# introduction

The subject matter of these editorials is largely dictated by the topics covered in the articles contained in each particular issue of ***DDW***. The articles themselves probably give an indication of matters of current interest or concern to those engaged in the fascinating, frustrating, but potentially enormously rewarding, pursuit of useful new medicines. It is fair to say that although the fascination remains and the rewards may be forthcoming, there is a large element of frustration evident among many people in the pharmaceutical and biotechnology industries as well as among those who invest in them. Hardly a week passes without someone, be it a senior figure from within the industry or a respected observer from without, drawing attention to the fact that increased spending on R&D is not matched by an increase in the rate of new drug submissions and approvals. This has been a recurrent theme in these editorials but it remains the top issue in the world of drug discovery and, as such, is one which we feel we must cover.

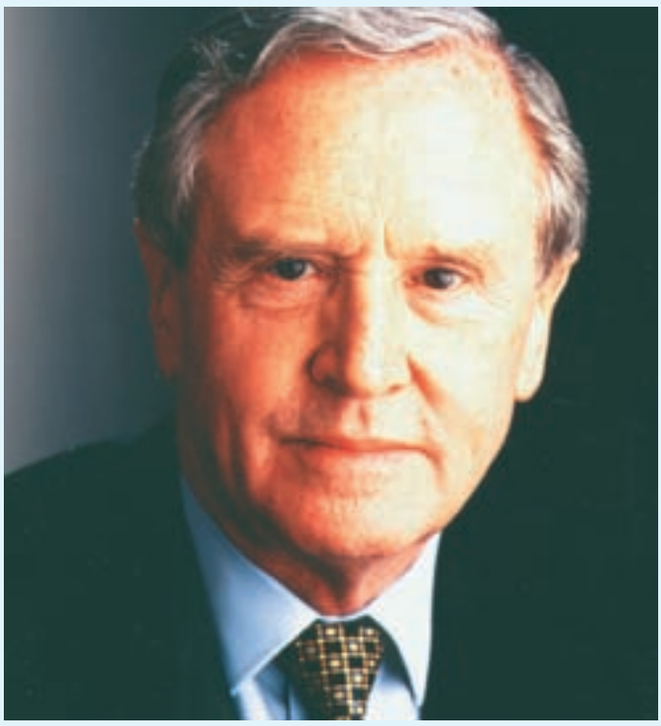
It is generally accepted that there are two possible solutions to this so-called productivity crisis. One is organisational the other technological. Firstly, there is a widely held view that small groups, often exemplified by young biotech companies, are more productive than large groups, usually exemplified by 'big pharma'. This view is more intuitive than evidence-based but nevertheless some large organisations are trying to create the small company environment within their organisations. Others are forming alliances of one sort or another with small companies whereby they take their discoveries and assume full or part responsibility for their development and total responsibility for their marketing and sales. The ultimate, much discussed but not yet instituted, is for the large pharmaceutical companies to rely entirely on small organisations for the 'R' of R&D and to concentrate exclusively on development and commercialisation.

Secondly, there are unceasing attempts to develop new technologies to facilitate the process of developing novel, useful drugs from the mass of information emanating from genomics and proteomics. Clearly, recent discoveries have increased enormously the number of targets with potential value in drug discovery but separating the wheat from the chaff, ie producing drugable leads and then optimising them, still presents a formidable problem.

We have included articles in ***DDW*** over the past four years or so dealing with each of these approaches. It so happens that in this issue our articles concentrate mainly on the second, technological, approach which is put into a useful context by one of our authors, an industry analyst who indicates that the end of the age of DNA sequencing has left 'a wealth of information and countless questions'. The good news is, however, that we are also left with 'a myriad of new technologies' which should help to answer these difficult questions. On the other hand, the potential bad news is that some of these technologies may require investments beyond the pockets of all but the very wealthy organisations. The challenge is for the providers of these technologies to make them both efficient and affordable.

Informatics is already playing a big role in modern drug discovery and this role will increase as amounts of data to be processed and analysed become even more daunting. A new acronym has emerged – CeR&D – meaning Collaborative eR&D – which is described in one of our articles as an emerging model for information management which enables the scientist to focus on the primary problem solving process while the secondary record automation process goes on simultaneously and automatically.

Another article makes the point that existing IT systems and networks in many organisations are just not adequate to cope with the requirements of modern drug discovery. Data-driven drug discovery (4D) is a methodology which enables IT infrastructure to be aligned with strategic goals.



Another essential tool in drug discovery is high throughput screening and, as indicated in an article in our last issue (Winter 2003/4), the trend is now towards cell-based assays. In this issue we include a further article on functional cell-based assays which looks into the future when controlling and changing the micro-environment in which the assays are carried out may generate results even more relevant to the complex and changing chemical environment in the whole organism.

Another relatively new acronym is HCS (High Content Screening). The jury still seems to be out on the precise definition of HCS and, indeed, on its usefulness. We include an article summarising the discussions at a recent meeting devoted to HCS.

Biological catalysis has traditionally been used industrially in the production of commodity chemicals, drug substances, complex intermediates, etc. With the current desire to introduce maximum diversity into chemical libraries for screening we include an article advocating the use of biocatalysis to achieve this objective.

Gene expression analysis may represent a technique for identifying genes which are legitimate targets for drug discovery. One of our authors reviews this critically in the context of diagnostics and predictive toxicology as well as efficacy.

RNA interference (RNAi) is increasingly being used to identify and validate novel drug targets. We include an article which describes the use of a RNAi screen to identify new kinases involved in cellular proliferation and cell division. This is a case study in a specific area but does indicate that the technique may well be much more broadly applicable.

It remains to be seen whether any, or all, of the technological advances discussed in the pages of this and previous editions of ***DDW*** will contribute significantly to the objective of making the drug discovery process faster and more efficient – only time will tell!

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