Chapter 5
Biotechnology, Human Genome Sequencing Technologies, and the Medical, Public Health, and Wealth Creation Initiatives in the Industrialized G8 Nations

ABSTRACT

This project focused on the return on investment from the Human Genome Sequencing Project, and we characterized the quality of life indices and economic resources in the G8 nations. The research team explored the existing scientific infrastructures already in place in the industrialized nations, even before the completion of the human genome sequencing by March 2003. Their authentic and well-established technological workforce developed a new generation of innovative technologies for inexpensive, spontaneous, and precise genomic sequencing. The project team not only discussed the medical, public health and economic benefits derived from genomic research, but also compiled the fledging careers in bioscience and genetics in the G8 nations.

INTRODUCTION

Recent scientific developments have accentuated the relevance of biotechnological applications in the many and various scientific breakthroughs associated with the human genome sequencing initiatives of the National Institutes of Health (NIH) and the U.S. Department of Energy. Biotechnology involves any specific technique that uses living organisms or substances derived from microorganisms for appropriate applications. Biotechnology has been utilized to enhance medicine, agriculture, food science and processing, chemical compounds and environmental sciences and greenhouse sequestration (Tanticharoen et al., 2003. In modern biotechnological applications, the technique now transcend the mere traditional use of fermentation procedure such as fish sauce, soya sauce and beer making and palm wine processing by indigenous rural farmers. According to Tanticharoen et al. (2003), modern

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biotechnology has already provided several of benefits in health care, agriculture and other industries. Biotechnology-derived drugs (biopharmaceuticals) are now routinely used in medicine and over 25 industrial and food crops have been genetically modified. For example, gene technology has enabled the production of insulin that is identical to that produced in healthy individuals, replacing insulin derived from pigs in many applications. Novel therapeutic and diagnostic products for the prevention and treatment of thrombotic (blood clotting) disorders. In agriculture, biotechnology has produced biotic and abiotic-resistant crops, and foods with improved nutritional qualities. The development of pest and disease-resistant crops has increased yields and reduced the application of agricultural chemicals. For example, Bt cotton varieties grown in China, the United States, and other countries because they do not contain pesticides.Golden rice higher vitamin A content is an example of food with improved nutritional benefits. We must underscore that biotechnology plays monumental role in utilizing the scientific breakthrough derived from genomics in wealth creation activities at a global level if the relevant infrastructures are adequately developed.

The human genome sequencing will be recorded in human history as one of the greatest scientific achievements of the 21st century. This sequencing challenge has created a glimpse into apparently unattainable goal which through the collective vision and ingenuity of the International Human Genome Sequencing Consortium (IHGSC), the successful completion of the Human Genome Project (HGP) was reported two years ahead of schedule. In less than eight years after achieving this unprecedented feat in biological science the industrialized affluent G8 nations are developing new generations of innovative technologies to harness the medical, public health and economic benefits derived from genomic research. As a worldwide lesson for the international scientific community and budding scientists, we must reiterate that the distraction echoed by our distractors while our Nobel laureate and eminent scientists at the U.S. NIH and the U.S. Department of Energy doggedly pressed and ensured that the vision of our eminent scientists and visionary political leaders such as President William Jefferson Clinton of the United States and Tony Blair, the former prime-minister of Great Britain, collaborated in the international scientific quest which has created massive global wealth which not only saves lives but continue to emancipate the peoples of the world from diseases, abject poverty, hopelessness. The opponents of the project were quite vociferous, and they argued that the first phase of the HGP, a detailed map of all human chromosomes, already is several years behind schedule. They say the delay is evidence that the project, now in its third year of federal support, is more difficult and tedious than its promoters will admit. They also doubt that the project can be completed in anything close to its original deadline and budget.

Opponents contend that even if scientists manage to finish the genome project, it will have generated enormous reams of un-interpretable and often useless data, essentially a computerized catalogue of genes, subunits of genes, and long stretches of filler material, with few clues about how any of that genetic material works or can trigger disease.

''The human genome project is bad science, it's un-thought-out science, it's hyped science,'' said Dr. Martin Rechsteiner, a biochemist at the University of Utah. Some critics have begun aggressive letter-writing campaigns, urging colleagues who harbor similar sentiments to write Congress. (Angier, 1990)

''Everybody I talk to thinks this is an incredibly bad idea,'' said Dr. Michael Syvanen, a microbiologist at the Medical School of the University of California at Davis and a stout antagonist of the genome project. (Angier, 1990)