

Cambridge News

Gene Variants Linked to Depression

Natural variations in the Serotonin Transporter gene lead to altered behaviour.

Serotonin is a chemical produced in the brain that is important in many aspects of behaviour, including mood, emotion and appetite. Once it has been released, serotonin transporters act to recover it, ensuring that its effects are not too pronounced. A team of Cambridge researchers now suggest that natural variations in the serotonin transporter gene can alter people's response to certain chemical conditions in the brain.

Each individual has two copies of every gene in their genome—one from each parent. These two copies are called alleles and are not always identical. The gene that codes for the serotonin transporter, *5HTT*, is one such variable gene. Sometimes the

gene contains an extra 40 bases, called 'letters' of DNA. The different alleles code for slightly different proteins: a long and a short form. It has already been shown that people with the short form are more likely to develop depression.

The new research, led by Dr Jonathan Roiser and published in the journal *Neuropsychopharmacology*, suggests that a person's alleles can also change their response to reduced levels of a key amino acid, tryptophan. Reducing the body's levels of tryptophan causes reduced serotonin production and is already known to cause people who have recovered from depression to relapse temporarily.

Volunteers were given a test in which the chance of getting a reward changed throughout, in order to see how their

performance changed with increasing chance of a reward. Normally, people will try hardest when they have a high chance of success. People with two copies of the long allele performed the same, or better, when they were experiencing reduced tryptophan levels than when their tryptophan levels were normal. However, people with two copies of the short allele showed the opposite results, performing worse when their tryptophan levels were low. The researchers suggest that this tendency towards low motivation may help explain why the short allele is associated with depression.

The work was a collaborative effort between several departments on Cambridge's Addenbrooke's site, and researchers in London and California. DJ

Papers for Ghana?

A team of software developers from the Cambridge NGO Aidworld left for Ghana in late March. Their aim is to produce software that will improve access to online research resources for academic communities in the developing world. There are several initiatives, for example from the World Health Organization (WHO) and the UN, to make research widely available. Nevertheless, many academics still do not have access.

Academic papers are typically stored online as PDF files and can be very large, often hundreds of kilobytes. Searching for and downloading such files over a poor connection is very time-consuming and incurs enormous cost. Taking into account the living costs and average salaries, an Internet user in Ethiopia pays over one hundred times the cost of the same connection in the US.

"The result of this," explains Dominic Vergine, CEO of Aidworld, "is that researchers struggle to access up-to-date information." This limited access works both ways: "There is a lot of unique research being done in developing countries which isn't getting fed back into the international academic community."

While in Ghana, the Aidworld team will work with the UN and the WHO to address the three main problems with on-line materials: slow speed, poor bandwidth management and intermittent connectivity. They will build on their 'Loband' project, a website simplification service developed last year which provides 800 text-only web pages per day to people in developing countries and accelerates Internet access by about 10 times. LH

www.aidworld.org



Aidworld representative Tariq Khokhar (right) talks with Eric Acquaye (left), a network administrator at the Council for Scientific and Industrial Research, Ghana

Why are Monkeys Colour-Blind?

Humans, apes and some monkeys see in full colour, but most New World monkeys display some form of colour-blindness. According to a Cambridge scientist, the evolutionary advantages of full colour vision are not simply due to being able to spot fruit against a background of leaves, as has previously been suggested.

Mauricio Talebi, of the Department of Biological Anthropology, together with colleagues in the US, has recently investigated the peculiar colour vision of the woolly spider monkey, or muriqui, an endangered species found in Brazil.

Humans see in 'full colour' because the retina contains three types of photoreceptors, molecules that are sensitive to light. These respond most strongly to different colours of light: one to blue, another to green and the third to red. We share this distinction with only a few other mammals, one of which, the howler monkey, is closely related to the muriqui. But the muriqui, like many of their relatives, show variable colour vision: some females see in full colour, whilst males and other females are missing a photoreceptor and so cannot distinguish reds and greens. Also, individual monkeys have subtle differences in their photoreceptors. Talebi's team showed that, in the case of the muriqui, these differences are caused by variations in the gene encoding for the photoreceptor.

One theory is that full colour vision enabled monkeys to better pick out red fruit or green leaves from a background of trees. However, according to Talebi, writing in the journal *Molecular Ecology*, this does not explain the complex colour vision differences between closely-related monkey species with similar diets.

An alternative theory has recently been put forward by an American team. Dr Mark Changizi and colleagues, of Caltech, writing in *Biology Letters*, suggest instead that full colour vision may have evolved to detect blushing. Primates with bare faces would have an advantage if they could detect changes in skin tone, which typically signal emotional states like aggression or arousal. Changizi points out that those monkeys which are colour-blind species typically have their faces and rumps covered in fur, so little skin is visible; in these cases, seeing in full colour would provide little advantage. RVN