DAY 2: Absorb

SHINE

CONFERENCE

with Dr. Ritamarie Loscalzo (MS, DC, CCN, DACBN)

SCIENTIFIC AND HOLISTIC INVESTIGATION OF NUTRITIONAL ENDOCRINOLOGY

Medical Disclaimer: The information in this presentation is not intended to replace a one-on-one relationship with a qualified health care professional and is not intended as medical advice. It is intended as a sharing of knowledge and information from the research and experience of Dr. Ritamarie Loscalzo, drritamarie.com, and the experts who have contributed. We encourage you to make your own health care decisions based upon your research and in partnership with a qualified health care professional.

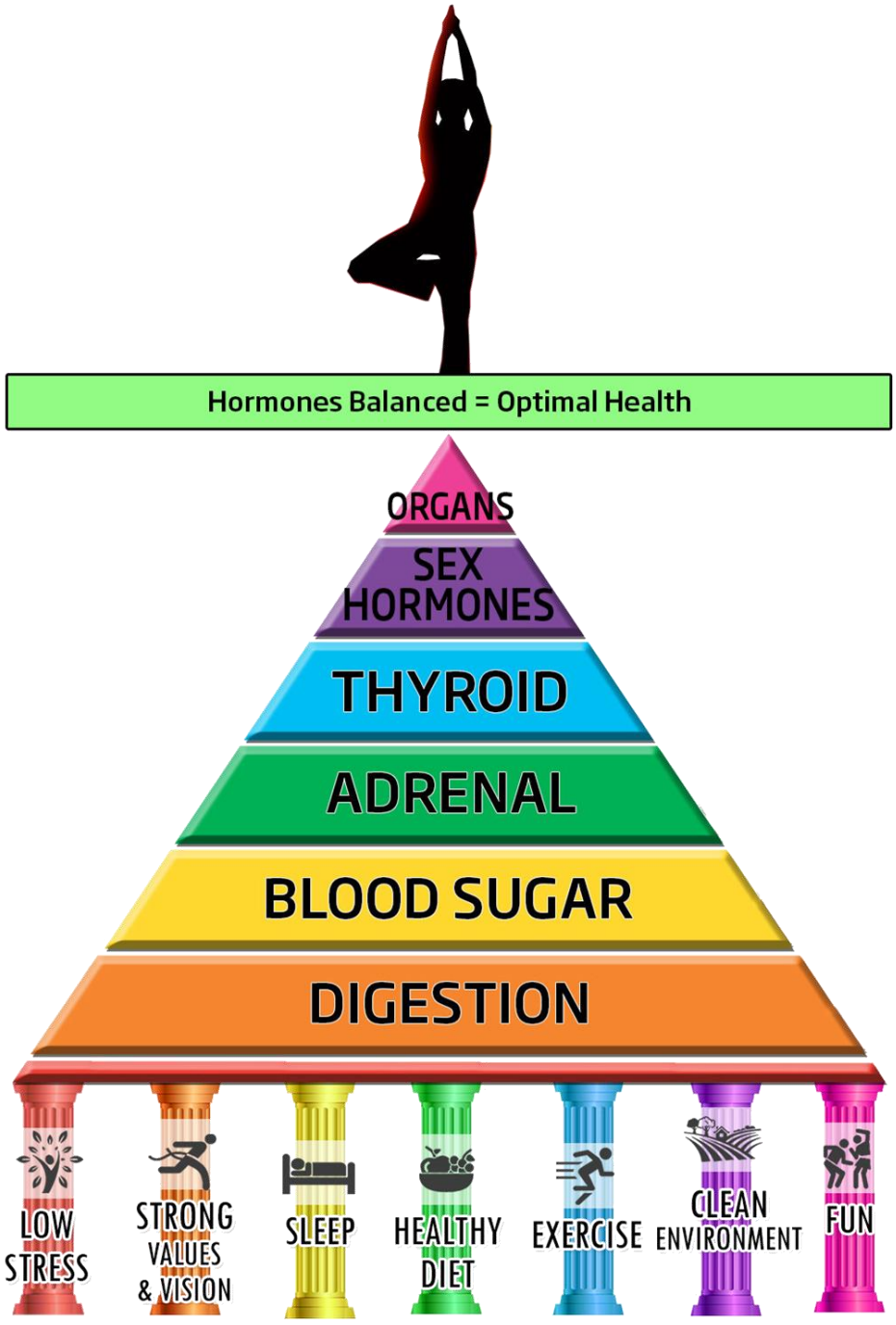
Mission Possible

A New Paradigm of Health Care

My Mission

Your Mission

Our Mission

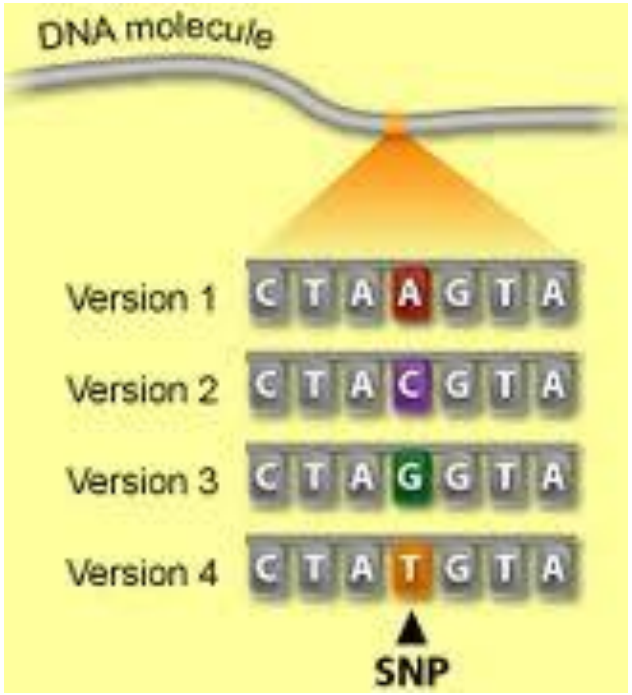



interview
yoga
lab testing
genetics
energy
environment
thoughts
exercise
relationships
touch
emotions
meditation
nutrition

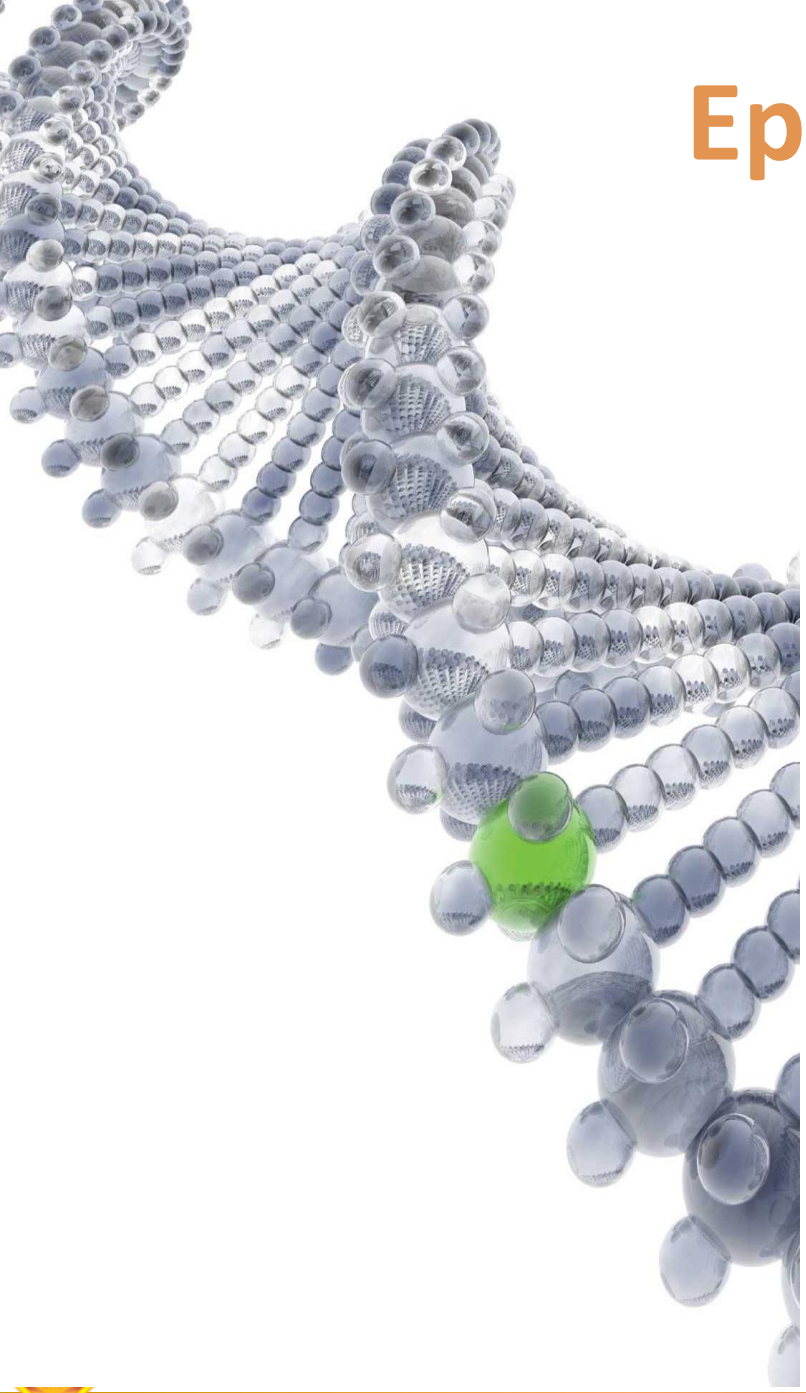
Genetics 101

- ✓ 99.9% of genes **in nucleus** of our 50 trillion cells
- ✓ The rest are in **mitochondria**
- ✓ DNA made of sugar, phosphate, bases
- ✓ **Adenine, thymine, cytosine, guanine**
- ✓ Uncoiled DNA – 6 feet long
- ✓ DNA contains **recipes for proteins**
- ✓ DNA tells the cell how to function
- ✓ DNA tells cell **what traits to express**

SNPs
Single Nucleotide Polymorphisms

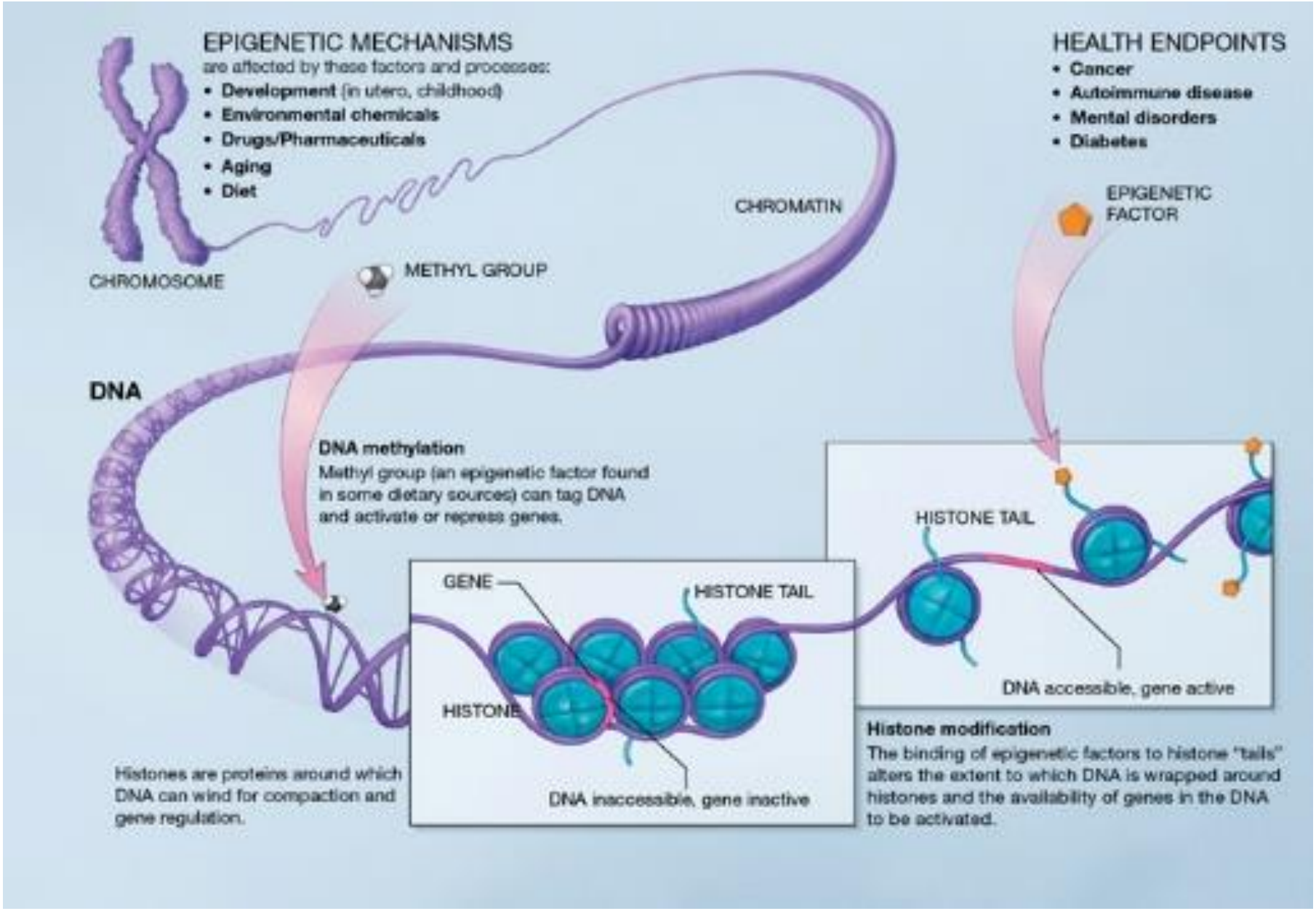


- ✓3 billion base pairs of nucleotides
- ✓**Single base pair** can get added, deleted, or substituted
- ✓**SNP**s are base pair *variations* (polymorphisms) which occur in 1% >= in the population
- ✓Most lead to no observable differences
- ✓Many lead to normal variations
- ✓Others contribute to **disease or nutrient imbalances**



Epigenetics

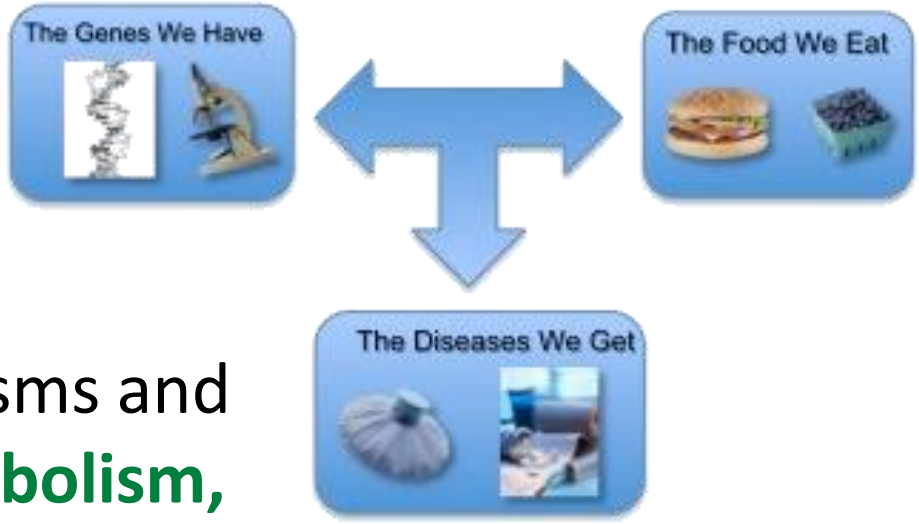
- ✓ Heritable changes in gene expression that does not involve changes to the underlying DNA sequence
- ✓ A change in phenotype without a change in genotype
- ✓ Modulated by histones and methyl groups



"Epigenetic mechanisms" by National Institutes of Health - http://commonfund.nih.gov/epigenomics/figure.aspx. Licensed under Public Domain via Commons - https://commons.wikimedia.org/wiki/File:Epigenetic_mechanisms.jpg#/media/File:Epigenetic_mechanisms.jpg

Nutrigenomics

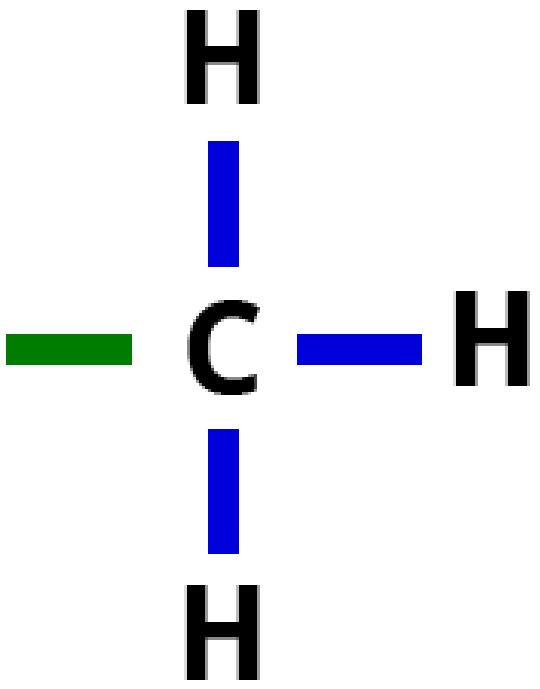
- ✓ Study of the **effects of foods and nutrients on gene expression**
- ✓ The influence of <u>genetic variation on nutrition</u>
- ✓ The correlation between single-nucleotide polymorphisms and a **nutrient's absorption, metabolism, elimination or biological effects**
- ✓ Experts say 5% of genetic expression is truly tied to our genes; the ***remaining 95% is within your control***



Methylation Functions

- ✓ Turn on and off genes
- ✓ Process **chemicals, endogenous toxins, and xenobiotic compounds**
- ✓ Build neurotransmitters (norepinephrine, epinephrine, serotonin, melatonin)
- ✓ **Metabolize neurotransmitters** (dopamine, epinephrine)
- ✓ Process hormones (estrogen)
- ✓ Build immune cells (T cells, NK cells)
- ✓ **Synthesize DNA bases**
- ✓ Produce energy (CoQ10, carnitine, creatine, ATP)
- ✓ Produce protective coating on nerves **(myelination)**
- ✓ Build and maintain **cell membranes** (phosphatidylcholine)
- ✓ Repair damaged DNA

Methylation



Methyl group

Methyl Donors

- SAM-e
- Folate
- Vitamin B12
- TMG
- DMG

Main Methylation SNPs

- ✓MTHFR C677T
- ✓MTHFR 1298C
- ✓MTRR, MTR
- ✓BHMT
- ✓CBS
- ✓COMT

Approximately 45% of the population has 1 copy of the MTHFR C677T SNP

Approximately 90% of those with chronic disease have 1 copy of the MTHFR C677T

Gut-Brain Conditions Associated With Methylation SNPs

- ✓ Fibromyalgia
- ✓ Chronic fatigue syndrome
- ✓ Autism
- ✓ Depression
- ✓ Insomnia
- ✓ ADD/ADHD
- ✓ Irritable bowel syndrome
- ✓ Inflammatory bowel syndrome
- ✓ Migraine
- ✓ Raynaud's
- ✓ Cancer
- ✓ Alzheimer's
- ✓ Parkinson's

SNPs Related to the Gut-Brain Axis

SNP	Possible impairments
TAS2R38	Eating disinhibition
ANKK1/DRD2	Effects on amount of effort put out to obtain food
TAS2R38	Bitter taster gene
TAS1R3	Sweet tooth gene
FTO	Effect on not feeling satisfied after eating
LEPR	Leptin receptor gene – associated with snacking behavior
SLC2A2	Sweet tooth
NBPF3	Risk of vitamin B6 deficiency – cofactor for neurotransmitter synthesis
SLC23A1	Risk of decreased vitamin C and increased risk of gastric cancer and IBD
MAO-A	Catalyzes deamination of dopamine, norepinephrine, and serotonin. Associated with a variety of psychiatric disorders, including antisocial behavior, obsessive compulsive disorders and anxiety.
GAD	Involved in the conversion of glutamate to GABA
LRRK2	Linked to increased risk of Parkinson's
IgA	Immune protection for GI and other mucous membranes

SNPs Related to the Gut-Brain Axis

SNP	Description
MC4R	Regulates energy balance
COMT	Can cause IBS due to too much dopamine
CYP27B1	Encodes an enzyme that activates vitamin D
DHCR7	Related to cholesterol and vitamin D synthesis
MTHFR	Affects folate metabolism, which is important for gut repair and methylation
HLA DQ2	Celiac disease and gluten sensitivity risk – most common gene as 90% of all celiac patients have it
HLA DQ8	Celiac disease risk – less prevalent than DQ2
ATG16L1	Increased risk of Crohn's disease
ApoA4	Role in lipid absorption in the intestines.
FUT2	Impact on the ability to secrete ABO antigens in body fluids, i.e., saliva, sweat, tears, gut. "Non-secretors" need more bifidobacteria as they can't make the oligosaccharide that feeds them. On the positive side, non-secretors are more resistant to H. pylori and rotovirus and have a higher risk for Crohn's.
DAO	Histamine breakdown
ACE	Regulates fluid balance and blood pressure

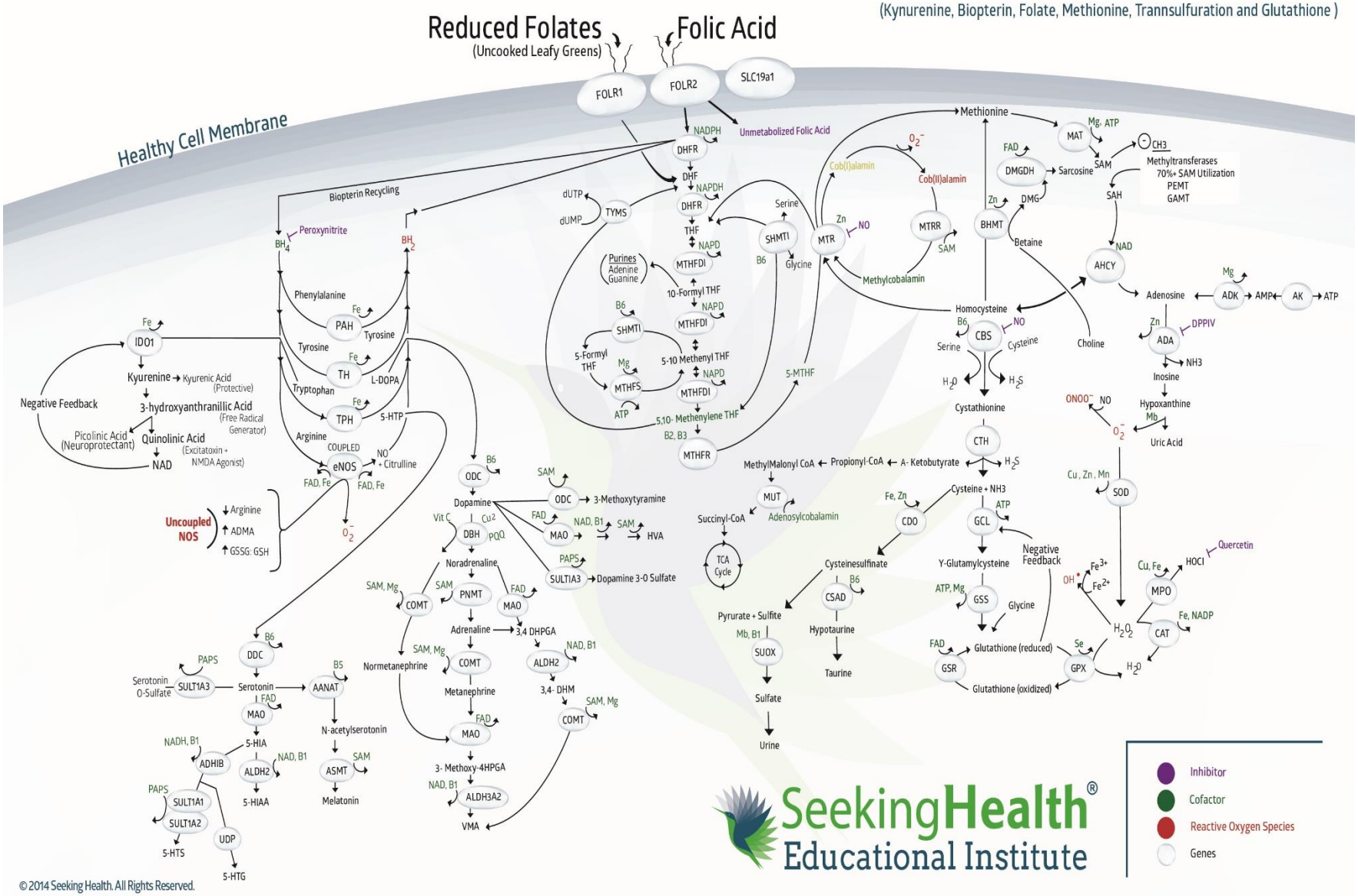
SNPs Related to the Gut-Brain Axis

SNP	Description
CYPE21	Related to alcohol metabolism and effects on liver and pancreas
APOA2	Regulates after meal response to saturated fat. C variant - saturated fats WILL make you fat, T variant + saturated fat - WILL NOT make you fat
GSTM3 V224I	Association with late-onset Alzheimer's disease
APOE	Association with Alzheimer's disease and ability to process saturated fat
CYP2C19	Increased risk of GERD
CCL26	Reflux; Eosinophilic esophagitis
ADRB3	Possible link to increased risk of gallstones and gallbladder cancer
PPARGC1A	Associated with non-alcoholic fatty liver disease
MCM6	Associated with lactose intolerance
GC	Encodes an enzyme that transports vitamin D in blood to cells. Risk of decreased vitamin D, which affects composition of the bacterial flora in the gut microbiome
VDR	Vitamin D receptor gene
FADS1	Risk of decreased omega-3 and omega-6 fatty acids

SeekingHealth.org

Pathway Planner

(Kynurenine, Biopterin, Folate, Methionine, Trannsulfuration and Glutathione)



SeekingHealth® Educational Institute

Before Addressing Individual SNPs

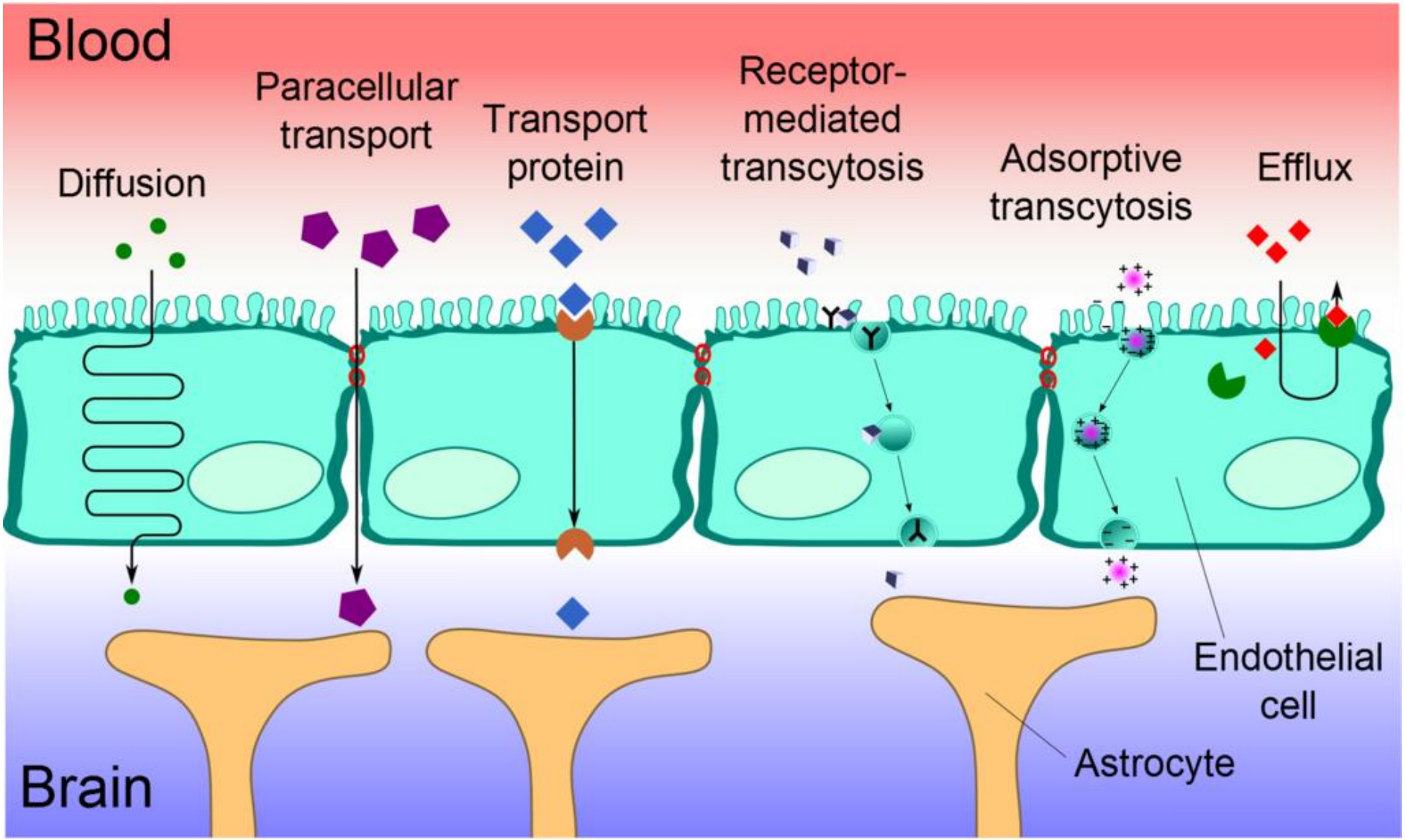
- ✓ **Foundational lifestyle/diet**
  - ➢ Hydration
  - ➢ Clean, antioxidant-rich, whole foods diet
  - ➢ Reduce stress
- ✓ Gut healing and pathogen removal
- ✓ Address mitochondrial dysfunction
- ✓ **Remove all folic acid**
- ✓ B vitamin support
- ✓ Balance blood sugar
- ✓ Adaptogens and adrenal support
- ✓ Test homocysteine levels
- ✓ Thyroid support

Genomic Testing

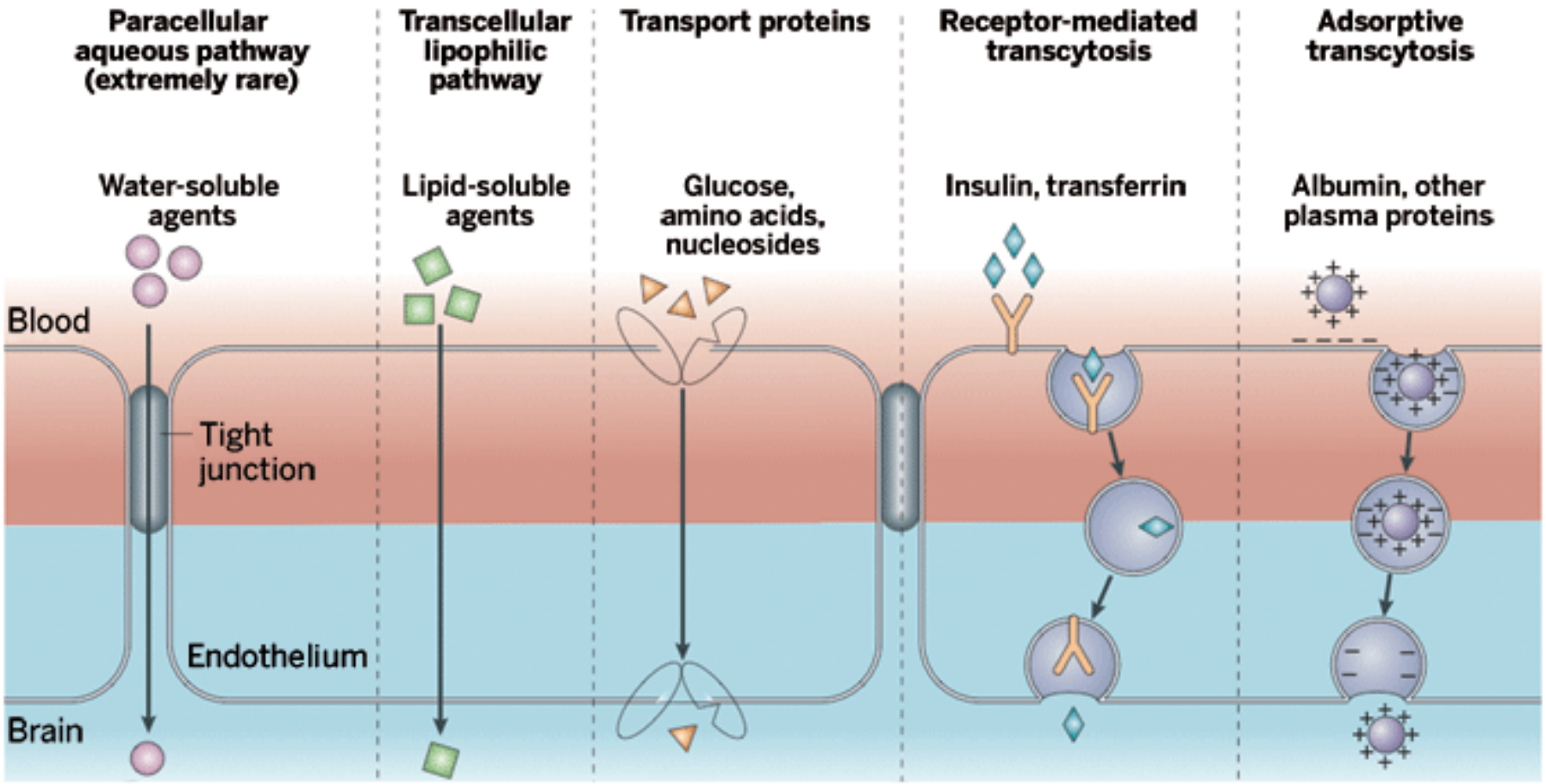
- 23 and Me
  - ✓ http://www.23andme.com
- Genova Diagnostics
  - ✓ http://www.GenovaDiagnostics.com
- Holistic Health International (Dr. Amy Yasko)
  - ✓ http://www.HolisticHealth.com
- Pathway FIT
  - ✓ http://www.pathwayfit.com
- SpectraCell (MTHFR Only)
  - ✓ http://www.drritamarie.com/go/SCGenotyping

"Something's just not right—our air is clean, our water is pure, we all get plenty of exercise, everything we eat is organic and free-range, and yet nobody lives past thirty."

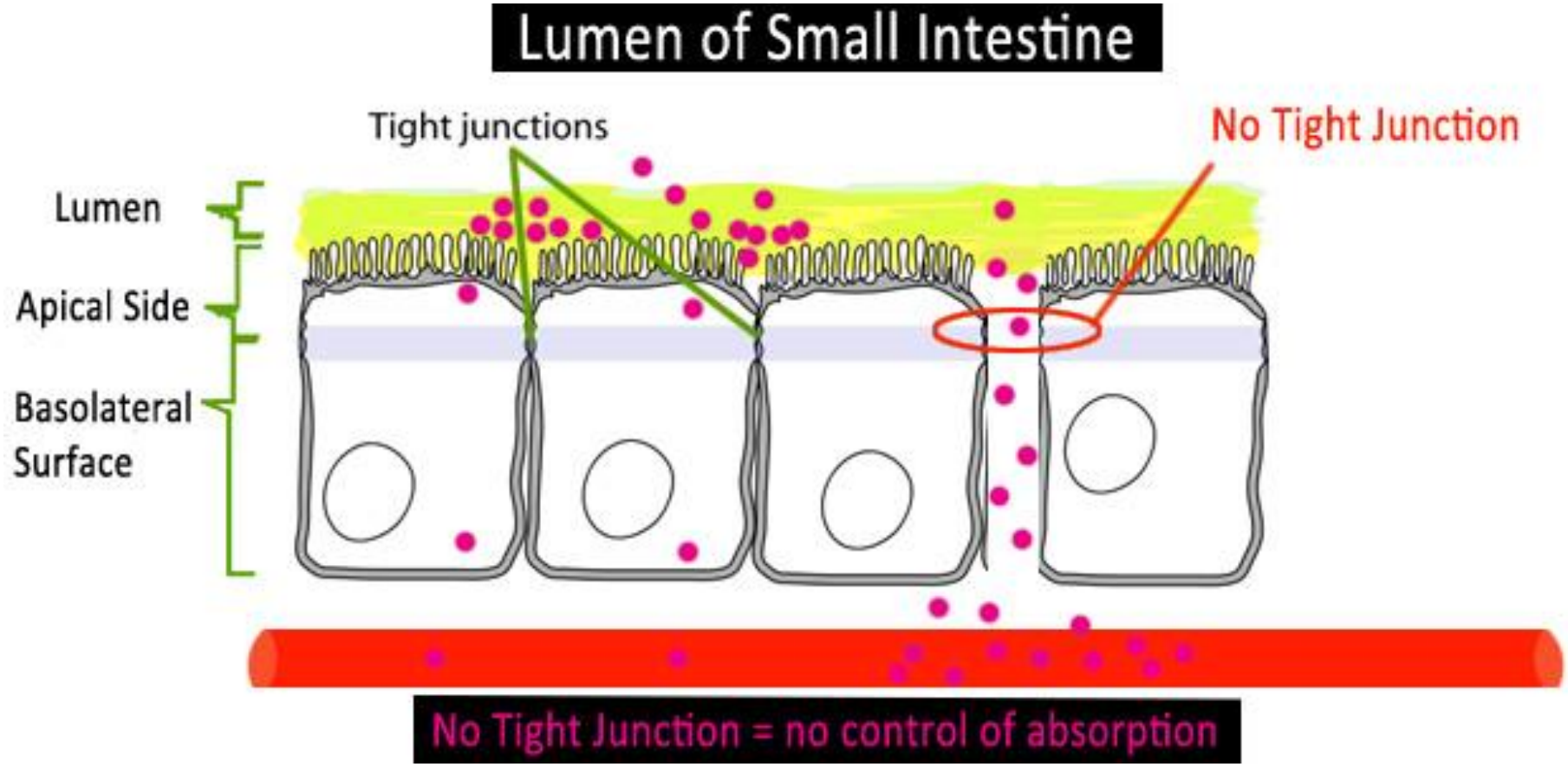
The Blood Brain Barrier

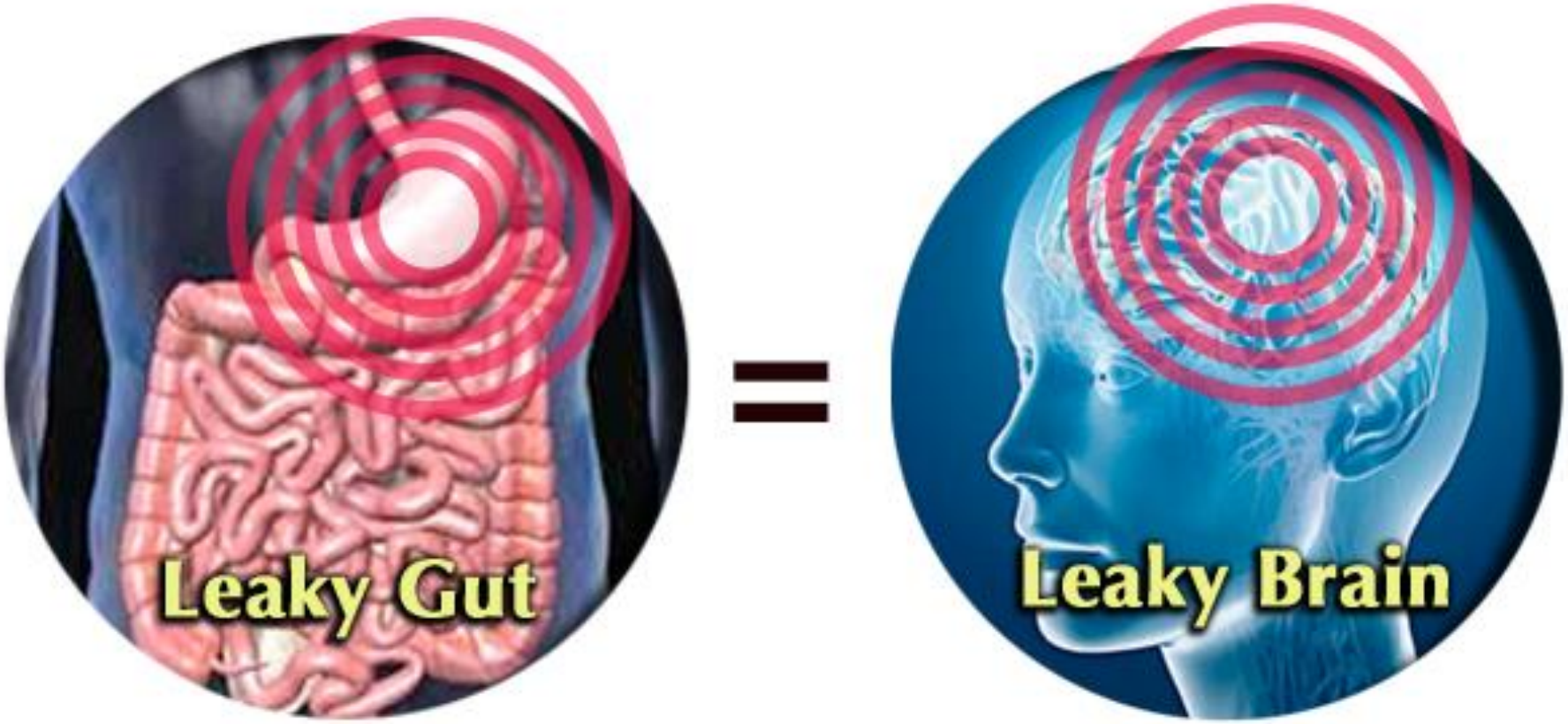


The Blood Brain Barrier in Action



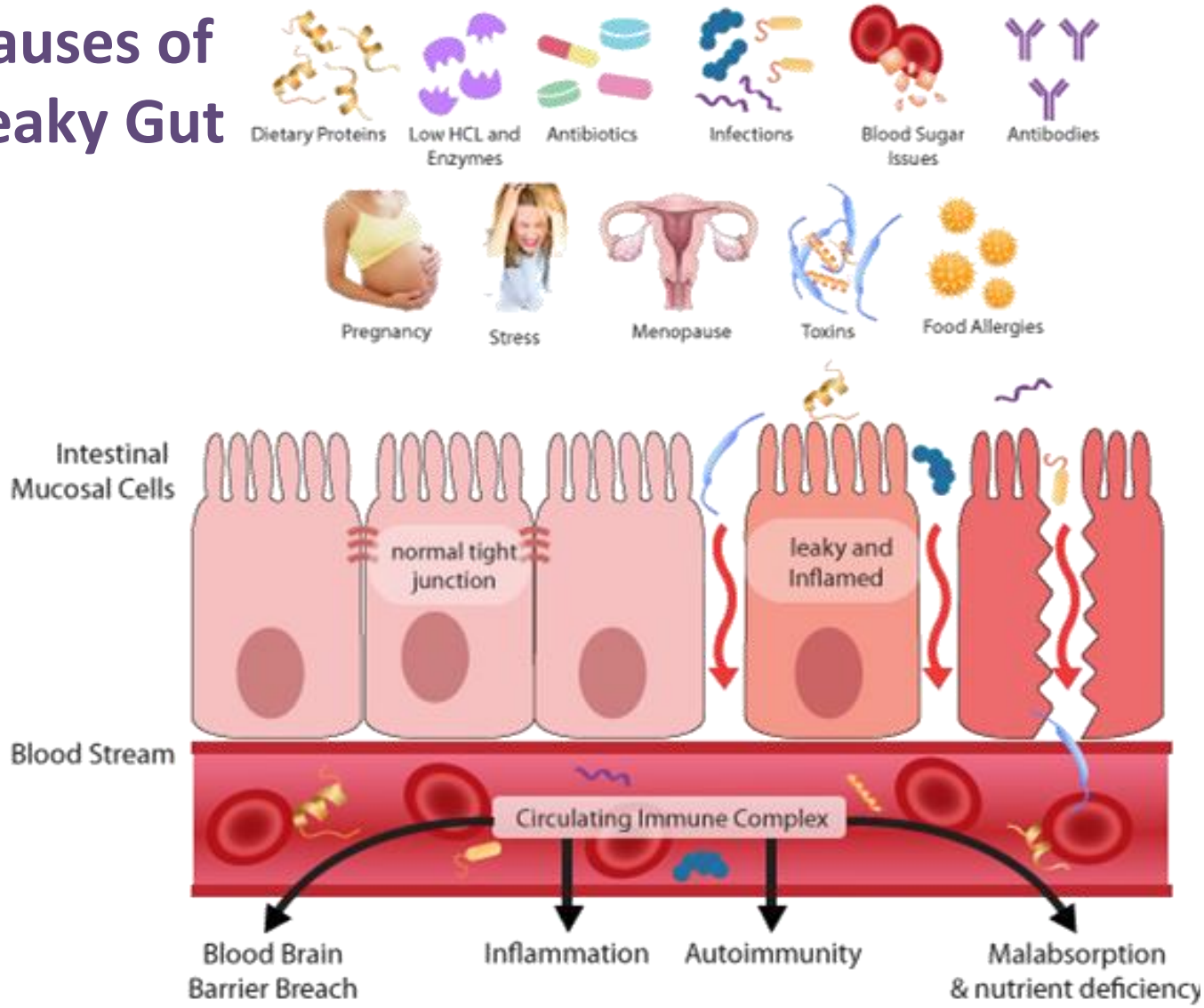
Gut Mucosal Barrier





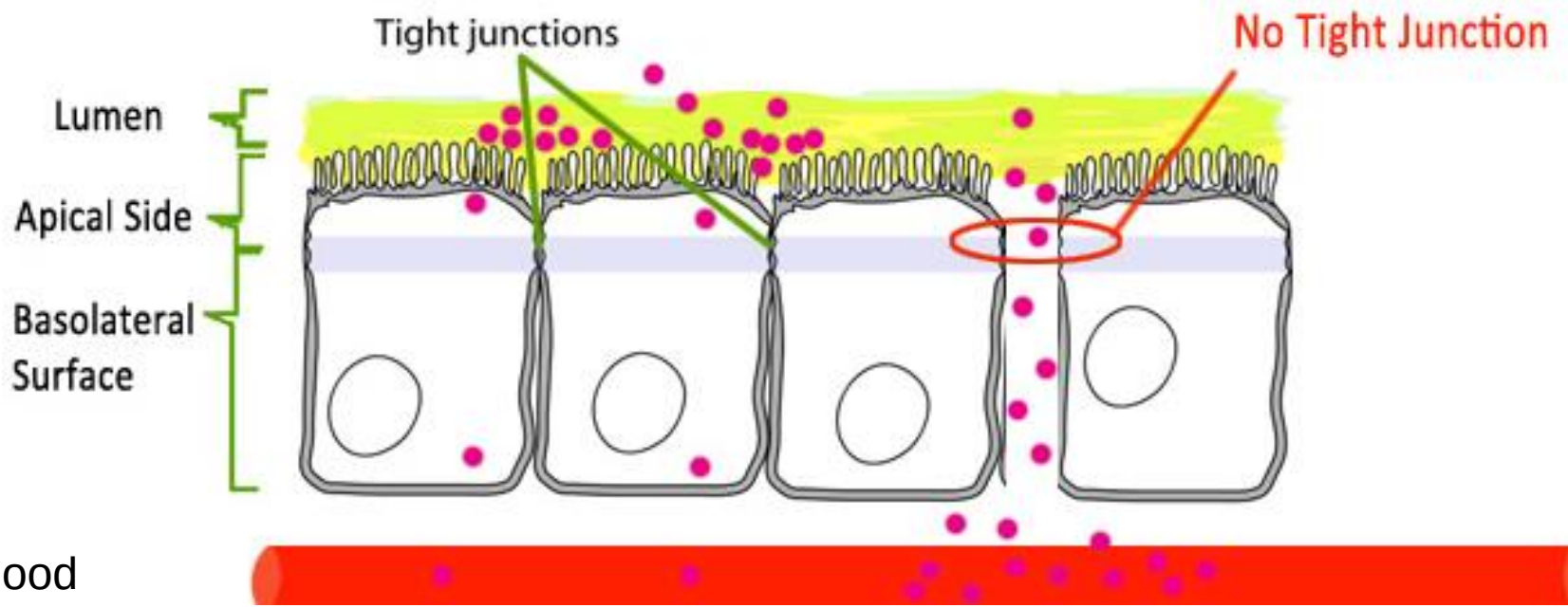
Leaky Gut and Leaky Brain

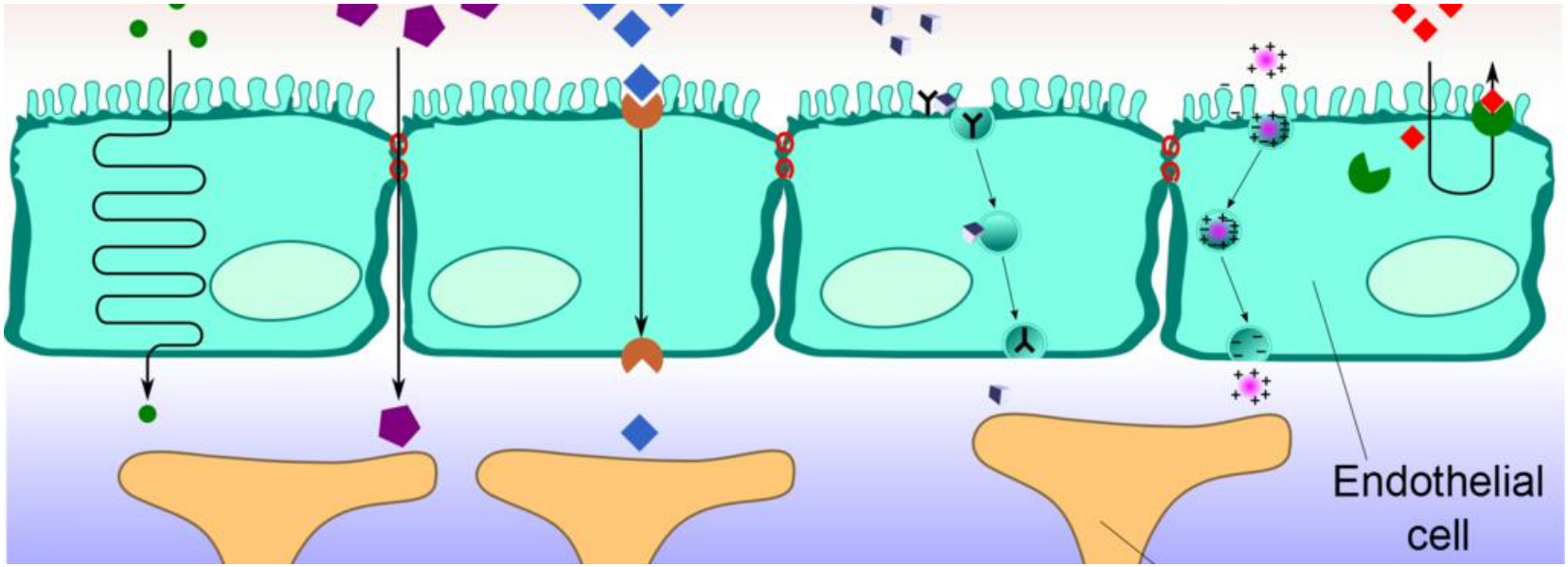
Causes of Leaky Gut



Causes of Leaky Brain

- Blood sugar imbalance
- Nutritional deficiencies
- Leaky gut
- Food sensitivities
- Inflammation
- Poor sleep
- Chronic stress





Assessing and Balancing the Gut-Brain Axis

Markers on Blood Chemistry Analysis

Low Stomach Acid

- ✓ BUN (hi or lo)
- ✓ Chloride (lo)
- ✓ Carbon Dioxide (hi)
- ✓ Calcium (lo)
- ✓ Phosphorus (lo)
- ✓ Protein (lo)
- ✓ Albumin (lo)
- ✓ Globulin (hi)
- ✓ Iron (lo)
- ✓ Hemoglobin (lo)
- ✓ MCV (hi)
- ✓ MCH (hi)
- ✓ MCHC (hi)
- ✓ Uric Acid (lo)
- ✓ Ferritin (lo)

Stomach

Hypochlorhydria

- Total Protein (hi or lo)
- Globulin (hi or lo)
- BUN (hi or lo)
- Phosphorus (lo)
- Creatinine (lo)
- Iron (lo)
- Calcium (lo)

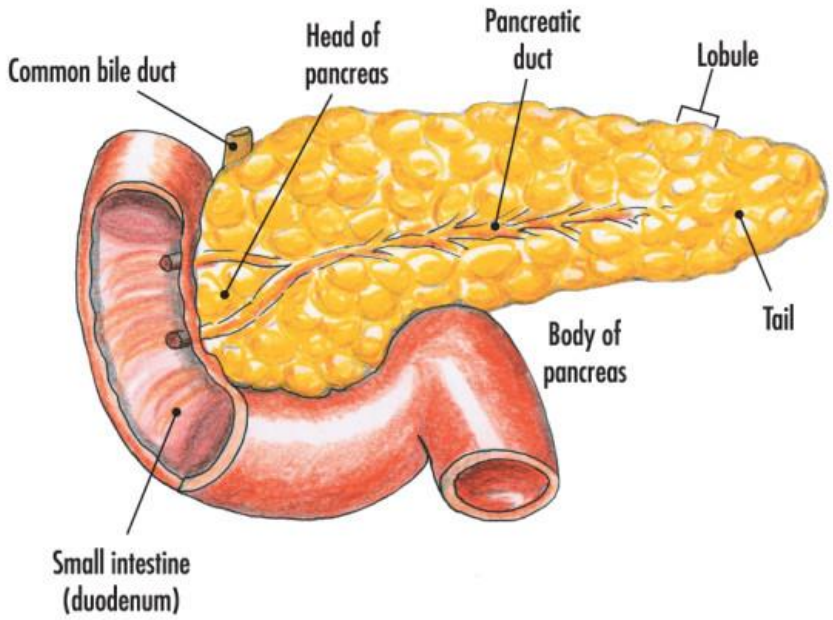
PLUS

Helicobacter Pylori

- WBC (hi or lo)
- Neutrophil (hi)
- Monocytes (normal to hi)
- Lymphocytes (lo)
- Special testing for H. pylori and Urea Breath Test

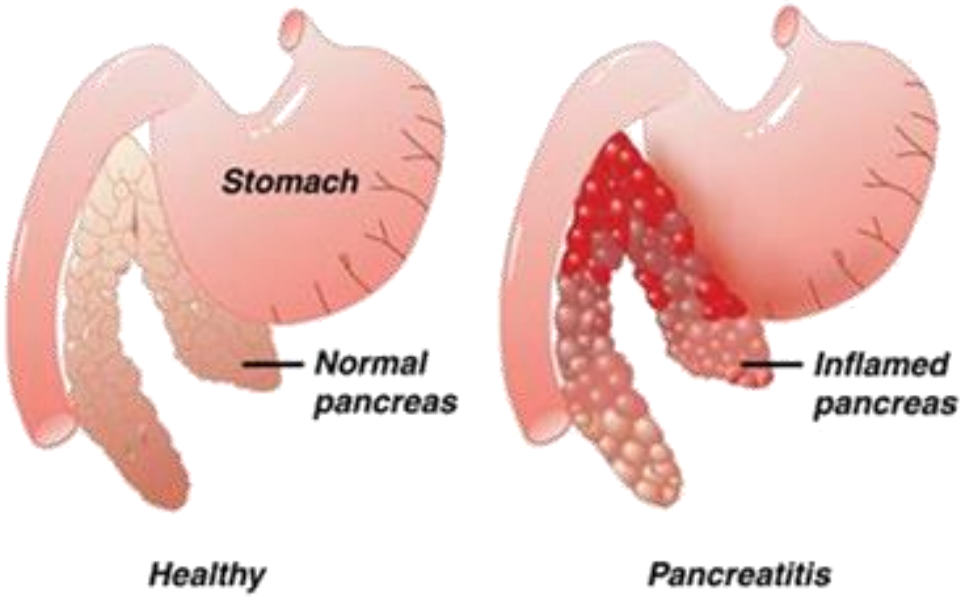
Small Intestine and Pancreas

- ✓ Uric Acid (hi)
- ✓ BUN (lo)
- ✓ Creatinine (lo)
- ✓ Protein (lo)
- ✓ Globulin (lo): GI inflammation
- ✓ Alkaline phosphatase (lo)
- ✓ Alkaline Phosphatase (hi): leaky gut
- ✓ GGT (lo): malabsorption
- ✓ Hematocrit (lo): inflammation



Pancreatitis

- ✓ Glucose (hi)
- ✓ Triglycerides (hi)
- ✓ Alkaline Phosphatase (hi)
- ✓ Lipase (hi)
- ✓ Amylase (hi)
- ✓ GGTP (hi)
- ✓ SGOT (normal to hi)
- ✓ SGPT (normal to hi)
- ✓ Albumin (lo)



Large Intestine

- ✓ Eosinophils (hi) - parasites
- ✓ Sodium (lo)
  - possible laxative use or adrenal issues

For in-depth look, need to do:

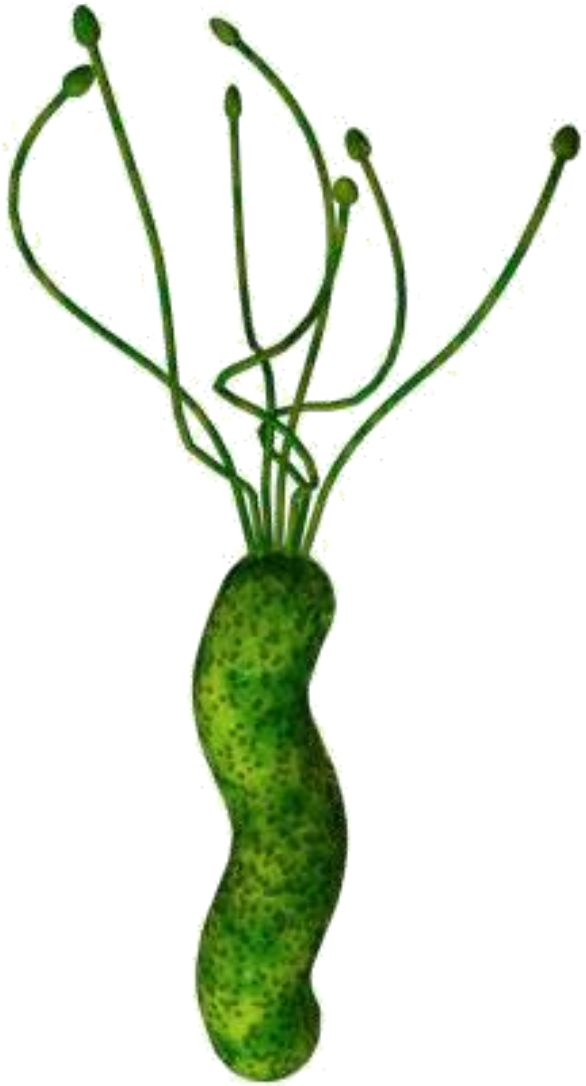
- ✓ Comprehensive stool and digestive analysis
- ✓ Parasitology
- ✓ Organic Acids Test (OAT) - markers for dysbiosis

Home and In-Office Testing

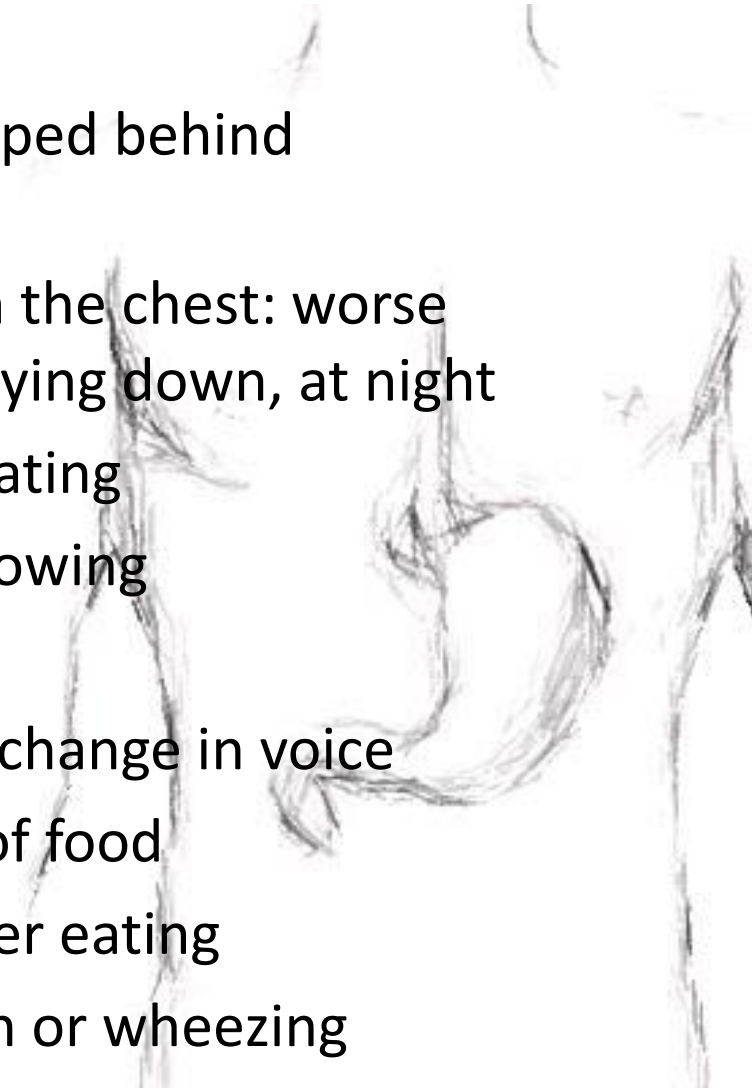
- ✓ Assessment questionnaires and scorecards
- ✓ Physical signs
- ✓ HCl challenge
- ✓ Transit time test

H. pylori Symptoms

- ✓ Gnawing or burning abdominal pain, just beneath the ribs; worse on an empty stomach
- ✓ Loss of appetite
- ✓ Bloating, burping
- ✓ Nausea, vomiting
- ✓ Black, tarry stools
- ✓ Autoimmune
- ✓ Cardiovascular, skin, liver, and biliary symptoms



Evaluating Gastroesophageal Reflux (GERD, AKA Heartburn)



Symptoms

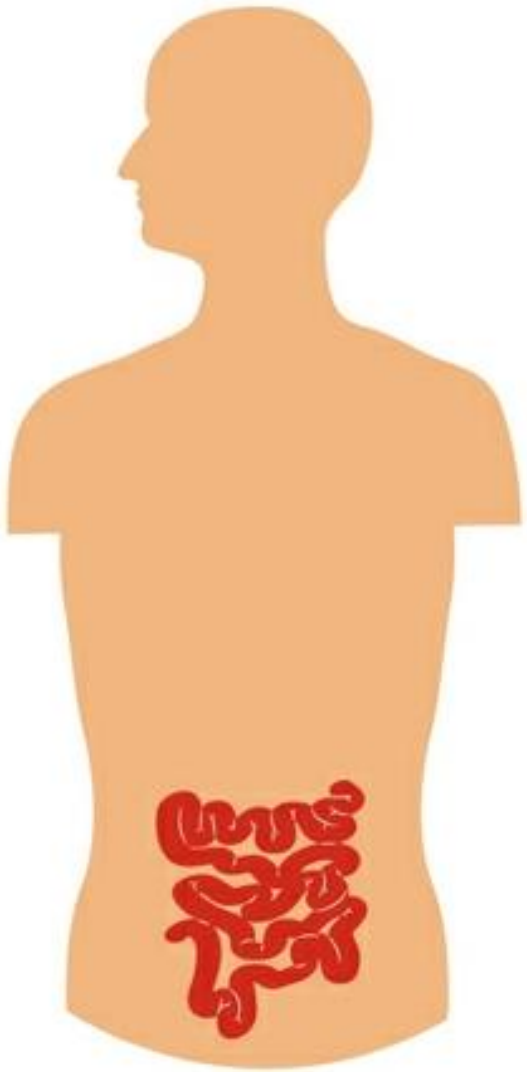
- ✓ Food feels trapped behind breastbone
- ✓ Burning pain in the chest: worse with bending, lying down, at night
- ✓ Nausea after eating
- ✓ Difficulty swallowing
- ✓ Hiccups
- ✓ Hoarseness or change in voice
- ✓ Regurgitation of food
- ✓ Sore throat after eating
- ✓ Possibly: Cough or wheezing

Possible Causes

- ✓ Overeating
- ✓ Vigorous exercise after eating
- ✓ Alcohol
- ✓ Caffeine – coffee, chocolate
- ✓ Tight garments
- ✓ Eating while or right before reclining
- ✓ Smoking
- ✓ Stress

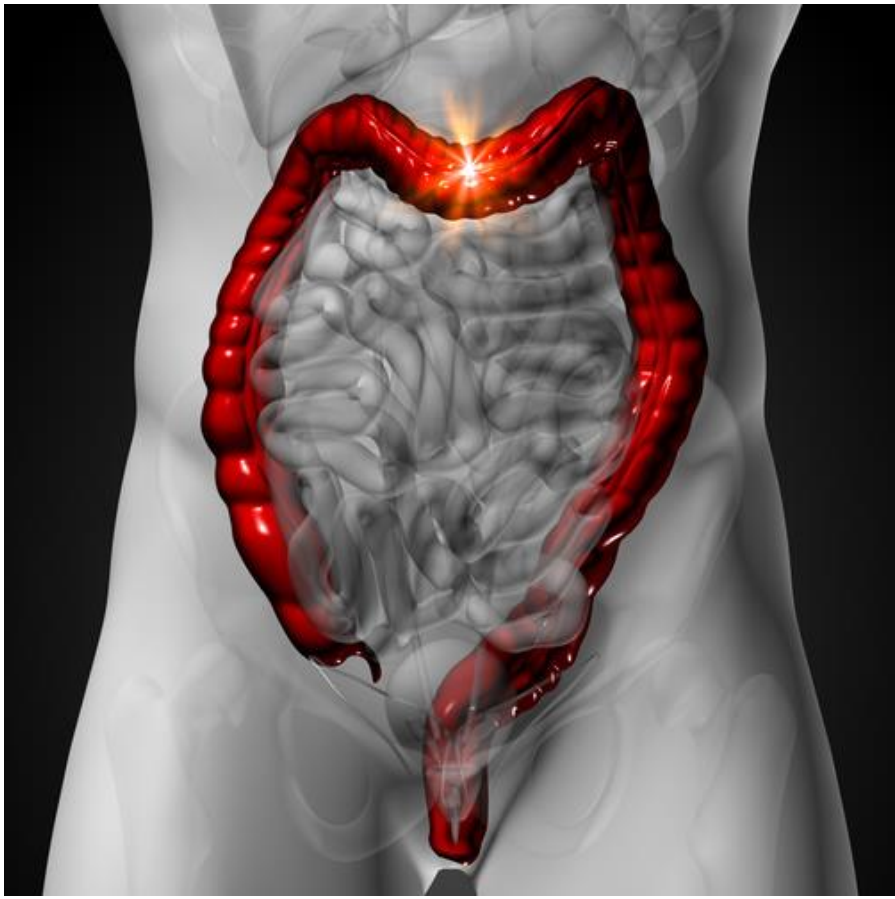
Small Intestine Physical Signs

- ✓ Tender spot at tips of 8th through 10th ribs
- ✓ Tender spot between 7th and 8th ribs on left
- ✓ Tenderness, hardness, or distension in a square, 3-inch radius in all directions from umbilicus



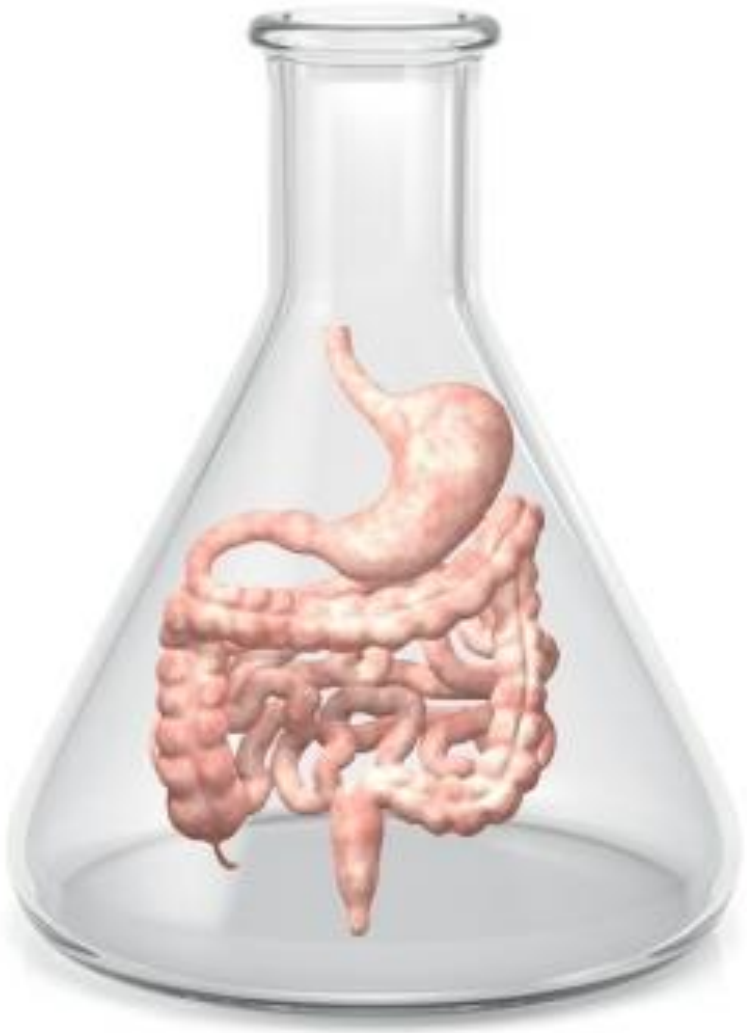
Large Intestine Physical Signs

- ✓ Tenderness along 8th through 10th ribs
- ✓ Tenderness over large or small intestine
- ✓ Hydration status: hands at side palpate veins
- ✓ Tenderness along outside of thigh



Intestinal Function Testing

- ✓ Gluten and casein antibodies – Entero Lab, Cyrex Labs
- ✓ Breath test
- ✓ Low zinc on zinc assay test
- ✓ Malabsorption: Urine Indican – Apex Energetics
- ✓ Bowel transit time
- ✓ Pulse test for food reactions, food allergy test
- ✓ Intestinal permeability – Cyrex Labs
- ✓ Bowel transit time
- ✓ Stool testing for dysbiosis, gut function – BioHealth, Doctor's Data, Genova Diagnostics, DiagnosTechs



HCl Challenge

- ✓ Home test to determine need for stomach acid supplementation.
- ✓ Start with ONE 500-650 mg capsule (not tablet) containing both hydrochloric acid (HCl) and 150 mg of pepsin.
- ✓ Take HCl after a few bites of food; **do not take on an empty stomach or after meals.**
- ✓ If you have no discomfort (burning or warm sensation), add one capsule per meal.
- ✓ If you experience pain, burning, or a warm sensation, take one of the following:
  - Take 1 teaspoon slippery elm in 8 ounces warm water
  - ¼ cup aloe vera juice
  - ¼ teaspoon baking soda in water
- ✓ Next meal, go back to the dose that caused no pain.

DO NOT **go above the maximal dose of 80 grains for the average man and 60 grains for the average sized woman.**

Bowel Transit Time Tracking

- ✓ Swallow 4 charcoal capsules at evening meal. Record the date and time
- ✓ After each bowel movement, observe your stool for the first sign of black or grey. Observe in a brightly lit room.
- ✓ Calculate the number of hours between “Time Charcoal Taken” to “Time/Date Color First Appears”.
- ✓ Continue to observe every stool and note the time and date when the color has completely disappeared. Ideally, it should take between 18 and 24 hours.
- ✓ Wait 5 days to make sure all is completely disappeared and try again.
- ✓ Repeat with a variety of test meals.

Comprehensive Digestive Analysis and Dysbiosis Testing

- ✓ Stool samples
- ✓ Multiple days
- ✓ Labs
  - ➢ BioHealth
  - ➢ Doctor's Data
  - ➢ DiagnosTechs
  - ➢ Genova Diagnostics
- ✓ Ubiome

Assessing Leaky Gut and Leaky Brain

- **Occulin/Zonulin:** signaling protein that transiently and reversibly opens the tight junctions between intestinal cells.
- **ActoMyosin:** a protein that anchors the tight junctions and provides structure for the intestinal muscle cells.
- **Lipopolysaccharides (LPS):** endotoxin produced by gram-negative bacteria upon death which can damage the intestinal lining and lead to leaky gut.
- **Blood Brain Barrier Protein:** tests for integrity of blood brain barrier.

Organic Acids Test - Great Plains

- ✓ Intestinal Microbial Overgrowth
- ✓ Oxalate Metabolites
- ✓ Glycolytic Metabolites
- ✓ Kreb Cycle Metabolites
- ✓ Neurotransmitter Metabolites
- ✓ Folate Metabolism
- ✓ Ketones and Fatty Acid Oxidation
- ✓ Nutritional Markers
- ✓ Detoxification Indicators
- ✓ Amino Acid Metabolites
- ✓ Bone Metabolites

72 MARKERS

The Great Plains Laboratory, Inc.

Health, Metabolism & Nutrition

www.greatplainslaboratory.com

Organic Acids Test - Nutritional and Metabolic Profile

Organic Acids Test

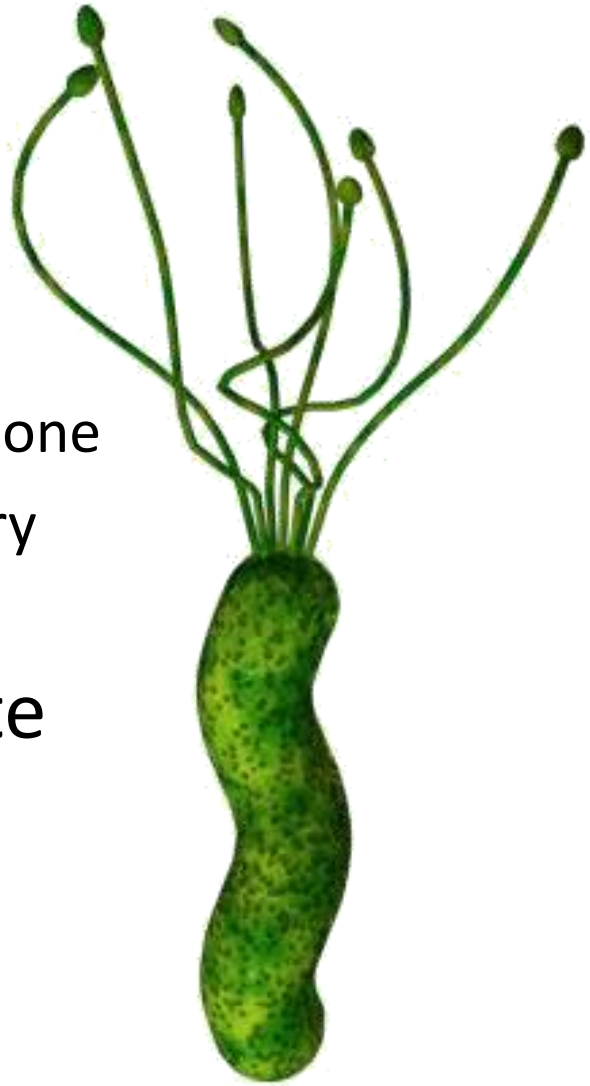
	Metabolic Markers in Urine	Reference Range (mmol/mol creatinine)		Patient	Reference Population - Females Age 13 and Over
Intestinal Microbial Overgrowth					
Yeast and Fungal Markers					
1	Citramalic	≤ 3.6		1.4	
2	5-Hydroxymethyl-2-furoic	≤ 14	H	20	
3	3-Oxoglutaric	≤ 0.33		0.13	
4	Furan-2,5-dicarboxylic	≤ 16	H	29	
5	Furancarbonylglycine	≤ 1.9		0.07	
6	Tartaric	≤ 4.5	H	31	
7	Arabinose	≤ 29	H	124	
8	Carboxycitric	≤ 29	H	64	
9	Tricarballylic	≤ 0.44	H	0.89	
Malabsorption and Bacterial Markers					
10	2-Hydroxyphenylacetic	0.06 - 0.66	H	1.1	
11	4-Hydroxyphenylacetic	≤ 19	H	26	
12	4-Hydroxybenzoic	≤ 1.3		0.68	
13	4-Hydroxyhippuric	0.79 - 17	H	22	
14	Hippuric	≤ 613		500	
15	3-Indoleacetic	≤ 11		4.8	
16	Succinic	≤ 9.3	H	11	
17	HPHPA (Clostridia Marker)	≤ 208		167	
18	4-Cresol (C. difficile)	≤ 75		0.62	
19	DHPPA (Beneficial Bacteria)	≤ 0.38		0.29	

Organic Acids Test

	Metabolic Markers in Urine	Reference Range (mmol/mol creatinine)		Patient	Reference Population - Females Age 13 and Over
Oxalate Metabolites					
20	Glyceric	0.77 - 7.0		5.8	5.8
21	Glycolic	16 - 117		40	40
22	Oxalic	6.8 - 101		89	89
Glycolytic Cycle Metabolites					
23	Lactic	≤ 48		7.6	7.6
24	Pyruvic	≤ 9.1		4.4	4.4
25	2-Hydroxybutyric	0.03 - 1.8		0.42	0.42
Krebs Cycle Metabolites					
26	Succinic	≤ 9.3	H	11	11
27	Fumaric	≤ 0.94	H	1.4	1.4
28	Malic	0.06 - 1.8		0.29	0.29
29	2-Oxoglutaric	≤ 35		11	11
30	Aconitic	6.8 - 28	H	36	36
31	Citric	≤ 507	H	1 040	1040
Neurotransmitter Metabolites					
32	Homovanillic (HVA) *(dopamine)*	0.80 - 3.6	H	7.0	7.0
33	Vanillylmandelic (VMA) *(norepinephrine, epinephrine)*	0.46 - 3.7		2.9	2.9
34	HVA / VMA Ratio	0.16 - 1.8	H	2.4	2.4
35	5-Hydroxyindoleacetic (5-HIAA) *(serotonin)*	≤ 4.3		1.5	1.5
36	Quinolinic	0.85 - 3.9	H	6.8	6.8
37	Kynurenic	0.17 - 2.2		1.7	1.7
38	Quinolinic / 5-HIAA Ratio	0.42 - 2.0	H	4.7	4.7
Pyrimidine Metabolites - Folate Metabolism					
39	Uracil	≤ 9.7		1.8	1.8
40	Thymine	≤ 0.56		0.15	0.15

H. pylori Testing

- ✓ **Stool Test**
  - **Metametrix**: part of GI effects
  - **Genova Diagnostics:** part of CDSA or standalone
  - **BioHealth Labs:** part of GI panel or standalone
  - **Doctor's Data:** as add-on to Stool Chemistry Profiles, or standalones
- ✓ **Blood Antibody Test:** least accurate
- ✓ **Urea Breath Test:** home test
- ✓ **Stomach Biopsy:** invasive



Real Life Cases

Case: 40-year-old Female

- ✓ **History:** 3-year-old and a nursing infant, running a successful online business
- ✓ **Top Presenting Complaints:** Fatigue, headaches, pelvic pain, poor sleep, inability to lose weight, brain fog, and “mommy brain”
- ✓ **Medications:** Naturthroid, Advil on occasion
- ✓ **Supplements:** Lots

Case: 40-year-old Female

- ✓ **Diet:**
  - ➢ Mostly whole foods, organic
  - ➢ Regularly: Raw cheese, sprouted grain bread (gluten), grains, eggs, chocolate, sweets, decaf coffee, green smoothies, greens, and salads a few days a week; no alcohol
  - ➢ Had done a raw vegan diet and felt great and lost weight, but felt starved all the time
- ✓ **Exercise:** Sporadic due to exhaustion and overwhelm with infant and toddler

Case: 40-year-old Female

- ✓ **Prior Labs:** TSH optimal, TG 151, HDL 36, TPO 14, candida blood antibody screen negative
- ✓ **Initial Testing:** Low vitamin D (22), low adrenal function, low thyroid function and Free T4 1, Free T3 2.2 (poor T4 to T3 conversion), gluten intolerance
- ✓ **Suspected:** Insulin resistance, leptin resistance, gluten intolerance, multiple food allergies, leaky gut, adrenal fatigue
- ✓ **Approach:** Started with foundations, gluten-free, dairy-free, and monitoring blood sugar
- ✓ **Advanced Testing:** Details follow

Case: 40-year-old Female

- ✓ **Genetics Testing:**
  - MTHFR C677T: homozygous
  - MTR: homozygous
  - MTRR: heterozygous
  - BHMT: homozygous
  - ACHY: heterozygous
  - COMT: heterozygous
  - MAO: homozygous
  - CBS: homozygous

EnteroLab: Stool Gluten Sensitivity

Gluten Sensitivity Stool Test
Fecal Anti-gliadin IgA 13 Units (Normal Range is less than 10 Units)

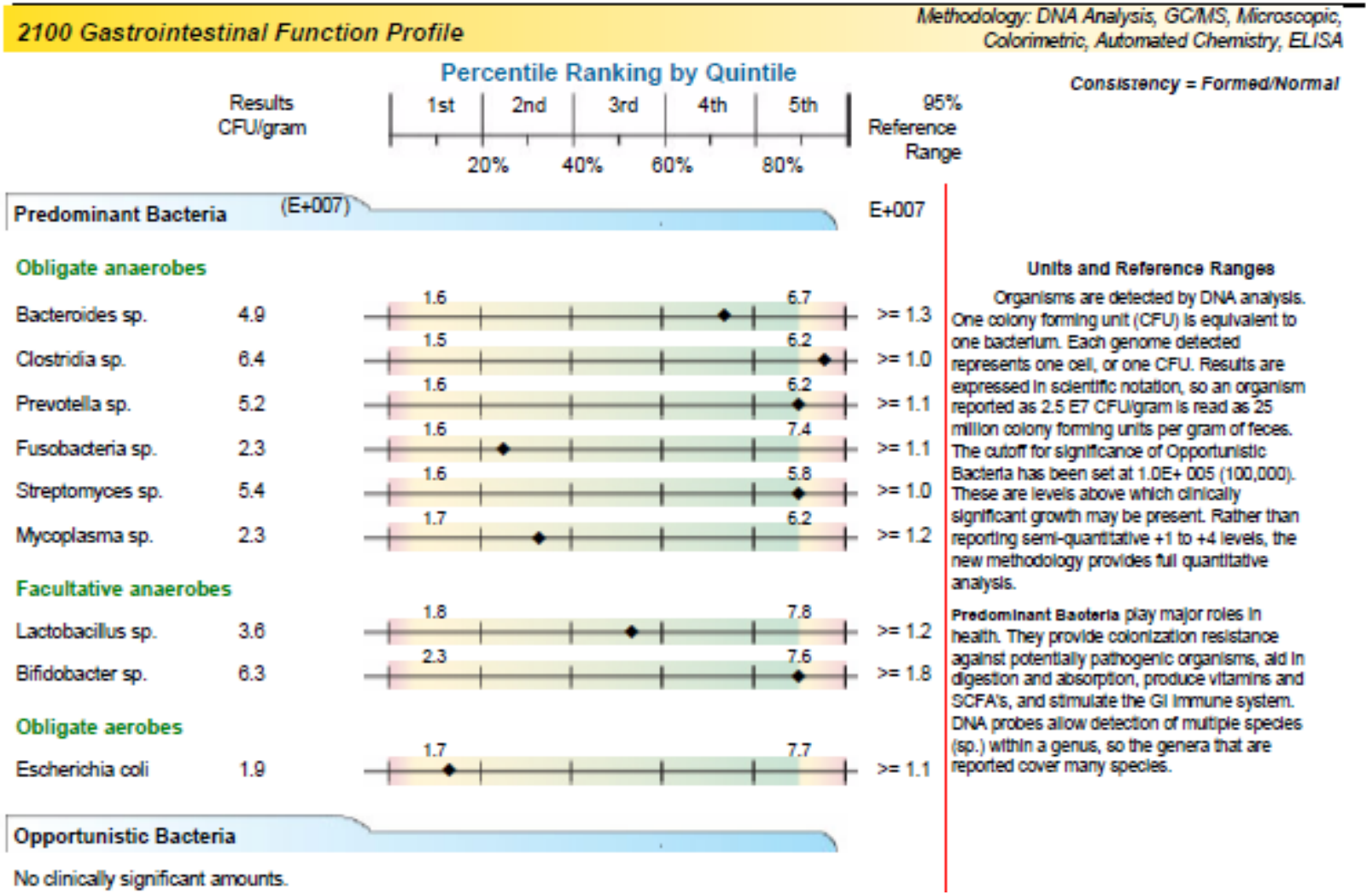
Interpretation of Fecal Anti-gliadin IgA: The level of intestinal anti-gliadin IgA antibody was elevated, indicative of active dietary gluten sensitivity. For optimal health; resolution or improvement of gluten-induced syndromes (mainly falling into six categories abbreviated as NAAAGS – neuropsychiatric, autoimmune, asthma, abdominal, glandular deficiencies/hyperactivity or skin diseases); resolution of symptoms known to be associated with gluten sensitivity (such as abdominal symptoms - pain, cramping, bloating, gas, diarrhea and/or constipation, chronic headaches, chronic sinus congestion, depression, arthritis, chronic skin problems/rashes, fibromyalgia, and/or chronic fatigue); and prevention of small intestinal damage and malnutrition, osteoporosis, and damage to other tissues (like nerves, brain, joints, muscles, thyroid, pancreas, other glands, skin, liver, spleen, among others), it is recommended that you follow a strict and permanent gluten free diet. As gluten sensitivity is a genetic syndrome, you may want to have your relatives screened as well.

Later confirmed by Alcat testing and elimination/provocation

Cross Reactivity 11/22/12

ANTIBODY ARRAY 4 Gluten-Associated Sensitivity & Cross-Reactive Foods	Normal	Equivocal*	Out of Range	Numeric Value	REFERENCE (ELISA Index)
Cow's Milk IgG+IgA Combined	X			1.47	0.4-2.0
Alpha-Casein & Beta-Casein IgG+IgA Comb.	X			1.53	0.2-2.3
Casomorphin IgG+IgA Combined	X			0.70	0.4-1.9
Milk Butyrophilin IgG+IgA Combined	X			0.96	0.3-1.3
American Cheese IgG+IgA Combined	X			0.95	0.4-2.2
Chocolate IgG+IgA Combined	X			1.11	0.3-2.4
Sesame IgG+IgA Combined			X	2.74	0.4-2.2
Hemp IgG+IgA Combined			X	7.41	0.6-1.8
Rye IgG+IgA Combined			X	3.24	0.5-2.1
Barley IgG+IgA Combined			X	5.91	0.4-1.8
Polish Wheat IgG+IgA Combined		X		1.91	0.4-2.1
Buckwheat IgG+IgA Combined			X	7.73	0.4-1.7
Sorghum IgG+IgA Combined			X	2.38	0.4-1.8
Millet IgG+IgA Combined			X	2.58	0.4-1.9
Spelt IgG+IgA Combined	X			1.41	0.2-2.0
Amaranth IgG+IgA Combined			X	7.32	0.3-2.5
Quinoa IgG+IgA Combined			X	3.46	0.3-1.7
Yeast IgG+IgA Combined	X			1.12	0.6-2.9
Tapioca IgG+IgA Combined	X			1.59	0.8-2.1
Oats IgG+IgA Combined	X			0.95	0.6-2.1
Coffee IgG+IgA Combined			X	3.10	0.5-2.5
Corn IgG+IgA Combined		X		2.19	0.6-2.6
Rice IgG+IgA Combined	X			1.62	0.6-2.4
Potato IgG+IgA Combined		X		1.85	0.7-2.0

Metametrix/Genova Test 12/9/11



2100 Gastrointestinal Function Profile

Methodology: DNA Analysis, GC/MS, Microscopic, Colorimetric, Automated Chemistry, ELISA

Consistency = Formed/Normal

Percentile Ranking by Quintile

Results CFU/gram	1st	2nd	3rd	4th	5th	95% Reference Range
		20%	40%	60%	80%	

Predominant Bacteria (E+007) — E+007

Obligate anaerobes

Bacteroides sp.	4.9	1.6	6.7	>= 1.3
Clostridia sp.	6.4	1.5	6.2	>= 1.0
Prevotella sp.	5.2	1.6	6.2	>= 1.1
Fusobacteria sp.	2.3	1.6	7.4	>= 1.1
Streptomyces sp.	5.4	1.6	5.8	>= 1.0
Mycoplasma sp.	2.3	1.7	6.2	>= 1.2

Facultative anaerobes

Lactobacillus sp.	3.6	1.8	7.8	>= 1.2
Bifidobacter sp.	6.3	2.3	7.6	>= 1.8

Obligate aerobes

Escherichia coli	1.9	1.7	7.7	>= 1.1

Opportunistic Bacteria

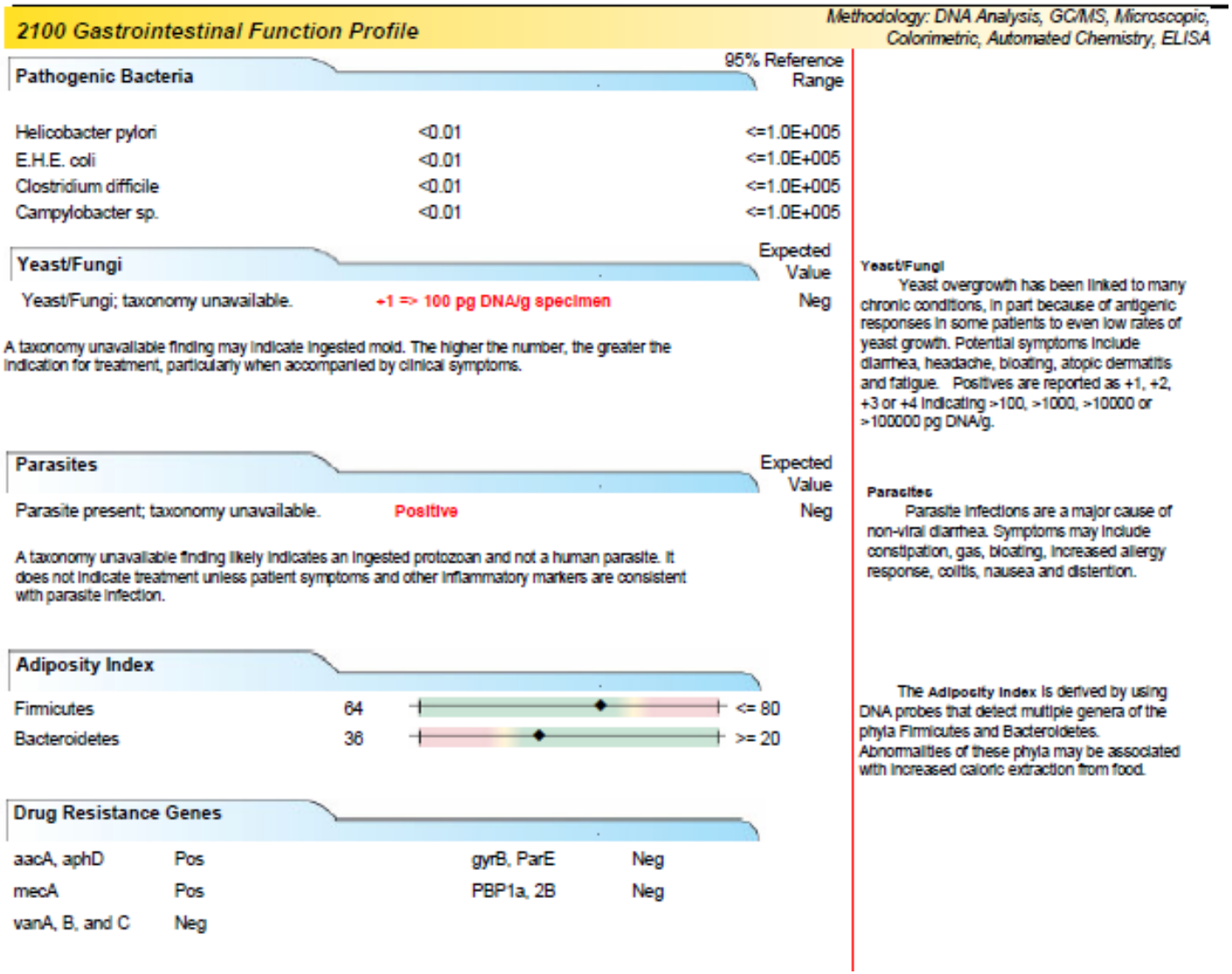
No clinically significant amounts.

Units and Reference Ranges

Organisms are detected by DNA analysis. One colony forming unit (CFU) is equivalent to one bacterium. Each genome detected represents one cell, or one CFU. Results are expressed in scientific notation, so an organism reported as 2.5 E7 CFU/gram is read as 25 million colony forming units per gram of feces. The cutoff for significance of Opportunistic Bacteria has been set at 1.0E+ 005 (100,000). These are levels above which clinically significant growth may be present. Rather than reporting semi-quantitative +1 to +4 levels, the new methodology provides full quantitative analysis.

Predominant Bacteria play major roles in health. They provide colonization resistance against potentially pathogenic organisms, aid in digestion and absorption, produce vitamins and SCFA's, and stimulate the GI immune system. DNA probes allow detection of multiple species (sp.) within a genus, so the genera that are reported cover many species.

Metametrix/Genova Test 12/9/11



2100 Gastrointestinal Function Profile

Methodology: DNA Analysis, GC/MS, Microscopic, Colorimetric, Automated Chemistry, ELISA

Pathogenic Bacteria

		95% Reference Range
Helicobacter pylori	<0.01	<=1.0E+005
E.H.E. coli	<0.01	<=1.0E+005
Clostridium difficile	<0.01	<=1.0E+005
Campylobacter sp.	<0.01	<=1.0E+005

Yeast/Fungi

		Expected Value
Yeast/Fungi; taxonomy unavailable.	+1 => 100 pg DNA/g specimen	Neg

A taxonomy unavailable finding may indicate ingested mold. The higher the number, the greater the indication for treatment, particularly when accompanied by clinical symptoms.

Yeast/Fungi
Yeast overgrowth has been linked to many chronic conditions, in part because of antigenic responses in some patients to even low rates of yeast growth. Potential symptoms include diarrhea, headache, bloating, atopic dermatitis and fatigue. Positives are reported as +1, +2, +3 or +4 indicating >100, >1000, >10000 or >100000 pg DNA/g.

Parasites

		Expected Value
Parasite present; taxonomy unavailable.	Positive	Neg

A taxonomy unavailable finding likely indicates an ingested protozoan and not a human parasite. It does not indicate treatment unless patient symptoms and other inflammatory markers are consistent with parasite infection.

Parasites
Parasite infections are a major cause of non-viral diarrhea. Symptoms may include constipation, gas, bloating, increased allergy response, colitis, nausea and distention.

Adiposity Index

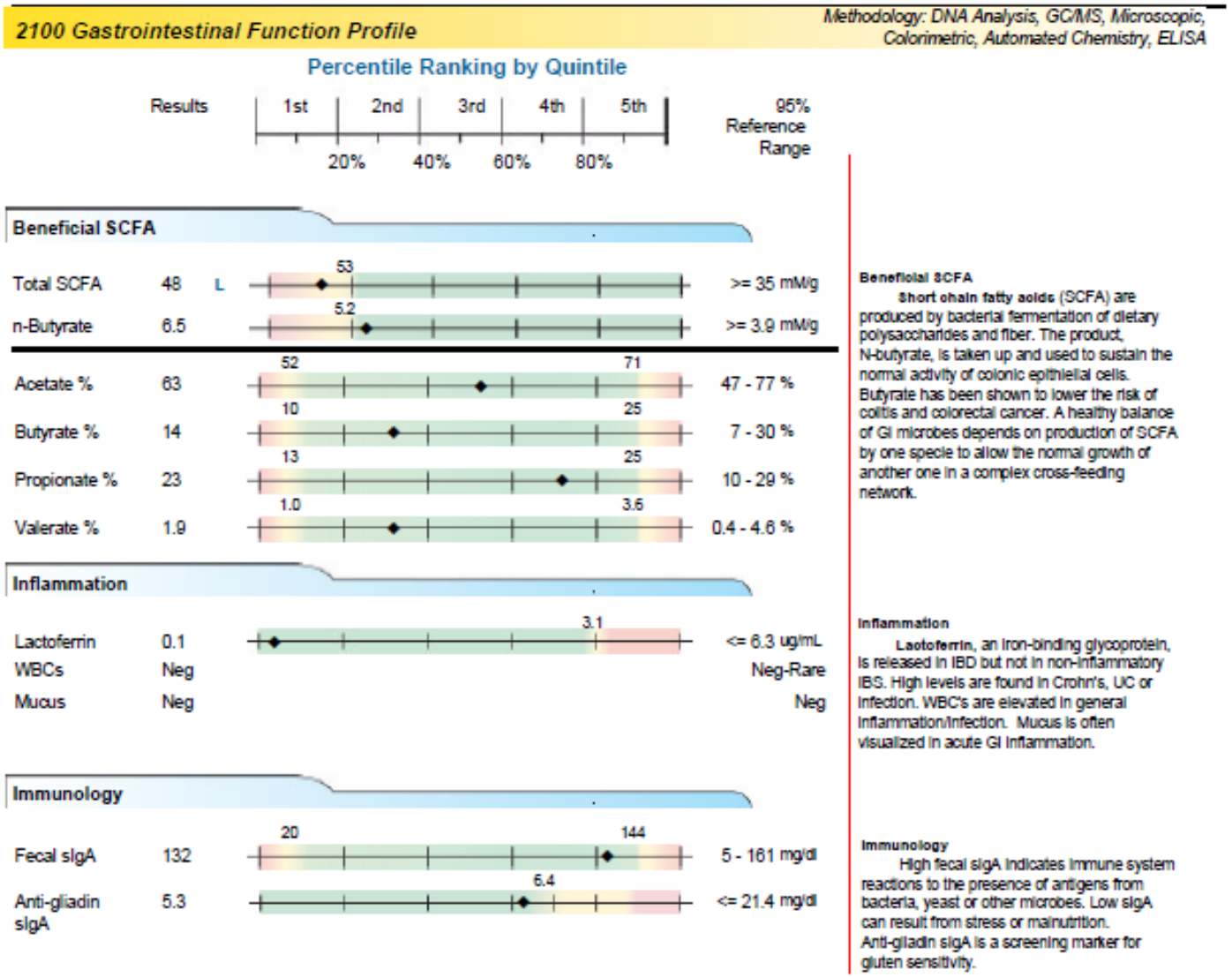
Firmicutes	64	<= 80
Bacteroidetes	36	>= 20

The **Adiposity Index** is derived by using DNA probes that detect multiple genera of the phyla Firmicutes and Bacteroidetes. Abnormalities of these phyla may be associated with increased caloric extraction from food.

Drug Resistance Genes

aacA, aphD	Pos	gyrB, ParE	Neg
mecA	Pos	PBP1a, 2B	Neg
vanA, B, and C	Neg		

Metametrix/Genova Test 12/9/11



2100 Gastrointestinal Function Profile

Methodology: DNA Analysis, GC/MS, Microscopic, Colorimetric, Automated Chemistry, ELISA

Percentile Ranking by Quintile

Results	1st	2nd	3rd	4th	5th	95% Reference Range
		20%	40%	60%	80%	

Beneficial SCFA

Total SCFA	48	L	53	>= 35 mM/g
n-Butyrate	6.5		5.2	>= 3.9 mM/g
Acetate %	63		52 – 71	47 - 77 %
Butyrate %	14		10 – 25	7 - 30 %
Propionate %	23		13 – 25	10 - 29 %
Valerate %	1.9		1.0 – 3.6	0.4 - 4.6 %

Inflammation

Lactoferrin	0.1	3.1	<= 6.3 ug/mL
WBCs	Neg		Neg-Rare
Mucus	Neg		Neg

Immunology

Fecal sIgA	132	20 – 144	5 - 161 mg/dl
Anti-gliadin sIgA	5.3	6.4	<= 21.4 mg/dl

Beneficial SCFA

Short chain fatty acids (SCFA) are produced by bacterial fermentation of dietary polysaccharides and fiber. The product, N-butyrate, is taken up and used to sustain the normal activity of colonic epithelial cells. Butyrate has been shown to lower the risk of colitis and colorectal cancer. A healthy balance of GI microbes depends on production of SCFA by one specie to allow the normal growth of another one in a complex cross-feeding network.

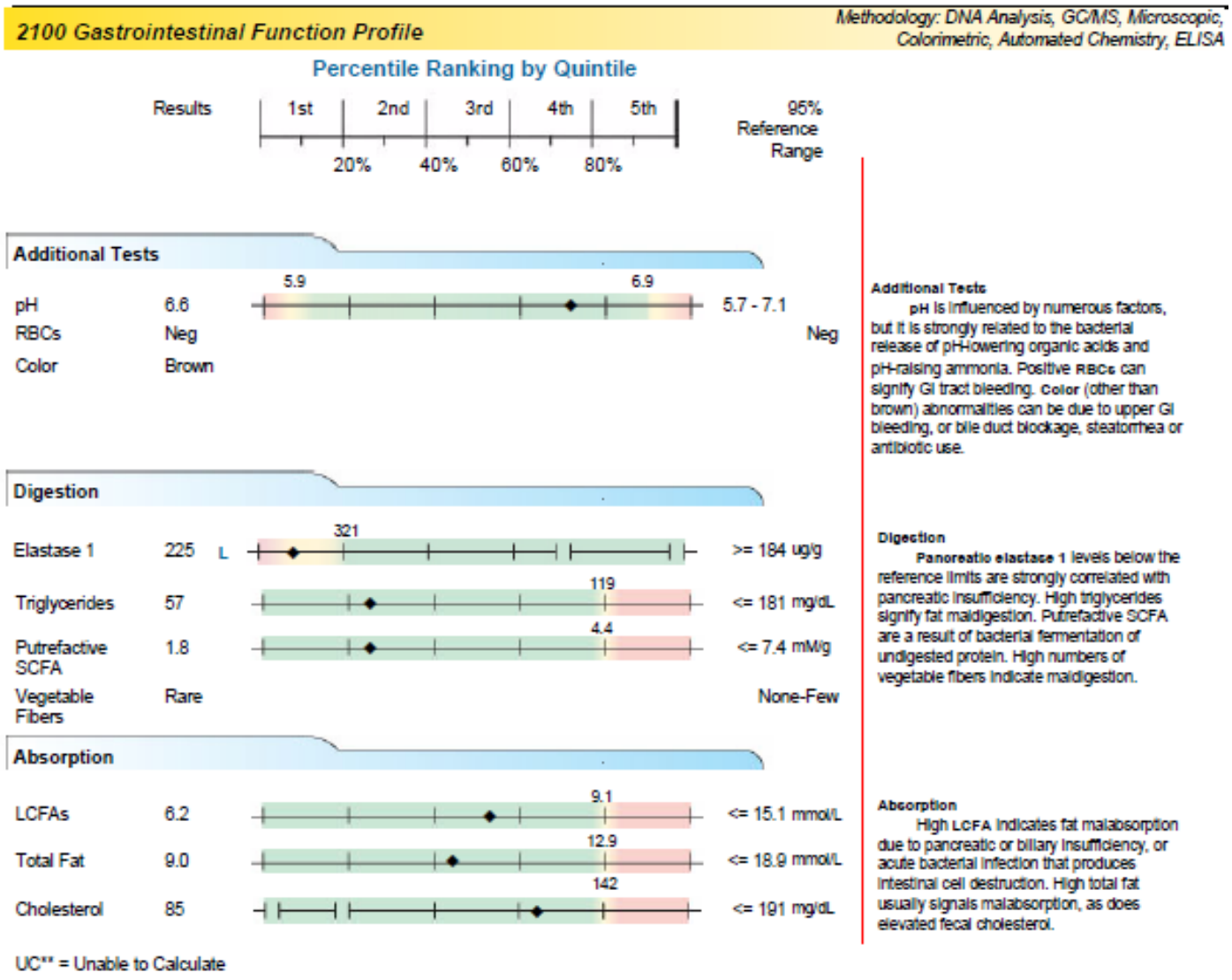
Inflammation

Lactoferrin, an iron-binding glycoprotein, is released in IBD but not in non-inflammatory IBS. High levels are found in Crohn's, UC or infection. WBC's are elevated in general inflammation/infection. Mucus is often visualized in acute GI inflammation.

Immunology

High fecal sIgA indicates immune system reactions to the presence of antigens from bacteria, yeast or other microbes. Low sIgA can result from stress or malnutrition. Anti-gliadin sIgA is a screening marker for gluten sensitivity.

Metametrix/Genova Test 12/9/11



Alcat Test 12/22/11

Severe Intolerance

LAMB
ONION
ROSEMARY

gluten
dairy

Moderate Intolerance

BLK/GREEN TEA
CELERY
MUSHROOM
MUSSEL
SOYBEAN
SQUASH (Yellow)

hemp
sesame
amaranth
coffee

Mild Intolerance

BLACKBERRY*
BREWER'S YEAST*
BROCCOLI*
CABBAGE*
CAROB*
CAYENNE PEPPER*
CHICK PEA*
CINNAMON*
CLOVE*
CUMIN*
DUCK*
GARLIC*
HADDOCK*
HAZELNUT*
HONEY*
JALAPENO PEPPER*
KALE*
KIWI*
MINT*
MUNG BEAN*
NAVY BEAN*
OREGANO*
PEAR*
PSYLLIUM*
QUINOA*
RADISH*
RICE*
SPINACH*
SQUID*
STRAWBERRY*
SWEET POTATO*
THYME*
COW'S MILK

Corn
potato
dairy

VEGETABLES / LEGUMES

ACORN SQUASH	ARTICHOKE	ASPARAGUS	BEET
BELL PEPPERS	BLACK BEANS	BLACK-EYED PEAS	BOK CHOY
BRUSSEL SPROUTS	BUTTERNUT SQUASH	CARROT	CAULIFLOWER
CUCUMBER	EGGPLANT	ENDIVE	FAVA BEAN
FENNEL SEED	GREEN PEA	ICEBERG LETTUCE	KELP
KIDNEY BEAN	LEAF LETTUCE	LEEK	LENTIL BEAN
LIMA BEAN	MUSTARD	OKRA	PARSNIP
PINTO BEAN	PORTOBELLO MUSHRO	ROMAINE LETTUCE	SCALLIONS
STRING BEAN	SWISS CHARD	TOMATO	TURNIP
WATERCRESS		ZUCCHINI SQUASH	

NUTS/ OILS AND MISC. FOODS

ALMOND	BAKER'S YEAST	BRAZIL NUT	CANE SUGAR
CANOLA OIL	CARAWAY	CASHEW	CHAMOMILE
COCOA	COCONUT		COTTONSEED
FLAXSEED	FRUCTOSE (HFCS)	HOPS	MACADAMIA
MAPLE SUGAR	PEANUT	PECAN	PINE NUT
PISTACHIO	SAFFLOWER		SUNFLOWER
VANILLA	WALNUT		

FRUITS

APPLE	APRICOT	AVOCADO	BANANA
BLACK CURRANT	BLUEBERRY	CANTALOUPE	CHERRY
CRANBERRY	DATE	FIG	GRAPE
GRAPEFRUIT	HONEYDEW (MELON)	LEMON	LIME
MANGO	NECTARINE	OLIVE	ORANGE
PAPAYA	PEACH	PINEAPPLE	PLUM
POMEGRANATE	PUMPKIN	RASPBERRY	WATERMELON

MEAT

BEEF	BUFFALO	CHICKEN	CHICKEN LIVER
PORK	TURKEY	VEAL	VENISON

DAIRY

EGG WHITE	EGG YOLK

SEAFOOD

ANCHOVY	CATFISH	CLAM	CODFISH
CRAB	FLOUNDER	HALIBUT	LOBSTER
MACKEREL	MAHI MAHI	OYSTER	SALMON
SARDINE	SCALLOP	SEA BASS	SHRIMP
SNAPPER	SOLE	SWORDFISH	TILAPIA
TROUT	TUNA		

GRAINS

AMARANTH	BUCKWHEAT		MILLET
TAPIOCA	WILD RICE		

HERBS / SPICES

BASIL	BAY LEAF	BLACK PEPPER	CARDAMOM
CHILI PEPPER	CORIANDER	DILL	GINGER
LICORICE	NUTMEG	PAPRIKA	PARSLEY
SAFFRON	SAGE	TURMERIC	

You have no reaction to Candida Albicans.

You have a severe reaction to Gluten/Gliadin, eliminate these foods:

BARLEY	MALT	OAT
RYE	SPELT*	WHEAT

You have a mild reaction to Casein and Whey, limit these foods:

GOAT'S MILK	SHEEP'S MILK

Intestinal Permeability 5/30/12

TEST	RESULTS				
ANTIBODY ARRAY 2	**Normal**	**Equivocal***	**Out of Range**	**Numeric Value**	**Reference** (ELISA Index)
Intestinal Antigenic Permeability					
Actomyosin IgA**	X			9.01	0.0-20.0
Occludin/Zonulin IgG	X			1.10	0.2-1.5
Occludin/Zonulin IgA	X			0.57	0.1-1.8
Occludin/Zonulin IgM			X	2.57	0.1-2.1
Lipopolysaccharides(LPS)IgG	X			1.14	0.1-1.6
Lipopolysaccharides(LPS)IgA		X		1.59	0.1-1.8
Lipopolysaccharides(LPS)IgM			X	4.21	0.1-2.0

PLEASE NOTE THAT THE REFERENCE RANGES HAVE BEEN UPDATED WITH EFFECT FROM 03/07/2012.

Initial 6/12/12

GI Pathogen Screen with H. pylori Antigen - 401H

Parameter	Result
Stool Culture for Pathogens	
Source	Stool
Preliminary Report	Normal flora after 24 hours
Final Report	* Klebsiella species isolated *
Amount of Growth	Moderate
Stool for Ova & Parasites	
Ova & parasites #1	No Ova/Parasites detected
Ova & parasites #2	No Ova/Parasites detected
Ova & parasites #3	* Endolimax nana cysts detected *
Ova & parasites #4	No Ova/Parasites detected
Trichrome Stain	No Ova/Parasites detected
Stool Antigens Test	
Cryptosporidium Antigen	Not detected
E. histolytica Antigen	Not detected
Giardia lamblia Antigen	Not detected
***	
Fungi	No fungi isolated
C. difficile Toxin A	Not detected
C. difficile Toxin B	Not detected
Yeast	No yeasts isolated
Occult Blood	Not detected
Helicobacter Pylori Stool Antigen	
H. pylori Antigen	* Detected *

Follow-Up 8/7/12

GI Pathogen Screen with H. pylori Antigen - 401H

Parameter	Result
Stool Culture for Pathogens	
Source	Stool
Preliminary Report	Normal flora after 24 hours
Final Report	* Escherichia coli isolated *
Amount of Growth	Abundant
Stool for Ova & Parasites	
Ova & parasites #1	* Endolimax nana cysts detected *
Ova & parasites #2	No Ova/Parasites detected
Ova & parasites #3	No Ova/Parasites detected
Ova & parasites #4	* Endolimax nana cysts detected *
Trichrome Stain	Few cyst forms of Endolimax nana seen on Trichrome Stain
Stool Antigens Test	
Cryptosporidium Antigen	Not detected
E. histolytica Antigen	Not detected
Giardia lamblia Antigen	Not detected
***	
Fungi	No fungi isolated
C. difficile Toxin A	Not detected
C. difficile Toxin B	Not detected
Yeast	No yeasts isolated
Occult Blood	Not detected
Helicobacter Pylori Stool Antigen	
H. pylori Antigen	Not detected

Follow-Up 10/8/12

GI Pathogen Screen with H. pylori Antigen - 401H

Parameter	Result
Stool Culture for Pathogens	
Source	Stool
Preliminary Report	Normal flora after 24 hours
Final Report	* Escherichia coli isolated *
Amount of Growth	Abundant
Stool for Ova & Parasites	
Ova & parasites #1	No Ova/Parasites detected
Ova & parasites #2	No Ova/Parasites detected
Ova & parasites #3	No Ova/Parasites detected
Ova & parasites #4	No Ova/Parasites detected
Trichrome Stain	No Ova/Parasites detected
Stool Antigens Test	
Cryptosporidium Antigen	Not detected
E. histolytica Antigen	Not detected
Giardia lamblia Antigen	Not detected
***	
Fungi	No fungi isolated
C. difficile Toxin A	Not detected
C. difficile Toxin B	Not detected
Yeast	No yeasts isolated
Occult Blood	Not detected
Helicobacter Pylori Stool Antigen	
H. pylori Antigen	Not detected