



Quantum Leap

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Unique kettle of fish

ZEBRAFISH, the colourful aquarium species, has become a hot potato for scientists engaged in genomic research. It's turning out to be a goldmine of genetic information that can be used to understand pathways and mechanisms of practically every human disease from blindness to coronary artery disease — information that can be used to design and test new drugs in the future. Since it is a transparent fish, scientists can also literally see how different organs develop

or diseases creep in, besides looking at genes responsible for them.

And the good news is that Indian scientists have a major stake in this emerging field of research — as they have sequenced the whole genome of this fish. This marks India's entry into the highly competitive area of whole genome sequencing of animals.

Zebrafish is native to Indian rivers

Zebrafish is a non-mammalian vertebrate, and has blood, eyes, heart, kidney and other biological processes that share many common features with humans. It is a valuable resource for identifying genes involved in human disease. Its genome is about half the size of the human genome — containing some 1.7 billion DNA base pairs.

Though scientists elsewhere have been working on the



The team of young scientists from the IGIB, Delhi, that sequenced the zebrafish's genome

Zebrafish genome for some time, they have been doing so with lab-grown strains or genetic clones. Thus these strains may not have captured real genetic diversity.

Zebrafish is native to Indian rivers. Taking advantage of this, scientists from the Institute of Genomics and Integrative Biology (IGIB) in Delhi picked up a wild strain of zebrafish from somewhere in Assam and sequenced its genome. This is a great achievement, but the genome of mere one fish is not going to help. In order to under-

stand disease mechanisms, one needs to see the variation in the genomes of different members of the same species.

To address this problem, scientists decided to raise a large colony of zebrafish from the one whose genome was sequenced. Now they have a zebrafish parent and over 100 of its offspring. After sequencing the genomes of all these offspring over the next three years, scientists will be able to tell how offspring differ from their parents as well as from each other, and why some traits

are different in different siblings. This kind of study is simply not possible in humans or even in animal models like mice. The mega effort has been dubbed "Project Kaurava".

The zebrafish genome was mapped by IGIB scientists in a record period of two months. This was possible due to the combination of three things — availability of a highly advanced sequencing technology in the form of a machine called genome analyser, a super computer and a young team of scientists.

Education on sex has potence

A NEW study among school-going students in Haryana has revealed that exposure to sex education indeed helps in changing attitudes towards subjects like premarital sex and condom use. The study was carried out among 500 children attending four government schools in urban and rural areas of Rewari district of Haryana in 2004-2008. It was conducted by researchers from MAMTA Health Institute for Mother and Child and the University of Melbourne.

A significant number of girls who had been through the programme — 78 per cent in rural and 33 per cent in urban school — said they would decline to have sex without a condom in comparison to five per cent in rural and 10 per cent in urban schools who had not participated in the programme. Interestingly, more girls exposed to sex education said 'yes' when asked 'if it was alright to have premarital sex', compared to girls who were not given any sex education. However, more boys in the sex education group said 'no' to the same question.

NOW it is pretty established that heart disease is no more a 'disease of the rich'. But a recent study from Britain has found a worrying trend — people from deprived socio-economic backgrounds have a far higher risk of death after cardiac surgery than people who are not poor. This means that though cardiac surgery has sig-

THE concept of technically tinkering with the climate system to halt global warming is called geo-engineering. One such geo-engineering experiment — to sequester large amounts of carbon dioxide through iron fertilisation of oceans — recently carried out by Indian and German scientists has ended on a disappointing note. During their ten-week research in the southern Atlantic, scientists fertilised a 300 square kilometre patch of ocean with iron, hoping that this would stimulate growth of phytoplankton

which in turn would absorb carbon from the atmosphere and sink to the bottom of the sea.

The addition of iron did stimulate growth of phytoplankton in the first two weeks, but further growth bloom was stopped by increased grazing by small zooplankton called oceanic copepods. A second fertilisation after three weeks had no further effect. So, fiddling with natural processes as a shortcut to mitigate the effects of global warming is beset with unknown consequences.

Waterproof paddy's here

RICE, although grown in standing water, will drown in the event of a flood. For many years now, farmers in Orissa and elsewhere have been using a flood-resistant rice variety called FR13a that can withstand complete submergence for one week or so.

But the yields remained low. So, rice breeders from the International Rice Research Institute in Manila decided to insert the gene responsible for flood-resistance into some high-yielding varieties. Over two decades' research has resulted in a new variety — which scientists call



Scuba 1 planted in Orissa fields

scuba rice or Sub1 — that can withstand flooding for over two weeks and give higher yields. Trials in Orissa have shown good results, and scientists hope to take the variety to all flood-prone areas in South Asia.

nificant benefits, these benefits do not apply equally to all patients. People from deprived socio-economic groups not only have a shorter life expectancy but also spend a greater proportion of their lives affected by disability or illness, says the study published in the *British Medical Journal*.



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