



My Big WHY



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From Health Crisis to Health Coach



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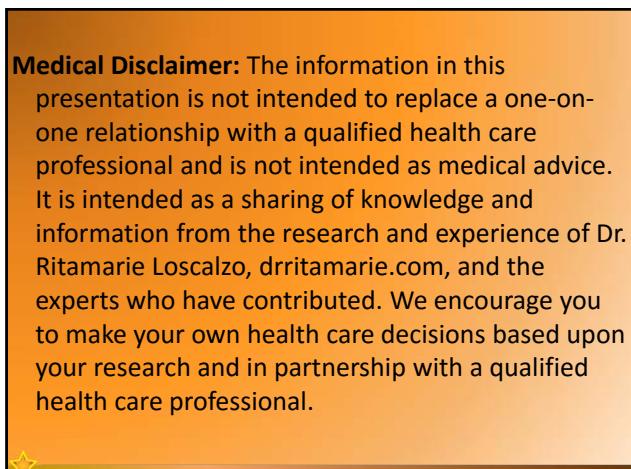


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What Does It Take to Succeed?

- ✓ Passion – a big WHY
- ✓ Knowledge
- ✓ A system
- ✓ A support network
- ✓ Tools and resources
- ✓ Superior interview skills
- ✓ Excellent listening skills
- ✓ “Detective skills” – functional assessment tools
- ✓ A complete holistic toolbox



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Endocrinology is the Master Control Center



*-- The key to unraveling the profound impact of hormone imbalance on **EVERY** system of the body!*

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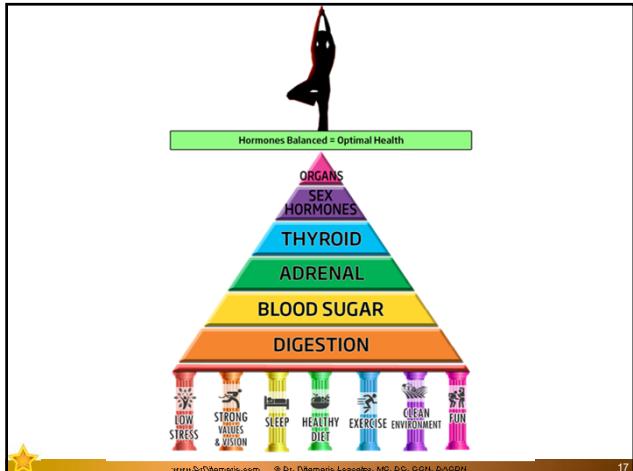
Nutritional Endocrinology Defined

- ✓ Relationship between **nutrition and endocrine imbalances**
- ✓ Impact of **nutrient deficiencies or excesses** on hormones
- ✓ The relationship between food and hormones



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Complex Health Challenges That Tend to Deflate Your Confidence!

- ✓ Been to many practitioners already
- ✓ **Already doing** a lot of diet and lifestyle things you usually recommend
- ✓ **Long history of medical interventions**
- ✓ Laundry list of symptoms
- ✓ **Shopping bag full of supplements**
- ✓ 4-inch thick stack of labs
- ✓ Feeling desperate and turning to YOU for help



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The Best Way to Grow Your Practice: Discover the Key to Unlocking Even the Most Difficult Client Cases



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Functional Medicine Meets Real Food Nutrition



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What Exactly Are Hormones?

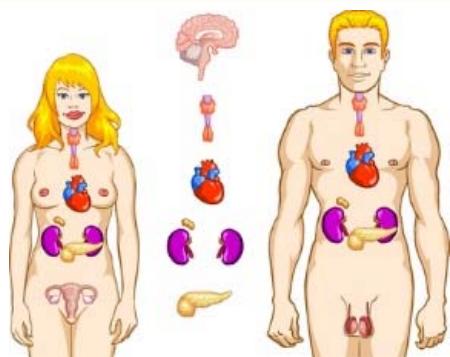
- ✓ Messengers of life
- ✓ **Chemicals secreted by glands:** usually directly into the blood stream
- ✓ Control physiological and behavioral activities such as the processes of digestion, metabolism, growth, reproduction, and mood control
- ✓ **Receptors** are located on a cell membrane or intracellularly within the cytoplasm of their target cell



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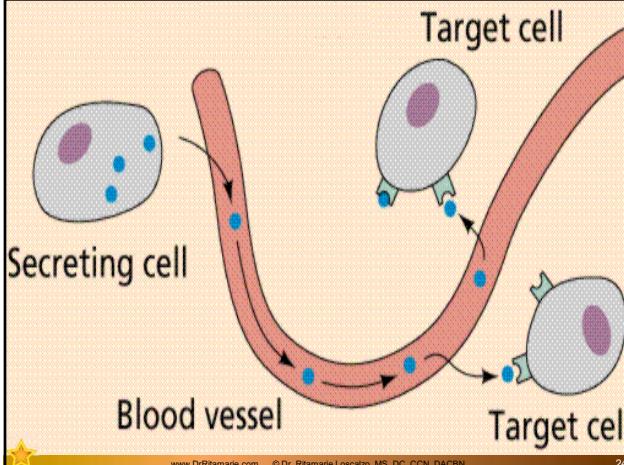
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The Endocrine System



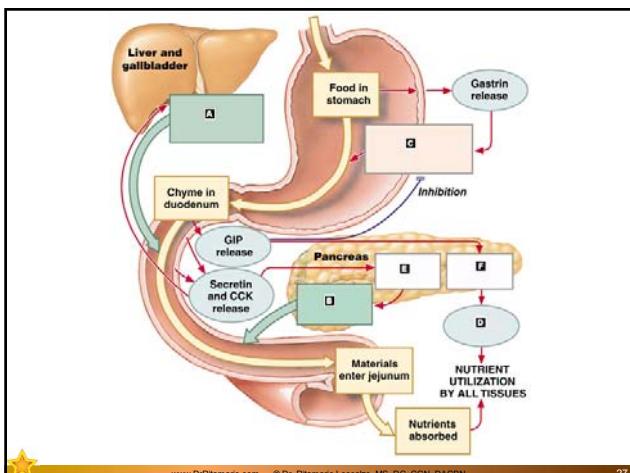
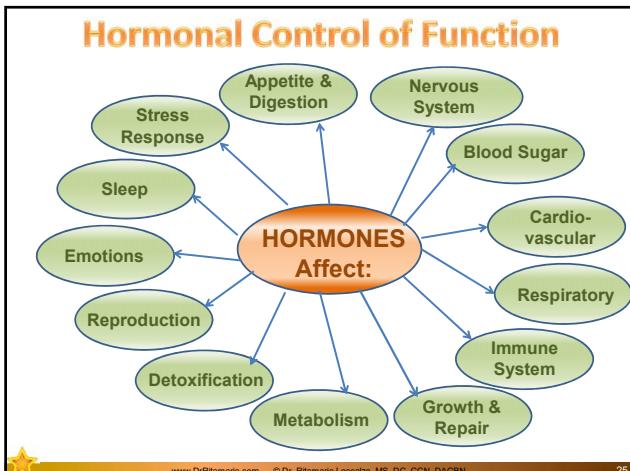
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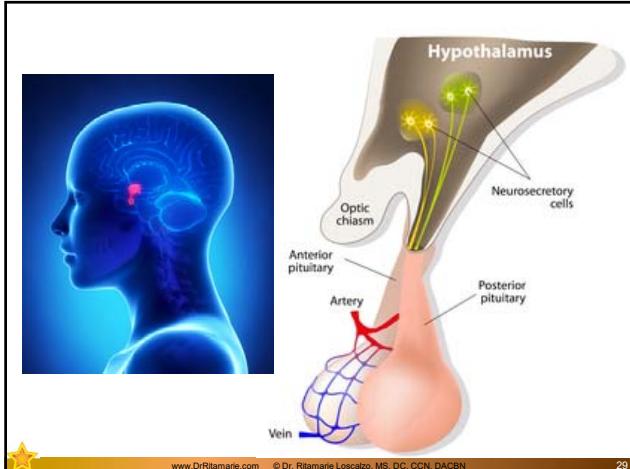


Gut Hormones

Hormone	Produced by	Action
Leptin	Fat cells	Signals satiety
Ghrelin	Stomach lining	Signals hunger
Gastrin	Stomach	Production of stomach acid
Cholecystokinin (CCK)	Small intestine	Production of pancreatic juices and emptying of gall bladder
Secretin	Duodenum	Stimulates bicarbonate production by pancreas, bile production by liver, and pepsin by stomach
Peptide YY	Mainly ileum and colon, but a little in other parts of GI tract	Inhibits gastric motility, increases water and electrolyte absorption in colon, may suppress pancreatic secretion, increases efficiency of digestion
Incretins: GIP: Gastric Inhibitory Peptide and GLP: Glucagon-Like Peptide	Small intestine	Increases insulin, inhibits glucagon release, slows rate of absorption of nutrients by reducing gastric emptying
Somatostatin	Stomach, intestine, pancreas	Inhibits gastrin, CCK, secretin, GIP and also growth hormone, TSH, glucagon and insulin
Dopamine	Brain and GI mucosa	Reduces motility and protects mucosa
Serotonin	Brain and GI mucosa	Inhibits gastric acid and stimulates mucus

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Brain Hormones - Hypothalamus

Hormone	Produced by	Actions
Thyrotropin-releasing hormone (TRH)	Parvocellular neurosecretory cells of the paraventricular nucleus	Stimulate thyroid-stimulating hormone (TSH) release from anterior pituitary (primarily).
Prolactin-releasing hormone (PRH)	Parvocellular neurosecretory cells of the paraventricular nucleus	Stimulate prolactin release from anterior pituitary.
Corticotropin-releasing hormone (CRH)	Parvocellular neurosecretory cells of the paraventricular nucleus	Stimulate adrenocorticotropin hormone (ACTH) release from anterior pituitary.
Dopamine aka Prolactin-inhibiting hormone (DA or PIH)	Dopamine neurons of the arcuate nucleus	Inhibit prolactin release from anterior pituitary.
Growth hormone-releasing hormone (GHRH)	Neuroendocrine neurons of the arcuate nucleus	Stimulate growth hormone (GH) release from anterior pituitary.
Gonadotropin-releasing hormone (GnRH)	Neuroendocrine cells of the preoptic area	<ul style="list-style-type: none"> Stimulate follicle-stimulating hormone (FSH) release from anterior pituitary. Stimulate luteinizing hormone (LH) release from anterior pituitary.
Somatostatin, aka growth hormone-inhibiting hormone (GHIH)	Neuroendocrine cells of the periventricular nucleus	<ul style="list-style-type: none"> Inhibit growth hormone (GH) release from anterior pituitary. Inhibit (moderately) thyroid-stimulating hormone (TSH) release from anterior pituitary.

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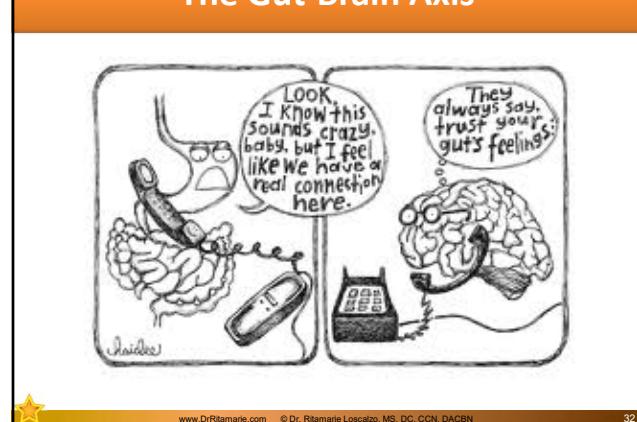
Brain Hormones - Pituitary

Hormone	Produced by	Actions
Thyroid Stimulating Hormone (TSH)	Anterior lobe of Pituitary	Stimulates thyroid gland to produce T4.
Adrenocorticotrophic Hormone (ACTH)	Anterior lobe of Pituitary	Stimulates adrenal glands to respond in times of stress.
Follicle-Stimulating Hormone (FSH)	Anterior lobe of Pituitary	In women, stimulates the growth of ovarian follicles before the release of the egg at ovulation. It also increases estrogen production. In men, acts on the Sertoli cells of the testes to stimulate sperm production.
Luteinizing Hormone (LH)	Anterior lobe of Pituitary	In men, stimulates Leydig cells in the testes to produce testosterone. In women, stimulates ovarian follicles to produce estrogen, and causes the follicle to rupture and release a mature egg.
Prolactin (PRH)	Anterior lobe of Pituitary	Promotes lactation in response to the sucking of young after birth. (It's inhibited by dopamine)
Growth Hormone (GH)	Anterior lobe of Pituitary	Promotes growth in children and helps to maintain normal body structure and metabolism by promoting the deposition of protein and burning of fat.
Alpha Melanocyte-Stimulating Hormone (α -MSH)	Anterior lobe of Pituitary	Bind to melanocytes to stimulate the production of melanin, a skin pigment.
Anti-diuretic Hormone aka Vasopressin (ADH)	Hypothalamus, stored and secreted by Posterior lobe of Pituitary	Regulates the body's retention of water by acting to increase water reabsorption in the kidney's collecting ducts.
Oxytocin (OT)	Hypothalamus, stored and secreted by Posterior lobe of Pituitary	Stimulates contraction of the uterus during childbirth and promotes the movement of milk into the breast. In men, stimulates sperm movement and production of testosterone by the testes.

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The Gut-Brain Axis



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Connections Between the Gut and Brain

- ✓ Vagus nerve
- ✓ Neurotransmitters: *dopamine, serotonin, GABA*
- ✓ Leaky gut
- ✓ Microbiome: *Lactobacillus helveticus, Bifidobacterium longum*
- ✓ Allergens
- ✓ Inflammation
- ✓ Mood, memory, and focus



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The Psychology of Digestion

Digestion Begins in your HEAD and HEART
-- Not Your Gut!!!

- Impact of thoughts
- Fight/flight effects on digestion
- Relaxation effects on digestion
- Role of breathing on digestion
- Pre-meal ritual



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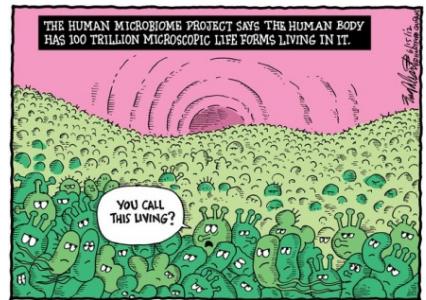


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The Human Body Is Mostly Non-Human

- ✓ 50 trillion human cells
- ✓ 500 trillion non-human cells
- ✓ 10% human, and 90% bacterial



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The Microbiome



- Microbial cells found to exceed human cells by a factor of ten-to-one.
- Total number of genes associated with the microbiome could exceed the total number of human genes by a factor of 100-to-one.
- Microbes contribute more genes responsible for human survival than humans' own genes.

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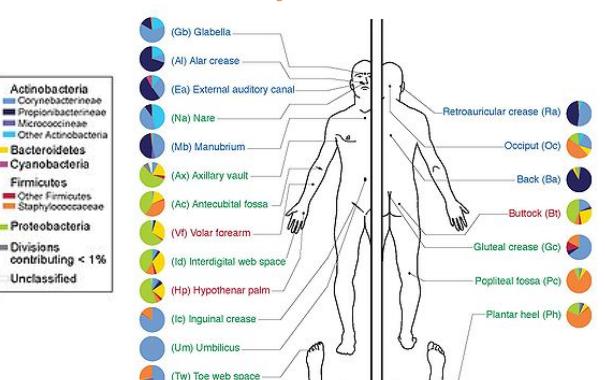
Gut Microbiome

Genomes of the Gut Microbes



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Microbiome Body Wide Distribution



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Division	Site	Approx. %
Actinobacteria	Glabella (Gb)	~10%
Actinobacteria	Alar crease (Al)	~10%
Actinobacteria	External auditory canal (Ea)	~10%
Actinobacteria	Nare (Na)	~10%
Actinobacteria	Manubrium (Mb)	~10%
Bacteroidetes	Axillary vault (Ax)	~10%
Bacteroidetes	Antecubital fossa (Ac)	~10%
Bacteroidetes	Volar forearm (Vf)	~10%
Bacteroidetes	Interdigital web space (Id)	~10%
Bacteroidetes	Hypohenar palm (Hp)	~10%
Bacteroidetes	Inguinal crease (Ic)	~10%
Bacteroidetes	Umbilicus (Um)	~10%
Bacteroidetes	Toe web space (Tw)	~10%
Firmicutes	Gluteal crease (Gc)	~10%
Firmicutes	Popliteal fossa (Pc)	~10%
Firmicutes	Plantar heel (Ph)	~10%
Proteobacteria	Back (Ba)	~10%
Proteobacteria	Buttock (Bt)	~10%
Proteobacteria	Occupit (Oc)	~10%
Proteobacteria	Retroauricular crease (Ra)	~10%
Unclassified	Front	~10%
Unclassified	Back	~10%

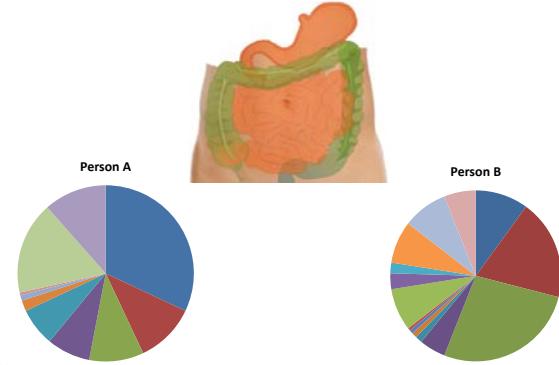
Microbes in the Gut



- Types:** beneficial, opportunistic, pathogenic
- Protection from foreign microbes by:**
 - Acidic stomach pH
 - Saliva and bile
 - Immune system
- Functions:**
 - Digestion
 - Synthesis of B vitamins and vitamin K
 - Making neurotransmitters
 - Metabolism of bile acids, sterols, and xenobiotics
 - Fermentation of undigested carbohydrates to short-chain fatty acids
 - Butyrates: colon epithelium
 - Propionates: liver
 - Acetates: muscle tissue

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Gut Microbiome Variability



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Firmicutes vs Bacterioidetes



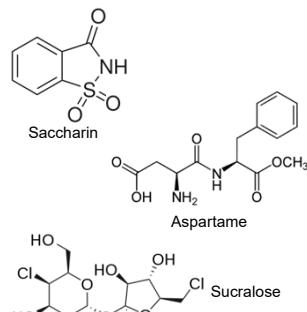
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Non-Caloric Sweeteners and Gut Microbes

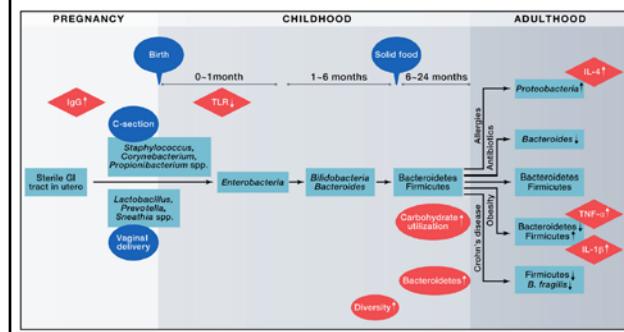


Credit: Walzmann Institute of Science



Nature 514, 181–186 (09 October 2014)

Gut Microbiome Timeline



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Goals:

- ✓ Develop a reference set of microbial genome sequences
- ✓ Preliminary characterization of the human microbiome
- ✓ Explore the relationship between changes in the human microbiome and
- ✓ To develop new technologies and tools for computational analysis
- ✓ To establish a resource repository
- ✓ To study the ethical, legal, and social implications of human microbiome research



HUMAN
MICROBIOME
PROJECT

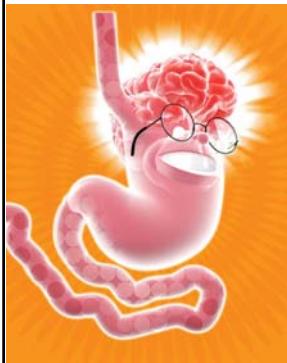
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Methods and Findings

HUMAN
MICROBIOME
PROJECT

- ✓ 242 healthy U.S. volunteers
- ✓ More than 5,000 samples collected from body sites such as mouth, nose, skin, lower intestine, and vagina
- ✓ Microbial genome data extracted by identifying the bacterial specific ribosomal RNA, 16S rRNA
- ✓ More than 10,000 microbial species found
- ✓ Bacterial components of the microbiome were found to change over time, affected by disease and medication
- ✓ Eventually it returns to equilibrium

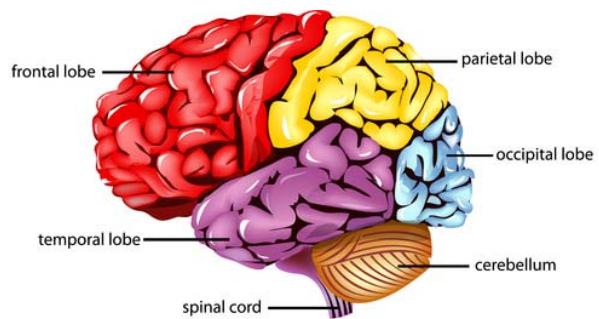
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The Second Brain**Enteric Nervous System (ENS)**

- Embedded in the wall of the gut
- 500 million neurons
- Responsible for cravings under stress
- Important in physical and mental well-being
- Can work both independently of and in conjunction with the brain
- Helps sense environmental threats and then influences response

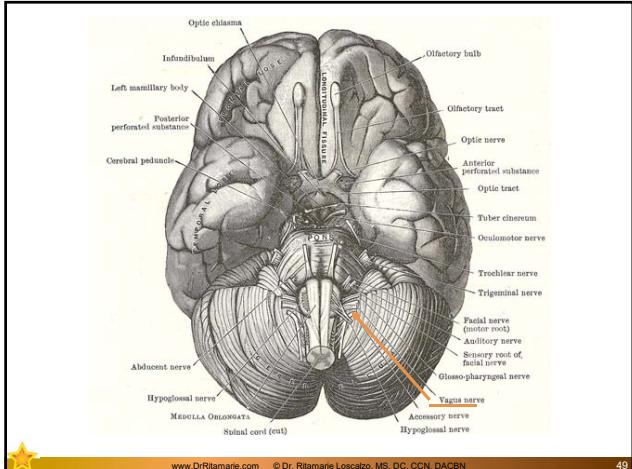
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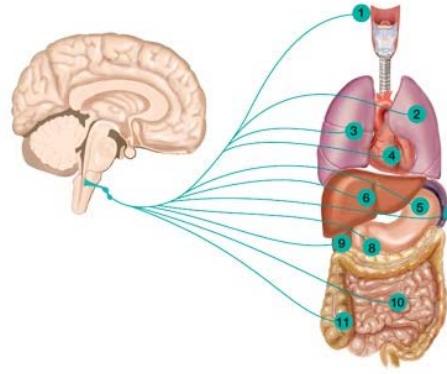
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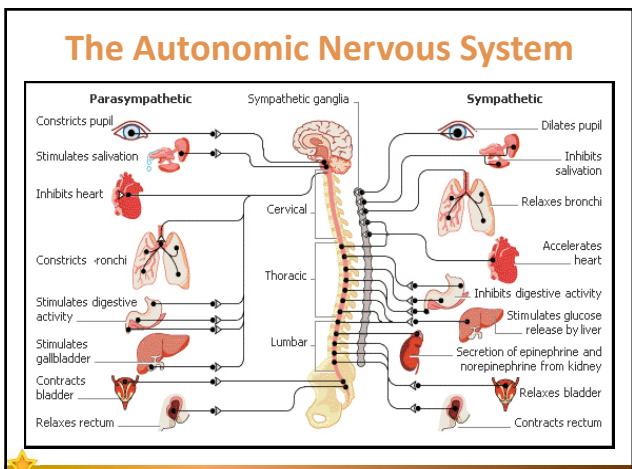
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Vagus Nerve Innervation (PNS)



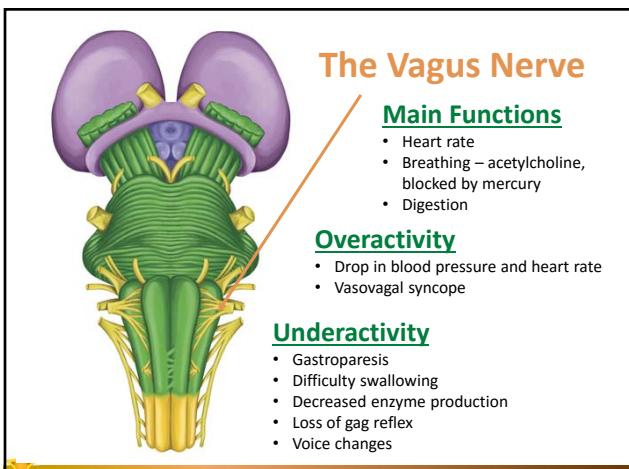
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Manifestations of Underactive Vagus Nerve

Symptoms	Causes
✓ SIBO	✓ Hiatal hernia
✓ Constipation	✓ Poor posture
✓ Gall bladder contraction problems	✓ Muscular imbalances
✓ Loss of ability to make digestive enzymes and HCl	✓ Alcohol
✓ Chronic intestinal permeability	✓ Spicy foods
✓ Depression	✓ Stress
	✓ Fatigue
	✓ Anxiety



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The Vagus Nerve and Gut Microbiome

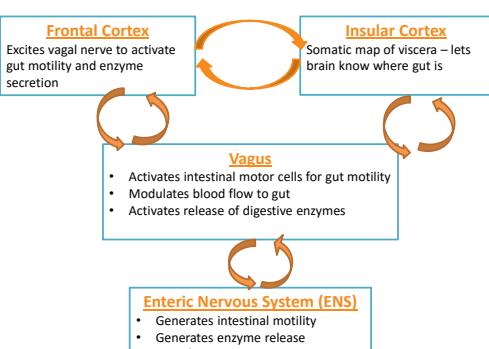
- ❑ Gut microorganism can activate the vagus nerve → critical role in mediating effects on the brain and behavior
- ❑ The vagus appears to differentiate between non-pathogenic and potentially pathogenic bacteria
- ❑ Immunomodulatory role regulating mood: Signals from the gut can instigate anti-inflammatory mediators including acetylcholine



Adv Exp Med Biol. 2014;817:115-33. doi: 10.1007/978-1-4939-0897-4_5. *Vagal pathways for microbiome-brain-gut axis communication.* *Forsythe P¹, Bienenstock J, Kunze WA²*

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Neurology of Gastrointestinal Activity



Frontal Cortex
Excites vagal nerve to activate gut motility and enzyme secretion

Insular Cortex
Somatic map of viscera – lets brain know where gut is

Vagus

- Activates intestinal motor cells for gut motility
- Modulates blood flow to gut
- Activates release of digestive enzymes

Enteric Nervous System (ENS)

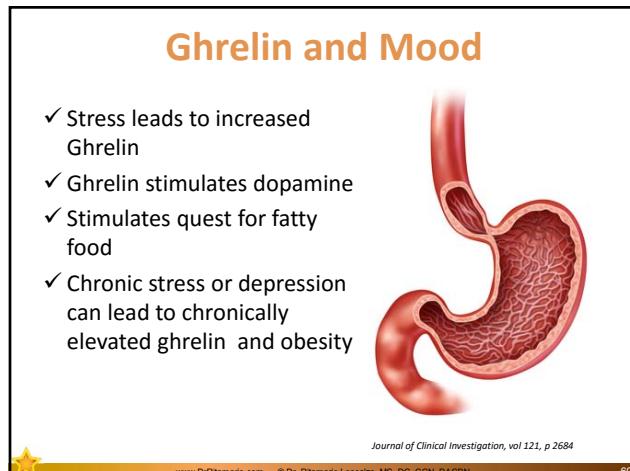
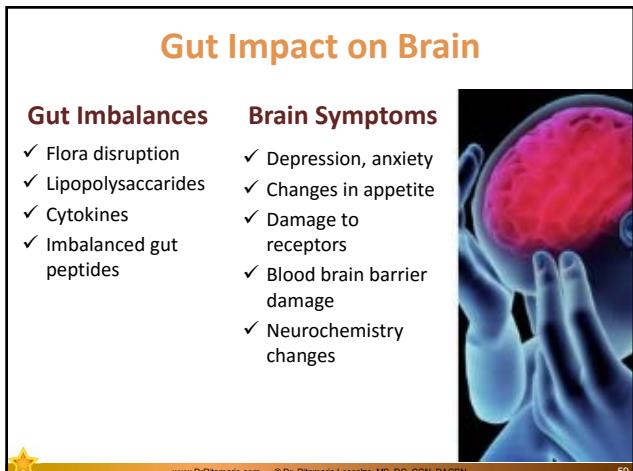
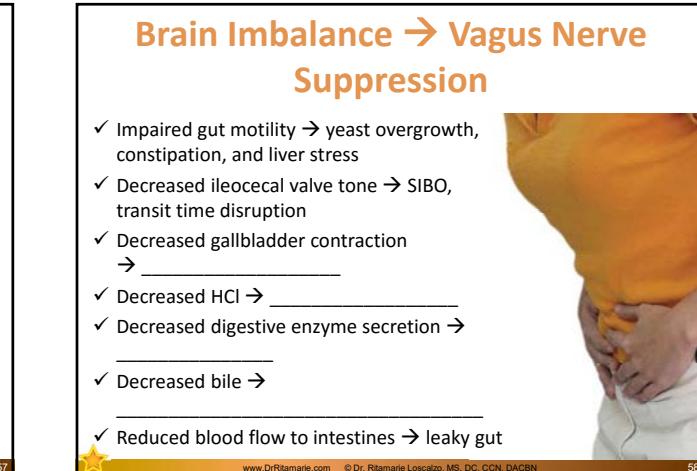
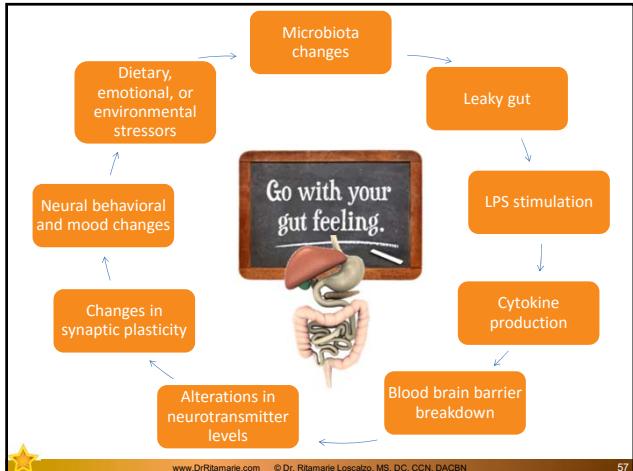
- Generates intestinal motility
- Generates enzyme release
- Provides sensory input to vagus

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The Enteric Nervous System (ENS)

- First discussed by American physician Byron Robinson in 1907 in *The Abdominal and Pelvic Brain*, and named by British physiologist Johannis Langley
- Gut contains 100 million neurons - more than the spinal cord
- Neurochemicals in gut: serotonin, dopamine, glutamate, norepinephrine, nitric oxide, neuropeptides, enkephalins, benzodiazepines
- 90% of signals along the vagus nerve come from the ENS
- Pathogens crossing the gut lining stimulate immune cells in the gut wall to secrete histamine and other inflammatory chemicals which triggers diarrhea or alerts the brain in the head via the vagus nerve, which may trigger vomiting
- Bacterial lipopolysaccharides, aka postbiotics, can lead to depression, irritability, anger, and violence
- Nerve signals from the gut to the brain via the vagus nerve affect mood
- Research in the *British Journal of Psychiatry* in 2006: **Stimulation of the vagus nerve found to be effective for chronic, non-responsive depression**





Parkinson's and the Gut

- ✓ Heiko Braak at the University of Frankfurt, Germany believes it begins in the gut
- ✓ Constipation may be an early sign

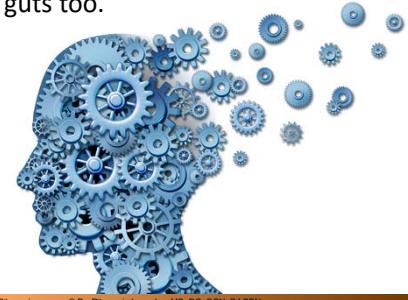


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Alzheimer's and the Gut

The characteristic plaques or tangles found in the brains of people with Alzheimer's are present in neurons in their guts too.



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Vagus Nerve Activation

Activities

- ✓ Gargling
- ✓ Gag reflex
- ✓ Singing loudly
- ✓ Coffee enemas

Results

- ✓ Increased motility
- ✓ Increased contraction of sphincters
- ✓ Increased release of digestive enzymes
- ✓ Increased blood flow to intestines



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