FUNCTIONAL MEDICINE
Continuing Education

The Autoimmune Puzzle: Interconnection Between Immune Disease & the Gut

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Founder at @foodiefarmacist LLC

Disclosures

- No financial relationships with any commercial interests to disclose

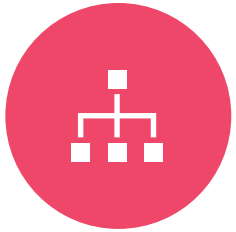
Today's Agenda

1. Describe the pathophysiological pathways that lead to allergic and autoimmune disease
2. Examine complex interaction of immune disease as it relates to GI integrity
3. Identify appropriate dietary modifications for patients with immune disorders.

Autoimmune Disease vs Allergic Disease

Let’s test our foundational knowledge

Autoimmunity: The Functional Medicine Window



SY*STEM'S* BASED APPROACH

UPSTREAM MEDICINE

VS

"SY*MPTOM-* BASED" APPROACH

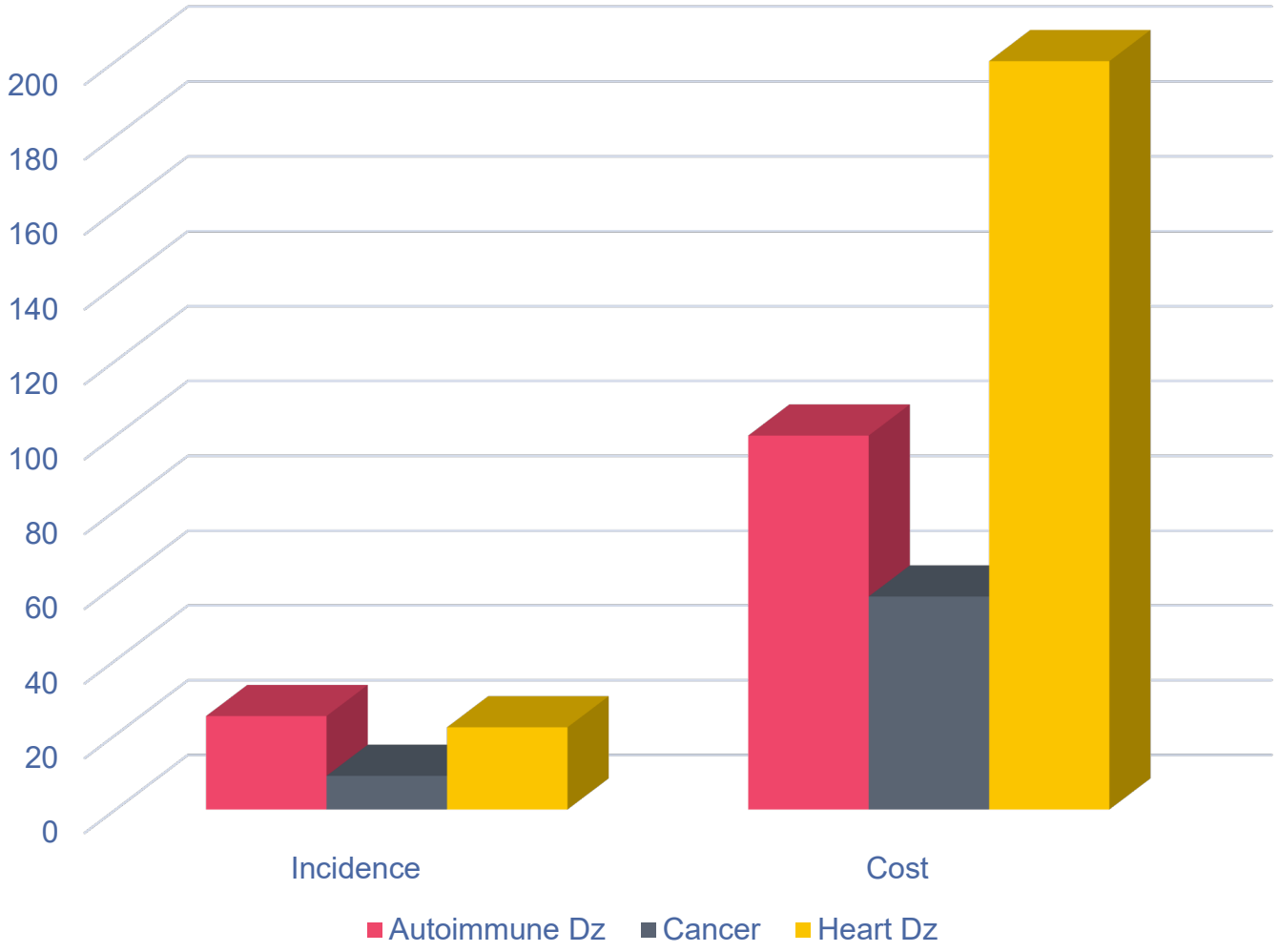
DOWNSTREAM MEDICINE

What is autoimmunity?

80 types of autoimmune disease as defined by the NIH	Defined as	Etiology	Prognosis/treatment
• Hoshimoto's, celiac, psoriasis, T1D, Lupus, MS, RA, etc…	• Genetically driven disease with some environmental factors • Autoantibodies, CRP, ANA, complement testing, ESR, immunoglobulin testing, genetic testing, electrophoresis	• 23.5 million Americans according to the NIH* • More common among women and white patients	• Difficult to diagnose • No cure, but can reduce the symptoms • Pharmacotherapy – DMARDs, anti-TNF biologics, other biologics, steroids, NSAIDS , opioids

Li P, et al. *Front Pharmacol*. 2017;8:460
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5506195/

Autoimmune Disease



American Autoimmune Related Diseases Association, Inc.

NIH incidence (US):

- AD 23.5 million*
- Cancer 9 million
- Heart disease up to 22 million

Cost (NIH, ACS, AHA):

- AD ~$100 **billion**
- Cancer ~$57 **billion**
- Heart and stroke costs ~$200 **billion**

https://www.aarda.org/news-information/statistics

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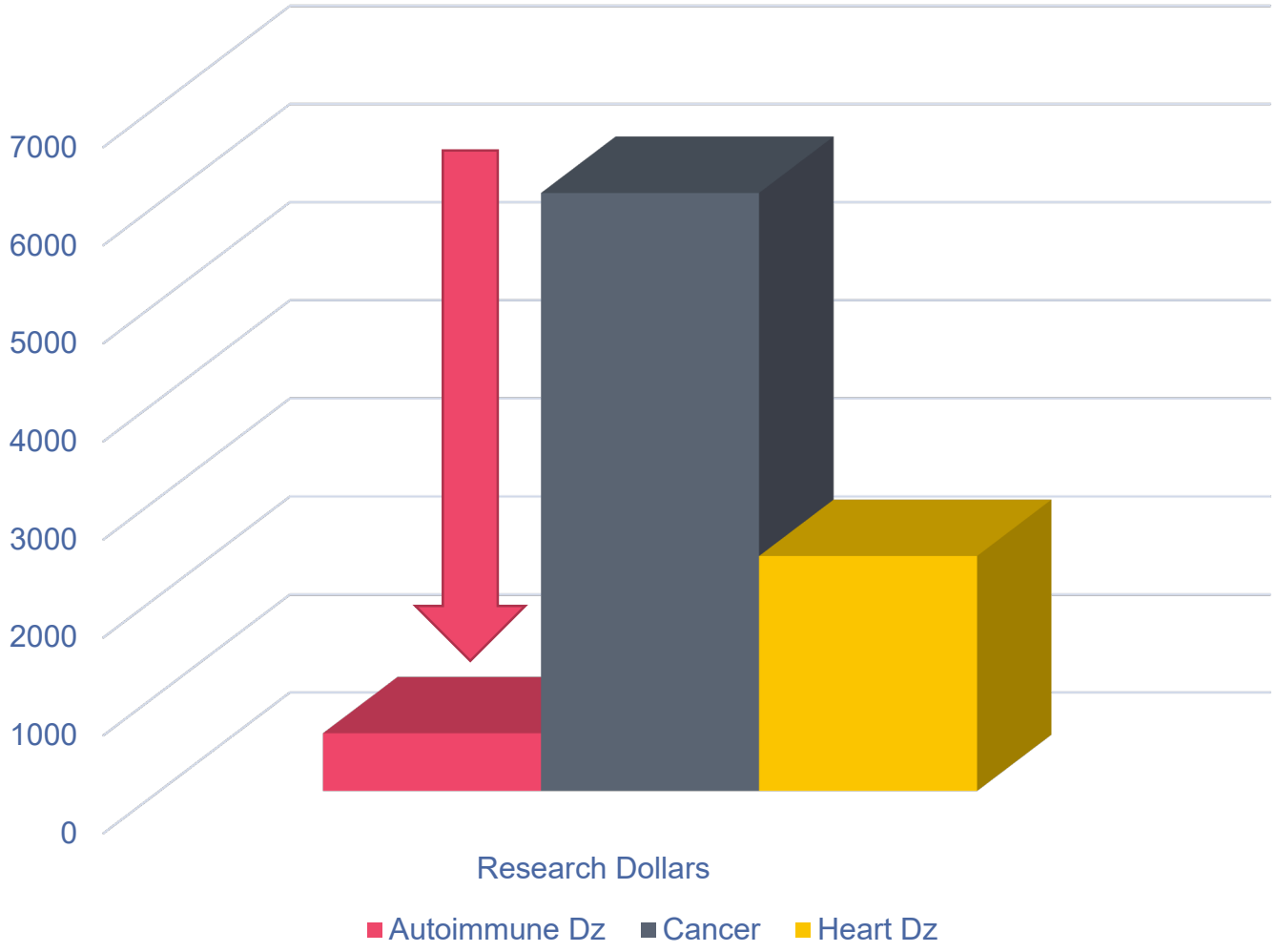
Autoimmune Disease

American Autoimmune Related Diseases Association, Inc.



2003 NIH Research Funding:

- AD **$591 million**
- Cancer $6.1 **billion**
- Heart disease and stroke $2.4 **billion**

https://www.aarda.org/news-information/statistics

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The problem with our current treatment “options” for treating Autoimmune Disease

- Disproportionate funding vs cost and disease burden.
- Immunosuppressant treatments have high side effect burden and lead to significant long-term side effects.
- *“Specialists are generally unaware of interrelationships among the different autoimmune diseases or advances in treatment outside their own specialty area*.”
- Medications are often ineffective and offer symptom management, without addressing the root cause of disease.

https://www.aarda.org/news-information/statistics/

Medications used in Autoimmune disease

NSAIDs

Glucocorticoids

Conventional Disease-Modifying Anti-Rheumatic Drugs (cDMARDs)

- Methotrexate
- Leflunomide
- Gold compounds, sulfasalazine, azathioprine, cyclophosphamide, antimalarials, d-penicillamine, cyclosporine

Anti-TNF Biologics:

- Infliximab
- Etanercept
- Adalimumab
- Golimumab
- Certolizumab Pegol

Li P, et al. *Front Pharmacol*. 2017;8:460
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5506195/

JMCP Journal of Managed Care & Specialty Pharmacy
A Peer-Reviewed Journal of the Academy of Managed Care Pharmacy

Cost and Effectiveness of Biologics for Rheumatoid Arthritis in a Commercially Insured Population

Jeffrey R. Curtis, MD, MS, MPH; Benjamin Chastek, MS; Laura Becker, MS; Caroleen Quach, MSPH; David J. Harrison, PhD; Huifeng Yun, PhD; George J. Joseph, PhD, MS; and David H. Collier, MD

ABSTRACT

BACKGROUND: Administrative clai
sis, and procedure data, but the l
arthritis (RA) historically has lim
research. A claims-based algorit
mate effectiveness for RA from c
modifications.

OBJECTIVE: To implement the cl
care database to estimate biolog

METHODS: The cohort included p
the Optum Research Database w
January 2007 and December 201
months before through 12 month
index date). Patients were categ
based algorithm if they met all o
post-index period: (1) a medicati
ous biologics, or at least as many
intravenous biologics; (2) no incre
logics; (4) no new nonbiologic disease
no new or increased oral glucocorticoid treatment; and (6) no more than 1 glucocorticoid injection. Drug costs (all biologics) and administration costs (intravenous biologics) were obtained from allowed amounts on claims. Biologic cost per effectively treated patient was defined as total 1-year biologic cost divided by the number of patients categorized by the algorithm as effectively treated with that index biologic. Sensitivity analysis was con-

"The index biologic was categorized as effective by the algorithm for **28.9% of patients overall**, including 30.6% for subcutaneous biologics and 22.1% for intravenous biologics. The index biologic was categorized as effective in the first year for **32.7% of etanercept (794/2,425), 32.3% of golimumab (40/124), 30.2% of abatacept (89/295), 27.7% of adalimumab (514/1,857), and 19.0% of infliximab (147/773)** patients."

- This study used the validated algorithm to estimate the cost of effective biologic treatment from adjudicated claims in 5,474 patients with RA who received an approved biologic between 2007 and 2010.
- Using the claims-based algorithm, mean 1-year biologic cost per

https://www.jmcp.org/doi/abs/10.18553/jmcp.2015.21.4.318

Reasons for Drug Discontinuation

- Cost of Immune modulating Rx = $1-3K/month
- Drug inefficacy varies in studies (as high as 84%) cited as the #1 reason cited for discontinuation of drug therapy
- They don't cure, they manage symptoms (downstream)
- Serious long-term risks
- Efficacy often short-lived (agent switching required)

It's not enough, we need a better solution

Narongroeknawin P1, et al. Int J Rheum Dis. 2018 Jan;21(1):170-178
https://www.ncbi.nlm.nih.gov/pubmed/28737837
Ebina K, et al. *PLoS One*. 2018;13(3):e0194130
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5854351/

The Functional Medicine Perspective

1. Your genes play a role, but your environmental exposures (toxins, “bugs” etc), lifestyle (stress, sleep, exercise), and diet play a larger role in outcome

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2. **Autoimmune disease is a spectrum, it moved backwards and forwards (not just progressively worse)**

The Functional Medicine Perspective

1. Your genes play a role, but your environmental exposures (toxins, “bugs” etc), lifestyle (stress, sleep, exercise), and diet play a larger role in outcome
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3. **All autoimmune disease is rooted in the same primary disorder → the immune system. It’s not an “organ-specific” disease but rather a whole system.**

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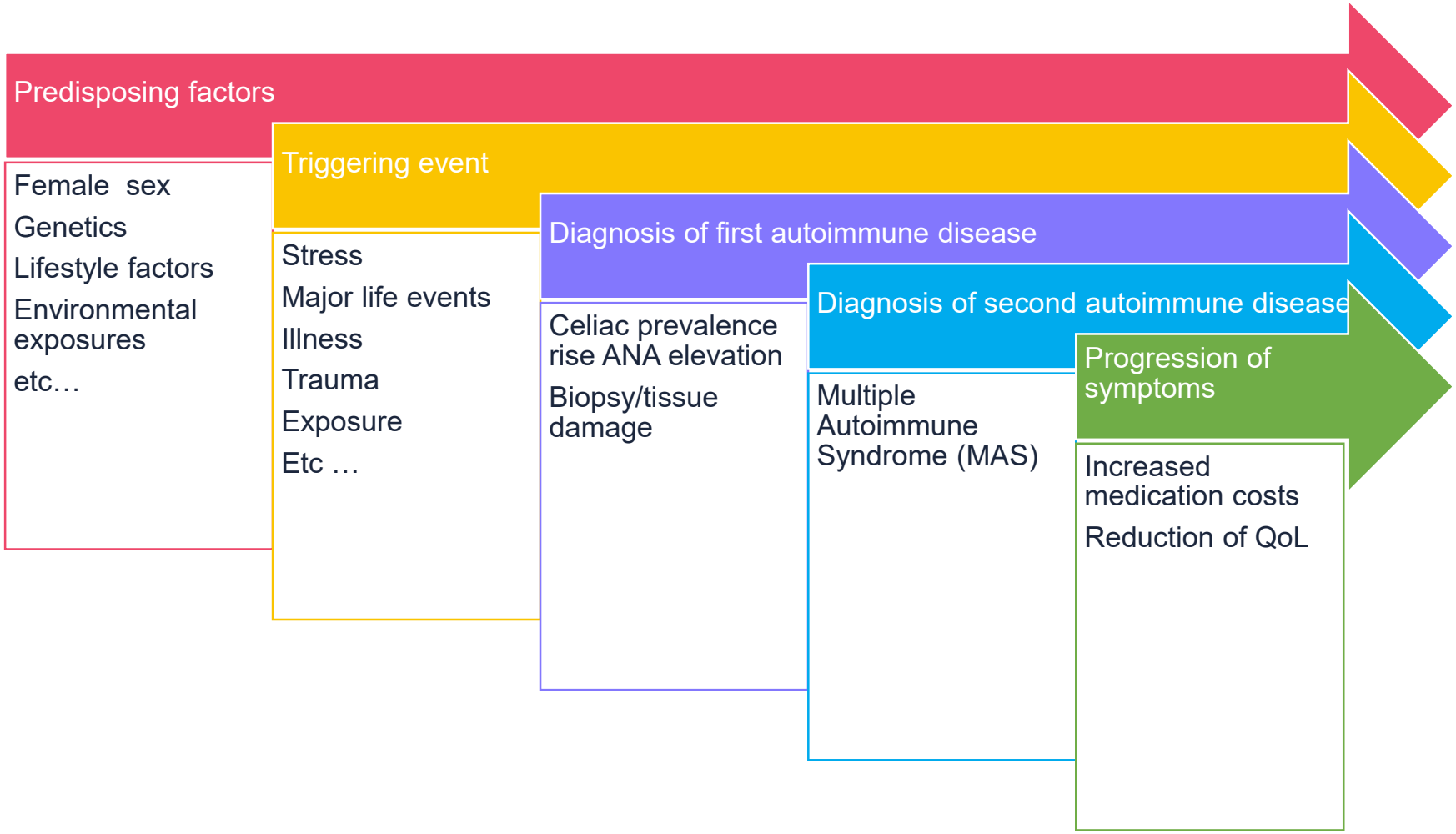
3. All autoimmune disease is rooted in the same primary disorder → the immune system. It’s not an “organ-specific” disease but rather a whole system.
4. **Symptom-relief with medication is an option, but it isn’t the only option**

The Functional Medicine Perspective

1. Your genes play a role, but your environmental exposures (toxins, “bugs” etc), lifestyle (stress, sleep, exercise), and diet play a larger role in outcome.
2. Autoimmune disease is a spectrum, it moved backwards and forwards (not just progressively worse)
3. All autoimmune disease is rooted in the same primary disorder → the immune system. It’s not an “organ-specific” disease but rather a whole system.
4. Symptom-relief with medication is an option, but it isn’t the only option
5. **Diet plays a key role in both the etiology and the remission of autoimmune disease. So does lifestyle modification.**

Autoimmune disease exists on a spectrum



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Offord C. *The Celiac Surge*. The Scientist. June 2017.
https://www.the-scientist.com/features/the-celiac-surge-31438
Marrie RA, et al. *Mult Scler*. 2015;21(3):282–293
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4429166/
Harpreet S, et al. *Reumatologia*. 2016;54(6):326–329
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5241371/

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FUNCTIONAL MEDICINE MATRIX

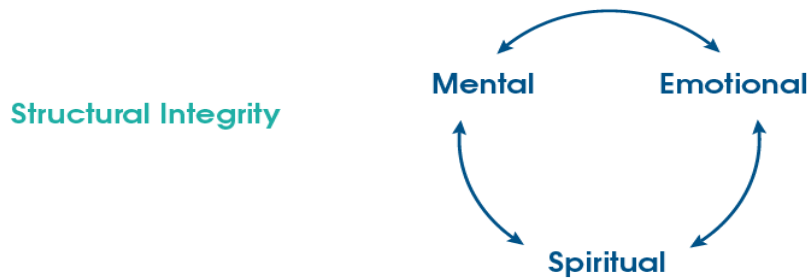
Retelling the Patient's Story

Antecedents

Triggering Events

Mediators/Perpetuators

Physiology and Function: Organizing the Patient's Clinical Imbalances

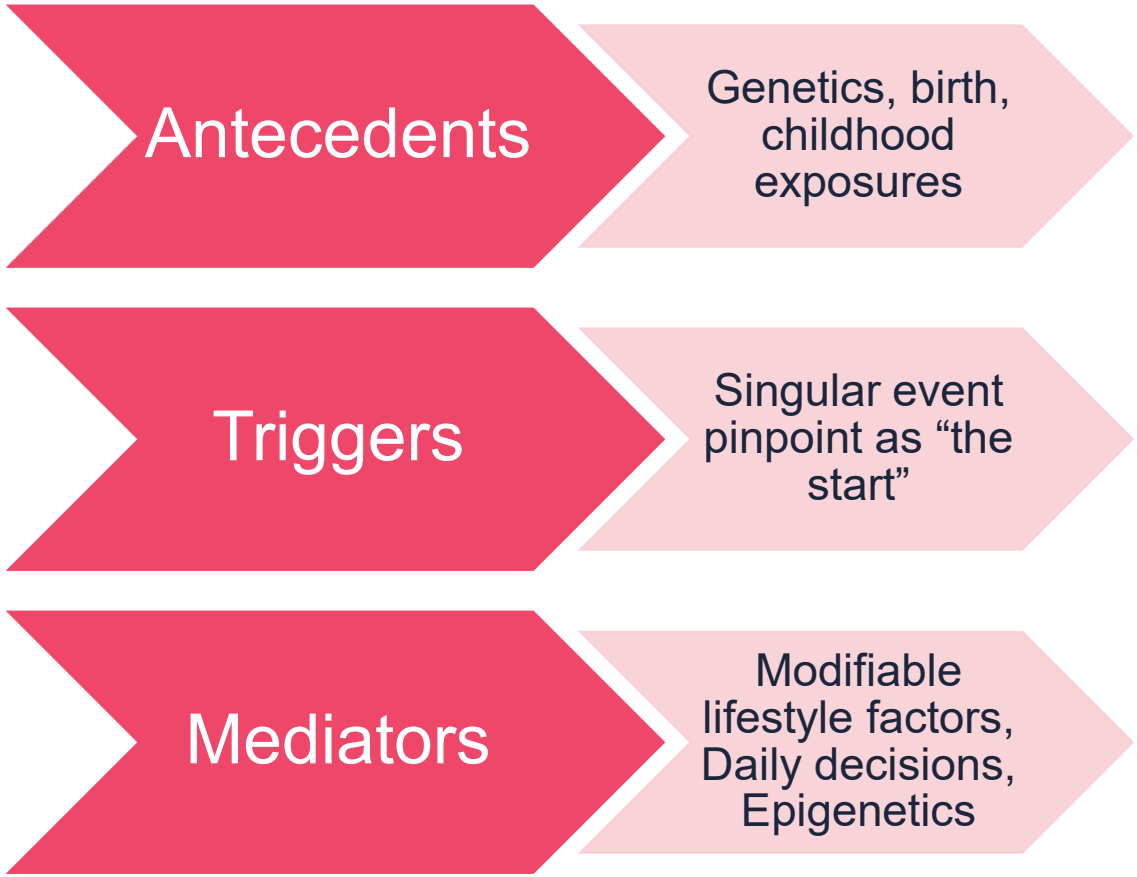


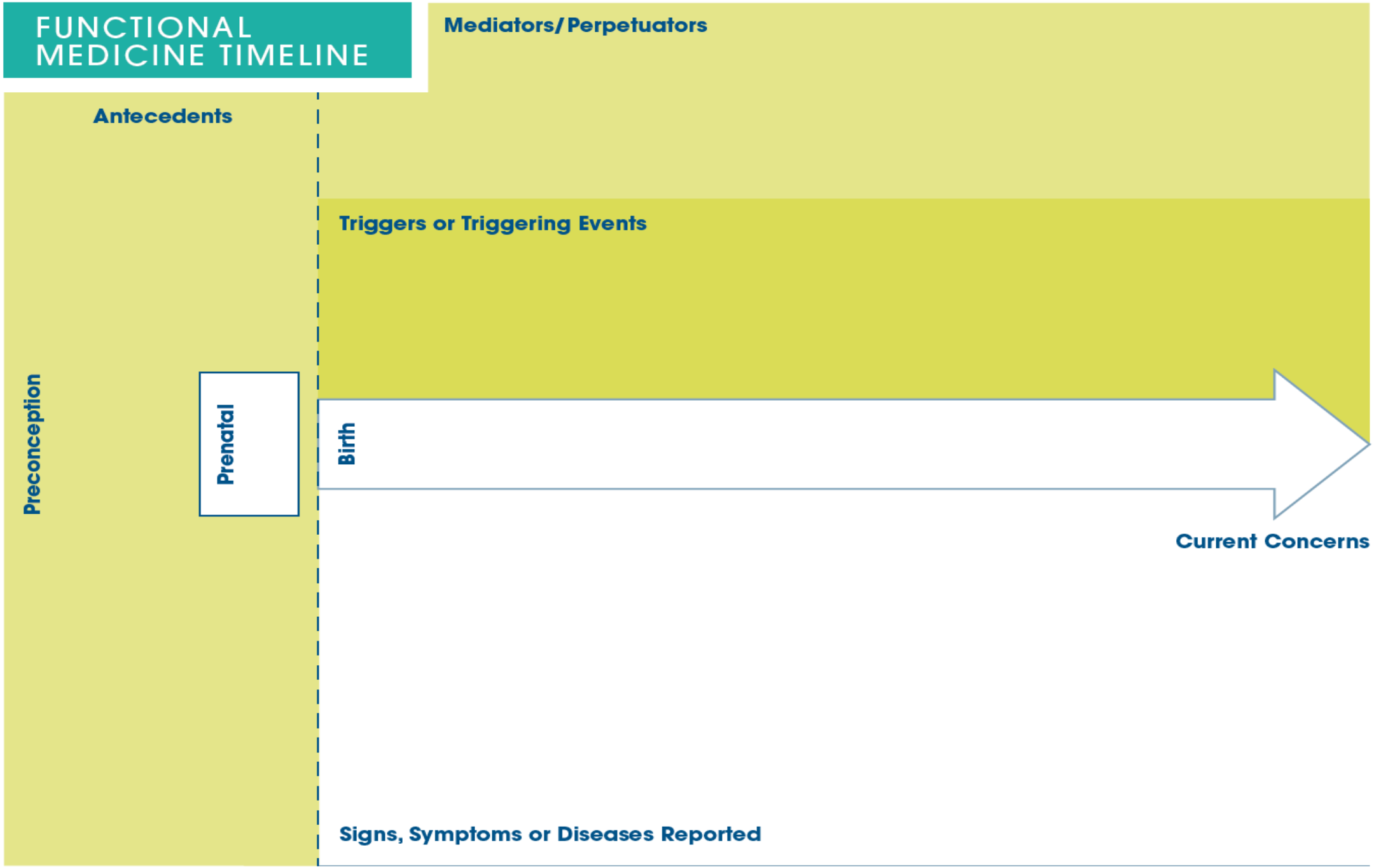
Modifiable Personal Lifestyle Factors

Sleep & Relaxation	Exercise & Movement	Nutrition	Stress	Relationships

Name: _____ Date: _____

The *ATMs*


Antecedents
Genetics, birth, childhood exposures
Triggers
Singular event pinpoint as “the start”
Mediators
Modifiable lifestyle factors, Daily decisions, Epigenetics



Name: _____ Date: _____

Pathophysiology Review

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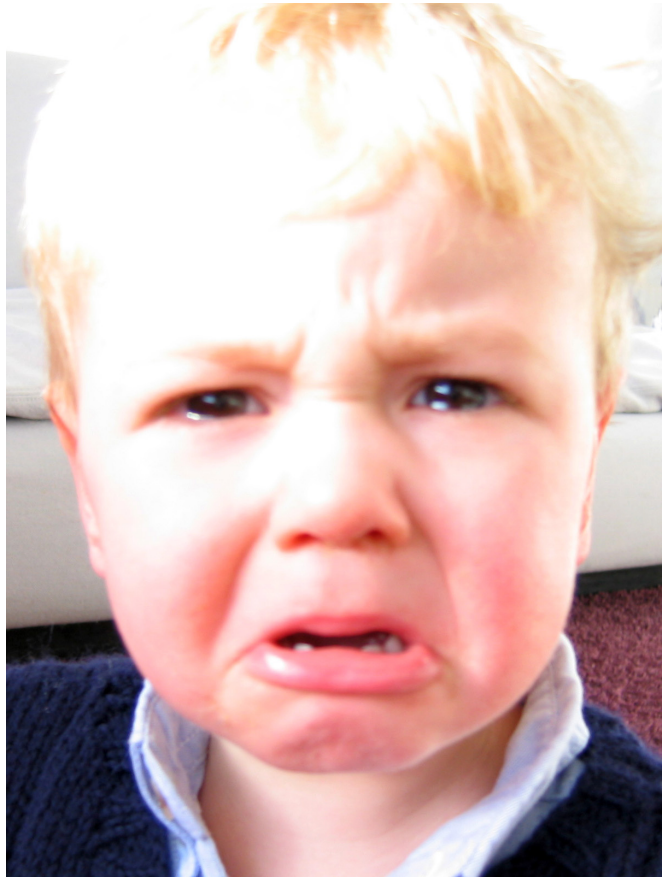
How do you feel about Immunology?



Defense & Offense

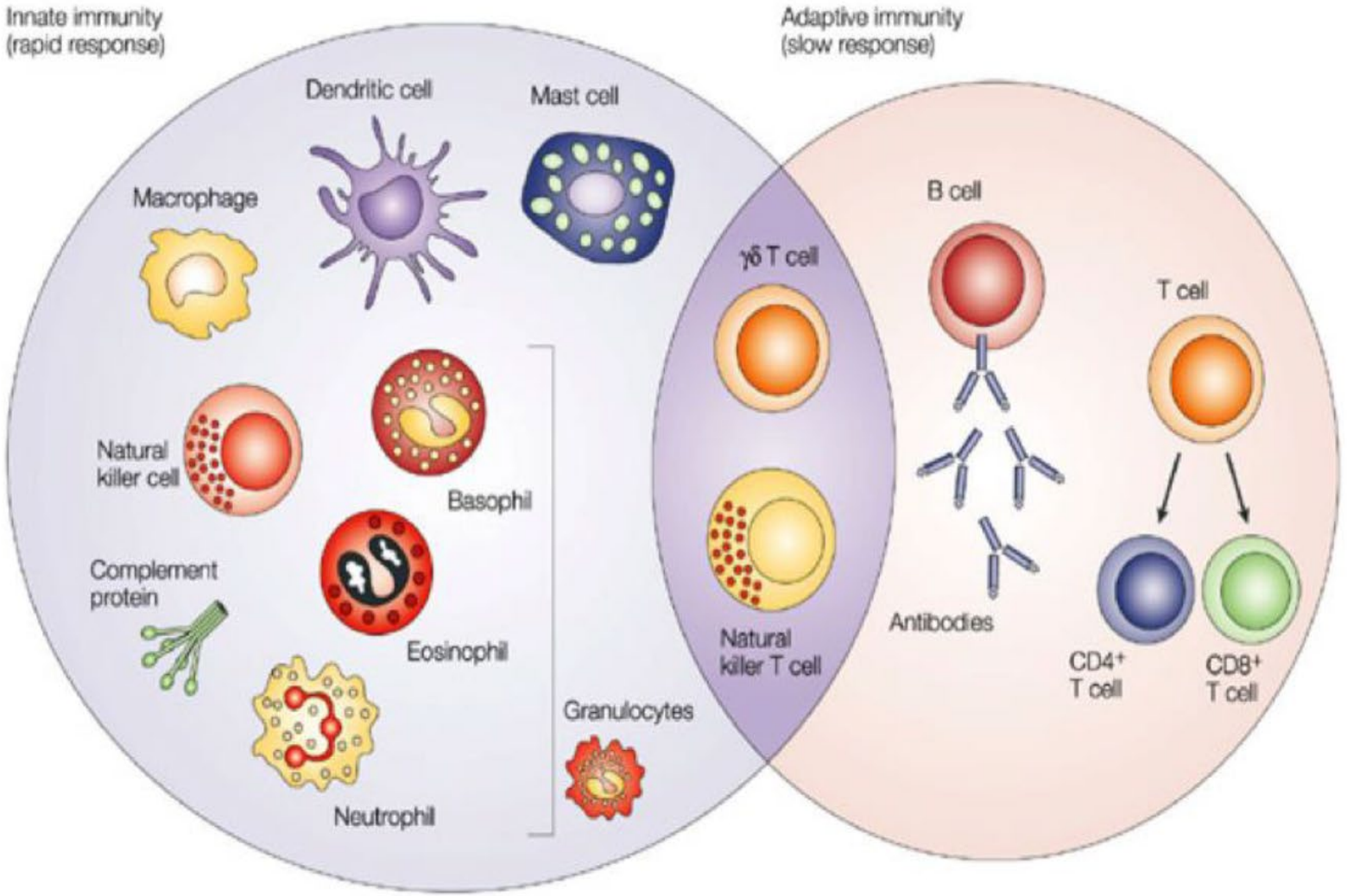
Physiological barriers

- VALT/GALT/MALT/BALT/NALT

Innate vs adaptive

- Cell mediated (T-cell)
- Humoral (immunoglobins)


15
11

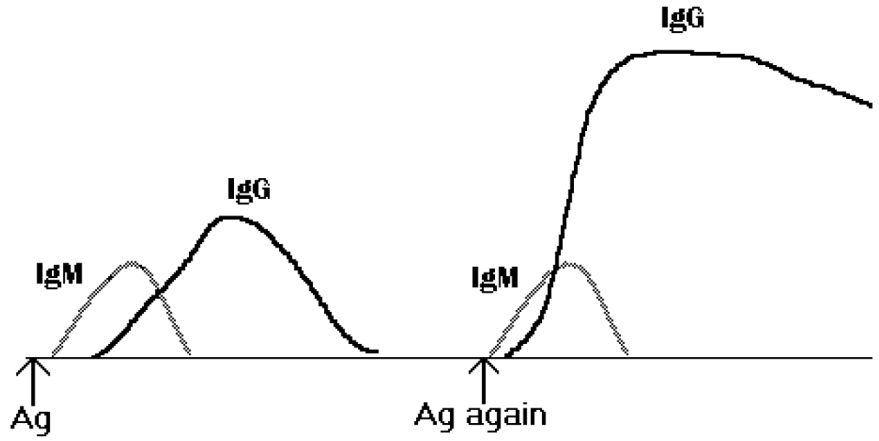


Innate & Adaptive Immunity

Dranoff G. Cytokines in cancer pathogenesis and cancer therapy. Nat Rev Cancer. 2004 Jan;4(1):11-22. Review.

Nature Reviews | Cancer

Innate Immunity



IgM

- Oldest antibody phylogenetically; 500 times more efficient than IgG at activating complement.

IgA

- Made by plasma cells in lymphoid tissues near mucous membrane
- **Secretory Component -** protective against invaders in the gut (first line of immunological defense)

IgG

- Most abundant in circulation
- Plasma half-life of IgG is about **3 weeks**
- **Opsonizing -** vital for clearance of most extracellular bacteria.

IgE

- Type I Immunopathology due to histamine-containing mast cells and basophils activation
- Protective for parasites.

Compliment Cascade

Compliment cascade – 3 Pathways to activation:

- Classic
- Alternative
- Lectin

Results in 4 actions:

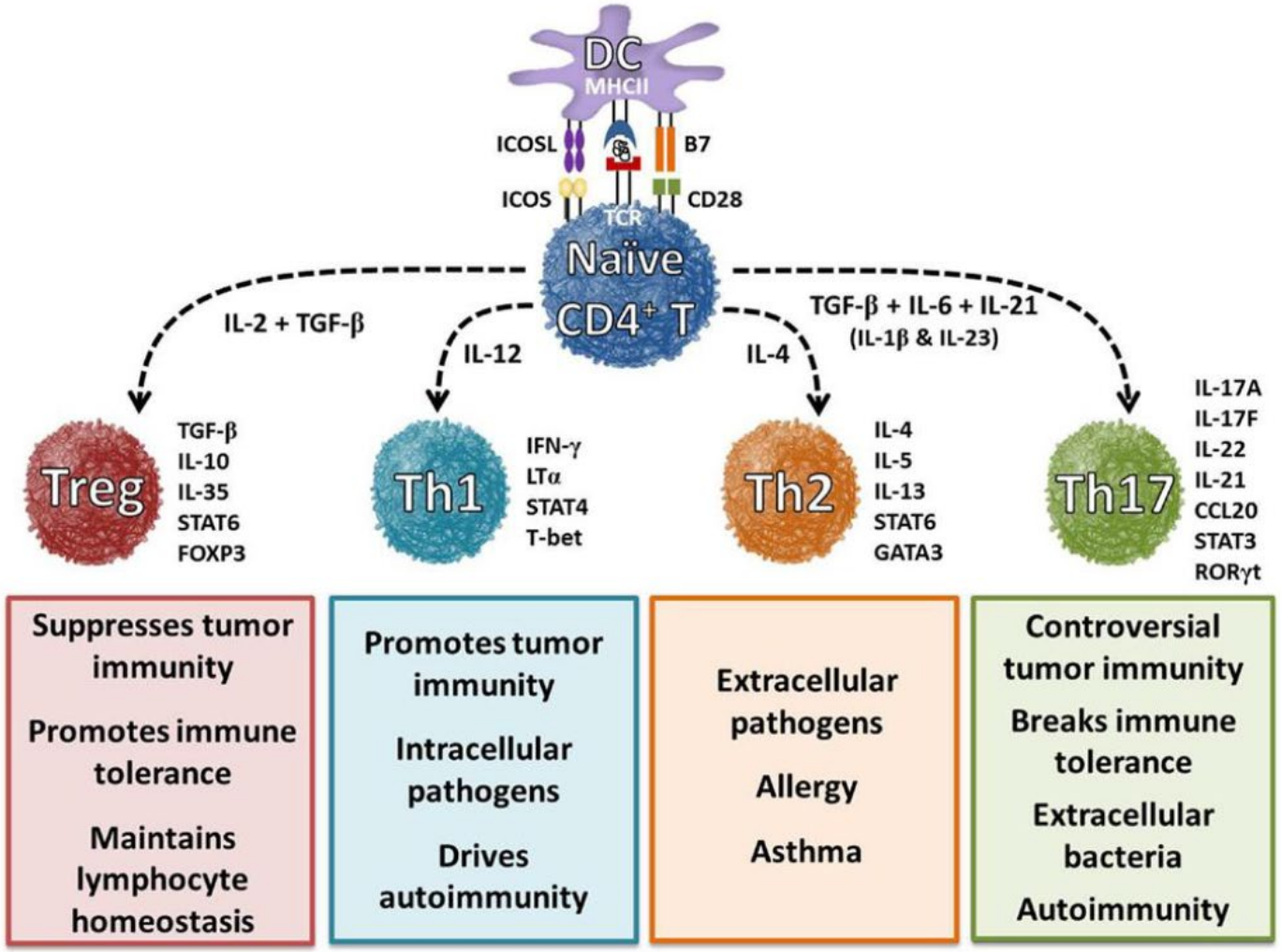
- Lysing – cell breakdown
- Opsonizing - phagocytosis
- Chemotactic – chemokine release
- Anaphylactic – mast cells, basophile response

frontiers in IMMUNOLOGY

REVIEW ARTICLE
published: 17 June 2014
doi: 10.3389/fimmu.2014.00276

Th17 cells in cancer: the ultimate identity crisis

Stefanie R. Bailey[1,2], Michelle H. Nelson[1,2], Richard A. Himes[3], Zihai Li[1], Shikhar Mehrotra[2] and Chrystal M. Paulos[1,2]**



Bailey SR, Nelson MH, Himes RA, Li Z, Mehrotra S, Paulos CM. Th17 cells in cancer: The ultimate identity crisis. Frontiers in Immunology. 2014;5. doi:10.3389/fimmu.2014.00276.

https://www.frontiersin.org/articles/10.3389/fimmu.2014.00276/full

Adaptive Immunity

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What's the tipping point?

FUNCTIONAL MEDICINE MATRIX

Retelling the Patient's Story

Antecedents
- Genetics/Family History
- C-section birth
- Frequent childhood antibiotic use

Triggering Events
- Tick bite
- Home renovation
- Family stress, traumatic event
- Physical injury or surgery

Mediators/Perpetuators
Standard American diet
Chronic infection (viral, bacterial, parasite)
Intestinal permeability/dysbiosis/SIBO

Physiology and Function: Organizing the Patient's Clinical Imbalances

Assimilation
GI disorders affecting absorption of nutrients
Dysbiosis, leaky gut, motility

Defense & Repair
Hypersensitivity reactions
Food intolerances
Frequent colds
Environmental allergies

Structural Integrity
Frequent hives/rashes
Intestinal permeability

Energy
Fatigue
Poor sleep
Foggy brain

Communication
Cortisol
Insulin
Hormone imbalances
Thyroid …

Transport
Edema (legs, angioedema)
Swollen lymph/poor drainage

Biotransformation & Elimination
Elevated heavy metals
Chronic exposure to pollutants/toxins,
chemical sensitivity

Modifiable Personal Lifestyle Factors

Sleep & Relaxation
Sleep hygiene

Exercise & Movement
Regular exercise
Type, frequency

Nutrition
Glycemic load
Plant-based, variety
Color
Inflammatory foods

Stress
Amount of stress and stress management

Relationships
Social network
Friends and family
Stressful or supportive?

Name: _____ Date: _____

REVIEW

Current Opinions in Rheumatology Journal 2019

Pathogenesis and treatment of autoimmune rheumatic diseases

Eric Liu and Andras Perl

KEY POINTS

- Autoimmunity occurs in the setting of genetic predisposition and environmental influence.
- Both genetic and environmental factors modulate the innate and adaptive arms of the immune system towards self-reactivity and inflammation.
- Metabolic pathways serve as key sensors and effectors of genetic, epigenetic, and environmental cues that shape the development and function of the immune system.
- Activation of the mechanistic target of rapamycin has emerged as a central regulator of metabolic stress that underlies pro-inflammatory lineage development in the adaptive immune system.
- Blockade of mTOR reverses the depletion of Tregs and CD8 memory T cells and moderates the expansion of inflammatory Th17 cells in autoimmune diseases with promising therapeutic efficacy.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3992282/

REVIEW

Current Opinions in Pediatrics Journal 2019

CURRENT OPINION

Prevention of allergy with diverse and healthy microbiota: an update

Diana Chernikova[a], *Irene Yuan*[b], *and Marcus Shaker*[b,c,d]

Purpose of review

Microbiota consist of symbiotic microscopic neighb
incompletely understood ways throughout our lifeti
have been described, clear effective therapeutic in

Recent findings

The human microbiome is influenced by multiple fa
cesarean section), breastfeeding, diet, presence of
medications (particularly antacids), lifestyle, and d
atopic responses and tolerance have been describ
metabolic pathways to promote the health of their
system away from pro-allergic, Th2-dominated respo

Summary

Evidence suggests that specific healthy infant microbiome signatures may influence development of some components of the allergic march of childhood by decreasing atopic dermatitis, asthma, and food allergy. Further understanding of factors that influence healthy microbiota may lead to specific strategies tailored for early intervention and disease prevention.

Keywords

allergy, asthma, atopic dermatitis, microbiome, microbiota, prevention

Evidence suggests that specific healthy infant microbiome signatures may influence development of some components of the allergic march of childhood by decreasing atopic dermatitis, asthma, and food allergy.

https://www.ncbi.nlm.nih.gov/pubmed/30939512

Immune Disease Drivers (ATMs)

- **GI Function**
  - Leaky gut
  - Dysbiosis
  - Malabsorption
  - Inflammation/food sensitivities
- **Diet**
  - Macronutrient imbalance
  - Micronutrient deficiencies
  - Phytonutrients deficiencies
- **Inflammation**
  - Insulin resistance/MetS
  - Hormonal dysregulation (estrogen dominance)
  - Injury/trauma
- **Stress**
  - Exercise
  - Stress management
  - Adrenal fatigue
- **Chronic toxin or allergen exposure**
  - Acute occupational
  - Chronic exposures (As, Hg, Pb, pesticides, air pollutants, etc)
  - Smoking, drug, and/or alcohol use
  - Food allergen
- **Chronic infection**
  - Viruses (EBV, CMV, etc…)
  - Tick-borne illness (Lyme, Babesia, Borellia etc..)
  - Fungal and mold

Autoimmune Triggers

PAMPS

- Bugs (bacterial, viral, parasites, candida, mold)

DAMPS

- Trauma or surgery

Food reactivity or increased sensitivity

- Advanced glycation end products (AGEs)
- IgG/IgA/IgE development
- Mannose binding lectins
- FODMAP/Sulphur/histamine sensitivity

Toxins acute exposure or increased chemical sensitivity

- Mercury exposure (Amalgam removal)
- Daily household exposure or home renovations (new furniture, carpet removal, etc)

ARTICLE IN PRESS

Biochemical Pharmacology xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Biochemical Pharmacology

journal homepage: www.elsevier.com/locate/biochempharm

Review

Adipokines: Linking metabolic syndrome, the immune system, and arthritic diseases

Vera Francisco[a,1], Clara Ruiz-Fernández[a,1], Jesús Pino[a], Antonio Mera[b], Miguel A. González-Gay[c], Rodolfo Gómez[d], Francisca Lago[e], Ali Mobasheri[f], Oreste Gualillo[a,*]

[a] SERGAS (Servizo Galego de Saude) and IDIS (Instituto de Investigación Sanitari
Inflammatory Diseases), Santiago University Clinical Hospital, Building C, Trav
[b] SERGAS (Servizo Galego de Saude), Santiago University Clinical Hospital, Di
[c] Epidemiology, Genetics and Atherosclerosis Research Group on Systemic Inflan
Valdecilla, Av. Valdecilla, Santander 39008, Spain
[d] Musculoskeletal Pathology Group, SERGAS (Servizo Galego de Saude) and I
University Clinical Hospital, Santiago de Compostela, Spain
[e] Molecular and Cellular Cardiology Group, SERGAS (Servizo Galego de Saud
Santiago University Clinical Hospital, Santiago de Compostela, Spain
[f] Department of Regenerative Medicine, State Research Institute Centre for Inn

ARTICLE INFO

Keywords:
Adiponectin
Inflammation
Leptin
Lipocalin-2
Metabolic syndrome
Obesity
Osteoarthritis
Rheumatoid arthritis

ABSTRA

Metabolic syn
obesity and vi
increase the r
diseases, such
vances in the
tified as a possi
obesity has been established as a significant contributing factor to the increased prevalence of MetS. Adipokines, which play important physiological roles in metabolic activities contributing to the pathogenesis of MetS, are also involved in the regulation of autoimmune and/or inflammatory processes associated with arthritic diseases. Therefore, MetS and dysregulated secretion of pro-inflammatory adipokines have been recognized as a molecular link between CVD and arthritis diseases. In the present paper, we review recent evidence supporting the role played by adipokines, in particular leptin, adiponectin, and lipocalin-2, in the modulation of the immune system, MetS and arthritic diseases. The underlying cellular and molecular mechanisms are discussed, as well as potential new therapeutic strategies.

Adipokines, which play important physiological roles in metabolic activities contributing to the pathogenesis of MetS, are also involved in the regulation of autoimmune and/or inflammatory processes associated with arthritic diseases. Therefore, **MetS and dysregulated secretion of pro-inflammatory adipokines have been recognized as a molecular link between CVD and arthritis diseases**.

https://www.ncbi.nlm.nih.gov/pubmed/30910694

Published in final edited form as:
Nat Rev Immunol. 2009 May ; 9(5): 313–323. doi:10.1038/nri2515.

The gut microbiome shapes intestinal immune responses during health and disease

June L. Round[*] and **Sarkis K. Mazmanian**[*]

[*]Division of Biology, California Institute of Technology, Pasadena, California 91125, USA

Abstract

Immunologic dysregulation is the cause of
autoimmunity, allergy and cancer. The gas
between the host immune system and micr
discuss findings which indicate that develo
influenced by intestinal bacterial colonizati
mediate host–symbiont interactions that re
recent evidence to support an emerging co
result in immunological dysregulation that
disease. Perhaps the mammalian immune sy
fact, controlled by the microbes themselves.

"The gastrointestinal tract is the primary site of interaction between the host immune system and the microorganism, both symbiotic and pathogenic… **disturbances in the bacterial microbiota result in immunological dysregulation that underlie disorders such as inflammatory bowel disease.**"

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4095778/

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Nat Rev Immunol. 2009 May ; 9(5): 313–323. doi:10.1038/nri2515.

The gut microbiome shapes intestinal immune responses during health and disease

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"Perhaps the mammalian immune system which appears designed to control microbes **is, in fact, controlled by the microbes themselves**."

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4095778/

JCI The Journal of Clinical Investigation

Environmental exposures and mechanisms in allergy and asthma development

Liza Bronner Murrison, … , Jocelyn Biagini Myers, Gurjit K. Khurana Hershey

J Clin Invest. 2019;129(4):1504-1515. ht

Review Series

Environmental exposures interplay with
and progression of allergic diseases. Tl
as a result of complex gene-environme
host response. Research shows an ass
increasingly modern Westernized lifest
urbanization, time spent indoors, and a
in increased exposure to air and traffic p
and other early-life and lifelong risk fact
and allergic diseases. It is increasingly
allergen exposure affect allergic disease
prevent allergic diseases is hindered by ga
mechanisms and interaction of environmental, viral, and allergen exposures with immune pathways that impact disease development. This Review highlights epidemiologic and mechanistic evidence linking environmental exposures to the development and exacerbation of allergic airway responses.

Research shows an association between the rise of allergic diseases and increasingly modern Westernized lifestyles, which are characterized by increased urbanization, time spent indoors, and antibiotic usage. These environmental changes result in increased exposure to **air and traffic pollution, fungi, infectious agents, tobacco smoke, and other early-life and lifelong risk factors for the development and exacerbation of asthma and allergic diseases**. It is increasingly recognized that the timing, load, and route of allergen exposure affect allergic disease phenotypes and development.

https://www.jci.org/articles/view/124612

So …

- Immune dysregulation might be linked to general rise of chronic disease like cardiometabolic disease, which in turn, impacts inflammation.
- The GI houses the “cockpit” of the immune system - major site of immune regulation
- The microbiome is having a two-way conversation involving epigenetic expression and immune modulation and we can go as far as to say that the host is, “***in fact, controlled by the microbes themselves”***
- GI integrity (physiological, biochemical, and immunological barrier). Leaky gut when combined with genetic risk and contributing factors can increase risk of development of autoimmune disease

Mu Q, et al. *Front Immunol*. 2017;8:598.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4095778/

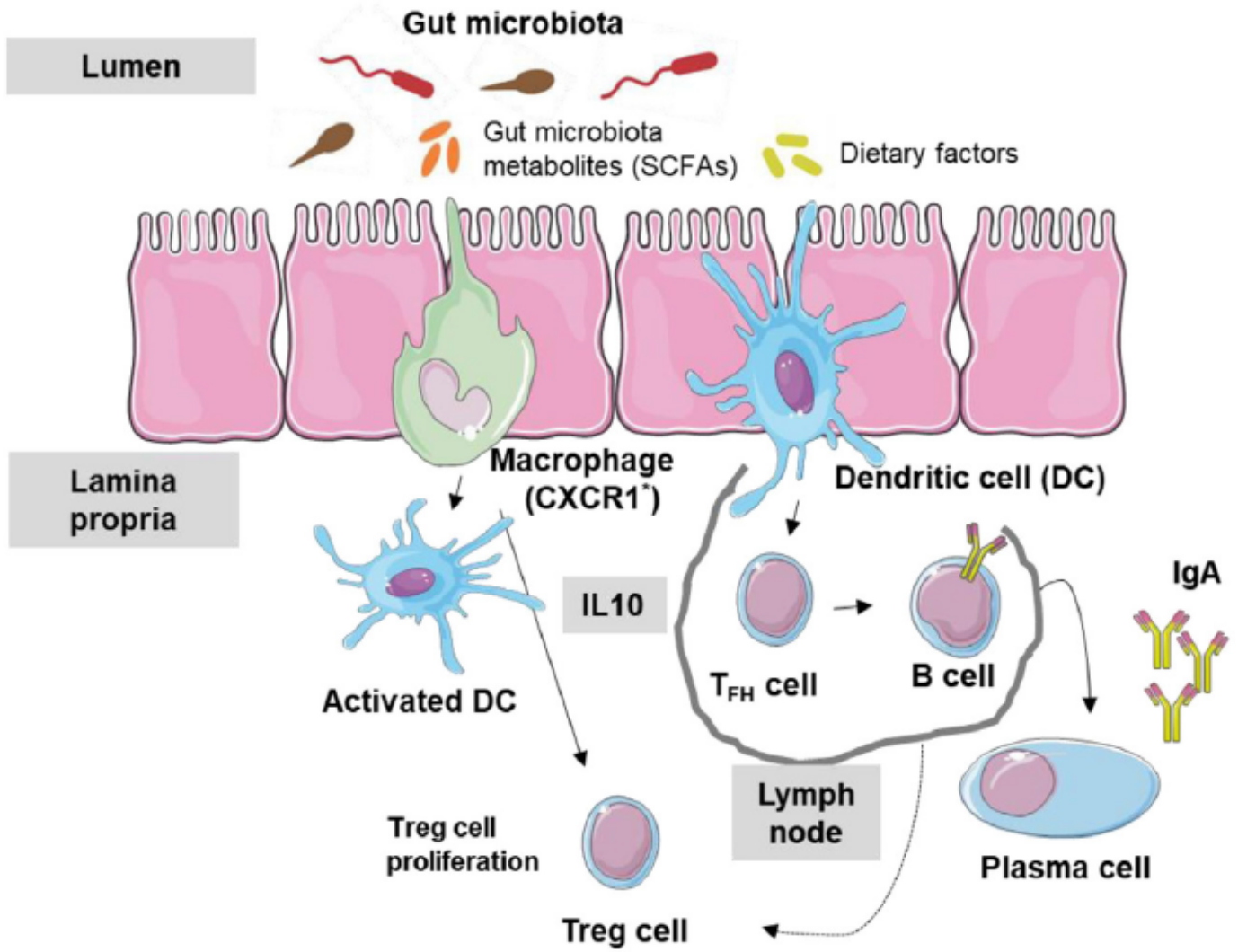


FIGURE 1 | Interaction between gut microbiota and immune system. Gut microbiota metabolites and dietary factors constitute the main antigen load of the gastrointestinal tract. Macrophages (CXCR1+) and dendritic cells (DCs) are stimulated and T regulatory (Treg) cells are activated by metabolic products such as short chain fatty acid (SCFA). Follicular T cells activate B cells inducing the production of IgA antibodies.

Pascal M, et al. Microbiome and Allergic Diseases. *Front Immunol*. 2018;9:1584.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6056614/

A few (more) comments on allergic disease and the gut

Allergy (atopic sensitization) is considered the strongest risk factor for development childhood asthma.

The microbiota is influenced by multiple environmental and dietary factors, and has a complex role in development of allergic diseases.

Environmental exposures and lifestyle have been implicated as primary drivers in the dramatic rise of childhood allergies.

Lynch SV. Gut Microbiota and Allergic Disease. New Insights. *Ann Am Thorac Soc*. 2016. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5015732/
Pascal M, et al. Microbiome and Allergic Diseases. *Front Immunol*. 2018;9:1584. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6056614/

Modulating Risk: The connection to the gut

Altered gut microbial colonization in very early life has been linked with increased risk of allergies.

- Severe food- or aero-allergens have a significantly higher risk of developing asthma.

Key factor influencing gut microbiome diversity is infant feeding/breastfeeding

- Lactobacilli and *Bifidobacteria*, oligosaccharides, range of fatty acids which impact microbiome and capacity to produce metabolites that protect against allergies and asthma.
- *Lachnospiraceae* and *Ruminococcaceae* impact gut microbiome by producing SCFAs, acting as an essential energy source for gastrointestinal colonocytes and exerting anti-inflammatory effects that modulate allergic disease (MOA increasing epithelial barrier function and inducing Treg cells, DCs precursors, and IL-10 production.

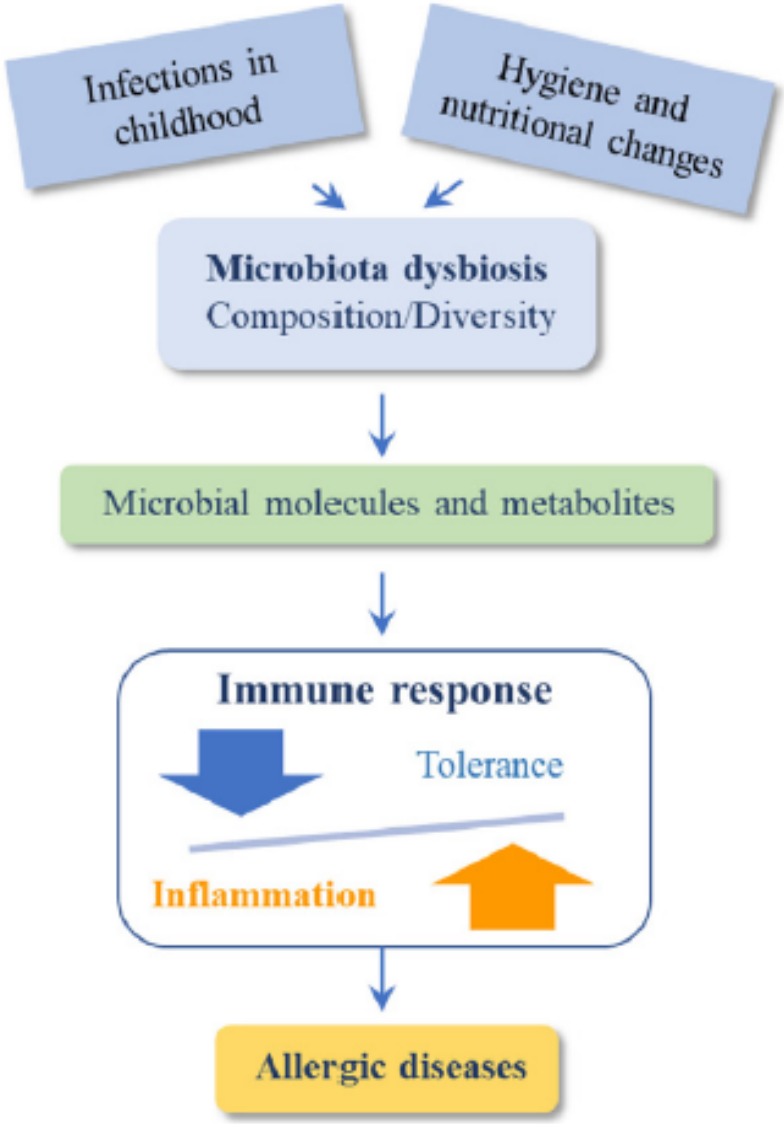
Supplementing Probiotics and prebiotics show promise for the development of a preventive therapy.

- MOA likely due to restoring microbiome balance, reducing dysbiosis, and improving immune response.

More studies with larger sample sizes are needed to dissect the role of microbiome in allergic diseases.

Lynch SV. Gut Microbiota and Allergic Disease. New Insights. *Ann Am Thorac Soc*. 2016. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5015732/
Pascal M, et al. Microbiome and Allergic Diseases. *Front Immunol*. 2018;9:1584. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6056614/

In Summary…

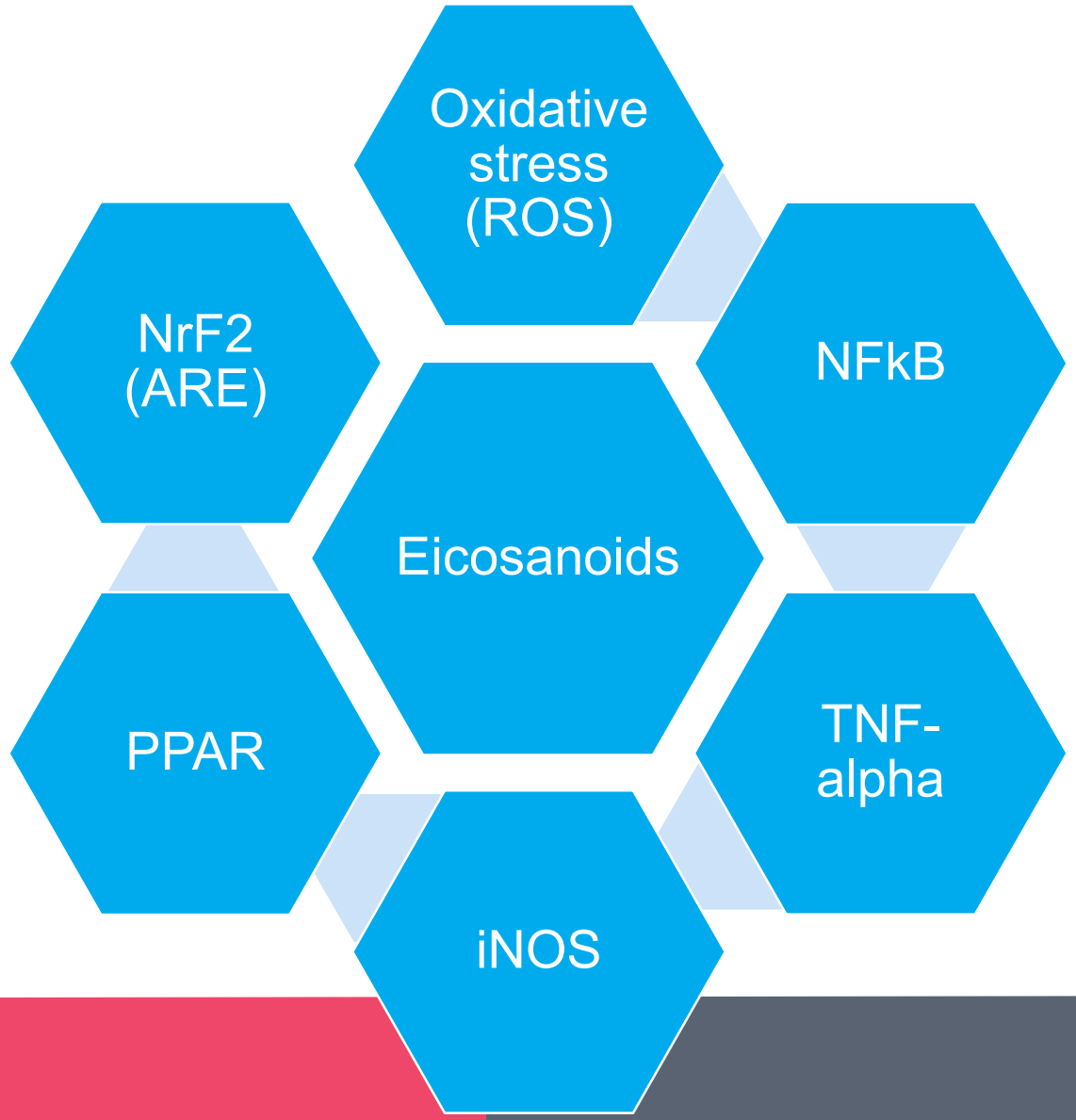


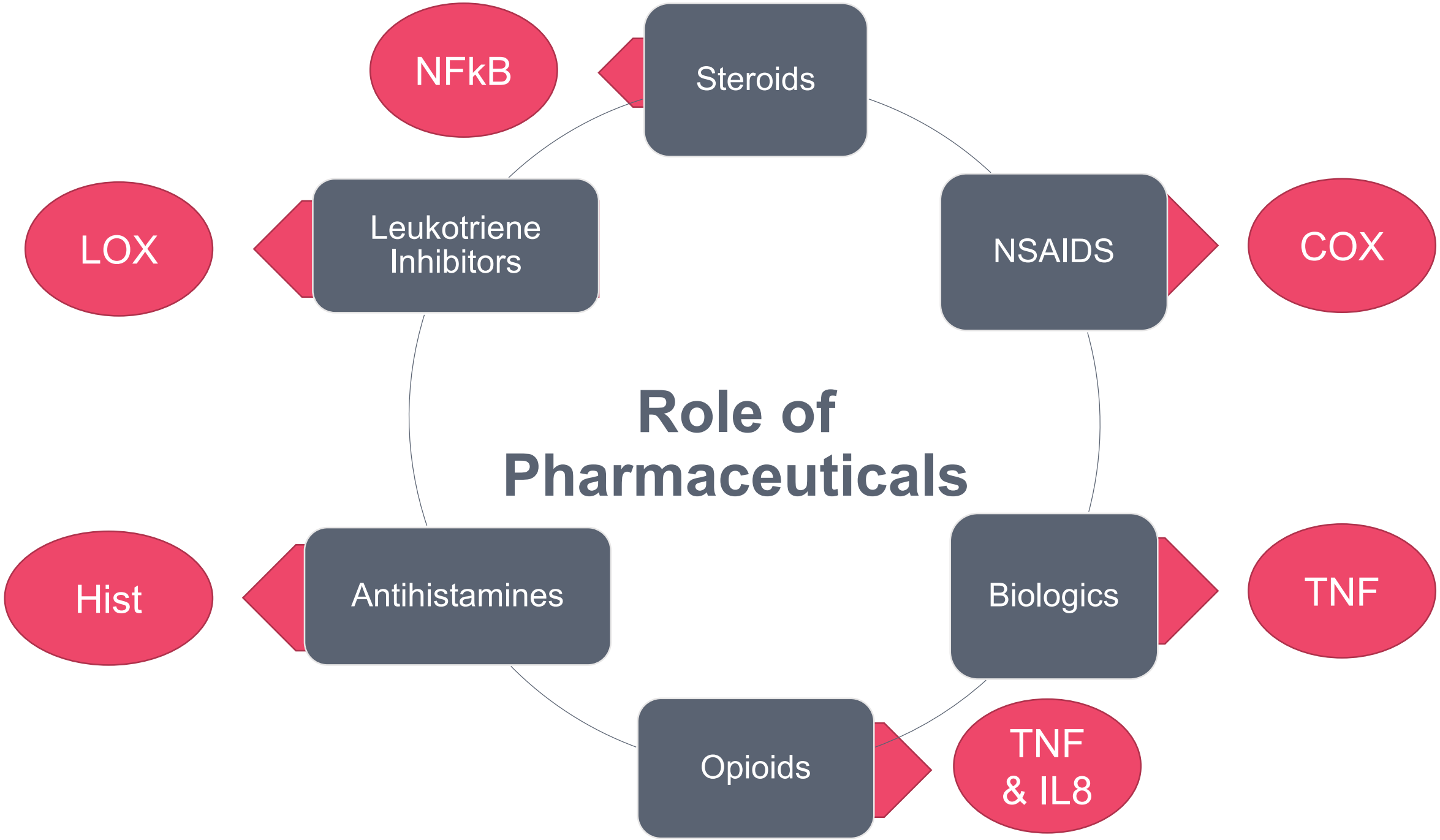
Pascal M, et al. Microbiome and Allergic Diseases. *Front Immunol*. 2018;9:1584. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6056614/

FIGURE 2 | Dysbiosis induce qualitative and quantitative changes in the microbiota that directly affect immunological mechanisms leading to allergic diseases.

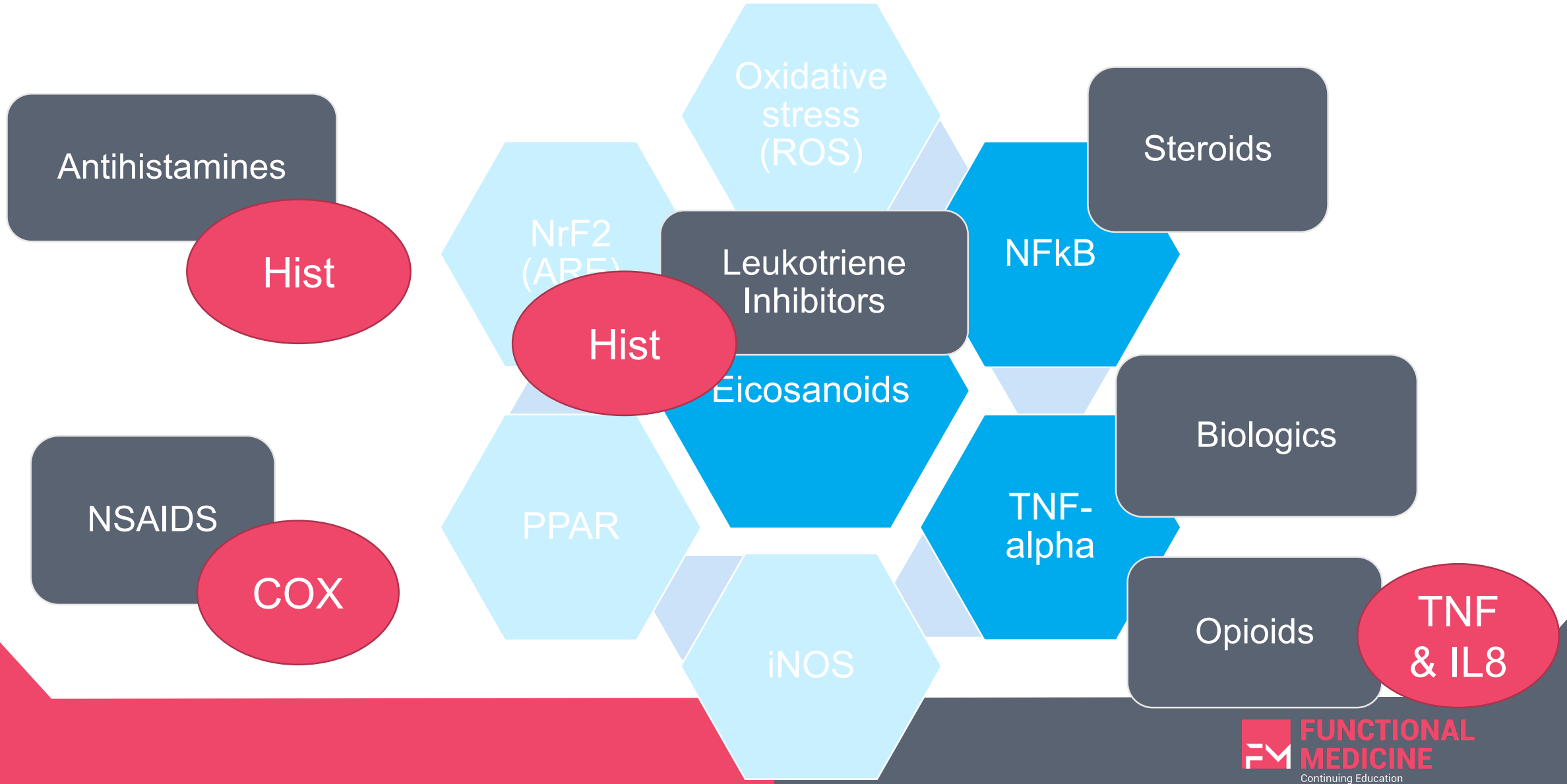
Let’s test our foundational knowledge

Mediating Inflammatory Response




NFkB
Steroids
LOX
Leukotriene Inhibitors
NSAIDS
COX
Role of Pharmaceuticals
Hist
Antihistamines
Biologics
TNF
Opioids
TNF & IL8

Mediating Inflammatory Response



FUNCTIONAL MEDICINE
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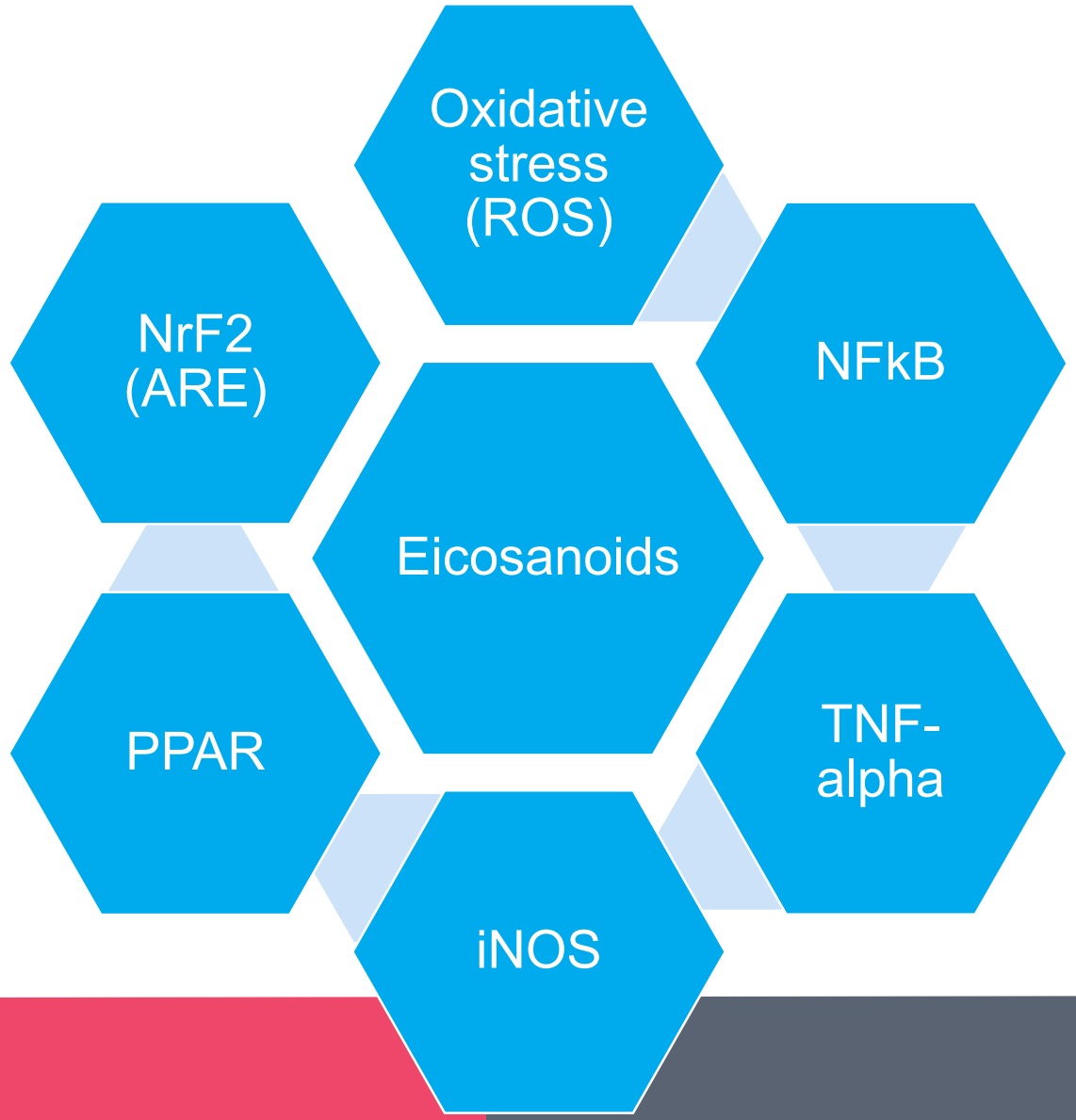
Mediating Inflammatory Response



NF-kB Inhibitors

- Resveratrol
- Curcumin
- EGCG
- Lycopene
- Allicin (garlic)
- Quercitin
- Vitamin C
- Vitamin D3
- Vitamin E
- Vitamin B6
- Folate
- B12
- B5
- Mg
- ALA
- CoQ10
- EPA/DHA
- Carnosine
- Dark chocolate
- Blueberries
- Ginger

Nrf2 inducers

(polyphenols, flavonoids, organosulfur)

- Sulforaphane
- Curcumin
- Ginger
- Trans-resveratrol
- Quercitin
- ALA
- Carnosol (rosemary)
- Garlic
- Coffee & EGCG
- Cinnamon
- Ginko biloba

PPAR activation

- PUFAs including
  - Omega 3
  - ALA
  - DHA
  - LA
- Along with cofactors:
  - Zn
  - Mg
  - Vitamin C
  - B3
  - B6
  - Saturated FA (some)

Nature's Immune Modulators

Arachidonic Cascade Modulators

Phospholipase A2

- Licorice
- Quercitin
- Vitamin E

COX1 + COX2 Inhibitors

- Bromelain
- Ginger*
- EPA/DHA*
- Quercitin*
- Garlic
- Turmeric
- Willow
- Barberry
- Licorice
- Wild yam
- Chamomile
- EGCG
- Romarinic acid
- Skullcap
- Thyme
- Clove

**both COX1+ COX2 activity*

5-LOX Inhibitors

- Quercitin
- Boswellia
- Turmeric
- Licorice
- Ginger
- EPA
- EGCG
- Skullcap
- Thyme

REVIEW

Vitamin D and autoimmunity

Y Rosen[1], J Daich[1], I Soliman[1], E Brathwaite[1], Y Shoenfeld[2]

[1]Department of Medicine, Coney Island Hospital, Brooklyn, NY, USA, and [2]Zabludowicz Centre for Autoimmune Diseases, Medical Centre, Tel Hashomer, Israel

Objectives: To review and evaluate the role of vita
Method: We searched PubMed using keywords su
compiled and reviewed various studies including pr
genetic studies, and experimental models that inves
Results: There is evidence based on these various
vitamin D. These diseases include, but are not limi
(SSc), autoimmune thyroid diseases, rheumatoid art
Conclusions: Although there is evidence for vitamin
mechanism for this association has yet to be elucidated. Additional data are needed to corroborate these findings.

RESULTS: There is evidence based on these various studies that several key autoimmune diseases are modulated by vitamin D. These diseases include, but are not limited to, multiple sclerosis (MS), scleroderma or systemic sclerosis (SSc), autoimmune thyroid diseases, rheumatoid arthritis (RA), and primary biliary cirrhosis (PBC).

https://www.ncbi.nlm.nih.gov/pubmed/27191042

Diet & Lifestyle Interventions

Upstream Plan: Nutrition Overview

Overarching diet

- Elimination diet
- Autoimmune Diet/Paleo (AIP vs Whals)
- Fasting

Focus on: Cruciferous veggies, garlic, onion, rosemary, cherries, dark chocolate, blueberries, turmeric, raspberries and grapes, fish, egg*, flax, nuts/seeds, grass-fed beef and wild game, organ meats, green tea.

- (ntioxidants and cofactors)
- Direct immune modulators (Vit C and D)
- FIBER

**Eggs re often removed during elimination phase and challenged*

https://www.ncbi.nlm.nih.gov/pubmed/16194694

Rheumatology International (2018) 38:737–747
https://doi.org/10.1007/s00296-017-3912-1

Rheumatology
INTERNATIONAL

SYSTEMATIC REVIEW

The effects of the Mediterranean diet on rheumatoid arthritis prevention and treatment: a systematic review of human prospective studies

Casuarina Forsyth[1] · Matina Kouvari[2] · Nathan M. D'Cu
Demosthenes B. Panagiotakos[1,2,4] · Duane D. Mellor[1,3,5]

Received: 25 September 2017 / Accepted: 12 December 2017 / Published on

Abstract
Rheumatoid arthritis is a progressive autoimmune disease ch
ment pharmacotherapy, people living with rheumatoid arthriti
diet. The aim of the present systematic review is to discuss t
prevention of rheumatoid arthritis in human prospective studi
vention studies reporting improvement in the pain visual ana
questionnaire for rheumatoid arthritis score ($p < 0.05$) in the M
in the 28 joint count disease activity score for rheumatoid arth
has identified beneficial effects of the Mediterranean diet in reduc
with rheumatoid arthritis. However, there is currently insufficient evidence to support widespread recommendation of the Mediterranean diet for prevention of rheumatoid arthritis.

In conclusion, presently, there is insufficient evidence to support the use of the MD for the prevention of RA. However, the results from this review suggest that the MD may provide benefit for PLRA in conjunction with medical treatment. **While the intervention studies presented in this report suggest a beneficial effect in using a MD for the management of arthritic pain and function, these trials have many shortcomings, and their results should be interpreted with caution.** The MD is a well-balanced, nutritionally adequate diet that encompasses all the food groups.

The Journal of Nutrition
Nutritional Epidemiology

Paleolithic and Mediterranean Diet Pattern Scores Are Inversely Associated with Biomarkers of Inflammation and Oxidative Balance in Adults[1–3]

Kristine A Whalen,[4] Marjorie L McCullough,[7] W Dana Flanders,[4–6] Terryl J Hartman,[4,6] Suzanne Judd,[8] and Roberd M Bostick[4,6]*

[4]Department of Epidemiology and [5]Department of Biostatistics and Bioinformatics, Rollins School of Public Health, and [6]Winship Cancer Institute, Emory University, Atlanta, GA; [7]Epidemiology Research Program, American Cancer Society, Atlanta, GA; and [8]Department of Biostatistics, University of Alabama at Birmingham, Birmingham, AL

Abstract

Background: Chronic inflammation and oxidative balance are associated with pc
chronic diseases. A diet–inflammation/oxidative balance association may relate
Objective: We investigated associations between 2 diet pattern scores, the
circulating concentrations of 2 related biomarkers, high-sensitivity C-reactive
protein, and F_2-isoprostane, a reliable marker of in vivo lipid peroxidation.
Methods: In a pooled cross-sectional study of 30- to 74-y-old men and wom
population (n = 646), we created diet scores from responses on Willett food-
plasma hsCRP and F_2-isoprostane concentrations by ELISA and gas chromato
Both diet scores were calculated and categorized into quintiles, and their associa
estimated with the use of general linear models to calculate and compare adjuste
ordinal logistic regression.
Results: There were statistically significant trends for decreasing geometric
concentrations with increasing quintiles of the Paleolithic and Mediterranean diet s
comparing those in the highest with those in the lowest quintiles of the Paleolithic and Mediterranean diet scores were 0.61 (95% CI: 0.36, 1.05; P-trend = 0.06) and 0.71 (95% CI: 0.42, 1.20; P-trend = 0.01), respectively, for a higher hsCRP concentration, and 0.51 (95% CI: 0.27, 0.95; P-trend 0.01) and 0.39 (95% CI: 0.21, 0.73; P-trend = 0.01), respectively, for a higher F_2-isoprostane concentration.
Conclusion: These findings suggest that diets that are more Paleolithic- or Mediterranean-like may be associated with lower levels of systemic inflammation and oxidative stress in humans. *J Nutr* 2016;146:1217–26.

CONCLUSION:

These findings suggest that diets that are more Paleolithic- or Mediterranean-like may be associated with lower levels of systemic inflammation and oxidative stress in humans.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4877627/

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Degenerative Neurological and Neuromuscular Disease

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Open Access Full Text Article

CLINICAL TRIAL REPORT

Randomized control trial evaluation of a modified Paleolithic dietary intervention in the treatment of relapsing-remitting multiple sclerosis: a pilot study

This article was published in the following Dove Press journal:
Degenerative Neurological and Neuromuscular Disease
4 January 2017
Number of times this article has been viewed

Amanda K Irish[1]
Constance M Erickson[1]
Terry L Wahls[2,3]
Linda G Snetselaar[4]
Warren G Darling[1]

[1]Motor Control Laboratories, Department of Health and Human Physiology, College of Liberal Arts and Sciences, The University of Iowa, [2]Veterans Affairs Medical Center, [3]Department of Internal Medicine, Carver College of Medicine, [4]Department of Epidemiology, College of Public Health, The University of Iowa, Iowa City, IA, USA

Background/objective: A Paleolithic diet may i
multiple sclerosis (MS) patients, but past rese
intervention in combination with other treatme
pilot study was to evaluate a modified Paleolithi
of fatigue and other symptoms in relapsing-rem
Methods: We measured the effects of a MPDI
randomly assigned to control (maintain usual di
jects (one man) completed the control group and
Results: Significant improvements were seen ir
tiple Sclerosis Quality of Life-54 and time to co
baseline in MPDI subjects compared to control
observed in MPDI subjects postprotocol compa
Conclusion: A Paleolithic diet may be useful
reducing perceived fatigue, increasing mental and p
capacity, and improving hand and leg function. By increasing vitamin K serum levels, the MPDI may also reduce inflammation.

Keywords: diet therapy, nutrition therapy, gluten-free, quality of life, fatigue, complementary medicine, alternative medicine

CONCLUSION:

A Paleolithic diet may be useful in the treatment and management of MS, by reducing perceived fatigue, increasing mental and physical quality of life, increasing exercise capacity, and improving hand and leg function. By increasing vitamin K serum levels, the MPDI may also reduce inflammation.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6053098/

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Published in final edited form as:
Mol Cell Endocrinol. 2017 November 05; 455: 4–12. doi:10.1016/j.mce.2017.01.042.

Nutrition and fasting mimicking diets in the prevention and treatment of autoimmune diseases and immunosenescence

In Young Choi[a,b], **Changhan Lee**[a], and **Valter D. Longo**[a,c,d,e,*]

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[e]IFOM, FIRC Institute of Molecular Oncology, 20139, Milan, Italy

Abstract

Complex and coordinated signals are necessary to initiate and sustain
and differentiation of lymphocytes. These signals, which are known t
function, also depend on the metabolic state of the organism. Recent stu
type and levels of nutrients can influence the generation, survival and function of lymphocytes and therefore can affect several autoimmune diseases. Here, we review the dysregulation of lymphocytes during autoimmunity and aging, the mechanisms associated with loss of immune function, and how fasting mimicking diets and other dietary interventions affect autoimmunity and immunosenescence.

…periodic IF/FMD combines a period of severe restriction sufficiently long to promote the death of a significant portion of damaged cells with a period of high nourishment re-feeding able to promote the opposite effect on growth and other factors leading to multi-system regeneration

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6053098/

Published in final edited form as:
Cell Rep. 2016 June 7; 15(10): 2136–2146. doi:10.1016/j.celrep.2016.05.009.

Diet mimicking fasting promotes regeneration and reduces autoimmunity and multiple sclerosis symptoms

In Young Choi[1,†], **Laura Piccio**[2,†], **Patra Childress**[3], **Bryan Bollman**[2], **Arko Ghosh**[4], **Sebastian Brandhorst**[1], **Jorge Suarez**[1], **Andreas Michalsen**[5], **Anne H. Cross**[2], **Todd E. Morgan**[1], **Min Wei**[1], **Friedemann Paul**[6,7], **Markus Bock**[6,7,*], and **Valter D. Longo**[1,4,8,9,*]

Summary

Dietary interventions have not been effective
show that periodic 3 day cycles of a fasting
demyelination and symptoms in a murine ex
model. The FMD reduced clinical severity i
of the animals. These improvements were as
cell number, reduced levels of pro-inflamma
presenting cells (APCs). Moreover, the FMI
regeneration and remyelination in axons in
supporting its effects on both suppression of
preliminary data suggesting that a FMD or a chronic ketogenic diet are safe, feasible and
potentially effective in the treatment of relapsing remitting multiple sclerosis (RRMS) patients
(NCT01538355).

…associated with increased corticosterone levels and regulatory T (Treg) cell numbers and reduced levels of pro-inflammatory cytokines, TH1 and TH17 cells, and antigen-presenting cells (APCs)… **We also report preliminary data suggesting that an FMD or a chronic ketogenic diet are safe, feasible, and potentially effective in the treatment of relapsing-remitting multiple sclerosis (RRMS) patients**

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4899145/

Dietary recommendations

Summary of dietary Recommendations

Emphasis on:

- Fiber-dense foods and lower carbohydrate diet
- Anti-inflammatory fats (some)
- Apoptogenic and antioxidant properties of micronutrients an phytonutrients

Paleo

- Might be due to reduced carbohydrates, avoidance of processed foods, and possibly avoidance of lectin and phytic acid in grains and legumes.

Keto and Intermittent Fasting

- Benefit may be similar to paleo in addition to that from added anti-inflammatory effect of ketosis state

AIP/Wahls etc..

- Combine some of the above benefits into a protocol

Removal of IgG/IgA and cross-reactive foods (always with goal of safe expansion)

- May contribute to delayed food sensitivities of mast cell reactivity

Elimination diet and careful challenge (gold standard)

- Basic elimination may include gluten, dairy (casein), egg, soy, corn, peanuts, shellfish

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3705319/
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6448398/
https://www.ncbi.nlm.nih.gov/pubmed/23375693

5R Protocol

Remove	Potential triggers, including polypharmacy, pathogenic organisms, food intolerances, sensitivities and allergies, or toxic exposure
Replace	Digestive aid to support improved nutrient absorption and metabolism, including digestive enzymes, or agents that promote improved motility and regular bowel movements
Reinoculate*	Provide an environment where good bacteria can thrive and where bad ones cannot
Repair	Support of the cellular repair process through the above, as well as by providing specific nutritional support for the regeneration of the GI protective barrier
Rebalance	lifestyle factors that influence the gut bacteria such as stress, sleep, exercise and relationships and assure ongoing gut health

**Arguably, reinoculated isn't as simple as "reseeding" but we use the term to simplify*

Mu Q, et al. *Front Immunol*. 2017;8:598.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5440529/

Role of supplements

Useful supplements in allergic disease

Work horses:

- Quercetin
- Vit C
- Vit D3/K2
- Vit A

Anti-inflammatory support (fish oil, selective proresolving mediators, ginger, resveratrol, curcumin, etc…)

Adaptogens (caution in some patients)

GI protocol (antimicrobial herbs, glutamine, etc…)

Probiotics and prebiotics (caution in some patients)

Targeted approach: Consider nutrition evaluation and stool testing to assess assimilation and nutrient utilization

Putting it all together…

FUNCTIONAL MEDICINE MATRIX

Retelling the Patient's Story

Antecedents
Genetics/Family History
C-section
Frequent childhood antibiotic use

Triggering Events
Tick bite
Family stress, traumatic event

Mediators/Perpetuators
Standard American diet (SAD+)
SIBO methane dom
Intestinal permeability
Stress

Physiology and Function: Organizing the Patient's Clinical Imbalances

Assimilation
GI distress/bloating
Constipation.
Positive SIBO
Indication so leaky gut

Structural Integrity
Intestinal permeability
Heat rash

Defense & Repair
Frequent colds
Chemical sensitivity (perfume)
Heat sensitivity

Energy
Fatigue
Poor sleep
Foggy brain

Communication
Cortisol blunted due to chronic steroid use
Fasting Insulin elevated (7)

Transport
Edema (legs)

Biotransformation & Elimination
Constipation
chemical sensitivity

Modifiable Personal Lifestyle Factors

Sleep & Relaxation
Sleep irregular,
Not enough

Exercise & Movement
Exercise induces heat rash

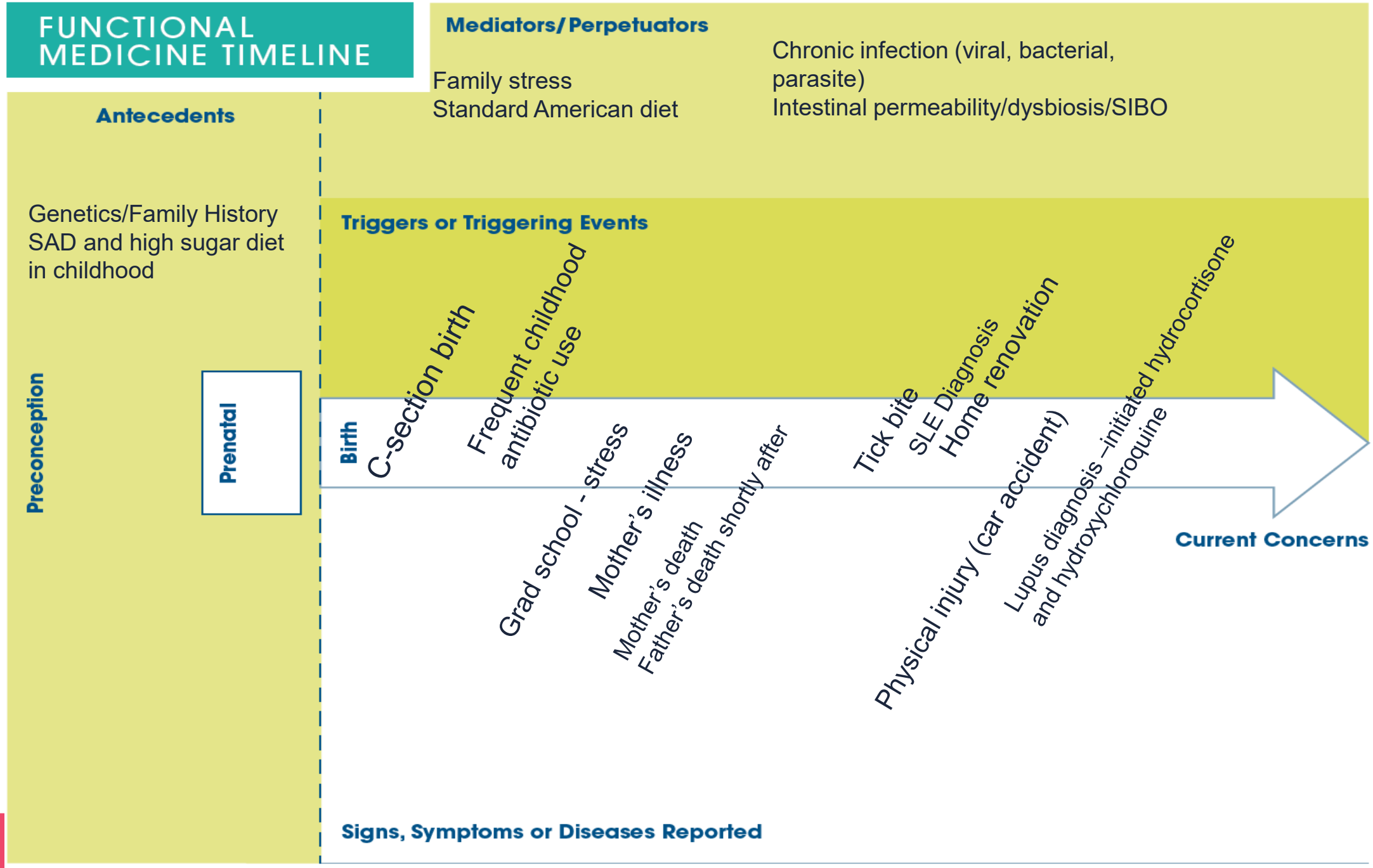
Nutrition
Diet is SAD+

Stress
Amount of stress high, has some good stress management

Relationships
Strong social network
Friends and family

Name: _____ Date: _____

FUNCTIONAL MEDICINE TIMELINE



Name: _____ Date: _____

Autoimmune Assessment: Labs

- **Basic biomarkers:**
  - basic chem, FBS/A1C/Insulin, hsCRP, ANA
  - Compliment, tripson, IgA, IgE total
- **Food and environmental triggers:**
  - Food allergy – IgE
  - Food sensitivity testing IgG/IgA
  - Environmental allergens and cross reactants
- **GI function, inflammation, and dysbiosis**
  - Digestion enzymes, fat and protein absorption,
  - calprotectin, sIgA, EPX
  - SIBO, pathogen overgrowth, low commensal count and diversity
- **Nutrition status (key nutritional markers):**
  - B-vitamins, Mg
  - Oxidative stress markers (Fe, Zn, Vit C)
  - Fat soluble (A, D)
  - Fatty acid profile
- **Hormones**
  - Estrogen
  - Cortisol
- **Genetics SNPs Detoxification**
  - Methylation
  - Detoxification markers (CYP, glutathione, Sulfation, etc…)

Implications of dysbiosis

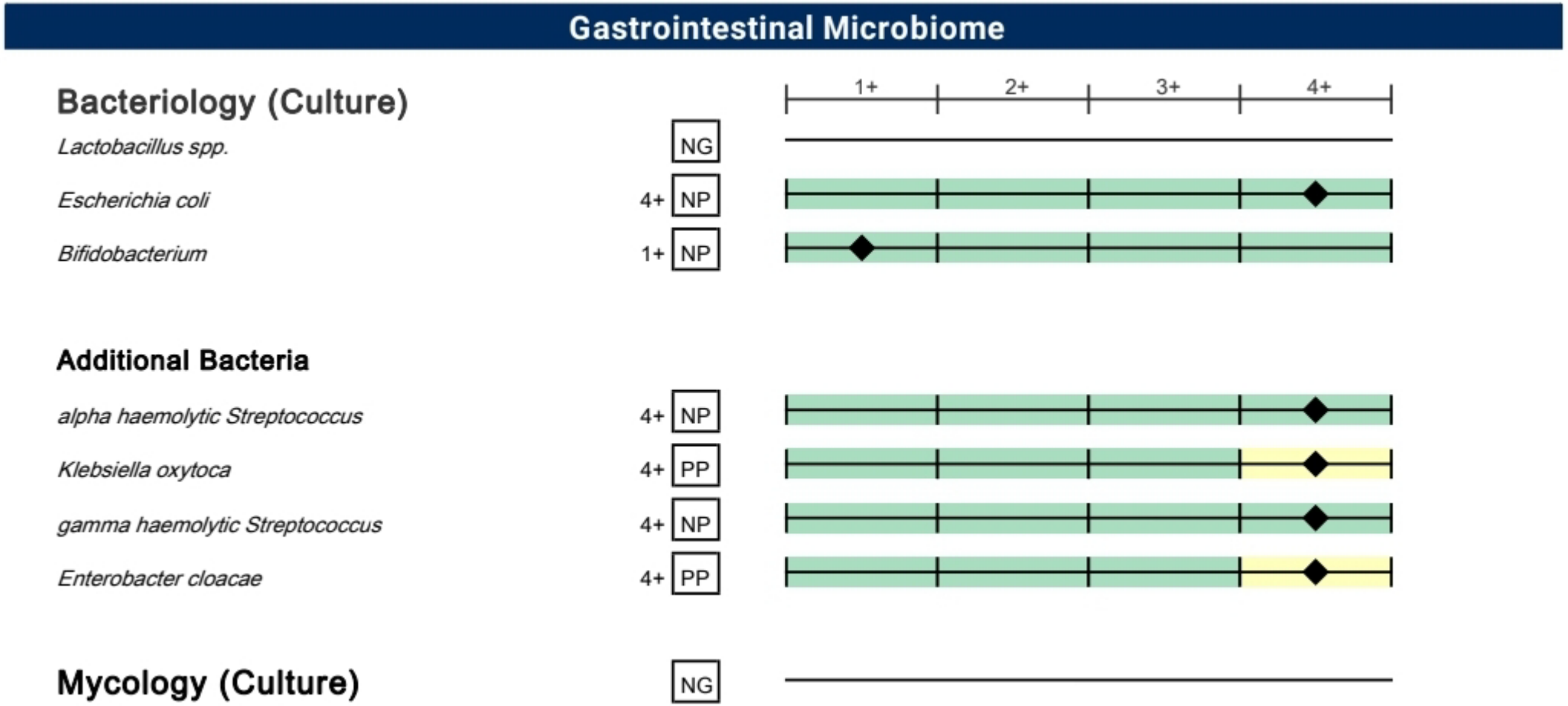
Opportunistic Bacteria			
Additional Dysbiotic/Overgrowth Bacteria	Result		Normal
Bacillus spp.	**6.61e5**	**High**	<1.50e5
Enterococcus faecalis	**<dl**		<1.00e4
Enterococcus faecium	**1.02e4**	**High**	<1.00e4
Morganella spp.	**<dl**		<1.00e3
Pseudomonas spp.	**<dl**		<1.00e4
Pseudomonas aeruginosa	**<dl**		<5.00e2
Staphylococcus spp.	**<dl**		<1.00e4
Staphylococcus aureus	**7.85e2**	**High**	<5.00e2
Streptococcus spp.	**2.02e4**	**High**	<1.00e3
Methanobacteriaceae (family)	**1.14e8**		<5.00e9
Potential Autoimmune Triggers	Result		Normal
Citrobacter spp.	**<dl**		<5.00e6
Citrobacter freundii	**4.69e5**		<5.00e5
Klebsiella spp.	**1.02e6**	**High**	<5.00e3
Klebsiella pneumoniae	**1.66e6**	**High**	<5.00e4
M. avium subsp. paratuberculosis	**<dl**		<5.00e3
Prevotella spp.	**4.57e7**		<1.00e8
Proteus spp.	**<dl**		<5.00e4
Proteus mirabilis	**<dl**		<1.00e3
Fusobacterium spp.	**6.43e5**		<1.00e8

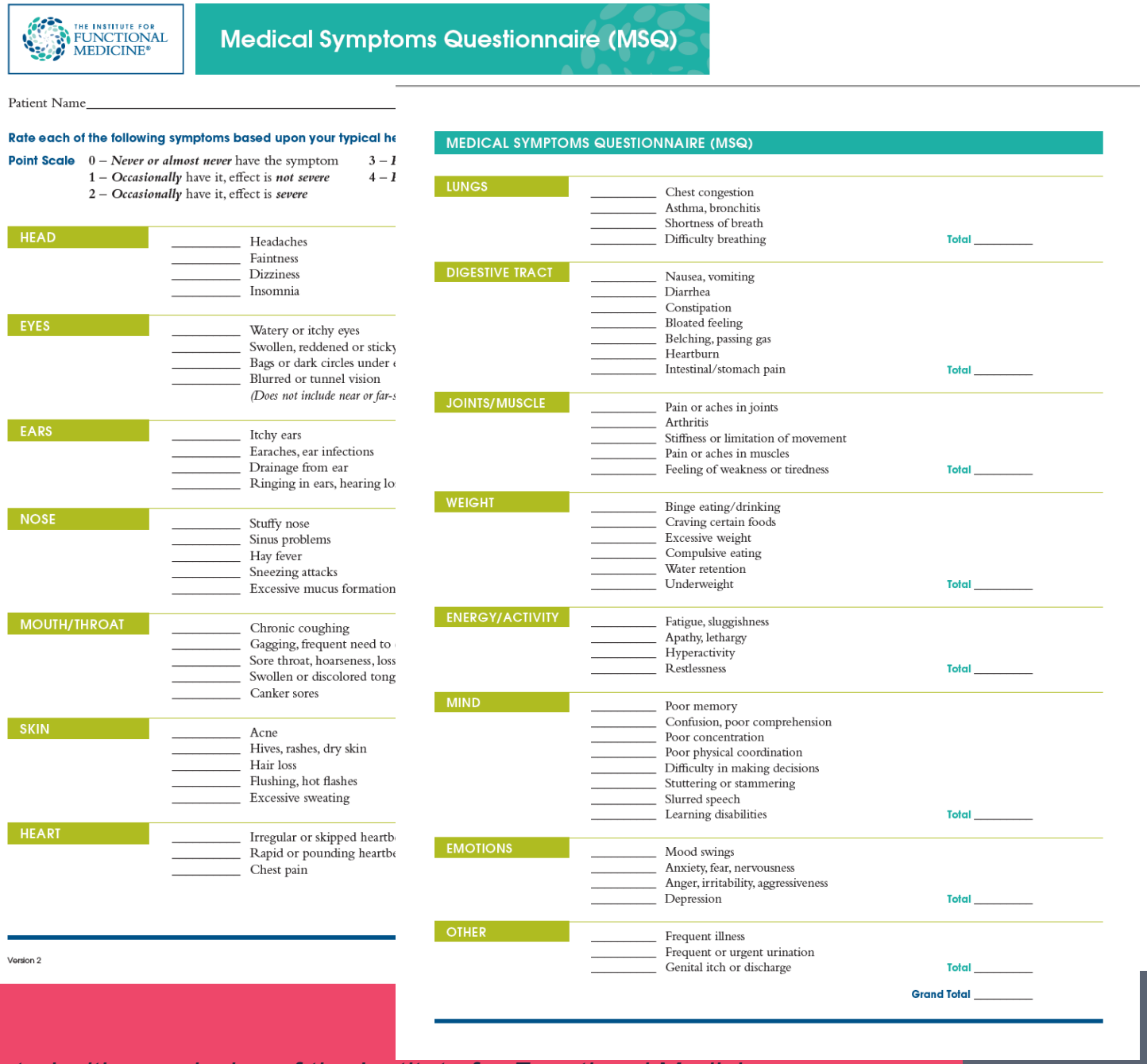
Implications of dysbiosis

Intestinal Health			
Digestion	Result		Normal
Steatocrit	**<dl**		<15 %
Elastase-1	**502**		>200 ug/g
GI Markers	Result		Normal
b-Glucuronidase	**4158**	**High**	<2486 U/mL
Occult Blood - FIT	**0**		<10 ug/g
Immune Response	Result		Normal
Secretory IgA	**2889**	**High**	510 - 2010 ug/g
Anti-gliadin IgA	**101**		0 - 157 U/L
Inflammation	Result		Normal
Calprotectin	**0**		<173 ug/g
Add-on Test	Result		Normal
Zonulin	**208.2**	**High**	<107 ng/g

Implications of dysbiosis

Methodology: Culture/MALDI-TOF MS, Automated and Manual Biochemical Methods, Vitek® 2 System Microbial identification and Antibiotic susceptibility





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Medical Symptoms Questionnaire (MSQ)

Patient Name_____

Rate each of the following symptoms based upon your typical he

Point Scale 0 – *Never or almost never* have the symptom
1 – *Occasionally* have it, effect is *not severe*
2 – *Occasionally* have it, effect is *severe*
3 – *I*
4 – *I*

HEAD
_____ Headaches
_____ Faintness
_____ Dizziness
_____ Insomnia

EYES
_____ Watery or itchy eyes
_____ Swollen, reddened or sticky
_____ Bags or dark circles under
_____ Blurred or tunnel vision
(Does not include near or far-s

EARS
_____ Itchy ears
_____ Earaches, ear infections
_____ Drainage from ear
_____ Ringing in ears, hearing lo

NOSE
_____ Stuffy nose
_____ Sinus problems
_____ Hay fever
_____ Sneezing attacks
_____ Excessive mucus formation

MOUTH/THROAT
_____ Chronic coughing
_____ Gagging, frequent need to
_____ Sore throat, hoarseness, loss
_____ Swollen or discolored tong
_____ Canker sores

SKIN
_____ Acne
_____ Hives, rashes, dry skin
_____ Hair loss
_____ Flushing, hot flashes
_____ Excessive sweating

HEART
_____ Irregular or skipped heartb
_____ Rapid or pounding heartbe
_____ Chest pain

Version 2

MEDICAL SYMPTOMS QUESTIONNAIRE (MSQ)

LUNGS
_____ Chest congestion
_____ Asthma, bronchitis
_____ Shortness of breath
_____ Difficulty breathing
Total _____

DIGESTIVE TRACT
_____ Nausea, vomiting
_____ Diarrhea
_____ Constipation
_____ Bloated feeling
_____ Belching, passing gas
_____ Heartburn
_____ Intestinal/stomach pain
Total _____

JOINTS/MUSCLE
_____ Pain or aches in joints
_____ Arthritis
_____ Stiffness or limitation of movement
_____ Pain or aches in muscles
_____ Feeling of weakness or tiredness
Total _____

WEIGHT
_____ Binge eating/drinking
_____ Craving certain foods
_____ Excessive weight
_____ Compulsive eating
_____ Water retention
_____ Underweight
Total _____

ENERGY/ACTIVITY
_____ Fatigue, sluggishness
_____ Apathy, lethargy
_____ Hyperactivity
_____ Restlessness
Total _____

MIND
_____ Poor memory
_____ Confusion, poor comprehension
_____ Poor concentration
_____ Poor physical coordination
_____ Difficulty in making decisions
_____ Stuttering or stammering
_____ Slurred speech
_____ Learning disabilities
Total _____

EMOTIONS
_____ Mood swings
_____ Anxiety, fear, nervousness
_____ Anger, irritability, aggressiveness
_____ Depression
Total _____

OTHER
_____ Frequent illness
_____ Frequent or urgent urination
_____ Genital itch or discharge
Total _____

Grand Total _____

MSQ

- ✓ Quantifies subjective physical
- ✓ Highlights areas of priority

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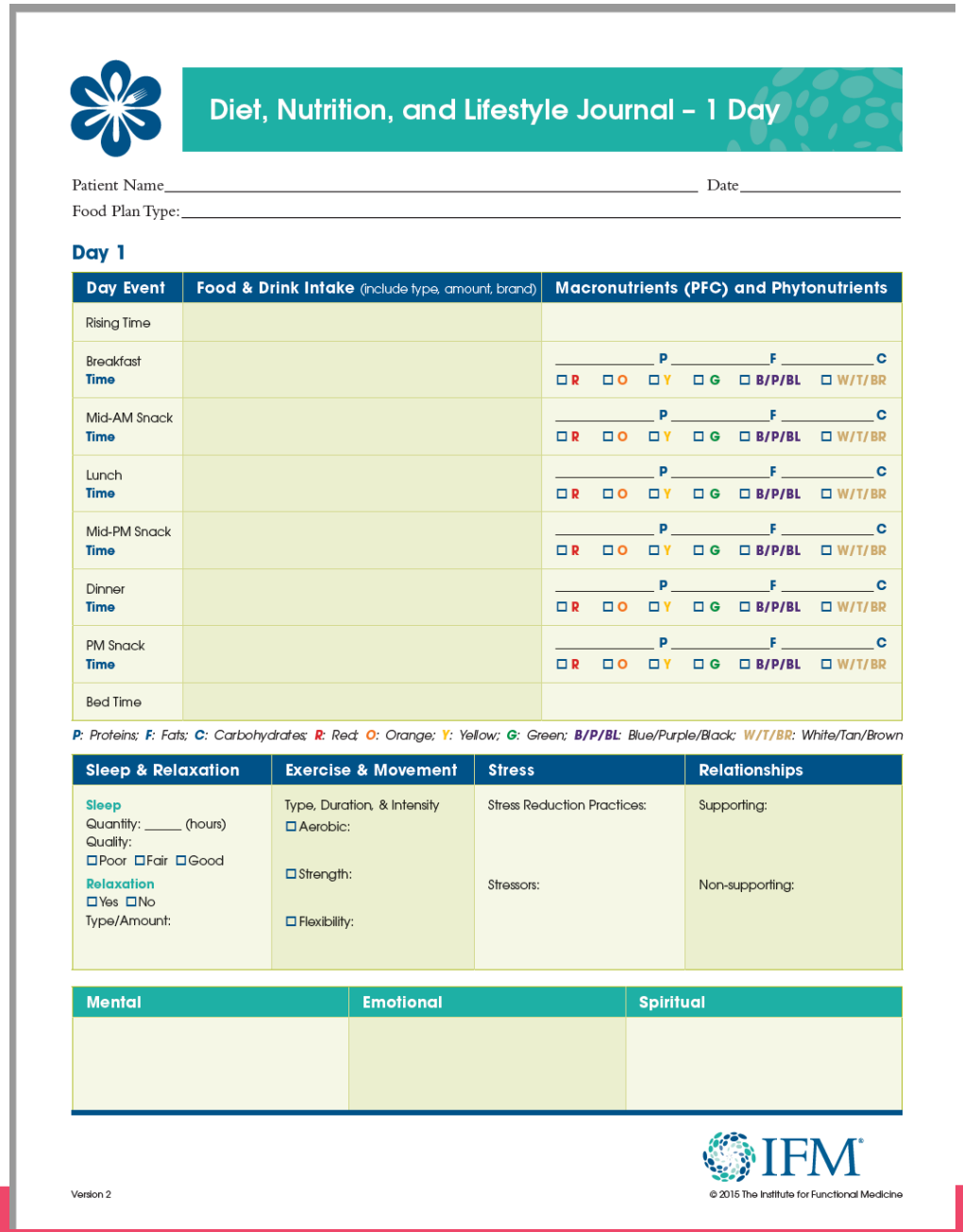
FUNCTIONAL MEDICINE
Continuing Education



Diet, Nutrition, and Lifestyle Journal – 1 Day

Patient Name_____ Date_____

Food Plan Type:_____

Day 1

Day Event	Food & Drink Intake (include type, amount, brand)	Macronutrients (PFC) and Phytonutrients
Rising Time		
Breakfast Time		_____ P _____ F _____ C ☐ R ☐ O ☐ Y ☐ G ☐ B/P/BL ☐ W/T/BR
Mid-AM Snack Time		_____ P _____ F _____ C ☐ R ☐ O ☐ Y ☐ G ☐ B/P/BL ☐ W/T/BR
Lunch Time		_____ P _____ F _____ C ☐ R ☐ O ☐ Y ☐ G ☐ B/P/BL ☐ W/T/BR
Mid-PM Snack Time		_____ P _____ F _____ C ☐ R ☐ O ☐ Y ☐ G ☐ B/P/BL ☐ W/T/BR
Dinner Time		_____ P _____ F _____ C ☐ R ☐ O ☐ Y ☐ G ☐ B/P/BL ☐ W/T/BR
PM Snack Time		_____ P _____ F _____ C ☐ R ☐ O ☐ Y ☐ G ☐ B/P/BL ☐ W/T/BR
Bed Time		

P: Proteins; F: Fats; C: Carbohydrates; R: Red; O: Orange; Y: Yellow; G: Green; B/P/BL: Blue/Purple/Black; W/T/BR: White/Tan/Brown

Sleep & Relaxation	Exercise & Movement	Stress	Relationships
Sleep Quantity: _____ (hours) Quality: ☐ Poor ☐ Fair ☐ Good **Relaxation** ☐ Yes ☐ No Type/Amount:	Type, Duration, & Intensity ☐ Aerobic: ☐ Strength: ☐ Flexibility:	Stress Reduction Practices: Stressors:	Supporting: Non-supporting:

Mental	Emotional	Spiritual

IFM

Version 2

Diet Diary

- ✓ Meal timing
- ✓ Color and variety
- ✓ Track macronutrients (later)
- ✓ Foundational aspects:
  - Sleep & Relaxation
  - Exercise
  - Stress
  - Relationships
  - Mental, emotional and Spiritual factors/practices

Description	Amount	Unit
Oatmeal. Regular or Quick. Dry	1	FDA Serving Size
Raisins. Uncooked	1	miniature box each 1/2
Flax Seeds. Fortified	1	tbsp. whole pieces
Coconut Milk. Plain or Original. Fortified. Unsweetened	4	tbsp
Tap Water	1	cup
Salt	1	dash
Pecans. Raw	1	oz
Green Tea. Brewed. Unsweetened	1	cup
vacuuming. general. moderate effort	10	minutes
Mild stretching	15	minutes
Cantaloupe. Fresh	1	wedge 1/8 of medium
Seaweed. agar. dried	5	g
Arugula. Raw	3	cup. cut pieces
Spinach. Raw	1	cup. cut pieces
Apple. Fresh. With Skin	1	very small 2 1/2" diamet
Carrots. Raw	1	medium 6" to 7" long
Black Olives	6	large
Avocado. Black Skin. California Type	1	Serving (3 slice)
Olive Oil	1	tbsp
Lemon Juice. Fresh	1	wedge juice from one w
Tap Water	2	cup
Dates	1	each
Rice Cake	2	regular 4" diameter
Cashew Butter. Salted	3	tbsp
swimming laps. freestyle. front crawl. slow. light or moderate effort	30	minutes
Soup. Stock. Chicken. Home Prepared	1	cup
Mushrooms. Cooked from Fresh	1	FDA Serving Size
Chicken Breast. Skin Removed Before Cooking	1	medium split
Brown Rice. Cooked in Salted Water	1	FDA Serving Size
Spinach. Cooked from Fresh	1	FDA Serving Size
Tap Water	2	cup
White Wine. Other Types	1	× 1/2 cup
Tap Water	1	cup
Rice Cake	2	regular 4" diameter

Daily Average Nutrition Report 2018 February 17 to 2018 February 24

Calories Summary

1540 kcal CONSUMED

Protein | Fat | Carbs

Activity | Basal Metabolic Rate

1504 kcal BURNED

94% TARGETS | 120% Fiber | 172% Iron | 35% Calcium | 480% VitA | 174% Vit.C | 205% Vit.B12 | 92% Folate

Carbohydrates

Carbs	162.8	g	125%
Fiber	25.2	g	120%
Net Carbs	137.6	g	106%
Starch	61.4	g	No Target
Sugars	56.0	g	No Target

Lipids

Fat	65.5	g	101%
Monounsaturated	28.8	g	No Target
Polyunsaturated	16.7	g	No Target
Omega 3	2.8	g	255%
Omega 6	13.8	g	125%
Saturated	14.0	g	n/a
Trans Fats	0.2	g	0.242 g
Cholesterol	93.9	mg	No Target

Protein

Protein	66.4	g	144%
Cystine	0.9	g	165%
Histidine	1.9	g	234%
Isoleucine	2.8	g	263%
Leucine	4.8	g	202%
Lysine	4.5	g	210%
Methionine	1.5	g	269%
Phenylalanine	2.7	g	289%
Threonine	2.6	g	228%
Tryptophan	0.7	g	264%
Tyrosine	2.1	g	223%
Valine	3.3	g	239%

Vitamins

B1 (Thiamine)	1.2	mg	111%
B2 (Riboflavin)	1.2	mg	113%
B3 (Niacin)	23.7	mg	170%
B5 (Pantothenic Acid)	5.7	mg	114%
B6 (Pyridoxine)	2.4	mg	159%
B12 (Cobalamin)	4.9	µg	205%
Folate	368.0	µg	92%
Vitamin A	11188.8	IU	480%
Vitamin C	130.3	mg	174%
Vitamin D	77.9	IU	13%
Vitamin E	7.5	mg	50%
Vitamin K	211.4	µg	235%

Minerals

Calcium	417.9	mg	35%
Copper	2.3	mg	254%
Iron	13.7	mg	172%
Magnesium	459.3	mg	144%
Manganese	6.6	mg	368%
Phosphorus	1183.1	mg	169%
Potassium	3332.1	mg	71%
Selenium	76.6	µg	139%
Sodium	1463.5	mg	113%
Zinc	12.2	mg	152%

General

Energy	1539.7	kcal	133%
Alcohol	13.6	g	No Target
Caffeine	7.7	mg	No Target
Water	2393.1	g	89%

Nutrient Balances

OMEGA-6 : OMEGA-3

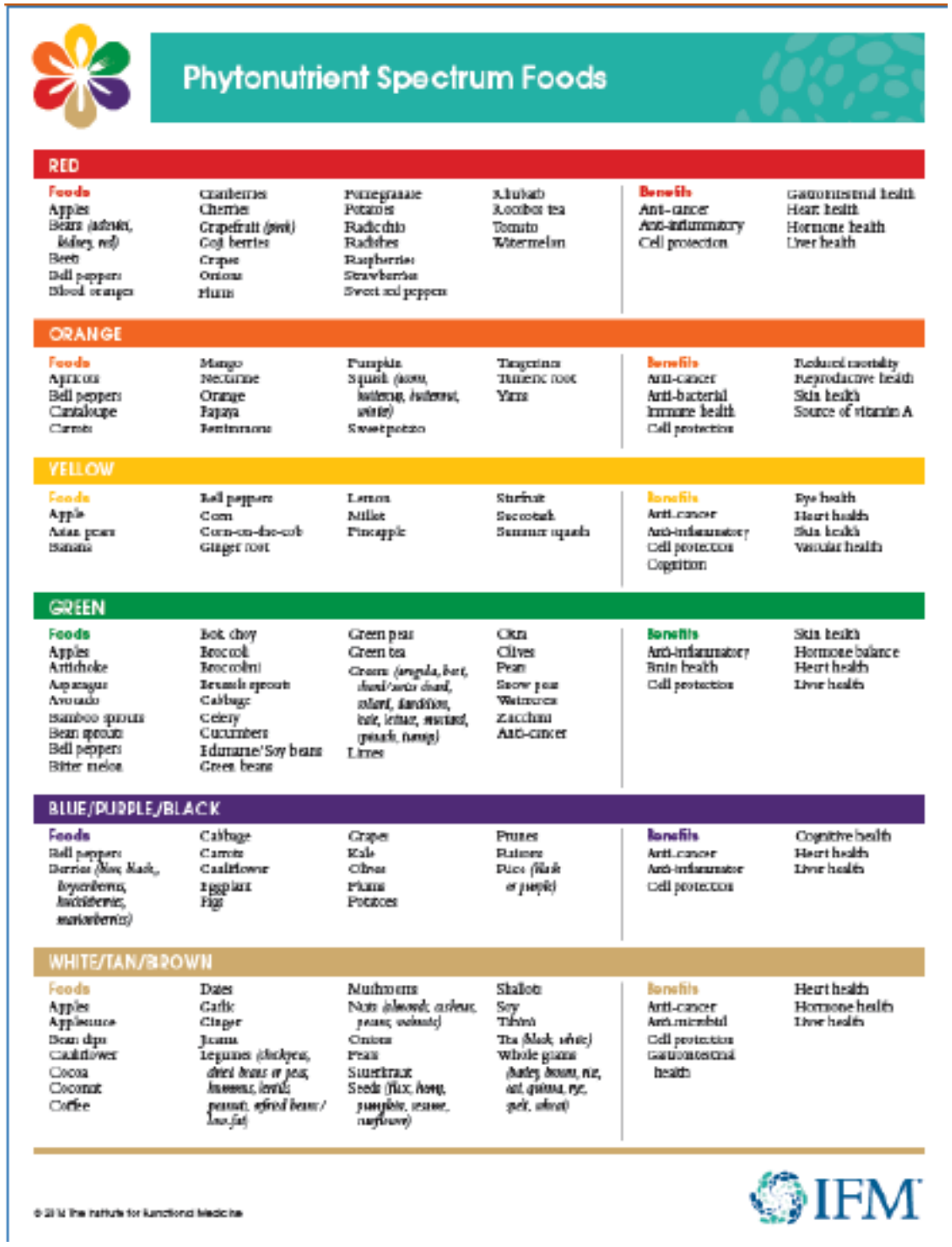
ZINC : COPPER

POTASSIUM : SODIUM

CALCIUM : MAGNESIUM

Reminder: *Eat the Rainbow*

- Color and variety
- 8 or more servings of veggies a day
- High fiber, low glycemic fruits & veggies
- LOTS of water
- Minimize caffeine and alcohol
- Avoid cigarettes
- Exercise
- Meditate



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Elimination Diet Food Plan

PROTEINS — *Proteins*

Servings/day_____

Lean, free-range, grass-fed, organically grown animal protein; non-GMO, organic plant protein; and wild-caught, low-mercury fish preferred.

Animal Proteins:

- ☐ Fish: Halibut, herring,● mackerel, salmon, sardines,● tuna, etc.–*1 oz*
- ☐ Meat: All wild game, buffalo, elk, lamb, venison–*1 oz*
- ☐ Poultry (skinless): Chicken, Cornish hen, turkey–*1 oz*

Plant Protein:

- ☐ Spirulina–*2 T*

Protein Powder:

- ☐ Check label for # grams/scoop (*1 protein serving=7 g*) Hemp, pea, rice

1 serving as listed = 35–75 calories, 5–7 g protein, 3–5 g fat, 0–4 g carbs

Average protein serving is 3–4 oz (size of palm of hand).

Eliminate

Beef/veal, canned meats, cold cuts, eggs, frankfurters, pork, shellfish, whey, soy (miso, natto, tempeh, tofu, textured vegetable protein)

LEGUMES — *Proteins/Carbs*

Servings/day_____

Organic, non-GMO preferred

- ☐ Bean soups–*¾ c*
- ☐ Dried beans, peas, or lentils (cooked)–*½ c*
- ☐ Flour, legume–*¼ c*
- ☐ Green peas (cooked)–*½ c*
- ☐ Hummus or other bean dip–*⅓ c*
- ☐ Refried beans, vegetarian–*½ c*

1 serving = 90–110 calories, 3–7 g protein, 0 fat, 15 g carbs

Eliminate

Soybean products (edamame, miso, soy sauce, tamari, tempeh, tofu, soy milk, soy yogurt, textured vegetable protein)

DAIRY ALTERNATIVES — *Proteins/Carbs*

Servings/day_____

Unsweetened, organic preferred

- ☐ Kefir: Coconut (plain)●▲–*4-6 oz*
- ☐ Milk: Almond, coconut, flaxseed, hazelnut, hemp, rice–*8 oz*
- ☐ Yogurt: Coconut (cultured)●▲–*4-6 oz*

1 serving = 25–90 calories, 1–9 g protein, 1–4 g carbs (nutritional values vary)

Eliminate

Butter, cheese, cottage cheese, cream, frozen yogurt, ice cream, milk, non-dairy creamers, soy milk, yogurt (dairy and soy), whey

NUTS & SEEDS — *Proteins/Fats*

Servings/day_____

Unsweetened, unsalted, organic preferred

- ☐ Almonds–*6*
- ☐ Brazil nuts–*2*
- ☐ Cashews●–*6*
- ☐ Chia seeds–*1 T*
- ☐ Coconut (dried)–*3 T*
- ☐ Flaxseed (ground)–*2 T*
- ☐ Hazelnuts–*5*
- ☐ Hemp seeds–*1 T*
- ☐ Macadamias–*2-3*
- ☐ Nut and seed butters–*½ T*
- ☐ Pecan Halves–*4*
- ☐ Pine nuts–*1 T*
- ☐ Pistachios–*16*
- ☐ Pumpkin seeds–*1 T*
- ☐ Sesame seeds–*1 T*
- ☐ Sunflower seeds●–*1 T*
- ☐ Walnut halves●–*4*

1 serving = 45 calories, 5 g fat

Eliminate

Mixed nuts (with peanuts), peanuts, peanut butter

FATS & OILS — *Fats*

Servings/day_____

Minimally refined, cold-pressed, organic, non-GMO preferred

- ☐ Avocado●–*2 T or ⅛ whole*
- ☐ Coconut milk, regular (canned)–*1½ T*
- ☐ Coconut milk, light (canned)–*3 T*
- ☐ Ghee/clarified butter (grass-fed)–*1 t*
- ☐ Olives:● Black, green, kalamata–*8*
- ☐ Oils, cooking: Avocado, coconut, grapeseed, olive (extra virgin), rice bran, sesame–*1 t*
- ☐ Oils, salad: Almond, avocado, flaxseed, grapeseed, hempseed, olive (extra virgin), pumpkin, safflower (high-oleic), sunflower (high-oleic), sesame, walnut–*1 t*
- ☐ Prepared salad dressing with acceptable oils–*2 T*

1 serving = 45 calories, 5g fat

Eliminate

Butter, corn oil, cottonseed oil, margarine/spreads, mayonnaise, peanut oil, shortening, soybean oil

KEY

● **High Histamine** ■ **Nightshades** ▲ **Fermented Foods**

Notes: *Nutritional amounts are based on average values for the variety of foods within each food category.*

Dietary prescription is subject to the discretion of the health practitioner.

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Eliminates:

- Gluten
- Dairy
- Eggs
- Soy
- Peanuts
- Shellfish
- Pork

Considerations:

- Paleo, Wahl's
- Low carbohydrate/higher fat
- Intermittent Fasting or FMD
- Nightshades
- Histamine
- Fermented foods*
- Food sensitivity testing

**Stomach pain or bloating after eating certain high-fiber food might be a symptom of bacterial overgrowth*

VEGETABLES Non-starchy — Carbs

Servings/day_____

- ☐ Artichoke
- ☐ Arugula
- ☐ Asparagus
- ☐ Bamboo shoots
- ☐ Beets (cubed)
- ☐ Bok choy
- ☐ Broccoflower
- ☐ Broccoli
- ☐ Brussels sprouts
- ☐ Cabbage
- ☐ Carrots
- ☐ Cauliflower
- ☐ Celeriac root
- ☐ Celery
- ☐ Chard/Swiss chard
- ☐ Chervil
- ☐ Chives
- ☐ Cilantro
- ☐ Cucumbers
- ☐ Daikon radishes
- ☐ Eggplant●■
- ☐ Endive
- ☐ Escarole
- ☐ Fennel
- ☐ Fermented vegetables:●▲ Kimchi, pickles, sauerkraut, etc.
- ☐ Garlic
- ☐ Green beans
- ☐ Greens: Beet, collard, dandelion, kale, mustard, turnip, etc.
- ☐ Horseradish
- ☐ Jicama
- ☐ Kohlrabi
- ☐ Leeks
- ☐ Lettuce, all
- ☐ Microgreens
- ☐ Mushrooms●
- ☐ Okra
- ☐ Onions
- ☐ Parsley
- ☐ Peppers, all■
- ☐ Radicchio
- ☐ Radishes
- ☐ Salsa●■
- ☐ Sea vegetables
- ☐ Scallions
- ☐ Shallots
- ☐ Snap peas/snow peas
- ☐ Spinach●
- ☐ Sprouts, all
- ☐ Squash: Delicata, pumpkin,● spaghetti, yellow, zucchini, etc.
- ☐ Tomato●■
- ☐ Tomato juice●■–*¾ c*
- ☐ Turnips
- ☐ Vegetable juice–*¾ c*
- ☐ Water chestnuts
- ☐ Watercress

1 serving = ½ c, 1 c raw greens = 25 calories, 5 g carbs

VEGETABLES Starchy — Carbs

Servings/day_____

- ☐ Acorn squash (cubed)–*1 c*
- ☐ Butternut squash (cubed)–*1 c*
- ☐ Plantain–*⅓ c or ½ whole*
- ☐ Potato: Purple, red, sweet, white, yellow–*½ med*
- ☐ Potatoes (mashed, made with non-dairy milk)–*½ c*
- ☐ Root vegetables: Parsnip, rutabaga–*½ c*
- ☐ Yam–*½ med*

1 serving = 80 calories, 15 g carbs

Eliminate

Corn, Potato (if avoiding nightshades)

FRUITS — Carbs

Servings/day_____

Unsweetened, no sugar added

- ☐ Apple–*1 sm*
- ☐ Applesauce–*½ c*
- ☐ Apricots–*4*
- ☐ Banana–*½ med*
- ☐ Blackberries–*¾ c*
- ☐ Blueberries–*¾ c*
- ☐ Dried fruit● (no sulfites)–*2 T*
- ☐ Figs–*3*
- ☐ Grapes–*15*
- ☐ Grapefruit–*½ med*
- ☐ Juices (diluted)–*½ c*
- ☐ Kiwi–*1 med*
- ☐ Kumquats–*4*
- ☐ Lemon–*1*
- ☐ Lime–*1*
- ☐ Melon, all–*1 c*
- ☐ Mango–*½ sm*
- ☐ Nectarine–*1 sm*
- ☐ Orange–*1 med*
- ☐ Papaya–*1 c*
- ☐ Peach–*1 sm*
- ☐ Pear–*1 sm*
- ☐ Persimmon–*½*
- ☐ Pineapple–*¾ c*
- ☐ Plums–*2 sm*
- ☐ Pomegranate seeds –*½ c*
- ☐ Prunes–*3 med*
- ☐ Raisins–*2 T*
- ☐ Raspberries●–*1 c*
- ☐ Tangerines–*2 sm*

1 serving = 60 calories, 15 g carbs

Eliminate

Citrus fruits (if directed by your healthcare provider)

Organic, non-GMO fruits, vegetables, herbs and spices preferred

GLUTEN-FREE GRAINS — Carbs

Servings/day_____

Unsweetened, sprouted, organic preferred

- ☐ Amaranth–*¾ c*
- ☐ Brown rice cakes–*2*
- ☐ Buckwheat/ kasha–*½ c*
- ☐ Crackers: (nut, seed, rice)–*3-4*
- ☐ Flours for baking: Arrowroot, sorghum, tapioca–*3 T*
- ☐ Millet–*½ c*
- ☐ Oats: Rolled, steel-cut–*½ c*
- ☐ Quinoa–*½ c*
- ☐ Rice–*⅓ c*
- ☐ Teff–*¾ c*

All grain servings are for cooked amounts.

1 serving = 75-110 calories, 15 g carbs

Eliminate

Barley, corn, emmer, farro, kamut, rye, spelt, triticale, wheat

BEVERAGES, SPICES & CONDIMENTS

Unsweetened, no sugar added

- ☐ Filtered water
- ☐ Sparkling/mineral water
- ☐ Unsweetened coconut water
- ☐ Green tea
- ☐ Fresh juiced fruits/ vegetables
- ☐ Herbs and Spices, all
- ☐ Condiments: Mustard,● vinegars●▲ *–use sparingly, suggest 1 T or less per serving*

KEY

● High Histamine ■ Nightshades ▲ Fermented Foods

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Gut restoration:

First step: Diet

Herbals & Supplements:

- Turmeric, ginger, resveratrol
- Vitamins (D,A, C, B's)
- Minerals (Mg, Zn,Se, etc)
- Quercitin
- Boswellia
- Digestive enzymes & Betaine HCL
  - Swedish bitters, ACV
- L-glutamine
  - Bone broth & collagen
- Marshmallow, slippery elm, aloe, DGL
- Butyric acid & other prebiotic fibers (Arabigalactan, pectin, etc)
- Probiotics

ReNew Food Plan

PROTEINS — *Proteins*

Servings/day_____

Lean, free-range, grass-fed, organically grown animal protein; non-GMO, organic plant protein; and wild-caught, low-mercury fish preferred.

Animal Protein:

- ☐ Egg●–*1*
- ☐ Fish: Anchovies,● cod, flounder/sole, herring,● halibut, salmon, sardines,● trout, etc.–*1 oz*
- ☐ Meat: Beef, buffalo, elk, lamb, venison, ostrich, etc.–*1 oz*
- ☐ Poultry (skinless): Chicken, Cornish hen, duck, pheasant, turkey, etc.–*1 oz*

Plant Protein:

- ☐ Black soybeans●–*¼ c*
- ☐ Edamame●–*¼ c*
- ☐ Hemp tofu–*1½ oz*
- ☐ Mung bean/ Edamame pasta●–*½ oz*
- ☐ Natto●▲–*1 oz*
- ☐ Spirulina–*2 T*
- ☐ Tofu (firm/extra firm)●–*1½-2 oz*
- ☐ Tofu (soft/silken)●–*3 oz*
- ☐ Tempeh●▲–*1 oz*

Protein Powder:

- ☐ Check label for # grams/scoop *(1 protein serving = 7g protein)* Bovine collagen, egg,● hemp, pea

1 serving as listed = 35–75 calories, 5–7 g protein, 3–5 g fat, 0–4 g carbs

Average protein serving is 3–4 oz (size of palm of hand).

DAIRY ALTERNATIVES — *Proteins/Carbs*

Servings/day_____

Unsweetened, organic preferred

- ☐ Yogurt: Coconut (plain)●▲–*4-6 oz*
- ☐ Kefir: Coconut (plain)●▲–*4-6 oz*
- ☐ Nut/seed milk: Almond, cashew,● coconut, flaxseed, hazelnut, hemp–*8 oz*

1 serving = 25–90 calories, 1–9 g protein, 1–4 g carbs (nutritional values vary)

NO DAIRY ALLOWED

NUTS & SEEDS — *Proteins/Fats*

Servings/day_____

Unsweetened, unsalted, organic preferred

- ☐ Almonds–*6*
- ☐ Brazil nuts–*2*
- ☐ Cashews●–*6*
- ☐ Chia seeds–*1 T*
- ☐ Coconut (dried)–*3 T*
- ☐ Coconut wraps (raw, vegan)–*1 wrap*
- ☐ Flaxseed (ground)–*2 T*
- ☐ Hazelnuts–*5*
- ☐ Hemp seeds–*1*
- ☐ Macadamias–*2-3*
- ☐ Nut and seed butters: Almond, cashew,● macadamia, pecan, sunflower,● tahini, walnut●–*½ T*
- ☐ Pecan halves–*4*
- ☐ Pine nuts–*1 T*
- ☐ Pistachios–*16*
- ☐ Pumpkin seeds–*1 T*
- ☐ Sesame seeds–*1 T*
- ☐ Sunflower seeds●–*1 T*
- ☐ Walnut halves●–*4*

1 serving = 45 calories, 5 g fat

FATS & OILS — *Fats*

Servings/day_____

Minimally refined, cold pressed, organic, non-GMO preferred

- ☐ Avocado●–*2 T or ⅛ whole*
- ☐ Coconut butter (raw)–*1 t*
- ☐ Coconut milk, regular (BPA-free canned or boxed)–*1½ T*
- ☐ Ghee/clarified butter (grass-fed)–*1 t*
- ☐ Oils, cooking: Avocado, coconut, ghee/clarified butter, olive (extra virgin), sesame–*1 t*
- ☐ Oils, salad: Almond, avocado, flaxseed, hempseed, olive oil (extra virgin), sesame, walnut–*1 t*
- ☐ Olives:● Black, green, kalamata–*8*
- ☐ Pesto (olive oil)–*1 t*

1 serving = 45 calories, 5 g fat

KEY

● High Histamine ■ Nightshades ▲ Fermented Foods

Notes: *Nutritional amounts are based on average values for the variety of foods within each food category.*

Dietary prescription is subject to the discretion of the health practitioner.

NO LEGUMES (Except those specifically listed) and NO GRAINS (Bread, pasta, cereal, oats, etc.)

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Version 4

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Paleo (lectins)

- With vegetarian option (soy*)

Eliminates:

- Gluten
- Dairy
- Peanuts
- Shellfish
- Pork

**Soy can be problematic in certain individuals, so this might take a deeper conversation about their choice to be vegetarian – always approached with respect for their autonomy balanced with informed decision making.*

VEGETABLES Non-starchy — Carbs

Servings/day_____

Brassicales (i.e. Cruciferous)
- ☐ Arugula
- ☐ Broccoflower
- ☐ Broccoli
- ☐ Broccoli sprouts
- ☐ Brussels sprouts
- ☐ Cabbage
- ☐ Cauliflower
- ☐ Horseradish
- ☐ Kohlrabi
- ☐ Radishes

Detoxifying Leafy Greens
- ☐ Bok choy
- ☐ Chard/Swiss chard
- ☐ Chervil
- ☐ Cilantro
- ☐ Endive
- ☐ Escarole
- ☐ Greens: Beet, collard, dandelion, kale, mustard, turnip, etc.
- ☐ Microgreens
- ☐ Parsley
- ☐ Radicchio

Thiols
- ☐ Chives
- ☐ Daikon radishes
- ☐ Garlic
- ☐ Leeks
- ☐ Onion
- ☐ Scallions
- ☐ Shallots

Liver & Kidney Support
- ☐ Artichokes
- ☐ Asparagus
- ☐ Celery
- ☐ Sprouts, all

Other Non-Starchy Vegetables
- ☐ Bamboo shoots
- ☐ Bean sprouts
- ☐ Beets (not canned)
- ☐ Carrots
- ☐ Cucumbers
- ☐ Eggplant ● ■
- ☐ Fennel
- ☐ Green beans
- ☐ Jicama
- ☐ Kimchi ● ▲
- ☐ Lettuce, all
- ☐ Mushrooms ●
- ☐ Okra
- ☐ Peppers, all ■
- ☐ Salsa ● ■
- ☐ Sauerkraut ● ▲
- ☐ Sea vegetables
- ☐ Shirataki noodles
- ☐ Snap peas/snow peas
- ☐ Spinach ●
- ☐ Squash: Delicata, pumpkin, ● spaghetti, yellow, zucchini, etc.
- ☐ Tomato ● ■
- ☐ Turnip
- ☐ Watercress

1 serving = ½ c, 1 c raw greens = 25 calories, 5 g carbs

NO STARCHY VEGETABLES (root vegetables)

Organic, non-GMO fruits, vegetables, herbs and spices preferred

FRUITS — Carbs

Servings/day_____

Unsweetened, no sugar added
- ☐ Blackberries–¾ *c*
- ☐ Blueberries–¾ *c*
- ☐ Cherries ●–*12*
- ☐ Cranberries ●–¾ *c*
- ☐ Kiwi–*1 med*
- ☐ Pomegranate seeds–½ *c*
- ☐ Raspberries ●–*1 c*
- ☐ Strawberries ●–*1¼ c*

1 serving = 60 calories, 15 g carbs

NO OTHER FRUITS ALLOWED

HERBS & SPICES
- ☐ Basil
- ☐ Bay leaf
- ☐ Black pepper
- ☐ Cayenne pepper ● ■
- ☐ Chili powder ● ■
- ☐ Cilantro
- ☐ Cinnamon ●
- ☐ Cloves ●
- ☐ Cacao powder ● (100% raw)
- ☐ Coriander seed
- ☐ Cumin
- ☐ Curry powder ● ■
- ☐ Dill
- ☐ Fenugreek
- ☐ Garlic powder
- ☐ Ginger
- ☐ Himalayan salt
- ☐ Nutmeg ●
- ☐ Onion powder
- ☐ Oregano
- ☐ Parsley
- ☐ Paprika ● ■
- ☐ Pumpkin spice
- ☐ Red curry paste ■
- ☐ Rosemary
- ☐ Sage
- ☐ Sea salt
- ☐ Thyme
- ☐ Turmeric
- ☐ Vanilla bean (whole)

BEVERAGES

Unsweetened, no sugar added
- ☐ Broth (organic): Bone, ● meat, ● vegetable
- ☐ Coconut water kefir ● ▲
- ☐ Filtered water
- ☐ Seltzer water
- ☐ Tea: ● Green, herbal
- ☐ Vegetable juice (fresh, raw, cold pressed)

NO COFFEE, ALCOHOL, CAFFEINE, SODA

CONDIMENTS
- ☐ Coconut aminos ● ▲
- ☐ Lemon/lime juice (fresh) ●
- ☐ Miso ● ▲
- ☐ Mustard: ● Dijon, stone ground
- ☐ Tamari ● ▲
- ☐ Vinegars: ● ▲ Apple cider, balsamic, white, etc.

Use sparingly, suggest 1 T or less per serving.

NO SUGARS, NATURAL SWEETENERS, OR ARTIFICIAL SWEETENERS, INCLUDING (BUT IS NOT LIMITED TO) ASPARTAME, SPLENDA, STEVIA, AND SUGAR ALCOHOLS.

KEY
● High Histamine ■ Nightshades ▲ Fermented Foods

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Considerations:
- Low carbohydrate/higher fat
- Ketogenic, remove egg and soy
- Intermittent Fasting or FMD
- Nightshades
- Histamine
- Fermented foods*
- Food sensitivity testing

Key Take Aways

1. **Remember the T in ATMs.** In a SYSTems-Based approach, when we think of autoimmunity, we want to consider the underlying triggers within the context of the *perfect storm* : Bugs, environment, food, stress/trauma

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1. **Remember the T in ATMs.** In a SYSTems-Based approach, when we think of autoimmunity, we want to consider the underlying triggers within the context of the *perfect storm*: Bugs, environment, food, stress/trauma
2. **When in doubt, start with the gut**. Autoimmune disease exists on a spectrum with interplay of GI dysfunction and immune dysregulation, with symptoms developing/manifesting as a consequence of dysbiosis, intestinal permeability, and issues with nutrient absorption and digestion.

Key Take Aways

1. **Remember the T in ATMs.** In a SYSTems-Based approach, when we think of autoimmunity, we want to consider the underlying triggers within the context of the *perfect storm*: Bugs, environment, food, stress/trauma
2. **When in doubt, start with the gut**. Autoimmune disease exists on a spectrum with interplay of GI dysfunction and immune dysregulation, with symptoms developing/manifesting as a consequence of dysbiosis, intestinal permeability, and issues with nutrient absorption and digestion.
3. **Food as Medicine**. Diet and lifestyle factors are an essential foundation for mitigating autoimmune disease and putting our patients in remission.

Today's Agenda

1. Describe the pathophysiological pathways that lead to allergic and autoimmune disease
2. Examine complex interaction of immune disease as it relates to GI integrity
3. Identify appropriate dietary modifications for patients with immune disorders.

How did we do?

lara zakaria

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Questions