

DATE: October 02, 2008

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National Science Foundation grants Clemson professors award to develop nanoprobes

CLEMSON — The National Science Foundation has granted two Clemson University professors \$250,000 to research and develop nanofiber-based probes — needles that are 10 times smaller in diameter than a human hair — for medical diagnostics.

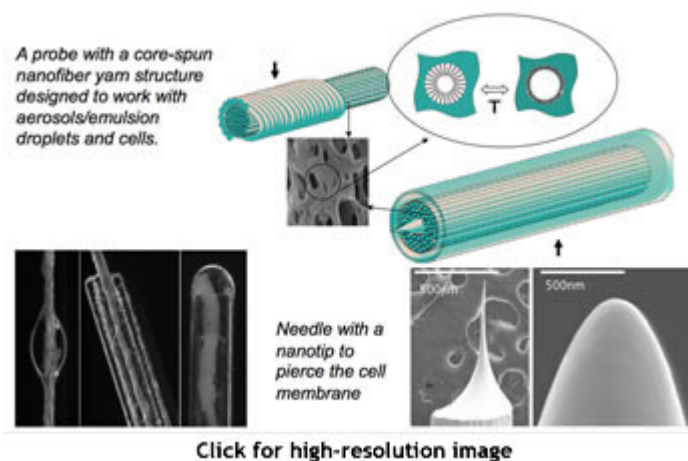
The probes may save both money and time compared to more traditional methods of sampling biological fluids. Needles containing tiny fibers will work like a sponge to draw up fluids from even the smallest surface.

“This is much like the procedure a butterfly uses to suck up its food,” said Konstantin Kornev, associate professor in Clemson’s School of Materials Science and Engineering. “It’s interesting to see how these conduits that nature invented work.”

Kornev cites one potential application as the ability to draw tiny samples of saliva from the glands of chemotherapy patients who often experience painful dry mouth as a side effect of their treatment.

Other possible applications include extracting sweat from individual human pores or inserting new genes into cells.

This research is part of an ongoing project to develop fiber-based medical devices in Clemson’s School of Materials Science and Engineering and the Center for Advanced Engineering Fibers and Films, according to center director Douglas Hirt.



Kornev and Igor Luzinov will conduct research over three years with two teams of graduate students. Kornev's group will focus on the development of the fiber probes themselves, while Luzinov's will concentrate on creating smart coatings that will expel fluid upon heating.

Kornev came to Clemson in 2006. He is an associate professor who specializes in micro- and nano-fluidic systems. He received both his master's and doctoral degrees from Kazan State University in Russia. He has been a member of both the Russian Academy of Sciences and the Textile Research Institute in Princeton, N.J., and has written more than 60 technical papers on materials science.

Luzinov has been an associate professor of polymer science at Clemson since 2000. He received both his master's and doctoral degrees from Lviv Polytechnic Institute in Ukraine. He was a senior research scientist at the National Academy of Science of Ukraine and a NATO research fellow at the University of Liege in Belgium.

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This material is based upon work supported by the National Science Foundation grant number CMMI-0826067. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.