Genome Medicine

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The emergence of commercial genomics: analysis of the rise of a biotechnology subsector during the Human Genome Project, 1990 to 2004

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Abstract

Background: Development of the commercial genomics sector within the biotechnology industry relied heavily on the scientific commons, public funding, and technology transfer between academic and industrial research. This study tracks financial and intellectual property data on genomics firms from 1990 through 2004, thus following these firms as they emerged in the era of the Human Genome Project and through the 2000 to 2001 market bubble.

Methods: A database was created based on an early survey of genomics firms, which was expanded using three web-based biotechnology services, scientific journals, and biotechnology trade and technical publications. Financial data for publicly traded firms was collected through the use of four databases specializing in firm financials. Patent searches were conducted using firm names in the US Patent and Trademark Office website search engine and the DNA Patent Database.

Results: A biotechnology subsector of genomics firms emerged in parallel to the publicly funded Human Genome Project. Trends among top firms show that hiring, capital improvement, and research and development expenditures continued to grow after a 2000 to 2001 bubble. The majority of firms are small businesses with great diversity in type of research and development, products, and services provided. Over half the public firms holding patents have the majority of their intellectual property portfolio in DNA-based patents.

Conclusions: These data allow estimates of investment, research and development expenditures, and jobs that paralleled the rise of genomics as a sector within biotechnology between 1990 and 2004.

Background

A cluster of companies that employed genomic technology emerged in parallel to the publicly funded Human Genome Project between 1990 and 2004 [1,2]. The business plans, technologies, size and financial health of these firms differed widely, but they shared a common reliance on methods and technologies associated with the then-new field of genomics: DNA sequencing, DNA manipulation on the chromosome or whole-genome scale, and bioinformatics. These firms drew heavily on the scientific commons, public funding, availability of startup capital, and two-way technology transfer between academic and industrial research.

As originally conceived, the Human Genome Project was a public works project - to construct maps and derive a reference sequence for the human genome and other genomes. Maps and reference sequences were primarily conceived as scientific tools, but they have obvious commercial implications. New genomics firms began to form in the early 1990s, five years after the Human Genome Project was first conceived in 1985. The firms built on three decades of molecular biology and human genetics research to develop a commercial genomics sector within biotechnology. The information tools - maps, sequences, and algorithms - generally (with some exceptions) resided in the public domain through scientific publications in open literature and public databases. The Human Genome Project also relied upon automated DNA sequencing and

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