Nutrition, Lifestyle, Supplements That Support People Diagnosed with MS

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Top things that always come up:

- What am I supposed to eat?
- No dairy, no gluten, right?
- Can I have coffee and alcohol?
- What foods and supplements are best?
- Is lifestyle really important?

The information in this presentation is presented for educational purposes only. It is not intended as a substitute for the diagnosis, treatment, or advice of a qualified, licensed medical professional. The facts presented are offered as information only, not medical advice, and in no way should anyone infer that we are practicing medicine. Seek the advice of a medical professional for proper application of this material to any specific situation.

We recommend that you do your own independent research before acting on anything.

"Medical school does not teach nutrition… "

- Dr. Darrell Wolfe, AC. PH. D

It can take time to introduce new flavours and textures to your weekly menu, changing your taste bud's food preference takes time… don't like kale? No problems, substitute spinach instead. No dairy? Mash an avocado for the creamy texture… Healthy food for some is a struggle! But we hope this work-book helps!

We LOVE what we do and want to make sure you gain the most you possibly can from this session so feel free to ask as many questions as you like or need. We also want to make this the best possible so welcome any feedback.

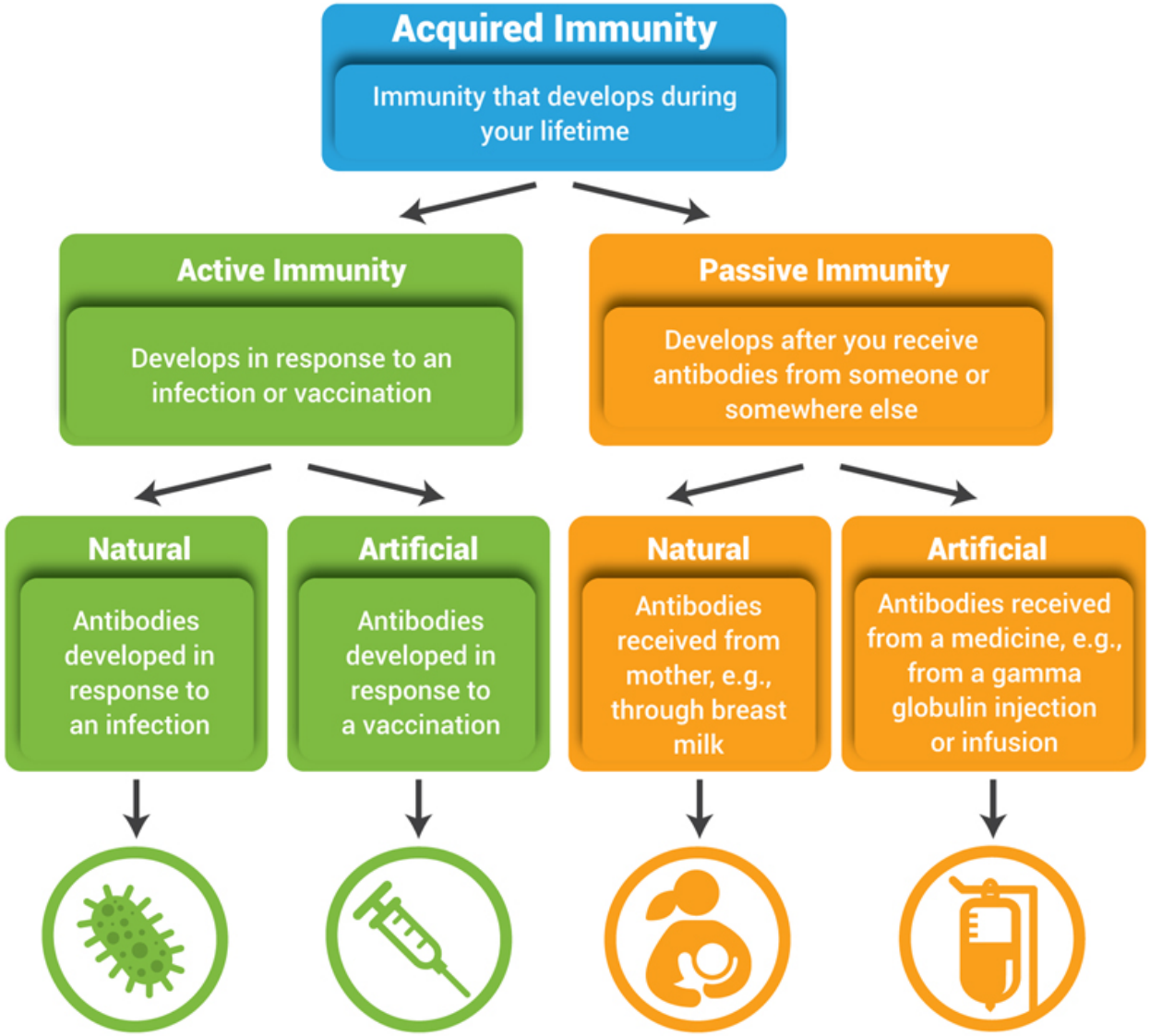
This workshop is based around food and nutrients… we wish we had more time to talk about detoxification, how important it is… Mindfulness and medication, exercise, laughter, spirituality, purpose and a solid support system. Psychoneuro-immunology (how your body reacts to whats going on in your mind). And SO much more.

Welcome!

The Boyd Clinic Team xx

To understand autoimmunity it's also important to understand **acquired immunity**.

However, in autoimmunity the immune system may have a misdirected response in which it responds in an aggressive manner to its own tissue.



Diets over the decades...

Dr Swank ~ 1940's
- Decrease fat to <15 gm sat fat daily
- Decrease red meat and oily fish, increase white fish
- High drop-outs, no benefits shown

George Jelinek's overcoming MS (OMS) dev 1999
- Similar to Swanks. But combo of lifestyle as well as dietary modifications:
- omega 3 fish oil or flaxseed + vitamin D

The Best Bet Diet
- No dairy, legumes, gluten, refined sugar, eggs or yeast.

Wahls protocol 2000 - nutrient-rich paleo diet high in vitamins, minerals, antioxidants, and essential fatty acids helped reduced her symptoms and out of a wheelchair.
FASTING!!!

AIP Diet - Autoimmune Paleo Diet
- No dairy, legumes, nuts and seeds, eggs - anything immune stimulating that removes all gut-irritating foods. The diet is meant to be used in conjunction with a healing protocol of herbs and supplements. With the purpose of reintroducing foods slowly.

Dr Swank ~ 1940's

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The Best Bet Diet

- No dairy, legumes, gluten, refined sugar, eggs or yeast.

Wahls protocol 2000 - nutrient-rich paleo diet high in vitamins, minerals, antioxidants, and essential fatty acids

- Improve energy

Generally if someone follows any of these it will be an improvement (generally) vs. previous diet.

Mediterranean - has most research

Johns Hopkins - studying ketogenic diet

Harvard - studying carnivore

Valter Longo - Fasting

Nutrition is the KEY

Medical school does not teach nutritional therapy and nutrigenomics = 15 hours max of the most basic information.

We cannot expect them to know everything!

Follow an anti-inflammatory diet that's:

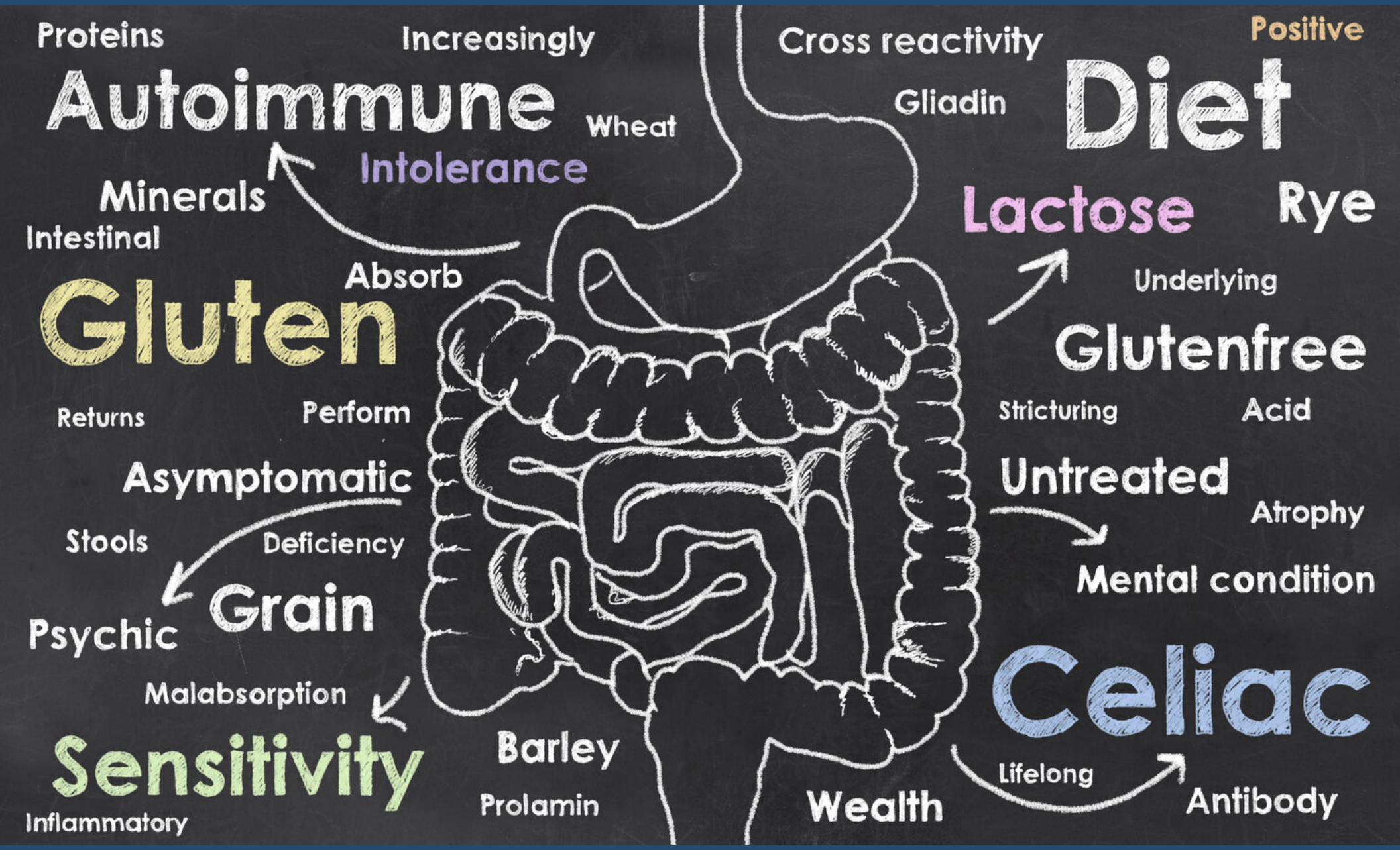
- high in nutrient-dense fruits and vegetables
- REAL FOOD - grown from under and on top the soil's surface
- low in fats (processed to be solid) - **up for debate!**
- keeps red meat to a minimum * - **up for debate!**
- low in grain and dairy (gluten and casein)

Autoimmune diseases involve inflammation, many theories on the potential positive effects diet may have on the disease are based in decreasing inflammation in the body and improving neuronal health.

7 FACTORS THAT CAUSE INFLAMMATION

- Eating Inflammatory Foods
- Blood Sugar Imbalances
- Leaky Gut Syndrome
- Chronic Stress
- Poor Sleep Habits
- Environmental Toxins
- Chronic Infections

Just to name a few …


Proteins
Increasingly
Cross reactivity
Positive
Autoimmune
Gliadin
Diet
Wheat
Intolerance
Minerals
Lactose
Rye
Intestinal
Absorb
Underlying
Gluten
Glutenfree
Returns
Perform
Stricturing
Acid
Asymptomatic
Untreated
Atrophy
Stools
Deficiency
Mental condition
Grain
Psychic
Celiac
Malabsorption
Sensitivity
Barley
Lifelong
Prolamin
Wealth
Antibody
Inflammatory

One of the mechanisms that can lead to this misdirected immune response is **cellular mimicry**, which is when the immune system flags both a pathogen and an innocent tissue in the body as one in the same and tries to destroy both.

You may have heard that if you deal with MS, it is wise to keep gluten, and perhaps even dairy, out of your diet. This can be a hard pill to swallow for those of us who consider bread, milk, and cheese staples in our diets.

Gluten is a protein in various grains, including wheat, barley, and rye.

Gluten contains a protein called gliadin, and the molecular structure of gliadin is very similar to transglutaminase - an enzyme that present throughout the body to make chemical bonds.

This enzyme is abundant both in the intestines and in the thyroid, as we as the brain. If you have MS, your body is producing antibodies that attack transglutaminase in the myelin sheath.

doi: 10.1212/NXI.0000000000000998

Neurology® Neuroimmunology & Neuroinflammation | AMERICAN ACADEMY OF NEUROLOGY®

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doi: 10.1212/NXI.0000000000000998

PMCID: PMC8105890 | PMID: 33906937

Tissue Transglutaminase Expression Associates With Progression of Multiple Sclerosis

Claudia Sestito, PhD, Cyra E. Leurs, MD, PhD,* Martijn D. Steenwijk, PhD,* John J.P. Brevé,

PBMC-derived TG2 mRNA levels were significantly associated with disease progression, i.e., worsening of the EDSS over 2 years of follow-up, normalized brain volume, and normalized gray and white matter volume in the total MS patient group at baseline. Of these, in patients with relapsing-remitting MS, TG2 expression was significantly associated with worsening of the EDSS scores over 2 years of follow-up. In the patients with primary progressive (PP) MS, TG2 mRNA levels were significantly associated with EDSS, normalized brain volume, and normalized gray and white matter volume at baseline. In addition, TG2 mRNA associated with T1 hypointense lesion volume in the patients with PP MS at baseline.

Wheat and dairy products could play a huge role in MS disease progression.

Going gluten free in non-celiac autoimmune diseases: the missing ingredient. Expert Review of Clinical Immunology. Volume 14, 2018 - Issue 11
Trends in gluten research and its relationship to autoimmune and allergic diseases. Edward J.Ciaccio, GovindBhagat, Suzanne K.Lewis, Peter H.Green. Informatics in Medicine Unlocked. , 2016, Pages 7-14
L.M. Sollid. Coeliac disease: dissecting a complex inflammatory disorder. Nat Rev Immunol, 2 (2002), pp. 647-655
The immune recognition of gluten in coeliac disease. R. Ciccocioppo, A. Di Sabatino, G.R. Corazza. Clin Exp Immunol, 140 (2005), pp. 408-416

- Increases human intestinal permeability (G)

- Inflammatory, oxidative (G + D).

More immunogenic (G + D).

Going glute
Trends in gluten research and its relationship to autoimmune and allergic diseases. Edward J.Ciaccio, GovindBhagat, Suzanne K.Lewis, Peter H.Green. Informatics in Medicine Unlocked. , 2016, Pages 7-14
L.M. Sollid. Coeliac disease: dissecting a complex inflammatory disorder. Nat Rev Immunol, 2 (2002), pp. 647-655
The immune recognition of gluten in coeliac disease. R. Ciccocioppo, A. Di Sabatino, G.R. Corazza. Clin Exp Immunol, 140 (2005), pp. 408-416

Is The Carnivore Diet DANGEROUS?

There is little scientific evidence that proves that an all meat diet is bad for you* or detrimental to your health. On the flip side there is not a lot of evidence that an all meat diet is healthy, or ideal for human consumption*.

One thing that is known is that human beings have ***survived and thrived*** on a ***multitude of diets*** around the globe. There are tribes of people such as the *Inuit*, The Maasai, or The Sami* who consumed mostly animal products due to their extreme climates.

When people say the Harvard Carnivore Diet Study, they're referring to a piece of research titled: Behavioral Characteristics and Self-Reported Health Status among 2029 Adults Consuming a "Carnivore Diet"

This study involved 2029 participants aged 18 or over, who consumed a carnivore diet for more than 6 months. The objective of the research was to understand the effect of the carnivore diet on physical and mental health status.

A survey was conducted through social media, with most participants participating through Facebook, Instagram, Reddit, and Twitter. Most of the survey questions were about their motivation for following the carnivore diet, dietary intake patterns, symptoms that could suggest dietary or nutritional deficiencies, satisfaction with the diet, and prior and current health conditions.

What Were the Results of the Study?

The results were that real people following a carnivore diet experienced huge health benefits from this way of eating.

Most of the people who participated in the study (93%) consumed a carnivore diet for more than 14 months, and were motivated to eat this way because they had medical conditions or health issues.

Respondents showed a high level of satisfaction with the diet.

Here's a summary of some of the key findings:

- 98% of the population with diabetes reported improvement in their condition, and a decrease in need for their medication
- 97% of the population with gastrointestinal issues reported improvement in their symptoms
- 93% of obese participants reported weight loss due to a carnivore diet, with only 1% reporting weight gain
- 93% of participants with hypertension reported improvement

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- 93% of participants with hypertension reported improvement

Conclusion: Does Evidence Support the Carnivore Diet?

In short, yes — this study does provide evidence of some of the benefits of the carnivore diet. It's not a perfect piece of research, but it's an excellent start and likely a sign of things to come.

The fact that such a high-level and publicized study took place is also encouraging, as it shows the carnivore diet is going mainstream and more people are waking up to the power of ancestral diet and lifestyle.

The carnivore diet can help with many autoimmune conditions by eliminating gut-irritating foods and instead focusing on nutrient-dense foods that don't cause inflammation in our bodies.

There is insufficient research to show that the carnivore diet treats MS, but here we'll break down ways in which the nutrients in carnivore diet foods may help.

How the Carnivore Diet May Help Multiple Sclerosis

There are multiple risk factors for getting multiple sclerosis, some of which are nutrient deficiencies. Having low levels of vitamin D and iron in the body can predispose you to this disease.

A carnivore diet of only meat contains an abundance of healthy nutrients such as protein, fats, vitamin D, vitamin A, sodium, iron, magnesium, and potassium. All these nutrients potentially help multiple sclerosis in different ways.

Iron

Iron is one of the essential nutrients necessary for the development and proper myelination of the nervous system during the developmental process. The carnivore diet, especially when it contains organ meat (such as beef liver or cod liver), is a rich source of iron.

According to the USDA, 100g of beef liver contains 17.9 mg of iron. Iron we get from animal sources is easily absorbable, so no matter how much spinach you eat, the iron from meat is much better for you.

As iron strengthens the development of nerves, it may help you fight multiple sclerosis.

Vitamin D and Calcium

Research has shown that people living in areas closer to the sun have lower chances of getting MS.

Adequate levels of vitamin D and calcium can be protective against MS because of the positive effects of vitamin D on the immune system. Patients diagnosed with MS are advised to maintain adequate vitamin D levels.

The carnivore diet offers foods rich in vitamin D, such as eggs to meat, fish, and milk. A healthy carnivore lifestyle also involves lots of natural sunlight and outdoor activity.

Biotin

Biotin helps with multiple sclerosis because it's a vitamin B that acts as a coenzyme or cofactor in various chemical reactions — one of them being myelin production.

Myelin strengthens your nerves as it's a fat covering for nerves. Because of this role, it was one of the early nutrient supplements that were thought to be protective against MS.

Beef liver and eggs are some excellent suggestions for Biotin — and both are key parts of the carnivore diet.

Omega 3 Fatty Acids

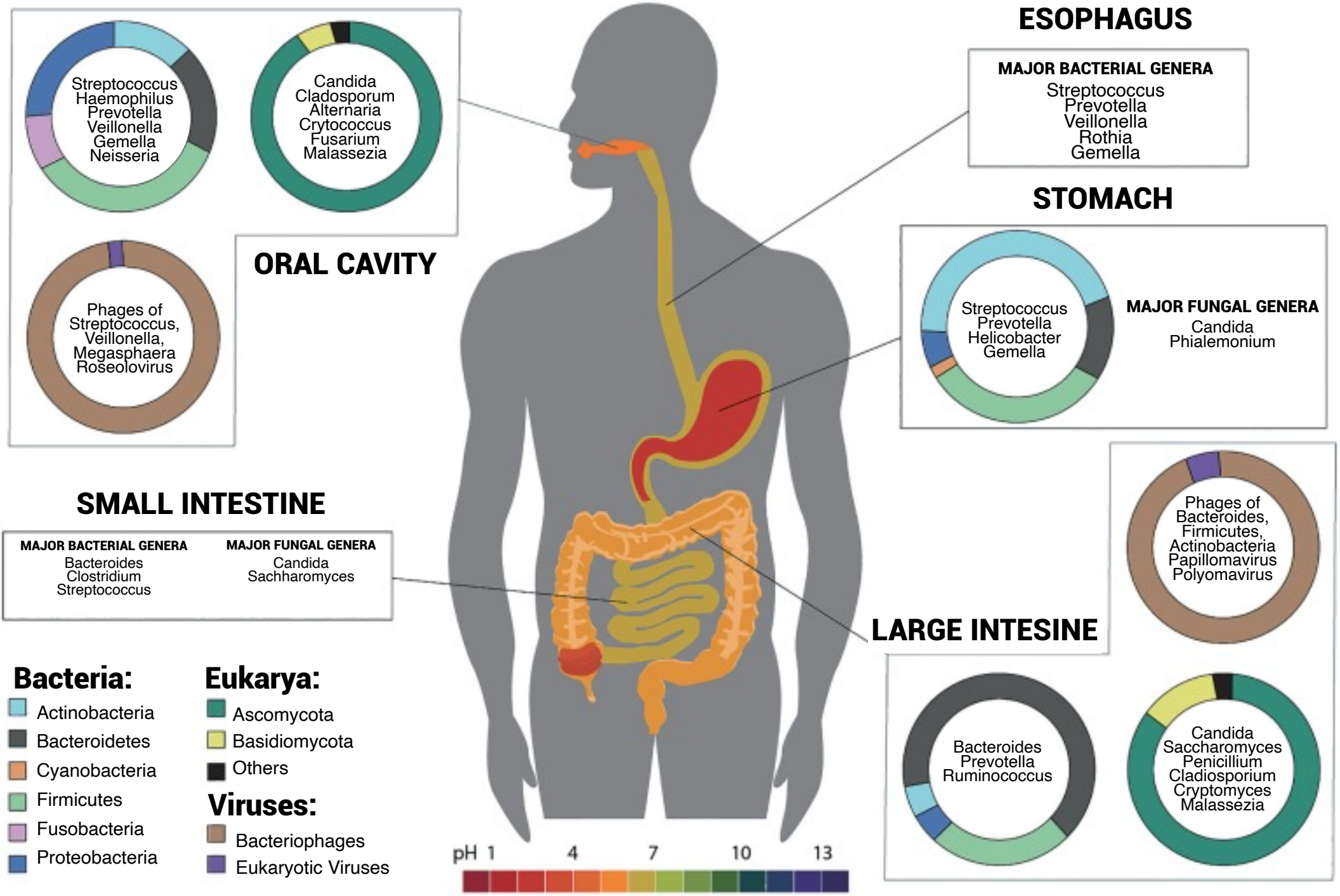
Multiple studies have evaluated the positive effects of omega-3 fatty acids on MS patients. Results showed that omega-3 fatty acids had a beneficial impact on glutathione reductase, an antioxidant. It also reduces the relapsing rate.

Omega 3 fatty acids are only found in a few foods like salmon and sardines, but these foods are key parts of any carnivore diet that includes fish.

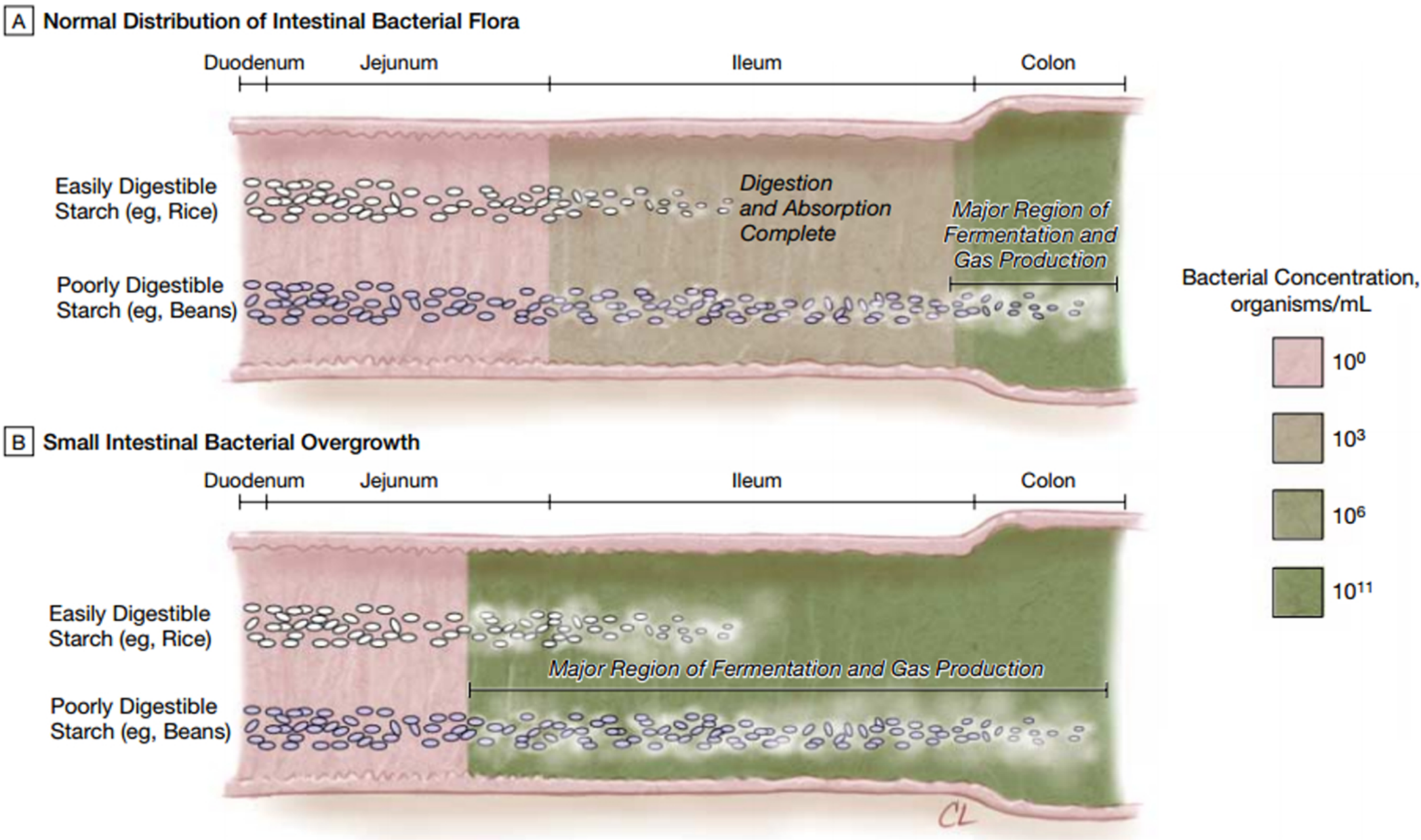
Conclusion

Of course, multiple sclerosis is a complex disease and this article is not medical advice. But there is growing research to show that the carnivore diet could help people who suffer from MS and similar autoimmune issues.

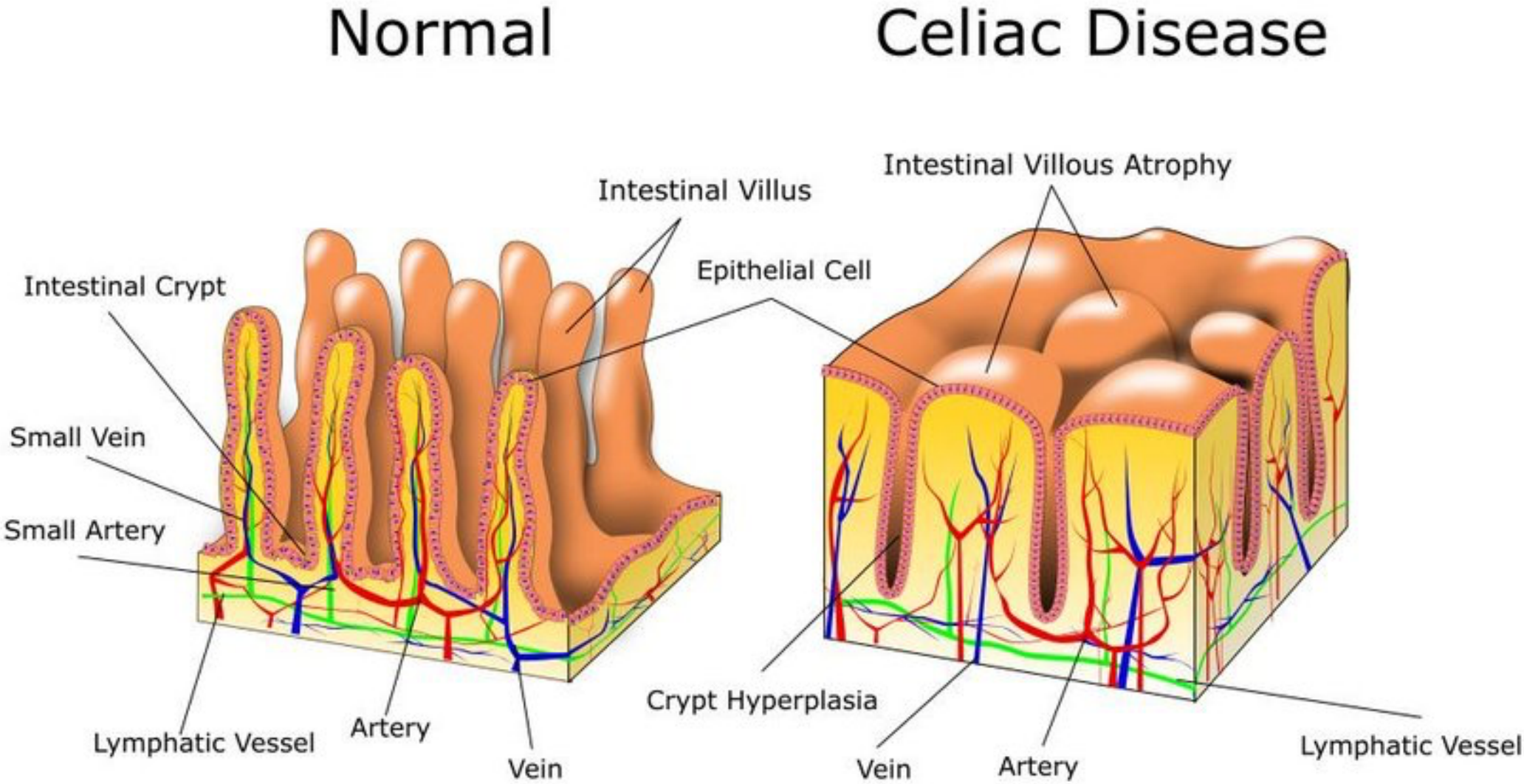
Consult a doctor before you try any new diet plan, but if you feel your current diet is aggravating your symptoms more than helping, the carnivore diet may be worth exploring.


ORAL CAVITY
Streptococcus
Haemophilus
Prevotella
Veillonella
Gemella
Neisseria
Candida
Cladosporum
Alternaria
Crytococcus
Fusarium
Malassezia
Phages of
Streptococcus,
Veillonella,
Megasphaera
Roseolovirus
ESOPHAGUS
MAJOR BACTERIAL GENERA
Streptococcus
Prevotella
Veillonella
Rothia
Gemella
STOMACH
Streptococcus
Prevotella
Helicobacter
Gemella
MAJOR FUNGAL GENERA
Candida
Phialemonium
SMALL INTESTINE
MAJOR BACTERIAL GENERA
Bacteroides
Clostridium
Streptococcus
MAJOR FUNGAL GENERA
Candida
Sachharomyces
LARGE INTESINE
Phages of
Bacteroides,
Firmicutes,
Actinobacteria
Papillomavirus
Polyomavirus
Bacteroides
Prevotella
Ruminococcus
Candida
Saccharomyces
Penicillium
Cladiosporium
Cryptomyces
Malassezia
Bacteria:
Actinobacteria
Bacteroidetes
Cyanobacteria
Firmicutes
Fusobacteria
Proteobacteria
Eukarya:
Ascomycota
Basidiomycota
Others
Viruses:
Bacteriophages
Eukaryotic Viruses
pH 1
4
7
10
13

Distribution of Intestinal Bacteria in Normal Gut and SIBO

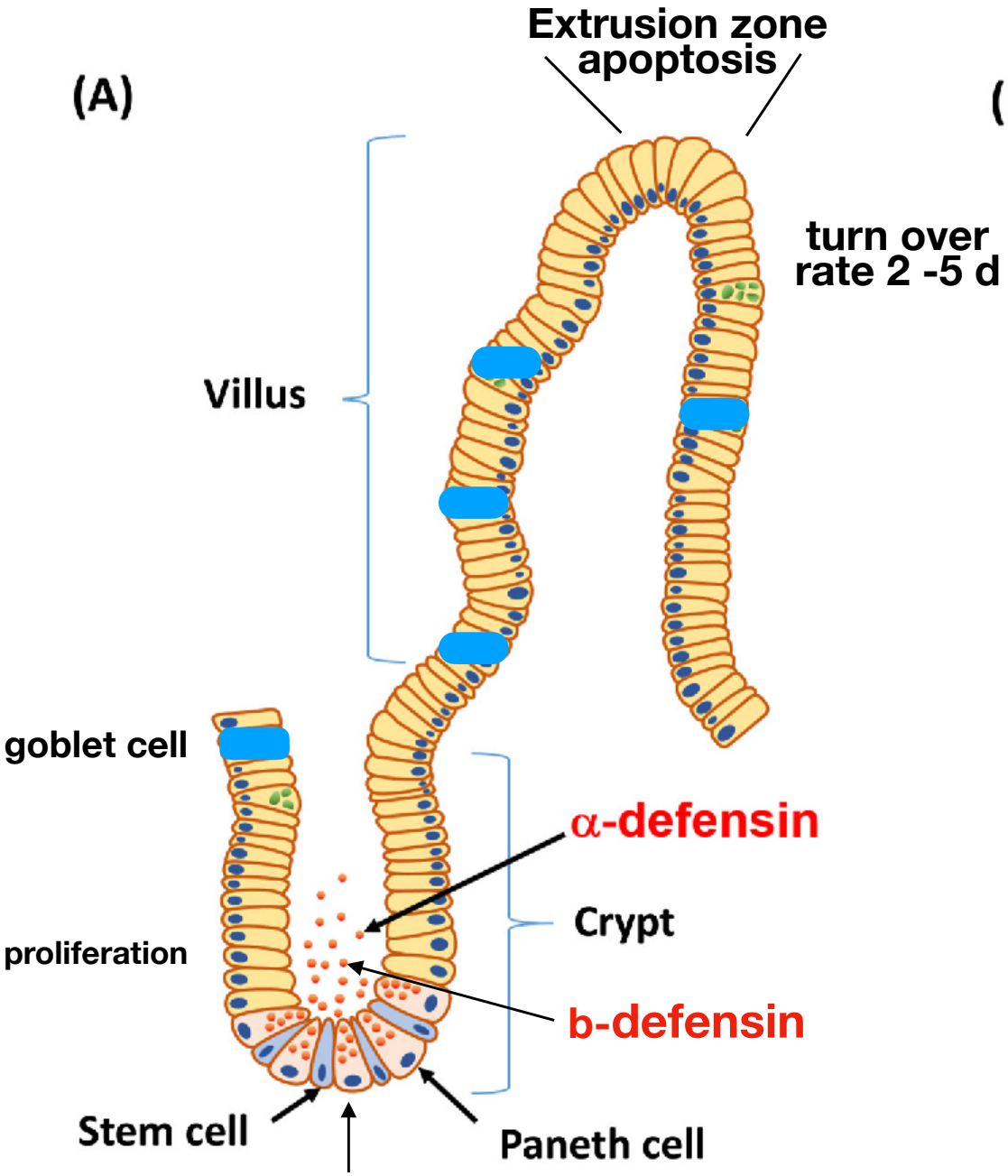


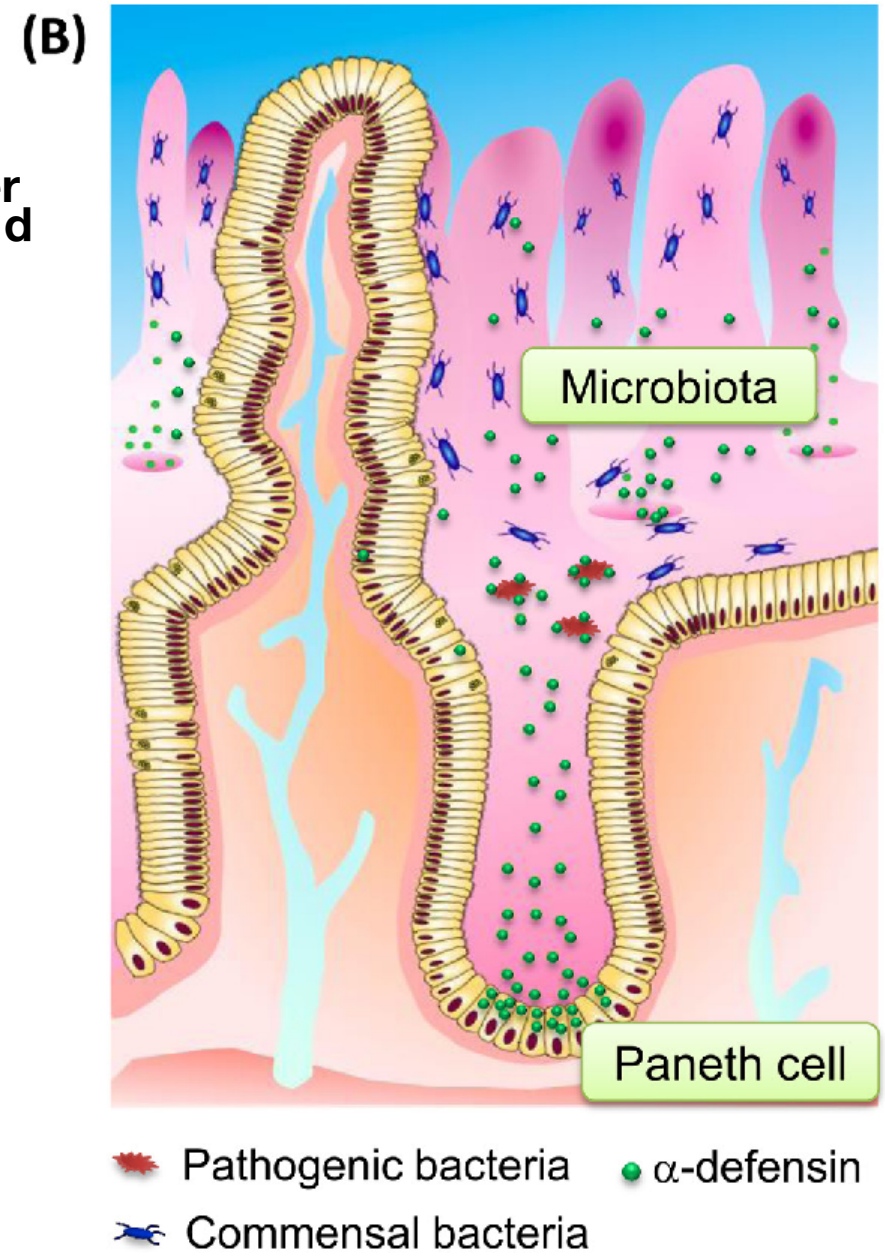
While research is still underway, scientists do know that the immune system is directly influenced by the makeup of the microbes and bacteria in the gut.



Can look like this with bacterial overgrowth too:

"SIBO"
Small Intestinal Bacterial Overgrowth





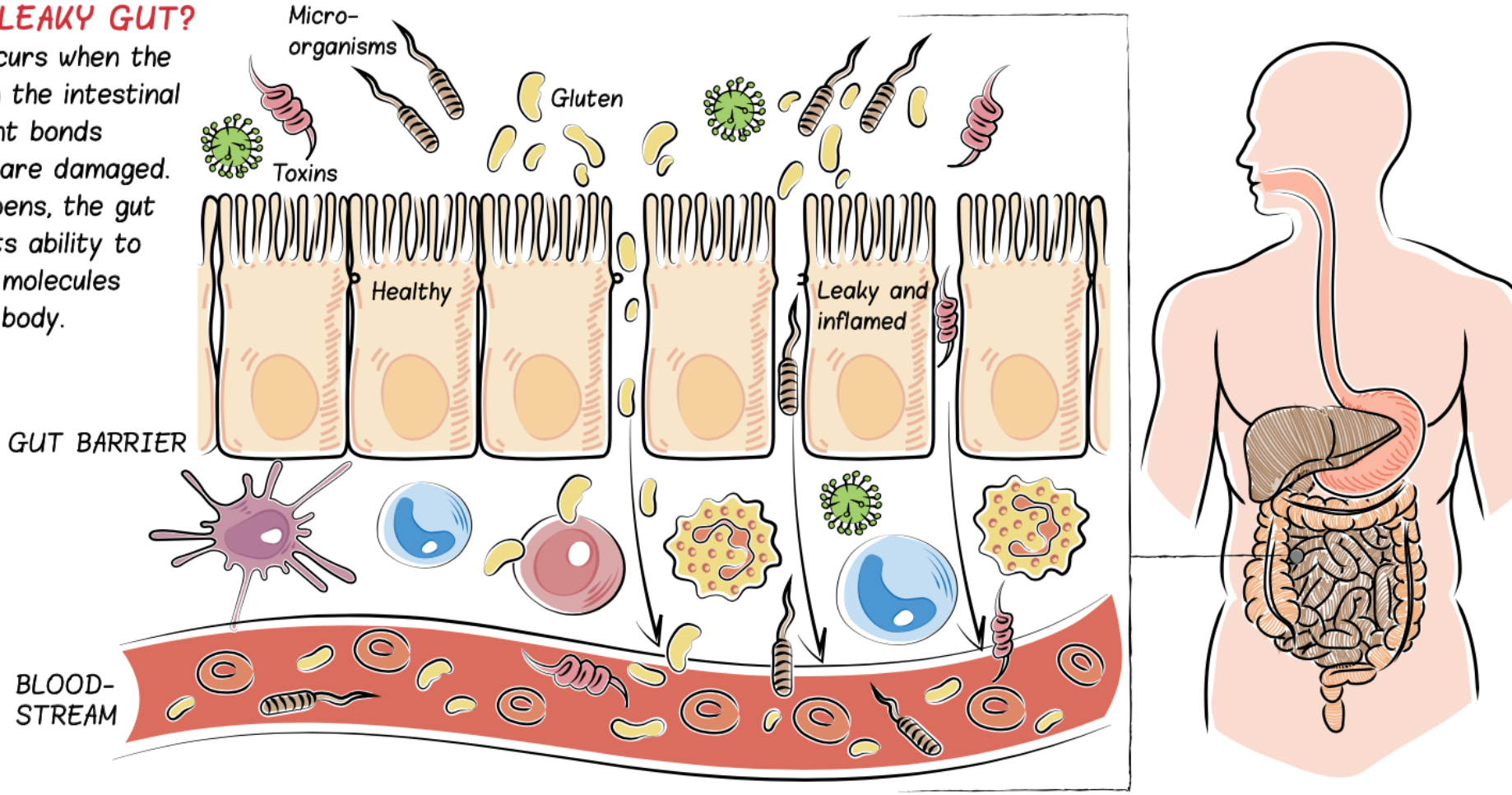
To target the tissues - produce own antimicrobial compounds
can distinguish between pathogenic and commensal organisms

doi: 10.1128/IAI.06165-11
doi: 10.1186/s12876-014-0189-7
doi: 10.1136/gut.2005.068601
doi: 10.1038/s41385-018-0010

A leaky gut has been observed in a number of autoimmune diseases including multiple sclerosis.

WHAT IS A LEAKY GUT?

A leaky gut occurs when the cells that form the intestinal wall or the tight bonds between them are damaged. When this happens, the gut barrier loses its ability to regulate which molecules cross into the body.



https://www.gastrosav.com/blog/leaky-gut-what-it-is-and-how-to-heal-it/
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6115935/

Intestinal Permeability in Relapsing-Remitting Multiple Sclerosis

M C Buscarinu [1], S Romano [1], R Mechelli [1], R Pizzolato Umeton [2], M Ferraldeschi [3], A Fornasiero [1], R Reniè [1], B Cerasoli [1], E Morena [1], C Romano [1], N D Loizzo [1], R Umeton [4], M Salvetti [1 5], G Ristori [6]

Affiliations + expand

PMID: 29119385 PMCID: PMC5794695 DOI: 10.1007/s13311-017-0582-3

Free PMC article

Abstract

Changes of intestinal permeability (IP) have been extensively investigated in inflammatory bowel diseases (IBD) and celiac disease (CD), underpinned by a known unbalance between microbiota, IP and immune responses in the gut. Recently the influence of IP on brain function has greatly been appreciated. Previous works showed an increased IP that preceded experimental autoimmune encephalomyelitis development and worsened during disease with disruption of TJ. Moreover, studying co-morbidity between Crohn's disease and MS, a report described increased IP in a minority of cases with MS. In a recent work we found that an alteration of IP is a relatively frequent event in relapsing-remitting MS, with a possible genetic influence on the determinants of IP changes (as inferable from data on twins); IP changes included a deficit of the active mechanism of absorption from intestinal lumen. The results led us to hypothesize that gut may contribute to the development of MS, as suggested by another previous work of our group: a population of CD8+CD161high T cells, belonging to the mucosal-associated invariant T (MAIT) cells, a gut- and liver-homing subset, proved to be of relevance for MS pathogenesis. We eventually suggest future lines of research on IP in MS: studies on IP changes in patients under first-line oral drugs may result useful to improve their therapeutic index; correlating IP and microbiota changes, or IP and blood-brain barrier changes may help clarify disease pathogenesis; exploiting the IP data to disclose co-morbidities in MS, especially with CD and IBD, may be important for patient care.

Keywords: Autoimmune comorbidity; Celiac disease; Crohn' disease; Intestinal permeability; Mucosal-associated invariant T (MAIT) cells; Multiple sclerosis.

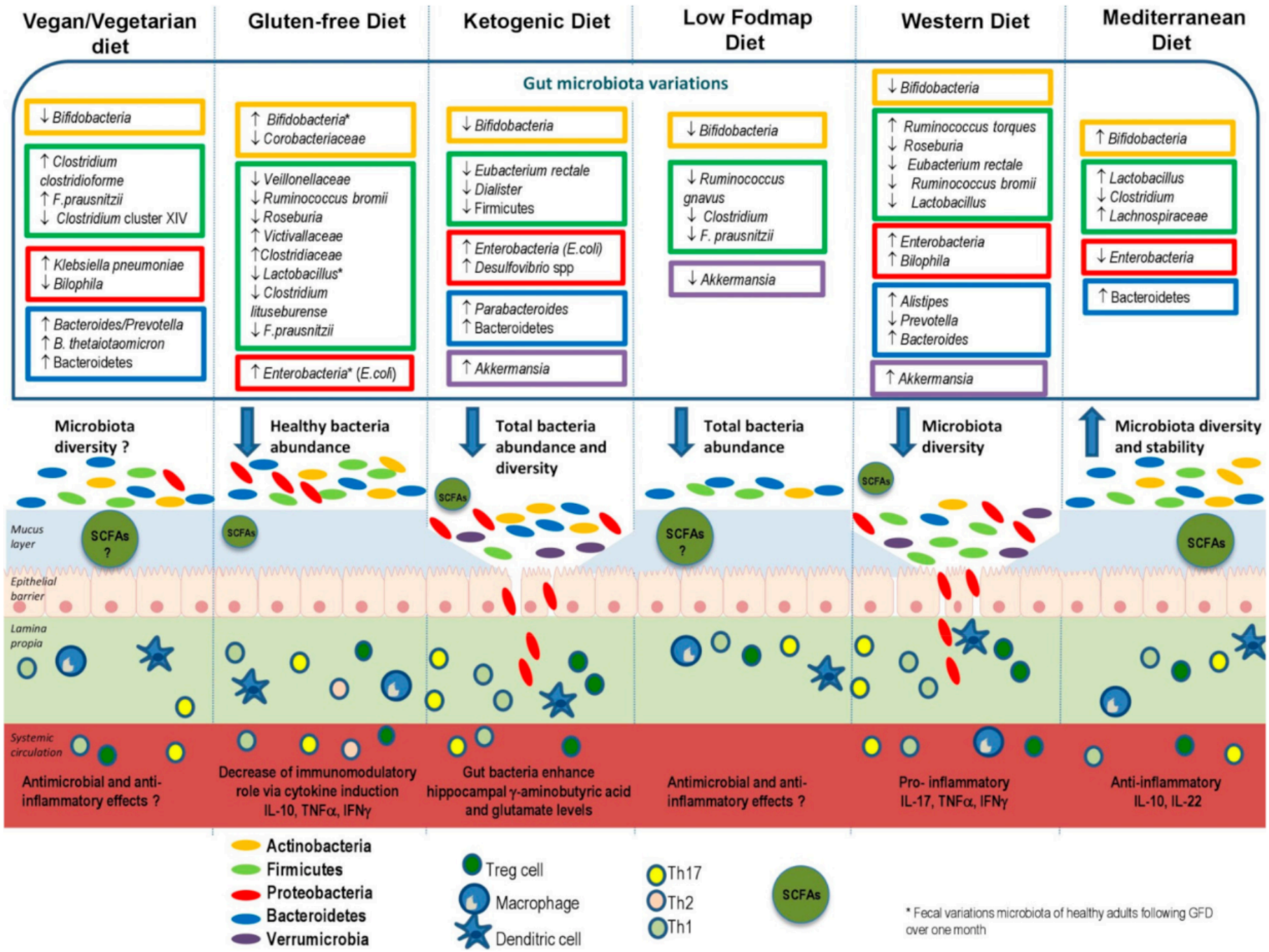
BMC Gastroenterol. 2014; 14: 189. Published online 2014 Nov 18. doi: 10.1186/s12876-014-0189-7

PMCID: PMC4253991 | PMID: 25407511

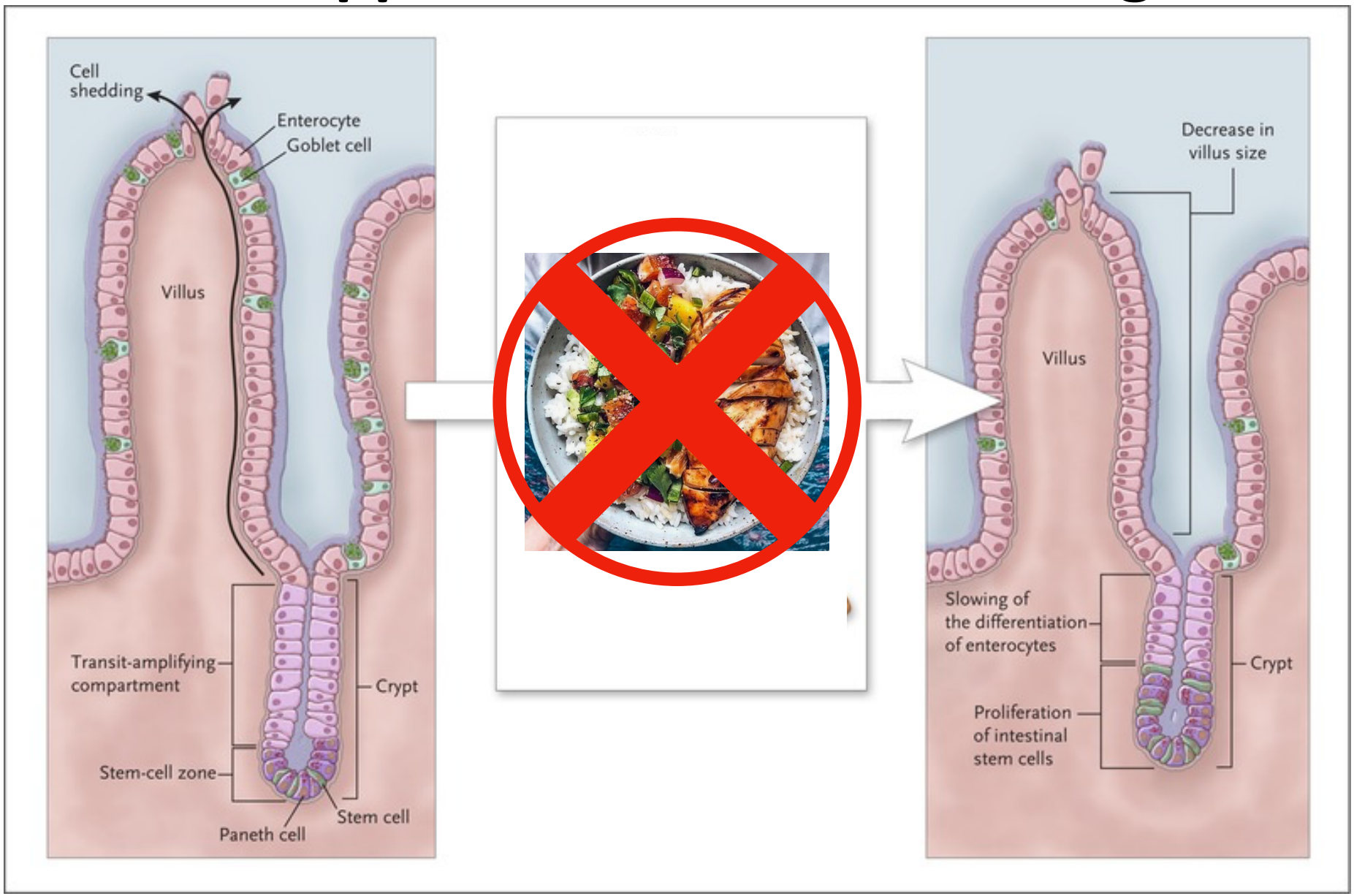
Intestinal permeability – a new target for disease prevention and therapy

Stephan C Bischoff, Giovanni Barbara, Wim Buurman, Theo Ockhuizen, Jörg-Dieter Schulzke, Matteo Serino, Herbert Tilg, Alastair Watson, and Jerry M Wells

In summary, intestinal permeability, which is a feature of intestinal barrier function, is increasingly recognised as being of relevance for health and disease, and therefore, this topic warrants more attention.


Vegan/Vegetarian diet
Gluten-free Diet
Ketogenic Diet
Low Fodmap Diet
Western Diet
Mediterranean Diet
Gut microbiota variations
↓ Bifidobacteria
↑ Clostridium clostridioforme
↑ F.prausnitzii
↓ Clostridium cluster XIV
↑ Klebsiella pneumoniae
↓ Bilophila
↑ Bacteroides/Prevotella
↑ B. thetaiotaomicron
↑ Bacteroidetes
↑ Bifidobacteria*
↓ Corobacteriaceae
↓ Veillonellaceae
↓ Ruminococcus bromii
↓ Roseburia
↑ Victivallaceae
↑Clostridiaceae
↓ Lactobacillus*
↓ Clostridium lituseburense
↓ F.prausnitzii
↑ Enterobacteria* (E.coli)
↓ Bifidobacteria
↓ Eubacterium rectale
↓ Dialister
↓ Firmicutes
↑ Enterobacteria (E.coli)
↑ Desulfovibrio spp
↑ Parabacteroides
↑ Bacteroidetes
↑ Akkermansia
↓ Bifidobacteria
↓ Ruminococcus gnavus
↓ Clostridium
↓ F. prausnitzii
↓ Akkermansia
↓ Bifidobacteria
↑ Ruminococcus torques
↓ Roseburia
↓ Eubacterium rectale
↓ Ruminococcus bromii
↓ Lactobacillus
↑ Enterobacteria
↑ Bilophila
↑ Alistipes
↓ Prevotella
↑ Bacteroides
↑ Akkermansia
↑ Bifidobacteria
↑ Lactobacillus
↓ Clostridium
↑ Lachnospiraceae
↓ Enterobacteria
↑ Bacteroidetes
Microbiota diversity ?
Healthy bacteria abundance
Total bacteria abundance and diversity
Total bacteria abundance
Microbiota diversity
Microbiota diversity and stability
Mucus layer
Epithelial barrier
Lamina propia
Systemic circulation
SCFAs ?
SCFAs
Antimicrobial and anti-inflammatory effects ?
Decrease of immunomodulatory role via cytokine induction IL-10, TNFα, IFNγ
Gut bacteria enhance hippocampal γ-aminobutyric acid and glutamate levels
Antimicrobial and anti-inflammatory effects ?
Pro- inflammatory IL-17, TNFα, IFNγ
Anti-inflammatory IL-10, IL-22
Actinobacteria
Firmicutes
Proteobacteria
Bacteroidetes
Verrumicrobia
Treg cell
Macrophage
Denditric cell
Th17
Th2
Th1
SCFAs
* Fecal variations microbiota of healthy adults following GFD over one month

Fasting increases stem cells in GIT
Does this happen with athletes training fasted?

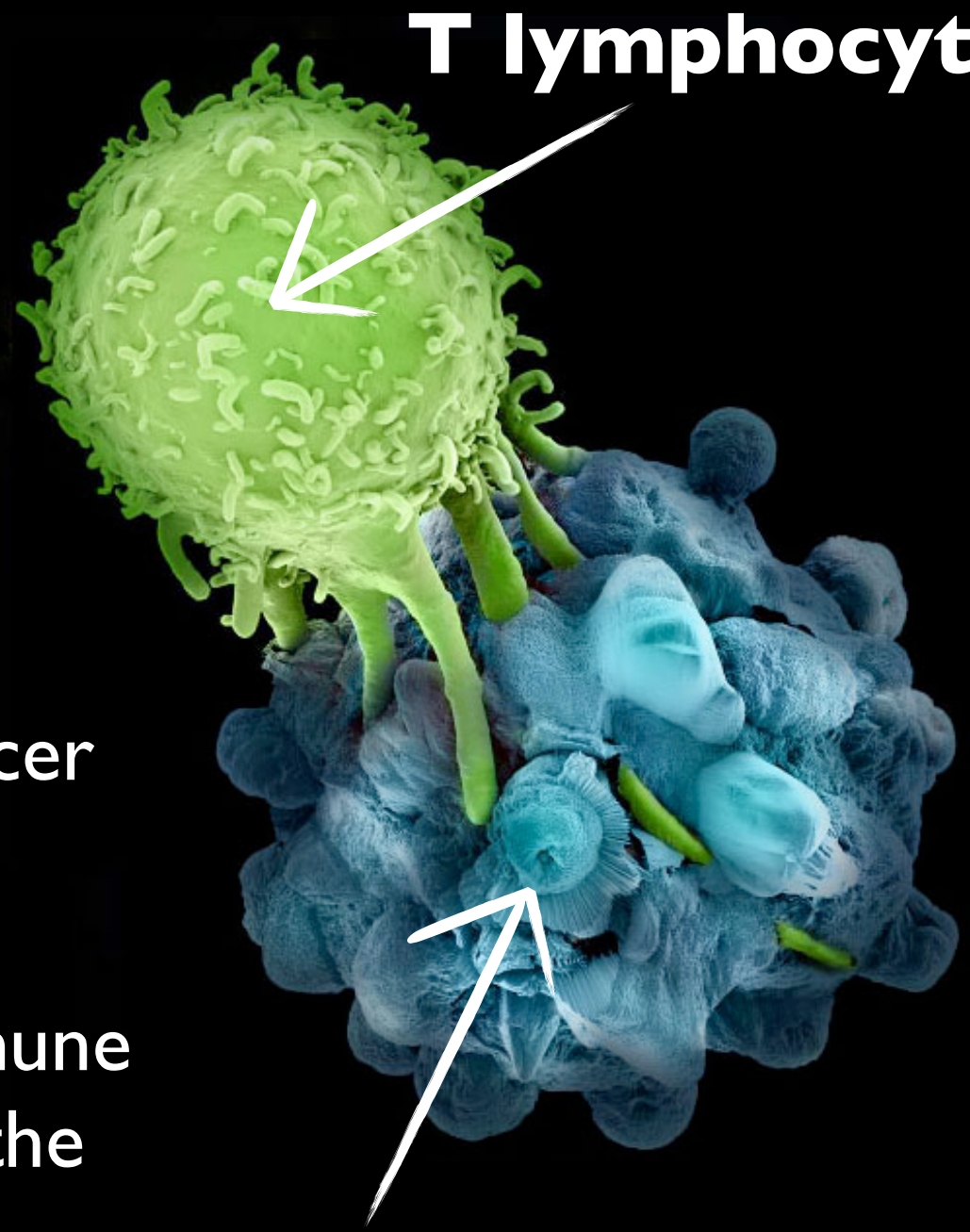


DOI: 10.1056/NEJMcibr1208353

After "breaking a fast" your body produces more lymph cells*

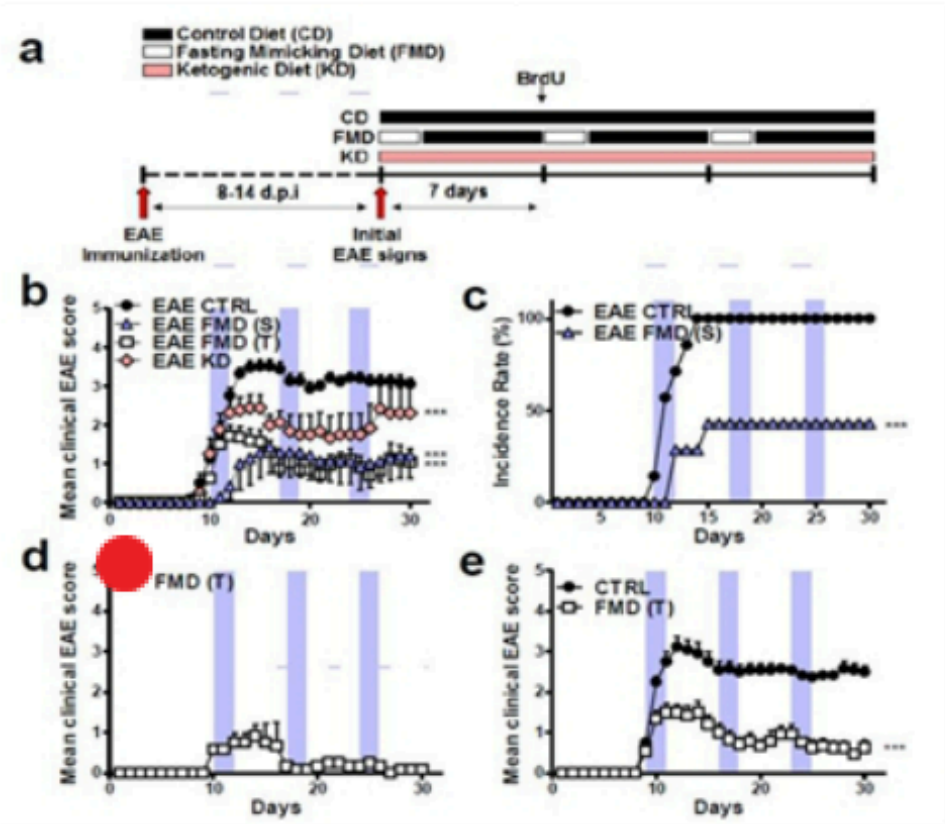
T-Cells recognise the cancer cells and bind to it.

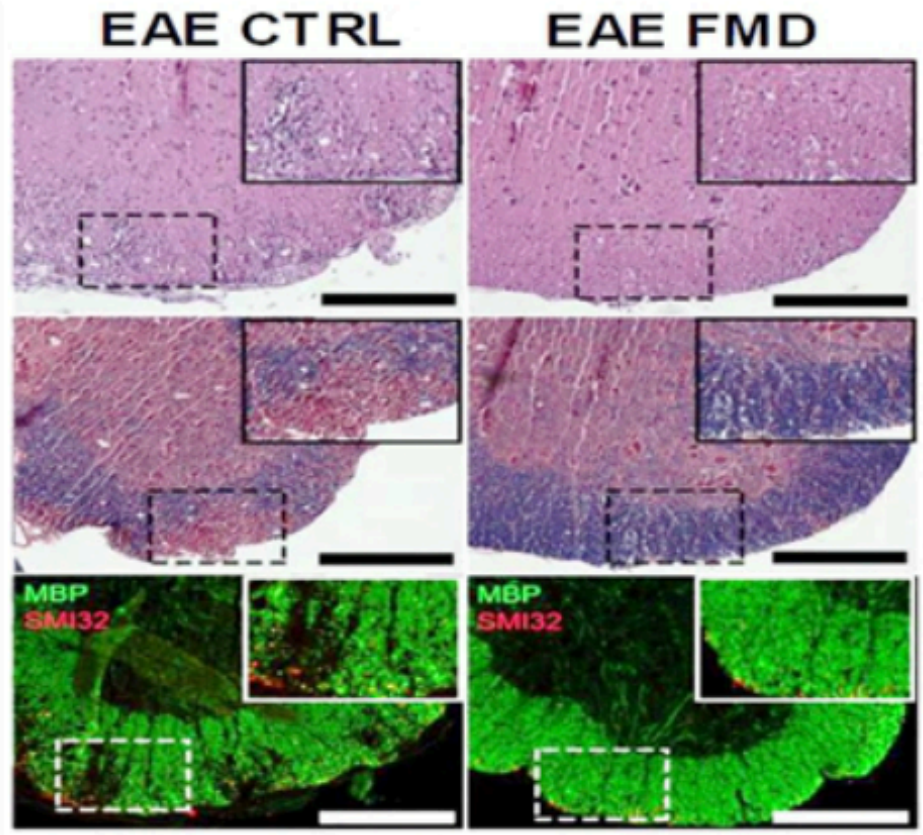
Then signal for other immune system cells to eliminate the cell.



Multiple Sclerosis - Valter Longo

FMD (LFD) promotes cell regeneration and re-myelination of axons in mice

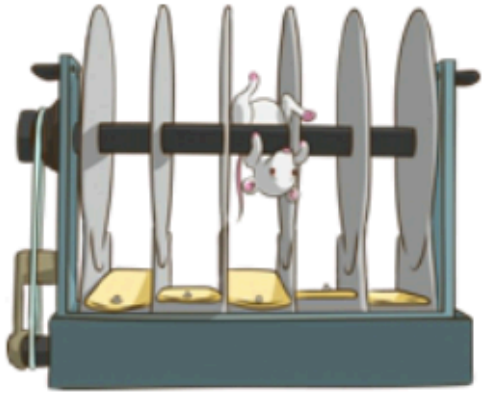




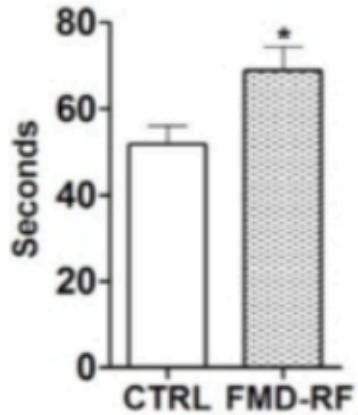
FMD promoted oligodendrocyte precursor cell regeneration and re-myelination in axons in mice

Choi, Y et al. Cell Reports 2016

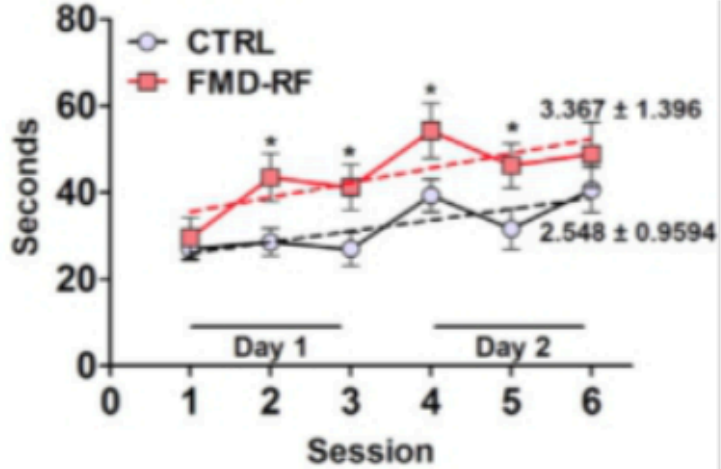
FMD improves motor coordination and working memory



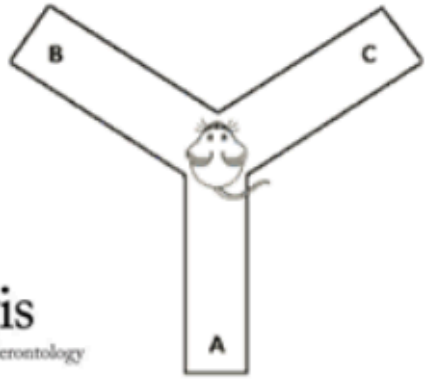
Best rotarod performance score. cohort.

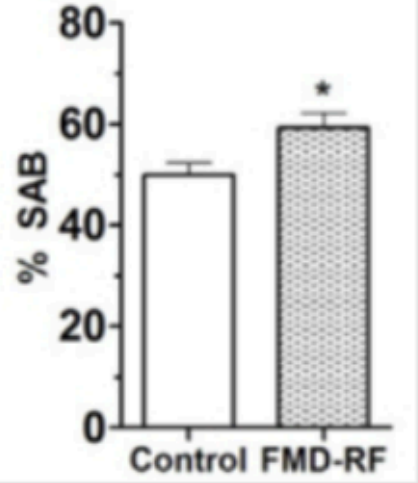


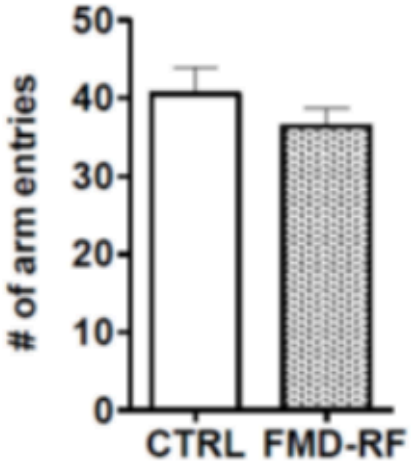
Rotarod performance as linear regression for each



Spontaneous alternation behavior (SAB) at 23 months.







USC Davis School of Gerontology

Brandhorst et al. Cell Metab. 2015 Jul 7;22(1):86-99.

“Heritage” & “heirloom” plant varieties

Farmers used organic farming methods and ensured **HEALTHY NUTRIENT RICH SOIL**

Rotated crops for the health of the soil

They shared, traded, stored seed from one season to the next

Heirloom are likely to be momentously more nutritious than newer varieties.

Higher and higher yields = “hybrid”

Declining Fruit and Vegetable Nutrient Composition - HortScience

In NZ there are a number of well-known deficiencies within our soils:

- **Zinc** – a common sign of low zinc levels is white spots on the nails. Vital for healthy **immune function**, clear skin, reproductive health, energy and metabolic regulation.
- **Selenium** (We roughly get 10-20% of the selenium we require to meet our recommended daily intake of 60 mcg per day (RDI). Remember this figure is the amount needed to prevent disease but for optimal health we need more). Good sources of selenium include organic brazil nuts, beef, mushrooms and fish.
- **Iodine** Iodine is required by the thyroid to make thyroid hormones which help manage metabolism, growth and development.
- **Boron** deficiency signs and symptoms have not been firmly established. Limited data suggest that boron deficiency might affect brain function by reducing mental alertness and impairing executive brain function

...if the nutrients we need are not in the soil, then they cannot be in our food.

So much of our food in depleted.

Nielsen FH, Eckhert CD. Boron. Adv Nutr 2019; In press.
Institute of Medicine. Food and Nutrition Board. Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc Washington, DC: Natio
Nielsen FH. Update on human health effects of boron. J Trace Elem Med Biol 2014;28:383-7.
Nielsen FH. Manganese, Molybdenum, Boron, Chromium, and Other Trace Elements. In: John W. Erdman Jr. IAM, Steven H. Zeisel, ed. Present Knowledge in Nutrition. 10th ed: Wiley-Blackwell; 2012:586-607.
Naghii MR, Mofid M, Asgari AR, Hedayati M, Daneshpour MS. Comparative effects of daily and weekly boron supplementation on plasma steroid hormones and proinflammatory cytokines. J Trace Elem Med Biol 2011;25:54-8. [PubMed
Hunt C. Boron. In: Coates PM BJ, Blackman MR, Cragg GM, Levine M, Moss J, White JD, ed. Encyclopedia of Dietery Supplements. New York informat healthcare; 2010:82-9.

Omega-3 fish oils

- Some studies found those with MS had **low blood levels**
- Decrease **inflammation** and certain immune reactions
- In large placebo-controlled study **decrease in relapse** and disability progression **1989**

- Fatty fish, salmon, mullet, kahawhai, sardines, herring, anchovies, mackerel.

- Supplement form: fish oil, krill oil, cod liver oil, and algal oil (a vegetarian source that comes from algae).
- Flaxseed oil and flaxseeds, chia and walnuts

https://ods.od.nih.gov/factsheets/Omega3FattyAcids-Consumer/

Cheapest way to access B vitamins, iron, folate, zinc, copper… “Natural mineral supplement”

Vitamin D

Professor Rebecca Mason (President of the Australian and New Zealand Bone and Mineral Society) says "research suggests that among the general population, **around one in three of us will be vitamin D deficient by the end of winter**."

To get your daily dose of vitamin D, it takes around half the time taken to get sun burnt. We should expose as much skin as possible for at least 15-30mins depending on the time of the year. What we absorb in summer supports our vitamin D levels through winter.

Food sources of vitamin D include egg yolks, beef, organ meat, and fish.

To get your daily dose of vitamin D, it takes around half the time taken to get sun burnt.

We should expose as much skin as possible for at least 15-30 mins depending on the time of the year. What we absorb in summer supports our vitamin D levels through winter.

Endocrine Society recommends a dose of 600–2000 IU per day (according to the amount of sunlight the individual is exposed to).

important regulator of the **immune** system with a preponderance towards tolerance induction, its therapeutic potential as an **immune** modulator is appealing in the treatment of **immune**-mediated diseases.
https://www.ncbi.nlm.nih.gov/labs/pmc/articles/PMC7281985/

What is a healthy vitamin D level?

There is general agreement that a level of **at least 50nmol/L (20ng/mL) in winter** is the threshold adequate 25OHD level.

However, research supports higher threshold levels of 75nmol/L (30ng/mL) and many natural health and integrative medicine practitioners aim for levels of 100 -120 nmol/L.


VITAMIN
D

Nutrients to help vitamin D

To get the most benefit from vitamin D, you must have other nutrient cofactors in your body.

Magnesium helps your body to use vitamins and other minerals, such as calcium, phosphorus, sodium, potassium, and vitamin D.
Magnesium can be found in the following foods:

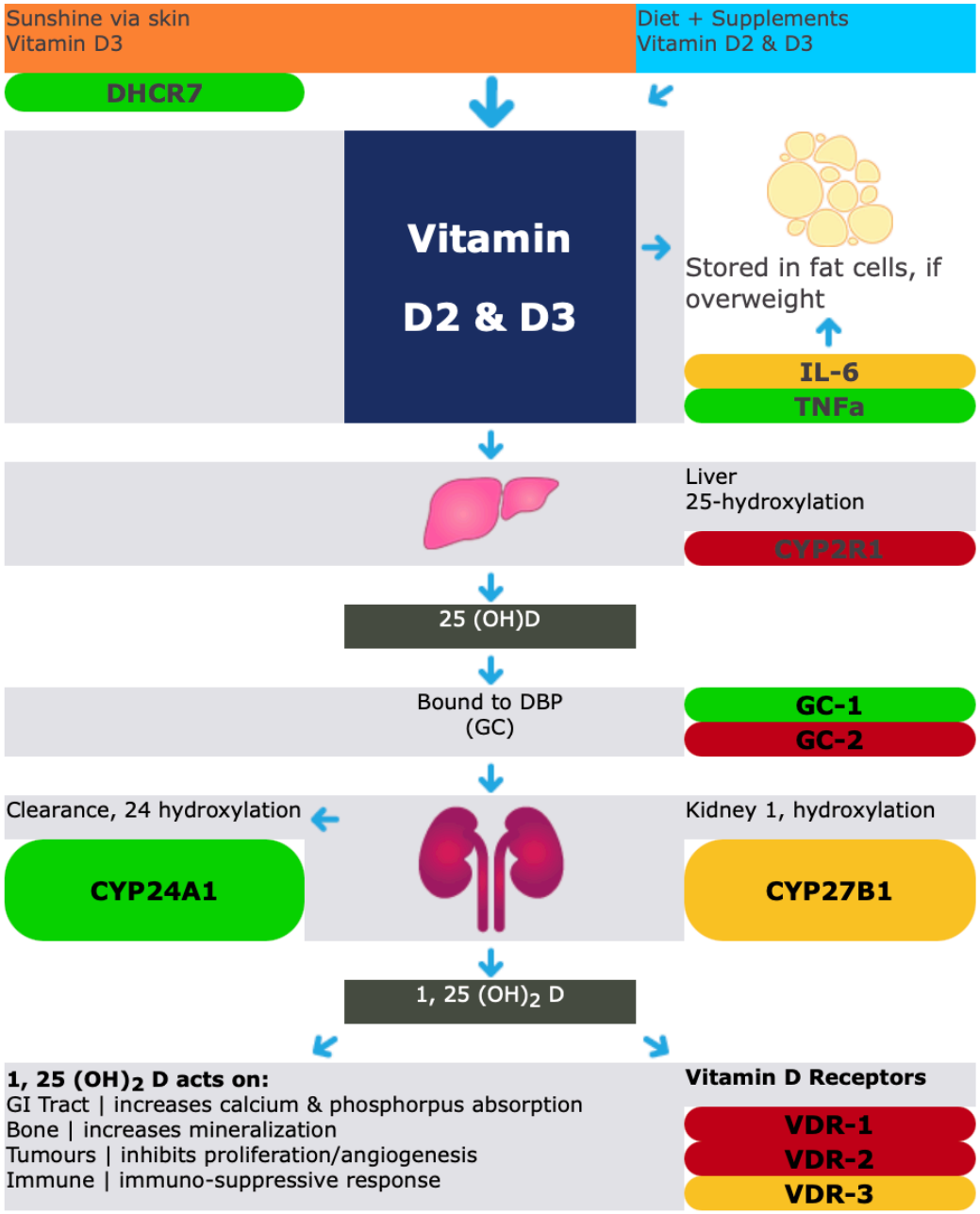
- Fish
- Leafy green vegetables
- Pumpkin seeds
- Nuts - almonds, brazil nuts, cashews, pine nuts, pecans.
- Meat
- Legumes
- Avocado
- Dark chocolate

Note: many people don't get enough magnesium from the foods they eat. Magnesium isn't very soluble or bioavailable but particular formulations allow it be absorbed through the skin. Some research studies show that your body needs between 500 and 700 mg a day.

Vitamin D Pathway and Genetic Variation Results

Vitamin D Pathway

The following table illustrates the biological process of vitamin D as it is processed by the skin, liver and kidneys and their associated genes.



Coffee significantly interacts with vitamin D receptor – a study in mice looked at this and stated a 70% decrease in VDR function with coffee… not sure how much yet

Caffeine metabolism

Caffeine is one of the most popular and widely used stimulant drugs in the world. Some individuals consume caffeine daily, while others rarely use it at all. Research has shown that doses of caffeine over 300 mg is unhealthy and can be damaging to the brain, and puts significant stress on the heart, liver, and kidneys. Those who are slow metabolisers of caffeine are at a higher risk for organ damage. For example, the average half-life of caffeine in a 20 year old male is 4-6 hours. A female's caffeine half-life is 8-12 hours in contrast to a pregnant female whose caffeine half-life is nearly doubled at 18-22 hours.

CYP1A2 genetic test result

Gene and SNP ID	Genotype	Indicator	Result and Interpretation
CYP1A2 rs762551	AC		**SLOW caffeine metabolism based on this CYP1A2 genotype.** This genotype is associated with an increased risk of hypertension and heart attack when caffeine consumption exceeds two cups of coffee per day. Please review the action steps and comments in relation to this result.

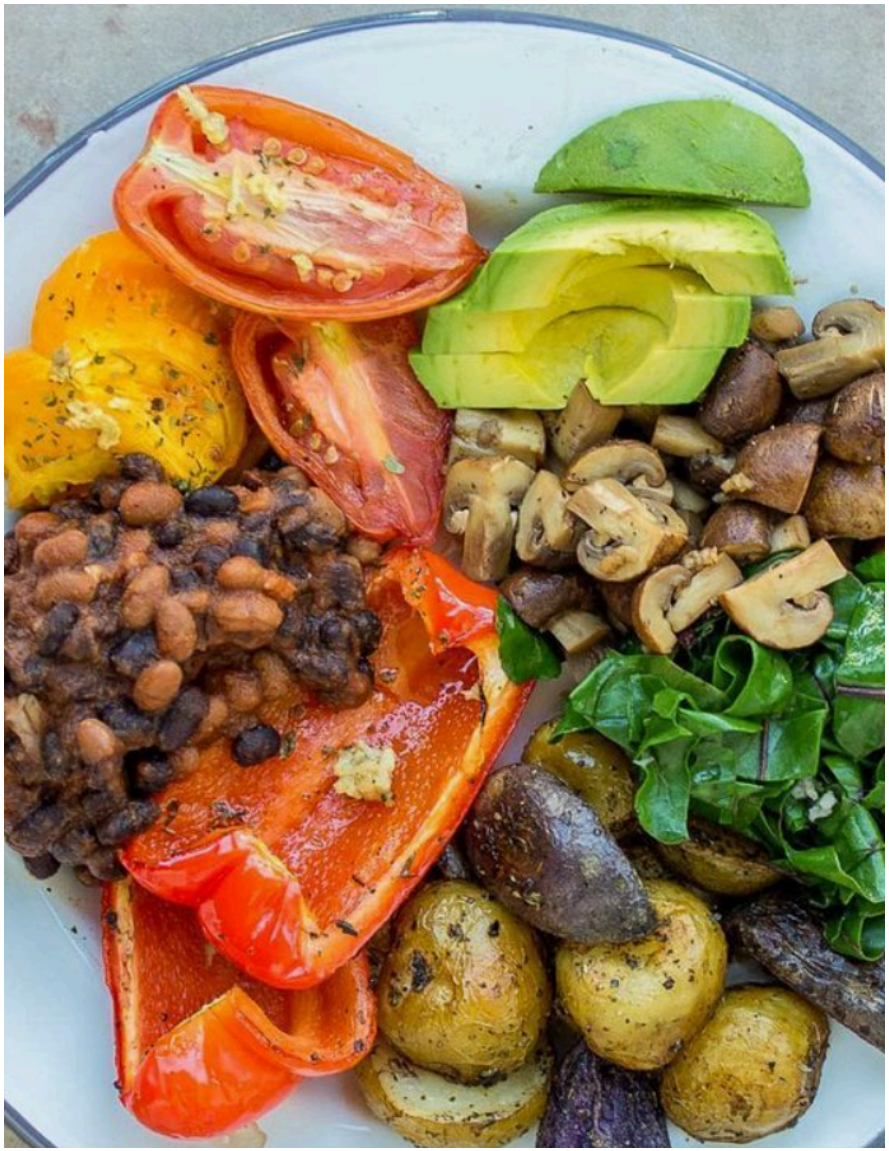
What does this CYP1A2 genetic test result mean?

This individual has inherited the risk allele associated with slow caffeine metabolism based on this CYP1A2 genotype.

ACTION STEPS and comments:

- Reduce caffeine consumption if it exceeds more than two cups of coffee per day since there is increased risk of hypertension and heart attack with increased consumption of caffeine.
- Caffeine is found in many food and drink products. Reviewing the consumption of caffeinated products may be useful in assessing the individuals overall caffeine intake.

THE
BOYD CLINIC



THE BOYD CLINIC

Meal Suggestions:

Remember, this plan is JUST a guide, not a rule book. It does not have to be perfect. You will still get amazing benefits in all your organ systems and functions, even if you do not follow it to the T!

Breakfast Options:	Lunch or Dinner Options:	Snacks Options:
Smoothie bowl	Quinoa salad with steamed fish	- Green apple & almond butter - Nuts or pumpkin seeds (¼ cup max) - Fresh fruit or baked apple slices with cinnamon - Dark chocolate ~ 2-4 cubes - 1 row - Chia seed puddling + add stevia - Seed crackers with herb spread or hummus - Chopped veggies & hummus - Raw matcha slice (YUM!) - Turmeric tea - Bone broth - Smoothie from options - Left-over quinoa/cauli sushi rolls
Paleo muesli & coconut yogurt with stewed apple & cinnamon	Large salmon or sardine salad - think salad nicoise (olives, capers, boiled egg, chopped veggies) + tones of greens	
Paleo toast (gluten free loaf - five loaves) with avocado, tomato, sprouts + olive oil	Poached egg & quinoa salad Or Roast veggies with rocket salad + chicken or fish	
Chia seed pudding + blueberries	Mushroom tacos or vegetarian option	
Poached eggs & veggie hash with spinach & mushrooms	Roasted cauliflower with fried egg on top with massive side of greens	

BANANA +
KALE +
COCONUT WATER

Beet + Berry Smoothie Bowl - serves 1

1-2 cup frozen or fresh berries
½ cup red beetroot, diced small {approximately 1 medium sized beet}
1/2 banana
¼ cup ground flax seeds
2 handfuls greens {kale, collard greens, silverbeet, beetroot leaves, spinach}
½-1 cup unsweetened almond milk (nut milk)
1 scoop protein powder (pea, hemp, rice based)

Blend all of the ingredients until smooth.
Top with additional garnishes.

Cinnamon Raisin Cacao Smoothie Bowl - serves 1

1 C frozen blueberries
1¾ cups unsweetened almond "milk"
1 tablespoons flaxseed meal
1 tablespoon raisins
1 teaspoon ground cinnamon
1 pinch salt
¾ teaspoon pure vanilla extract

Blend all of the ingredients until smooth. Top with additional garnishes.

Paleo Muesli & coconut yogurt with fresh fruit

Brands examples:

- Pure Delish
- Ceres Super Good Muesli
- Clean Paleo

Plus:

1-2 Tbsp coconut yogurt
Big splash of nut milk
Sliced fresh fruit

Kumara Toast

1 Tbsp Almond butter,
1 Tbsp pumpkin and sunflower seeds
Handful of sliced berries

Toast in a sandwich press, smear almond (or any nut butter except peanut),
lay blueberries and nuts on top. YUM

Tropical Green Smoothie - serves 1

1 handful of mint
1 C coconut water or filtered water
1 x slice whole lemon (skin included)
1/2 C chopped pineapple
1 large handful of leafy greens (not kale)
Ice if needed

Pop all ingredients in a blender and wizz till smooth.

Creamy Green Smoothie bowl - serves 1

1/2 avocado
1 C chopped pineapple or 1 frozen banana, chopped
1/2 tsp spirilina or wheatgrass powder
2 cups of spinach (or other leafy green)
1 cup coconut water (or plain water)
2 Tbsp flaxseed oil

Toppings

1 kiwi fruit, peeled and sliced, ½ cup blueberries, ¼ cup coconut flakes, 2 tbsp sunflower seeds
(add coconut cream to this recipe and 1 scoop protein powder - pea for fullness)

Add all smoothie bowl ingredients to a high-powered blender and blend until thick and creamy. Pour into a bowl and top with kiwi, blueberries, coconut and sunflower seeds.

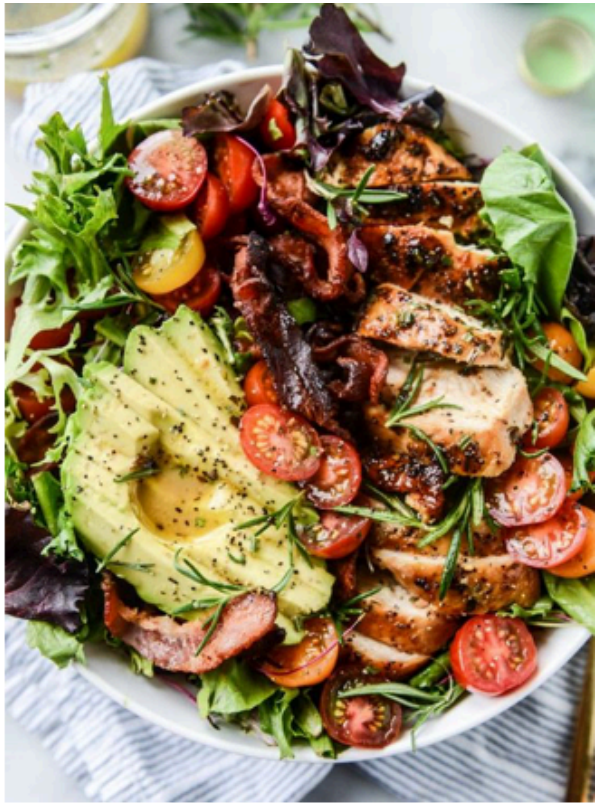
Roasted Carrots And Red Onions With Fennel And Mint - serves 8

Toasting the seeds and nuts in oil forms the base of a complex vinaigrette.

1 kilo small carrots (about 2 bunches), peeled, cut into 3-inch pieces
2 large red onions, each cut through root end into 8 wedges
1 fennel bulb, cut into ½-inch wedges
4 tablespoons olive oil, divided
Quality salt, freshly ground pepper
2 tablespoons raw sunflower seeds
1 teaspoon coriander seeds, coarsely chopped
1 pinch of crushed red pepper flakes
½ teaspoon Hungarian hot paprika
2 tablespoons apple cider vinegar
1 tablespoon fresh lemon juice
2 tablespoons torn mint leaves

Preheat oven to 180°. Place carrots, onions and fennel on rimmed baking sheet. (Make sure to give them plenty of room, which is key to roasted veggies with nicely browned edges.) Drizzle vegetables with 2 Tbsp. oil, dividing evenly; season with salt and pepper. Roast, tossing occasionally, until golden brown and tender, 20–25 minutes for carrots and 35–45 minutes for onions and fennel. Let cool.
Meanwhile, cook sunflower seeds, coriander seeds, Aleppo pepper, paprika, and remaining 2 Tbsp. oil in a small skillet over medium heat, stirring often, until oil is gently bubbling around seeds and spices are fragrant (be careful not to burn), about 2 minutes. Let cool. Stir in vinegar and lemon juice; season vinaigrette with salt and pepper.
Combine roasted carrots, fennel, and onions onto the same baking sheet, drizzle vinaigrette over, and toss to coat well; transfer to a platter. Just before serving, re-toss vegetables to pull up any dressing that may have settled at the bottom of the platter and scatter mint over top. **This is fabulous with fresh snapper.**

Rosemary chicken & avocado salad - serves 2



250g boneless, skinless chicken breasts
salt and pepper
1 tablespoon or coconut or olive oil
2 tablespoons minced fresh rosemary
6 cups spring greens and/or butter lettuce
1 bunch watercress
1 cup cherry tomatoes, halved
1 large avocado, thinly sliced

rosemary vinaigrette

2 teaspoons dijon mustard
1/4 cup olive oil
1/4 cup red wine vinegar
1 teaspoon minced fresh rosemary
salt and pepper

directions:

Season the chicken with salt and pepper. Cover with the rosemary. In the skillet, over medium-high heat, add the chicken and cook until golden and crisp on both sides, about 5 to 6 minutes per side. Remove the chicken and let sit for a moment while you assemble the salad, then slice it.

Toss the greens with the watercress and the tomatoes. Top with the sliced chicken, the bacon and the avocado. Drizzle with the rosemary vinaigrette!

rosemary vinaigrette

Whisk together the mustard, oil and vinegar. Whisk in the rosemary and a pinch of salt and pepper.

Recommendations for cruciferous vegetables have not been established.

http://www.sciencedirect.com/science/article/pii/S1043661807000321

Sardines & avocado

1 x tin sardines in olive oil or spring water
1 carrot, grated or chopped
1 tomato
2 huge handfuls of rocket, radicchio, spinach or any other dark leafy green you can find
Handful of fresh basil or parsley, ripped
1/2 avocado, sliced
Big handful of left-over roast vegetables (throw under the salad)
1 glug of olive oil & squeeze of fresh lemon

Throw everything together, add the oil and lemon juice and enjoy!

Vegetable Cauliflower Rice + Quinoa Sushi

This is the best recipe!! We will have this on the FaceBook page so you can instantly have access to it.

Great as a lunch or dinner option!

https://www.simplyquinoa.com/vegetable-cauliflower-rice-quinoa-sushi/ check out this also: **LINK**

Cauliflower + Mushroom Risotto

This creamy cauliflower risotto is the perfect low carb side dish. It's so rich and delicious, you won't believe it's grain-free.

Ingredients

- ***1 Tbsp butter***
- 250 gm mushrooms chopped
- 2 cloves garlic minced
- Salt and pepper to taste
- 350 gm riced cauliflower (the frozen version works just as well as the fresh, no need to thaw) can grate it
- 1/4 cup dry white wine
- 1/4 to 1/2 cup chicken broth
- ***2 to 4 tbsp heavy cream - coconut cream***
- Copious amounts of grated parmesan cheese (about 1/2 cup to start, add more as desired)

Instructions

1. In a large saute pan, heat butter over medium heat until melted and hot. Add chopped mushrooms and garlic and sauté until mushrooms are tender and just turning golden brown. Season with salt and pepper.
2. Reduce heat to medium low, add cauliflower, and toss to coat in the butter. Add white wine and cook until the liquid has bubbled away. Add broth a few tbsp at a time, stirring frequently and letting it evaporate each time.
3. When cauliflower is becoming tender, add a little more broth and a few tbsp of cream. Cover with a lid and continue to cook, allowing the cauliflower to steam, until tender (adding a bit more broth and/or cream if needed).
4. Stir in the parmesan and add any additional salt and pepper to taste. Serve with additional grated parmesan as desired.

Recipe Notes

Serves 4 as a side dish. Each serving has 5.24 g NET CARBS.
How long this recipe takes depends on whether you use frozen or fresh cauliflower rice.

Herb Spread

2 big handfuls of herbs (parsley, basil, dandelion etc)
4-6 big handfuls of leafy greens (kale, silverbeet, collard greens etc)
1/2 whole lemon
2 juiced lemons (zest first and add, then juice)
2-3 glugs of olive oil
1 avocado (or not)
Salt & pepper to taste if desired

Wizz... and throw into some old jam jars (GREAT on EVERYTHING)

Seed Crackers

½ cup	Sunflower seeds
½ cup	Pumpkin seeds
¼ cup	Sesame seeds
¼ cup	Poppy seeds
¼ cup	Linseed / flaxseed
¼ cup	Chia seeds
½ tsp	Salt
1 cup	Water
1 serving	Flaky sea salt, to sprinkle

Heat oven to 170C. Place all the seeds and the salt in a bowl, pour in water and mix to combine. Leave for 15 minutes for the chia and flax seeds to soften and bind everything together.
Tip out on to a baking paper-lined oven tray and spread out as thin as possible (around 4mm thick) and sprinkle with some flaky sea salt. Bake for 30 minutes. Remove from the oven and slice into crackers, then return to the oven to cook for another 20-30 minutes until crisp and golden. Remove to a rack to cool then store in an airtight container.

Medicinal plants:

These are foods which ‘talk to our genes’.
As we learn more about prescribing nutrigenomic substances with powerful clinical ‘upstream’ effects, we are reminded that these are the medicines of Nature.

MICHAEL A. ZELIGS. Journal of Medicinal Food. March 2009, 1(2): 67-82. doi:10.1089/jmf.1998.1.67.
Published in Volume: 1 Issue 2: March 12, 2009

Preserving the benefits of vegetables

Here are a few tips that will help you get the most benefits from eating all those great cancer-fighting vegetables:

- **Eat at least 50% raw fruits (max 2 a day) and vegetables 3-6 cups a day.**
- **When cooking vegetables, steam until just tender using a small amount of water.**
- **Wash all fruits and vegetables before consuming.** Choose organic produce if possible, grown without the use of pesticides.

Don’t charcoal your meats!!

Beginners guide for getting more plant-based foods in your diet

Start the day with filtered water and lemon juice or apple cider vinegar & supplements/probiotics

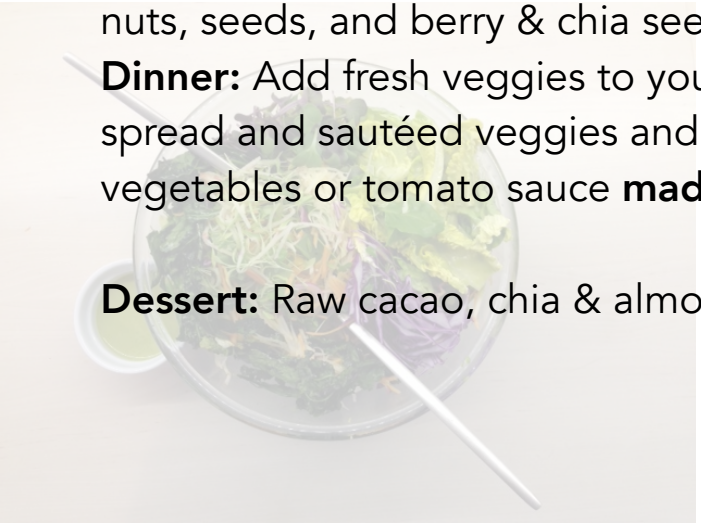
Breakfast: Vegetable juice or green smoothie to start the day, turmeric or herbal tea
Add berries, raw nuts & seeds, coconut, cinnamon & chia seeds
- Smoothie with everything piled in, try something new each day/week (see recipes for ideas)
- Veggie stack with herbs & olive oil, raw chopped nuts and free-range organic eggs
- Soup with toasted chia seed or seed bread

Lunch: Aim for 4-6 vegetables/sprouted foods - purple, red, orange, yellow, green. Eat a big salad filled with your favorite beans, peas, sprouted grains (buckwheat or sprouts) or other combo of veggies. Cabbage, spinach and kale as a base instead of protein. Always with quality oils.

Snacks: Fresh fruit limited if possible to one or two max a day. Keep it high in vegetables. Raw veggies such as carrots,beetrot, cucumbers, peppers, etc. and green herb spread. Keep trail mix made with raw nuts, seeds, and berry & chia seed mix

Dinner: Add fresh veggies to your favorite quinoa or buckwheat dish.Top a steamed broccoli with herb spread and sautéed veggies and avocado, or with salsa. Replace creamy pasta sauces, with sautéed vegetables or tomato sauce **made with healthy olive, hemp, borage and black cumin seed oil.**

Dessert: Raw cacao, chia & almond pudding. Berries with chopped nuts & coconut cream pudding.



Lifestyle

Meditation ‘turns on' **genes** that improve **our** body's resiliency and reduce **our** vulnerability to disease.

AND inflammatory genes.
- Meditation (etc) can reduce the levels of NFKB, therefore reversing the effects of gene expression of **inflammation** caused by chronic stress.

Although long term practitioners had more pronounced results, **changes** were evident after even one session.

https://www.frontiersin.org/articles/10.3389/fimmu.2017.00670/full

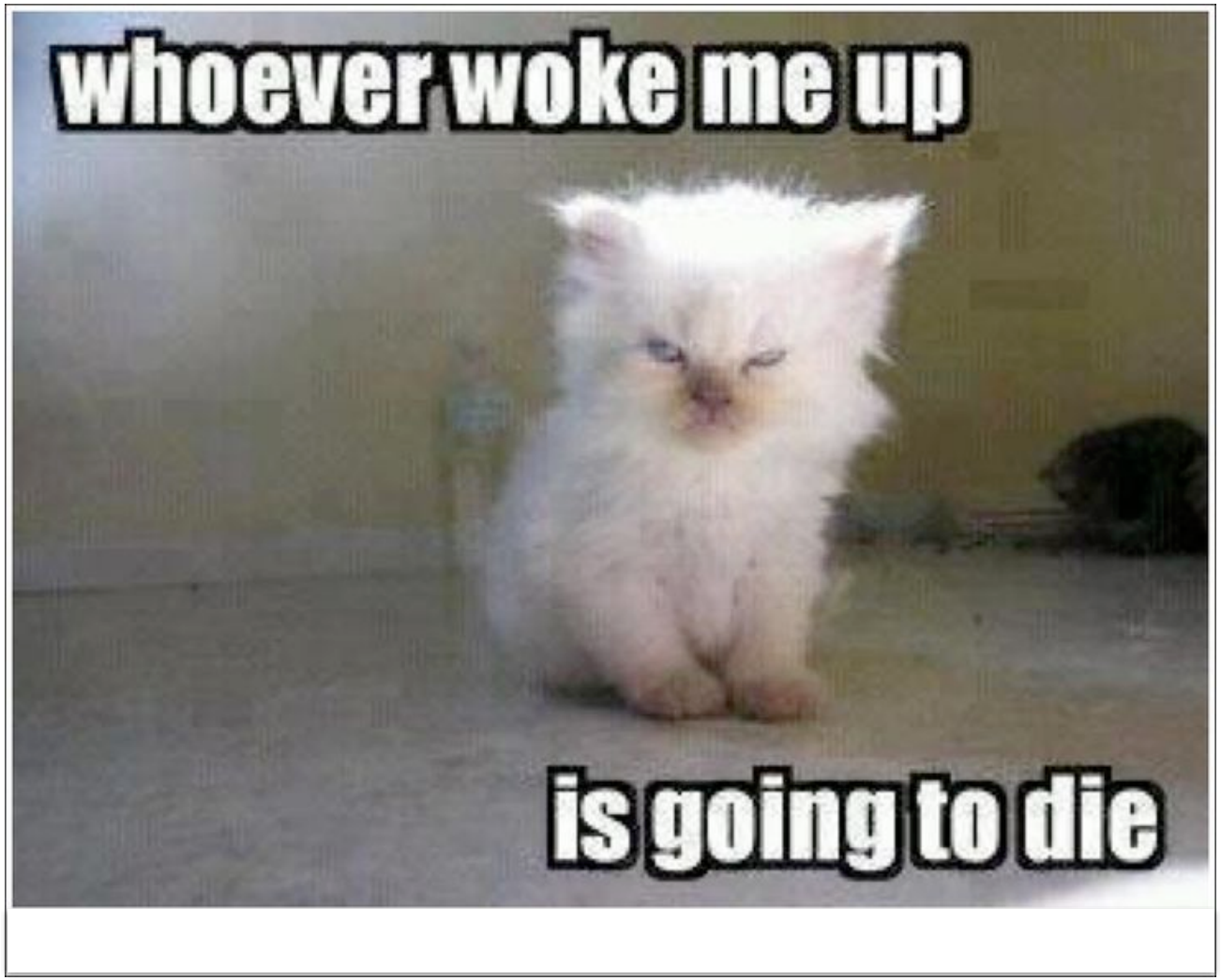
Lifestyle

Studies included:

- mindfulness
- yoga
- Tai Chi
- Qigong
- Breath regulation

https://www.frontiersin.org/articles/10.3389/fimmu.2017.00670/full

Sleep deprivation is also considered a “stress”

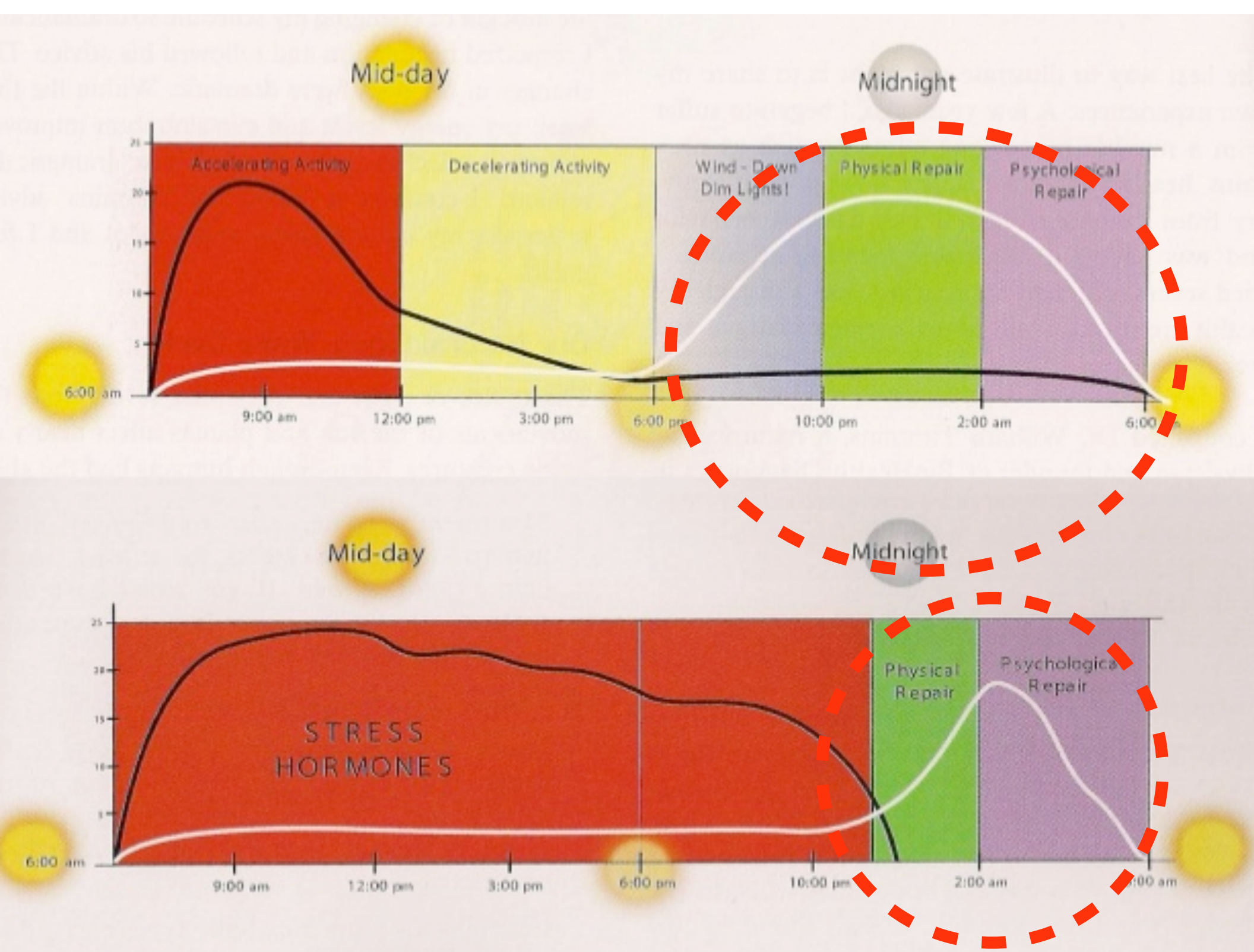


Treating sleep problem in MS

Additional support for addressing sleep problems as an underlying cause of fatigue is more recent findings that effective treatment of sleep problems actually results in reductions in self-reported fatigue and sleepiness in MS. More specifically, in a controlled, non-randomized clinical study, Cote et al. evaluated 62 individuals with MS and referred those suspected of having a sleep disorder for evaluation and treatment at a sleep disorder clinic. Of the 39 (63%) who were diagnosed with a sleep disorder, 21 were treated and 18 were not. Treatment consisted of sleep hygiene advice and then further treatment, which was dependent on the nature of the sleep disorder and included continuous positive airway pressure (CPAP) or other position devices for sleep apnea; treatment of exacerbating factors (e.g., iron or B12 deficiency) and/or pramipexole for RLS; clonazepam for REM behavior disordered sleep; and cognitive behavioral therapy for insomnia. Three months follow-up revealed a significant improvement in fatigue as well as sleepiness, subjective sleep quality, depression, pain, and quality of life among those who were treated. Those not treated did not demonstrate such improvement (39). In another study, progressive muscle relaxation was also shown to improve sleep quality and reports of fatigue in a sample of 32 individuals with MS (47). More specifically, the average score of the fatigue severity scale (48) decreased from 5.75 ± 0.95 (a score above the recommended cutoff of 4) to 3.81 ± 1.30 ($p < 0.001$). Finally, Veauthier et al.

921

378


Mid-day
Midnight
Accelerating Activity
Decelerating Activity
Wind - Down
Dim Lights!
Physical Repair
Psychological
Repair
6:00 am
9:00 am
12:00 pm
3:00 pm
6:00 pm
10:00 pm
2:00 am
Mid-day
Midnight
STRESS
HORMONES
Physical
Repair
Psychological
Repair
6:00 am
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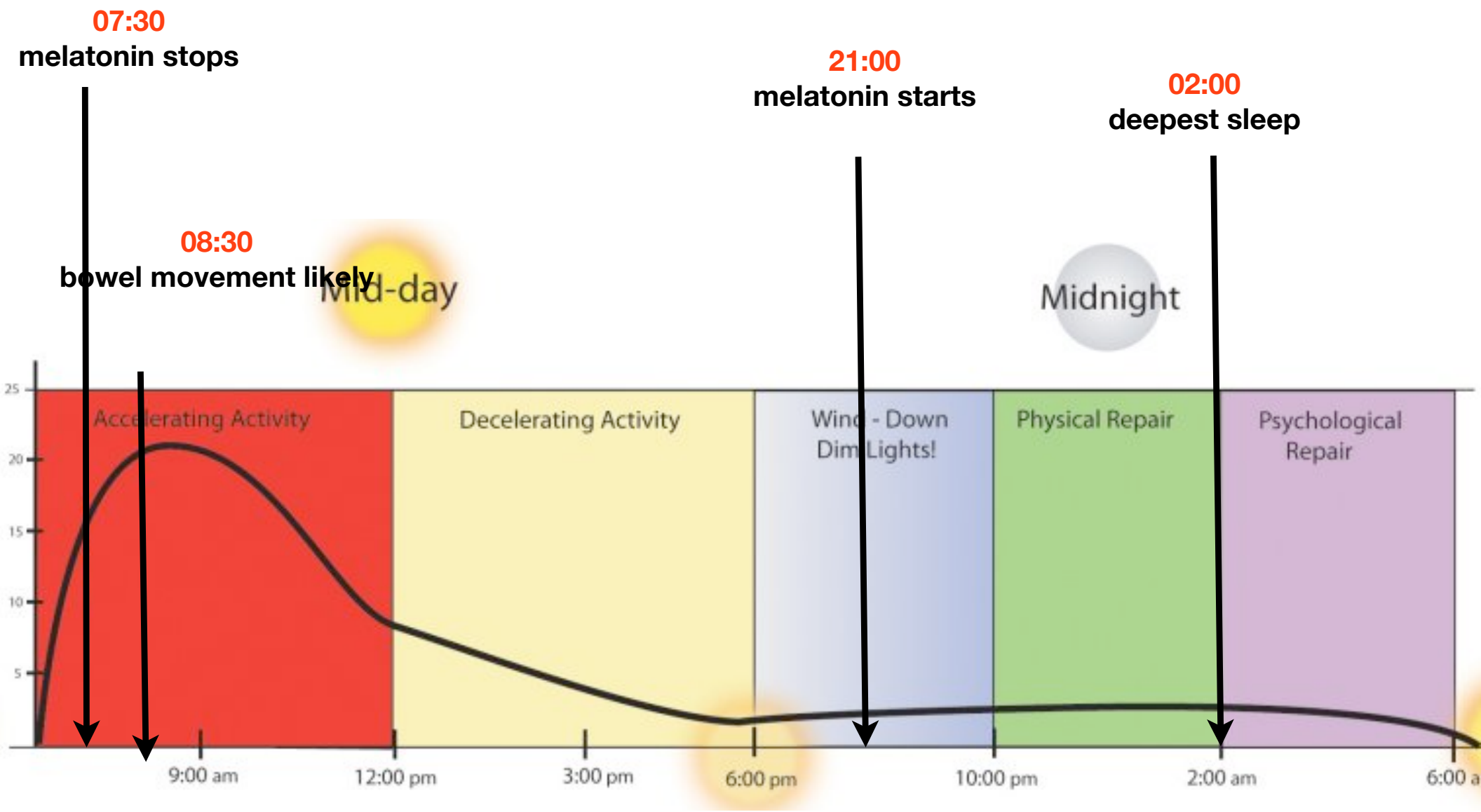
07:30
melatonin stops
08:30
bowel movement likely
Mid-day
21:00
melatonin starts
Midnight
02:00
deepest sleep
25
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5
Accelerating Activity
Decelerating Activity
Wind - Down
Dim Lights!
Physical Repair
Psychological
Repair
9:00 am
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3:00 pm
6:00 pm
10:00 pm
2:00 am
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Proteins

Zinc
B1 B6
Stomach
Acid

L-Phenylalanine
An amino acid

Folate Iron
B3 B6 Vit C
Phenylalanine
Hydroxylase

L-Throsine
An amino acid

Folate Iron
B2 B3 Vit C
Thyrosine
Hydrolase

L-Dopa

Zinc
Magnesium
B6 Vit C
Dopa
Decarboxylase

Dopamine

Copper
Vit C
Dopamine
Hydroxylase

Noradrenaline

SAMe Mn
Phosphorus
B5 Folate
Phenylethanolamine
N-methy1 transferase

Adrenaline

Zinc
B1 B6
Stomach
Acid

L-glutamine
An amino acid

Mg or Mn
Glutamine
Synthetase

L-glutamate

Mg B6
Vit C Zinc
Glutamate
Decarboxylase

Amino Butyric Acid GABA

Blocked by Valerian

Succinate
Breakdown product

Zinc
B1 B6
Stomach
Acid

Methionine
An amino acid

Mg

Zinc
B1 B6
Stomach
Acid

L-Tryptophan
An amino acid

Folate Iron
Calcium B3
Tryptophan
Hydroxylase

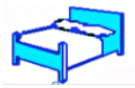
5-Hydroxytryptophan

Zinc
Megnesium
B6 Vit c
Dopa
Decarboxylase

5-Hydroxytryptamine (Serotonin)

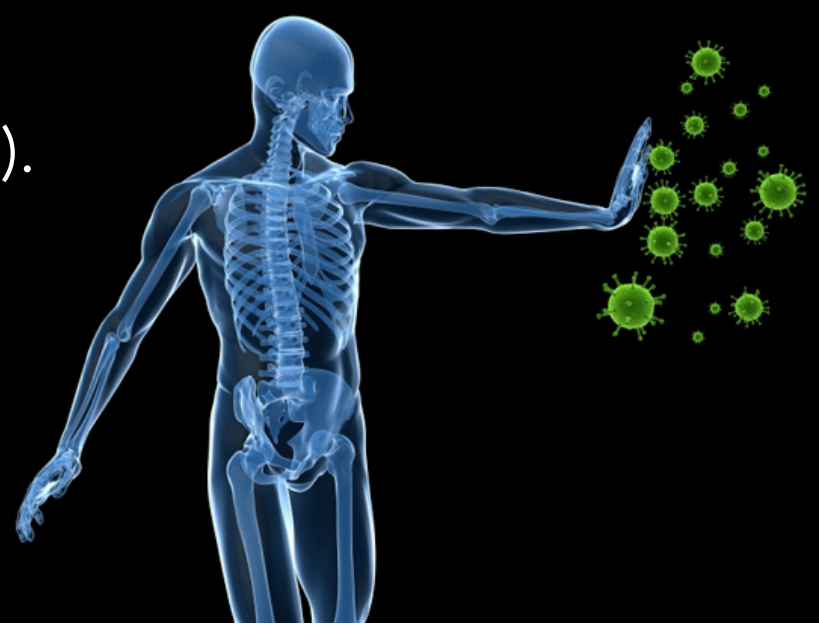
SA Me

Melatonin



To improve the body's healing power:

- A **diet** with ample amounts of vitamins and minerals, antioxidants, and natural protective substances found in **plants**.
- Enough **rest** and **recovery** and **stress reliance** strategies.
- This includes **SLEEP**! Sleep clears toxins in the brain, liver…
- **Low** exposure to **toxins** and heavy metals.
- Get rid of **candida**, **gut** issues, **food allergies** and intolerances.
- Ensure good daily **bowel** movements!
- Regular body-movement (**exercise**).
- **Laugh** daily and **love yourself**.
- **Cut sugar** (effects immune function too!).



Study protocol | Open Access | Published: 02 January 2020

Ketogenic diet and fasting diet as Nutritional Approaches in Multiple Sclerosis (NAMS): protocol of a randomized controlled study

Lina Samira Bahr, Markus Bock, Daniela Liebscher, Judith Bellmann-Strobl, Liane Franz, Alexandra Prüß, Dania Schumann, Sophie K. Piper, Christian S. Kessler, Nico Steckhan, Andreas Michalsen, Friedemann Paul & Anja Mähler

Trials **21**, Article number: 3 (2020) | Cite this article

"Preclinical data suggest that a KD and a FD may modulate immunity, reduce disease severity and promote remyelination in the mouse model of MS...
However, clinical evidence is lacking. This study is the first clinical study investigating the effects of a KD and a FD on disease progression of MS".

Testimonial:

"I have to say, I am feeling so much better that I have to pinch myself to see if I'm dreaming.
After a very busy couple of weeks I expected to have a major flare up this weekend, but nothing, instead I was able to have friends over and go for bike rides with the kids. My daughter even said that it was good to see me being silly and having fun again. Thank you again, this is seriously amazing!"
- S M

The Boyd Clinic

Thank you for listening!

Q & A...

Sept 2020

MS Society is launching Phase 2 clinical trial based on 2019 research

Metformin and an antihistamine **Clemastine** also led to **regeneration of a myelin sheath damaged by MS.**

"Metformin is one of the most exciting developments in myelin repair we have ever seen. Our findings last year shed light on why cells lose their ability to regenerate myelin, and how this process might be reversed,"

Professor Robin Franklin, Cambridge UK