NUTRITION

Seminar

Department of Public Health

Academic year 2018/2019

Why nutrition?

Diet and body weight are related to health status. Good nutrition is important to the growth and development of children. A healthful diet also helps reduce risks for many health conditions, including:

- Overweight and obesity
- Heart disease
- High blood pressure
- Dyslipidemia (poor lipid profiles)
- Type 2 diabetes mellitus
- Some cancers
- Osteoporosis
- Dental caries
- Constipation
- Diverticular disease
- Malnutrition
- Vitamin A, iodine-deficiency
- Iron-deficiency anemia
- …

Why are nutrition and weight status important?

Individuals who are at a healthy weight are less likely to:

- Develop chronic disease risk factors, such as high blood pressure and dyslipidemia.
- Develop chronic diseases, such as type 2 diabetes, heart disease, osteoarthritis, and some cancers.
- Experience complications during pregnancy.
- Die at an earlier age

BMI [= weight (kg) / height (m^2)]	
Underweight	<18.5
Normal weight	**18.5–24.9**
Overweight	25-29.9
Obesity	BMI of 30 or greater

Food Based Dietary Guidelines (FBDG)

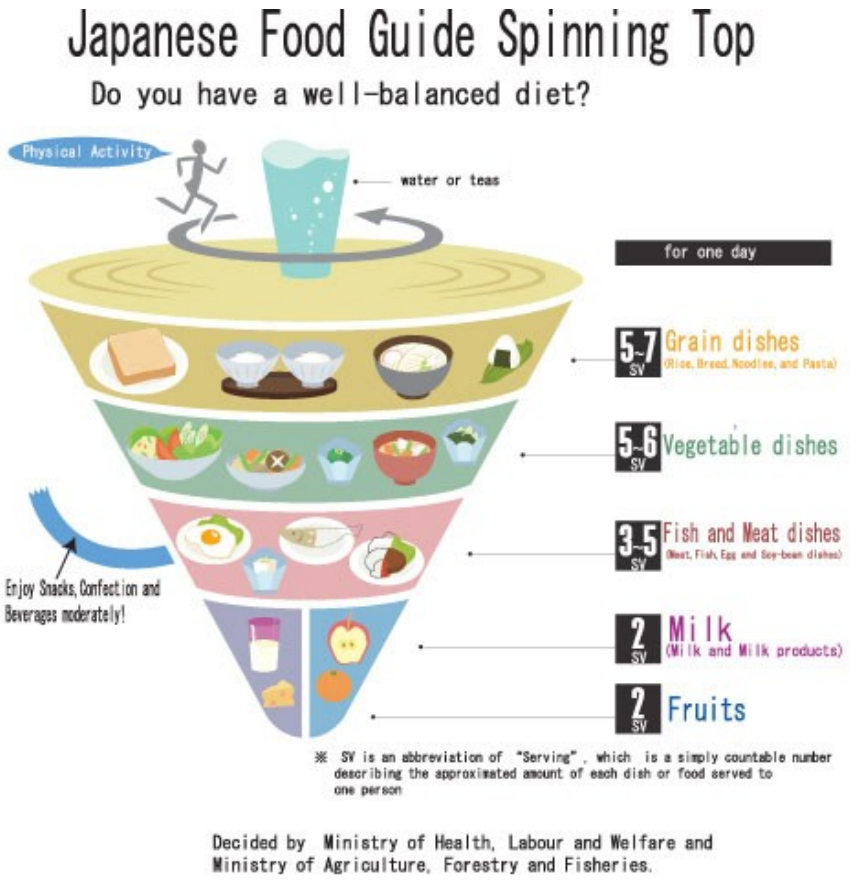
- simple messages on healthy eating, **aimed at the general public**
- Nutrition education tool translating scientific knowledge and dietary standards and recommendations into an understandable and practical form for use by those who have little or no training in nutrition.
- FBDG are generally **based upon scientific evidence on the relationship between diet and chronic disease risk**, taking into account nutrient recommendations.
- They give an indication of what a person should be eating **in terms of foods rather than nutrients**, and provide a basic framework to use when planning meals or daily menus.
- Foods are **classified into basic groups** according to **similarity of nutrient content** or some other criteria.

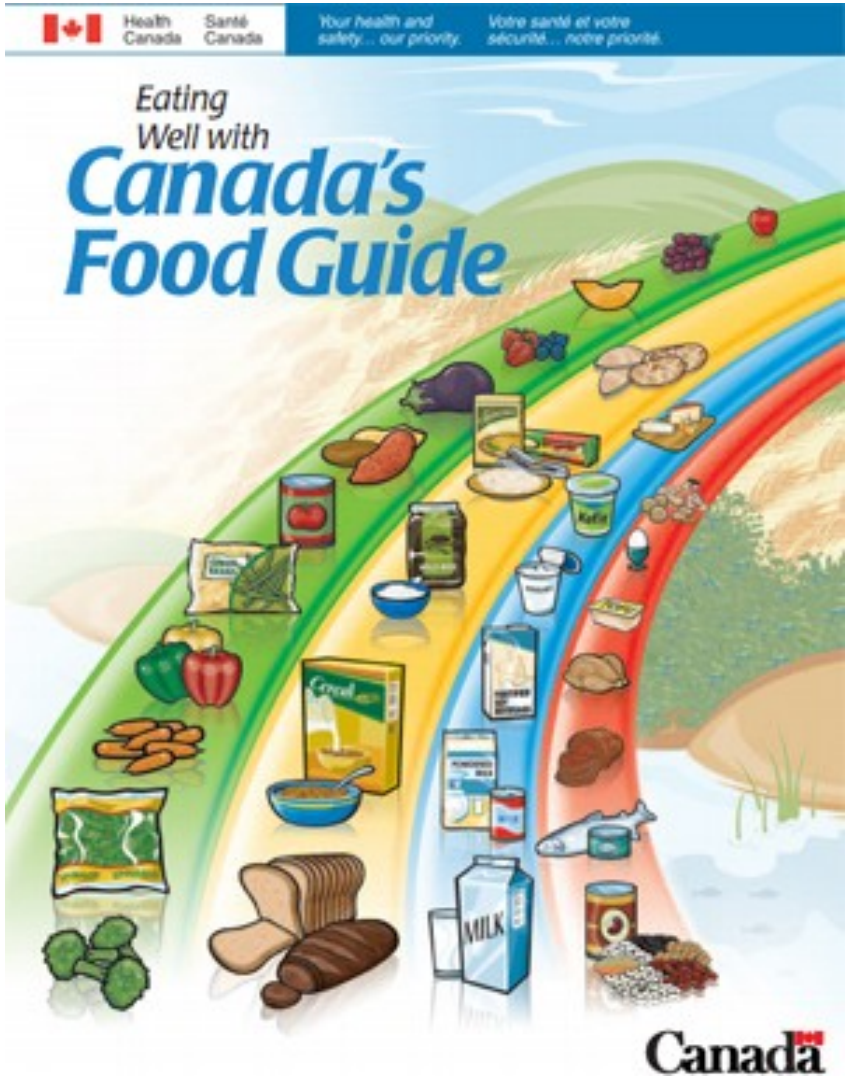
WHY? BALANCED, ADEQUATE AND VARIED DIET

- to help consumers in planning an overall healthy diet, while achieving an adequate nutrient intake

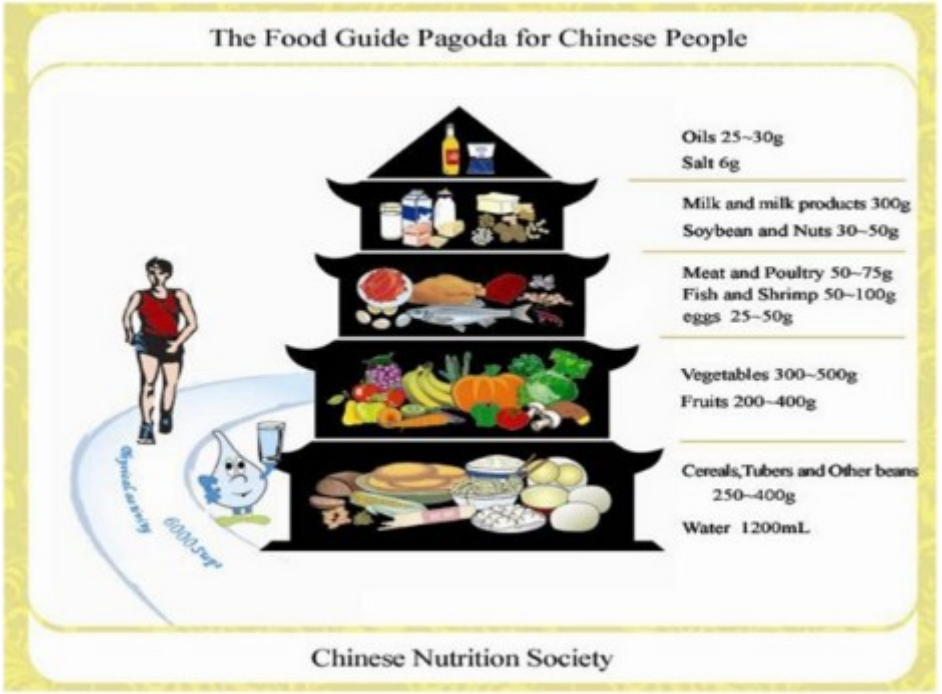
FBDG

graphic formats

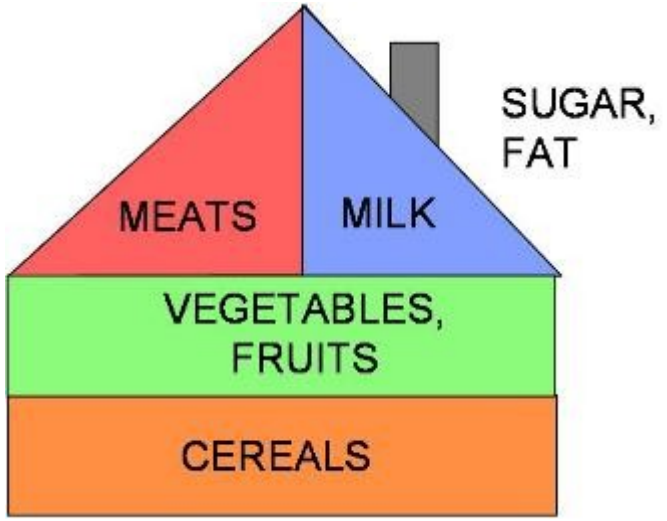





Fruits
Grains
Dairy
Vegetables
Protein
ChooseMyPlate.gov


The Food Guide Pagoda for Chinese People
Oils 25~30g
Salt 6g
Milk and milk products 300g
Soybean and Nuts 30~50g
Meat and Poultry 50~75g
Fish and Shrimp 50~100g
eggs 25~50g
Vegetables 300~500g
Fruits 200~400g
Cereals,Tubers and Other beans 250~400g
Water 1200mL
Chinese Nutrition Society


BIEN MANGER, BOUGER,
PROTÈGE VOTRE SANTÉ.
Eau à volonté
5 par jour au moins
Fruits & légumes
A chaque repas selon l'appétit
Féculents
3 par jour
Produits laitiers
1 ou 2 fois par jour
Viandes, œufs et poissons
Gras
Salé
Sucré
limiter la consommation
Pour plus d'informations www.mangerbouger.fr
Programme National Nutrition Santé


SUGAR,
FAT
MEATS
MILK
VEGETABLES,
FRUITS
CEREALS


La nueva Rueda de los Alimentos
Legumbres
Frutos secos

FOOD LABELING - REGULATION (EU) No 1169/2011

Mandatory particulars:

a) The name of the food

b) The list of ingredients (in descending order by weight)

c) Any ingredient or processing aid listed in Annex II or derived from substance or product listed in Annex II causing allergies or intolerances used in the manufacture or preparation of a food and still present in the finished product, even if in an altered form

d) The quantity of certain ingredients or categories of ingredients

e) The net quantity of the food

f) The date of minimum durability or the ′use by′ date

FOOD LABELING - REGULATION (EU) No 1169/2011

g) Any special storage conditions and/or conditions of use

h) The name of business name and adress of the food business operator

i) The country of origin or place of provenance where provided for

j) Instructions for use where it would be difficult to make appropriate use of the food in the absence of such instructions

k) With respect to beverages containing more than 1,2 % by volume of alcohol, the actual alcoholic strenght by volume

l) A nutrition declaration

Nutrition declaration

The **mandatory nutrition declaration** shall include the folowing:

a) energy value

b) the amounts of fat, saturates, carbohydrate, sugars, protein and salt

	Typical value per 100g (%RI)	Typical value per 35g serving (%RI)
Energy	1075kJ / 254kcal (18)	367kJ / 89kcal (6)
Fat	2.3g (3)	0.8g (0.3)
of which: saturates	1.2g (6)	0.4g (2)
Carbohydrate	57g (22)	20g (8)
of which: sugars	1.4g (1)	0.5g (<1)
Protein	1.2g (2)	0.4g (1)
Salt	0.6g (10)	0.2g (3)

Reference intake of an average adult (8400kJ / 2000kcal)

Allergens I

- **Food ingredients that must be declared as allergens in the EU**

  1. **Cereals containing gluten**, namely: wheat (such as spelt and khorasan wheat), rye, barley, oats or their hybridised strains, and products thereof, except:

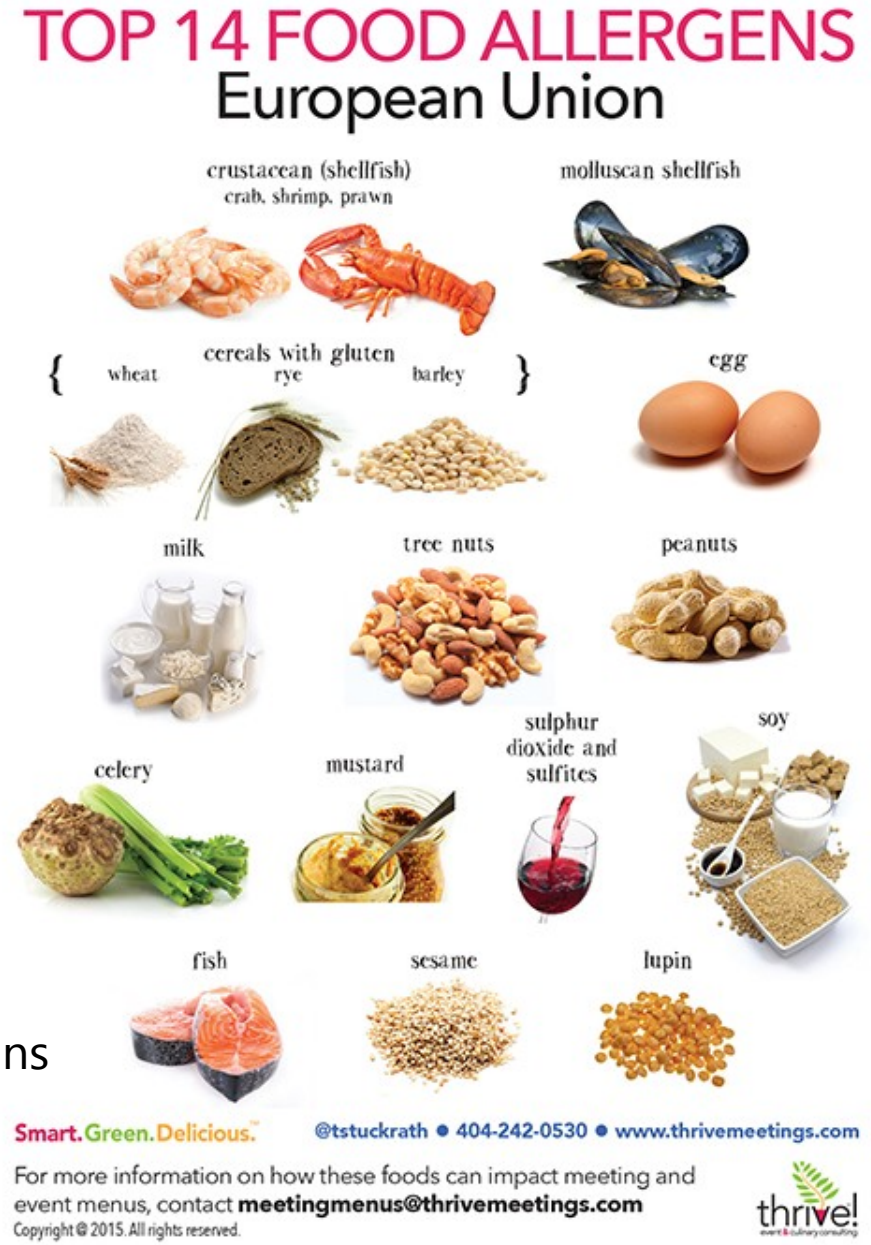
  (a) wheat based glucose syrups including dextrose
  (b) wheat based maltodextrins
  (c) glucose syrups based on barley
  (d) cereals used for making alcoholic distillates including ethyl alcohol of agricultural origin

  2. **Crustaceans** and products thereof

  3. **Eggs** and products thereof

  4. **Fish** and products thereof, except:

  (a) fish gelatine used as carrier for vitamin or carotenoid preparations
  (b) fish gelatine or Isinglass used as fining agent in beer and wine



Allergens II

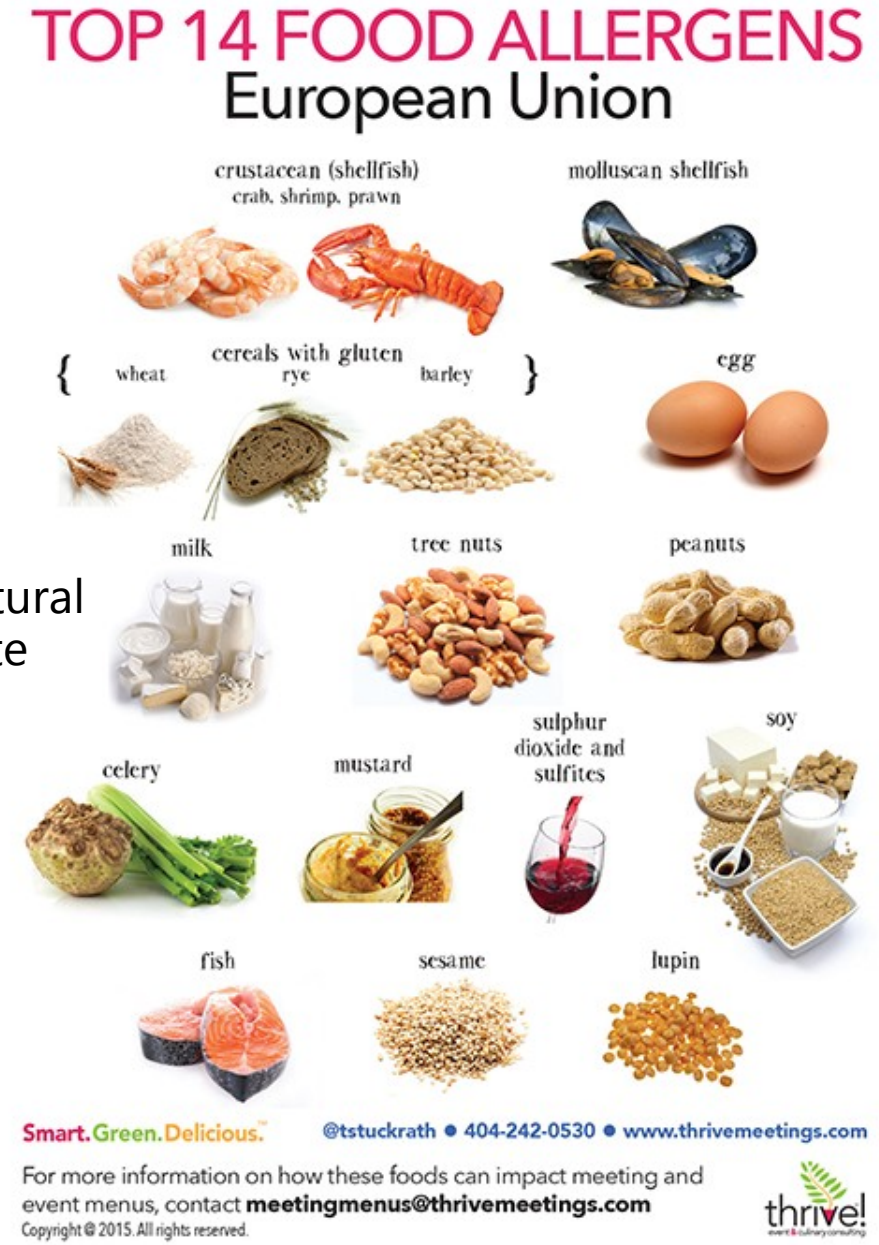
5. **Peanuts** and products thereof

6. **Soybeans** and products thereof, except:

(a) fully refined soybean oil and fat
(b) natural mixed tocopherols (E306), natural D-alpha tocopherol, natural D-alpha tocopherol acetate, and natural D-alpha tocopherol succinate from soybean sources
(c) vegetable oils derived phytosterols and phytosterol esters from soybean sources
(d) plant stanol ester produced from vegetable oil sterols from soybean sources

7. **Milk** and products thereof (including lactose), except:

(a) whey used for making alcoholic distillates including ethyl alcohol of agricultural origin
(b) lactitol



Allergens III

- 8. **Nuts**, namely: almonds (*Amygdalus communis* L.), hazelnuts (*Corylus avellana*), walnuts (*Juglans regia*), cashews (*Anacardium occidentale*), pecan nuts (*Carya illinoinensis* (Wangenh.) K. Koch), Brazil nuts (*Bertholletia excelsa*), pistachio nuts (*Pistacia vera*), macadamia or Queensland nuts (*Macadamia ternifolia*), and products thereof, except for nuts used for making alcoholic distillates including ethyl alcohol of agricultural origin

  9. **Celery** and products thereof

  10. **Mustard** and products thereof

  11. **Sesame seeds** and products thereof

  12. **Sulphur dioxide and sulphites** at concentrations of more than 10 mg/kg or 10 mg/litre in terms of the total SO_2 which are to be calculated for products as proposed ready for consumption or as reconstituted according to the instructions of the manufacturers

  13. **Lupin** and products thereof

  14. **Molluscs** and products thereof

Nutrition claim…

- …any claim which states, suggests or implies that a **food has particular beneficial nutritional properties** due to:
- The energy (calorific value) it:
  - (a) provides
  - (b) provides at a reduced or increased rate or
  - (c) does not provide
- The nutrients or other substances it:
  - (a) contains
  - (b) contains in reduced or increased proportions or
  - (c) does not contain

- Nutrition claims are only permitted if they are listed in the Annex of Regulation (EC) No 1924/2006, lastly amended by Regulation (EU) No 1047/2012.

Permitted nutrition claims - examples

LOW SUGARS

- A claim that a food is low in sugars, and any claim likely to have the same meaning for the consumer, may only be made where the product contains no more than 5 g of sugars per 100 g for solids or 2,5 g of sugars per 100 ml for liquids.

LOW FAT

- A claim that a food is low in fat, and any claim likely to have the same meaning for the consumer, may only be made where the product contains no more than 3 g of fat per 100 g for solids or 1,5 g of fat per 100 ml for liquids (1,8 g of fat per 100 ml for semi-skimmed milk).

HIGH FIBRE

- A claim that a food is high in fibre, and any claim likely to have the same meaning for the consumer, may only be made where the product contains at least 6 g of fibre per 100 g or at least 3 g of fibre per 100 kcal.

HIGH OMEGA-3 FATTY ACIDS

- A claim that a food is high in omega-3 fatty acids, and any claim likely to have the same meaning for the consumer, may only be made where the product contains at least 0,6 g alpha-linolenic acid per 100 g and per 100 kcal, or at least 80 mg of the sum of eicosapentaenoic acid and docosahexaenoic acid per 100 g and per 100 kcal.

Permitted nutrition claims - summary

- Low energy
- Energy-reduced
- Energy-free
- Low fat
- Fat-free
- Low saturated fat
- Saturated fat-free
- Low sugars
- Sugars-free
- With no added sugars
- Low sodium/salt
- Very low sodium/salt
- Sodium free or salt-free
- No added sodium/salt
- Source of fiber
- High fiber
- Source of protein
- High protein
- Source of (name of vitamin/s) and/or (name of mineral/s)
- High (name of vitamin/s) and/or (name of mineral/s)
- Contains (name of nutrient or other substance)
- Increased (name of the nutrient)
- Reduced (name of the nutrient)
- Light/lite
- Naturally/natural
- Source of omega-3 fatty acids
- High omega-3 fatty acids
- High monounsaturated fat
- High polyunsaturated fat
- High unsaturated fat

Health claim…

- …any statement about a **relationship between food and health**
- The Commission authorises different health claims provided they are based on scientific evidence and can be easily understood by consumers. The European Food Safety Authority (EFSA) is responsible for evaluating the scientific evidence supporting health claims.

- *"Vitamin D is needed for the normal growth and development of bone in children."*
- *„Iodine contributes to normal functioning of the nervous system."*

- **Regulation (EC) No 1924/2006**

Useful references

- EFSA - http://www.efsa.europa.eu/
- EUFIC - www.eufic.org

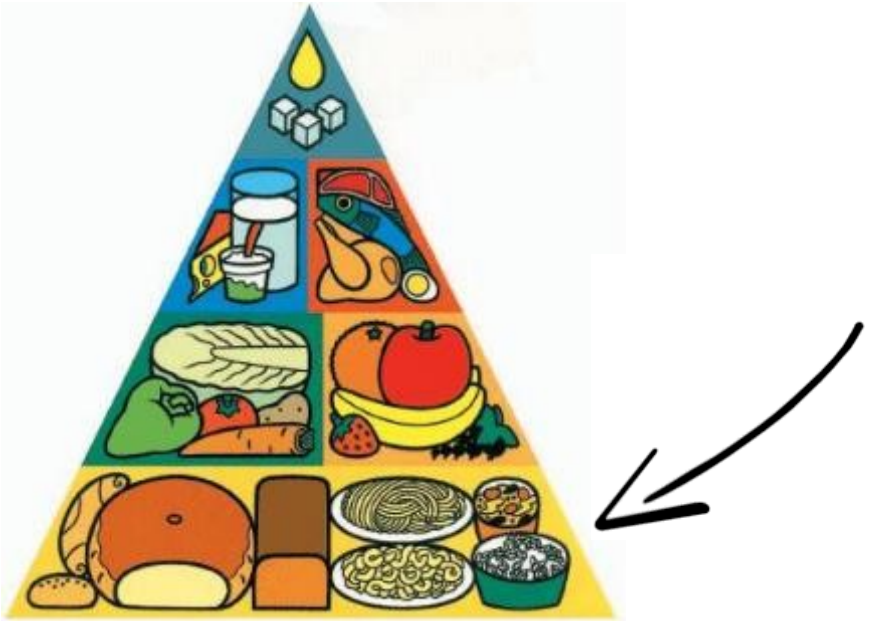
Journals:

- American journal of clinical nutrition
- Nutrition reviews
- Journal of the American College of Nutrition
- Journal of the Academy of Nutrition and Dietetics
- Clinical nutrition
- European journal of clinical nutrition
- Nutrition bulletin

GRAINS

Grains group

- all foods made from wheat, rice, oats, cornmeal, barley, such as bread, pasta, oatmeal, breakfast cereals, tortillas,…
- 3-6 portions a day
  - 1 portion = 1 slice of bread (60 g), 1 roll, 1 scoop of cooked rice or pasta (125 g), 1 bowl of breakfast cereals



carbohydrates (starch) → energy → 1 g = 17 kJ

fibre

B vitamins (thiamin, niacin)

minerals (magnesium)

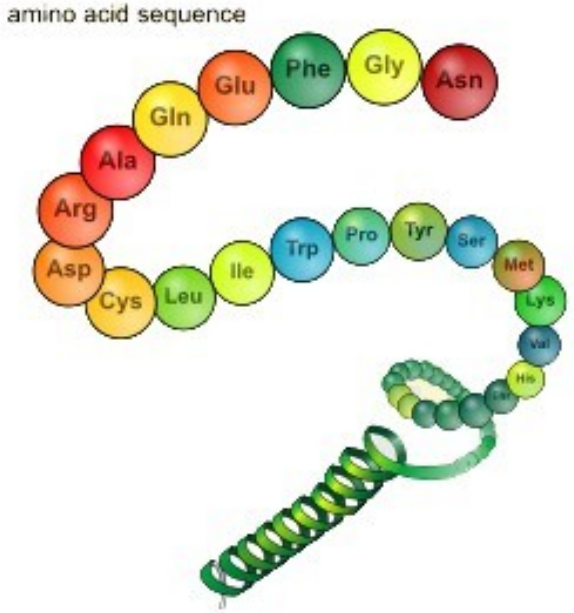
proteins - incomplete

Incomplete proteins…

…limiting aminoacids

- …is any indispensable amino acid falling below the amount recommended in the amino acid reference pattern

- wheat –
- legumes (soya) –
- corn –
- rice –



Gluten

GLUTEN

- wheat, rye, barley, oats and all products of them (pasta, bread, rolls, breakfast cereals, crackers, pastry and other grain-based foods)

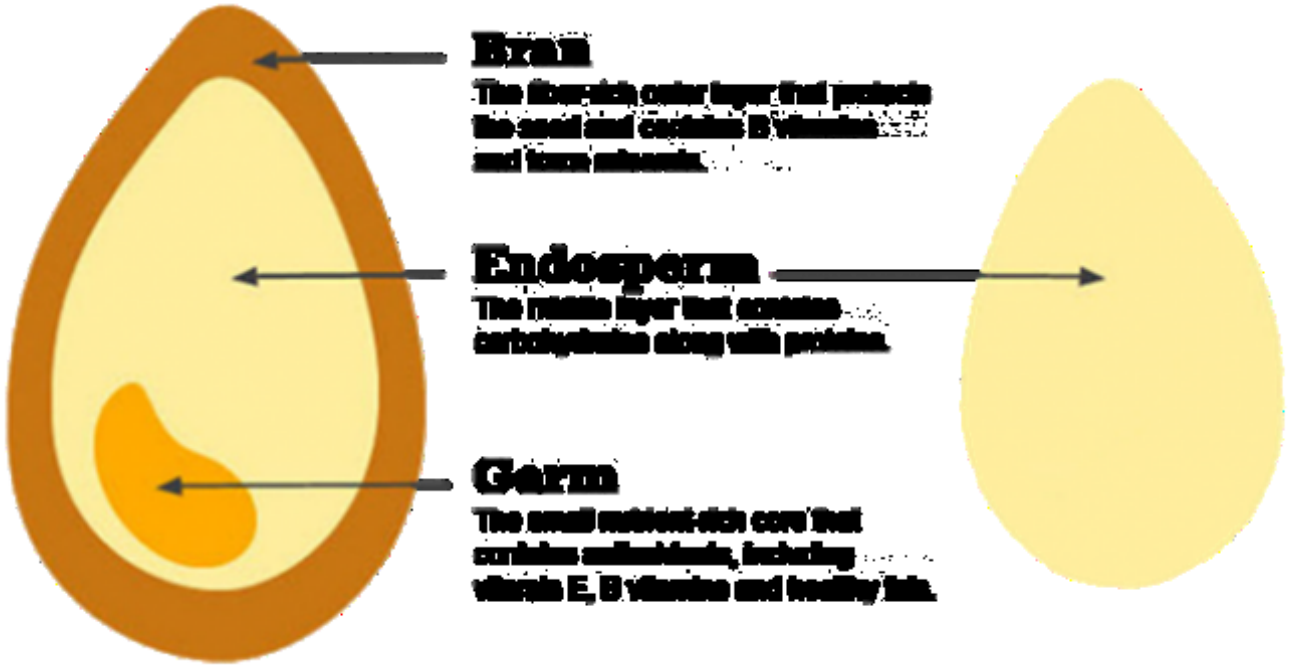
GLUTEN FREE

- rice
- corn, cornmeal
- buckwheat
- quinoa
- amaranth
- wild rice
- millet

…pseudocereals

Celiac disease – autoimmune disease, not allergy

Whole Grain vs. "White" Grain



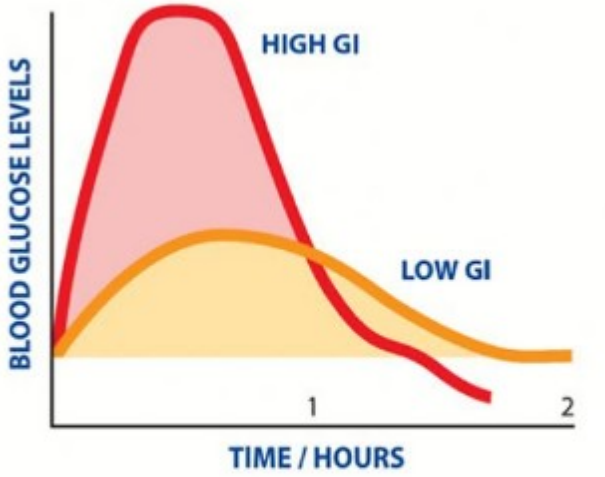
Dietary fibre

- *"Dietary fiber is the edible parts of plants or analogous carbohydrates that are resistant to digestion and absorption in the human small intestine with complete or partial fermentation in the large intestine. Dietary fiber includes polysaccharides, oligosaccharides, lignin, and associated plants substances. Dietary fibers promote beneficial physiological effects including laxation, and/or blood cholesterol attenuation, and/or blood glucose attenuation."*

(AACC International)

- Whole grains, fruits, vegetables, legumes, nuts and oily seeds
- Recommended fibre intake for adults … **25–30 g per day**

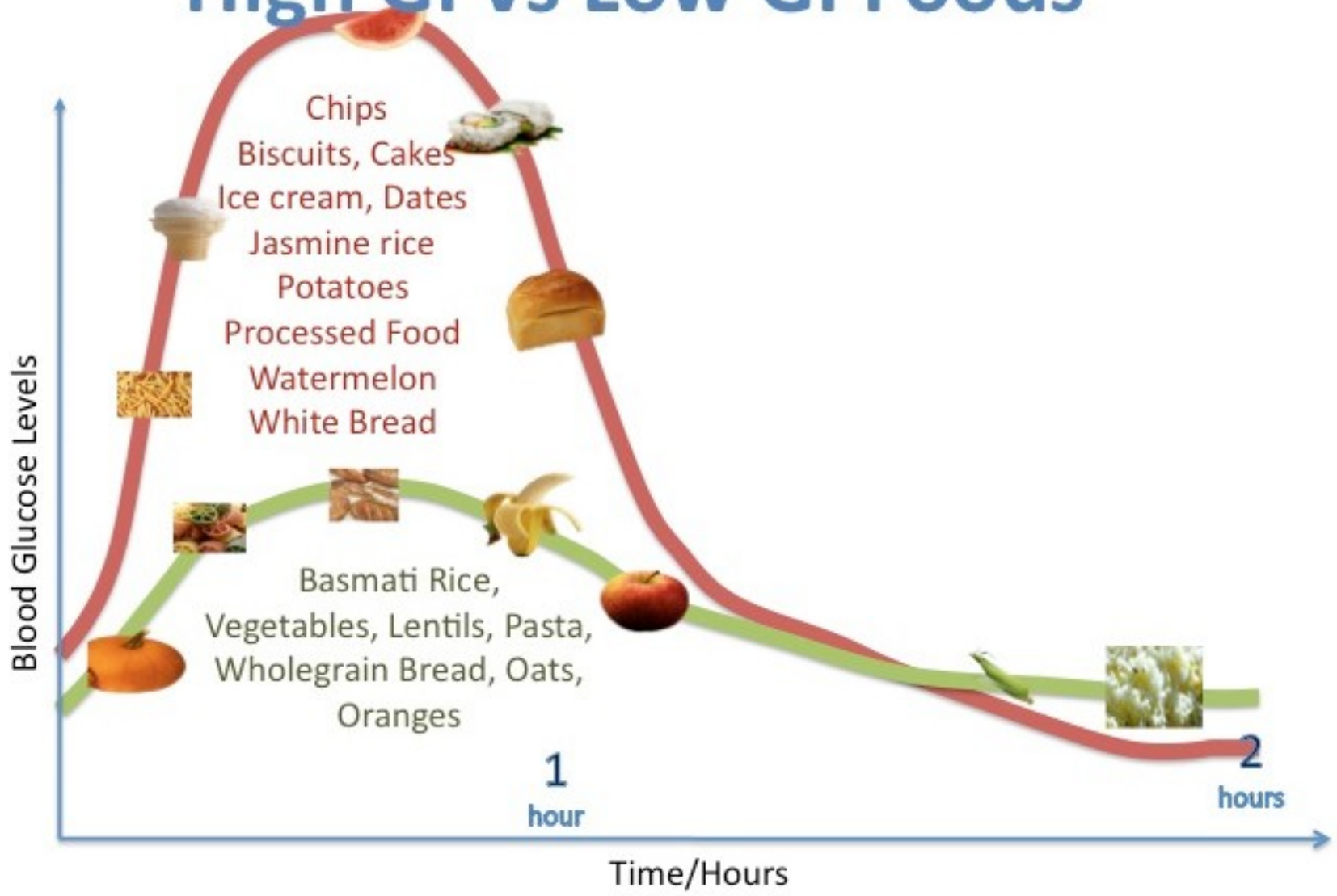
Glycemic index



The amount of carbohydrate in the reference and test food must be the same.

- Carbohydrate foods are digested and absorbed at different rates.
- **GI is a relative measure of the effect of different carbohydrate-containing foods on blood glucose level. A food with a high GI will raise blood glucose to a greater extent than a food with a low GI.**
- **A number of factors** influence the rate and duration of the glycemic response - the type and form of the carbohydrate eaten, the cooking and processing methods used, the time of day the carbohydrate is ingested or the amount of other nutrients in the food, such as fat or protein or fiber. In addition, individuals differ in their metabolism, which can also affect the glycemic response.
- For prevention and control of conditions such as **obesity, diabetes and heart disease and has also dietary advice for sport, for example which foods should be eaten in the hours before and after physical exertion.**
- GI does not refer directly to quantified food exchanges → **Glycemic Load**

High GI vs Low GI Foods



Health claims

about beta-glucans

Beta-glucans contribute to the maintenance of normal blood cholesterol levels.

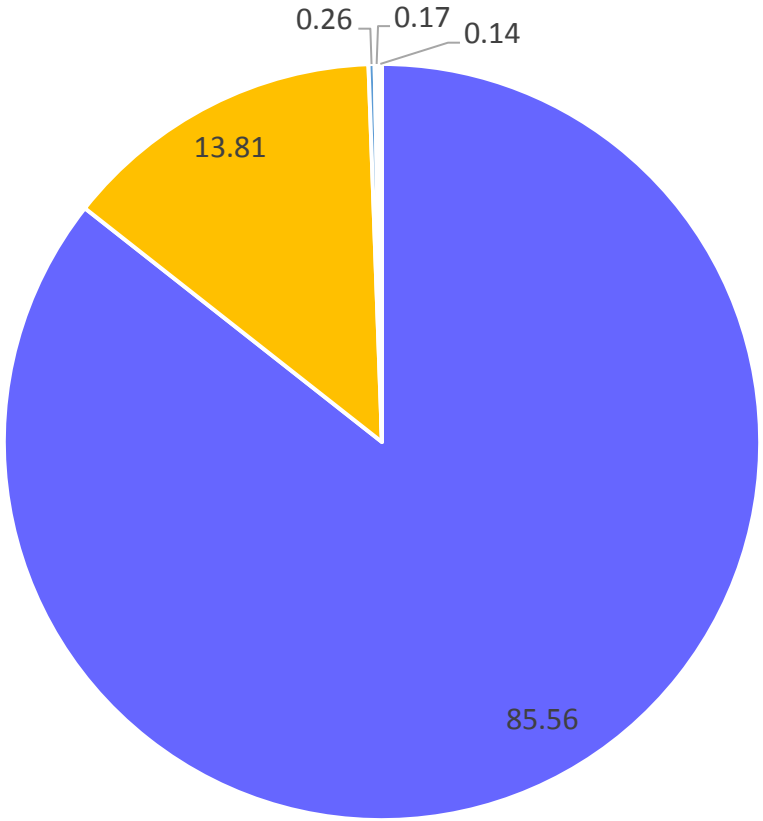
The claim may be used only for food which contains at least 1 g of beta-glucans from oats, oat bran, barley, barley bran, or from mixtures of these sources per quantified portion. In order to bear the claim information shall be given to the consumer that the beneficial effect is obtained with a daily intake of 3 g of beta-glucans from oats, oat bran, barley, barley bran, or from mixtures of these beta-glucans.

Consumption of beta-glucans from oats or barley as part of a meal contributes to the reduction of the blood glucose rise after that meal.

The claim may be used only for food which contains at least 4 g of beta-glucans from oats or barley for each 30 g of available carbohydrates in a quantified portion as part of the meal. In order to bear the claim information shall be given to the consumer that the beneficial effect is obtained by consuming the beta-glucans from oats or barley as part of the meal.

FRUITS AND VEGETABLES

Nutrient content (apple)



…and those are?

- pigments – carotenes (ß-carotene, lycopene), xantophylls, chlorophylls
- phenolic compounds, polyphenols
- flavonoids, isoflavonoids
- lignans, lignins
- glucosinolates
- … and much more, servings!

Utilization?

provitamins, antioxidants,
anticarcinogenic, antibacterial stuff etc.

3–5 servings; a serving is…

FRUITS

- banana, apple, orange – 1x 100 g
- berries – a bowl 150–200 ml
- juice – 250–300 ml, not diluted

VEGETABLES

- carrot, sweet pepper, medium-sized tomato – 1 piece
- raw leafy vegetables – a bowl 150–200 ml
- **cooked**, including **potatoes** – 125 g
- juice – 250–300 ml, not diluted

To imagine that better

Health claims

- **dried plums**
  - dried plums/prunes contribute to normal bowel function – 100 g per day
- **huge number of vitamins and minerals**
  - **vitamins – mainly vit. C**
    - normal function of the immune system
    - normal collagen formation for blood vessels, bones, cartilage etc.
    - normal energy-yielding metabolism
    - normal psychological functions … **etc. etc. – 15 authorised claims**
  - **minerals – mainly potassium (K)**
    - normal functioning of the nervous system
    - normal muscle function
    - maintenance of normal blood pressure

Sources?

Vitamin C

Food	Vitamin C (100 g)
Sweet peppers, red	191 mg
Black currant	166 mg
Broccoli	121 mg
Brussels sprouts	95 mg
Kiwi	93 mg
Cauliflower	77 mg
Strawberries	66 mg
Red cabbage	52 mg
Orange, lemon	cca 50 mg

One veggie, two faces

Nutrient	Value per 100 g
Energy	47 kcal / 200 kJ
Fat	0,2 g
Saturated	0 g
Carbohydrates	10,1 g
Sugar	8,3 g
Protein	1,2 g
Salt	0,9 g

Fruit or juice?

Nutrient	Value per 100 g		
	ORANGE	SMOOTHIE	JUICE
Energy	49 kcal / 205 kJ	56 kcal / 235 kJ	43 kcal / 180 kJ
Fat	0 g	0,3 g	0 g
Carbohydrates	10 g	14,4 g	9 g
Sugars	7,3 g	12,1 g	9 g
Protein	0,9 g	0,6 g	0,7 g
Fibre	2 g	1,7 g	0,1 g
Vitamin C	50,7 mg	41 mg	30 mg
Antioxidants (ORAC)	2 103	1 566	900

MILK AND DAIRY PRODUCTS

Milk and dairy products

- they are for example: yoghurt, cheese, milk, cottage cheese, fermented milk products and other
- they provide a range of nutrients → the main are protein, calcium, vitamin B_{12}, riboflavin and other
- dairy proteins…
  - have a high nutrition value (like those in meat, fish and egg)
  - contain satisfactory proportions of all the aminoacids that are essential to the human organism

Composition of cow's milk

Component	Amount in 100 ml	Percentage
Water	~	87,0 %
Lactose	5,0 g	4,8 %
Fat	4,1 g	4,0 %
Proteins	3,3 g	3,2 %
Calcium	110 mg	0,1 %
Riboflavin (vitamin B_2)	0,18 mg	~
Vitamin B_{12}	0,4 µg	~

*recommended daily allowance

Servings and recommendation

- one glass/cup of milk (250 ml)
- one pot of yoghurt (200 ml)
- cheese 55 g
- …or like your palm/your fist/your hand

- **2–3 servings per day**

Calcium 800 mg per day (health claims)

- Calcium contributes to normal blood clotting.
- Calcium contributes to normal energy-yielding metabolism.
- Calcium contributes to normal muscle function.
- Calcium contributes to normal neurotransmission.
- Calcium contributes to the normal function of digestive enzymes.
- Calcium has a role in the proces of cell division and specialization.
- Calcium is needed for the maintenance of normal bones.
- Calcium is needed for the maintenance of normal teeth.

- nutrition claim: „SOURCE OF CALCIUM“
- other sources of calcium are **30 g poppy = 150 g cabbage = 200 g broccoli** = (50 g of hard cheese = yoghurt 150 g = 250 ml milk)

Calcium absorption

- calcium absorption from vegetables such as broccoli, cauliflower and kale is **higher** than from milk and diary products

Milk as a source of calcium

- **availability** = cca 30 %

- **content in milk and dairy**
  - **cheese** – 300–450 mg/50 g (serving)
  - **milk** – 330 mg/250 g (porce)
  - **yoghurt** – 280 mg/150 g (porce)

Food	Availability
Cauliflower, broccoli	> 50 %
Watercress	
Cabbage, sprouts	
Almonds	cca 20 %
Sesame seeds	
Beans	
Spinach	< 5 %
Rhubarb	

Allergy to CMP vs. lactose intolerance

What is the difference?

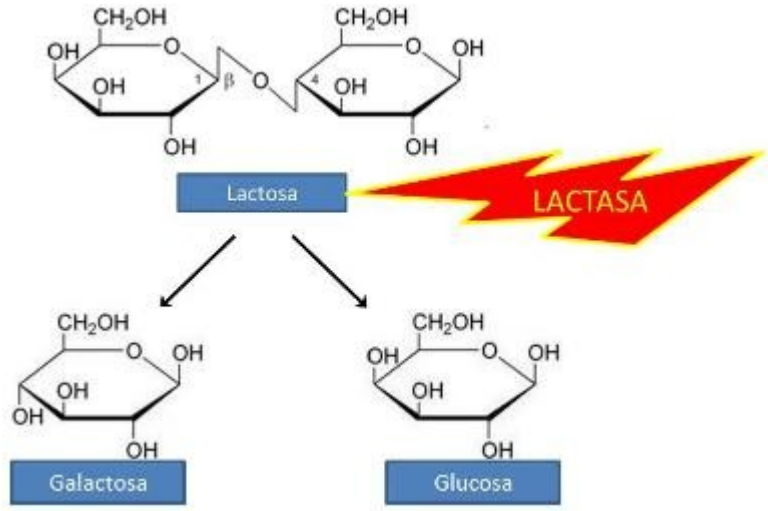
Allergy to cow’s milk

- is an abnormal response of the body's immune system to milk and products containing milk
- allergy related to lactoglobulin, lactalbumin and casein
- symptoms of milk allergy: wheezing, vomiting, hives and digestive problems, anaphylaxis (a severe, life-threatening reaction)
- treatment: food-elimination diet

Lactose intolerance (hypolactasia, lactase-non persistence)

- **primary** lactose intolerance is a genetically influenced **reduction of intestinal lactase**
- **secondary** lactose intolerance can **develop as a consequence** of infecton of the small intestine, inflammantory disorders or malnutrition
- symptoms: abdominal bloating and cramping, flatulence, diarrhea after lactose consumption
- treatment:
  - lactose-free or low-lactose diet

ASIANS	98 %
AFRICANS	78 %
CZECHS	6–20 %
SCANDINAVIANS	10 %



Read labels!

Nutrient	Sweetened dairy	Normal dairy
Energy	**69 kcal / 290 kJ**	**40 kcal / 170 kJ**
Fats	1 g	1 g
Proteins	3 g	3 g
Carbohydrates	**12 g**	**5,4 g**

MEAT, FISH AND SEAFOOD, EGGS, LEGUMES, NUTS AND SEEDS

		**Energy** kJ/100 g	**Water** g/100 g	**Protein** g/100 g	**Fat** (SFA) g/100 g	**Carb** g/100 g
EGGS Chicken eggs		575	76,1	12,5	9,2 (2,5)	1,3
MEAT Lean beef – raw Lean beef - stewed		427 823	73,3 55,9	22,3 36,9	1,3 (0,6) 5,3 (2,3)	0 0
FISH Tuna		610	69,5	23,7	5,6 (1,3)	0
LEGUMES Lentils – dried Lentils – boiled		1372 466	9,8 62,4	69,6 23,6	0,7 0,4	48,5 16.3
NUTS Almonds		2520	4,7	20,2	52,7	7,3
SEEDS Sesame seeds		2380	3,2	24,5	45,9 (8,5)	13,9

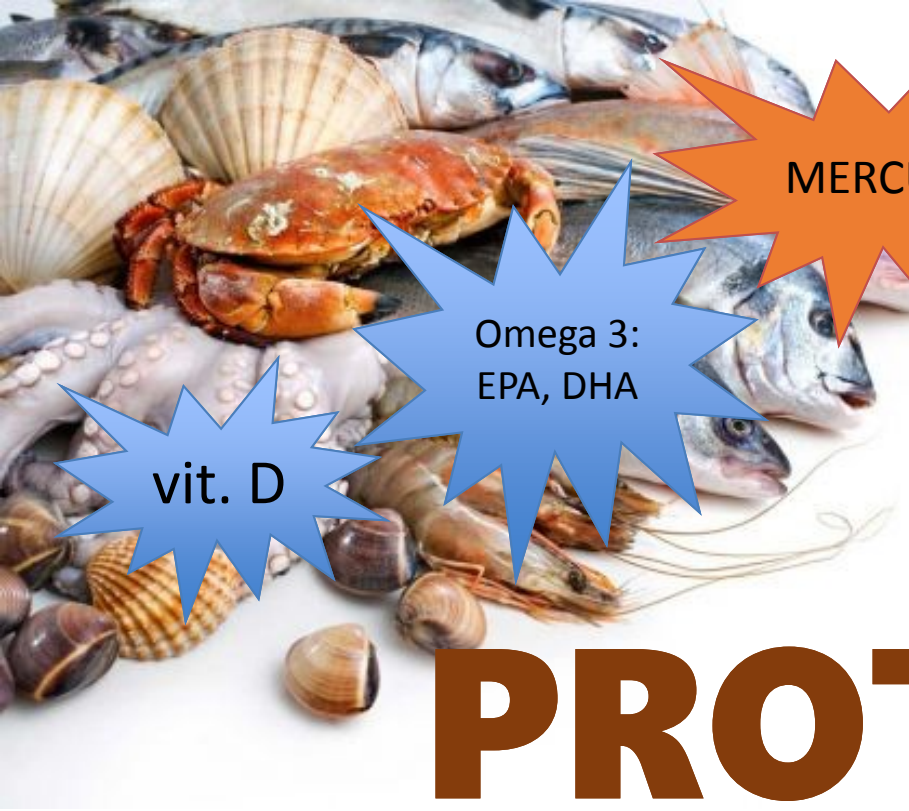
PROTEIN FOODS

Servings

1-3 portions a day

80 g cooked meat
2 eggs
100 g or 250 ml cup of boiled legumes

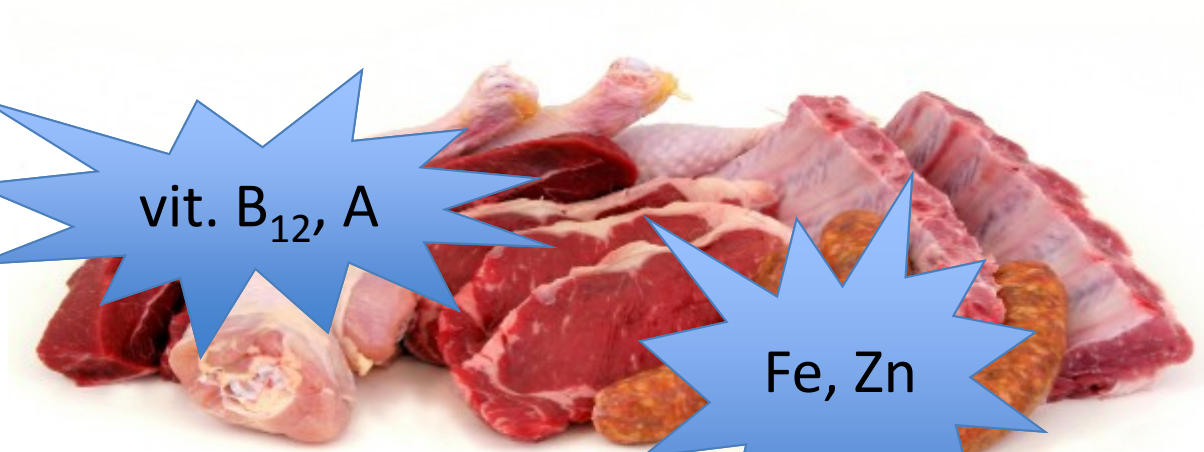
www.pav.rvp.cz



MERCURY

Omega 3:
EPA, DHA

vit. D



vit. B_{12}, A

Fe, Zn

PROTEIN FOODS

Omega 3:
ALA

FIBRE

All essential
amino acids

Fish and seafood: EPA, DHA, vit. D

HEALTH CLAIM/RELATIONSHIP:

- **EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid):**
  - maintenance of normal cardiac function[1], blood pressure[2], blood concentrations of triacylglycerols[3]
- **DHA:**
  - maintenance of normal (fasting) blood concentrations of triacylglycerols[4]
- **MATERNAL INTAKE:**
  - DHA maternal intake contributes to the normal brain development of the foetus and breastfed infants[5]
  - DHA maternal intake contributes to the normal development of the eye of the foetus and breastfed infants[6]
- **vitamin D:**
  - absorption and utilisation of calcium and phosphorus and maintenance of normal blood calcium concentrations, maintenance of bones and teeth, normal muscle function, normal function of immune system and inflammation response, cell division[7]

Mercury in fish and shellfish

Mercury may harm an unborn baby or young child's developing nervous system!

Recommendations for child-bearing women, breastfeeding women and young children:

1. Do not eat shark, swordfish, king mackerel, tilefish.

They contain high levels of mercury.

2. Eat up to 340 g a week of a variety of fish and shellfish that are lower in mercury.

Five of the most commonly eaten fish that are low in mercury are shrimp, canned light tuna, salmon, pollock, and catfish.

Another commonly eaten fish, albacore ("white") tuna has more mercury than canned light tuna. So, when choosing your two meals of fish and shellfish, you may eat up to 170 g (one average meal) of albacore tuna per week.

MEAT: Fe, Zn, B_{12}

HEALTH CLAIM/RELATIONSHIP:

Iron: cognitive function, contribution to normal energy-yielding metabolism, formation of red blood cells and haemoglobin, oxygen transport in the body, function of the immune systém, reduction of tiredness and fatigue, cell division*

Zinc: DNA synthesis and cell division, acid-base metabolism, contribution to normal carbohydrate metabolism, cognitive function, fertility and reproduction, contribution to normal macronutrient metabolism, maintenance of normal serum testosterone concentrations, vitamin A metabolism, contribution to normal protein synthesis, maintenance of bones, normal hair, normal nails and normal skin, fertility and reproduction, maintenance of vision, function of the immune system, protection of DNA, proteins and lipids from oxidative damage, DNA synthesis and cell division*

B_{12}: energy-yielding metabolism, contribution to neurological and psychological function, contribution to normal homocysteine metabolism, contribution to neurological and psychological function, red blood cell formation, function of the immune system, reduction of tiredness and fatigue, cell division*

A: metabolism of iron, maintenance of normal skin and mucous membranes, normal vision and normal function of the immune system, cell differentiation*

*The claim may be used only for food which is at least a source of iron as referred to in the claim SOURCE OF [NAME OF VITAMIN/S] AND/OR [NAME OF MINERAL/S] as listed in the Annex to Regulation (EC) No 1924/2006

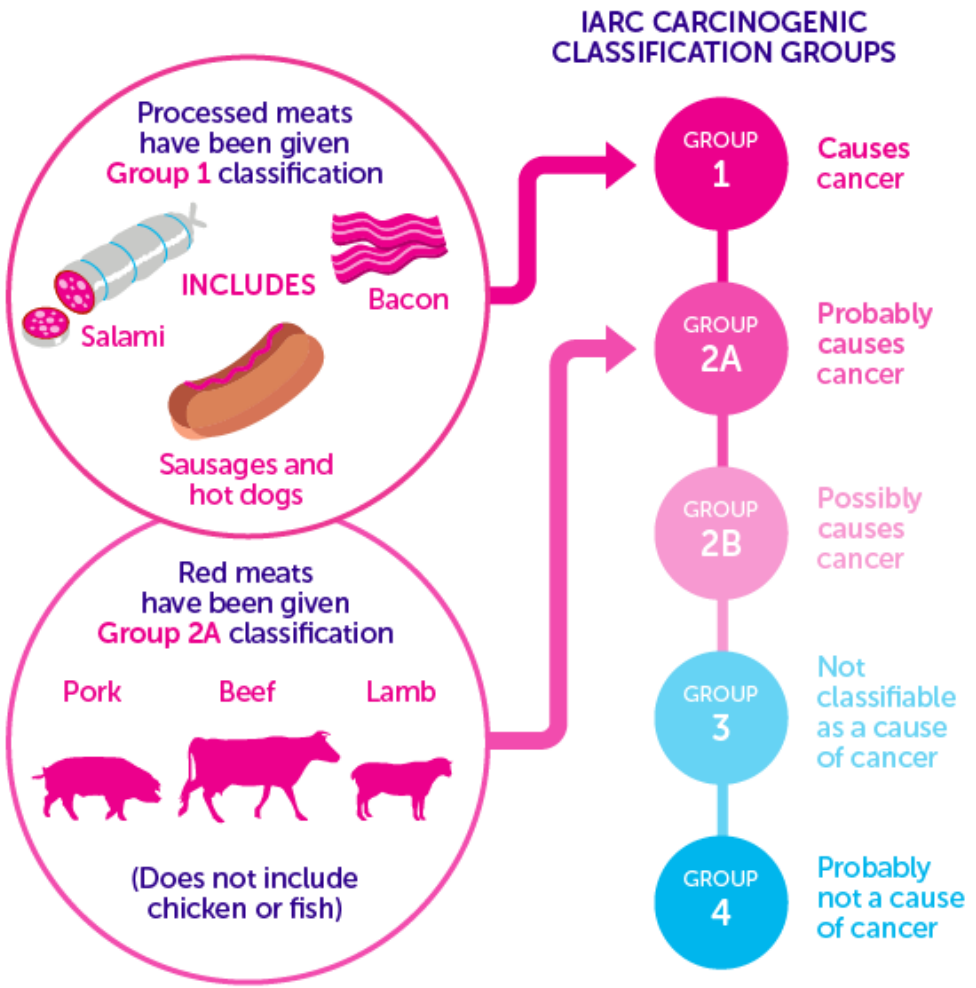
Health claim: MEAT or FISH

Meat or fish contributes to the **improvement of iron absorption when eaten with other foods containing iron***

= MEAT FACTOR EFFECT

*The claim may be used only for food which contains at least 50 g of meat or fish in a single quantified portion. In order to bear the claim information shall be given to the consumer that the beneficial effect is obtained by consuming 50 g of meat or fish together with food(s) **containing non-haem iron**.

MEAT AND CANCER
HOW STRONG IS THE EVIDENCE?



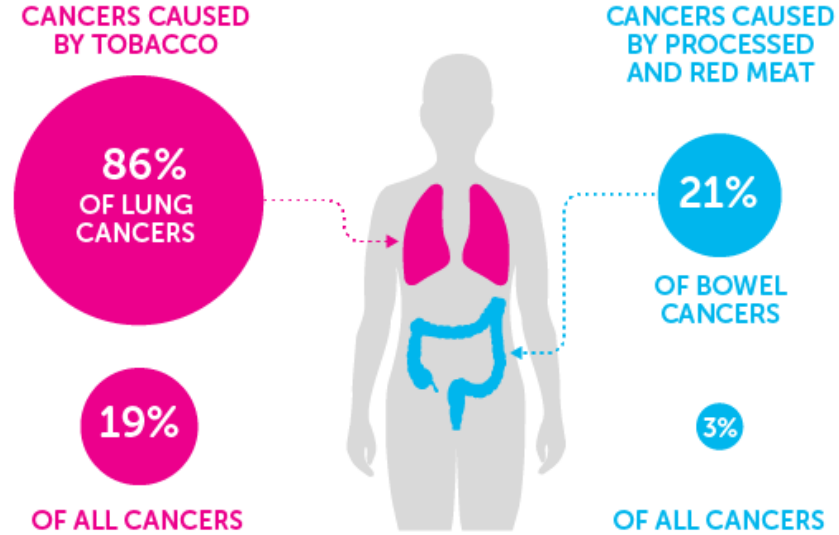
These categories represent how likely something is to cause cancer in humans, not how many cancers it causes.

WE WILL BEAT CANCER SOONER
cruk.org

CANCER RESEARCH UK

TOBACCO vs MEAT WHAT'S THE RISK?

The EVIDENCE that processed meat causes cancer is as strong as the evidence for tobacco, but the RISK from tobacco is much higher...



THE NUMBER OF CANCERS PER YEAR IN THE UK THAT COULD BE PREVENTED IF...

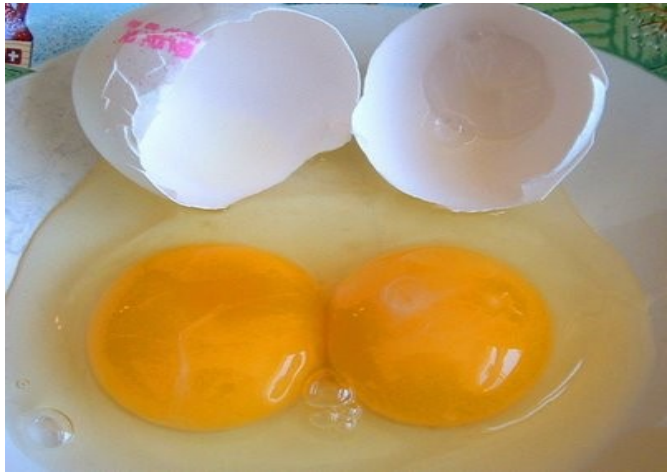
Source: cruk.org/cancerstats

WE WILL BEAT CANCER SOONER
cruk.org

CANCER RESEARCH UK

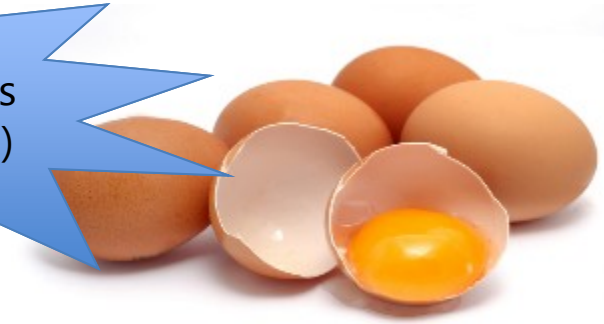
Cholesterol In Foods:

- all animals make cholesterol > if you eat any animal product, including *MEAT, POULTRY and FISH*, you will be consuming some "*extra*" or unneeded cholesterol.
- other foods high in cholesterol are:
  - egg yolks
  - liver / organ meats
  - some shellfish



Nutrients in eggs

All essential nutrients
(except vitamin C ☺)



8,25 µg Se/100 g

CHICKEN FEED

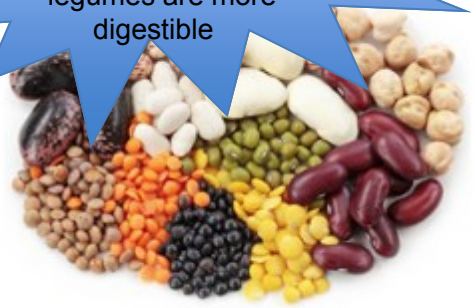
40 mg EPA+DHA/100 g

Legumes, nuts and seeds: FIBRE

SOURCE OF FIBRE (nutrition claims)
= product contains at least 3 g of fibre per 100 g or at least 1,5 g of fibre per 100 kcal.

HIGH FIBRE (nutrition claims)
= product contains at least 6 g of fibre per 100 g or at least 3 g of fibre per 100 kcal

SOAKING, GERMINATION, COOKING
- legumes are more digestible



FIBRE	
SOYBEANS - dried: 19,4 g/100 g - boiled: 7,9 g/100 g	ALMONDS: 12,2 g/100 g PISTACHIOS: 10,4 g/100 g HAZELNUTS: 8,7 g/100 g
LENTILS: - dried: 15 g/100 g - boiled: 5 g/100 g	POPPY SEEDS: 22,7 g/100 g SESAME SEEDS: 7,9 g/100 g PUPMKIN SEEDS: 3,9 g/100 g

Health claim: WALNUTS

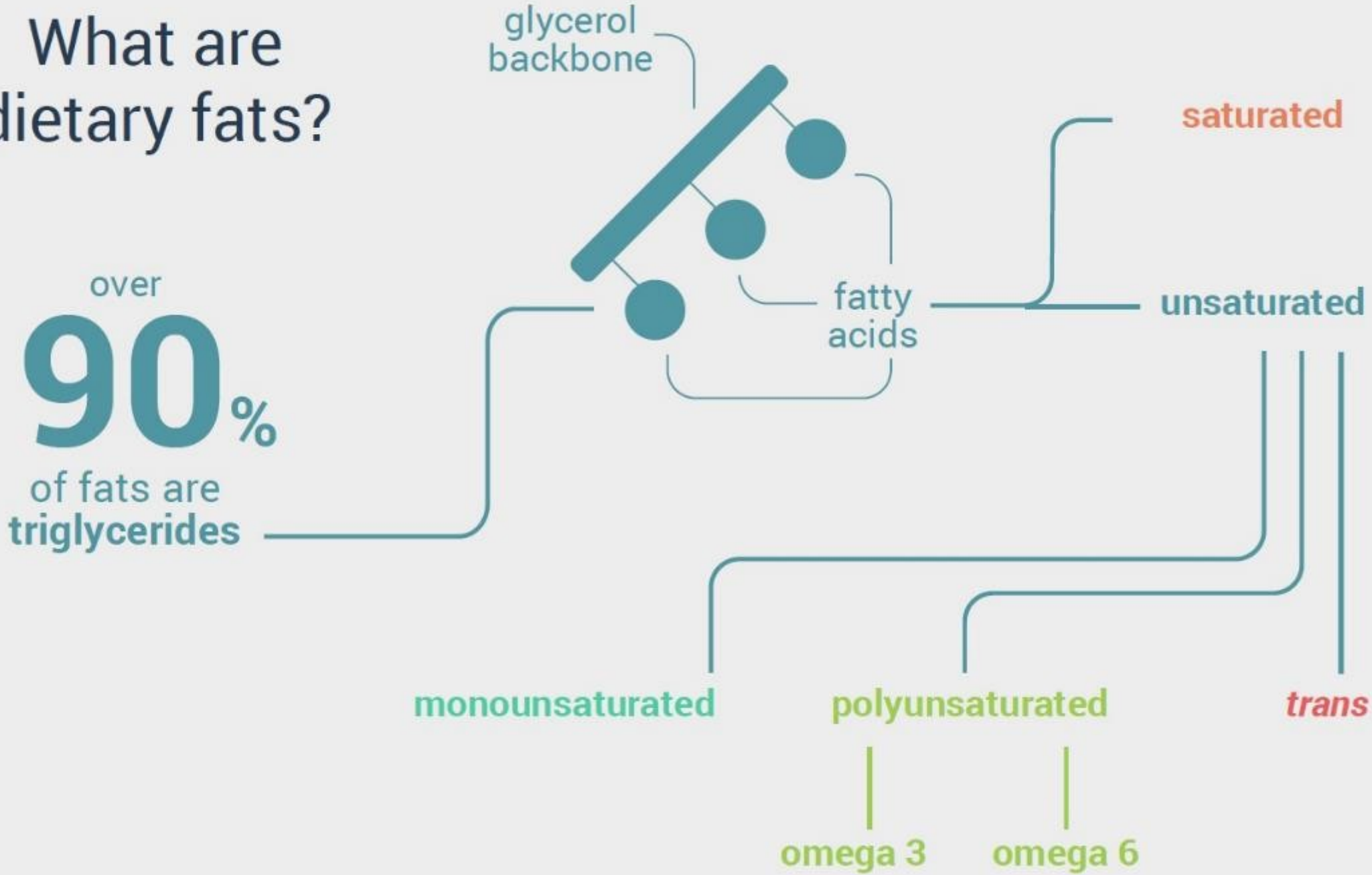
Walnuts contribute to the improvement of the elasticity of blood vessels*

*The claim may be used only for food which provides a daily intake of 30 g of walnuts. In order to bear the claim, information shall be given to the consumer that the beneficial effect is obtained **with a daily intake of 30 g of walnuts**.

FAT, SALT AND SUGAR

Use moderation with their intake!

What are dietary fats?



over **90%** of fats are **triglycerides**

Why do we need dietary fats?

as a structural component of **cells**

support the **absorption** of vitamins

help **brain development** and function

60% of brain is fat

source of **energy**

certain types help to keep a **healthy heart** and blood vessels

In 2.000 kcal…

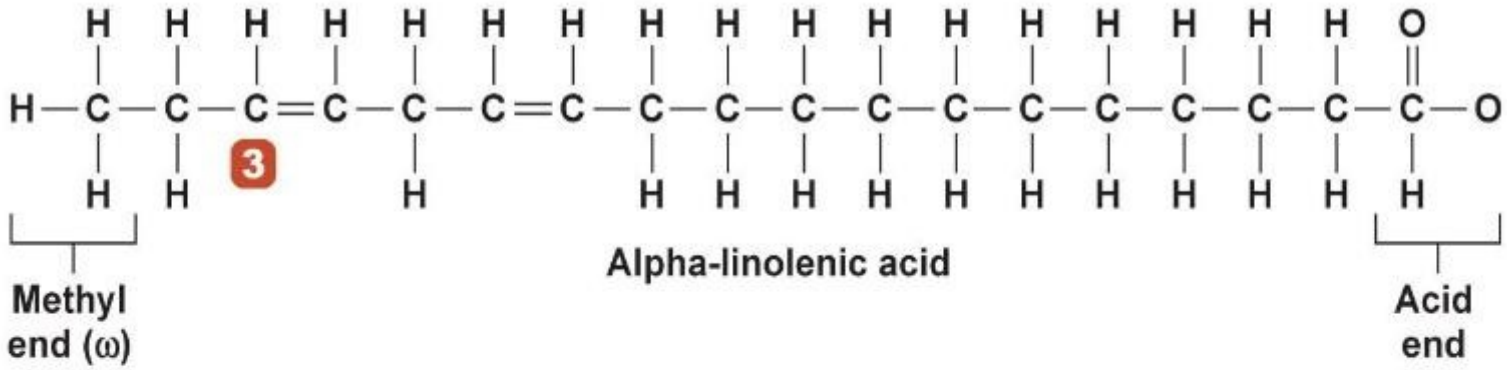
- It is recommended that the maximum number of grams of fat a person should have in a day is 60-70 grams.

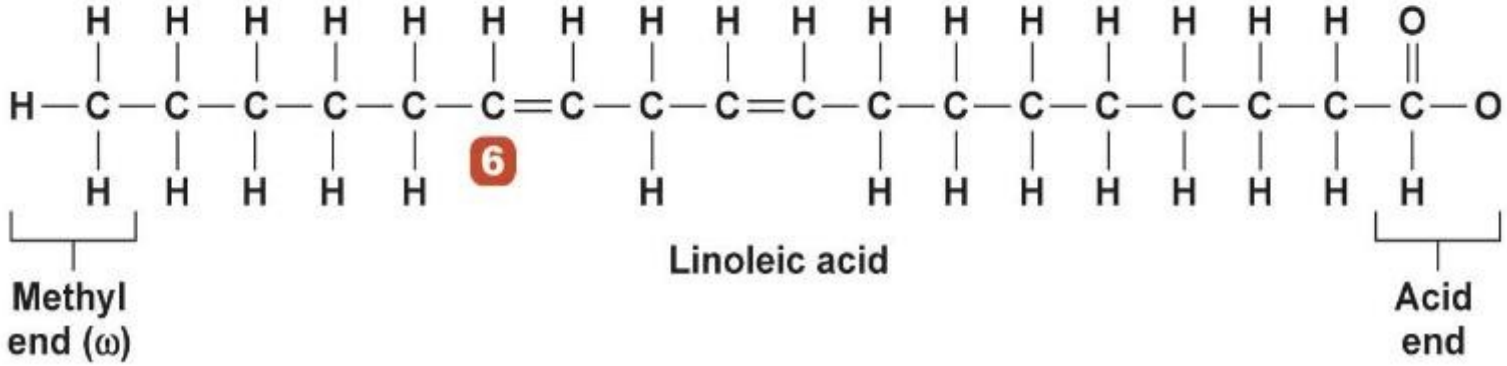
- No more than 30 % (adults 20-35 %) of a person's total calories should come from fat sources.

Types of fatty acids

- **organic acid units** that make up fat
- there are three types:
  1. Saturated FA - SFA (SAFA)
  2. Monounsaturated FA - MUFA
  3. Polyunsaturated FA - PUFA
- recommended ratio: **1 SFA : 1,4 MUFA : 0,6 PUFA**

The Omega fatty acids





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Sources of fatty acids

- **Saturated fatty acids** sources: butter, beef fat, lard, meat, milk and dairy products, coconut, palm and palm kernel oils

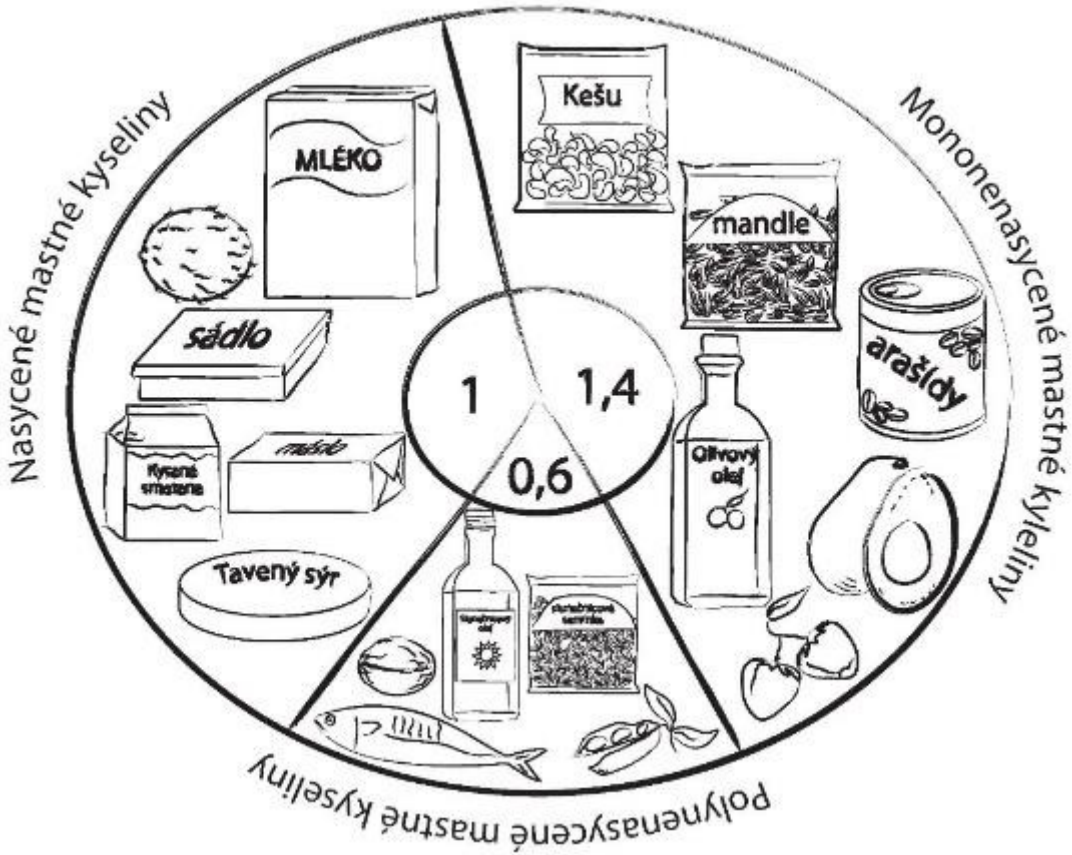
  Recommended amount: 20 g

- **Monounsaturated fatty acids** sources: olive canola oil, nuts - pistachios, almonds, hazelnuts, cashews, as well as peanuts, avocados

  Recommended amount: 28 g

- **Polyunsaturated fatty acids** sources: walnuts, soybeans, flax, sunflower, sesame oils, salmon, mackerel, herring (ie. especially oily fish and seafood)

  Recommended amount: 12 g



SFA

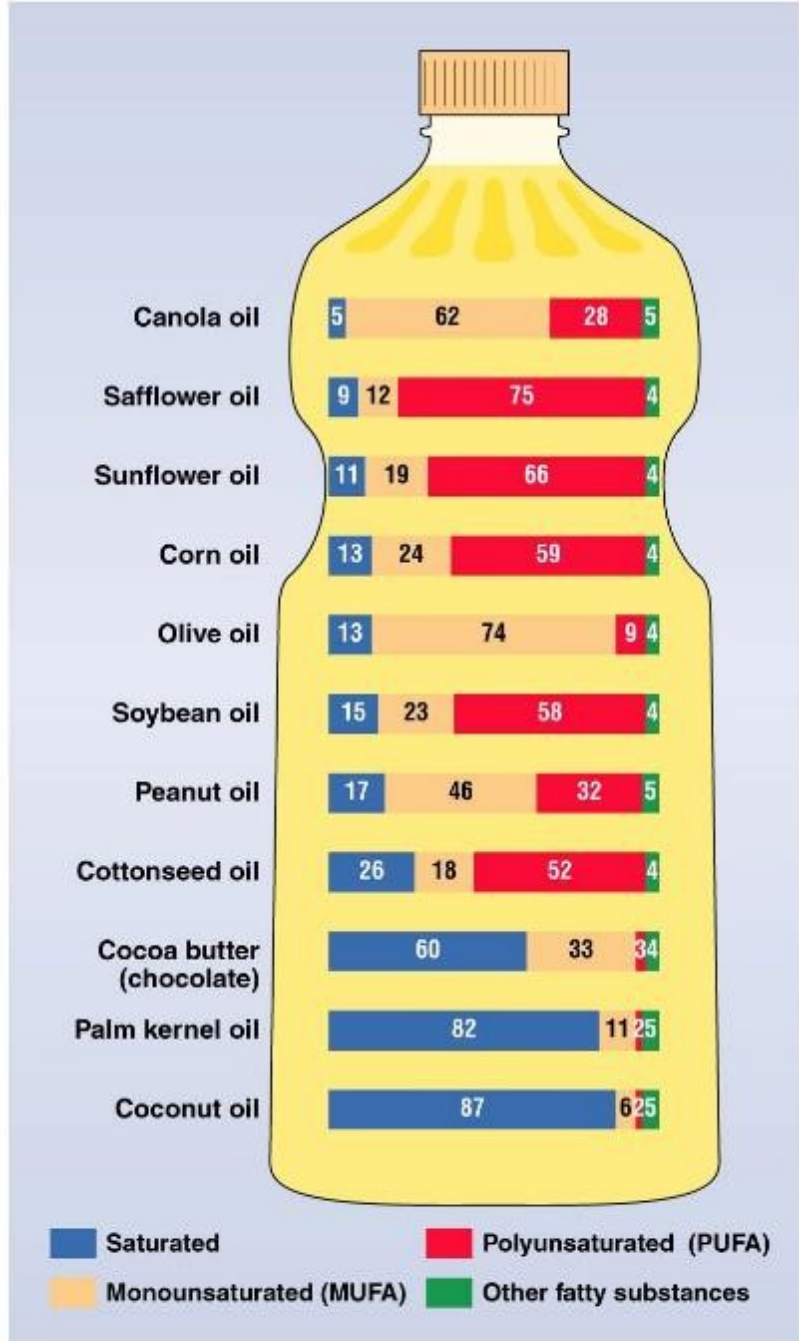
- butter, beef fat, lard, meat, milk and dairy products, coconut, palm and palm kernel oil
- recommended amount: 20 g

MUFA

- olives, olive oil, rapeseed oil (canola oil), nuts (pistachios, almonds, hazelnuts, cashews, also peanuts), avocados
- recommended amount: 28 g

PUFA

- walnuts, soybeans, flaxseed, sunflower, sesame, canola oils, salmon, mackerel, herring (ie. especially oily fish and seafood)



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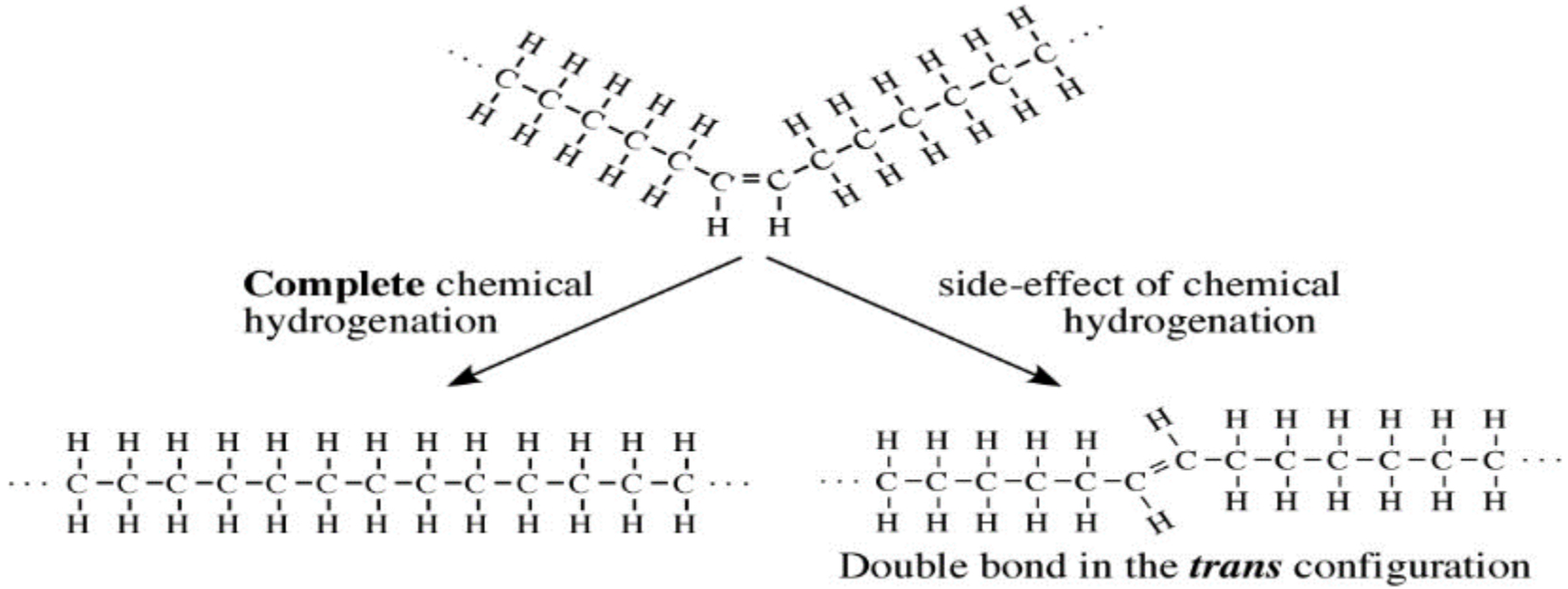
Hydrogenation of unsaturated FA

= conversion of PUFA to MUFA & SFA

- **purposes:**
  - production of solid fats (shortening) from liquid oils
  - production of more chemically stable fats (resist oxidation, rancidity)
- the process in which missing hydrogen atoms are added to an unsaturated fat to make it firmer

Hydrogenation

- forms a new type of fatty acid called trans-fatty acid
  - (“man-made” fat)
- trans-fatty acids have many of the same properties as SATURATED fats



Trans-unsaturated fatty acids (TFAs)

- Trans fatty acids are produced by partial hydrogenation of liquid plant oils
- Trans fatty acids occur naturally in animal products such as meat and dairy products
- Trans fatty acids are formed during heating of cooking oils

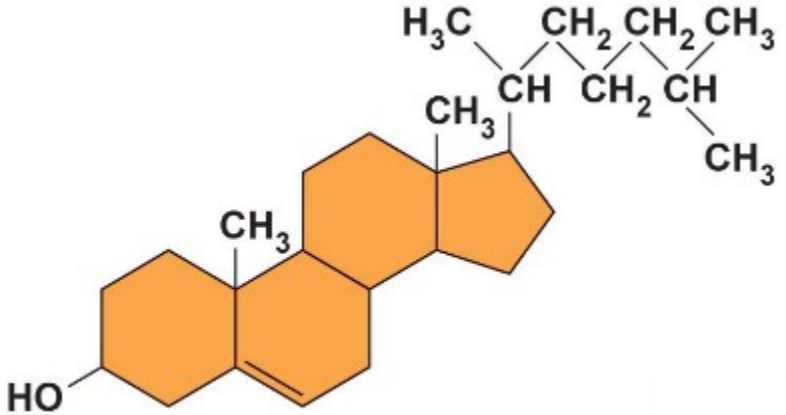
Down with TFAs -1 %

- **TFAs have been associated with a detrimental effect on plasma lipids, with raised levels of LDLs, and lowered high-density lipoproteins (HDLs)**
- Because of this , food manufacturers have in recents years worked to lower levels of TFAs in foods, and some labelling regulations require that any TFAs are declared.
- *Trans* fatty acids intake should be as low as possible within the context of a nutritionally adequate diet.
- The available evidence is insufficient to establish whether there is a difference between **ruminant and industrial** *trans* fatty acids consumed in equivalent amounts on the risk of coronary heart disease.

Sterols

Sterols are not fat!

- More complex than phospholipids or triacylglycerols
  - Four connected rings of carbon and hydrogen
- Do not provide energy
- Cholesterol is the best known sterol
  - Found in every cell



Cholesterol

Phytosterols – major plant sterols

- phytosterols are derived from plants
- **beta-sitosterol** is obtained from nuts, cereals, fats and oils
- plant stanol and sterol esters have been marketed in recent years to help in cholesterol lowering, as they compete with cholesterol for absorption and promote the increases loss of cholesterol in faeces

Plant sterols/stanols – HEALTH CLAIMS

- following wording reflects the scientific evidence: “Plant sterols/stanols help to maintain normal blood cholesterol levels”.
  - **Plant sterols improve blood cholesterol levels**
  - **Daily phytosterols intake helps achieve acceptable LDL-cholesterol levels**

- In order to bear the claim, a food should provide at least 0.8 g per day of plant sterols/stanols in one or more servings. These amounts can be reasonably achieved in the context of a balanced diet. The target population is adults.

- Food products containing plant sterols and/or plant stanols may not be nutritionally appropriate for pregnant and breastfeeding women, and for children under the age of five years.

Low-Density Lipoproteins

- take cholesterol **from** the **liver** to wherever it is needed in the body
- if too much LDL cholesterol is circulating, the **excess** amounts of cholesterol can **build up** in **artery** walls
- this buildup **increases** the risk of **heart disease** or **stroke**
- thus, LDL cholesterol has come to be known as "**bad cholesterol**"

High-Density Lipoproteins

- picks up excess cholesterol and takes it **back** to the **liver**, keeping it from causing harm
- Thus, HDL cholesterol has come to be known as "**good cholesterol**."

Important!

For most people, the amounts and types of *fats* eaten have a greater effect on blood cholesterol than does the cholesterol itself.

The fats found in food, such as butter, chicken fat, or corn oil, are made up of different combinations of *fatty acids*.

Saturated fatty acids

- **raise LDLs -** lauric, myristic and palmitic acid raise blood total and LDL cholesterol concentrations
- **raise HDLs -** lauric acid strongly increases blood HDL cholesterol

Monounsaturated fatty acids

- appear to **lower LDL** (“bad”) cholesterol and help **raise** levels of **HDL** (“good”) cholesterol

Polyunsaturated Fatty Acids

- *n-6* PUFA **lower** blood **total and LDL** cholesterol concentrations
- effects of alpha-linolenic acid on the blood lipoprotein profile are comparable to those of linoleic
- EPA and DHA **lower** blood **triacylglycerol** concentrations

How much fats are there in common foods*?

*standard portion sizes

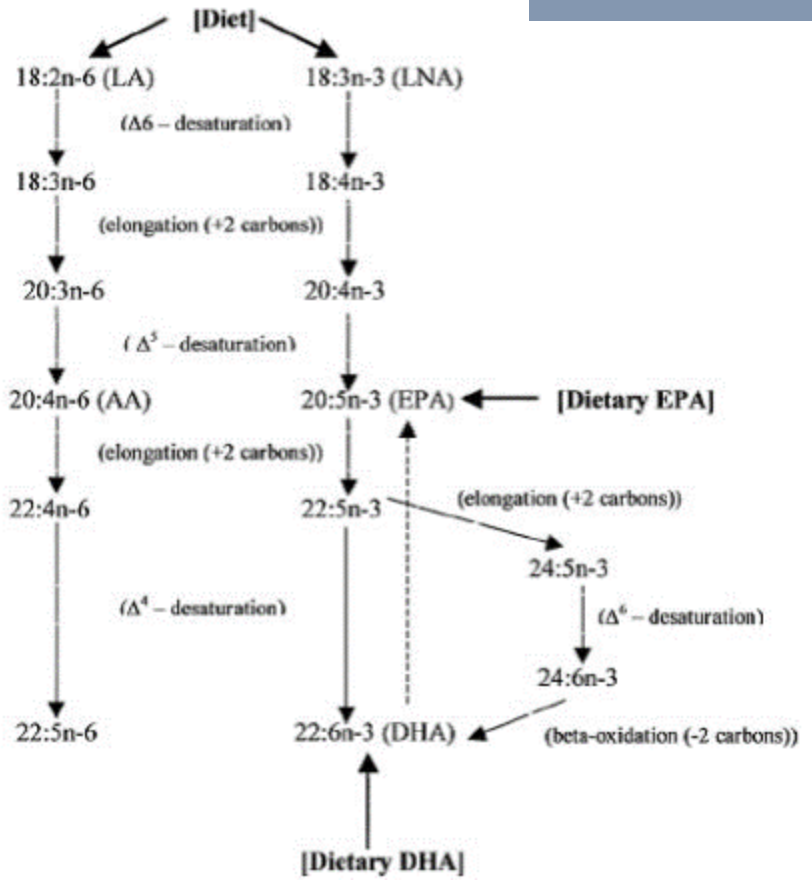
Essential fatty acids

1. **Alfa-Linolenic Acid (ALA)**
2. **Linoleic Acid (LA)**

- “essential” because the body cannot manufacture them
- have to be supplied by food a person eats
- both polyunsaturated fatty acids
- found in the natural oils of plants and fish
- body needs them for its basic functions, including production of various hormones

Interconversion between fatty acids

desaturation and elongation



Eicosanoid functions: role in heart disease

- regulate
  - smooth muscle contractions
    - blood pressure
      - **Omega-3 eicosanoids tend to lower BP**
      - Omega-6 tend to increase BP
  - blood clotting
      - **Omega-3 eicosanoids tend to inhibit blood clotting**
      - Omega-6 tend to increase blood clotting
  - inflammatory response
      - **Omega-3 PUFA may reduce inflammatory response**

Lowering fat and cholesterol in the diet

- **exercise**!
- replace saturated fats with **unsaturated** fats in the diet
- choose **lean** cuts of meat
- **steam**, **boil** or **bake** foods instead of cooking them in oil or fat
- many more!!

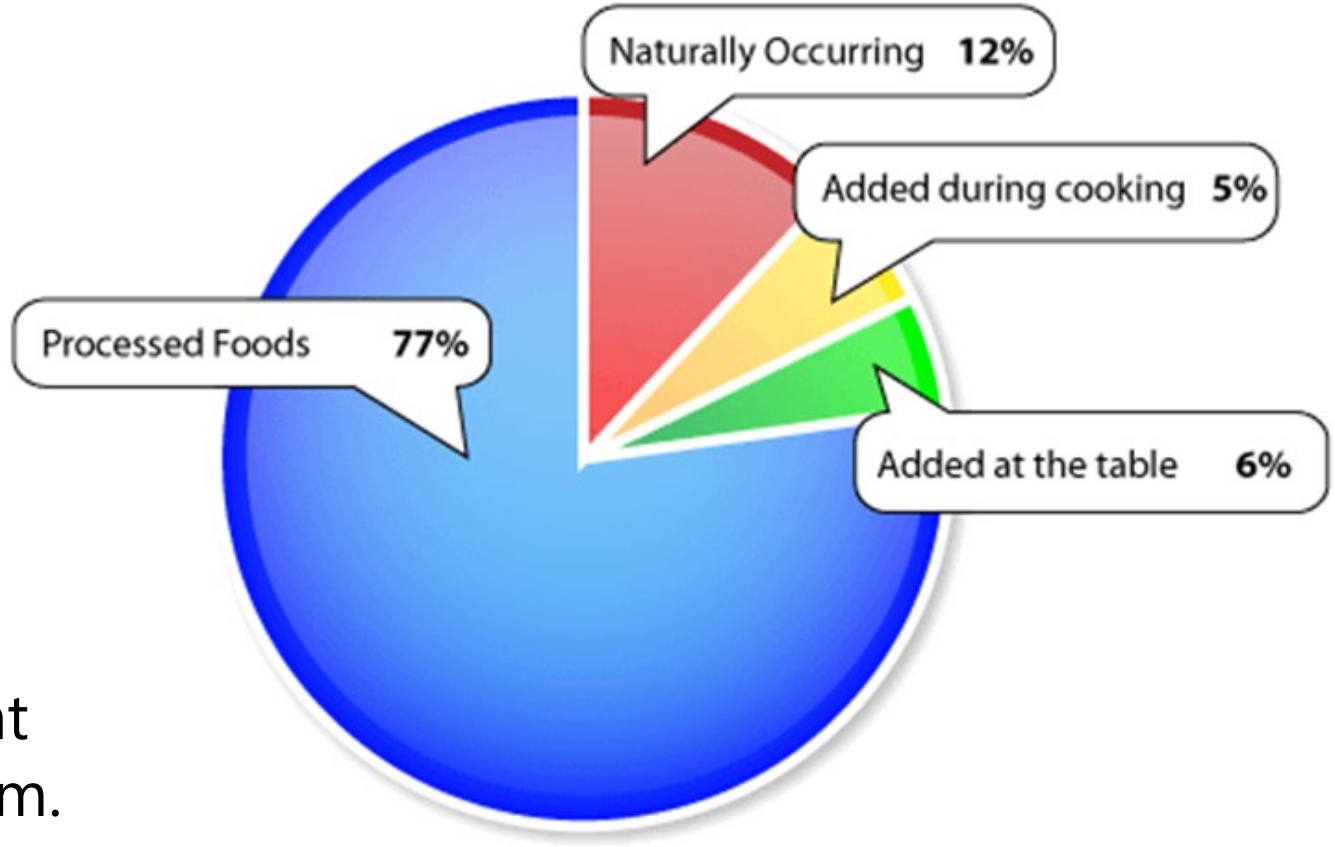
Use moderation with fat intake

- read food labels
- use olive oil, canola oil for cooking
- avoid margarine with trans fatty acids
- choose lean meat, fish, poultry
- eat fewer cold cuts, less bacon, sausages, hot dogs, organ meats
- use substitutes for higher-fat products

Salt vs. Sodium

- Salt is sodium chloride (NaCl)
- Sodium is an element which occurs naturally and is used by the body
- 1 g of sodium = 2,5 g of salt

Where is the sodium?



Fact: Most of the foods we eat contain too much sodium.

Why Sodium Reduction?

- hypertension
- osteoporosis
- stomach cancer
- obesity

Iodine and salt

- IDD is the world's leading cause of preventable mental retardation and impaired psychomotoric development in young children.
- in its most extreme form, iodine deficiency causes **cretinism**
- it also significantly raises the risks of stillbirth and miscarriage for pregnant women

Differences in Na between Countries

- **USA - 6-piece Chicken Nuggets**
  - 600 mg sodium
  - (280 calories)
- **United Kingdom - 6-piece Chicken Nuggets**
  - 280 mg sodium
  - (260 calories)

= 320 mg less sodium

Sugar

- It has been estimated that indigenous sugars provided by recommended daily intakes of fruits, vegetables, cereals and dairy products would amount to about 45 g in adults.
- Assuming that the remaining 45 g of sugars (up to the 90 g proposed for the labelling reference intake) are added sugars, this would correspond to 9 E% for a 8400 kJ or 2000 kcal diet.

Empty Calories?

	Honey	Coke	Apricots
Size of 100 kcal portion	1.5 tbsp	1 cup	6
Carbohydrate (g)	26	26	24
Protein (g)	trace	0	2
Calcium (mg)	2	6	30
Vitamin A (mg)	0	0	554
Vitamin C (mg)	trace	0	22

Sugar recommendations

DRI:

- < 10% of average daily energy intake should be from sugars

Tips for limiting sugar intake:

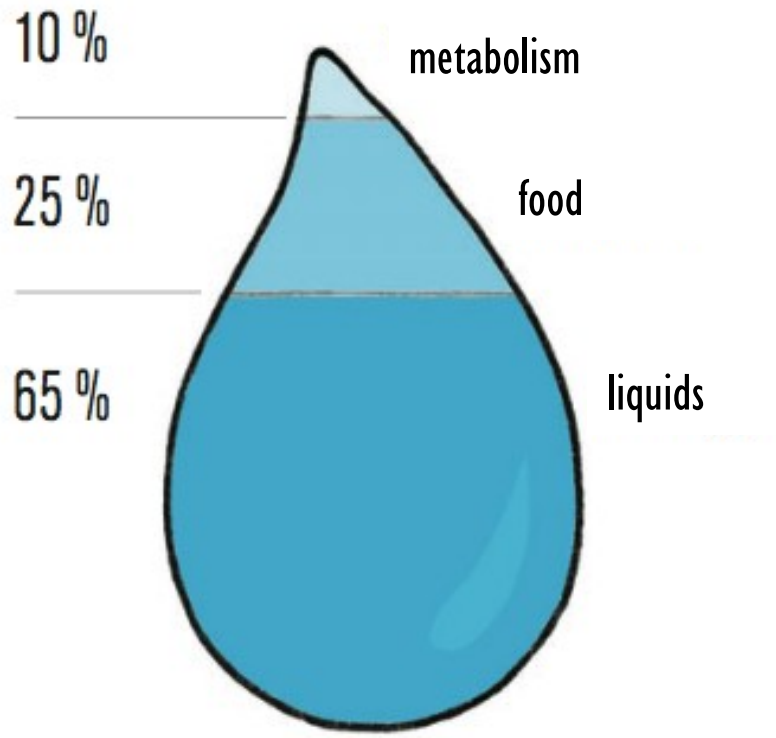
- use **food labels** to determine amount of sugar in products
- use **ingredient lists** to identify multiple sugar sources and added sugars
- use less added sugar
- limit soft drinks, juice, sugary cereals, candy
- choose fresh or frozen fruits

WATER

Water balance

- **IN**
  - fluids: 1 400 ml
  - food: 700 ml
  - metabolism: 200 ml

- **OUT**
  - urine: 1 400 ml
  - feces: 100 ml
  - perspiration: 100 ml
  - insensible loss (skin, respiration): 700 ml



How much water?

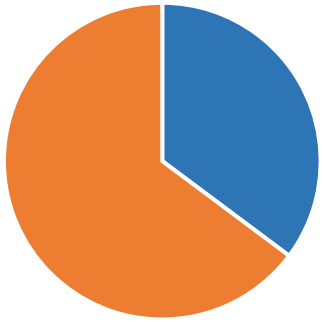
30–35 ml/day/kg BW

average man of 70 kg
= **2,1–2,5 l**

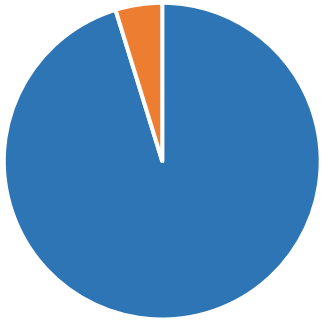
(total gain from food and drinks)

Content of water in food

Wheat bread

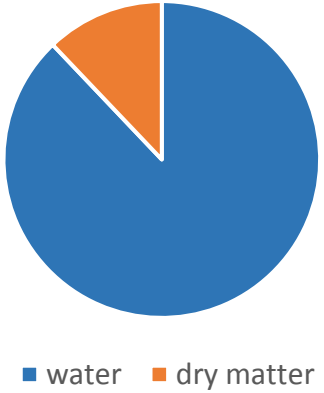


Cucumber

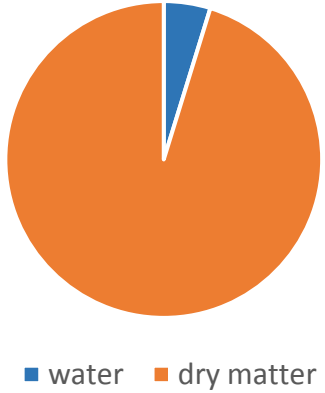


Chicken breast

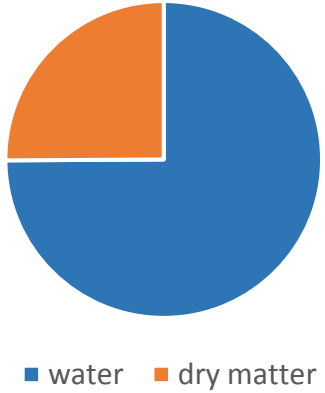
Yoghurt



Walnuts



Banana



Use nutrition information on food labels to help you make healthier food choices.