David Horrobin. *The Madness of Adam and Eve*. London: Bantam Press. 2001. £18.99 (hardback). pp. 275. ISBN 0-593-04649-8 (hb)

One of the six books short listed for the 2002 *Aventis Prize* (won by Stephen Hawking's *The Universe in a Nutshell*), David Horrobin has written a fascinating and highly readable account of 'how schizophrenia shaped humanity.' As with all *Aventis Prize* nominees, this is a popular science book written primarily for non-scientists and scientists whose expertise lies outside the biological sciences. Thus the necessary biochemistry, genetics, neuroscience and psychiatry are covered in a straightforward but non-condescending way, although I did find the proliferation of abbreviations, even when initially defined, slightly overwhelming (*e.g.* AA, ALA, DGLA, DHA, EFA, EPA, GLA and LA, with up to five in a single sentence; p.78). Having said this, there is plenty to interest nutritionists as Horrobin sets out to show that schizophrenia is linked to a deficiency in polyunsaturated fatty acids.

Schizophrenia is a psychotic disorder affecting just under 1% of the population and with only a reasonable to good prognosis in about half the sufferers, it is one of the major causes of chronic disability, particularly in younger adults. As the incidence of schizophrenia is similar across all ethnic groups, Horrobin believes the origin of the disease, depending upon the approaches used (anthropology, molecular genetics or paleobiology), was between 60,000 and 160,000 years ago. Somewhere in this one hundred millennia span, the single most important event in human history occurred, what the author refers to as the 'true creation story'.

Horrobin's central thesis is that what separates *Homo sapiens* from the earlier large-brained, tool-using *H. erectus*, the pre-human *Australopithecus* species and apes, was a small genetically determined change in brain phospholipid metabolism, producing an explosion of creativity. This however, proved to be a double-edged sword, as it also resulted in schizophrenia. Horrobin cites examples of 'high achievers' in the arts and sciences who may be considered to exhibit a 'borderline' or 'milder' form of schizophrenia, (schizotypy) or have first degree relatives with schizophrenia or less commonly, some have the disease itself. Most well known in the last category is John Nash, the winner of the 1994 Nobel Prize for Economics and subject of the recent Hollywood film, *A Beautiful Mind.*

The development of a larger brain in humans is, according to Horrobin, the result of an increased intake of the ω6 (arachidonic, 20 : 4) and ω3 (eicosapentaenoic, 20 : 5 and docosahexaenoic, 22 : 6) polyunsaturated fatty acids. (Although in nutritional terms it is their precursors, linoleic acid and α-linolenic acid, that are ***essential*** fatty acids (EFA), for simplicity, this designation is also applied to the physiologically important metabolites; pp. 77–8). This change in diet occurred following the move by *H. erectus* to living on the margins of mineral rich lakes of central and east Africa and the use of tools. Aquatic microalgae at the bottom of the food chain are rich in these EFA while tools allowed humans access to bone marrow, another valuable source. These three EFA make up about 15% of the brain dry weight and are involved in cell signalling; arachidonic acid acting as a precursor for the eicosanoid families of leukotrienes, prostaglandins and thromboxanes.

A possible mutation in a gene coding for an enzyme (*e.g.* phospholipase A_2) involved in the metabolism of arachidonic acid has been suggested and some studies have reported a reduced level of ω3 fatty acids in cell plasma membranes in schizophrenia. Twenty five years ago, Horrobin published his 'prostaglandin deficiency hypothesis' in *The Lancet*. This was based on a number of responses in patients with schizophrenia which were indicative of a decreased production of prostaglandins: resistance to rheumatoid arthritis, reduced nociception, remission during pyrexia and absence of niacin-induced flushing. Although at first largely ignored, the accumulation of more evidence, including data from recent clinical trials with EFA, has generated more interest. For example, administration of 2 g/d ethyleicosapentaenoic acid (LAX-101) with clozapine in resistant schizophrenia (Peet & Horrobin, 2000) or 1 g/d with antidepressants for unresponsive depression (Peet & Horrobin, 2001) resulted in a significant reduction in symptoms in both groups of psychotic patients.

One important question that remains to be addressed is why does schizophrenia persist in the population today if what we largely observe is the highly destructive side of this mutation? Horrobin answers this by reference to the changes in human diet that have taken place since our hunter-gatherer ancestors walked the Earth. At that stage of human existence, the high intake of the EFA ameliorated the detrimental effects of the mutation and allowed the highly creative schizotypical phenotype to flourish. With the advent of agriculture, 5,000 to 15,000 years ago, intake of these EFA was largely replaced by their precursors, linoleic acid and α-linolenic acid, that now meant that expenditure of energy was required to synthesise EFA. By the beginnings of the industrial revolution some 200 years ago, the combination of saturated animal fats largely replacing EFA in the diet and food processing removing them from staples like flour, the negative side of schizophrenia was becoming more evident. The decade from the mid-1860 s witnessed the first descriptions of the clusters of symptoms making up the disease later to be named 'schizophrenia' by Eugen Bleuler in 1911.

For readers who wish to delve further into the diversity of research strands that are brought together in this book, a 28 page Bibliography is provided. One criticism here, is that while the book is divided into 18 chapters, the Bibliography has 14 subject-based sections with none of the titles matching any of the chapter headings. There is a tendency for some repetition of material between chapters, in particular of the numerous imprecise dates associated with human development. The descriptions of oestrogen as the female hormone (p.117), and genes (p.11) and genomes as schizophrenic (pp. 189–190) are inappropriate, while clozapine should be correctly described as an antipsychotic (or neuroleptic) not an anti-schizophrenic drug (p. 213).

References

Peet M & Horrobin DF (2000) *J. Psychopharmac* **14**, Suppl. 3, A63.
Peet M & Horrobin DF (2001) *J. Psychopharmac* **15**, Suppl. 3, A12.

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