

India can attain global leadership in biotechnology

07 March 2007 | News



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We are on the verge of a new revolution. A revolution brought about by biotechnology. The twentieth century belonged to physics and chemistry. The twenty first century will belong to biology. Mukesh Ambani, Chairman and Managing Director, Reliance Industries Limited is convinced that the Indian industry is set to climb new peaks of innovation and creativity and is destined to attain global leadership in biotechnology. In an exclusive column to BioSpectrum, Mukesh Ambani outlines the key imperatives for success.

History tells us that a transition from science to technology matures over decades before it starts to influence society in a fundamental way. We saw this in physics with the advent of the science of heat engines, electricity and computing. Humanity benefited immensely several decades later through technologies in transportation, electrical equipment, electronic devices and computers. We also saw this in chemistry with the advent of inorganic and organic chemical sciences. Mankind stood to gain enormously after several decades through technologies to manufacture pharmaceuticals, plastics and advanced materials. But when it comes to biology, we are seeing this transition only now.

The 1900s and 1950s saw the emergence of genetic, protein and cell sciences. These biological sciences are now beginning to impact society through technologies in genetic engineering, recombinant proteins, monoclonal antibodies and tissue engineering.

Physics and chemistry altered living. But biology will transform our very lives. Physics and chemistry led to discovery of

elements in nature that led to the development of a whole range of new synthetic materials. But biology discovered the code of life, or genome, which will lead to transformation of life. Biotechnology will thus bear upon humanity at its very essence. It will fundamentally transform existence in three ways-the basis of life, the basics of living and the base of living systems.

We are therefore talking of the opportunity in biotechnology that, by its very genetic constitution, is global. Biotechnology will touch every single life on this planet-from over six billion people to millions of plants, animals and aquatic species and microorganisms. This will happen in three ways-improving the quality of life, controlling the form of life, and extending the duration of life.

Biotechnology, a much larger opportunity

India has a unique opportunity to ride the biotechnology revolution. Biotechnology, to my mind, will be a much larger opportunity for India than information technology. This is because information technology is limited to the process of productivity and human living. On the contrary, biotechnology is expansive to the process of procreation and human life.

India has several factors going for it to attain global leadership in biotechnology. We have varied agro climatic zones that bring to life every conceivable plant, animal and aquatic life. We have one of the largest professional resources trained in biology in the world. These include several centers of educational excellence in universities and national laboratories. We have several overseas Indians at the leading edge of biology research in universities in the US and Europe. We have a strong framework of public funded research institutions in biological sciences in medical and agricultural domains.

Our tradition in plant research is commendable. We have a network of plant breeding and plant genetics laboratories. We have a fair number of modern tertiary care hospitals to facilitate clinical studies. Our patient population for fast track clinical trials is significant. We have a strong pharmaceutical industry. Above all, we have a market that makes up one-sixth of humanity.

Imperative measures

India's endowment in biotechnology is only one part of the story. It is not alone enough. India needs to ignite the potential and the promise of the biotechnology industry. This will call for several imperatives.

Fire innovation: Foremost among these imperatives is to fire innovation in our research labs. Our research institutions must be geared to nurture innovation. They must be at the forefront of the technology envelope. To attain this, we must create a competitive and demanding research environment. We must take bold national initiatives in several frontier research areas of biotechnology, such as genomics, proteomics, pharmacogenomics, cell biology, tissue engineering, biopharmaceuticals and plant metabolic engineering.

We must also get the private sector to give up its nonchalance towards research and development. Many innovations in the developed world have come out of the private sector. These have been facilitated by a climate of sizeable public funding, surpluses from traditional businesses of large corporations, protection for intellectual capital, vibrant venture capital participation, competitive market place and a demanding environment for academic researchers. India must work to create such a climate for innovation.

Develop professional resources: The second imperative is in developing professional resources in biotechnology. Research-led higher education in biotechnology will be basis for innovation. India needs a large number of research-led institutions in biotechnology. Only this will lay the foundation for global leadership in this domain.

Develop affordable BT

solutions: The third imperative is to develop biotechnology solutions in an affordable manner. In the developed world, biotechnology has always come up with expensive solutions to problems in medical, plant and industrial biotechnology domains. This will not be acceptable in the Indian environment, given the socio-economic profile of the Indian consumer. It would also not help leverage the cost-volume tradeoff so typical of Indian markets. Therefore, it is imperative that cost economics are constantly on the radar screen of discovery and development efforts.

Fortunately, we have the means to achieve aggressive cost positions in biotechnology. Our research costs are about a third of those of the western world. Our development costs are also in the same vein, given the shorter patient accrual periods for clinical trials and relatively lower health care costs.

Create conducive environment: The final imperative for India is to create a conducive environment for the industry. Biotechnology, and for that matter other emerging technologies, are characterized by a large number of strategic alliances. This will call for research, clinical and market collaboration across borders. Barriers to these collaborations in the nature of

government agency approvals and transfer of biological material must be done away with.

Reliance is fully tuned to the potential of the biotechnology industry. Reliance Life sciences envisions bringing biotechnology to better life, living and living systems in a cost-effective and sustainable manner. Cost-effective from the point of affordability to millions of users, first in India and then in other parts of the world. Sustainability from the point of view of the enterprise set in a capital intensive, research driven mode.

Unlike other biotechnology companies in the world, Reliance Life Sciences has embraced a wide span in the biotechnology domain. It is engaged in research-driven initiatives to understand science, technology, scale-up and cost economics issues. This will enable Reliance Life Sciences to configure a business based on what makes sense and what works best in an emerging technology area.

Reliance Life Sciences envisions discovering and developing new therapies for intractable and incurable diseases through stem cell biology, tissue engineering, molecular biology, molecular genetics, therapeutic proteins and new drug molecules. On the industrial side, Reliance Life Sciences is engaged in developing biopolymers and biofuels to defend the global leadership position of Reliance in polymers, polyesters, processes and fuels. These initiatives will yield results in the clinical domain during the later part of this decade.

Wheels of history turn periodically. We are witnessing a similar process before our eyes. I believe we can make the twenty-first century the India century. Biotechnology has the potential to significantly contribute to this aspiration.

Empowering India

All the essential ingredients to make India a great power in these areas are within our reach. A variety of favorable factors have arisen in the twentieth century to nurture these seeds and help them to grow into a mighty force. These include a critical mass of educated and skilled young men and women, strength of institutions of science and technology, a new sense of self-confidence amongst professionals, and last, but not the least, unleashing of the productive energies of the private sector.

I am convinced that India is set to climb new peaks of innovation and creativity and is destined to attain global leadership in biotechnology.