Interest ferments in yeast genome sequence

Paris. The first complete sequence of the genome of a eukaryote, the yeast *Saccharomyces cerevisiae*, will be achieved this week with the release of the final portion of the sequence by the European-led consortium of 96 laboratories — including some in the United States, Japan and Canada — involved in the Yeast Genome Project.

The yeast genome is made up of 12.06 million bases distributed among 16 chromosomes, and contains around 6,000 genes. It is about 250 times smaller than the human genome. The availability of the entire yeast genome will provide unprecedented information about the architecture of a eukaryote genome, according to André Goffeau of the Université Catholique de Louvain in Belgium, who is the coordinator of the Yeast Genome Project.

This has already shown that the yeast genome is much more densely covered with genes than expected, says Goffeau, while much of it is also redundant, with repeated sequences on various chromosomes. Waves and troughs of G-C rich and poor areas also occur on all the chromosomes. Both features must have evolutionary significance, he adds, while the G-C waves may also be

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Brewing up: sequencing of the yeast genome follows the first genetically engineered beer recently launched in Britain.

important for replication. The sequence of the telomeres of all the yeast chromosomes is also unexpectedly similar.

The complete inventory of the yeast genome has also revealed a surprising number of both unknown genes — amounting to around one-third of the 6,000 genes identified in its genome — and new members of known protein families. For example, more than 20 putative sugar transporters, identified on the basis of their

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transmembrane spans, have been found.

Clusters of proteins with similar structures, but no homology to known proteins, also occur. "We are discovering that there are many more protein families than we thought," says Goffeau. Discovering the function of these unknown proteins will be the aim of a new European Union programme, EUROFAN, which will receive ECU7.7 million (US\$9.6 million) over the next two years. The programme will involve 144 laboratories.

The level of homology of yeast genes with human genes is also "striking", says Goffeau, who predicts that as many as half the yeast genes will be "significantly similar" to human genes. Many code for proteins involved in human diseases, and may open the way for the mechanisms of such pathologies to be studied within yeast, a much simpler alternative to doing so in human cells.

Bruno Hansen, head of life sciences at the European Commission, and former vice-president of research at Novo Nordisk, predicts that this high level of homology also means that the results of the yeast genome project will play a major role in underpinning progress in the understanding of the ►

AIDS advisers disagree over events in HIV blood scandal

Tokyo. After the Japanese government's recent admission of its failure to prevent the infection of thousands of haemophiliacs with HIV in the early to mid-1980s, two parliamentary committees last week heard testimony from three scientists involved in deciding Japan's policy on blood products.

Their contradictory testimony, presented to the health and welfare committees of the upper and lower houses of Japan's Diet, raised more questions than answers. But it did provide some insight into the decisions and actions of these policy-makers.

The three were Takeshi Abe, former vice president of Teikyo University, who headed an AIDS study group established by the Ministry of Health and Welfare in 1983; Atsuki Gunji, a professor at Tokyo University medical school, who headed the ministry's biologics and antibiotics division from 1982 to 1984 and setup the study group; and Juzo Matsuda, an assistant professor of Teikyo University, who was a member of the study group.

It was this study group and its subcommittee that recommended in 1983 that haemophiliacs should continue to use blood coagulants that had not been heat-treated to kill viruses, and which is said to have rejected a proposal for emergency imports of heat-treated products. Instead, clinical trials of heat-treated products were recommended and were carried out between 1984 and 1985, coordinated by Abe.

Abe and Gunji, who testified separately and have previously given conflicting accounts of the events in question, failed to agree on the purpose or role of the AIDS study group. Abe claimed that its role was chiefly to determine whether there were any AIDS patients in Japan, and insisted that the group had only an advisory academic and scientific purpose and played no part in setting administrative policy.

But Gunji argued that the group's purpose was to examine how haemophiliacs were being treated and to decide if any changes were necessary because of the AIDS epidemic. He added that, while the group was set up only with research funds and was not intended to have an administrative role, it ended up becoming a "very important decision-making" body.

Matsuda testified that the study group's decisions resulted in the spread of HIV being much wider and he apologised to haemophiliacs. But Abe refused to take any responsibility, saying that "there is no point in feeling responsible".

Abe was repeatedly asked at both hearings about allegations that he deliberately delayed clinical trials of heat-treated blood coagulants so that the Japanese blood product manufacturer Green Cross Corporation (Midori Juji) could catch up with US and European manufacturers in the development of such products. He was also quizzed about large donations that he received from

Midori Juji and other companies in the clinical trials for a foundation that he set up.

Abe said it was "ridiculous" to suggest that he delayed the clinical trials. He claimed that he received money from the companies, ¥10 million (about US\$100,000) each, only between May and July 1983, before the clinical trials started. He said it was "insulting" to suggest any link between the donations and the trials.

But Gunji testified that in "late 1983" he received several complaints from foreign blood product manufacturers that Abe was requesting money, and that these had asked if such behaviour was acceptable. Gunji said he therefore decided to "warn" Abe about his fund-raising.

Although it was not discussed at the hearings, it has been widely reported that Abe, angered by Gunji's warning, suspended organization of the clinical trials and their start was delayed for a month until February 1984 because Abe, at the time Japan's leading authority on haemophilia, was seen as the only person with the power and influence to assemble the necessary groups of patients for the trials.

Abe did, however, admit in his testimony that he urged Midori Juji, Japan's largest blood manufacturer, to make heat-treated products "as quickly as possible". He said that this was because the clinical trials could not be carried out without Midori Juji's products.

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