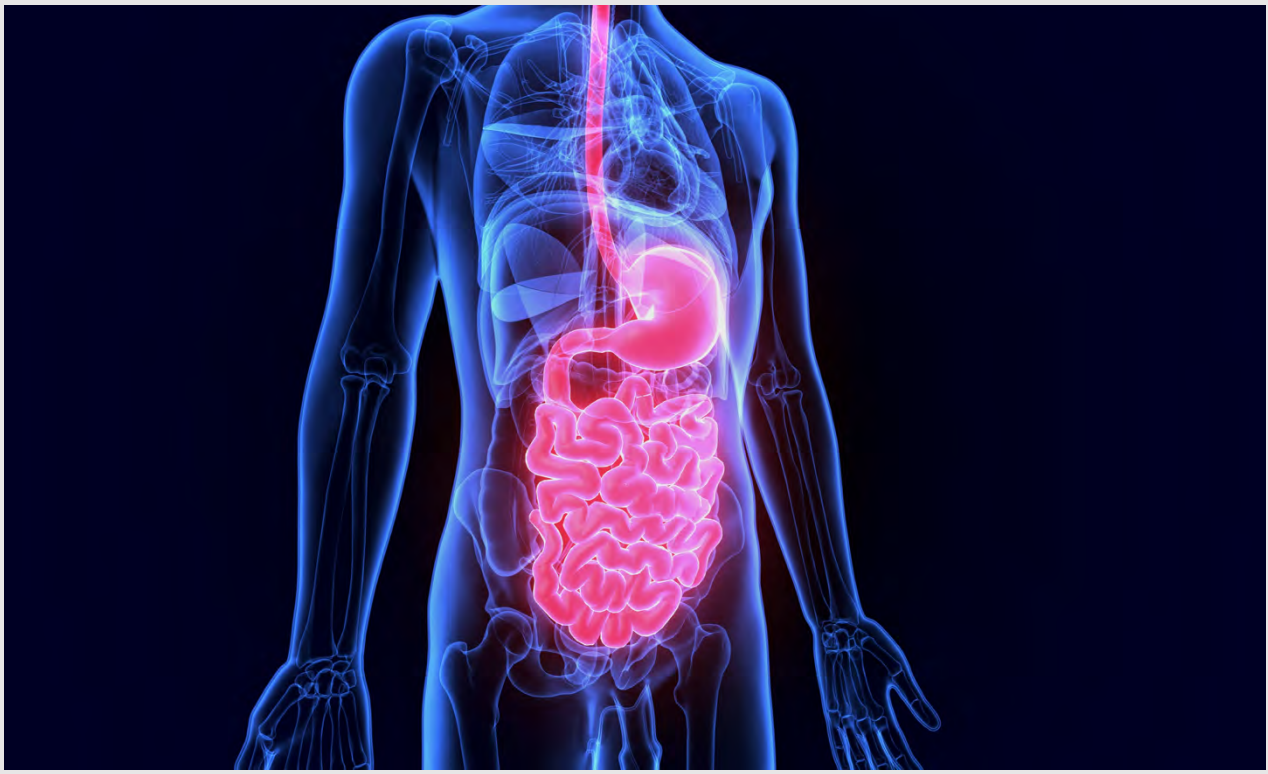
Nutrition And Physical Complaints



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The same author also published books on:

- Cranial Nerve Disorders and the Scientific Osteopathic Approach
- Fascial Chains
- Nutrition and Physical Complaints
- Posturology and its Scientific Osteopathic Approach
- Scientific Osteopathic Approach to Patients with Abdominal Complaints
- Scientific Osteopathic Approach to Patients with Cervical Pain
- Scientific Osteopathic Approach to Patients with Headache
- Scientific Osteopathic Approach to Patients with Knee or Foot Pain
- Scientific Osteopathic Approach to Patients with Low Back Pain
- Scientific Osteopathic Approach to Patients with Shoulder, Elbow, Wrist or Hand Pain
- Scientific Osteopathic Approach to the Immune System
- Scientific Osteopathic Approach to Vascularization and Oxygen Supply in Patients
- Understanding Pain and the Scientific Osteopathic Approach of Pain
- Understanding Stress and the Scientific Osteopathic Approach of Stress
- Understanding the Autonomic Nervous System and its Scientific Osteopathic Approach
- Perimenopausal Women and their Complaints
- Cerebrospinal Fluid and its Influence on Health
- Attention Deficit Disorder / Hyperactivity and the Scientific Osteopathic Approach
- Principles of Modern Osteopathy – Integration of Osteopathy into General Healthcare
- Evidence Based Practice
- Patient Information – What can Osteopathy do for You?

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Figure 1 - Sources of proteins

1.1.2. Chemical Composition

Proteins are polymers composed of amino acids.

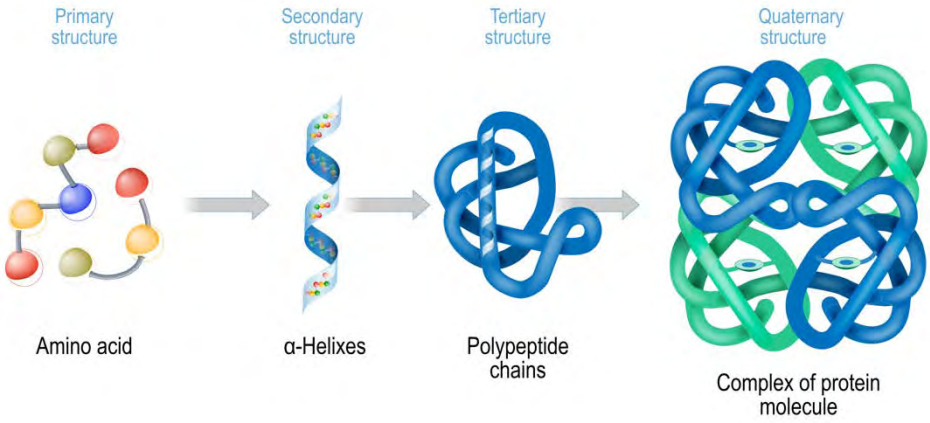


Figure 2 - Protein structure

Proteins are assembled by:

- **Carbon:** 50-55%:
  - Atomic number: 6.
  - Symbol: C.
  - This is the primary energy source and building block for plant tissue.
  - Carbon atoms make up a large part of the human molecular structure.
  - Most human cells contain carbon.
  - It is essential for life because it is able to form a huge variety of chains of different lengths.

        - Vegetables and fruits such as lettuce, radish, rhubarb and spinach.
        - Dairy products, meats and fish contain a good amount of nitrogen, but not at the levels of vegetables.
        - Cured meat such as sausage, which is preserved with sodium nitrate or nitrate, are yet another way for people to get nitrogen into their bodies.
    - The amount of nitrogen in the blood can increase or decrease insulin production.
        - More N will increase insulin production.
    - Too much N is cancerous because it reduces the oxygen carrying capacity of blood.
    - Nitrogen cycle:
        - This is a biochemical process through which nitrogen is converted in many different forms.
- **Hydrogen:** 6.5-7.3%:
    - Atomic number: 1.
    - Symbol: H.
    - Hydrogen is colorless, tasteless and odorless.
    - It is a highly combustible gas.
    - Hydrogen is present in all animal and vegetable tissue, even in petroleum.
    - Hydrogen is necessary for building sugars and other molecules to produce glucose for plant energy.
    - Hydrogen can be added to drinking water and this hydrogen rich water increases the antioxidant capacity, thereby reducing the inflammatory response in healthy subjects. There is some but not much proof for this.
- **Sulphur:** 0.0-2.4%:
    - Atomic number: 16.
    - Symbol: S.
    - It is a mineral.
    - It is an abundant, multivalent and nonmetallic element.
    - Sulphur is all around us, especially in the soil.
    - Our body uses sulphur for various important functions, such as building and repairing DNA, as well as protecting our cells against damage.
    - Sulphur rich food seems to be beneficial when coming from natural sources, not from artificial sources.
    - Sulphur can be found in:
        - Some waters, beer, cider, wine.
        - Meat and poultry.
        - Fish and seafood.
        - Vegetables.
        - Eggs and dairy.
        - Dried fruit.

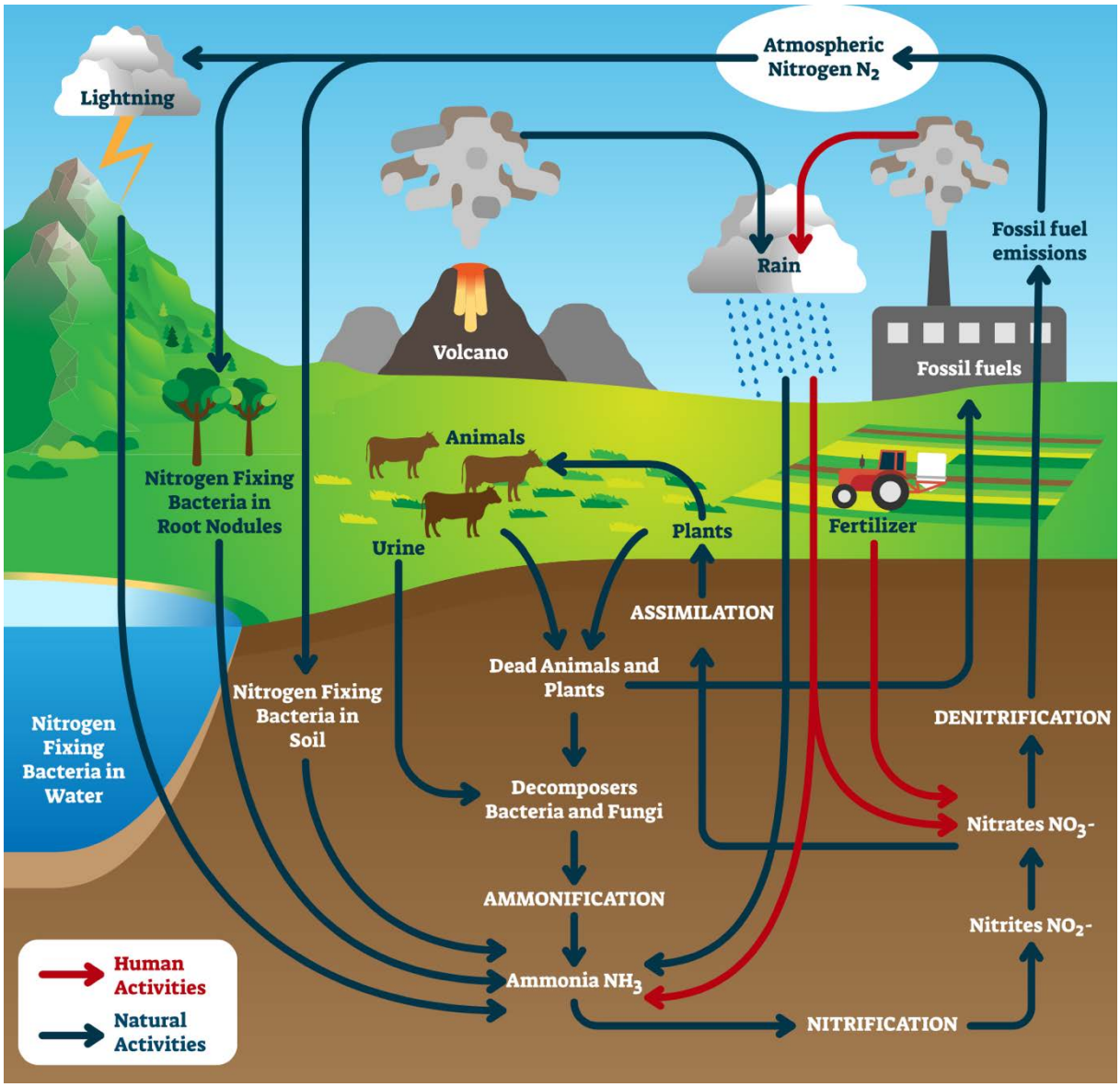


Figure 4 - Nitrogen cycle

Protein are broken down to amino acids during digestion.

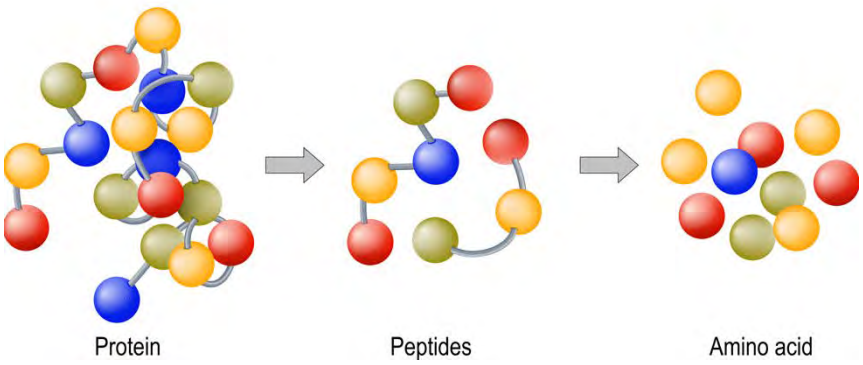


Figure 5 - Digestion of protein

20 common amino acids build all proteins in living cells. They are all α-amino acids.

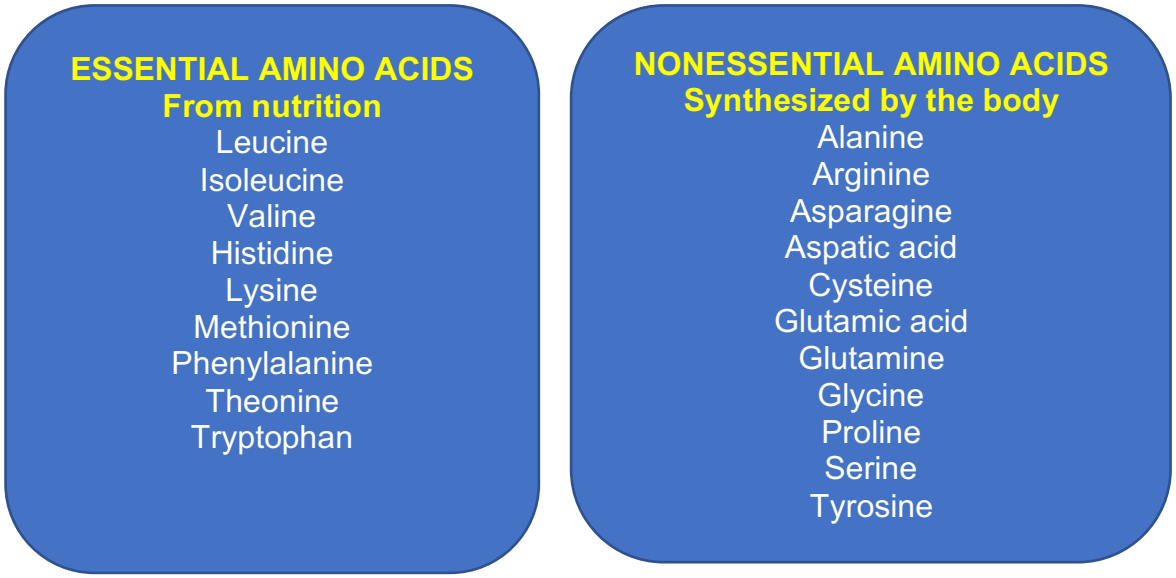


Figure 6 - Amino acids in the human body

Some amino acids are not soluble in water (hydrophobic).

Some amino acids are soluble in water (hydrophilic).

Quality of the proteins:

- The quality of a protein is determined by its ability to provide the 9 essential amino acids.
- Proteins from animal sources (eggs, dairy products, meat, poultry, and fish) and one vegetable protein (soy) are all considered high-quality because they contain all of the essential amino acids in the necessary proportions.

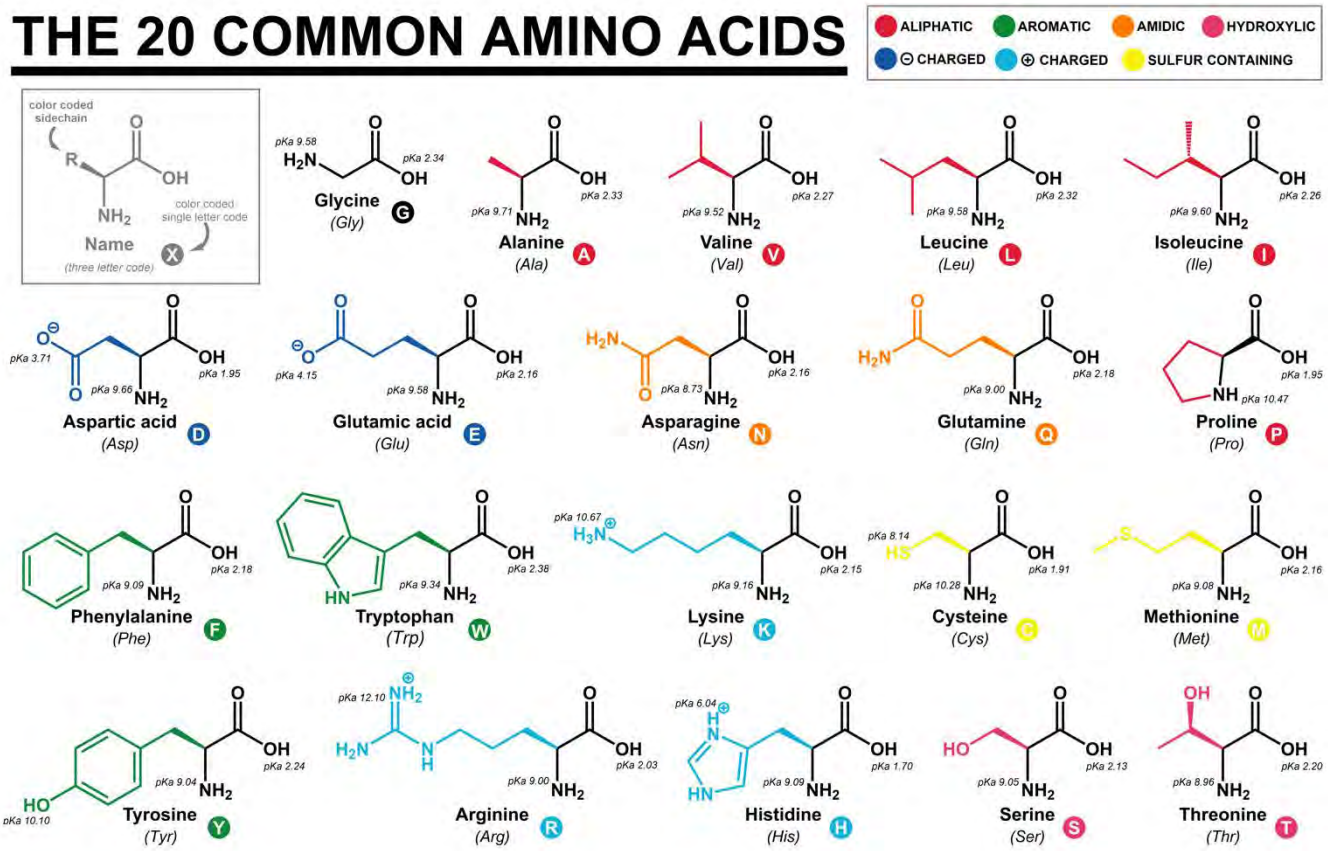


Figure 7 - Amino acids

1.1.3. The Role of Proteins in the Nutrition

Every cell in the human body contains protein.

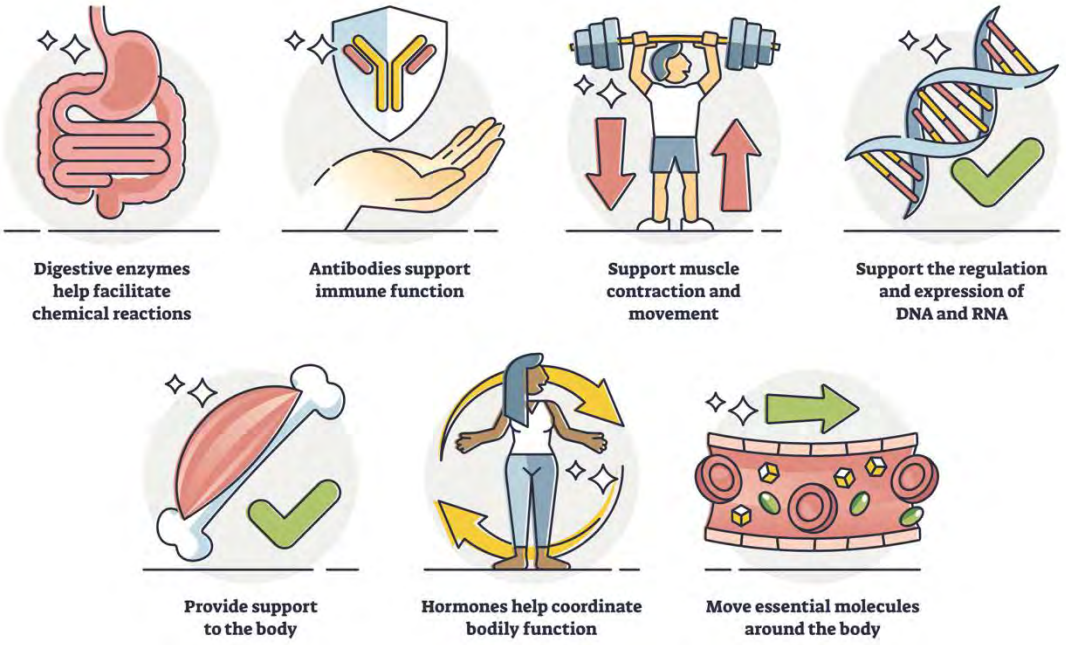


Figure 8 - Functions of proteins

Another way to calculate the need for protein is:

- The amount of protein you need in your diet will depend on your overall calorie needs.
- The daily recommended intake of protein for healthy adults is 10% to 35% of your total calorie needs.
- For example, a person on a 2000 calorie diet could eat 100 grams of protein, which would supply 20% of their total daily calories.

In general, what does this mean in real life:

- 30 g (1 ounce) of protein-rich food contains 7 g of protein.
- 30 g od protein rich food equals:
    - 30 g meat, poultry or fish.
    - 1 large egg.
    - ¼ cup of tofu.
    - ½ cup of beans or lentils.

The amount of protein needed depends on several factors such as:

- Growing children.
- Pregnant women and breastfeeding.
- Athletes.
- Gender.
- Age.
- Energy expenditure.

Age / Gender	Recommended daily protein intake in grams (g) per day
Children	
0–6 months	9.1
6–12 months	11.0
1–3 years	13.0
4–8 years	19.0
Men	
9–13 years	34.0

- **Receptor proteins:**
    - They respond to chemical stimuli.
    - Example: neuron receptors release chemicals (proteins).

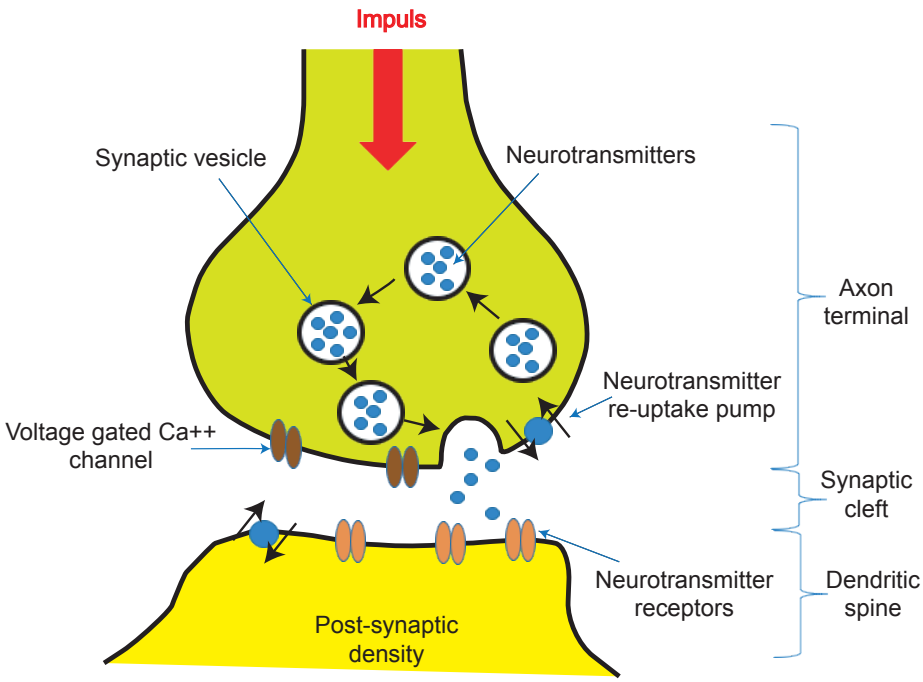


Figure 13 - Neurotransmitters

- **Contractile proteins:** actin and myosin are examples. They are responsible for muscular activity.
- **Defensive proteins:** they protect against disease. Examples are antibodies that combat bacteria and viruses.
- **Enzymatic proteins** to speed up chemical reactions. Example is amylase hydrolyzes sugar polymers in food.

Amino acids are joint by peptides: peptide linkage or polypeptide bonds.

There are 4 types of protein:

- **Primary:**
    - Unique sequence of amino acids.
    - Even slight change can affect their function.
    - For example: sickle cell anemia is caused by such changes.
- **Secondary:**
    - Controlled by a hydrogen bonding network.
- **Tertiary:**
    - Controlled by side chain interactions.

- **Quaternary:**
  - Interaction of multiple chains.
  - Hemoglobin is an example.

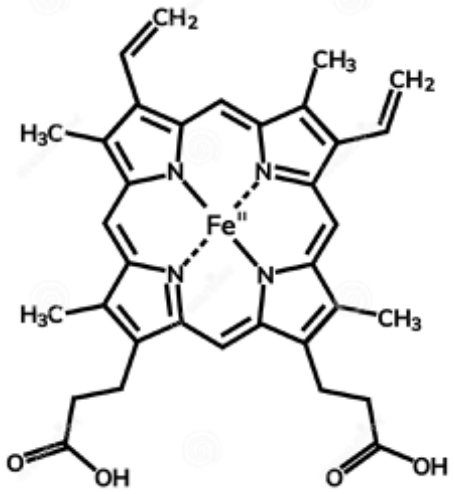


Figure 14 - Hemoglobin

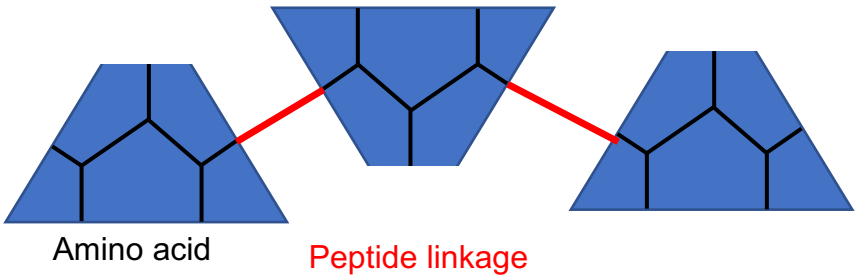


Figure 15 - Joined amino acids

1.1.4. Negative Aspects of Too Much Protein Intake

Nitrogen balance:

- Protein is the only energy nutrient that provides nitrogen.
- The nitrogen balance =
  - Normal use of protein:
    - Nitrogen intake = nitrogen excretion.
  - Higher use of protein (positive nitrogen balance):
    - Nitrogen intake > nitrogen excreted.
    - Happens during pregnancy of high growth periods.
    - Building more tissue.

- Dehydration, thirsty all the time.
- Frequent peeing.
- Bad breath.
- Brain fog.

Protein poisoning is the possible cause for diseases such as:

- Cardiovascular disease.
- Blood vessel diseases.
- Seizures.
- Liver and kidney diseases. The liver turns nitrogen into urea and kidneys have to excrete this urea. This extra work for the liver and kidneys creates stress and aging.
- Diabetes type 2.
- Osteoporosis (calcium loss).
- Overweight.
- Cancer.

High protein diets such as Atkins, Keto or Paleo encourage higher fat intake and some carb intake, so protein poisoning is unlikely.

People that are at risk for too much protein intake are:

- People with kidney and liver diseases.
- People with low carbohydrate intake.
- Starvation.
- People with gout.

Protein toxicity

This is different from protein poisoning.

Protein poisoning is due to excessive protein intake without carbs and fat balancing out nutrients.

Protein toxicity is the buildup of protein metabolic wastes due to under-functioning kidneys.

Patients with kidney disease may not take an overdose of proteins in their diet.

Building macromolecules

Some glucose is converted to ribose and deoxyribose. These are essential building blocks for important macromolecules such as RNA, DNA and ATP.

Glucose can also be used to make the molecule NADPH, an important factor for protection against oxidative stress.

When all the energy, glycogen storage capacity and building needs are fulfilled, the excess glucose is used to make fat.

Sparing protein

When the body has not enough glucose, glucose is synthesized from amino acids.

Since there is no storage of amino acids, this process destructs proteins, mostly from muscle tissue.

Relation with the lipid metabolism

As long as there is enough glucose, there is no lipid burning. This means that glucose has a fat-sparing effect.

This is because an increase in blood glucose stimulates the release of the hormone insulin. This insulin will tell the cells to use glucose instead of lipids to make energy.

Adequate glucose levels in the blood also prevent the development of ketosis.

Ketosis is a metabolic condition resulting from an elevation of ketone bodies in the blood. Ketone bodies are an alternative energy source that cells can use when glucose supply is insufficient, such as during fasting.

Ketone bodies are acidic and high elevations in the blood can cause it to become too acidic.

This is rare in healthy adults, but can occur in alcoholics, people who are malnourished, and in individuals who have type 1 diabetes.

The minimum amount of carbohydrate in the diet required to inhibit ketosis in adults is 50 grams per day.

Ketose can be a natural change from carbohydrates burning into fat burning. This allow patients to lose weight fast.

1.2.4. Negative Aspects of Too Much Carbohydrates Intake

If we eat too much carbohydrates, the extra is stored in the liver or in body tissues as fat.

Weight gain is the consequence as well as a fatty liver.

An overdose of carbohydrates causes a rise of blood sugar.

The consequence is that the body makes more insulin (in the pancreas).

Then the cells save extra glucose as fat.

This can lead to:

- Diabetes.
- Diabetes related health issues.
- Overweight.

How many carbohydrates should we eat per day?

- 45 to 65% of our daily calories.
- Based on a 2.000 calorie diet, this means 225 to 325 grams per day.
- This of course depends on:
    - Age.
    - Activity level.
    - Individual metabolism.
- It is important to eat healthy carbohydrates.

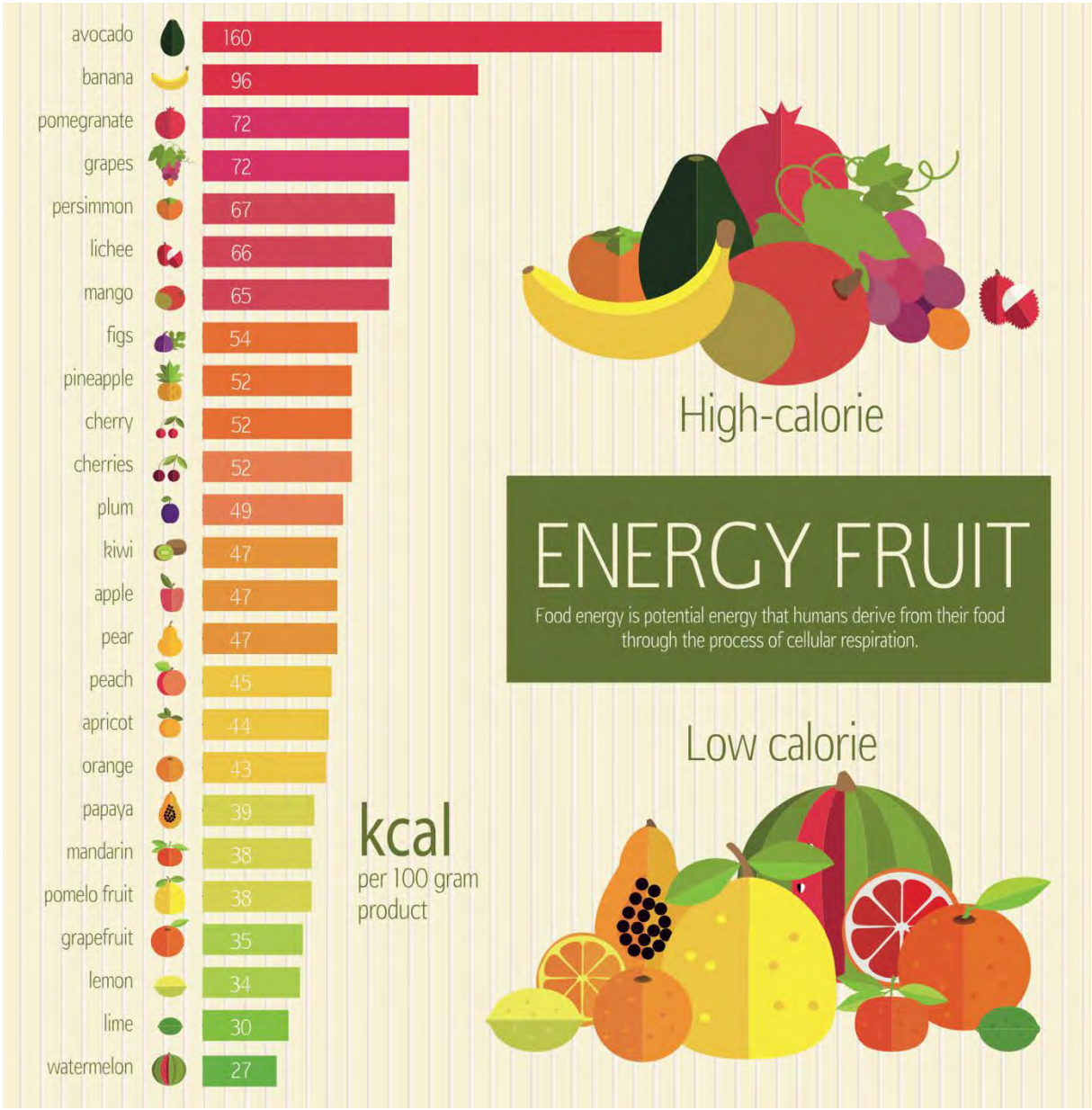
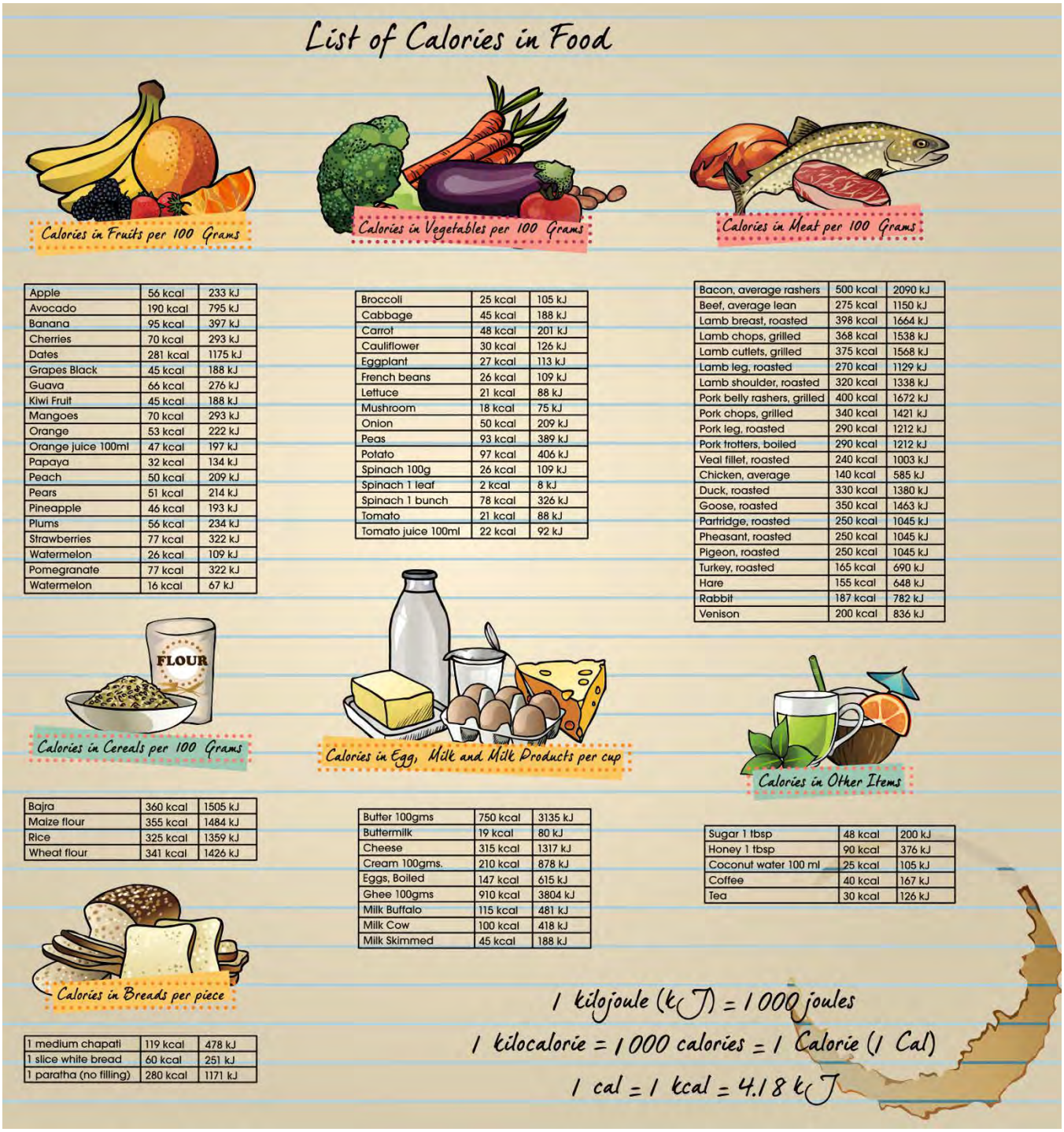


Figure 22 - Calories in fruits



Apple	56 kcal	233 kJ
Avocado	190 kcal	795 kJ
Banana	95 kcal	397 kJ
Cherries	70 kcal	293 kJ
Dates	281 kcal	1175 kJ
Grapes Black	45 kcal	188 kJ
Guava	66 kcal	276 kJ
Kiwi Fruit	45 kcal	188 kJ
Mangoes	70 kcal	293 kJ
Orange	53 kcal	222 kJ
Orange juice 100ml	47 kcal	197 kJ
Papaya	32 kcal	134 kJ
Peach	50 kcal	209 kJ
Pears	51 kcal	214 kJ
Pineapple	46 kcal	193 kJ
Plums	56 kcal	234 kJ
Strawberries	77 kcal	322 kJ
Watermelon	26 kcal	109 kJ
Pomegranate	77 kcal	322 kJ
Watermelon	16 kcal	67 kJ

Broccoli	25 kcal	105 kJ
Cabbage	45 kcal	188 kJ
Carrot	48 kcal	201 kJ
Cauliflower	30 kcal	126 kJ
Eggplant	27 kcal	113 kJ
French beans	26 kcal	109 kJ
Lettuce	21 kcal	88 kJ
Mushroom	18 kcal	75 kJ
Onion	50 kcal	209 kJ
Peas	93 kcal	389 kJ
Potato	97 kcal	406 kJ
Spinach 100g	26 kcal	109 kJ
Spinach 1 leaf	2 kcal	8 kJ
Spinach 1 bunch	78 kcal	326 kJ
Tomato	21 kcal	88 kJ
Tomato juice 100ml	22 kcal	92 kJ

Bacon, average rashers	500 kcal	2090 kJ
Beef, average lean	275 kcal	1150 kJ
Lamb breast, roasted	398 kcal	1664 kJ
Lamb chops, grilled	368 kcal	1538 kJ
Lamb cutlets, grilled	375 kcal	1568 kJ
Lamb leg, roasted	270 kcal	1129 kJ
Lamb shoulder, roasted	320 kcal	1338 kJ
Pork belly rashers, grilled	400 kcal	1672 kJ
Pork chops, grilled	340 kcal	1421 kJ
Pork leg, roasted	290 kcal	1212 kJ
Pork trotters, boiled	290 kcal	1212 kJ
Veal fillet, roasted	240 kcal	1003 kJ
Chicken, average	140 kcal	585 kJ
Duck, roasted	330 kcal	1380 kJ
Goose, roasted	350 kcal	1463 kJ
Partridge, roasted	250 kcal	1045 kJ
Pheasant, roasted	250 kcal	1045 kJ
Pigeon, roasted	250 kcal	1045 kJ
Turkey, roasted	165 kcal	690 kJ
Hare	155 kcal	648 kJ
Rabbit	187 kcal	782 kJ
Venison	200 kcal	836 kJ

Bajra	360 kcal	1505 kJ
Maize flour	355 kcal	1484 kJ
Rice	325 kcal	1359 kJ
Wheat flour	341 kcal	1426 kJ

Butter 100gms	750 kcal	3135 kJ
Buttermilk	19 kcal	80 kJ
Cheese	315 kcal	1317 kJ
Cream 100gms.	210 kcal	878 kJ
Eggs, Boiled	147 kcal	615 kJ
Ghee 100gms	910 kcal	3804 kJ
Milk Buffalo	115 kcal	481 kJ
Milk Cow	100 kcal	418 kJ
Milk Skimmed	45 kcal	188 kJ

Sugar 1 tbsp	48 kcal	200 kJ
Honey 1 tbsp	90 kcal	376 kJ
Coconut water 100 ml	25 kcal	105 kJ
Coffee	40 kcal	167 kJ
Tea	30 kcal	126 kJ

1 medium chapati	119 kcal	478 kJ
1 slice white bread	60 kcal	251 kJ
1 paratha (no filling)	280 kcal	1171 kJ

Figure 23 - Calorie counting chart

Healthy versus unhealthy carbohydrates

- Healthy:
  - Slow-digesting carbs like 100% whole bread, oats, beans, lentils, fruits, vegetables.
- Unhealthy:
  - Fast-digesting carbs as from sugary carbs, white bread, white rice, processed snacks and drinks.

Needs

0 to 6 months old	400 micrograms (mcg)
7 to 12 months	500 mcg
1 to 3 years	300 mcg
4 to 8 years	400 mcg
9 to 13 years	600 mcg
14 to 18 years	900 mcg for males, 700 mcg for females
14 to 18 years/pregnant females	750 mcg
14 to 18 years/breastfeeding females	1,200 mcg
19+ years	900 for males, 700 for females
19+ years/pregnant females	770 mcg
19+ years/breast-feeding females	1,300 mcg

Deficiency signs:

- Retarded growth in children.
- Night blindness.
- Xerophthalmia (dry eyes).
- Reproduction disorders.

Excess signs:

- Can be acute or chronic.
- Acute:
    - Increased pressure in brain.
    - Irritability.
    - Abdominal pain.
    - Nausea.
    - Vomiting.
    - Bulging eyeballs.
    - Bulging fontanel.
    - Inability to gain weight.

weight loss, and it suggests that an interaction with dietary protein level may be important.

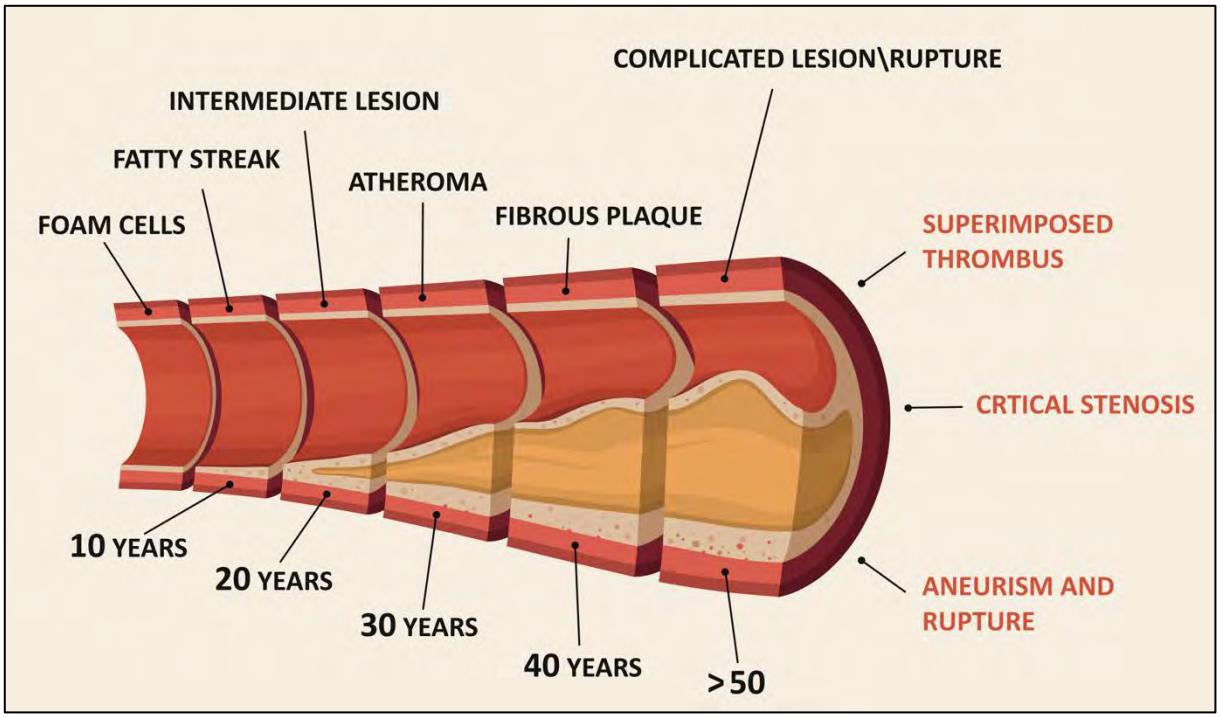


Figure 60 - Evolution of atherosclerosis

4.4.4.2. High Blood Pressure

Ideal blood pressure is considered to be between 90/60mmHg and 12/80mmHg.

High blood pressure is considered to be 140/90mmHg or higher.

The major causes of high blood pressure are:

- Excessive energy intake.
- Obesity.

Obesity is associated with:

- Increased activity of the renin-angiotensin-aldosterone and sympathetic nervous systems.
- Possibly other mineralocorticoid activity.
- Insulin resistance.
- Salt-sensitive hypertension and excess salt intake.
- Reduced kidney function.

High sodium chloride intake strongly predisposes to hypertension.

Increased alcohol consumption may acutely elevate blood pressure.

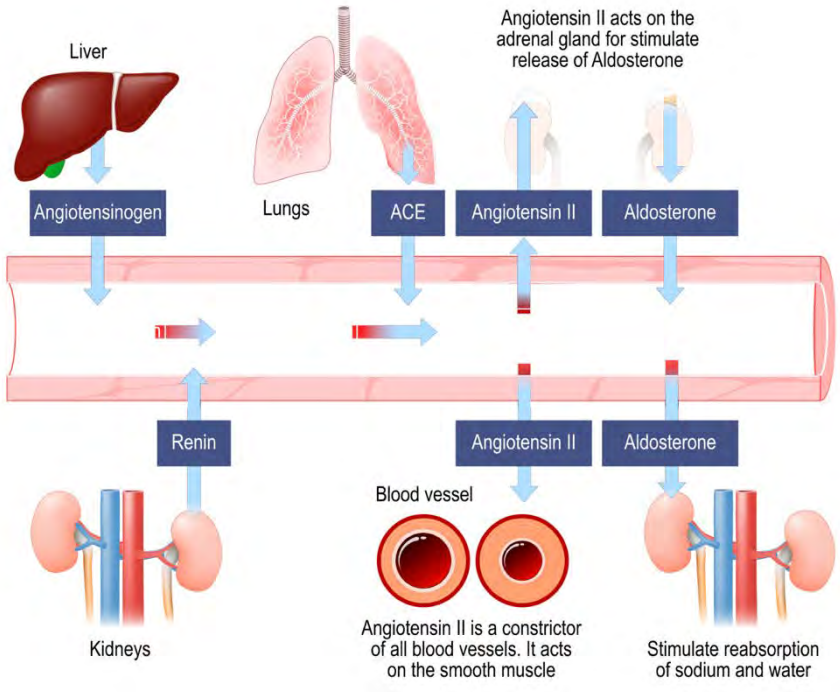


Figure 61 - Renin-angiotensin-aldosterone system

Prevention:

- High intakes of potassium, polyunsaturated fatty acids, and protein, along with exercise and possibly vitamin D, may reduce blood pressure.
- Reduce sodium intake. Reducing is less than 1.500 mg per day. Remember that 1 teaspoon of salt contains 2.300 mg of sodium.
- Eat no processed food.
- Drink no alcohol.
- Stop smoking.
- Reduce caffeine.
- Reduce stress.
- Less-conclusive studies suggest that amino acids, tea, green coffee bean extract, dark chocolate, and foods high in nitrates may reduce blood pressure.
- Healthy nutrition as describes earlier.
- Weight control.
- Moderate sports related to age and gender.
- Less-conclusive studies suggest that amino acids, tea, green coffee bean extract, dark chocolate, and foods high in nitrates may reduce blood pressure.
- Short-term studies indicate that specialized diets may prevent or ameliorate mild hypertension; most notable are the Dietary Approaches to Stop

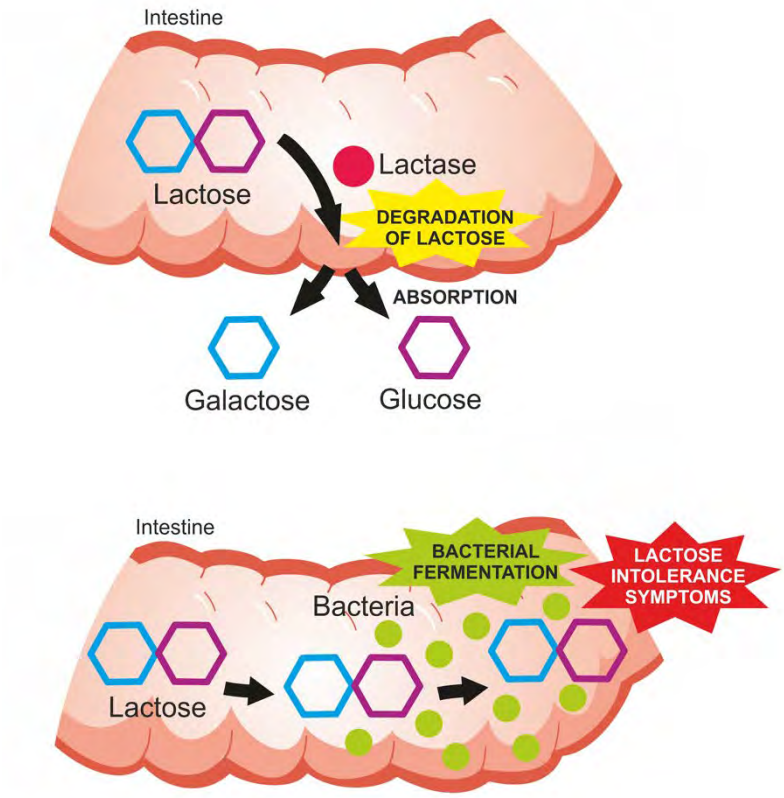


Figure 81 - Lactose intolerance

4.19. Malabsorption Syndrome and Nutrition

Malabsorption is the inability of the gastrointestinal tract to adequately absorb nutrients.

Malabsorption of macronutrients and/or micronutrients may occur.

There are many causes for this malabsorption syndrome such as:

- Lactose intolerance.
- Inflammatory bowel disease.
- Cystic fibrosis.
- Short bowel syndrome.
- Bacterial overgrowth.
- Celiac disease.
- Crohn’s disease.
- Ulcerative colitis.
- Damage to the intestines after infection, inflammation, surgery.
- Prolonged use of antibiotics.
- Chronic pancreatitis.
- Parasitic diseases.
- Radiation therapy.

- Alcohol abuse.
- Intestinal surgery.

Possible symptoms:

- Abdominal pain.
- Diarrhea, sometimes explosive.
- Bloating.
- Light-colored, foul smelling stool, soft and bulky, difficult to flush.
- Dry hair.
- Edema.
- Anemia.
- Low blood pressure.
- Muscle wasting.
- Scaly skin rashes.
- Children that avoid certain foods.
- Slower growth and weight gain in children.
- Osteoporosis.
- Depending of course which nutrients can't pass the enterocytes.

Nutritional treatment options:

- Strive for a healthy microbiota (see previous chapters).
- Use enzyme supplements.
- Use vitamin supplements.
- Change the diet towards:
    - Healthy diet.
    - Healthy microbiota.

4.20. Puberty and Nutrition

Nutrition is one of the most important factors affecting pubertal development.

Consuming an adequate and balanced healthy diet during all phases of growth (infancy, childhood and puberty) appears necessary both for proper growth and normal pubertal development.

Some specific advices (beside a normal healthy diet as already described):

- Overweight or obese children are more likely to enter puberty early. Some evidence suggests that obesity can accelerate the onset of puberty in girls and may delay the onset of puberty in boys.
- The progression of puberty is strongly influenced by nutrition.

- Puberty triggers a growth spurt, which increases nutritional needs including macro and micronutrients.
- Increased caloric, protein, iron (especially in girls: onset menstruation), calcium (building bone), magnesium, zinc and folate needs have to be provided during this critical period of rapid growth.
- Concerning calorie intake:
    - For ages 9 to 13, girls should consume about 1.400 to 2.200 calories per day and boys should consume 1.600 to 2.600 calories per day.
- Proteins are needed during the rapid growth periods:
    - 10 to 30 percent of daily calories (35-105 grams for 1.400 daily calories for girls and 40-120 grams for 1.600 daily calories for boys).
- Extra vitamins needed during puberty include vitamins D, K, and B_{12}.
- Adequate calcium intake is essential for building bone and preventing osteoporosis later in life.
- Young females need more iron at the onset of menstruation, while young males need additional iron for the development of lean body mass.
- Almost all of these needs should be met with dietary choices, not supplements (iron is an exception).
- Carbohydrates:
    - 45 to 65 percent of daily calories (which is a recommended daily allowance of 158–228 grams for 1.400-1.600 daily calories).
- Healthy fats:
    - 25 to 35 percent of daily calories (39-54 grams for 1.400 daily calories for girls and 44-62 grams for 1.600 daily calories for boys),
- The above recommendations are of course depending on the energy expenditure (for examples in sports).

4.21. Perimenopause and Nutrition

Perimenopause is the period in women around the menopause.

It is the stage in life where the ovaries start to produce less estrogen.

The age period is 45-55 years of age.

Perimenopause can last up until menopause, which means that the ovaries have stopped releasing eggs.

A few months or years before menopause (individual differences), women experience a wide range of premenopausal symptoms such as:

- Irregular periods.
- Sleep problems.
- Hot flashes (because of the fluctuating hormone levels).
- Mood changes.
- Decreasing fertility.
- Vaginal and bladder problems.
- Decreased sexual function.
- Loss of bone mass.
- Fluctuating cholesterol levels.

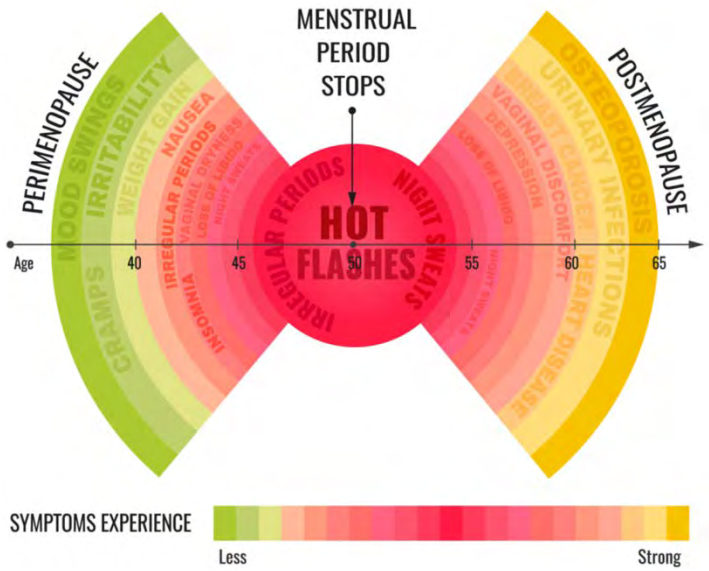


Figure 82 - Symptom experience

During this perimenopausal period in life, the women are more vulnerable for:

- High cholesterol levels.
- Atherosclerosis.
- Osteopenia and osteoporosis.
- Increased body weight.

Nutrition advices:

- A healthy diet as already describes earlier.
- With special attention to:
    - Avoiding atherosclerosis:
        - No alcohol.

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This book gives a practical overview of nutrition and the relation with physical complaints.

The theory and procedures in this book are checked on their scientific background and esotericism is avoided.

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