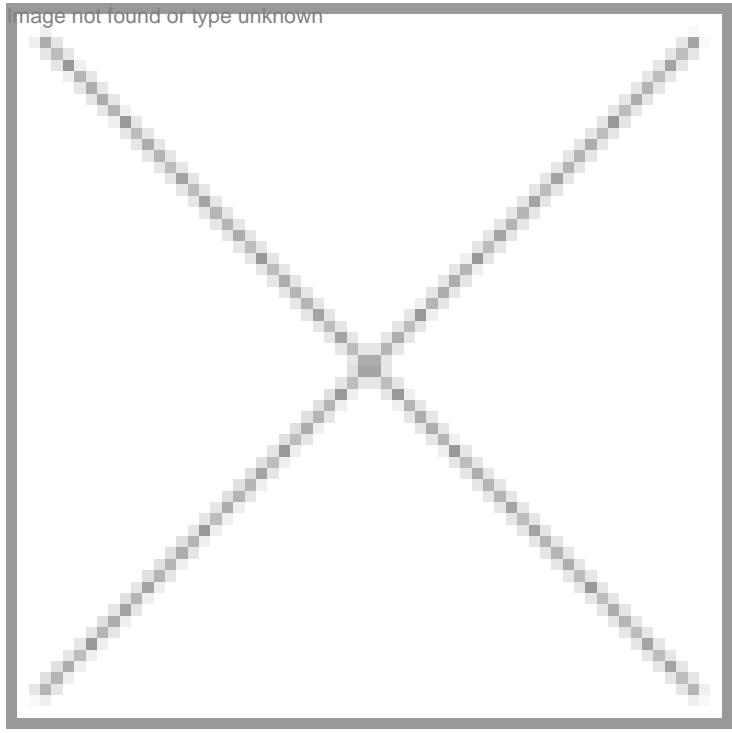


## The vaccine innovator

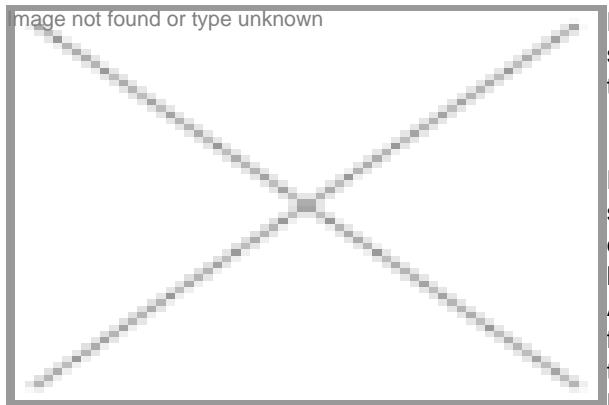
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*A firm believer in innovation, Dr Krishna M Ella dreams about creating excellence. His return to India was only the beginning of a success story called Bharat Biotech and many other ventures*

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Defying all odds and transforming his ideas into reality, Dr Krishna M Ella successfully created synergy between biotechnology and business. He is the man behind Bharat Biotech International, one of the successful

Dr Ella, well-known among the first generation of entrepreneurs in the sector, pursued his early education in India and acquired a postgraduate degree in agricultural sciences with distinction and gold medals. He did his PhD in Molecular Biology from the University of Wisconsin-Madison. After working with Sandoz and Bayer for some time, he moved to the US for higher studies on a Rotary Foundation scholarship. He also received the National Research Service Award from the National Institute of Health, Bethesda, Maryland, US, and became part of the research

faculty at Medical University of South Carolina-Charleston, US.

It was during his tenure at the university that his mother and wife encouraged him to return to India. 'I still remember my mother convincing me by saying: 'You have nine inches of stomach to feed. No matter how much you earn, you cannot eat more than this capacity. I assure you, I will not let you starve for a single day. Come back to

India, do whatever you like to do, take all the risks possible'. This is how they got me back to India,' recollects Dr Ella.

After coming back, he and his wife, Ms Suchitra K Ella, founded Bharat Biotech International in 1996 in Hyderabad. The company has since grown to become one of the largest manufacturers of recombinant, viral, bacterial, combination vaccines and bio pharmaceuticals in India. It is one of the largest manufacturers of Indirab (anti-rabies vaccine) in India and a WHO-pre-qualified manufacturer of Revac-B (hepatitis-B vaccine) for supply to UNICEF and the only vaccine company in India to manufacture and supply a preservative (thiomersol)-free vaccine (Revac-Bmcf).

Dr Ella, who calls himself a serial entrepreneur, has established six companies, apart from Bharat Biotech, in various other sectors.

### **Firm believer in innovation**

Dr Ella, who is an expert in plant, human and yeast systems, has more than 30 scientific publications to his credit in peer reviewed academic journals. His expertise in gene expression system has been well acclaimed and demonstrated internationally.

Dr Ella said he spends 90 percent of his time in research and development. "Every day, I get one idea and I can't sleep without exploring those ideas. That's my weakness which becomes a strength," says Dr Ella.

The second priority is product development. "I always ask people not to follow the multinational companies. If somebody is producing by a certain method, do not limit your mind by blindly following the same method," he says. "Being a new company, we can always take high risk and we can always develop alternatives, better strategies, more efficient, and more innovative products."

According to Dr Ella, the successful creation and production of a Hepatitis B vaccine was a major achievement. He brought down the price of Hepatitis B vaccination from ~~Image not found or virus unknown~~ (\$22) per child to a few rupees. The vaccine, which was then sold at ~~Image not found or virus unknown~~ 800 per dose, today costs less than ~~Image not found or virus unknown~~ 20 per dose.

"It's just because of competition and innovation that the price has gone down. The second important thing we did was the rotavirus vaccine programme. We are now bringing global attention to the foundation. It is for the first time that an Indian company is bringing the vaccine to phase III trials," says Dr Ella.

According to Dr Ella, affordability should not come in the way of good technology and product quality must not be compromised. Ten years ago, he spotted that the purification method used by SmithKline Beecham to extract vaccine protein was inefficient and costly. The multinational uses till date a technique called ultracentrifugation, in which samples are subjected to 100,000 times gravity to separate the protein from DNA. The equipment cost over ~~Image not found or virus unknown~~ 6.9 crore (\$1.5 million) and recovered 15 percent of the protein. The technique also uses caesium chloride, which is expensive and has to be completely removed from the final product because it was toxic. The vaccine protein has a phospholipid tail that is electrically neutral, unlike most of the yeast proteins and DNA, which carry an electrical charge.

Dr Ella devised a method called the Himax technique in which the vaccine protein can be made to precipitate out of the solution onto a special matrix, while all the charged molecules stay put. Bharat Biotech has since started manufacturing other products, such as a typhoid vaccine and an antibiotic for use against staphylococcus bacteria.

Dr Ella was instrumental in creating India-made, single-dose vaccine, HNVAC, when many thought that he was wasting his time and that India should copy rather than innovate. HNVAC is the only flu vaccine to be manufactured through cell culture in the developing world.

"HNVAC was tested extensively in one of the largest phase I, II and III clinical trials for flu vaccines in India and has proved to be safe and was well-tolerated. The key benefit of our cell culture vaccine is its potential to scale up and produce large quantities quickly as required. It also has a much more sterile and faster production cycle, without the external dependence on eggs, thus enabling quicker response times, in the event of a pandemic," says Dr Ella.

Dr Ella is part of various government and industry committees on biotechnology, including the Five Year Plan-Biotechnology of the Government of India, and advisor to many state governments.

### **Addressing key issues**

Dr Ella said it was important to go beyond biogeneric and biosimilars business model and move towards innovation and research. According to him, companies following on the footsteps of generic model of pharma, will eventually become sick and get acquired.

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- Dr Krishna M Ella

â€œBesides this, in a biogeneric model, we have competition from China, Argentina, Korea, Cuba and a lot of countries who are ahead of us in this model. Biogeneric model will be wiped out after five years,â€? he says. â€œWe never wanted to be a biogeneric or biosimilars company. Our pursuit was always to move away from this and find solutions and build an ecosystem to be innovative and encourage creation of IPR. Giving back to the society is equally important for an organization.â€?

He said unlike many others, India was important to him. â€œFor me, what's important is, whether I could solve the problem of this continent? For instance, two lakh children die in this country every year because of rotavirus as compared to H1N1, which killed about 1,000 people. We got into the rotavirus vaccine programme when the product was being sold from the US market. I said this was a problem of this continent and not a US problem. Two lakh children is a big number. If I can save about two lakh lives per year, I will have achieved my mission of being a citizen of this country,â€? says Dr Ella.

He has a lesson for the entrepreneurs looking forward to start business in this area. â€œFor companies to be innovative and risk-taking, they need comfort at early stage of entrepreneurship and innovation as the incubation period is the most challenging time and hard to maintain,â€? he cautioned.

### **Marching ahead**

Bharat Biotech has now the country's largest manufacturing capacity for making hepatitis-B (10 crore doses), typhoid (five crore doses) and rabies (80 lakh doses) vaccines. The company has invested a significant amount of money on conducting clinical trials of seven of its products. These products include therapeutics and vaccines that are at an advanced stage of development.

It has product development projects in varying stages for the vaccines and therapeutics, such as malaria, rotavirus, typhoid, Japanese encephalitis, pandemic influenza, chikungunya, and staphylococcus aureus.

The operational team at Bharat Biotech under his guidance initiated a phase III trial in India with THR-100 in patients suffering acute myocardial infarction (AMI or heart attack). He anticipates that the phase III trial with THR-100 will be completed in the second half of 2011. The results of this phase III trial will pave the way for this novel thrombolytic to be filed for marketing approval by Bharat Biotech with Indian regulatory authorities.

Rotavac, the first oral rotavirus vaccine developed by Bharat Biotech, is currently under phase III clinical trials. It is one of the first and largest phase III clinical trials in Indian history involving 10,000 infants. The company has invested significantly in the clinical trials with funding assistance from the Gates Foundation and the Department of Biotechnology, Government of India.

Besides being a scientist and a businessman, Dr Ella doubles up as a philanthropist too. He feels strongly about healthcare facilities available to Indian people and believes that one has to have a sense of duty and responsibility towards the safety of the people and environment too.

To give shape to his beliefs, he established the Ella Foundation to cater to society-driven issues and public health problems. He remembers the day when Dr Bill Gates wrote a letter to him saying that Bharat Biotech was the only company in the discovery business that stood out.

Dr Ella has a strong belief that there cannot be separate quality standards for the people in developed countries and the one living in countries such as India. â€œMy dream is to make safe and quality drugs available to every Indian irrespective of their economical background,â€? he says.

**Rahul Koul in New Delhi**