

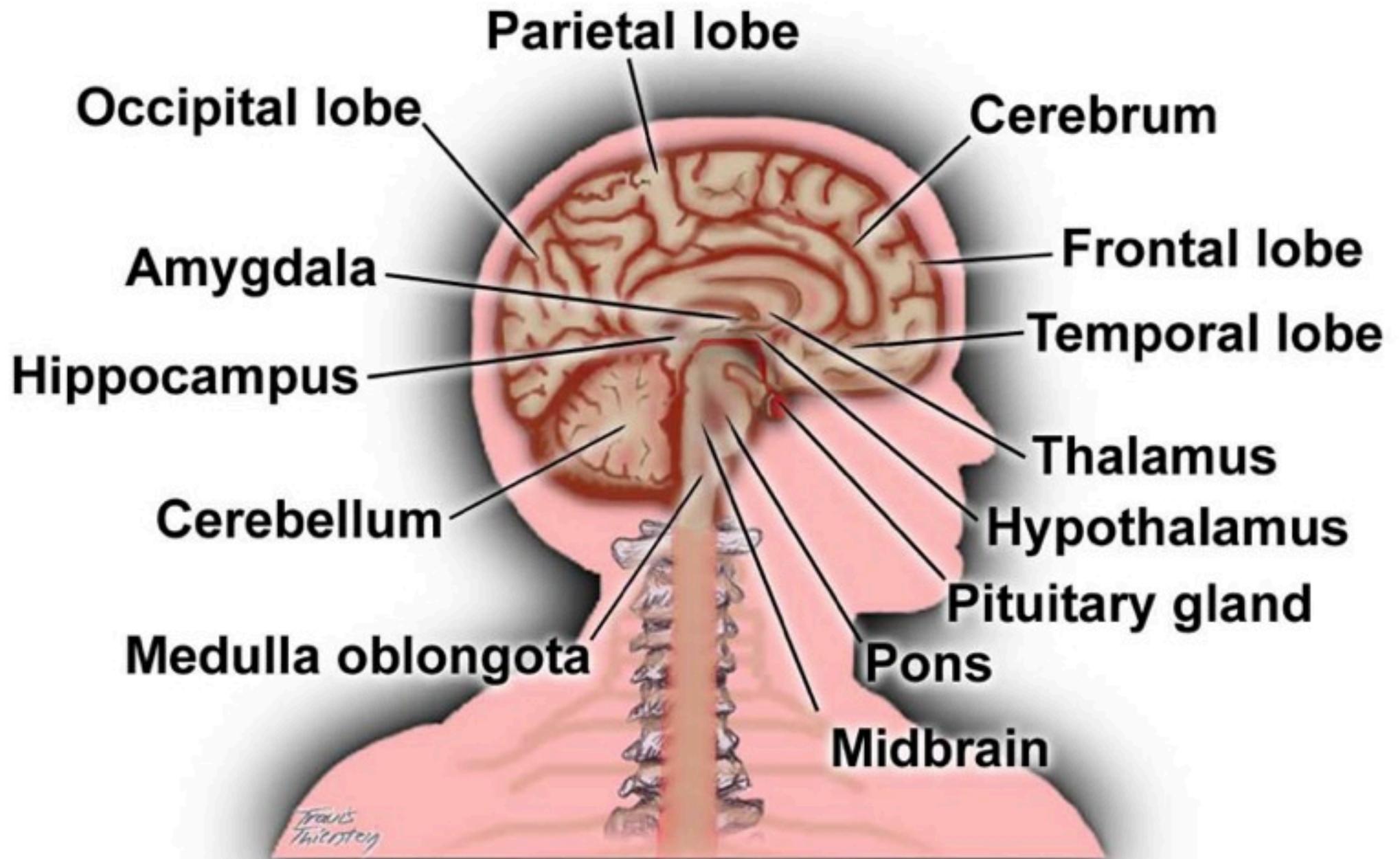


Sensory Integration

- Nourishment for the Nervous System
- Begins in the Womb
- Making the “whole” from the “parts”
- Play and Fun in a safe supporting environment
(this includes physiological environment too !)
- Tactile, auditory, visual and other sensory inputs affect higher brain development
- Is the basis for reading, writing, learning and social behavior

The Nervous System and SI

- Learning and behavior are the manifestation of SI. Higher functions of the brain evolve from lower sensory functions. Higher cognitive functions and emotions are linked to the basic sensory development of movement, tactile perceptions and proprioception.
- Via sensory neurons 80% of the nervous system is involved in SI. The spinal cord, brain stem, cerebellum and cerebral hemispheres process sensory input to influence awareness, perception and knowledge. This is further integrated with thoughts, emotions, memories and learning as well.



The cerebral Hemispheres have the most mass of the brain. The most complex SI processes occur here. This SI gives us meaning to senses and allows us to plan, perform and integrate thoughts, feeling and actions. Within the hemispheres lies the **limbic system** integrating emotional memories with our sensory input linking emotions to memories and activities we perform. The **frontal lobes** “angel lobes” are areas of the highest sensory processing linked to moral behavior and higher creative functions. These structures often do not integrate well in some sensory processing disorders

Lateralization of the Brain - “Seeing the Forest from the trees.”

-The two hemispheres of the brain serve different functions. Right sided and left sided functions are in mirror image.

-By age five the Left hemisphere is dominant in most people. It is the language center and area of abstract thinking. It starts to dominate with learning to walk and speak. The right hemisphere dominates spatial experience, artistic, synthetic and holistic thinking ! So, for example listening to music the Left brain allows us to distinguish tones and variations of sound while the right brain allows us experience the quality of the whole symphony of sounds. Detailed spatial perception and learning require coordinated lateralization. SI disorders of the brain stem greatly affect learning via the poor lateralization processing.

-The **spinal cord** is full of sensory and motor nerve tracts to muscles and organs. Little SI takes place there.

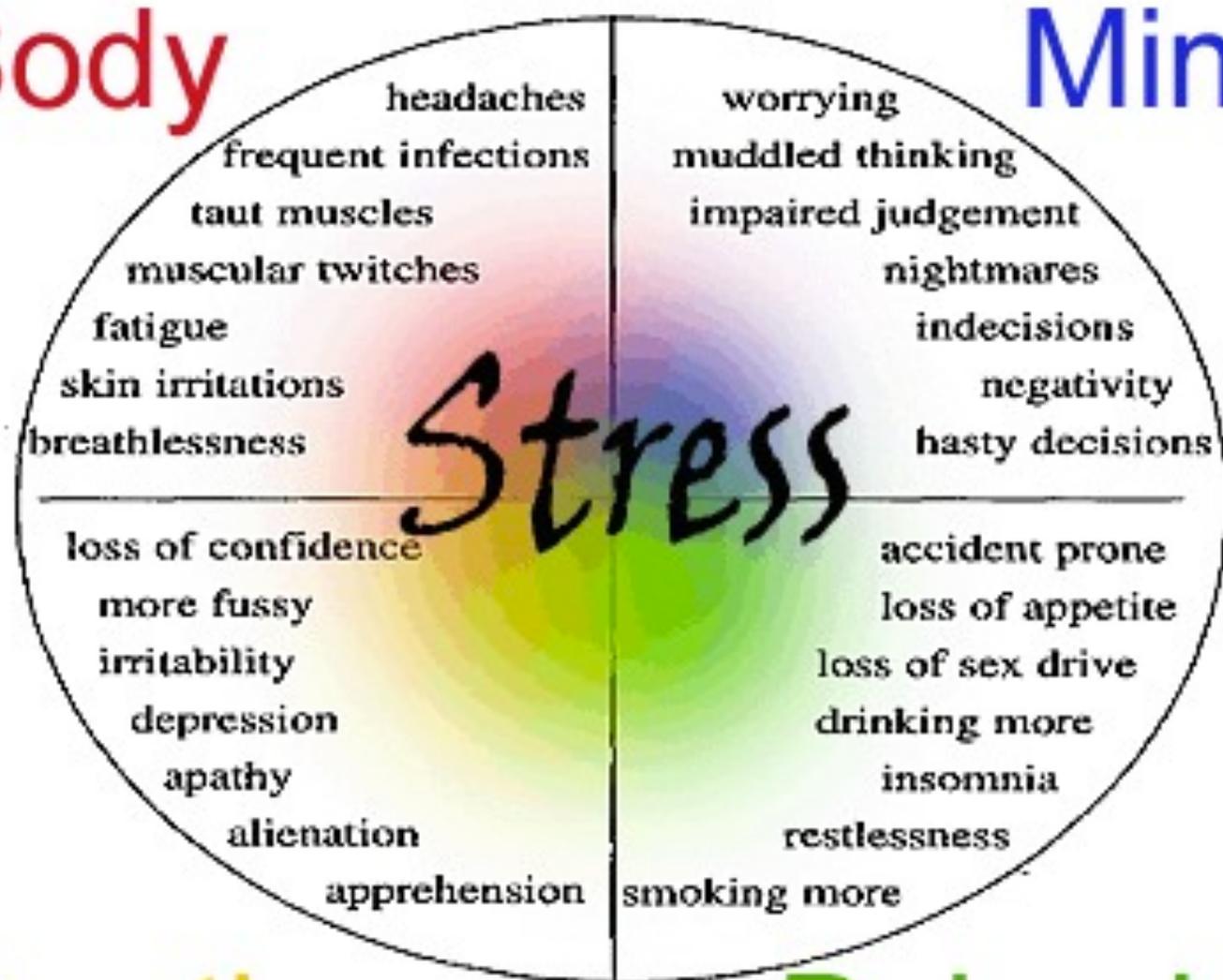
-At the level of our ears. The **brain stem** is full of nuclei for first level SI. Most brain stem SI is automatic and connects to primal responses. The reticular (netlike) formation resides here. Organ systems are regulated here as well as arousal centers. A person can become over excited, aggressive or hyperactive if the reticular centers aren't functioning well. We see this in sensory processing disorders. Via the hypothalamus the sympathetic and parasympathetic systems (Autonomic System)

connect to our metabolic, respiratory, circulatory, and thermoregulatory systems.



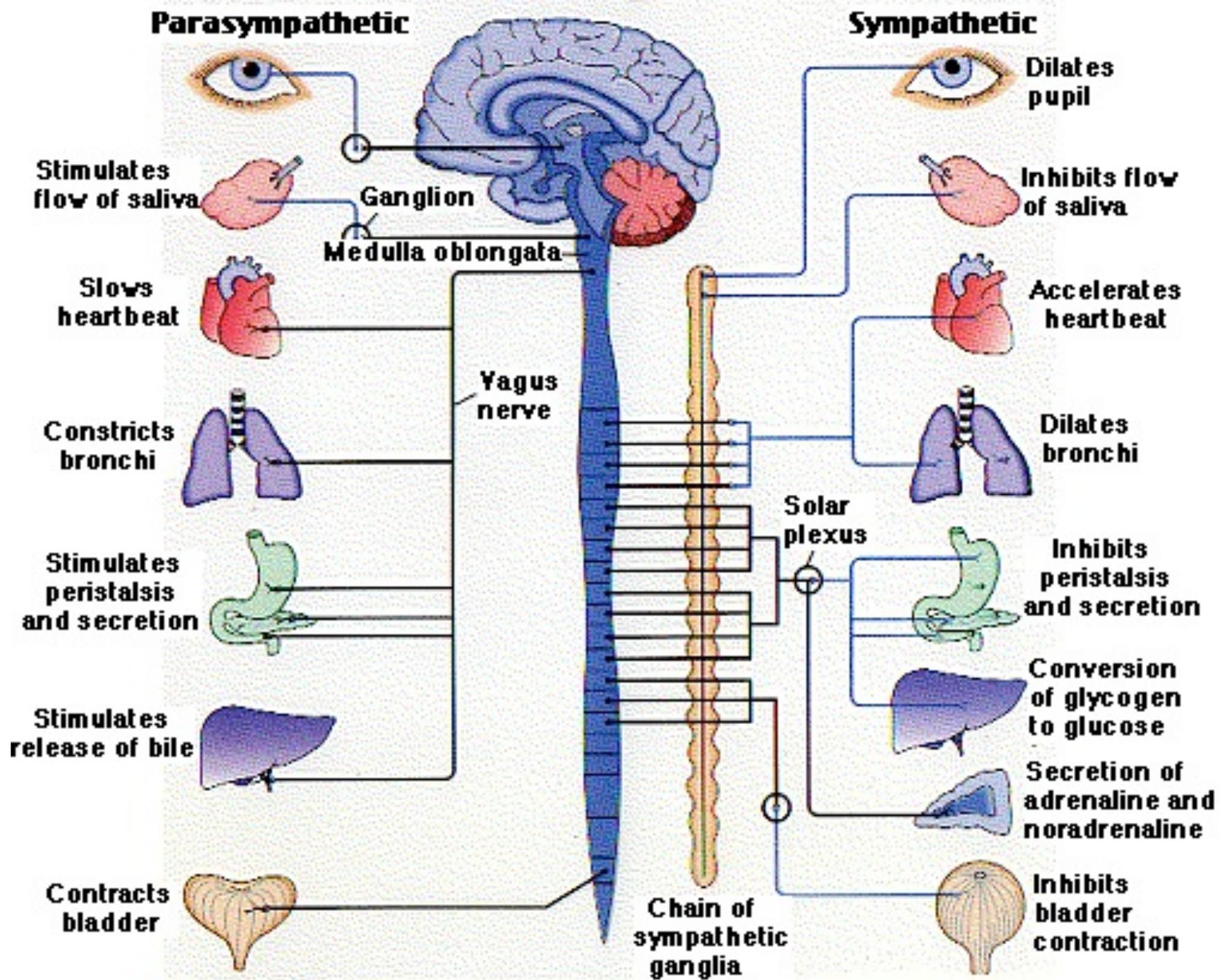
Body

Mind ^x



Emotions

Behavior



Damage to sensory integrative pathways can lead to increased stress responses related to anxiety, depression and difficulty with social cues. Especially when limbic and frontal lobe pathways are involved.





Levels of Consciousness - Not Intelligence

In Anthroposophic Medicine we relate these areas to thinking, feeling and will impulses. Remedies and therapies are chosen to balance these “soul” or personal qualities of activity.

Upper Level	Cerebral Cortex	Waking Consciousness
Middle Level	Limbic System	Semi-conscious Dreaming
Lower Level	Hypothalamus Reticular form.	Unconscious ANS

The Early Childhood Environment

-Sensory stimulation and motor activity during childhood will create interconnections between motor and sensory neurons.

-We are born with most of the neurons we will have but the interconnections must be formed. How the quality of sensory experiences effect us is debated. But every experience creates a new element or possibility of neuronal connection.

-By age 10 most of our sensory and motor neuron connections are complete.

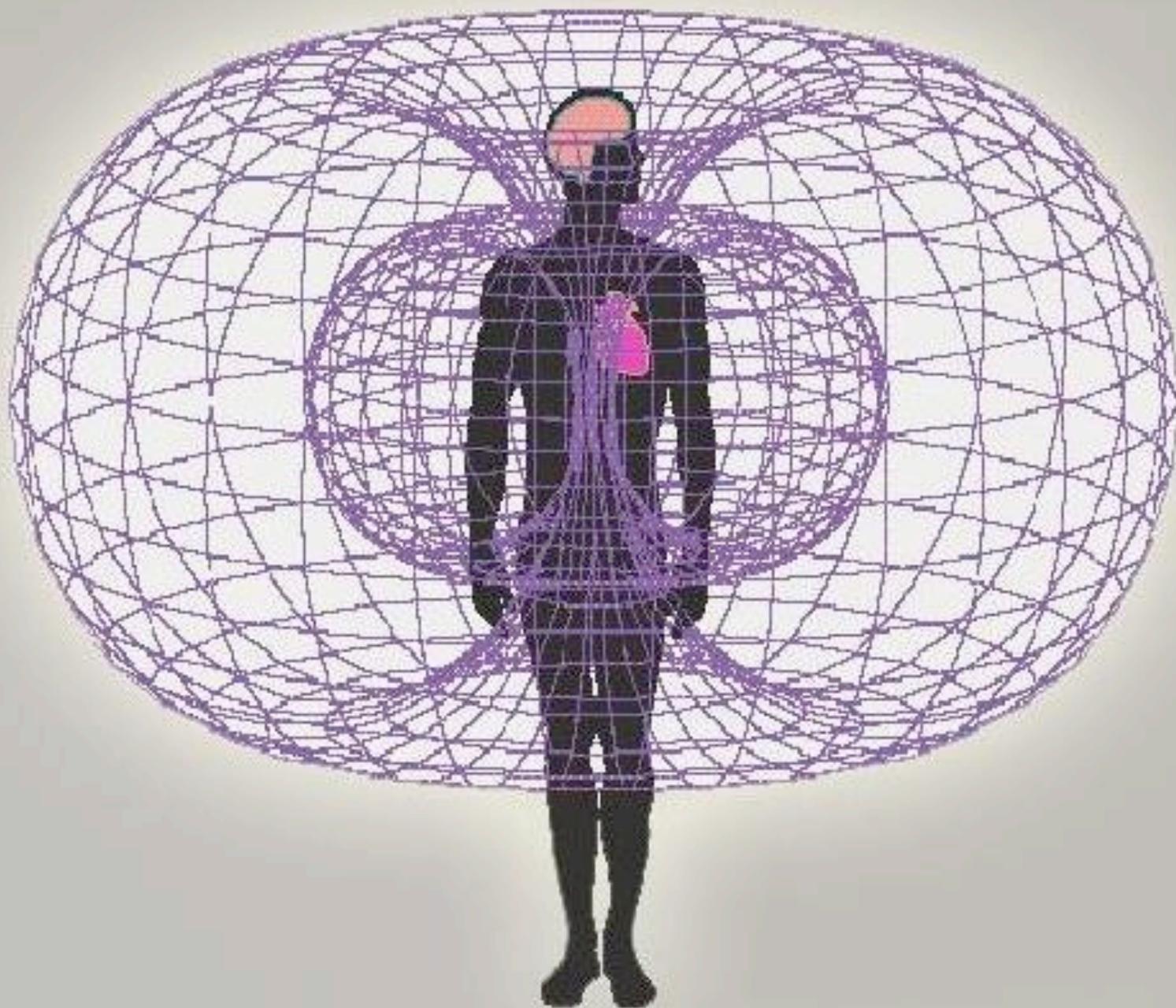
-The more we can identify “stresses” to SI in early childhood the more successful we are with therapy. Environmental, nutritional, biochemical and other stresses need to be considered.

After this time we have to change or “habits” ourselves through our own activity !!!!!

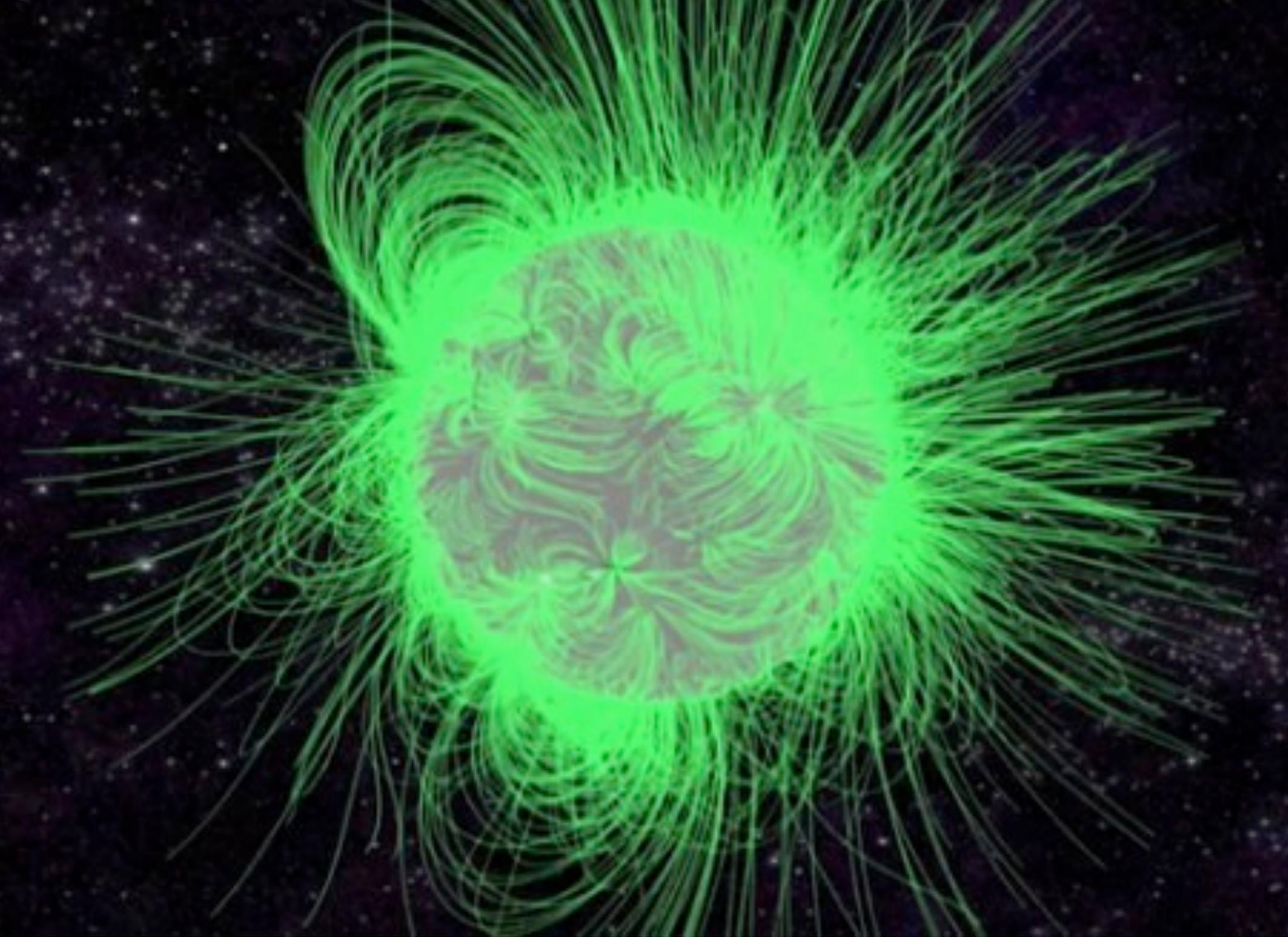
● Heart Rate Variability

- Heart rate variability is a measure of the time intervals between heart beats. HRV has shown to be a predictor of mortality after myocardial infarction, sids, diabetic neuropathy, CHF, exercise performance, depression post-operatively and several ^{Text} others markers of health. It is a good measure of stress response including post-traumatic stress, attention/focus, anxiety and arousal.
- HRV is controlled via inputs of the parasympathetic and sympathetic nervous systems. ***Factors that affect the input are the baroreflex, thermoregulation, hormones, sleep-wake cycle, meals, physical activity, and stress.***

The electromagnetic field of the heart

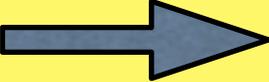
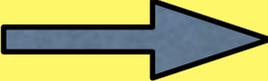
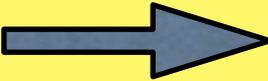
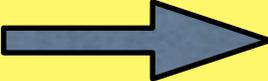


- Decrease in Heart Rate Variability is a biological signal of loss of homeostasis and a warning sign for loss of autonomic regulation . It has been shown that through biofeedback, neural feedback and processes that achieve electrical congruence of the heart and brain homeostasis and autonomic regulation can be restored and balanced with less stress on the body mental and physical.
- The glial cells (metabolic support to neurons) of the brain respond to the electromagnetic field of the heart which is altered in connection with HRV.



Meditation and Prayer

- Meditation and prayer as an art of relaxation and self-determination and present mindedness where life is truly lived.
- Healthy breathing is a reflection of heart and mind in congruence. Heart rate Variability reflects the balance of autonomic nervous system
- Breathing and pulse come into a healthy ratio of 5:1 when autonomic balance is achieved. Here stress responses are diminished and physiological balance is achieved. ***Posture reflects breathing !!!***

- Etheric (Chi) - Life 
- Human Body 
- Memory 
- Growth - Regeneration - Vitality 
- Through “action” “self-adaptation” we can build up our vitality as we age. Heart and mind must come together in “congruence” !

Seven Exercises for Nervousness

- Picture/Recreate an event of the day
- Change a letter or style in handwriting
- Imagine the day, music, story in reverse
- Change ourselves (gait, grooming, posture)
- Forgoe a personal desire (do no harm)
- Before acting see multiple points of view
- Refrain judgement (9/10 self preserving)
- ***Note all steps are active not passive !

How Do We Find the Good In Life ?

-Not in Thoughts (duality) non-judgement !

-Not in Feelings (duality) empathy not sympathy and antipathy !

Only in sincere “deeds” can we find the good (warmth-sacrifice-love) equanimity.

Peace Prayer of St. Francis of Assisi

Lord, make me an instrument of your peace;
where there is hatred, let me sow love;
when there is injury, pardon;
where there is doubt, faith;
where there is despair, hope;
where there is darkness, light;
and where there is sadness, joy.
Grant that I may not so much seek
to be consoled as to console;
to be understood, as to understand,
to be loved as to love;
for it is in giving that we receive,
it is in pardoning that we are pardoned,
and it is in dying that we are born to eternal life.



