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Future of life, 50 years after double helix

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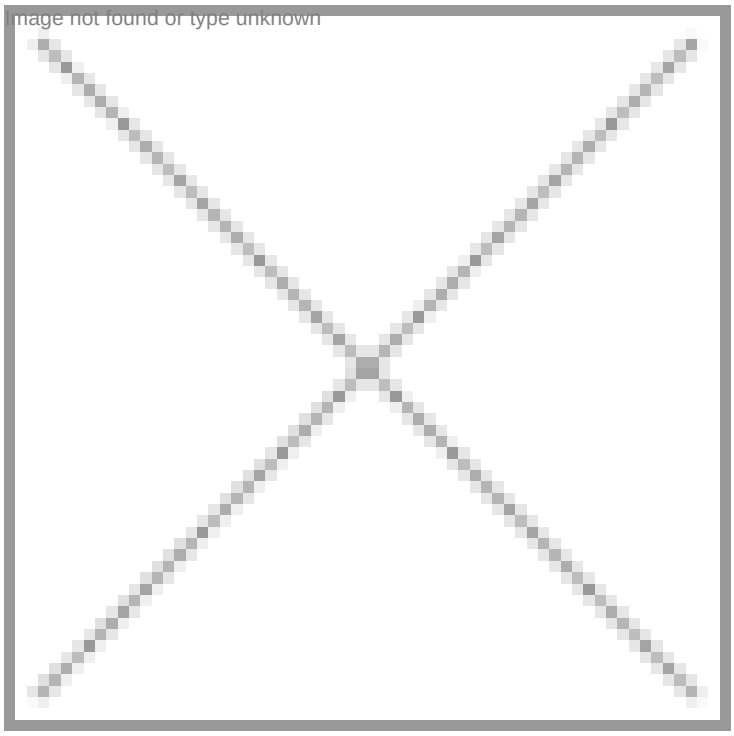
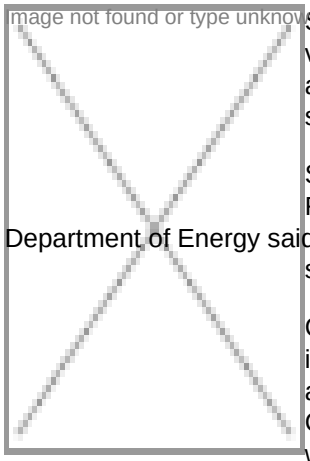


The emphasis during the last 50 years of genetic engineering was on reductionism to explain biological phenomena at the atomic and molecular level. The challenge for the next 50 years is to integrate these insights into an understanding of higher levels of spatial and temporal organization and to move on from discovery to invention of better tools and techniques for medicine and health care.

From early 2003, scientific communities all over the world have been celebrating the 50th anniversary of the discovery of the double helix structure of the human chromosome by Nobel laureates James Watson and Francis Crick. The completion of the mapping of the human genome had only added an extra zing to the celebrations. At these celebrations, scientists have been thinking aloud about the future too.



Scientists have been discussing the various issues threadbare. Many favor continuing of the various research projects while some prefer to give these projects a closer look from the ethical angle. James Watson, the co-discoverer of the double helix structure is emphatic that research should continue because, "we are all interested to know why we are different."

Sharing his views on the genetic breakthroughs made in the last 50 years at the Time magazine's Future of Life Summit, Francis Collins, head of the Human Genome Project funded by US Department of Energy said, "the promise for the developing world is quite substantial."

Collins predicted that within 10 years, affordable genetic tests for people would be available to identify an individual's risks for certain diseases. With this information, many diseases could be avoided through diet and other forms of pre-emptive treatment. "We are all at risk for something," Collins said adding that within 20 years, powerful drugs derived from the study of the genome would be ready.

Dr Paul Nurse, a 2001 joint Nobel Prize winner and chairman of the Royal Society's Science in People's Science Summit program also emphasized that within 20 years it would be technically possible to sequence the genome of each newborn baby and provide him/her with details of every gene and the associated risk of various diseases.

The darker side

Scientists assembled at the summit also acknowledged the darker side of genetic breakthroughs such as the potential development of genetically engineered bioweapons and genetic discrimination. Without proper public debate and education, some of these developments could lead to 'genetic apartheid' with people being written off by insurers and employers because of some inherited genetic abrnormalities.

Another topic of concern was the moral issues related to the work using human embryonic stem cells to develop effective cure against many diseases and cloning.

Stem cell research has now become controversial in countries like the US and many groups advocate destruction of human embryos donated by fertility clinics to research centers. Researchers harvest stem cells from these embryos and then attempt to tweak them to exhibit certain desirable traits. Many religious groups feel that life begins at conception and so destruction of embryos was immoral.

There were other concerns too such as the possibility of 'genetic divide'. Genomics-based information would dominate the world economy in the next 50 years and only those countries that understood these developments and take advantage of them were going to be the big winners. "Other countries may be left out of the genetic party," summed a leading geneticist.

Similarly, there were concerns about the hype over the promises offered by nanotechnology in medicine and the scope for enormous profits from such innovations. Such developments have the potential to deflect people away from seeking preventive measures and shun healthy lifestyles in the hope of instant cure.

So scientists have to evolve a balance between the need to take technological developments forward and also ensure that the benefits do no lead to too many moral and ethical dilemmas in the society.

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