Nutrition and Immunity 5

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Metabolic Syndrome

- Dr Gerald Reaven coins phrase “Syndrome X”
- Now known as Metabolic Syndrome:
  - Large Waist Circumference
  - High Triglycerides
  - Low HDL
  - High Glucose
  - High Blood Pressure

Driven by insulin resistance

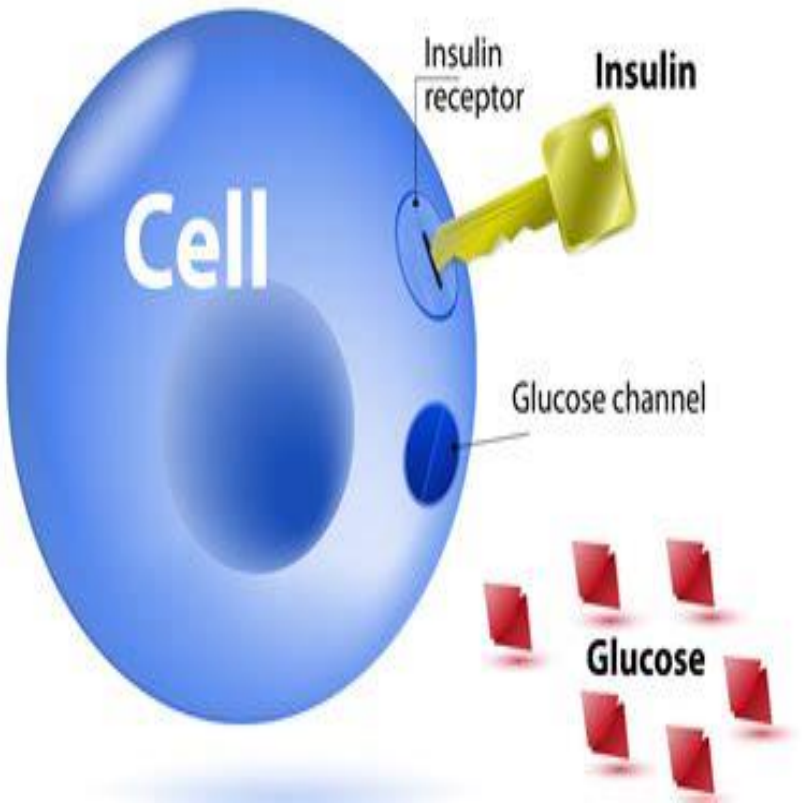
88% of Americans Have Poor Metabolic Health

- Science News
- from research organizations
- **Only 12 percent of American adults are metabolically healthy, study finds**
- Trends help sound alarm for efforts to lower associated risk of types 2 diabetes, heart disease and other complications

- Date:
- November 28, 2018
- Source:
- University of North Carolina at Chapel Hill
- Summary:
- The prevalence of metabolic health in American adults is 'alarmingly low,' even among people who are normal weight, according to a new study. Only one in eight Americans is achieving optimal metabolic health. This carries serious implications for public health since poor metabolic health leaves people more vulnerable to developing Type 2 diabetes, cardiovascular disease and other serious health issues.

Metabolic Syndrome is Insulin Resistance

- Insulin is a Pancreatic Hormone
- Storage hormone (fat/sugar)
- Glucagon is its opposite
- Elevated by carbohydrates primarily, protein moderately
- Dietary fat has little to no effect on blood sugar or insulin **ITSELF**
- Insulin is an anabolic (build up) hormone
- Primary function is to drive sugar from blood into cells and store fat
- Humans have 1 hormone to lower glucose and several to raise it

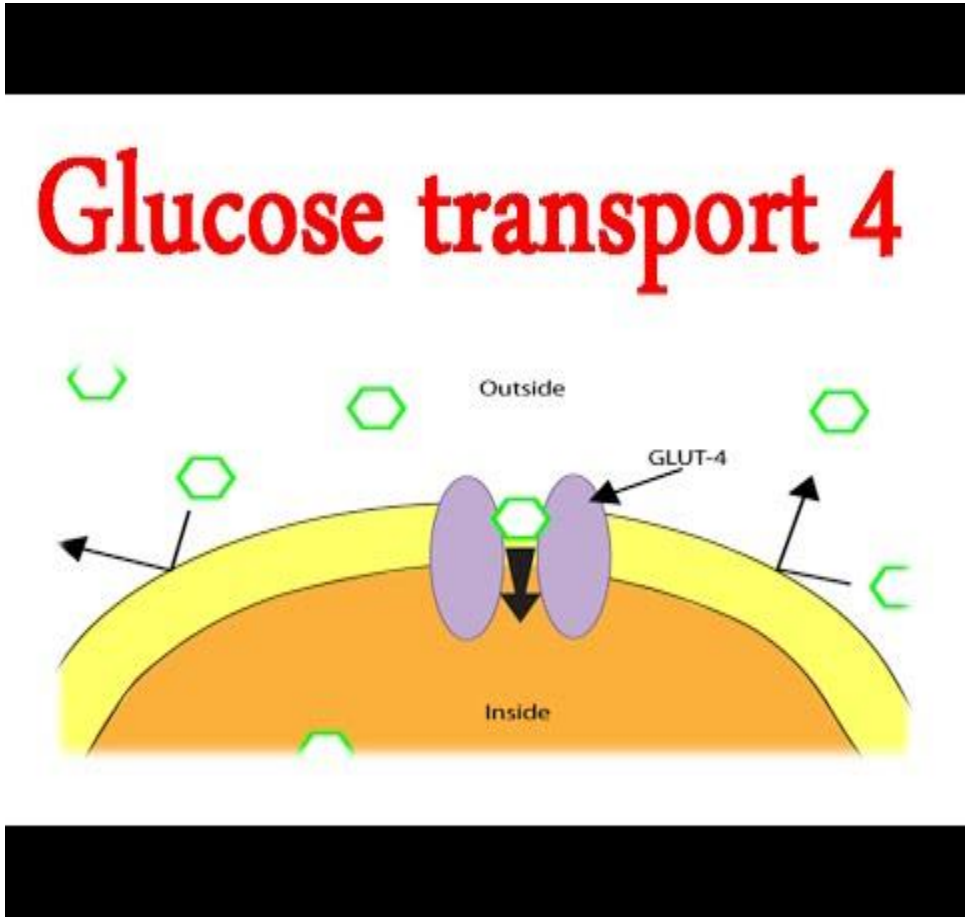


What Elevates Insulin

- Carbohydrates
- Low activity
- Frequent eating
- Meds: glimepiride, glipizide, glyburide (directly)
- Meds: antibiotics, antidepressants, steroids, beta-blockers, statins (indirectly by raising blood sugar)

Elevated Insulin- Triple Whammy to Weight Loss

- Stimulates GLUT 4 transporter so glucose enters fat cells
- Stimulates lipoprotein lipase so fatty acids can enter fat cells
- Blocks hormone sensitive lipase so fat cannot leave cell to be used as energy



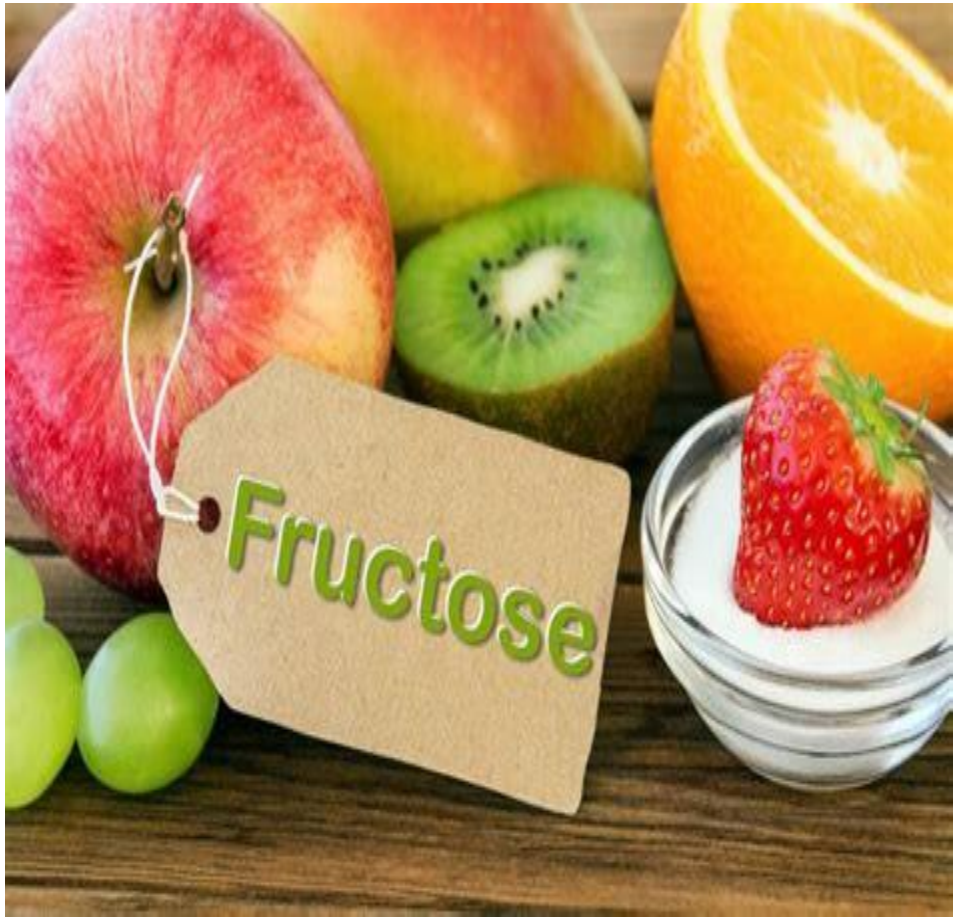
Carbohydrates (Sugars)

- Okay if metabolically healthy and active
- Found naturally in grains, below ground veggies, fruit, milk
- Added to most all processed foods in many forms
- Greatest stimulator of insulin
- Stored in muscles (~400grams)and liver (~100grams)
- Limited storage capacity
- Most addictive macronutrient?

Different Carbohydrate Sources

- Glucose
- Fructose (Fructans)
- Sucrose- table sugar
- Lactose- milk sugar
- Complex carbohydrates or polysaccharides

There are many other kinds of sugars but these are the main kinds in the typical diet.



High Fructose Corn Syrup

- Sucrose or table sugar is ~50% glucose and 50% fructose
- High Fructose corn syrup is ~55% fructose and 45% glucose

Fructose

- Worst kind of sugar?
- Sweetest tasting sugar
- Used primarily by the liver
- Shuttled to liver from stomach like alcohol
- Fatty liver
- Increases uric acid (gout)
- Does not stimulate insulin secretion
- Causes insulin resistance in liver as fructose is easily converted to fat
- Elevated blood glucose (~126) gets converted to fructose through the polyol pathway
- People with digestive issues can have fructose (fructan) malabsorption (IBS)

Increase Insulin Sensitivity

- Balance carbohydrates to match your current metabolic health and activity
- Consuming less carbohydrates depletes liver sugar stores and activity depletes muscle sugar stores
- Intermittent fasting or time restricted eating. This should be done gradually. If diabetic you should work with a healthcare professional to guide you.

  Example: Eating within a 6-8 hour window and fasting within a 16-18 hour window
- If you are prediabetic or diabetic check your glucose levels especially when you change the diet, medications, or exercise
- Every precaution should be taken to prevent hypoglycemia or low blood sugar

Autophagy

- Self-eating, Self cleaning
- Maid service inside cells (lysozomes)
- Yeast to mammals utilize autophagy
- Recycles damaged proteins
- Repair DNA
- Removes intracellular debris: free radicals, excess energy stores, etc.
- Removes intracellular pathogens: viruses, bacteria
- Stop cancer initiation
- Similar to Mitophagy: removal of damaged mitochondria
- Regulates energy use in cells: mTOR, Insulin, AMPK

Cell Metabolism
Volume 27, Issue 6
June 5 2018 pages: 1212-1221

Early Time-Restricted Feeding Improves Insulin Sensitivity, Blood Pressure, and Oxidative Stress Even without Weight Loss in Men with Prediabetes

- Intermittent fasting (IF) improves cardiometabolic health; however, it is unknown whether these effects are due solely to weight loss. We conducted the first supervised controlled feeding trial to test whether IF has benefits independent of weight loss by feeding participants enough food to maintain their weight. Our proof-of-concept study also constitutes the first trial of early time-restricted feeding (eTRF), a form of IF that involves eating early in the day to be in alignment with circadian rhythms in metabolism. Men with prediabetes were randomized to **eTRF (6-hr feeding period, with dinner before 3 p.m.)** or a control schedule **(12-hr feeding period)** for 5 weeks and later crossed over to the other schedule. eTRF improved insulin sensitivity, β cell responsiveness, blood pressure, oxidative stress, and appetite. We demonstrate for the first time in humans that eTRF improves some aspects of cardiometabolic health and that IF's effects are not solely due to weight loss.

Metabolic Labs

- Fasting Insulin- optimal is ~5mlU/mL (many labs go up to 24 as high normal) ***Insulin can be elevated for 10-15 years before glucose issues arise***
- Fasting glucose- optimal is ~80 mg/dL
- Hemoglobin A1c- ~3 month glucose average:
- Thyroid- TSH, free T3, free T4, Thyroid antibodies (there are 2: thyroglobulin and thyroid peroxidase) & rT3 (reverse T3)
- Triglycerides (fat)- under 100, optimal is ~50
- Vitamin D- ~50
- Vitamin B12- ~800
- RBC Folate- ~1200
- RBC Magnesium- ~6

Lab Ranges

- Different labs use different ranges
- Wide ranges are often not scrutinized. Low end of range is considered the same as high end without being addresses
- Based on the population that uses the lab
- Based on statistical analysis, not on health
- Most people who get lab work are not healthy

What Does High Blood Sugar Do?

- Sugar is sticky (Glycation)
  - Sticks to blood vessel walls
  - Sticks to immune cells
  - Sticks to red blood cells
  - Makes platelets sticky
  - Damages nerve cells
  - Feeds bacteria and yeast
  - Cancer’s favorite fuel

Biggest Impact on Blood Sugar

- Liquids with sugar (not diet):

cokes, juice, sweet tea, milk, sport drinks

- Sweets
- Processed grain products

Breads, pasta, crackers, chips, cereals

- Whole grains
- Fruit (esp. dried fruits)
- Below ground vegetables
- Beans and Peas

Smallest Impact on Blood Sugar

- Fats (oils)
- Meat

Beef, poultry, fish, shellfish, game

- Eggs
- Above Ground Vegetables

Leafy greens, Broccoli, cauliflower, asparagus

- Nuts
- Cheese
- High fat fruits

Coconut, avocado, olives

Sugar Substitutes

- Equal (aspartame)
- Sweet N Low (saccharine)
- Splenda (sucralose)
- Stevia (herbal extract)
- Monk Fruit/Lo han (fruit extract)
- Sugar alcohols

(*sorbitol, maltitol, lactitol, xylitol, erythritol)*

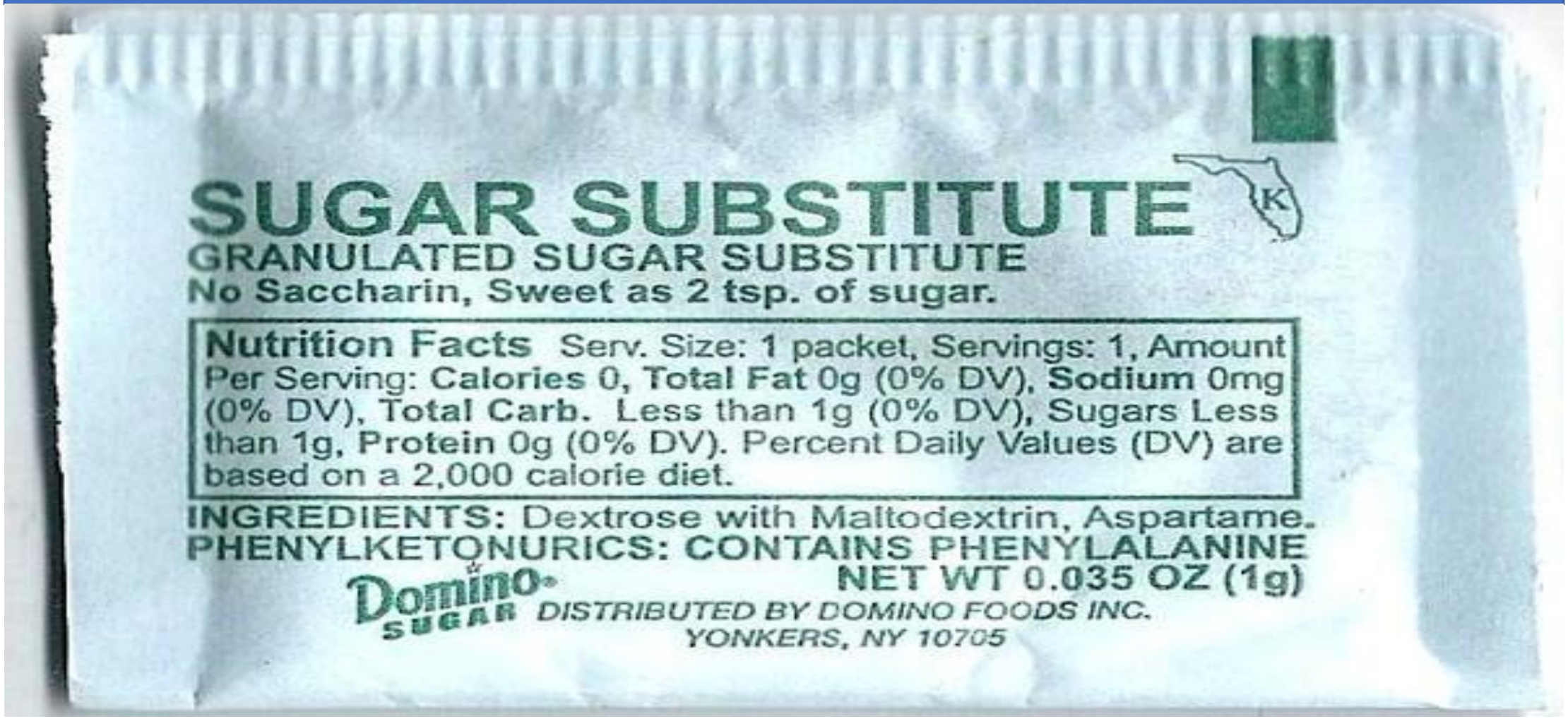
*Agave is 70-90% fructose

Ken Burris

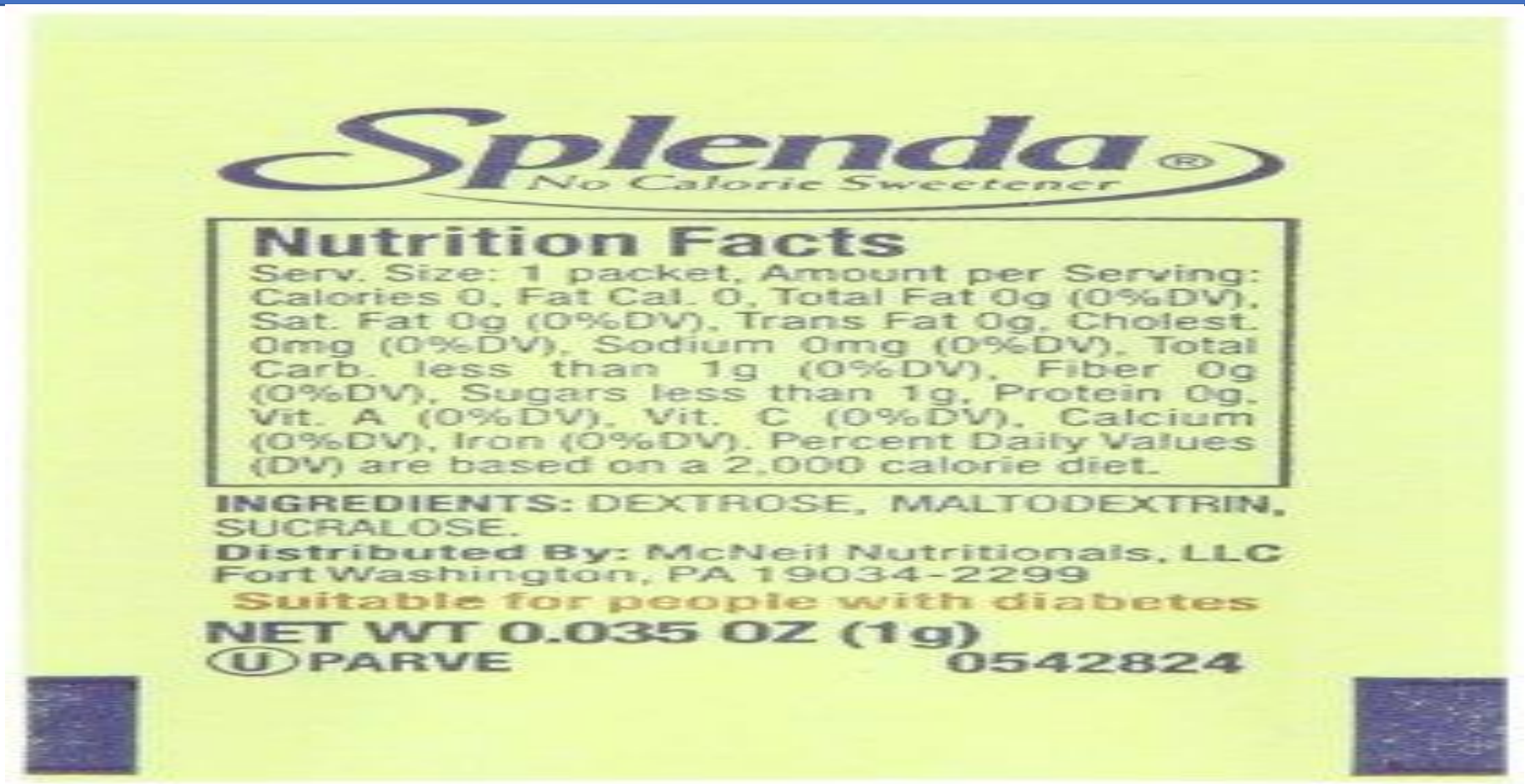
Sweet N Low


SWEET'N LOW BRAND
U PARVE
Pat. No. 3,625,711
ZERO CALORIE SWEETENER
A blend of nutritive and non-nutritive sweeteners
INGREDIENTS: Nutritive Dextrose, 3.6% Soluble Saccharin (36 mg per packet), Cream of Tartar, Calcium Silicate (an anti-caking agent).
Nutrition Facts: Serv. Size: 1 packet, Servings: 1, Amount Per Serving: Calories 0, Total Fat 0g (0% DV), Sat. Fat 0g (0% DV), Trans Fat 0g, Sodium 0mg (0% DV), Total Carb. Less than 1g (0% DV), Sugars Less than 1g, Protein 0g. Percent Daily Values (DV) are based on a 2,000 calorie diet.
Information: 1 packet contains the sweetness of 2 teaspoons of sugar.
Cumberland Packing Corp., Brooklyn, NY 11205
NET WT. 0.035 OZ. (1g)
Go to sweetnlow.com for great recipe ideas and premium offers.

Equal


SUGAR SUBSTITUTE
K
GRANULATED SUGAR SUBSTITUTE
No Saccharin, Sweet as 2 tsp. of sugar.
Nutrition Facts Serv. Size: 1 packet, Servings: 1, Amount Per Serving: Calories 0, Total Fat 0g (0% DV), Sodium 0mg (0% DV), Total Carb. Less than 1g (0% DV), Sugars Less than 1g, Protein 0g (0% DV). Percent Daily Values (DV) are based on a 2,000 calorie diet.
INGREDIENTS: Dextrose with Maltodextrin, Aspartame.
PHENYLKETONURICS: CONTAINS PHENYLALANINE
NET WT 0.035 OZ (1g)
Domino SUGAR
DISTRIBUTED BY DOMINO FOODS INC.
YONKERS, NY 10705

Splenda


Splenda®
No Caloric Sweetener
Nutrition Facts
Serv. Size: 1 packet, Amount per Serving: Calories 0, Fat Cal. 0, Total Fat 0g (0%DV), Sat. Fat 0g (0%DV), Trans Fat 0g, Cholest. 0mg (0%DV), Sodium 0mg (0%DV), Total Carb. less than 1g (0%DV), Fiber 0g (0%DV), Sugars less than 1g, Protein 0g. Vit. A (0%DV), Vit. C (0%DV), Calcium (0%DV), Iron (0%DV). Percent Daily Values (DV) are based on a 2,000 calorie diet.
INGREDIENTS: DEXTROSE, MALTODEXTRIN, SUCRALOSE.
Distributed By: McNeil Nutritionals, LLC
Fort Washington, PA 19034-2299
Suitable for people with diabetes
NET WT 0.035 OZ (1g)
U PARVE
0542824

Truvia


The Truvia® brand has strong environmental, economic, and social sustainability goals for bringing stevia from **field to table**.
Learn more at **truvia.com**.
truvía
Nature's Calorie-Free Sweetener
Distributed By:
Cargill, Incorporated
Minneapolis, MN 55440
Truvia® is a trademark of The Truvia Company LLC.
(866) 853-6077
truvia.com
Ingredients:
erythritol, stevia leaf extract, natural flavors
Ⓚ PARVE
Suitable for people with diabetes.
Nutrition Facts
Serving Size 1 packet (3.5g)
Servings Per Carton 40
Amount Per Serving
Calories 0
% Daily Value*
Total Fat 0g **0%**
Sodium 0mg **0%**
Total Carbohydrate 3g **1%**
Erythritol 3g
Protein 0g **0%**
Not a significant source of calories from fat, saturated fat, trans fat, cholesterol, dietary fiber, sugars, vitamin A, vitamin C, calcium and iron.
* Percent Daily Values are based on a 2,000 calorie diet.

Monk Fruit


Monk Fruit Blended With Other Sweeteners
MONK FRUIT IN THE RAW
ZERO CALORIE SWEETENER
40
PACKETS
NET WT. 1.12 OZ. (32g)
PARVE


MADE FROM NATURE
COOKS AND BAKES JUST LIKE SUGAR
LAKANTO
MONKFRUIT SWEETENER
ZERO CALORIES
ZERO GLYCEMIC
Classic
NON GMO
ZERO ADDITIVES
VEGAN
GLUTEN FREE
ZERO AFTERTASTE
1:1 SUGAR REPLACEMENT
NET WT 8.29 OZ (235G)

Erythritol


CONFECTIONERS
Swerve
THE ULTIMATE
SUGAR REPLACEMENT
CONFECTIONERS
Zero Calories | Natural | Tastes, Bakes and Measures Like Sug
NET WT 12 OZ (340G)

Food Labels

Total Calories	60
Calories From Fat	15
Total Fat	2 g
Saturated Fat	1 g
Trans Fat	0 g
Cholesterol	0 mg
Sodium	45 mg
Total Carbohydrates	15 g
Dietary Fiber	4 g
Sugars	4 g
Sugar Alcohols	3 g
Protein	2 g

*Percent Daily Values are based on a 2,000 ca
diet.

Ingredients: Wheat flour, unsweetened chocol
erythritol, inulin, oat flour, cocoa powder, evap
cane juice, whey protein concentrate, corn star
glycemic), natural flavors, salt, baking soda, w
gluten, guar gum, shortening

Common Digestive Disorders

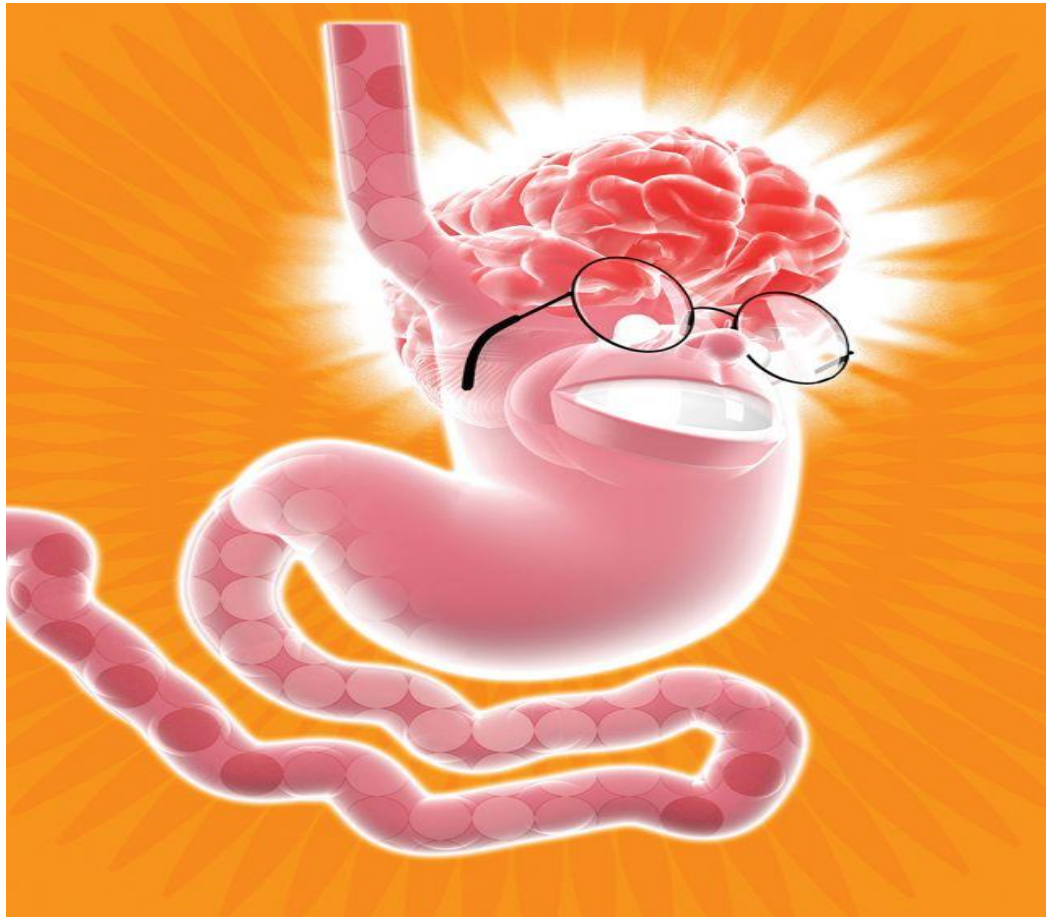
- GERD
- IBS: (IBS-D and IBS-C)
- Ulcerative Colitis
- Crohn’s
- Diverticulosis & Diverticulitis
- SIBO
- Leaky Gut Syndrome
- Gallstones
- Appendicitis
- Hemorrhoids

Gut Facts

- Your gut is your “Second Brain”
- Enteric Nervous System
- 95% of the serotonin in your body is in your gut.
- 50% of the dopamine is in your gut
- You make 400 times more melatonin in your gut than in your brain(mostly made by your gut bugs and stored in the appendix)
- You have 10 times more microbes in your colon than cells in your body
- The genes of your gut flora are 100 times greater than our own
- Around 80% of your immune system is located in the gut (GALT)

The Second Brain

- More nerve cells in the gut than the spinal cord or the peripheral nervous system
- The vagus nerve is the primary connection between the 2 brains
- New research shows most of the information is from gut to brain
- Many of our mood influencing neurotransmitters like serotonin are made in the gut
- Helps the gut function on its own
- Mental issues like anxiety and depression may arise first in the gut (inflammation)

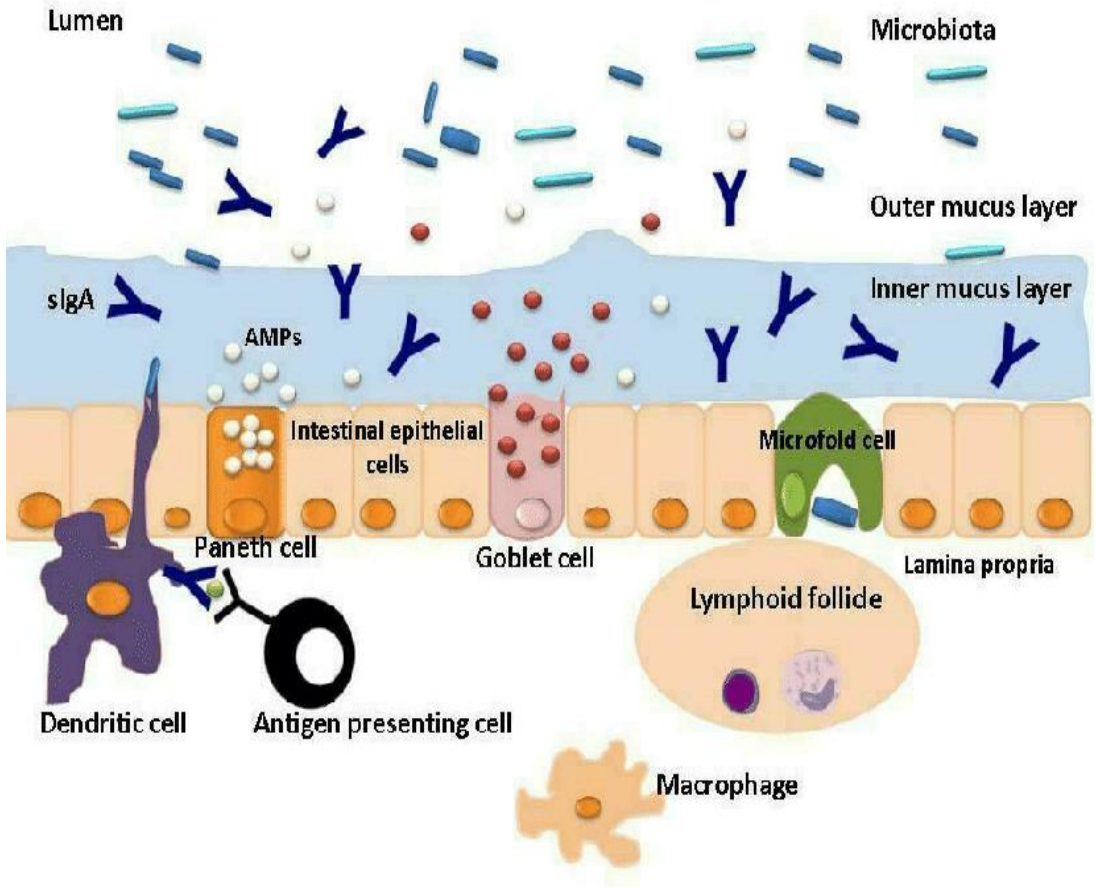


Melatonin

- Sleep- regulates our circadian rhythm (sleep-wake cycle)
- Once thought to be only in the brain (pineal gland)
- Very powerful antioxidant
- Protects stomach lining from toxins like NSAID's
- Reduces stomach acid while you are sleeping
- Regulates LES and UES pressure regulation
- Increases blood flow to esophagus for quick healing
- Reduces bowel spasms

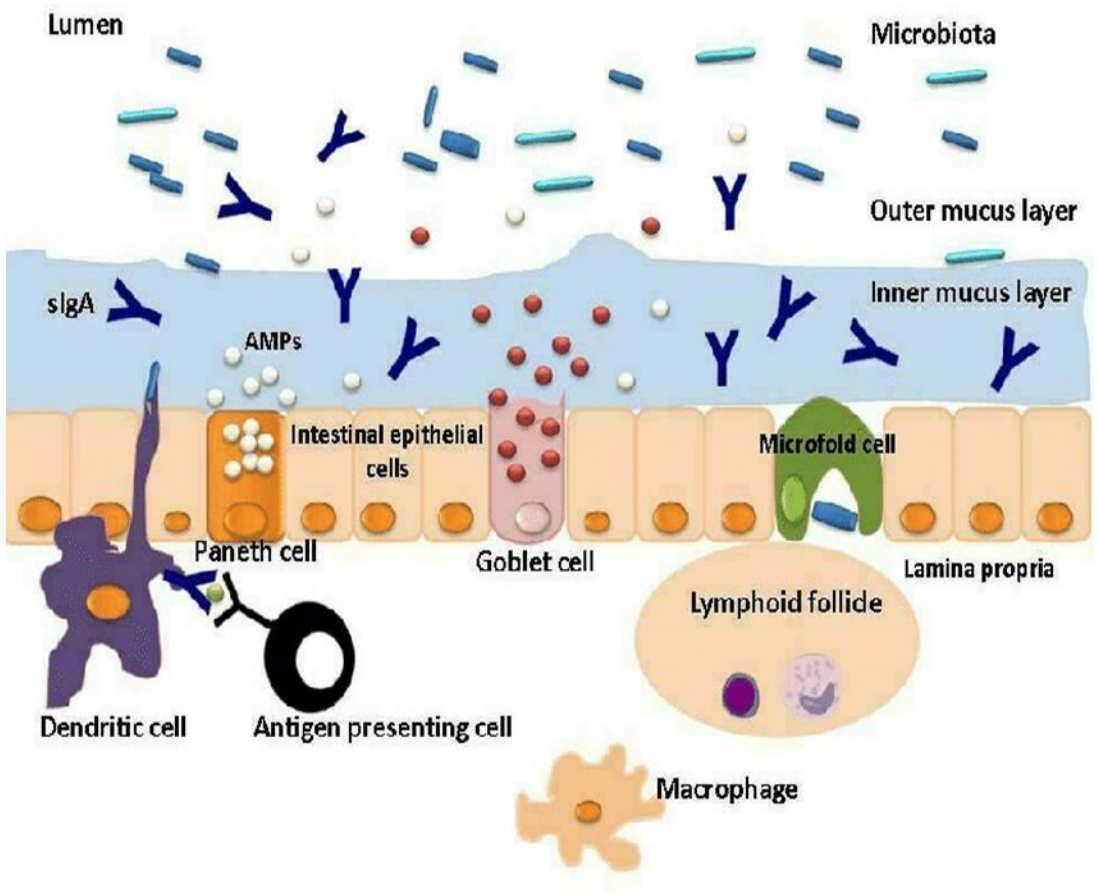
Importance of Colon Mucus

- Microbiota-→ gut bacteria, yeast
- Mucus- produced by goblet cells→
- Colon cells→
- Inside of body→



Importance of Fiber

- Bacteria ferment soluble fiber and resistant starch, which produces short chained saturated fats:
  - Butyric acid
  - Propionic acid
  - Acetic acid
- These short chained saturated fats are used by Goblet cells to make Mucus
- If the microbes are starved they may begin to consume the mucus
- Without the short chained saturated fatty acids the goblet cells starve and make less mucus



PROBIOTICS

- Bifidobacteria strains
- Lactobacillus strains
- Saccharomyces boulardii
- Streptococcus
  - **Streptococcus salivarius*
  - **Streptococcus thermophilus*

- Do not use if immune system is severely compromised.
- If gut is in bad shape an infant formula may be best to start
- Take on empty stomach (bedtime?)
- Take with non-chlorinated water
- People with histamine issues should be careful with fermented foods and probiotics

What Is Creating all the Digestive Issues?

- Antibiotics
- Too much refined sugar
- Not enough good fiber
- Too many medications
- Chronic Stress
- Chronic Infections
- C-sections?
- Pollution
- Low Stomach Acid

D-limonene


Jarrow
FORMULAS
d-Limonene
Natural Orange Peel Oil
1000
MILLIGRAMS
60
SOFTGELS
DIETARY
SUPPLEMENT

Vinegar- diluted with water

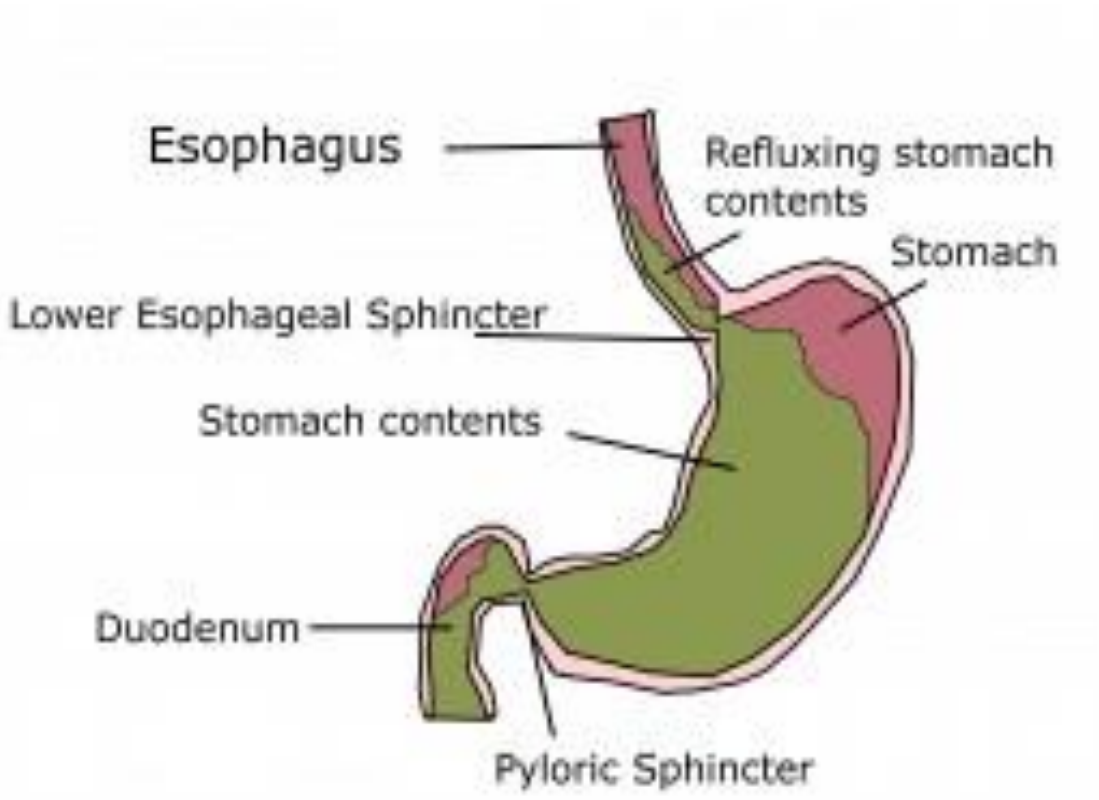
Bitters


FLORA
Premium Herbal Formulas
Swedish Bitters
Maria's Original Formula
Aqueous Extract • Alcohol-Free
Dietary Supplement
8.5 FL. OZ. (250 mL)

What Causes Acid Reflux?

- Too much acid or too little?
- Dysfunction in the LES
- Intra-abdominal pressure
- Bacterial overgrowth?
- The stomach can handle HCL, the esophagus can not
- Those with Zollinger-Ellison Syndrome are an exception
- ZES is caused by a tumor in the small intestine, pancreas, or lymph nodes by the pancreas
- ZES is rare. Occurs in about 1 in

  1 million people



Conventional Treatment for Acid Reflux

Acid Neutralizers

*Antacids: Tums, Rolaids

Maalox, Mylanta, etc.

Acid Suppressors

*Histamine blockers: Zantac, Tagamet, Pepcid, etc.

Proton Pump Inhibitors

*Prilosec, Nexium, Prevacid, etc.

"Why Stomach Acid Is Good For You"
by Jonathan Wright, M.D.

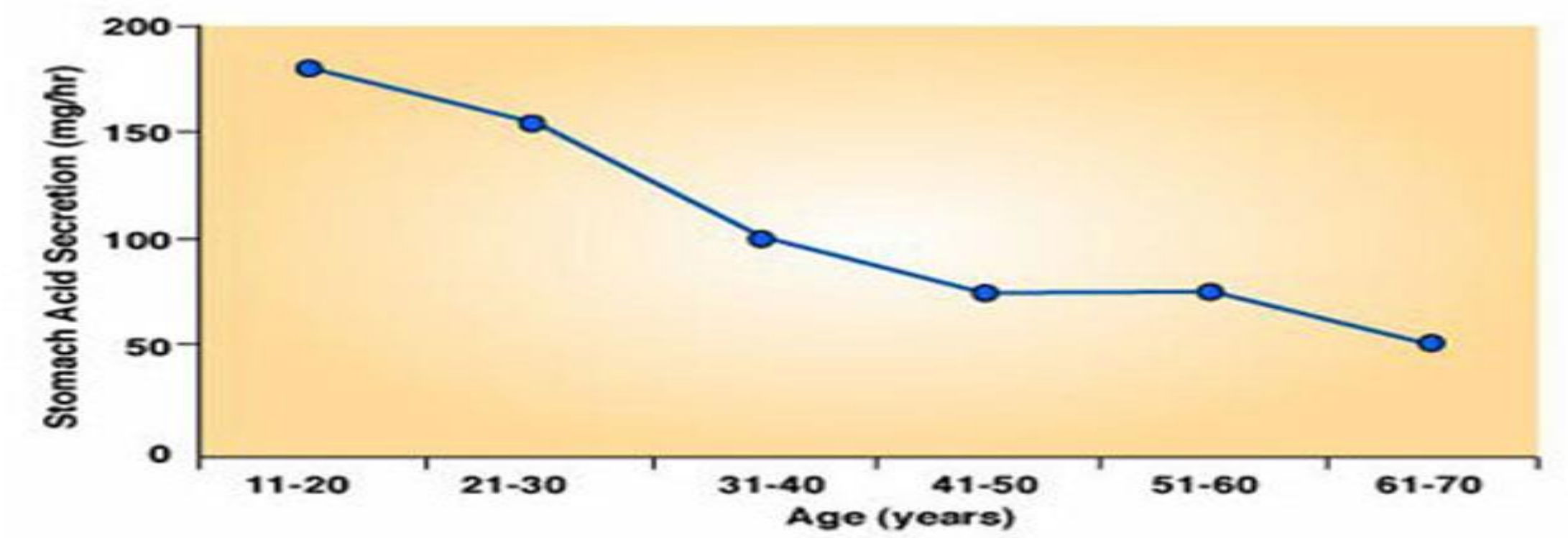
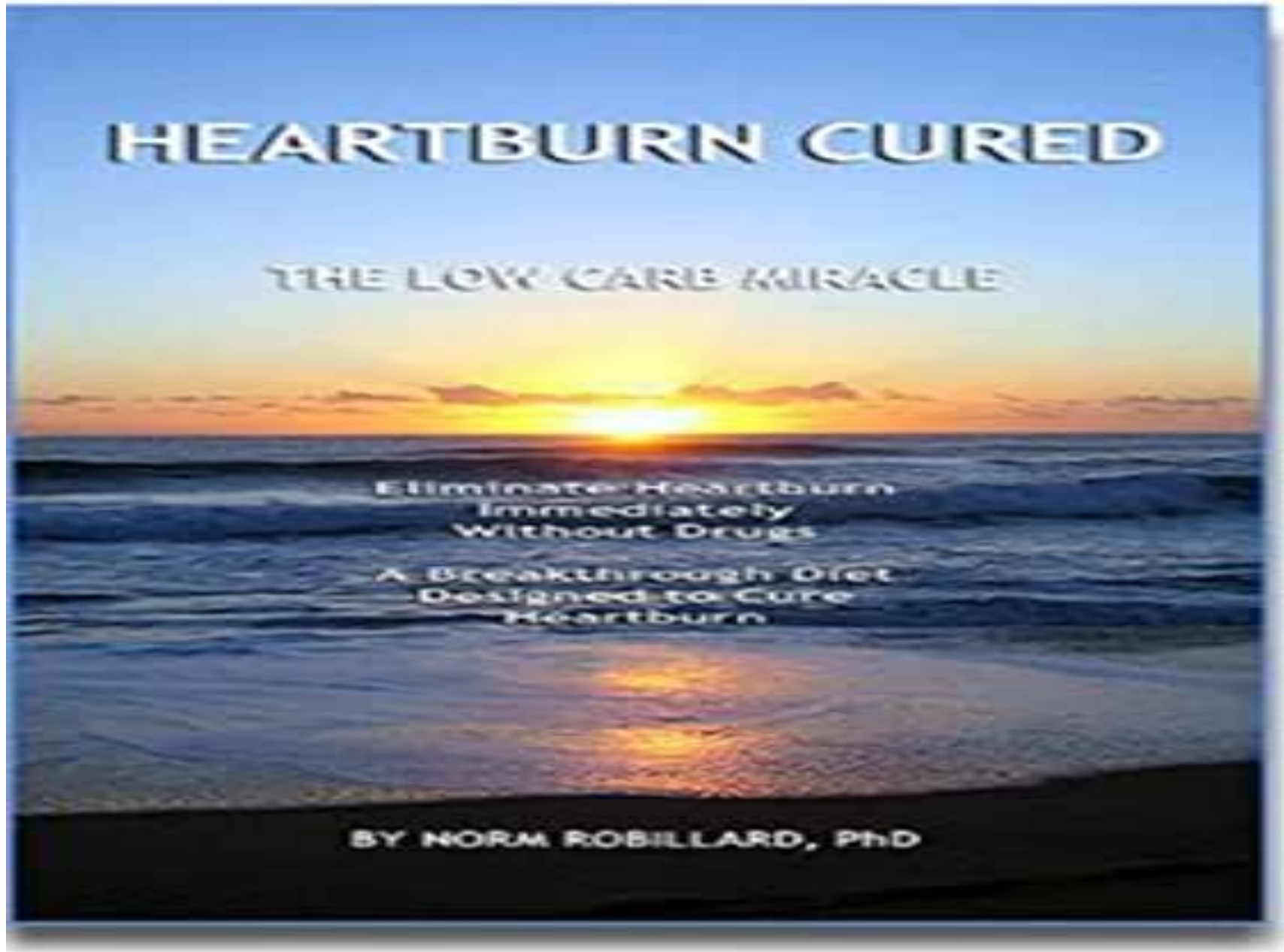


Fig. 1. Contrary to popular belief, stomach acid secretions drop with advancing age. This graph shows average decline in stomach acid secretion in humans between age 20 to age 80. (From "*Why Stomach Acid is Good For You.*")


HEARTBURN CURED
THE LOW CARB MIRACLE
Eliminate Heartburn
Immediately
Without Drugs
A Breakthrough Diet
Designed to Cure
Heartburn
BY NORM ROBILLARD, PhD

Journal of Gastroenterology; July 2009 editorial

- ***Treating gastroesophageal reflux disease with profound acid inhibition will never be ideal because acid secretion is not the primary underlying defect.***

It is never ideal to treat 1 abnormality by creating another, as was the case for many years with management of ulcer disease before the discovery of H pylori infection.

The pathophysiology of acid reflux concerns the dysfunction of the gastroesophageal barrier and research needs to refocus on ways of restoring its competence rather than merely suppressing gastric acid secretion.

What Causes the LES to Malfunction?

- Intra-abdominal pressure
- Overweight
- Overeating
- Lying down after eating
- Low stomach acid
- Bacterial overgrowth (H. pylori)
- Carbohydrate malabsorption
- Gas
- Bloating and Distention

Low Stomach Acid?

- Low chloride and protein numbers (liver enzymes ok)
- Low B12/High homocysteine
- High BUN
- Baking soda test
- Betaine HCl test
- Heidelberg test

What Causes Stomach Ulcers

- The suspected cause of stomach ulcers and gastritis for most of the 20th century was stress
- In 1982 Barry Marshall and Robin Warren theorized the cause was a bacteria, *Helicobacter Pylori.*
- Dr. Marshall drank a broth full of *H. Pylori and developed gastritis in 5 days*
- The two doctors won the Nobel Prize in Medicine in 2005

IBS-Irritable Bowel Syndrome

- Symptoms:

Constipation (IBS-C)

Diarrhea (IBS-D)

Bloating

Gas

Rosacea, and other skin issues

Abdominal Pain

Possible Solutions

GERD

* Modified Carbohydrate Intake
  - FODMAP Diet
  - Specific Carbohydrate Diet
  - GAPS Diet
* Replace HCl acid
  - Diluted vinegar in water with meals
  - D-Limonene (orange oil)
  - Betaine HCl with Pepsin****
  - Bitters
* *Antibacterial agent
* *Chew food thoroughly

IBS

Increase HCl

Modified Carbohydrate Intake

Digestive Enzymes

No Gall Bladder=Low fat diet

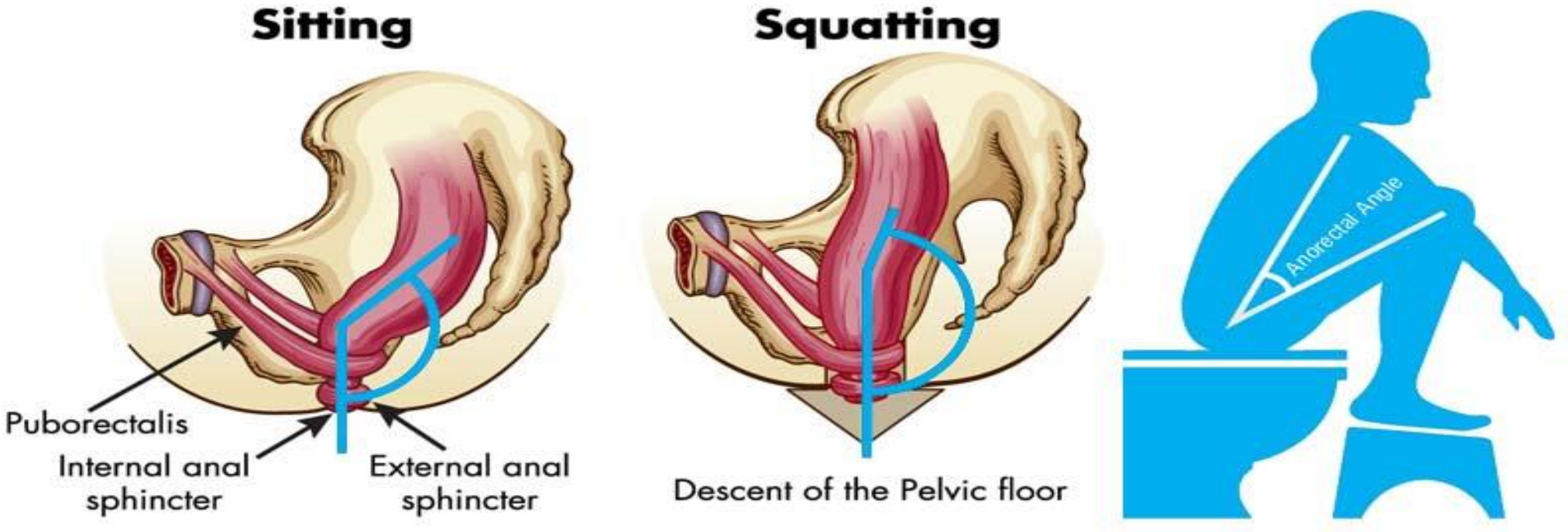
Antibacterial agent

Probiotics or prebiotics?

IBS-C: squatty potty?

Floor Toilet

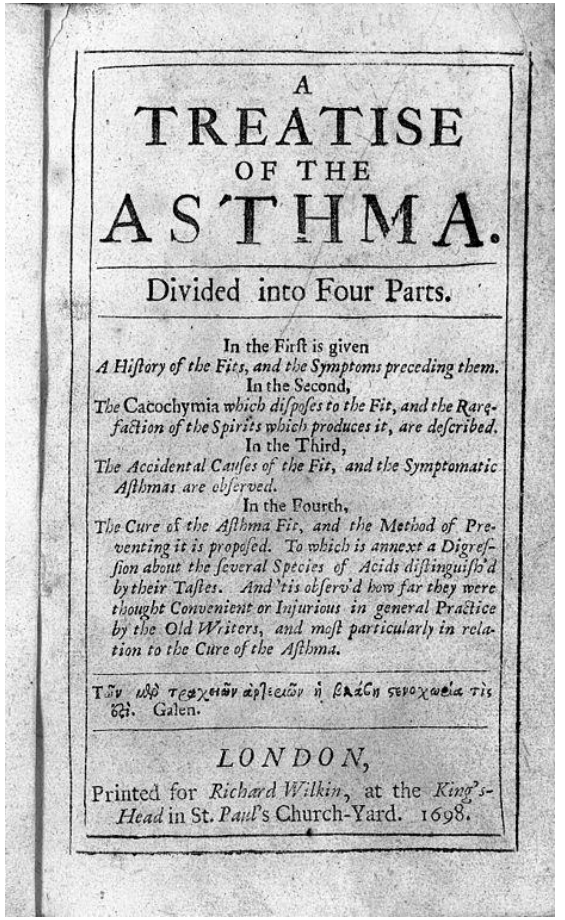
Anorectal angle



Squatty Potty

Conclusion

- You are what you can digest and absorb.
- Stomach acid is very important.
- Digestive issues can affect areas outside the gut. (rosacea, depression, asthma, etc.)
- Focus on eating changes first.
- Feed your gut bugs properly.
- Supplementation and medication can also be useful.



A
TREATISE
OF THE
ASTHMA.

Divided into Four Parts.

In the First is given
A History of the Fits, and the Symptoms preceding them.
In the Second,
The Cacochymia *which disposes to the Fit, and the Rarefaction of the Spirits which produces it, are described.*
In the Third,
The Accidental Causes of the Fit, and the Symptomatic Asthmas are observed.
In the Fourth,
The Cure of the Asthma Fit, and the Method of Preventing it is proposed. To which is annext a Digression about the several Species of Acids distinguish'd by their Tastes. And 'tis observ'd how far they were thought Convenient or Injurious in general Practice by the Old Writers, and most particularly in relation to the Cure of the Asthma.

Τῶν μὲν τραχειῶν ἀρτηριῶν ἡ βλάβη στενοχωρία τις ἐστί. Galen.

LONDON,
Printed for *Richard Wilkin*, at the *King's-Head* in St. *Paul's* Church-Yard. 1698.