

# Bibliometric Analysis of Human Genome Research

Computer Horizons, Inc. (CHI) was hired by the Office of Technology Assessment to conduct a bibliometric analysis of work on human gene mapping, including an international bibliography of the most relevant literature. This bibliography centered on an examination of the growth of relevant scientific literature keyed to the words "Gene or Genes or Genetic," "Marker or Linkage or Map," and "Human." Additional key word combinations included "Human Chromosome," "Human DNA Sequence," "Human Nucleic Acid Sequence," "Human Restriction Fragment Length Polymorphism," and various combinations designed to select papers on methods and techniques of DNA analysis.

The use of publication counts as a measure of research activity is part of the field of bibliometrics. A growing body of research has demonstrated the usefulness of bibliometric techniques: Counts of scientific papers and the numbers of citations to them have been shown to be indicators of research productivity. Limitations to bibliometric techniques do exist, particularly in balancing the treatment of non-English publications. Since the literature of science is dominated by English-speaking researchers, there is an inherent bias against citations of foreign-language publications. In the pres-

ent case, however, the primary purpose of the literature search was to provide indicators of growth rather than to develop specific bibliographies. As such, the analysis clearly demonstrated a rapid growth in the scientific literature related to mapping and sequencing the human genome, and an acceleration of this growth over very recent years.

Over 11,000 entries of relevant literature were presented in the bibliography, which scanned appropriate publications from 1977 through 1986. The literature search included journals published in English, French, German, Dutch, Italian, Polish, Japanese, Spanish, Russian, Bulgarian, Swedish, Finnish, Norwegian, Danish, and Hebrew. All entries were subsequently grouped by OTA into the country or region of origin to identify national and regional trends in research. The regions included the United States, Western European countries, Japan, and other non-European countries. The table below presents the results. The data were used as the basis for figures 7-1 and 7-2 and table 7-1 in chapter 7, which display the growth in the total number of articles on human gene mapping and sequencing and the breakdown by country or region.

Annual Publications in Human Genetics:  
Articles Published on Human Genes or Genetic Markers and Linkage Maps

Year	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
United States . . . . .	187	218	235	314	308	364	487	577	689	818
Japan . . . . .	7	11	17	22	32	45	39	58	67	85
Western Europe										
Denmark . . . . .	6	14	9	7	12	7	9	12	21	25
Federal Republic of Germany . . . . .	20	23	14	33	42	41	51	69	78	100
Finland . . . . .	3	6	8	7		5	9	12	15	14
France . . . . .	21	34	36	42	5	57	64	70	94	114
Italy . . . . .	8	8	9	15	24	15	44	39	44	66
Netherlands . . . . .	15	25	17	20	13	18	25	25	50	45
United Kingdom . . . . .	32	49	57	46	66	88	97	126	184	185
Other . . . . .	31	19	46	30	45	44	62	69	70	92
Other Non-European countries										
Australia . . . . .	2	8	11	17	18	22	24	23	20	38
Canada . . . . .	12	17	17	28	14	29	26	38	60	68
Eastern Europe and U.S.S.R. . . . .	23	17	21	38	36	33	36	51	60	62
South Africa . . . . .	0	6	7	8	6	3	4	6	16	9
Other . . . . .	20	20	35	33	33	41	32	42	87	63
Uncertain . . . . .	32	41	79	75	57	87	61	81	95	101
Total . . . . .	419	516	618	735	772	899	1,070	1,298	1,650	1,885

SOURCE: Office of Technology Assessment, 1988.