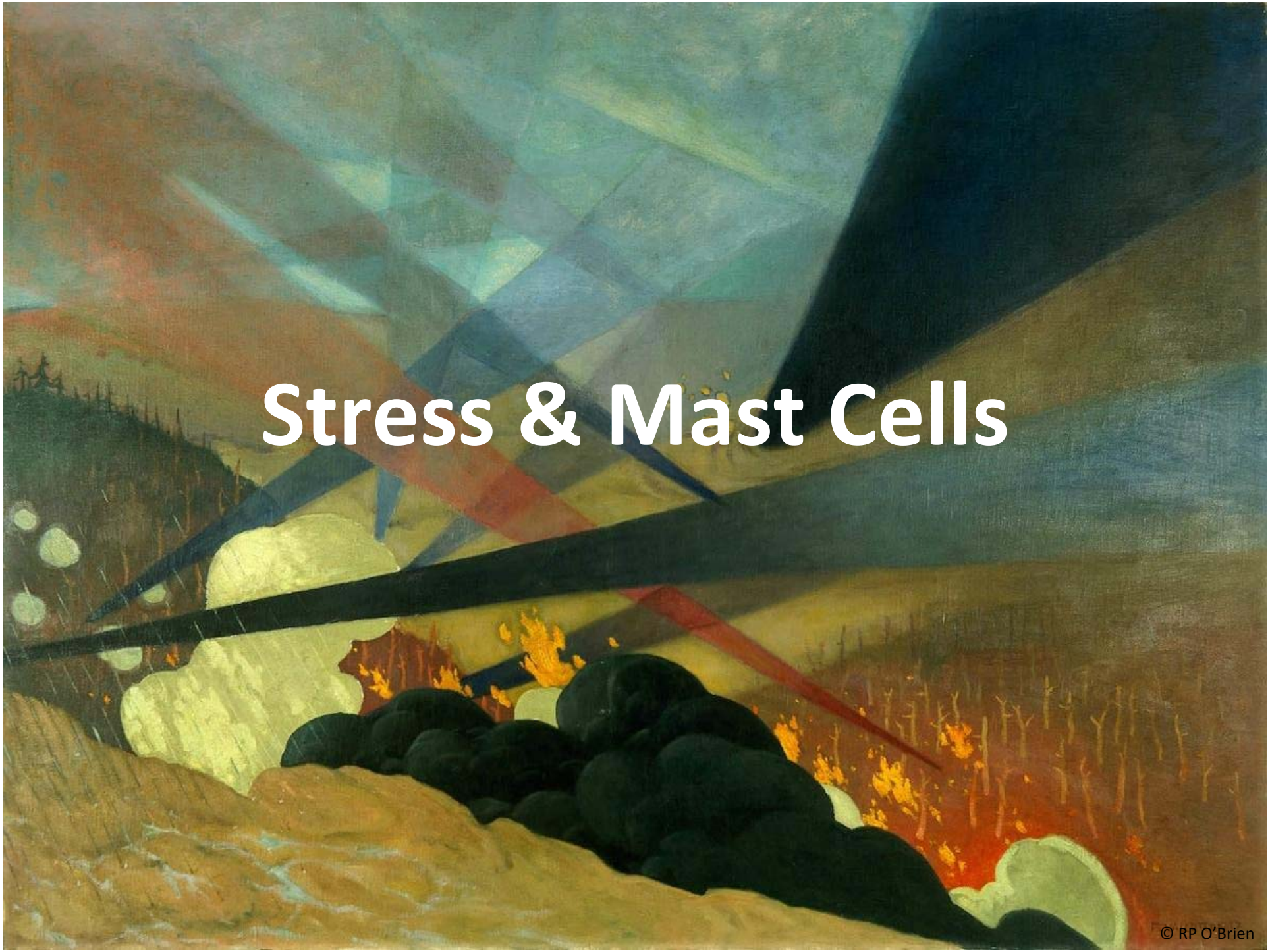
Stress & Mast Cells
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About:

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CELA - The Center for Expressive Living

& Creative Arts

https://celaonline.com

The Counseling Center at CELA

https://counselingatcela.com


See the light
IN EACH OTHER.
Be the light
FOR EACH OTHER.

Road Map:

What Mast Cells are & What they Do

How Cells Communicate

What is Mast Cell Activation & Why does it Matter?

Terminology: 4 Important Words

Mast Cell Activation in 4 Steps

Mast Cell Mediators

Stress & Mast Cells

Strategies & Game Plans

Tools for your Toolbox

Mast Cells Are:

- A type of white blood cell
- Found in the connective tissue throughout the body
- Found in every organ system including the brain
- Part of the body's immune response
- Part of the body's inflammatory response
- The body's 1st responders to perceived dangers and threats

Things Mast Cells Do:

- Body's 1st line of defense against viruses, bacteria, foreign substances, pathogens (our immune response)
- Help protect the body against things like bacteria, viruses—it "adapts" to the specific danger it encounters (adaptive immune response)
- Regulate blood pressure
- Regulate wound healing
- Regulate the body's inflammatory response
- & more

How Cells Communicate:

- Through the nervous system
- Sending signals in different ways
- By being physically in close proximity to other cells (called paracrine signaling)
- Brain to cell / cell to brain direct communications
- Through neurotransmitters (e.g., serotonin, dopamine, histamine)
- Chemical signaling

The Nervous System

What it is & What it Does

Our nervous system is in charge. It runs everything and allows us to do everything—move, eat, feel, think, digest, breathe, have memories and remember, sleep, sense and interpret what we see, hear, taste, touch. It responds to stress, stressors, and to stressful situations.

The nervous system is divided into the central nervous system (CNS) and the peripheral nervous system (PNS). The CNS is made up of the brain and the spinal cord. The PNS is made up of everything else.

Mast Cells & the Nervous System

Mast cells play a highly important role in the nervous system.
The relationship between mast cells and the nervous system is bi-directional which means that mast cells influence neural function and neurons modulate mast cell activity.

Mast cells are present in the CNS, including the brain and spinal cord, as well as in the PNS.

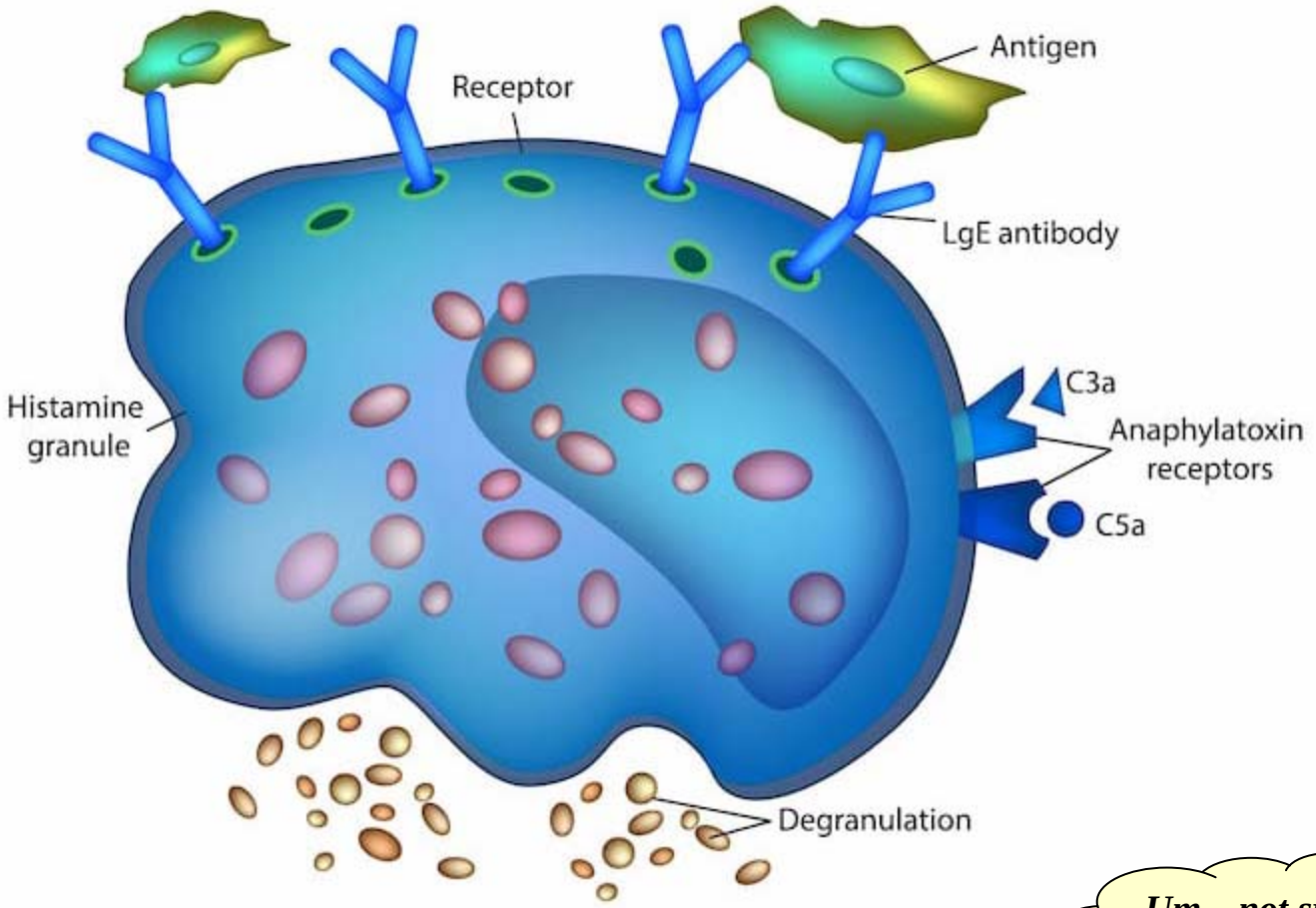
Nervous System & Mast Cell Activation

Mast cells in the nervous system can be activated by various different stimuli which include but are not limited to:

- Neurotransmitters – mast cells have receptors for specific neurotransmitters such as histamine that cause mast cell activation
- Inflammation – produces mediators such as cytokines that are released during inflammation causing mast cell activation
- Stress – leads to the release of mediators such as histamine and serotonin causing mast cell activation

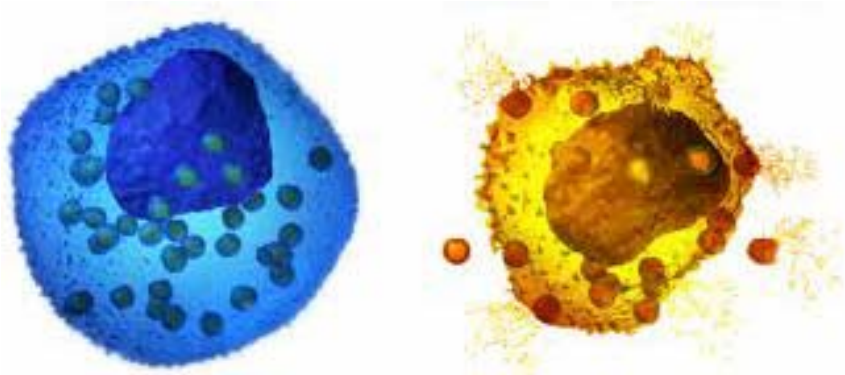
Mast Cell Activation

What *is* Mast Cell Activation?



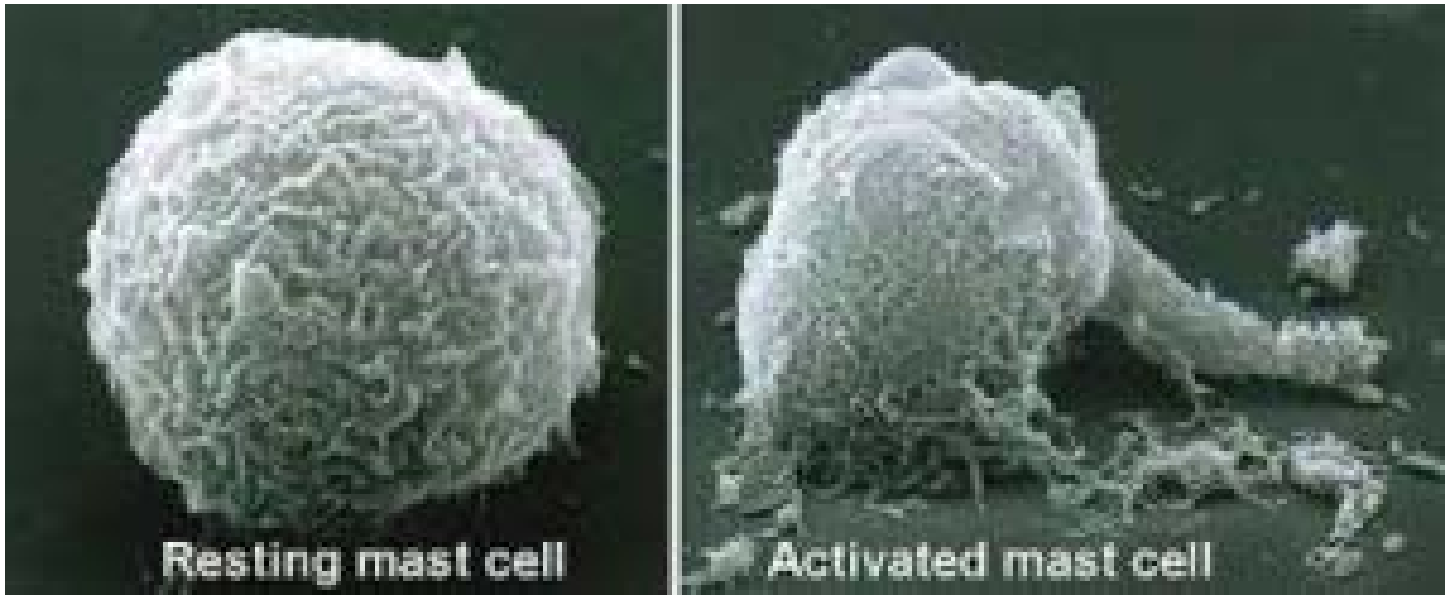
Um…not sure I get it…

Resting & Activated:



Yeah, looks like some big intergallactic catastrophe....

Resting & Activated:



…..really??

Not terrifically clear…..

Terminology: 4 Words

Activation – the thing that mast cells do when they encounter something they perceive as a danger or threat, they get activated

Degranulate – to crumble (what mast cells do when they've been activated, they degranulate = crumble)

Mediators – chemicals that activated mast cells pump into the body, (of which histamine is only one of hundreds,) as they degranulate

Receptors – "doors" on cells that let things in (specifically the molecules for caffeine, sugar, salt, nicotine, histamine, ginger, chocolate,--for everything we encounter and take into our bodies) enabling those molecules to then interact with our body

Mast Cell Activation in 4 Steps:

Step 1: Activation

The mast cells have encountered a perceived threat or possible danger. They're sensitized then—bang!—they're activated;

Step 2: Degranulate

The activated mast cells degranulate, they crumble;

Step 3: Mediators

The degranulating mast cells pump out hundred of mediators (chemicals) into the body. These mediators flood the body;

Step 4: Receptors

When mast cell-specific mediators hit their mast cell receptors ("doors") those substances get in and interact with the body.


Some Mast Cell Mediators
& What They Do

Mast Cell Mediator: Histamine

- Skin symptoms - hives; flushing; angioedema; itching
- Respiratory - cough; wheezing
- GI - diarrhea; gastritis
- Pain - headache
- Acts as neurotransmitter

Mast Cell Mediator: Neuromedan B

Induction of acute itch

Mast Cell Mediator: Leukotrienes

Respiratory - shortness of breath; airway inflammation

Mast Cell Mediator: VGF Nerve Growth Factor Inducible

- Chronic pain
- Has influence on neuroplasticity (the brain's ability to change and grow as a result of experience) associated with learning, memory, depression, and chronic pain

Mast Cell Mediator: Prostaglandins

- Skin - flushing
- Cardiovascular - hypo or hypertension; vasodilation or vasoconstriction (depends on amount of prostaglandins)
- Pain - bone pain; cramping
- Cognitive - brainfog

Mast Cell Mediator: Interleukins

- Regulates the immune system
- Fatigue
- Weight loss
- Enlarged lymph nodes

Mast Cell Mediator: Tryptase

- Skin lesions
- Osteoporosis

Mast Cell Mediator: Serotonin

Direct activation of pain nerve fibers

Mast Cell Mediator: Acetylcholinesterase

Muscle weakness (myasthenia)

Mast Cell Mediator: Galanin And GMAP Prepropetide

Mast cell mediators can activate the sensory neurons (called nociceptors) that send information about pain to our brain and make us aware of it, leading to pain perception as in, for example, fibromyalgia, migraines, and Complex Regional Pain Syndrome.

Mast Cell Mediator: Corticotropin Releasing Hormone

Mediates autonomic, behavioral, and neuroendocrine responses to stress


The Stress Factor

Stress

The human body is constructed to experience stress and to respond to the stress it feels in particular ways. Our body communicates information about stress at the cellular level.

The cells in the human body are in constant communication. They talk to each other, share information, give directions, respond to instructions, analyze and assess situations, and more—nonstop, 24/7.

Short-term Responses:

It's all about preparing for the fight, flight, or freeze response. A potential threat or danger situation (a stressor) is encountered. Hormones get released in the body especially cortisol (the stress hormone) which cause physical things to occur:

- Increased heart rate
- Increased blood pressure
- Rapid breathing
- Enhanced senses (e.g., vision and hearing)
- Reduced digestion
- Reduced immune function
- & more

Long-term Responses:

Long-term responses happen from chronic activation of the body's stress response system which can lead to all sorts of negative effects on the body including but not limited to:

- Increased blood pressure
- Cardiovascular disease
- Digestive problems
- Sleep disturbances
- Mood disorders (e.g., anxiety and depression)
- & more

Physical Symptoms of Stress:

The physical symptoms of stress can vary from person to person. Common symptoms include but are not limited to:

- Headache
- Fatigue
- Insomnia
- Nausea
- Sweating
- Muscle tension
- Digestive problems (e.g., irritable bowel syndrome)
- & more

Stress & Mast Cells:

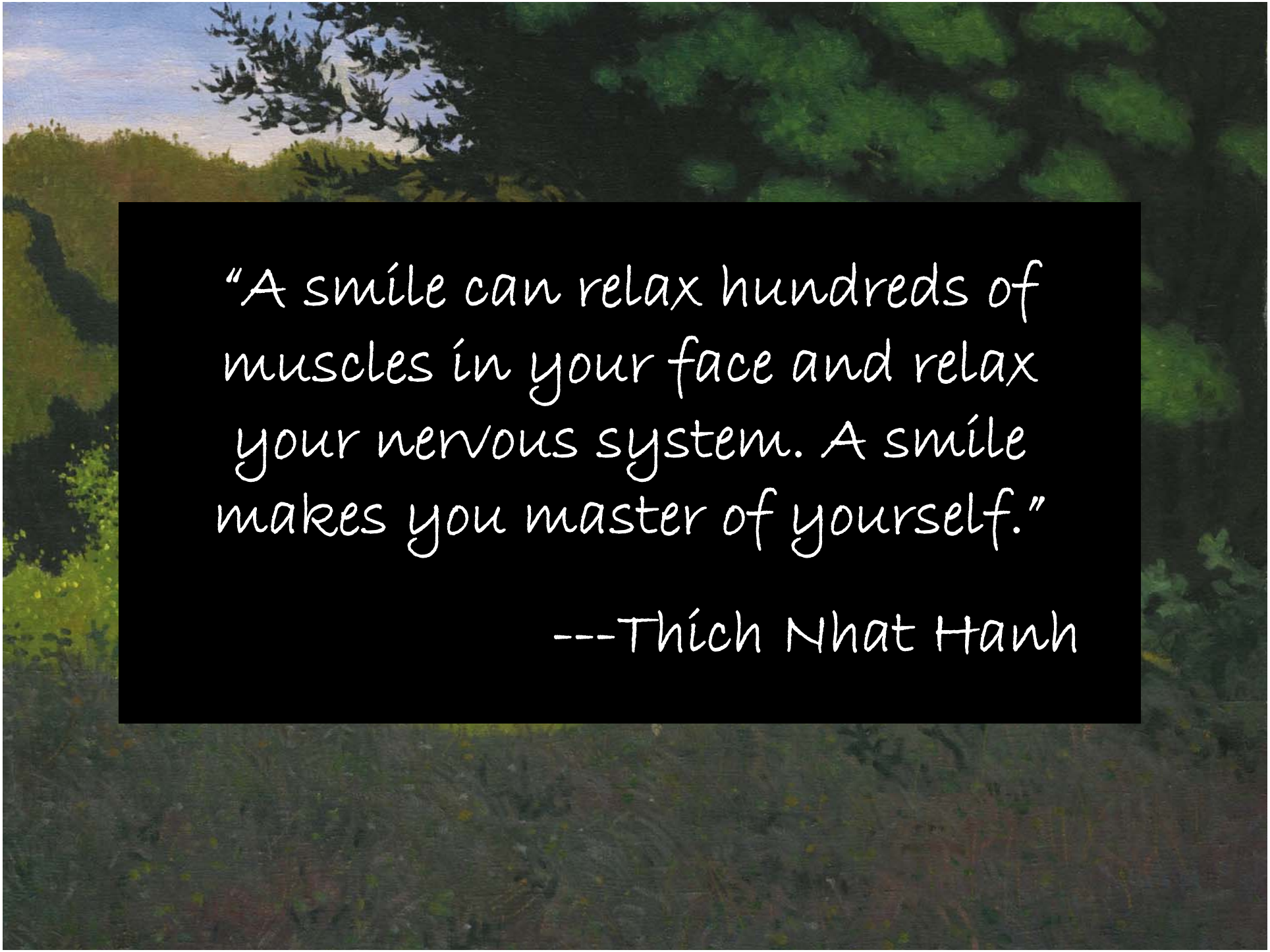
There are receptors—doors into the body--for cortisol (the stress hormone) on every mast cell:

- Cortisol can activate mast cells causing them to degranulate and pump mediators into the body, causing or worsening reactions
- Chronically elevated levels of cortisol can suppress the immune response and suppress the function of mast cells
- Elevated cortisol levels can lead to memory and concentration problems, anxiety, depression, headaches, & more
- Activated mast cells can cause memory and concentration problems, anxiety, depression, headaches, & more

Triggers & Stressors:

Common triggers and stressors that can bring about mast cell activation and degranulation include:

- Physical exertion
- Extremes in temperature (whether hot or cold)
- Intense emotions (whether positive or negative)
- Concentrating (e.g., at work, reading, at the computer)
- Social activities and socializing


"A smile can relax hundreds of muscles in your face and relax your nervous system. A smile makes you master of yourself."
---Thich Nhat Hanh

Strategies & Game Plans

A strategy, by definition, involves having and moving toward a goal; having a game plan. The stress & mast cells strategy and game plan must include:

Holistic health & self awareness

Informed decision-making

Education - of self and others

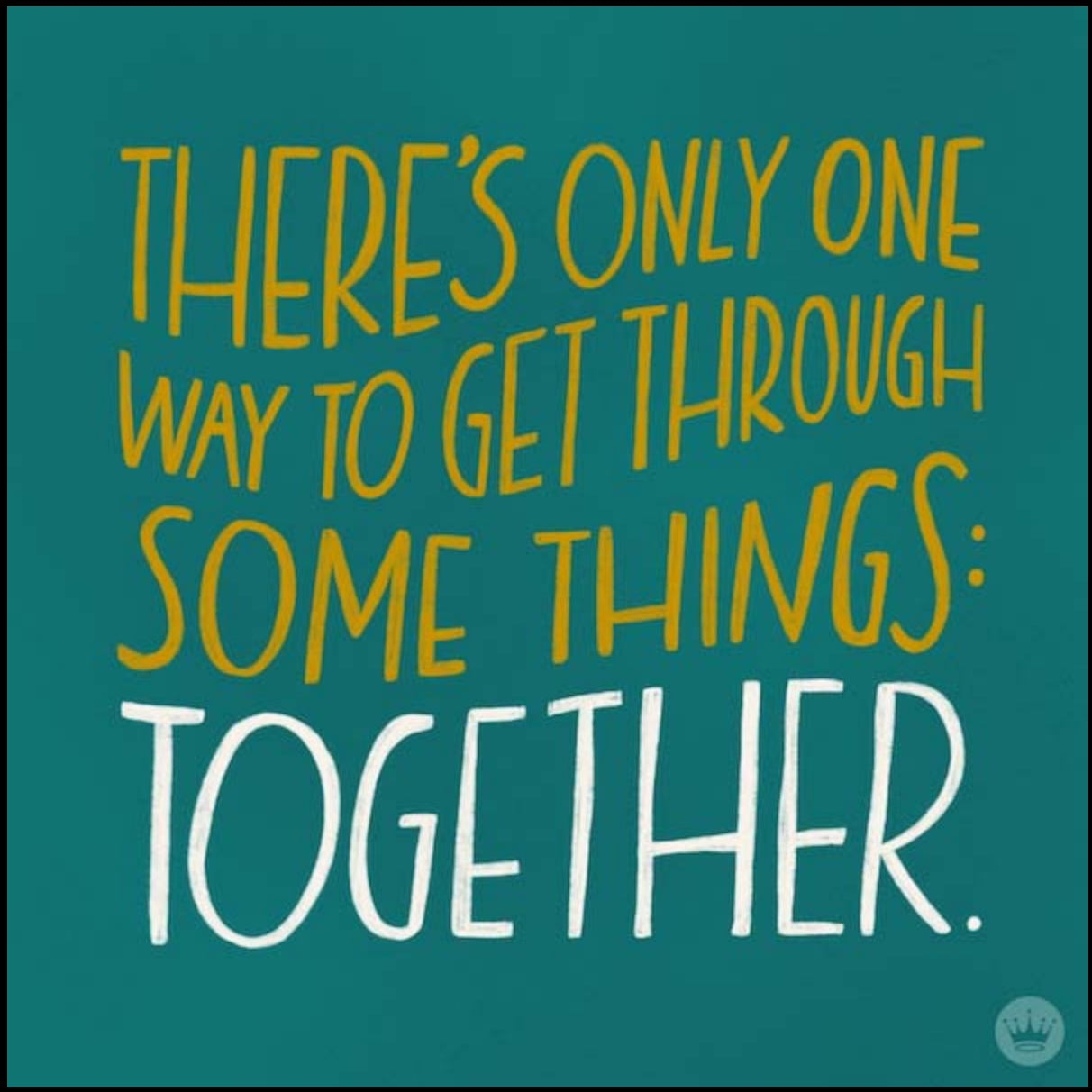
Patience in the face of challenges

Appropriate supports

Know thy body

Tools for the Toolbox

- Circadian rhythm awareness
- Vagus nerves system
- Neuroscience of memory
- Retraining mast cells & brain cells
- Food as medicine
- Medications
- Sleep


THERE'S ONLY ONE
WAY TO GET THROUGH
SOME THINGS:
TOGETHER.

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