

In search of dengue vaccine

13 February 2012 | News



	<p>Dr Navin Khanna group leader, Mammalian Biology Division, ICGEB, New Delhi</p>
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Dr Navin Khanna holds more than five patents in the diagnostics space and is one of those who has transferred the maximum number of technologies to the industry in the country. His current research on developing an indigenous dengue vaccine has raised many hopes and is being keenly followed by the government and the industry.

After his PhD in biochemistry from the All India Institute of Medical Sciences (AIIMS), New Delhi, Dr Khanna moved to Canada and worked on cell regulation at the University of Calgary for three years from 1984 as an Alberta Heritage Foundation Fellow. Later, he shifted to the US and worked as a post-graduate research biologist for two years at the Center for Molecular Genetics, University of California, from 1987. Before returning to India in 1990, he worked as a research assistant professor for a year at the department of molecular biology and biochemistry, University of California.

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Since 1990, when he joined the International Centre for Genetic Engineering & Biotechnology (ICGEB), Dr Khanna has been working on genetically engineered bio-molecules for medical use. He has been instrumental in the development of novel recombinant designer proteins as inexpensive, highly sensitive and specific diagnostic intermediates for viral infections. The availability of recombinant clones for production of high quality diagnostic intermediates from his laboratory has reduced production costs of HIV, HCV and HBV diagnostic kits significantly. Diagnostic kits based on these proteins have been successfully commercialized. Manufactured in India by companies such as Bio-Med, Ranbaxy Laboratories, J Mitra, XCyton Labs and few others, these are not only being used in India but are also being exported to other Asian and African countries.

One of his very promising projects is development of a sub-unit-based vaccine for dengue, which till now has no vaccine or antiviral drug. Most importantly, all the four serotypes of dengue viruses (DENV-1, -2, -3 and -4) that cause dengue are being taken care of in the project. His group is interested in developing sub-unit vaccines, based on DENV envelope domain III, that mediates virus entry into cells and elicits virus-neutralizing antibodies.

Elaborating on this, Dr Khanna says, "Currently, our research activities are focused on the development of experimental dengue tetravalent sub-unit vaccine in yeast. In consultation with the Indo-US Vaccine Action Program, we have created DENV-2 EDIII HBsAg virus-like particles (VLPs) and are evaluating these physically and functionally."

Besides, his present research activities are focused on genetically engineered biomolecules of medical use. He has developed a prototype dual assay for the simultaneous detection of HIV and HBV infections. Work is underway to build upon this to create a unique 3-in-1 assay for the simultaneous detection of HIV, HBV and HCV infections, in blood bank settings. His laboratory is also exploring the designer proteins for developing novel reporter assays using Terbium-labelled nanoparticles, in partnership with Prof Kim Pettersson at the University of Turku, Finland.

For his outstanding contribution to the development of novel designer proteins as diagnostic intermediates of high sensitivity and specificity for detection of viral infections, Dr Khanna was honored with the Biotech Product & Process Development and Commercialization Award in 2011. Being a dedicated researcher, he has published more than 85 research papers and five reviewed articles in national and international journals and books.

Calling the Department of Biotechnology (DBT) as the lifeline of the new mood of translating science for public good, Dr Khanna says, "I can recall several occasions on which sustained research support from DBT provided me the courage to change. I learnt how to think differently and dared to commercialize our research findings."

Rahul Koul in NewDelhi