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IISc's Sood discovers diagnostic kit

VITHAL C NADKARNI

TIMES NEWS NETWORK [TUESDAY, DECEMBER 20, 2005
02:01:36 AM]

NRI Special Offer!

MUMBAI: Bangalore-based researcher Ajay Sood has scored a scientific hat trick. The professor of physics from the Indian Institute of Science (IISc) and his PhD student Ajay Negi claim to have discovered an electric effect that promises to revolutionise diagnostics and detection technology, to provide a new generation of ultra-sensitive medical tests, hi-tech chemical sniffers and anti-terrorism devices.

The new discovery adds 'electric teeth' to conventional test kits by means of a small charge to sharpen their sensitivity by several degrees. This, in turn, promises to dramatically lower the bar for 'culprit' molecules: they could be caught at progressively earlier stages of the disease, at extreme low concentrations.

The new effect could also be used for ultra-sensitive sensors; in recognition of myriads of other molecules and chemicals that involves matching of molecules and their receptors in a lock-and-key manner.

In an exclusive interview with ET, Mr Sood, who has won numerous awards including the GD Birla award and the Third World Academy of Sciences prize from Trieste, Italy, described his newest discovery as "directed antibody-antigen recognition" which, in lab tests, has proved to be far more sensitive than the random clumping together used in diagnosis today.

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As a physicist, Mr Sood seemed understandably cautious about speculation about the biotech impact of his discovery. However, when pressed for spin-offs for his electric corralling of colloidal particles, he said the effect could also be used in nanotech manufacturing and titration, in precipitation of molecules with great precision.

The scientists said an application for a world-wide patent had been filed and they were submitting the research for publication.

In '03, Mr Sood and his student Shankar Ghosh, now at the Tata Institute of Fundamental Research, electrified the global science community with their research on generation of electricity with liquid flow on carbon nanotubes.

In '04, Sood and Ghosh showed once again how to generate electricity by blowing gas onto doped semi-conductor material.

The informally named "Sood Effect" promised to provide more effective gas or mass flow sensors and electricity generators without moving parts.

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The research was published last August in the prestigious "Physical Review Letters" and in less than eight months, the patented gas flow technology was licensed to an American start-up called Trident Metrologies for use in the semiconductor and gas pipeline industries. "I didn't know that the gas flow market was so large," Mr Sood said, "and I was therefore startled by a headline in a business weekly which said 'Ajay Sood discovers a billion-dollar effect'."

With his current research too, the soft-spoken scientist seems to have broken into the multi-billion market of biological and chemical test kits. "But it's neither serendipitous nor accidental," he emphasised.

"We couldn't get it without an almost counter-intuitive understanding the physics. Subsequently, our experiments with commercial rheumatoid arthritis test kits provided tell-tale clumping of antigens when the test samples were diluted more than a hundred times," Mr Sood said. "Because we wanted to be absolutely certain, we benchmarked the process with a standard assay on proteins tagged with the biotin molecule."

Experts ET spoke to likened the research to "waving an electric magic wand" on a colloidal solution to coax the antibody-coated latex particles to bind to their antigen counterparts in an orderly manner. The crucial factor is the electric goad in the absence of which the free-floating colloidal particles come together in a random manner, with much less sensitivity.

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