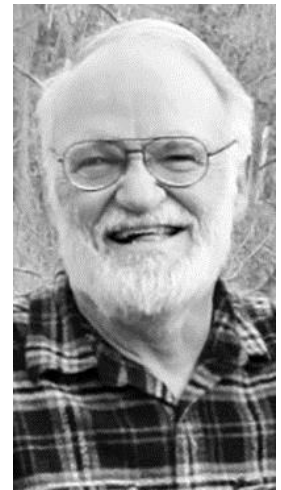
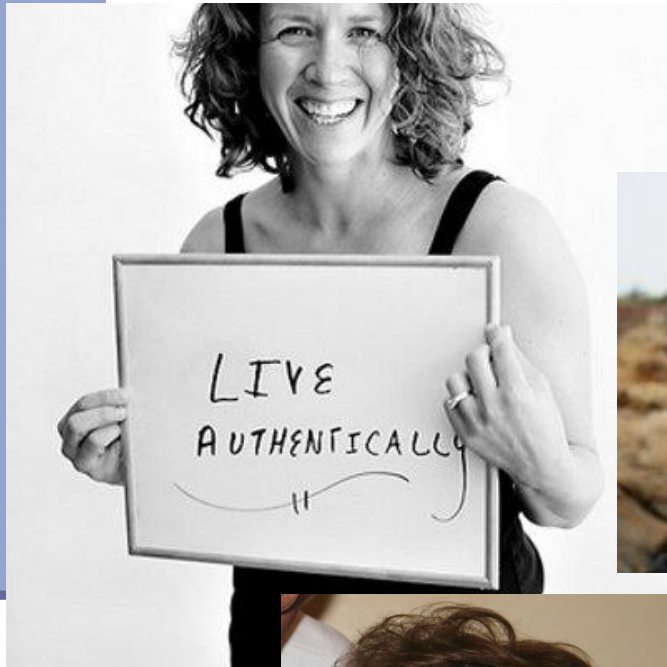
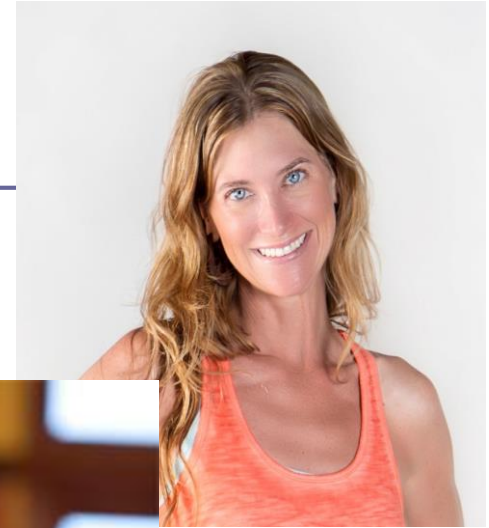


The Neurobiology of Traumatic Stress and the Healing Power of Yoga



Janine M. D'Anniballe, Ph.D., RYT
Director of Trauma Services
Mental Health Partners, Boulder Colorado



"yoga teaches us to
cure what need not
be endured and endure
what cannot be cured."

-B.K.S. Iyengar

What is Trauma?

❑ Shock Trauma

- ❑ Overwhelms ability to cope
- ❑ Danger to life, or bodily safety
- ❑ A person is unable to bring body and mind back into balance after the event is over

❑ Developmental Trauma

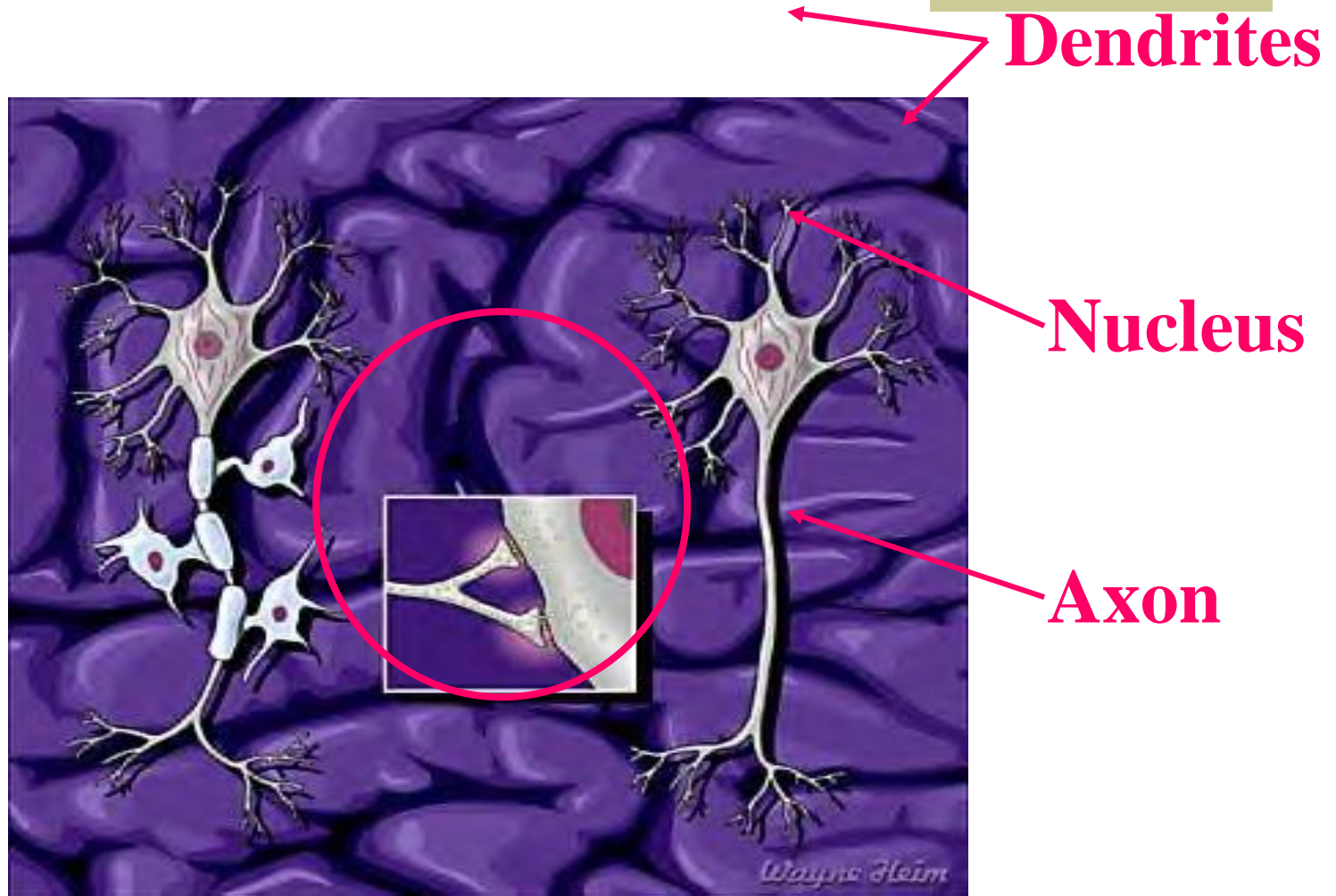
- ❑ Chronic misattunement between child and primary caregiver

What is Trauma?

- Physical abuse, sexual abuse, neglect
- Domestic violence
- Stalking
- School or gang violence
- Divorce/custody battle
- Kidnapping
- War
- Natural Disasters
- Immigration
- Serious health issues
- Severe accidents
- Witnessing or hearing about any of the above

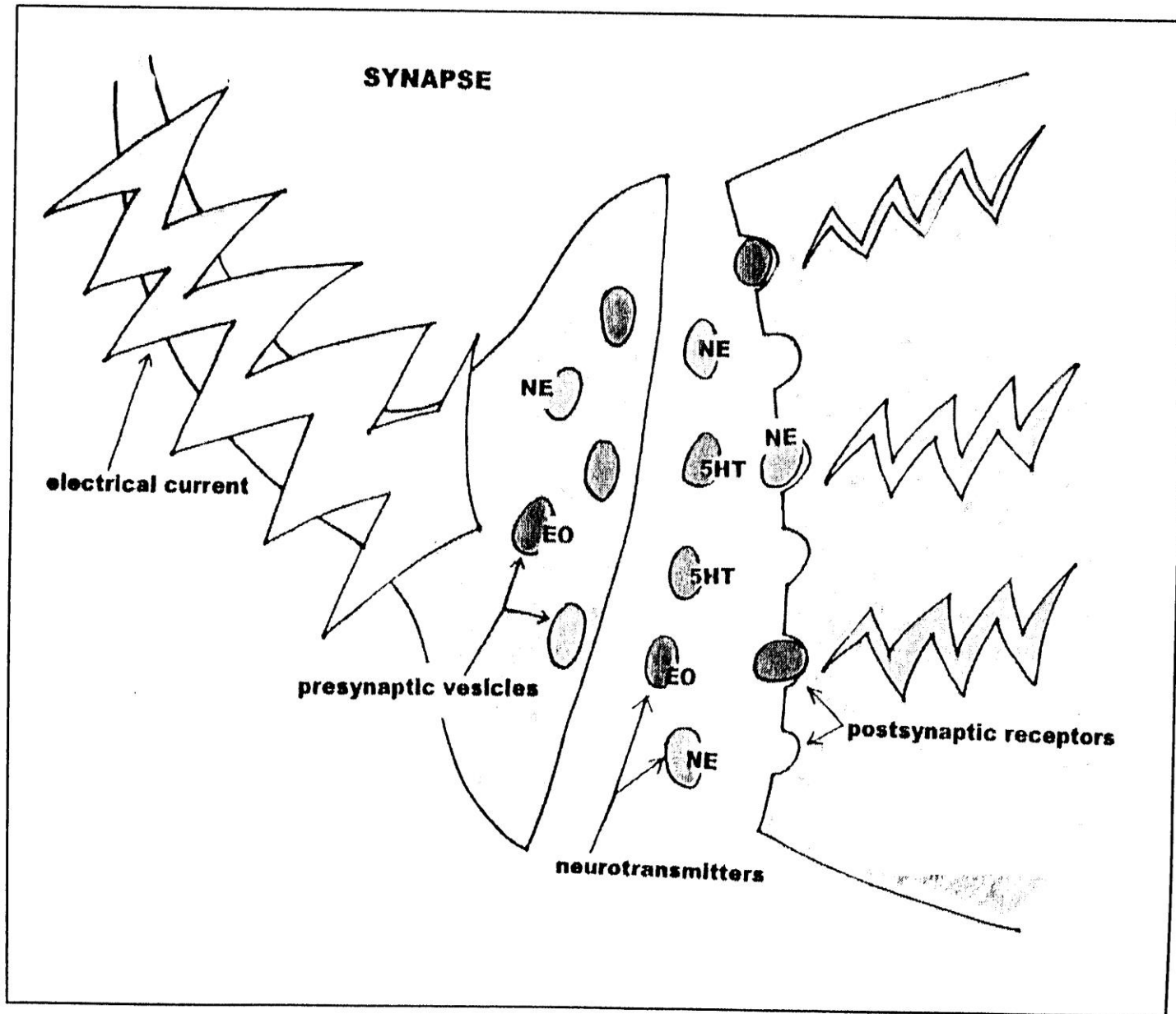


Neurobiology of Trauma

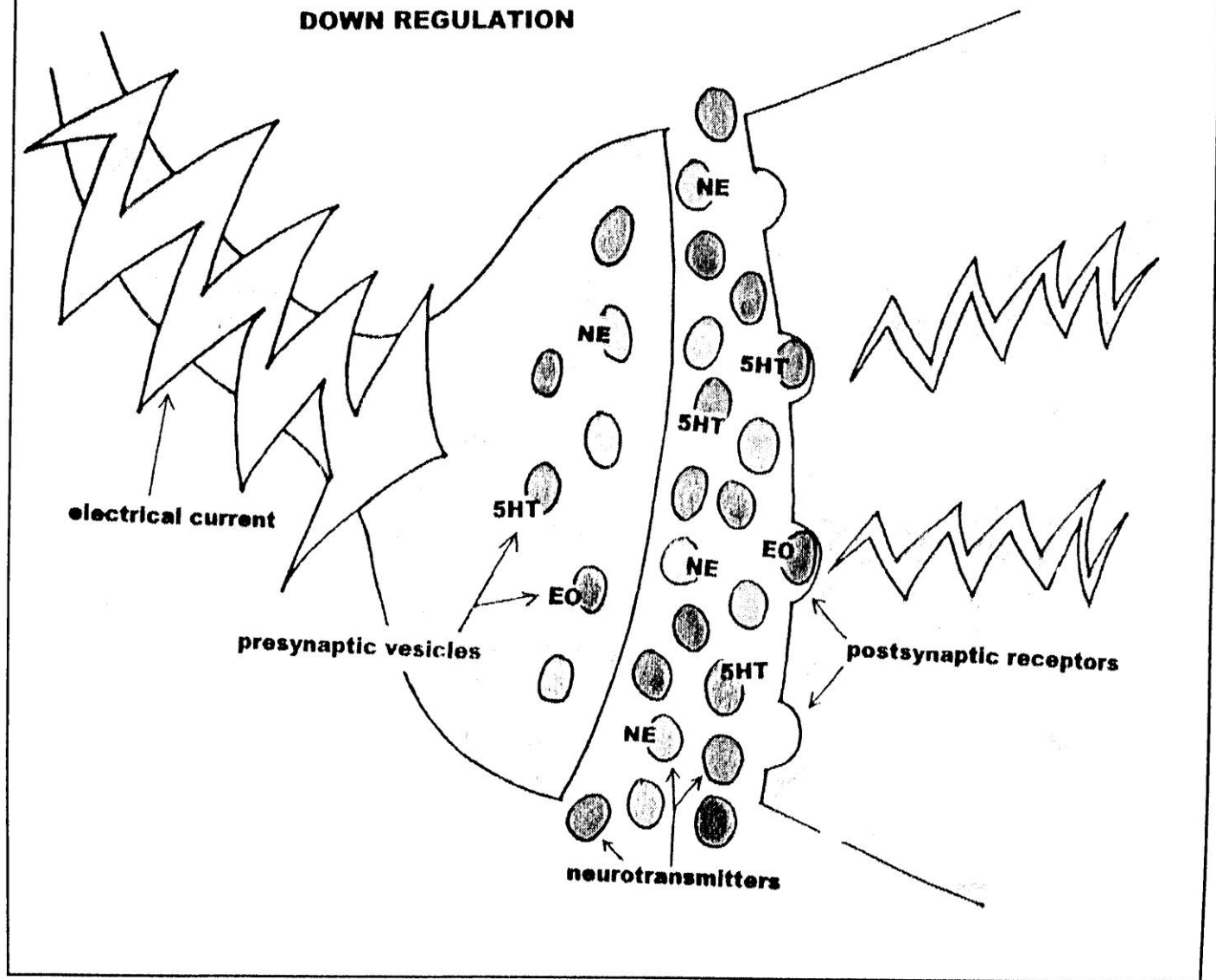


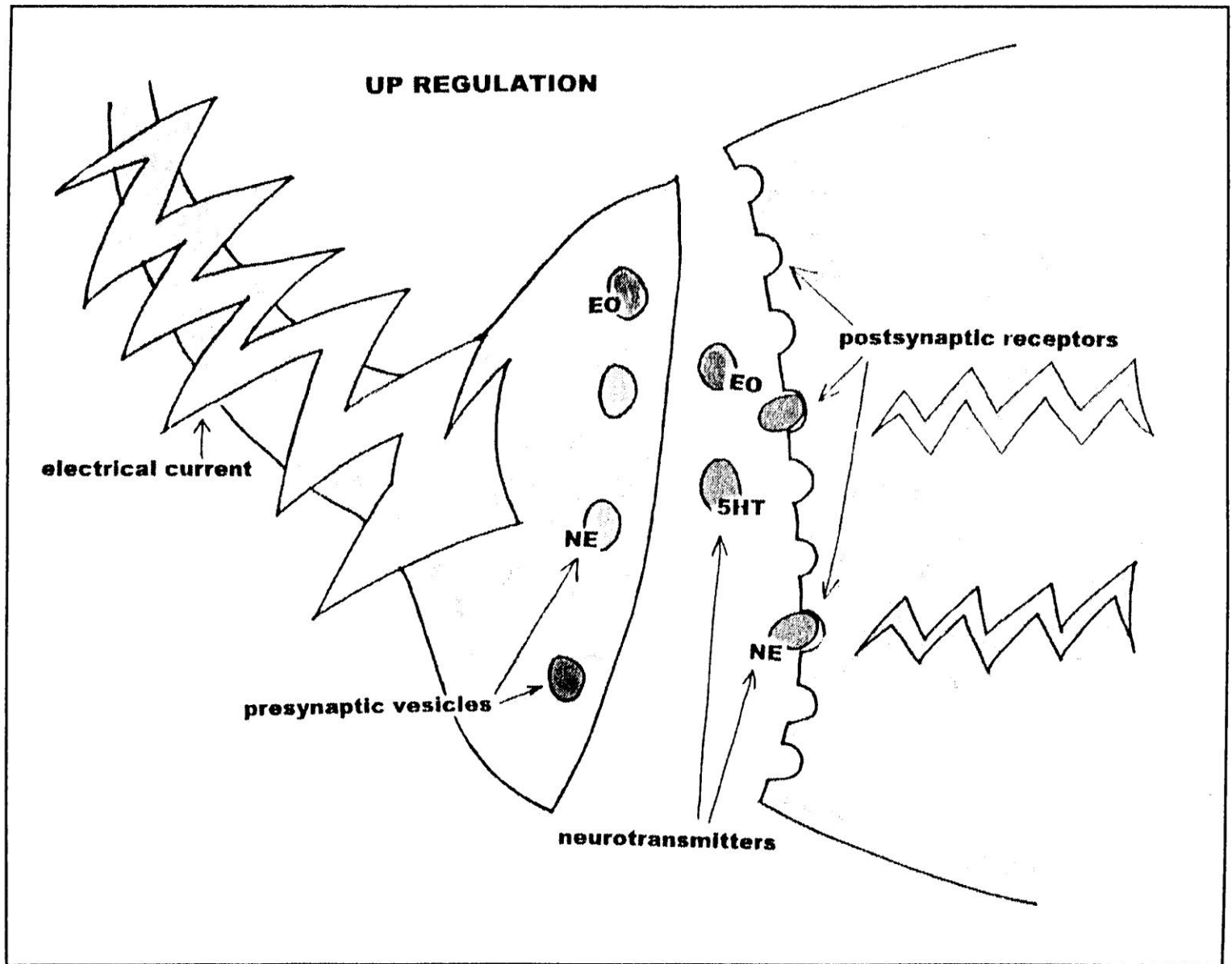
Synaptic Activity



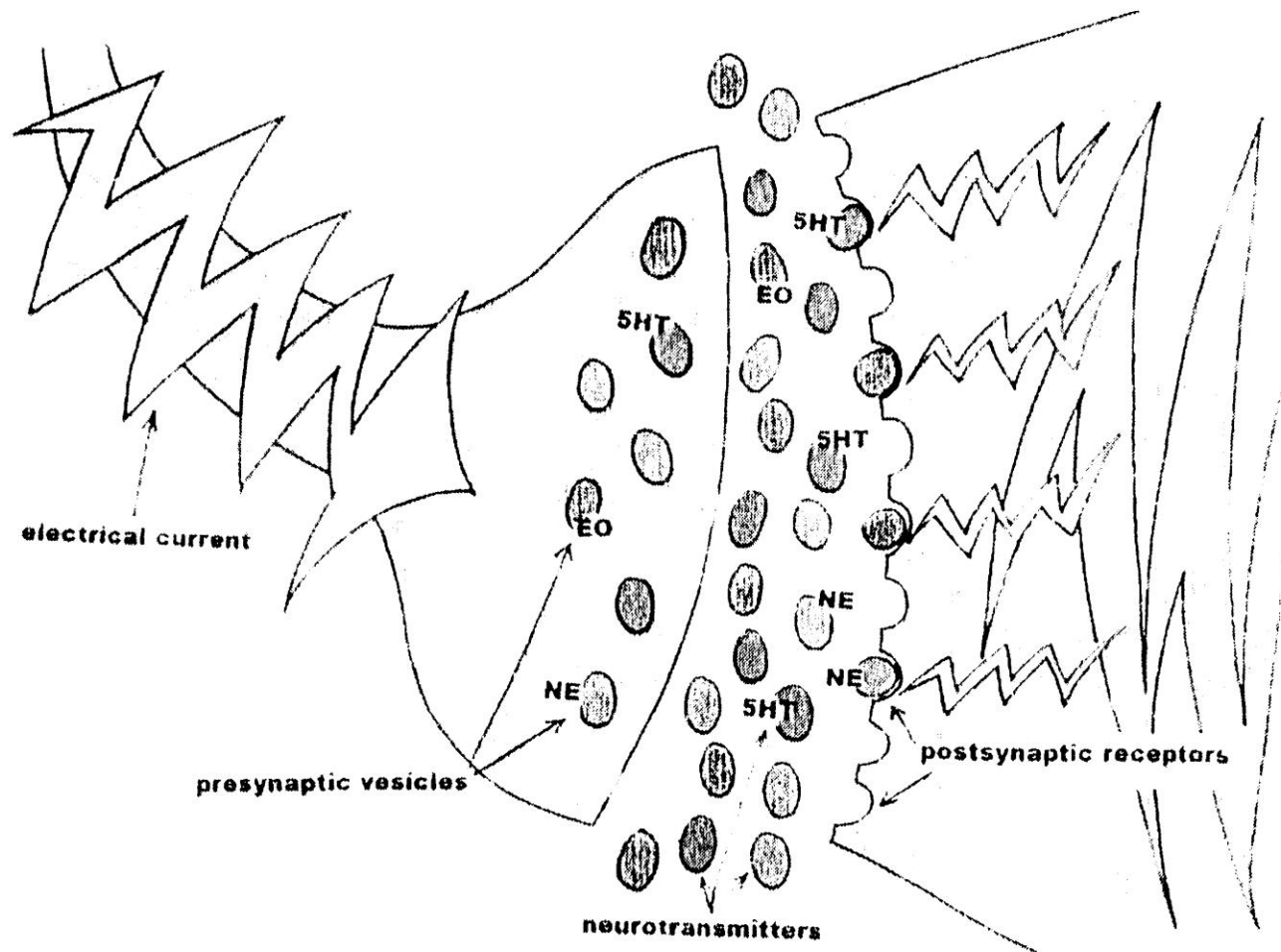


DOWN REGULATION





E. AMPLIFICATION



L. Langhammer

The Importance of Discharging after a Traumatic Event or Trigger

- Traumatic symptoms appear when energy mobilized for fight or flight is not discharged and remains stuck inside the body. This excess of energy causes the nervous system to be over activated
- People's presentation differs: they can look stuck on ON or stuck on OFF



High Arousal (Fear) = Impaired Prefrontal and Insular Cortex

- Stress chemicals disable the mid cortex and limbic brain takes over

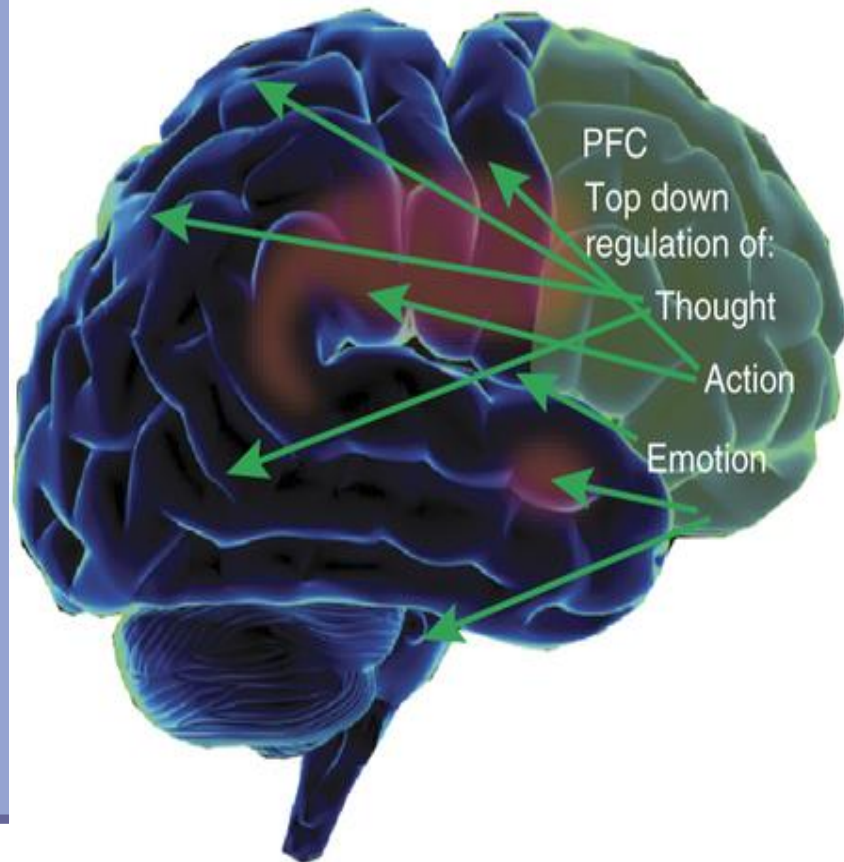
So what activates and rewires the Prefrontal and Medial Cortex?

- Meditation
- Mindfulness practices (Mono-tasking)
- Moving and focusing in new ways
- Conscious breathing

These behaviors kick-in “top-down” brain functioning versus “bottom-up” processing

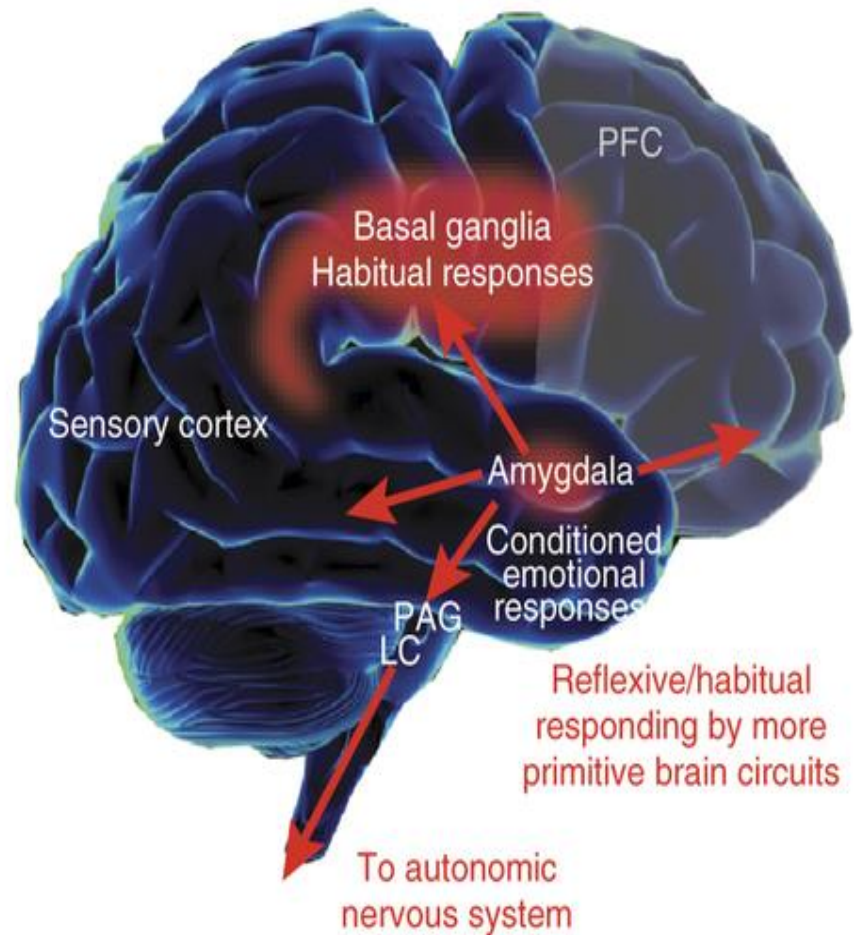
a

Alert



b

Stressed



The Insula Cortex or Insula

- **The Insula** is critical to relational functioning, empathy, connecting
- Helps us with:
 - Being able to focus
 - Interoception: tuning into bodily sensations
 - Memory and reason
 - Self-awareness, reflection, emotions, impulses
 - Empathy, compassion

What we can learn from animals and The Slinky



The Power of Yoga to Heal Trauma

Trauma = Split between mind and body
Yoga = Unifying mind and body

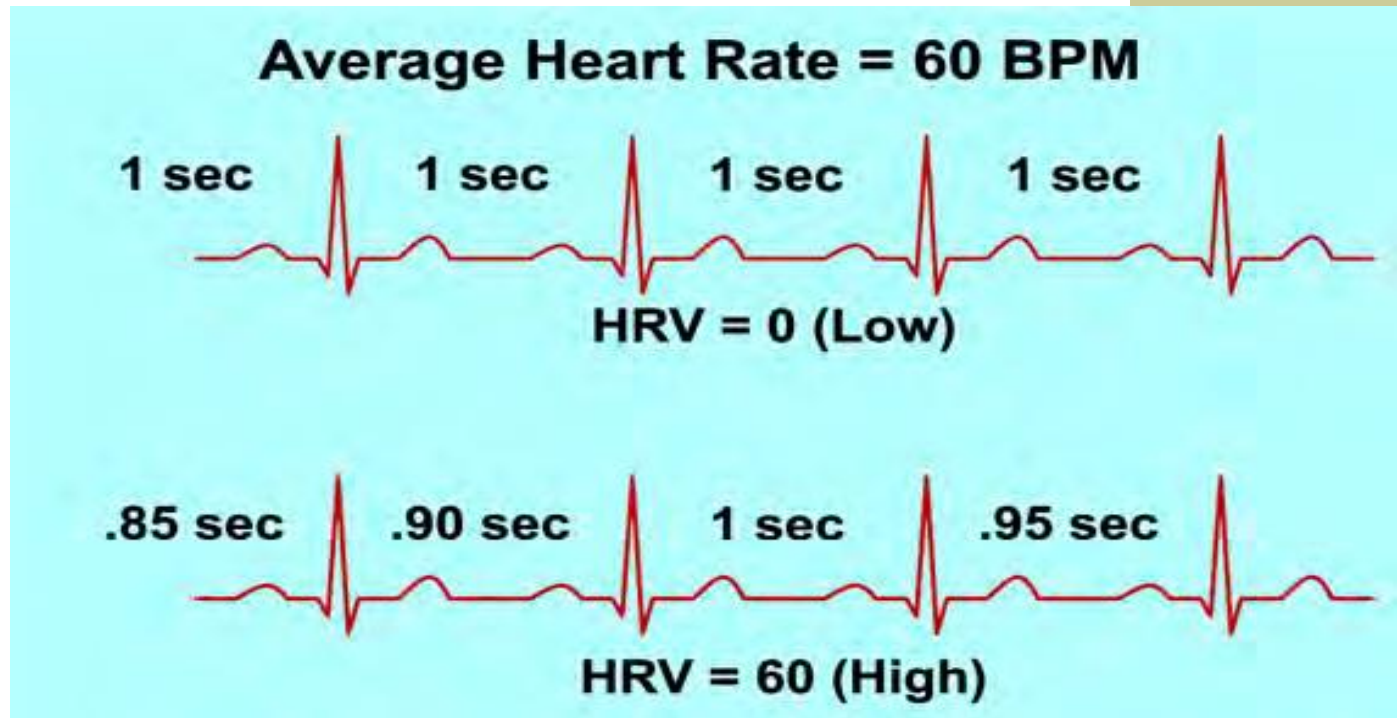


The Neurobiology of Yoga

- Yoga increases heart rate variability (HRV); an indicator of the body's ability to respond more flexibly to stress; the measurement of HRV is often applied as an index of autonomic nervous system (ANS) balance. ANS balance is important to balance flight, fight, and freeze response.
- Benefits of controlled breathing activates parasympathetic system similar to those receiving electroconvulsive therapy (ECT), and taking an antidepressant .



Yoga and Heart Rate Variability (HRV)



HRV is the variation in the time interval between one heartbeat and the next. When you inhale, heart rate speeds up; when you exhale it slows down. When HRV is high, a person experience lower levels of stress and great resiliency. Dozens of research studies show that yoga of all kinds (Vinyasa, Hatha, Yoga Nidra) increases HRV.

The Neurobiology of Yoga



- Yoga increases Gamma-aminobutyric (GABA) levels in the brain (measured by fMRIs)
- Low GABA levels are associated with depression and anxiety
- Activate the GABA receptors with ambien, xanax, or a glass of wine, and you get relaxed and sleepy. When these substances are constantly in the brain and then rapidly withdrawn, you suddenly have overexcited GABA receptors and you can get side effects such as [insomnia](#), anxiety

- Streeter et al., **Effects of Yoga Versus Walking on Mood, Anxiety, and Brain GABA levels: A Randomized Controlled MRS Study.** *The Journal of Alternative and Complementary Medicine*, 2010.

Yoga Down-Regulates the HPA Axis and the SNS



Transforming from the Sympathetic to the Parasympathic System

- The more anxiety we have, the less optimally our brains function
- **Sympathetic System** -
 - Ready to react, on alert, high arousal
 - Multi-tasking overload
- **Parasympathic System (PNS)** -
 - Relaxed, comfortable, intentional, optimal functioning
 - Yoga increases PSN dominance through vagus nerve stimulation



The Psoas: Muscle of the Soul

- Deepest muscle in the body
- Only muscle that connects the spine to the legs
- Connects to the diaphragm through fascia and affects our breath and fear reflexes
- Forms prenatally the same time as the limbic brain
- Constant contraction due to stress causes the muscle to shorten leading to low back pain, hip or knee pain, menstruation and digestive issues.
- Contraction can signal danger; can exhaust the adrenals and deplete the immune system.

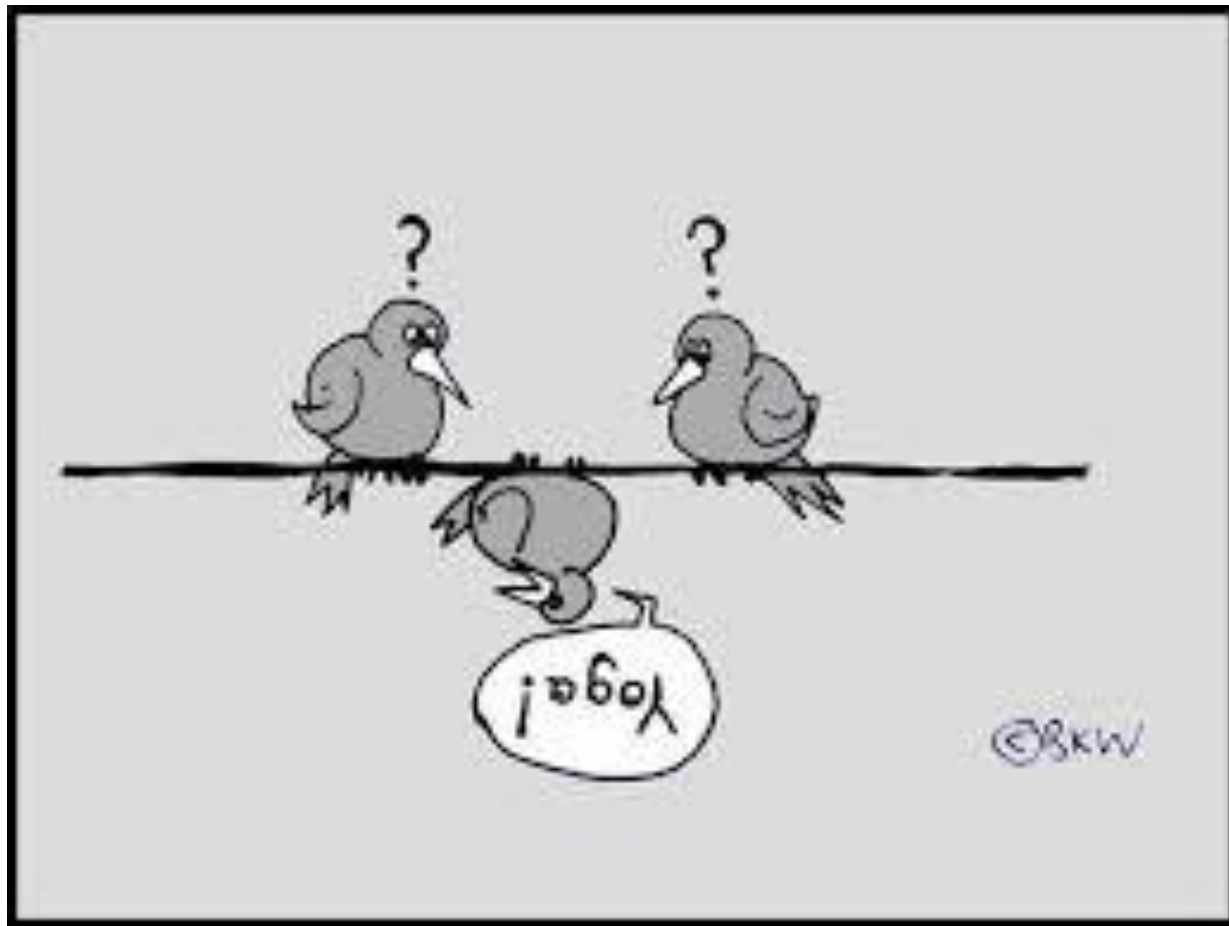


Three-Part Yogic Breath – Dirga Pranayama



When asked to slow the rate of breathing and expand breathing volume – this activates the parasympathetic nervous system and the Vagus Nerve.

Cellular Awkwardness is Necessary for Change



Yoga is a physical practice that teaches you how to get through psychological and physiological stress



Yoga works, not because the poses are relaxing, but because they are stressful. The shaking or the tinkling that happens in poses helps to release energy.

Yoga Helps to Develop Interoception: Befriending the Body

- Healing happens when one experiences sensation (stress, discomfort) and instead of backing away (disconnecting, dissociating) – you move **toward** and **stay with** sensation.



More Benefits of Yoga to Mitigate Effects of Trauma

- Research shows that yoga decreases oxidative stress in the cells after an eight week practice. Less inflammation, less cell damage, less acidity in the body = health



Janine and Scout Practicing

Grounding into the Physical Body

Many trauma survivors develop patterns of disassociation or disconnection from their physical bodies – a necessary survival mechanism to make it through the traumatic event.



Yoga poses that help to gradually re-establish a healthy grounded connection to the earth and resourcing in the physical body are critical to promote healing.



What are the core principles of Trauma-Informed Yoga?

- Helping people connect with and find safety in their bodies
- Inviting people to be in contact with their emotions without lashing in or lashing out (finding equanimity)
- Teachers assist with helping people **resource**



What are the core principles of Trauma-Informed Yoga?

- Help **orient students to time and space** and using their senses to stay present (related to the muscle of the neck and upper back)
- **Cultivate groundedness**; anxiety and dissociation move up the body. (related to the legs and feet).
- **Cultivate centering** - knowing one's existence and personal power (related to the muscles in the abdomen).



Trauma-Informed Yoga focuses on helping people to **resource** in their body

- Trauma + No Resource = **Trauma Symptoms**
- Trauma trigger + No Resource = **Trauma Symptoms**
- Trauma trigger + **Resource** = **HEALING**
😊

Important Trauma-Informed Yoga Practices for Teachers

- Choice
- Control
- Boundaries
- Language of inquiry
- Predictability
- Making the stakes low
- Be mindful of pace
- Hands off assists



References

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Bringing the Body into Treatment
-David Emerson

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Yoga: Reclaiming Your Body
**- David Emerson and Elizabeth
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The Body Keeps the Score:
Brain, Mind, and Body in the
Healing of Trauma
- Bessel van der Kolk



Contact Information:

Janine M. D' Anniballe, Ph.D., RYT
jdanniballe@mhpcolorado.org