

product milestones.

•Due to the difficulty in judging the ability of a new drug to work in humans based on animal data, there will always be a number of unpredictable product disappointments. This is especially true for the biotechnology-derived drugs, many of which represent a brand-new approach to treating a particular disease. The lack of experience with similar drugs makes it extremely difficult to design human clinical trials and predict results.

A large number of PLA filings are projected in the next six to 12 months, however.

•MedImmune's Hyperimmune-RSV/Respirivir (November 1992).

•Gensia's Arasine (December/January 1993).

•Genzyme's recombinant Ceredase (December/January 1993).

•Genentech's DNase (January-March 1993).

•Synergen's Antril (June 1993).

•And Immune Response's AIDS vaccine (June 1993).

The next rally?

In our most optimistic scenario, the group could rally in early 1993 in anticipation of a large number of biotech-drug PLA filings. Unfortunately, the large number of product disappointments in

1992 may have shaken investors' confidence such that a wave of PLA filings may not be sufficient to start a rally. Thus, our more pessimistic scenario predicts that the group might not rebound until late 1993 or early 1994, in anticipation of the next wave of biotech drug approvals.

In the short 10-year history of the biotechnology industry, the price performance of the group has been characterized by distinct up-and-down price cycles. Although it is hard to extrapolate from the industry's short history, history appears to support the more pessimistic scenario. In the last 10 years, there have been two down cycles in the price movements of the biotechnology group—1983/84 and 1987/88—each lasting approximately two years. If the current down cycle were to last two years, it would continue from early 1992 until early 1994. On a more positive note, the historical up cycles have lasted three to five years. Thus, beginning in 1994, the group could be beginning a multi-year period of price strength fueled by the next wave of new product approvals.

Cash danger list

A prolonged bear market for biotech stocks could seriously affect the financial health of a growing number of biotech companies. With the continued inaccessibility

of the public-equity markets to biotech offerings, a number of companies are facing dwindling cash balances. An early warning system, called our cash danger list, highlights companies that have less than two years of cash and should be considering alternative methods of raising capital. Although these companies are not yet facing a serious financial crisis, they need to begin to take action to raise capital before the situation does become serious. The list includes: Telios Pharmaceuticals (San Diego, CA), 1.1 years; Magainin Pharmaceuticals (Plymouth Meeting, PA), 1.2 years; Centocor, 1.2 years; Genelabs Technologies (Redwood City, CA), 1.4 years; Seragen (Hopkinton, MA), 1.4 years; Somatogen (Boulder, CO), 1.7 years; ImClone Systems, 1.8 years; and Repligen (Cambridge, MA), 2.0 years.

The estimated years of cash represent a rough approximation based on current cash levels and our estimate of the future cash needs of the company. It is extremely difficult to estimate a company's future needs for cash, considering the large number of variables involved.

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PERKIN-ELMER AND APPLIED BIOSYSTEMS

JOINING FORCES IN DNA ANALYSIS

NEW YORK—A desire to not reinvent the wheel propelled the recent merger between Perkin-Elmer (Norwalk, CT) and Applied Biosystems (Foster City, CA). Both companies wanted to develop DNA identification systems to tap into emerging markets like agriculture, animal husbandry, environmental testing, paternity testing, and forensic science. Though Perkin-Elmer owned PCR DNA-amplification technology, it lacked technology to analyze amplified DNA. Applied Biosystems, conversely, owned DNA-analysis technology but lacked PCR DNA-amplification technology.

"Separately, both companies were missing half of the puzzle. But, combined, we field the best DNA-analysis system in the industry," says Michael Hunkapiller, Applied Biosystems's executive vice president. And Riccardo Pigliucci, Perkin-Elmer's senior vice president, adds that "instead of wasting time duplicating each other's technology, we decided to join forces."

The merger—which is valued at \$330 million—involves a stock swap, with Perkin-Elmer exchanging 0.678 shares of its stock for each share of Applied

Biosystems stock. The deal still requires the approval of shareholders of both companies and certain regulatory bodies, though a final okay is expected early next year. Perkin-Elmer, the biggest analytical-instrument maker, racked up profits of \$58.8 million on sales of \$911 million in fiscal-year 1992. Applied Biosystems, a leading supplier of automated DNA and protein systems, lost \$15.9 million on sales of \$183 million in fiscal 1992. The loss, however, was due to a one-time charge of \$22 million for intangibles and the closing of a small Swedish operation.

Perkin-Elmer has worked with PCR for several years. In 1986, it set up a joint venture with Cetus (Emeryville, CA), the discoverer of PCR, to develop PCR instrumentation. Then, last year, when Hoffmann-La Roche (Nutley, NJ) purchased PCR technology from Cetus for \$300 million, Perkin-Elmer formed a strategic alliance with Roche. It now holds exclusive worldwide marketing rights to PCR systems in all non-diagnostic applications of the technology.

Indeed, DNA research is a booming field. For Applied Biosystems, sales of

DNA products skyrocketed 31 percent from 1991 to 1992, and such sales now account for over 60 percent of the company's total sales. Driving this growth are the ever-increasing number of laboratories investigating DNA, as well as the numerous genome-sequencing programs underway. Applied Biosystems, in fact, claims to command 70 percent of the DNA-products market, with Millipore (Bedford, MA) and Pharmacia (Piscataway, NJ) its nearest competitors.

In all, the emerging markets that Applied Biosystems and Perkin-Elmer will target with DNA identification systems are bigger than the life-science-research market, which currently accounts for over 95 percent of Applied Biosystems's product sales. As one of these markets, environmental testing is a field in which Perkin-Elmer is making headway. Last year Perkin-Elmer introduced a DNA identification assay to detect *Legionella* bacteria in water samples. The assay gives results in a few hours, whereas prior *Legionella* analysis took about a week.

—B.J. Spalding