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## Science Notebook

May 02, 2005

### A blood test that may point to autism; last ordures down on the farm

Science Notebook by Anjana Ahuja

THE RESULTS from the single blood sample stood out. It displayed an unusual defect — it was exceptionally low in glutathione, an antioxidant that helps the body to get rid of environmental toxins.

Sandra Jill James, from the University of Arkansas for Medical Sciences, investigated further. Subsequent blood samples from other autistic children mostly exhibited the same biochemical hallmark. In contrast, samples from healthy children showed normal levels of glutathione. Her team plans to look at younger children with developmental delays to see if this could form the basis of a blood test for autism.

The Arkansas study found that about 80 per cent of autistic children have notably low levels of active glutathione, as well as depleted levels of the amino acids needed to make it. The missing antioxidant leaves the way clear for free radicals to rampage through the body unhindered. We already know that a reduction of glutathione can wreak damage on the brain, gastro-intestinal tract and immune system. This squares neatly with the observation that children with autism often have gastro-intestinal disorders.

Professor James says that environmental toxins, such as heavy metals, would reach higher levels more quickly in children with low glutathione. The build-up may act as an environmental trigger, turning on latent autism-causing genes. That would also fit with the current thinking on autism, which regards genes as a major part, but not the whole, of the story. The Arkansas team has also found that the genes controlling glutathione metabolism are more likely to be disrupted in autistic children than in healthy ones.

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The fascinating work, presented last month at the Experimental Biology 2005 conference in San Diego, is controversial. First, it lends credence to a causal link between heavy metals and the onset of autism. For example, mercury has been cited as a possible trigger factor; until recently, it was used as an ingredient in thimerosal, the vaccine preservative. However, no large-scale studies have backed up such a connection.

Secondly, Professor James suggests that autistic children may benefit from being prescribed antioxidant supplements. Paediatricians at the University of Virginia Medical School are trying it out, with, they claim, encouraging results.

Others remain wary of raising false hope. Craig Newschaffer, an autism epidemiologist at Johns Hopkins Bloomberg School of Public Health in Baltimore says “this is an interesting study and worth some more follow-up, but . . . there are no leaps to be made about using antioxidants as a therapeutic agent”.

- THE JUSTICE meted out on Death Row is so arbitrary, critics of the American penal system complain, that you might as well have a monkey flicking the switch. Or at any rate, say two researchers at Loyola University in New Orleans, you could give the job to a computer.

Dee Wood Harper, a criminologist, and Stamos Karamouzis, a computer scientist, have developed a software program that is able to predict with unnerving accuracy which convicts on Death Row will be executed. I say unnerving because it was able to estimate who would die largely on the basis of the inmate’s characteristics. The most influential factors include sex, race, age, educational attainment and marital status. The date and type of crime also matter, as does location (some states, such as Texas, do a rather brisk trade in executions).

The program, a neural network, was fed details of 1,000 cases in which the outcome for the convict was known. The program was then fed details of another 300 convicts and asked to predict whether they had been executed. The computer guessed the correct outcome in more than 90 per cent of cases. Professor Harper tells the *Christian Science Monitor* that “if this mindless software can determine who is going to die and who is not going to die, then there’s some arbitrariness here in the (justice) system”.

- AH, THE SMELL of freshly cut grass and, er, cattle manure. Now scientists in Nebraska, keen to ease the olfactory trauma of urbanites who move to the country, are studying the diets of cattle to make their waste less pungent. They have found that high-moisture corn produces less aromatic manure than dry-rolled corn, because the starch is more thoroughly digested. The unusual project is being conducted, appropriately, by ARS, the Agricultural Research

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