

Vision Document on biotechnology

The Prime Minister Atal Bihari Vajpayee released the document 'Biotechnology – A vision', on 7 September 2001 at New Delhi. The document contains a ten-year perspective of the Department of Biotechnology (DBT), Ministry of Science and Technology, Government of India. Vajpayee, on this occasion said that hopes had been pinned on new biotechnological products increasing agricultural production, fighting disease, combating nutritional deficiencies and protecting our environment.

Some of the milestones laid out in the Vision Document are as follows:

Basic research in modern biology and biotechnology would henceforth be driven by time and utility. Garnering long-term support are stem cell research, and tissue engineering for the development of biological substitutes, and metabolic engineering that uses recombinant DNA technology for enhancing potential of organisms, producing antibiotics. Support will also be provided for micro-assay systems, design of biosensors used in applications such as detection of antigen/antibodies in body fluids and monitoring food additives. Research into developing therapeutics from small peptides/proteins and carbohydrates found in animals/humans will also be given support, as also research into enzyme-mediated synthesis of drugs, processes in pollution control and for bioinstrumentation. 'Gen-Net India' for assisting study of genetic disorders in the country will be established. Research on pathogenic organisms and parasites relevant to India would be encouraged.

Strengthening the bioinformatics network in the country would be completed by 2005. Dedicated network centres involved in 'developing data warehouses, data design and data mining from single and multiple databases and mirror sites, to decipher the international data available in the public domain and to correlate

them to the function of individual sequences' will be set up. Partnership with software companies would be encouraged. This partnership would help in the understanding of the genetic basis of diseases, by aiding identification of useful genes and correlating available epidemiological data for locating missing links.

In agriculture, a complete field assessment of large-scale seed production of transgenics, for enhancing the nutritional content of major crops and vegetables would be undertaken by 2005. In a couple of years, farmers are likely to be able to grow transgenic wheat with improved protein and lysine content, through marker-assisted breeding programmes. Edible vaccines for combating diseases like cholera, rabies and hepatitis B are expected to be ready for clinical trials in 2–3 years. For improving crop yields, biofertilizers and botanical biopesticides would be field-tested. In the Tenth Plan period, there would be emphasis on development of crops as sources of biofuel.

Encouragement will be given for studies on diseases affecting livestock, domestic animals and marine resources leading to vaccines, diagnostic kits and establishment of cell lines. Mouse genetics and mouse as a model in study of human genetics will receive support. Marine resources will be tapped for conversion into useful products. An environmental action plan is also envisaged for the protection of important ecosystems such as coastal belts and mangroves. A systematic documentation of biodiversity in the country would get underway.

Medical biotechnological products like diagnostic kits for major infectious diseases such as tuberculosis (TB), malaria, HIV/AIDS, dengue, hepatitis, etc. are all set to hit the market next year. Target dates have been set by DBT for the

following. In 2–3 years, DNA vaccines for rabies in dogs would be ready for manufacture. Gene therapy trials against cancer would be initiated in 2001–2002. Rotoviral diarrhoea vaccine would enter Phase I trial in 2001 and is expected to obtain approval in 2 years. A vaccine for hepatitis-C would enter Phase I clinical trials by 2003. By 2004–2005, the cholera vaccine would complete its trial and by that time vaccines for HIV/AIDS, TB and malaria are expected to enter Phase I and Phase II trials. Also, manufacturing units for recombinant biologicals, DNA chips and related materials would be set-up in the next five years. A molecular medicine approach would be adopted for research in cancer and cardiovascular diseases. Support is also promised for neurosciences and neuroinformatics, a discipline new to India.

There would be an increased accent on private-public partnership for bringing research products into the market place. A single-window facility is mooted for speeding up the process in obtaining clearances for biotechnology products. Vital policy matters in the realm of Intellectual Property Rights (IPR), patenting and ethical issues in biotechnology will get due attention. Guideline procedures for clinical trials, genetically modified foods and recombinant vaccines would be implemented.

In human resource development, central to achieving the goals set, the DBT proposes to train at least fifty teachers and about hundred students on a yearly basis. This would result in the country having a substantial number of trained personnel to carry out India's aspirations in biotechnology. Finally, necessary steps would be taken for a better public understanding of biotechnology research.

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