

Newsdesk

Diversity in neurons

Recent studies have highlighted the enormous diversity among apparently similar classes of neurons. The "simple" retina has provided a useful model for these studies which show, for instance, that there are more than a dozen types of ganglion cells and two dozen types of amacrine cell. As a result, researchers believe that this is bad news for the micromodellers who are in the business of developing theories of brain function based on detailed cellular interactions between different types of cell, particularly since similar research in the hippocampus suggests that there are, for instance, up to 50 types of inhibitory interneuron and possibly many more based on other functional estimates.

This new information, recently reviewed (see *Current Biology* 1998;8:708–10), has been gained from experiments which allow simultaneous recording from large numbers of neurons using a microelectrode array system, and have shown that the retina displays the neat phenomenon of "tiling"—that is, where there is overlap at the edge of receptive fields for different neurons allowing some degree of redundancy. Redundancy may also be the explanation for the apparently very large diversity of neurons in the brain itself allowing several neurons to perform the same task and thereby explaining the discrepancy between apparent extensive neuronal loss without corresponding loss of function. While the authors suggest that such redundancy is considerably less in the retina, to a degree there must be some of the same effect as evidenced by the known widespread ganglion cell loss which occurs before field defects are detectable in chronic simple glaucoma and following pan-retinal photocoagulation for conditions such as diabetic retinopathy.

European Association for Vision and Eye Research (EVER) holds first meeting

The first meeting of the European Association for Vision and Eye Research was held in Mallorca, Spain in October 1998. Representing a fusion of various eye and vision research associations and societies, this first meeting was well attended and warmly received. In addition to a variety of special symposia, workshops, and free paper sessions there was an inaugural lecture given by A Bron on the subject of the tear film and its pathology. A call was made for greater representation of other branches of vision and eye research at EVER and delegates were encouraged to publicise the activities of this new association. In view of the recent interest in developing formal collaborations within research groups generally in Europe (see *Nature* 1998;395:623), it is opportune that EVER has now been formed since it can act as a focus for such endeavour within the branch "eye and vision research". EVER plans to meet annually during the first week of October and for the next 1–2 years the meeting is likely to be held in Spain.

Bristol study supports second eye cataract surgery

Clinical researchers at Bristol Eye Hospital and the University of Bristol have reported the findings of their recent study into the benefits

of second eye cataract surgery (see *Lancet* 1998;352:925–9). The group studied more than 200 patients awaiting second eye surgery who were randomised for expedited surgery (planned to take place within 6 weeks) or routine surgery (routine waiting time 7–12 months). Although there were only slight differences in the achieved binocular single vision results in favour of the expedited groups using conventional analytical tests, there were major benefits in the reduction of visual symptoms and in the improvement in quality of life measures. In addition, stereoacuity was better in the expedited surgery group. Particular care was taken to account for possible bias which might be introduced simply by the positive effect of having expedited surgery over routine surgery. Explanations for the great difference in the reporting of visual symptoms and the quality of life have been attributed to lack of symptoms deriving from loss of depth perception and the absence of binocular inhibition and binocular rivalry which would occur in the presence of a monocular cataract. In addition, the researchers suggested that abnormal motion perception may add to the visual disability. The value of this trial relies upon its prospective randomised nature and the results of the study have considerable implications for the delivery of health care in the UK and its cost. In other western countries such as the USA and several European countries second eye cataract surgery at an early date is the norm.

Laser for foveal drusen?

The past few years have seen a series of attempts to delay the onset of macular degeneration by laser treatment of drusen following the original observation that their number and size can be reduced with laser therapy. However, the initial enthusiasm has waned somewhat since early results showed that not only are some patients not helped by this treatment but that some can actually be made worse either directly or because of secondary complications. Empirically, now four groups of patients are described on the basis on how they respond to laser (*Eyenet* 1998;2:No 9). Group A patients behave best and have the smallest lesions with the worst initial visual acuity while groups D patients with large lesions and better initial acuity actually suffered loss of vision as a result of the treatment. Further analysis will be conducted as the duration of follow up of these patients extends but for now it appears that this treatment is unlikely to become the standard approach for prophylaxis of macular degeneration.

Do the visually impaired develop supersensory abilities in their remaining senses?

A topic of considerable interest to ophthalmologists and those responsible for disability assessment of the visually impaired was recently investigated by a group of research psychologists in Quebec (*Nature* 1998;395:278)—namely, "Do blind people develop capacities of their remaining senses that exceed those of sighted individuals?" The researchers tested three groups of subjects (early blind individuals with no vision, early

blind individuals with some residual vision, and normal sighted individuals) for their ability to construct a three dimensional spatial map based on localisation of sounds, both monaural and binaural. Their results show that indeed early blind individuals with no vision perform better than normal sighted individuals in this task but, surprisingly, early blind individuals who have some residual vision actually performed worse than normal individuals. These results resolve a long standing controversy concerning the ability of totally blind individuals to compensate for their lack of sight, and the authors attribute this function to functional reorganisation in developing neurons and to improved learning capacity. However, the failure of the partially sighted but severely visually impaired to develop similar capacity was not explained and may pose a problem for developing this approach therapeutically since most blind registered individuals have at least some vision.

Active and passive vision

There has been great interest recently in developing paradigms of how the eyes are used to obtain information in real living situations rather than under the traditional laboratory conditions in which the emphasis has been placed on how neural computational mechanisms of retinal images are analysed. Specifically it has been shown using ingenious devices which use lightweight video camera technology to record accurately the position of gaze during periods of continuous "normal" activity such as making a pot of tea (see review, *Current Biology* 1998;8:R640–2). It has been observed that gaze and direction of intentional activity occur in a rapid sequential stream of activity rather than simultaneously and, for instance, directed body motion occurs even before actual gaze towards the object of interest. In addition, the eye movements required to refixate on a new target in a different plane or at a different distance do not necessarily involve rapid conjugate movements followed by slower disconjugate eye movements as suggested from more "controlled experiments" but that different individuals used their head and eye movements to different degrees often maintaining the same fixation angle when refixating on a new target by appropriate movement of the head. As a result, questions have been asked about how much of the changing visual scene is memorised. In fact it would appear that surprisingly large changes to the visual scene can take place without any recognition of the events, an effect termed "change blindness". The processes involved in visual searching and how search decisions are taken are also of great interest and vary greatly with the complexity of information held in the target. Much remains to be understood concerning these fascinating processes.

Global theme issue

The 1999 global theme issue will be "Impact of new technologies in medicine". Prospective authors please consider submission for this issue.



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