You are the architect of your child's brain

Part 1 – The theory simplified

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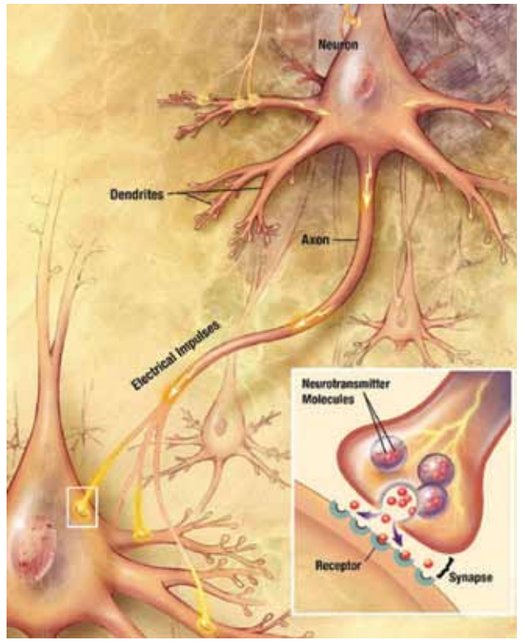

DIAGRAM: SUPPLIED

WHAT'S HAPPENING TO OUR CHILDREN?

The developed world, especially the most economically successful countries, including the USA, UK, Germany and Japan, is faced with an epidemic of misery among its young. In 2004, an English research foundation recorded that behavioural problems in children and adolescents had doubled over the last 30 years, and emotional problems had increased by 70%! The American Psychological Association now estimates that one in five children and teens suffer from mental health problems, and the World Health Organisation expects that by 2020, neuropsychiatric disorders in children will swell by 50% compared with other health issues.

People involved with education are also facing a frightening escalation in the number of ADHD (attention deficit and hyperactivity disorder) learners. This disorder affects the learner's ability to concentrate and to control behaviour. Other developmental disorders are also significantly on the rise among the young. These include: dyslexia, dysgraphia, dyscalculia and dyspraxia (difficulty in reading, writing, math and physical co-ordination respectively). However, the most recent and extremely worrying increase has been in autistic spectrum disorders. These disorders affect a children's ability to relate to the world and to communicate with others. In 2004, the American Academy of Paediatrics recorded on its website that

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"1 in 6 children are diagnosed with a developmental disorder and/or behavioural problem". Phenomena occurring in the USA seem to have a habit of replicating themselves in the rest of the developed world. It has become apparent that today's special educational needs, especially when unattended to, often turn into tomorrow's mental health problems and antisocial behaviours. In short, this is the situation we are faced with today. The question is, is there hope? Can we be proactive in combating the epidemic?

In order for us to fight the problem and to work on prevention, we need first to define our challenge. A significant amount of research has dealt with the predicament of the deterioration in development, behaviour, emotional well-being and concentration in children. Although there are multiple contributing factors, namely, the fast pace of life, 'fastly' presented media (which interferes with thought processes), radiation in the air, marital breakdowns, mothers who are forced to be away from home for long hours, pressure to achieve, lack of exercise and more, it seems that often, the biggest contributing factor is our food.

YOU ARE WHAT YOU ABSORB

In order to understand how food affects the child's brain, we would need to acquire even a simplistic understanding of the anatomy of the brain. As the foetus grows *in utero*, thousands of brain cells, called neurons, are being developed every minute. As he reaches the age of two, a child's brain has approximately 100 billion neurons. Each neuron contains the cell body (nucleus) and up to hundreds of dendrites, which branch out of the cell body. These dendrites convey incoming messages (electrical signals) towards the cell body. Each neuron also contains one axon**,** which is in charge of transferring a message (electrical signals) away from the neuron towards another neuron through the many terminals which this axon has. In this way, neurons are connected to each other and work in a network fashion. While the number or neurons does not increase in children beyond the age of two, the number of connections made between the neurons does, very dramatically.

When the child is born, each neuron is able to connect to another 2 500 neurons. By the time the child reaches the age of two or three, that number has swollen to 15 000. These connections are vital to memory, cognition and learning since they are the conduits along which the electrical impulses of our thoughts travel. With repeated information, thoughts and actions, the neuronal pathways are reinforced, while every redundant connection will get

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dismantled. Unlike other organs in the body, the brain keeps restructuring itself. In order to understand how the messages actually travel between neurons, let's have a closer look at the dendrites. At the point of connection between the dendrites and the axons of other cells, there is a gap called a synapse (like a 'spark' gap in a spark plug) and it is across the synapse that messages are sent from one neuron to another. The message is sent from a sending station and received in a receiving station called a receptor.

The sending and receiving stations are composed of essential fats and amino acids. The message itself, which is comprised of chemicals, is known as a neurotransmitter and is made-up of amino acids.

Amino acids are the raw material of protein. As mentioned above, neurotransmitters are made up of amino acids. Different amino acids make different neurotransmitters. As an example, the neurotransmitter serotonin, which keeps you happy, is built from the amino acid tryptophan. Adrenalin and dopamine, which keep you motivated, are made from phenylalanine. Turning an amino acid into a neurotransmitter is not a simple operation. Enzymes located in the brain, which depend on vitamins, minerals and special amino acids, are needed to accomplish this task. These vitamins and minerals also supply the brain with a sturdy blood sugar that feeds each neuron. Therefore, what our children eat not only builds their bodies, but affects the structure and functioning of their brains, namely, their thoughts, feelings and behaviour. A child's mental health is directly impacted on by what nourishes the child's neurons. Hence, "you are the architect of your child's brain".

Part two of this article, "from theory to practice", is scheduled to appear in the next edition. It will deal with practical nutritional issues facing parents today. I will attempt to discuss some solutions, turning healthy eating into a pleasure instead of a struggle. JL

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