

PATENT PATTERNS IN BIOTECH

by B.J. Spalding

Simply counting patents is no way to measure a company's research productivity. Indeed, the U.S. issues roughly 85,000 patents each year, but only about 3,000 of them lead to any money.

Yet CHI Research (Haddon Heights, NJ) not only counts company patents, it measures their quality, timeliness, and dependence on basic research. By these yardsticks, six U.S. biopharmaceutical companies far outperform the universe of established pharmaceutical companies. "The biotech players are hot companies with hot technologies," says Francis Narin, CHI's president.

Total patents, however, is one area where the six surveyed biopharmaceutical companies fall short (table 1). On average, established pharmaceutical firms around the world—including diversified firms with pharmaceutical operations—each hold 47 drug-related U.S. patents issued between 1985 and 1989. Merck (Rahway, NJ) is a leader, with 446 patents. Among biopharmaceutical companies, Cetus (Emeryville, CA) leads the way, with 48 patents. After its merger with Cetus, though, Chiron (Emeryville, CA) emerges as the front runner, with 58 patents.

The patents of biopharmaceutical firms are of a higher quality, says CHI (table 2). It measures quality by determining how many times company patents are cited by subsequent patents. "Heavily cited patents represent key advances that lead to other advances," says Narin. Among biotech companies, Cetus' patents are of the highest caliber. They're cited 3.23 times as often as an average pharmaceutical patent. Glaxo (London) leads pharmaceutical firms, with its patents cited 1.68 times as often as the norm.

Biopharmaceutical patents are more dependent on basic research (table 3). CHI calculates this dependence by counting how many references company patents make to scientific journals. Such journals, says Narin, to a "large extent embody basic research." Genentech tops biotech companies, as its patents average 22 journal references. Among pharmaceutical firms, Eli Lilly (Indianapolis, IN) leads the way, with its patents averaging 4.66 references. A typical pharmaceutical patent, for its part, makes 2.17 journal references.

Biopharmaceutical company patents are based on more recent technology (table 4). CHI determines this timeli-

TABLE 1 Number of Patents

Biopharmaceutical Company	Number of Patents	Established Pharmaceutical Company	Number of Patents
Cetus*	48	Merck	446
Genentech	39	Warner-Lambert	304
Chiron*	10	Ciba-Geigy	290
Genetics Institute	10	Bristol-Myers Squibb	278
Genex**	8	Eli Lilly	251
Immunex	7	Pfizer	211
Average	47		47

TABLE 2 Quality of Patents

Biopharmaceutical Company	Quality of Patents	Established Pharmaceutical Company	Quality of Patents
Cetus	3.23	Glaxo	1.68
Immunex	3.03	Bristol-Myers Squibb	1.66
Genex	2.66	Warner-Lambert	1.58
Genentech	2.13	Syntex	1.38
Chiron	1.66	Merck	1.32
Genetics Institute	0.00	Searle	1.28
Average	1.00		1.00

TABLE 3 Dependence on Basic Research

Biopharmaceutical Company	Dependence on Basic Research	Established Pharmaceutical Company	Dependence on Basic Research
Genentech	22.00	Eli Lilly	4.66
Genetics Institute	16.05	Upjohn	4.06
Cetus	9.94	Wellcome	3.13
Immunex	9.77	Marion Merrell Dow	2.37
Chiron	7.45	Merck	1.97
Genex	5.63	Syntex	1.95
Average	2.17		2.17

TABLE 4 Timeliness

Biopharmaceutical Company	Timeliness	Established Pharmaceutical Company	Timeliness
Immunex	3.8	Wellcome	6.2
Chiron	4.0	Bristol-Myers Squibb	6.4
Cetus	4.3	Marion Merrell Dow	6.6
Genetics Institute	5.2	Sandoz	6.7
Genentech	5.8	Searle	6.8
Genex	11.6	Warner-Lambert	6.9
Average	7.6		7.6

*Chiron (Emeryville, CA) has agreed to buy Cetus (Emeryville, CA).

**Enzon (South Plainfield, NJ) has agreed to acquire Genex (Gaithersburg, MD).

Source: CHI Research (Haddon Heights, NJ)

ness by figuring the average age of the patents cited by each company patent. "The faster a patent turns around current technology—the more timely," says Narin. Immunex is the quickest bio-

tech firm, as the patents cited by its patents are 3.8 years old, on average. Wellcome (London) is the fastest pharmaceutical company, as its patents cite patents that average 6.2 years of age.