

The Primary Importance of the Gut in All Healing



Acres USA

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St. Paul, Minnesota



Jerry Brunetti ©2009



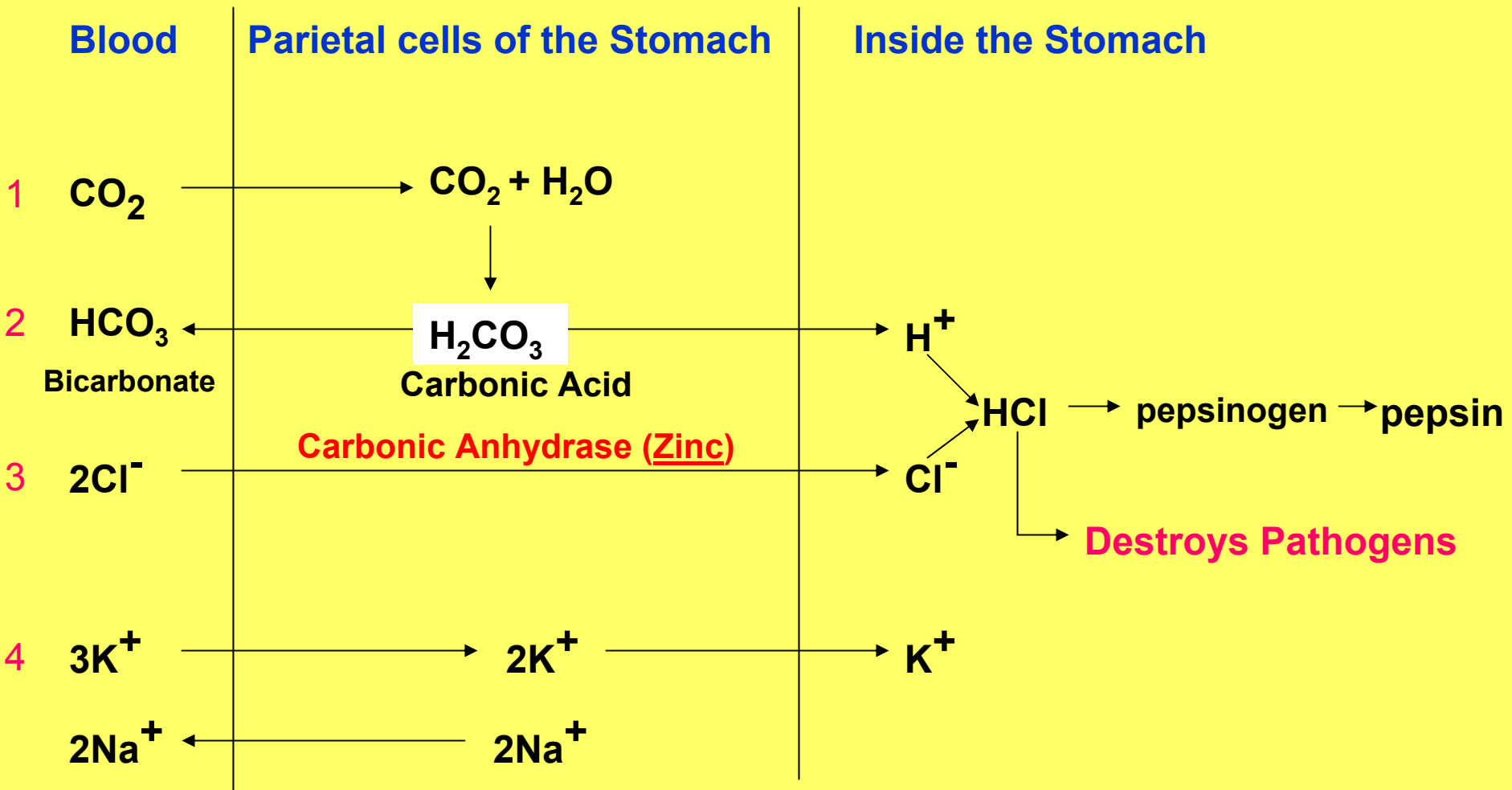
Digestion

“All Diseases Begin in the Gut”

Hippocrates, 460-370 B.C.



HOW STOMACH ACID IS MADE



Pre-Digestion

- Resting pH of Stomach = pH 5.0-6.0
- Active Stomach (with food):
 - 30-60 minutes → pH <3.0 (0.8-2.5)
- Food Enzymes: Active @ pH 3.0-9.0
 - Stomach Digestion of: 60% Starch;
30% Protein; 10% Fat!
- Pancreatic Enzymes: @ pH 7.2-9.0
 - Active in Duodenum Only

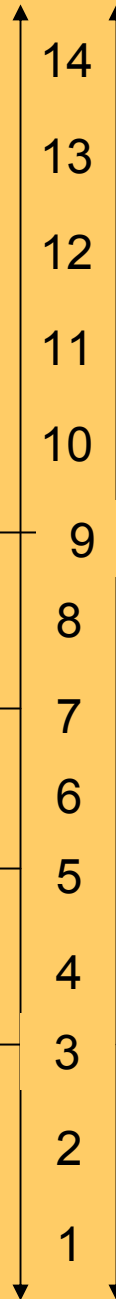
pH SCALE

Alkaline (OH⁻)

Pancreatic enzymes work in this zone 7.0-9.0

pH of mouth and resting stomach pH 5.0-7.0

Acid stomach zone HCl and pepsin work in this zone 3.0-5.0



NEUTRAL
(Water)

Food
Enzymes
Work
In
This
Zone
3.0-9.0

Acid (H⁺)

Low Stomach Acidity

- Creates deficiency of Secretin/cholecystokinin
- Creates absorption of Partially Digested Protein
 - Casomorphin & gliadomorphin (gluteomorphin)
 - Auto-immune reactions, allergies
- Creates Malabsorption of vitamins/minerals
- Creates Maldigested carbohydrates → food for pathogenic flora → alcohols, acetaldehydes
- Creates Mal-digested Fat → deficiency of fat soluble ADEK, EFA's

Stomach Digestion Acidity

- Low pH (<2.0) stimulates Secretin & Cholecystokinin
 - Secretion
 - Prevents the production of HCl by stomach (natural “Brake”)
 - Causes Liver to Produce Bile
 - Causes Mucous Production on Intestinal Wall
 - Causes Pancreas to Produce Bicarbonate (raises pH)
 - Cholecystokinin
 - Produces pancreatic enzymes
 - Halts Stomach Activity
 - Gall Bladder Empties Bile
 - Pancreas Secretes Enzymes Protease, Amylase, Lipase
- Low pH (Acidity) Destroys Pathogens (e.g. Helicobacter pylori, Campylobacter pylori, Salmonella, Enterobacteria, Streptococci, Candida, etc.)
- 50% of 60 (+) years: Low HCl and 80% of 80 (+) years: Low HCl
- HCl necessary for B-12 absorption
- Secretion of Picolinate (needed to absorb zinc)
 - Zinc needed to produce HCl

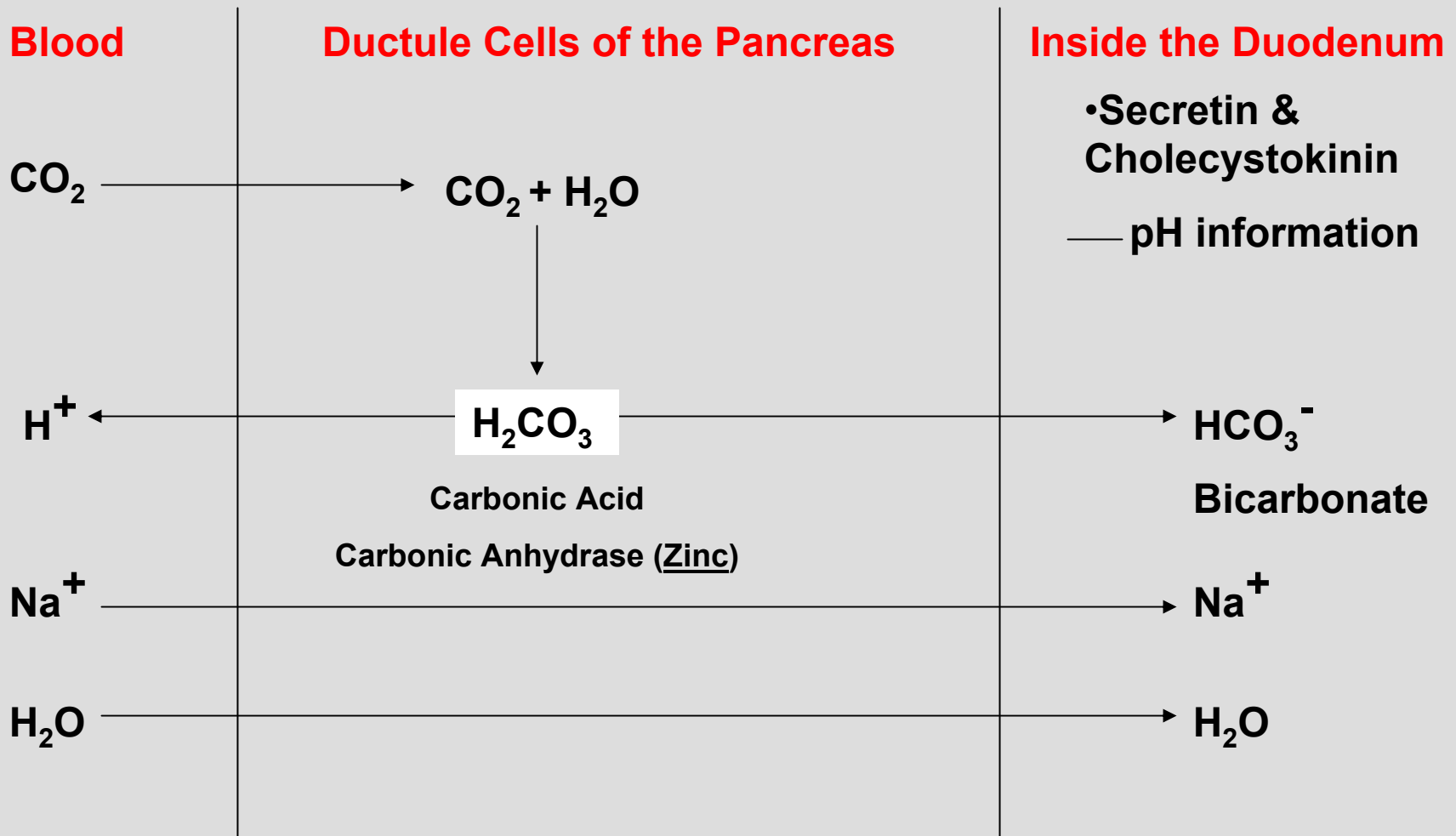
Intestinal Digestive System

Relative Importance of Site absorption within the Small Intestine

Location	Length	Exits to Blood
Duodenum	12-18 inches Susceptible To plaque Build up!	Chlorine, Sulfuric acid, Calcium, Magnesium, Iron, Zinc, Copper, Manganese Monosaccharides, Glucose, Galactose, Fructose B₁, B₂, B₆, Folate, C Fat (i.e., short-chain fatty acids, long-chain fatty acids, and partially split glycerides) Fat Soluble vitamins A, D, E, H
Jejunum	10 feet	Disaccharides, sucrose, maltose, lactose Water-Soluble vitamins: thiamine, pyridoxine, riboflavin, folic acid Proteins and amino acids
Ileum	12 feet	Cholesterol Vitamin B₁₂ Bile Salts

Digestive Wellness by Dr. Elizabeth Lipski
MSCNN

HOW THE DUODENUM BECOMES ALKALINE



Proteins

Stomach → Pepsin → Duodenum →
Pancreatic Protease → Peptide →
Villi Enterocyte → Peptidases →
Amino Acids → absorption

• Damaged gut wall → peptides (e.g. gluten/casein) leak through gut wall

Best Proteins: Eggs, Fish, Meat (broiled, stewed, poached)

Protein Digestion

Mouth:

- Chewing to Expose Surface Area
- Weak protease from sublingual glands

Stomach:

- Plant (food) Enzymes & Salivary Protease
- Hydrolyze proteins for 30-60 minutes @ pH 5.0-6.0
- 30% Protein digestion @ pH >3.0
- HCl reduces pH to <3.0
- HCl activates pepsin
- Chyme enters duodenum @ pH >5.0

Duodenum:

- Pancreatic Protease Reduces Long Chain Polypeptides
 - Short chain polypeptides, tripeptides, dipeptides and amino acids by amino peptidase & dipeptidase
 - Into Portal Vein

Portal Vein: Amino Acids transported to liver for metabolism

Carbohydrates

- **Monosaccharides**
 - Glucose/fructose (fruit & vegetables, honey)
 - Galactose (soured milk) from lactose
- **Disaccharides (Disaccharidases from microvilli)**
 - Sucrose (also unripe fruit)
 - Lactose
 - Maltose (digestion of starch)
- **Poor Gut Lining** → **Damaged microvilli**
 - Disaccharides = substrate for pathogens (no absorption)

Carbohydrate Digestion

Mouth

- Chewing to Expose Surface Area and Remove Cellulose
- Parotids Secrete Amylase
- Salivary pH @ 6.3-9.0 working range

Stomach

- Plant Amylase (Food) Enzymes & Salivary Amylase
- Hydrolyze carbohydrates for 30-60 minutes @ pH 5.0-6.0
- 40-85% of starches digested @ pH >3.0!
- HCl reduces pH <3.0

Duodenum

- Pancreatic Amylase: Carbohydrates to Disaccharides (Maltose, Sucrose, Lactose)
- Lactose & Maltose not absorbed into blood → gas, diarrhea
- Sucrose absorbed into blood → kidney stress, constipation

Jejunum

- Microvilli secrete Lactase, Maltase, Sucrase
→ Glucose → Blood

Disaccharidases in Jejunum (Microvilli)

- Lactase hydrolyzes Lactose → Glucose & Galactose
- Sucrase hydrolyzes Sucrose → Glucose & Fructose
- Maltase hydrolyzes Maltose → Glucose & Glucose

Cellulose/Cellulase

- Cellulose = Glucose + SCFA
- **NOT Digestible by Humans!**
 - Discomfort from Raw Foods → Intestinal Gas
- Cooking Destroys Cellulose
- Thorough Chewing Destroys Cellulose
- Cellulase Found In: Apples, Pears, Papaya, Melons, Wheat, Millet

Raffinose & Stachyose/Glucoamylase

- Abundant in Beans, Peas, Nuts, Seeds, Beets, Broccoli, Cabbage, Pumpkin, Oats, Wheat, Barley, Millet
- Glucoamylase not produced by Humans!
 - Undigested sugars feed → bacteria gas



Phytates/Phytase

Grains, Seeds, Nuts, Rhizomes



Pectins/Pectinase

- Non-cellulose polysaccharide in Fruits & Vegetables
- Enzyme increase water solubility of fiber → Bind Toxins & Pre-biotic

Lipid Digestion

Mouth:

- Chewing to Expose Surface Area
- Weak Lipase from Sublingual Glands

Stomach:

- Gastric Lipase, Plant (food) Enzymes and Salivary Lipase
- Hydrolyzed for 30-60 minutes @ pH 5.0-6.0
- 10% Fat Digestion at pH >3.0
- HCl reduces pH to <3.0

Duodenum:

- Bile emulsifies fat
- Pancreatic enzymes hydrolyze fat
- FA's released from glycerol
 - FA's & Triglycerides & Diglycerides → absorption
 - SCFA: attracted to water → intestinal wall
 - LCFA → chylomicrons → lacteals (lymph) → systemic veins



Large Intestine

- Length 3-5 Feet
- 2.5 Gallons Water per day (80% removal)
- Colon Bacteria
 - Lower pH
 - Synthesize vitamins A,B,K
 - Ferment Fiber
 - Create Short Chain Fatty Acids (Butyric, Propionic, Acetic, Valeric)
 - Energy For Colonic Cells
 - Deficiency = colitis, cancer, IBS
 - Excretion of Degraded Hormones (Beta-glucuronidase = cancer marker)
- Stool Transit Time: 1-2 B.M.'s/day
 - <12 hours: malabsorption
 - 12-24: optimal
 - >24: poor
 - Stool transit test: 5-6 charcoal tablets or 3-4 red beets
- Stool Excretion
 - Americans: Average 5 oz. stool/day
 - Africans (Traditional diet): Average 16 oz stool/day
- Fiber
 - American Average Fiber: 12 grams/day vs. NCI recommendation: 20-30 grams/day
 - High Fiber-good when healthy flora is present!
 - High Fiber- bad when unhealthy flora is present

Where Hydrolytic Enzymes Are Found

- **Plants**
 - Ripening Process- Digestion
 - Predigestion in Humans
- **Digestive Tracts**
 - Salivary Glands
 - Stomach
 - Pancreas
 - Small Intestine
- **White Blood Cells**
 - Digestive Leukocytosis-Phagocytosis
 - Inflammation
- **Every Cell Wall**
 - Lysosomes
- **Inside Every Cell**
 - Catalase

Six Families of Enzymes

1. Hydrolases

- Digest food with H_2O
- H^+ and OH^-

2. Lysases

- Catalyze decomposition of molecule in two fragments without H_2O

3. Oxidoreductases

- Transfer of electrons from one molecule to another
- Oxidation of one = reduction of another
- Usually involves Coenzymes

4. Transferases

- Transfer chemical groups (e.g. $-PO_4$, $-NH_2$, $-CH_3$) from donors to acceptor molecules

5. Isomerases

- Convert molecule into mirror image of original (e.g. D-form, or dextrorotatory to L-form, levorotatory)

6. Ligases or Synthetases

- Catalyze formation of chemical bond allowing energy rich phosphate compounds to be broken (e.g. conversion of glucose into energy)

Enzyme Anatomy

- **Apoenzyme** – protein portion of hundreds of amino acids in specific long chain arrangement
- **Prosthetic Group (Coenzyme)** – mineral or vitamin, or molecule made by a vitamin

What Influences Enzyme Activity

1. Temperature

- Enzymes have optimum temperature
- Generally, chemical reaction doubles when temperature increases 10° C

2. Substrate Concentration

- Increase of substrate increases enzyme reactions

3. pH (Acid/Alkaline)

- Plant enzymes at 3.0-9.0
- Animal (pancreatic) enzymes at 7.0-9.0

Healthy Gut Eco-System

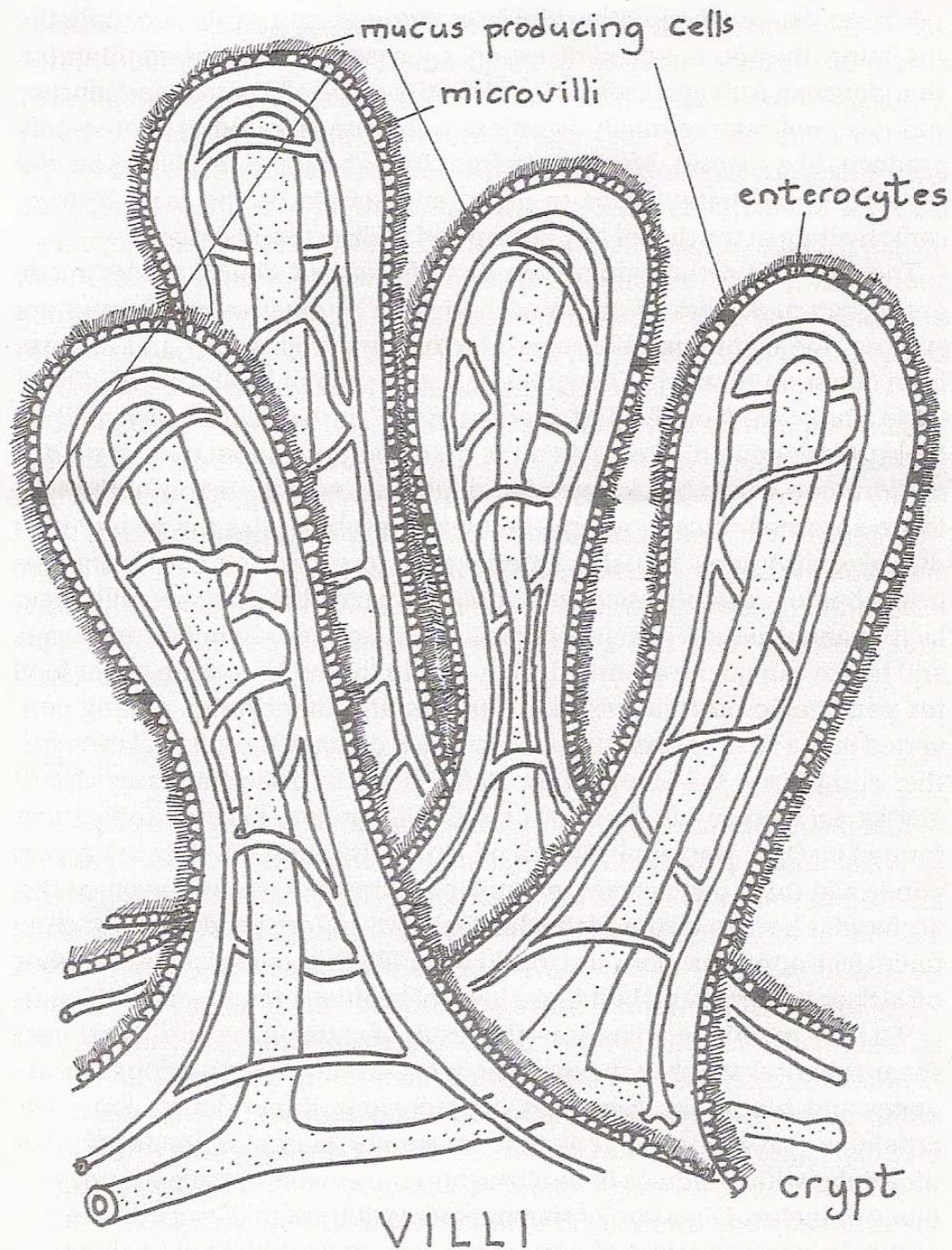
- 3-5 lbs of 500 species of Bacteria-greater than number of cells in the body! Only 30% identified!
- Essential: Bifido, Lacto, Propiono, E. coli, Enterococci, Peptostreptococci
- Gut flora produce steady stream of water-soluble B vitamins, amino acids, vitamin K.
- Produce antibiotics, anti-virals, anti-fungals
- Organic acids: Gut wall pH=4.0-5.0
- Immune substances: interferon, lysozyme, surfactants
- Neutralize toxins: nitrates, indoles, skatoles, phenols, histamine
 - chelate heavy metals
 - suppress hyperplastic processes
- Normal Gut Flora
 - Nourish gut epithelia (60-70% energy from bugs!)

Main Bacteria Types in Our Bodies

Type	Aerobic/Anaerobic	Percent
<i>Bacteroides, twenty species</i>	Anaerobic	Almost 50
<i>Bifidobacterium</i>	Anaerobic	11
<i>Pepto streptococcus</i>	Anaerobic	8.9
<i>Fusobacteria, five species</i>		7
<i>Rheumanococcus, eleven species</i>		4.5
<i>Lactobacillus</i>	Both	2-2.5
<i>Clostridia</i>		0.6
<i>Enterobacteria, E. coli, Klebsiella, Aerobacteraerobacter, etc.</i>		Less than 0.5

Opportunistic Microbes

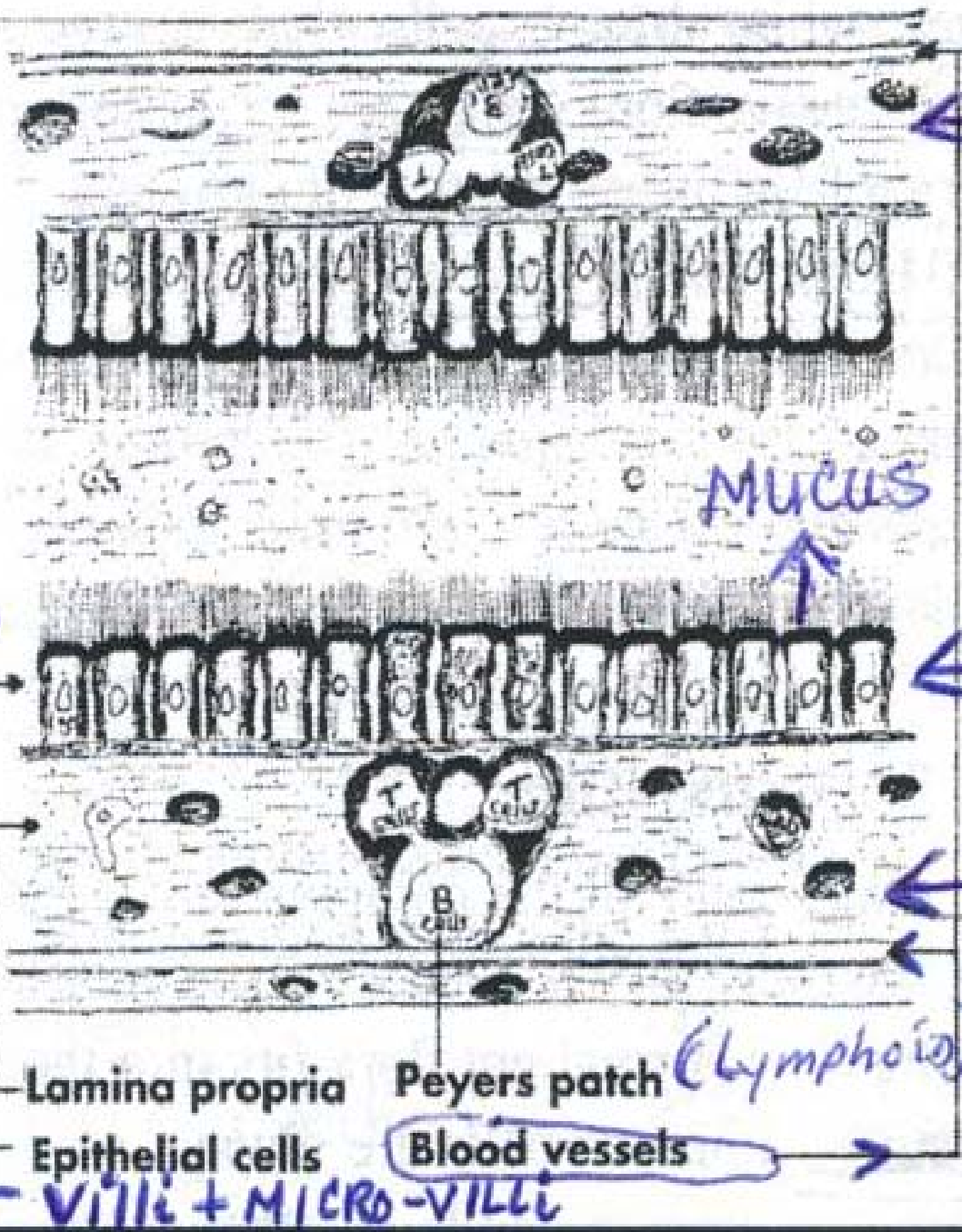
- Bacteroids, Peptococci, Staph, Strep, Bacilli, Clostridia, Enterobacteria (Proteus, Klebsiella, Citrobacteria), Fuzobacteria, Eubacteria, Catenobacteria
- Iron Loving: Actinomycetes, Mycobacteria, E. coli, Corynebacterium, etc.
 - Create anemia



Enterocytes begin in crypt as “stem” cells, mature as they migrate upwards into enterocytes, slough off every 3-5 days

Gut Associated Lymphoid Tissue (G.A.L.T.)

- 70% Immune System Located in Gut
- Antigen $\xrightarrow{\text{M-Cells}}$ Peyers Patches
- Peyers Patches (lymph nodes) 1-25 mm
 - Alert B-cells, T-Cells \longrightarrow Transport antigens to mucosa: macrophage ingestion
 - Filters Lymph (imprisons pathogens)
 - Produces Lymphocytes



Lamina
propria
(connective
tissue + blood
vessels)

G.A.L.T.
(25%)

CD-4; CD-8,
Dendrocytes,
MAST CELLS

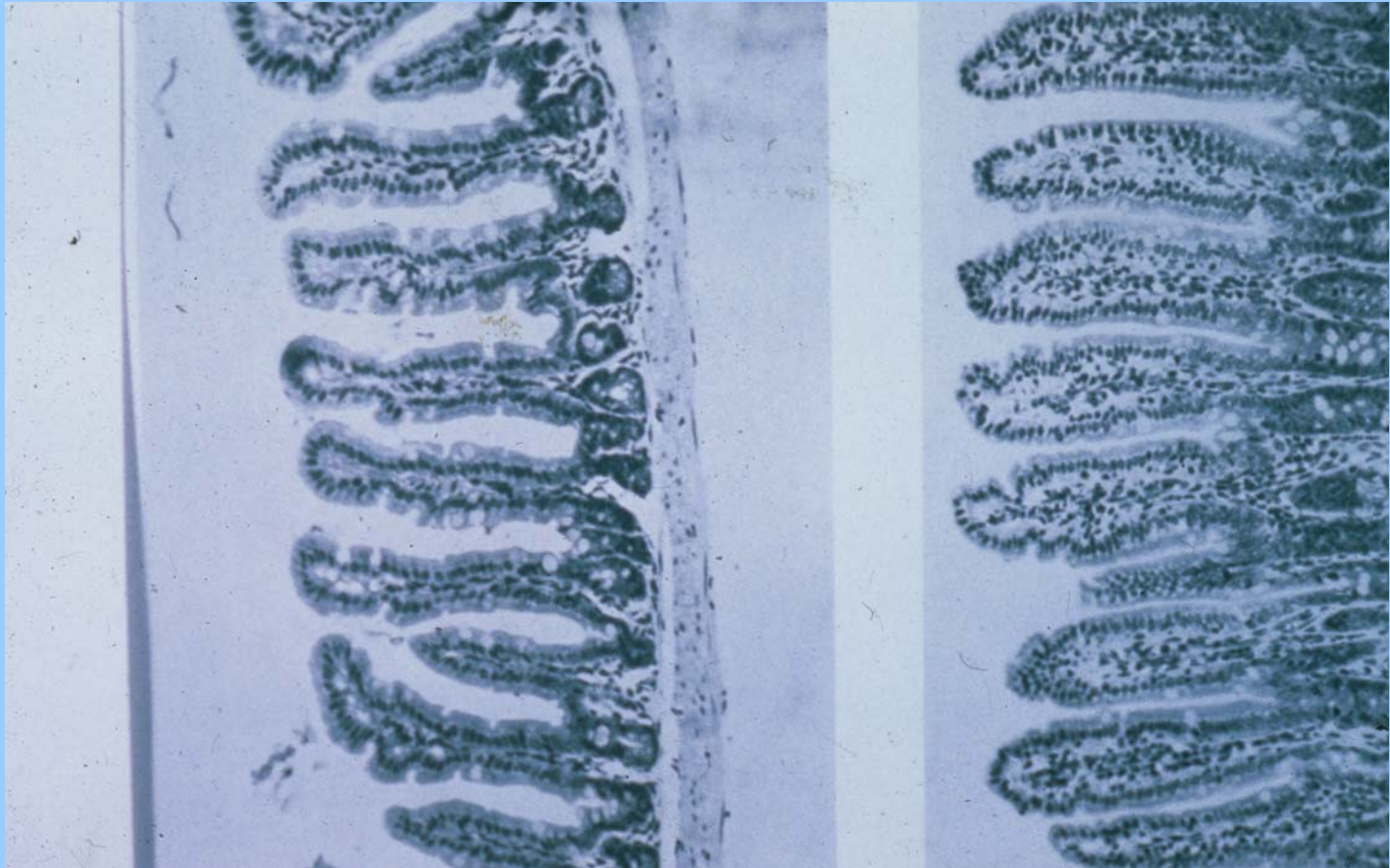
Lamina propria
Epithelial cells
Villi + Micro-villi

Peyers patch (Lymphoid)
Blood vessels

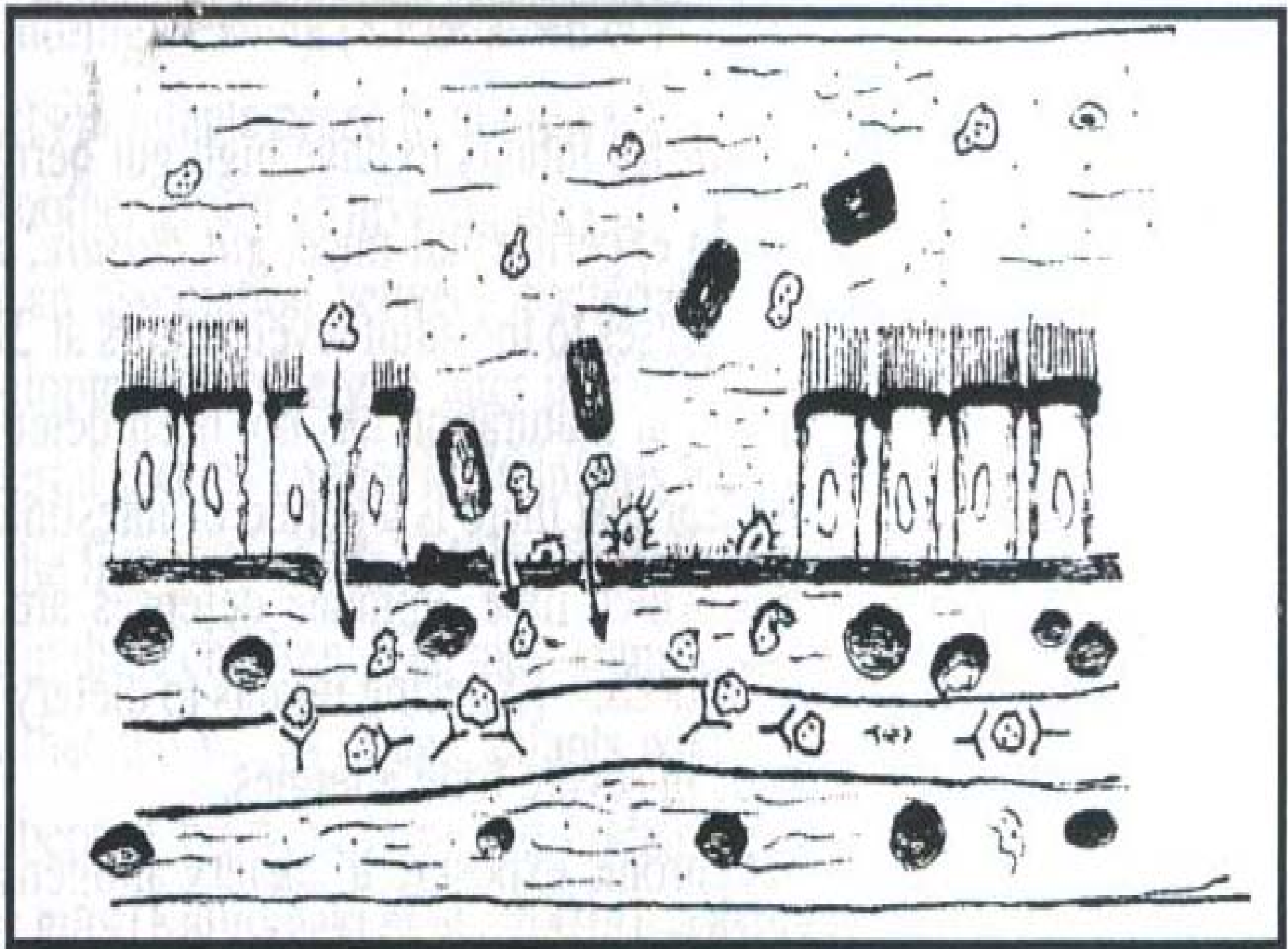
Mucus

The Gut's Immune System

1. Immune Exclusion: IgA Antibodies Enhanced by Probiotic Flora
 - Confine Infection to GI Tract
2. Immune Elimination: GALT Degrades Invaders
3. Immune Regulation: Based Upon Immune “Memory”
 - Specialized ‘T’ Cells (Memory Cells) → Rapid B-cell Antibody Response
 - Oral Tolerance: Memory of Beneficial (Harmless) Flora & Foods
 - Impaired by Inflammatory Reactions
 - Impaired by Immunosuppressive Influences (disease, drugs)
 - Impaired by IgA Deficiency
 - Gut organisms = Earliest & Largest Stimulus Upon Oral Tolerance
 - Age When Exposed, Duration of Antigen Exposure



Healthy villi vs. Unhealthy villi



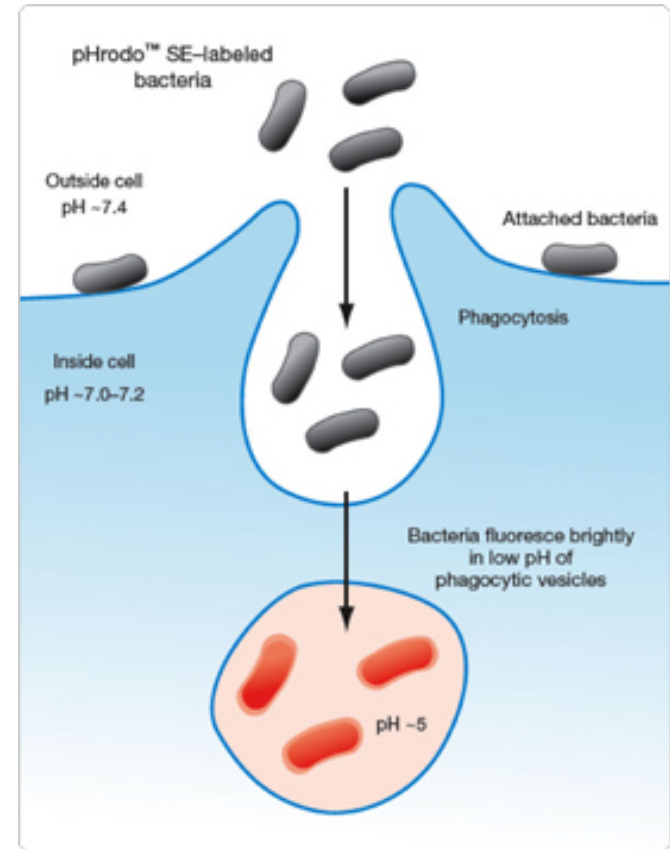
When the Barrier is Breached

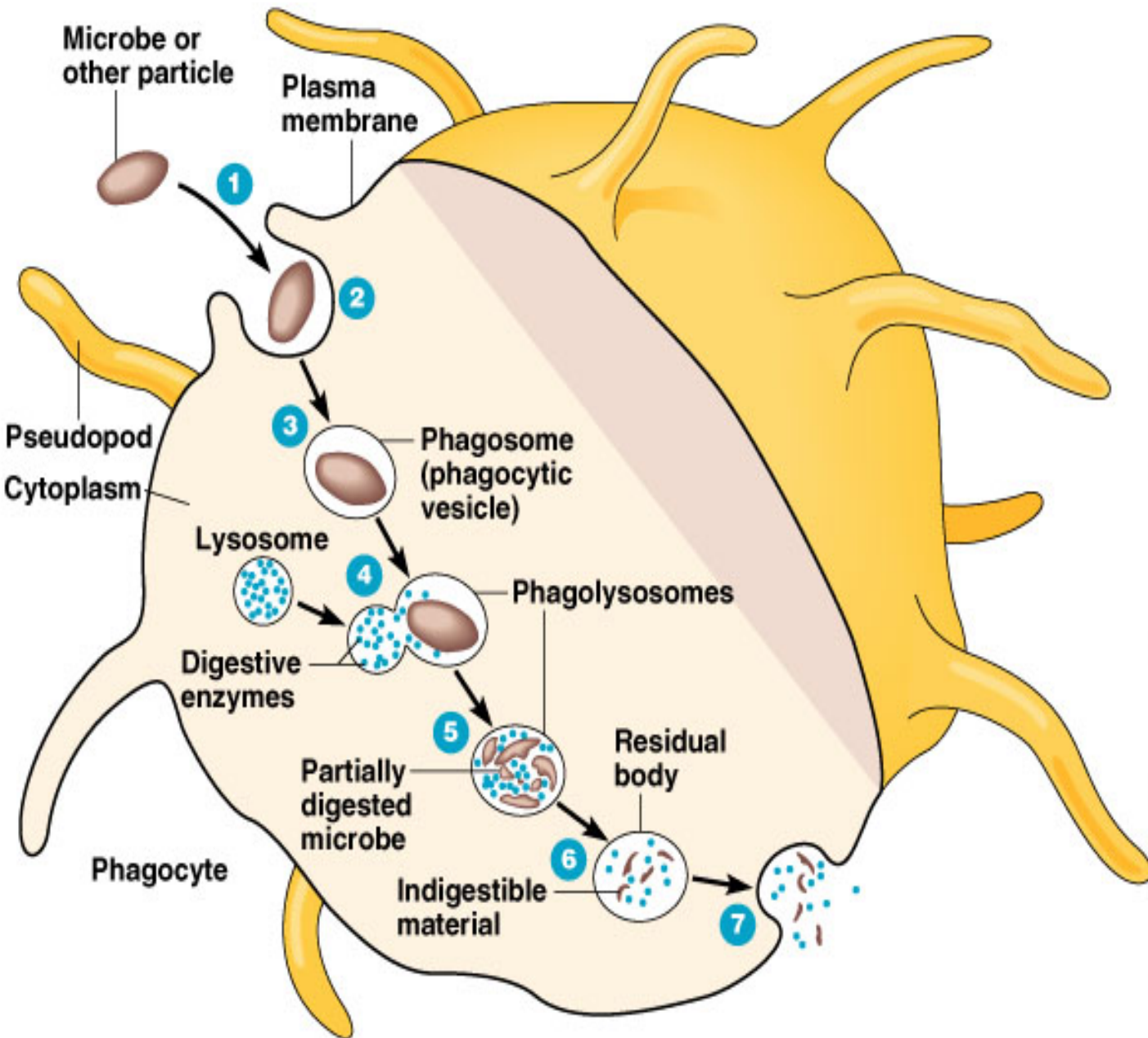


- Digestion is forced upon Leukocytes!
 - Digestive Leukocytosis
 - Researched by Paul Kouchakoff, MD in 1930
 - Raw/Frozen Food: No Leukocytosis
 - Cooked Food: Mild Leukocytosis
 - Canned Food: Moderate Leukocytosis
 - Refined Foods (sugar, carbs, sodas, alcohol): Severe Leukocytosis
 - Cured, Salted, Canned, Cooked Meats: The Worst Leukocystosis
 - Biggest Processed Meat Consumers: US Military & Babies

Phagocytosis

- Occurs in a fraction of a second!
- Macrophages
 - 5X amount of neutrophils
 - Can engulf large particles
 - Can engulf necrotic tissue
 - Contain proteolytic (bacteria) and lipase (lipid membrane of T.B. etc.)



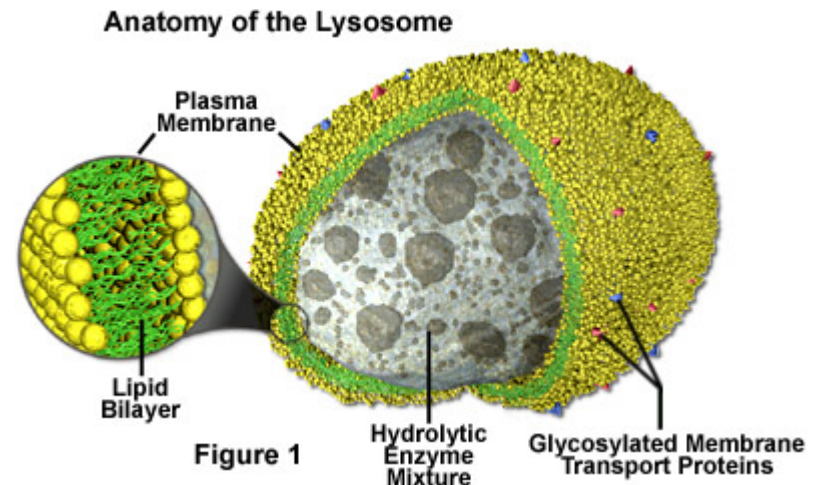
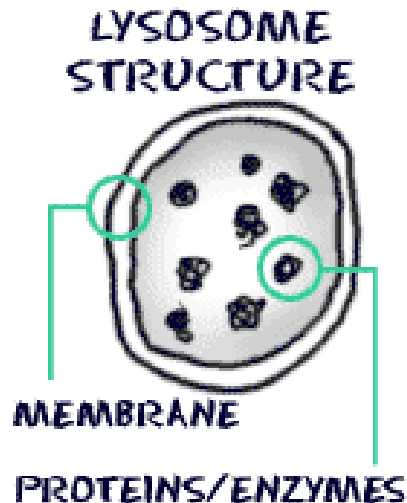


- 1** Chemotaxis and adherence of microbe to phagocyte.
- 2** Ingestion of microbe by phagocyte.
- 3** Formation of a phagosome.
- 4** Fusion of the phagosome with a lysosome to form a phagolysosome.
- 5** Digestion of ingested microbe by enzymes.
- 6** Formation of residual body containing indigestible material.
- 7** Discharge of waste materials.

(a) Phases of phagocytosis

Lysosomes (Body of Enzymes)

- Sacs in cell membrane: digest debris following phagocytosis
- Autolysis: cell destruction following lysosome rupture



Handy Guide to Your White Blood Cells, or Your Body's Cellular Army (Why Dirt is Good)

System	White Blood Cell Type	Function
Innate Immunity	Monocyte	Circulates in your blood until needed in the tissues; then exits the bloodstream and becomes a macrophage.
	Macrophage	The big eater-destroys invaders by engulfing and digesting them. Helps to activate T cells.
	Neutrophil	The most abundant white blood cell in your body. Circulates in the blood until needed in the tissues, then exits the bloodstream and destroys invaders by eating and digesting them. When this cell is frustrated by too much to eat it becomes bulimic and sterilizes the area with its "vomit."
	Mast cell	Granulocytic or flamethrower cell that fights parasites and is involved in allergic reactions.
	Eosinophil	Granulocytic or flamethrower cell that fights parasites and is involved in allergic reactions.
	Basophil	Granulocytic or flamethrower cell that fights parasites and is involved in allergic reactions.
	Natural killer cell	Cell that destroys a variety of invaders, including bacteria, viruses, tumor cells, fungi and parasites. Abbreviated as NK.
Adaptive Immunity	B cell	Antibody-producing cells.
	T cell	Cells that control the immune response.
	Helper T cell	A type of T cell that produces chemical signals to activate and direct the immune response. Abbreviated as Th.
	Killer T cell	T cells that directly attack and destroy cells infected with viruses or changed by cancer processes. Also called a cytotoxic T lymphocyte (CTL).

Immune Alert: Circulating Immune Complexes (CIC's)

–Causes systemic inflammation

* NSAIDS and Steroids (Prostaglandin Inhibitors) increase gut permeability (NSAIDS: 70 million Rx's/year (+) OTC's!)

–Extreme use: Stomach, duodenal ulcers

* Antacids: Increase amount of undigested proteins and reduces mineral absorption

* Antibiotics: Overgrowth of yeast/fungi → inflammation

* CIC's & Leukocytosis: Leading cause of Fibromyalgia inviting more analgesics and anti-inflammatories!

Intracellular Fluid

66% of the body's water is inside its cells. This fluid is **not** maintained in a homeostatic condition. It changes based on what the extracellular fluid requires.

• 20% ECF
• 80% ECF = interstitial fluid (connective tissue)

33% of the body's water is outside its cells. It serves as a fluid transport system for nutrients and wastes. This fluid is maintained in a homeostatic condition. It is the internal environment.

Blood

nutrients

wastes

20% of the ECF is in the blood. The body strives to maintain the following constants in the blood:

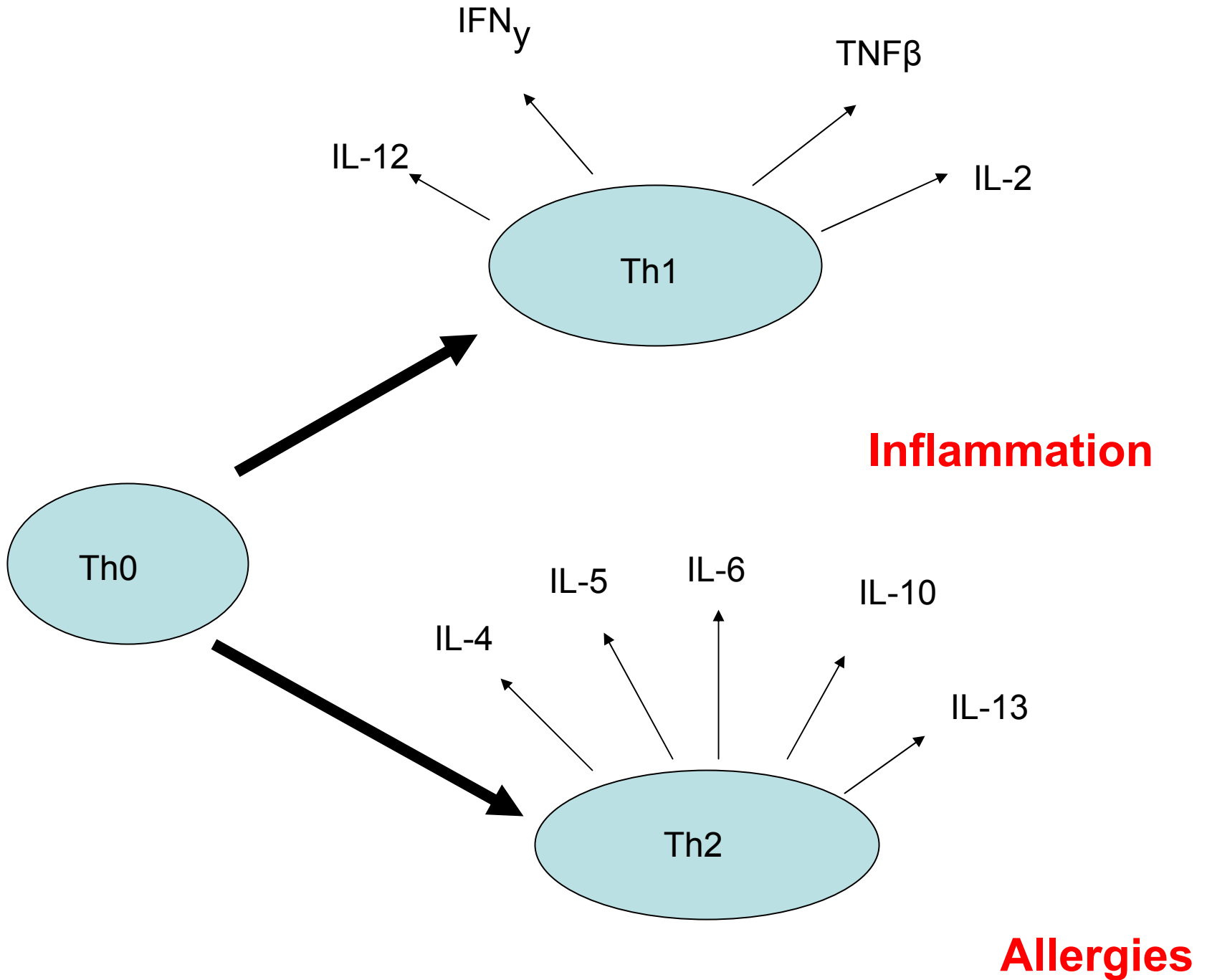
- pH (acid/alkaline)
- volume (blood pressure)
- temperature
- concentration of dissolved substances such as:
 - cholesterol
 - glucose
 - iron
 - triglycerides
 - hormones

Extracellular Fluid (ECF)

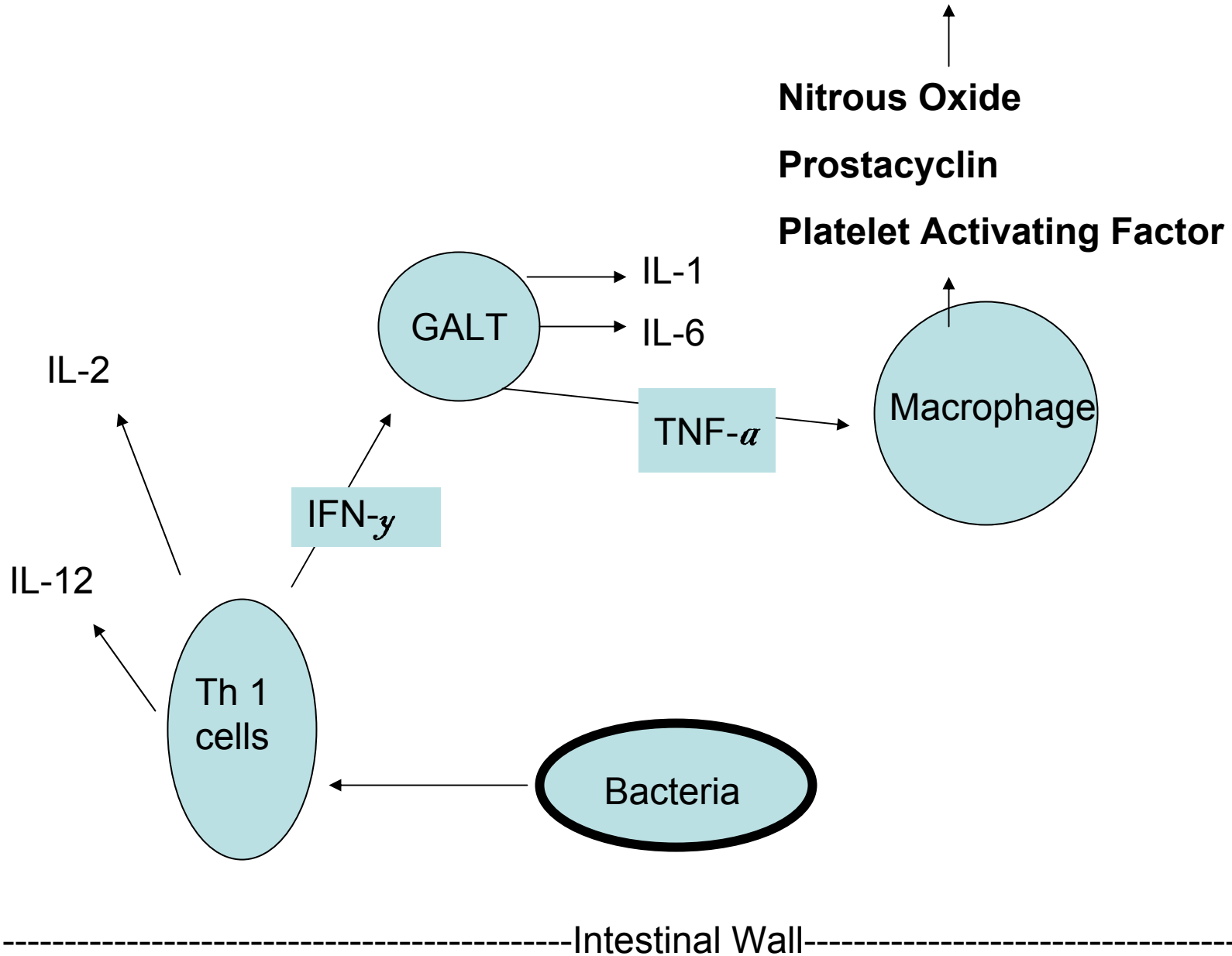
33% BODY'S WATER

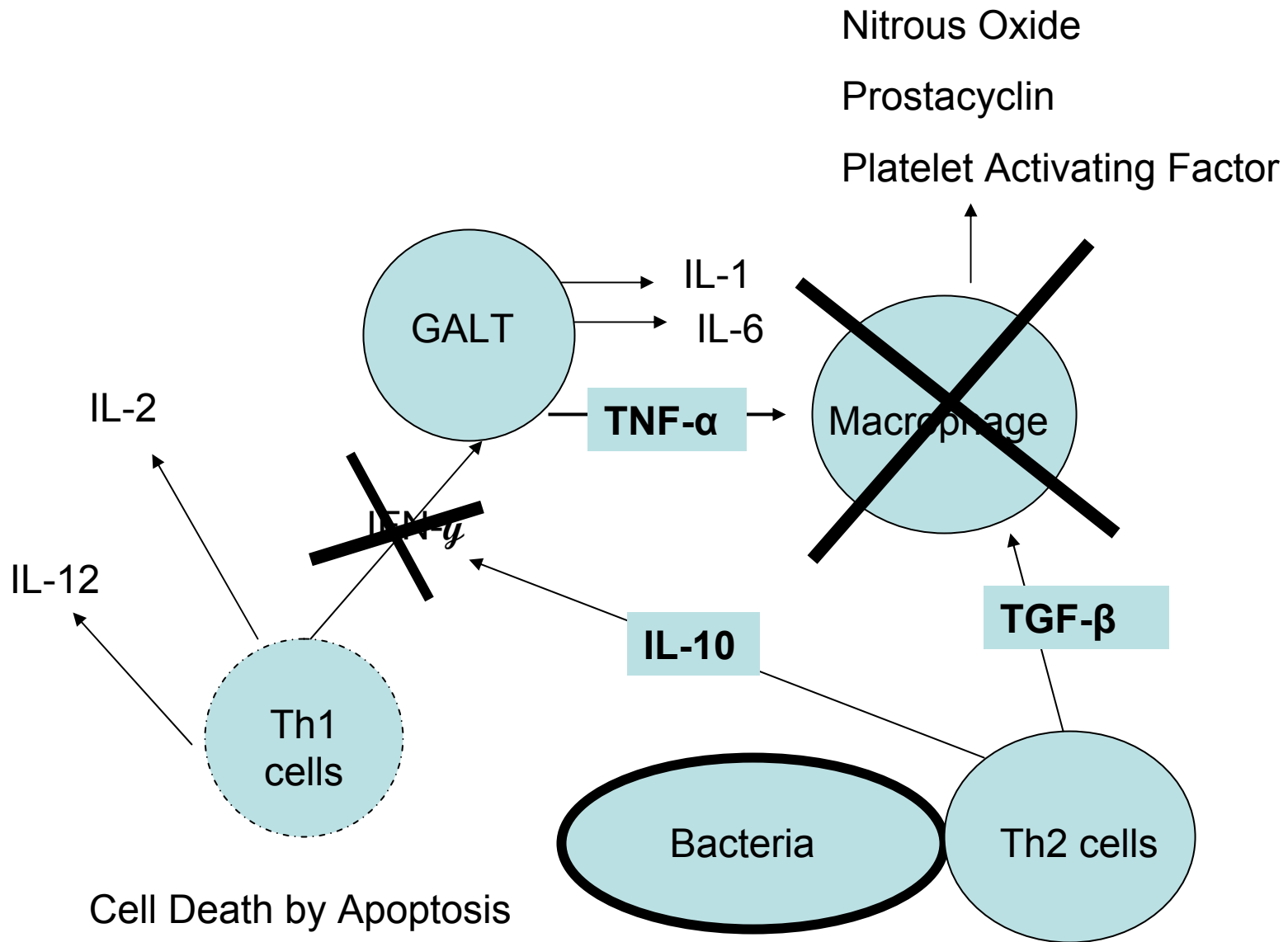
The Reticuloendothelial System

- Excludes the 10 Major Organ Systems
- Includes WBC's in Connective Tissue (ECF)
 - Monocyte (in blood) —————> Macrophage (ECF)
 - Can Produce Enzymes (lysosomes) in Acid pH
 - Found in ECF of Lymph Nodes, Spleen, Mucous Membranes of GI Tract, Respiratory Tract, Pleura, Peritoneum, Microglia of CNS



Inflammation of Intestinal Wall





Symptoms of Indicanuria (Intestinal Toxemia)

- Skin-Hair-Nails
 - Dermatitis
 - Eczema
 - Psoriasis
- Eyes-Ears-Nose-Sinuses
 - Diseases of nasal accessory sinuses
 - Diseases of middle and internal ear
 - Eye strain
- Genitourinary
 - Foul odor to urine
- Cardiovascular
 - Tachycardia
 - Cardiac arrhythmias
 - Migraines
- Endocrine System
 - Breast pathology
 - Eclampsia
 - Thyroid goiter
- Musculoskeletal System
 - Arthritis
 - Low back pain and sciatica
 - Fibromyalgia and myofascitis
- Respiratory System
 - Asthma
- Gastrointestinal
 - Gas and bloating
 - Constipation
 - Crohn's disease
 - Diarrhea
 - Food allergies
 - Foul Stool Odor
 - Gastritis-Heartburn-Hiatal hernia
 - Inflammatory bowel disease
 - Ileocecal valve
 - Mal-assimilation-Weight loss
- Mouth-Throat
 - Body Odor-Halitosis
- Nervous System
 - Depression and melancholy
 - Epilepsy
 - Excessive worry
 - In-coordination
 - Irritability
 - Lack of confidence
 - Loss of concentration and memory
 - Mental sluggishness and dullness
 - Schizophrenia
 - Senility
 - Sensory polyneuritis

The Body's Defense Against Autointoxemia

1. Adequate HCl and pepsin in stomach.
2. Adequate bile secretion to emulsify fats.
3. Adequate pancreatic enzyme production.
4. Healthy microvilli in Jejunum to convert disaccharides to simple sugars.
5. Healthy intestinal flora.
6. Healthy mucus to trap undigested food remnants and provide mucosal antibodies to neutralize them.
7. An intact intestinal barrier to disallow large undigested molecules and allowing absorption of digested nutrients.
8. Gut Associated Lymphoid Tissue (GALT) of healthy Peyers Patches to neutralize invaders passing through mucosal barrier.
9. Healthy crypt that replaces epithelial lining daily.
10. Plant (food) enzyme rich diet, either from raw or fermented foods that pre-digest proteins, fats and carbohydrates.
11. Healthy oral cavity and adequate mastication (chewing) to release enzymes, increase surface area, remove cellulose and activate salivary enzymes.
12. Fermentation metabolites that detoxify, nourish indigenous flora.

PREBIOTIC

Food Sources (Fruits/Vegetables)

- Onions
- Garlic
- Leeks
- Chicory
- Asparagus
- Jerusalem Artichokes
- Bananas
- Kefir



PREBIOTIC REQUIREMENTS

Healthy Bowel Needs: 4-8 gms/day

Clinical Trials: 10-15 gms/day

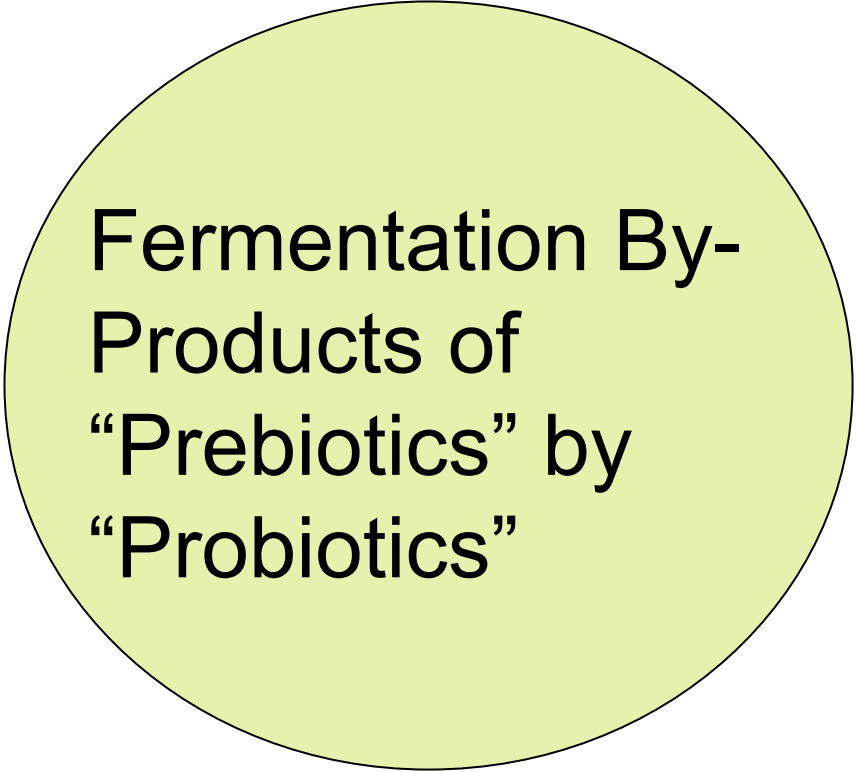
Western Diet: 2 gms/day

Possibly Useful Prebiotics

Arabinogalactose	Palatinose
Fructooligosaccharides	Polydextrose
Inulin	Pyrodextrin
Isomatooligosaccharides	Raftiline
Lacitol	Sorbitol
Lactulose	Soybean oligosaccharide
Manitol	Xylooligosaccharides/ Xylitol
Oligomate	

Short Chain Fatty Acids (SCFA)

- Acetic
- Propionic
- Butyric
- Lactic
- Succinic



Fermentation By-Products of
“Prebiotics” by
“Probiotics”

Prebiotic Benefits

- Improve Calcium Absorption
- Improve Lipid Levels
- Inflammatory Bowel Disease
- Gallstone
- Colon Cancer Protection
 - VFA's
 - Mucosal secretion
 - Enzyme Stimulation (Gs-Trans)

Prebiotics and Infant Diarrhea

Four Days Treatment
(62 Infants, Ages 5-12 Months)

Cooked Bananas	78% Improvement
Pectin	82% Improvement
Rice Based Diet	23% Improvement

SCFA BENEFITS

- Supply Energy to Epithelial Cells (70%!)
- Up to 10% of Total Body's Energy Needs (Liver, Muscle)
- SCFA = Recovered, Recycled Energy Not Lost in Stool
- Supply Energy to Bacteria
- Amounts and Ratios of SCFA Depend Upon
 - Diet!
 - Bacterial Species
 - Length of Time Food is in Gut
- SCFA in Large Intestine (Colon): Have Constant Amounts and Types Because of Many Bacterial Species
- Lowers Blood Sugar and Blood Cholesterol

Beneficial Butyric Acid

- Modulates and Stimulates Intestinal Cell Growth
- Maintains Intestinal Homeostasis
- Vital Role in Cell Differentiation
- Growth Inhibitor of Cancer Cells
- Facilitates Cell Migration and DNA Repair (Prevents Cancer Mutations)
- Regulates Gene Expression
- Programs Apoptosis

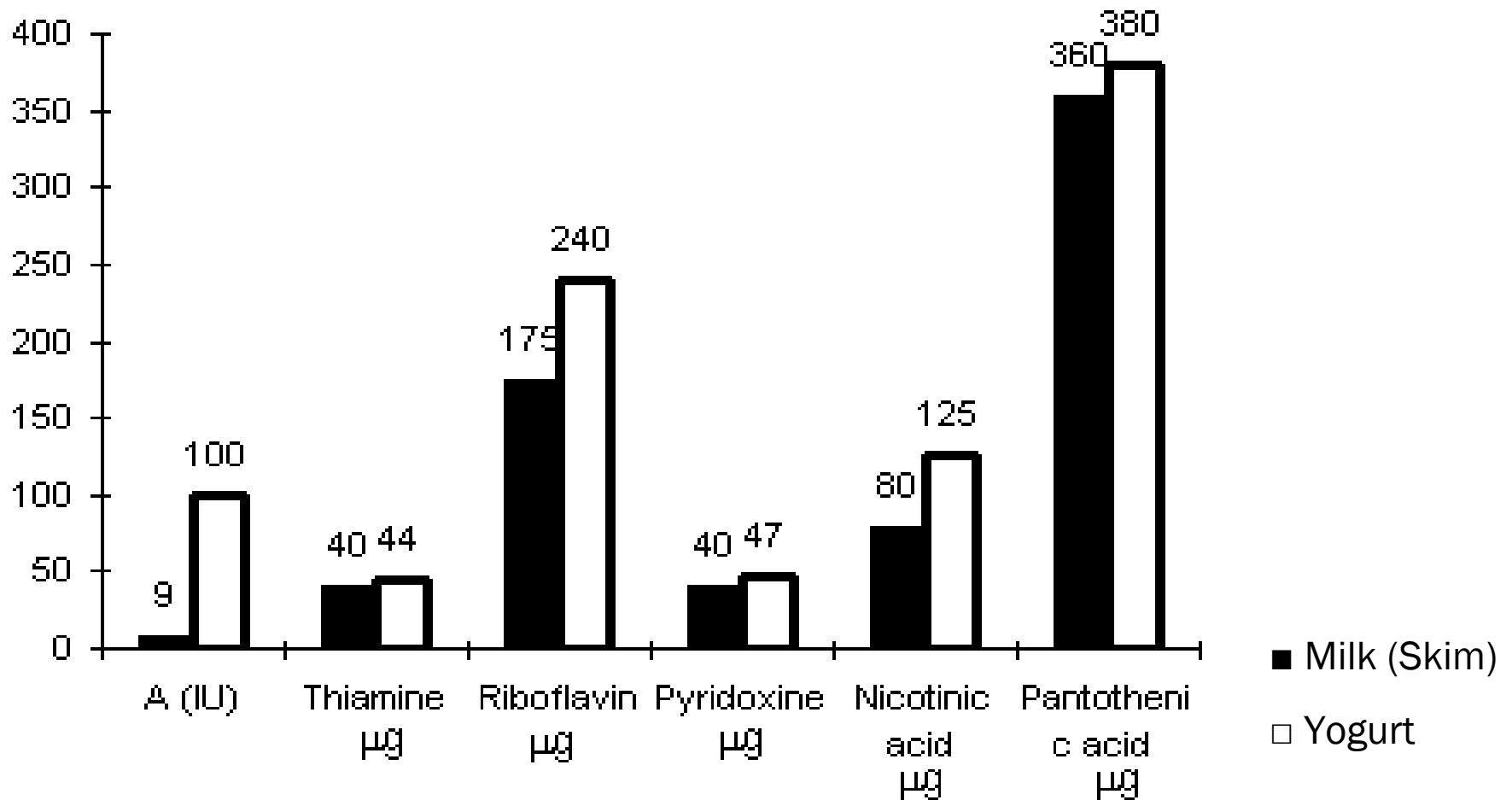
Importance of Gut Flora

- Necessary for IgA Antibodies to Mature
- Essential for Healthy Immune Function (esp. *E. coli* & *Bacteroides*)
- Responsible for Activating Macrophages
- Stimulates Epithelial Cell Growth

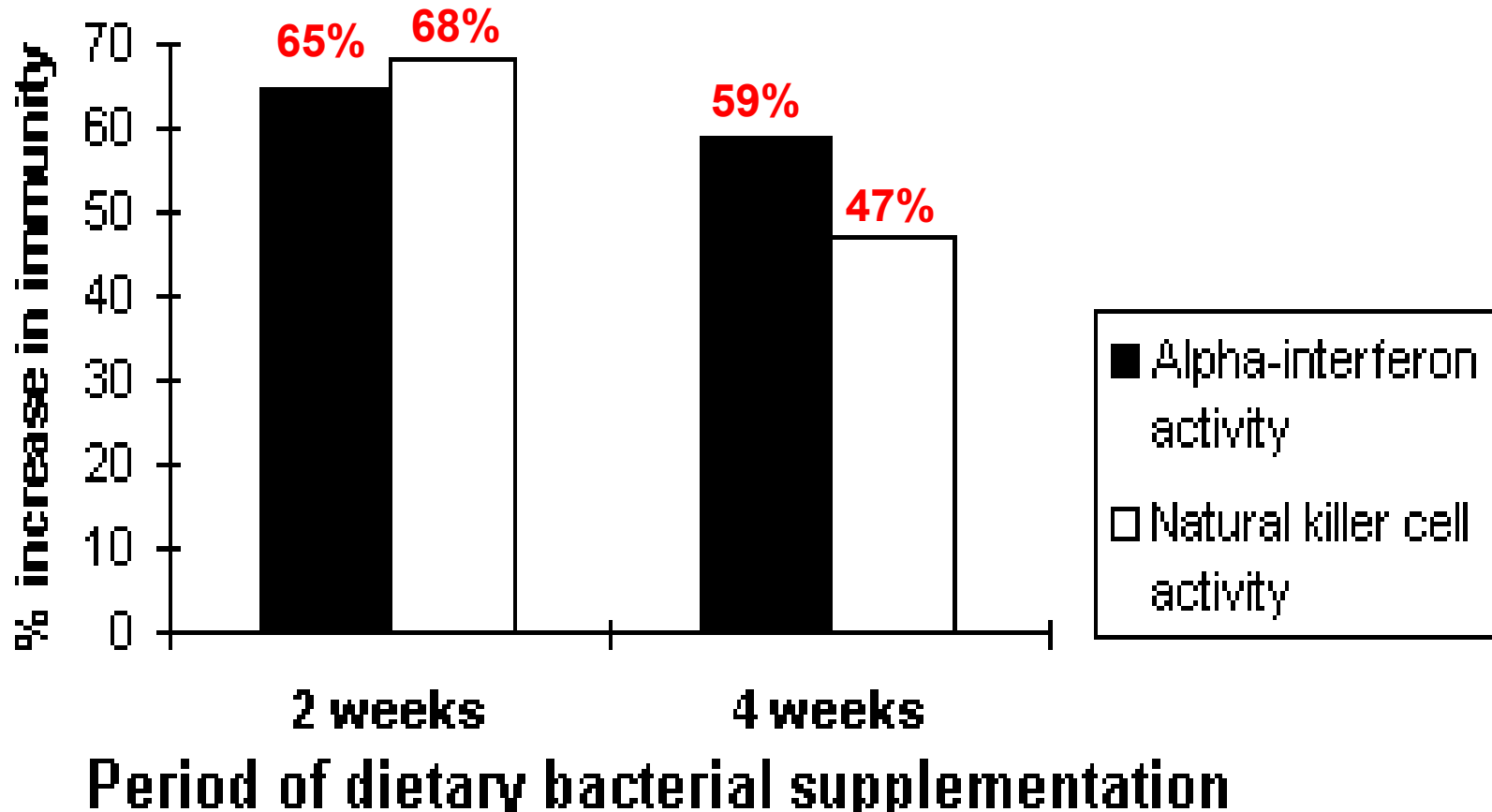
BACTERIOCINS ISOLATED FROM DIFFERENT LACTOBACILLUS SPECIES

Substance	Producing species	Substance	Producing species
Acidolin	L. acidophilus	Lactolin	L. plantarum
Acidophilin	L. acidophilus	Plantaricin B	L. plantarum
Lactacin B	L. acidophilus	Lactolin 27	L. helveticus
Lactacin F	L. acidophilus	Helveticin J	L. helveticus
Bulgarin	L. bulgaricus	Reuterin	L. reuteri
Plantaricin SIK-83	L. plantarum	Lactobrevin	L. brevis
Plantaricin A	L. plantarum	Lactobacillin	L. brevis

Vitamin Content of Milk & Yogurt



Effect of Dietary *L. brevis* on the Immune System Response



Probiotic Effects on Cold & Influenza Symptoms in Children

326 Children (3-5yrs); 2x/Day for 6 Months vs. Placebo

	Fever Reduction Incidence	Coughing Incidence	Rhinorrhea Incidence	Fever Duration	Antibiotic Use	Days Absent In Childcare
L.acidophilus NCFM (Alone)	↓ 53%	↓ 41.4%	↓ 28.2%	↓ 32%	↓ 68.4%	↓ 31.8%
Bifidobacterium (+) L. acidophilus NCFM animalis lactis (Bi-07)	↓ 72.7%	↓ 62.1%	↓ 58.8%	↓ 48%	↓ 84.2%	↓ 27.7%



Testing

- CSDA (Comprehensive Digestive & Stool Analysis)
 - Levels & Types of bacteria, Candida
 - Efficiency of Protein, Fat, Carbohydrate Digestion
 - Levels of Pancreatic Enzymes
 - Short Chain Fatty Acids & Butyric Acid
 - Dysbiosis Index
- Leaky Gut Syndrome/Intestinal Permeability
 - Mannitol & Lactulose Test
 - Mannitol/Lactulose Mixture Followed by Urine Collection for (6) Hours

Healthy	High Mannitol	Low Lactulose
Leaky Gut	High Mannitol	High Lactulose
Malabsorption	Low Mannitol	Low Lactulose
Celiac/Crohn's	Low Mannitol	High Lactulose

Testing (Con't)

- Food & Environmental Sensitivity Testing
 - Elimination Diet (7-14 days):
 - Consume
 - Any fruit (except citrus)
 - Any vegetable (Except Nightshade)
 - White Rice
 - Olive Oil
 - After Fast, Slowly Introduce Foods, Measure Reaction
 - Sleepy following wheat?
 - Cheese causes diarrhea?
 - Oranges causes itching?
 - Tomatoes create Joint Pain?
- Blood Test for Foods, Molds, Pollens, Chemicals
 - IgG-4 & IgE Anti-body
 - IgA & IgM
 - Sensitivity: “Normal to Severe”
- Testing Laboratories
 - Doctor’s Data
 - Immuno Sciences Lab
 - Great Smokies Diagnostic Labs

Digestive Relief For Distress

- Betaine HCl (200-300 mg) & Pepsin (100 mg Pepsin)
- Apple Cider Vinegar (1) tsp/glass of water
- Digestive Enzymes
 - Digestitol (Pancreatic) (National Enzyme Co): 1 capsule per meal. Mega-Zyme (Enzymatic Therapy), Wobenzyme (Douglas Labs)
 - N-Zimes (Plant Enzymes) (National Enzyme Co.): 1-2 capsules per meal and 1 capsule in between meals (Omega-Zyme)
- Probiotics: First thing in the morning or in between meals
 - Nature's Biotic
 - Primal Defense, Thera-Lac
 - Kefir, Yogurt
- Swedish Bitters: 30 minutes prior to eating stimulates HCl and Liver
- Sauerkraut, kim chi, miso, etc.
- Zinc aspartate: 40-50 mg Zn; necessary for HCl synthesis
- Chew Thoroughly

Bone Broth Miracle

1. Beef, Lamb, Fish, Poultry or Pork bones
 - Include attached meat, skin, fat, fish heads, chicken feet
 - Pasture, ecologically raised –not CAFO meats!
 2. Cover desired amount of bones with water in a covered pot (stainless steel or porcelain)
 - Add (2) Tbl. of Apple Cider Vinegar, Red Wine Vinegar, or Lemon Juice per Quart of Water
 - Allow to sit at room temp. for 30(+) minutes to let acids “work”
 3. Bring to a boil; immediately reduce heat to simmer
 4. Cover and simmer for:
 - 4-6 hours for Fish
 - 6-8 hours for Poultry
 - 12-18 hours for Lamb, Beef, Pork
 5. Decant liquid and consume immediately as:
 - Tea, soup or gravy
 - Use as liquid to cook rice, beans, grains (after soaking them overnight to remove phytates)
- OR
6. Add vegetables of choice and simmer with meats the last 30 minutes
 7. Add preferred seasonings, salt, pepper, butter, olive oil to taste
 8. Storage
 - Refrigerator for 5 days
 - Store in Freezer (e.g. (1) quart jars [leave 2” from top of jar to allow for expansion] store for several months)
 - **Do not reheat in Micro-wave:** Conversion of Amino Acids to Toxic Forms (Lancet 89;2(8676):1293-93)

Galactic Glycine

- Most Common of all Amino Acids
- Non-Essential Amino Acid - Made By Essentials
- Synthesis of Glycine Requires High Quality Dietary Protein Containing Essential Amino Acids (e.g. Eggs!)
- Found in Whey Protein Concentrate/Isolate
 - Whey Protein Protects GI Tract from Ulcers!
(Biosci Biotechnol Biochem 01;65(5):1104-1111)
- Gelatin is a Rich Source of Glycine
 - Glycine Stimulates Stomach Acid Secretion!
(J Clin Invest 76;58:623-631)
- Dr. Francis Pottenger, MD: Adding Gelatin to Meals Improved Digestion of all Foods
- Edgar Cayce: Gelatin Assists Digestion of Raw Vegetables and Salads
- Gelatin: A Great Source of Hyaluronic Acid
 - Makes up Synovial Fluid in Joints



Enhanced Nutrient Content of Selected Dairy Foods (Fermentation)

Fermentation = Exogenous Digestion, or Pre-Digestion

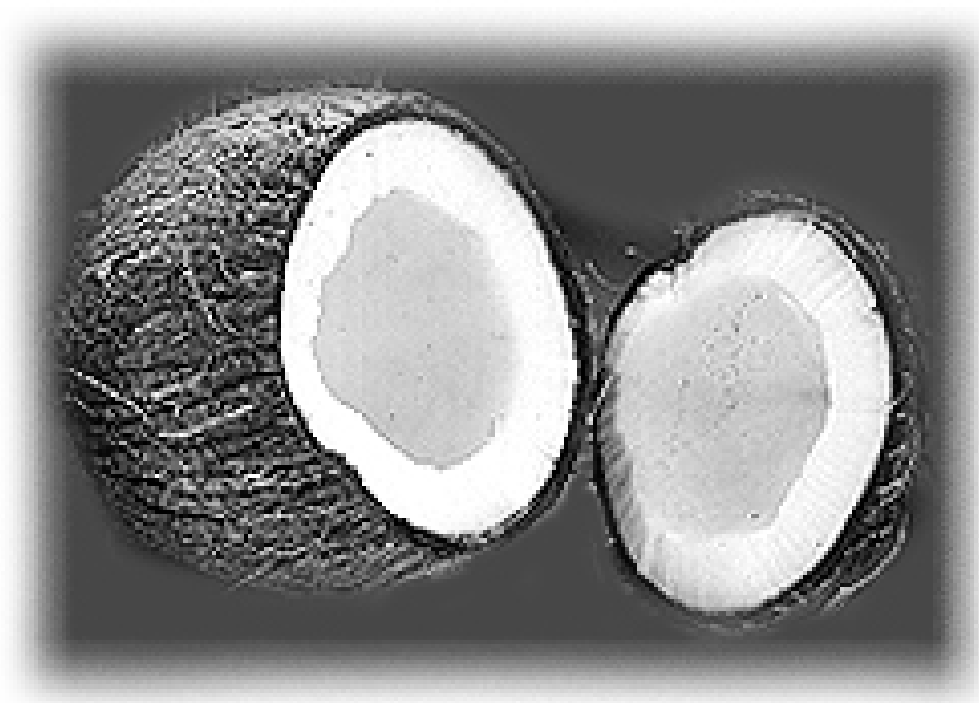
Original Food	Fermented/Cultured Food	Increased Nutrition
Milk	Cheddar Cheese	Vitamin B1, 3X
Milk	Cottage Cheese	Vitamin B12, 5X
Milk	Yogurt	Vitamin B12, 5-30X
Milk	Yogurt	Vitamin B3, 50X
Skim Milk	Low-fat yogurt	Vitamin A, 7-14X

Digestive Healing Modalities

- Licorice DGL: increases healing prostaglandins for mucous secretion, cell proliferation. Chew 2-4 tablets 3X/day
- Aloe Vera Juices
- Gamma-Oryzanol (from rice bran oil)
 - 100 mg 3X daily for 3-6 weeks (minimum dose/minimum duration)
 - Very effective for ulcers, gastritis, IBS
 - Normalizes TG, cholesterol
- Cabbage Juice: one quart daily for two weeks
- Glutamine: 8 grams/day for four weeks

COCONUT OIL

- Contains medium chain fatty acids
- Rich in anti-microbial lauric acid
- 92% saturated = very resistant to rancidity



Coconut Complexity

- Medium Chain Fatty Acids (63%)
 - Lauric Acid (48%) → Monolaurin (Lauricidin)
 - Caprylic Acid (8%)
 - Capric Acid (7%)
 - MCFA: Anti-yeast, anti-viral, anti-bacterial, anti-parasitic
 - MCFA → stomach portal vein → liver → energy
 - Thermogenesis increases by up to 50%
 - 5-6 Tbsp. daily

Some Beneficial Constituents in Butter

(Source: Fallon, 1995)



Benefit	Description
Wulzen (anti-stiffness) factor	Protects against degenerative arthritis, hardening of the arteries & cataracts
Short & Medium Chain Fatty Acids	About 15% of butterfat. Absorbed directly by the small intestine without emulsification by the bile. Antimicrobial, anti-tumor, immune stimulating, antifungal
Conjugated Linoleic Acid	Anticancer
Glycosphingolipids	Protect against gastrointestinal infections
Trace Minerals	Chromium, iodine, manganese, selenium & zinc

Candida Remedies

- Tanalbit (Plant tannins)
- Mathake (South American Herb)
- Lactoferrin-300 mg 1-3X/day
- Cilantro Extract
- Samento
- Silver (Hydrosol or Ionized- Argentyn 23/Sovereign Silver)
- Garlic (Raw)
- Grapefruit Seed Extract
- Oil of Oregano (Oregacillin)
- Monolaurin (Lauricidin)
- Caprylic Acid

The End

