From the Beginning –
Our Gut Story

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- Ph.D. - Holistic Health
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- Ph.D. & Doctor - Integrated Medicine (Quantum Physics)
- Doctor of Integrated Medicine (B.O.I.M.)
- Doctor of Humanitarian Medicine (W.O.N.M.)
- Chair: Health Professional Advisory Committee (HPAC)
- “Order of Excellence- Integrative Medicine Award” 2016
- 22 yrs. private practice, 18,000+ consultations.
- Int’l Lecturer (U.S., Canada, China, Israel, Mexico, U.K., Ireland)
- Author “Life is a Teeter-Totter” - “Outsmarting HPV”.
- 11 DVD’s, 100’s published articles, TV, and Radio.

Hippocrates, 460-370 B.C.
Increasing Interest

The gut microbiome has emerged as a major influence in the health status of individuals.

Intestinal Microbiome

- Trillions of microorganisms
- Up to 6,000 distinct bacterial species
- 4 to 6 pounds of weight to the body
Maternal Gut Microbiota

• Studies report that mothers’ microbial communities change profoundly during pregnancy to support delivery

Putignani, Chierico, Petrucca, Vernocchi, Dallapiccola. The human gut microbiota: a dynamic interplay with the host from birth to senescence settled during childhood. Pediatric Research. 2014;76(1).

Further Inoculation

• Occurs during birth from the bacteria present in the mother’s vaginal tract and anus, and will undergo a myriad of changes throughout a lifetime

Gohir, Ratcliffe, Sloboda. Of the bugs that shape us: maternal obesity, the gut microbiome, and long-term disease risk. Pediatric Research. 2015;77:196-204.

Breast Milk vs. Formula

• Breast fed babies show a higher abundance and a more diverse microbiota community than formula fed
• Earliest gut microbiota consists of bacteria that can metabolize the lactose from breast milk or infant formulas made from cow’s milk

The Microbiome

• Colonized bacteria reside not only in the gut, but also in the nasal and oral cavity, the vagina, on the skin, etc.

Introduction of Solid Foods

• The gut increases bacterial species associated with vitamin synthesis and the body’s ability to use plant protein, carbohydrates, and fats
• Resemble an adult microbiota at approximately 3 years of age
• Until it develops and stabilizes it is vulnerable to influences such as infections and antibiotic use

Frequent Antibiotics

• Repeated antibiotic administration can cause a permanent shift from the gut’s initial state, and when used within the first six months of life there is evidence that they may be associated with future childhood obesity
Back to the Beginning

• During fetal development, the brain and gut both develop from the same tissue
• One part becomes the enteric nervous system (ENS) while the other develops into the central nervous system (CNS)
• The brain-gut axis is a bi-directional communication system between the gastrointestinal tract (ENS) and the brain and spinal cord (CNS)

Brain-Gut Axis

• This system enables bottom-up signaling from the gut to the brain, and top-down signaling whereby the brain influences secretory and motor function of the gastrointestinal tract

Brain-Gut Connection

• Studies show the gut microbiome can have a significant influence on psychosis, mood, and behavior via communication along the gut-brain axis and the HPA axis
• Research findings indicate that exposure to stressful events influences the composition of the microbiome, creating both short- and long-term effects
Dysbiosis (Dysbacteriosis)

- Research data suggests dysbiosis in gut bacteria can induce depression and anxiety – known as bottom-up signaling
- When laboratory animals were exposed to a social disruption it resulted in an increase inflammatory markers, reducing the “healthy” bacteria

Dysbiosis (alcohol, antibx, diet)

- Dysbiosis (GI) bacteria has been implicated in cardiovascular disease, fungal/bacterial overload, IBS/collitis, cancer, and obesity
- Dysbiosis of the gut has also been implicated in diabetes and metabolic syndrome

Metabolic Syndrome

- Metabolic syndrome is a lifestyle disease.
- Defined as having any combination of: metabolic disorders, elevated fasting glucose, high blood pressure, dyslipidemia, or polycystic ovarian syndrome, with obesity being a significant risk factor for its development
- Diagnosis of metabolic syndrome increases the risk of developing type 2 diabetes and cardiovascular disease
“Cardiometabolic” Disorders

- Changes in the bacterial composition and diversity of the intestines has been associated with inflammation of visceral fat tissue, a feature common in obesity, that can eventually lead to type 2 diabetes and insulin resistance
- It also appears to play a strong role in the development of cardiometabolic disorders

Cardiometabolic Disorders

- Those with low bacterial richness gained more weight and had higher C-reactive protein, dyslipidemia, insulin resistance, and lower leptin levels
- Dyslipidemia is elevated “bad” cholesterol (LDL) accompanying low levels of “good” cholesterol (HDL).
- Insulin resistance is when the cells become resistant to insulin – a hormone that allows glucose “sugar” to enter the cells to fuel the body.

Endotoxemia (LPS/ZONULIN)

- Occurs when cell walls of bacteria containing compounds leak into the bloodstream when the gut lining is compromised, resulting in systemic inflammation
- This inflammation can result in insulin resistance, leptin resistance, depression, muscle pain, and fatty liver disease
Metabolic Endotoxemia

• Occurs when the level of endotoxins in the blood increases 2-3 times the normal amount.

Leaky Gut

• Due to systemic inflammation increased intestinal permeability can occur caused by disrupted intestinal tight junctions, creating “leaky gut” or loss of gut barrier integrity.

• When this happens, bacteria from the gut leaks beyond the mucosal barrier and continues to weaken the tight junctions.

Liver Functioning

• Hepatic inflammation increases fat storage in the liver and results in hepatic steatosis (accumulation of fat in the liver), which is closely linked to metabolic syndrome.

• Disruptions in the normal balance of microbial populations in the gut have been linked to NAFLD.

The Spectrum of NAFLD
Non-Alcoholic Fatty Liver Disease

• The prevalence of (NAFLD) disease ranges from 17% – 33%, in the obese about 75%
• NAFLD can progress from a simple fatty liver, to liver cirrhosis, and ultimately liver cancer
• Many studies involving animals and humans have found a relationship between the gut microbiota and NAFLD

Gut Microbiota and Fecal Transplants

• A group of researchers at the Academic Medical Centre in Amsterdam, Netherlands working with obese patients found that insulin response almost doubled in just six weeks’ time after gut microbiota fecal transplants from lean donors

Obesity and the Microbiota

• Obesity is reportedly associated with a microbiota rich in the group of bacteria belonging to Firmicutes
• Researchers found the microbiota of obese mice was dominated by Firmicutes, whereas the gut in lean mice favoured Bacteroidetes
Shifting Gut Bacteria
• Harvard University studies showed that dieting and gastric bypass operations encourage shifts in gut microbiota by decreasing Firmicutes and increasing Bacteroidetes.
• Thus, shifting gut bacteria with diet to an abundance of beneficial bacteria can show the same results when compared to invasive surgery.

Social Interaction and Microbiome
• In primate societies, social behaviour has been shown to affect which bacterial species will populate the gut microbiome.
• Extensive social interactions not only preserved a widely diverse composition of microbial species, it also showed similarity in bacterial species.

Human Social Interaction
• Acquisition of the similar composition was attained through social interaction, rather than by mother-to-child transmission.
• Physical contact in humans such as hugging, holding hands and kissing, may provide a similar route through which social partners transmit gut bacteria.
Children and Dogs
• Children raised in homes with dogs seems to alter the gut microbiome to be protective against respiratory viruses
• Close physical contact between animals and humans facilitates the exchange of microbes

Nori Genes
• In shaping our gut’s microbiota from birth to adulthood, we are what we eat
• For instance, Japanese gut microbiota has special seaweed-associated marine bacteria not found in Caucasians
• These “nori genes” evolved with the individual’s feeding habit
Plant Based Diets

- Diets primarily plant-based (vs. animal based) have a greater diversity of helpful bacteria.
- Diets high in protein/plant-based/fermentation are associated with an abundance of supportive bacteria.

Fibre Rich Diets

- With the ability to robustly affect the composition of the gut microflora, fibre rich diets have been shown to increase healthy bacteria, improve gut barrier, increase insulin sensitivity and lipid profiles.

*Reset (remove), Repair, and Replenish*
The 3 R’s and Fish Food Analogy

Reset (remove)

• Goal - eliminate things from the body that negatively affect our health including environmental chemicals and pollutants, visceral fat, accumulated waste material in the colon, an overabundance of foods, beverages that promote inflammatory processes, and the wrong kind of gut bacteria

Repair

• Goal - to provide nutritional support for healing and regeneration of the gut.
• Supplying the body with vitamins, minerals, antioxidants, essential fatty acids, and anti-inflammatory plants
**Repair with Protein**

- Protein is the major functional and structural component of all the cells in the body.
- In a study of women aged 50-79 years, there was a significant reduction of risk of stroke in women who consumed 20% more protein in their daily diets, as well as lowered blood pressure.

**Repair Tight Junctions**

- The amino acid l-glutamine is the major fuel source for intestinal cells -- crucial for individuals with gut disorders.
- Legumes (protein) provide a rich source of glutamine to aid in the integrity of the gut to develop tight junctions and reduce intestinal permeability.

**Legumes (Pulses)**

- Supply several bioactive compounds, antioxidants, and phyto (plant) chemicals.
- Studies show that consumption of legumes was associated with a 22% lower risk of CHD and an 11% lower risk of CVD.
- In addition, the non-digestible carbohydrate, or insoluble dietary fibre, stimulates activity of lactobacilli and bifidobacteria in the colon with demonstrated anti-tumor and anti-inflammatory activity.
Replenish

• Restore a healthy balance of beneficial bacteria to the gut by reinoculating with desirable GI flora to obtain a more desirable balance that keeps the body working at an optimal level

Benefits of Probiotics

• They maintain the gut’s beneficial microbial community by inhibiting invasion of pathogens through an increase in the amount of mucus secretion and in reducing gut permeability
• Bifidobacteria has been demonstrated in several studies to improve the gut barrier function and reduce intestinal endotoxin levels

Probiotics and Premature Babies

• Probiotic supplementation in preemies has been shown to reduce the length of stay in hospitals, reduce the duration of hyperbilirubinemia, increase weight gain, and feeding tolerance
Cardiometabolic Disorders

• The cholesterol lowering potential of probiotics has been widely studied
• Fermented vegetables and pre-biotic containing foods have been show to reduce blood pressure, heart rate, and cholesterol, while inducing weight loss and decreasing toxin-producing bacteria

Prebiotics

• Prebiotics are non-digestible fibres that are fermented in the GI tract by bacteria such as FOS, guar, lactulose and inulin
• Inulin-type prebiotics enhance the growth of the probiotics Bifidobacteria and Lactobacillus species in the gut and exert beneficial effects on preventing cardiovascular disease

Prebiotics

• The most studied prebiotic supplements are inulin and FOS (fructooligosaccharides)
• Prebiotic fibres have also shown promise in improving nonalcoholic fatty liver disease (NAFLD)
Inulin

• In studies, inulin has shown improvement in glucose metabolism, reductions in weight gain and fat mass accumulation, and improvements in metabolic endotoxemia (and obesity-related inflammation).

Synbiotics

• Synbiotics are simply a combination of probiotics and prebiotics that allow specific changes to the microbiota which enhance the health and well-being of the host.

Announcements
Leverage The Gut Microbiome Trend!

IN.FORM Metabolic Age Support

**Pea Protein**
- 20 grams of vegan pea protein
- Enhances the build up of lean muscle mass
- Dietary fibre, including inulin
- Flax seed, rice protein bamboo fibre, rice bran, broccoli, cranberry, extracts of grape seed and grape skin, black bean, blueberry, monk fruit, garbanzo bean, pomegranate

Leverage The Gut Microbiome Trend!

IN.FORM Metabolic Age Support

**Soy Protein**
- 20 grams of high-quality, non-GMO soy protein
- Enhances the build up of lean muscle mass
- Dietary fibre, including inulin and flax seed
Leverage The Gut Microbiome Trend!

IN.FORM Metabolic Age Support Berberine
• Supports gut health to combat endotoxins
• Supports balance of the microbiome
• Supports healthy insulin response
• Supports healthy cholesterol and triglyceride levels

Indian Barberry Root (Berberis aristata)

Leverage The Gut Microbiome Trend!

IN.FORM Metabolic Age Support Probiotic
• 18 billion CFUs of 11 strains of beneficial bacteria
• Helps maintain and replenish friendly bacteria in the gut
• It’s “synbiotic” — contains a prebiotic blend of inulin, fructooligosaccharide (FOS)

Leverage The Gut Microbiome Trend!

IN.FORM Metabolic Age Support Probiotic
• Lactobacillus rhamnosus
• Bifidobacterium bifidum
• Lactobacillus acidophilus
• Lactobacillus brevis
• Lactobacillus bulgaricus
• Lactobacillus plantarum
• Streptococcus thermophiles
• Bifidobacterium infantis
• Bifidobacterium longum
• Lactobacillus casei
• Lactobacillus salivarius
Leverage The Gut Microbiome Trend!

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