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Nanobiotech pioneers

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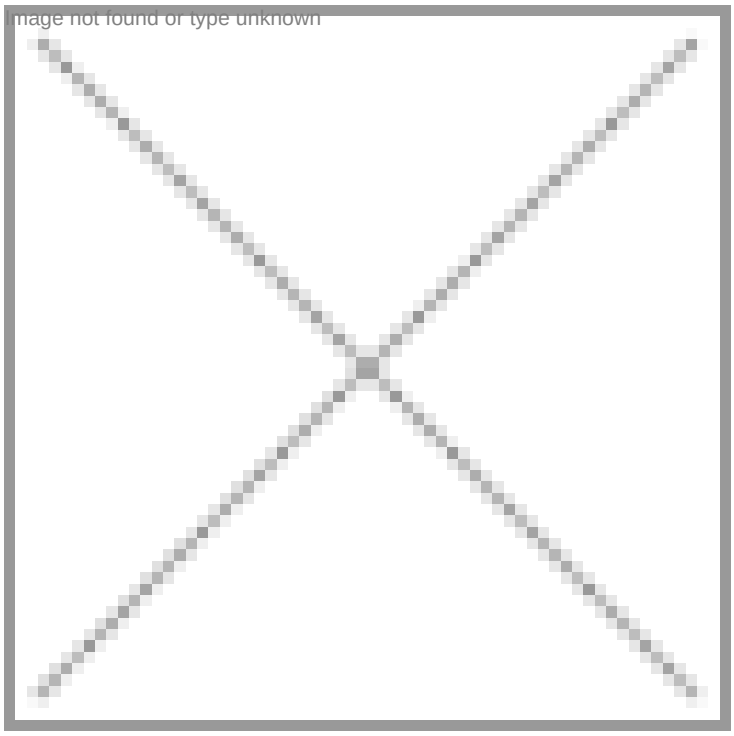

Nanobiotech pioneers

There are several organizations that have been active in India. BioSpectrum presents the activities of some of them here.

NCRM

Chennai-based Nichi-In Centre for Regenerative Medicine (NCRM) has been working on close to 240 different nanomaterials and technologies in specialties such as ophthalmology (corneal regeneration), orthopedics (cartilage injury repair), and hematology (expansion of hematopoietic stem cells).

Virtus Technoinnovation

Mumbai-based Virtus Technoinnovation Pvt Ltd works on the science of gene repair therapy which CEO, Dr Tripathi terms as biomimicry. Its research team at present is working on a technique which will slacken the pace of the aging process in a human being. “Ongoing research is done in the field of biomimicry by topically using nanoparticles of the 92 trace minerals and the 28 amino acids. We call it we are mimicking the ‘gene-repair-experience’ of the fetus floating in the amniotic fluid in the mothers womb. The fluid contains nanoparticles of the same minerals etc. in organic form. The inactive genes of the fetus received from parents at procreation age are being ‘in vivo repaired’ in the mother’s womb,” said Dr Tripathi. Despite this being known to science for past few decades, Dr Tripathi claims, that he is the first scientist to study the receptors under the skin of the fetus carrying the minerals to the gene-proteins. “The contention here is that the human genome which is responsible for the whole process of aging remains active at birth but then by the time we reach the age of 25 years, 90 per cent of them become silent,” said Dr Tripathi.

Tata Chemicals

Pune-based Tata Chemicals Ltd (TCL) is also working on nanotech-based products that are still some distance away from commercialization but was reluctant to give out details. “The main research in TCL is around nanotech and biotech based

products and processes," was the only statement that was brought out. Similar is the case with RLS. The company at present does not have any product offering in nanotechnology but is researching on delivery systems using nanotechnology
Nanomedicine, that involves drug particles engineered to the size of an atom, is at the frontline of new drug delivery. It is playing a key role in life cycle management of existing drugs, where novel formulations based on nanomaterials are enhancing bioavailability and efficacy, and reducing side effects. A number of Indian pharma and biotech companies are working on the applications of nanotech in drug delivery.

Dabur Research Foundation

Dabur Research Foundation last year launched the indigenously developed nanoparticle paclitaxel formulation, Nanoxel. Speaking about this product, Dr Surendra Tyagi of Dabur said, "Our Nanoxel is the only nanomedicine approved and launched outside US. It demonstrates improved efficacy and significantly lesser toxicity compared to the conventional paclitaxel formulations." It has also been launched in Philippines and we are planning to expand the availability of this product for many more countries including US and EU countries, he added. Dabur Research Foundation has a promising pipeline of other oncology products based on similar drug delivery system.

Lifecare Innovations

Gurgaon-based Lifecare Innovations is yet another company that specializes in controlled release of pharmaceuticals by employing an array of technologies of novel drug delivery systems (NDDS). The company which was started in 2000 has been the first of its kind to combine liposome technology with nanotechnology for liposome mediated delivery of Amphotericin B through its breakthrough product Fungisome. "Fungisome is an undisputed drug of choice for the treatment of dreaded mucor mycosis which is alarmingly on the rise in India due to indiscriminate use of other anti-fungals in spite of well established knowledge that no other anti-fungal drug is effective in patients of mucor mycosis. We took the laboratory scale technology of DBT and we complemented it with nanosomisation to make nanosomes of liposomal Amphotericin B," said Dr JN Verma, MD, Lifecare Innovations. Taking the technology a bit further, the company then developed a liposomal dithranol for the treatment of psoriasis. Today Lifecare Innovations has platform technologies for oral and parenteral sustained released nanodrugs. "Using that technology we have developed an anti-TB formulation in collaboration with PGI-Chandigarh. Preclinical toxicology work is over and we are starting clinical trials soon," added Dr Verma. The company is also working on other oral sustained release nano-drugs for variety of treatments with institutions in South Africa, Brazil and Canada.

Velbionanotech

Bangalore-based Velbionanotech (VBN) developed a bionanochip which functions in targeting and cure for nephrolithiasis in a disease specific and controlled mechanism of nanomedicine release. Bionanochips can be injected into the blood stream, they circulate and reach kidneys. The bionanochip senses the decreased pH in the environment around the stone and identifies the site for functioning. The decreased pH in the vicinity of the stone triggers the release of the nanomedicine from the VBN bionanochip. The released nanomedicine then function on the stones leading to their removal. The nanochip thus functions with a hallmark of mechanism of disease specific targeting and release of nanomedicine in a controlled mechanism.
The company has invested around $10 million on nanobiotechnology through private equity funding. Speaking about his company's research activities Joseph Asantraj, CEO, Velbionanotech said, "We are currently working on nephrolithiasis, diabetes mellitus and atherosclerosis. Our focus for next nanotechnology products will be on neurological disorders." We have recently started our research for neurological disorder and we are also planning to come out with Nanodevices which is still under paper work, he added.

Agharkar Research Institute

Pune-based Agharkar Research Institute (an autonomous institute of the Department of Science and Technology, Government of India) is a pioneer in the field of nanobiotechnology. For the past nine years, its focus is on the applications of nanotechnology in medicine, environment and agriculture. The institute has a strategic tie-up with a start-up company, Nano Cutting Edge Technology Pvt Ltd (Nanocet) floated by Khandelwal Laboratories, Mumbai. Agharkar Research Institute has licensed several patents to Nanocet. In addition, Nanocet has been funding research at the institute for the past three years. The institute has also given a nanotechnology incubator facility to Nanocet in its premises provided expertise to the company on the path to commercialization of the technologies. Talking about this research-industry partnership, Dr Kishore M Paknikar, in-charge, Center for Nanobioscience, Agharkar Research Institute, said, "This arrangement has proved very useful. Recently, the Drug Controller General of India (DCGA) has granted permission to Khandelwal Laboratories for the manufacture of 'Nanocrystalline silver gel' for the treatment of burns and wound infections. The gel contains silver nanoparticles made by our patented process that work as a potent antimicrobial agent. This is perhaps the first product of its kind being approved in India. The gel will be available in the Indian market shortly."

Jahanara Parveen with Nayantara Som and Shalini Gupta