MAST CELL
360

Mast Cell Activation and EDS:

In-depth Considerations and Adaptations for Feldenkrais

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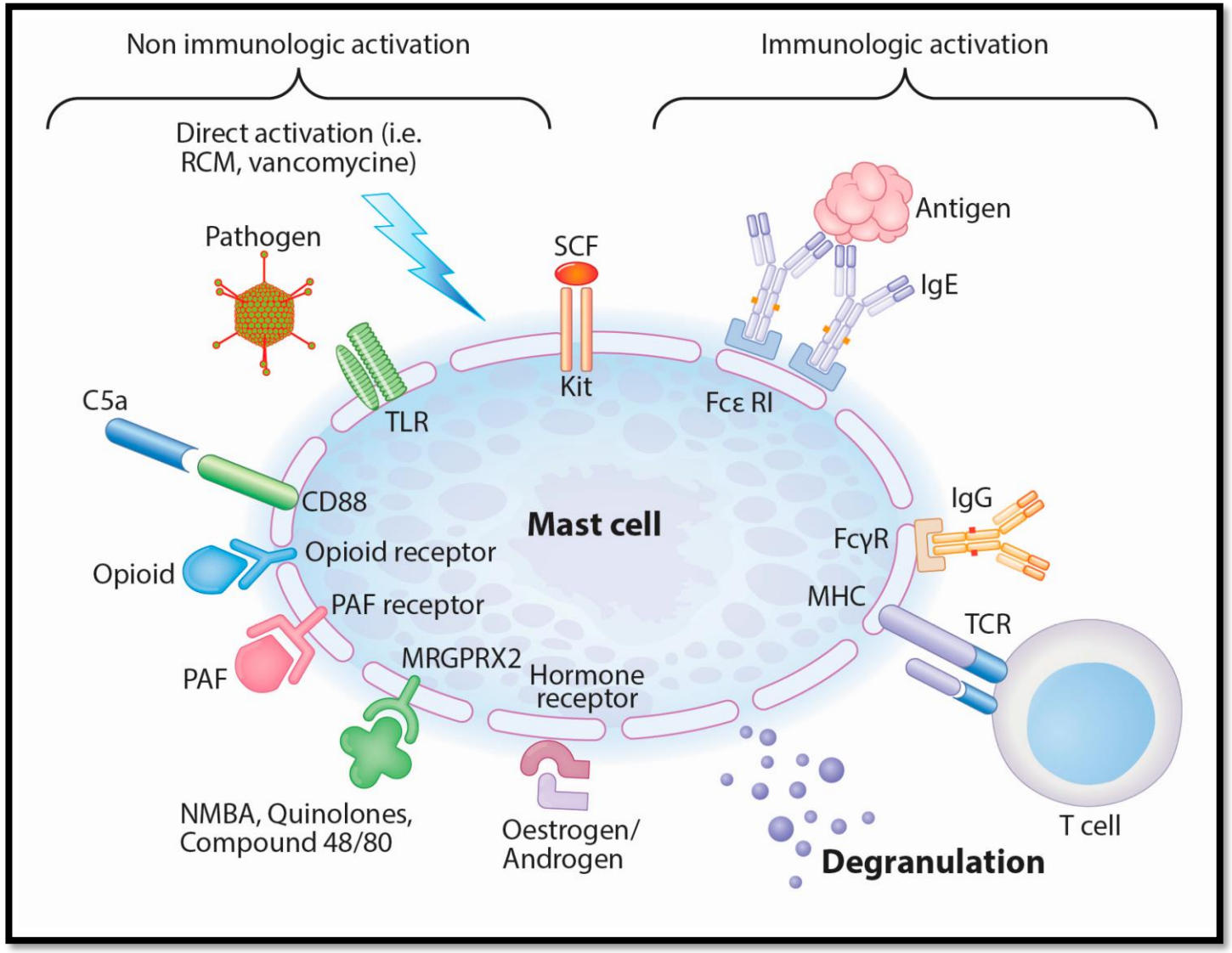
Mast Cell Activation



See Reference Slides #11

Mast Cell Locations

- Hollow Space mucosal and epithelial tissues: like lining of the nose and sinuses, eyes, mouth, lining of the digestive tract, lining of the bladder and urethra, lining of the lungs
- Vascularized tissues
- Connective tissues like ligaments and tendons of the joints, bones, blood vessels, lymph vessels, hair follicles, and skin
- Nerve tissue and brain

See Reference Slides #1-2

Mast Cell Roles and Functions

- Innate and Adaptive Immunity
- Coordination of immune defense in infections like viruses, bacteria, mold, candida, and parasites
- Venom detoxification
- Wound healing and tissue repair
- Recovery of connective tissues after injury
- Formation of new blood vessels and Vasodilation
- Homeostasis of tissues and organs
- Neurogenesis and hippocampal function
- Angiogenesis
- Regulation of menstruation
- Regulation of pregnancy

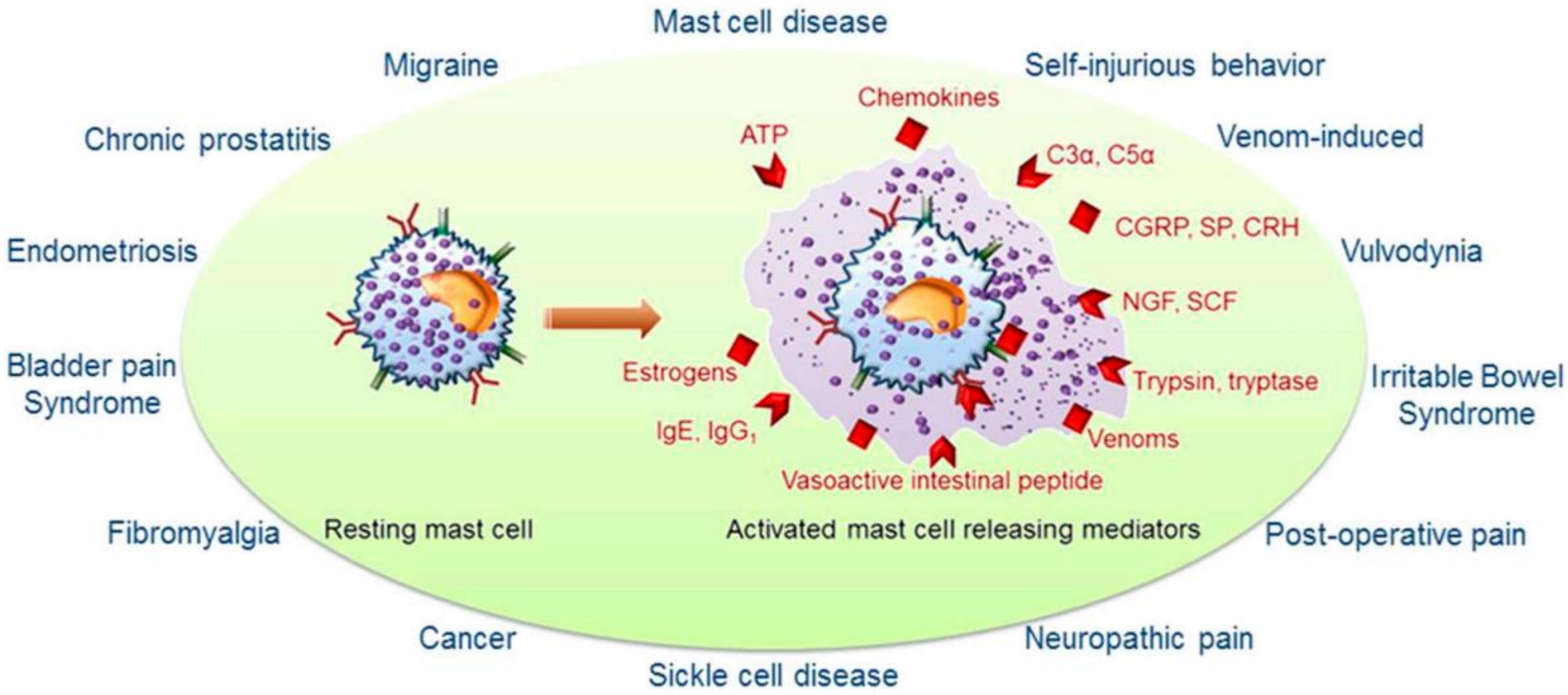
See Reference Slides #1-4

Clinical implications of Mast Cell Dysregulation

- Allergy, asthma and anaphylactic reactions (IgE)
- Eczema, chronic dermatitis
- Migraine/neurological disorders
- GI disorders including Crohn's/IBD
- Autoimmune diseases (DM I, Sjogren's, MS)
- Vascular inflammation and atherosclerosis
- Unexplained multi-system/symptom illness

See Reference Slides #1-4

Mast Cell Associated Conditions



See Reference Slides #5

Mast Cell Mediators

- Amines
  - **Histamine**
  - Polyamines
- Proteoglycans
  - Heparin
  - Chondroitin sulfates
  - Serglycin
- Lysosomal enzymes
  - β-Glucuronidase
  - β-Hexosaminidase
  - Arylsulfatase
- Proteases
  - **Tryptases**
  - Chymase-1
  - Cathepsin G
  - Granzyme B
  - Carboxypeptidase A3
- Serotonin
- Leukotrienes
- **Prostaglandins**
- VEGF
- PDGF
- **Cytokines**
  - TNFα
  - TGF-β1
  - IFNγ
  - βFGF
  - Interleukins
  - Chemokines
  - SCF
- **Substance P**

See Reference Slides #8-9

Mast Cell Mediators

Class	Mediators	Physiological effects
Preformed mediators	Histamine, serotonin, heparin, neutral proteases (tryptase and chymase, carboxypeptidase, cathepsin G), major basic protein, acid hydrolases, peroxidase, phospholipases	Vasodilation, vasoconstriction, angiogenesis, mitogenesis, pain, protein processing/degradation, lipid/proteoglycan hydrolysis, arachidonic acid generation, tissue damage and repair, inflammation
Lipid mediators	LTB4, LTC4, PGE2, PGD2, PAF	Leukocyte chemotaxis, vasoconstriction, bronchoconstriction, platelet activation, vasodilation
Cytokines	TNF-α, TGF-β, IFN-α, IFN-β, IL-1α, IL-1β, IL-5, IL-6, IL-13, IL-16, IL-18	Inflammation, leukocyte migration/proliferation
Chemokines	IL-8 (CXCL8), I-309 (CCL1), MCP-1 (CCL2), MIP-1αS (CCL3), MIP1β (CCL4), MCP-3 (CCL7), RANTES (CCL5), eotaxin (CCL11), MCAF (MCP-1)	Chemoattraction and tissue infiltration of leukocytes
Growth factors	SCF, M-CSF, GM-CSF, bFGF, VEGF, NGF, PDGF	Growth of various cell types, vasodilation, neovascularization, angiogenesis

See Reference Slides #10

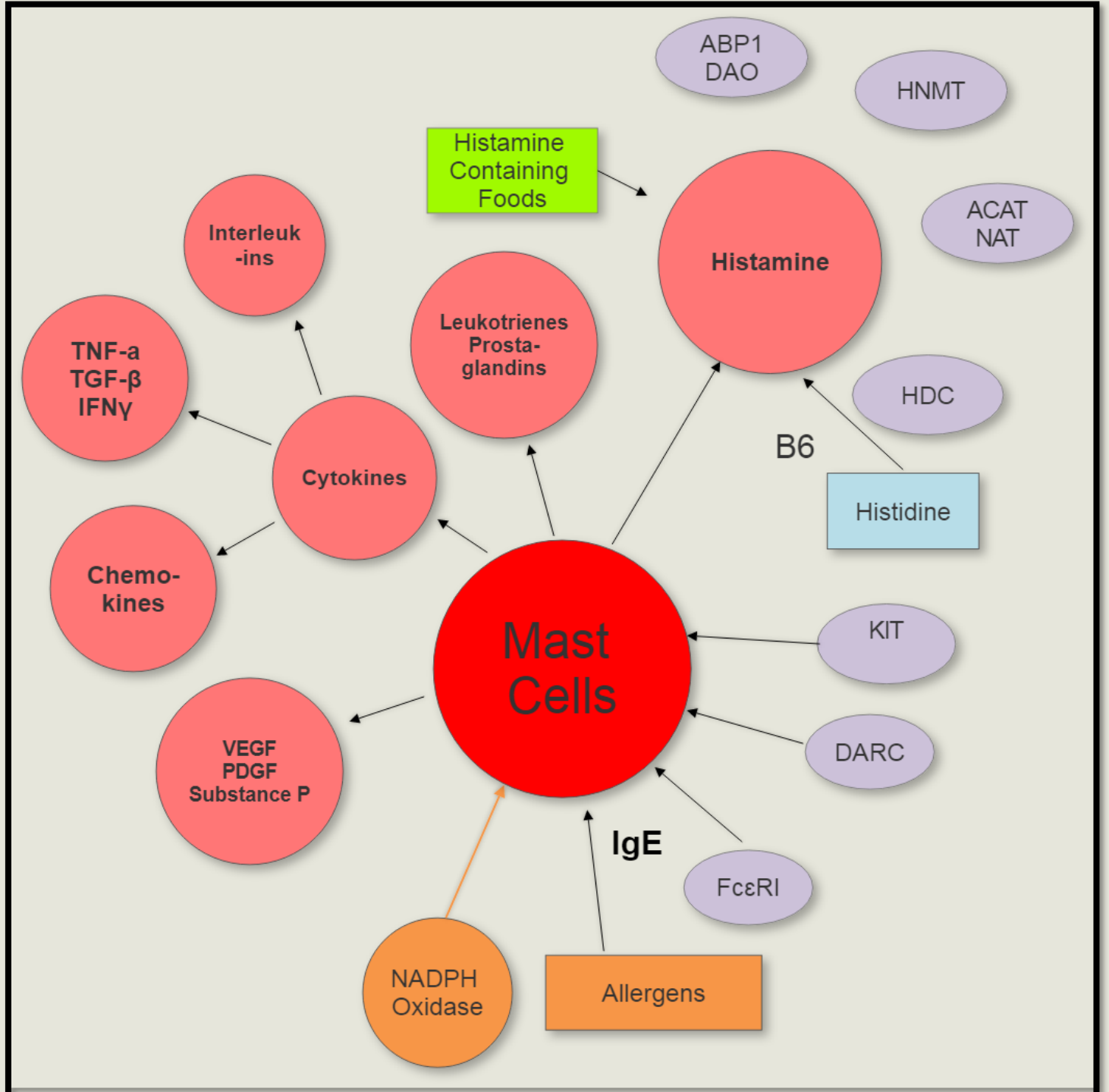


Image Credit: Nutrigenetic Research Institute

Mast Cell Activation Syndrome

Mast Cell Activation Syndrome

- Dysregulation of Mast Cells
- Mast cells become over-reactive and over-release inflammatory mediators
- Studies show present in 9-17% of the general population
- Likely present in >50% of the chronically ill population

See Reference Slides #1-7

Mast Cell Activation Syndrome Symptoms

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Symptoms in Mast Cell Activation Syndrome

- Systemic symptoms: overall fatigue and feeling bad (malaise), food, drug, environmental, and chemical sensitivities, chills, sweats, sense of being cold all the time, inflammation, swelling, swollen lymph nodes, weight changes

- Musculoskeletal Symptoms: osteoporosis and osteopenia (even in young people), arthritis that moves around, general muscular and bone pain, hyperflexible joints, degenerative disk issues

- Skin Symptoms: itching, flushing, hives, easy bruising, reddish or a pale complexion, burning sensations, dermatographia (persistent redness or white marks after scratching skin), slow healing of skin, hair loss, rosacea, psoriasis, eczema

See Reference Slides #5-7

Symptoms in Mast Cell Activation Syndrome

- Cardiovascular Symptoms: feeling faint or fainting, chest pains, fast heartbeat, heart palpitations, dizziness and lightheadedness when standing up, low blood pressure

- Digestive Symptoms: mouth burning, gum inflammation, diarrhea, constipation, cramping, abdominal pain, nausea, vomiting, reflux, trouble swallowing, throat tightness, malabsorption, bloating, elevation of liver enzymes, high cholesterol, food sensitivities and food allergies, irritable bowel syndrome, and obesity may occur due to fat metabolism and absorption issues

See Reference Slides #5-7

Symptoms in Mast Cell Activation Syndrome

- Brain and Nervous System Symptoms: brain fog, short term memory issues, trouble recalling words, headaches, migraines, depression, loss of pleasure in life, nerve pains, trouble with attention, anxiety, insomnia, dizziness, tinnitus, numbness, sweating, temperature changes, tingling and numbness in arms and legs

- Lungs and Respiratory Symptoms: congestion, coughing, shortness of breath, wheezing, asthma, increased mucous production, post-nasal drip, sinus congestion, frequent throat clearing, sinus and/or nasal swelling, nasal polyps

- Eye Symptoms: eye pain, redness, trouble focusing, inflammation in the eyes, blurry, itchy, watery, irritated

See Reference Slides #5-7

Symptoms in Mast Cell Activation Syndrome

- Reproductive System Symptoms: endometriosis, painful periods, male and female infertility, hormonal imbalances

- Urinary Tract Symptoms: inflammation of tissues, burning, pain with urination, urinary tract infection type symptoms

- Anaphylaxis or Anaphylactiod Reactions (can be life threatening): difficulty breathing, itchy hives, flushing or pale skin, feeling of warmth, weak and rapid pulse, nausea, vomiting, diarrhea, dizziness and fainting.

See Reference Slides #5-7

Symptoms in Mast Cell Activation Syndrome

Other conditions that may be related to Mast Cell Activation Syndrome:

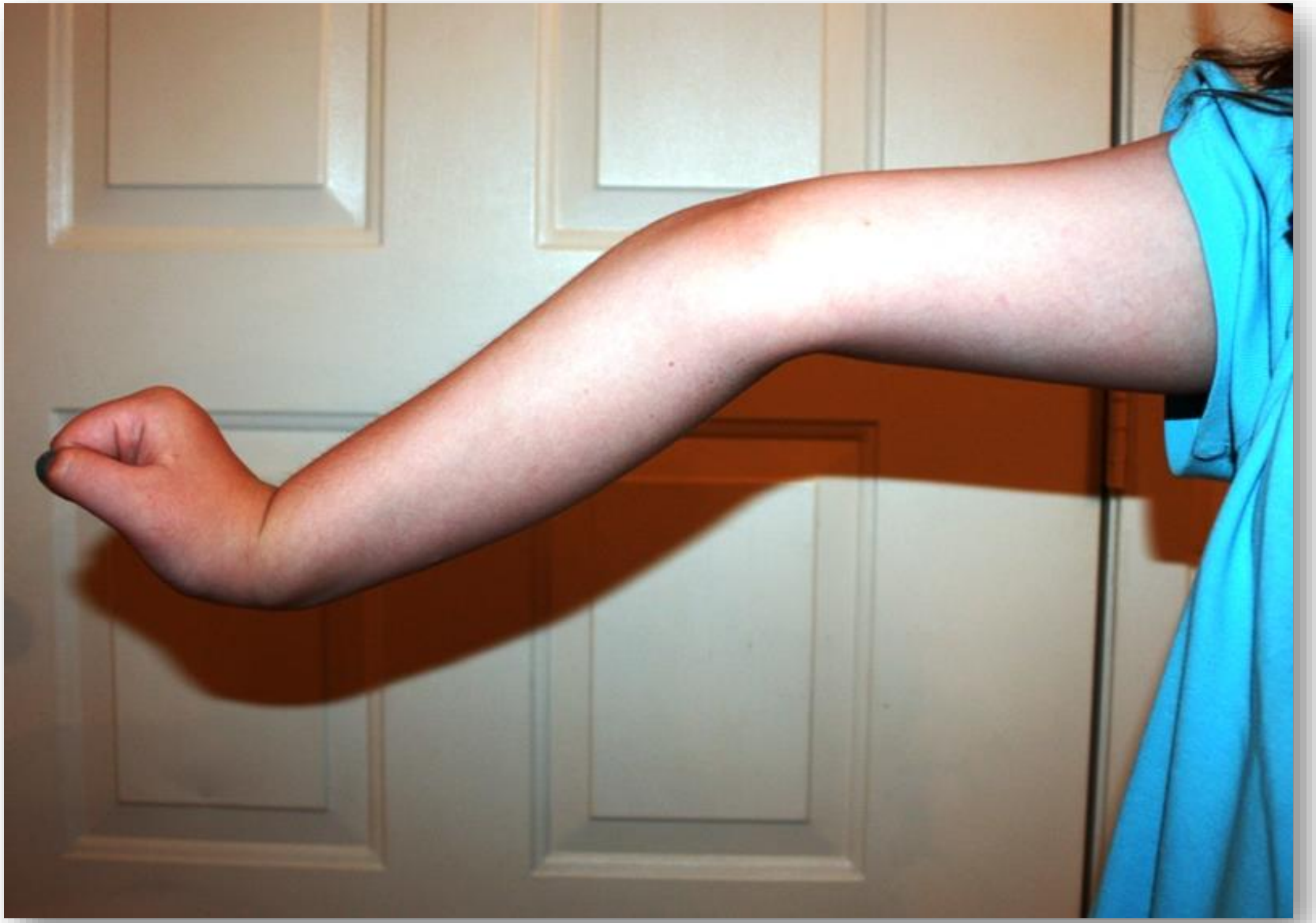
- Fibromyalgia, Chronic Fatigue, Interstitial Cystitis
- Certain cancers
- Crohn's disease, Irritable Bowel Syndrome
- Diabetes,
- **Ehler's Danlos Syndrome (EDS)**
- Postural Orthostatic Tachycardia Syndrome (POTS)
- Autism Spectrum Disorders
- Autoimmunity, such as Rheumatoid Arthritis, Lupus, Hashimoto's Thyroiditis, and Multiple Sclerosis

See Reference Slides #5-7

Signs of Mast Cell Activation Quicklist

- Patient seeing multiple practitioners looking for an answer
- Negative outcomes or paradoxical response from traditional approaches
- Hypermobility
- Uncontrolled pain
- Severe Allergies, hives and rashes
- GI Complaints
- Autonomic dysfunction
- Intolerant to hot or cold and exercise
- Extreme fatigue
- Anxious, panicked and depressed
- Brain fog
- Wired and tired

Ehler’s Danlos Syndromes



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Ehler’s Danlos Syndromes

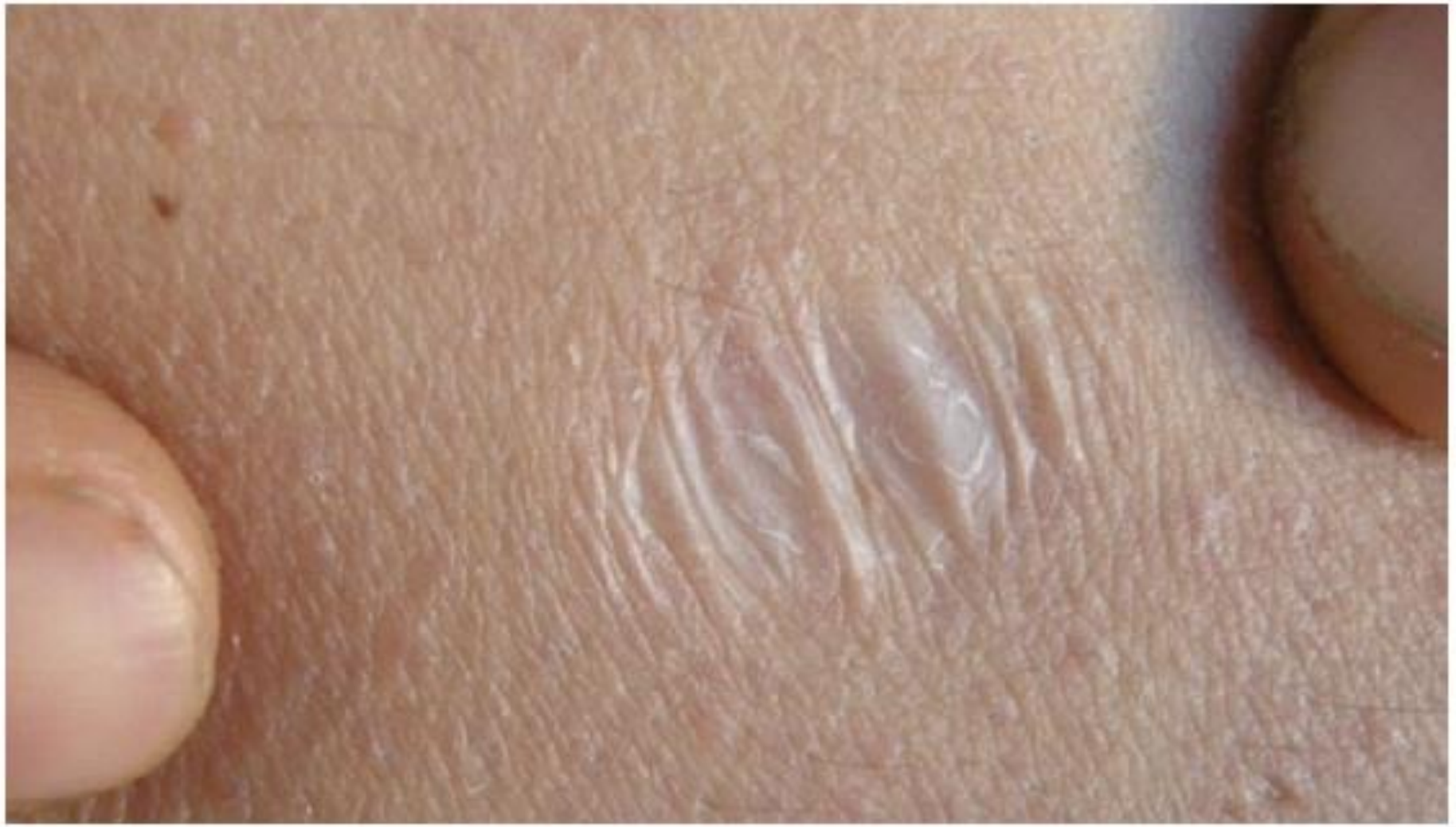


Image source: https://commons.wikimedia.org/wiki/File:Atrophic_scar_of_Ehlers_Danlos_syndrome.jpg

Mast cell disorders in Ehlers–Danlos syndrome

Suranjith L. Seneviratne, Anne Maitland, Lawrence Afrin

Well known for their role in allergic disorders, mast cells (MCs) play a key role in homeostatic mechanisms and surveillance, recognizing and responding to different pathogens, and tissue injury, with an array of chemical mediators. **After being recruited to connective tissues, resident MCs progenitors undergo further differentiation, under the influence of signals from surrounding microenvironment.** It is the differential tissue homing and local maturation factors which result in a diverse population of resident MC phenotypes. An abundance of MC reside in connective tissue that borders with the external world (the skin as well as gastrointestinal, respiratory, and urogenital tracts). **Situated near nerve fibers, lymphatics, and blood vessels, as well as coupled with their ability to secrete potent mediators, MCs can modulate the function of local and distant structures (e.g., other immune cell populations, fibroblasts, angiogenesis), and MC dysregulation has been implicated in immediate and delayed hypersensitivity syndromes, neuropathies, and connective tissue disorders (CTDs).** This report reviews basic biology of mast cells and mast cell activation as well as recent research efforts, which implicate a role of MC dysregulation beyond atopic disorders and in a cluster of Ehlers–Danlos Syndromes, non-IGE mediated hypersensitivity disorders, and dysautonomia. © 2017 Wiley Periodicals, Inc.

Ehler’s Danlos Syndrome

- Connective tissue disorders
- 13 subtypes
- Can involve:
  - Joints
  - Skin
  - Organs
  - Vascular tissue

Ehler’s Danlos Syndrome

- Classical EDS (cEDS)
- Classical-like EDS (clEDS)
- Cardiac-valvular EDS (cvEDS)
- Vascular EDS (vEDS)
- Hypermobile EDS
- Arthrochalasia EDS (aEDS)
- Dermatosparaxis EDS (dEDS)
- Kyphoscoliotic EDS (kEDS)
- Brittle Cornea Syndrome (BCS)
- Spondylodysplastic EDS (spEDS)
- Musculocontractural EDS (mcEDS)
- Myopathic EDS (mEDS)
- Periodontal EDS (pEDS)

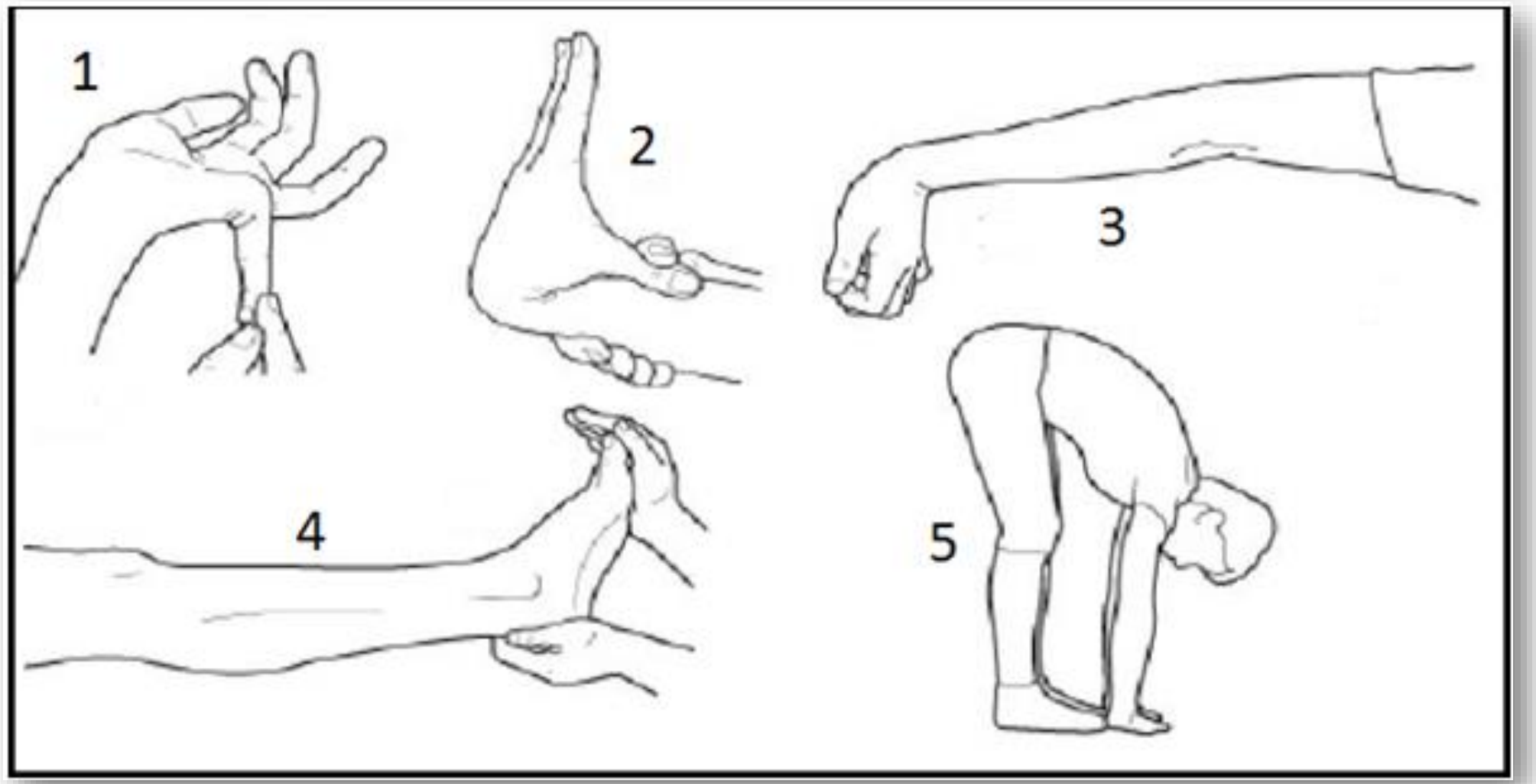
Hypermobile EDS

- Generalized joint hypermobility

- And 2 of the following:
  - Feature A—systemic manifestations of a more generalized connective tissue disorder (a total of five out of twelve must be present)
  - Feature B—positive family history, with one or more first degree relatives independently meeting the current diagnostic criteria for hEDS
  - Feature C—musculoskeletal complications (must have at least one of three); and

- All these prerequisites must be met: absence of unusual skin fragility, exclusion of other heritable and acquired connective tissue disorders including autoimmune rheumatologic conditions, and exclusion of alternative diagnoses that may also include joint hypermobility by means of hypotonia and/or connective tissue laxity.

Beighton Scale



Hypermobile EDS – Associated Symptoms

- Sleep disturbance
- Fatigue
- Postural orthostatic tachycardia (POTS)
- Functional gastrointestinal disorders
- Dysautonomia
- Anxiety
- Depression

Hypermobile EDS – Common Causes

- Possible Genetic Causes – still unknown
- Mold Toxicity
- Bartonella

Mast Cell 360 Approach to MCAS

Identify and address the triggers.

Most common triggers in MCAS:

- Food Triggers (beyond just histamine)
- Inflammatory Triggers (iron dysregulation, EMFs, etc)
- Toxicity – Mold, Chemicals, Metals
- Infections – Mold, Lyme, Bartonella, etc.
- Genetic Factors
- Nutritional Imbalances
- Hypoxia
- Hormone Imbalances
- Stress and/or Early Trauma

Feldenkrais Implications

Listen to their bodies:

- Go slow
- Healing may take much longer
- Emphasize strengthening over stretching
- Avoid deep tissue work
- Avoid vibration
- Be aware of skin elasticity possibilities
- Encouragement
- Refer for root trigger assessment and addressing

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