

# NUTRITION'S IMPACT ON THE GUT/BRAIN CONNECTION

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*“All disease begins in the gut.”*

Hippocrates

# Introduction

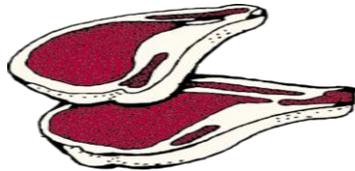
Topics that will be discussed:

- *Food groups:*
  - Vitamins
  - Minerals
- *Obesity*
- *Specific diets*
- *Gut flora; leaky gut*
- *GAPS Syndrome:*
  - Symptoms
  - Treatment

# FOOD GROUPS

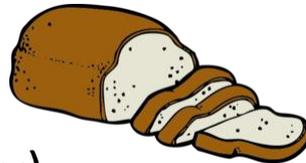
- **PROTEIN:** (help with structure, transportation, regulation)

1. Animal
2. Plant



- **CARBOHYDRATES:**

1. Simple (sugary).
2. Complex (non- sugary).



- **FATS:** (energy, insulation & transportation).

1. Solid
2. Liquid



- **VITAMINS:** (growth, regulation & maintenance).

1. Water soluble (B, C)
2. Fat soluble (A, D, E, K).



- **MINERALS:** (regulators, building, overall health).

- **WATER:** (50-75 % of body, blood, urine & kidneys).



Protein

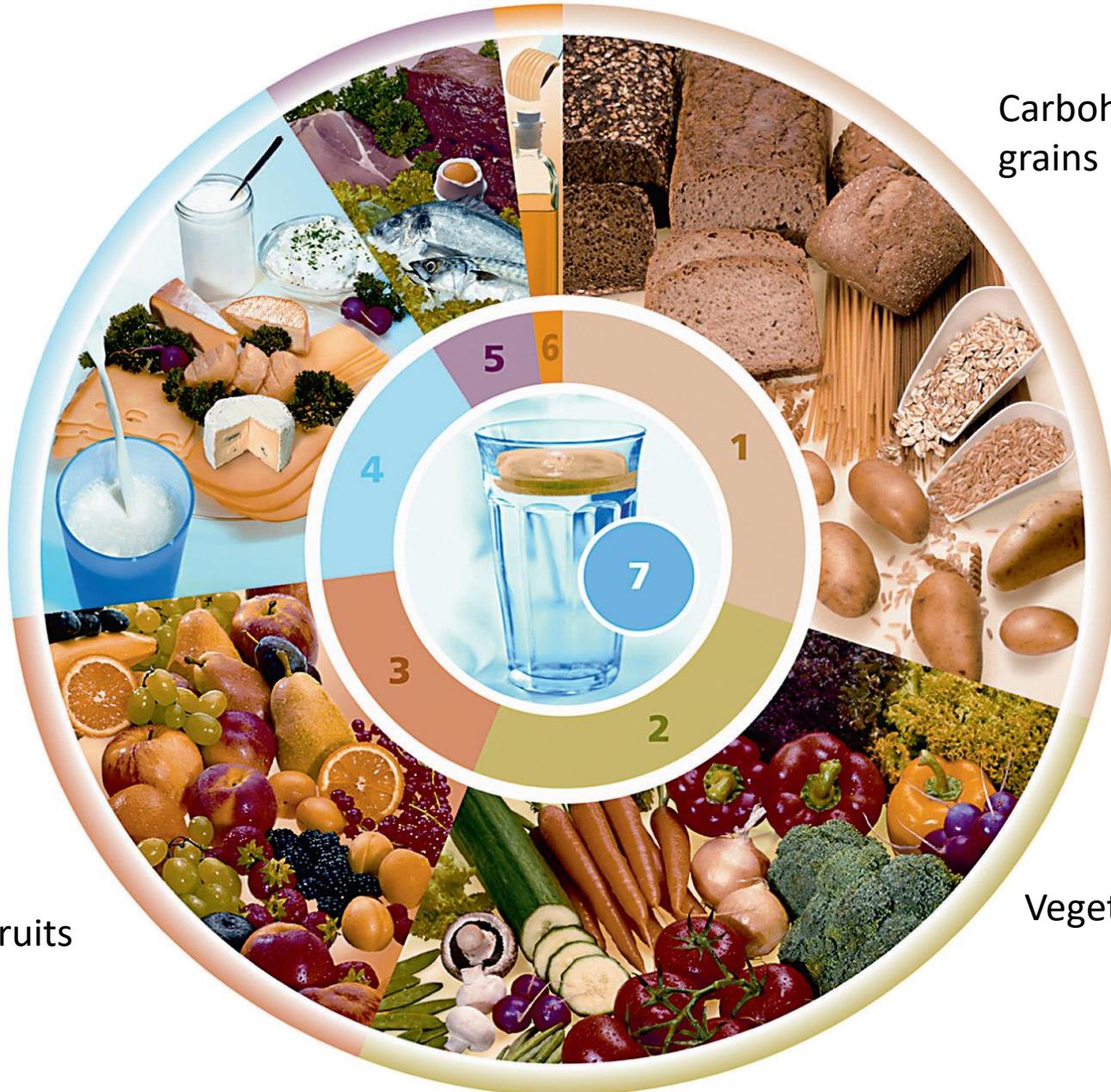
Vitamins & minerals

Carbohydrates/  
grains

Fats

Fruits

Vegetables



# VITAMINS

## Water Soluble:

**Vitamin C:** antioxidant vitamin needed for the formation of **collagen** to hold the cells together and for healthy **teeth, gums and blood vessels**; improves **iron absorption** and resistance to infection

**Sources:** Guava, black currant, red pepper, kiwi, green peppers, oranges, strawberries, broccoli and parsley.

### **Vitamin B:**

**B1 (Thiamine):** is coenzyme used by the body to metabolize food for **energy** and to maintain proper **heart and nerve function**.

**Sources:** yeasts, certain whole grains, beans, nuts and meat.

**B2 (Riboflavin)** breaks down proteins into amino acids, fats, and carbohydrates in the form of glucose. This helps convert **nutrients from food** into usable bodily **energy** that helps to maintain a healthy metabolism.

**Sources:** liver, natural yogurt, mushrooms spinach, almonds.

**B3 (Niacin):** converts food into glucose, used to produce **energy**. Produce macromolecules, including fatty acids and cholesterol. Facilitate **DNA repair and stress responses**.

**Sources:** turkey and chicken breast, peanuts, mushroom, liver, tuna and beef.

**B6 (Pyridoxine):** maintain a healthy **metabolism, nerve function, liver function, skin health, eye health**, as well as help to boost levels of energy

**Sources:** seafood, lean meats, poultry, eggs, legumes (beans and peas), nuts and seeds.

**B7 (Biotin):** essential for the **metabolism of carbohydrate and fat**.

**Sources:** organ meats, egg yolks, soybeans and yeast.

**B9 (Folic Acid):** is optimal **brain** functioning and has an important role in the production of RNA and DNA. It also works with vitamin B6 and B12 to control the serum levels of homocysteine, an essential amino acid.

**Sources:** dark leafy greens, okra, broccoli, avocado, beans and lentils.

**B12 (Cobalamin):** important for **protein metabolism**. It helps in the formation of red blood cells and in the maintenance of the **central nervous system**.

**Sources:** fish, meat, poultry, eggs, milk, and milk products

# Fat Soluble:

- ***Vitamin A***: maintain healthy **skin, teeth, skeletal and soft tissue, mucus membranes**, and skin. It is also known as **retinol** because it produces the pigments in the retina of the eye. Vitamin A promotes good vision, especially in low light.

**Sources:** beef liver, carrots, sweet potato, kale, broccoli

- ***Vitamin D***: Absorb calcium. With calcium, helps build **bones** and keep bones strong and healthy.

**Sources:** Egg yolks, liver, fatty fish, fortified milk, fortified margarine.

- ***Vitamin E***: fat-soluble antioxidant. "It protects **cells** from damage, aids in lowering a variety of health problems, from heart disease to cancer, and possibly even dementia

**Sources:** Vegetable oils (such as wheat germ, sunflower, safflower, corn, and soybean oils) almonds, peanuts, hazelnuts, sunflower seeds.

- ***Vitamin K***: normal **blood clotting and synthesis of proteins found in plasma, bone, and kidneys**.

**Sources:** kale, spinach, turnip greens, collards, Swiss chard, mustard greens, parsley, romaine, green leaf lettuce, fish, liver, meat and eggs,

# MINERALS

## 1. Calcium

Mineral for **bones, regulates blood pressure and cholesterol levels**, maintaining heart health and milk production during pregnancy.

**What To Eat:** Apart from milk and dairy products, green leafy vegetables, broccoli, kale, bok choy, sardines, salmon, turnip greens, kelp, dried figs and oysters are a good source of calcium.

## 2. Magnesium

Enzyme-catalyzed reactions for the **normal functioning of the body**. keeps your **kidneys, heart** and **brain** healthy.

**What To Eat:** Whole grains, beans, leafy greens, nuts, soybean, legumes, bran cereals and seeds like pumpkin, sunflower and flaxseeds .

## 3. Phosphorus

Builds strong **bones and teeth**. It helps the **cells to function** properly and make **energy**.

**What To Eat:** Mushrooms, meat, poultry, eggs, legumes, nuts and dairy products

## 4. Iron

**Blood** mineral, essential for the formation of **red blood cells** and transporting **oxygen** in the body. It regulates growth and supports the immune system.

**What To Eat:** Lean meat, shellfish, liver, lentils, iron fortified cereal, dried beans, peas, chickpeas, nuts and seeds, molasses and organic apricots.

## 5. Zinc

An anti-oxidant mineral, zinc is vital for **immunity and wound healing**. It is crucial for **sexual development** and reproduction, maintaining healthy **eyes** and supporting **liver** function.

**What To Eat:** Black-eyed peas, soybeans, lima beans, mushrooms, pumpkin and pumpkin seeds, seafood, organic eggs, brightly colored fruits and vegetables

## 6. Sodium

An essential fluid mineral that keeps a control over your **blood volume** to regulate **blood pressure**, sodium is extremely beneficial in **digestion** and maintaining the chemical composition of blood.

**What To Eat:** Unrefined organic sea salt, beets, okra, coconuts, carrots, and dried fruits such as apricots, figs, and raisins.

## 7. Selenium

An anti-oxidant mineral, selenium is vital for the proper **functioning of your immune system** as well as the **thyroid gland**. It even **protects your cells** from damage.

**What To Eat:** Organ meats, seafood, dairy, brewer's yeast, butter, sesame seeds, garlic and Brazil nuts.

## 8. Potassium

Necessary for maintaining the **fluid balance and regulating blood pressure**. Known as the **nerve tonic**, it also aids the **sensory function**.

**What To Eat:** Potatoes, tomatoes, avocados, citrus fruits, bananas, cantaloupes, fatty fish, poultry, spinach and celery

## 9. *Iodine*

Indispensable for the **production of thyroid hormones**, iodine is a trace element that gives you healthy **skin, hair and nails**.

**What To Eat:** Fresh seafood, iodized salt, Swiss chard, spinach, turnip greens and summer squash.

## 10. *Manganese*

Manganese combines with other minerals and promotes a healthy **immune system**. It is useful in producing **sex hormones, blood clotting** and for healthy **skin, nails and hair**.

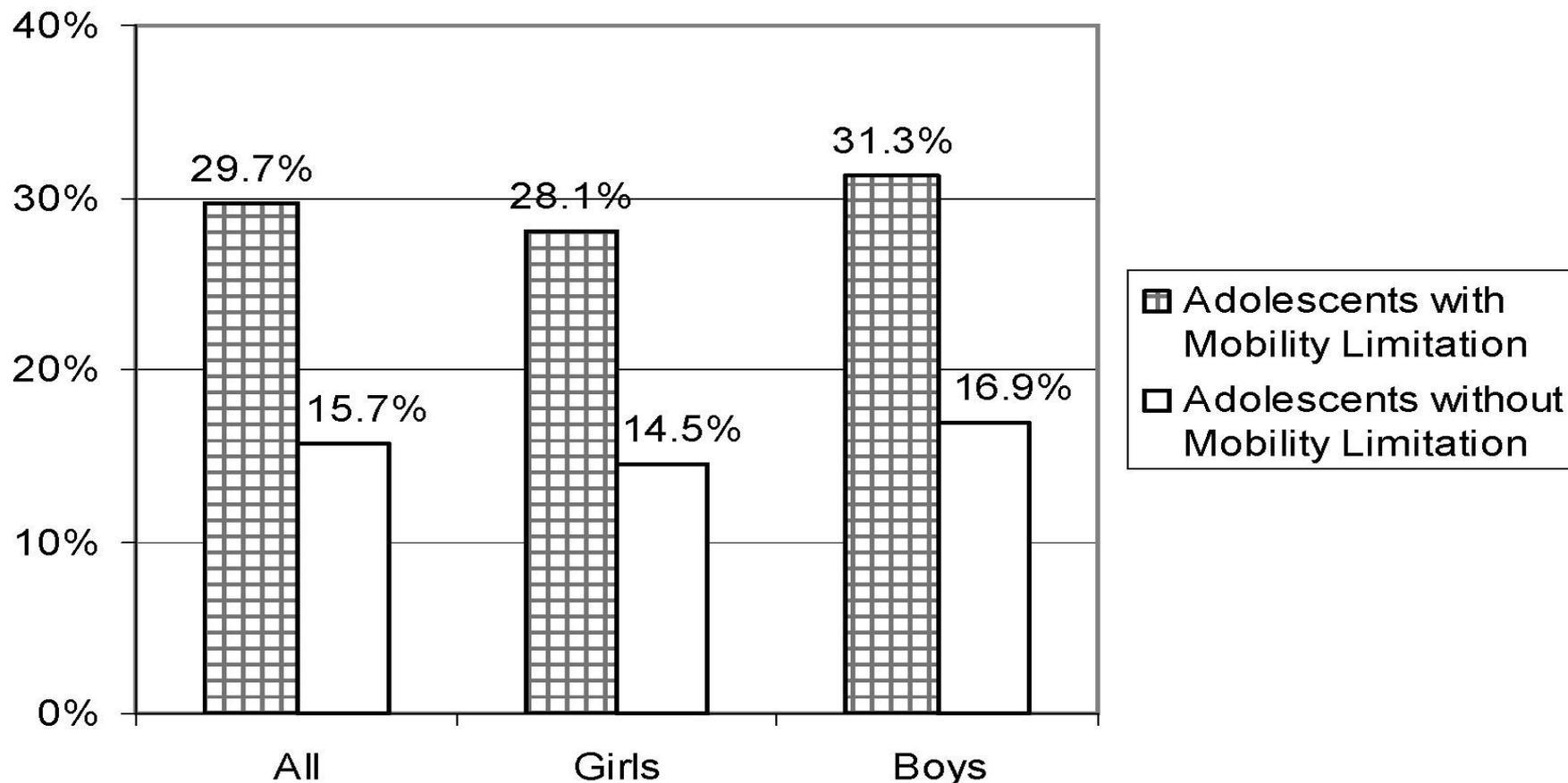
**What To Eat:** Green leafy vegetables, avocados, blueberries, pineapples, green tea, eggs, fresh beetroot.

# Different Diets

Diet	Goal	What can you eat?
Specific Carbohydrate Diet (SCD)	It is based on the theory that by eliminating most CHO (primarily grains, starches, dairy, and sugars) and allowing only specific CHO that require minimal digestion, it can reduce inflammation and make eating enjoyable for people with gastrointestinal (GI) disorders.	All natural products non processed
Gluten Free Casein Free (GFCF)	strict elimination diet, all foods containing gluten ( found in wheat, barley and rye) and casein ( found in milk and dairy products) are removed	<b>All food EXCEPT</b> gluten: wheat, rye and barley, <i>derivatives</i> ; malt, soy sauce and grain vinegar. <b>EXCEPT</b> casein; dairy, baked products, pasta, and sports drinks.
Ketogenic Diet (KD)	low carbohydrate diet, where the body produces ketones in the liver to be used as energy.	Fats, oils, protein, vegetables, dairy, nuts, seeds & water.

Disorder	ASD	Down's Syndrome
Nutritional issues/ GIT problems	<ol style="list-style-type: none"> <li>1. Chronic diarrhoea</li> <li>2. Abdominal distension, discomfort and bloating</li> <li>3. GERD</li> <li>4. Excessive gas</li> <li>5. Constipation -&gt;faecal impaction,</li> <li>6. Leaky gut syndrome</li> <li>7. Food intolerances</li> <li>8. Candida</li> </ol>	<ol style="list-style-type: none"> <li>1. Constipation</li> <li>2. Hypothyroidism -&gt; obesity</li> <li>3. GERD</li> <li>4. Gluten intolerance</li> <li>5. Celiac disease</li> <li>6. Slow metabolism</li> </ol>
Diets used	<ul style="list-style-type: none"> <li>• GFCF</li> <li>• SCD</li> <li>• Feingold Diet</li> </ul>	<ul style="list-style-type: none"> <li>• GFCF</li> <li>• SCD</li> <li>• Balanced diet to avoid weight gain and diabetes</li> </ul>
Common nutritional deficiencies present	<ul style="list-style-type: none"> <li>• Vitamin E</li> <li>• Vitamin Ca</li> <li>• Vitamin D</li> <li>• K</li> <li>• Choline</li> </ul>	<ul style="list-style-type: none"> <li>• Vitamin A,</li> <li>• Vitamin B12</li> <li>• Vitamin C</li> <li>• Zn</li> <li>• Selenium</li> <li>• Serotonin</li> </ul>
Contraindications:	<ul style="list-style-type: none"> <li>• Cu</li> <li>• Fe</li> </ul>	<ul style="list-style-type: none"> <li>•Folic acid</li> </ul>

# Obesity and children with SN



Prevalence of overweight (body mass index [BMI]  $\geq 95^{\text{th}}$  percentile) among youth ages 6–17 years, by disability and gender. (Based

Disorder	ADHD	CP	Epilepsy
Nutritional issues/ GIT problems	<ol style="list-style-type: none"> <li>1. Chronic diarrhoea</li> <li>2. Abdominal distension, discomfort and bloating</li> <li>3. GERD</li> <li>4. Excessive gas</li> <li>5. Constipation -&gt;faecal impaction,</li> <li>6. Leaky gut syndrome</li> <li>7. Food intolerances</li> </ol>	<ol style="list-style-type: none"> <li>1. Swallowing disorders</li> <li>2. regurgitation and/or vomiting</li> <li>3. abdominal pain</li> <li>4. chronic pulmonary aspiration</li> <li>5. chronic constipation</li> </ol>	<ol style="list-style-type: none"> <li>1. Abdominal pain</li> <li>2. Cramping</li> <li>3. GI discomfort</li> <li>4. Nausea/ vomiting</li> <li>5. Constipation</li> </ol>
Diets used	<ul style="list-style-type: none"> <li>• GFCF</li> <li>• SCD</li> </ul>	<ul style="list-style-type: none"> <li>•Ketogenic diet</li> <li>•SCD (intro stages)</li> </ul>	<ul style="list-style-type: none"> <li>• GFCF</li> <li>• SCD</li> <li>• Ketogenic diet</li> </ul>
Deficiency	<ul style="list-style-type: none"> <li>• parathyroid hormone</li> <li>• Vitamin D</li> <li>• Mg</li> <li>• Omega 3</li> <li>• B complex</li> </ul>	<ul style="list-style-type: none"> <li>• Omega 3</li> </ul>	<ul style="list-style-type: none"> <li>•Omega 3</li> </ul>

Disorder	ADHD	CP	Epilepsy
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Disorder	ASD	ADHD
Foods to avoid:	<ol style="list-style-type: none"><li data-bbox="703 208 909 244">1. Gluten</li><li data-bbox="703 265 880 301">2. Dairy</li><li data-bbox="703 322 871 358">3. Corn</li><li data-bbox="703 379 890 415">4. Citrus</li><li data-bbox="703 436 884 472">5. Sugar</li><li data-bbox="703 494 1174 529">6. Artificial ingredients</li></ol>	<ol style="list-style-type: none"><li data-bbox="1307 208 1663 244">1. Processed sugar</li><li data-bbox="1307 265 1837 301">2. Artificial ingredients/ dyes</li><li data-bbox="1307 322 1499 358">3. Gluten</li><li data-bbox="1307 379 1779 451">4. Dairy (beta casein a1 &amp; lactose)</li><li data-bbox="1307 472 1624 508">5. Refined grains</li><li data-bbox="1307 529 1846 565">6. Nitrates (processed meats)</li><li data-bbox="1307 586 1711 622">7. Artificial sweeteners</li><li data-bbox="1307 644 1441 679">8. Soy</li></ol>

Disorder	DS	Epilepsy	CP
Foods to avoid	<ol style="list-style-type: none"> <li>1. Processed food</li> <li>2. Refined sugar</li> <li>3. + salt</li> <li>4. refined flour</li> <li>5. Poor quality fats; hydrogenated, trans fat, + omega 6</li> </ol>	<ol style="list-style-type: none"> <li>1. Processed sugar</li> <li>2. Gluten</li> </ol>	<ol style="list-style-type: none"> <li>1. Hard solid foods.</li> <li>2. Very fibrous food</li> <li>3. Processed products</li> </ol>
Foods to eat	<ul style="list-style-type: none"> <li>• Antioxidants slow aging process</li> <li>• Protein</li> <li>• Vegetables</li> </ul>	<ul style="list-style-type: none"> <li>• High fat intake.</li> </ul>	<ul style="list-style-type: none"> <li>• ++ stock (chicken/meat)</li> </ul>

# Toxic Effects of Sugar



Premature aging process

Supresses immunity

Disturbs mineral balance

Raises cholesterol &  
triglycerides

Increased risk of  
Alzheimer's

Diabetes & hyperglycemia

Tooth decay & disease

Weight gain & obesity

Candida overgrowth

Kidney disease

Hyperactivity

Depression & anxiety

Various cancers

Weakened eyesight

Osteoperosis

Coronary heart disease

Crohn's disease &  
ulcerative colitis

Asthma

Arthritis

Gallstones & kidney stones

Hormonal imbalances

Appendicitis

Exacerbation of MS

Decreased growth  
hormones

Emphysema

Atherosclerosis

Fatty liver

Constipation

Fluid retention

Headaches & Migraines

# Allergy vs. Intolerance



- Lactose intolerance & mal-digestion are due to an inability to digest milk sugar (lactose) not an allergic reaction to milk protein (casein).
- An allergy elicits an immune reaction & involves antigens & antibodies.
  - **Antibody:** Protein structures produced by immune cells that inactivate antigens (allergens).
  - **Antigen (allergen):** Foreign protein substances that elicit an immune reaction.
- Allergic responses cause the formation of mucous in the respiratory tract, GI distress &/or hives.

## *Problems with Dairy*

1. The sugar lactose
2. The protein casein



# Cow Milk Protein

***What are the types of protein found in cow milk???***

- Casein
- Whey protein:
  1. Beta- lactoglobulin
  2. Alpha- lactalbumin

## What is gluten

- Multiple Proteins found in wheat, barley, rye
- Contains: gliadomorphin
- Causes:
  - Diarrhea
  - Constipation
  - Abdominal pain
  - Digestive problems in general
  - Gut inflammation
  - Malabsorption-particularly beta-casein
  - depression



## SOURCES OF GLUTEN TO AVOID

- Wheat
- Rye
- Barley
- Spelt
- Kamut
- Triticale
- Oats (*commercial*)
- Semolina
- Hydrolysed Vegetable Proteins
- MSG
- Dextrin
- Malt
- Citric acid
- Artificial flavors & coloring \*
- "Spices" \*
- Soy sauce (*unless wheat-free*)\*
- Potato chips/fries \*
- Sauces and gravies \*
- Bologna and hot dogs \*

\* *unless specified  
gluten-free*



## SOURCES OF CASEIN TO AVOID

- All animal milk products  
(*cow, goat, sheep*)
- Cheese
- Yogurt
- Butter
- Buttermilk
- Ice cream
- Kefir
- Cream
- Sour cream
- Whey
- Galactose
- Casein, Caseinate
- Lactose in seasoning
- Lactalbumin as natural flavor
- Lactic acid
- Sherbet
- Canned tuna
- Cool Whip
- Artificial butter flavor
- Milk chocolate
- Wax on some fruits and vegetables
- Seasoned potato chips
- Hot dogs and bologna (*may contain*)



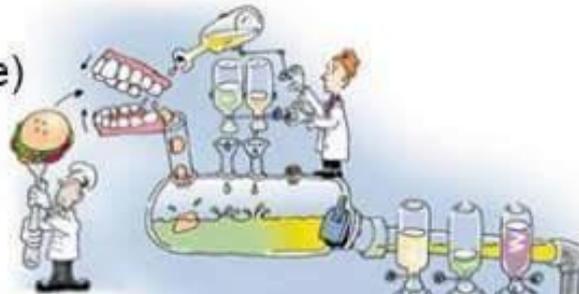
- *Gluteomorphins*
- *Caseomorphins*

Both have a opiate form chemical structure; that crosses the BBB which causes addiction.

# GIT

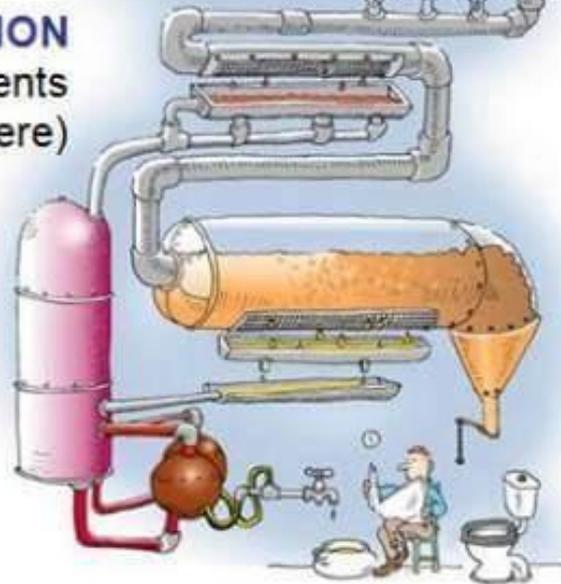
## INGESTION

(Nutrition starts here)



## ABSORPTION

(Supplements help here)



## DIGESTION

(Enzymes work here)

## GUT HEALTH

(Probiotics live here)

# Gut flora:

about 90% of all cells and genetic material  
in the body!

Gut flora is made out of three groups:

1. essential or beneficial flora
2. opportunistic flora
3. transitional flora

# Roles of Gut Flora

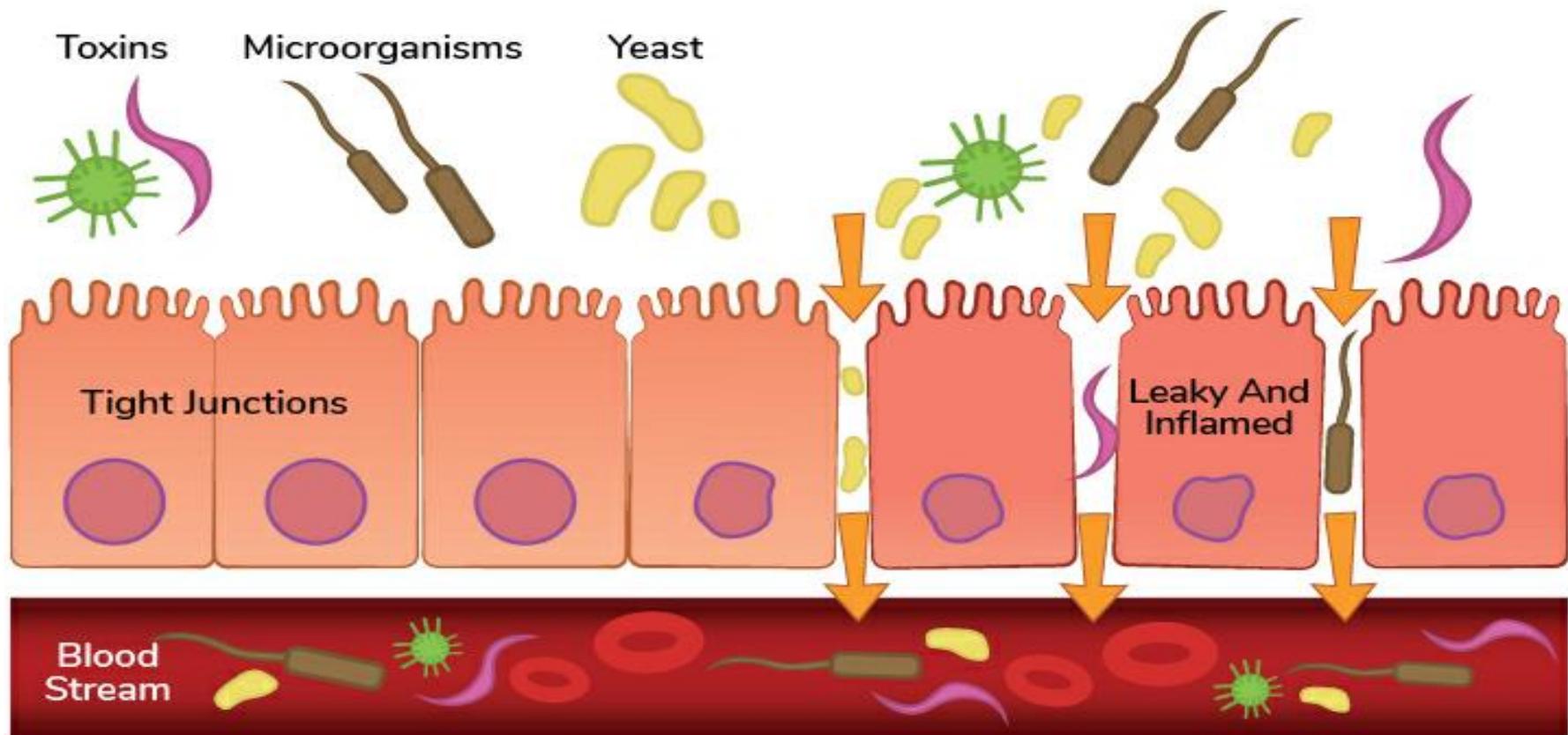
- Protection from Invaders
- Health and Integrity of the Gut
- Appropriate Digestion and Absorption
- Vitamin Production
- Detoxification
- Immune System Modulation

# What can damage gut flora?

- Antibiotics
- Steroids, The Pill
- Other Drugs
- Stress
- Poor Diet
- Infections
- Disease
- Bottle Feeding
- Old Age
- Pollution
- Radiation
- Alcohol
- Toxic Chemicals
- Dental Work

# DAMAGED GUT WALL

- Lack of protection by beneficial gut flora
- Attack by pathogenic microbes & toxins
- Enterocytes degenerate, tight junctions open
- Foods absorb partially digested leading to food allergies & intolerances
- Damaged gut lets toxins & microbes into the bloodstream
- General toxicity in the body
- Immune system reacts adding autoimmunity



Immune Response • Reaction • B and T Cells Release

Nutrient Malabsorption

Autoimmunity

Food Intolerances

Gut-Brain Axis Compromised

Systemic Inflammation



**Brain**

Depression  
Anxiety  
ADHD

**Skin**

Acne  
Rosacea  
Eczema  
Psoriasis

**Thyroid**

Hashimoto's  
Hypothyroidism  
Graves

**Leaky Gut  
Affects the  
Whole Body**

**Colon**

Constipation  
Diarrhea  
IBD

**Adrenals**

Fatigue

**Joints**

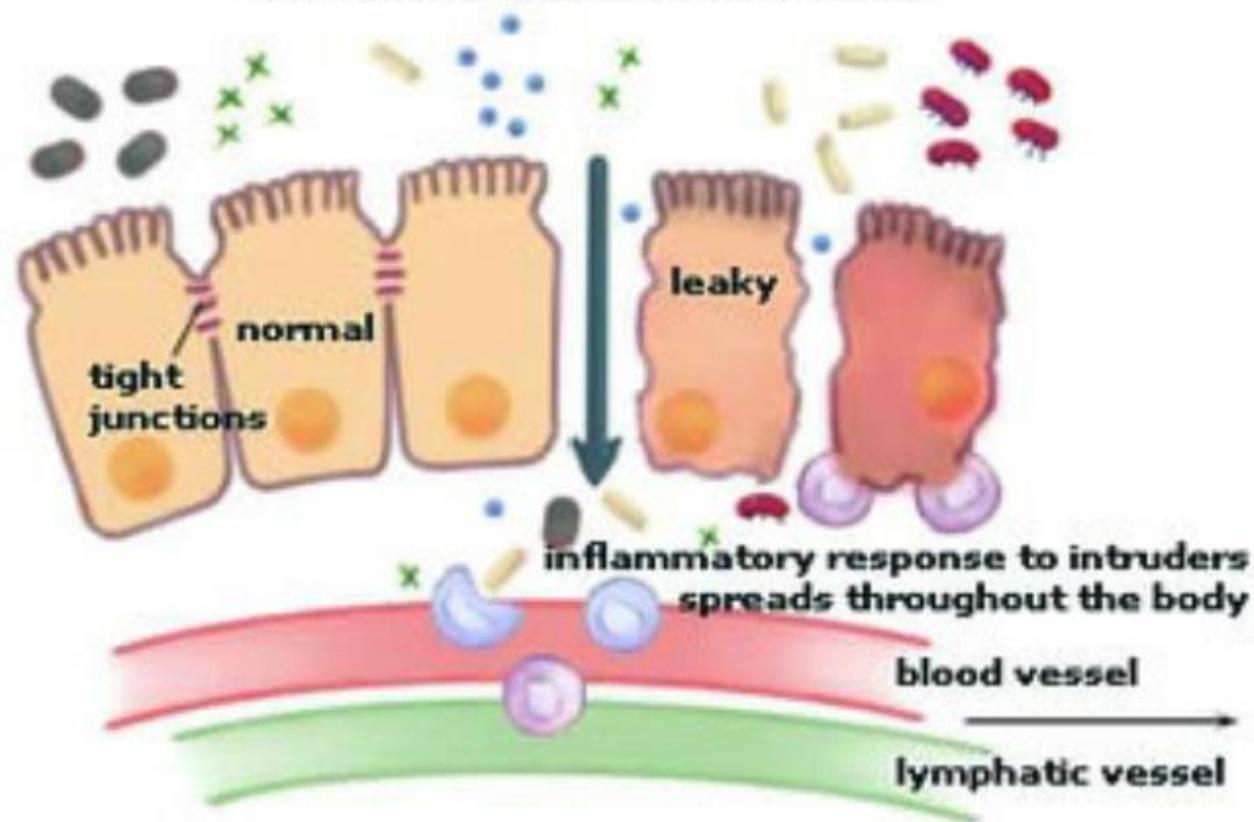
Rheumatoid Arthritis  
Fibromyalgia  
Headaches

**Sinus and  
Mouth**

Frequent Colds  
Food Sensitivities

# LEAKY GUT

undigested food particles / toxins



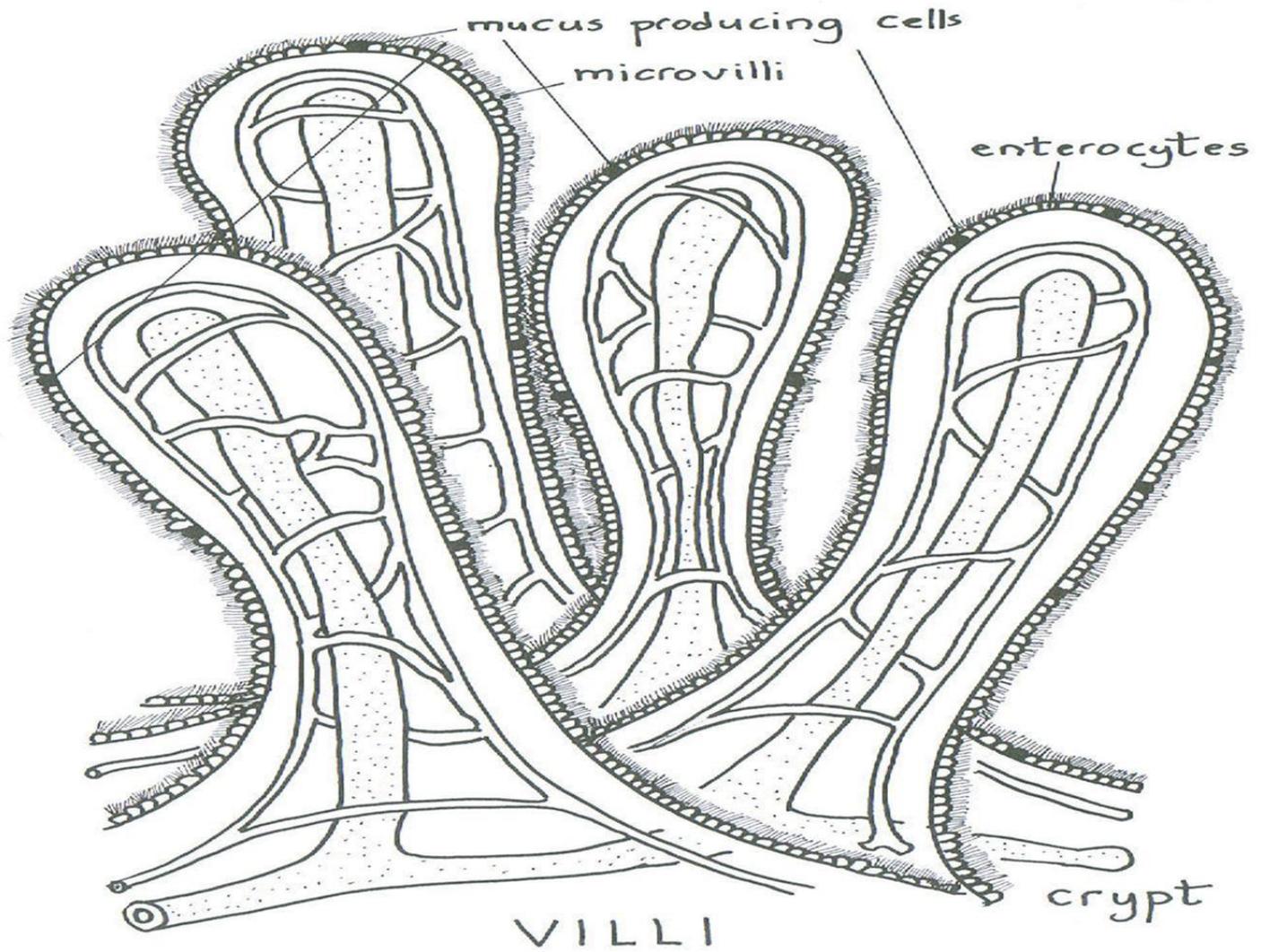


FIG. 3 The absorptive surface of intestines.

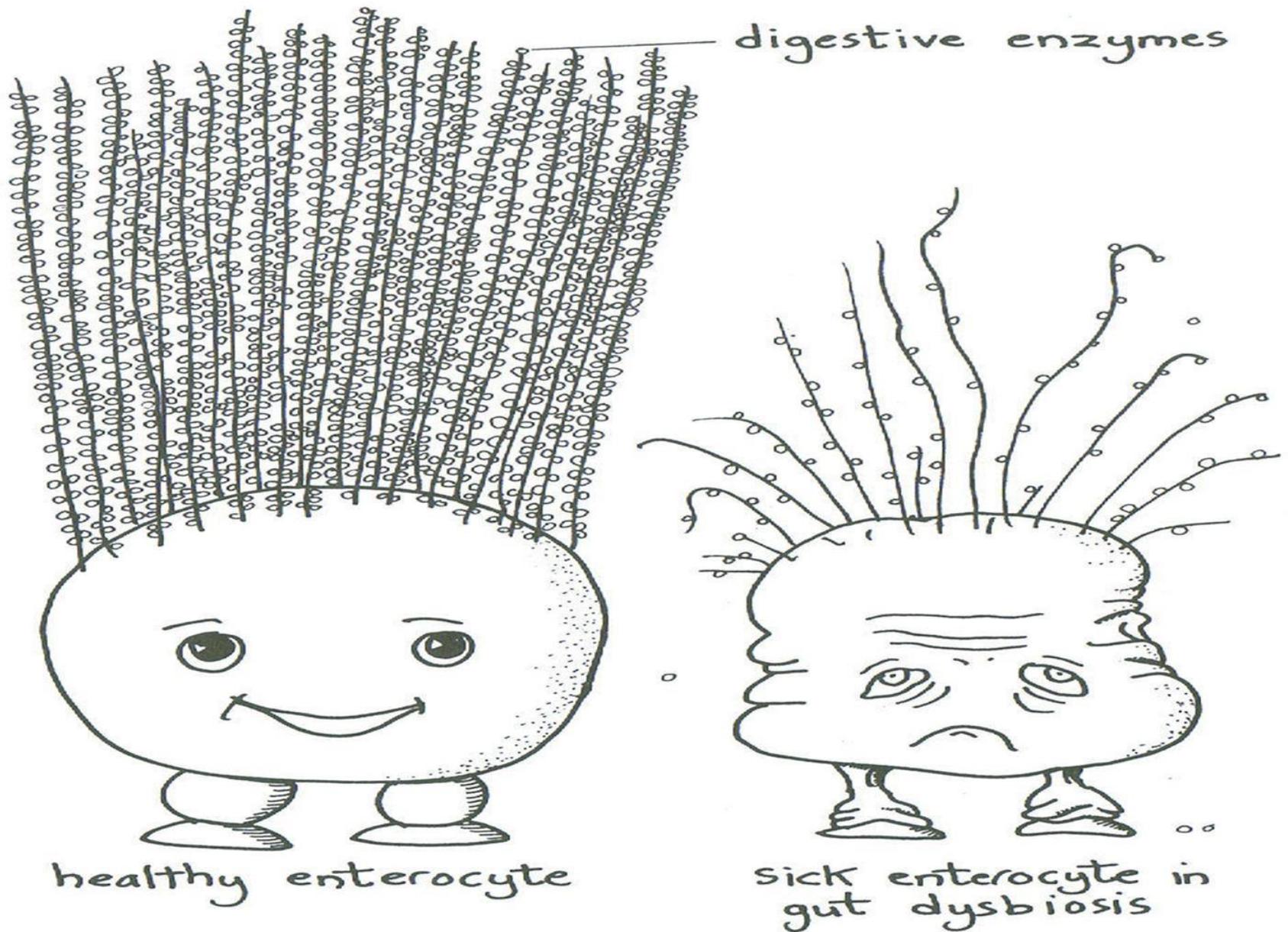
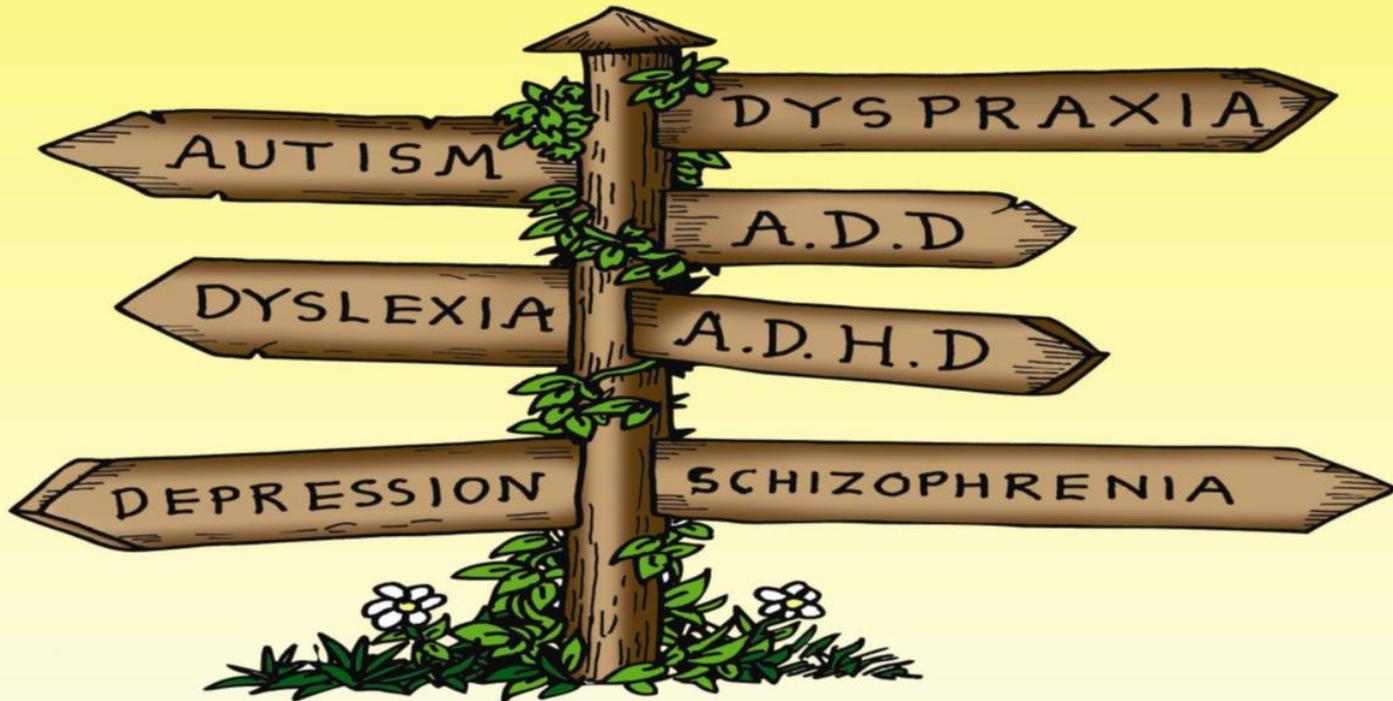


FIG. 2 The hair on the enterocytes represent microvilli. As the enterocytes cover the surface of the villi their hair (microvilli) make a so-called brush-border, where the last steps in digestion of food happen.

# Gut and Psychology Syndrome

*Natural treatment for*



**Dr. Natasha Campbell-McBride MD,  
MMedSci(neurology), MMedSci(nutrition)**

# GAP Syndrome

## Child

- AUTISM
- ADHD/ADD
- DYSLEXIA
- DYSPRAXIA
- LEARNING,  
BEHAVIOURAL,  
SOCIAL PROBLEMS
- EPILEPSY, TICS, FITS

## Adult

- SUBSTANCE ABUSE
- EATING DISORDERS
- DEPRESSION
- OBSESSIVE-  
COMPULSIVE
- MANIC-DEPRESSIVE
- SCHIZOPHRENIA
- EPILEPSY, TICS, FITS

# **GAP Syndrome**

**digestive problems**

**allergies**

**asthma, eczema**

**malnutrition**

**bed wetting**

**thrush**

**chronic cystitis**

# GAPS digestive symptoms

- Colic
- Bloating/ Flatulence
- Diarrhoea
- Constipation
- Feeding Difficulties
- Food Allergies/Intolerances
- Faecal Compaction with an Over-Spill Syndrome
- Inflammatory Bowel Conditions

# **Key Treatments:**

## **Re-establishment of Normal Gut Flora**

- GAPS Diet
- Supplementation
- Detoxification

# **GAPS Nutritional Protocol aims**

- Normalise the gut flora
- Heal and seal the gut lining
- Restore the gut functions
- Remove nutritional deficiencies
- Restore immunity
- Remove toxicity from the body
- Restore the body's own detoxification system

# **SUPPLEMENTATION**

- **AN EFFECTIVE PROBIOTIC**
- **COD LIVER OIL**
- **ESSENTIAL FATTY ACIDS (OMEGA-3, OMEGA-6)**
- **DIGESTIVE ENZYMES**
- **OTHER SUPPLEMENTS**

# DETOXIFICATION

- **JUICING**
- **BATHS WITH EPSOM SALT, SEA SALT, SEAWEED, BICARBONATE OF SODA & CIDER VINEGAR**
- **REDUCING GENERAL TOXIC LOAD**

# GAPS: Before & After.....

## BEFORE:

<https://youtu.be/bAse3Apfjo8>

## AFTER:

<https://youtu.be/DfzQx2ZAnow>

*[www.Doctor-Natasha.com](http://www.Doctor-Natasha.com)*

*[www.GAPS.me](http://www.GAPS.me)*