

Not enough fish in the sea

We need omega-3 oils for our brains to function properly.
But where will they come from?

The more it is tested, the more compelling the hypothesis becomes. Dyslexia, ADHD, dyspraxia and other neurological problems seem to be associated with a deficiency of omega-3 fatty acids, especially in the womb. The evidence of a link with depression, chronic fatigue syndrome and dementia is less clear, but still suggestive. None of these conditions are caused exclusively by a lack of these chemicals, or can be entirely remedied by their application, but it's becoming pretty obvious that some of our most persistent modern diseases are, at least in part, diseases of deficiency.

Last year, for example, researchers at Oxford published a study of 117 children suffering from dyspraxia. Dyspraxia causes learning difficulties, disruptive behaviour and social problems. It affects about 5% of children. Some of the children were given supplements of omega 3 and 6 fatty acids, others were given placebos. The results were extraordinary. In three months the reading age of the experimental group rose by an average of 9.5 months, while the control group's rose by 3.3. Other studies have shown major improvements in attention, behaviour and IQ.

This shouldn't surprise us. During the Palaeolithic, human beings ate roughly the same amount of omega-3 fatty acids as omega-6s. Today we eat 17 times as much omega-6 as omega-3. Omega-6s are found in vegetable oils, while most of the omega-3s we eat come from fish. John Stein, a professor of physiology at Oxford who specialises in dyslexia, believes that fish oils permitted humans to make their great cognitive leap forwards. The concentration of omega-3s in the brain, he says, could provide more evidence that human beings were, for a while, semi-aquatic.

Stein believes that when the cells which are partly responsible for visual perception

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– the magnocellular neurones – are deficient in omega-3s, they don't form as many connections with other cells, and don't pass on information as efficiently. Their impaired development explains, for example, why many dyslexic children find that letters appear to jump around on the page.

So at first sight the government's investigation into the idea of giving fish oil capsules to schoolchildren seems sensible. The food standards agency is conducting a review of the effects of omega-3s on childrens' behaviour and performance in school. Alan Johnson, the secretary of state for education, is taking an interest. Given the accumulating weight of evidence, it would be surprising if he does not decide to go ahead. Already, companies such as St Ivel and Marks and Spencer are selling foods laced with omega-3s.

There is only one problem: there are not enough fish. In March an article in the British Medical Journal observed that "we are faced with a paradox. Health recommendations advise increased consumption of oily fish and fish oils within limits, on the grounds that intake is generally low. However ... we probably do not have a sustainable supply of long chain omega 3 fats." Our brain food is disappearing.

If you want to know why, read Charles Clover's beautifully-written book *The End of the Line*. Clover travelled all over the world, showing how the grotesque mismanagement of fish stocks has spread like an infectious disease. Governments help their fishermen to wipe out local shoals, then pay them to build bigger and more powerful boats so they can go further afield. When they have cleaned up their own continental shelves, they are paid by taxpayers to destroy other people's stocks. The European Union, for example, has bought our pampered fishermen the right to steal protein from the malnourished people of Senegal and Angola. West African stocks are now going the same way as North Sea cod and Mediterranean tuna.

I first realised just how mad our fishing policies have become when playing a game of ultimate frisbee in my local park. Taking a long dive, I landed with my nose in the grass. It smelt of fish. To the astonishment of passers-by, I crawled across the lawns, sniffing them. The whole park had been fertilised with fishmeal. Fish are used to feed cattle, pigs, poultry and other fish – in the farms now proliferating all over the world. Those rearing salmon, cod and tuna, for example, produce about half as much fish as they consume. Until 1996, when public outrage brought the practice to halt, a power station in Denmark was running on fish oil. Now I have discovered that the US Department of Energy is subsidising the conversion of fish oil into biodiesel, through its "regional biomass energy program". It hopes that fish will be used to provide electricity and heating to homes in Alaska. It describes them as "a sustainable energy supply".

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Three years after Ransom Myers and Boris Worm published their seminal study in *Nature*, showing that global stocks of predatory fish have declined by 90%, nothing has changed. The fish stall in my local market still sells steaks from the ocean's charismatic megafauna: swordfish, sharks and tuna, despite the fact that their conservation status is now, in many cases, similar to that of the Siberian tiger. Even the *Guardian's* Weekend magazine publishes recipes for endangered species. Yesterday, the European Fisheries Council reversed the only sensible policy it has ever introduced. Having dropped them in 2002, it has decided to reinstate subsidies for new boat engines. Once again we will be paying billions to support over-fishing. Franco rose to power with the help of the whalers and industrial fishermen of his native Galicia. Somehow the old fascists in Vigo – the centre of the European industry's power – still seem to exercise an extraordinary degree of control.

If fish stocks were allowed to recover and fishing policies reflected scientific advice, there might just about be enough to go round. To introduce mass medication with fish oil under current circumstances could be a recipe for the complete collapse of global stocks. Yet somehow we have to prevent many thousands of lives from being ruined by what appears to be a growing problem of malnutrition.

Some plants – such as flax and hemp – contain omega-3 oils, but not of the long-chain varieties our cell membranes need. Only some people can convert them, and even then slowly and inefficiently. But a few weeks ago, a Swiss company called eau+ published a press release claiming that it has been farming “a secret strain of algae called V-Pure” which produces the right kind of fatty acids. It says it's on the verge of commercialising a supplement. As the claims and the terrible names put me in mind of the slushiest kind of New Age therapy, I was, at first, suspicious. So I went to see Professor Stein to ask him whether it was likely to be true. He could be said to have a countervailing interest: his brother is the celebrity fish chef Rick Stein. But he happened to have met the company's founder the day before, and he was impressed. The oils produced by some species of algae, he told me, are chemically identical to those found in fish: in fact this is where the fish get from them from. “I think they're fairly optimistic about the timescale. But there is no theoretical impediment. I haven't yet seen his evidence, but I formed a very strong impression that he is an honest man.”

He had better be, and his project had better work. Otherwise the human race is destined to take a great cognitive leap backwards.