PRODUCT PROJECTIONS

HANDICAPPING PHARMACEUTICALS' PROSPECTS

SEATTLE, Wash.—Implicit in any discussion of biotech products and markets is the probability the various recombinant proteins will actually work and be used. Intuitively, for example, a replacement product such as recombinant human growth hormone has a greater chance for success than a new cancer therapeutic like interleukin-2. Now Robert Kupor, biotechnology analyst here for the investment bank of Cable Howse & Ragen, has pinned down these gut feelings with numbers in a new report on biotech therapeutics (see chart).

"It's the only report that overviews the whole field and assigns probabilities based on one analyst's perspective," says Kupor, who admits that these percentages are "semi-arbitrary." He explains that the two main components of each probability are the chance that the product will work and the product's potential to garner market share from competing drugs. The sales figures, in 1987 dollars, represent market estimates for 3-4 years after each product's introduction.

Although no drug warrants a 100-percent rating under Kupor's scheme, he rates two as 98-percent chances: recombinant factor VIII as a replacement for the blood-derived product in treating hemophilia, and erythropoietin for use against anemia in kidney dialysis patients. Kupor also believes that—at a price of \$2,000 per dose—tissue plasminogen activator has a 95 percent probability of garnering \$400 million in annual U.S. sales by 1990, and a 70 percent chance at \$790 million (if it is approved for conditions in addition to heart attacks).

Tougher to quantify are the cancer treatments. Kupor's \$50-million estimates for gamma-interferon and tumor necrosis factor may seem small, but he stresses that these are for their use as *monotherapies*. It is still too early, he says, to predict additional potential market sizes and probabilities for combination therapies. And with little real efficacy data to go by for monoclonal antibody-based cancer therapies, Kupor estimates that these products have an 80-percent chance of attaining \$100 million in sales, 50-percent for \$300 million, and 15 percent for \$1 billion. It all depends on which cancers monoclonal antibodies turn out to be effective against. In fact, the analyst says he considered describing each product's potential in graph form, showing high probabilities of small-to-moderate sales and

PROBABILITY OF SUCCESS FOR BIOTECH THERAPEUTICS			
Product	Application	U.S. Market Size (in \$ millions)	Probability
Atrial natriuretic factor	diuretic	45-85	60%
GM-CSF	chemotherapy and bone marrow grafts	125	95%
	AIDS	200	20%
G-CSF	chemotherapy and bone marrow grafts	125	95%
	leukemia	25	40%
M-CSF (CSF-1)	increase and activate macrophages	50-150	50%
Epidermal growth factors	wound healing	150	75%
Erythropoietin	anemia in kidney dialysis patients	165	98%
	other anemias and blood enrichment	160	55%
Factor VIII	hemophilia	155	98%
Follicle stimulating and leuteinizing hormones	infertility	65	90%
Human growth hormone	short stature	300	80%
Alpha-interferon	cancer	80	85%
	infectious disease	up to 150 100	50% 70%
Beta-interferon	cancer and infectious disease	20-30	60%
Gamma-interferon	cancer (monotherapy)	45	60%
	arthritis	25	40%
Interleukin-2	cancer	50-75 300-500	80% 50%
	infectious disease	35-70	40%
Intranasal spray for small proteins	insulin	150	60%
	pro-insulin	250	30%
Lipocortin	anti-inflammatory	50	35%
Lung surfactant	infant respiratory distress syndrome	55	95%
Monoclonal antibodies	as therapy vs. various cancers	100 300 1000	80% 50% 15%
	as therapy vs. Gram-negative septicemia	180	80%
	as prophylactic vs. Gram-negative septicemia	300	45%
Superoxide dismutase	heart attacks	250-350	60%
	other uses	160	40%
Tissue plasminogen activator	blood clots	400 790	95% 70%
Tumor necrosis factor	cancer (monotherapy)	50	60%

Data courtesy Robert Kupor, Cable House & Ragen

correspondingly lower chances of greater sales.

Kupor stresses that product probabilities are only the first step in evaluating biotech firms. Each company's competitive situation, patent position, portfolio of products, and potential return on those products must all be considered. Still, he believes it is about time that analysts and investors

alike pay more attention to the probability that a product will succeed, rather than being seduced by large market potentials. "Anybody can crystal-ball and talk about up-side potential," he concludes, "but I feel there's a need within the biotechnology community for somebody to say what we know and what we don't know."

—Arthur Klausner