Summary of Module 2

Role of Good Bacteria

Our Good Bacteria – Slide 2

Here Is The Issue – Slide 3

The Role of Good Bacteria – Slide 4 – 6
Lactose Intolerance
Improve Immune function – IgA
Helicobacter Pylori
Antibiotic associated Diarrhea (AAD)– Slide 5
C. Diff
Lactose rhamnosus may reduce risk of AAD - Slide 6
Taking Probiotics with antibiotics
Superinfection

C. Diff – Slide 7
C. Diff – Slide 7
VSL #3 – Slide 7
Yeast such as *Candida albicans and fungi* can also produce superinfections when bacteria is eliminated by antibiotics – Slide 7

Good Bacteria and Carbs – Slide 8
Short Chain Fatty Acids (SCFA)
Butyrate, propionate and acetate
Resistant starch and fiber
Low levels of good bacteria decrease SCFA production

Good Bacteria - Slide 9
Improves mineral absorption and can help correct malabsorption of trace minerals
Prevents the growth of harmful bacteria where we are stressed
Reduces Inflammation
Provides non–immunological protection against infection
Stimulates the immune system to mature at birth and keep its balance
Regulates and primes the immune system throughout life

Irritable Bowel Syndrome (IBS) and Colitis – Slide 10
IBD, IBS and Colitis
Symptom based diagnoses
Common theory of IBS

Various health benefits from probiotic consumption chart – Slide 11

Other Functions – Slide 12 & 13
Other functions of good bacteria include: Essential to organ development – including the intestines, liver, heart and lungs. – Slide 12
Facilitates a wide variety of metabolic functions and can affect:
- metabolic diseases
- mental disease and mental health
- CVD and various mechanisms
- Cholesterol lowering
- Helps with lowering blood pressure – Slide 12

Drives intestinal mucosal cell turnover, and maintenance of villi and cell lining wall structure, increases development and physical size of lymph system and systemic and mesenteric lymph nodes, Reduces food intake by regulating appetite and satiety and Regulates physiology:
- Increases cardiac output, and oxygen consumption
- Increases intestinal motility, secretion, and absorption – Slide 13

GIT – Slide 14
Tight junctions
Reduces secretion of E. Coli
Anti bacterial and anti microbial agents
Stimulates enzyme production
Increase the production of mucous and mucin
Deconjugation of bile

Three ways to Detox – Slide 15
1) Liver detoxification
2) Cellular detoxification
3) Enteric microflora detoxification

Detoxification Continued…. – Slide 16
Liver detox phase I and phase II
Bile detaches in the ileum
Intestinal Flora Epithelial Phase I & II
Enterocytes and colonocytes
Production of P450 enzymes functionality of gut is considered to approach that of the liver

Detoxification and Toxin Production – Slide 17
Heavy Metals
BPA and Nitrosamines
Biotransformation of plant polysaccharides (Help prevent colon and breast cancer)

Biotransformation – Slide 18
Release of quercetin by bacterial β-galactosidase
Quercetin & rutin have been shown to be powerful anti-mutagens, anti-cancer and chemoprotective
Plant polyphenols
Release of dietary glucosinolates (isothiocyanates) found in cruciferous has effect of regulating cytochrome P450 enzymes in liver and have anti-cancer benefits

Gut Brain Role – Slide 19
Breaks down exorphins, which play a role in autism and ADHD
Increases and regulates serotonin production
Blunts sensory nerves – helps with pain reduction
Aids cognitive function although how is not known.
Produces anti-depressive effects

Metabolic Physiology Role – Slide 20
Prevents obesity
Stroke recovery
T-reg cell stimulation and regulation
Maintain and enhance the normal function of the intestinal mucosa (Leaky gut, SIBO)

Summary of Function – Slide 21 & 22

Transient v. Residential Bacteria

Good Bacteria – Slide 2
Misunderstanding about role of fermented foods and probiotics

Residential – Slide 3 & 4
Bacteria native to you – Good or Bad
Develops as a baby and reaches adult level by age two
Diet and lifestyle affect it
Only bacteria that can colonize in our gut
Difficult to re-colonize small intestines than large – Slide 4
Quality of intestinal wall lining important

Transient Bacteria – Slide 5 & 6
It is the bacteria we get in probiotics and fermented foods
They just passes through
They can perform the same functions as our residential but they do not stay and colonize

Human microflora in probiotics lasts the longest (up to two weeks after a person stops taking them).
Pathogens that are ingested are also transient – they are not colonizing – Slide 6
Fungus and Yeast
Specific Aspergillus niger strain perform useful functions

Aspergillus Niger – Slide 7
Makes Enzyme called asparaginase which prevents formation of acrylamide
Produces phytase enzyme
Produces transglucosidase (TGD) enzyme
Produces aflatoxins

Dysbiosis – Slide 8
Dysbiosis is the term for lack of good bacteria
Prebiotics food may be poorly digested causing numerous symptom
Pathogenic bacteria, yeast and fungus can produce toxins that cause symptoms
Fermented foods and some probiotics may cause symptoms

Replenishing Gut Bacteria – Slide 9
Prebiotic foods help the residential colonize
Probiotics and fermented foods can take pressure off and create an environment helpful for residential to colonize
Enhancing the health of the intestinal wall lining helps aid the colonization process for the residential bacteria
SCFA can help heal the gut along with glutamine and other intestinal nutrients.
Creating a proper protocol for each client

Understanding Strains

Name of the Strain – Slide 2
1000 species and 5000 strains

Strains are named as follows:

Example: *Lactobacillus rhamnosus GG*
Lactobacillus = the name of the genus
Rhamnosus = the name of the species
GG = the name of the strain

Understanding Strains – Slide 3
Understanding what the more common strains can do allows us to better pick a supplement for a client.

Prebiotics

Prebiotics – Slide 2
Feeds good bacteria
#1 way to promote the growth of residential bacteria
Found in food that already has numerous health benefits

Oligosaccharides – Slide 3
They are smaller saccharides chains of 3-9 glucose molecules or other monosaccharides
Fructo-oligosaccharides (FOS) consists of fructose molecules
Galacto-oligosaccharides (GOS) consists of galactose molecules
GOS is found in dairy products and legumes

FOS – Slide 4
Promote good bacteria levels and SCFA
Increases nutrient absorption, lowers serum cholesterol, triglycerides and phospohlipids

GOS – Slide 5
GOS relieves constipation
It stimulates lactobascilus and bifidus strain in infants
Inhibits growth of pathogens
Aids nutrient absorption and synthesis of vitamins
Aids the brain gut connection

Isomaltooligosaccharides (IMO) – Slide 6
Similar to FOS and GOS
It is the least likely to cause gas, bloating or other digestive discomfort.
Now being added to GI supplements instead of FOS
Help promote gut bacteria in a similar fashion to FOS
Found in grains and potatoes

Resistant Starch – Slide 7 & 8
Has both soluble and insoluble properties
There are four types:
Type 1 - found in grains, seeds and legumes
Type 2 - found in green bananas and raw potatoes
Type 3 – found in starchy foods that are cooked such as potatoes and rice and then cooled causes the starch to change to resistant starch in a process called retrogradation
Type 4 – is man-made via a chemical process
Resistant starch is considered helpful for those suffering from Crohn's, Colitis, diverticulitis, constipation and diarrhea – Slide 8
Improves insulin sensitivity

Resistant Starch – Slide 9
Increases SCFA production in the colon
Reduces inflammation and the risk of colon cancer
Feeds the good bacteria to help them reproduce
May bind with bad bacteria and force them to be excreted
Resistant starch is more likely to feed the good bacteria in the small intestine

Keystone Bacteria – Slide 10
Ruminococcus bromii is a special type of bacteria researchers are calling a “keystone” bacteria and aids the break down of resistant starch
Lack of this bacteria strains and it’s relatives, limits degradation of resistant starch, producing less SCFA
No food or supplement sources for this bacteria at this time

Food Sources – Slide 11
FOS and Inulin: Jerusalem artichokes, chicory, garlic, onions, dandelion greens, asparagus, bananas, blueberries, almonds, broccoli, cabbage, kale, cauliflower, radish, chia, flax
GOS: Dairy products and legumes
Resistant Starch: Wheat, rye, spelt, kamut, barley, oats, corn, brown rice (and cooled white rice), potatoes, sourdough

In Conclusion – Slide 12

Benefits of Short Chain Fatty Acids

Short Chain Fatty Acids – Slide 2
Aid colon function

Synthesis of SCFAs – Slide 3

The large intestinal flora ferments soluble fibre and produces approximately 20-30 g short chain fatty acids a day - acetate, propionate and butyrate
Ratio 3:1:1 95% absorbed 5% excrete
The epithelial cells of the colon get approximately 50% of their energy requirements from butyrate produced by the microflora.
5- 10% of the body’s energy is from SCFA’s

Butyrate – Slide 4 – 8
Nourishes the colon mucosa
Produces T-cells in the gut
Acts as an anti-inflammatory

Helpful for IBD, colitis, allergy and autoimmunity
Boost immune function – Slide 5
May prevent cancer
Helps to prevent cancer from spreading
Helps prevent heart disease and lowers cholesterol – Slide 6
Helps prevent strokes
Stabilizes blood sugar
Helps memory and cognition
Helps Leaky Gut – Slide 7
Cells deprived of Butyrate – Slide 8

Propionate – Slide 9 – 10
Can lower lipogenesis and serum cholesterol
Can also inhibit the formation of cancer cells
Help glucose metabolism and lowers glycemic response
Helps create a protective barrier against pathogens in the gut – Slide 10
Helps with repair of the gut lining
Help reduces food intake and aids the maintenance of weight

Acetate – Slide 11 – 12
Can be metabolize to acetyl CoA which aids the process of acetylation
Acetylation is helpful in detoxing pro-inflammatory histones
Acetyl CoA fuels the production of acetyl groups which can help make acetylcholine - essential for memory and cognition
Acetylation is also a process for Phase II liver detoxification – Slide 12
Acetate is the most predominant SCFA in feces
Aids gut motility and maintaining the gut lining

Food sources – Slide 13

The Liver & Gut

Liver and Gut – Slide 2
One does not work well without the other

Gut Health for Detoxing – Slide 3

How the Gut Helps the Liver – Slide 4
Help the liver with glucose, glycogen and triglyceride metabolism
Eliminates toxins produced by bad bacteria
Stimulate enzyme production in the liver
Help prevent and heal a fatty liver and lower liver enzymes

Can detox out chemical and heavy metals before they enter blood stream

LPS – Slide 5 – 6

Lipopolysaccharides are endotoxins
They are produced by bad bacteria
They have been indicated in brains conditions such as autism, Alzheimer's, Parkinson's
LPS cause liver damage (stimulates Kupffercell activity)
Il-10 (the good guy) regulates inflammatory cytokines
IL-10 also prevents the ability of LPS to lock onto receptors and do damage – Slide 6
L. plantarumand L. reuterienhance IL-10 production
SCFA produced in the colon migrate to the liver to promote T-reg cells which stimulate IL-10 production

Hepatic Encephalopathy – Slide 7 – 8

A deterioration in brain function in people with acute liver failure or chronic liver disease
The brain requires a healthy liver to function
Three Types:

1. Acute liver failure (with no previous liver disease)
2. Portal systemic failure
3. Cirrhosis (late stage)

Symptoms: Trouble sleeping, difficulty concentrating, memory issues, slow reaction times, anxiety, mood and personality changes – Slide 8
Severe state: Drowsiness, disorientation, slurred speech, unconsciousness, coma

Issues That Make HE Worse – Slide 9

Constipation
Infections
Kidney problems
Dehydration
Surgery
Sleeping pills, antidepressants, tranquilizers
Alcohol
Portosystemic shunt

Treatment – Slide 10

Alternative:
Probiotics
Antimicrobials,
Branch-chain amino acids –Isoleucine, leucine and valine helps remove ammonia
Fibre –ground chia, ground flax or psyllium seed/husk –helps remove ammonia
Prebiotics foods and fermented foods

Probiotics – Slide 11
Discusses study of 70 severally alcoholic men, given L. plantarumand and B. bifidum

Liver/Gut – Slide 12
Liver detox phase I and phase II
Bile is antibacterial
Bile acids are an acids but bile is a combination of acids and salts, phospholipids, cholesterol, water, and electrolytes

Supporting the Liver – Slide 13 – 14
Milk Thistle
Jerusalem artichoke
Sarsaparilla
Burdock
Chanca piedra - Slide 14
Bitter foods
Liver friendly foods
Probiotics –L. rhamosusand L. breve lower TNF Alpha and L. paracasei lowers IL-6 related to LPS and liver issues
L. caseiand B. Lactis reduce tissue damage in the liver (and the intestinal mucosa)

Fermented Foods – Slide 15
Kimchi contains bio-chemicals such as isocyanate and sulfide that help detox out heavy metals from the liver and kidneys

And Finally… - Slide 16
Good liver strategy

Heart Disease, Diabetes and Obesity

Heart Disease – Slide 2
Cholesterol has benefits to the microflora
Plant sterols

Cholesterol – Slide 3 - 4
B. longum SPM1207 - cholesterol lowering
Lactobacillus helveticus and Saccharomyces cerevisiae lowered LDL and raised HDL
High cholesterol is related to chronic inflammation – Slide 4
Good bacteria regulates inflammation in the body lowering IL6 and increasing IL 10
L. Acidophilus has been shown to free up cholesterol from bile salts
L. Casei removes cholesterol

Hypertension – Slide 5 - 6

C-reactive protein
CRP, as a pro-inflammatory agent, it is associated with with the release of interleukin-6 and is a factor in IBD
The microflora lowers IL-6 and increases IL-10
IL-6 has been indicated as a factor in hypertension
ACE (Angiotensin-Converting Enzyme) produces angiotensin II which cause the narrowing of arteries and release hormones that can raise blood pressure – Slide 6
Bifidobacterium longum 5022 showed the highest ACE inhibitory potential, followed by L. delbrueckii ssp. bulgaricus 1368, L. casei 15286, S. thermophilus 1275, and L. acidophilus 4461

Stroke – Slide 7 – 8
TMAO
Clostridia, *Proteus*, *Shigella*, and *Aerobacter*
Phosphatidylcholine in the gut can also play a role in TMAO in the presence of the same bacteria
Regulatory T cells protect the brain after stroke – Slide 8
Gut bacteria increase T-reg cells levels which produce IL10 – anti-inflammatory (L. casei and L. reuteri)

Diabetes and Obesity – Slide 9
L. plantarum and L. gasseri are associated with weight loss

Obesity – Slide 10
Mention of studies
different microbial composition for obese versus lean

Diabetes – Slide 11 – 12
Lactic acid bacteria
A specific fungus (aspergillus niger) has the ability to convert starch molecules to oligosaccharides and feed the good bacteria (instead of being absorbed as glucose)
Mention of studies – Slide 12
Diabetes II has been linked to chronic inflammation

Protocol Strategies – Slide 13

Osteoporosis, Arthritis, CFS and Fibromyalgia

Osteroporosis – Slide 2 – 3
Good bacteria aids the absorption of calcium
L reuteri, L casei and L gasseri help with calcium absorption and increasing bone density
Osteoclasts and osteoblasts
Lactobacillus reuteri increases vitamin D levels by about 25% - Slide 3

Building Bone Density – Slide 4
Increase mineral solubility
Producing the phytase enzyme
Reducing intestinal inflammation followed by increasing bone mass density
Hydrolysing prebiotics in the intestines by *Lactobacillus* and *Bifidobacteria*.

Osteoarthritis – Slide 5 – 6
Predisposition to GIT disturbances is common in people with musculoskeletal conditions
The gut microflora regulates inflammation in the body
Free radicals and inflammation linked to cartilage destruction
nitric oxide – can damage tissues and inhibit collagen formation in cartilage
NSAIDs, aspirin and ibuprofen damage the gut lining and increases dysbiosis – Slide 6
Sulfur essential to maintaining cartilage

Sulfur – Slide 7
Glycosaminoglycans (GAGs) - building blocks of joint cartilage
Sulfur maintains cross-linking of connective tissue and strengthens them
Bad Bacteria, especially Streptococcus, Enterococcus and Prevotella, turn sulfur into hydrogen sulfide gas.

Chronic Fatigue Syndrome – Slide 8 – 9
Cause is unknown and it causes a variety of symptoms include fever, aching, and prolonged tiredness and depression
Low grade inflammation has been linked to depression as has leaky gut which are both present in CFS sufferers
Gut dysbiosis is linked to fatigue and poorer immune functions – Slide 9

Fibromyalgia – Slide 10
Study show patients with fibromyalgia and IBS tested positive in a LBT (Lactulose Breath Test) which measures abnormal bacterial levels
Low endocrine and immune function are also factors

In Conclusion – Slide 11

Gut Bacteria and Immune Tolerance

The Immune System – Slide 2 - 3

Immune Reaction – Slide 4
Allergy and autoimmunity require an inflammatory response and the reactions cannot occur without it
Gut bacteria influences the immune response

Dendrites – Slide 5

They play a key role in keeping the tight junctions between intestinal wall lining cells closed
This also plays a role in preventing allergic and autoimmune reactions and inflammation
Gut bacteria activate dendrites

GALT – Slide 6
GALT (Gut-Associated Lymphoid Tissue)
Gut bacteria is essential for the protein and the nutrients that GALT needs
Gut bacteria are a major source of natural antigens that stimulate the GALT and induce mucosal immune tolerance for food and other non-pathogenic substances
T-reg cells are generated in the GALT

Probiotic Strains – Slide 7 – 9
Lactobacillus strains have been shown to decrease inflammation and increase production of Il-10
B. fragilis is another strain that has had a positive effect with IL-10
Certain strains of filamentous bacteria (which are a unique of type of bacteria that may be related to Clostridium) increases Th17 cells
Some evidence that dendrite cells extend into the intestines to interact with transient strains and may even carry the strains across the epithelial layer for further use in the body - Slide 8
Bifidobacterium longum, Bifidobacterium infantis, Bifidobacterium breve, Lactobacillus rhamnosus GG, Lactobacillus acidophilus, Lactobacillus casei, Lactobacillus delbrueckii subsp. bulgaricus, Lactobacillus plantarum, and Streptococcus salivarius subsp. Thermophilus help regulate inflammation response and play a role in maintaining immune tolerance – Slide 9

In Summary – Slide 10

Where to start – Slide 11 – 13
Protocol

Working with Clients – Slide 14 – 15
individualized with each client

Immune Tolerance, Allergies & the Gut

Foods and Sensitivity – Slide 2
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 – Slide 5

Much of the focus is that triggering an immune response: ie inflammation leads to allergy

The Experts – Slide 6
Pick your food – Someone will be blaming it for allergies and inflammation

Inflammation – Slide 7
There is no such thing as an inflammatory food
Dysbiosis promotes inflammatory reactions to foods
Certain chemicals in food also can cause inflammatory

Dairy Study – Slide 8

Allergy Refresher – Slide 9
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 – Slide 10
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

Gut Microbes – Slide 11
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

Secretory IgA – Slide 12
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

Gut Microbes – Slide 13
There are many ways in which the gut microbes affect the immune response

Immune Tolerance – Slide 14
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

The Role of T-Cells – Slide 15

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 – Slide 16

They modulate the immune system and maintain tolerance despite the presence of self-antigen T cells
Promote anti-inflammatory cytokines which supresses self-antigen T cell activity

T-Regulatory Cells – Slide 17

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 – Slide 18

T-reg cells are also produced in the intestines from naïve T- cells promoted by metabolites (butyrate) made by the good bacteria

Other Advantages of Immune Tolerance – Slide 19

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 – Slide 20

Known to cause allergic reactions
Produced by mold on the surface of foods
Studies find higher amount in conventional vs organic
Also linked to liver disease

Aflatoxins – Slide 21

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
Study of mice found that honey can inhibit aflatoxins and increase good gut bacteria

Allergies and 'Leaky Gut' – Slide 22

The Path To Allergy:

1. Dysbiosis:
2. Genetic Susceptibility
3. Environmental Triggers
4. ‘Leaky Gut’

Healthy Gut Bateria – Slide 23
Picture

Leaky Gut – Slide 24
Atrophied Unhealthy Cells Picture

Leaky Gut Benefits – Slide 26
Gut open and closes on a regular basis
Triggered by the chemical zonulin
Aflatoxins can trigger zonulin to be released to cause the gut to open

Leaky Gut – Slide 27
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.

Study – Slide 28

Gluten – Slide 29
10 healthy adults were put on a GFD for one month

Gluten – Slide 30
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 – Slide 31
Aspergillus niger prolyl endoprotease is an enzyme that digests gluten
Certain strains of aspergillus niger produce helpful enzymes
They are considered part of the healthy microbiome and decreases when dysbiosis is present

Dipeptidyl Peptidase IV (DPP IV) – Slide 32
This is a brush border enzyme that aids the break down of gluten
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 – Slide 33

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 histmine

OBJ

Helping Histamine Intolerance – Slide 34

Take a probiotic that does not have strains that prevent histamine release (Xymogen)

Eat prebiotics foods or perhaps take a prebiotic

OBJ

Liver and Allergies – Slide 35

Liver and gut are connected

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

OBJ

Liver Damage – Slide 36

Alcohol and it's 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

OBJ

Hope for Allergies – Slide 37

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

OBJ

In Summary – Slide 38

In order for allergy to be present, there must be a loss of immune tolerance

Immune tolerance is regulated by gut bacteria (and liver)

Food is not the issue – it is the symptom

OBJ

What We Can Do – Slide 39

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

OBJ

Protocol – Slide 40

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
Butyrate as a supplement

And Finally... – Slide 41

No one can state that allergy can be reduce at this time
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.

Explaining The Client Questionnaire Forms