An international team of researchers has deciphered the genetic code of chromosome 22. This is the first complete sequencing of a chromosome in the race to write the code of the entire human genome. The team was located at the following centers: Wellcome-Trust–funded Sanger Centre near Cambridge University in the United Kingdom, Keio University in Japan, and US laboratories at the University of Oklahoma and Washington University at St Louis.

Working in collaboration, the scientists spanned oceans to share information and succeeded in determining the sequence in which the >34 million base pairs are arranged along the strand of DNA on the chromosome. Along the way, they found 679 genes, 55% of which had never been identified in humans before. The finding gives scientists insight into how genes are arranged along a strand of DNA and what has to happen to control their function.

Mutations of genes on chromosome 22 adversely affect the workings of the immune system, cause congenital heart disease, and are associated with schizophrenia, various forms of mental retardation, and a variety of cancers.

Ian Dunham, MD, at the Sanger Centre led the international effort to decipher chromosome 22. He said, “This is the first time that we have been able to see the organization of a chromosome at the base-pair level. This immediately suggests new experiments and avenues of research which can be pursued.”

Michael Dexter, MD, director of the Wellcome Trust commented, “For the first time, the scientific world knows what a whole human chromosome looks like, and the knowledge that we derive from this discovery will be used for centuries to come. The sequence of chromosome 22 includes 298 genes previously unknown in man, which are being released without the constraints of patents and fees. The fact that all of this information is now freely available for scientists to use is of major importance if the knowledge of our genetic make-up is to be used for the good of mankind.”

“Until now, the ability to sequence an entire chromosome was just hypothetical. No one knew if there would be insurmountable problems that prevented the assembly. Having done this for chromosome 22 tells us we will be able finish the human genome in another 2 or 3 years,” said Francis Collins, MD, PhD, director of the National Human Genome Research Institute at the National Institutes of Health.

Donna Shalala, US Secretary of Health and Human Services, said, “Today, we mark yet another important milestone in our journey to unravel the mysteries of how a single cell develops into a unique human being. This achievement follows on the heel of another major accomplishment of the Human Genome Project: the accumulation of 1 billion DNA letters, or base pairs, for the entire human genome. Today’s announcement is especially exciting because we can now see many future milestones that will occur with increasing speed and more chromosomes whose DNA code will be completely sequenced, until the entire human genome is finished and is freely and readily accessible to everyone by the year 2003 or sooner.”

The international effort was spurred by the announcement of J. Craig Venter and his partners in the Celera Corporation that they would completely sequence the human genome themselves, leading to fears that the company could patent significant sequences of DNA and, thus, essentially own the blueprint to human existence.

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Circulation Newswriter
International Team Deciphers Chromosome 22
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