Chronic Disorders of the Peripheral and Nervous System Linked to Malfunctioning Digestive System

Science has been tackling the effects of diet on brain malfunction for years. Patient X had suffered from myofascial pain syndrome, a disorder in which the muscles in the face, neck and shoulders become chronically painful. Her specialist detected a toxin-producing bacterial infection and prescribed a course of antibiotics to quell it. By her next visit, the patient was feeling much better and asked the specialist: “Am I supposed to be seeing better, too”?'

The woman had been dyslexic since childhood and had poor reading skills. In several brain-development syndromes, including autism and dyslexia, some defect in the brain's visual circuitry makes the words appear to vibrate or jump around -- rather like trying to read a map in a car on a corrugated bush track. Improbably, the antibiotics seemed tohave improved her ability to focus and read printed words on a page.

Here was an enigma: How could antibiotic therapy possibly improve a patient's vision? The episode both intrigues and excites associate professor Dr. Tim Roberts, who has been investigating the underlying causes of chronic diseases.

Dr. Roberts and orthodontist Neil Macgregor, both of the University of Newcastle, and two colleagues with conjoint appointments to the university, Microbiologist Dr. Henry Butt of Newcastle's John Hunter Hospital and Periodontist, Dr. Hugh Dunstan, have been working on a radical new theory that links a malfunctioning digestive system to a number of chronic disorders of the peripheral and nervous system.

At first glance, there seems very little to connect the disparate diseases and disorders they are investigating: autism, dyslexia, chronic fatigue syndrome, Chronic Fibromyalgia and myofascial muscle pain syndromes. However, what the Newcastle researchers have discovered is a generalized pattern of underlying abnormalities in many individualswith these disorders. They seem to have problems digesting certain foods, especially dairy foods and foods containing wheat flour.

These problems may stem from a grossly abnormal microbial flora in the digestive tract. The digestive abnormalities may be responsible for an abnormal profile of amino acids and fatty acids in the bloodstream in many patients, and these compounds may in turn disrupt the immune and nervous systems, causing inflammation, chronic pain, and affecting brain function, particularly the regions controlling vision and hearing. Welding this chain of cause-and-effect into a coherent theory is a formidable challenge, and the Newcastle research team's findings remain controversial. People with Chronic Fatigue Syndrome were once dismissed as hypochondriacs and malingerers.

That was before Dr. Roberts and his colleagues showed, in the mid-1990s, that many CFS patients shared an abnormal biochemical profile. ”These people have a common metabolic profile that indicates the body is in a chronic catabolic state where it is breaking down its own muscle proteins to mount an immune response to fight off

some underlying infection", Dr. Roberts said. "Most of their symptoms appear to be cytokine-induced; the sort of painful symptoms that just make you want to go and lie down. (Cytokines are immune-system signaling molecules that cause the generalized muscular aches, headaches and backaches commonly experienced in early stages of severe bacterial or viral infections, such as influenza.)

Whether we're looking at dyslexia, autism, rheumatoid arthritis, muscle pain or malfunction of the body's systems, we commonly see a disturbance of the gut, and an abnormal bacterial flora of the gut. For instance, with cognitive disorders such as autism and dyslexia, we find patients' levels of the common gut-dwelling bacterium Escherichia coli are very low.

1

If this goes on for a long time, it seems to cause nutritional imbalances, and we find patients' symptoms improve when we replace the missing nutrients''.

The problem with modern medicine is that 90 per cent of people and 95 per cent of doctors believe everyone in affluent societies has a good diet. Some people may indeed have a good diet, but for some reason, they cannot digest it properly.

The Newcastle researchers have recently shown that, as is the case with many autistic children, people with various forms of dyslexia are sensitive to casein, the major protein in milk, and glutens - the proteins that give wheat flour its stretchy properties. Dr. Roberts says that, like many autistic children, the symptoms of people with dyslexia improve if milk and wheat products are removed from their diet.

By analyzing blood lipids and amino-acids in urine samples sent by a Sydney GP specializing in behavioral disorders, Dr. Roberts and his colleagues have shown that autistic children also have a peculiar biochemical profile that distinguishes them from children with the milder social-cognitive disorder Asperger's Syndrome, or attention deficit-hyperactivity disorder.

He believes that in these disparate disorders, something interferes with the release of pancreatic enzymes required to digest casein and gluten. Proteins consist of long, folded chains of amino acids, like a string of pearls cupped in the palm of the hand.

Digestive enzymes break down the chains into individual amino acids, which are recycled and assembled into new proteins. But in many of the university's patients with chronic disorders, certain proteins are incompletely digested, leaving behind short protein fragments called peptides, typically five amino acids long. Two things may happen as a result: the patients become deficient in certain amino acids, and the peptide fragments "leak" through the gut wall and enter the bloodstream.

Some make it to the brain, where they mimic the natural peptides that regulate nerve function -- they have been dubbed exorphins. Dr. Roberts' group has produced evidence that exorphins are involved in dyslexia as well as autism. Enter

secretin: a compound that is claimed, controversially, to improve the cognitive and social skills of autistic children.

“Our interpretation is that secretin works by improving the release of pancreatic enzymes that then enhance the hydrolysis (breakdown) of casein and gluten,” Dr. Roberts said. Complete hydrolysis of casein and gluten should eliminate the exorphin peptides that disrupt brain function. The fact that many of their subjects with dyslexia, Chronic Fatigue Syndrome, Myofascial Syndrome, Fibromyalgia, and other disorders such as Temporomandibular Syndrome (“clicking jaw'') and Rheumatoid Arthritis also appear to be allergic to casein and gluten suggests to Dr. Roberts that food intolerances are not the primary cause of their problems.

The abnormal gut flora in many patients with chronic disorders leads him to suspect the real culprit -- or culprits -- may be undiagnosed microbial infections in the gut; the cryptic invaders somehow displace normal, beneficial bacteria such as E.coli from their ecological niche in the gut.

Dr. Roberts believes a systematic search among a group of obscure microbes including Mycoplasma, Rickettsia, Chlamydia and Erlichia might prove fruitful. If such hypothetical invaders exist, they do not show up standard microbiological assays, nor does the immune system make antibodies that may betray their presence. Where would such microbes come from? Dr. Roberts says many common insects; ticks and mites carry a host of intracellular parasites that can be transmitted to humans.

Helicobacter and Chlamydia bacteria are notorious examples, and some viruses are now known to cloak themselves in proteins resembling proteins of their human hosts' tissues. As a result, the immune system is deceived into attacking the tissues that the virus mimics, deflecting the attack from the virus itself. SUCH cryptic microbes have been implicated in autoimmune disorders such as diabetes, multiple sclerosis, rheumatoid arthritis and myasthaenia gravis.

2

Dr. Roberts' colleague Neil McGregor, says two of his co-workers, Dianne Sparkes and Greg Robinson, have been studying visual anomalies, including dyslexia. He said that when they compared the symptoms and biochemical profiles of 40 patients with vision anomalies with those of 40 normal controls, they found that the vision anomaly groups were far more likely to suffer from food allergies, especially to gluten and casein.

All vision anomaly subjects showed a marked response to wearing colored lenses. For most, the lenses improved their reading performance in tests that measured eyestrain and print distortion. For a small minority, there was no benefit from any color, and certain colors -- yellow and orange -- actually made their vision dramatically worse.

Most subjects improved their reading performance when they wore mauve, blue or teal lenses; blue lenses provided the greatest benefit. Twenty per cent of Dr. McGregor's subjects found it easier to read when they wore red, green, khaki or purple tinted lenses.

Dr. McGregor says the study also showed that differences between vision anomaly “types'' and normal controls relate to deficiencies in certain amino acids that are essential to normal brain function, including memory and vision: tyrosine, aspartic acid and glutamic acid. ”These amino acids are all very important for memory and brain excitation, and when they are deficient, they reduce the availability of neurotransmitters in the brain,'' he said. ”It will be fascinating when we complete these studies, and can make more definitive diagnoses about what amino acids and micro-organisms are deficient in specific disorders.''