most complex genome sequenced to date is probably the most comprehensive and computationally advanced yet undertaken, and will be of direct benefit to those working on the Human Genome Project. Discoveries about genes lead ultimately to new diagnostic tools, new targets and new drugs – 'in silico' genomics is of obvious importance in drug discovery.

Dr Nash also discussed the way that new web-based tools, such as Java, convenient interfaces and new visualization technologies, such as Silicon Graphics' recently released 'data mining' application MineSet, improve the communication of data throughout international networks and across disciplines.

A concluding presentation given by Prof. Rod Hubbard (University of York, UK) highlighted the challenges to bioinformatics for the future, and lively discussions ensued about learning neural nets as 'sophisticated search engines', for example, to search 3D databases, and the use of virtual reality technology in molecular modelling.

The next bioinformatics meeting in this series takes place in October; all enquiries should be addressed to: Nicola McCall, Henry Stewart Conference Studies, Russell House, 28/30 Little Russell St, London, UK WC1A 2HN, tel: + 44 171 404 3040, e-mail: 100622.3263@compuserve.com.

Matthew Thorne

Expansion at Oxford Asymmetry

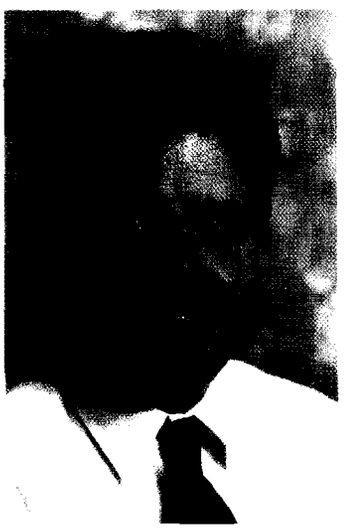
At the end of March, Oxford Asymmetry celebrated the opening of their new facilities at Milton Park in Oxfordshire by UK Deputy Prime Minister Michael Heseltine. The company has grown very rapidly and now claims to offer complete solutions to chemical needs in the pharmaceutical industry, from library generation through to commercial-scale production. Oxford Asymmetry became profitable last year, only the fourth year of operation, with a turnover of £2.8 million, and turnover is expected to double in 1996. The company sprang from the research group of Dr Stephen Davies at the Dyson Perrins Laboratories of Oxford University. Davies and a team of thirty researchers were excelling in the field of chiral chemistry.

Dr Nick Cross, Chairman of Oxford Asymmetry, believes that "the biggest single milestone in the company's development" has been the recruitment of Dr Edwin Moses, whose international credentials are already established through experience at Raggio-Italgene SpA in Italy and Enzymatix in the UK. When Moses joined as Managing Director in July 1993, turnover was only around £100,000 and the staff numbered less than ten.

Moses, in turn, points to another milestone: the deal with Pfizer in early 1995. Pfizer pumped £3.6 million into Oxford Asymmetry in a two-year deal tied in with the creation of a subsidiary called Oxford Diversity. The company is developing additional enabling technology in solid-phase synthesis and producing combinatorial compound libraries for its large partner. It will retain ownership of the enabling technology, which it will license to Pfizer, and has the right, subject to a royalty, to exploit the technology derived from the association to generate small quantities of compounds for screening and analogues for lead optimization. Oxford Diversity is headed by Dr Tony Baxter, formerly of Glaxo and Ciba-Geigy.

Moses believes that Pfizer's approach to the deal has been exemplary, offering Oxford Asymmetry scientists access to Pfizer's combinatorial experience in a very open way so that, in effect, their learning curve has been eliminated. Oxford Asymmetry not only benefits from Pfizer's technical experience, but according to Moses "a major collaboration with such a progressive company confers prestige and credibility on Oxford Asymmetry that must assist in generating new business". Pfizer are also pleased with the way the collaboration is developing. Dr Nick Terrett of Pfizer's New Leads Chemistry Group describes Oxford Diversity as "a young and innovative group, producing new solid-phase technology that is proving valuable in our drug discovery programmes".

At the other end of the scale, Oxford Asymmetry established another major deal with the US giant Cambrex at the end of 1995. This association has enabled the company to complete its range of services to the industry, from small volume library development up to multi-ton manufacture. Cambrex operate from seven centres within the USA and three in Europe. The US presence has further enabled the company to interact with new US partners (some 50% of Oxford Asymmetry business is derived from partnerships with US and Japanese companies). Cambrex will also underwrite $1 million of the company's R&D annually for the next 3 years. Cambrex, in return, has a partner that can provide flexible and responsive support for early development of its chemical technology.



Dr Edwin Moses, Managing Director of Oxford Asymmetry.

Oxford Asymmetry originally anticipated that most business would derive from the biotechnology sector, but mainstream pharmaceutical companies now represent half of Oxford Asymmetry's partners. The company is working in collaboration with 'virtual' pharmaceutical companies, but Moses stresses that the company has no wish to become a pharmaceutical company in its own right. Not only would this require different skill sets and funding, but the trust that it has established with its partners would be jeopardized.

What of the future? Moses believes that the real strength of Oxford Asymmetry lies in offering leading edge chemistry. Growth of the company continues apace, the headcount of 50 at the start of 1996 will double in the course of the year. Nevertheless, through structuring the science teams in small units, he expects to maintain the flexible and enthusiastic approach that it has been able to offer to its partners.

David Hughes

Video reviews

Chemical Diversity: Synthetic Techniques of Combinatorial Chemistry
American Chemical Society, 1995, 2 hours
Chemical Diversity: Applications of Computational Approaches
American Chemical Society, 1995, 2 hours
Price per video: $225.00 (includes 120-page study guide)

Synthetic Techniques of Combinatorial Chemistry is a video of a live satellite television programme broadcast in October 1995. It includes two seminars in combinatorial chemistry plus introductory and closing remarks by Dr Mario Geysen (GlaxoWellcome, Research Triangle Park, NC, USA) and a phone-in session of questions from viewers. The format is novel and the seminars interesting, but it is unclear why the two talks, which in Geysen's words cover such extremes of combinatorial chemistry, are brought together.

The first talk by Dr Brian Kay (University of North Carolina, Chapel Hill, NC, USA) is an informative demonstration of the preparation and use of phage display libraries. However, the seminar builds on, and thus demands, considerable prior knowledge; terms and expressions requiring explanation are given none. The second talk by Dr Robert Armstrong (UCLA, CA, USA) describes his work on multicomponent organic reactions for library synthesis. Although possibly more understandable for the average synthetic organic chemist, this is by no means a typical approach to combinatorial synthesis. The talks presented were thus highly contrasting, and it seems that whilst these seminars map the extremes of library technology, they are not truly representative of combinatorial chemistry.

The video is not wholly successful. The slides are occasionally illegible, the presenters appear uncomfortable reading their lectures and the power of television to enhance teaching by conveying visual messages is underused. The question time is embarrassingly devoid of questions after Kay's seminar, but more lively after Armstrong's talk, when the presenters all appear more at ease responding spontaneously to questions. However, it is intriguing to note that the questions that were phoned in were of a much more general nature than either talk, revealing a demand from the audience for more information on the basics of combinatorial chemistry. Indeed, it was only during the final discussion that the 'mix and split' method, surely a linchpin of combinatorial chemistry, was mentioned. Deconvolution, tagging, new polymers, compound analysis, diversity and the challenge of developing new solid-phase chemistry, all of which are fascinating and sometimes controversial aspects of libraries, are only mentioned in passing. Perhaps there is an opportunity for a more rewarding ACS video in these topics.

Applications of Computational Approaches is a recording of a live satellite presentation made around the same time. Like the first in this series, the video includes two seminars by leading scientists, with opening and closing remarks by Geysen. This video is the more satisfying of the two; it included two excellent presentations, from Dr David Spellmeyer (Chiron Corporation, Emeryville, CA, USA) and Dr Garland Marshall (Washington University, St Louis, MO, USA), covering critical issues in drug discovery based on combinatorial libraries. Spellmeyer's talk covers the question of how to design libraries to gain maximum benefit, with due regard to structural diversity – that essential but highly elusive factor in combinatorial chemistry. Marshall describes how the screening data from testing combinatorial libraries can be used to gain a better understanding of the receptor structure.

The presentations do suffer from being recorded live. The format does not completely work; the presenters are not totally at ease with the teleprompter, and phoned-in questions are still embarrassingly thin on the ground. However, this second video provides a fairly complete picture of computational methods, and for those involved in library synthesis, it answers many questions as well as provoking new ones. As drug discoverers become more adept at the synthesis of combinatorial libraries, the demands of drug discovery will ensure that library design receives greater care and that screening results will be used to better understand biological targets. The seminars in this video offer thoughtful insight into both areas.

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