New micro-device could change drug testing

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(PhysOrg.com) -- Texas Tech University scientists have filed for a patent on a new device that could make some drug testing faster and less expensive.

Siva Vanapalli, an assistant professor in Texas Tech's Department of Chemical Engineering, and his team created a simple microfluidic device about the size of a penny that could replace the current drug screening systems. Vanapalli's work was recently featured in the journal Lab on a Chip.

"To develop a drug one must develop not only the drug compound, but also determine how much of the drug to give for it to be effective," said Vanapalli.

Vanapalli is currently working with anti-bacterial chemicals, but hopes the process can be refined to aid in screening for new anti-cancer drugs.

The pharmaceutical industry screens hundreds of thousands of drug candidates each year using large robots that deliver one specific concentration of the drug at a time, a time-consuming process that requires large amounts of the compound and reagents.

"Our chip changes the process in two ways," said Vanapalli. "We can do multiple concentrations of the drug at one time. That means we can use a sample maybe 1,000 times smaller than the amount currently used and we can do the same work in a much shorter time period. In short, making the drug screening process faster and more inexpensive for the

pharmaceutical company and hopefully reducing the ultimate cost to the consumer."

Vanapalli's lab has demonstrated testing 60 different concentrations of a drug in about 10 minutes and expects to be able to improve on those numbers in future devices.

The new device looks like a computer chip with multiple microchannels and nanoliter-wells to hold an array of droplets of a substance. A scientist can vary the presence of other materials from drop-to-drop, thus testing multiple concentrations of the drug at the same time.

The use the microfluidic droplet arrays for drug testing was actually an accident. "We were working on a different type of experiment, but the outcome led us down this path," said Vanapalli. "It is incidents like this that make science exciting."

Vanapalli's research is supported in part by the National Science Foundation and the Cancer Prevention and Research Institute of Texas.

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