Trends within the Drug Delivery Sector

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Introduction

As the drug delivery sector develops, there will be an increasing choice of technologies to be used to administer therapies. Drug delivery technologies are enabling drugs to be launched that would otherwise have been terminated in development because they could not be delivered effectively. They have also helped in lowering the amount of drug that needs to be administed, thus giving improved safety profiles. Moreover, these technologies have been crucial to the life cycle management of therapies. A clear example of this is the approval of Exubera, where a drug that was only available by injection is now approved for inhalation. This approval has importance on several levels, mainly to improve the lives of many diabetics, but it is the first approval of a protein-based drug to be used systemically delivered via the lungs.

Trends within the Drug Delivery Sector

This is the third in a series of articles discussing the trends within the drug delivery sector. The first article (*Drug Delivery Report Autumn/Winter 2005*) discussed the trends relating to deal types and company types involved with drug delivery deals. The second article (*Drug Delivery Report Spring/Summer 2006*) takes this further, providing analysis of the trends and therapy focuses of the drug delivery sector. The aim of this article is to build on the previous articles breaking the available data down further to analyse whether there are any significant trends relating to therapy focus versus the deal types within the drug delivery sector.

Taking the total number of healthcare related deals recorded within PharmaDeals® Agreements, there is a clear trend – year on year the number of deals recorded is increasing; over 3,000 deals are now recorded each year (*Figure 1a*). This is mirrored in the number of deals relating to drug delivery; there is a similar general increase (*Figure 1b*). When considering drug delivery deals as a proportion of total deals the value is around 10%, although there might be a slight decrease (*Figure 1c*).

The identification of the trend that the number of drug delivery deals is increasing should not be surprising as drug delivery systems are key for certain new therapies and business models. However, what is perhaps interesting is the fact that the proportion of drug delivery deals relative to total deals is not increasing. As therapies become more complex and the need to manage product lifecycles becomes a key strategy, should it not be expected for the proportion of drug delivery deals relative to the total deals to increase, and not decrease?

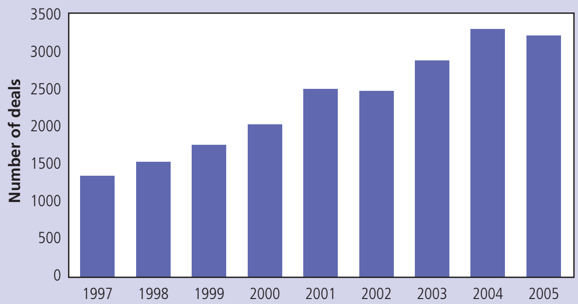

Figure 1a – Drug delivery deals vs total deals – total deals. *(Source: PharmaDeals® © PharmaVentures Ltd.)*

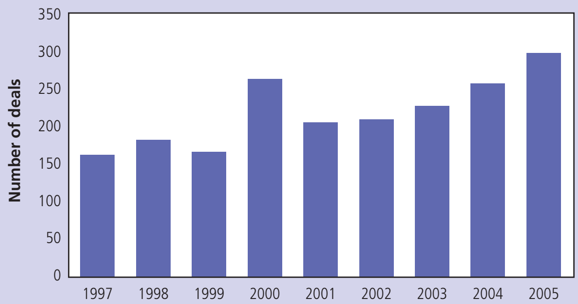

Figure 1b – Drug delivery deals vs total deals – drug delivery related deals.
(Source: PharmaDeals® © PharmaVentures Ltd.)

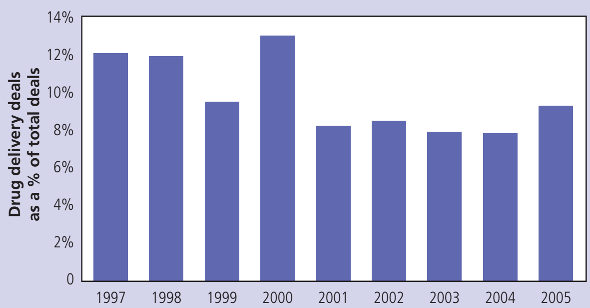

Figure 1c – % of drug delivery deals vs total deals.
(Source: PharmaDeals® © PharmaVentures Ltd.)

Within this article, the aim is to focus analysis on drug delivery deals that involve elements of licensing, collaborative research and development (R&D), and co-development. The number of transactions recorded for the other deal types is very low and, therefore, it is not possible to interpret any meaningful trends. For each of the three deal types – licensing, collaborative R&D and co-development – further analysis has been conducted assessing the therapy areas of cancer, cardiovascular, anti-infective and respiratory. Again, due to low numbers of deals in the other therapy areas, it is not possible to analyse these further.

Licensing

When considering drug delivery agreements, it is not surprising that a large proportion of them involve an element of licensing. As with total healthcare deals and drug delivery related deals, there is also a general increase in the number of recorded licensing deals (*Figure 2a*). However, when separating these deals into therapy areas, the same clear trend is not always evident (*Figures 2b-e*). Nevertheless, there is a steady, uniform increase in the number of deals (*Figure 2b*).

However the trend in the licensing drug delivery deals relating to cardiovascular is less clear. In the year 2000, the level of deal activity dropped to its lowest point (*Figure 2c*). This was also the year when there was a peak in the number of signed drug delivery agreements and there was the highest proportion of drug delivery deals relative to total deals. The deal trends for anti-infective and respiratory broadly follow the same trend as cancer, where a gradual increase is observed, although the trends are less consistent (*Figures 2d and e*).

Collaborative Research and Development (R&D) Deals

As with licensing deals, there is a general increase in collaborative R&D deals which have an element of drug delivery (*Figure 3a*). Within this series, however, there is an outlier, this being the year 2000, where more deals were recorded than would have been predicted from the general trend.

Considering drug delivery collaborative R&D deals that focus on cancer, a similar increase can be seen to that of the total number of deals (*Figure 3b*). The problem with the analysis of this group is the number of actual deals is fairly low and any small changes give the impression of a trend. However, there does appear to be a similar increase in the year 2000 as discussed in the licensing deals. The same trend is observed when considering drug delivery collaborative R&D deals relating to the anti-infective sector, but there is a more pronounced peak for the deals announced in the year 2000 (*Figure 3d*).

Assessing the two other therapy sectors under analysis within collaborative deals - cardiovascular (*Figure 3c*) and respiratory (*Figure 3e*) - there is no visible peak for the year 2000, but again the number of deals is low and one or two deals will disguise a trend.

Co-development Deals

Assessing the total co-development deals that involve drug delivery, the trend does not follow the same pattern as licensing and collaborative R&D (*Figure 4a*). Up to and including the year 2004, it appeared there was a general

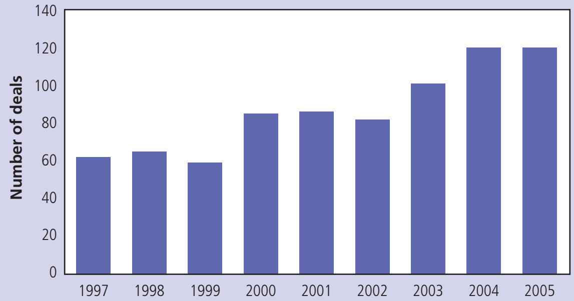

Figure 2a – Drug delivery licensing deals – total drug delivery deals. *(Source: PharmaDeals® © PharmaVentures Ltd.)*

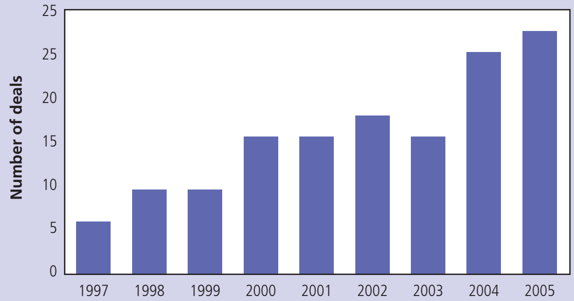

Figure 2b – Drug delivery licensing deals – cancer. *(Source: PharmaDeals® © PharmaVentures Ltd.)*

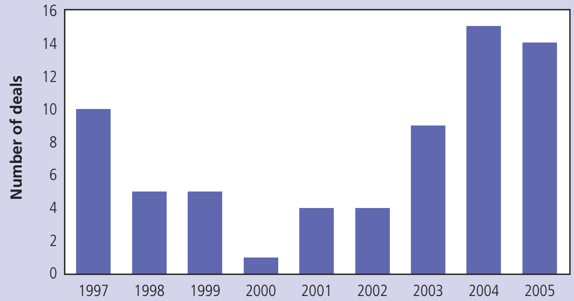

Figure 2c – Drug delivery licensing deals – cardiovascular. *(Source: PharmaDeals® © PharmaVentures Ltd.)*

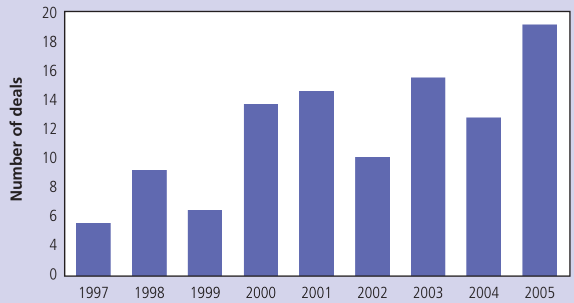

Figure 2d – Drug delivery licensing deals – anti-infective. *(Source: PharmaDeals® © PharmaVentures Ltd.)*

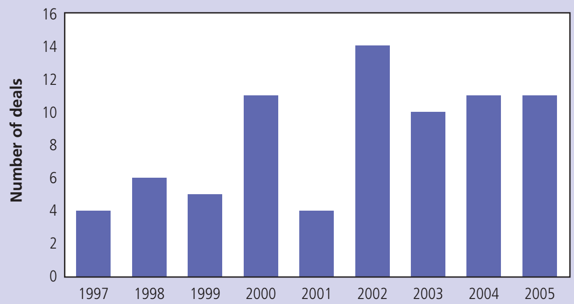

Figure 2e – Drug delivery licensing deals – respiratory. *(Source: PharmaDeals® © PharmaVentures Ltd.)*

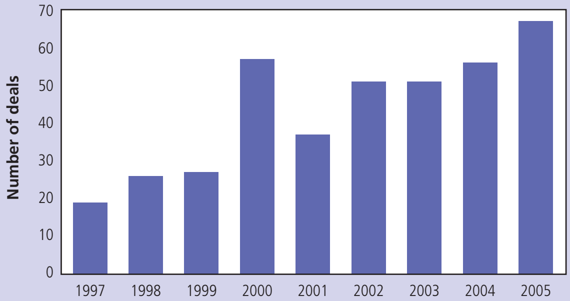

Figure 3a – Drug delivery collaborative R&D deals – total drug delivery deals. *(Source: PharmaDeals® © PharmaVentures Ltd.)*

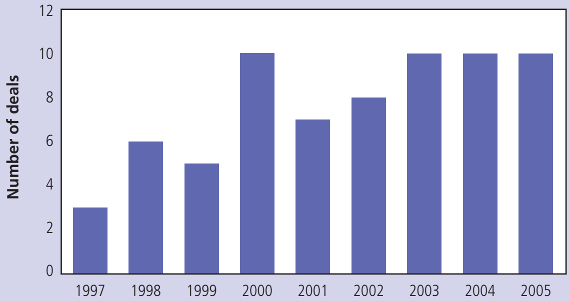

Figure 3b – Drug delivery collaborative R&D deals – cancer. *(Source: PharmaDeals® © PharmaVentures Ltd.)*

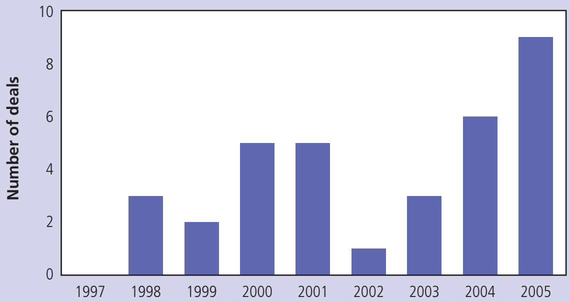

Figure 3c – Drug delivery collaborative R&D deals – cardiovascular. *(Source: PharmaDeals® © PharmaVentures Ltd.)*

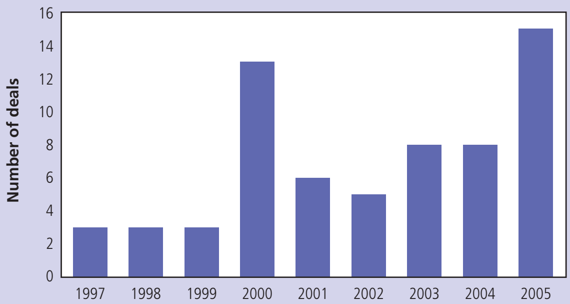

Figure 3d – Drug delivery collaborative R&D deals – anti-infective. *(Source: PharmaDeals® © PharmaVentures Ltd.)*

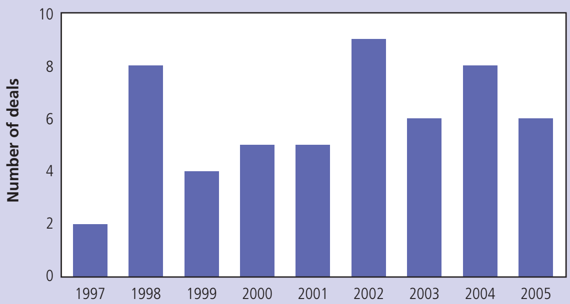

Figure 3e – Drug delivery collaborative R&D deals – respiratory. *(Source: PharmaDeals® © PharmaVentures Ltd.)*

decrease in the number of drug delivery co-development deals announced. There was a peak within 2000 which gradually declined until 2004. However, in 2005 there was an increase where 57 deals were recorded. Therefore, looking at the number of drug delivery collaborative deals between 1997 and 2005, there has been little change in the average number of deals per year.

Breaking these deals down into the four sections as before reveals some interesting observations although it is difficult to define a trend due to the low number of actual deals recorded. Prior to 2005, there was a general decrease in the number of co-development deals relating to cancer and drug delivery. However, as with the overall drug delivery co-development agreements, there was a relatively large increase in 2005 (from 1 to 7 deals) (*Figure 4b*). A very similar observation is evident relating to the anti-infective deals; a general decline until 2004 followed by a relatively large increase in 2005 (*Figure 4d*). For the other two sectors, cardiovascular (*Figure 4c*) and respiratory (*Figure 4e*), there is no real observations as the deal numbers are low, except for respiratory and the year 2000, which again appears to be an outlier.

A further observation relating to the four sectors of analysis is that the increase seen in 2005 for the deals relating to cancer, anti-infective and respiratory is not seen in cardiovascular deals.

Summary

In analysing the deal types described in certain cases, for example licensing and collaborative R&D, there is an increase in the number of announcements each year. Other sectors, such as co-development, the level of deal activity on average is fairly static. Breaking these sectors down further, the main identifiable trend is often that there was a relatively high number of deals announced in 2000 relating to certain deal types and certain therapy sectors. For example, this increase is seen in co-development and collaborative R&D deals but is not evident in licensing agreements. Even breaking the deals down further into deal types and therapy area, the peak is not seen in deals relating to licensing. However, breaking the co-development and collaborative R&D deals down into therapy areas the peak is not seen in all therapy areas. For collaborative R&D, the peak is evident relating to cancer and anti-infective and for co-development it is only evident in deals focusing on cancer.

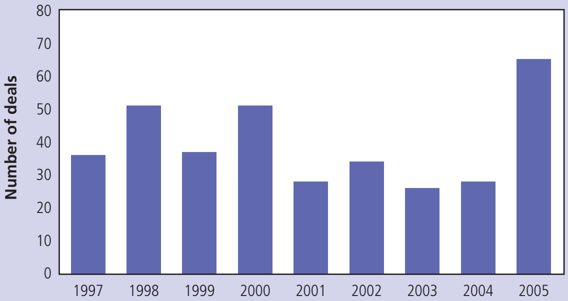

Figure 4a – Drug delivery co-development deals – total drug delivery deals. *(Source: PharmaDeals® © PharmaVentures Ltd.)*

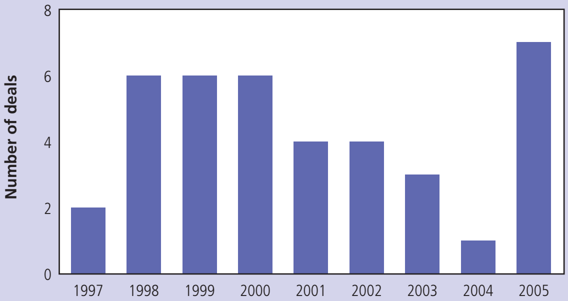

Figure 4b – Drug delivery co-development deals – cancer. *(Source: PharmaDeals® © PharmaVentures Ltd.)*

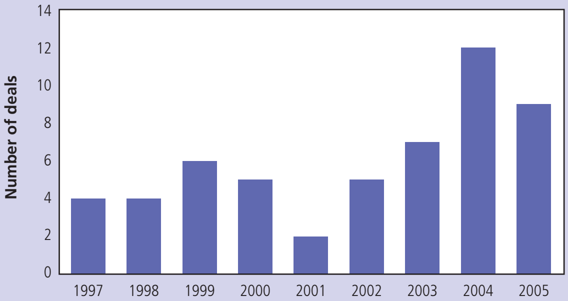

Figure 4c – Drug delivery co-development deals – cardiovascular. *(Source: PharmaDeals® © PharmaVentures Ltd.)*

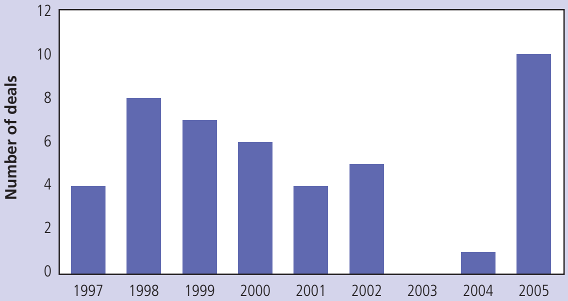

Figure 4d – Drug delivery co-development deals – anti-infective. *(Source: PharmaDeals® © PharmaVentures Ltd.)*

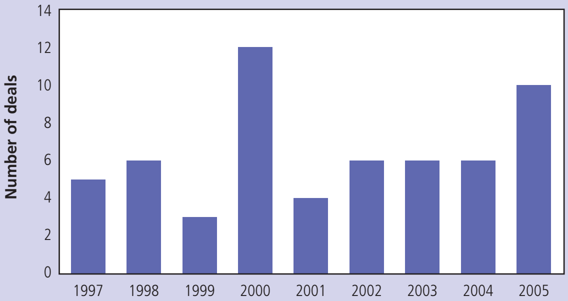

Figure 4e – Drug delivery co-development deals – respiratory. *(Source: PharmaDeals® © PharmaVentures Ltd.)*

Drug delivery deals as a proportion of total deals

As well as analysing the overall trends and observations relating to the absolute number of deals within particular sectors of drug delivery, it is necessary to analyse these deals as percentage of total deals. By analysing each drug delivery sector against the overall deals it is possible to assess the relative importance of drug delivery within each sector. Figure 5 and Table 1 show the results of this type of analysis. Figure 5 takes the 4 sectors under investigation, drug delivery deals related to cancer, cardiovascular, anti-infective and respiratory, and compares them to the same deal sectors but not limiting them to drug delivery. Perhaps not surprisingly, the proportion of deals for respiratory drugs including drug delivery is much higher than the other three sectors as most respiratory drugs require local delivery to the lungs. Table 1 takes an average over the nine years of analysis, again highlighting the higher proportion of drug delivery deals within the respiratory sector.

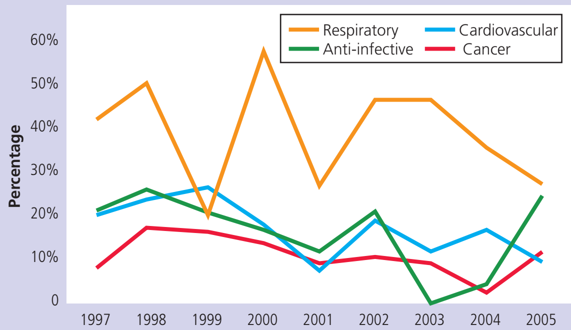

Figure 5 – Drug delivery deals as a proportion of total deals.

	Licensing	Collaborative R&D	Co-development
Cancer	10.1%	7.0%	10.9%
Cardiovascular	12.6%	8.9%	16.9%
Anti-infective	11.4%	9.1%	16.2%
Respiratory	32.9%	25.2%	38.9%

Table 1 – Drug delivery deals as a proportion of total number of deals. Nine-year average (1995-2005).

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