

ME/CFS: Are you M.A.D?

Plagued by

Mast Cell Activation Disease
Autonomic Dysfunction, and/or
Disorders of connective tissue



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Division of Allergy & Clinical Immunology

Conflict of Interest

Relevant financial relationships with commercial interests

Speakers' Bureau: Blueprint Medicines

Honorariums, Travel grants for Scientific faculty meetings/conferences:

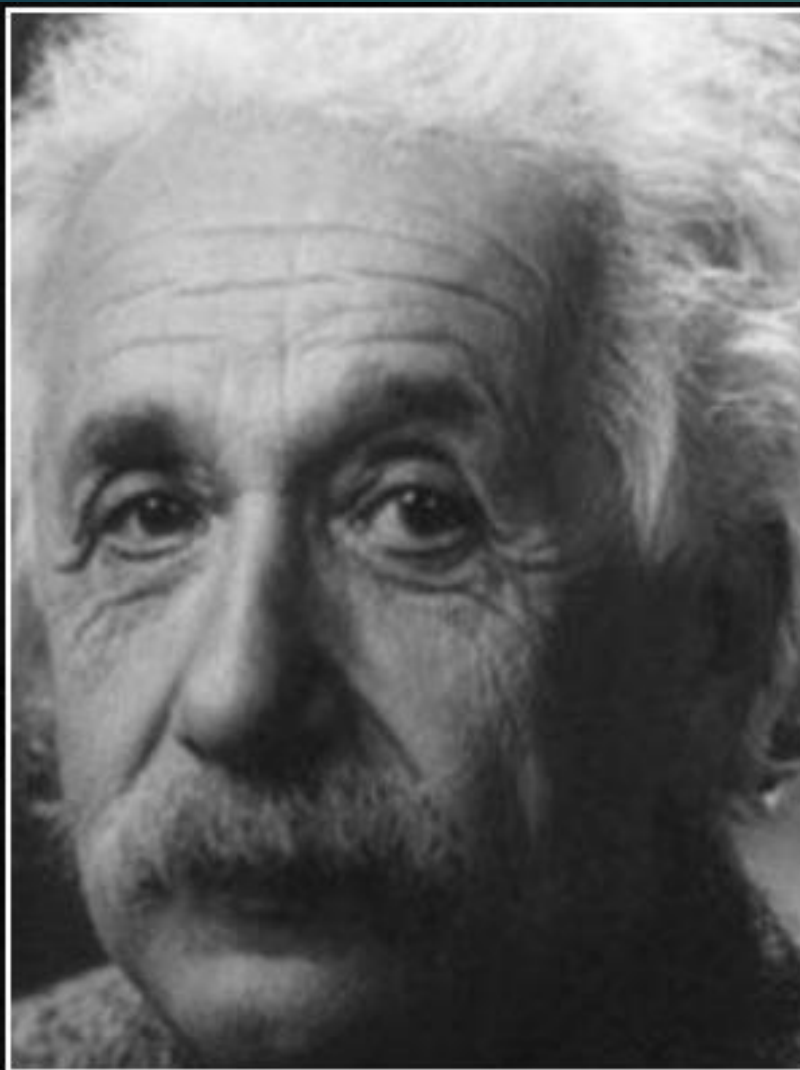
National Medical Association, Ehlers-Danlos Society, Bobby Jones Chiari Syringomyelia Foundation

Book Chapters:

Symptomatic

Disjointed

Transforming Ehlers Danlos Syndrome

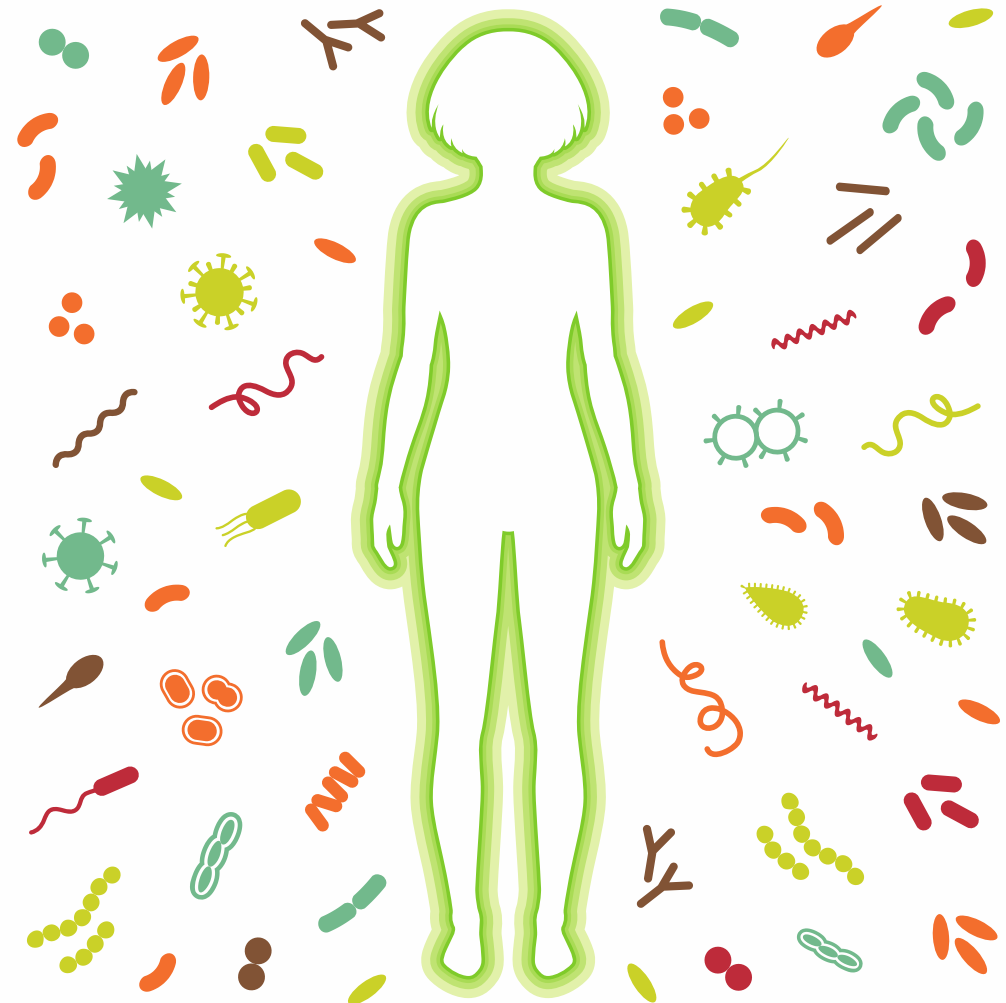
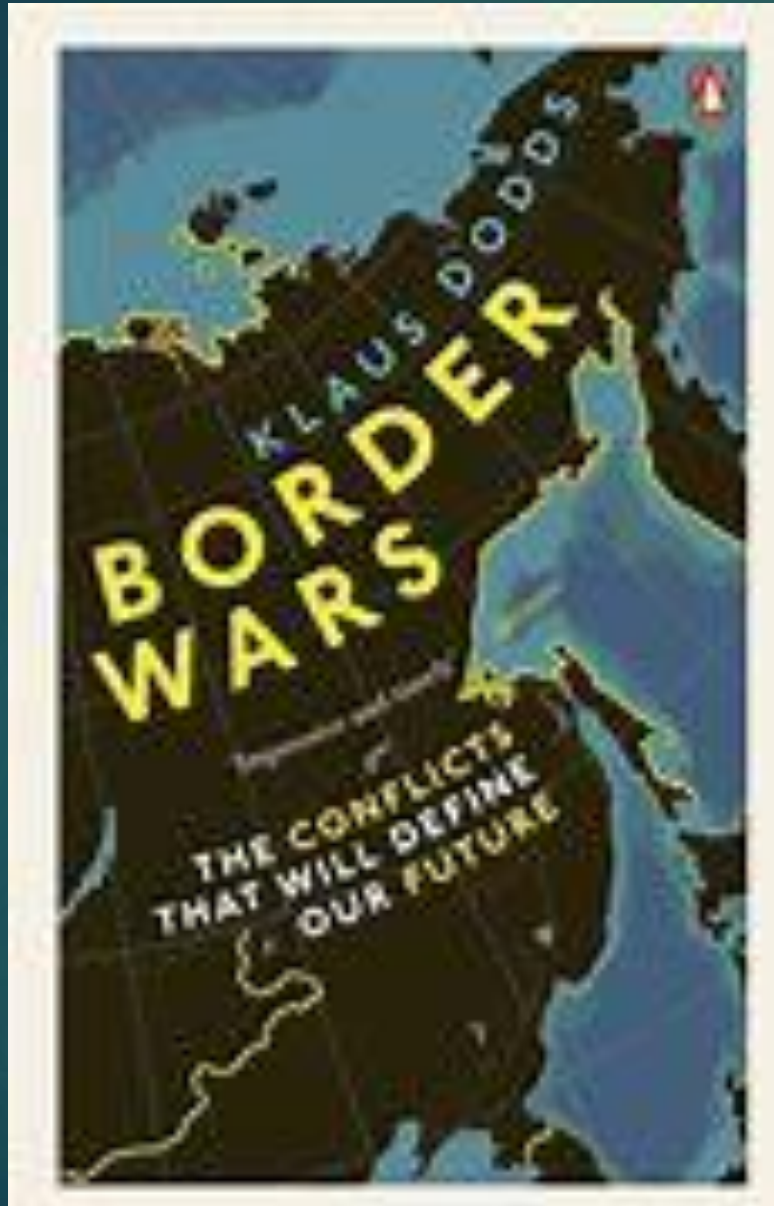


The world is a dangerous place to
live

— *Albert Einstein* —

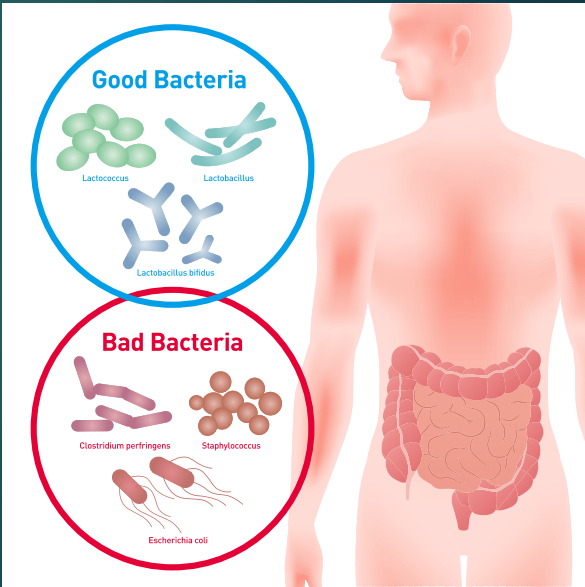
AZ QUOTES

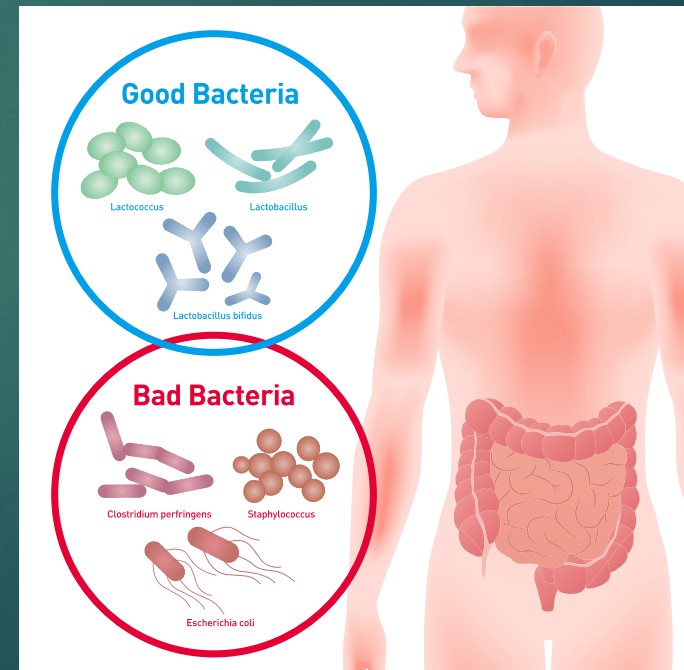
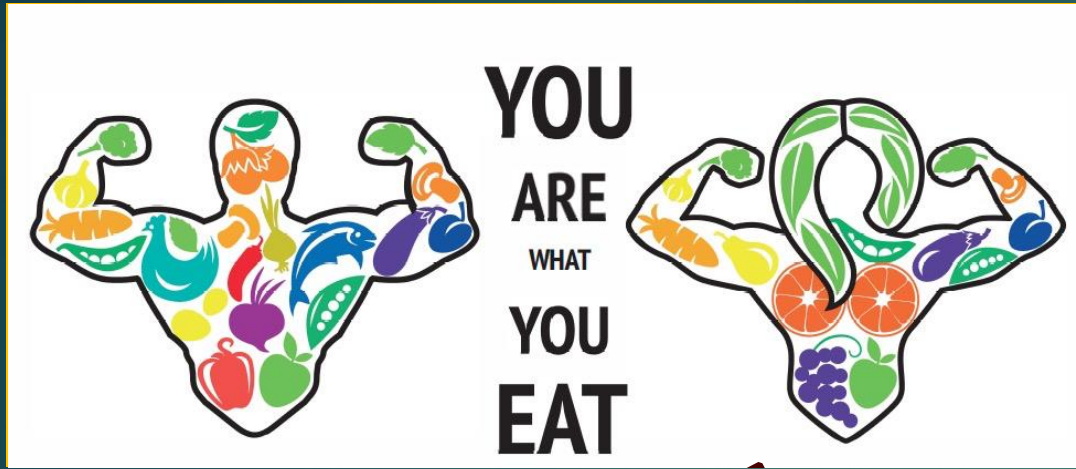
Our Borders





Our Borders





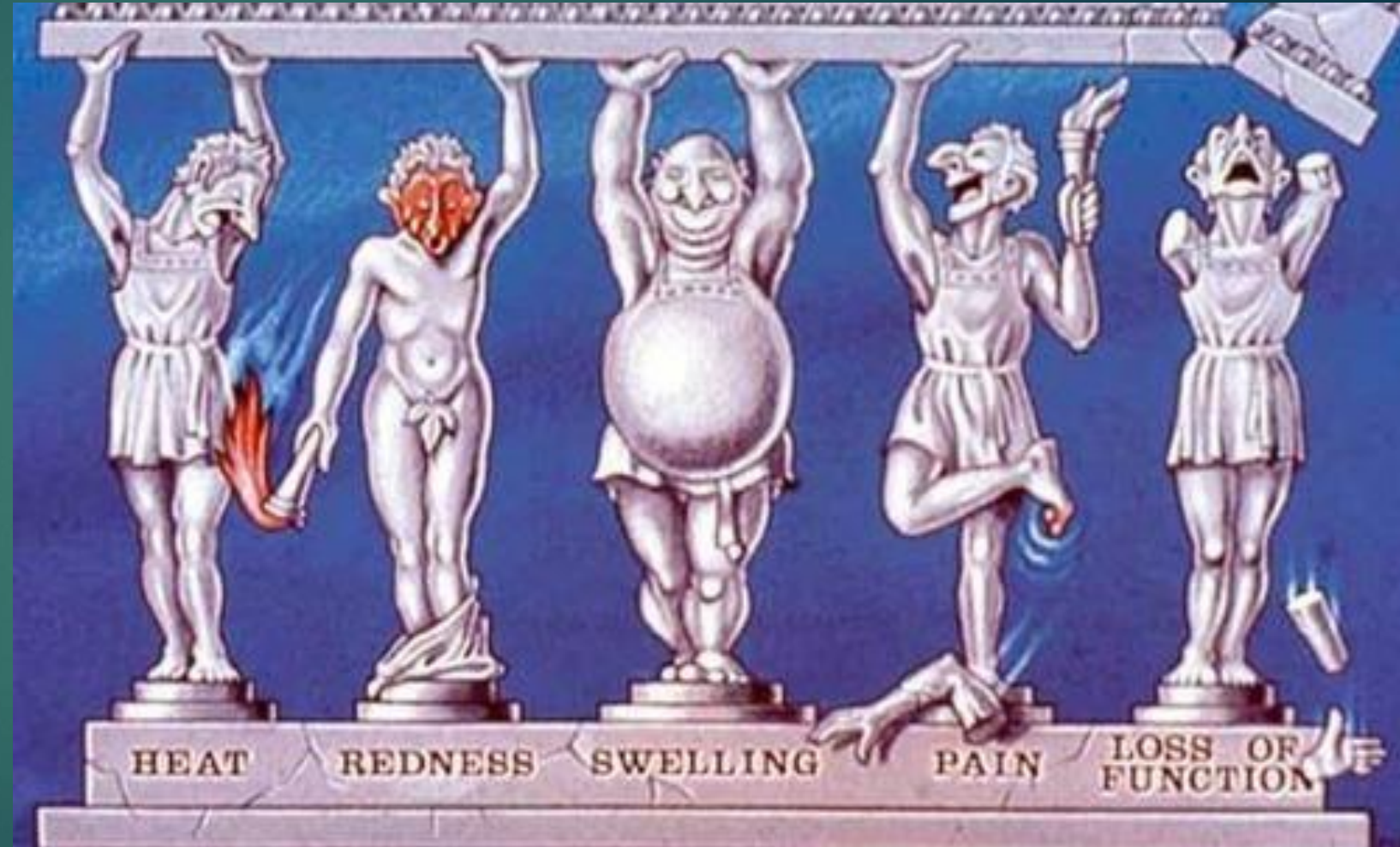
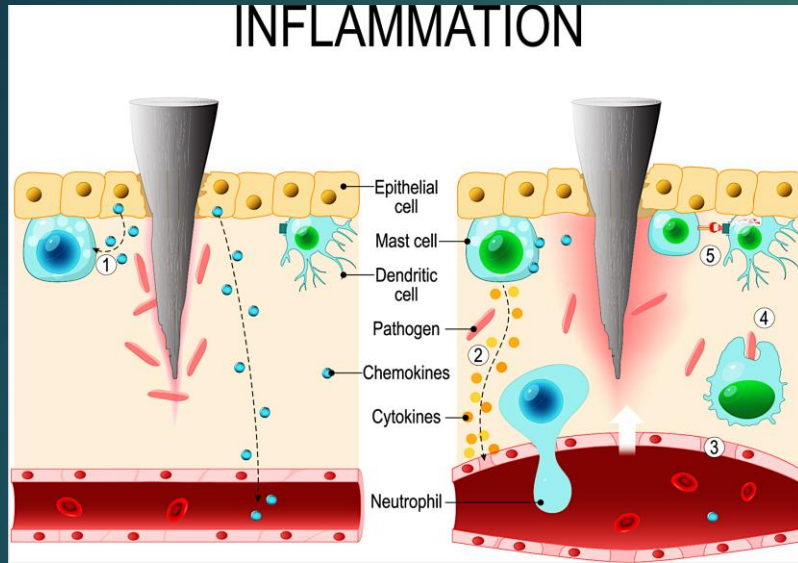
The United States =
highest military spending in 2022,
with
877 billion U.S. dollars dedicated
to the military.
3.5% of the U.S.' GDP = dedicated
to the military



Price tag for
surveillance,
defense and
repair?



Price tag for defense and repair?



The immune system



In the late nineteenth and early twentieth centuries, a notable group of scientists led by Louis Pasteur, Paul Ehrlich, Elie Metchnikoff, Jules Bordet y Emil A. Von Behring described a novel system whose function was to defend the body from attacks

The history of the idea of allergy,
J. M. Igea, 2013



Spoiler Alert:

THE THING IS, THE IMMUNE SYSTEM
IS VERY COMPLICATED.

There's a joke about immunology, which Jessica Metcalf of Princeton recently told me.

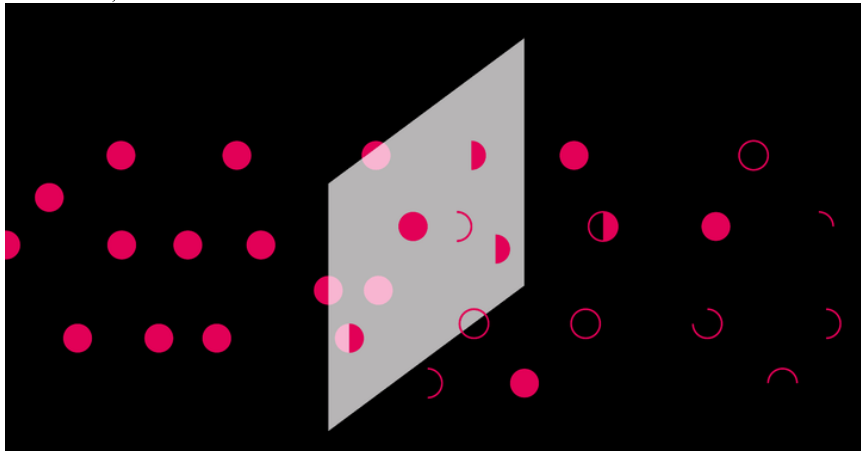
HEALTH

Immunology Is Where Intuition Goes to Die

Which is too bad because we really need to understand how the immune system reacts to the coronavirus.

ED YONG

AUGUST 5, 2020



An immunologist and a cardiologist are kidnapped.

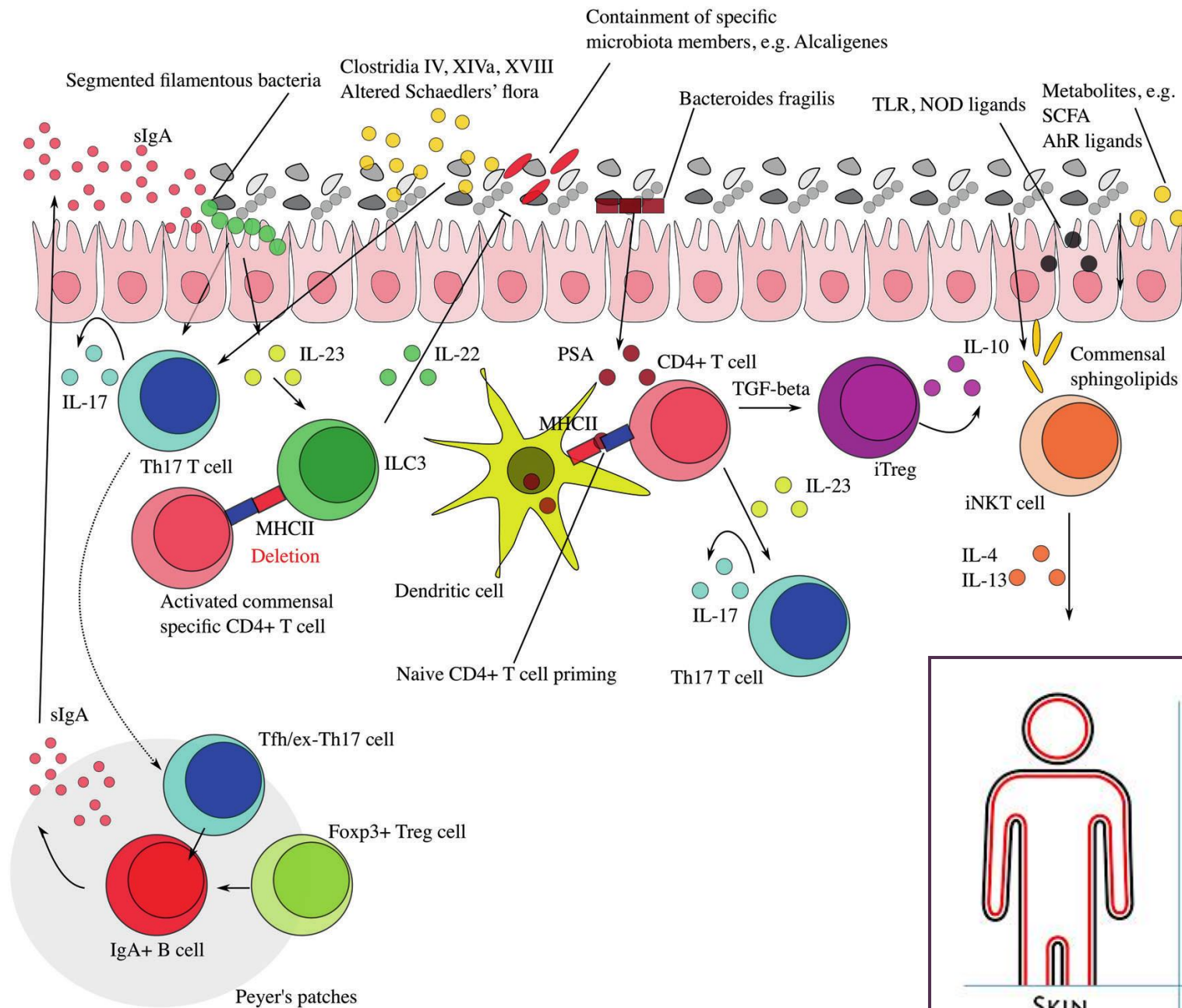
The kidnappers threaten to shoot one of them, but promise to spare whoever has made the greater contribution to humanity.

The cardiologist says, “Well, I’ve identified drugs that have saved the lives of millions of people.”

Impressed, the kidnappers turn to the immunologist. “What have you done?” they ask.

The immunologist says, “The thing is, the immune system is very complicated ...”

And the cardiologist says, “Just shoot me now.”



1 Intestinal microbiota-immunity interplay in homeostasis. Selected mechanistically well-characterized microbiota-immune system interactions. Microbiota-derived TLR- and NOD-like receptor ligands (e.g., SCFA, AhR ligands) act on the immune system.

Immunology 1010

IMMUNITY

INNATE

NONSPECIFIC
fast response (0-4 hours)

MONONUCLEAR PHAGOCYTE SYSTEM



macrophage



dendritic cell



monocyte



complement
protein



natural killer
cell



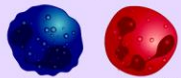
mast cell



natural killer
T cell



basophil



eosinophil neutrophil

granulocytes

ADAPTIVE

SPECIFIC
slow response (4-14 days)

HUMORAL



B cell



antibodies

CELLULAR

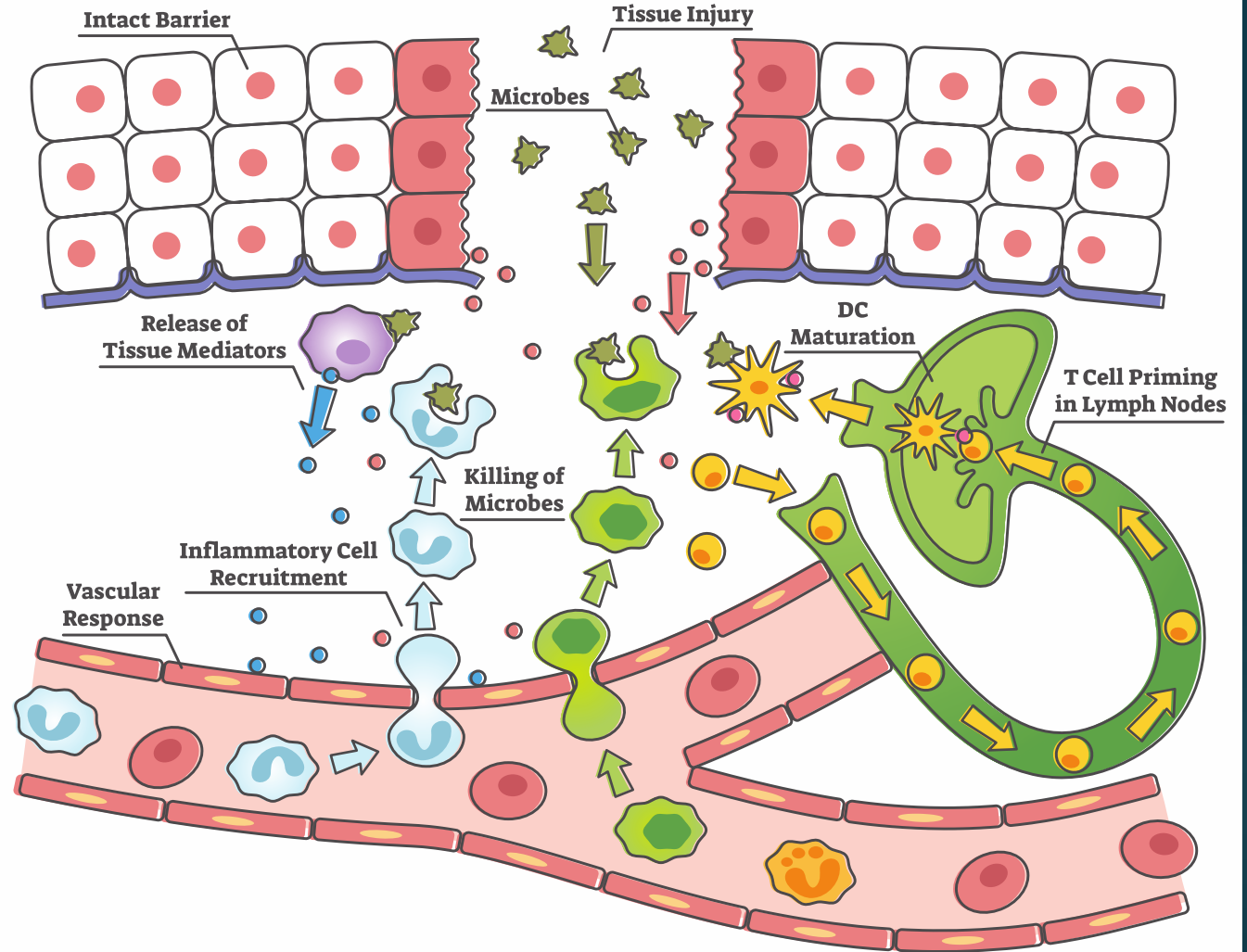


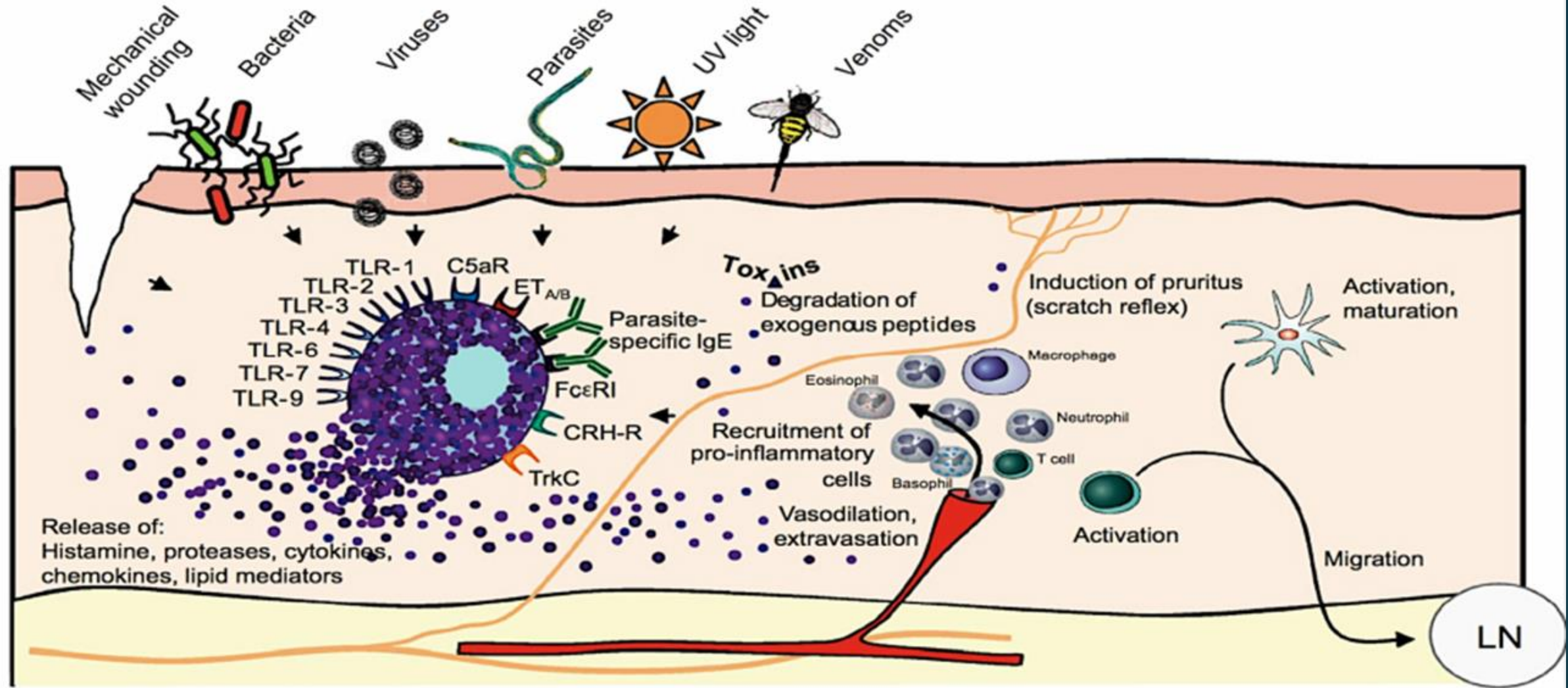
T lymphocyte

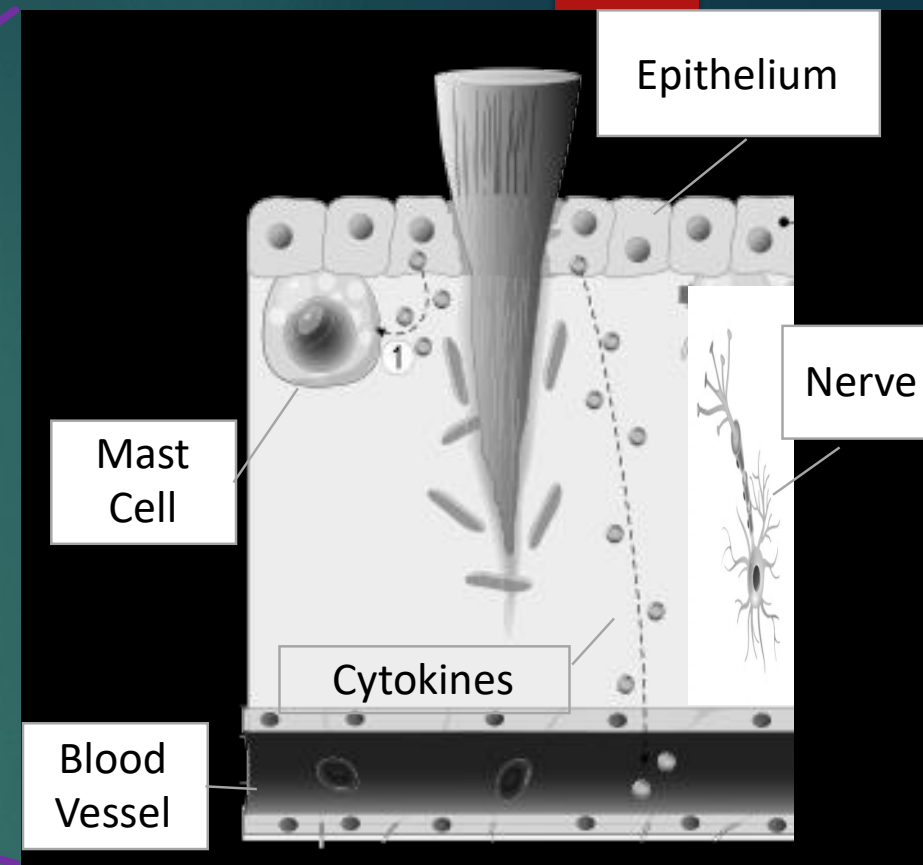
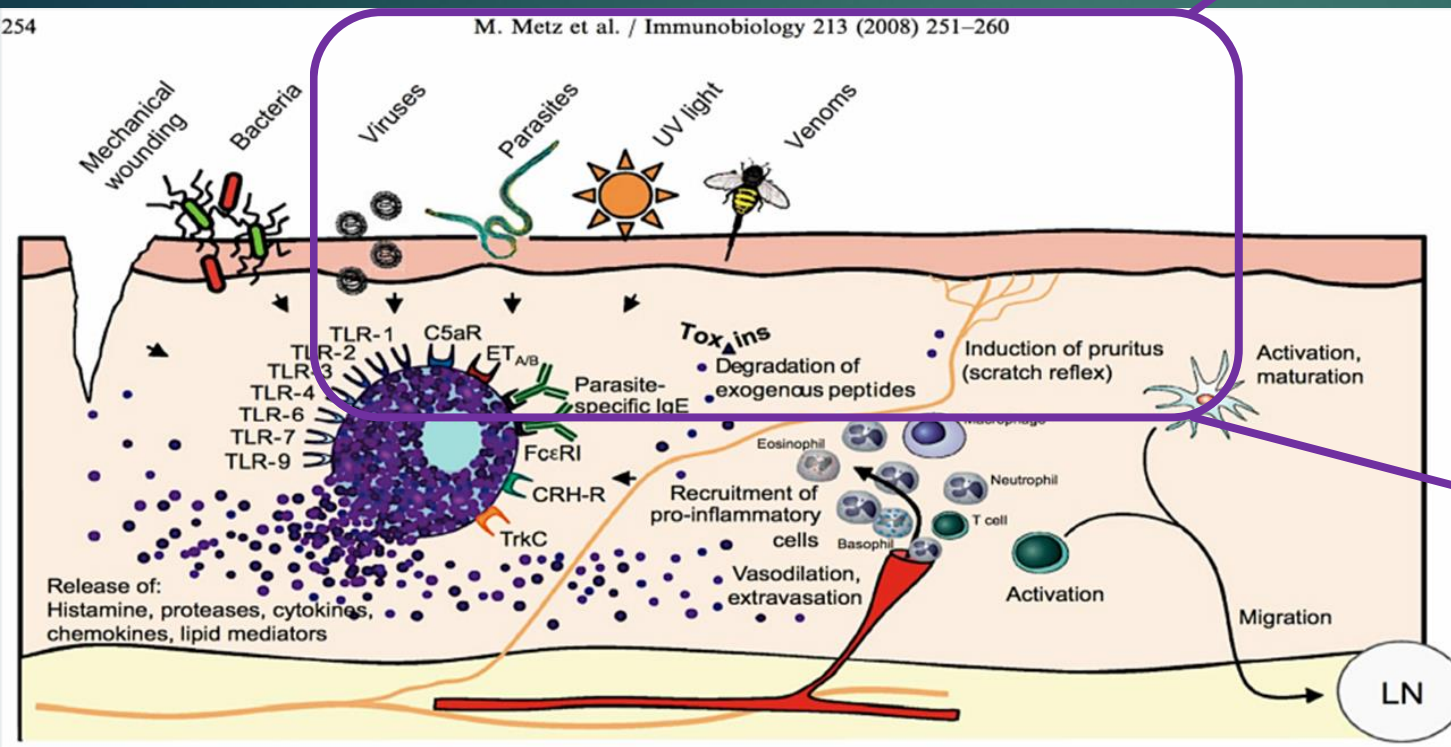


CD4+ CD8+

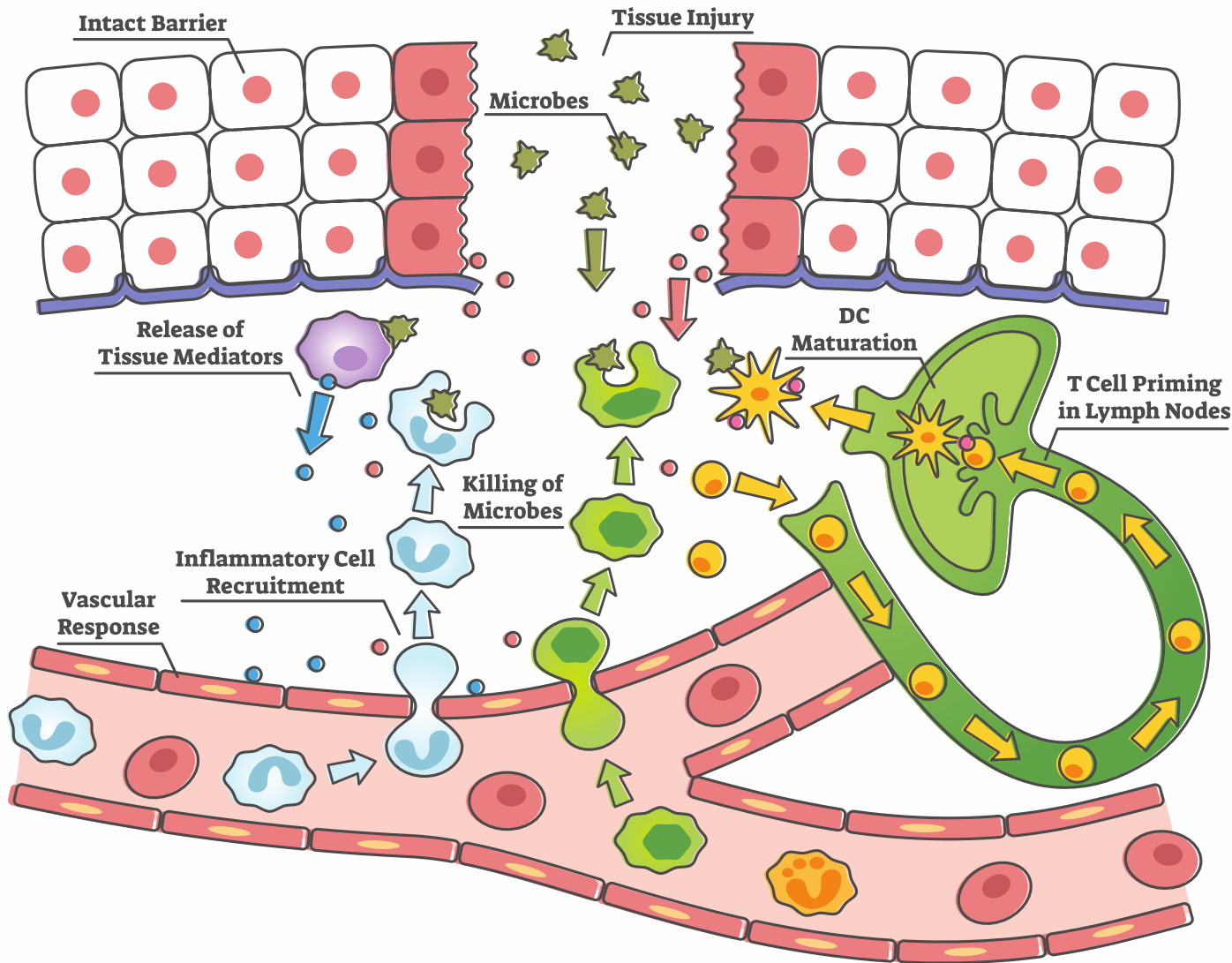
INJURY INFLAMMATION





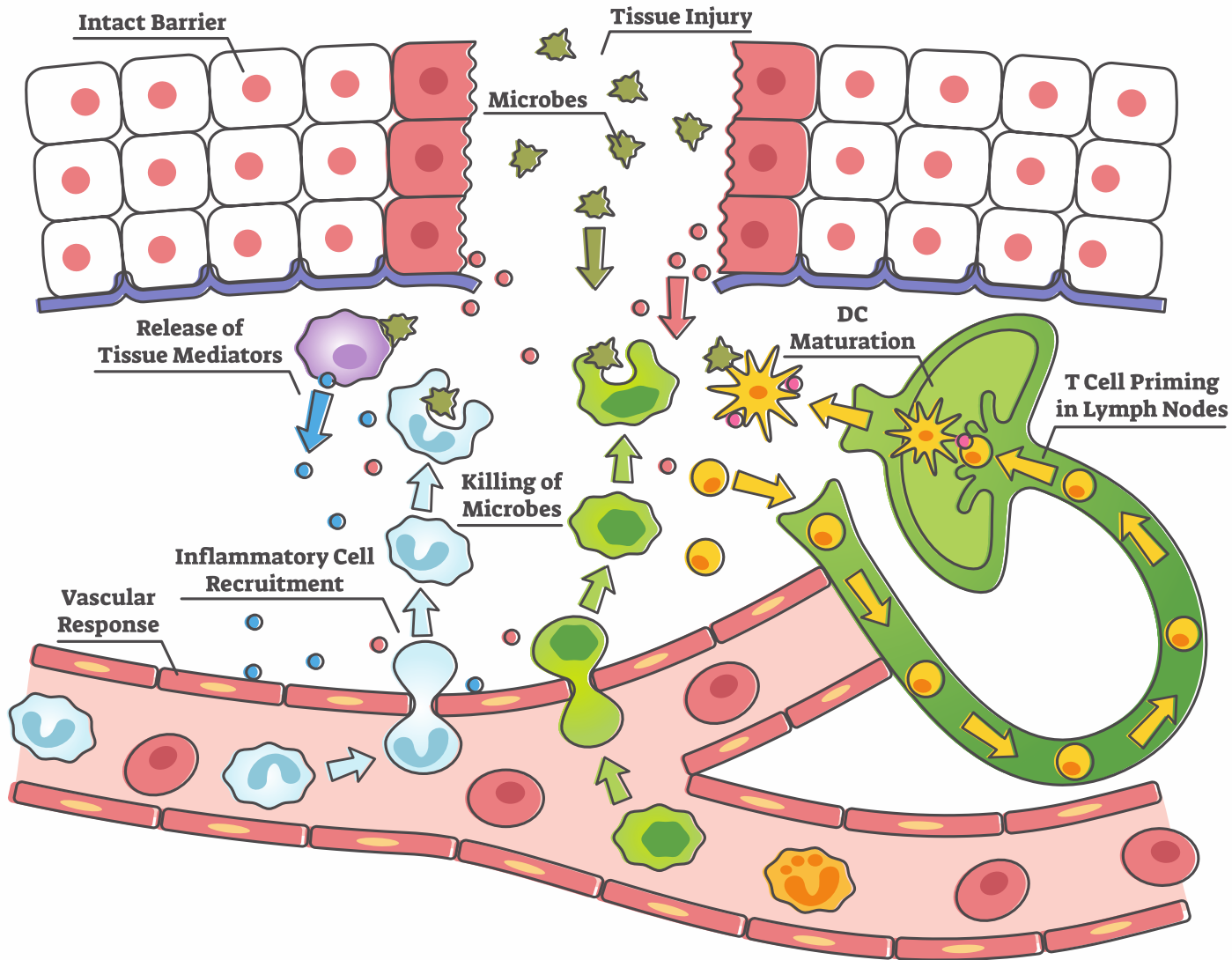


INJURY INFLAMMATION



The immunity provided by this system entailed an absolute protection against a noxious agent, or at least the occurrence of some process strictly advantageous to the host.

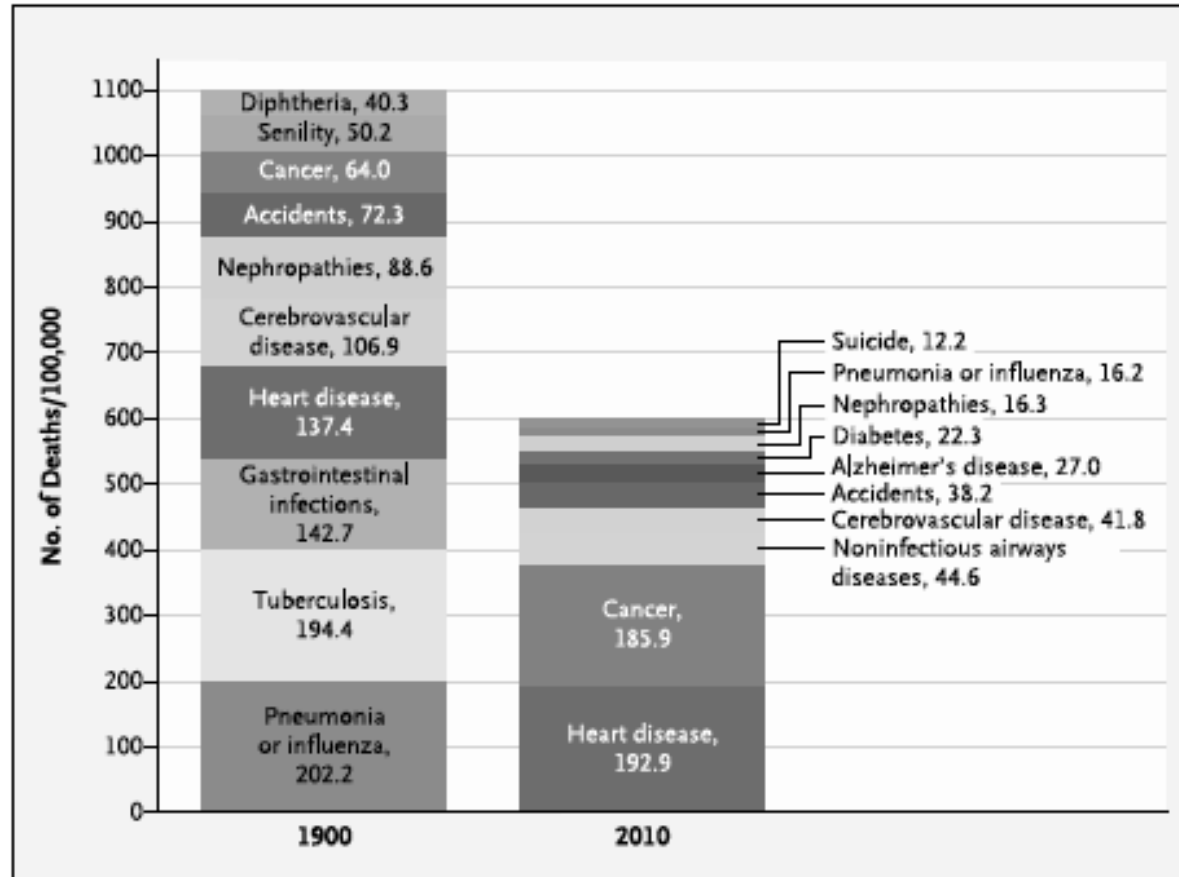
INJURY INFLAMMATION



Nobody could imagine then that [the immune system] could harm the host it protects.

MEDICAL MILESTONES

CELEBRATING KEY ADVANCES SINCE 1840



Top 10 Causes of Death: 1900 vs. 2010.

Data are from the Centers for Disease Control and Prevention.

- 5 **ANAESTHESIA** Symbol of humanitarianism
Stephanie J Snow
- 6 **ANTIBIOTICS** The epitome of a wonder drug
Robert Bud
- 7 **CHLORPROMAZINE** Unlocking psychosis
Trevor Turner
- 8 **COMPUTERS** Transcending our limits
Alejandro R Jadad, Murray W Enkin
- 9 **DISCOVERY OF DNA STRUCTURE** The best is yet to come
John Burn
- 10 **EVIDENCE BASED MEDICINE** Increasing, not dictating, choice
Kay Dickersin, Sharon E Straus, Lisa A Bero
- 11 **GERM THEORY** Invisible killers revealed
Harry Burns
- 12 **IMAGING** Revealing the world within
Adrian M K Thomas, John Pickstone
- 13 **IMMUNOLOGY** Making magic bullets
D Michael Kemeny, Paul A MacAry
- 14 **ORAL REHYDRATION THERAPY** The simple solution for saving lives
Olivier Fontaine, Paul Garner, M K Bhan
- 15 **THE PILL** Emblem of liberation
Carl Djerassi
- 16 **RISKS OF SMOKING** All done and dusted
Simon Chapman
- 17 **SANITATION** Pragmatism works
Johan P Mackenbach
- 18 **TISSUE CULTURE** Solving the mysteries of viruses
Yvonne Cossart
- 19 **VACCINES** Conquering untreatable diseases
Michael Worboys
- 20 **I've got a little list**
Jeffrey P Koplan

THE EFFECT OF INFECTIONS ON SUSCEPTIBILITY TO AUTOIMMUNE AND ALLERGIC DISEASES

JEAN-FRANÇOIS BACH, M.D., D.Sc.

ple sclerosis,⁷
(type 1 diabetes
— and Crohn's
diseases. The
atopic dermatitis
between 1979
many, the inci-
from 1969 to
more than tri-
to the 1990s.¹

The New England Journal of Medicine

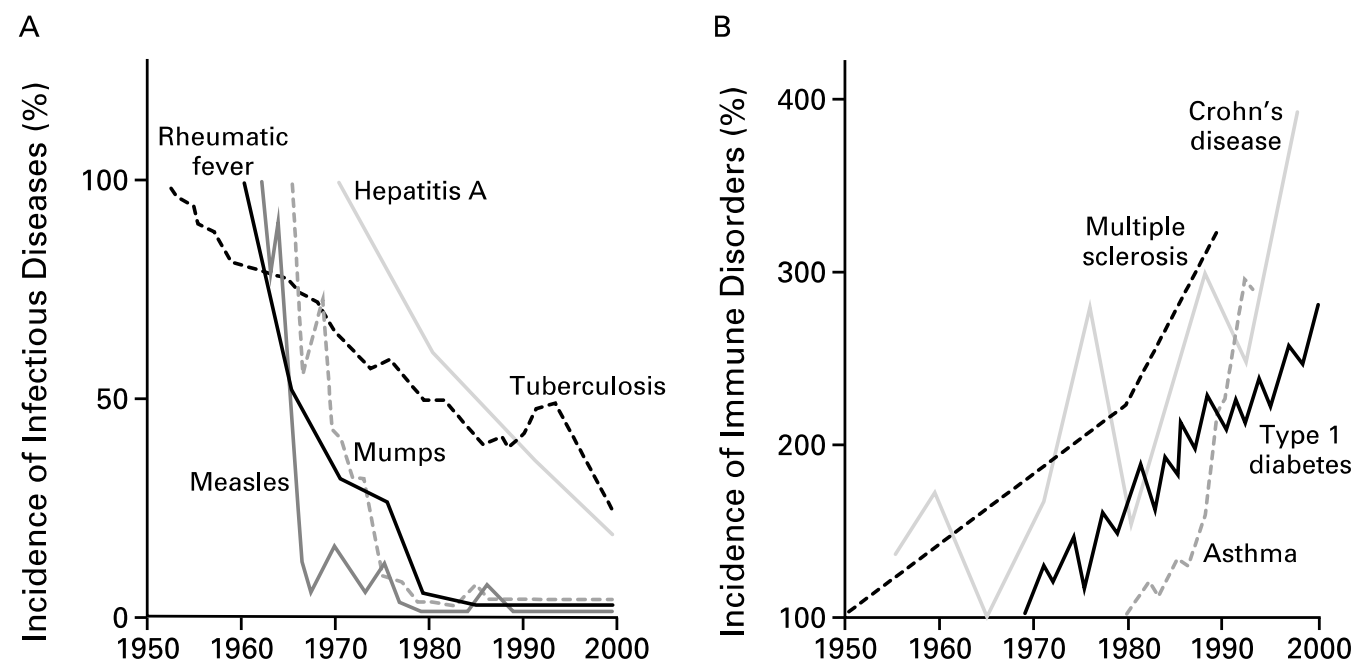
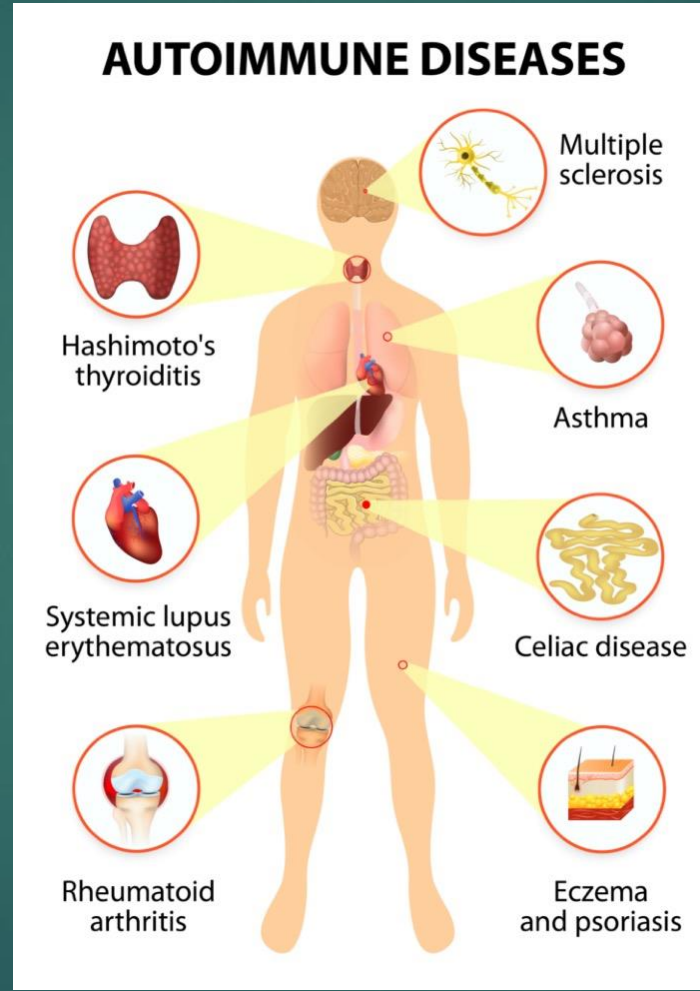
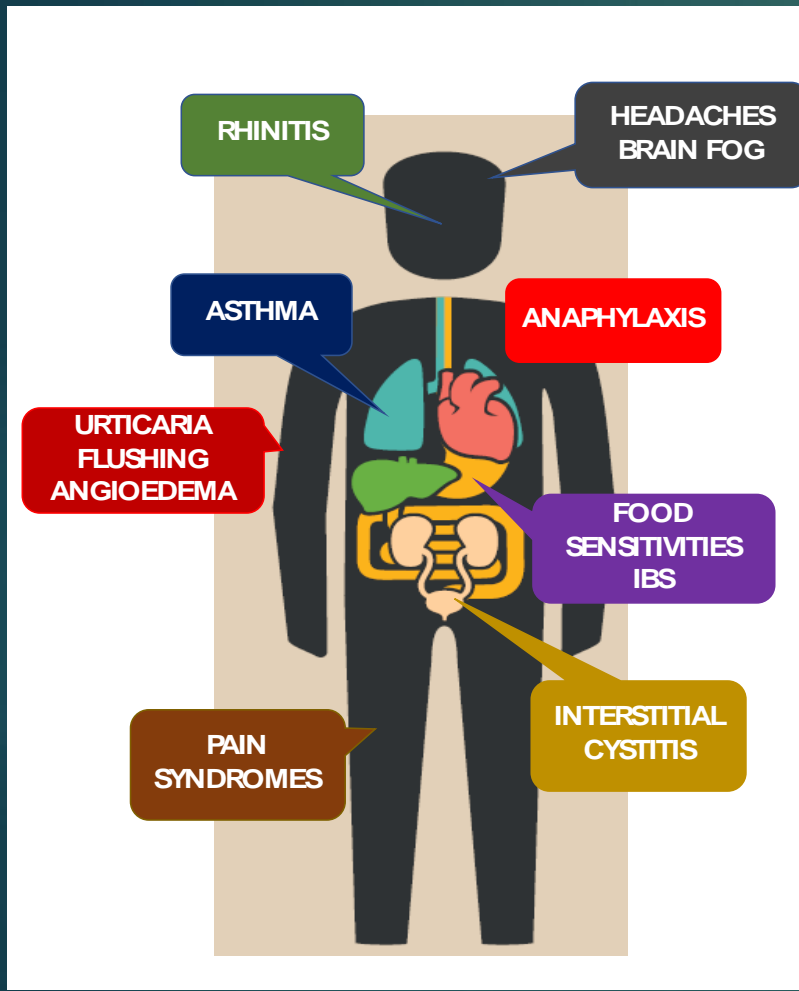


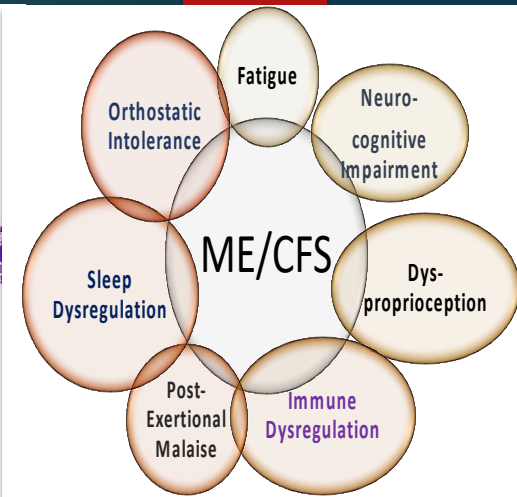
Figure 1. Inverse Relation between the Incidence of Prototypical Infectious Diseases (Panel A) and the Incidence of Immune Disorders (Panel B) from 1950 to 2000.

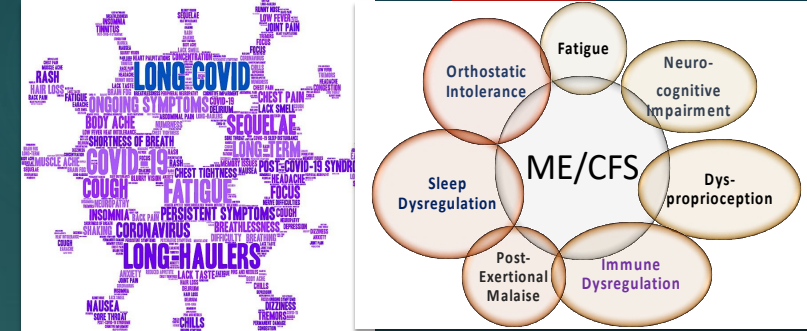
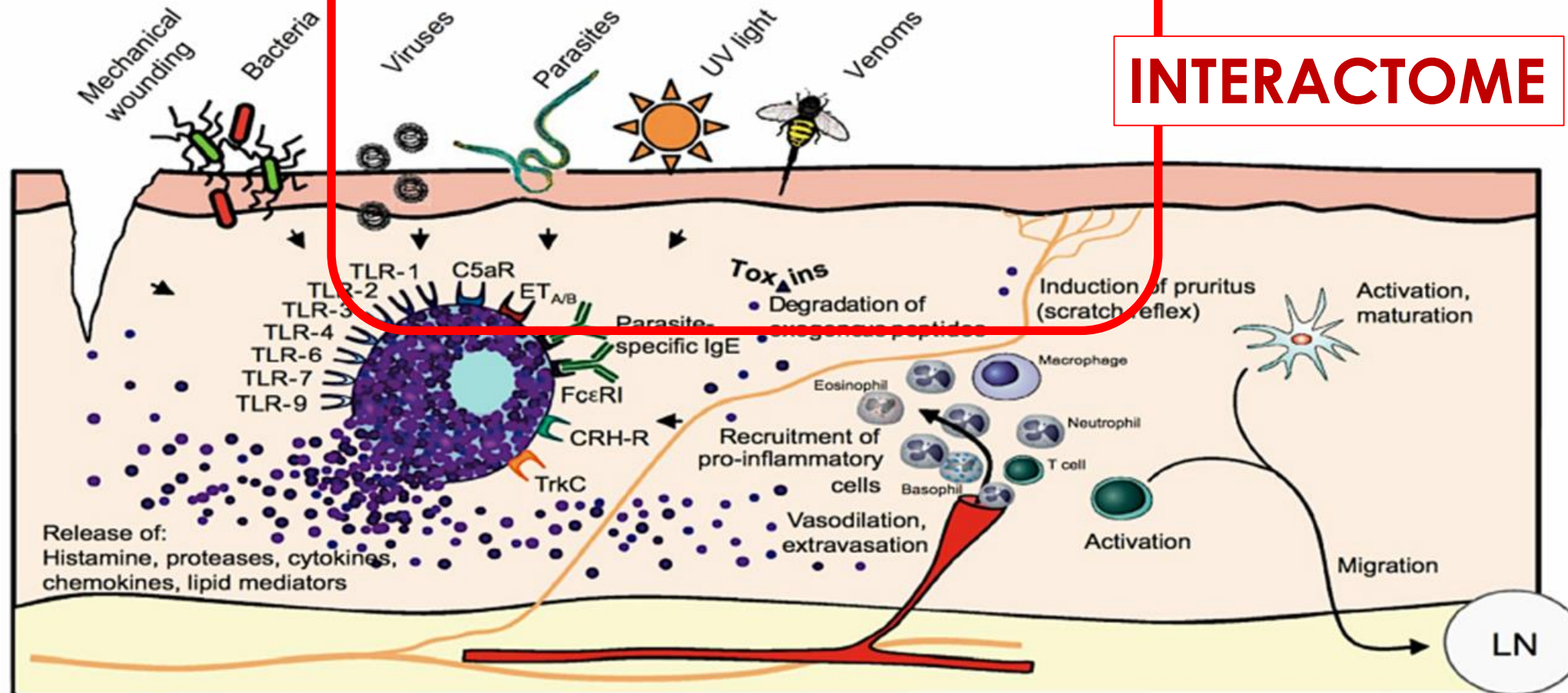
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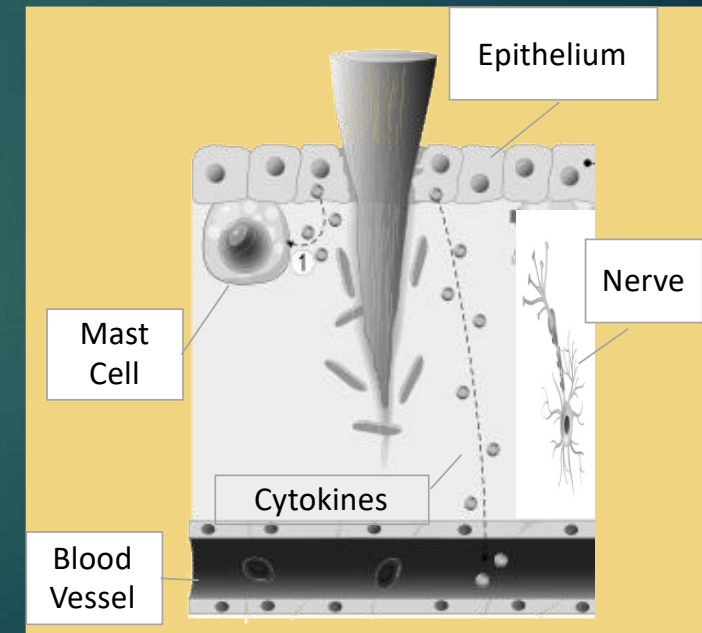
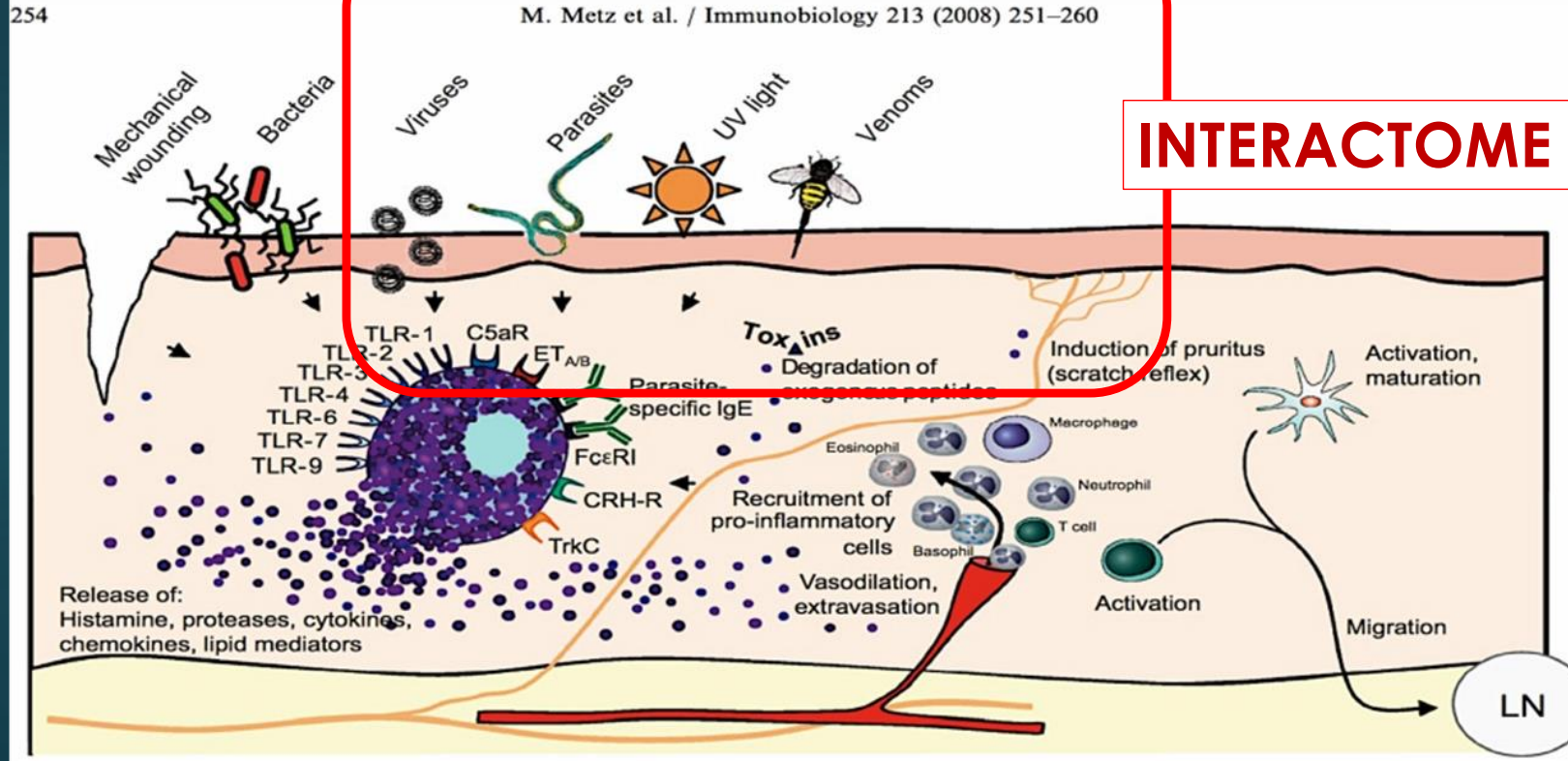
Loss of
Tolerance

Hypersensitivity





The Interactome: The nervous and the immune systems as surveillance and 1st responders



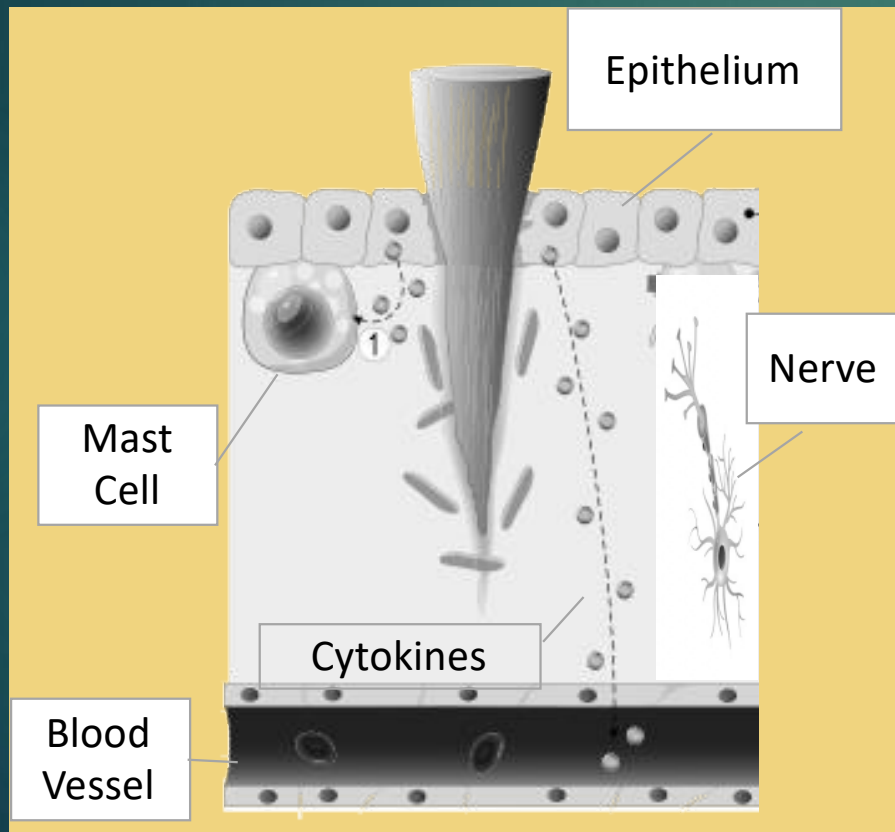


Brief Reviews

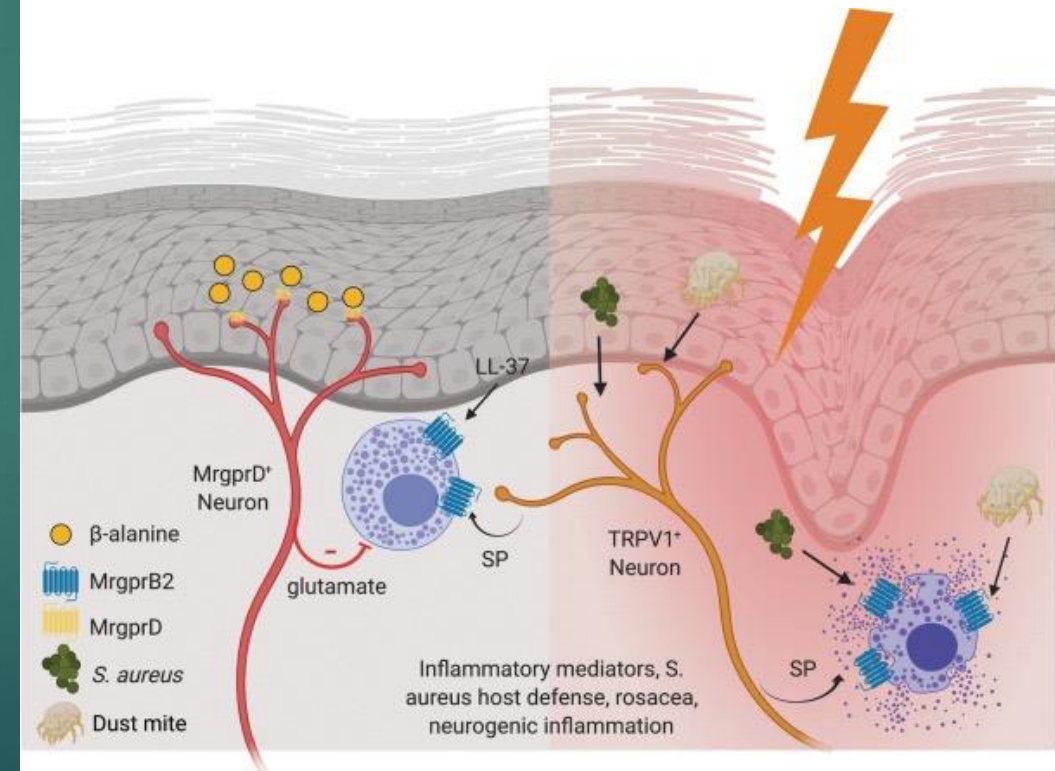
The Journal
of Immunology

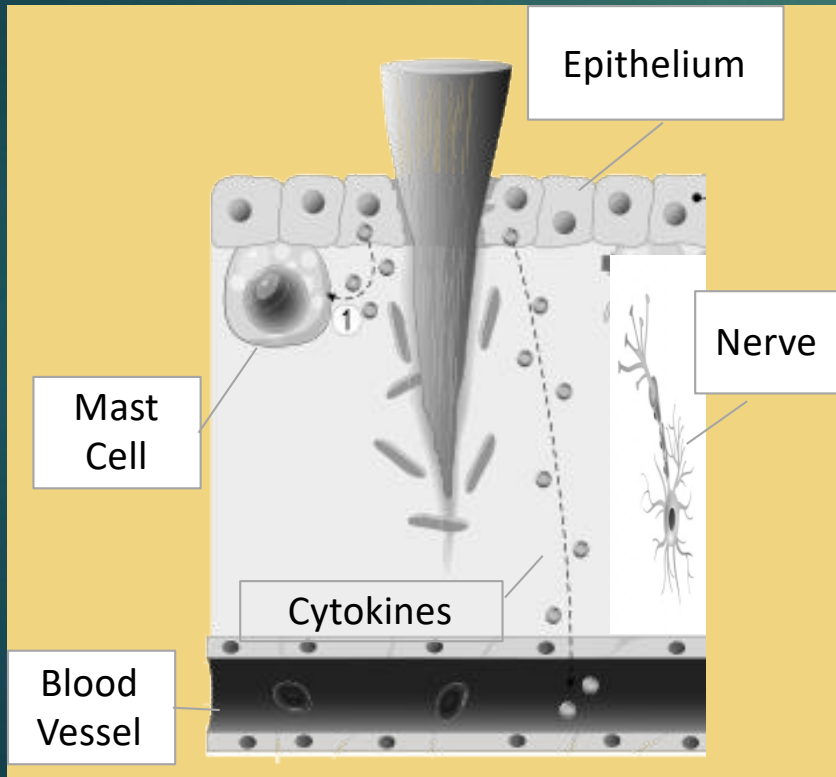
Unraveling the Plastic Peripheral Neuroimmune Interactome

Aakanksha Jain, Sara Hakim, and Clifford J. Woolf

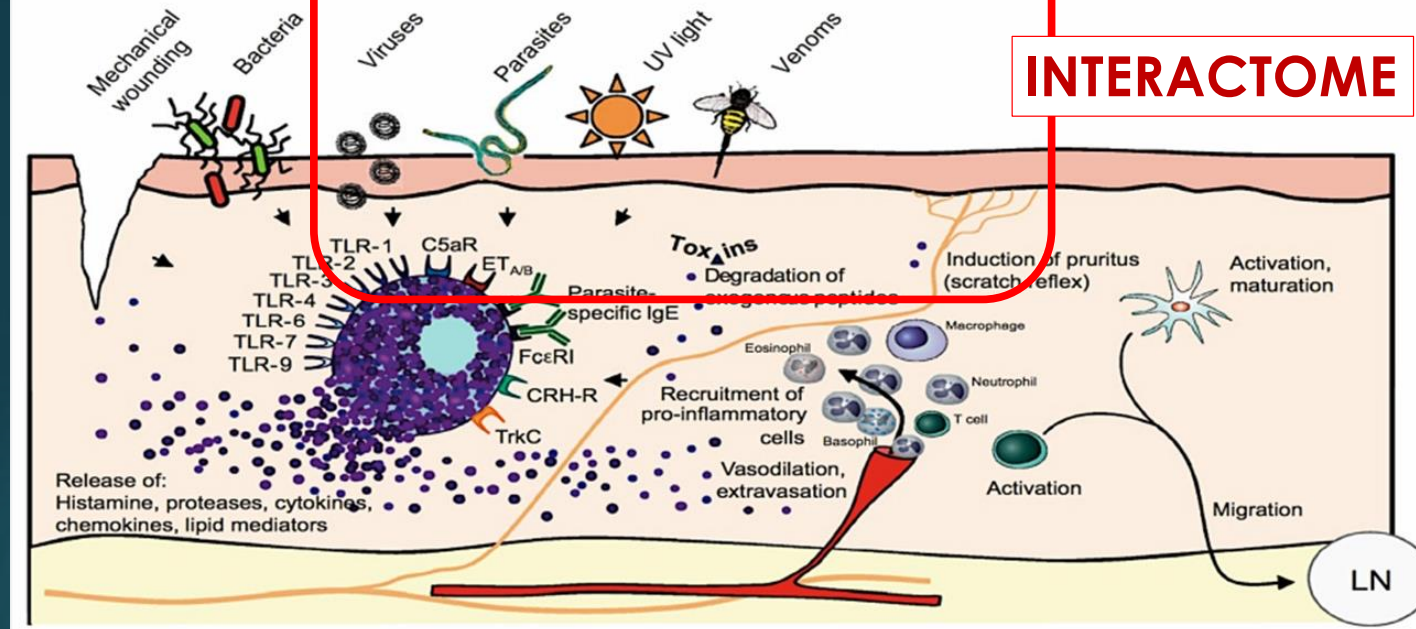


Neuroimmune System





The nervous and the immune systems both protect and warn individuals of local and systemic threats by virtue of many shared functions, including sensing the presence of pathogens as well as injured and dying cells.



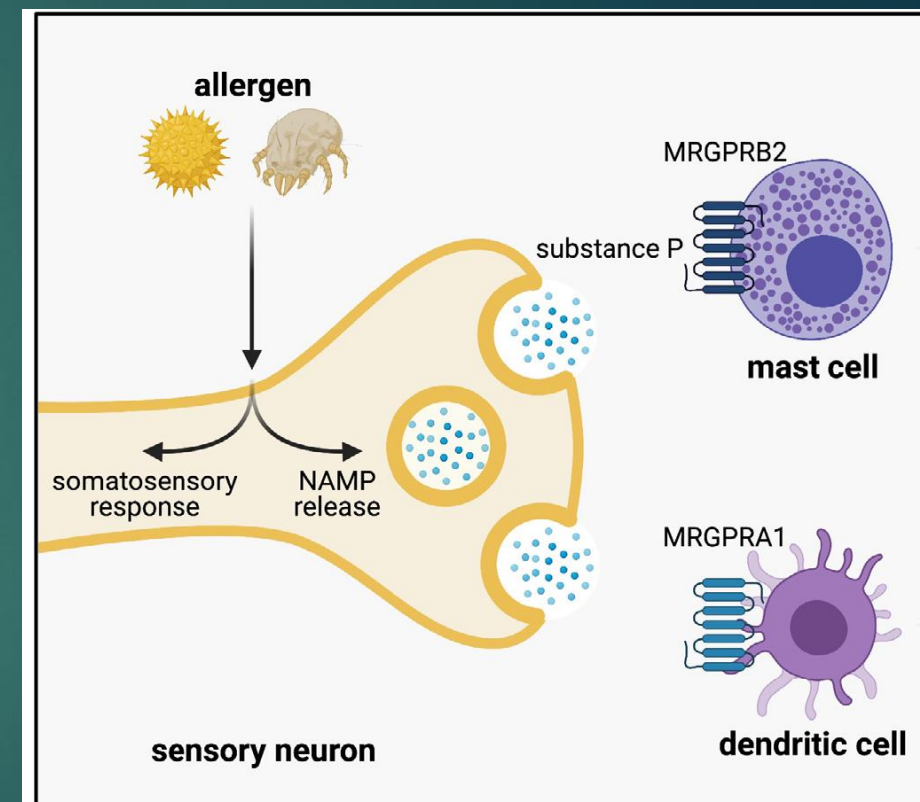
Immunology & Cell Biology 2021; 99: 936–948
www.wileyonlinelibrary.com/journal/icb

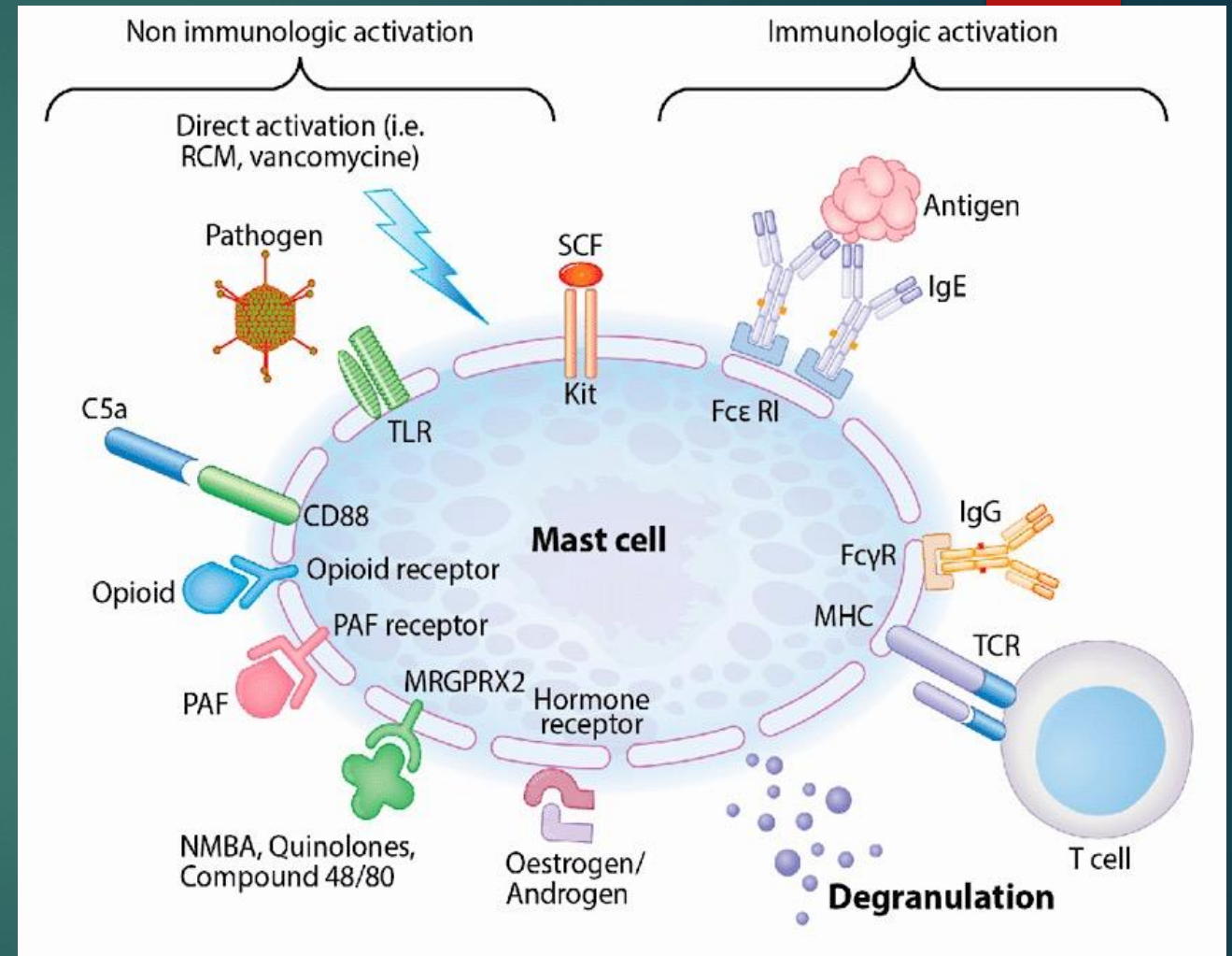
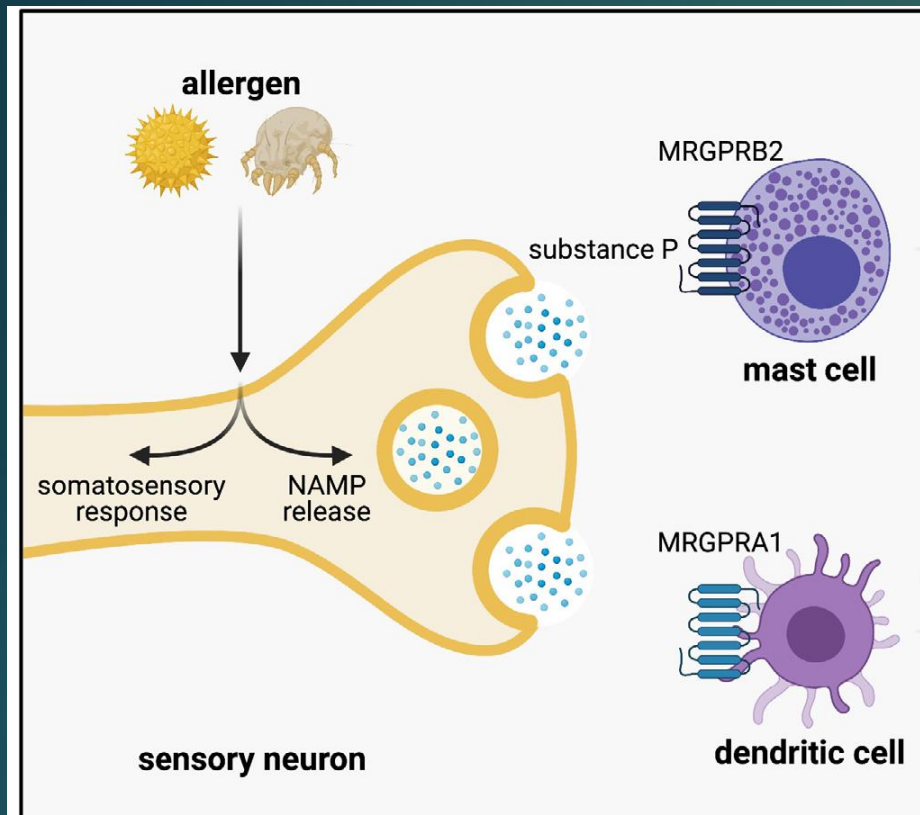
SPECIAL FEATURE REVIEW

A decision tree model for neuroimmune guidance of allergic immunity

Cameron H Flayer, Caroline Perner  & Caroline L Sokol 

Division of Rheumatology, Allergy and Immunology, Center for Immunology and Inflammatory Diseases, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA





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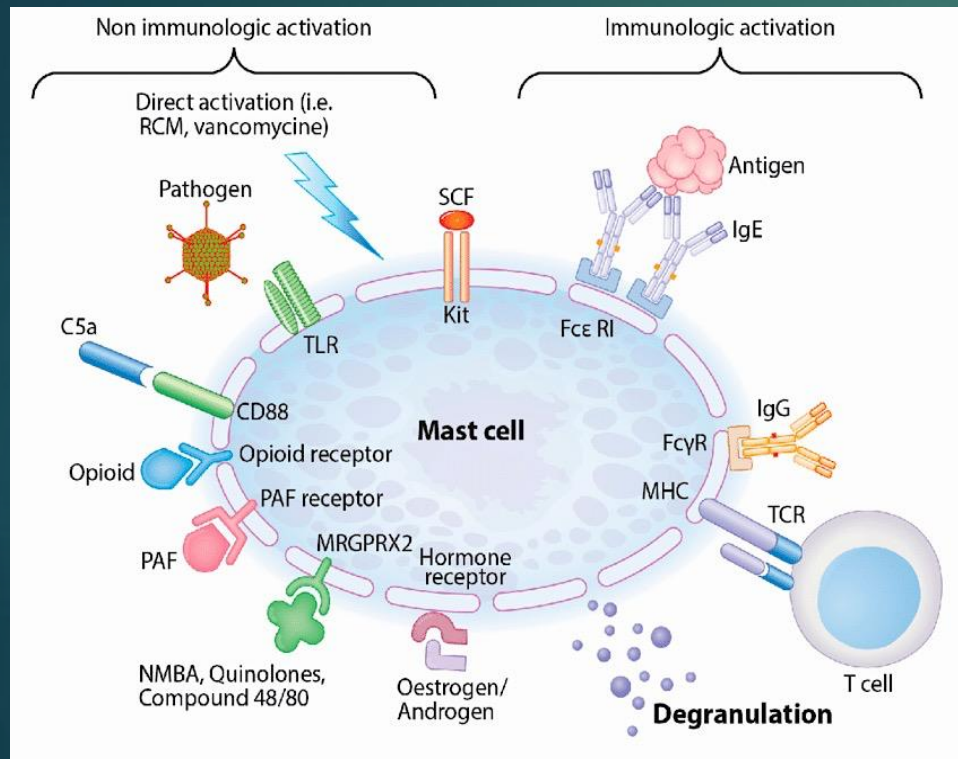
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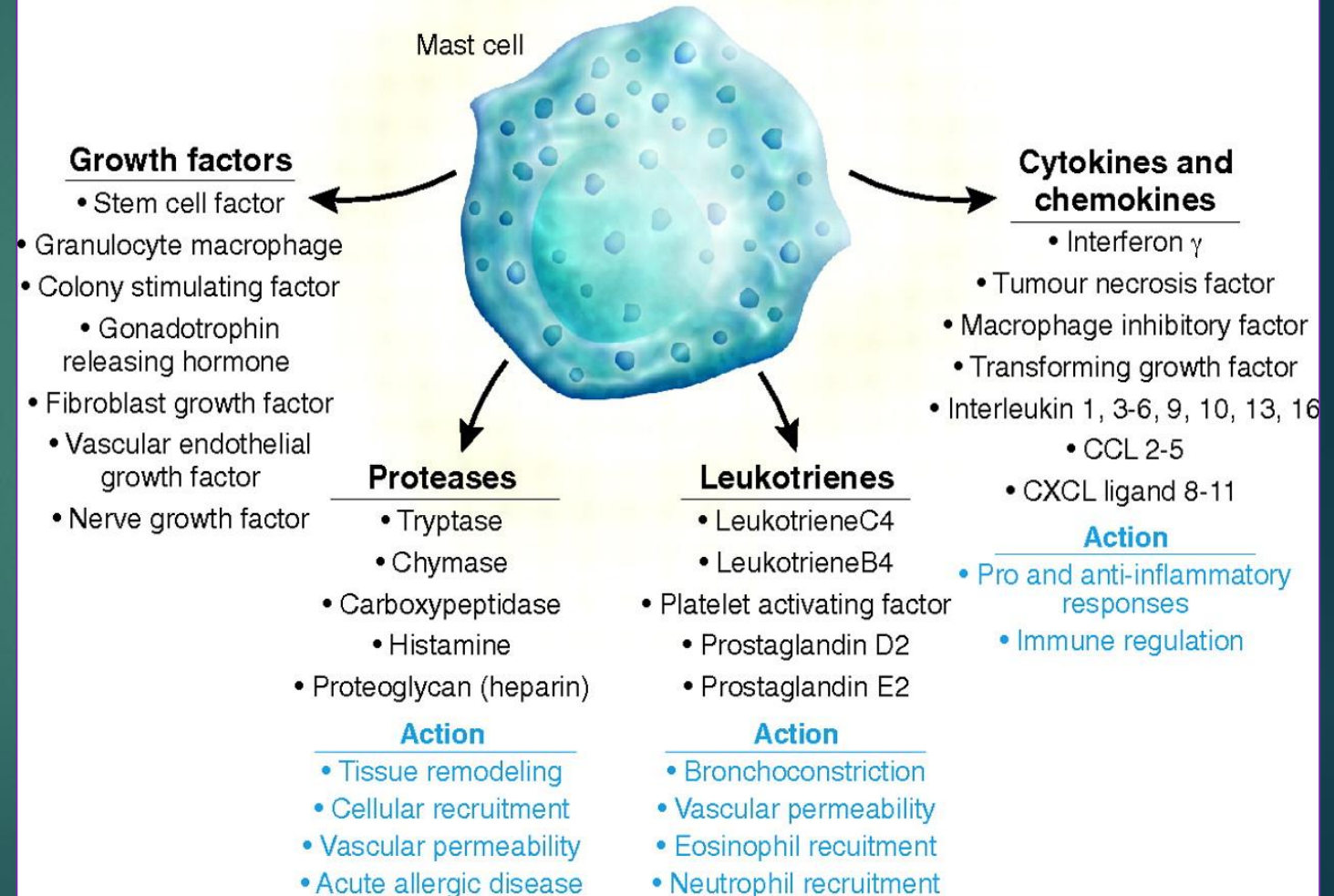
Cameron H Flayer, Caroline Perner & Caroline L Sokol

Division of Rheumatology, Allergy and Immunology, Center for Immunology and Inflammatory Diseases, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA

Mast Cells: Surveillance. Response. Repair.



MEDIATOR RELEASE AND PHYSIOLOGICAL REACTIONS OF MAST CELL DEGRANULATION



Mast Cells: Surveillance. Response. Repair.

MEDIATOR RELEASE AND PHYSIOLOGICAL REACTIONS OF MAST CELL DEGRANULATION

Mast cell

Growth factors

- Stem cell factor
- Granulocyte macrophage colony stimulating factor
- Fibroblast growth factor
- Vascular endothelial growth factor
- Nerve growth factor

Cytokines and chemokines

- Interferon γ
- Tumour necrosis factor
- Macrophage inhibitory factor
- Transforming growth factor
- Interleukin 1, 3-6, 9, 10, 13, 16
- CCL 2-5
- CXCL ligand 8-11

Action

- Pro and anti-inflammatory responses
- Immune regulation

Proteases

- Trypsin
- Chymase
- Carboxypeptidase
- Histamine
- Proteoglycan (heparin)

Action

- Tissue remodeling
- Cellular recruitment
- Vascular permeability
- Acute allergic disease

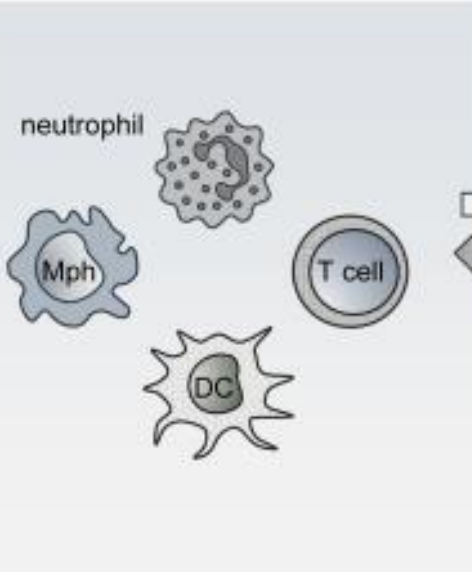
Leukotrienes

- Leukotriene C4
- Leukotriene B4
- Platelet activating factor
- Prostaglandin D2
- Prostaglandin E2

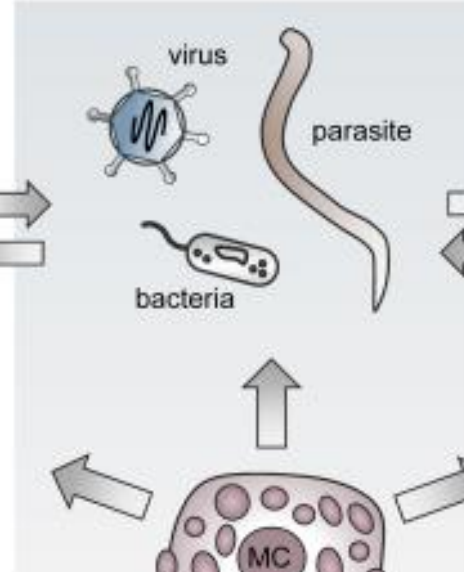
Action

- Bronchoconstriction
- Vascular permeability
- Eosinophil recruitment
- Neutrophil recruitment

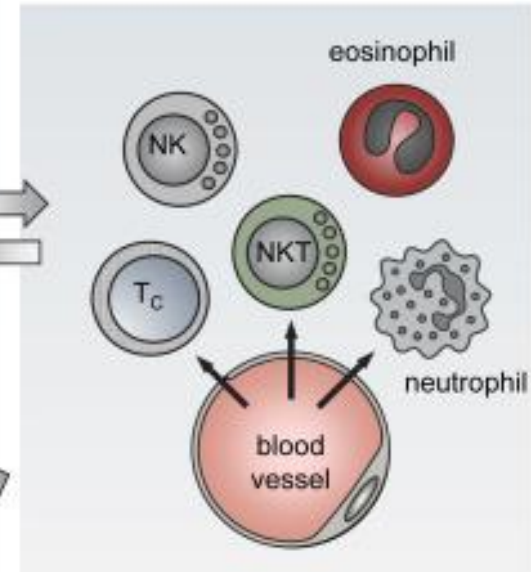
activation of effector cells



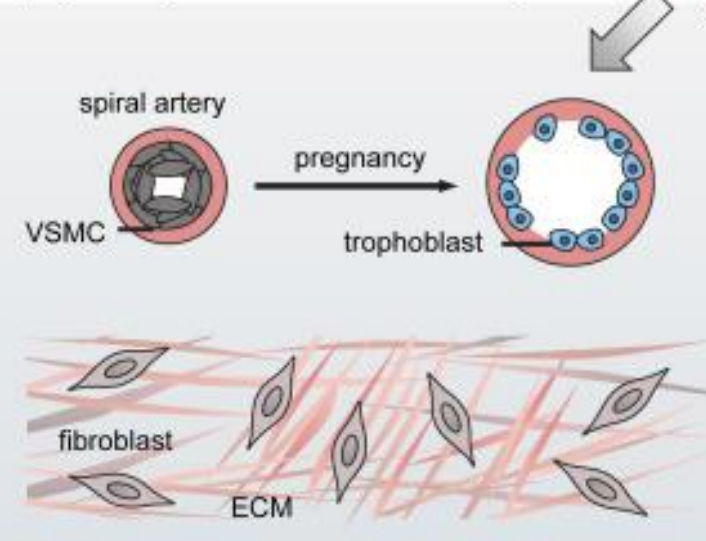
direct antimicrobial effect



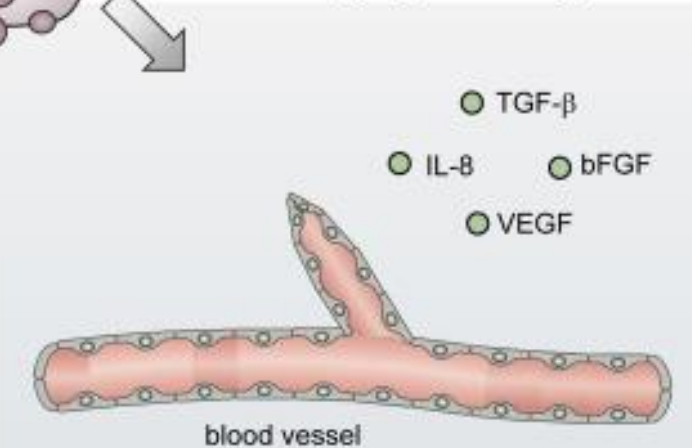
recruitment of effector cells



physiological tissue remodeling



angiogenesis regulation



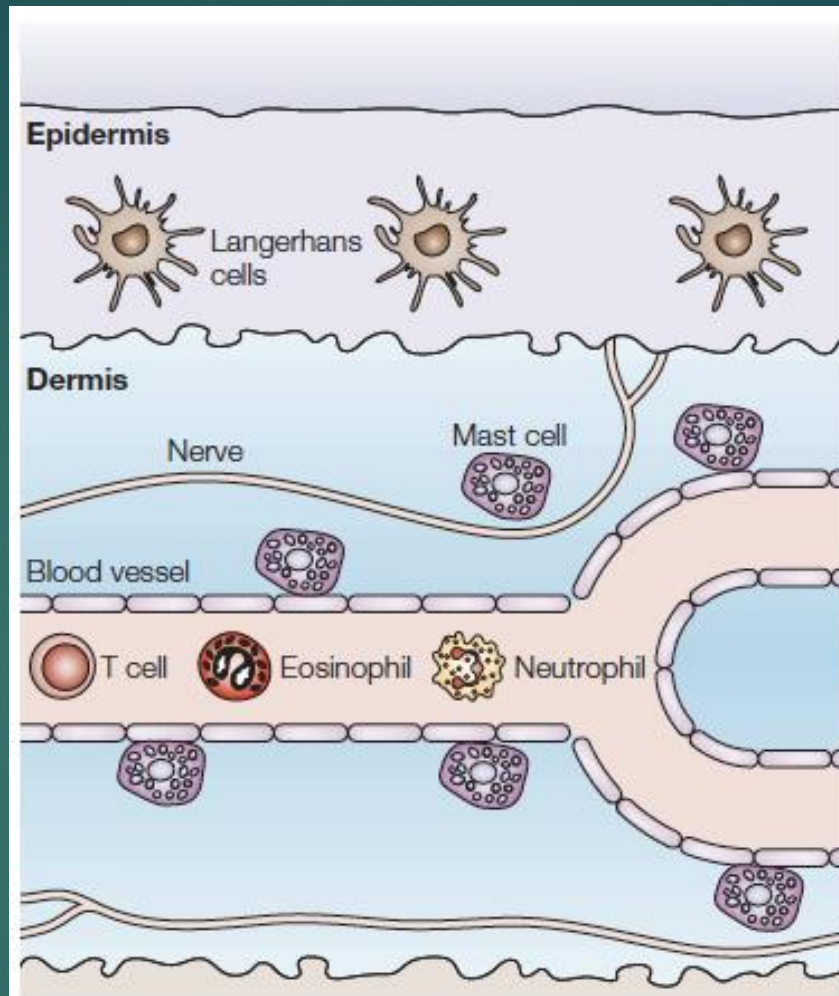
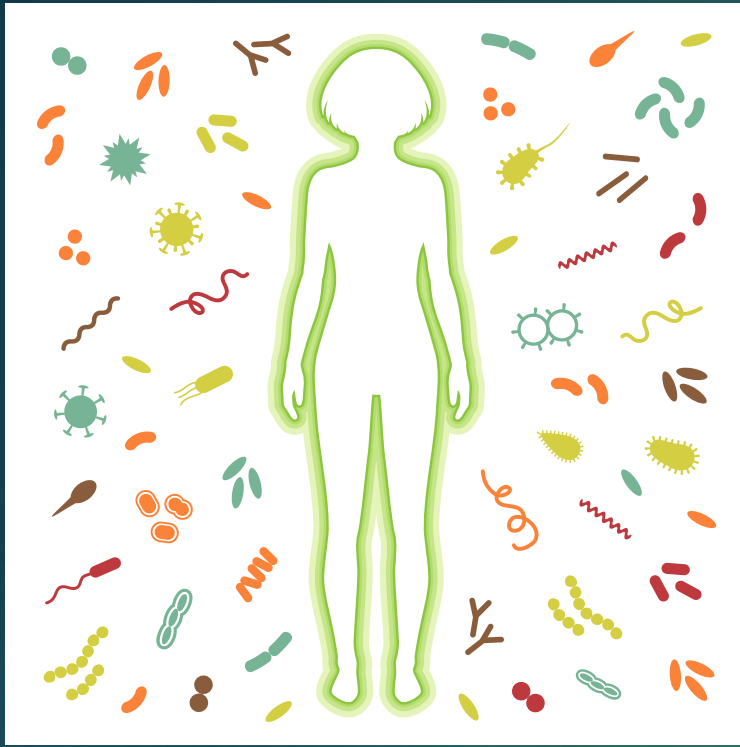
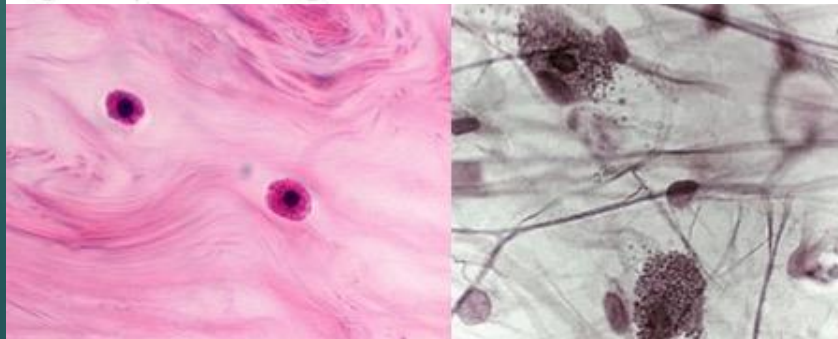


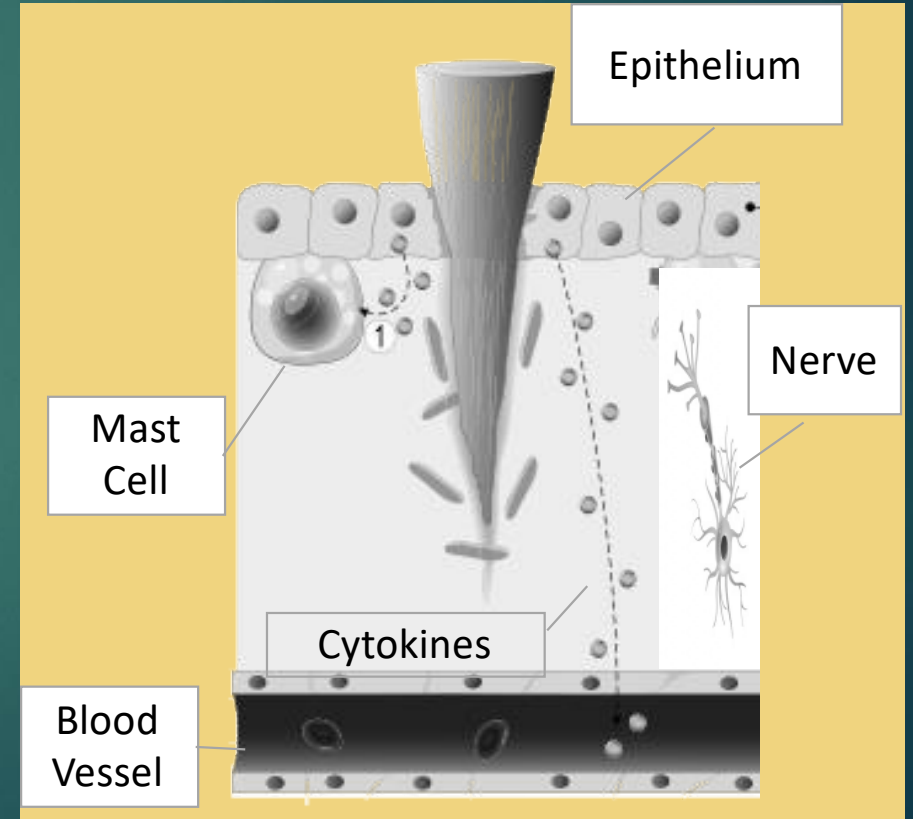
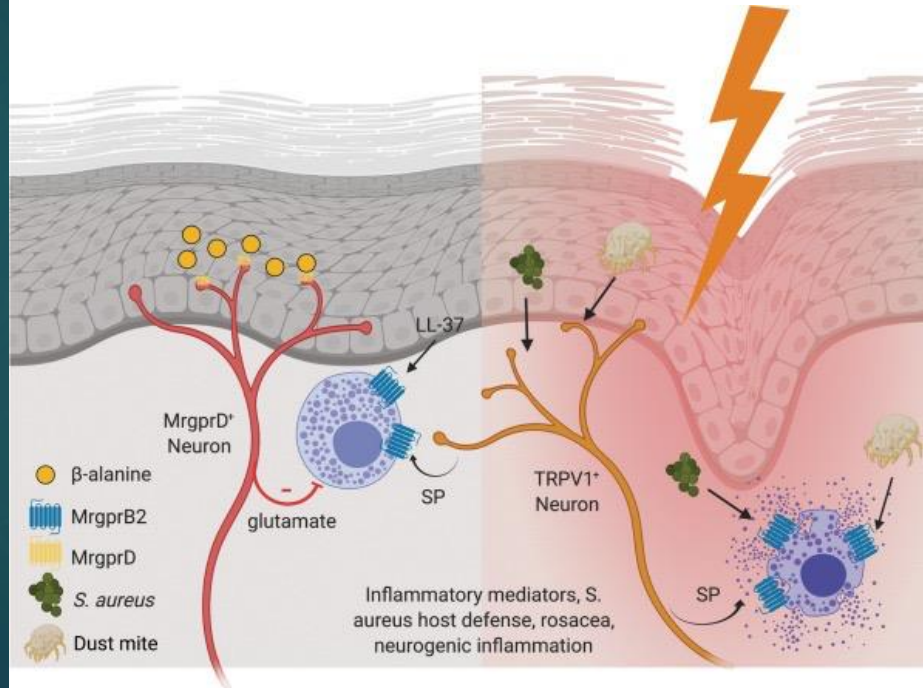
Figure 1 | The strategic location of mast cells. Mast cells



- Nerves and mast cells (MCs) are closely associated with the epithelium.
- Nerve-MCs are located at sites of microbial entry into the host
- Nerve-MCs tend to cluster near blood vessels



Neuroimmune System



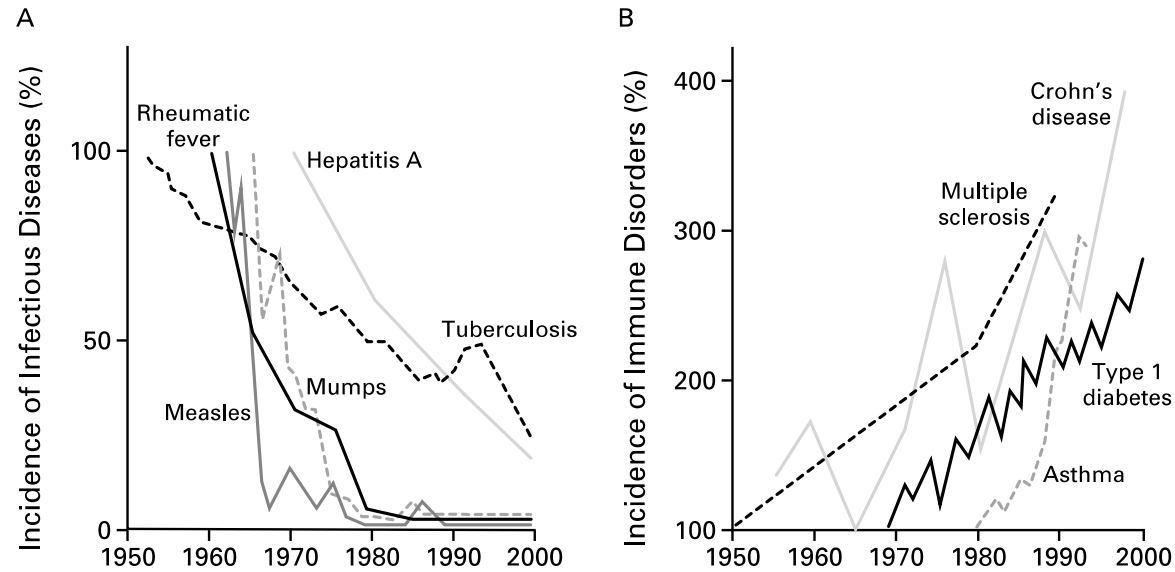
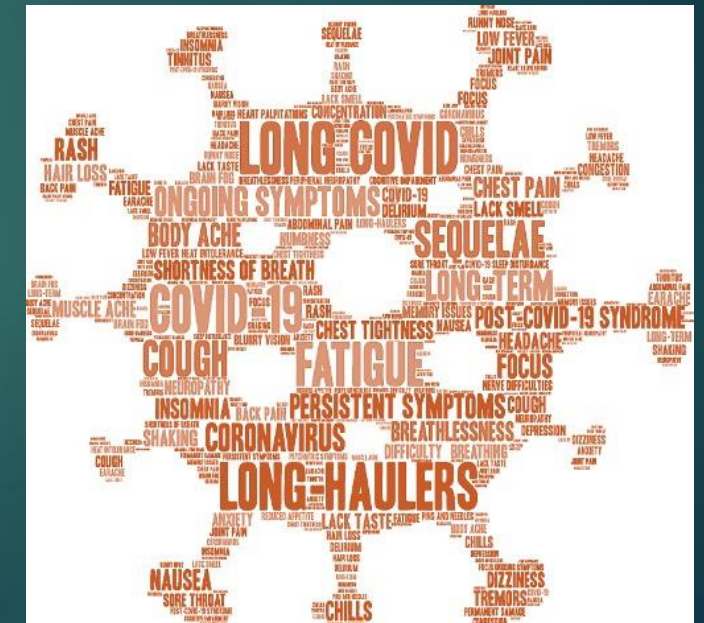
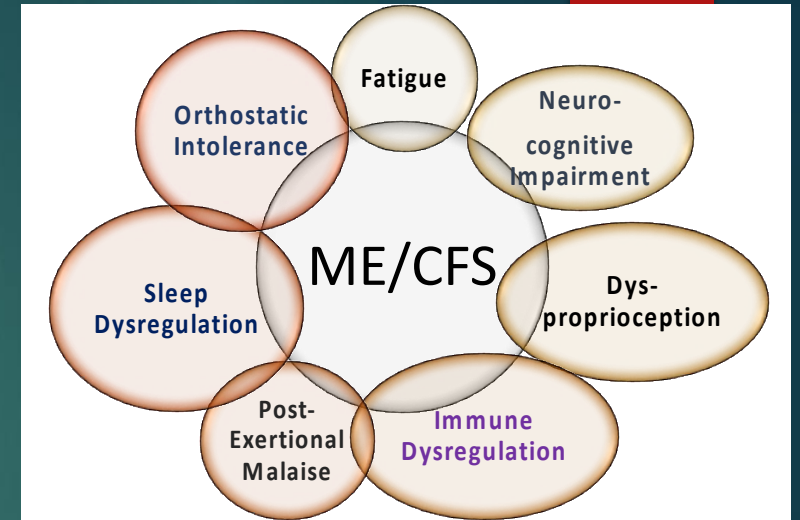


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THE EFFECT OF INFECTIONS ON SUSCEPTIBILITY TO AUTOIMMUNE AND ALLERGIC DISEASES

JEAN-FRANÇOIS BACH, M.D., D.Sc.

— and Crohn's diseases. The atopic dermatitis between 1979 and 1990, the incidence from 1969 to 1990, to more than tripled to the 1990s.

Is the neuro-immune system not turning off?

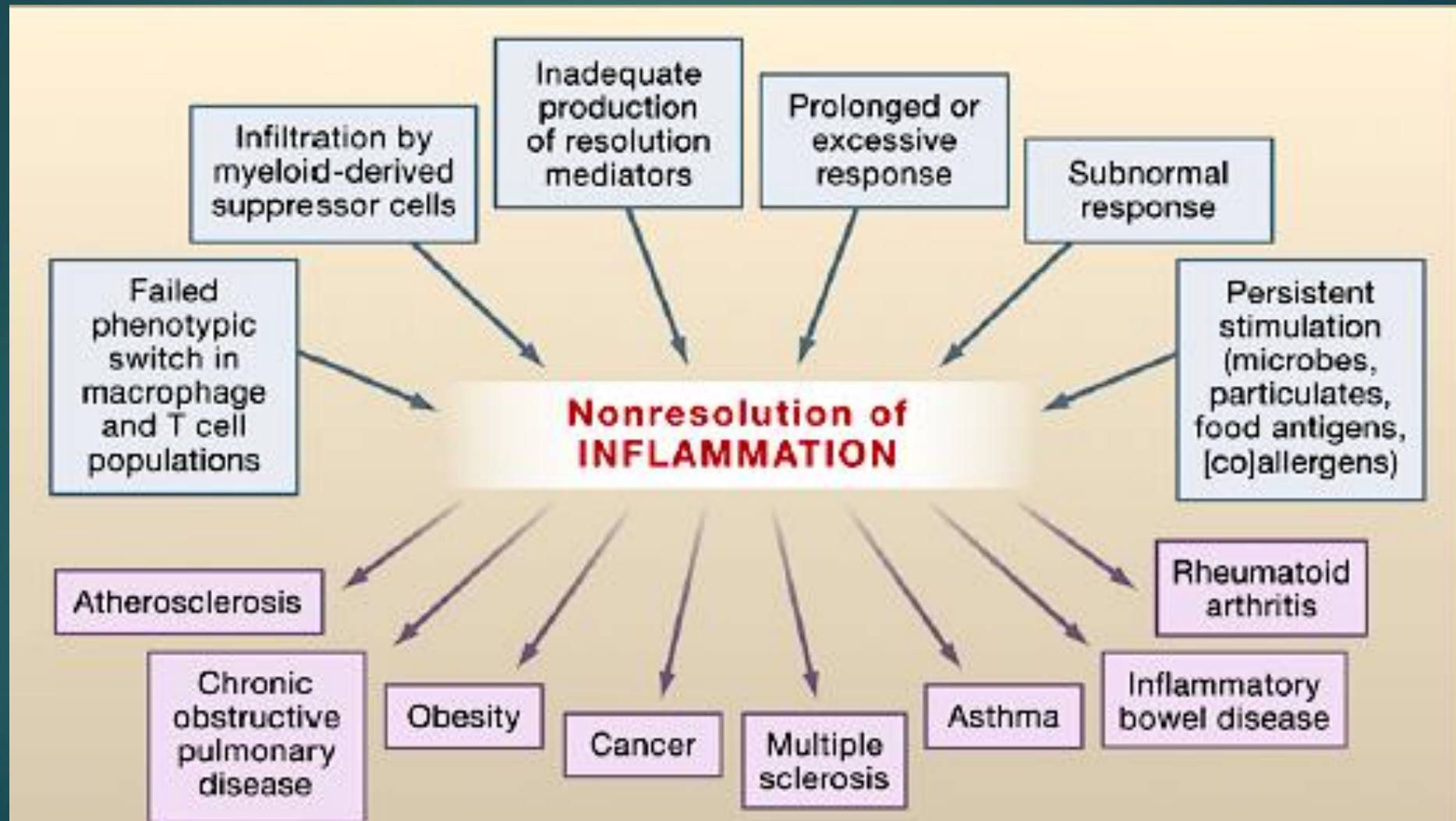
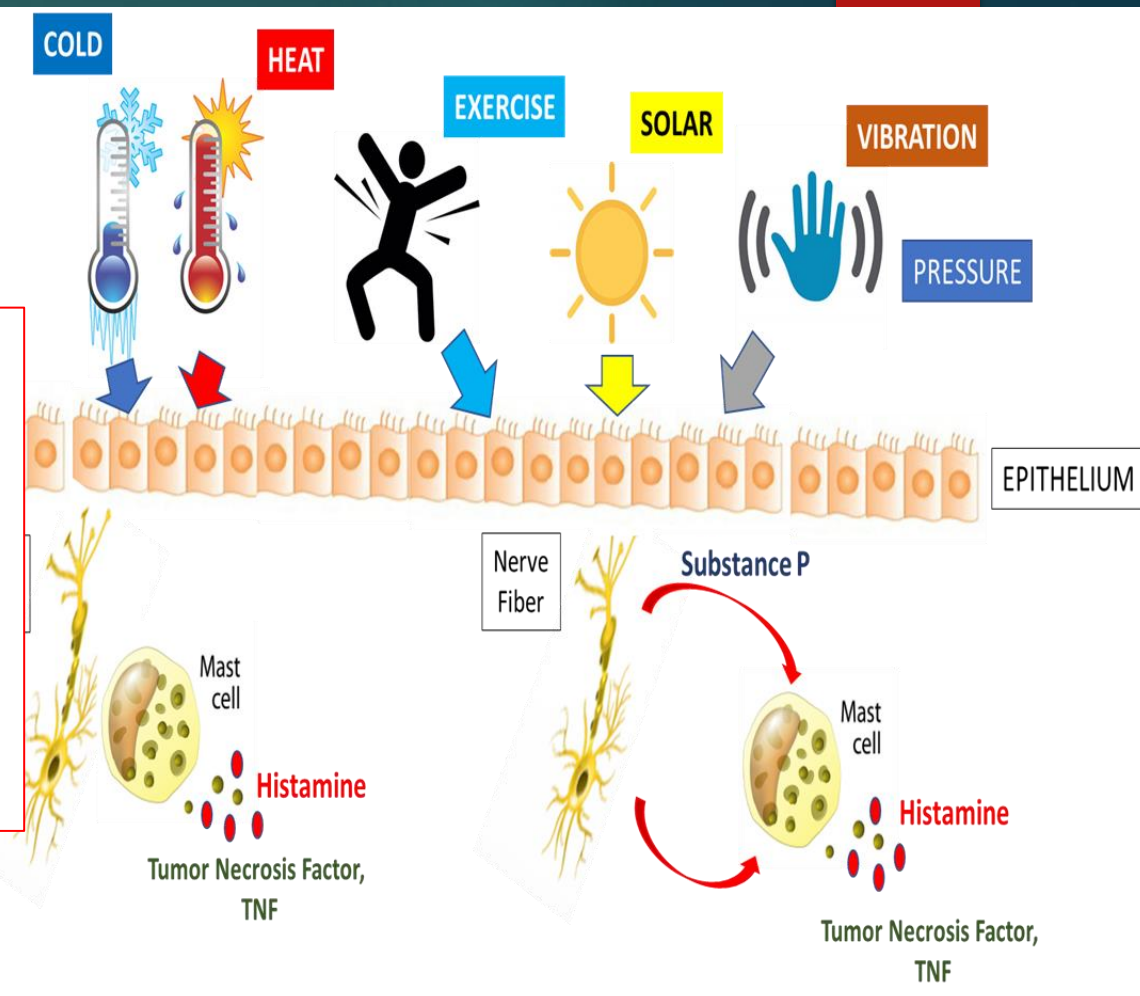


Table I. *Classification of urticaria*

Group/Subgroup	Characteristics
<i>Spontaneous urticaria</i>	<i>Definition</i>
Acute urticaria	Spontaneous wheals < 6 weeks
Chronic urticaria	
<i>Physical urticaria</i>	
Acquired cold urticaria	
Delayed pressure urticaria	
Heat urticaria	
Solar urticaria	
Dermographic urticaria/urticaria factitia/	
Vibratory urticaria/angioedema	
<i>Other urticaria disorders</i>	
Aquagenic urticaria	Water
Cholinergic urticaria	Increase of body temperature
Contact urticaria	Contact with urticariogenic substance
Exercise-induced anaphylaxis/urticaria	Physical exercise

UV: ultraviolet

**Physical Urticarias:
Direct
Bi-directional
Mast Cell-Nerve
Crosstalk**

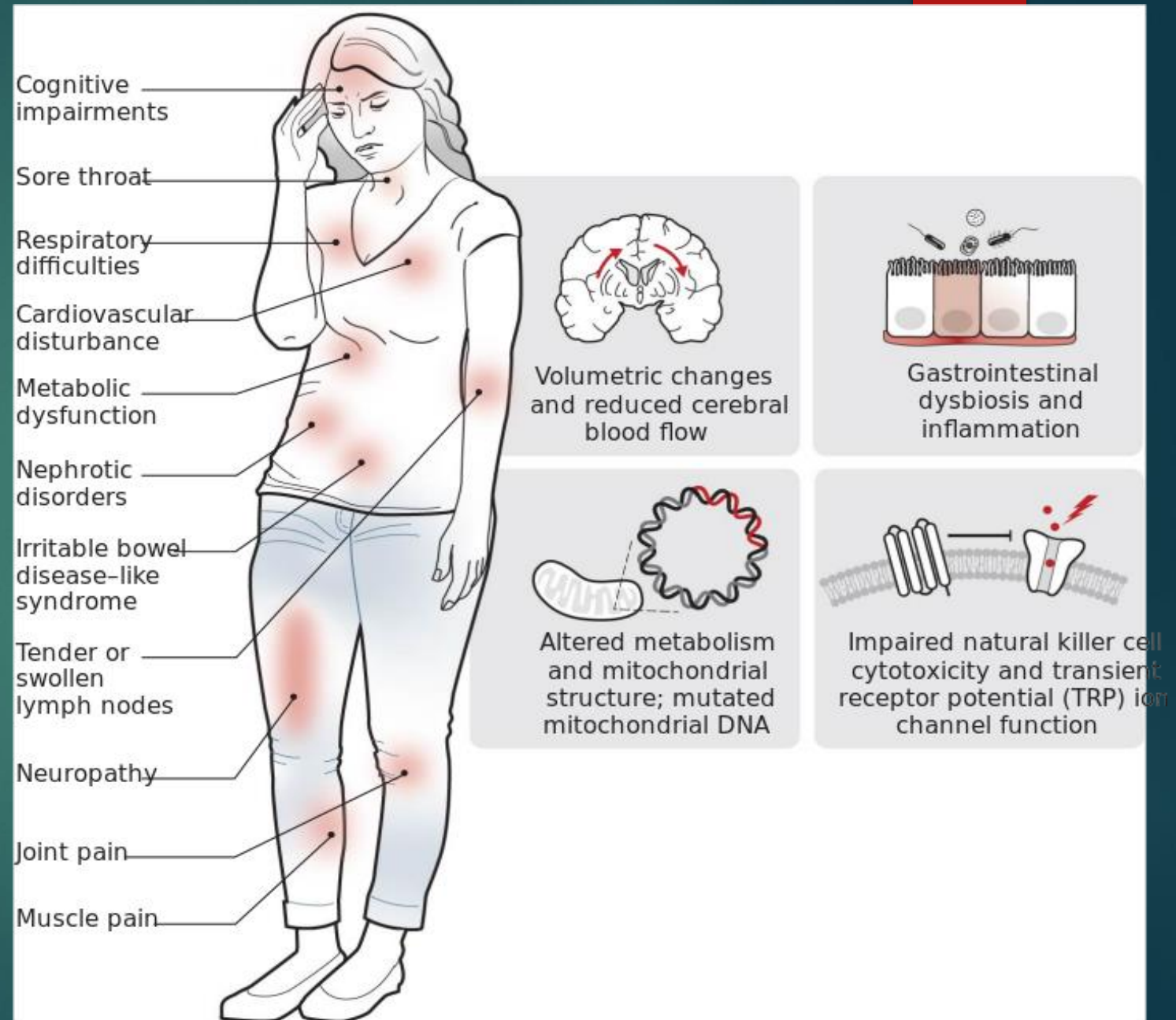


Possible Causes of ME/CFS:

Infections

Immune System Changes

Stress (Neuroendocrine
/Metabolic Changes/ Energy
Production)



Joint Pain



Joint Pain



Cough
Wheeze

Rhinitis, "allergies"



Achoo.

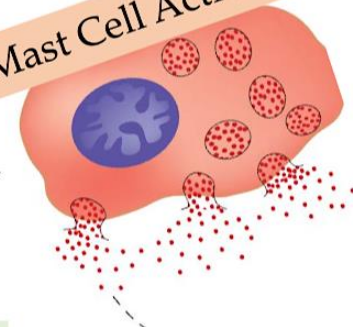


Rashes

Brain fog
Lightheaded
Fatigue



Mast Cell Activation



Throat
tightness



Headaches



Gastro-intestinal upset
Nausea, vomiting, bloating



When Anxiety or Depression Masks a Medical Problem

[Personal Health](#)

By [JANE E. BRODY](#) JUNE 26, 2017

SYSTEMIC

- Fatigue
- Post-exertional malaise

NEUROPSYCHIATRIC

- Anxiety
- Depression
- Insomnia
- Brain fog (impaired attention, concentration, memory)

PULMONARY

- Dyspnea (breathlessness)
- Ground glass opacities (signs of fibrosis and inflammation)
- Hypoxemia (low blood oxygen)
- Reduced diffusion capacity (inefficient transfer of gas from lungs to blood)

EARS-NOSE-THROAT

- Sore throat
- Dry cough

CARDIOVASCULAR

- Nonspecific chest pain
- Myocarditis (inflammation of heart muscle)
- Palpitations
- High heart rate

ENDOCRINE

- Diabetic ketoacidosis (high levels of ketones make blood too acidic)
- Mild thyroiditis (inflammation of thyroid gland)

RENAL

- Acute kidney injury (sudden inability to filter)

GASTROINTESTINAL

- Diarrhea
- Loss of appetite

DERMATOLOGIC

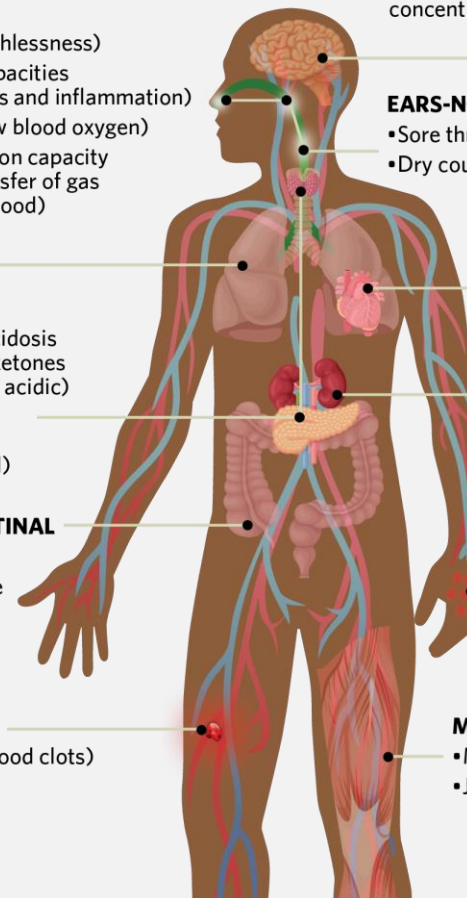
- Alopecia (hair loss)
- Rashes

HEMATOLOGIC

- Thrombosis (blood clots)

MUSCULOSKELETAL

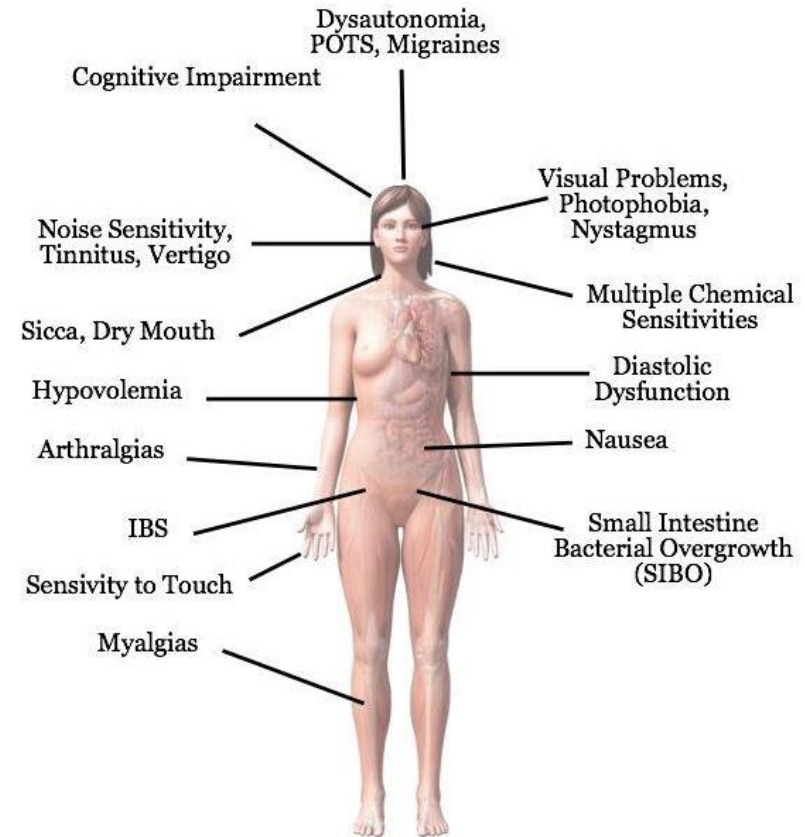
- Muscle ache
- Joint Pain



Myalgic Encephalomyelitis and Chronic Fatigue Syndrome

- severe and disabling fatigue that fails to improve with rest;
- multifocal pain
- sleep disruption
- cognitive dysfunction
- mild exertion can exacerbate symptoms
- Viral infection is an established trigger for the onset of ME/CFS symptoms

Symptoms Of ME/CFS




RESEARCH ARTICLE

Open Access



Illness progression in chronic fatigue syndrome: a shifting immune baseline

Lindsey Russell^{1†}, Gordon Broderick^{1,4,5*†} , Renee Taylor², Henrique Fernandes¹, Jeanna Harvey^{3,4}, Zachary Barnes^{3,4,5}, AnneLiese Smylie¹, Fanny Collado⁴, Elizabeth G. Balbin³, Ben Z. Katz⁶, Nancy G. Klimas^{4,5} and Mary Ann Fletcher^{4,5}

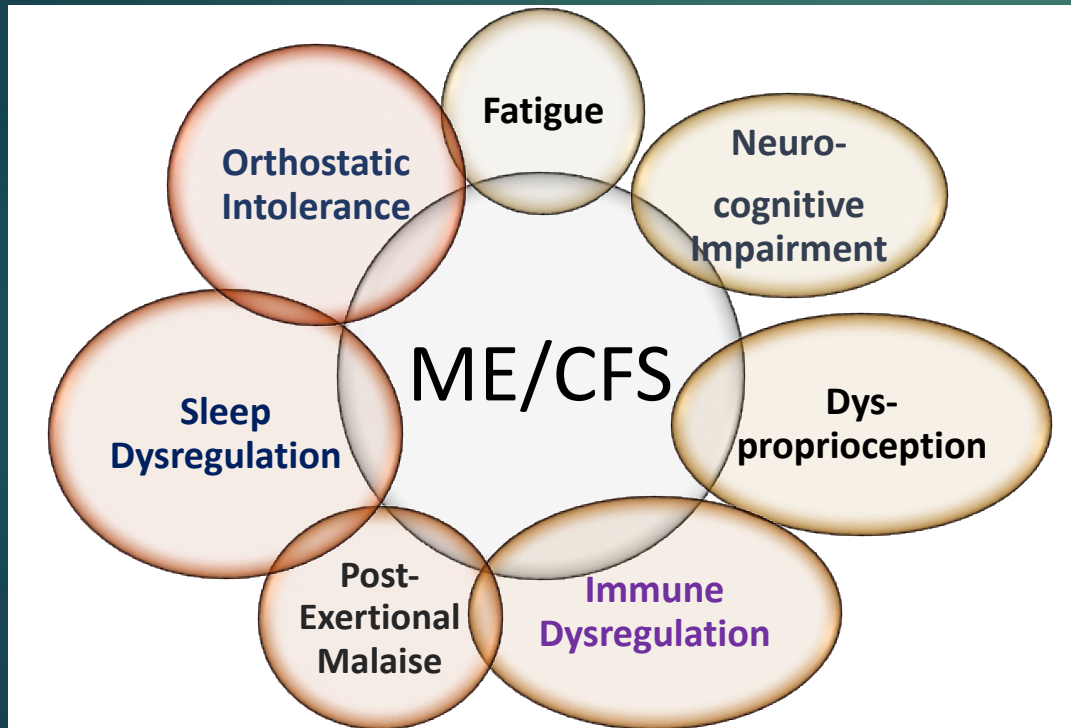
...mounting evidence suggesting that ME/CFS may be characterized by a significant imbalance in [neuroimmune] function and that this imbalance may be perpetuated by an altered homeostatic response



Myalgic Encephalomyelitis/Chronic Fatigue Syndrome

Possible Causes

Scientists have not yet identified what causes myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS). It is possible that ME/CFS has more than one cause, meaning that patients with ME/CFS could have illness resulting from different causes (see below). In addition, it is possible that two or more triggers might work together to cause the illness.



- **Chronic production of cytokines** (cytokines are proteins that are produced by the immune system and regulate behavior of other cells). Higher levels of cytokines for a prolonged period can lead to changes in the body's ability to respond to stress and might lead to the development of health conditions, including ME/CFS.

- **Low-functioning natural killer (NK) cells.** NK cells are cells of the immune system that help the body fight infections. Many patients with ME/CFS have NK cells with lower functional ability to fight infections. Studies have found that the poorer the function of NK cells in ME/CFS patients, the worse the severity of the illness. NK cell function tests are hard to do and their results are not reliable outside of research studies. Because of this problem, NK cell function testing is not yet useful for healthcare providers. Also, low NK cell function can occur in other illnesses and thus cannot be used to diagnose ME/CFS.
- **Differences in markers of T-cell activation.** T-cells are cells of the immune system that help activate and suppress immune responses to infections. If they become too active or not active enough, the immune response does not work as it should. However, not all patients with ME/CFS appear to have these differences in markers of T-cell activation.

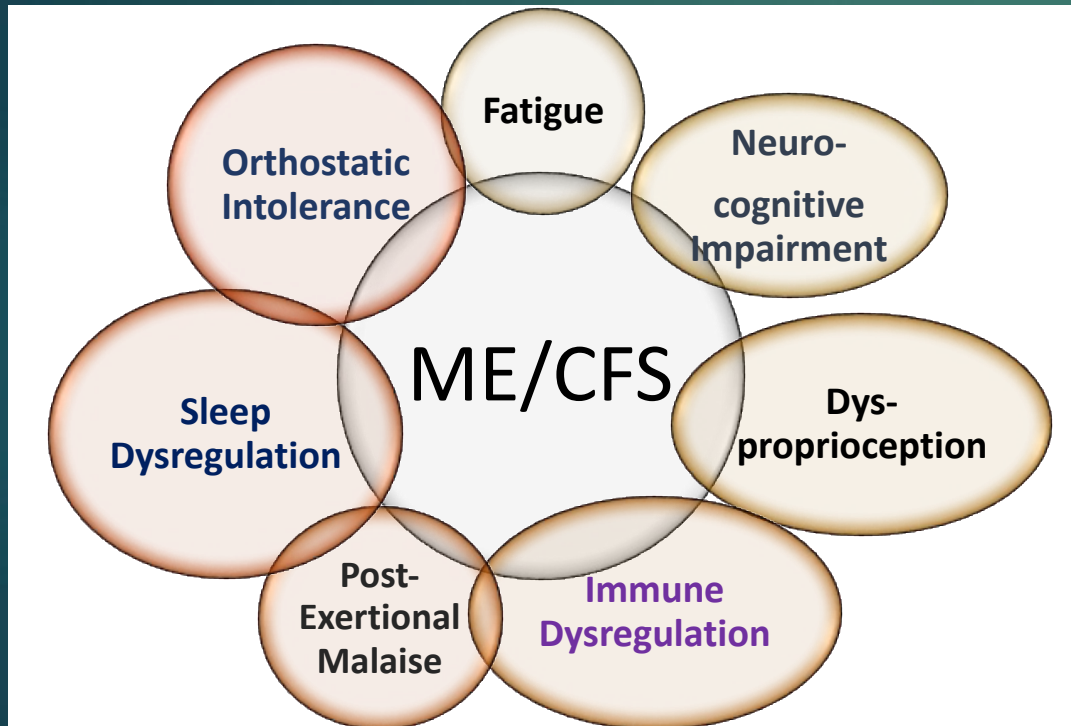
ME/CFS: Neuro- Immune System Changes



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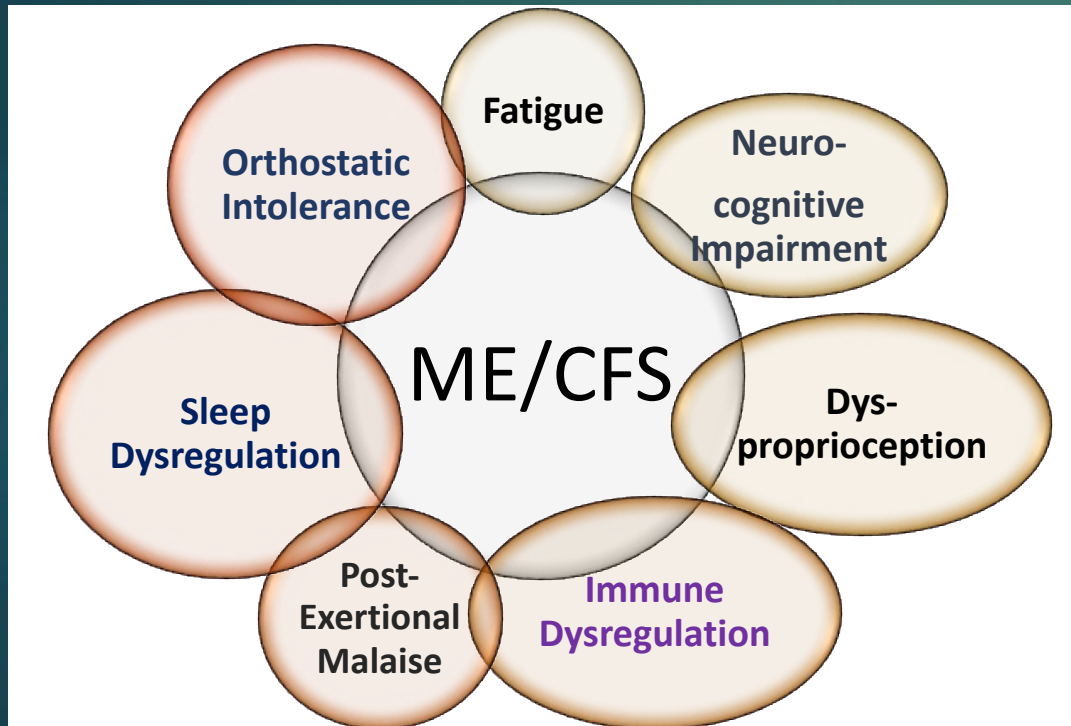
ME/CFS: Neuro- Immune System Changes



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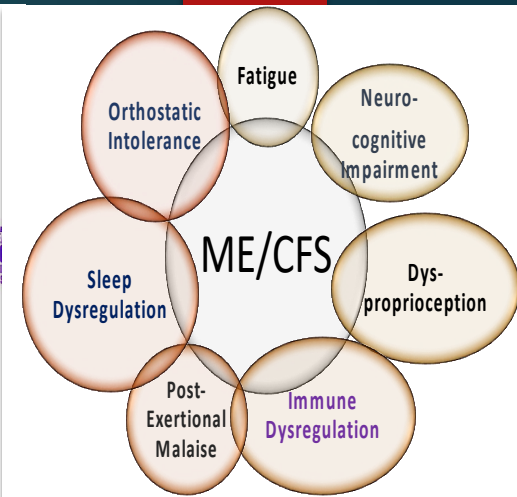
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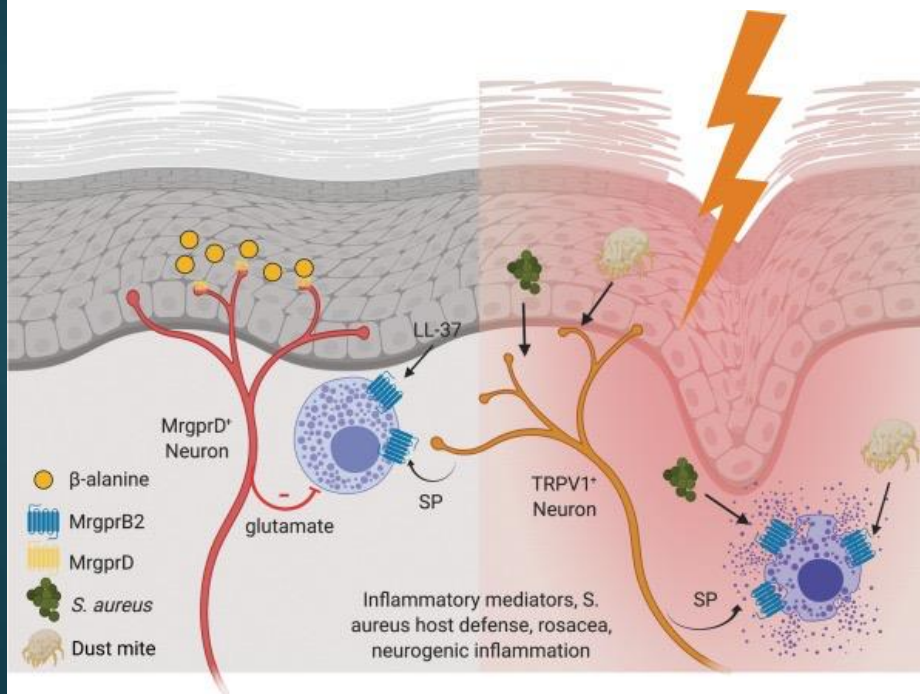
ME/CFS: Neuro- Immune System Changes



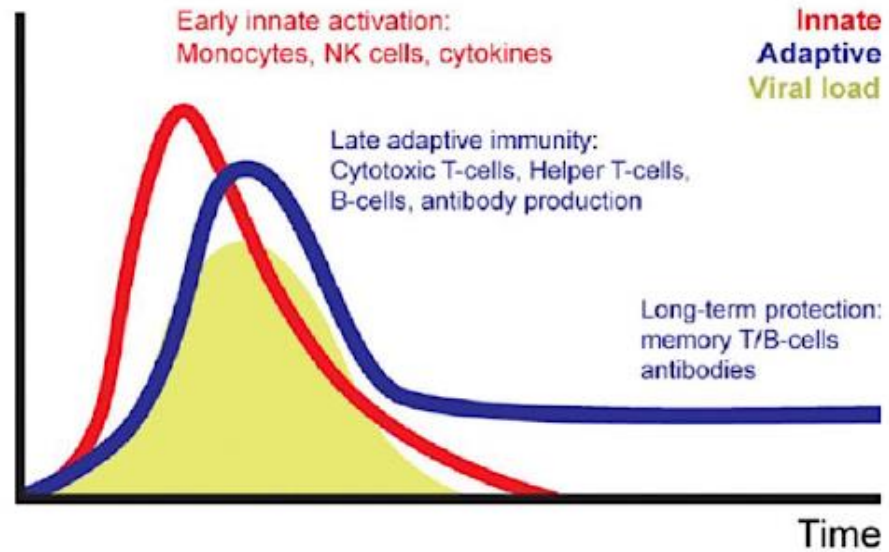
Long CoVID: The Next Chapter in the COVID-19 Pandemic

The American Society of Microbiology, 2022

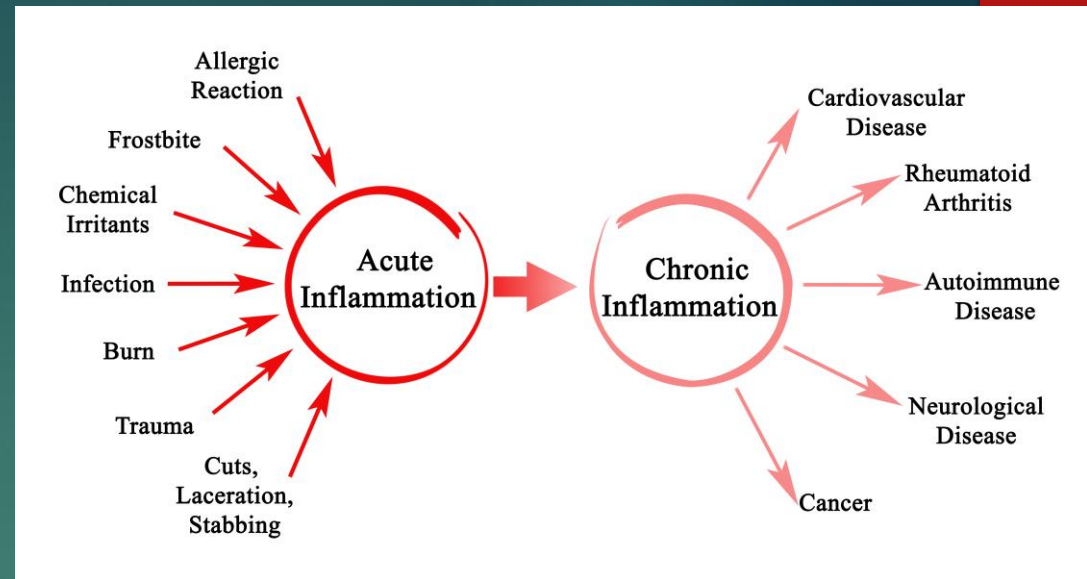
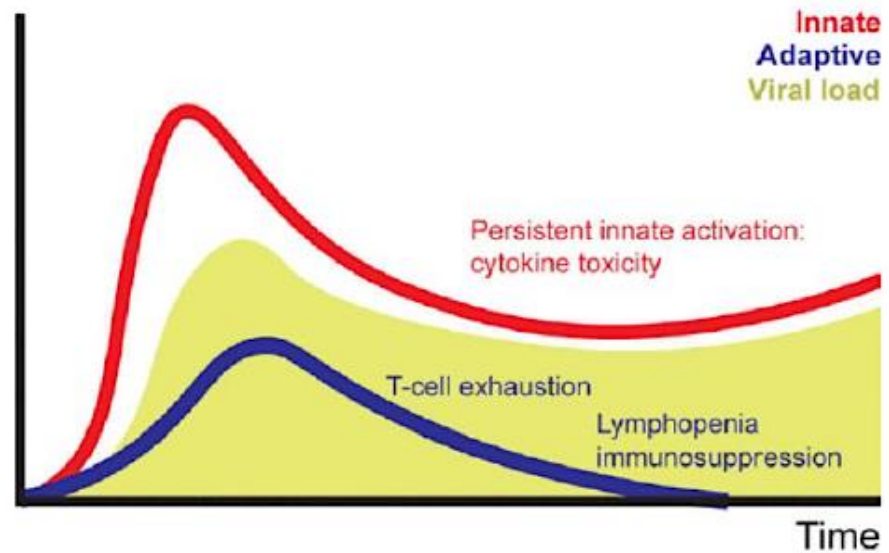
Neuroimmune System



A Acute/controlled viral infection



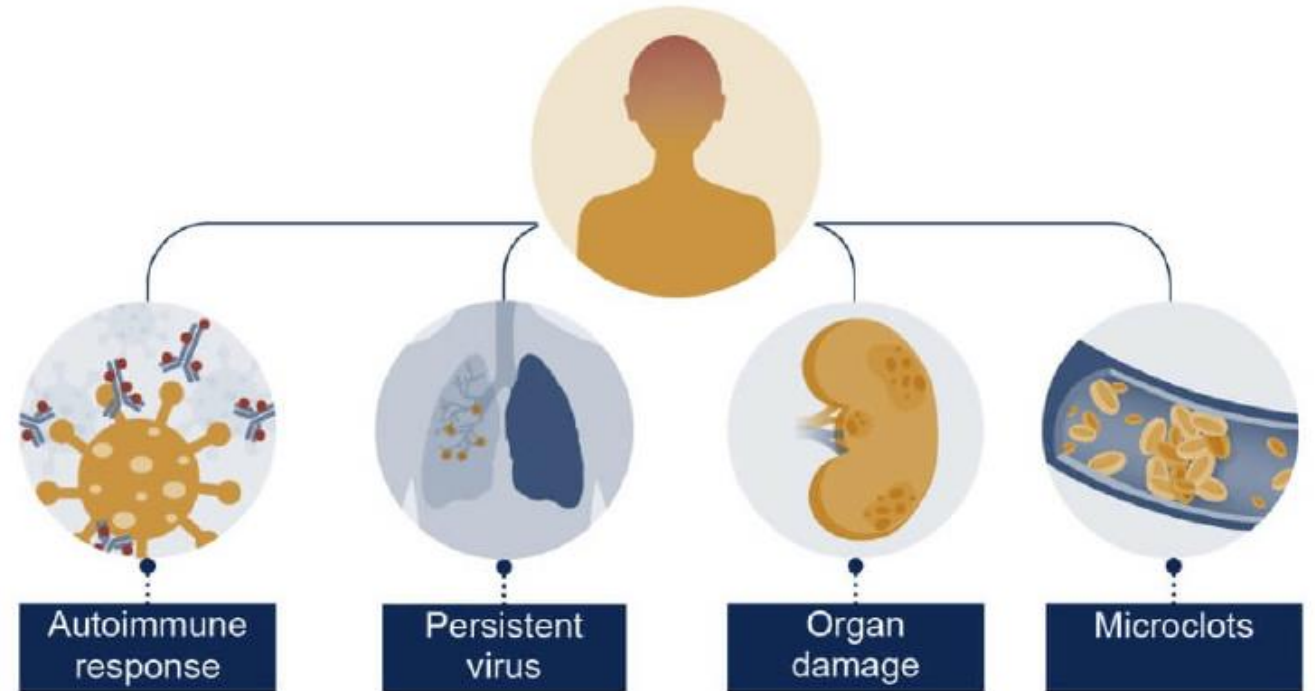
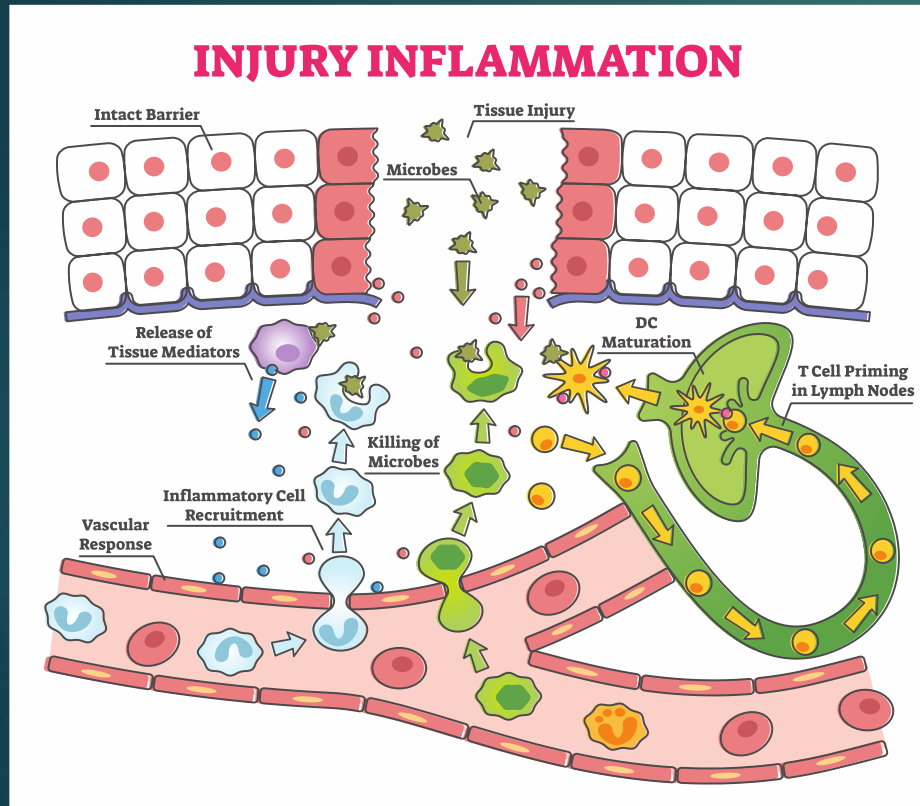
B Chronic/uncontrolled viral infection



Hyperinflammatory Immune Response and COVID-19: A Double Edged Sword

Li Yin Tan^{1,2}, Thamli Vaani Komarasamy¹ and Vinod RMT Balasubramaniam^{1*}

Long CoVID/ ME- CFS



Source: GAO analysis of medical literature. | GAO-22-105666

Pathogenesis of post-COVID-19 condition.

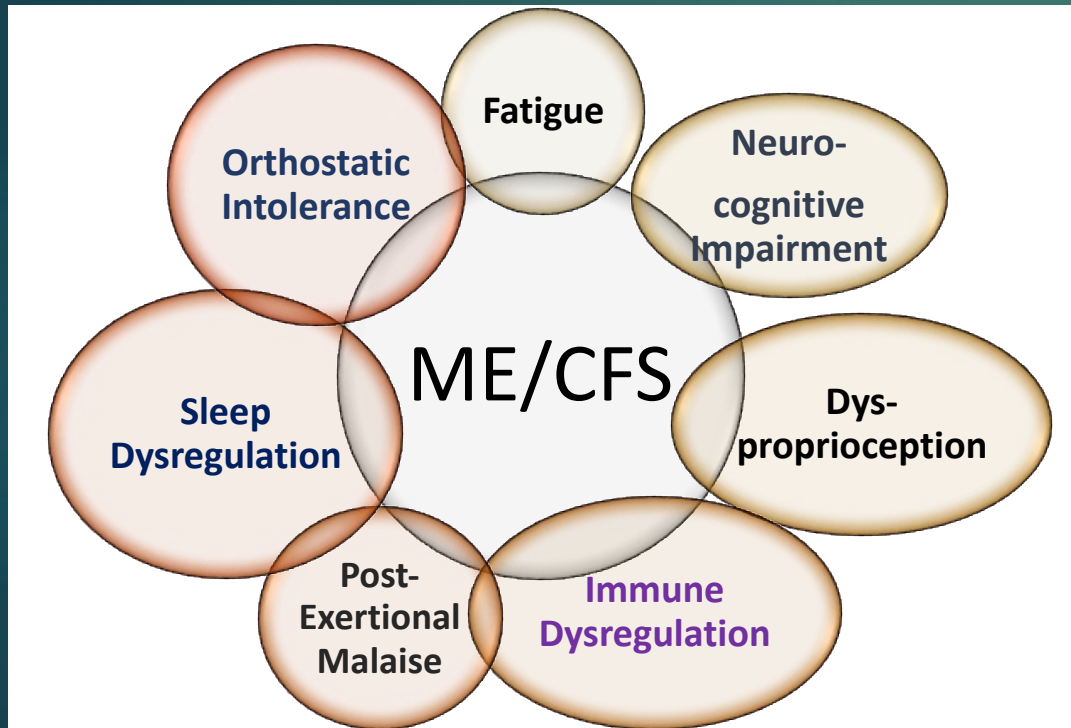
Source: <https://www.gao.gov/assets/gao-22-105666.pdf>



Myalgic Encephalomyelitis/Chronic Fatigue Syndrome

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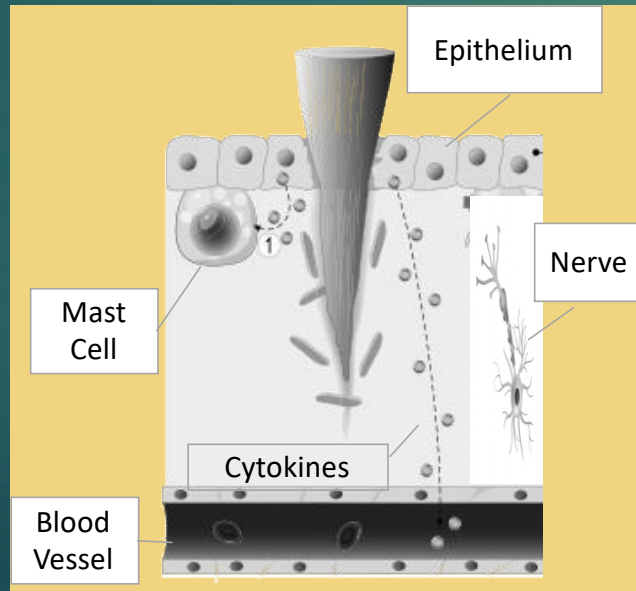
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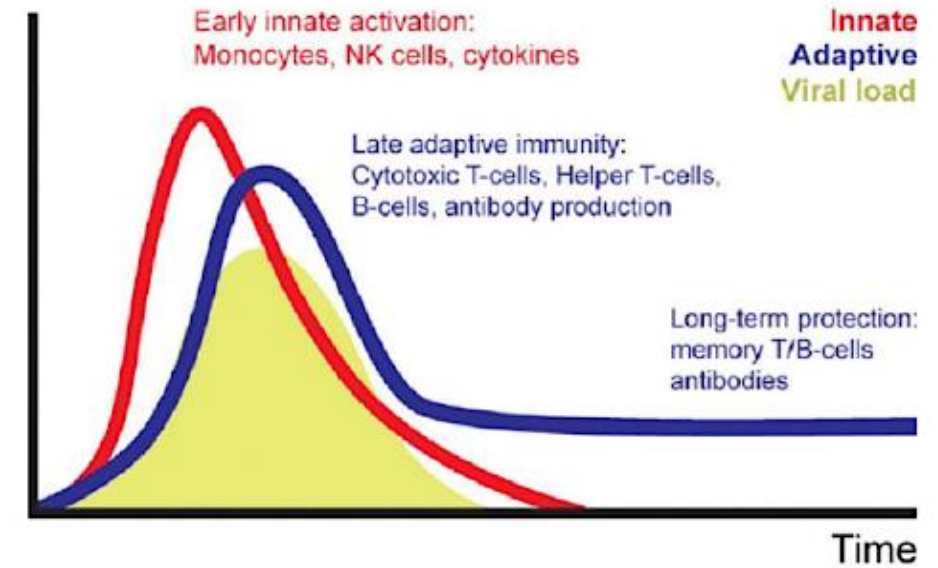
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ME/CFS: Neuro- Immune System Changes



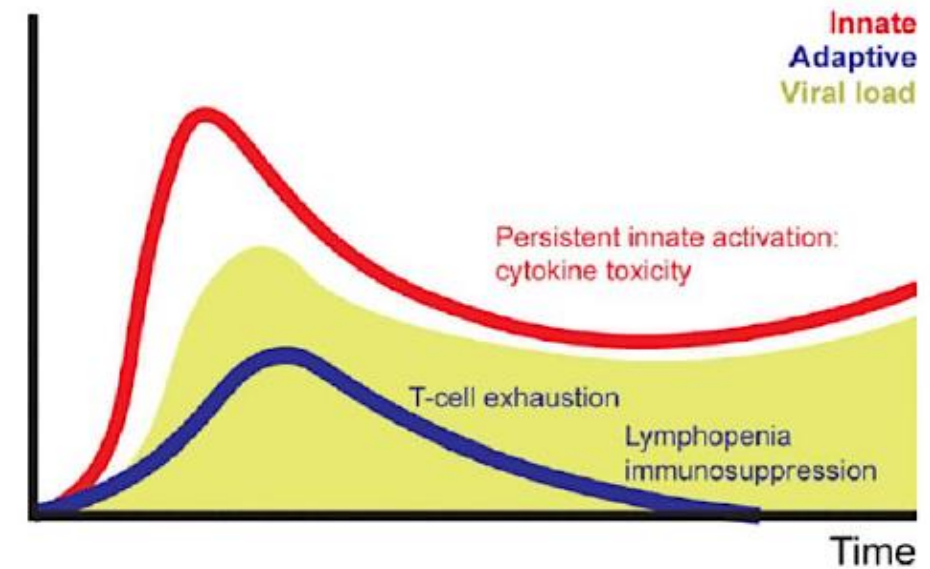
A

Acute/controlled viral infection

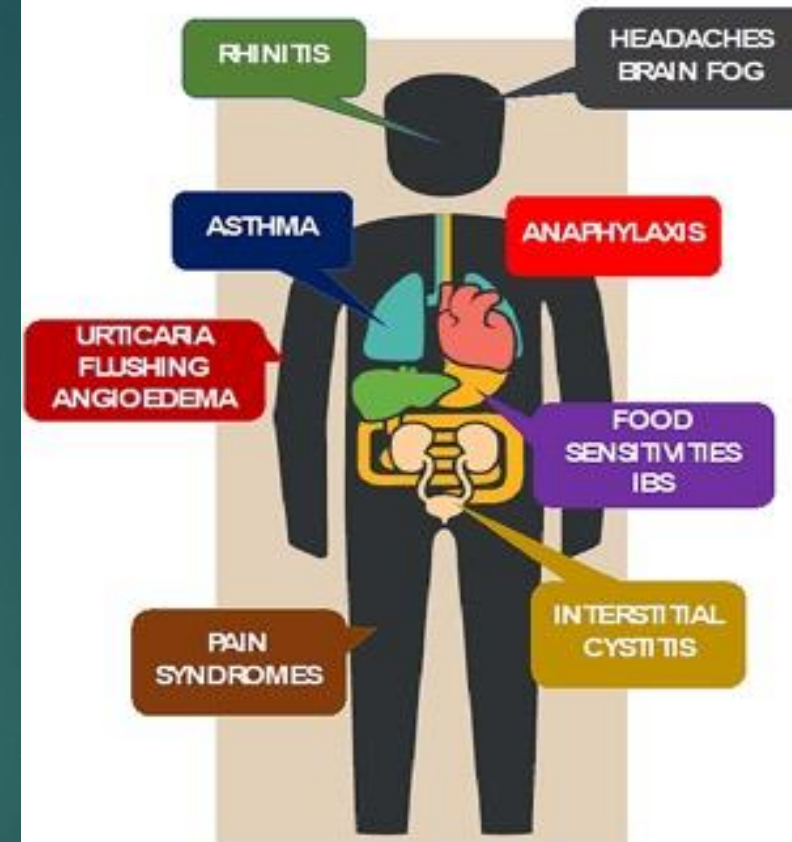
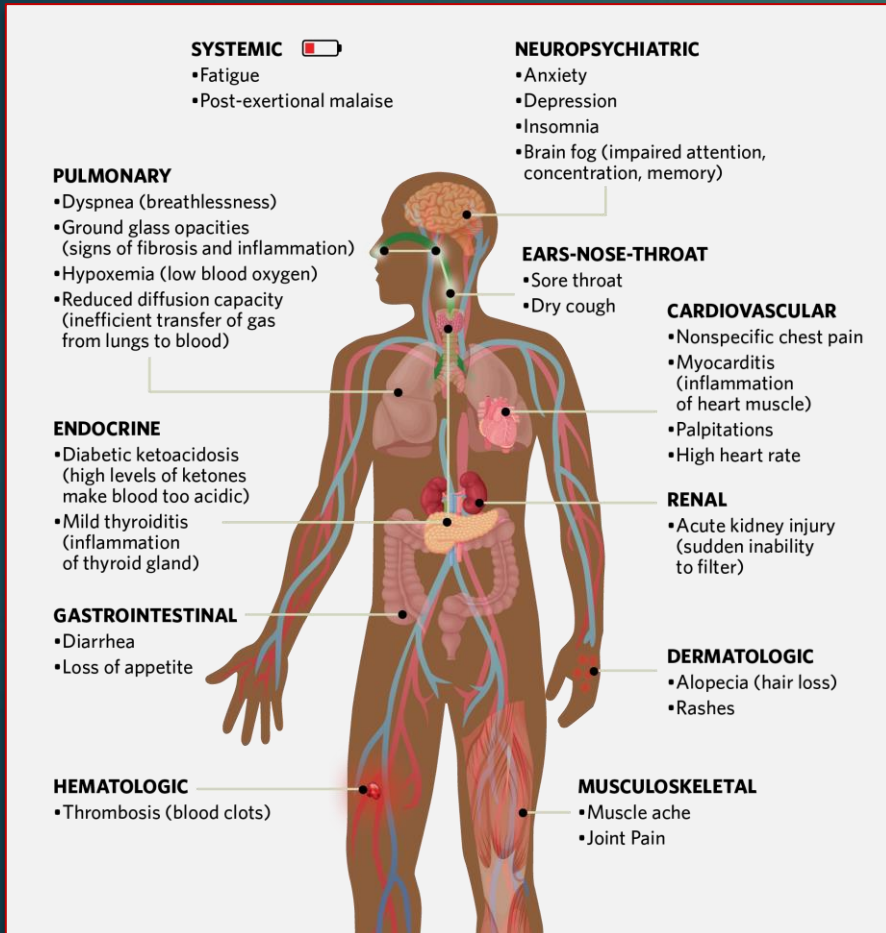


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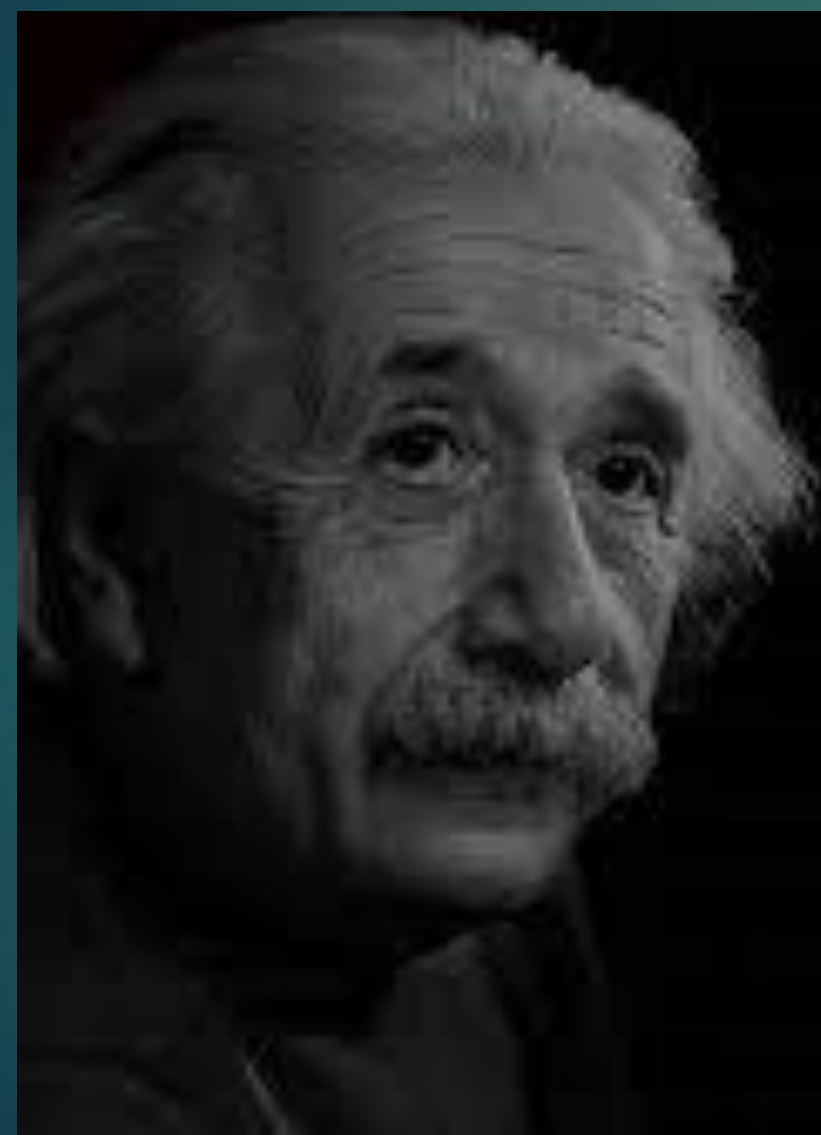
Chronic/uncontrolled viral infection



If you have ME/CFS, Long CoVID, then screen for



**Mast Cell Activation
Disease**

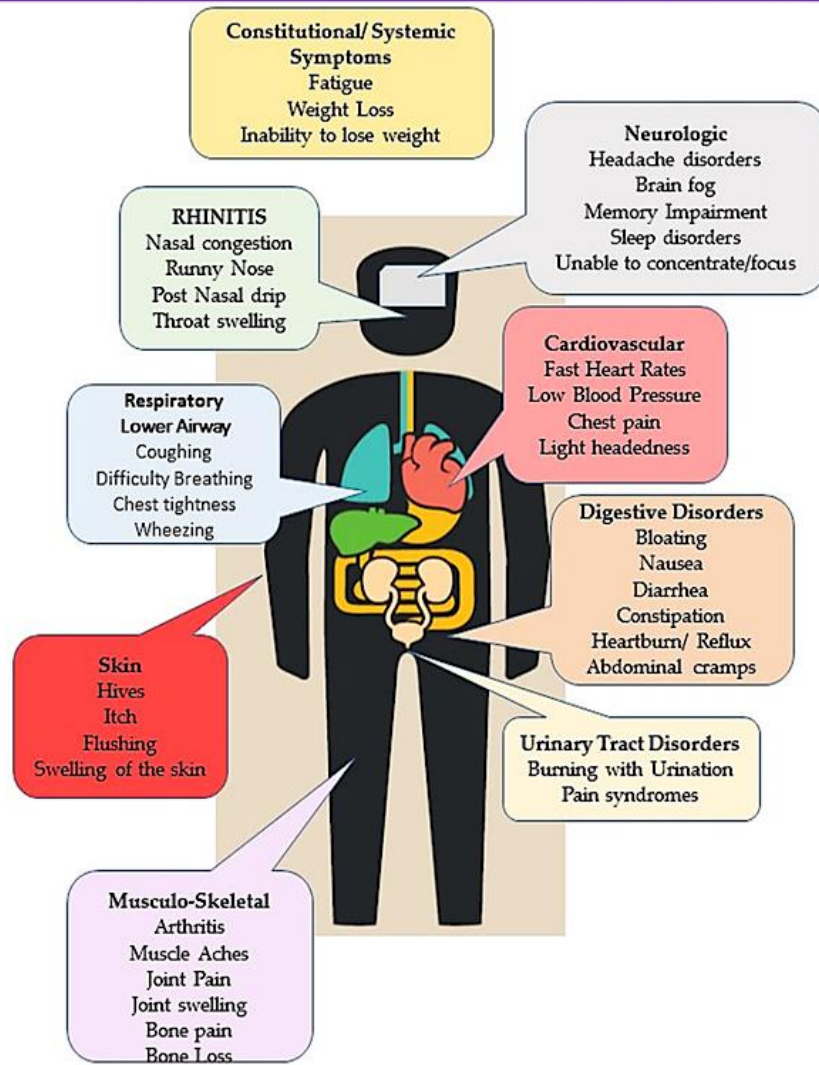


The world is a dangerous
place, not because of those
who do evil, but because
of those who look on and
do nothing.

Albert Einstein / @InspiringThinkn

MCA in 2 or more organ systems?

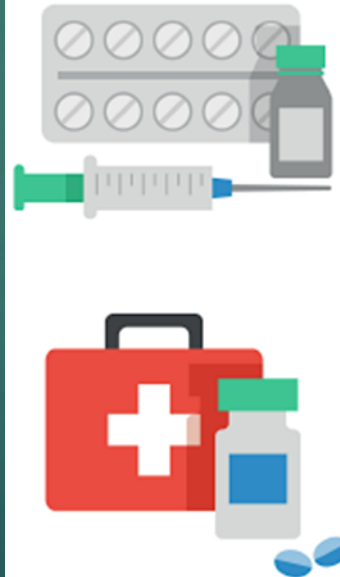
Mast Cell Activation Disorders



Mast cell activation syndrome: Proposed diagnostic criteria

Cem Akin, MD, PhD,^{a*} Peter Valent, MD,^b and Dean D. Metcalfe, MD^c *Ann Arbor, Mich, Vienna, Austria, and Bethesda, Md*

Better with anti-MC/MC mediator medications?



- Histamine Blockade
- Leukotriene Antagonists
- Cromones
- Omalizumab
- Ketotifen

MCA events associated w/ validated MCA markers

- Tryptase
- Urine Methylhistamine
- Urine Prostaglandin D2
- Urine 11- Beta Prostaglandin F2alpha
- C kit mutation- tissue, peripheral blood
- CD25+ MC in biopsies
- Clustered MC in biopsies

Got 'Nerve-MC issues'? questionnaire

Gastro-intestinal tract (Irritable bowel syndrome screen)	<input type="radio"/> Have discomfort or pain anywhere in your abdomen?	
	<input type="radio"/> Do you have more frequent bowel movements or episode of diarrhea and/or constipation?	
	<input type="radio"/> Do you experience bloating or abdominal distension, after eating?	
	<input type="radio"/> Do you have to rush to the bathroom because of a sudden urge to have a bowel movement?	
Uro-genital tract (screen for interstitial cystitis)	<input type="radio"/> Do you have pain in your bladder or pelvis (vagina, lower abdomen, urethra, perineum)?	
	<input type="radio"/> Do you have pain or urge to urinate?	
	<input type="radio"/> Do you get out of bed to urinate?	
Screening for Urogenital problems in girls/women	<input type="radio"/> For women: do you experience dyspareunia (pain during or after sexual intercourse), recurrent bouts of vaginitis or cope with heavy/sporadic vaginal bleeding?	
Skin	<ul style="list-style-type: none"> Do you experience urticaria (hives)? Do you experience angioedema (skin swelling)? Do you experience flushing? 	

Neuropsychiatric (screen for neuropathies and mood disorders)	<input type="radio"/> Headache disorders	
	<input type="radio"/> Mood disorders (anxiety and/ or depression?)	
	<input type="radio"/> Pain syndrome	
	<input type="radio"/> Tingling /Paresthesias /Weakness	
	<input type="radio"/> Difficulty with concentration?	
	<input type="radio"/> Difficulty with memory?	
	<input type="radio"/> Difficulty with balance?	
Eyes/ Ears/ Nose / Sinuses/Throat	<input type="radio"/> Watery runny nose, Sneezing fits?	
	<input type="radio"/> Nasal obstruction?	
	<input type="radio"/> Itchy nose?	
	<input type="radio"/> feeling of being unable to breathe through your nose??	
	<input type="radio"/> mucus in the back of your throat / "post nasal drip"?	
	<input type="radio"/> fullness /pain in ears ?	
Lungs (Asthma Screen)	<input type="radio"/> Watery, Itchy eyes?	
	<input type="radio"/> Have you had any trouble breathing?	
	<input type="radio"/> Feeling short of breath?	
	<input type="radio"/> Episodes of coughing?	
	<input type="radio"/> Episodes of wheezing?	
	<input type="radio"/> Have you ever been given an inhaler by a doctor to help your breathing?	
	<input type="radio"/> Do you experience angioedema (swelling of the tongue, lips, hands, feet)?	
	<input type="radio"/> Do you experience pruritis (itch without rash)?	
Cardiovascular	<input type="radio"/> Do you experience or flushing (redness, heat sensation of the skin)?	
	<input type="radio"/> Do you experience palpitations or extra heartbeats?	
	<input type="radio"/> Do you experience episodes of low blood pressure?	
Musculo-skeletal system, Joints	<input type="radio"/> Do you experience episodes of lightheadedness or nearly fainting?	
	<input type="radio"/> Do you experience increase joint pain or swelling?	
	<input type="radio"/> Do you experience increase muscle cramps?	
	<input type="radio"/> Do you experience muscle weakness?	

Diagnosis: MCAS Checklist

- ✓ Symptoms?
- ✓ Better with treatments that target MC or MC mediators?
- ✓ Test Results?

Intrinsic
Endotypes

Clonal

Mast Cell Activation Disorders

- Mastocytosis
- Monoclonal Mast Cell Activation Syndrome

Extrinsic
Endotypes

Nonclonal

Mast Cell Activation Disorders

- Allergic (IGE mediated) Disorders
- MC activation associated with chronic inflammatory/neoplastic disorders
- Physical Urticarias
- Chronic Autoimmune Urticaria

Hypertryptasemia – Mast Cells that have increased copies of the tryptase gene, patients exhibit MCAS signs and Symptoms

Idiopathic – Idiopathic anaphylaxis, Idiopathic Urticaria

Allergen testing
Celiac Panel
EGD/
Colonoscopy

- Some food (wheat/gluten, peanuts, eggs, nuts and shellfish, milk*, egg*, soy*)
- Medications
- Airborne Allergens
- Insect stings or bites

Allergen
testing

**PIDD
evaluation**
Primary
Immune
Deficiency
Disorder

- Autoimmune Disorders
- Infections
- Physical stimuli, such as pressure, cold, heat, exercise or sun exposure

Rheumatology Panel
ANA, RF, ANCA, Thyroid
Abs
Neuonal Abs
PIDD evaluation

Connective Tissue
Disorder EDS Screen

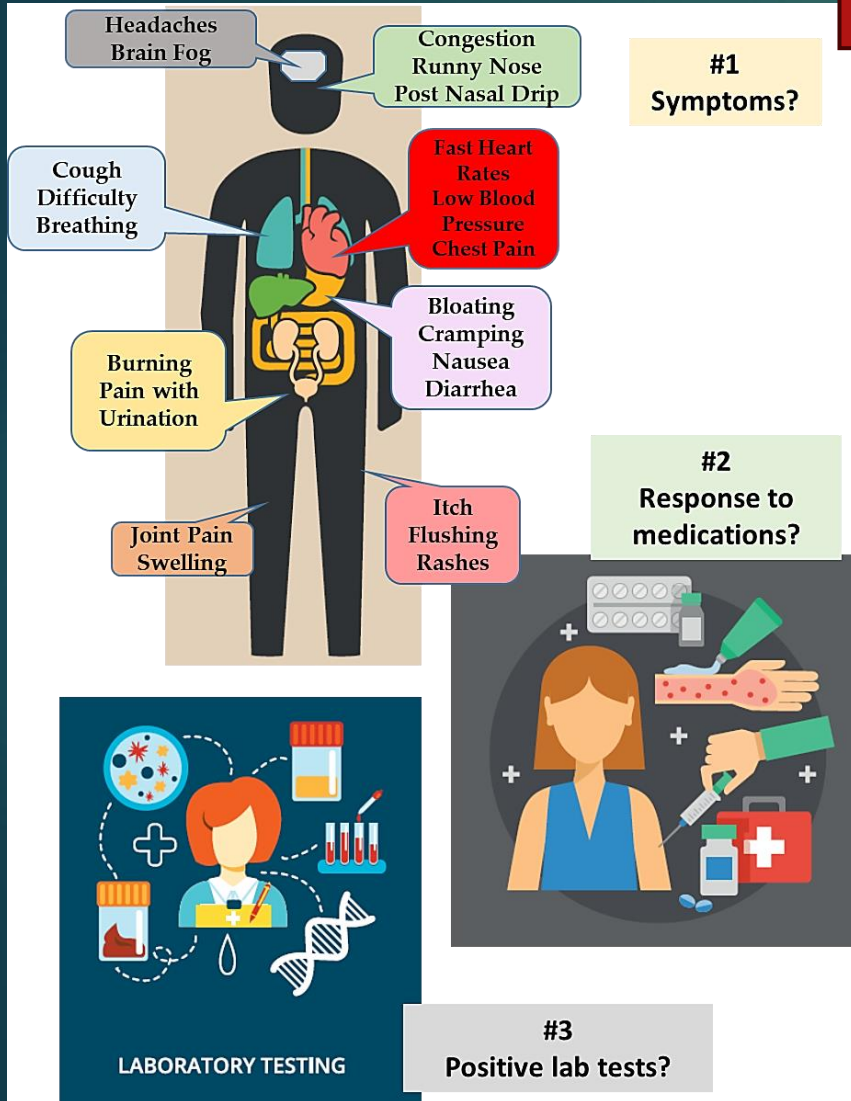
If 5 of 9 are present with a sensitivity of 99.6% and a specificity of 98% there is a form of EDS present:

- Peri-arthritis (more than 1 joint more than 3 months)
- Fatigue (chronic, disabling more than 6 months)
- motor dysproprioception (the door sign)
- joint instability (subluxations, dislocations often autoreducing)
- skin fragility (atrophic scarring, delayed wound healing)
- Hypermobility (pos Beighton / 5 point historic questionnaire / pos glomerulo-humeral abduction above 95 degrees),
- gastro-esophageal reflux (treated)
- Ecchymosis (spontaneous)
- Hyperacusis (fragility to sounds below 50 decibel)

► Hamonet C., *et al.* "Ehlers-Danlos Syndrome (EDS) - Contribution to Clinical Diagnosis - A Prospective Study of 853 Patients". *EC Neurology* 10.6 (2018).



Treating MCAD...



Cardiac conditions

Coronary hypersensitivity (the Kounis syndrome)*
Postural orthostatic tachycardia syndrome

Endocrine conditions

Fibromyalgia Parathyroid tumor
Pheochromocytoma Carcinoid syndrome

Digestive conditions

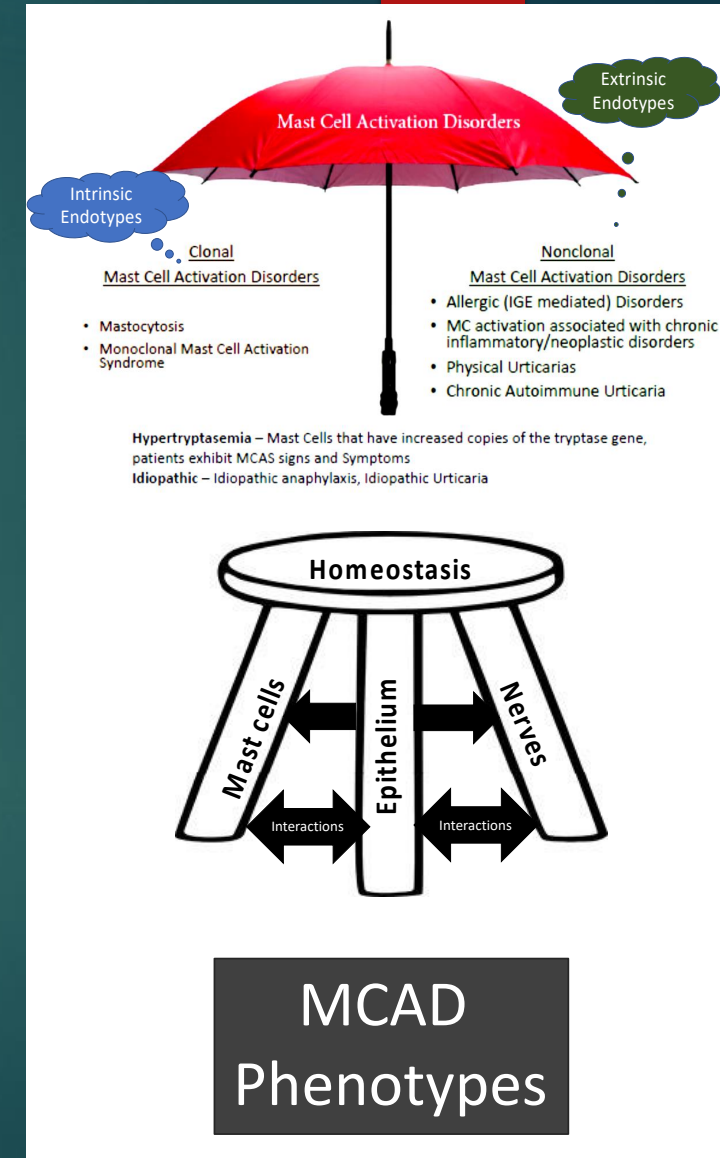
Adverse reaction to food* Eosinophilic esophagitis*
Eosinophilic gastroenteritis* Gastroesophageal reflux disease; Gluten enteropathy; Irritable bowel syndrome; Vasoactive intestinal peptide-secreting tumor

Immunologic conditions

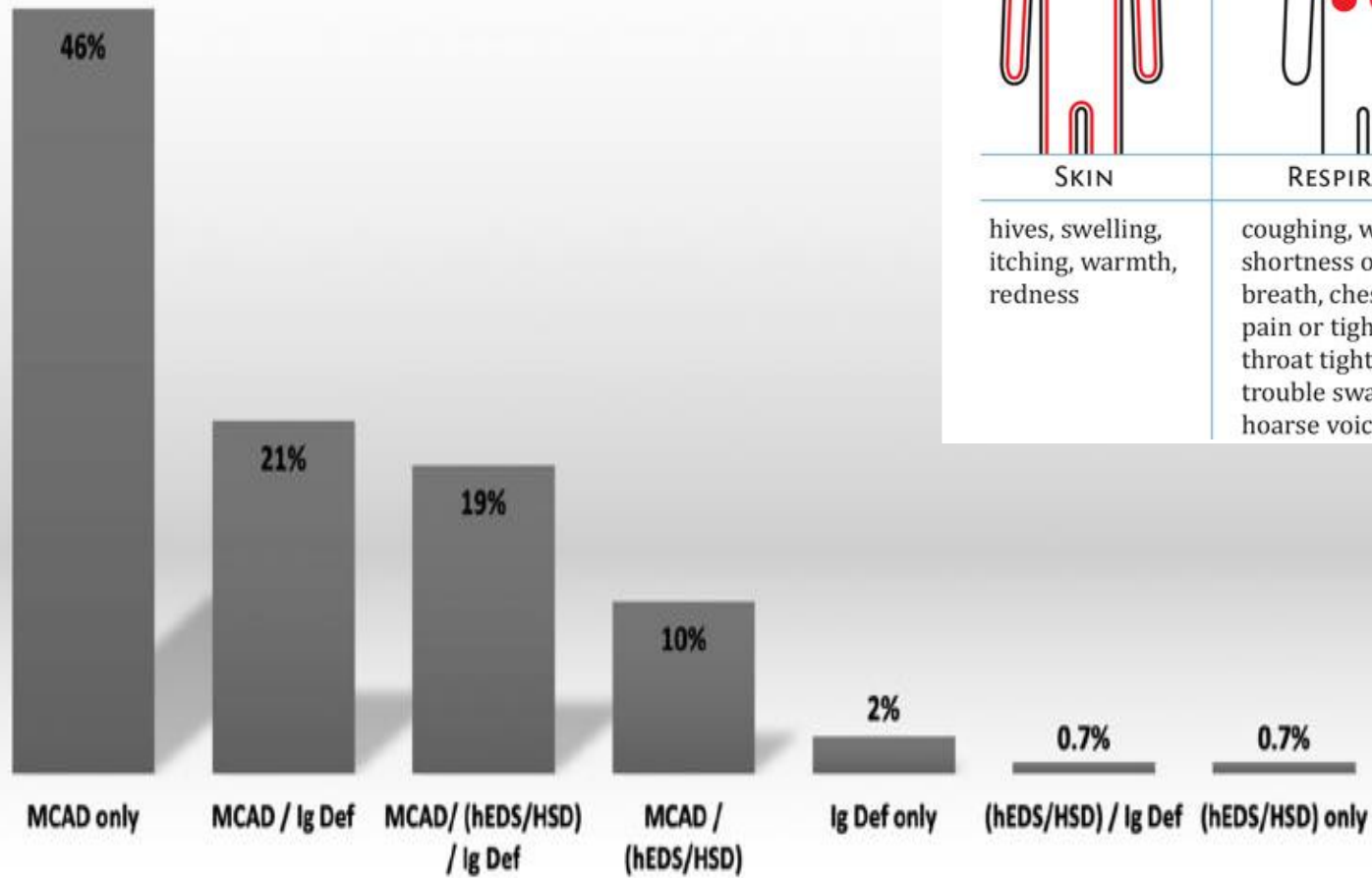
Auto-inflammatory disorders such as deficiency of inter- leukin-1-receptor antagonist*; Familial hyper-IgE syndrome Vasculitis*

Neurologic/psychiatric conditions

Anxiety; Chronic fatigue syndrome Depression;
Headaches; Mixed organic brain syndrome;
Somatization disorder; Autonomic dysfunction;
Multiple sclerosis

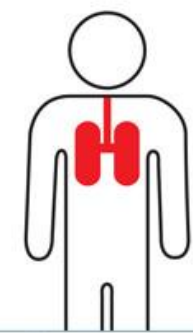


Frequencies of Diagnoses



SKIN

hives, swelling, itching, warmth, redness



RESPIRATORY

coughing, wheezing, shortness of breath, chest pain or tightness, throat tightness, trouble swallowing, hoarse voice, nasal



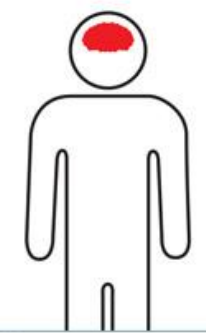
GASTROINTESTINAL

nausea, stomach pain or cramps, vomiting, diarrhea



CARDIOVASCULAR

dizziness/ lightheadedness, pale/blue colour, weak pulse, fainting, shock, loss of consciousness



NEUROLOGICAL

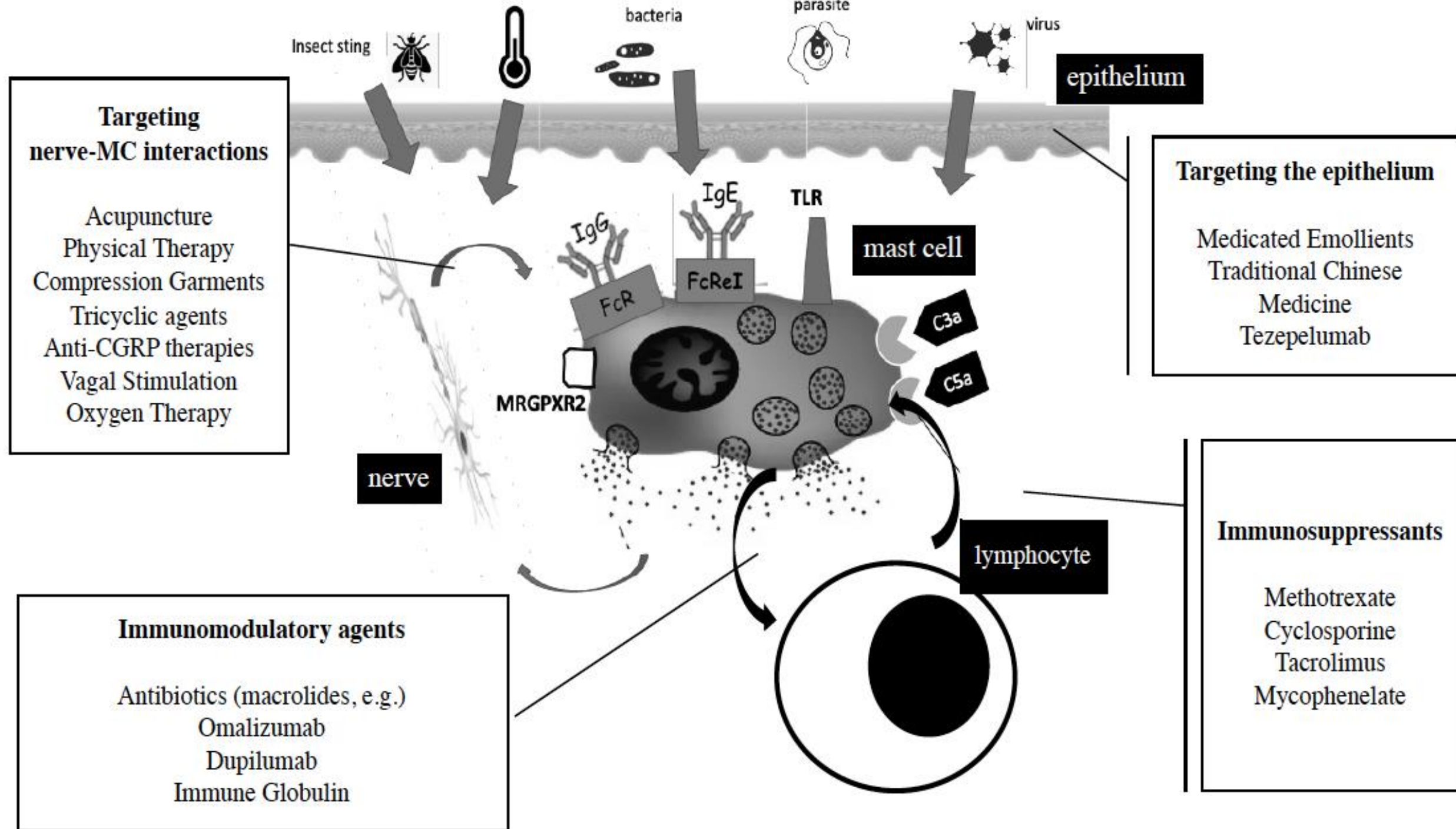
anxiety, feeling of "impending doom" (feeling that something really bad is about to happen), headache

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DOI: 10.1002/ajmg.c.31940

RESEARCH ARTICLE

Mast cell activation disease and immunoglobulin deficiency in patients with hypermobile Ehlers-Danlos syndrome/ hypermobility spectrum disorder

Isabelle Brock^{1,2,3} | Walter Prendergast¹ | Anne Maitland^{1,4}



Traditional Chinese medicine for food allergy and eczema

Zixi Wang, Zhen-Zhen Wang, Jan Geliebter, Raj Tiwari, Xiu-Min Li
Ann Allergy Asthma Immunol 126 (2021) 639e654

Z. Wang et al. / Ann Allergy Asthma Immunol 126 (2021) 639–654

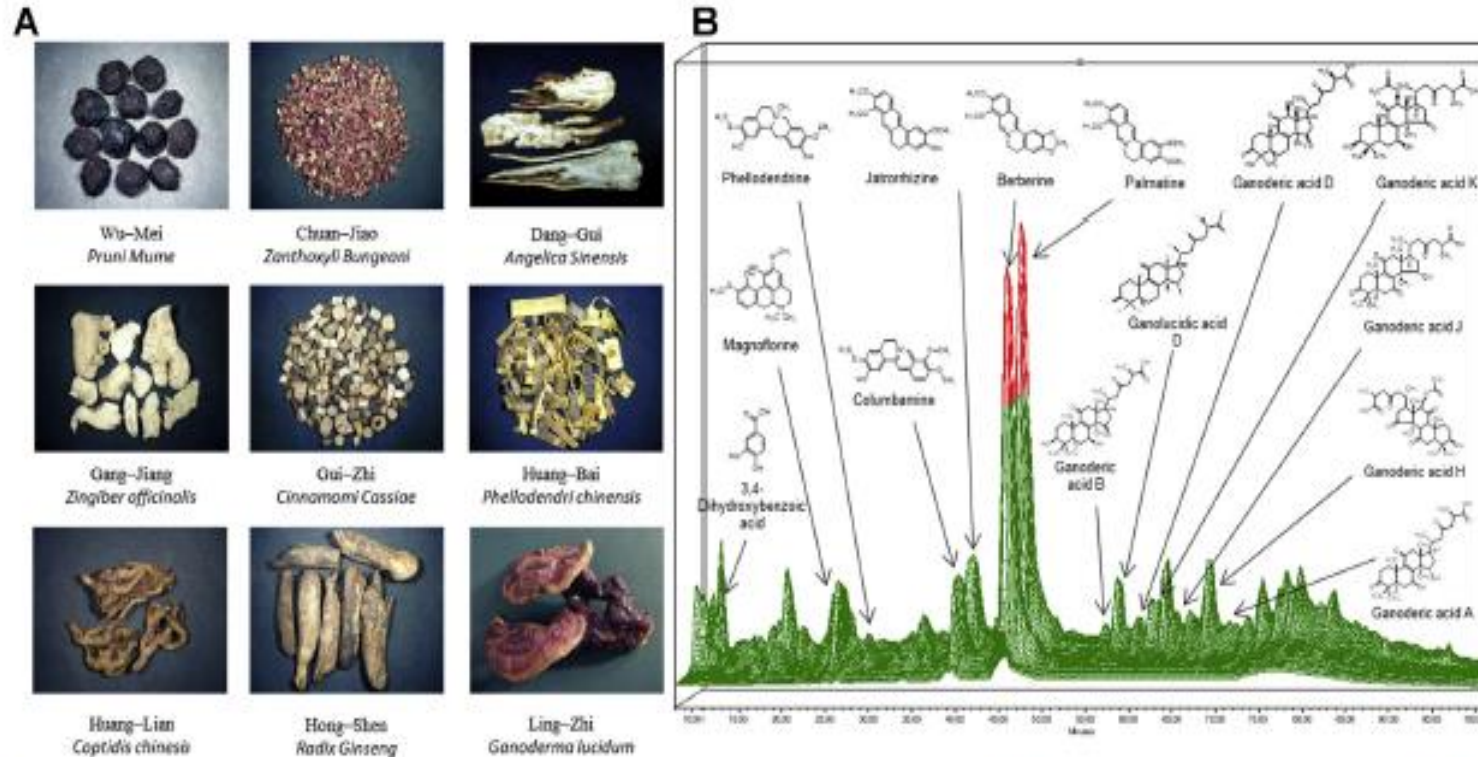
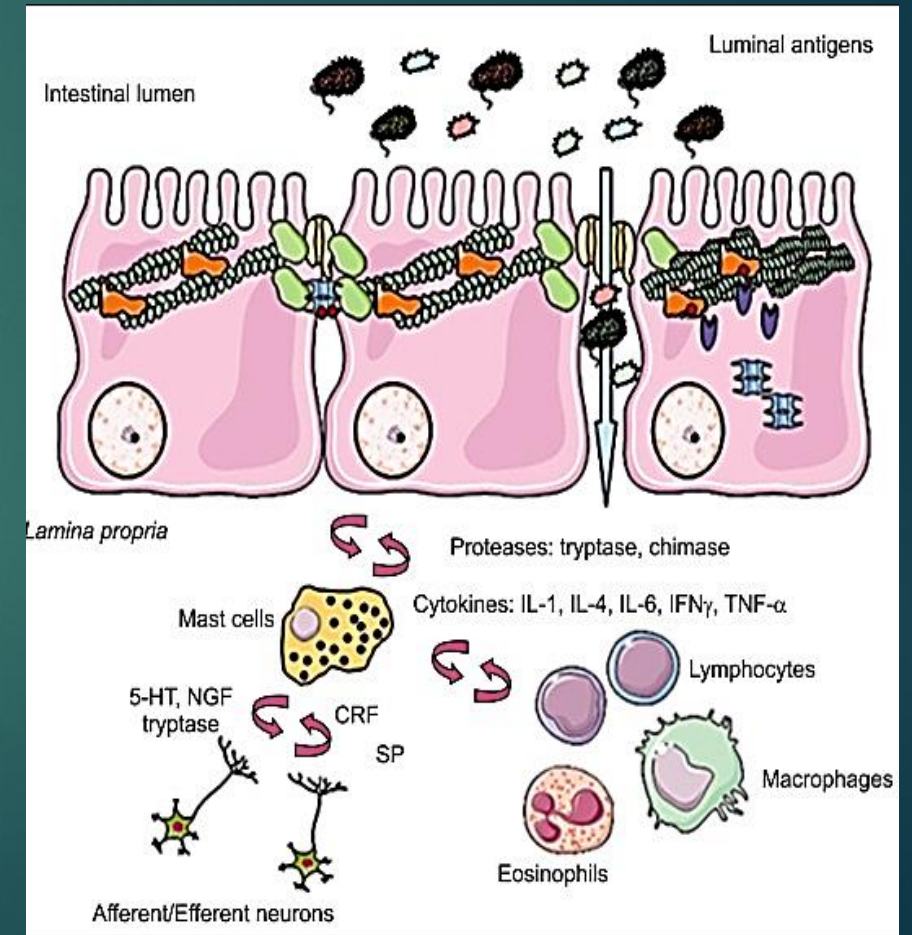
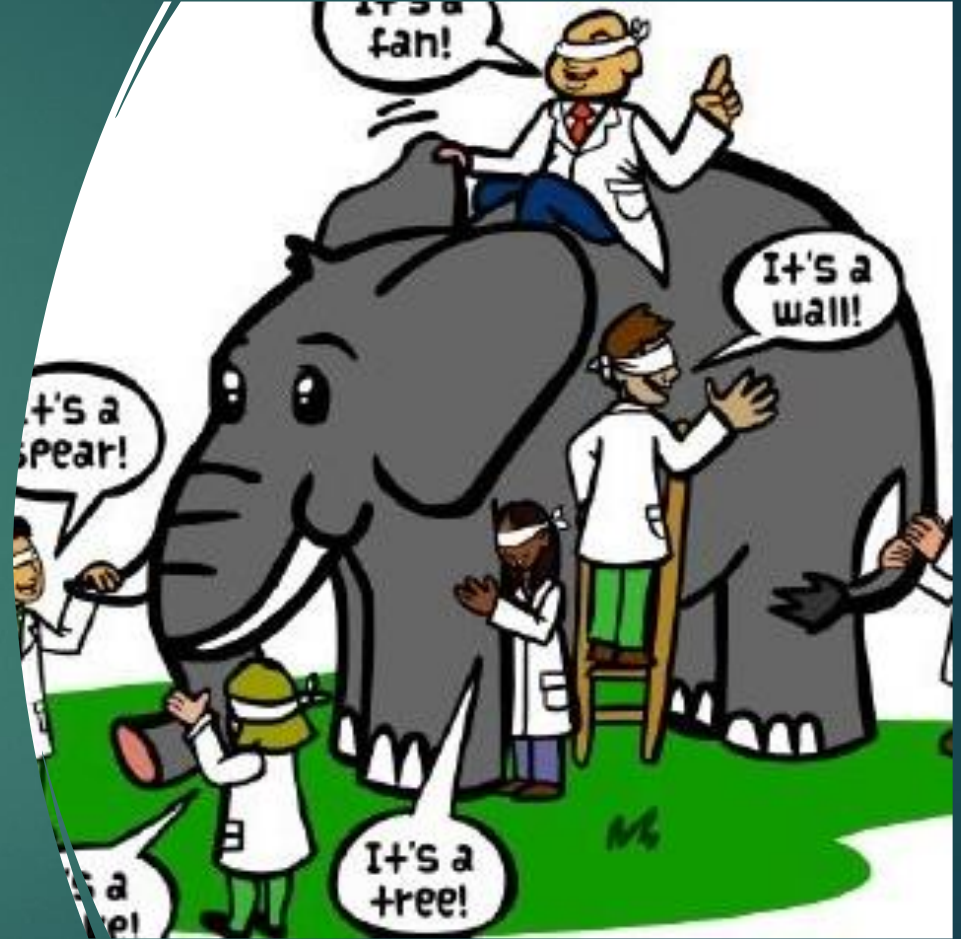


Figure 1. Herbal components of FAHF-2. A, Photographic illustration of 9 herbal constituents of FAHF-2 formula.³⁶ B, 3-Dimensional HPLC fingerprint of FAHF-2.⁴⁰ FAHF-2, Food Allergy Herbal Formula; HPLC, high-performance liquid chromatography.

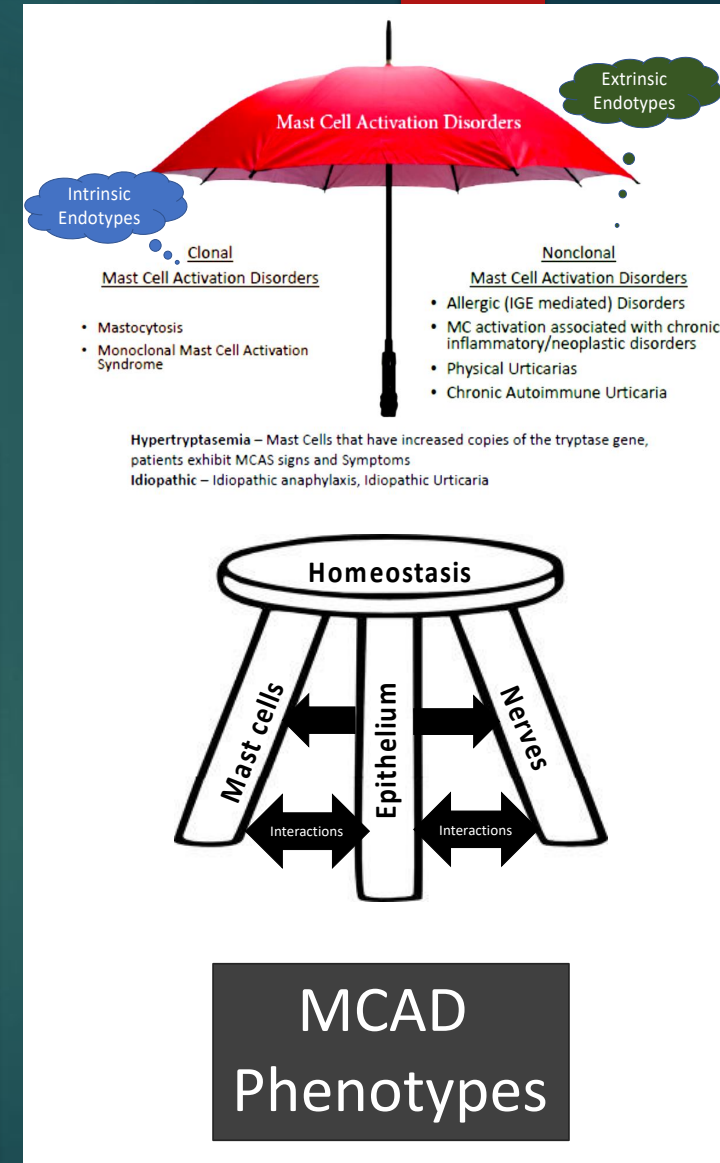
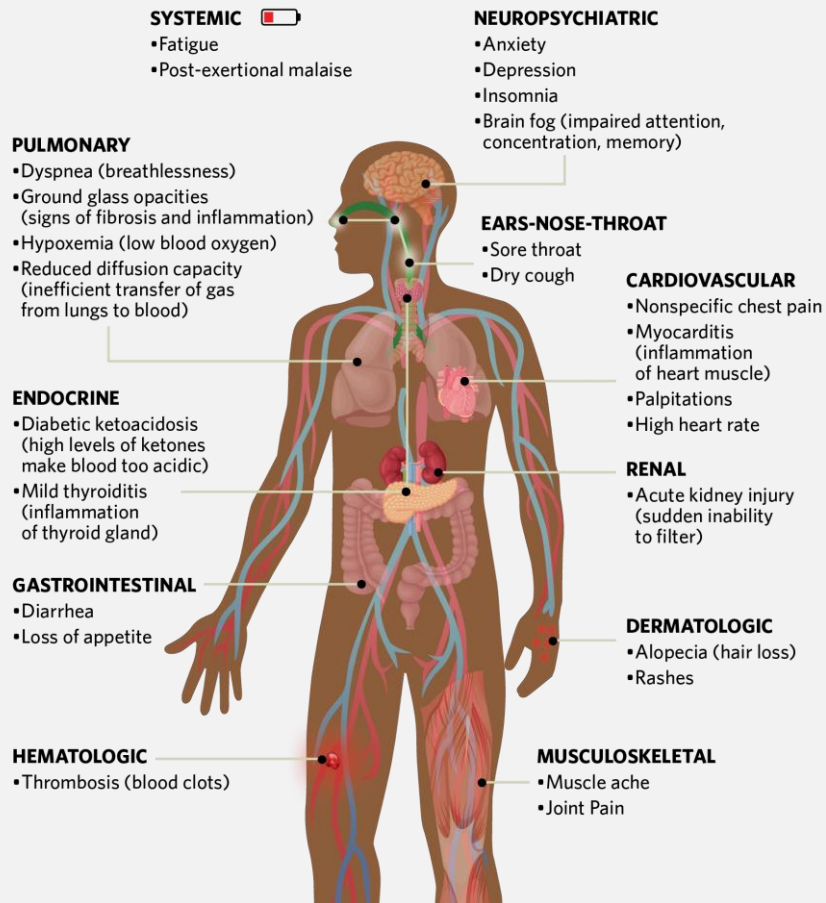


“[ME-CFS] is complex and considered to be currently incurable” if one adopts an all or nothing approach to ME-CFS”

– Bateman, Medscape 2018

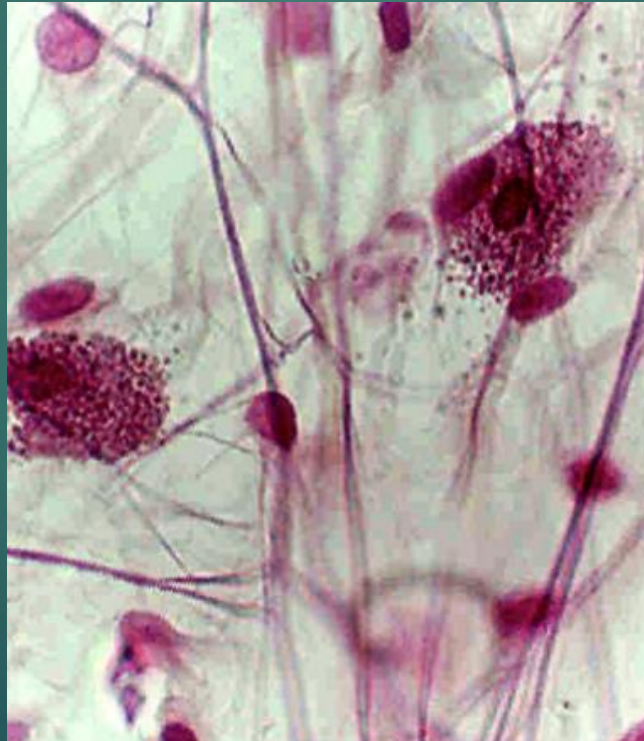
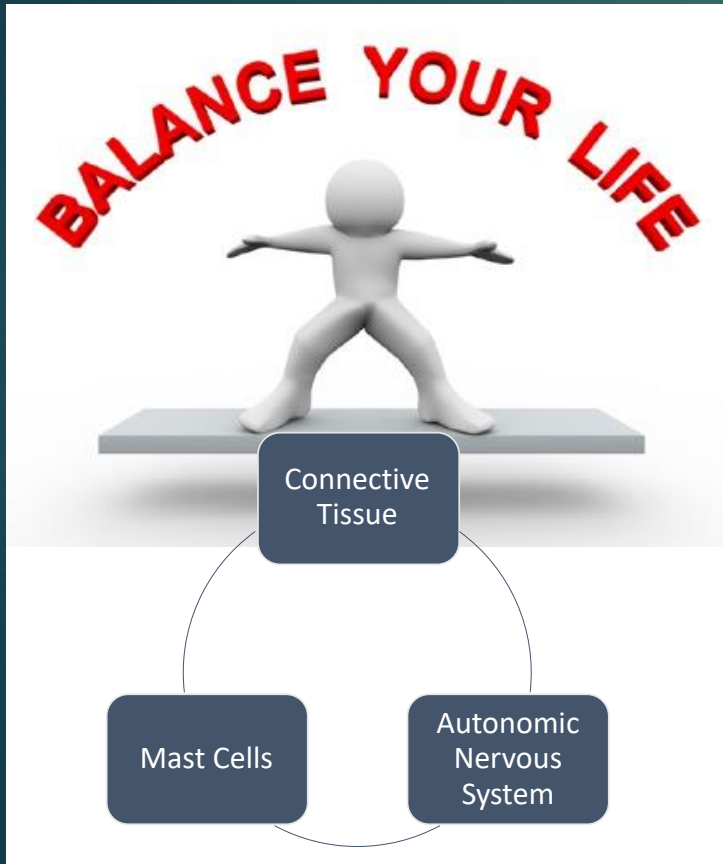


ME/CFS and M.A.D. = The Neuroimmune Axis Gone Awry



Gratitude

anne.maitland@mssm.edu



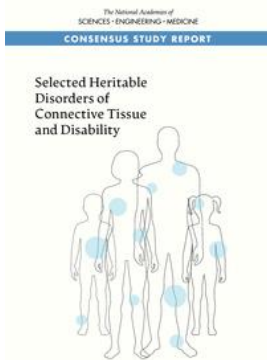
- ▶ Dr. Xiu-Min Li and her laboratory and colleagues
- ▶ Comprehensive Allergy & Asthma Care
- ▶ Clinical Paradigms, LLC, Drs. Brock and Pizano
- ▶ Ehlers Danlos Society
- ▶ Bobby Jones Chiari Syringomyelia Society
- ▶ Mt Sinai- South Nassau Hospital- Chiari/EDS center

Selected Heritable Disorders of Connective Tissue and Disability

The U.S. Social Security Administration has requested the National Academies of Sciences, Engineering, and Medicine establish an ad hoc committee to review certain heritable conditions related to connective tissues, including but not necessarily limited to Ehlers-Danlos syndrome and Marfan syndrome. The Committee will use published evidence and professional experience to develop a report that will examine the diagnosis, treatment, and prognosis of the selected conditions, as well as levels of associated functional limitation, in adults and children in the U.S. population.

 [Provide feedback on this project](#)

Publications



2022

Selected Heritable Disorders of Connective Tissue and Disability

Heritable disorders of connective tissue (HDCTs) are a diverse group of inherited genetic disorders and subtypes. Because connective tissue is found throughout the body, the impairments associated with HDCTs manifest in multiple body systems and may change or vary in severity throughout an affected individual's lifetime. In some cases, these impairments may be severe

RESOURCES

 [Report Highlights](#)

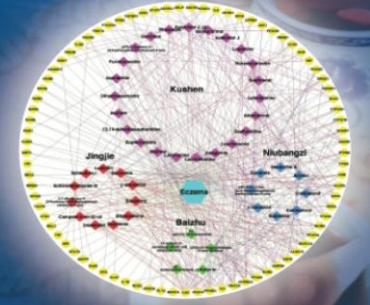
 [Report Conclusions](#)


<https://www.nationalacademies.org/our-work/selected-heritable-disorders-of-connective-tissue-and-disability>



Treating Eczema with Traditional Chinese Medicine

Xiu-Min Li • Henry Ehrlich



 World Scientific

Mast Cell Activation Disease Society
tmsforacure.org