Early Virus Detection in Cells Made Possible by New Research

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The benefits of real-time virus tracking, made possible through research from UCR's Bourns College of Engineering and the College of Natural and Agricultural Sciences (CNAS) include faster detection and better understanding of antiviral treatments. Work at Bourns and CNAS to provide a significant tool for the rapid detection of viral infection was reported in the *Proceedings of the National Academy of Sciences* Nov. 11, 2008, edition.

In addition to quick infection detection, the work also has important implications for conducting therapeutic studies of antiviral treatments. Current techniques to detect viruses can take days or weeks.

"If you can detect them earlier and implement prevention procedures, you can delay the infection process," said Wilfred Chen, professor of chemical and environmental engineering, Bourns College of Engineering, who with student Hsaio-Yun Yeh, Ashok Mulchandani, professor of chemical engineering, and Marylynn Yates, professor of environmental sciences, CNAS, completed the study. The paper is entitled "Visualizing the dynamics of viral replication in living cells via TAT-peptide delivery of nuclease-resistant molecular beacons."

The UCR team's study describes using a probe to enter cells, which fluoresces when it detects the viral nucleic acid. Researchers are then able to observe in real time the virus's reproductive cycle and its spread from cell to cell.

“Our goal was to develop a method to follow virus replication in living cells,” Chen said. “It’s a generalized concept.”

Chen said that while some viruses can replicate quickly, enabling detection within a few days, others can take more than a week to detect using traditional methods.

“We have been working on this for two years and recently had the study published,” said Chen. “Some of the pieces have been demonstrated in the past, but this is the first time we have used all of the pieces together.”

The study determined that this new method of virus tracking would be extremely useful in environmental monitoring and perhaps counterterrorism detection.

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