have a hydrophobic, or water-repelling nature, they pump a lot of water. But if they are hydrophilic they become clogged with water molecules and pump poorly.
Full Article