

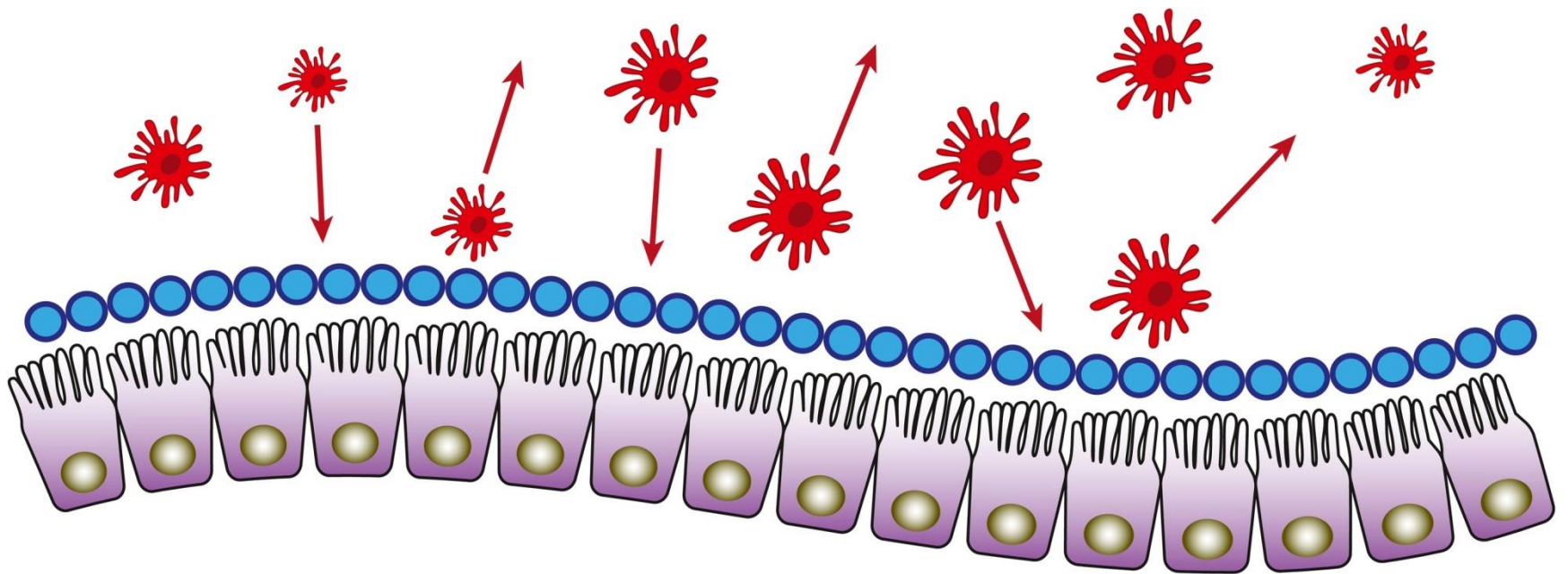
IMMUNE TOLERANCE, ALLERGIES & THE GUT

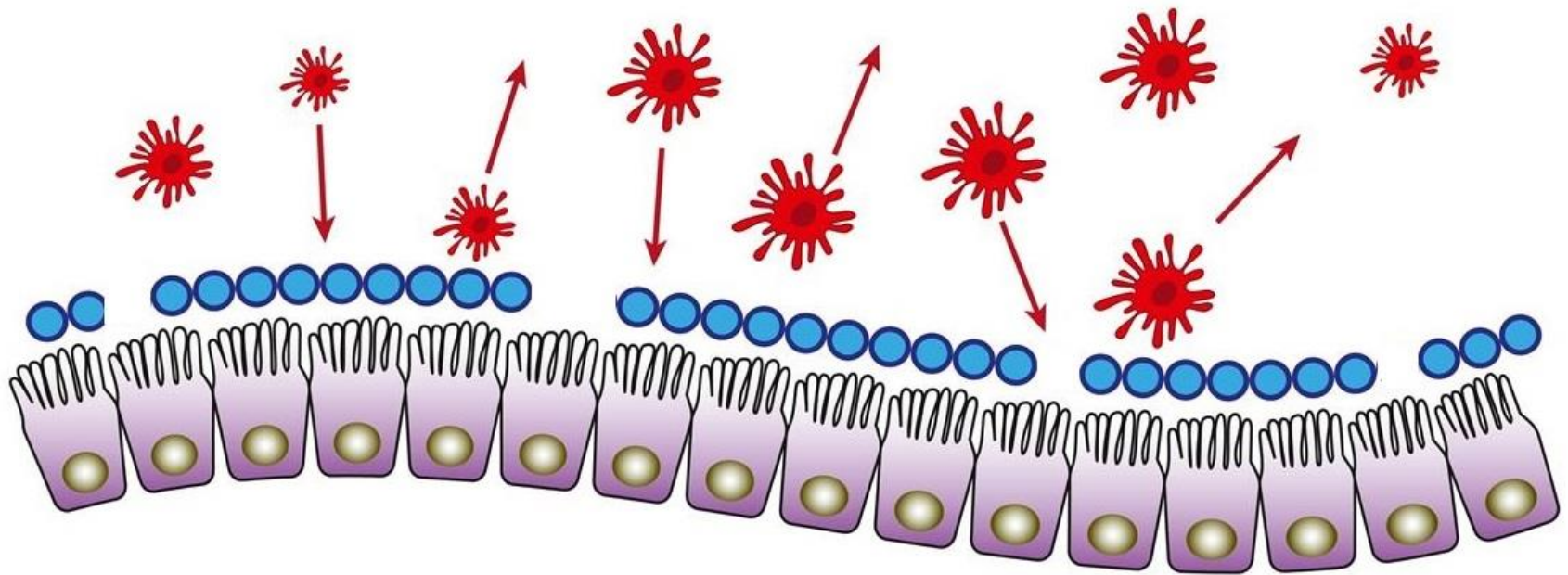


Foods and Sensitivity

- The food is not the issue
- No food is more susceptible to being an allergy or sensitivity than any other food
- There are three factors:
 1. Frequency of consumption – more opportunity for reaction
 2. Prone to developing mold spores and aflatoxins
 3. Lack of good bacteria







Allergies

- Discussion of allergy usually involves a conversation of immune reactions and substances in a factual manner
- Little discussion of the abnormality of the occurrence
- Focus often turns to food as a cause
- Including foods not related to the actual allergen
- Many theories with opposing causes
- Much of the focus is that triggering an immune response: ie inflammation leads to allergy



The Experts

- Depends on who you listen to and what type of diet they are promoting.
- Paleo: Grains are the cause = inflammatory
- Vegan: Animal products = inflammatory
- Nutritionists – Wheat? Dairy? Soy? Nightshades? Salicylates?
- Pick your food – someone will be blaming it for allergies and inflammation
- This is all very misleading and not factual



Inflammation

- There is no such thing as an inflammatory food – the inflammation belongs to the person, not the food
- Dysbiosis promotes inflammatory reactions to foods and the foods with large protein, fat and carbohydrate molecules take longer to digest and therefore, there is more opportunity for an inflammatory reaction to occur
- Certain chemicals in food also can cause inflammatory reactions (nightshades, salicylates foods)
 - Part of the foods immune system



Dairy Study

- Effect of dairy products on biomarkers of inflammation –
- Meta-analysis of 7 randomized controlled studies
- High consumption of dairy lowered C-reactive protein, Interleukin 6, TNF-alpha in 3 of the studies and showed dairy was neutral in the other 4



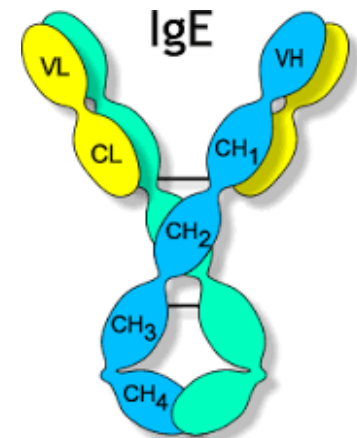
Allergy Refresher

Allergies are an irregular reactions to substances that are not harmful

IgE reactions occur when plasma cells release IgE antibodies specific to that substance and they attach to the surface of the mast cells, which triggers the release of histamine and other inflammatory substances

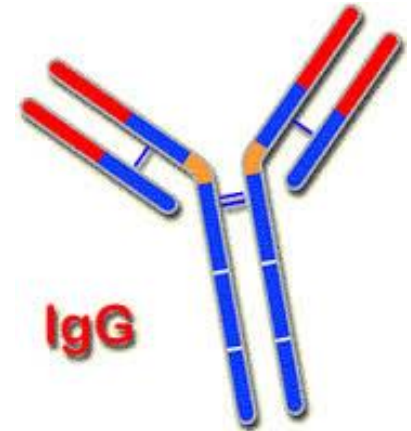
This also triggers the breakdown of occludin and claudin which keeps the tight junctions tight – opening the gut

This is an immediate reaction and easy to diagnose



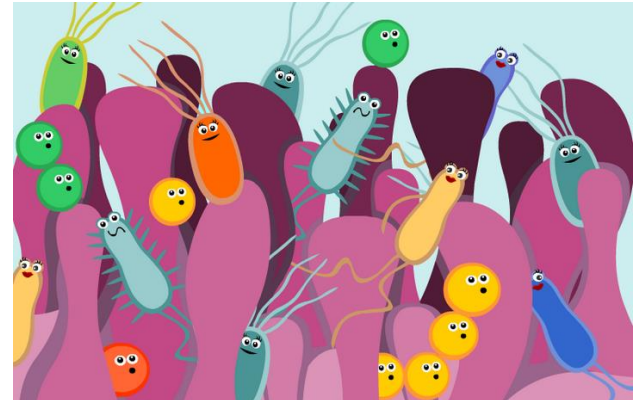
Refresher

- IgG reactions – chemicals, food particles enter through leaky gut and IgG antibodies are formed to the substance
- IgG antibodies can last up to three weeks
- This all part of the adaptive immune system that has to be learned and remembered



Gut Microbes

- Microbes interact with the adaptive immune system constantly
- In order for them to stay in our intestinal system – the immune system has to be able recognize them as foreign but not pathogenic
- The immune system constantly tests the microbes using cells located in the intestinal wall lining



Secretory IgA

- Intestinal cells secrete IgA (SIgA) which promote the removal of antigens and pathogens
- SIgA prevents them from locking onto intestinal wall receptor sites
- SIgA's relationship with the good bacteria allows the immune system to leave the good bacteria alone and target the pathogens
- Further research has found that good gut microbes play a role to stimulate the production of SIgA
- So they are not just sitting there
 - they are active players



Gut Microbes

- There are many ways in which the gut microbes affect the immune response
- Germ-free mouse studies show that these mice have a lower number of immune cells than normal mice
- Introduction of bacteria in young mice allows for them to quickly gain immune cells
- Does not happen in adult mice
- The total exact nature of the relationship is not known



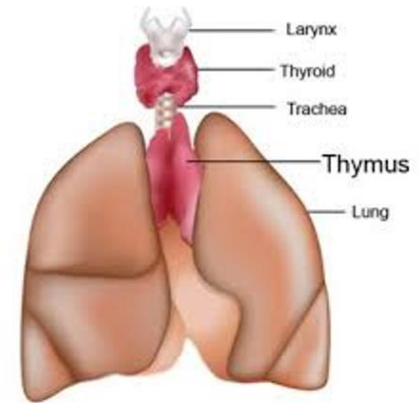
Immune Tolerance

- Refers to the lack of reaction by the immune system to a substance or body tissue
- Baby in the womb has immune tolerance
- Gut microflora have immune tolerance
- Everything else must be given immune tolerance and this is controlled by the gut microflora
- Otherwise, we would be experiencing an immune reaction to everything we are exposed to



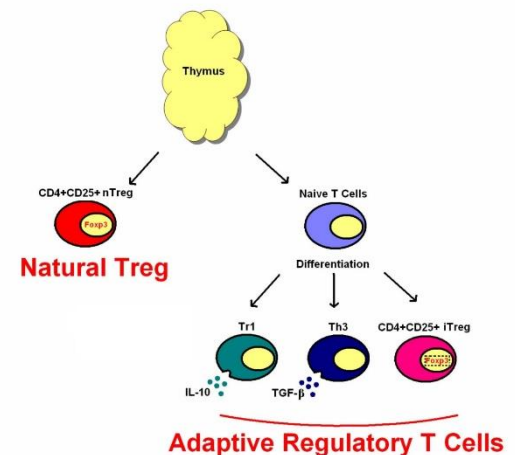
The Role of T-Cells

- The thymus makes T-cells and there are 3 types we are going to talk: reactive self-antigen T-cells, naïve T-cells and regulatory T-cells
- Reactive self-antigen T- cells have the potential to be involved in allergy
- Naïve T cells (made by the thymus) are made into other types
- T-Regulatory cells exist as a distinct type of T-Cell



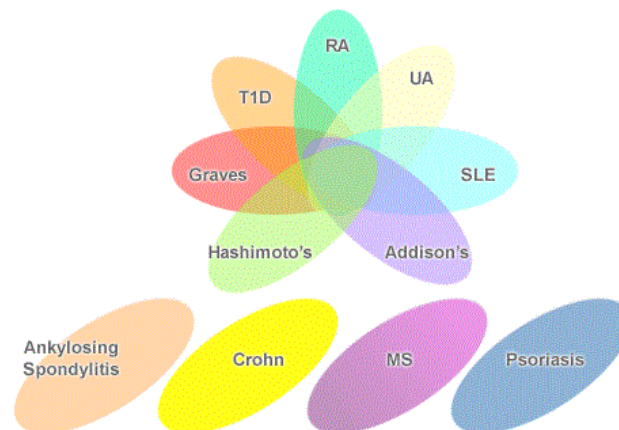
T-Regulatory Cells

- They modulate the immune system and maintain tolerance despite the presence of self-antigen T cells
- Promote anti-inflammatory cytokines which suppresses self-antigen T cell activity
- T-reg cells are produced in higher numbers to enable control and protect immune tolerance by suppressing self-reactive T cells



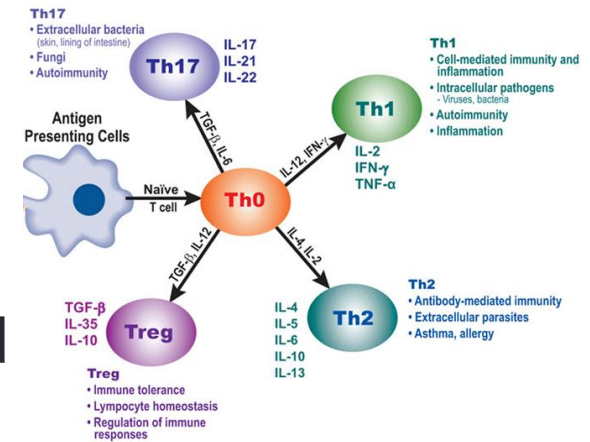
T-Regulatory Cells

- Studies show that people with lower levels of T-reg cells are more prone to allergy
- T-reg cells promote the production of IL-10 which suppresses allergic inflammation
- TGF-Beta is also involved in promoting T-Reg cells and lowering immune response to allergies



Gut Connection

- T-reg cells are also produced in the intestines from naïve T- cells promoted by metabolites (butyrate) made by the good bacteria
- Having sufficient good bacteria is the key to maintaining a normal response (to promote T-reg cells)
- The maintenance of immune homeostasis by the gut is the key to preventing or resolving allergies



Other Advantages of Immune Tolerance

Studies have show that good immune tolerance also means:

- Better ability to fight pathogens
- More robust microbiome
- Increased nutrient absorption
- Better gut-brain connection
- Less ability for pathogens to colonize



Aflatoxins/Mycotoxins

- Known to cause allergic reactions
- Produced by mold on the surface of foods
- How a plant is grown determines the amount of aflatoxins present
- Studies find higher amount in conventional vs organic
- Aflatoxins from mold spores, produced after harvest are the most critical
- Also linked to liver disease



Aflatoxins



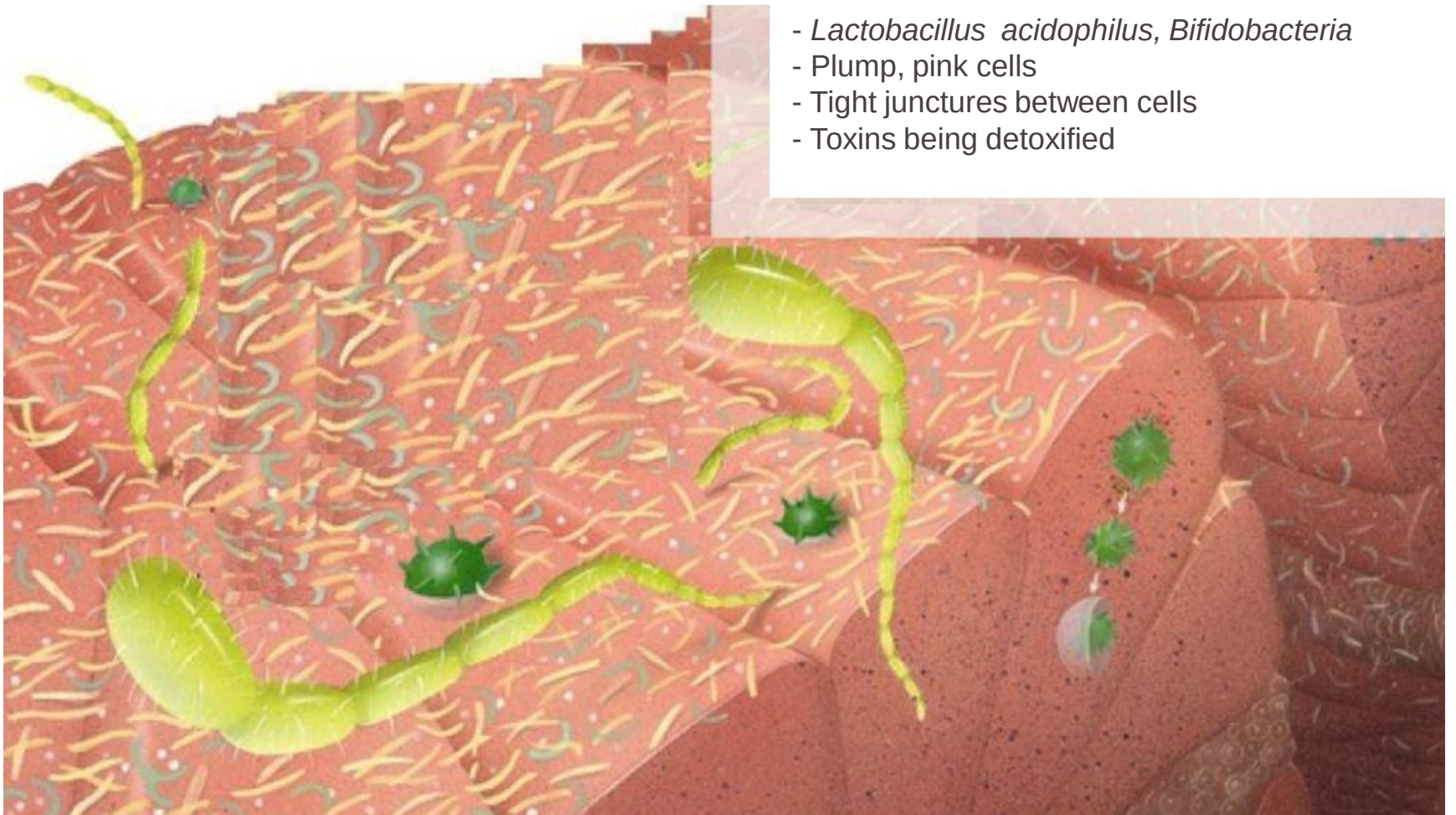
- The higher the phytonutrient content, the lower the aflatoxin content in the food
- Phytonutrients go up in the plant when plant is allowed to defend itself
- Gut bacteria (LAB) can bind aflatoxins, playing a preventative role
- However, too many aflatoxins can deplete good bacteria levels lowering immune tolerance and creating an opportunity for allergy
- Study also found that aflatoxins do not effect the gut lining but can be removed by fluids - triggered by zonulin
- Study of mice found that honey can inhibit aflatoxins and increase good gut bacteria

Allergies and 'Leaky Gut'

The Path To Allergy:

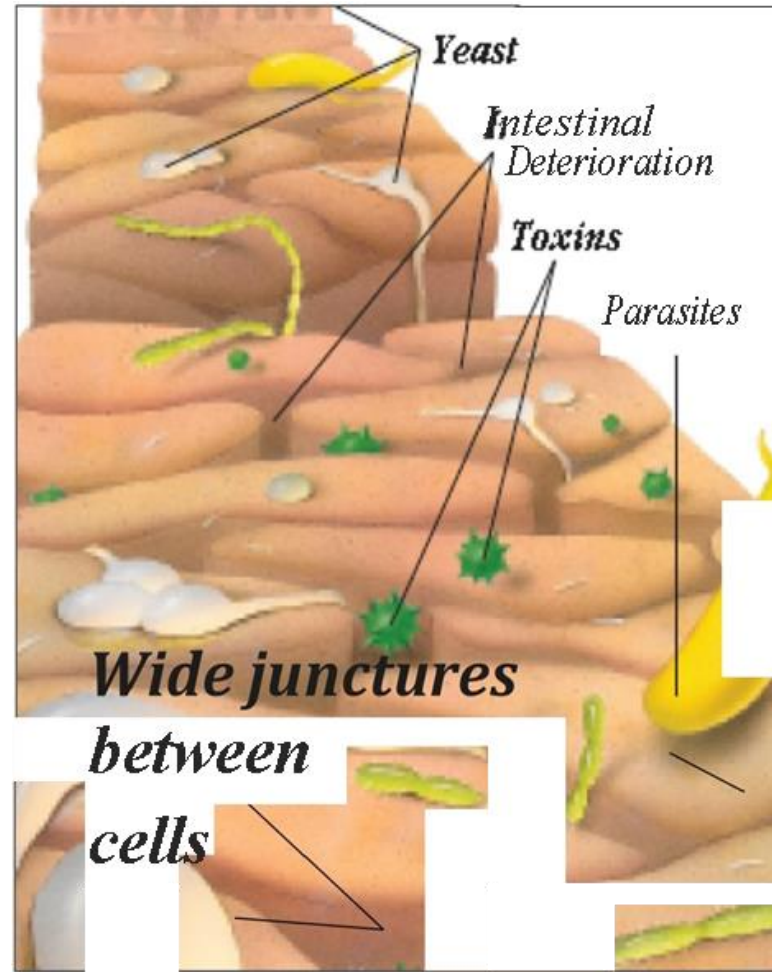
1. Dysbiosis: Must be present – Research shows that dysbiosis preceded the development of allergy
2. Genetic Susceptibility: Not always necessary but common
3. Environmental Triggers: Toxins and chemicals
4. 'Leaky Gut': It's controlled by Zonulin and is often secreted at higher levels in those with the previous three factors - This process is dynamic and reversible.

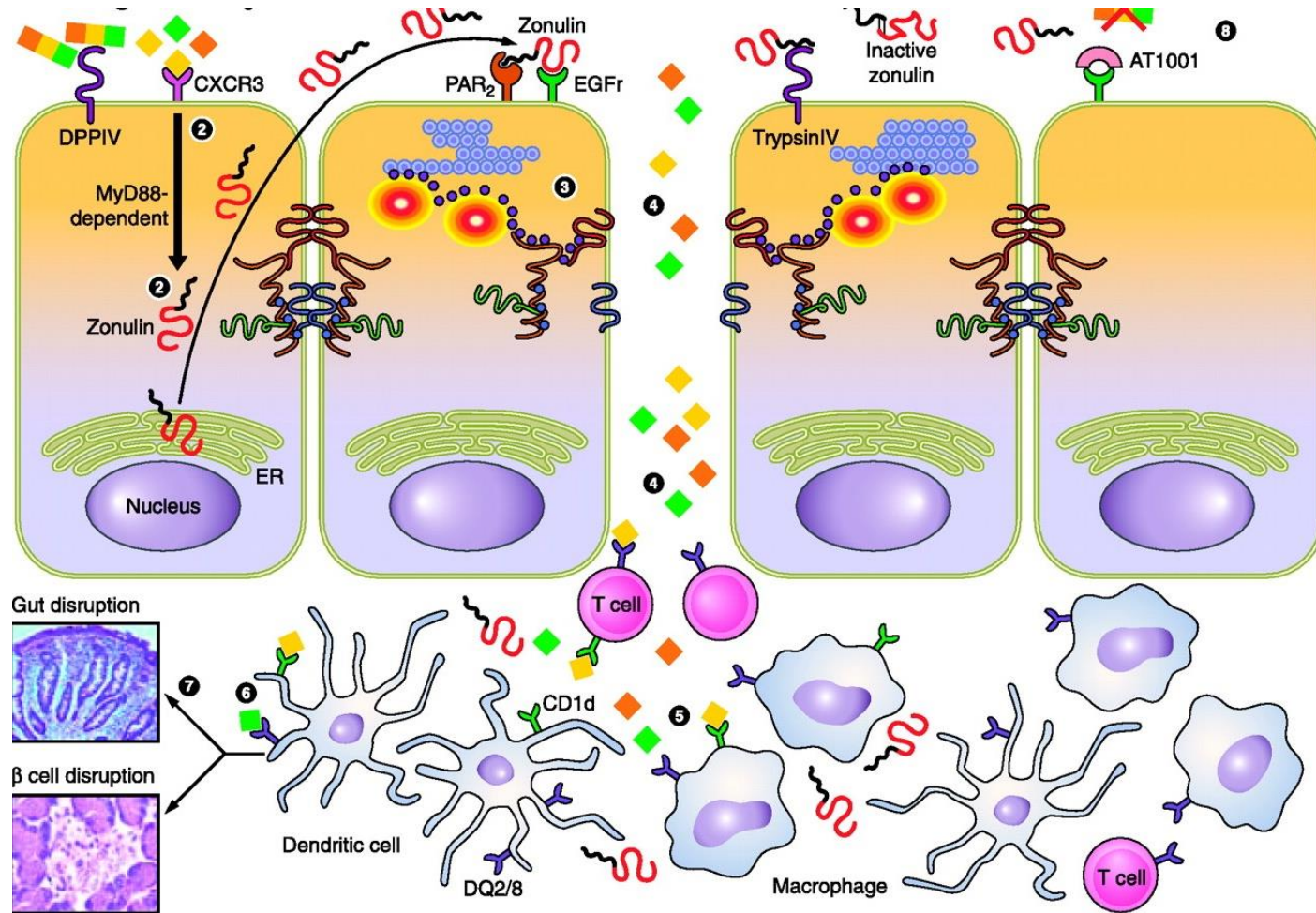
- Abundant healthy bacteria
- *Lactobacillus acidophilus*, *Bifidobacteria*
- Plump, pink cells
- Tight junctions between cells
- Toxins being detoxified



Leaky Gut

Atrophied
Unhealthy
Cells





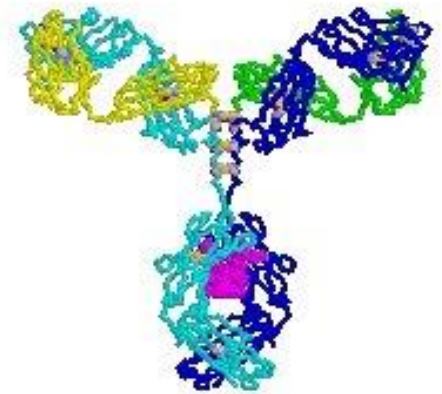
Leaky Gut Benefits

- Gut open and closes on a regular basis
- Triggered by the chemical zonulin – it opens to allow fluids to flood the intestines to flush out toxins and pathogens
- Aflatoxins can trigger zonulin to be released to cause the gut to open – the goal is to flush out the aflatoxin
- So opening of the gut is not a bad thing
- However, when it opens – substances can enter into the blood stream



Leaky Gut

- During this process – toxins and food particles can slip in but the amount of exposure is low
- Some IgG antibodies may form but in most people - not enough to trigger reactions.
- Prolonged open gut allows for more opportunity for IgG antibodies increasing reactions





Invited review

Modulation of intestinal barrier by intestinal microbiota: Pathological and therapeutic implications

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... "alterations in gut microbiota (dysbiosis) have been linked to the recent increased expression of obesity, allergy, autoimmunity, functional and inflammatory disorders such as irritable bowel syndrome (IBS) and inflammatory bowel disease (IBD). In this article, we review the evidence supporting a role of gut microbiota in regulating intestinal barrier function."

function. We discuss the hypothesis that microbial factors can modulate the barrier in ways that can prevent or promote gastrointestinal disease. A better understanding of the role of the intestinal microbiota in maintaining a functional intestinal barrier may help develop targeted strategies to prevent and treat disease.

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Gluten

- 10 healthy adults were put on a GFD for one month
- Colon bacteria was analyzed before and after
- Good bacteria had decreased and bad bacteria had a parallel increase
- Also suppressed immune system function



Gluten

- The key here is to understand why a client is having an issue with gluten instead of blaming the gluten
- Celiacs and other with gluten issues go on to develop other more serious conditions
- If gluten was the cause – then why do they continue to have health issues



Aspergillus Niger

- *Aspergillus niger* prolyl endoprotease is an enzyme that digests gluten
- In a double-blind placebo controlled study of healthy volunteers - AN-PEP significantly enhanced gluten digestion in the stomach - increasing caloric density, prolonged the gastric residence time of the meal.
- Certain strains of *aspergillus niger* produce helpful enzymes (and do not produce mycotoxins)
 - they are considered part of the healthy microbiome and decreases when dysbiosis is present

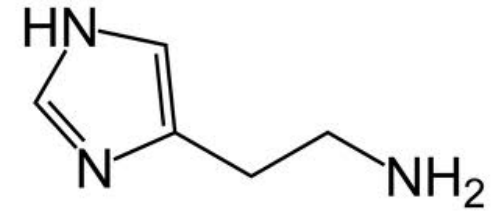


Dipeptidyl Peptidase IV (DPP IV),

- This is a brush border enzyme that aids the break down of gluten
- Celiacs have low levels
- Low levels have been indicated in other health conditions –dermatitis and cancer, Diabetes Type 2
- Lactobacillus helveticus, Lactobacilus acidophilus, Lactobacillus rhamnosus and bifibobacterium contain signals for DPP IV and are associated with digesting exorphins
- DPP IV are also associated with the digestion of casein
- Lactobacillus lactis inhibit activity
 - therefore gut bacteria regulates function



Histamine



Histamine

- Some people cannot tolerate fermented foods – this is due to histamine and enzyme insufficiencies (histamine intolerance)
- If the body is unable to break down histamine, then symptoms will arise in the gastrointestinal system
- Gut bacteria and the liver both make cytochrome P450 enzymes to break down histamine
- *B. infantis*, *B. longum*, *L. rhamnosus*, *L. salivarius*, *L. sporogenes*, *L. plantarum* and *L. gasseri* break down histamine
- *B. infantis* could be very important to those not breast fed
- *L. casei* and *L. bulgaricus* increase histamine

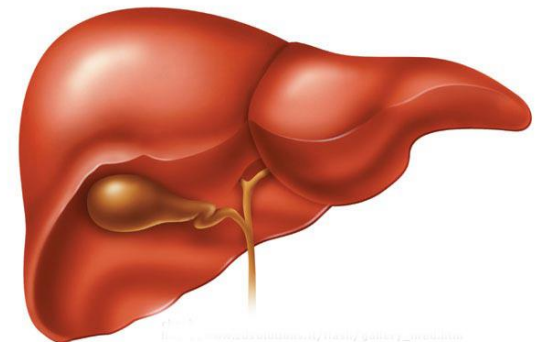
Helping Histamine Intolerance

- Take a probiotic that does not have strains that prevent histamine release (Xymogen)
- Eat prebiotics foods or perhaps take a prebiotic
- Do a food journal and take our high-histamine foods that seem to bother them in the short-term
- Support the liver – this will vary from client to client – milk thistle, Jerusalem artichoke, sarsaparilla



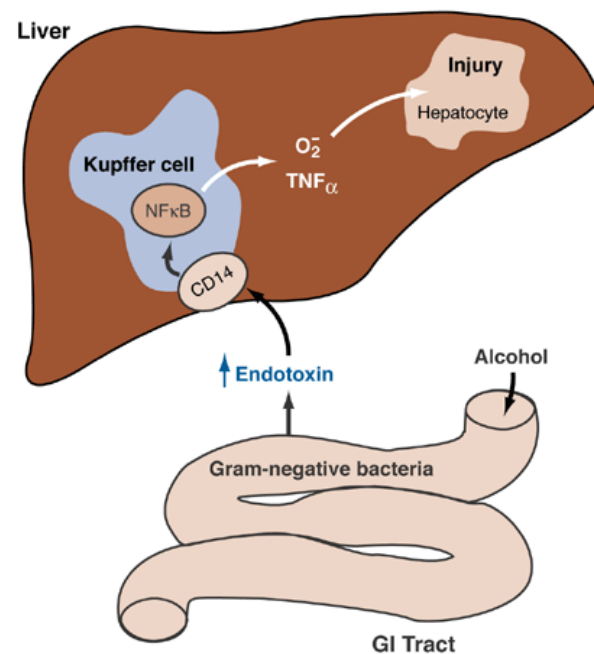
Liver and Allergies

- Liver and gut are connected
- Liver also produces T-reg cells which secrete IL-10 in response to controlling allergic reactions
- This also makes Kupffer cells, which generate immune responses, non-reactive
- In other words T-reg and Kupffer cells (KC) work together for immune tolerance
- SCFA such as butyrate (made in the colon) travel to the liver to promote T-reg cells



Liver Damage

- Alcohol and other liver stressors exacerbate the immune response in the liver
- Alcohol and its ability to induce leaky gut allows for more endotoxins to enter the blood stream and head for the liver
- Kupffer cells are activated
 - the more endotoxins, the more Kupffer activation – chemicals and free radicals damage liver
- Allergic reactions will also increase



Hope for Allergies

- Double blind placebo controlled randomized study of 56 children
- Experimental group received oral peanut immunotherapy and *Lactobacillus rhamnosus* CGMCC 1.3724
- Placebo group receive just the oral immunotherapy
- 89.7 % in the experimental group were non-reactive versus 7.1% for the placebo group
- Desensitization was sustained up to 2-5 weeks



In Summary

- In order for allergy to be present, there must be a loss of immune tolerance
- Immune tolerance is regulated by gut bacteria (and liver)
- Proper digestion of foods includes the brush border enzymes which are regulated by gut bacteria
- The gut is a complex array of organisms and other players like beneficial fungus which can also produce special enzymes
- Food is not the issue
 - it is the symptom
- So what can we do?



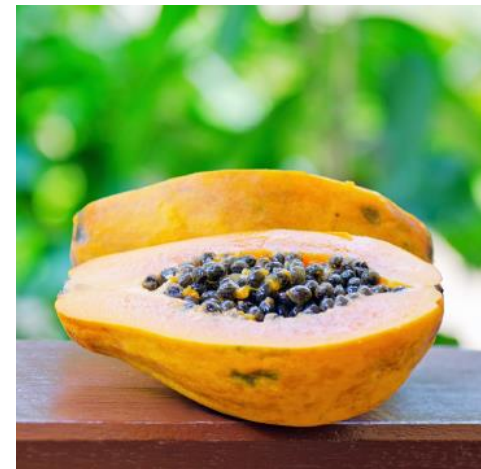
What We Can Do

- Vitamin A, C and D helps promote the production of brush border enzymes
- SCFA, good bacteria, Omega 3 and Vitamin D promote IL-10
- Prebiotics help grow our own residential bacteria which is essential
- Butyrate (SCFA produce from resistant starch and bifidus bacteria) promote T-reg cells
- Glutamine helps repair gut lining



Protocol

- If there are know allergens, remove them
- Probiotics –see the strains chart
- Probiotics and fermented foods (unless client reacts to them) are helpful for restoring immune tolerance and protecting the gut lining (preventing leaky gut)
- Support the liver
- Digestive enzymes to ensure the food is broken down so the client can benefit from the nutrients
- Butyrate as a supplement



And Finally...

- No one can state that allergy can be reduced at this time
- We only know pieces of the puzzle
- What we do know now does change what we know about Leaky Gut and the pathway to allergy
- Gut health strategies are comprehensive and go beyond recommending probiotics.
- What improvement we can achieve with this new info takes time – but it is worth it as a major underlying imbalance with huge health implications will be improved.
- And remember...
- It is not the food's fault

