

Wall Street and the commercial exploitation of the human genome

Frank Gaglioti
10 April 2000

Last month, after a huge rise of 81 percent in the previous two months, the NASDAQ biotechnology index went on a roller coaster ride. The decline began on March 6. But then on March 14, following a much publicised joint statement by US President Bill Clinton and British Prime Minister Tony Blair, biotechnology stocks went into a tailspin, declining by 12.5 percent in one day. The overall NASDAQ index, which is heavily weighted with technology stocks, fell by 4 percent, its second greatest one-day fall ever.

The stock market reaction to the Clinton/Blair statement, which called for information about the human genome or genetic code to be made publicly available, is very revealing. First, it indicates the degree to which the price of technology stocks in general, based on hype and overblown expectations, are susceptible to anything perceived to be a threat to future profits. Second, given the centrality of the rising NASDAQ to Wall Street and thus the US economy, it underscores the huge pressures at work to ensure the commercial exploitation of the astonishing advances in genetics even if it cuts across the needs of science and medicine and their potential applications in eradicating disease.

For over a decade, scientific researchers using more and more sophisticated techniques have been engaged in unravelling the vast and complex code of the human genome—the totality of genetic information to be found in the DNA sequences on the chromosomes in human cells. The sequencing, as it is known, is being done by the publicly funded Human Genome Project (HGP) and by various private competitors. HGP, the oldest organisation in the human genetics field founded in 1989, is mainly based in the US and Britain. Its policy has been to publish DNA sequences on the Internet within 24 hours so that the information is freely available to other research scientists.

Most of the private biotechnology companies have been formed in the last couple of years in the expectation of making enormous profits from the manufacture of a new generation of drugs and other medical treatments based on the newly available data. They have sought to keep their information secret or to keep exclusive rights over their data by obtaining a patent. The biggest individual losers on the stock market were the companies most closely associated with the genetic discoveries. The stocks of Celera Genomics Corporation, one of the leading biotech companies and a direct competitor with HGP, fell by 22 percent. Incyte Pharmaceuticals lost 28 percent.

The initial fall in stock values on March 6 began after HGP

suddenly broke off negotiations with Celera aimed at collaborating in the sequencing of the human genome. The talks broke down because Celera insisted that it retain exclusive rights to the data until 2005, thus enabling it to effectively block competitors. The stock market reacted when HGP published the details of the talks. Celera has been able to gain a substantial lead on HGP by using the publicly available data from HGP to verify its own sequences.

The Clinton/Blair statement on March 14 was interpreted as preventing the private companies from filing patents on their raw data. "To realise the full promise of this research," they stated, "raw fundamental data on the human genome, including the human DNA sequence and its variations, should be made freely available to scientists everywhere.... Intellectual property protection for gene-based inventions will also play an important role in stimulating the development of important new health care projects."

But this was little more than a motherhood statement, which committed neither government to anything and proposed no changes to the existing patent laws. White House spokesman Jake Siewert was quick to reassure the markets that the Clinton/Blair statement would not affect the operations of biotechnology corporations. "The whole point of this is to make raw data available so private companies can innovate, create new medicine and treatment and make a profit. It's meant to foster competition," he said. His remarks were reinforced by the spokesmen for leading biotechnology companies who said that their patents would not be affected.

The Clinton/Blair statement was a result of ongoing high-level discussions on gene patents between the US and Britain, the two countries where most of the biotechnology industry is based. On September 20 last year the *Guardian* newspaper released details of discussions between Lord Sainsbury, Blair's science advisor, and Neal Lane, Clinton's science and technology advisor, held in Kyoto in Japan and in Williamsburg in the US during the Carnegie group summits of G-8 science ministers. The two advisors agreed to work towards an inter-government agreement to release all genetic information and not to issue patents. The Clinton/Blair statement falls far short of this proposal.

To drive home the point, the US Patent and Trademark Office (PTO) issued a statement on March 16 reaffirming that its patent policy remained unchanged. Commissioner of Patents and Trademarks, Q. Todd Dickinson, stated that "genes and other genomic inventions remain patentable so long as they meet the

statutory criteria of utility, novelty and non-obviousness. Genes and genomic inventions that were patentable last week continue to be patentable this week, under the same set of rules."

Celera, in particular, has taken what has been termed a "shotgun" approach to the patenting of human gene sequences. Up to now it has filed 6,500 preliminary patent applications for DNA sequences. These are provisional applications that establish the date of the discovery and give the company one year to file a full patent application. Celera is then able to carry out further research to determine if the information can be turned to some profitable use. But if HGP publishes a sequence on the Internet before an application is made then it cannot be put under patent. So Celera and other biotech corporations are in a race to stake their claims on portions of the human genome in much the same crude fashion as mining corporations apply for leases on a tract of virgin territory.

The rival firm Human Genome Sciences (HGS) has made preliminary claims on 7,500 sections of the genome. A *Washington Post* article last October claims that Celera aims to obtain provisional patents on 20,000 or 30,000 DNA sequences. The Wellcome Trust, a major financial backer of HGP, has threatened to challenge the validity of Celera Genomics' patents in the US courts. The Wellcome Trust is largely supported by leading pharmaceutical companies such as Wellcome Foundation Limited and Glaxo, which are in a position to profit from the information and do not want to pay for it.

But already hundreds of human genes have been granted patents. Celera has a stated aim to patent up to 300 human genes. HGS has been issued 117 patents on specific uses for genes. Incyte Pharmaceuticals has 353 patents; SmithKline Beecham, 60; the US government, 49; the University of California, 46; and Massachusetts General Hospital in Boston, 45. These genes represent only a tiny fraction of the total human genome, which is estimated to be made up of 100,000 separate genes, most of them still to be identified.

The patents issued so far have already begun to act as a barrier to further research and medical discoveries. HGS, for example, has a patent pending on a gene linked to a receptor known as CCR5 on cells controlling infections. Since the patent was lodged, scientists at the Aaron Diamond AIDS Research Center in New York discovered the same receptor was used by the AIDS virus to gain entry into a cell. It is possible that a drug can be developed to block the entry of the virus to the cell, thus preventing the development of AIDS. Researchers proceeded to isolate the receptor and the gene involved, unaware HGS already had a patent pending and could block any further research.

HGS also kept secret its knowledge of the sequenced chromosome of the bacteria *Staphylococcus aureus*. Commonly known as Golden Staph, it is responsible for Toxic Shock Syndrome and the deaths of many elderly people and infants who have become infected by antibiotic resistant strains. Professor of Medicine at Harvard University Gerald Pier was working on a vaccine against the bacteria, but was unable to gain access to the sequence data, effectively blocking his research. Pier revealed that four separate companies had sequenced Golden Staph by 1996 without revealing their data. He has now obtained a sequence funded by the US National Institutes of Health and has since

produced a vaccine, but after a two- to three-year delay.

On March 24 Celera together with a publicly funded institute, the Institute of Genomic Research, announced the mapping of the entire genome of the *Drosophila melanogaster* or the common fruit fly. But such cooperation has not been extended to the human genome. Moreover, the fruit fly data will be used to develop applications for the identification of genes within a DNA sequence, which can then be applied to the human genome.

Celera, a subsidiary of Perkin Elmer Corporation, which manufactures analytical instruments, announced on January 10 this year that it had completed sequencing of most of the human genome and that 97 percent of human chromosomes are represented on its database. Celera claims it will have a complete sequence by 2001. Even though Celera was only formed in 1998 it invested huge resources in the project. It has 300 sequencing machines, each valued at \$300,000, and the largest known civilian computer. Access to Celera's data is only by paid subscription. Rates for pharmaceutical companies will be \$US50 million a year.

Companies such as HGS, Millenium Pharmaceuticals and Incyte Pharmaceuticals sell genetic information to drug companies. HGS has struck a deal with the British pharmaceuticals giant SmithKline Beecham to produce small molecule drugs using the gene discoveries. Millenium Pharmaceuticals has struck \$US1 billion worth of deals with pharmaceutical giants Roche Holding AG, Eli Lilly & Co, and Bayer AG to develop small molecule drugs and biotechnology drugs for predictive medicine. Dr. Eric Lander, the founder of Millenium Pharmaceuticals, stated "the game has moved on. Now it's: How do you add value to the genome?"

HGS Chief Executive Officer Dr. William A. Haseltine was quite unashamed about the commercial exploitation of the human genome and the restrictions that patenting will impose on scientific and medical research. "Any company that wants to be in the business of using genes, proteins or antibodies as drugs has a very high probability of running foul of our patents," he said. "From a commercial point of view, they are severely constrained—and far more than they realise."



To contact the WSWS and the Socialist Equality Party visit:

wsws.org/contact