

Nanotechnology Virus Detection Laser

How it all came about...

The University of Georgia's physics professor Yiping Zhao and chemistry professor Richard Dluhy through trial and error have perfected the principles of the Raman Shift to rapidly detect viruses in biological samples. Using nanotechnology, they have developed a diagnostic test that can detect viruses as diverse as influenza, HIV and RSV in 60 seconds or less.

How it works...

The technique, called surface enhanced Raman spectroscopy (SERS), works by measuring the change in frequency of a near-infrared laser as it scatters off viral DNA or RNA. The change in frequency, named the Raman shift for the scientist who discovered it in 1928, is distinct like a fingerprint.

Raman Spectroscopy

Raman spectroscopy is a spectroscopic technique used to study vibrational, rotational, and other low-frequency modes in a system.

Previous attempts to use Raman spectroscopy to diagnose viruses failed because the signal produced was weak. But Zhao and Dluhy experimented with several different metals and methods and found a way to amplify the signal greatly.

The Benefits...

The technique is truly remarkable because it has the potential to detect a single virus particle and can also discern virus subtypes and those with mutations such as gene insertions and deletions. The specificity makes it so valuable and it also provides epidemiologists a way to track where viruses originate from and how they change as they move through populations.

Sources

http://www.medgadget.com/archives/2006/11/lasers_detect_a.html

http://en.wikipedia.org/wiki/Raman_spectroscopy