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**Keywords:** *rDNA, mAbs, small molecules, oncology, AIID*

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# Marketspace

## Leading biotechnology players, 2002–08: Key products, indications and technologies

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Date received: 3rd October, 2003

### Abstract

For the full year 2002, the top ten biotechnology houses generated combined revenues (= royalties/licensing income + ethical or product sales; product sales includes both diagnostic and prescription drugs) of US\$15.9bn, a 27 per cent increase over 2001. Using Datamonitor's proprietary forecasting methodology, the ethical sales of the ten leading biotechnology companies (Amgen, Genentech, Serono, Genzyme, Biogen, Chiron, MedImmune, Gilead, IDEC and Celltech) are forecast to grow from US\$17.4bn in 2003 to US\$32.7bn in 2008. Amgen and Genentech will lead the pack with ethical sales forecast to reach US\$13.7bn and US\$5.3bn, respectively. Amgen's Aranesp will be the leading biotechnology blockbuster, with sales forecast to reach US\$3.1bn in 2008. Oncology and haematology/anaemia will be the most successful therapeutic indications, capturing more than 45 per cent of the group's ethical sales. When looking at the group's key technologies, rDNA proteins will maintain their leading position with more than half the ethical sales by 2008, although this dominance will decline as the market shares of antibody and small molecule-based drugs rise.

### INTRODUCTION

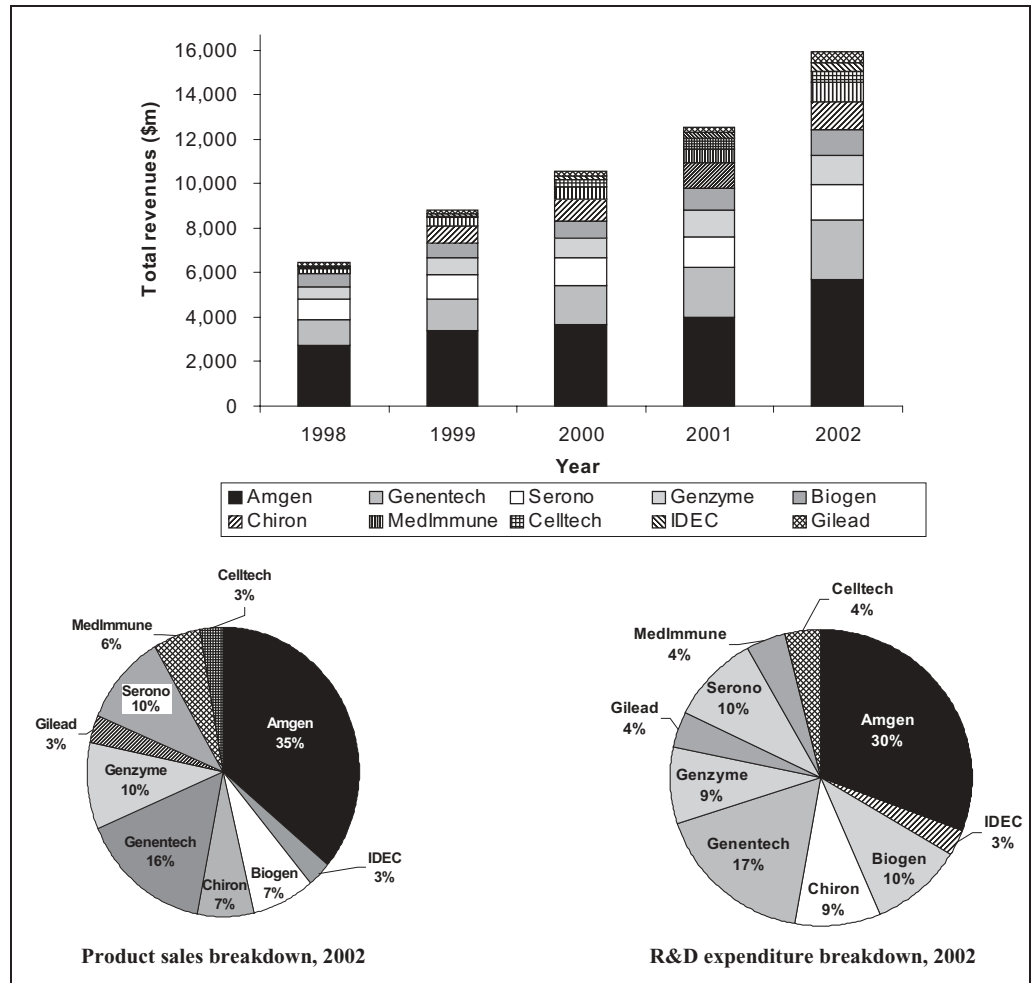
As in any research-driven sector, the performance of the leading biotechnology players is a key measure of the industry's state of 'health' and can affect the market valuation of other publicly traded biotechnology houses. This performance can also shape the strategic decisions that other biotechnology players will have to take over the next five years, regardless of their technological or therapeutic foci. The analysis presented here positions the leading biotechnology companies according to their 2002 financial performance in order to describe the relationship between research and marketing spending and revenue or profit generation. This is followed by analysis of their ethical revenue forecasts, with an

emphasis on leading products, key therapy areas and technological platforms. In this way, the performance of the industry leaders is used as a 'mirror', reflecting the key trends expected to shape the evolution of the global biotechnology sector.

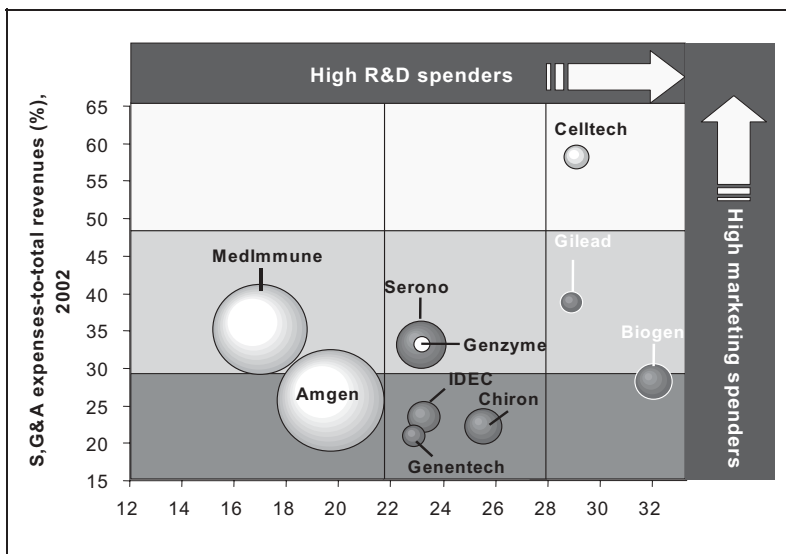
### RESULTS FROM THE FULL YEAR 2002

#### Positioning according to revenues and R&D expenditure

As shown in Figure 1, the leading biotechnology group generated revenues of US\$15.9bn an increase of 27.1 per cent over 2001 compared with a 6.2 per cent revenue growth recorded by the top ten pharma players (Merck & Co., Johnson & Johnson, Pfizer, GlaxoSmithKline, Bayer,



**Figure 1:** Total revenues of the leading biotechnology players, 1998–2002  
Source: Datamonitor



**Figure 2:** Positioning of the leading biotechnology players according to R&D and marketing investment, net profit (loss) and total revenues in 2002. Bubble size = profit in 2002 e.g. Serono’s net profit = \$321m  
MedImmune, Amgen and Celltech and Amgen Genzyme recorded losses in 2002. S, G & A = selling, general and administrative  
Source: Datamonitor

Novartis, Aventis, Roche, Bristol-Myers Squibb, AstraZeneca; top-ten biotechnology revenue equals approximately 6 per cent of the top ten pharma players’ revenues in 2002). Amgen recorded revenues of US\$5.7bn in 2002, an increase of 41.4 per cent over 2001, accounting for 36 per cent of revenues generated by the leading biotechnology group. Genentech showed a 23 per cent increase in revenues, reaching US\$2.7bn and representing 17 per cent of the leading players’ revenues. Overall the two companies captured more than half the revenues generated by the leading group.

When looking at biotechnology product sales recorded in 2002, Amgen was the top performer for another year with US\$5bn, an increase of 42.2 per cent over 2001 and accounting for over one-third of the top ten biotechnology

product sales. In addition, Genentech recorded product sales of US\$2.2bn, showing a 24.2 per cent growth and capturing a 15.6 per cent share of the top ten product sales. The highest sales growth was recorded by Gilead and IDEC. These companies have business models that are not based on the traditional therapeutic protein development. Gilead is a specialist in small molecule-based anti-infectives while IDEC is a leading monoclonal antibody developer. For the full year 2002, Gilead's product sales increased by 122 per cent to US\$424m, while IDEC recorded product sales growth of 58.9 per cent to US\$400m. On the other hand, traditional rDNA players Genzyme and Biogen

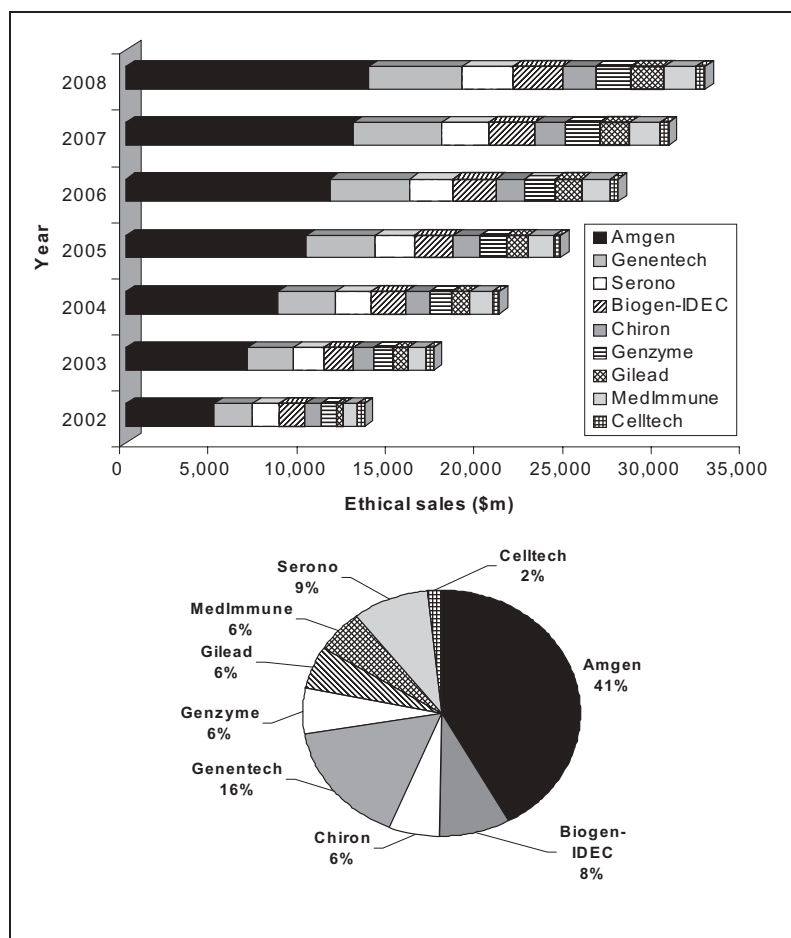
recorded product sales growths well below 10 per cent, each being heavily dependent on the success of one key protein. Biogen's Avonex faces strong competition from Serono's/Pfizer's Rebif, while Genzyme's Cerezyme is suffering from market saturation effects.

In terms of R&D expenditure, the top ten biotechnology leaders spent US\$3.6bn, a 16.2 per cent increase over 2001, while the top ten pharma players' R&D investment (US\$32.6bn in 2002) showed a 7 per cent growth. Amgen, with R&D costs of over US\$1.1bn, captured 30 per cent of the biotechnology leaders' research investment. Between 2001 and 2002, three players showed the highest growth in R&D spending: MedImmune (73.5 per cent) Amgen (29.1 per cent) and Genentech (18.4 per cent).

### Positioning the biotechnology leaders according to operating costs, revenues and profits

In terms of R&D spend as a proportion of revenue (Figure 2), the top 10 biotechnology companies fall into three distinct clusters: Amgen, MedImmune (less than 20 per cent), Genentech, Serono, IDEC, Genzyme, Chiron (between 20 and 27 per cent) and Celltech, Gilead and Biogen (more than 27 per cent). In addition when looking at sales and marketing expenses ratios recorded in 2002, Datamonitor has recognised three groups: Amgen, IDEC, Biogen, Chiron, Genentech (less than 30 per cent), Genzyme, Gilead, Serono, MedImmune (between 30 and 40 per cent) and Celltech (above 40 per cent).

To some extent, this cost-ratio analysis highlights the evolution of the key players within the industry towards sustainable profitability. While a business model characterised by high proportions of R&D and SG&A spending (eg Biogen, Gilead and Celltech) highlights a focus on pipeline development and marketing optimisation, it cannot guarantee high returns. On the other hand, the most mature biotechnology business, Amgen,



**Figure 3:** Ethical sales forecasts for the leading biotechnology companies, 2002–08

Source: Datamonitor

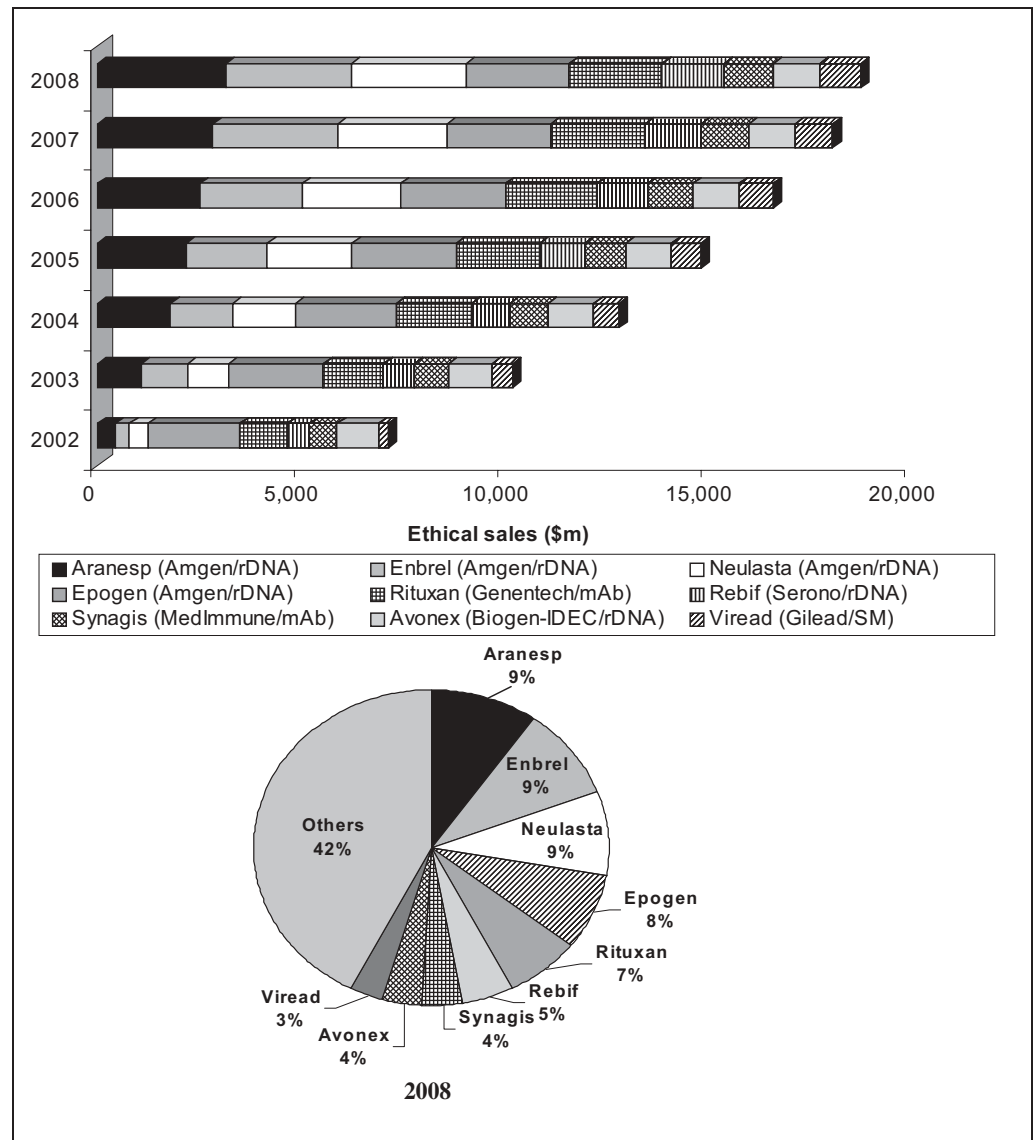
recognises the lowest research and marketing spending ratios, approaching those of the major pharma players.

For the full year 2002, the leading biotechnology players demonstrated a net loss of over US\$1.5bn, mainly caused by additional mergers and acquisitions (M&A) investments made by Amgen and MedImmune (eg acquisitions of Immunex and Aviron). The most profitable player in 2002 was Serono, the leading European therapeutic protein and infertility player. However, although its net profit reached US\$321m, representing almost one-fifth of its revenues, this grew only by 1.3 per cent over 2001. The

player with the highest profit growth was IDEC, which showed five year (1998–2002) revenue and net profit compound annual growth rates (CAGR) of 47 and 61 per cent, respectively where its 2002 net profit increased by 45 per cent to US\$149m, accounting for 36 per cent of its revenues. IDEC's success explains Biogen's decision to propose the second biggest merger deal in the history of biotechnology, valued at US\$6bn.

**ETHICAL SALES BY COMPANY: 2002–2008**

For the period 2001–02, the leading biotechnology group achieved ethical



**Figure 4:** Ethical sales forecasts of the blockbusters marketed by the leading biotechnology group, 2002–08  
Source: Datamonitor

sales of US\$13.5bn, a 20 per cent increase (Figure 3). For the period 2003–08, Datamonitor forecasts that the biotechnology leaders' ethical sales will grow from US\$17.4bn to US\$32.7bn in 2008 with a six year CAGR of 16 per cent.

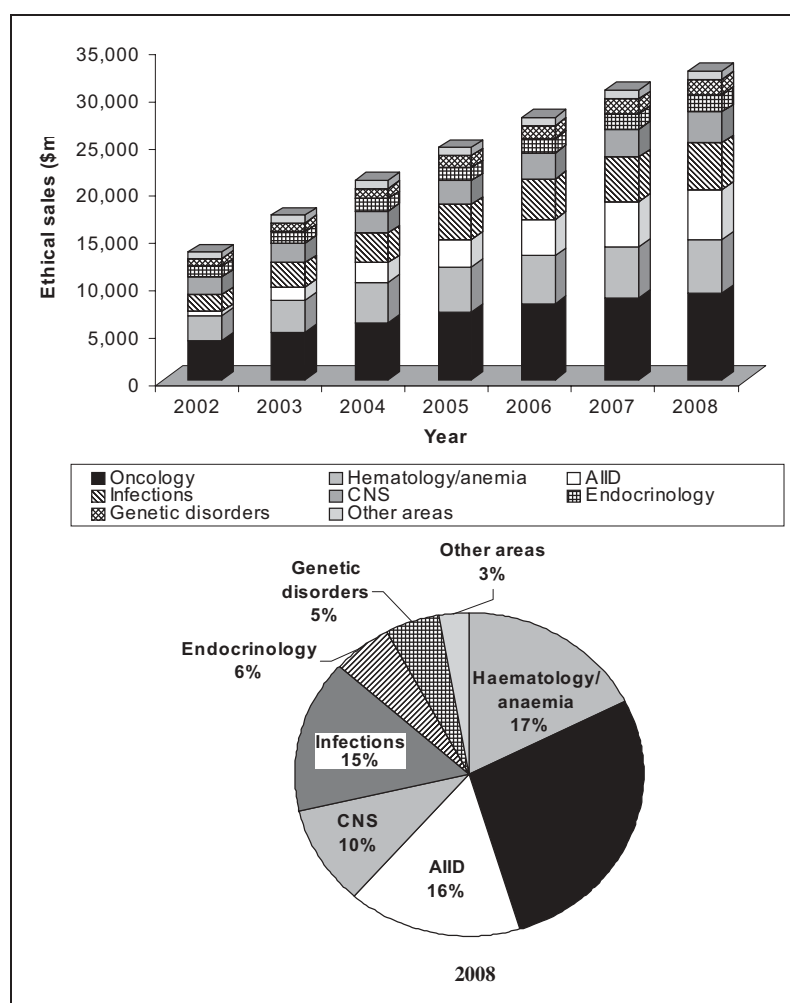
However, when looking at annual ethical revenue growth, Datamonitor predicts that the sector's growth will start falling from 21 per cent in 2004 to 17 per cent in 2005 and 13 per cent in 2006. To maintain a high degree of investor confidence and to avoid stock devaluation the sector will have to revive its growth above or close to 20 per cent (2002 levels). To achieve this, biotechnology companies will have to enrich their

pipelines with a number of late stage compounds currently being developed by the emerging biotechnology sector. This could bring another M&A wave mainly targeting the pipelines of smaller biotechnology players and lessen the probability of further mergers between the biotechnology leaders.

The Biogen–IDEC deal serves a potential solution to Biogen's product maturity and competition issues. In terms of ethical revenue the new company is expected to become the fourth largest biotechnology house, with sales forecast to reach US\$2.8bn behind Amgen, Genentech and Serono. However, the new company with the current newly merged portfolio will still not be able to generate a sales growth higher than 12 per cent by 2008.

Amgen, the sector's leader, is expected to reach ethical sales in 2008 of US\$13.7bn, with a six year CAGR of 18 per cent, accounting for 41 per cent of the group's sales. Genentech will follow with 2008 ethical sales of US\$5.3bn, representing a six year CAGR of 16 per cent and capturing a 16 per cent share of the group's sales. The biotechnology player with the highest six year CAGR growth will be Gilead, which is expected to increase its sales from US\$858m in 2003 to US\$1.9bn in 2008.

On the other hand, Celltech will not be able to generate a CAGR higher than 6 per cent. This is a worrying signal for UK's largest biotechnology player and should bring further M&A activity. In early 2003, Celltech acquired Oxford GlycoSciences (OGS), Europe's proteomics leader, for almost US\$150m. However, OGS does not provide near-term revenue opportunities and Celltech should also look for emerging players that could supply recently launched or ready-to-market products that carry orphan drug status or can gain leading shares in their markets. For example, Millennium with the acquisition of Cor Therapeutics gained Integrillin, a cardiovascular product with a leading position in its market and strong revenue potential.



**Figure 5:** Ethical sales breakdown by therapy area, 2002–08

Source: Datamonitor

## BIOTECHNOLOGY BLOCKBUSTERS: 2002–2008

By 2008, Amgen will have four rDNA blockbusters (Aranesp, Enbrel, Neulasta, Epogen) with sales of over US\$2.5bn each (Figure 4). More specifically, Aranesp will lead its anaemia-related market segments and it is forecast to achieve a 40 per cent six year CAGR with sales expected to grow from US\$1.1bn in 2003 to US\$3.1bn in 2008. This is followed by Enbrel, the arthritis leader, with ethical sales forecast to increase from US\$1.1bn in 2003 to US\$3bn in 2008 with a six year CAGR of 43 per cent.

Genentech's Rituxan will continue to

be the leading monoclonal antibody with its ethical income expected to grow from US\$1.5bn in 2003 to US\$2.3bn in 2008, with a six year CAGR of 12 per cent. This will be followed by MedImmune's Synagis, which will have ethical sales of US\$1.2bn in 2008. Within the interferon class, Rebif is expected to overtake Avonex, with sales forecast to reach more than US\$1.5bn by 2008.

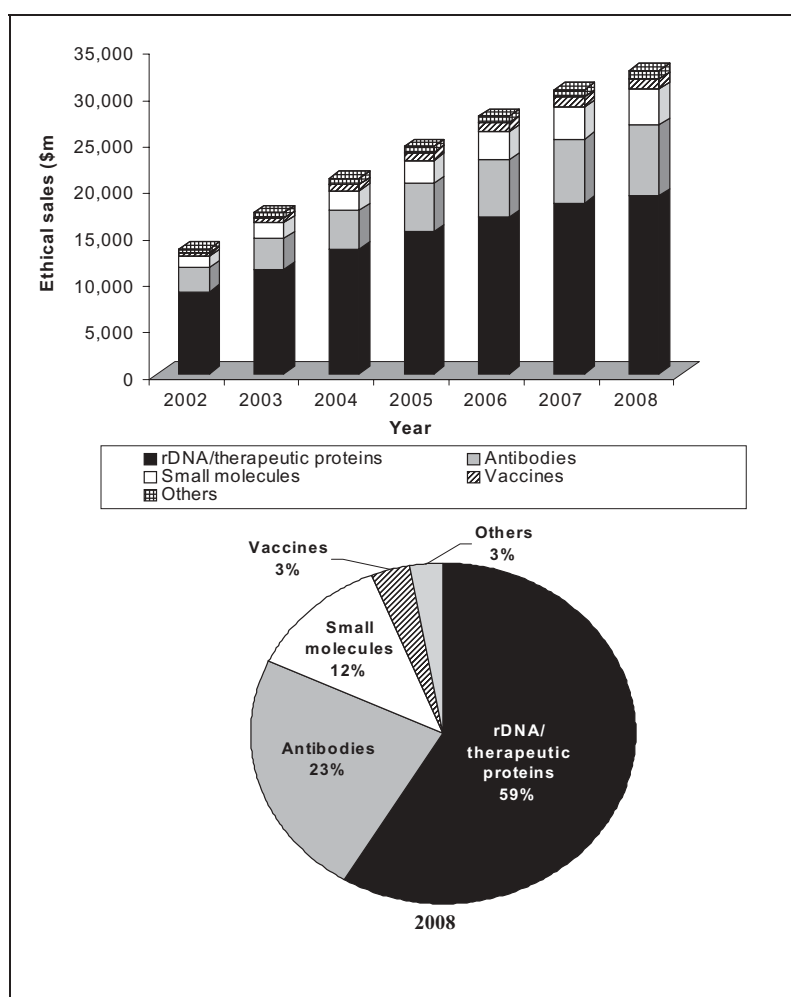
Overall, the leading biotechnology group will have nine blockbusters, six rDNA proteins, two antibodies and one small molecule (Gilead's Viread) which are forecast to generate combined sales of over US\$18.8bn, equivalent to approximately 57 per cent of the group's ethical sales.

## KEY THERAPY AREAS

In terms of ethical sales, oncology will be the most valuable therapy area for the leading biotechnology players, with its sales forecast to grow from US\$5bn in 2003 to US\$9.1bn in 2008, accounting for 28 per cent of the group's ethical sales (Figure 5). Haematology/anaemia will be the second most important area, with sales expected to reach US\$5.7bn, capturing 17 per cent of the group's sales. This will be followed by arthritis and immune and inflammatory disorders (AIID), which will see ethical sales grow from US\$1.3bn in 2003 to US\$5.3bn, representing a six year CAGR of 53 per cent and accounting for 16 per cent of the groups' ethical sales.

## KEY TECHNOLOGIES

The field of rDNA proteins will continue to dominate the leading biotechnology sector, with ethical sales forecast to grow from US\$11.3bn in 2003 to US\$19.2bn in 2008, demonstrating a six year CAGR of 14 per cent (Figure 6). This will be followed by monoclonal antibodies, with ethical sales expected to increase from US\$3.3bn in 2003 to US\$7.6bn in 2008, representing a six year CAGR of 19 per cent, significantly higher than rDNA proteins. However the highest growth will be achieved by small molecules. The



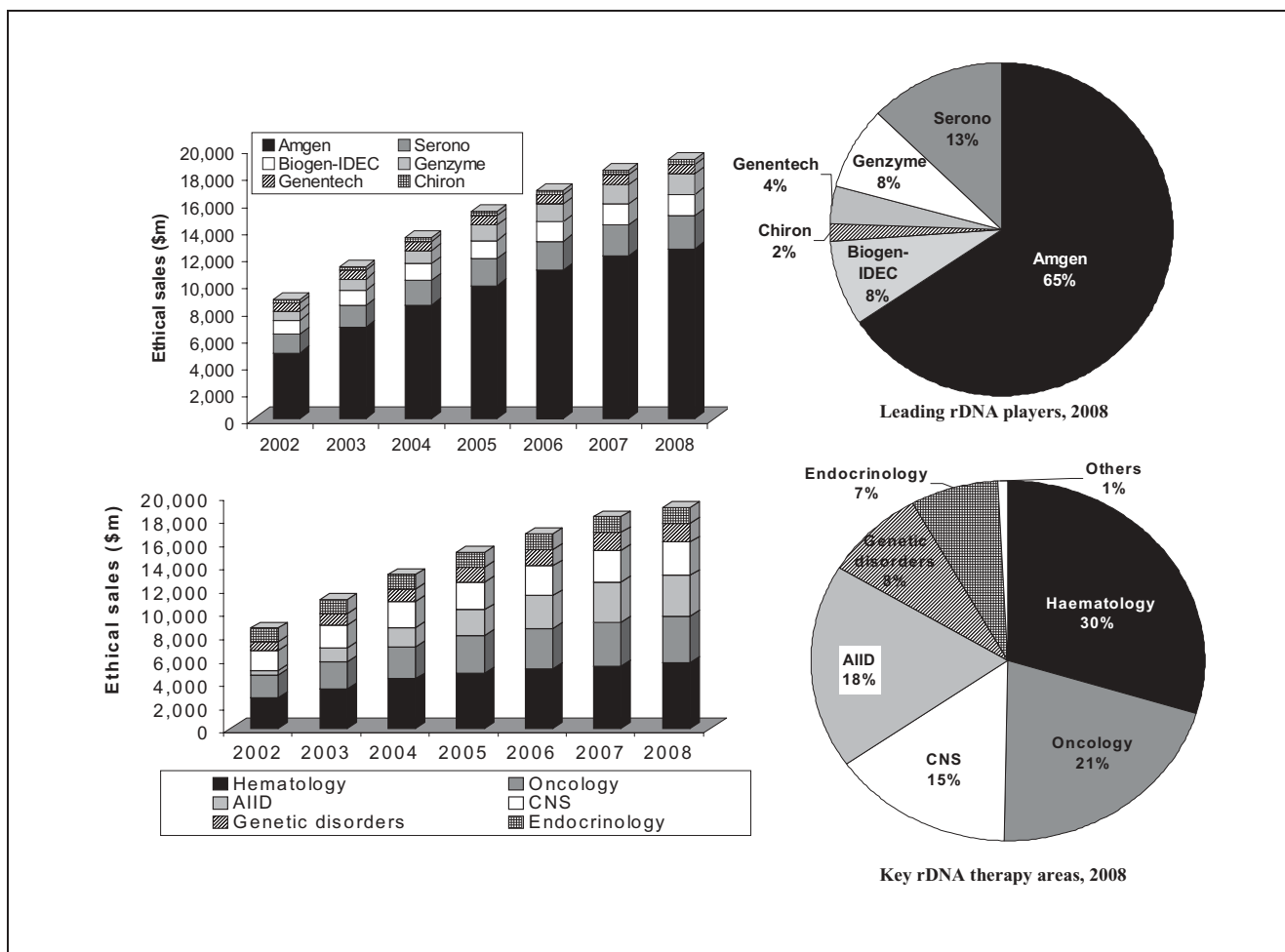
**Figure 6:** Ethical sales breakdown by technological platform, 2002–08.  
Source: Datamonitor

latter are forecast to reach ethical sales of US\$3.9bn in 2008 with a CAGR of 22 per cent. The contribution of rDNA proteins to the group's ethical sales is expected to fall from 65 per cent in 2003 to 59 per cent in 2008, while antibodies' and small molecules' shares will increase from 19 per cent and 10 per cent in 2003 to 23 per cent and 11 per cent in 2008, respectively.

**rDNA PROTEINS: KEY PLAYERS AND THERAPY AREAS**

Amgen will lead the rDNA players, with ethical sales forecast to grow from US\$6.8bn in 2003 to US\$12.6bn in 2008, accounting for 65 per cent of rDNA sales

in 2008 (Figure 7). Second to Amgen will be Serono, with its ethical sales forecast to grow from US\$1.6bn in 2003 to US\$2.4bn in 2008, representing a CAGR of 10 per cent and accounting for 13 per cent of rDNA sales. The leading indication will be haematology, with sales expected to grow from US\$3.4bn in 2003 to US\$5.7bn in 2008, accounting for 30 per cent of rDNA sales in 2008. Oncology will be the second most important indication, with sales growing from US\$2.3bn in 2003 to US\$4bn in 2008, accounting for 21 per cent of rDNA sales. AIID is expected to follow, with ethical sales forecast to grow from US\$1.2bn in 2003 to US\$3.5bn in 2008 capturing a share of 18.4 per cent.



**Figure 7:** Breakdown of rDNA proteins ethical sales by company and therapy area, 2002–08  
Source: Datamonitor

### MONOCLONAL ANTIBODIES: KEY PLAYERS AND THERAPY AREAS

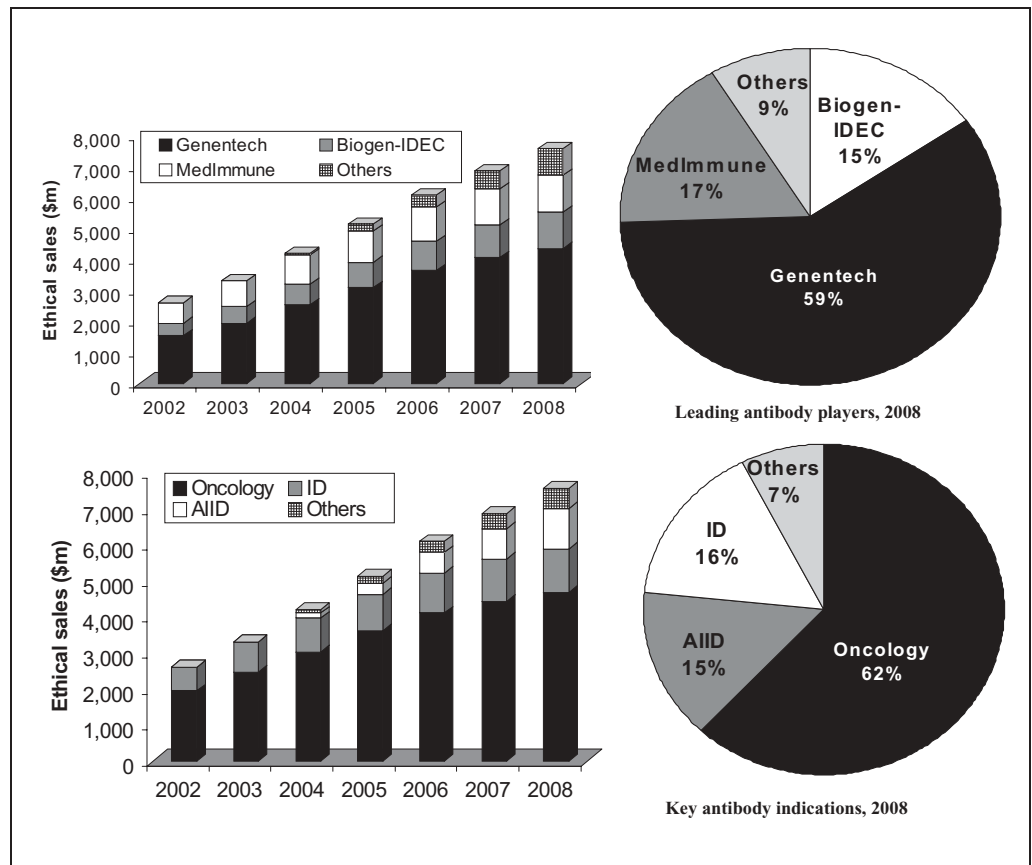
Genentech will maintain its leading position within the field of antibodies, with ethical sales forecast to grow from US\$1.9bn in 2003 to US\$4.4bn in 2008, showing a six year CAGR of 19 per cent and accounting for 59 per cent of the group's antibody sales (Figure 8). MedImmune will follow, with sales reaching US\$1.2bn in 2008, capturing a 15.8% share of antibody sales.

Most antibody sales will be derived from oncology indications, with such products expected to demonstrate a six-year CAGR of 16% to reach US\$4.7bn in 2008, accounting for 62 per cent of the group's antibody sales. However, arthritis

and immune and inflammatory disorders will show the highest CAGR of 42 per cent, with sales forecast to reach US\$1.1bn in 2008, representing a 15 per cent share of antibody sales.

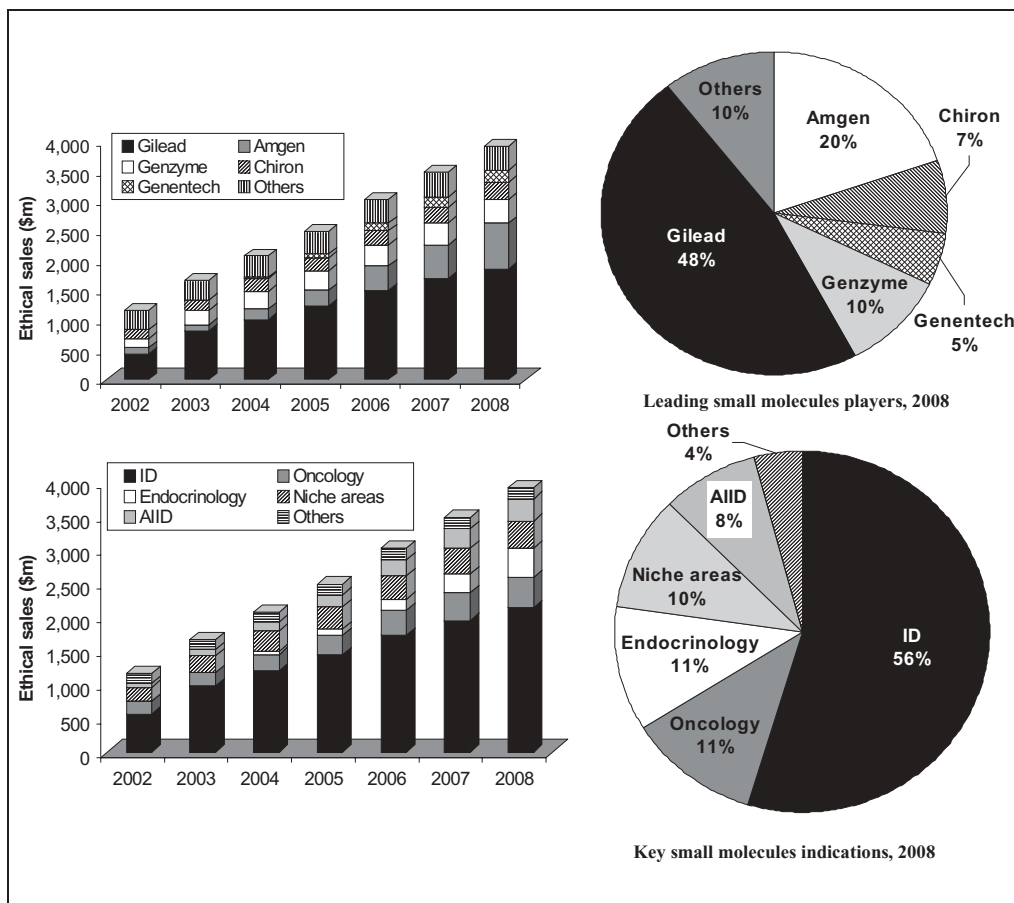
### SMALL MOLECULES: KEY PLAYERS AND THERAPY AREAS

Gilead will be the leading small molecule biotechnology player, with sales forecast to reach US\$1.9bn in 2008, demonstrating a six year CAGR of 28 per cent and accounting for 48 per cent of small molecules sales (Figure 9). Amgen will follow, with its small molecules sales forecast to grow from US\$95m in 2003 to US\$772m in 2008, showing a 39 per cent CAGR and accounting for 20 per cent of small molecule



**Figure 8:** Breakdown of antibodies ethical sales by company and therapy area, 2002–08  
Source: Datamonitor





**Figure 9:** Breakdown of small molecules ethical sales by company and therapy area, 2002–08  
Source: Datamonitor

sales in 2008. Small molecule revenues will be heavily dependent on anti-infectives, which are forecast to account for 55 per cent of small molecule sales in 2008, reaching US\$2.1bn, and demonstrating a six year CAGR of 24.8 per cent.

## CONCLUSIONS

It is Datamonitor's view that a number of key trends extracted from analysis of the ethical revenue performances of the leading biotechnology houses could give an insight into the evolution of the global biotechnology sector. Based on Datamonitor's forecasts for the period 2003–2008, it appears that Amgen will continue to lead the pack, capturing more than 40 per cent of the group's ethical sales in 2008. The newly merged

Biogen–IDEC will become the fourth largest biotechnology house but its CAGR will not be higher than 12 per cent, questioning the rationale behind the deal's proposal.

The group will have nine blockbusters, of which five will reach sales of over US\$2bn. Oncology will be the main therapeutic area with sales of over US\$9.1bn, accounting for 28 per cent by 2008. Recombinant proteins will be the most successful platform with 2008 sales of US\$19.2bn followed by antibodies and small molecules with forecast sales of US\$7.6 and US\$3.9bn in 2008, respectively.

Overall, the biotechnology leaders will reach ethical sales of US\$32.7bn in 2008, although the group will demonstrate a continuous fall in the

annual sales growth after 2005. Datamonitor expects the sector to respond with another wave of M&A activity, targeting newly approved or

ready-to-launch products in well-protected market segments from the emerging biotechnology or small-sized private pharmaceutical sectors.