



medGadget

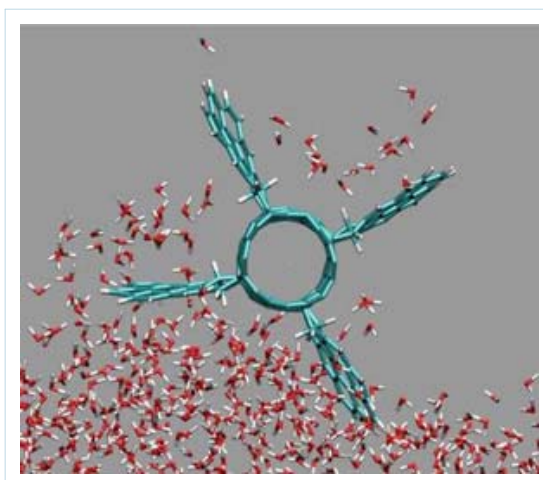
internet journal of emerging medical technologies

Thursday, July 19, 2007

Seeing Nano Propellers of the Future

Filed under: [Nanomedicine](#)

In a way similar to bacteria that use the flagella to swim to a desired location, the delivery of medicines, packaged in nanovesicles, or other nanostructures, may one day depend on molecular-sized motors. A research group of Dr. Petr Král at the University of Illinois at Chicago studies the design and modeling of nanoscale systems, and they now believe that they "created a theoretical blueprint for assembling a nanoscale propeller with molecule-sized blades."



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.

While 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.

"We want to see what happens when the propellers get to the scale where it's impossible to reduce the size of the blades any more," said Král.

Král's group found that at the molecular level -- unlike at the macro

ARCHIVES

By specialty...

By date...

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 -- water-attracting -- they become clogged with water molecules and pump poorly.

"Pumping rates and efficiencies in the hydrophilic and hydrophobic forms can differ by an order of magnitude, which was not expected," he said.

The UIC researchers found that propeller pumping efficiency in liquids is highly sensitive to the size, shape, chemical or biological composition of the blades.

"In principle, we could even attach some biological molecules to the blades and form a propeller that would work only if other molecules bio-compatible with the blades are in the pumped solution," he said.

The findings present new factors to consider in developing nanoscale liquid-pumping machines, but Král added that such technology probably won't become reality for several years, given the difficult nature of constructing such ultra-small devices.

Král's laboratory studies how biological systems, like tiny flagella that move bacteria, offer clues for building motors, motile systems and other nanoscale devices in a hybrid environment that combines biological and inorganic chemistry.

Press release: [Nano Propellers Pump with Proper Chemistry ...](#)

[Petr Král's Design and Modeling of Nanoscale Systems Group](#)

✉ | 📄 📌 🗨️ (0)

STOP paying full price to marinas and divers.
BUY ONLINE and SAVE

Up to 50% off, including:

- Inboard Propellers
- Outboard Propellers
- Cutless Bearings
- GPS Units
- and much much more

FREE! DOMESTIC GROUND SHIPPING ON ALL OUTBOARD PROPELLERS, HUB KITS, AND GPS UNITS
No Sales Tax for residents outside of FL (FL residents pay 6% tax)

Direct: (954) 444-6259
Toll Free: (800) 454-6960
www.deepblueyachtsupply.com

DEEPBLUE YACHT SUPPLY



[Always Clean Glass, Tile](#)

Diamon-Fusion Patented Nano-Process Water, Scratch and Impact resistant

[TCnano-Nanoteknologi B2B](#)

Effektiv og langtidsholdbar overfladebehandling til alle materialer

[0.00072° Stepper Motors](#)

Nano-Step Exceeds Micro-Step. 5 & 2 PH to 500,000 Steps/Rev. Hi-Torque.

[Top Biotechnology Stocks](#)

3 pharmaceutical companies to invest in now. Don't miss out! www.Fool.com

[Medical Device Assemblies](#)

Precision Concepts is a registered electro-medical device contractor.

Recent Posts...

» [Video of i-LIMB Hand](#)

- » [Seeing Nano Propellers of the Future](#)
- » [Ins and Outs](#)
- » [Trix Tick Remover Lassos the Little Buggers](#)
- » [SpeechEasy® for European Stammerers](#)

[Ads by Google](#)

replies: 0 comments

Open comments are not moderated, although abusive and vulgar remarks may be deleted. Opinions expressed do not necessarily reflect the views of Medgadget.com. Please consult our disclaimer.

add a comment

html tags: , <i>, and <a>
examples: **Bold** <i>*Italic*</i>

Name:

Email Address
(will not be published):

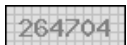
URL:

Comments:

Remember personal info?
(anonymous comments allowed)

Yes No

B *I* [link](#)



Enter the above anti-spambot
Turing code:

Medical Alert

Automated delivery of pre-recorded phone messages. HIPPA compliance.

www.voiceshot.com

[Advertise on this site](#)

[Preview](#) [Post](#)

Click the "**Post**" button only **once**!



Electronic Medical
Records

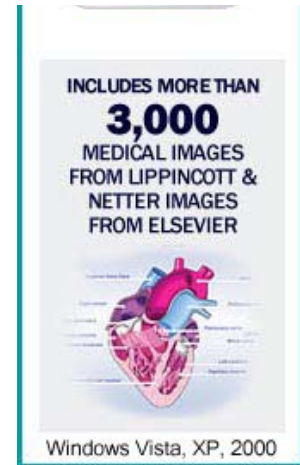
Specialty-specific EMR

Medgadget.com is an independent journal of the latest medical gadgets, technologies and discoveries. Updated every weekday. Written, edited and published by a group of MDs and biomed engineers.

The Medical Revolution Will Be Blogged.

© 2004–2007 Medgadget LLC. All Rights Reserved. | [Privacy Policy](#) | [Terms of Use](#)
All trademarks are properties of their respective holders.

[home](#) [about us](#) [contact](#) [rss](#) [category rss](#) [news feeds](#) [pda edition](#) [widget](#)
[folding@home](#)



[Your ad here.](#)

[Ads by Google](#)

advertisement

**New Media Medicine –
Medical Forums:**

[MCAT](#)

[USMLE](#)

[Residency](#)

[PLAB](#)

[UKCAT](#)

[MRCP](#)

[UMAT](#)

[GAMSAT](#)

[US Medical Schools](#)
[Canadian Medical](#)
[Schools](#)

MEDGADGET JOB
BOARD

[See more jobs](#)

[Post your job here](#)

Powered by [JobThread](#)

[Get your own job
board](#)

SYNDICATION 

add Medgadget

MEDGADGET BY
EMAIL

your email

Delivered by [FeedBurner](#)

MAILING LIST

your email

Privacy: Your email address will be used by Medgadget editorial team only. We hate spam too.

medGadget
NEWS FEEDS



We comply with the [HONcode standard](#) for trustworthy health information: [verify here](#).