Indian biotechnology sector is expected to become a five billion-dollar (around Rs 23,400 crore) industry by 2010

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Indian biotechnology sector has excellent potential and is expected to touch five billion-dollar mark by 2010," a report jointly prepared by industry chamber CII and consultancy firm KPMG said.
"India is ranked among the top 12 biotech destinations in the world and is the third biggest in Asia-Pacific in terms of the number of biotech companies," it added. nvestments in the segment are also growing at the rate of about 38 per cent for the last three years and have touched 560 million dollars in 2006-07. iopharma is one of the important segments of the Indian biotechnology sector and it constitutes about 70 per cent of the domestic biotech industry. Of the total 325 biotechnology companies in India, more than 40 per cent are in the biopharma sector, the report said.

- *Press Trust of India 5 October 2008*

Two children on gene therapy trial in France develop cancer.

27 gene therapy trials in US put on hold. Since 1999, gene therapy has been used to treat children with X-linked severe combined immune deficiency (X-SCID). A research team, led by Alain Fisher at Necker Hospital in Paris, first created a human retrovirus containing a normal version of a gene called gamma c. They removed bone marrow cells from affected children, infected them with the virus and the defective cells were taught how to fight infection correctly. In 9 cases, the children treated were "cured", but some of the reprogrammed white cells in two children have divided out of control. In both cases, the new gene has been accidentally inserted close to a gene called Lmo2, activating it permanently. Lmo2 can cause cancer if too active.

- *New Scientist 25 January 2003*

Inkjet printers to print living structures

Inkjet printers can be used to print complex living structures, by filling ink wells with living cells in special gel which melts below 20 degrees C and is solid above 32 degrees C. Three dimensional structures have been created, such as tubes, using layers of cells and gel. Cells grow to fill gaps. In the past many structures have been made by seeding scaffolding made of polymers with living cells - for example to create shapes such as a replacement ear on the back of a mouse. Blood supply is a major challenge and this technique could allow blood vessels to be printed - although huge technical challenges remain. Vladimir Miranov, Medical University of South Carolina.

- New Scientist 25 January 2003

Growing Organs on Hosts

Scientists in Israel have grown perfect miniature human and pig kidneys inside mice whose immune systems are deficient. They took small clumps of cells from embryos 6-8 weeks old and implanted them into the mice. If pigs had been used, the resulting kidneys would have been normal size and could possibly have been used in transplantation. The work raises huge ethical problems. For example, most people would think it morally wrong to clone someone, implant the cloned embryo into a mother's womb, and then abort it in order to get hold of primitive tissues which are then grown in an immune deficient animal.

- Nature Medicine, DOI, 10.1038/nm812, December 2002

Recent Stem Cell Research

New evidence that stem cells from bone marrow can become brain cells in humans. Researchers at the US Institute of Neurological Diseases and Stroke have found male brain cells in four women after death who received bone marrow transplants from men. Eva Mezey, who led the team, believes stem cells circulate all the time, looking for damaged tissues which they then settle near and repair. Other experiments in adult mice show that bone marrow cells can be persuaded to develop into brain or heart cells. This whole area is very exciting and hugely significant, because it means we probably don't need to develop replacement tissues from embryonic stem cells, thus avoiding all the ethical dilemmas of destroying human embryos for research purposes. It also means that arguments in favour of therapeutic cloning collapse, because adult stem cells are a neater and simpler method of generating other tissues - despite all the campaigning rhetoric by the human cloning community about the benefits to medicine.

- Proceedings of the National Academy of Sciences DOI:10.1073

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