

Book review

Nutritional and Environmental Influences on the Eye. Edited by Allen Taylor. Boca Raton, FL, USA: CRC Press. 1999. Hardback, thirteen chapters, pp. 285. US\$99.95. ISBN 0 8493 8565 2

The central premise of the editor, and most of the authors, is that cataract, and probably also age-related macular degeneration, is mainly due to oxidative damage caused by sunlight, combined with a deficiency of antioxidants, substances derived from the diet to protect the tissues.

I read the first half of this useful volume, the eight chapters which deal mainly with cataract, while sitting beside Lake Titicaca at an altitude of 3820 m and 16° from the equator. The sun was beating down from a cloudless sky, as it does for 9 months of the year, and the skins of the local Quechua people passing by were burnt a dark mahogany. The night before, my colleagues and I had examined a number of the people age 40 years and over and we had been struck by the relative few we had found with significant cataract. We made the same observation the following day about a different ethnic group. Considering my setting, it was very difficult to believe that sunlight could be playing a major role in cataract aetiology. Can the diet of these people really be rich enough in antioxidants to protect against the effects of a lifetime spent in such intense solar u.v. radiation?

Despite my reservations about the overall proposition, this multi-author volume is valuable as a review of the thinking in 1998 on selected topics. The contributors are all recognised authorities in their subject areas, and the book will be of value to other researchers in the field and a useful reference for practitioners of ophthalmology and optometry, and nutritionists.

After an excellent summary of normal function and transparency of the lens, Leo Chylack gives a very useful account of the history and advantages and disadvantages of the different lens grading schemes. His striking claim (if true) is that the precision of grading is now such that clinical trials need only 200–300 individuals and 1 or 2 years of follow-up.

Chylack's essay is followed by an overall well-referenced review by Allen Taylor of the nutritional and environmental influences on risk for cataract. Unfortunately, the values for the odd ratios for risk of cataract of all the main antioxidants are difficult to read as they are arranged horizontally (instead of vertically as is the convention for meta-analyses) and I also found the key system difficult to use.

The evidence from animal studies is reviewed by George Edwin Bruce. After all the evidence, his conclusion is not especially startling: 'Thus nutritional measures to defend

against cataract would be the same as those endorsed to prolong longevity, namely optimization of oxidant defences, minimization of oxidant stress, and avoidance of obesity. In practical terms, this can be achieved by the standard advice of a diet rich in fruits and vegetables, calorific discipline and abstinence from smoking.'

John Clark and Toshihiko Hiraoka clearly explain the use of phase diagrams as applied to lens cytoplasm, and the various agents which can protect against phase separation; Cathy McCarty and Hugh Taylor give a useful summary of the evidence for the association of light with age-related eye disease; Sheila West gives a similarly concise review of the association between smoking and eye diseases.

The last four chapters deal with the macula. One of the best of these is a detailed, closely argued account of the relationship between diet and age-related macular degeneration by Julie Mares-Perlman and Ronald Klein. With 149 references, this is a valuable chapter. The book concludes with two chapters on the carotenoids of the retina, and how the macular pigments can be studied *in vivo* by psycho-physical tests.

What is unsatisfying about a multi-author volume of this kind is that there is no overall synthesis, no coherent inclusive theory. One of the authors admits that there is 'not yet a totally coherent view of the aetiology' of cataract. Sheila West is the only author to suggest that smoking interacts with other risk factors, notably genetic factors, to produce a characteristic pathological response in certain individuals, and that fruitful research should delve into mechanisms of the interaction between factors. Nor are there clear and logical recommendations about what can be done at the present time to prevent the onset, or delay the advance of cataract.

The rationale for the book, given by Allen Taylor in the introductory chapter, is that we are: 'on the verge of achieving a means to diminish the risk of damage by photo-oxidation of lens proteins and the macula'. But if all these authors are convinced, as they claim to be, that u.v. is the main causal agent for cataract and blue-light a cause of age-related macular degeneration, why have there not been major national and global campaigns to get everyone to wear glasses which filter out u.v. and blue wavelengths of light whenever they are outdoors, together with protective headgear, from infancy onwards? While not denying the importance of dietary advice, protection from light is likely to be much more practical and achievable as a universal public health intervention than persuading the same people to change long-entrenched dietary customs.

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