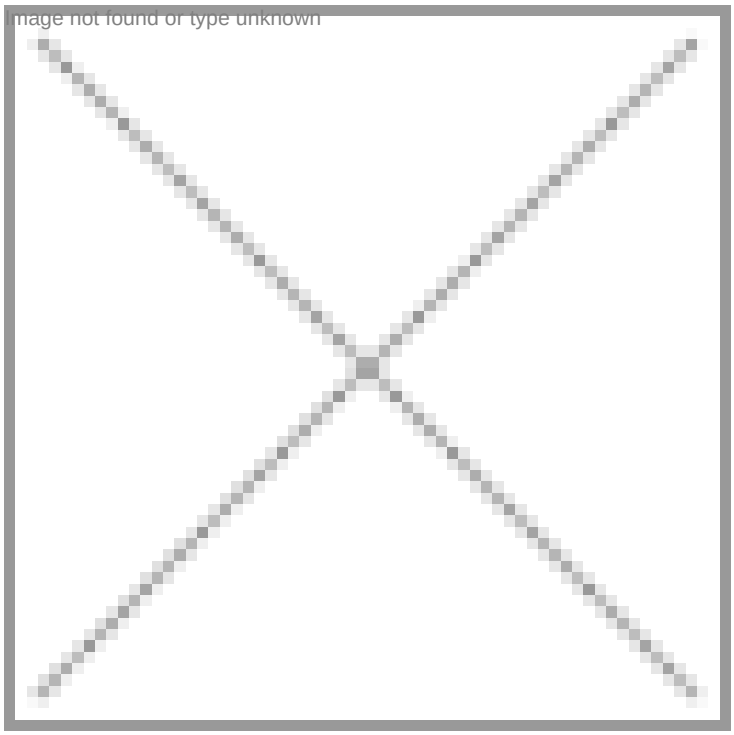
BioSpectrum the business of Bio & Health Sciences

Engineering a New Future

12 May 2004 | News



bio student

Engineering a New Future

Medical and engineering were the sole premier career choices for several years now. However, during the last five years or so, there have been several attractive alternative careers. Biotechnology is one among the new career options. With the Indian biotech industry in an expansion mode, a career in biotechnology is not just attractive but challenging and rewarding too.

A question on career aspirations from any bright budding science student would more often than not, till the recent past, elicit the standard doctor or engineer reply. This was partly due to an innate urge to be associated with these professions but importantly also due to dearth of other options. Though these still remain a popular career choice, but now a student can choose from a range of equally attractive options, like biotechnology.

One can argue that scientific research in this area of life sciences always existed and this is nothing new except that now it is bundled together under the new name of "biotechnology". But what one misses is while the research findings were earlier only of academic interest but now they have the potential to transform into excellent business opportunities. This has made biotechnology an attractive alternative career to the conventional engineering and medical sciences.

Indian biotech industry

Biotechnology in India is a "sunrise industry" which is still nascent and growing. Biotech based knowledge has found applications in the agriculture, pharmaceutical, informatics etc. This emerging industry in India was worth Rs 2,305 crore during 2002-03 (BioSpectrum estimates). This includes the biopharma, bioagri and bioindustrial products, bioinformatics market, the clinical trials and contract research services segment and the suppliers business. According to industry sources, of the various segments, the biopharma accounted for the largest market share (about Rs 1,275 crore). Then comes the biosuppliers' segment followed by the industrial, services, agricultural, and informatics sector in that order.

Given the above statistics, does this field constitute a serious long-term career option? The answer is a definite "yes". According to Prof. G Padmanabhan, distinguished biotechnologist and Padma Bhushan awardee and honorary professor Indian Institute of Science, "At this juncture, the biotech industry has just crossed the lag phase and is at the start of the log phase. We have a long way to go but the path is exponential now." His words are substantiated by the trends seen in the industry. It is in a consolidation phase today and is investing heavily in setting infrastructure and in research and development activities. The total investment during 2002-03 was about Rs 120 crore more than in 2001-02 and this is expected to double in the next two years. Another pointer in this direction is that the manpower employed during the year (2002-03) grew by 68 percent over that in the previous year to 6,400!

The Intellectual Engine

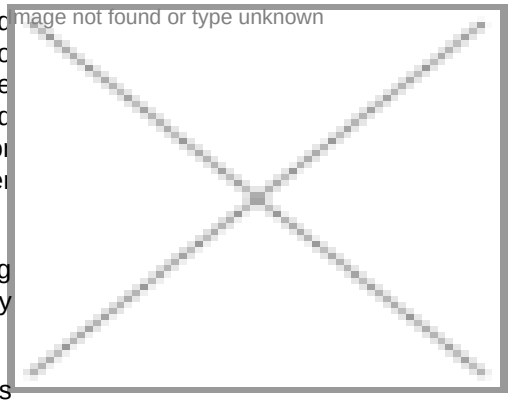
- 40 National Research Institutes
- 15,000 Scientists
- 300 Life Science Colleges
- 500,000 Gradutes Per Annum
- 120 Medical Colleges
- 17,500 Medical Gradutes Per Annum
- 200 Biotech Companies
- Employing 6,000 Scientists in R&D
- 100 Teaching Hospital Employing Medical & Paramedical Professionals

PAIRS Factor

Biotechnology is gaining prominence in India and the world over with many research institutions, university departments and corporate sector companies engaging in biotech research activities. In India alone there are over 200 research institutes and universities involved in biotech research. And there are more than 150 private sector companies working in different segments of biotech research, manufacturing and marketing. Biospectrum terms it as the PAIRS opportunityâ€"Pharma, Agri, Informatics, Research, and Services.

Talking about the scope of the largest segment in the biotech industryâ€"BioPharma, Dr SD Ravetkar, senior director, Serum Institute of India, Pune said, "The potential for this sector is huge. With the implementation of WTO and patents regime in 2005 Indian companies would not be able to backward engineering of the products, so they are focusing on in-house R&D. The growth prospects are bright as a large number of foreign pharma companies are setting their R&D units here."

According to Dr William A Haseltine, founder and former chief executive officer, Human Genome Sciences, "Each pharma company has phase I and II compounds and they are desperate for products. And this is where the biotech companies come in." He has been a pioneer and contributed significantly to the use of genomicsâ€"the study of all human genesâ€"to develop new pharmaceutical products. He has immense faith in the methods of treating and curing diseases by bringing new gene-based products to patients around the world.



Dr Haseltine explained the logic for the importance of biotech in general and Indian biotech in particular as: "The Indian market is small and is not going to build a huge pharma or biotech internal market. Indian biopharma should be looking at the global market as India is uniquely situated between the developed and developing world. Today India has evolved as a raw material supplier for products but this is under competitive threat from both internal quarters and other countries like China. This is a race to the bottom.

India can move up the value chain by competing on the manufacturing costs/processes, on the quality process and ultimately capture the proprietary product.

India can partner early with companies, take the products through clinical trials and develop them. But there are issues of ban on phase I clinical trials of outside drugs and pharma companies face problems in getting animals for testing. Both of these issues should be solved politically. Also for clinical trials, hospitals records need to be automated and the general infrastructure needs to be improved.

The biotech world is a resource-limited world, where to find new compounds, the companies will do anything to reduce costs. This has led to outsourcing of manufacturing, clinical trials, etc. to reduce costs while maintaining quality.

India is an attractive destination for outsourcing because of the 'trust' that the western countries have in it. This should be stressed upon and preserved. The reason for this underlying trust could be due to India's preexisting integration with the

western world, which will serve it well. Also India has a system of governance and laws and a fair legal system.

In this way working through collaborations bring a product to the proprietary stage and take the product to the market. In this way, you own the product in part and benefit from it. In this way, India can move up from the bottom of the value chain, from being a supplier to the top of the chain."

Also outsourcing is fast becoming the mantra of the biotech industry in today's global village. The lower operational costs of R&D in India (about one-tenth of that of developed countries) coupled with a large pool of qualified English speaking professionals and its traditional strength in the pharma business has helped contract research and manufacturing evolve into a huge market in India. Like wise India is also emerging a global hub in clinical trials. "The Indian Contract Research Organization (CRO)/services market is currently growing at 20 percent per annum and has excellent growth opportunities," said VV Raghavan managing director, Lotus labs, an independent Bangalore-based CRO. This segment coupled with the bioinformatics sector accounted for close to 85 percent market share in exports last year.

While the inclination to biopharma is obvious, bioinformtics is another key arena. Till the previous year, bioinformatics accounted for about 4 percent of the total size of the biotech industry, but it is expected to catch up fast. With a strong IT infrastructure and knowledge base in India, this sector aims at capturing a significant market share both in India and abroad. Elaborating on the opportunities in this segment, Dr Akhilesh Pandey, chief scientific advisor, Institute of Bioinformatics, Bangalore said, "The next wave in bioinformatics is systems biology, which involves the integration of genomics, proteomics, and bioinformatics information to create a whole system view of a biological entity. Needless to say, the opportunities in the bioinformatics segment are vast and there is a shortage of trained personnel in this field today."

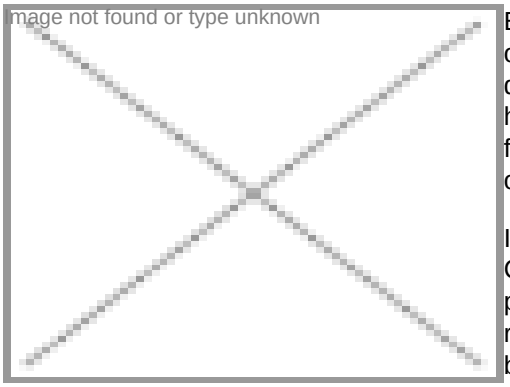
India offers a huge market for agribiotech products as more than half of the country's population depends on agriculture. The surge in opportunity will be in improving agricultural productivity. "BioAgri will be a very strong sector in the years to come, in view of the Indian government's decision to open the market for biotech crops," remarked Dipankar Bandyopadhyay, HR Manager, Monsanto India. Monsanto, an integrated agri solutions provider, has introduced the country's first GM cropâ€”Bollguard (Bt cotton).

Further, with European countries yet to finalize on the agribiotech policy, India opens up as an alternative destination. Said Prof. Sir David King, Chief Scientific Advisor, HM Government, and Head of the Office of Science and Technology, Department of Trade & Investment, the UK, "After his last visit to Bangalore, our Prime Minister Tony Blair had remarked that he was worried that the Indian biotech industry would overtake Britain's because India does not seem to be faced with the public that is skeptical about GM, whereas our public was. He was impressed and I am impressed too. But your(Indian) biotech industry is still very young and still in an early stage of growth. Our industry is looking for partnership with an eye for win-win."

The growth of biotech industry both in research and manufacturing sectors is being supported with equipment, consumables and knowledge management tools by the BioSuppliers. There are about 25-40 key companies supplying biotech products in India. "The potential for BioSuppliers is increasing and the growth rate expected is around 13 to 15 percent. This is directly related with the biotech R&D and products for which equipments are required. The opportunities will increase slowly by 5 to 7 percent and by 2005 the rate will be substantially high," said MT Rananaware, DGM-Life Science, Alfa Laval (India) Ltd, Pune.

Pro biotech policies

Realizing the future potential of biotechnology, the Indian government is playing a proactive role and encouraging the growth of the biotech industry. Emphasizing this fact Dr Manju Sharma, former secretary of the Department of Biotechnology (DBT), Ministry of Science and Technology of India said, "India held great potential for using the tools of bioscience to boost its developmentâ€¦and the government wants to be a facilitator in this process."



Established in 1986, DBT within the Ministry of Science and Technology focuses on research and training in the different areas of biotechnology, generation of quality human resources along with dealing in the complex regulatory affairs. DBT has played an important role in the biotech development and recently launched a five-year $20 million Indian Genome Initiative (IGI) to study the genetic variation of diverse Indian populations.

In the area of genomics research, the government has set up Plant Genomics Centre (New Delhi) and Centre for Human Genetics (Bangalore). Also there is a proposal to spend $40 million annually over the next 10 years in genomic research. Due to the government support and its clear-cut policies, the Indian biotechnology industry is among the top five in the world in terms of stem cell research. While debate on ethics of using stem cells is going on in western countries, India is free of such controversies. Both the government and private industry have invested heavily in research institutes studying human disease and searching for treatments as well. The Health Ministry, with assistance from the US and Japan, has recently established a $40 million National Institute of Biologicals (NIB) in New Delhi to carry out research, manufacturing and clinical studies.

Other government agencies involved in biotechnology R&D include: Indian Council of Medical Research (ICMR), Indian Council of Agriculture Research (ICAR), Council of Scientific and Industrial Research (CSIR) and Department of Science and Technology (DST).

India has also signed the WTO agreement and will provide product patent protection by 2005, by changing its process patenting system. India has decided to accede to the Paris convention for the protection of intellectual property and the patent co-operation treaty. These moves will improve the industrial climate and encourage more research and development in India, by domestic and foreign companies.

Optimism

Furthering research in the area of life sciences (including some bit of biotechnology also) though existed in the research labs since a long time but was not considered a "happening" career. Today the scenario has taken the proverbial three sixty degrees turn. Biotechnology being a knowledge-intensive industry, intellectual capital is the prime driver. Last year, the R&D manpower in the Indian biotech sector grew by a phenomenal 74 percent of which women form a significant part. Most of the companies with which we interacted plan to increase their workforce in the near future.

The Total Industry in 2002-03(Including the BioSuppliers)

SEGMENT	Sales Revenues*	Percentage Share	Exports*	Domestic Sales*
Bio Pharma	1275	55	663	612
Bio Industrial	235	10	122	113
Bio Services	135	6	115	20
Bio Agri	110	5	6	105
BioInformatics	75	3	64	11
Bio Suppliers	475	21	60	415

Biotechnology is the cocktail of many facultiesâ€”microbiology, biochemistry, genetics, immunology, chemistry, etc. Being an emerging and growing field, it offers excellent opportunities for qualified professionals having the relevant profile and training like microbiologists for manufacturing process; biochemists for down stream processing; biotech engineers for bulk manufacturing processes/process standardizing; plant molecular biologists, geneticists, plant breeders in the agri biotech sector; clinical investigators, clinical research associates, analytical chemists for clinical trials among others. Interestingly, most of the biotech companies have a strong sales and marketing teams also, which according to industry sources increased by about 51 percent last year.

The salaries offered by the biotech companies are attractive, on par with those offered by other industries and have begun to reflect the growing demand for skilled people. The remuneration depends on experience, skills, quality and availability and generally varies from Rs 6,000 for freshers to Rs 50,000 or more per month for senior experienced people.

This is just the beginning. BioSpectum's interaction with the industry shows that the Indian biotech industry is projected to have grown by about 26 percent by March end. According to Kiran Mazumdar-Shaw, chairman and managing director, Biocon, and president, the Association of Biotechnology Led Enterprises (ABLE), the Indian biotech has the potential to be a staggering Rs 45,000-crore industry by 2007-08. Definitely, if all things are put into place, there is no reason why this sector would not make India Shining.

Rolly Dureha with inputs from Narayan Kulkarni in Mumbai and Faiz Askari in Delhi