DISCLAIMER

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The information contained herein includes both psychological and non psychological interventions. The delivery of psychological services requires a medical referral whilst non psychological services do not.

Each person is an individual and has a unique psychological profile, biochemistry, developmental and social history. As such, advice will not be given over the internet and recommendations and interventions within this website cannot be taken as a substitute for a thorough medical or allied health professional assessment or diagnosis.

The Relationship Between Vital Energy and the Human Brain and the Autonomic Nervous System

Article QUICK LINKS :

INTRODUCTION

Physicians originally regarded the healing principles as an art and creative work of service to humanity and the "idea" of "healing" pervades all cultures.

The World Health Organization (WHO) defines health as "a state of complete physical, mental and social wellbeing, and not merely the absence of disease or infirmity". According to the Australian Bureau of Statistics, "while the level of disease or infirmity can be assessed by mortality, disability and morbidity statistics, the presence of positive wellbeing is more difficult to measure".

At this time in history we are at the cross roads of a paradigm shift in the way that we view the world around us. In Western society we are moving away from the century old allopathic model of medicine of anaesthetising pain or cutting it out, and reaching toward a more integrative approach to healing, of 'functional medicine' through balancing lifestyle, good nutrition, spirituality and vital energy necessary for good health. Prevention is indeed better than the cure.

Biological, mechanical and chemical processes are no longer absolutely repeatable in double blind studies. The notion of spirit, energy transfer and quantum physics renders the scientific model as we know it increasingly obsolete.

The very idea of *creative consciousness* in healing was for a time, lost in the science of our times, which is largely materially based and "of course minds trained to material concepts only can not be expected to function well at altitudes of penetration, comparison, and compassion". The central theme of 'life' was lost in our search for countless external details in matter only.
The general practice of today is grossly physical rather than 'atomic' in its principle and application. This means that many modern physicians work mainly with symptomatics - treating usually just the symptoms and NOT the underlying cause. Scientific focus on the implications of chemistry and 'curing' symptoms appears to have blinded us to another vital component of our being. The idea of energy fields in action through physiological functions, according to the finer lines of force and mind energy patterns, is not yet generally accepted.

For true healing to take place, it must be applied from a dedicated, integrative and spiritual approach in tandem with the patient's own efforts and in full knowledge of the scientific discoveries of our times. Keith Thomas once said "ALL THAT IS CURRENTLY KNOWN IS NOT ALL THAT WILL EVER BE KNOWN". Current paradigms will be slow to change, but shift does happen!! Witness the Ptolemaic Earth at the center of our universe and how it finally gave way to Copernican theory. Witness also David Bohm's current theory of "Implicate Order" in light of the non-linear physics of "Chaos Theory", Or Rupert Sheldrake's theories of "Morphic Resonance". In protecting the prevailing paradigms, science and medicine, like all institutions move ever so slowly, so as purportedly 'not to make mistakes'.

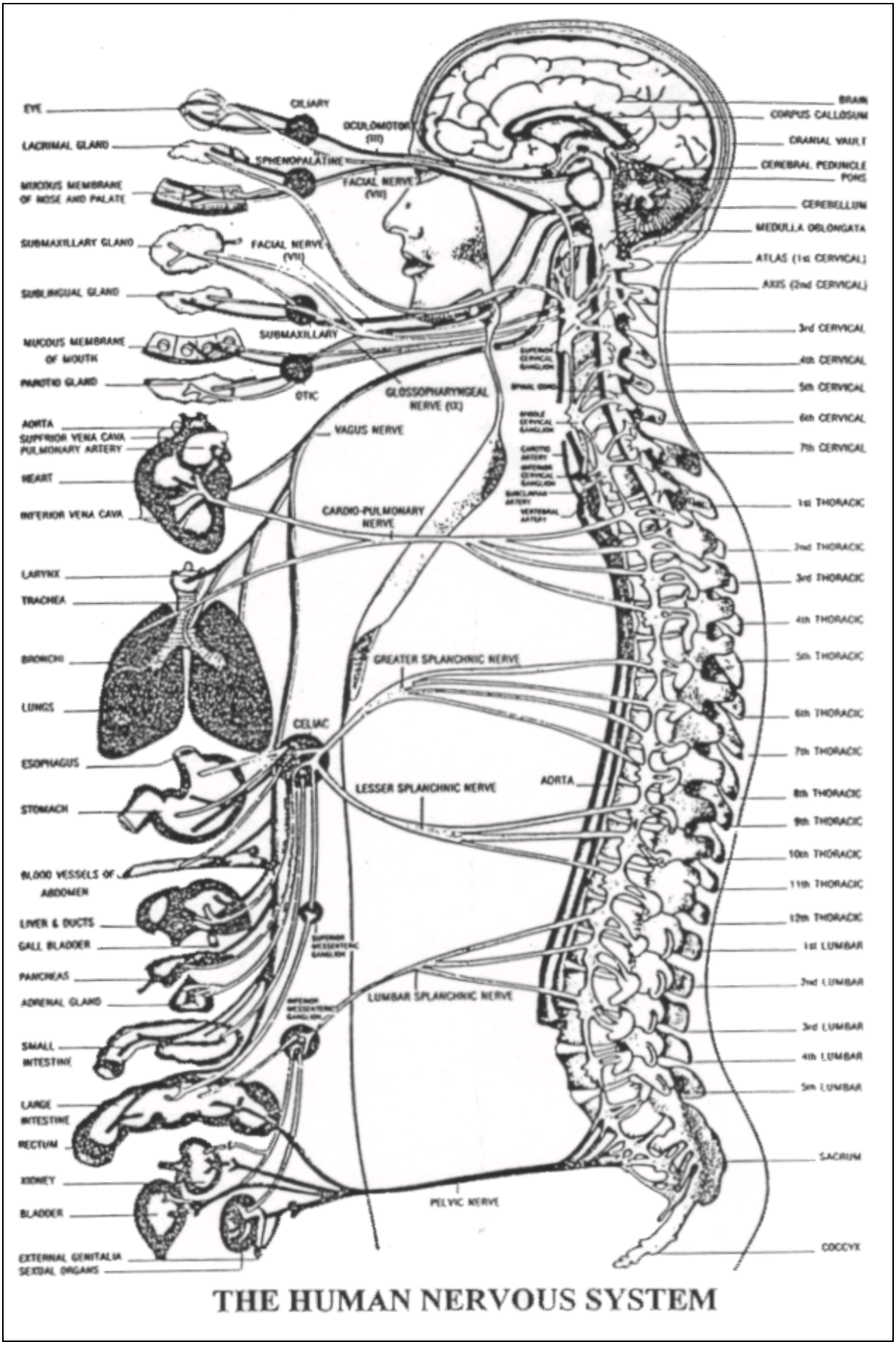
As a consequence, genuinely new and important ideas can tend to be subjected to intense and unprecedented scrutiny, or alternatively they are reviled, and rejected out of hand. And older philosophies such as vitalism which respects the individual's inherent rights to functional integrity are lost in the archives.

In nature, each individual pattern is sustained by the whole through its latent powers of attraction within its own electro-magnetic energy field, which is reliant upon its seed pattern keynote. This keynote is the central core of its creative energy field as an individual, separate being, endowed with consciousness and awareness and potential for growth.

The philosophy and study of the body as a manifestation of consciousness now provides a physical foundation for psychology and psychiatry through the concepts of *cellular memory*.

The core of man lies in the Central Nervous System (CNS) and the cerebrospinal tract. In fact, Randolph Stone, DO DC, once said that "the human soul swims in a sea of cerebrospinal fluid". This is interesting, as there is also an ancient Chinese concept of 'Sui-Hai-ku' - which means "Brain Sea". The allegory is apt as the sea ebbs and flows, is subject to electrical storms, is salty and full of myths, phantasms and beasts. The brain as it lies suspended in CSF is like a sea creature, passively waiting in the depths, pumping and billowing, processing and waiting. It knows.[3]

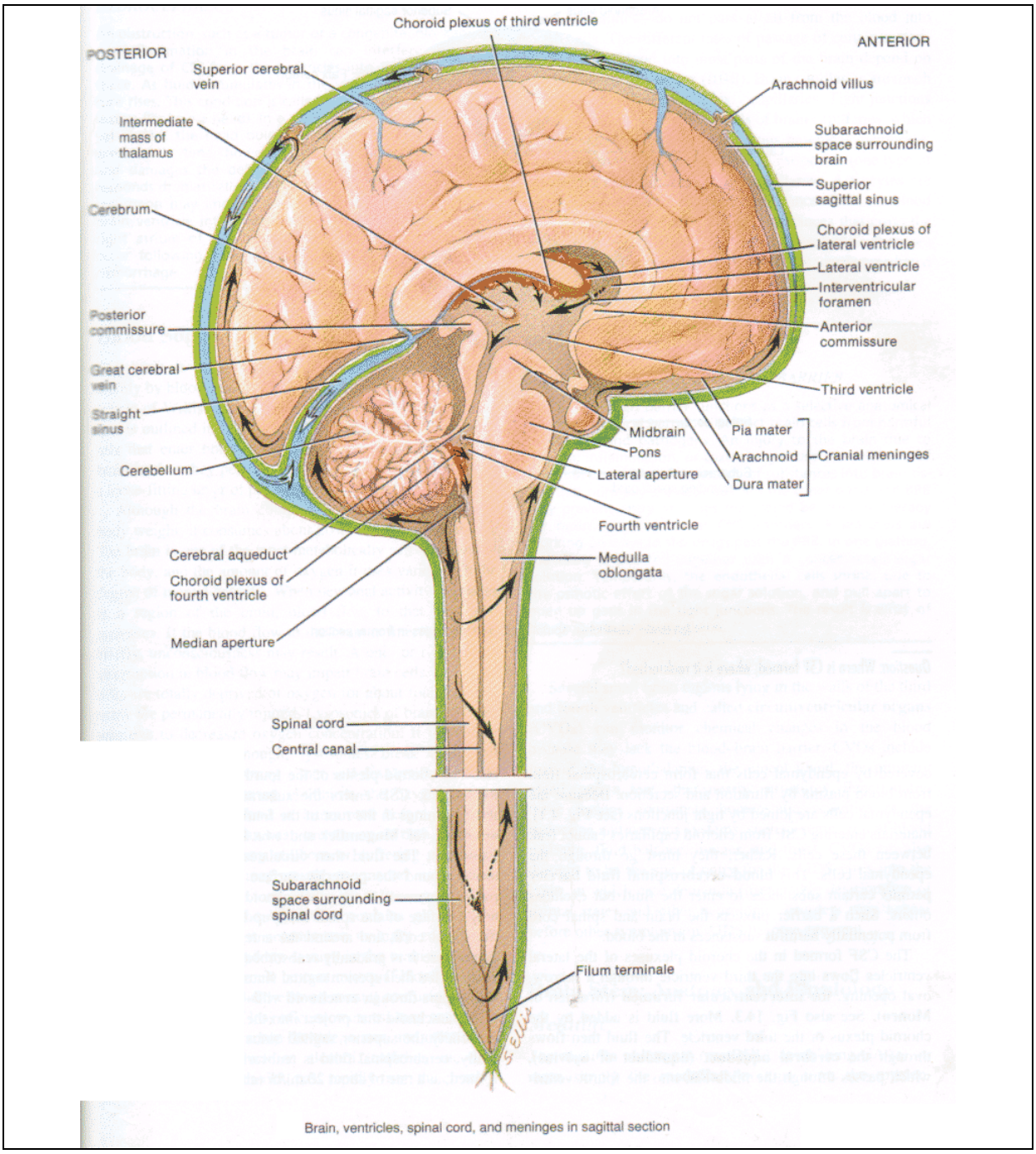
The Eastern idea of the chakras as centres of energy in the human body has long been substantiated through simple anatomy and the correlation to major nerve plexuses within the body and emanating from the spinal column or cord.



THE HUMAN NERVOUS SYSTEM

This core essence and the currents of the energy fields within us and around us, provide for us that within which we move and have our being as a living human entity in harmony and health or disharmony and disease.

Ancient writings, particularly the Vedas (6,000 BC), tell us that the core of man follows a twin serpentine pathway describing the flow of kundalini or vital energy around the spinal column. (viz. The Caduceus or Staff of Hermes).
Modern anatomical and physiological investigation now confirms this ancient representation in the spiral flow of cerebrospinal fluid within the membrane known as the dura mater, and the intricacy of the serpentine crossover or decussation[8], of spinothalmic tracts or afferent and efferent pathways of the spinal cord itself.



Brain, Ventricles, Spinal Cord and Meninges in sagittal section

Candace Pert, a neuroscientist, biochemist and researcher into the body / mind connection, tells us in her book 'Molecules of Emotion', that molecules called neuropeptides are the chemical carriers of our essence, and that the memories and patterns of man are locked into the cellular and perhaps even molecular makeup of his physical being.[5]

Bodyworkers have long known that relaxing chronically tight muscles, or activating certain trigger or reflex points can actually trigger remembrance of traumatic incidents in our lives that we had thought that we had put behind us and all but forgotten. Coupled with guided imagery, this phenomenon has developed into a therapeutic technique that has become known as Somatoemotional Release.[10]

Modern anatomy shows us that cerebrospinal fluid has many functions and is significantly more complex than generally thought of. The whole of the bodily processes are dependent upon this innocuous fluid. Anatomical texts tell us that CSF is a clear and colourless, slightly viscous fluid.[8] The C*lassic Collector's Edition of Gray's Anatomy* describes it as being "a clear, limpid fluid, having a saltish taste and a slightly alkaline reaction". The same text says of it's 'chief function' as "probably to afford mechanical protection to the nervous centres, and to prevent the effects of concussions communicated from without". As we shall see, mechanical protection is only one of the CSF functions, but the main problem here is that the observation is of dissected corpses, and not of the living man. In a living person, the CSF is actually quite viscous and in fact, yellowish in colour. Ask any emergency worker who has attended cases of traumatic head injury and witnessed the flow of living CSF.

COMPOSITION OF THE CSF

CSF differs from plasma and blood. It is primarily different in its electrolyte composition and the fact that it is relatively protein free. The blood / brain barrier is designed to feed the CNS only the end product elements refined from the metabolism of food. Formed in the mid-brain in a structure known as the choroid plexus, CSF is classified as a secretion rather than a simple filtrate. CSF volume in the body is some 150 ml, which is reabsorbed as rapidly as it is formed, approximately 20m/hr or about 480 ml per day.[8] It has a specific gravity of 1.007, with a pH of 7.35.[3]

It is primarily composed of the following elements:

Glucose: The brain is quite greedy when it comes to glucose, consuming between 20+30 %. The brain will sacrifice a lot of body function to keep its glucose levels consistent. Glucose levels in cerebrospinal fluid are usually between between 2.5-4.5 mmol/L.

Monocarboxyllic Acid

Amino Acids: These are transported across the blood/brain barrier by one of three carriers according to their status - acidic, neutral or basic (alkaline). There is competition for carrier molecules, hence dietary supplementation can influence which amino acids cross. Tryptophan for example competes with 5 other neutral acids and is the precursor for synthesis in the brain of the neurotransmitter serotonin.

Nucleic Acids: These include specific carriers for adenine and nucleosides.

Choline: (amine)

Hormones:

Vitamins: The B group are especially prevalent

Electrolytes: The brain electrolyte balance is in delicately maintained homeostasis. This is acheived through junctions, gradients and other transport mechanisms. The CSF is in free equillibrium with cerebral interstitial fluid, the unwavering composition of which is vital to the maintenance of the functional integrity of the brain. Sodium (Na+) is the most abundant ion in CSF, ECF and plasma, accounting for 95%of the cation of these fluids. Other CSF electrolytes are K+, Ca++, Mg++, and Cl- as well as HCO3- (bicarbonate ion). It also contains some lymphoycytes (- from 0-10 lymphocytes per mm3) and immunoglobulin G (IgG) at 0.5-6.1g/L. The electrical nature of CSF is well known. The ions facilitate the rhythmic electrical activity and the generation and delivery of the action potential in the central nervous system. This activity is basic to neurological and therefore - all function. Even slight changes in the ionic composition of CSF could seriously disrupt production of postsynaptic potentials and action potentials.

Cerebrospinal fluid contributes to homeostasis in three main ways.

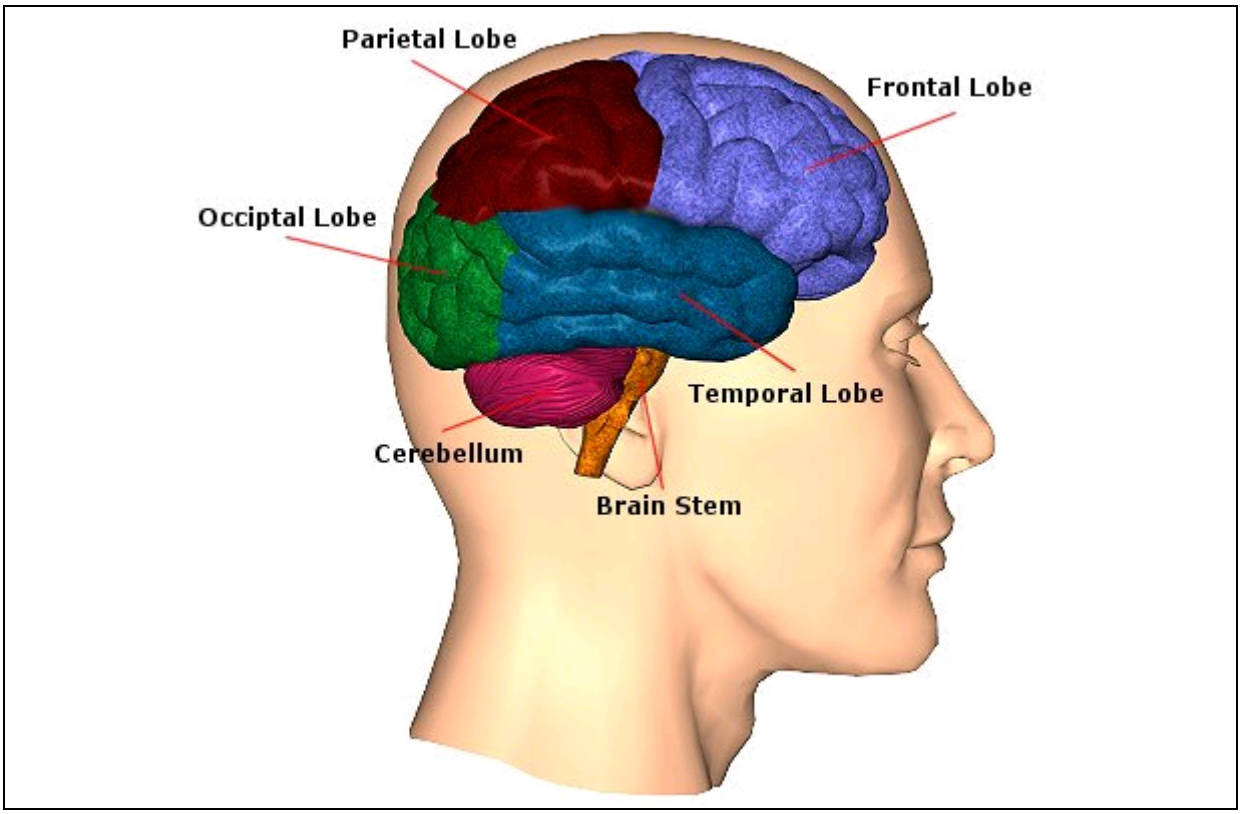
1. **Mechanical Protection:** The fluid serves as a shock absorbing medium to protect the delicate tissue of the brain and spinal cord that would otherwise cause them to crash against the bony walls of the cranial and vertebral cavities. The fluid buoys the brain so that it 'floats' in the cranial cavity.
2. **Chemical Protection:** CSF provides an optimal chemical environment for accurate neuronal signalling.
3. **Circulation:** CSF is a medium of exchange of nutrients and waste products between the blood and nervous tissue.

THE HUMAN BRAIN

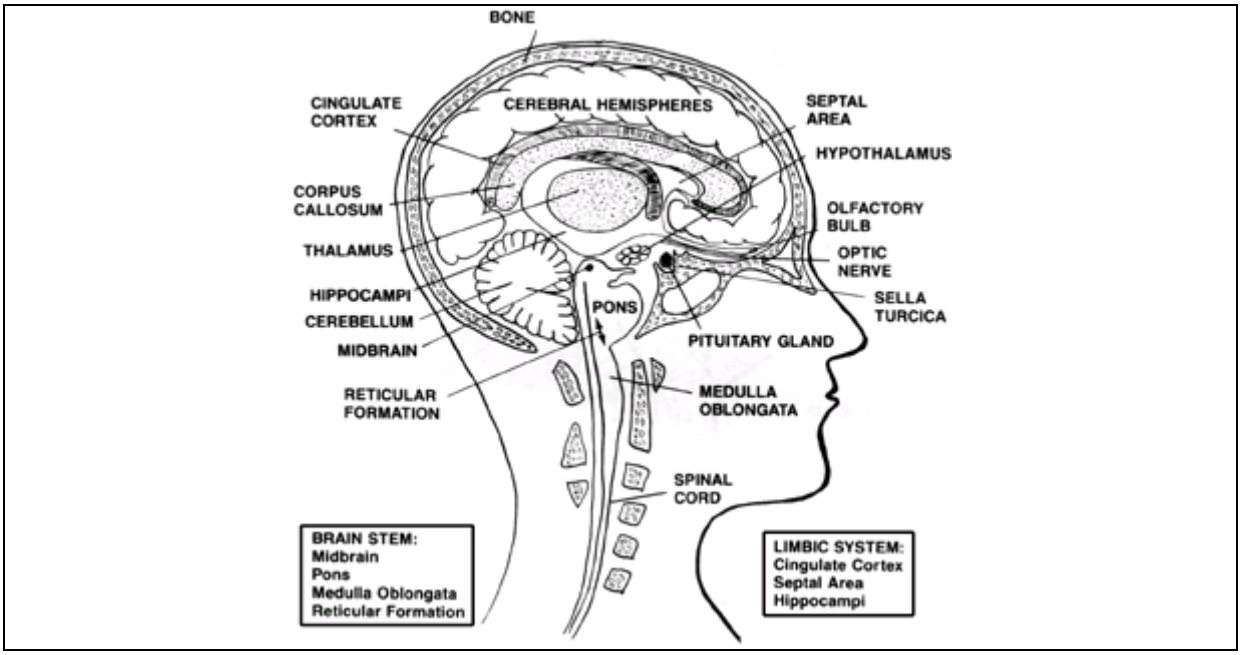
The human brain sits at the top of our living caduceus, controlling bodily functions in near perfect homeostasis. As the body's command centre, it is jealously guarded, 'floating' in a nourishing and protective sea of Cerebro Spinal Fluid (CSF), bounded by the meninges - the dura mater (which means literally - 'Strong Mother'), the sub-arachnoid space and the pia mater, and of course the hard casing of the human skull. Nevertheless, even a slight blow to the head from any angle can potentially cause substantial damage to the delicate nerve fibres and neural networks that form our functional and thinking patterns.

Obtaining a general understanding of the brain and its functions is important to understanding the rehabilitation process in any presenting difficulty. It is very important, however, to understand that rehabilitation concerns the whole person not just the 'affected part'. The identification of an individual problem simply gives the therapist areas in which to focus treatment plans designed to work toward the rehabilitation/rebalancing of the whole person. Each problem area affects other areas. Resolving one problem often has a major impact on other problems. For example, re-establishing postural balance and eliminating dizziness greatly enhances concentration and attention, which allows for improved cognition and problem solving.

The Basic Divisions of the Human Brain



Diagrammatic Sagittal Detail



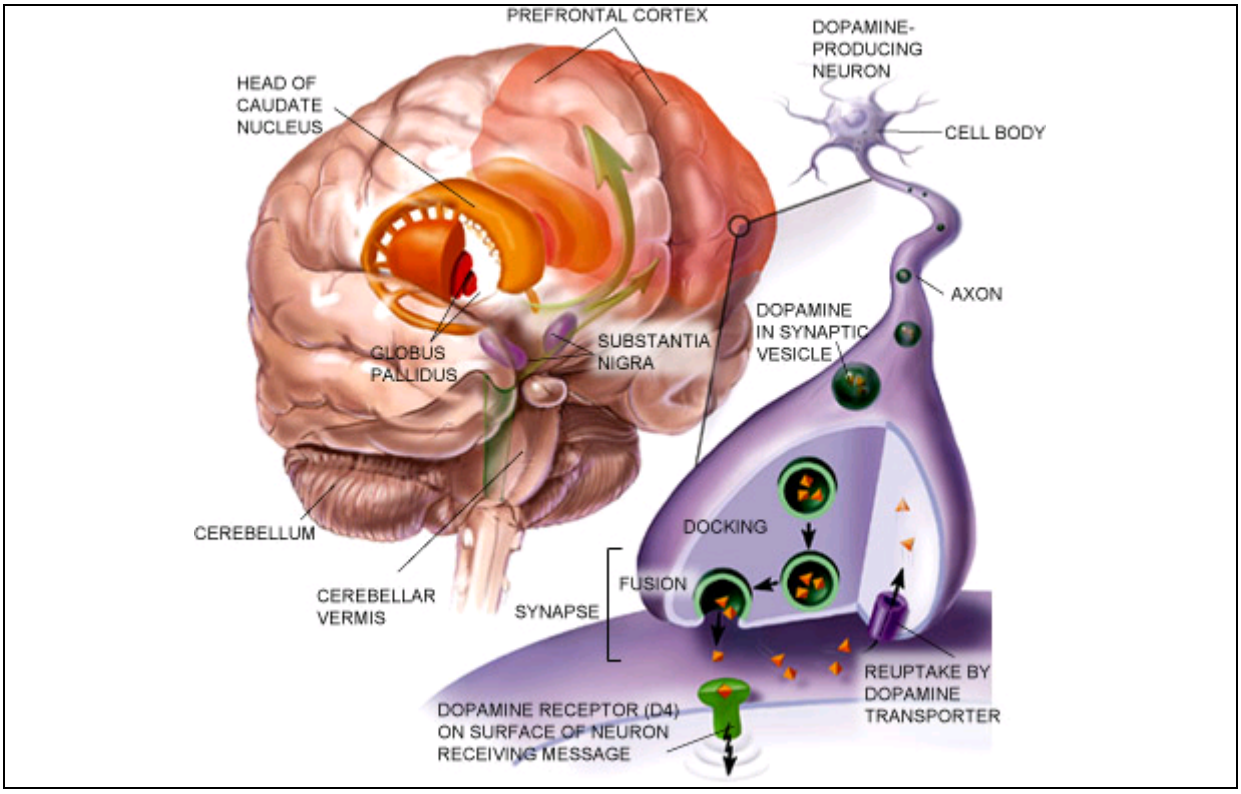
Dysfunction or injury to the brain may occur in a specific location, or may be diffuse (many different locations). Difficulties resulting from brain dysfunction include:

- Visual illusions - inaccurately seeing objects.
- Word blindness - inability to recognize words.
- Difficulty in recognizing drawn objects.
- Inability to recognize the movement of an object (Movement Agnosia).
- Difficulties with reading and writing.
- Short term memory difficulties
- Personality changes and / or emotional liability

FRONTAL LOBES (or Prefrontal cortex)

Located at forehead above eyes.

The frontal lobes receive input from various neocortical regions including the dorsomedial thalamic nucleus, and the parietal association cortex. The prefrontal orbital cortex, however, receives fibres from the pars magnocellularis of the mediodorsal thalamic nucleus, and from the mesencephallic recticular formation as well as from limbic structures. In this way the prefrontal cortex appears to receive information about all sensory modalities and also about motivational and emotional states of the individual. There are strong efferent connections to the motor and pre motor cortex, the basal ganglia and the caudate nucleus. Orbital-prefrontal regions send fibres into the hypothalamus, subthalamus, septum, mesencephalon and the pons.[11]



Functions associated with the frontal lobes:

- Conscious thought
- Concentration
- Perseverance
- Judgement
- Attention span
- Impulse control - self monitoring and supervision
- Problem Solving
- Organisation
- Critical thinking
- Forward thinking
- Ability to feel and express emotions
- Empathy

Decreased activity in the prefrontal cortex is a finding often cited in people who have cognitive difficulty, such as in schizophrenia or major depression. Abnormal frontal activity is a major factor in ADD and ADHD.

The prefrontal cortex is involved in mediating concentration, impulse control and critical thinking.

THE CINGULATE SYSTEM

At the top of the brain, in the middle of the frontal lobes is an area of the brain termed the "cingulate gyrus". It is the part of the brain which allows you to shift your attention from thing to thing, to move from idea to idea, to see the options in life. Feelings of safety and security have also been attributed to this part of the brain. The term that possibly best relates to this part of the brain is 'cognitive flexibility'.

Functions of the Cingulate System:

- Allows shifting of attention
- Helps the mind move from idea to idea
- Allows the mind to see options
- Cognitive flexibility (helps you go with the flow)
- Adaptability
- Ability to cooperate

Increased activity in the top, middle portions of the frontal lobes is frequently cited as a finding in obsessive-compulsive disorder, a condition where people become "stuck" on certain thoughts or behaviours. Aggressive people often become "stuck" on real or imagined injustices and think about them over and over. Oppositional, and addictive behaviours are also evident. Chronic pain, eating disorders and road rage appear to accompany cingulate dysfunction.

TEMPORAL LOBES

Located at sides of head above ears, the temporal lobes form the wings of the soul of our living caduceus.

FUNCTIONS

The dominant side is usually the left hand side and governs:

- Hearing ability
- Understanding and processing language
- Memory acquisition - particularly long term memory
- Some visual perceptions
- Categorisation of objects.

The non dominant side or right side governs:

- Recognition of facial expressions
- Decoding vocal intonation
- Rhythm
- Music
- Visual learning

OBSERVED PROBLEMS

- Difficulty in recognizing faces (Prosopagnosia).
- Difficulty in understanding spoken words (Wernicke's Aphasia).
- Disturbance with selective attention to what we see and hear.
- Difficulty with identification of, and verbalization about objects.
- Short-term memory loss.
- Interference with long-term memory and amnesia
- Increased or decreased interest in sexual behaviour.
- Inability to categorise objects (Categorisation).
- Right lobe damage can cause persistent talking.
- Increased aggressive behaviour.
- Dark or violent thoughts
- Religious or moral preoccupation
- Social skill troubles
- Emotional instability

- Hypergraphia (excessive writing)
- Periods of spaciness or confusion
- Seizures

BRAIN STEM

Located deep in the brain, leads to spinal cord. Often referred to as The 'Reptilian' or 'Primitive' Brain. The majority of the cranial nerves exit from the brain stem at the pons.

FUNCTIONS

- Breathing
- Heart Rate
- Swallowing
- Reflexes to seeing and hearing (Startle Response).
- Controls sweating, blood pressure, digestion, temperature (Autonomic Nervous System).
- Affects level of alertness.
- Ability to sleep.
- Sense of balance (Vestibular Function).

OBSERVED PROBLEMS

- Decreased vital capacity in breathing, important for speech.
- Swallowing food and water (Dysphagia).
- Difficulty with organisation/perception of the environment.
- Problems with balance and movement.
- Dizziness and nausea (Vertigo).
- Sleeping difficulties (Insomnia, sleep apnoea).

CEREBELLUM

Located at the base of the skull, and attached to the rear of the brain stem.
It is sometimes referred to as The Little Brain.

FUNCTIONS

- Coordination of voluntary movement
- Balance and equilibrium
- Some memory for reflex motor acts.

OBSERVED PROBLEMS

- Loss of ability to coordinate fine movements.
- Loss of ability to walk.
- Inability to reach out and grab objects.
- Tremors.
- Dizziness (Vertigo).
- Slurred Speech (Scanning Speech).
- Inability to make rapid movements.

LIMBIC SYSTEM

Is a group of cellular structures located between the brainstem and the cortex.
It is often referred to as the mammalian brain.

FUNCTIONS

- Maintaining homeostasis - body temperature, blood pressure, heart rate, blood sugar levels.
- Controls appetite and sleep cycles
- Strongly linked to emotional reactions that have to do with survival.
- Sets the emotional tone of the mind
- Filters external events to internal states (creates emotional colouring)
- Ear marks events as internally important
- Stores highly charged emotional memories
- Modulates motivation
- Promotes bonding
- Directly processes the sense of smell (which is another reason why aromatherapy can be so effective)
- Modulates libido

The limbic system has two key components:
the **hypothalamus** (below the thalamus) and the **pituitary gland**.

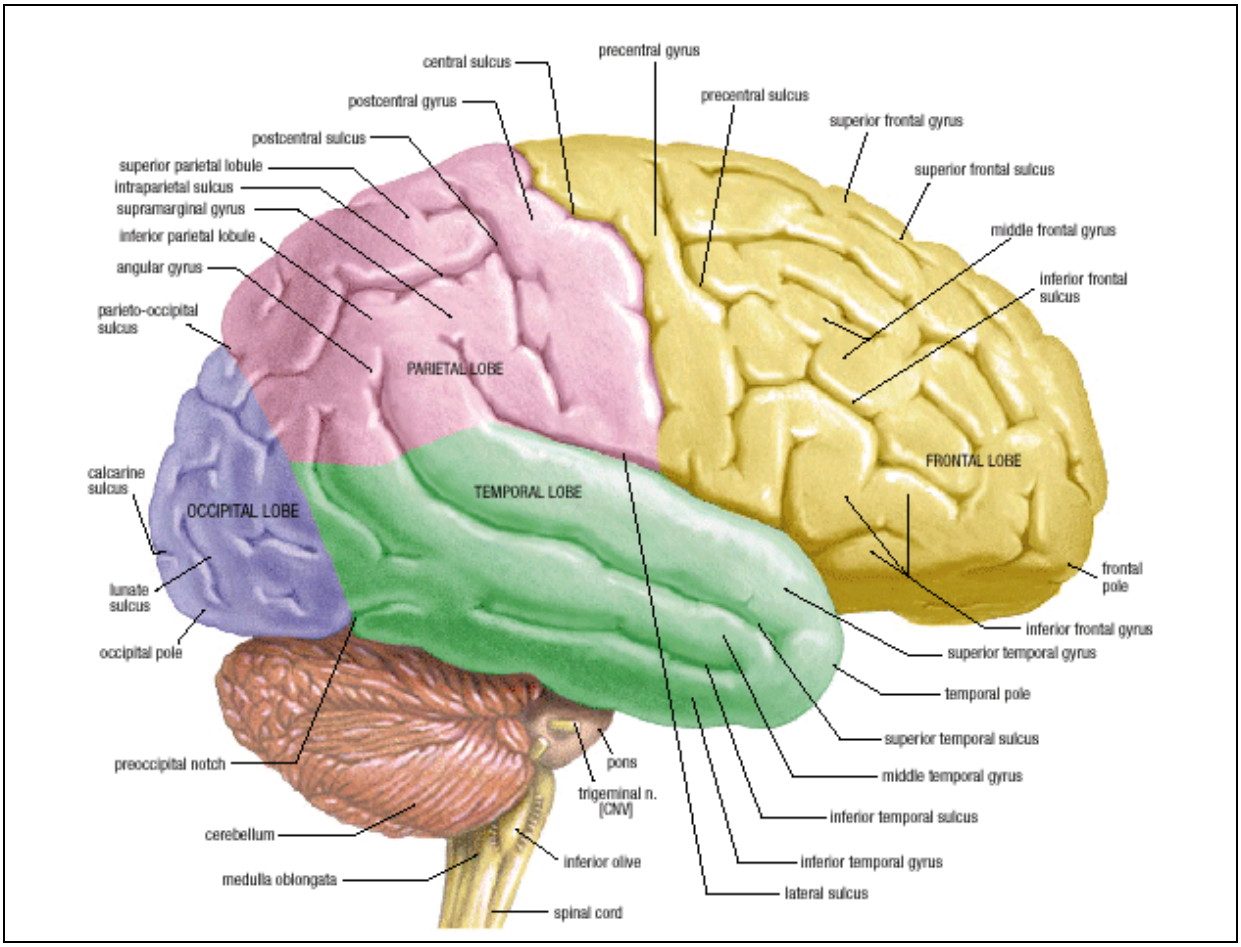
The hypothalamus regulates eating, drinking, sleeping, waking, body temperature, balance and many other functions. Through a combination of electrical and chemical messages, it directs the pituitary gland - the master gland of the body.

OBSERVED PROBLEMS

- Moodiness, irritability and clinical depression
- Increased negative thinking
- Negative perceptions of events
- Decreased motivation
- Appetite and sleep problems
- Increased or decreased sexual responsiveness
- Social isolation

The human brain has evolved over time, and from the archaeological records, it has demonstrated spectacular growth in the past few million years.

This growth, presumably in consciousness as well as size and capacity for creativity, allowed us to change the environment in which we live and our ability to make those changes is increasing. The problem lies in the fact that our ability to create always leaps ahead of our ability to adapt. Thus we are locked in a cycle of adapting to unprecedented situations.



If there are too many changes in our lives, our ability to adapt may be taxed to the limit, and we may become ill. In our modern society, the number of 'changes' that we experience is far greater than we were designed for, our current environment is, for many people beyond their biological limits.

But just how does stress cause disease? The emergency reaction, which is a primitive survival mechanism, is under the direct control of the brain.
It stimulates the heart to beat faster and directs peripheral blood vessels to clamp down, thus increasing blood pressure. The principle neurotransmitters (chemical carriers of messages between nerve connections) that accomplish this are epinepherine (adrenaline) and norepinepherine (noradrenaline).
This brings us to.....

THE HUMAN NERVOUS SYSTEM

The central nervous system (CNS) is representative of the staff of our living caduceus. The sympathetic (SNS) and parasympathetic (PNS) systems, like the cerebrospinal pathway, are representative of the twin serpentine pathway of kundalini energy, activating the chakric centres or nerve plexuses as it rises up the spinal cord in sushumna to the brain centres (hence the practice of Kundalini Yoga).

Human nervous system physiology is generally divided into the central nervous system (CNS), comprising the brain and spinal cord, and the peripheral nervous system, which comprises nervous tissue outside the CNS, including the cranial and spinal nerves.[1] The peripheral nervous system is further divided into the somatic system, concerned with muscular activities, and the autonomic nervous system (ANS), which controls visceral structures (glands and organs of the body). Finally, the ANS is sub-divided into the parasympathetic nervous system (PNS), the innervation mechanisms dominate when the individual is at rest, and the sympathetic nervous system (SNS), which is dominate in situations requiring mobilisation of energy.

The following schematic drawing explains these divisions somewhat, but is imperfect due to the fact that there are some parts of the ANS which are under the control of the CNS. For example, the hypothalamus and medulla are important in control of ANS functions, so the autonomic nervous system in fact has its nuclei within the central nervous system.

IMAGE MISSING

The ANS in Western medicine is believed to be exclusively motor in its function. That is, it sends out impulses to various organs and systems in the body so that the body functions automatically without the conscious control of the owner of the body.[10]

In the East and the Orient, practices such as yoga, tai-chi, qi-gong, breathwork and meditation (all techniques of self-directing vital energy) have been used to beneficially influence the autonomic nervous system (ANS) for centuries. It was not until the advent of biofeedback (Especially the pioneering work of Drs. Elmer and Alyce Green), that Western science demonstrated that this could be so.

More importantly, biofeedback training in combination with diet and specific exercises, has been clinically demonstrated to bring the ANS under the conscious control of its owner, enhancing stability, balance, flexibility and adaptability are the corner stones of optimal function and homeostasis.

The significance of this is easily recognised in the divisions of the human populace in terms of behaviour. Classifications of 'Type A' and 'Type B' in this regard is well known. Type A persons are generally have an exaggerated reaction to the stresses of daily life. These individuals are coronary prone, and have been described as fast-paced, impatient, and irritable; they tend to be deeply involved in their work, and deny failure, fatigue and illness. Type A's tend to try to get more and more done in less time. Type A individuals are twice as likely to develop heart disease than Type B's, who may be as successful, but tend to be calmer, better organised, less 'time urgent', concerned more with quality than quantity, and generally less prone to frustration. Type A's tend to be more SNS hypertonic, and type B's are more PNS.

As mentioned, the ANS is divided into two systems - the sympathetic and parasympathetic nervous systems.

The sympathetic nervous system (SNS) ganglia are located most often near the spine, its roots lying in the thoracic and lumbar regions. Hence it is sometimes referred to as the thoracolumbar division. The parasympathetic ganglia are usually located near the organs that they innervate, send impulses to, or otherwise essentially control. Its nerve roots exit the CNS from the brain stem, and the lower or sacral end of the spinal cord. The PNS is sometimes referred to as the craniosacral division.

The sympathetic part of the nervous system is the one which takes care of emergency responses. Flight or Fight. The SNS is called to arms on a daily basis. Sometimes, this is done without the SNS being allowed to express the energy that it has procured for the perceived excessive demand. This situation when repeated over and over, results in an elevated baseline of activity and the result of this sympathetic hyperactivity is chronic stress, which in turn leads to all kinds of stress related health problems. (Ulcers of the stomach and / or bowel, high blood pressure, hardening of the arteries, high cholesterol, coronary artery

disease, chest pains and stroke to name a few). The SNS then, expends our vital energy.

On the other side of the coin we have the parasympathetic nervous system (PNS), who's job it is to balance and restore energy reserves to safe levels.

The 'spending habits' of your sympathetic nervous system vary with your personality. If you are chronically angry, fearful, guilty etc., the chances are that your sympathetic nervous system is in chronic hyperalert.

If you tend to be complacent, secure, happy, and accepting, your SNS baseline will be lower, and the easier it is for your PNS to rebalance your energy levels.

Clearly then, any technique which can lower stress levels is going to be beneficial to your health.

The autonomic nervous system as already mentioned, influences internal organs and organ systems. When stimulated, the sympathetic nerves

1. Increase heart rate
2. Increase blood flow to heart muscle
3. Increase blood flow to skeletal muscle
4. Increase skeletal muscle strength and performance
5. Reduce blood flow to the skin
6. Reduce blood flow to all internal organs
7. Reduce conscious thought processes in the higher brain centres
8. Shut down digestive processes
9. Shut down peristalsis
10. Shut down kidney function
11. Open the bronchi
12. Raise blood sugar

It is important to note that all processes that are not necessary in the immediate moment for the perceived activity are shut down - including healing which is in process!

Parasympathetic nervous system responses are almost the exact opposite of the SNS. When activated, the PNS nerves slow heart rate, lower blood pressure, open the blood vessels to the skin and internal organs. The PNS has little influence over skeletal muscle, however, it does influence smooth muscle, and thus provides positive stimulation of the gastrointestinal system, enhancing peristalsis, digestion and elimination.

Most glands in the body secrete their hormones when the PNS goes into action.

The adrenal glands however, which aid the SNS in it's 'flight or fight' response, are slowed by the PNS. PNS activity favours anabolic activity - that is, it favours the absorption of nutrients and calories, and their conversion into stored energy and/or the formation of protein building blocks. SNS activity depletes these energy reserves and this in turn depletes our immune system.

Indirectly, the ANS divisions (sympathetic and parasympathetic) are very much involved in our responses to emotions such as fear, anger, rage, panic, pleasure, etc. In actuality, these emotions are triggered by higher brain centres which send messages to the ANS control centres, dictating in turn many of the bodily functions and responses. The responses then produce additional sensory input, which then contributes to a continuation of the emotional response. The emotional response then has potential to escalate unless the higher brain centres are able to intervene.

Thus it is easy to see the delicate balance and how easy it is for us to become locked into a thought pattern against our conscious volition. Equally, it is easy to see how the cycle may be broken through the use of vital energy techniques and other training such as biofeedback.

The human brain is marvellous in its resilience and capacity for adaptation. The concept of brain "plasticity" is transforming neuroscience. Michael M. Merzenich, (University of California, San Francisco Medical Centre), asserts that "the brain was constructed to change". "The plasticity of the living matter of our nervous system is the reason we do a thing with difficulty the first time, but soon do it more and more easily and finally with sufficient practice, do it semi-mechanically or automatically. The brain is built for change and functions in the environment in which it grows. The brain of every individual is continuously shaping its own processing and performance capabilities. Our capabilities reflect not just WHAT we've learned- but also how our brain has evolved TO learn. By its very nature, the brain's self-organising process is time based" (Menzenah14). Given this plasticity, is it not possible then for the brain to heal itself too, given appropriate stimulation?

FURTHER READING SUGGESTIONS

- Attention Deficit Disorder (ADD) & Attention Deficit Hyperactivity Disorder (ADHD)
- Brain Injury
- QEEG and Neurofeedback - diagnostic and training modalities for the enhancement of CNS functioning in ADHD and other disorders

For more information or to make an appointment please contact us on (02) 9637 9998 during business hours.

REFERENCES

1. Andreassi, J.L., Psychophysiology, Human Behaviour & Physiological Response, Lawrence Erlbaum Associates, Hillsdale, New Jersey.

2. Burger, B., Esoteric Anatomy, 1998, North Atlantic Book, Berkley, California.

3. Cohen, D., (DC), An Introduction to Craniosacral Therapy - Anatomy, Function, and Treatment, 1995, North Atlantic Books, Berkley, CA, USA.

4. Ornstein, R. and Thompson, R.F., The Amazing Brain, 1984, Houghton Mifflin Company, Boston, Massachusetts.

5. Pert, Candace B.(Phd), Molecules of Emotion - 1997, Scribner - New York, USA.

6. Stone, R., (DO, DC), Polarity Therapy - Vol I, - 1986, CRCS Publications, Somertown, TN, USA.

7. Stone, R., (DO, DC), Polarity Therapy - Vol II, - 1987, CRCS Publications, Somertown, TN, USA.

8. Tortora, G.J.(MA.BS), and Grabowski, S.R.(Phd), Principles of Anatomy and Physiology, 1993, Harper Collins Publishers, New York, USA.

9. Upledger, J., (DO,DC, F.A.A.O.), Vredevoogd, J.D., (M.F.A.), Caraniosacral Therapy, 1983, Eastland Press, Seattle, Washington.

10. Upledger, J., (DO,O.M.M.), A Brain is Born, 1996, North Atlantic Books, Berkeley, California.

11. Niedermeyer, E.(M.D.), Frontal Lobe Functions and Dysfunctions, Clinical EEG Electroenchalography, Vol. 29, No.2, April 1998.

12. Krebs, C., (Dr.), A Revolutionary Way of Thinking, 1998, Hill of Content Publishing, Melbourne, Australia.

13. Amen, D.G., (MD), Healing ADD, 2001, G.P. Putnam's Sons, New York, NY

14. Merzenich, M.M. (2001): "Brain Plasticity". Paper delivered at the International Society for Neuronal Regulation Annual Conference, Monterey, CA. See also the article "The Mutable Brain" by Marguerite Holloway in Scientific American, September 2003, 59-65.