

Schizophrenia, cars and algal farming

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On September 24 I had lunch with Dr. David Horrobin, a true innovator in Stirling, Scotland. Dr. David Horrobin was formerly CEO of Scotia Pharmaceuticals, a major British drug development company with one major research facility in Canada. Two years ago he left Scotia for Laxdale Ltd. where he will devote the rest of his research career to the development of drugs for the treatment of one specific disease, schizophrenia.

Dr. Horrobin's perspective on this disease and his absolute conviction that a solution is close at hand is truly remarkable. While most people think of schizophrenia as something totally bad and horrible, Dr. Horrobin's view of schizophrenia has some positive elements to it. First, some background information.

Schizophrenia is a disease with a distribution like no other. It is present in all races and on all continents affecting about 0.5-1.5% of the people. While the course of the disease varies between different populations, the relative numbers affected are about the same. This means that the disease must have been present before different races were developed, which is at least 50-100,000 years ago.

This time was marked by a rapid development of the brain and the origin of language. As the brain developed making language possible Dr. Horrobin suggests that as a consequence schizophrenia started. Dr. Horrobin has outlined these theories in a scientific publication with the title "Schizophrenia: the illness that made us human" (published in *Medical Hypotheses* 50, 269-288, 1998).

Trying to make a complicated issue simple, the bottom line with this theory is that the brain is like a motor in a car - it will run at different speeds depending on what car it is and how much fuel and lubrication we give it. "Normal" people can be likened to the average clunker, which runs fairly well up to 130 km per hour.

The "schizophren" car is a racing car keeping speed levels between 200-300

km per hour. Similarly the schizophren brain is typically carrying out tasks far faster than the "normal" brain. This according to Dr. Horrobin has allowed major advances in music, technology, religion, and virtually every other path of human life.

The negative symptoms of the high speed brain comes when the engine starts to misfire, when the fuel and lubrication isn't quite right. The fuels which the schizophren brain are running out of can be summed up as four major essential fatty acids with long scientific names, but for short they are DGA, AA, EPA and DHA. These fatty acids are called "essential" because the human body cannot manufacture them.

While the incidence of schizophrenia is similar in all races, the severity is not. In countries where DGA, AA, EPA and DHA are not supplied in adequate and balanced quantities in the diet the severity is much greater. Two of the fatty acids, EPA and DHA, are particularly difficult to get in sufficient quantities. These two fatty acids are present in algae and non-processed fish (whole fish or fillets, but not much is left in ground up fish such as in fish cakes). Countries that consume algae and fish in large quantities have less severe cases of schizophrenia (for example Japan) compared with the high severity of schizophrenia in North America.

We always hear how bad algae are as they form blooms in dugouts and lakes on the Canadian prairie. But, some algae contain large quantities of EPA and DHA and are actually seen as future sources of these compounds. Indeed, WateResearch Corp. (which I am the President of), works on the production of valuable compounds from algae. We are especially interested in EPA as well as a red coloured pigment called astaxanthin, which colours salmon and lobsters red. Both EPA and astaxanthin can prevent or treat several human health problems. Algae are also the main sources of these compounds. While fish can contain

both compounds it is not because the fish produced them, it is because the fish ate something that had eaten algae!

There is a fancy word for growing crops (including algae!) where one or two specific compounds are sought, it is called molecular farming. It has nothing to do with genetic engineering as it simply relies on growing the right organisms under the right conditions to produce the compounds of interest. These compounds can then be used in food or medicines.

The last week of September I attended a meeting in Italy, which was dedicated to the use of algae for the benefit of humans. The meeting was called "Algae and human affairs". It highlighted the production of valuable compounds from algae, the use of algae to clean up metal contaminated wastes, and to bind carbon dioxide (as a tool to prevent global warming). Three hundred scientists from around the world attended the meeting. I was the only person residing in Canada that attended. There were large delegations from USA, Japan, Australia, Mexico, Africa, Europe, India, and several other places. Indeed, the U.S. and Japan have large programs aimed at using algae to produce medicines, food and for environmental purposes. As far as I can tell in Canada, WateResearch Corp. is the only company trying to mass-culture microalgae for the production of valuable compounds.

This was the reason for my meeting with Dr. Horrobin as WateResearch Corp. hopes to be able to produce and supply a key ingredient in a drug developed by Laxdale Ltd. This drug is presently tested in clinical trials across North America and Europe and Dr. Horrobin hopes it will be available for use during the next couple of years. Until then Dr. Horrobin suggests that increasing the consumption of non-processed fish, taking fish oil pills and primrose oil pills, would provide some of the fatty acids that so often are missing from the North American diet. ■