

Receptor Based Therapies

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It is the purpose of this paper to present a model that accounts for the efficacy of almost all therapies, both conventional and those incorrectly labeled alternative. There is much attack in both the human and animal health care fields. The attack is about who is right and who is wrong in their approach to healing. All attack is based on fear. There should be no fear because we are all doing essentially the same thing. We're just pushing **different** buttons to affect the nervous system.

There is probably very little argument that the central nervous system (brain and chord) runs things; at least in the physical body. The nervous system directs healing and maintains health. There is nothing beyond the awareness of the nervous system. Information is received and transmitted throughout the neuro-axis by chemical and electrical means. Synaptic transmission of information is well understood and the sensitivity of neurons can be modulated by chemical and electrical factors. Extra-neural pathways or non-synaptic transmission of information is hypothesized by neuro-scientists to explain phenomenon that occur too quickly to be explained by synaptic transmission of information. For example, synaptic transmission of a bio-electrical impulse is too slow to allow for the speed at which a lead guitarist moves his fingers over a fret board or the speed of a race horse flying down the stretch. Nevertheless, the nervous system monitors and modulates all sensory input, integrates the new information with older, learned experiences and then responds via motor output.

Two "D" Batteries?

If the central nervous system drives all aspects of biology what drives the central nervous system (CNS)? The answer is critical because it explains why our therapies are so effective. **The central nervous system is driven by the environment!**

Receptors

Receptors are neural structures that transduce an environmental stimulus to an electrical message. There are differing receptors to transduce different types of environmental stimuli. The retinal receptors transduce light and the auditory receptors transduce sound etc. These are receptors that perceive the external environment but there are receptors that perceive the internal environment of the animal. Temperature, pH, hormone levels etc.

As sensory information enters the chord and brainstem via a sensory neuron it diverges via collateralization. In other words one sensory neuron will synapse with many post synaptic neurons who will in turn synapse with many other post synaptic neurons which will modulate the **central integrated state** of each neuron in its path. The central integrated state of a neuron can be defined as the sum total of all the excitatory and

inhibitory influences on the neuron. The central integrated state of a neuron will determine the probability of that neuron firing.

If there is a decreased frequency of firing of any sensory receptor the post-synaptic pool of neurons will at some point undergo **trans-neural degeneration** leading to cell death. All neural tissue needs oxygen, glucose and active electrical stimulation to remain healthy. When a neuron is fired there is immediate early gene responses which direct the production of new protein within the cytoplasm. This protein is used for structural purposes as in the production of mitochondria, which metabolizes glucose to produce ATP. This ATP is used in part to run ion pumps that maintain the electrochemical environment of the cell. Protein is also greatly responsible for the negative charge within the cell. With decreased frequencies of firing secondary to loss of receptor stimulation protein production is slowed or stopped and the numbers of mitochondria within the cell become less. With less mitochondria there is less ATP produced to power the ion pumps. Hydrated Na⁺ ions now accumulate within the cell. Less protein means less negativity within the neuron. As the equilibrium potential of the cell is slowly lost the neuron begins to swell. The next step is cell death. **It is the environment that keeps our animals alive!**

Sensory information **diverges** all the way to the cortex. It is at the cortex that a response to the incoming sensory information is initiated. The cortex fires back down through motor pathways to **converge** on two motor output systems. **There are only two output systems from brain.** One motor output system is to **somatic muscle** via the ventral horn and the other is to the **autonomics** via the intermedial cell column. This makes great sense. As the animal moves in response to environmental stimuli there is concurrent activation of the autonomic system to support that movement by shunting blood to the appropriate muscles, releasing glucose stores, increasing cardiac output etc.

Sensory information from the environment is transduced to an electrical message that diverges to many post-synaptic neurons that allows integration as well maintaining the health of those cells. At the cortex a motor response is sent through a converging system to effect somatic muscle and the autonomics.

We're All Receptor Therapists!

At some level all doctors are trying to have an affect on central integration or a motor output system. Most injuries are a failure of somatic muscle to fire at the right time and at the right amplitude to support a joint against the forces of movement and gravity. All healing involves the immune system whose function is modulated by the nervous system. All disease is a breakdown in efficiency of the nervous system to maintain homeostasis under existing genetic and environmental conditions.

In one way or another we are all influencing the central integrated state of the neuro-axis of the animal patient. If we use nutritional therapies we are positively affecting receptors that measure the internal environment of the animal. If we use acupuncture we affect receptors directly with the application of needles or indirectly by changing fields which influence the central integrated state of neurons. If we use drugs we affect receptors by influencing receptor sensitivity or by increasing or decreasing the frequency of firing of pools of neurons.

Changes in central integration of the neuro-axis can be measured. Since there are

only two output systems from the CNS, these output systems are a window to central integration. **By measuring changes in autonomic function and somatic muscle strength, before and after application of a modality, the efficacy and appropriateness of that modality can be determined.** Examples of autonomic windows include pupillary reflexes, venous/arterial ratio at the retina, blood pressure, heart rate, ECG's, baroreceptor response, skin changes, coat changes, etc. Somatic muscle testing can be employed using applied kinesiological methods or indirectly by palpation, flexor reflex afferent testing, gait analysis etc. All good physical exam procedures are essentially an evaluation of end organ function, which is dependent on the frequency of firing of pre-synaptic pools of neurons to that end organ.

All of us effect receptors whether we recognize it or not. By appreciating our impact on central integration when we apply our individual treatment protocols to our animal patients we can better understand why are treatments are more or less effective under differing circumstances. We can also appreciate that other healers, using different tools, are affecting the same central integration. There are times when one way into the system may be more appropriate and effective.

About the author

Dr. Carl J. DeStefano graduated Cum Laude from the National College of Chiropractic in 1984. He is certified in Animal Chiropractic from the Options for Animals Veterinary Chiropractic Center. He has also completed all the educational requirements for the Diplomat program sponsored by the American Veterinary Chiropractic Association. Dr. DeStefano was an instructor in the Options for Animals Veterinary Chiropractic course until 1998. In 2001, Dr. DeStefano joined the faculty of the first University sponsored Veterinary Manual Therapy program at Colorado State University where he taught technique and functional neurology. Dr. DeStefano is also on the faculty of the State of Wisconsin licensed Veterinary Manipulative Therapy program offered through the Healing Oasis in Sturtevant, Wisconsin where he also teaches technique and functional neurology. Dr. DeStefano participated in the Animal Chiropractic program at Tufts Veterinary School in 2003 by teaching neurology and technique. He teaches post-certification classes to Veterinarians and Chiropractors in the specialize area of Applied Kinesiology and Neurology.

He also teaches seminars on the diagnosis and treatment of allergies in animals. Dr. DeStefano has completed all course requirements towards his board certification in Chiropractic Neurology from Logan University of Health Sciences and the Carrick Institute. He is also enrolled in the Masters Degree program in Neurology offered by the Carrick Institute. Dr. DeStefano maintains a busy human and animal practice near Chicago, Illinois.