Abstract

Biotechnology mergers and acquisitions (Biotech M&A) can help the industry’s fully integrated players to increase in size and market value, boost the emerging players’ efforts to reach full integration or allow horizontal players to survive cyclical financial crises. Analysis of 82 key deals between 1999–2003 showed a dollar value of biotech M&A well over US$45bn. This activity, mainly driven by a continuous move towards industrial specialisation, also revealed a widely segmented model with seven major M&A trends. Intersector activity involved 11 key deals between the biotech, the drug delivery (Bio2DD: biotech-to-drug delivery) or pharma sectors (P2Bio: pharma-to-biotech) with a value totalling US$9.7bn, and were driven either by the pharma players’ need to expand their marketed portfolios or improve innovation, or the biotech sector’s intention to advance management lifecycle or business diversification. Furthermore, intrasector activity included 18 agreements between fully integrated (Fbio2Fbio: fully integrated-to fully integrated biotech players) or fully integrated and emerging players (Fbio2EBio: fully integrated-to-emerging biotech players) valued at US$30bn, which were aiming to increase market value and sustain profitability. In addition, Datamonitor analysis has identified 53 deals with a value of US$5.3bn between emerging players (EBio2EBio), emerging and horizontal players (EBio2Hor: emerging-to-horizontal players) that targeted full integration, or between horizontal players to reach a higher level of innovation or larger customer base.

INTRODUCTION

After nearly three decades of biotechnology funding cycles, the industry is undergoing a change that necessitates the creation of new business models. Biotechnology’s vertical model is representative of the business followed by fully integrated biotechnology players (FIBio). It consists of an integrated organisational structure with access to independent development, manufacturing and marketing capabilities. Although this business model operates within a high-risk environment, it targets high returns on research investment and strong profit margins. The horizontal model involves the discovery and development of a technology platform to aid drug discovery. This model is followed by hundreds of bioinformatic, bioanalytical, functional and population genomics companies (horizontal players).

WHAT DRIVES BIOTECH M&A?

M&A in the biotechnology sector (including deals with players within the biotechnology or with the pharmaceutical and drug delivery sectors) serves three main purposes (where A — B = A acquires B; A–B = A merges equally with B):

- increase pipeline productivity and innovation (eg Merck & Co. — Rosetta, Vernalis—British Biotech);
- support market expansion or sustainable profitability (eg Amgen — Immunex, Biogen—IDEC);
aid the transition towards full integration (eg Celera ← Axys, Millennium ← Cor Therapeutics).

**BREAKDOWN OF DEAL TYPES**

In terms of the partnering process, Datamonitor has identified three major types of biotechnology M&A agreements:

- **Horizontal**: defined as deals within the same sector from which the acquirer boosts its portfolio, pipeline or technological capabilities within a core market (eg Biogen–IDEC, Amgen–Immunex);

- **Vertical**: defined as deals in which the acquirer adds a new business unit to its supply chain, thus enhancing its internal capabilities (eg the acquisition and integration of genomics player Rosetta by Merck & Co.);

- **Congenerical**: defined as deals from which the acquirer gains a new business outside its current core focus (eg the acquisition of Wyntek Diagnostics by Genzyme General).

The first two categories are the most popular, as they are in line with the industry’s move towards increasing specialisation, while congenerical deals lead to corporate diversification. In the future, Datamonitor expects that most, if not all, M&A deals will fall into the first two categories, as the industry will be under pressure to demonstrate sustained profitability and increased shareholder value.

Figure 1 positions Biotech’s key business models and M&A trends with the pharma, drug delivery or intrabiotech sectors. Datamonitor has identified seven deal types which directly involve M&A activity, differentiated by the types of companies involved.

**Intersector** activity:

- Pharma and biotechnology players (P2Bio, eg Scios’s acquisition by J&J);

- Biotechnology and drug delivery players (Bio2DD, eg Chiron deal with PowderJect).

**Intrasector** activity:

- Mergers of two fully integrated biotechnology players (FIBio2FIBio, eg the merger of Biogen with IDEC);

- Fully integrated and emerging biotechnology players (FIBio2EBio, eg MedImmune’s acquisition of Aviron);

- Mergers of two emerging biotechnology players (EBio2EBio, eg the merger of British Biotech with Vernalis);

- Emerging biotechnology players and horizontal players (EBio2Hor, eg Axys’s acquisition by Celera Genomics);

- Mergers of two horizontal players (Hor2Hor, eg LION Bioscience AG acquisition of NetGenics).

Table 1 analyses the breakdown of 82 key deals between 1999 and 2003 by type of company. Over this period, the value of biotechnology M&A activity totalled US$45,045m. More specifically, 47 per cent of the M&A activity by value was captured by two major FIBio2FIBio deals (Amgen/Immunex and Biogen/IDEC). P2Bio activity driven by four deals reached US$8,129m, accounting for 20 per cent of M&A value. This was followed by FIBio2EBio activity, which included 16 deals reaching a value of US$7,905m and accounting for 17 per cent of the total M&A value. EBio2EBio accounted for the largest number of deals at 31; in value terms, these accounted for just US$3,874m, capturing 9 per cent of M&A value.

**Key pharma-to-bio – deals and trends**

When looking at the leading pharma or biotechnology sectors, consolidation can
be seen as a means to accelerate productivity and revenue growth, identify profitable synergies and adapt global focus. Although the leading pharmaceutical and biotechnology companies have managed to maintain stable growth performance, they have not been able to avoid consolidation. When looking at pharma-to-bio consolidation, two major deal types can be identified: licensing or joint ventures, which include the possibility of biotechnology stock purchase, and the less popular route of direct acquisition.

By focusing on wide-ranging licensing deals, coupled with minority stock purchasing, pharma players hope to acquire significant research knowledge or attractive pipeline programmes while allowing the biotechnology player to grow its talent and unique business
characteristics independently, and thus maintain the higher productivity often seen within the biotechnology sector. Datamonitor believes that this deal type will probably continue to dominate the relationship between pharma and biotechnology players.

More specifically, Novartis owns 46 per cent of Chiron’s corporate stock, while Johnson & Johnson participates in a joint venture with the same biotechnology player on diagnostic tests for hepatitis and HIV. Despite recent rumours related to a potential acquisition offer to Chiron’s management, Novartis has reported that it is happy with its current investment in Chiron and does not have any immediate plans to change its position. Both deals have created a ‘mutual business symbiosis’ providing Chiron with financial and potentially commercial support while providing the pharmas with access to Chiron’s innovative culture.

Direct acquisition is usually a less popular choice, as companies fear that the integration of a previously innovative player into a much larger organisation can affect R&D productivity – usually the driver for the merger in the first place. In many cases, successful acquisition strategies stem from the ability of the acquiring company to maintain the individual identity of the target company in such a way that productivity is left intact. Johnson & Johnson’s strategy of not integrating acquired companies, allowing them to maintain their existing structure as a Johnson & Johnson subsidiary, proved successful in the past with Centocor, and looks set to be a key factor in the success of the recent Scios acquisition.

**Key fully integrated players – deals and trends**

Shareholder value can be protected only if a company, regardless of its innovative characteristics, is able to maintain sustained profitability. However, achieving this in highly competitive environments also requires increasing revenue volumes and significant asset growth. When looking at the fully integrated biotechnology sector, the need to increase in size and reach sustained profitability (e.g. therapeutic franchise expansion), which includes both revenue and asset growth, is likely to drive an increasing future M&A activity.

The leading biotechnology player, Amgen, increased its asset and revenue volumes with the acquisition of Immunex. More specifically, Immunex’s US$16bn acquisition offered Amgen the anti-inflammatory drug Enbrel, which carries blockbuster potential and is forecast to reach sales of US$3bn by 2008. Although Amgen gained a potential blockbuster and a sales and marketing team to promote both Enbrel and Amgen’s own arthritis drug Kineret, it faces the costs of integrating Immunex into its own business, in addition to the initial cost of the acquisition. The purchase of Immunex was attractive to Amgen because, unlike many acquisitions, there were minimal overlaps between the two companies’ products and sales forces, and duplication of facilities was likely to be small.

In June 2003, Biogen and IDEC announced their decision to merge. This is not a merger of long-term corporate development vision or exciting medical research opportunities. Instead, this is a deal driven by market pressures to deliver competitive marketed portfolios, strong revenue volumes and sustained profitability. Biogen and IDEC are heading for a US$6bn merger that will create a biotechnology powerhouse of 3,700 employees, of which one-third will be in research. The new company will have an R&D budget of over US$500m, net cash of over US$1.5bn, two blockbuster biologics, Avonex and Rituxan, and a pipeline of ten products in clinical trials with potential in niche disorders, oncology and immune and inflammatory diseases. With this merger, Biogen and IDEC will be able to demonstrate strong revenue growth and move closer to Amgen and Genentech.
However, the new company will continue to operate in a highly competitive environment. Looking at the newly merged portfolio, Avonex is under significant threat in the multiple sclerosis market by its major rival, Serono’s/Pfizer’s Rebif. In addition, Biogen’s new psoriasis product Amevive is expected to be hit by a competition wave led by Genentech’s Raptiva, Amgen’s Enbrel and Johnson & Johnson’s Remicade.

Despite the promise in research and the expressed optimism, the deal clearly shows the use of consolidation as a ‘cure’ for the medical biotechnology sector’s major illness, its inconsistency in delivering sustained profitability. As volatility will continue to affect economic development in the biotechnology world, Datamonitor expects that more leading biotechnology players will be forced to join the consolidation wave out of economical necessity.

**Fully integrated-to-emerging players**

Each time the industry enters a ‘bear’ market environment, limiting funding sources and lower stock volumes can adversely affect the emerging sector. Financial crises such as these transform previously expensive stocks to relatively cheap and very attractive acquisition targets. Datamonitor expects the fully integrated players to compete strongly with leading pharma companies for lucrative acquisition deals involving the emerging biotechnology sector, which includes mid-size biotechnology companies that carry strong research and drug development capabilities but that are not able to market their own products. For leading biotechnology players wishing to expand, one method to overcome the hurdles associated with setting up a business from scratch is to acquire a small targeted operation, which can help hit the ground running.

The US$2bn acquisition of Cor Therapeutics by Millennium offered one marketed product, Integrinlin (with a 2008 revenue potential of over US$450m) and helped Millennium to construct a pipeline of 19 programmes and four franchises (cancer, cardiology, inflammation and metabolism), combined with a strong commercial presence derived from COR’s experienced salesforce and research staff of over 1,300. It remains to be seen over the next five years how wisely the newly acquired assets will be incorporated and the degree of integration the firm will be able to achieve. Although Integrinlin’s revenue potential is unlikely to be significantly threatened by existing competition, potential failures in Millennium’s pipeline may threaten pipeline expansion and new market opportunities.

Gilead’s ambitious growth strategy continued with the 1999 and 2003 acquisitions of Nexstar Pharmaceuticals and Triangle Pharmaceuticals. The deals were beneficial for Gilead’s growth as they enriched the company’s portfolio, expanded its revenue base and established a mature and international marketing organisation. The market responded positively to the Triangle’s purchase and Gilead saw its share price leap when the deal was announced. Gilead has successfully integrated the newly acquired operations into its own, a key factor in the success or failure of a merger/acquisition. With the latest deal, Gilead has consolidated one of the strongest anti-viral portfolios in the industry with three brands: Viread, Hepsera and Emtriva. Gilead will continue to lead the biotechnology HIV sector, as its virology franchise is forecast to reach revenues of US$1,593m in 2008.

**Key emerging players – deals and trends**

Datamonitor recognises that consolidation within the emerging sector will work to move the firms closer to full integration and potentially to sustainable profitability. Acquisitions of other emerging or horizontal players can be used to source a wide variety of skill sets to enhance the existing operations of biotechnology companies. However, the most common
type of deal involving the emerging biotechnology sector will involve the expansion of the technological reach of a company’s product portfolio, thereby lowering the level of risk resulting from operating in a small number of markets.

The purchase of Axys offered Celera access to a genuine pipeline of promising small molecules and a strong intellectual property position in protein and enzyme inhibitors with potential in the areas of inflammation and cancer. In addition, Celera has also acquired a minority interest in HuBit Genomix, an emerging biotechnology company based in Japan and 47.5 per cent of Shanghai GeneCore Biotechnologies stock as an attempt to lead the genomics race in Asia.

Human Genome Sciences (HGS) is also entering a transition phase following its US$120m acquisition of Principe Pharmaceutical, a leader in the production of recombinant human serum albumin. The newly purchased technology allows HGS to extend the half-life of protein therapeutics, enabling less frequent and lower dosing, and to improve its protein manufacturing technologies.

In April 2003, Protein Design Labs (PDL), a leader in antibody humanisation, completed its acquisition of privately held Eos Biotechnology, a pioneer in the discovery of genomics-based therapeutic antibodies based on information from the human genome. This expands PDL’s research and preclinical and clinical development pipelines. Eos will contribute a pipeline of more than 20 antibody targets, focusing mainly in oncology. This is a deal that will help PDL to achieve a higher level of business diversification and portfolio expansion targeting increasing investor confidence.

By contrast, other emerging players hit by pipeline failure and declining share prices are forced to merge in an attempt to revive growth and shareholder value. In July 2003, British Biotech and Vernalis agreed to a merger that will create a group with a market capitalisation of over US$150m, making it the sixth largest in the UK biotechnology sector. The merger, which will see British Biotech acquire the entire issued share capital of Vernalis, is expected to breathe new life into two of the sector’s former leading lights, which have in the last year struggled to regain their former standing. It comes as British Biotech reported an increased pre-tax loss of US$25m. The merged group, which will be called Vernalis, will have one marketed product, Vernalis’s migraine drug Frovatriptan, a broad product pipeline and a therapeutic focus on CNS disorders and oncology.

The aim of the merger will be to maximise the potential of Frovatriptan by conducting additional studies to obtain approval for the drug for other indications, for example menstrual migraine. The merged group will also have more resources to bring new products to market and expects to make cost savings of US$10m in the first full financial year. The merger comes less than four months after British Biotech – the former FTSE 100 contender that has never regained credibility since the failure of its much-touted cancer and pancreatitis drugs – merged with privately owned RiboTargets in March 2003. The company said it planned to use the merged group as a platform for further acquisitions. On the same day as the RiboTargets acquisition, Vernalis lost two-thirds of its market value as well as its chief executive, Robert Mansfield, after the pharmaceutical company reported sharply increased losses and warned of a shortfall in working capital.

Key horizontal players – deals and trends
As demand for services in hard financial times is still far below the golden year of 2000, consolidation in the low profit margin area of the genomics, proteomics or bioanalysis providers will come as a hopeful cure to declining stock values. The observation that Applied BioSystems, the world’s leading bioanalytical supplier, has been for some time struggling to produce strong revenue growth is
indicative of the sector’s crisis. At the same time other smaller players find it hard to attract lucrative deals with the pharma industry. For example, Celera Genomics, before its decision to acquire Axys, was finding it hard to secure strong growth as 80 per cent of its customer base included small research deals with academic institutions. The M&A wave will hit all those players that will be unable to secure either enough funding to grow their technological platforms or expand their customer base.

Centagenetix Inc. and Elixir Pharmaceuticals Inc. merged in January 2003 to create a new genomics player with the ambition to grow drug discovery capabilities in the area of geriatrics. Elixir has developed a comprehensive technology platform based on the biology and molecular genetics of ageing in laboratory organisms. Centagenetix, however, has conducted population genomics studies to identify patterns of genes and gene variants unique to individuals blessed with extreme longevity. Datamonitor believes that, combined, the two platforms will enable faster and more efficient move to full integration.

Meanwhile, in May 2003, Structural Bioinformatics and GeneFormatics merged to create Cengent Therapeutics, a new company utilising integrated, proprietary computational and experimental laboratory technologies to accelerate and optimise the drug discovery process. There are several driving forces behind this merger, including an extended offering of services, enhanced drug discovery capabilities and capital resources.

CONCLUSION
The success of intrabiotechnology acquisitions will determine the degree of evolution for the emerging business model. Despite the goal of moving closer to sustainable profitability in the long term, the emerging sector is likely to face significant challenges related to manufacturing or regulatory complexities. Consolidation activity is expected to move the emerging companies closer to full integration and potentially to sustainable profitability.