Newsdesk

Clinical ophthalmology and vision research

A recent one day meeting hosted by the Wellcome Trust in London (June, 1997) was aimed at predicting the future of vision and ophthalmic research as the millennium beckons, and indirectly examined the relation between vision research and clinical ophthalmology. An introduction (Forrester, Aberdeen) outlining the current perceived areas of need was followed by four overview presentations on broad research areas of importance to ophthalmology: aging and diabetes (Hammes, Giessen), genetics (Wright, Edinburgh), infection and immunology (Streilein, Boston), and visual psychophysics (Zeki, London). During the second session, research projects by vision research training fellows funded by the Trust were presented. The impact of aging was universally agreed to have assumed greater importance in recent years while the role of molecular genetics in both understanding and eventually providing treatments for diseases of the eye was highlighted as the way forward. However, the effects of infectious diseases, both new and old, were considered to comprise a regrettable persistent threat to ocular health, not so much because of lack of research but more because of lack of provision of health care in developing countries. Indeed, the continuing lead position of cataract as the major cause of worldwide blindness was cited as an example of failure of adequate health service provision.

Of interest to clinicians and researchers was discussion of the perceived difficulties in coordinating ophthalmic and vision research with clinical training programmes, particularly now that the training of ophthalmologists has been overhauled in the UK. Many of the observations made not only applied to UK research but were also experienced in other countries in Europe and North America. In particular, it was noted that it is becoming increasingly difficult to attract clinical ophthalmologists to programmes of basic research. Several reasons, apart from the practical difficulty of deciding when was the best time to undertake a period of research during clinical training, were cited but pre-eminent was the fact that ophthalmology has for some time become much more surgical than medical in its emphasis and most recent advances in ophthalmology have come from improvements in techniques and instruments.

In the meantime, many major 'research' questions which are medical in nature are becoming less tractable to the ophthalmologist. Probably only by enhancing the profile of medical ophthalmology will significant advances be made, and in this respect the new subspecialty of medical ophthalmology fostered through the Medical Ophthalmological Society (see Newsdesk, *BJO* 1997;**81**:342) and through accredited training programmes such as those initiated jointly by the Royal College of Ophthalmology and the Royal College of Physicians, are a welcome development.

Evidence based medicine and the practice of ophthalmology

There is increasing emphasis on evidence based medicine not only from the scientific community occupying the moral high ground but more pragmatically from health economists and, particularly, providers of health care. Accordingly, a recent symposium on screening in ophthalmology held during the annual Oxford Ophthalmological Congress (July, 1997) generated considerable debate. Three specific topics were presented after an overview presentation on methodology in screening (Muir-Gray, Oxford). The first of these (Stewart-Brown, Oxford) addressed the topic of preschool screening in children but broadened out to other far reaching subjects such as the value of patching for amblyopia and the effectiveness of orthoptists versus less trained personnel in detecting visual disability in children. The fashionable approach is to undertake a search of the data bases and critically examine all published data on a topic before making pronouncements on the value of any treatment or service currently provided.

Some remarkable facts were unearthed. For instance, a trawl of over 5000 papers indicated that there had been very few studies which clearly documented the value of patching in the long term preservation of vision on unilateral amblyopia. In addition, while orthoptists appeared to detect more cases of amblyopia in preschool children than did health visitors or general practitioners, the outcome of this higher detection rate was not reflected in better visual results. As might be expected, this generated considerable heated debate since the implications for the provision of paediatric ophthalmic services are likely to be far reaching.

Similar observations were made in a review of screening programmes for open angle glaucoma (Wormald, London). For instance, it was noted that while glaucoma is likely to become increasingly important as a cause of global blindness, screening programmes were fraught with difficulties because the detection of glaucoma cannot be based on one simple test such as visual field analysis, disc cupping, or intraocular pressure. Even treatment of the disease is problematic, since most treatments, including surgery, merely delay the progress of the condition.

Not all ophthalmic conditions present such difficulties for the screener. General support was voiced for screening for diabetic retinopathy (Harding, Liverpool) since effective treatments for at least one form of retinopathy are available (proliferative diabetic retinopathy). Difficulties are more likely to arise in determining the best method for detecting new vessels as part of a screening programme but research in this area is active and mostly supported by biostatisticians.

In spite of the unease felt, many delegates welcomed the new approach to clinical problems since it now allowed definitive studies to be planned and undertaken. Indeed it was observed that ophthalmologists should not feel threatened by the inroads of evidence based medicine into the practice of their craft since there was unlikely to be any drop in the workload as the population aged.

Colour vision and the visual cortex

One of the conundrums of visual neuroscience has been the extensively documented representation of colour opponent organisation of neurons (red-green, blue-yellow) in the retina and lateral geniculate body, and the relatively sparse representation of such neurons in the cortex where they might be expected in abundance. However, such conclusions are based mainly on single cell recordings from experimental models and information concerning bulk neuronal responses has been lacking. That is until the powerful properties of functional magnetic resonance imaging (fMRI) were put to the task. A recent study reported in the journal *Nature* (1997;**388**:69) has now shown that the cortical areas V1 and V2 register appropriate colour contrast stimuli, and over larger areas of cortex than luminance stimuli. These results fit extremely well with the psychophysical data and provide significant reassurance to the neurophysiologists. Further questions are of course thrown up, such as why does luminance not register as strongly as colour; do texture and form have similar representation; indeed is there a hierarchy for different visual stimuli in their cortical representation, in space and/or time? What is clear however is the increasingly recognised power of fMRI.

Credit where credit's due

Authorship of scientific papers has for many of us been a rather relaxed affair, particularly where multiauthorship is involved. Some conventions are tacitly recognised such as that the first author of a paper is generally the writer, while the last author is frequently the head of the laboratory or department where the research team is based. Other authors may be recognised as having provided specific expertise to a piece of work, but frequently the role of others is not clear and indeed may be minimal. Occasionally, such an author may not even have read the paper; on the other hand, others whose contribution may have been quite significant may be mentioned only as an acknowledgement or even not at all.

However, there is now considerable pressure to identify the role of each author and to specify precisely his/her contribution to the work overall. At a meeting sponsored by the *BMJ* (June, Nottingham 1997), it was proposed that there should be a system of credits, similar to the list of credits at the end of a film. In many ways this development is likely to be welcomed by the scientific community since it will indicate who is the major source of the work and it avoids authorship problems such as those associated with scientific misconduct.

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