

## From lab to boardroom

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*There has for long been a gap between research being done in our laboratories and its translation into innovative techniques and products that could be commercialized for the greater good of mankind. It is this gap that the biotechnology Young Entrepreneurs Scheme (YES) aims to fulfil and give wings to the ideas of young scientists. BioSpectrum spoke to the aspiring entrepreneurs. Excerpts:*

## YES competition

The Biotechnology Young Entrepreneurs Scheme (YES) is a UK-based competition opened for the first time for Indian students this year. It is an innovative academic business plan competition that raises awareness of the commercialization of ideas from young bioscientists.

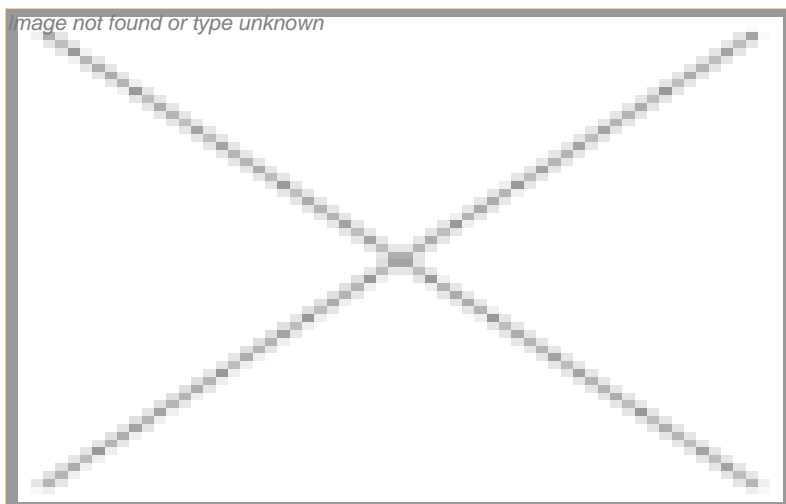
It was launched jointly by the British High Commission, UK Trade and Investment, University of Nottingham Institute for Enterprise and Innovation (UNIEI), Biotechnology and Biological Sciences Research Council, UK and the Ministry for Science and Technology and Ocean Development, India.

Inaugurating the session, British Council Director, Rod Pryde said, "The UK's future is increasingly staked on successful innovation, and on building ever-stronger links between innovative research and the marketplace. We are delighted to offer young Indian entrepreneurs this opportunity to engage with their UK counterparts."

Fourteen teams presented their ideas to an eminent panel comprising senior academicians, venture capitalists (VCs), experts from the Department of Biotechnology (DBT) and an industry representative. Of the 14, four teams were shortlisted to attend a three-day workshop in the UK, the last leg of which will be in December in London. During the workshop, the teams will attend sessions by leading British biotechnology experts on all aspects of commercialization of bioscience ideas.

## A novel treatment for diabetes

*Indian Institute of Technology (IIT) Bombay, School of Biosciences and Bioengineering*



Team members (pursuing PhD in Biomedical engineering):

Ayesha Chaudhary (team leader)

Swati M

Deepti Dyondi

Anubhav Kaviratna

Rahul Dev Jayant

## What is your business plan?

Ours is a therapeutic business plan for the treatment of diabetes using a combination of biotechnology and nanotechnology. Our product would be a replacement to the administration of daily insulin injections, which is quite a tedious job for the patients. It is a closed loop system, which provides a stimulus controlled long lasting delivery of insulin to the patients and would be better than the insulin pumps that need to be manually adjusted every time before use.

### Why did you choose this particular subject?

Diabetes is a global health issue which needs to be tackled at the earliest. It is estimated that there would be 380 million diabetics by 2025 worldwide (www.biomarketgroup.com) and 79.4 million diabetics in India by 2030 (WHO). All this, gave us the thought of working towards diabetes therapy. An interaction with a diabetic patient was also a driving force.

### How feasible is your plan? What is the USP of your plan?

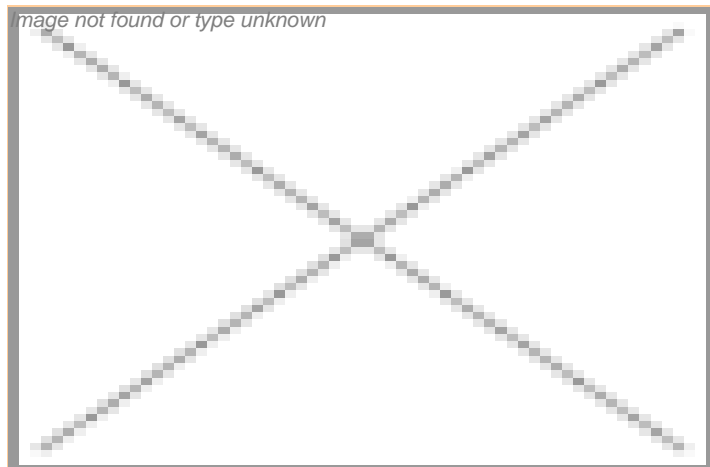
We have developed a sterile, painless, long lasting and in vivo stimulus controlled insulin injection. The system works on the basic principles of nanotechnology and biotechnology. The USP of our plan is the long term release of insulin, and decreased risk of hypoglycemia. In addition to this, the product is also biocompatible and a cost-effective treatment. All the team members have hands-on experience on the various techniques and skills required for the product development and hence we are confident of the technical feasibility of the plan. In fact 25 percent of the average family income of an Indian goes into diabetes treatment. Thus, our product would be designed to be highly economical and easily affordable to the common man. In addition it would also be patient compliant.

### What is your view on the state of R&D in India as compared to other countries? And what do you think is needed to improve the current state?

India is doing well in R&D especially in areas of healthcare. The research activities is commendable in few Indian universities, premier research institutions like IITs and some pharmaceutical companies compared to other countries. However, there can be a rapid improvement in R&D if the collaboration between the industry and the academia increases. There should be more scholarships from industries, application oriented-research and hands-on experience on industry problems. Indo-UK Biotechnology YES 2007 has been an excellent opportunity for us as it gave us an opportunity to think beyond what is to be explored.

### Innovative monoclonal antibody production

*Institute of Microbial Technology (IMTECH), Chandigarh*



Team members:  
Kamlesh Kumar Bisht  
Amin-ul Mannan  
Ashu Shah  
Sneh Lata  
Lomary Singh

### What is your business plan?

Monoclonal antibody production: using a novel B-cell immortalization technique

### Why did you choose this particular subject?

Monoclonal antibodies (MAbs) are real "magic bullets" used for the purpose of research, diagnostics and therapy. The worldwide market for therapeutic and diagnostic MAbs was \$5.4 billion in 2002 and is expected to reach \$26 billion by 2010. The development of hybridoma technology has opened the doors to the reproducible and large scale production of MAbs and this development was considered so significant, that it fetched Kohler and Milstein their Nobel Prize in 1986. But human monoclonal antibody technology has generally been hampered by various obstacles like lack of a suitable immune B cell source, poor direct B lymphocyte immortalization techniques and lack of suitable fusion partners. Several of these problems have been approached by designing humanized or transgenic antibodies, phage display technology and eukaryotic antibody expression system. Still, the preferred technique is the direct immortalization of individual human B cells, which is mainly achieved by Epstein-Barr virus (EBV) transformation. However, this approach has several drawbacks like the EBV-specific cytotoxic lymphocytes may attack and kill freshly EBV-transformed B cells in cultures; moreover, the EBV transformed B-cells are genetically unstable and are low antibody secretors as well.

### How feasible is your plan? What is the USP of your plan?

We are proposing a novel idea in which the need of myeloma counterpart or EBV transformation will be completely eliminated for human MAbs production. We are suggesting a unique way through which a B-cell can be immortalized by exploiting its own genetic information. This will be achieved simply by converting the B-cell's own proto-oncogene into an oncogenic form, just by introducing a novel DNA construct into the cell using an easy lipofection protocol. The successful integration and expression of the designed construct inside the cell will lead to malignant transformation of the B cell. This fact makes it particularly useful to combine this immortalization approach with in vitro immunization schedules. Moreover, this approach will provide a monoclonal antibody that is entirely of human origin and is free of any heterologous sequences unlike the humanized antibodies. So far, on the basis of available literature we are strongly claiming that no such attempt has been made in this field till date.

Advantages of proposed idea:

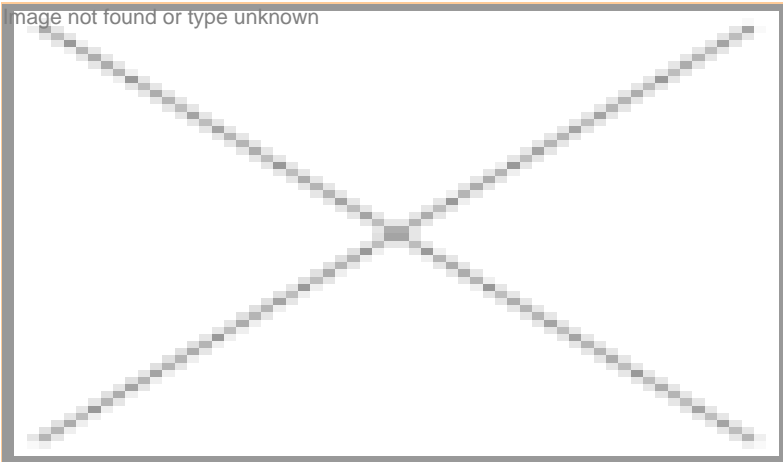
- Totally human antibody, free of any undesired immunogenic sequences.
- EBV transformation is not needed therefore, special safety laboratories not required.
- No need of human fusion partners (myelomas) which are rarely available.
- Economical, time saving and safe technique.

### What is your view on the state of R&D in India as compared to other countries? And what do you think is needed to improve the current state?

Students in foreign countries are privileged with more liberty in research field. They can talk to their mentors in a very informal way regarding their ideas and research activities. Abroad, one can get a PhD degree only in three years while in India sometimes it takes more than five years. This kills all the enthusiasm to carry on research further. We need to have an examination system by which one can go into higher scientific positions without going through the hierarchical system of PhD, PDF, scientist and so on. In this way talented students can carry their research in more independent way.

### The future of vaccine delivery

*Institute of Chemical Technology (Formerly UDCT), Matunga, Mumbai*



**Team members:**

Pirithi Pal Singh PS (team leader)

Ratnesh Jain

Prajakta P Dandekar

Aditya Pattani

Abhijit Date

**What is your business plan?**

Our business plan is based on the development of nanotechnology oriented oral vaccine delivery platform

**Why did you choose this particular subject or topic on which to base it?**

Most of the current vaccine products are injectable formulations which require skilled medical personnel for administration and result in a painful delivery. Furthermore, most of the vaccines contain ALUM as an adjuvant which by itself has long-term untoward toxic effects. These drawbacks and poor patient acceptability and reachability of injectable vaccine products have been a motivation for the development of oral vaccine platform. Also the colossal and renewing vaccine market has been one of the motivating factors for developing an oral vaccine product.

**How feasible is your plan? What is the USP of your plan?**

The market need for vaccine products is immense. About 25 million babies need to be vaccinated every year only in India. The unique selling features of the product include providing an oral vaccine delivery system at an affordable price.

**What is your view on the state of R&D in India as compared to other countries? And what do you think is needed to improve the current state?**

The R&D scenario in India has shown a continuous development and growth due to the various incentives and programs initiated by the government. There is still a need for entrepreneurship workshops and programs to give an insight to students with technical background. In this regard, the Biotechnology YES program comes as an excellent platform established by the UK government, which has now been made open to the Indian students through collaboration with the DBT. More efforts in this direction will definitely bring out more young entrepreneurs from amongst Indian students.