

Tiny Holes Offer Giant Glimpse into Future

Miniscule holes in a single molecule detector being developed at the University of Arkansas may hold the key to enormous advancements in the medical and biological sciences.

Jiali Li, an assistant professor of physics, recently received a \$500,000 grant from the National Institutes of Health to further her research into nanopores. Li, the first UA physicist to receive NIH funding, is fine-tuning a microscope-like device she and her former colleagues invented known as the single-molecule [nanopore](#) detector.

Nanopores are essentially holes as tiny as 30 atoms across that exist within all living systems. They act as sensitive membrane channels through which cells sustain life by breathing molecules in and out.

"Not many people study solid-state nanopores," explained Li, who began the project as part of postdoctoral research at Harvard University. "My lab at UA, Dr. [Jene] Golovchenko and Dr. [Daniel] Branton's lab at Harvard, and maybe one more lab in Europe [which is pursuing a different aspect of nanopores research]."

"Before, we didn't have the tools to look at a single molecule in motion; scientists had to look at thousands of millions of them together to get important information. This is a new tool through which we can look at them one at a time."

With the nanopore "microscope," Li and her research group can look not only at a single molecule, but can measure the interaction between molecules. Down the road, Li and colleagues hope to be able to identify single molecules that are responsible for illnesses. Doctors, for example, could have inexpensive devices in their offices that could read genetic blueprints quickly and easily. Medications and lifestyle changes could then be prescribed to suit each individual, depending upon their individual DNA makeup.

"If this project is successful, it will have a very big impact in the medical sciences and the biological sciences, because we can study a lot of things we could not study before and can't even study now," Li said.

Source: University of Arkansas

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