Diet composition and guidelines

U2

Foods are divided into 6 basic groups: each group includes similar foods as a source of one or more nutrients that are present in less significant amounts in the other groups

I gruppo

- proteine ad alto valore biologico
- sali minerali
- vitamine

II gruppo

- proteine ad alto valore biologico
- calcio
- vitamine gruppo B

III gruppo

- amido
- fibra

IV gruppo

- proteine
- minerali
- fibre

V gruppo

- lipidi
- vitamine liposolubili

VI gruppo

- vitamine
- minerali
- fibra

Diet composition and guidelines

U2

2. MORE CEREALS, LEGUMES, VEGETABLES AND FRUITS

Provide

1. starch and carbohydrates
2. Fiber
3. Vitamins and mineral
4. Bioactives

2. MAIN FIBER-rich FOODS

Legumes: beans, broad beans, chickpeas, lentils, peas

Cereals and derivatives: pasta, biscuits, bread and breakfast cereals (especially if wholemeal), bakery products, pearl barley

Vegetables : artichokes, cabbage, chicory, carrots, aubergines, beets, mushrooms, agretti, fennel

Fresh fruit: pears, apples, figs, bananas, kiwis, raspberries, prickly pears, currant

Dried fruit in shell: walnuts, hazelnuts, almonds

Dried fruit: dried apricots, dried figs, dried apples, raisins, prunes, dried chestnuts

Diet composition and guideli

4. SUGARS, SWEETS AND SUGARY DRINKS: WITHIN JUST LIMITS FRUITS

TABELLA 1 – CONTENUTO IN GRASSI, PROTEINE, CARBOIDRATI (AMIDO E ZUCCHERI SOLUBILI) E CALORIE DEI PIÙ COMUNI ALIMENTI DOLCI E BEVANDE (PER 100 GRAMMI DI PRODOTTO EDIBILE)

Alimenti	Grassi	Proteine	Carboidrati		Energia
			Amido	Zuccheri	
	g	g	g	g	kcal
Biscotti secchi	7.9	6.6	60.3	18.5	416
Cornetti	18.3	7.2	43.1	10.6	411
Cornflakes	0.8	6.6	70.0	10.4	361
Merendine farcite di latte	15.1	6.2	19.7	45.7	413
Merendine con marmellata	8.3	5.5	21.0	46.5	358
Crema di nocciole e cacao	32.4	6.9	tr	58.1	537
Panettone	10.7	6.4	30.3	22.9	333
Torta Margherita	10.4	8.9	26.6	34.1	367
Cioccolato al latte	36.3	7.3	tr	50.5	545
Caramelle dure	0	tr	0	91.6	344
Torrone alla mandorla	26.8	10.8	tr	52.0	479
Aranciata	0	0.1	0	10.0	38
Bevanda tipo cola	0	tr	0	10.5	39

TABELLA 2 – CONTENUTO IN GRASSI, PROTEINE, CARBOIDRATI (AMIDO E ZUCCHERI SOLUBILI) E CALORIE DEI PIÙ COMUNI ALIMENTI DOLCI E BEVANDE (PER PORZIONE)

Alimenti	Grassi	Proteine	Carboidrati		Energia
			Amido	Zuccheri	
	g	g	g	g	kcal
Biscotti secchi (2-4 unità – 20g)	1.6	1.3	12.0	3.7	83
Cornetti (1 unità – 40 g)	7.3	2.9	17.2	4.2	164
Cornflakes (4 cucchiai da tavola – 30g)	0.2	2.0	21.0	3.1	108
Merendine farcite di latte (1 unità – 35 g)	5.3	2.2	6.9	16.0	145
Merendine con marmellata (1 unità – 35 g)	2.9	2.0	7.4	16.3	125
Crema di nocciole e cacao (1 cucchiaio da tavola – 20 g)	6.5	1.4	tr	11.6	107
Panettone (1 porzione – 100 g)	10.7	6.4	30.3	22.9	333
Torta Margherita (1 porzione 100 g)	10.4	8.9	26.6	34.1	367
Cioccolata al latte (1 unità – 4 g)	1.5	0.3	tr	2.0	22
Caramelle dure (1 unità – 2,5 g)	0	tr	0	2.3	9
Torrone alla mandorla (1 porzione – 30g)	8	3.2	tr	15.6	144
Aranciata (1 lattina – 330 cc)	0	0.3	0	33.0	125
Bevanda tipo cola (1 lattina – 330cc)	0	tr	0	35.0	129

N.B.: I valori riportati nelle tabelle 1 e 2 sono tratti dalle Tabelle di Composizione degli Alimenti (INRAN – Aggiornamento 2000).

Diet composition

U2

CARBOHYDRATES

Carbohydrates are classified into four categories according to their chemical structure and degree of polymerization: monosaccharides, disaccharides, oligosaccharides, and polysaccharides

Monoaccarides

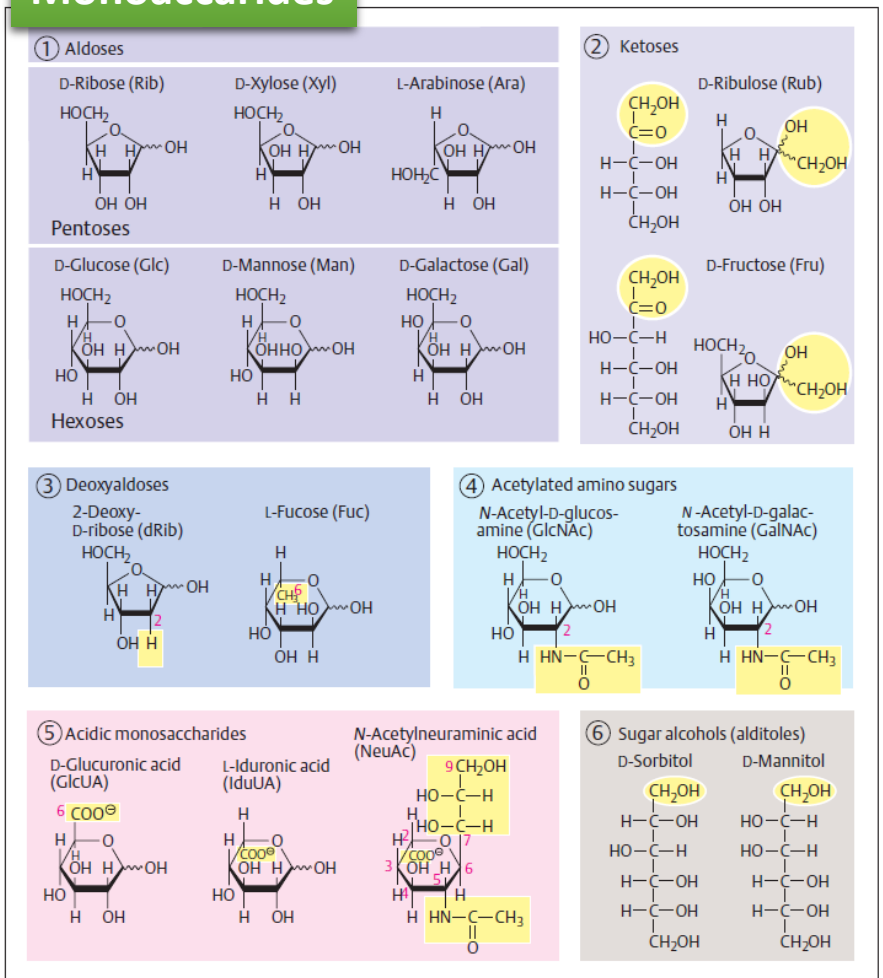


Table 1 Some nutritionally important monosaccharides

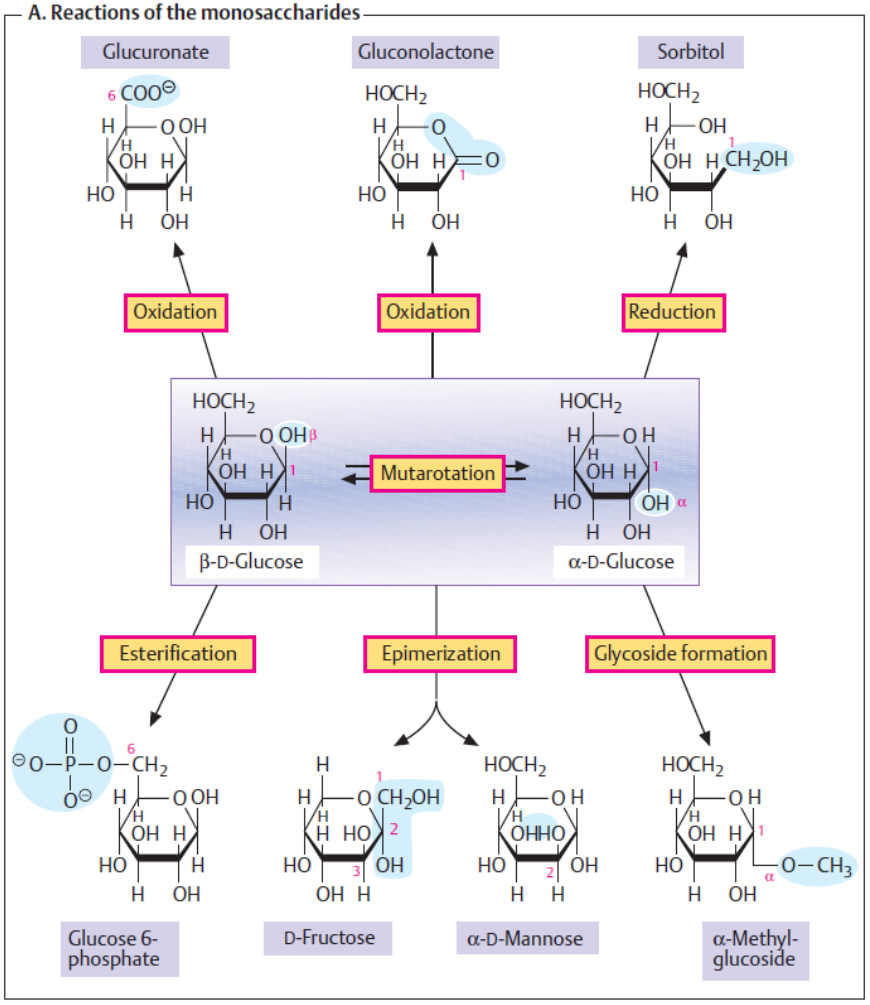
Class	*Species*	*Significance*
Hexoses	D-glucose	Major cell fuel, unbound in body fluids and tissues, building block of several polysaccharides
	D-fructose	Cell fuel, constituent of sucrose
	D-galactose	Cell fuel, constituent of lactose
	D-mannose	Constituent of plant cell wall polysaccharides and gums
Pentoses	L-arabinose, D-xylose	Constituent of plant cell wall polysaccharides
	D-ribulose, D-xylulose	Metabolite in pentose pathway
	D-ribose	RNA constituent
Uronic acids	D-glucuronic, D-galacturonic	Constituent of plant cell wall polysaccharides
	D-mannuronic, D-guluronic	Constituent of algal polysaccharides
Sugar alcohols	D-glucitol, D-xylitol	Food ingredient
	D-galactitol	Metabolite of galactose
Deoxysugars	D-deoxyribose	DNA constituent
	D-deoxygalactose	Constituent of algal polysaccharides
	L-fucose	Constituent of bacterial polysaccharides
	L-rhamnose	Constituent of pectic plant polysaccharides
Aminosugars	D-glucosamine, D-galactosamine	Constituent of aminosaminoglycans, cartilage

Diet composition

U2

CARBOHYDRATES

Monoaccarides



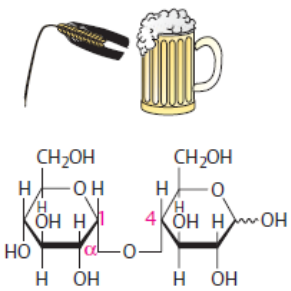
1. Mutarotation
2. Glycoside formation
3. Reduction and oxidation
4. Maillard reaction of the reducing sugars such as fructose, glucose

Diet composition

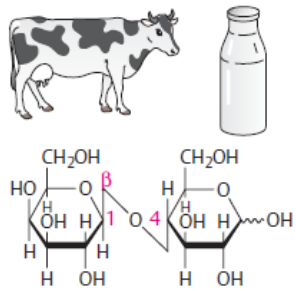
U2

CARBOHYDRATES

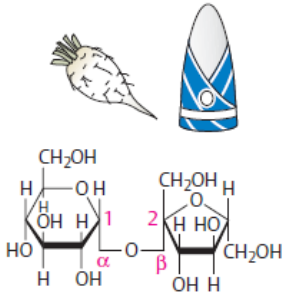
Disaccarides



1. Maltose
α-D-Glucopyranosyl-(1→4)-D-glucopyranose



2. Lactose
β-D-Galactopyranosyl-(1→4)-D-glucopyranose



3. Sucrose
α-D-Glucopyranosyl-(1↔2)-β-D-fructofuranoside

Table 2 Some nutritionally important disaccharides

Class	*Species*	*Significance*
Disaccharide	Sucrose	Constituent of fruits, vegetables, and sweetener
	Lactose	Constituent of milk and dairy products
	Maltose, Isomaltose	Constituent of starch
	Trehalose	Food additive, constituent of mushrooms
	Lactulose	Lactose derivative, laxative
Disaccharide alcohols	Maltitol	Constituent of starch, sweetner
	Lactitol	Constituent of lactose, sweetener

Olygosaccarides

Table 3 Some nutritionally important

Class	*Species*	*Significance*
Maltoses	Maltotriose, Maltotetraose	Constituent of starch
Raffinoses	Raffinose, Stachyose, Verbascose	Constituent of vegetables and legumes
Fructoses	Fructotriose	Constituent of cereals and tubers
Lactoses	Fucosyl lactoses	Constituent of human breast milk

Oligosaccharides consist of a chain of between three and nine monosaccharide units covalently linked to form large units and are named trioses, tetroses, etc, depending on the number of carbon atoms in their molecules. The major oligosaccharides are the raffinose series, formed by the linkage of galactose, sucrose, and glucose units, and the maltose series, formed by the linkage of glucose units.

Diet composition

CARBOHYDRATES

Polysaccarides

B. Important polysaccharides

Poly-saccharide	Mono-saccharide 1	Mono-saccharide 2	Linkage	Branch-ing	Occurrence	Function
Plants						
Agarose	D-Gal	L-aGal[2)]	β 1→4	β 1→3	Red algae (agar)	WB
Carrageenan	D-Gal	—	β 1→3	α1→4	Red algae	WB
Cellulose	D-Glc	—	β 1→4	—	Cell wall	SC
Xyloglucan	D-Glc	D-Xyl (D-Gal, L-Fuc)	β 1→4	β 1→6 (β 1→2)	Cell wall (Hemicellulose)	SC
Arabinan	L-Ara	—	α 1→5	α1→3	Cell wall (pectin)	SC
Amylose	D-Glc	—	α 1→4	—	Amyloplasts	RC
Amylopectin	D-Glc	—	α 1→4	α 1→6	Amyloplasts	RC
Inulin	D-Fru	—	β 2→1	—	Storage cells	RC
Animals						
Chitin	D-GlcNAc	—	β 1→4	—	Insects, crabs	SK
Glycogen	D-Glc	—	α 1→4	α1→6	Liver, muscle	RK
Hyaluronic acid	D-GlcUA	D-GlcNAc	β 1→4 β 1→3	—	Connective tissue	SK,WB

SC= structural carbohydrate, RC= reserve carbohydrate,
WB = water-binding carbohydrate; [1)] *N*-acetylmuramic acid, [2)] 3,6-anhydrogalactose

A. Polysaccharides: structure

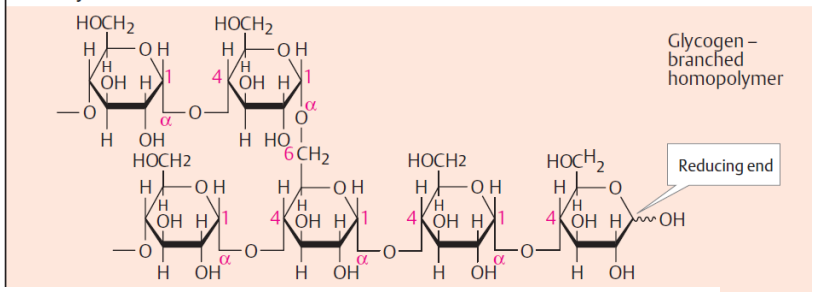


Figure 3A Amylose

Amylose molecules consist typically of 200 to 20,000 glucose units, which form a helix as a result of the bond angles between the glucose units.

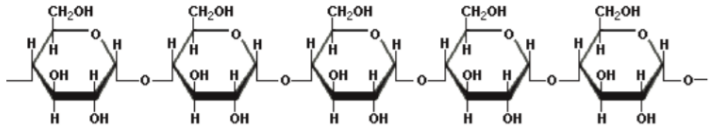
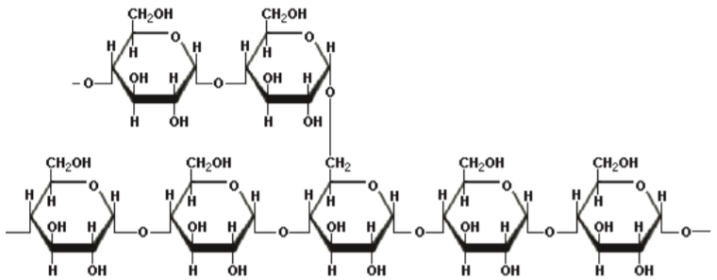
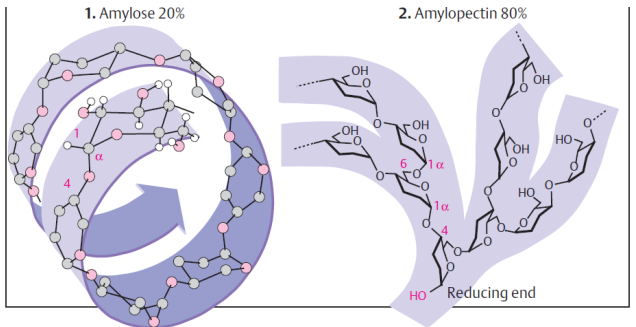


Figure 3B Amylopectin

Amylopectin differs from amylose in that it is highly branched. Short chains of about 30 glucose units are attached with 1 α→6 linkages approximately every twenty to thirty glucose units along the chain. Amylopectin molecules may contain up to two million glucose units.





Diet composition

CARBOHYDRATES

Polysaccarides

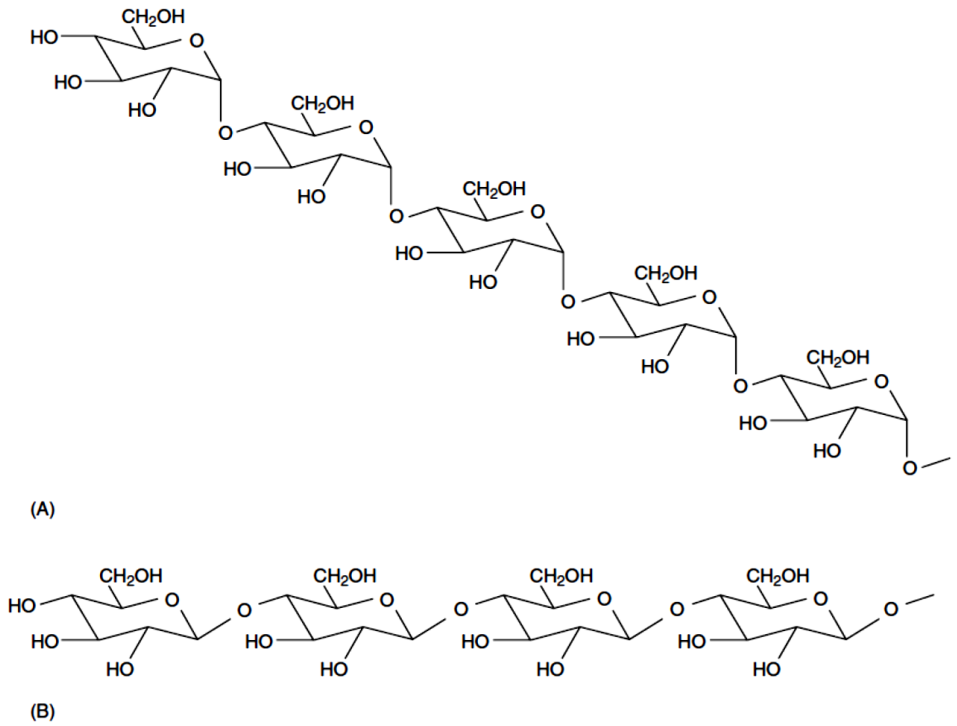


Figure 3 (A) Five units of an α-1,4-D-glucopyranose chain from a starch molecule (amylose). (B) Four units of a β-1,4-D-glucopy chain from a cellulose molecule.

Maltodextrin is a polysaccharide that is used as a food additive. It is produced from starch by partial hydrolysis and it is easily digestible. It consists of D-glucose units with α(1→4) glycosidic bonds. The chain vary from three to 17 glucose units long.

Table 4 Some nutritionally important polysaccharides

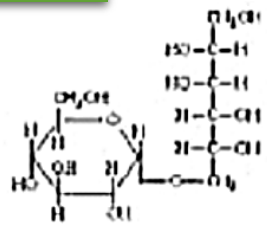
Class	*Species*	*Significance*
Glucans	Starch	Storage polysaccharide in plants
	Glycogen	Short-term storage form of glucose in animal tissues
	Cellulose	Major structural component of plant cell walls
Galactans		Major constituents of noncellulosic matrix of plant cell wall
Xylans		Constituents of mature plant tissues
Mannans		Storage forms in several plants
Uronans	Galacturonans	Major components of water-soluble pectic fraction of plants
	Mannuronans	Components of algal polysaccharides
	Guluronans	Components of algal polysaccharides
Starch	Amylose, amylopectin	Most common digestible plant polysaccharides
Nonstarch	Cellulose	Major component of plant cell wall
	Pectin	Constituent of plant cell wall, food additive
	Hemicellulose	Constituent of plant cell wall
	Gums, mucilages	Plant hydrocolloids, food additives
	Algal polysaccharides	Constituents of algae and seaweed, food additives

Diet composition

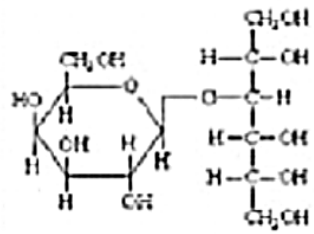
U2

CARBOHYDRATES

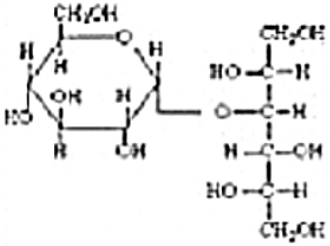
Poliols



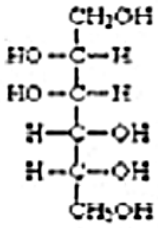
Isomalt



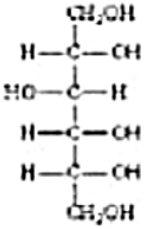
Lactitol



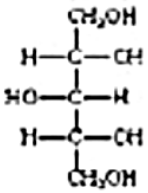
Maltitol



Mannitol



Sorbitol



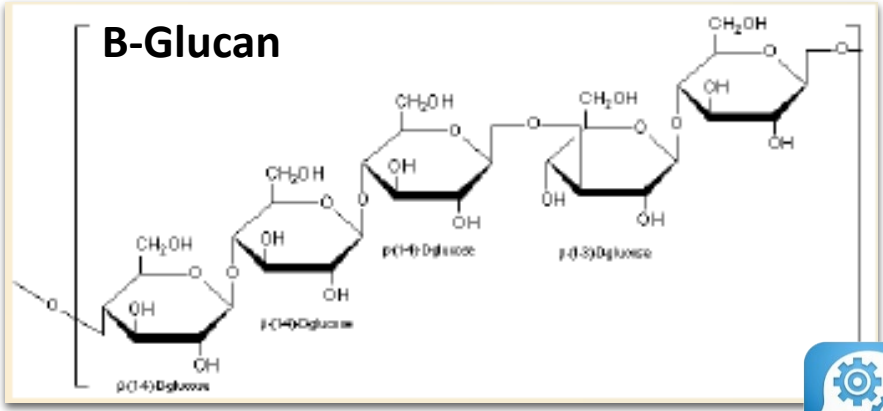
Xylitol

Fiber

Current definitions of dietary fiber

Source	*Definitions*
AOAC[a] IOM[b]	Fiber: nondigestible animal and plant carbohydrates Dietary fiber: intact nondigestible carbohydrates and lignin, derived from plant sources Functional fiber: nondigestible carbohydrates derived from either plant or animal sources that have shown favourable health outcomes for humans Total fiber: dietary and functional fiber

[a]AOAC: Association of Official Analytical Chemists
[b]IOM: Institute of Medicine



Diet composition

U2

CARBOHYDRATES - functions

Energy function
Glucose can be used by cells of all tissues, but it is essential for the brain and red blood cells. In the absence of glucose, the body is able to produce it starting from the amino acids of the proteins and from the glycerol present in the triglycerides (neoglicogenesis).

Plastic function
Carbohydrates provide material for the synthesis of indispensable structural and functional compounds such as nucleoproteins (DNA and RNA), mucoproteins and glycolipids.

Regulatory functions
Effect of saving on proteins
The production of glucose starting from the amino acids (neoglicogenesis) is canceled when the body has available glucose from foods (starch, sucrose). A diet rich in carbohydrates allows a saving of the share of proteins because they can be better used for the synthesis of body proteins

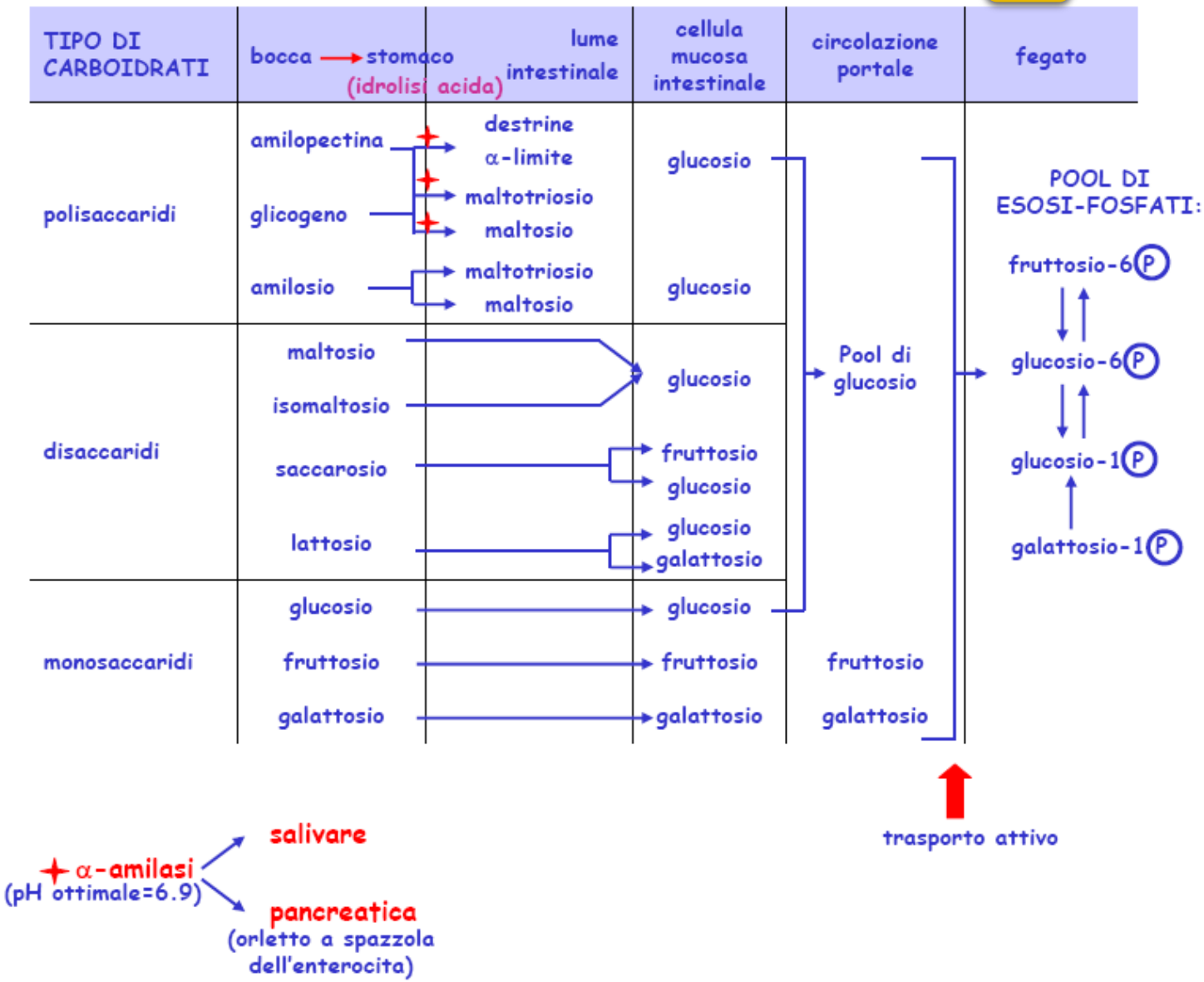
Antichetogenous effect
The normal course of lipid metabolism requires the presence of carbohydrates:
if the oxidation of fats occurs in conditions of carbohydrate deficiency, there is the formation of ketone bodies (acetacetic acid, beta-hydroxybutyric acid, acetone). The resulting state is called ketosis.
It can be observed in the child with febrile processes, in the course of diets lacking carbohydrates, fasting and diabetes mellitus, and can give rise to acidosis (ketoacidosis).

Organoleptic function
Finally, the "sugars" also have an organoleptic function, as they store sweet taste.

Diet composition

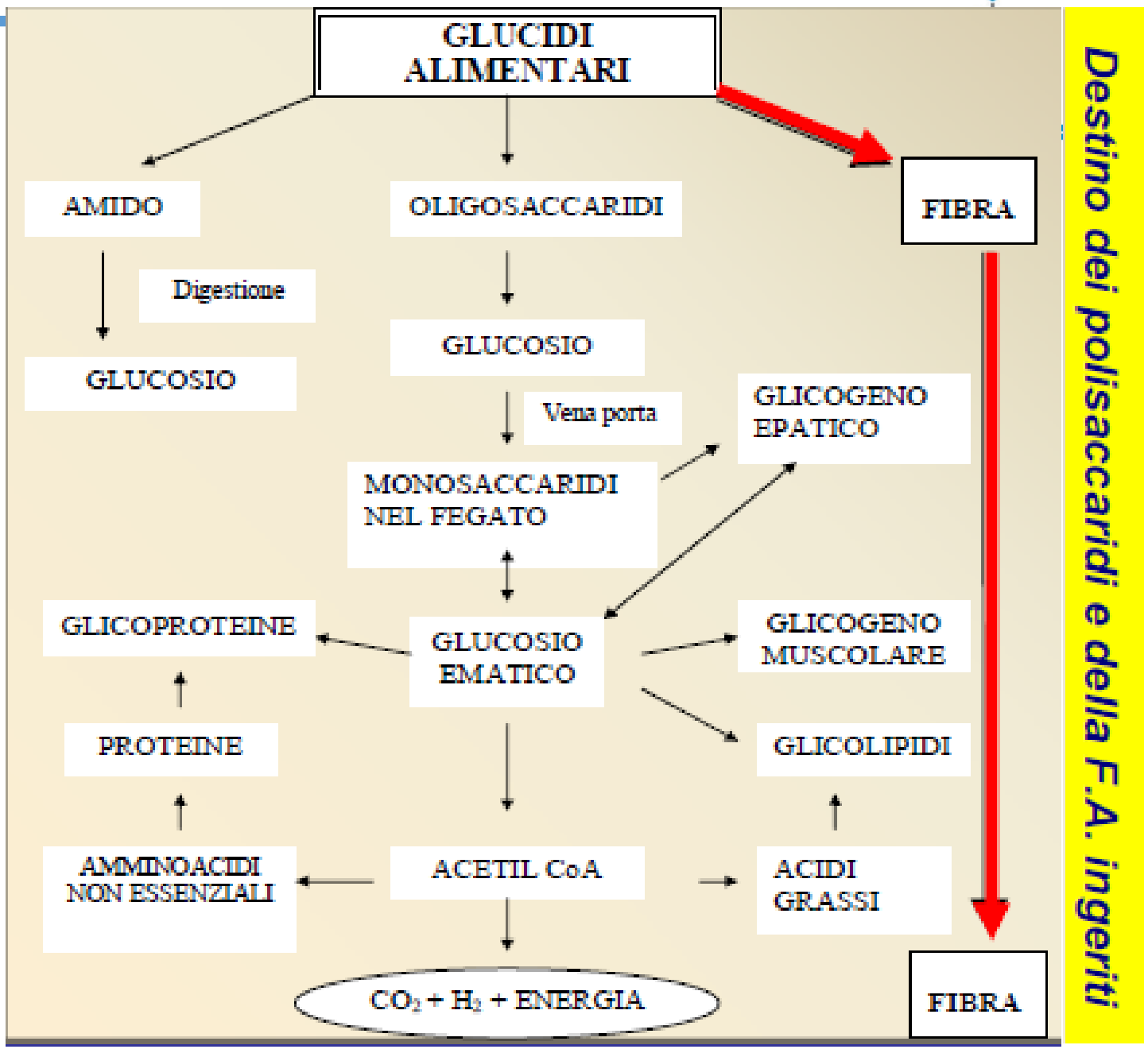
U2

CARBOHYDRATES



Diet composition

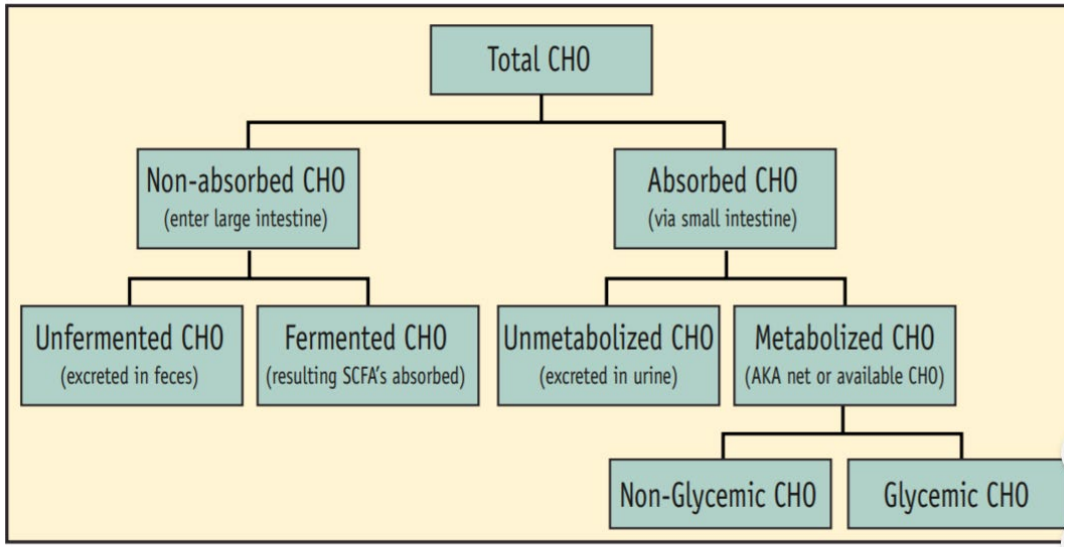
CARBOHYDRATES



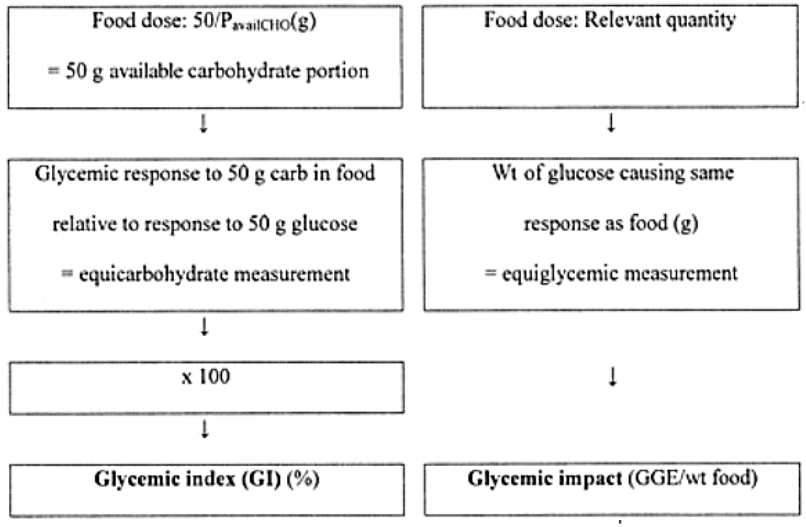
Diet composition

U2

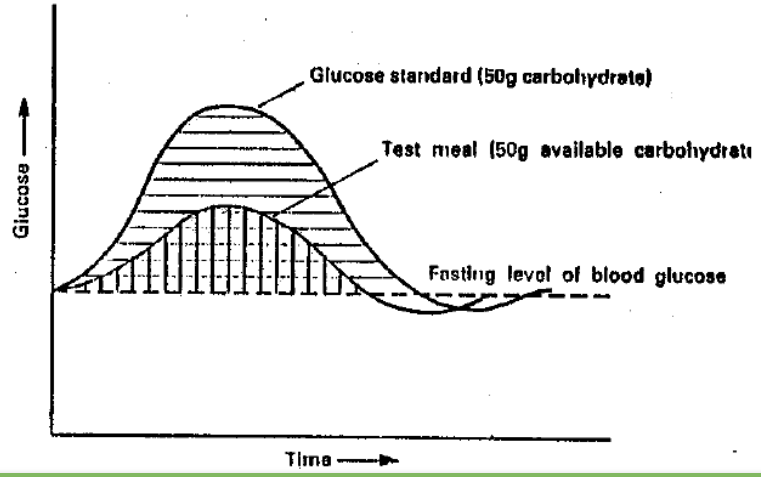
CARBOHYDRATES AVAILABLE



'Available carbohydrate' is carbohydrate that is digested and absorbed in the small intestine.



The glycemic index (GI) is defined as the area under the 2-h curve of blood glucose after the ingestion of a set amount of carbohydrate compared to ingestion of the same amount of carbohydrate from a reference food (white bread or glucose). The GI is expressed as a percentage of the standard food value:



Glycemic index **GI** =(Area under the curve of test food/ Area under the curve of standard food)x 100

Diet composition

CARBOHYDRATES AVAILABLE

- 70 – 100: alti
- 55 – 70: medi
- < 55: bassi

Table 5 Examples of foods high and low in glycemic index (GI) and glycemic load (GL)[a]

	GI	*Serving size (g)*	*GL*
Low GI/low GL			
Apple, NS (USA)	40	120	6
Oranges (Sunkist, USA)	48	120	5
Healthy Choice hearty 7-grain bread (USA)	55 ± 6	30	8
Ice cream, premium, French Vanilla—16% fat (Australia)	38 ± 3	50	3
Kidney beans (USA)	23	150	6
Pizza, Super Supreme, thin and crispy—13.2% fat, Pizza Hut (Australia)	30 ± 4	100	7
Low GI/high GL			
Barley (*Hordeum vulgare*) (India)	43 ± 6	150	26
High GI/low GL			
Watermelon, raw (Australia)	72 ± 13	120	4
White wheat flour bread	70	30	10
High GI/high GL			
Cornflakes (Kellogg's, USA)	92	30	24
Bagel, white, frozen (Lenders, Canada)	72	70	25
White rice, type NS, boiled 13 minutes (Italy)	102	150	31

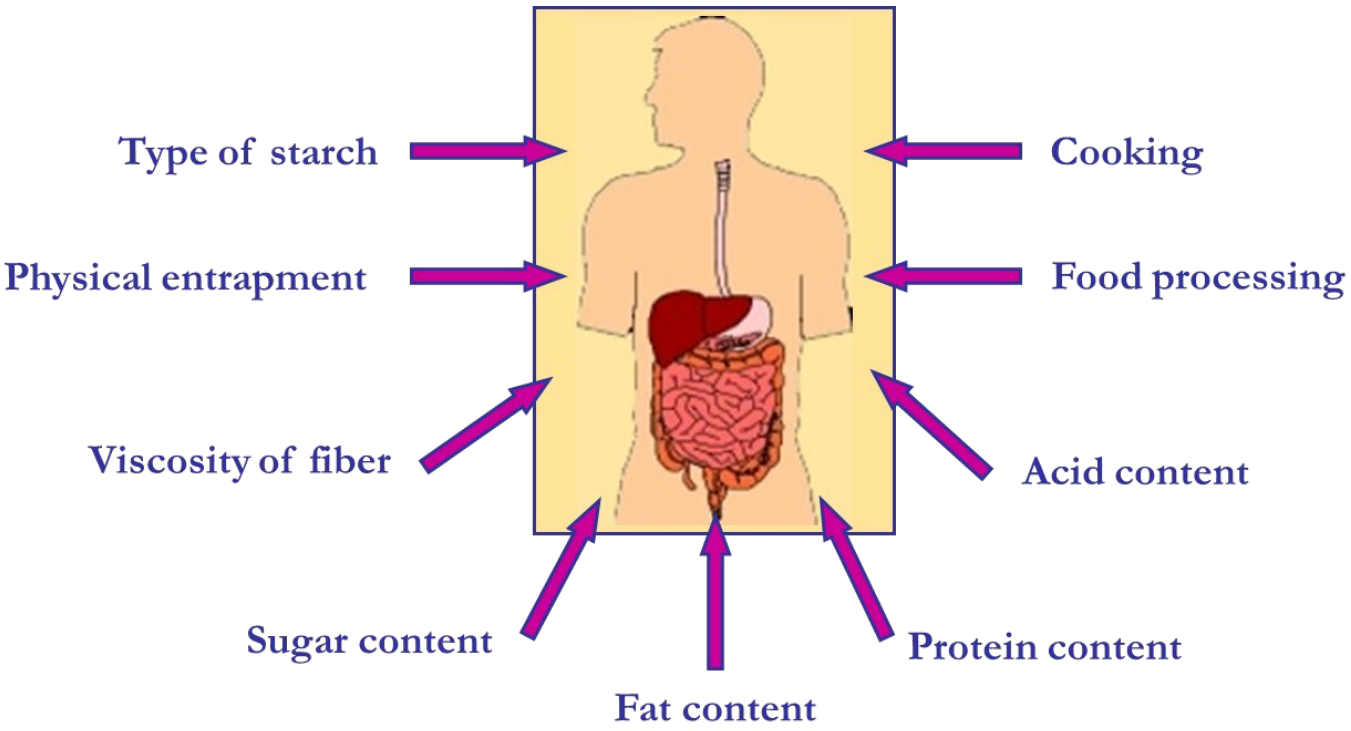
[a]High GI is considered >70 and low <55. High GL is considered >20 and low <10.

Adapted from Foster-Powell K, Holt SH, and Brand-Miller JC (2002) International table of glycemic index and glycemic load values. *American Journal of Clinical Nutrition* **76**(1): 5–56.

Diet composition

U2

CARBOHYDRATES AVAILABLE - Factors influencing GI of foods

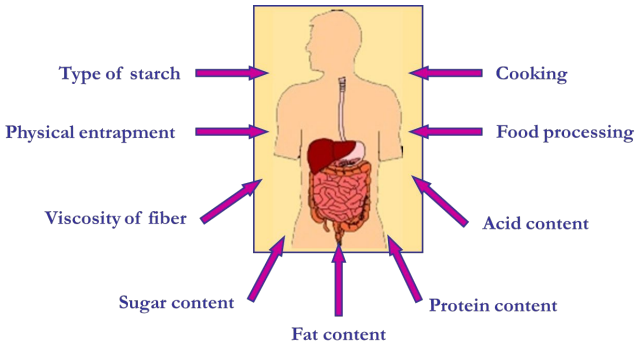


Is the GI a standard for the same kind of food?
Can these aspects affect our glycemic levels?

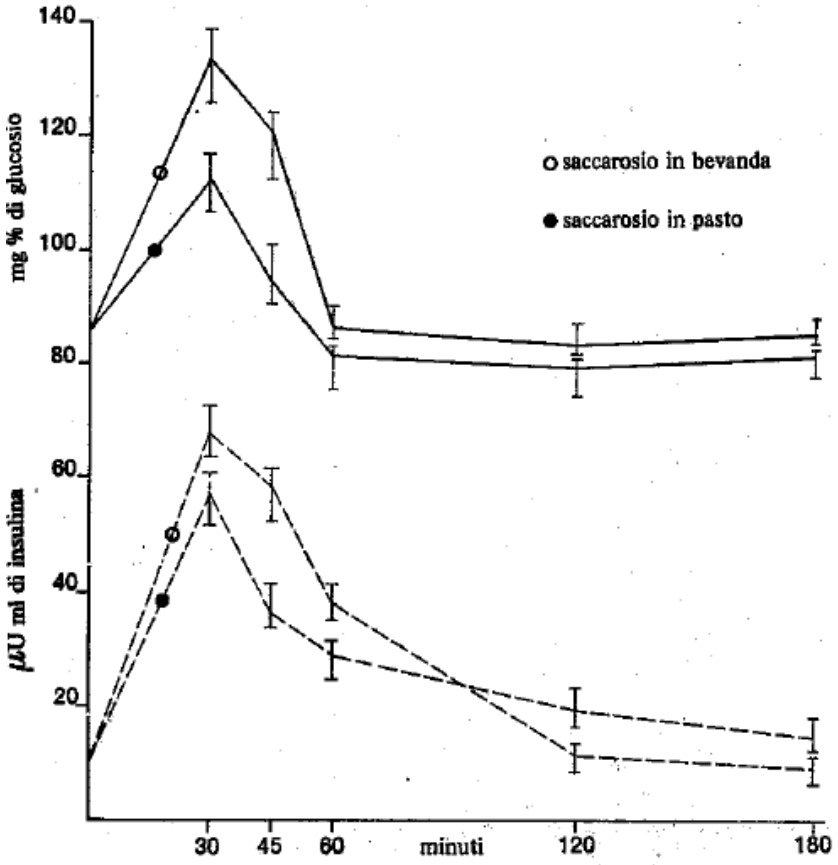
Diet composition

U2

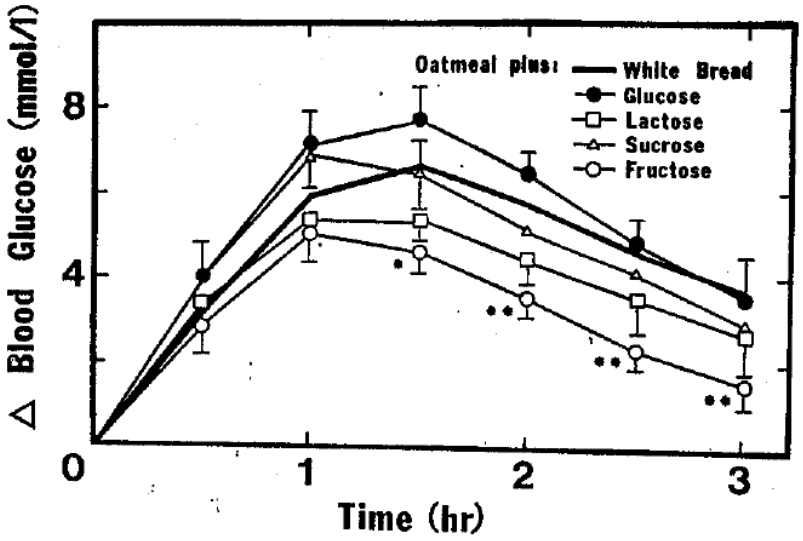
CARBOHYDRATES AVAILABLE - Factors influencing GI of foods



Nature of food (solid or liquid)



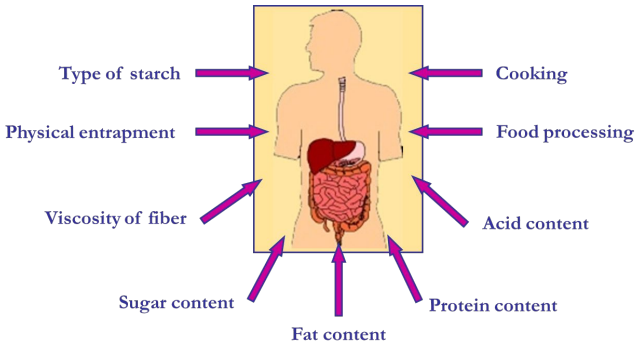
Nature of sugar



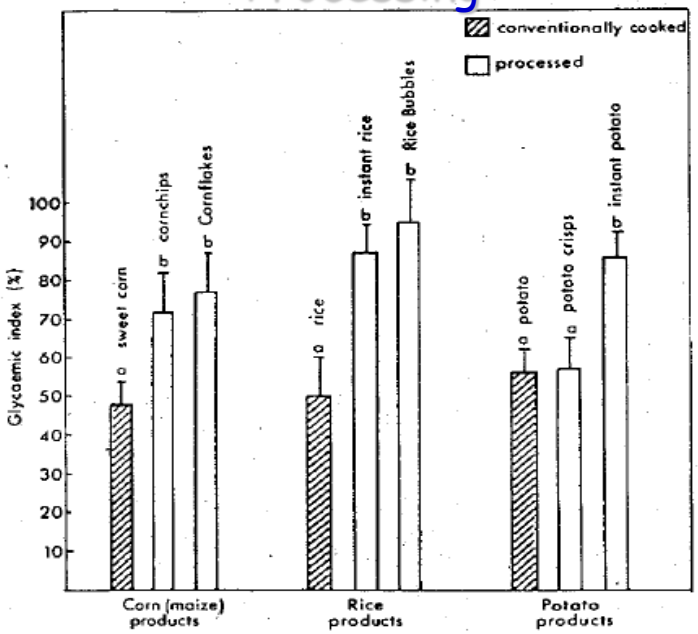
Diet composition

U2

CARBOHYDRATES AVAILABLE - Factors influencing GI of foods

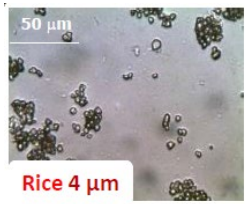


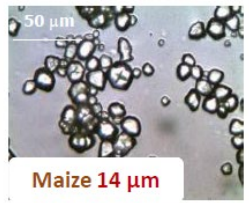
Processing

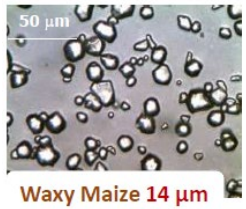


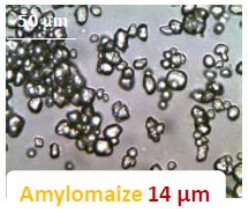
The effect of processing on the glycemic response to foods in six normal subjects. Bars bearing differ letters are significantly different from each other ($p < 0.05$).

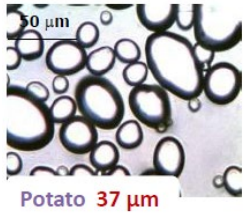
Nature of starch

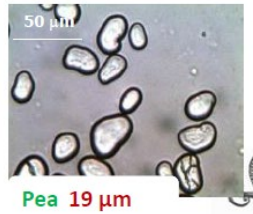








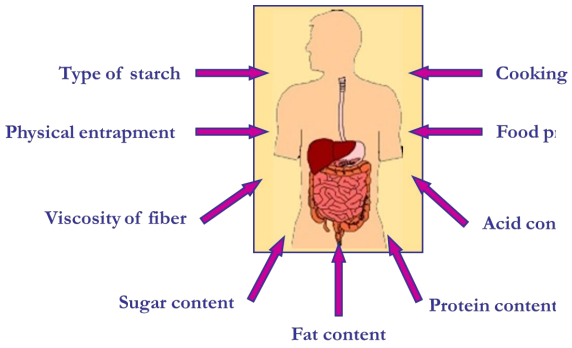




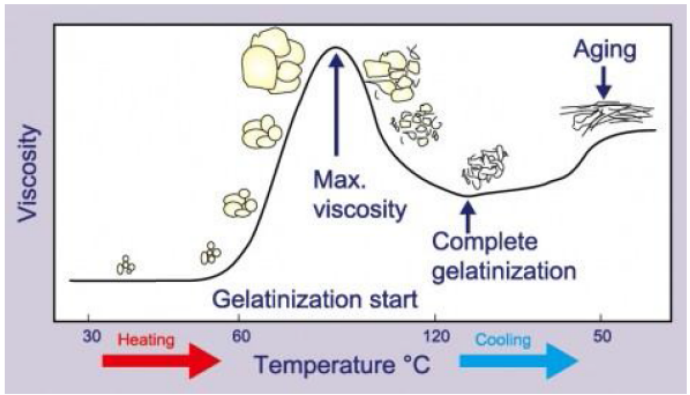
Diet composition

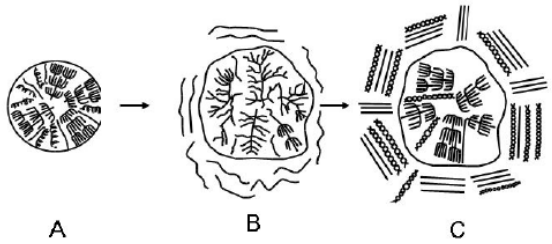
U2

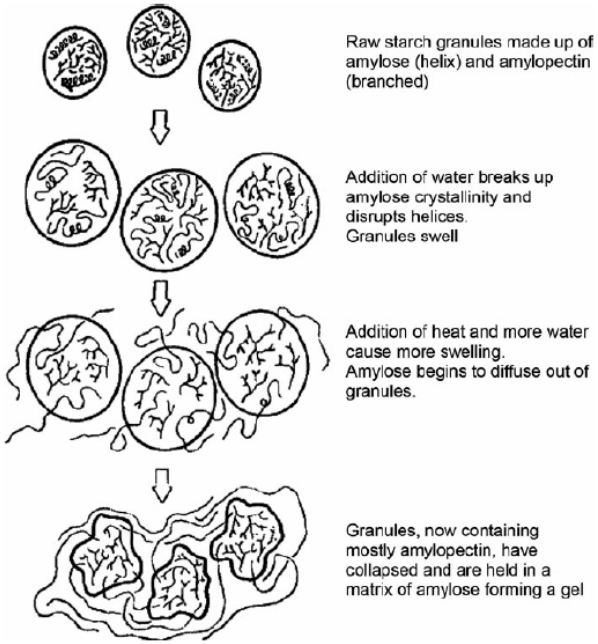
CARBOHYDRATES AVAILABLE - Factors influencing GI of foods

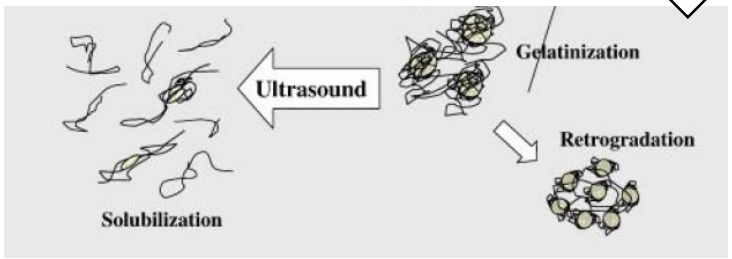


Starch cooking





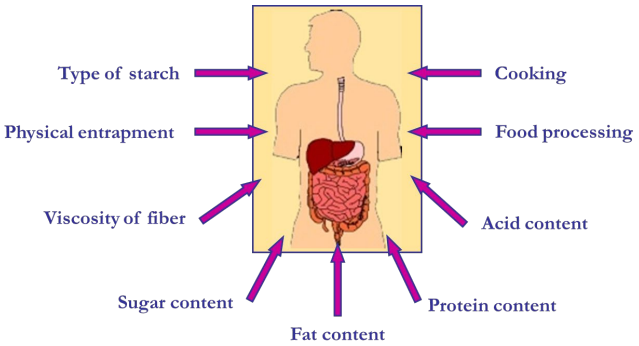




Diet composition

U2

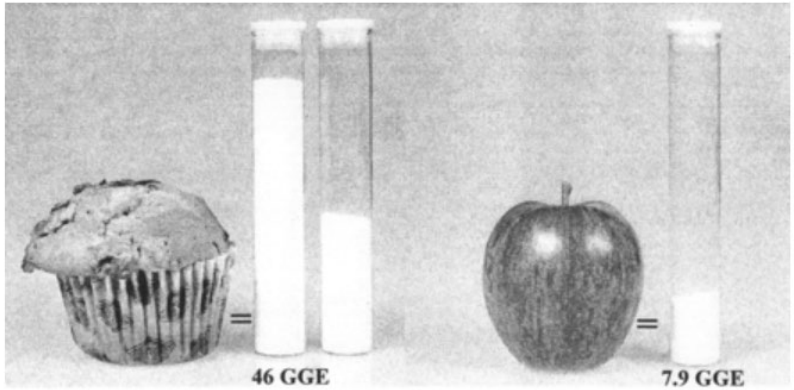
CARBOHYDRATES AVAILABLE - Factors influencing GI of foods



Sugar content

sugar ⇨ sucrose ⇨ glucose + fructose
(GI 60) (GI 100) (GI 19)

starch ⇨ maltose ⇨ glucose + glucose
(GI 105) (GI 100) (GI 100)



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Glycemic impact expressed as a glycemic glucose equivalent (GGE) intake. The sweet muffin has a glycemic impact equivalent to that of 46 g glucose, and the apple's glycemic impact is equivalent to that of 7.9 g glucose.

Fat & Protein

Fat and protein slow down gastric emptying, and thus, slows down digestion of starch.

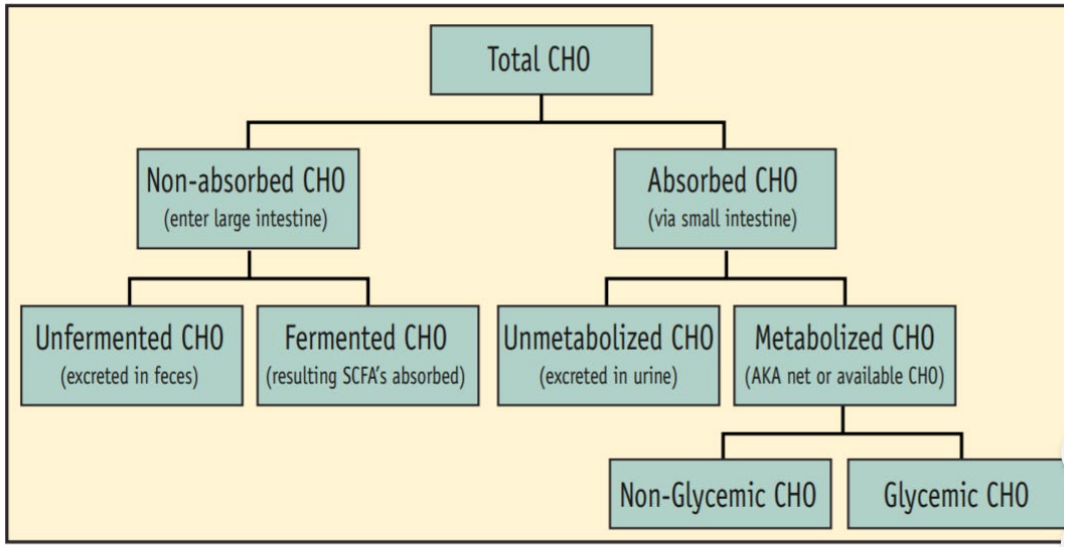
Acid content

Acid slows down gastric emptying, and thus, slows down the digestion of starch.

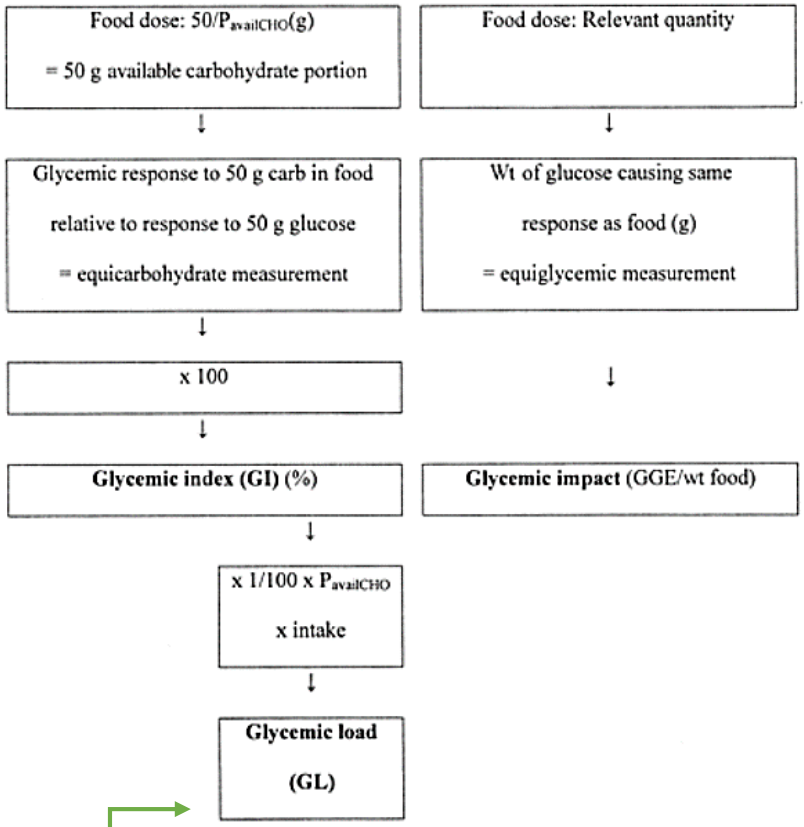
Diet composition

U2

CARBOHYDRATES AVAILABLE



'Available carbohydrate' is carbohydrate that is digested and absorbed in the small intestine.



The glycemic load (GL) is an additional measure in which the amount of carbohydrate in a typical portion is taken into account

Glycemic load **GI =** GI/100 x CHO (grams) per serving

Example: GL of an apple = 40/100 x 15g = 6g

Glycemic load reflects both the quality and the quantity of dietary carbohydrates

Diet composition

U2

CARBOHYDRATES AVAILABLE- GI vs GL

Glycemic Index: ranks carbohydrates based on their immediate blood glucose response.
GI = glycemic quality

Glycemic Load: helps predict blood glucose response to specific amount of specific carbohydrate food.

GL = glycemic { *quality*, *quantity*

GI = 60 GL = 48

GI = 42 GL = 31

Diet composition

U2

CARBOHYDRATES NOT-AVAILABLE and their relationship with GI and GL

Soluble Fiber

The most common fiber are cellulose, hemicellulose, lignins, pectins, and gums.

Fiber is resistant to digestive enzymes and hence leaves some residue in the digestive tract.

There are two categories of dietary fiber:
water soluble (**pectin, guar gum, inulin, glucanes**), presents in oats, rye, beans and other legumes, pulp of fruits and vegetables

water insoluble(**cellulose, hemicellulose, lignin**) presents in brown rice, corn, wheat bran (outer layer of the whole grain), peelings of fruits and vegetables

Fibra solubile	Fibra insolubile
Polisaccaridi a basso peso molecolare e con costituenti polari	Polisaccaridi ad alto peso molecolare
Non digerita nell'intestino tenue	Non digerita nell'intestino tenue
Possiede elevate capacità di idratazione	Trattiene H2O e gas presenti nel lume intestinale stimolando la velocità di transito
Aumenta la viscosità del contenuto intestinale interferendo con la velocità di transito	Interferisce in modo trascurabile con la viscosità
Totalmente fermentata nel colon	Scarsamente fermentata nel colon
Non escreta	Quasi totalmente escreta

Diet composition

CARBOHYDRATES NOT-AVAILABLE

and their relationship with GI and GL

Fiber

INSOLUBLE FIBER

Increase through water binding the volume of the stomach content

↓

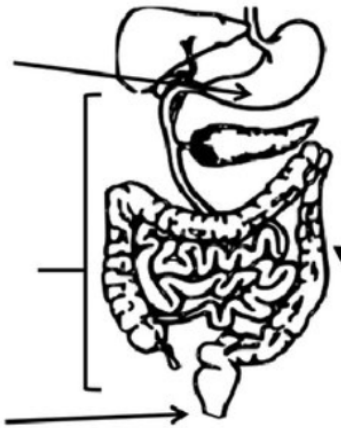
Satiety ↑

Decreased transit time through gastro-intestinal tract

NON FERMENTABLE

Stool weight ↑

"bulking effect"



SOLUBLE FIBER

Soluble in water

Passage through stomach and small intestine

-No influence: unchanged arrival in colon

-If very viscous: delayed rate of digestion

FERMENTABLE

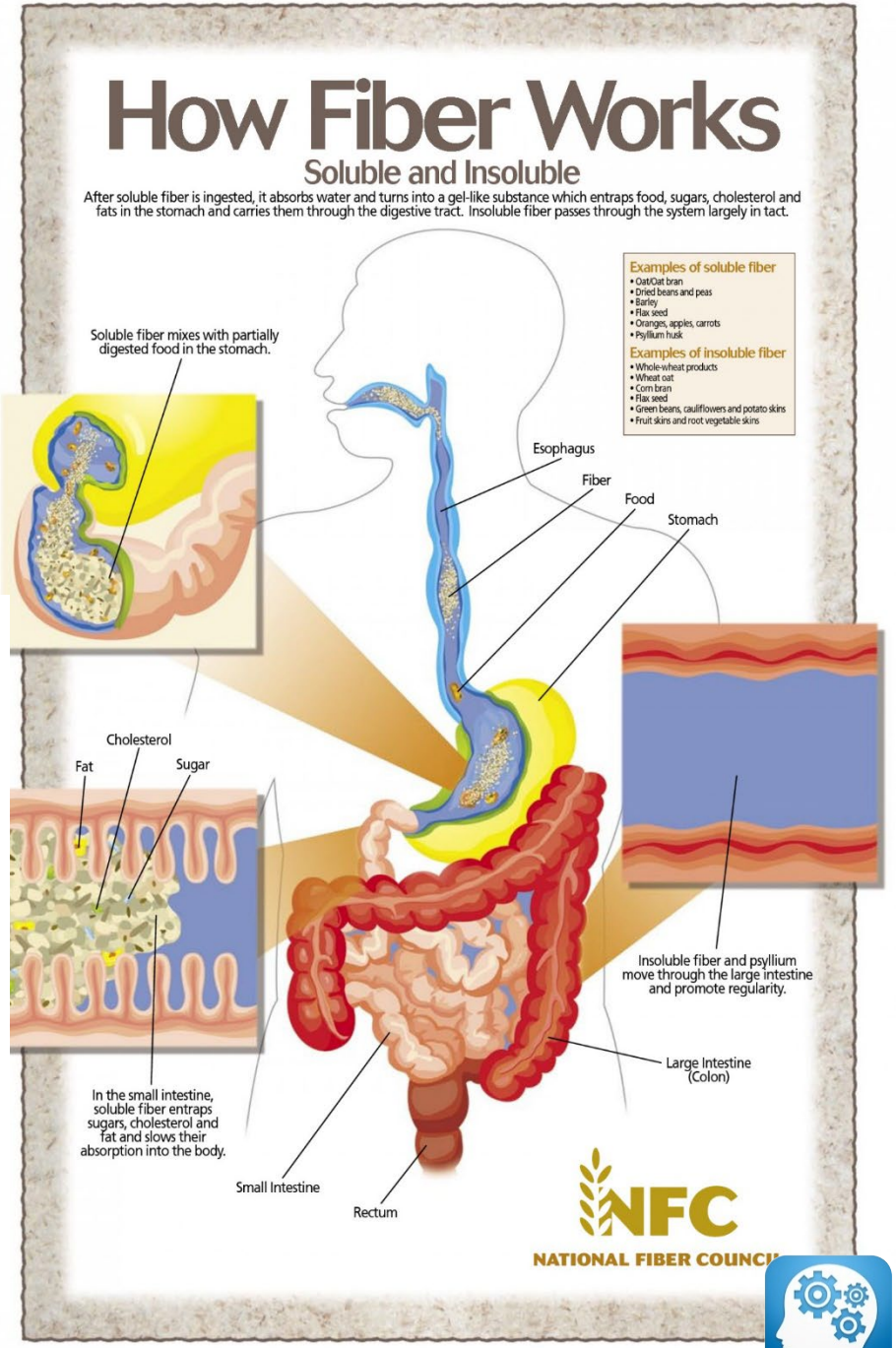
Dependent on:

- Substrate : physical and chemical properties
- Microbiota composition
- Transit time

Micriobial mass ↑

↓

Stool weight ↑



Diet composition

U2

CARBOHYDRATES NOT-AVAILABLE and their relationship with GI and GL

Fiber

In food supplements in which Fiber is concemntrated be aware to the coassumption of:

- Drugs (far from drug assumption because decrease the effect)
- The assumption should be always to be done with a properly amounts of water

Composizione chimica dei costituenti della fibra

FRAZIONI	Catena Principale	Catena Secondaria
CELLULOSA	Glucosio	----
EMICELLULOSE	Xilosio Mannosio Galattosio Glucosio	Arabinosio Galattosio Ac. glucuronico
PECTINE	Ac. galatturonico	Ramnosio Arabinosio Xilosio Fucosio
MUCILLAGINI	Galattosio-mannosio Glucosio-mannosio Arabinosio-xilosio Ac. galatturonico-ramnosio	Galattosio
GOMME	Galattosio Ac. glucuronico-mannosio Ac. galatturonico-ramnosio	Xilosio Fucosio Galattosio
POLISACCARIDI ALGALI	Mannosio Xilosio Ac. glucuronico Glucosio	Galattosio
LIGNINA	Alcol sinapilico Alcol coniferilico Alcol p-cumarilico	Struttura tridimensionale

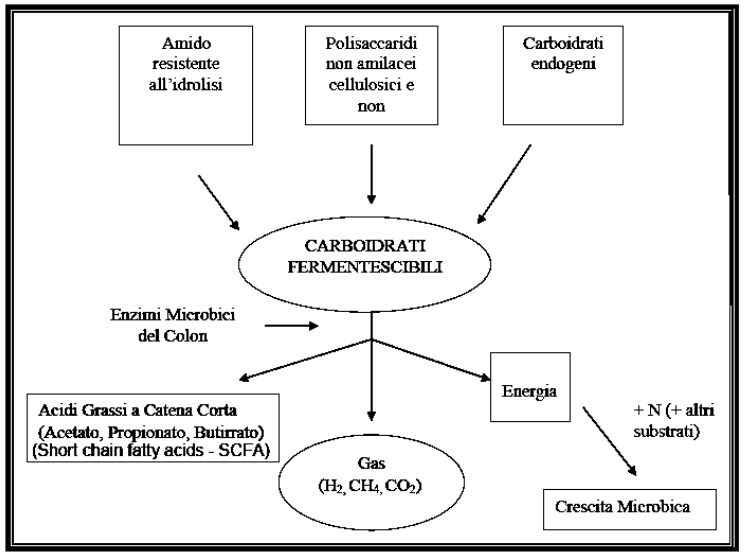
Diet composition

CARBOHYDRATES NOT-AVAILABLE

and their relationship with GI and GL

Fiber

La fibra alimentare ingerita produce energia. Il livello medio di **energia** fornito dalla fermentazione della fibra è compreso tra **1,5 e 2,5 kcal/g 6,3-10,5 kJ/g)**



Alimento	Fibra solubile	Fibra insolubile	Fibra totale
	g/100 g di sostanza edibile		
Cereali e derivati			
Farina bianca tipo 00	0,84	1,41	2,2
Farina integrale	1,92	6,52	8,4
Crusca	1,31	41,13	42,4
Pane bianco	1,46	1,72	3,2
Pane integrale	1,15	5,36	6,5
Fiocchi d'avena	3,30	4,99	8,3
Legumi			
Fagioli borlotti secchi	1,54	15,71	17,3
Fagioli borlotti freschi	0,91	3,93	4,8
Piselli freschi	0,45	5,80	6,3
Verdure			
Broccolo, bollito	0,84	2,42	3,3
Carciofi, freschi, bolliti	4,68	3,17	7,9
Carote crude	0,41	2,70	3,1
Cicoria di campo, bollita	1,12	2,43	3,6
Cipolle crude	0,16	0,88	1,0
Funghi prataioli, crudi	0,11	2,14	2,3
Lattuga	0,13	1,33	1,5
Patate, crude	0,71	0,85	1,6
Pomodoro, da insalata	0,24	0,77	1,0
Spinaci, bolliti	0,42	1,64	2,1
Frutta			
Banana	0,62	1,19	1,8
Fragola	0,45	1,13	1,6
Mela, con buccia	0,73	1,84	2,6
Pera, senza buccia	1,29	2,56	3,8
Uva bianca	0,16	1,20	1,4
Frutta secca/farinosa/oleosa			
Arachidi	1,03	9,89	10,9
Castagne	0,37	4,33	4,70
Datteri, secchi	1,24	7,49	8,70
Fichi secchi	1,94	11,01	13,0
Noci	0,84	5,37	6,20

Diet composition

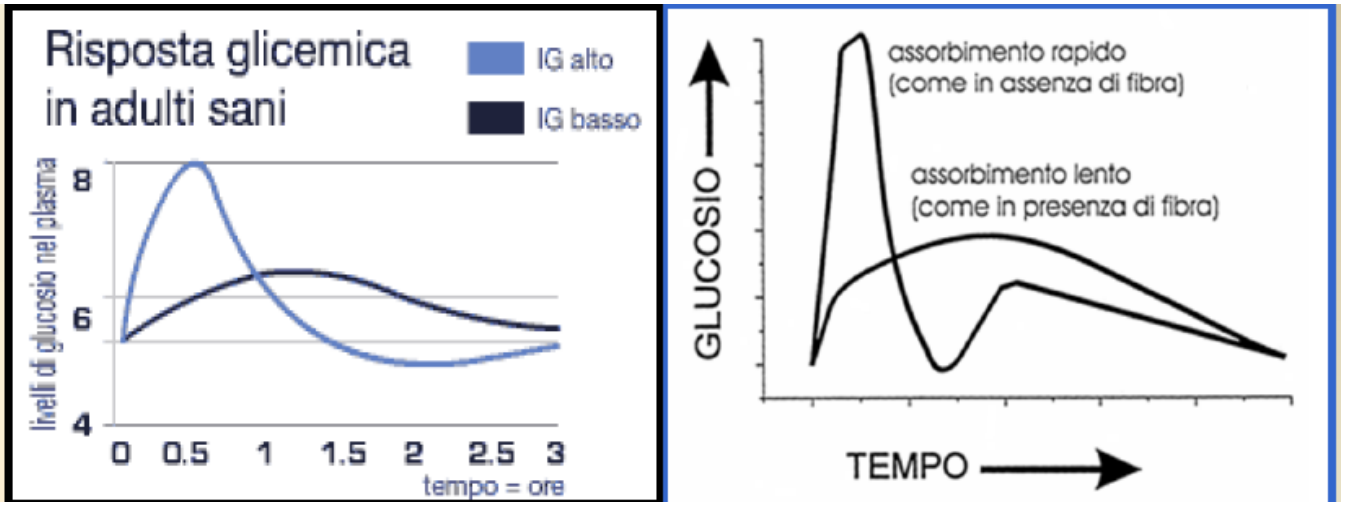
U2

CARBOHYDRATES NOT-AVAILABLE

and their relationship with GI and GL

Fiber

effect on post-prandial response



Foods with high GI provides a very fast varition of glycemia with insulin production rapid hypoglycemia.

While low GI foods generates a slowly glycaemic response. This is important not only for diabetic people but for the population in general.

Diet composition

U2

Società Italiana di Nutrizione Umana-SINU, 2014

CARBOHYDRATES

recommended intake

LARN - Livelli di assunzione di riferimento per la popolazione italiana: CARBOIDRATI E FIBRA ALIMENTARE.

LARN PER CARBOIDRATI E FIBRA ALIMENTARE			
Componente	**SDT** Obiettivo nutrizionale per la prevenzione	**AI** Assunzione adeguata	**RI** Intervallo di riferimento per l'assunzione di macronutrienti
Carboidrati totali	Prediligere fonti alimentari amidacee a basso GI in particolare quando gli apporti di carboidrati disponibili si avvicinano al limite superiore dell'RI. Tuttavia, limitare gli alimenti in cui la riduzione del GI è ottenuta aumentando il contenuto in fruttosio o in lipidi.		45-60% En*
Zuccheri **	Limitare il consumo di zuccheri a <15% En. Un apporto totale >25% En (95° percentile di introduzione nella dieta italiana) è da considerare potenzialmente legato a eventi avversi sulla salute. Limitare l'uso del fruttosio come dolcificante. Limitare l'uso di alimenti e bevande formulati con fruttosio e sciroppi di mais ad alto contenuto di fruttosio.	nd	nd
Fibra alimentare	Preferire alimenti naturalmente ricchi in fibra alimentare quali cereali integrali, legumi, frutta e verdura. Negli adulti, consumare almeno 25 g/die di fibra alimentare anche in caso di apporti energetici <2000 kcal/die.	Età evolutiva: 8,4 g/1000 kcal (2 g/MJ)	Adulti: 12,6-16,7 g/1000 kcal (3-4 g/MJ)

I LARN indicati in tabella fanno riferimento agli apporti medi per un ragionevole intervallo di tempo. L'evidenza scientifica non consente di definire il livello massimo tollerabile di assunzione (UL) per nessuno dei gruppi di interesse.
GI: indice glicemico; % En: percentuale dell'energia totale della dieta; nd: non disponibile.
* un apporto minimo di carboidrati disponibili di 2 g/kg di peso corporeo (desiderabile) ×die è sufficiente per prevenire la chetosi; il limite superiore dell'intervallo di introduzione pari al 65% En può essere accettato in condizioni di elevato dispendio energetico da attività fisica intensa.
** comprendono gli zuccheri naturalmente presenti in latte, frutta e verdura, e gli zuccheri aggiunti.

Diet composition

U2

CARBOHYDRATES used in dietary products

Molecola	Effetti	Note
Fibra alimentare Fibra insolubile Fibra solubile	in caso di ridotto apporto di fibra con la dieta e conseguente rallentato transito intestinale; per facilitare il conseguimento della sensazione di sazietà, nell'ambito di diete globalmente finalizzate al controllo/ riduzione del peso; per l'azione tendente a rallentare l'assorbimento dei nutrienti, nell'alimentazione di individui affetti da turbe del metabolismo lipidico e glucidico;	
Frutto-oligosaccaridi/inulina	prebiotico: equilibrio della flora batterica;	
Galatto-oligosaccaridi	prebiotico: equilibrio della flora batterica;	
Arabinogalattano	prebiotico: equilibrio della flora batterica	
Beta glucano	metabolismo del colesterolo; naturali difese dell'organismo;	

Diet compositio

3. FATS: CHOOSE THE QUALITY AND LIMITS THE AMOUNT

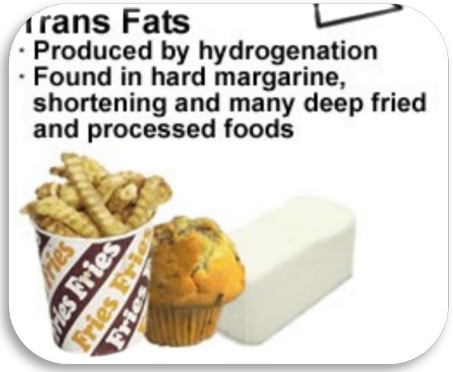


TABELLA 1 - CONTENUTO DI GRASSI TOTALI, GRASSI SATURI E COLESTEROLO IN ALCUNI ALIMENTI

Alimenti	g di grasso per 100 g di alimento[1]	Peso di una porzione	Contenuto per porzione		
			Grasso	Acidi grassi saturi	Colesterolo
	g	g	g	g	
Olio di oliva	100,0	10 (1 cucchiaio)	10,0	1,6	0
Burro	83,4	10 (1 porzione)	8,3	4,9	25
Noci secche	68,1	16[2] (4 noci)	4,1	0,3	0
Nocciole secche	64,1	16[2] (8 nocciole)	4,5	0,3	0
Cioccolata al latte	36,3	4 (1 unità)	1,5	0,9	0,4
Cioccolata fondente	33,6	4 (1 unità)	1,3	0,8	0
Salame Milano	31,1	50 (8-10 fette medie)	15,5	4,9	45
Groviera	29,0	50 (1 porzione)	14,5	8,8	9*
Parmigiano	28,1	10 (1 cucchiaio)	2,8	1,8	9
Mozzarella di mucca	19,5	100 (1 porzione)	19,5	10,0*	46
Prosciutto di Parma	18,4	50 (3-4 fette medie)	9,2	3,1	36
Cornetto semplice	18,3	40 (1 unità)	7,3	4,1*	30
Carne di bovino (punta di petto)	10,2	70 (1 fettina piccola)	7,1	2,2	46
Carne di maiale (bistecca)	8,0	70 (1 fettina piccola)	5,6	2,5	43
Uova	8,7	50 (1 unità)	4,3	1,6	186
Pizza con pomodoro	6,6	150 (1 porzione)	9,9	1,0*	0
Prosciutto di Parma (privato del grasso visibile)	3,9	50(3-4 fette medie)	2,0	0,7*	36
Latte intero	3,6	125 (1 bicchiere)	4,5	2,6	14
Carne di bovino (girello)	2,8	70 (1 fettina piccola)	1,9	0,6	42
Acciuga o alici	2,6	100 (1 porzione piccola)	2,6	1,3	61
Latte parzialmente scremato	1,5	125 (1 bicchiere)	1,9	1,1	9
Pane	0,4	50 (1 fetta media)	0,2	0,02*	0
Merluzzo o nasello	0,3	100 (1 porzione piccola)	0,3	0,1	50
Latte scremato	0,2	125 (1 bicchiere)	0,3	0,2	3

*N.B.: I valori riportati nelle tabella 1 sono tratti dalle Tabelle di Composizione degli Alimenti (INRAN – Aggiornamento 2000). Quelli contrassegnati con * derivano dalla Banca dati di composizione degli alimenti per studi epidemiologici in Italia, Istituto Europeo di Oncologia, 1998.*

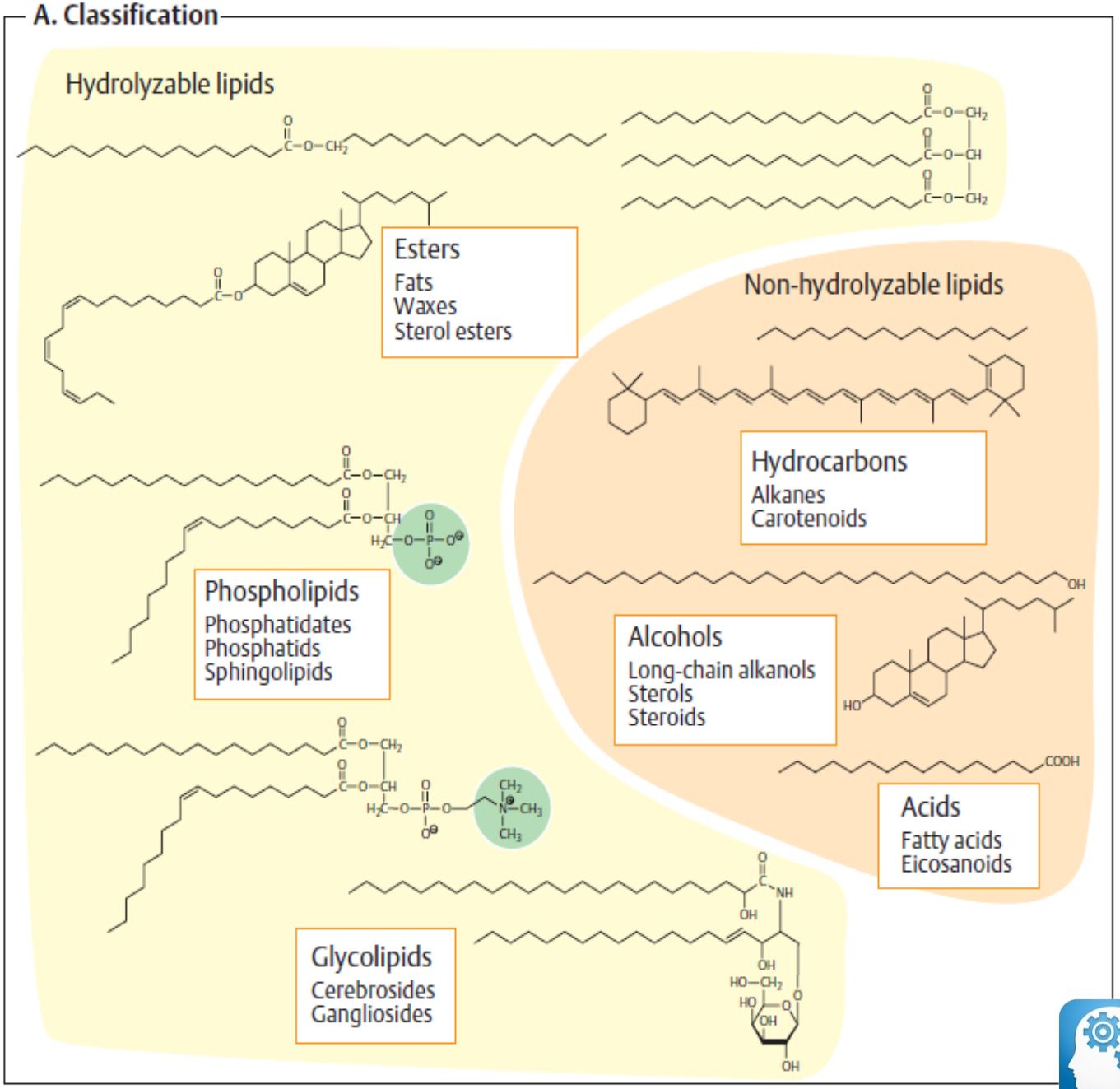
[1] parte edibile, ossia al netto degli scarti

[2] peso lordo

Diet composition

LIPIDS

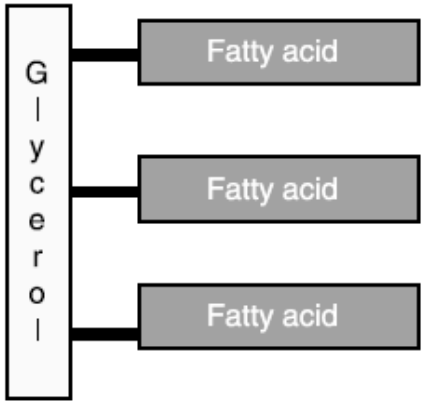
Dietary fat is a macronutrient that has historically engendered considerable controversy and continues to do so. Contentious areas include optimal type and amount in the diet, role in body weight regulation, and importance in the etiology of chronic disease(s).

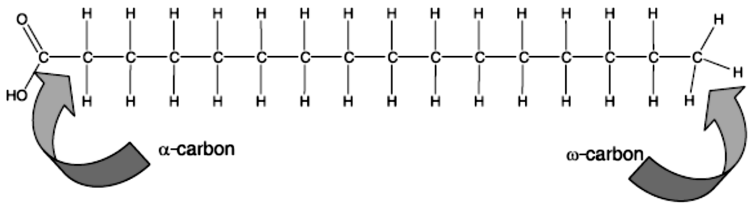


Diet composition

U2

LIPIDS





A. Carboxylic acids

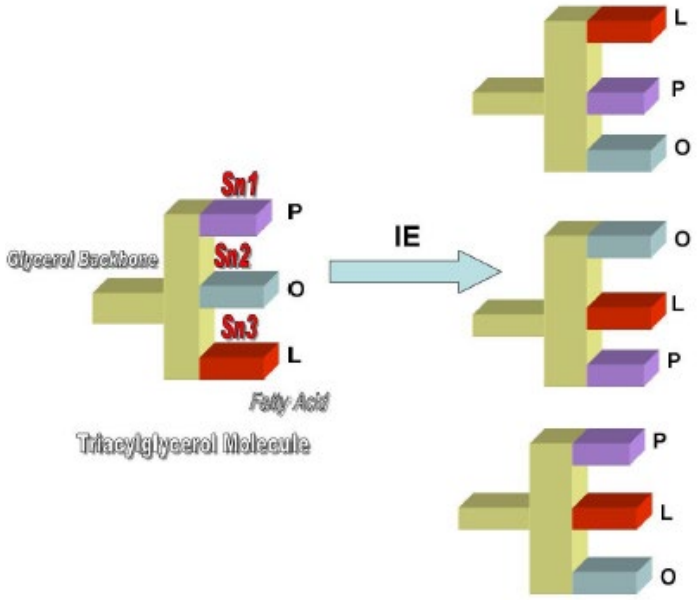
Name	Number of carbons : Number of double bonds; Position of double bonds
Formic acid	1 : 0
Acetic acid	2 : 0
Propionic acid	3 : 0
Butyric acid	4 : 0
Valerianic acid	5 : 0
Caproic acid	6 : 0
Caprylic acid	8 : 0
Capric acid	10 : 0
Lauric acid	12 : 0
Myristic acid	14 : 0
Palmitic acid	16 : 0
Stearic acid	18 : 0
Oleic acid	18 : 1; 9
Linoleic acid	18 : 2; 9,12
Linolenic acid	18 : 3; 9,12,15
Arachidic acid	20 : 0
Arachidonic acid	20 : 4; 5,8,11,14
Behenic acid	22 : 0
Erucic acid	22 : 1; 13
Lignoceric acid	24 : 0
Nervonic acid	24 : 1; 15

Not contained in lipids

$HOOC-CH_2-CH_2-CH_2-CH_2-CH_3$

Caproic acid

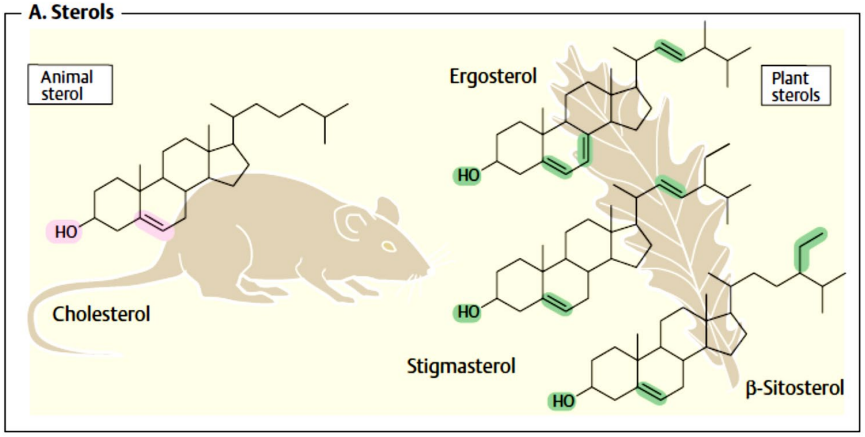
Essential in human nutrition

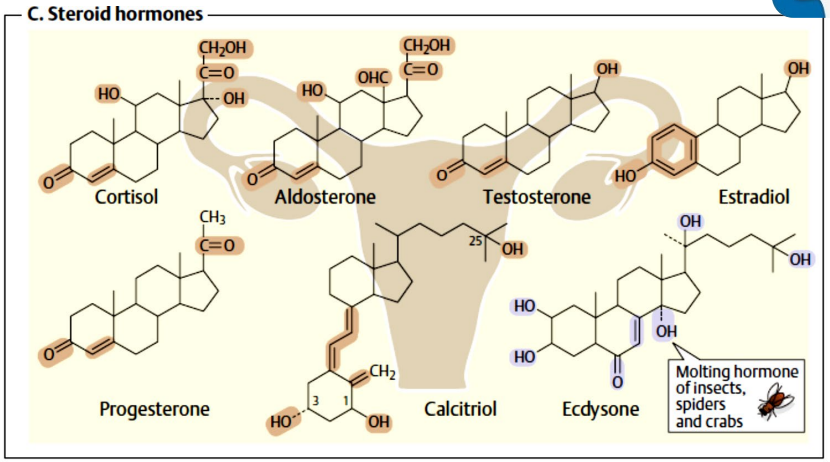


Diet composition

U2

LIPIDS





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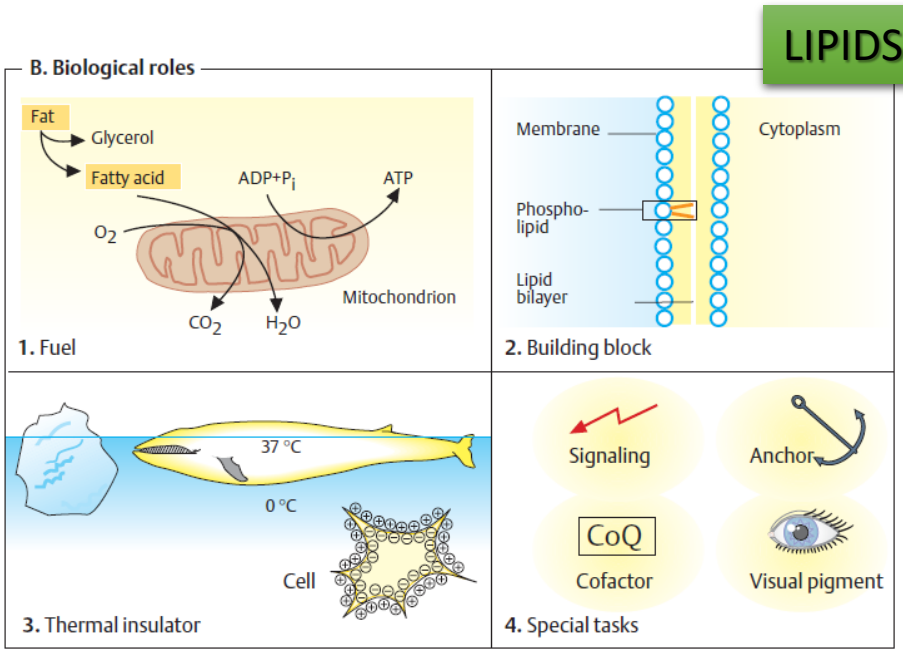


Diet composition

U2

LIPIDS

FATS: CHOOSE THE QUALITY AND LIMITS THE AMOUNT

The table below shows examples of foods that are high in fat, classified by the most prevalent type of fat they contain.

Typical foods	Most prevalent type of fat
High-fat cuts of red meat (beef, lamb, and pork), full-fat dairy products (such as butter, cheese, ice cream, milk and cream), palm oil, coconut oil and lard.	Saturated
Rapeseed oil, olives, sunflower seeds, sesame seeds, avocados, almonds, peanuts, hazelnuts and their oils.	Monounsaturated
Oily fish (like salmon, mackerel, herring, trout), rapeseed oil, soft fat spreads, walnuts, soybeans, flaxseeds (linseeds) and their oils.	Omega-3 polyunsaturated
Soft fat spreads, sunflower seeds, wheat germ, sesame seeds, walnuts, soybeans, corn and their oils.	Omega-6 polyunsaturated
Vegetable oils that have undergone a partial hydrogenation process* and are now present in products such as baked goods. Naturally present in milk, beef and lamb.	*Trans*

*Partially hydrogenated fat is declared on the food label list of ingredients

Diet composition

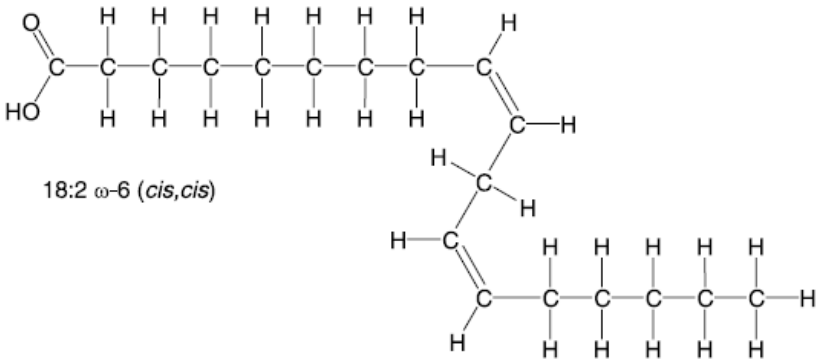
U2

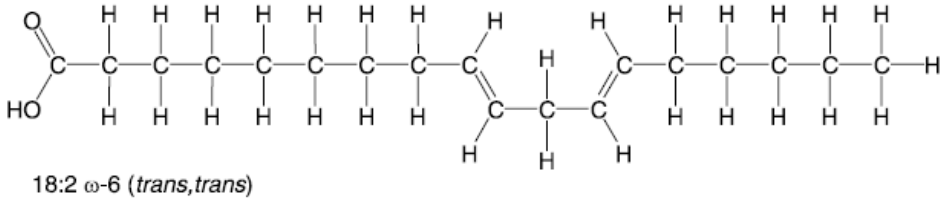
LIPIDS

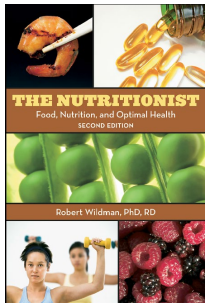
Most of the trans fat in the foods we eat is formed through a manufacturing process that adds hydrogen to vegetable oil, which converts the liquid into a solid fat at room temperature. This process is called hydrogenation. Trans fat also occurs naturally in food products from ruminant animals (e.g., milk, butter, cheese, meat products, etc.).

Eating trans fat raises the level of LDL ("bad") cholesterol in the blood. An elevated LDL cholesterol level in the blood increases your risk of developing heart disease, the leading cause of death in men and women in the U.S. Removing PHOs from processed foods could prevent thousands of heart attacks and deaths each year.

FDA has taken steps to remove artificial trans fats in processed foods. In 2015, FDA determined that PHOs, the major source of artificial trans fat in the food supply, are no longer "Generally Recognized as Safe," or GRAS. For the majority of uses of PHOs, June 18, 2018, remains the date after which manufacturers cannot add PHOs to foods. However, to allow for an orderly transition in the marketplace, FDA is allowing more time for products produced prior to June 18, 2018 to work their way through distribution. FDA is extending the compliance date for these foods to January 1, 2020. This action balances the health benefits of removing PHOs from the food supply with the need to provide an orderly transition in the marketplace.







FDA U.S. FOOD & DRUG ADMINISTRATION

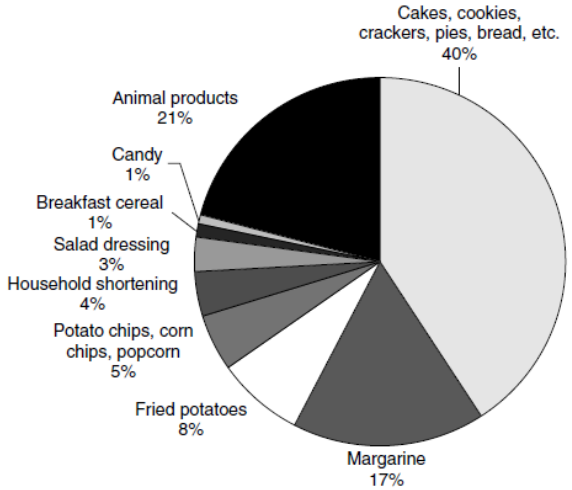


Figure 9 Major food sources of *trans* fat for US adults. (Data from www.cfsan.fda.gov/~dms/qatrans2.)

PHOs (Partially Hydrogenated oils)

Diet composition

U2

LIPIDS

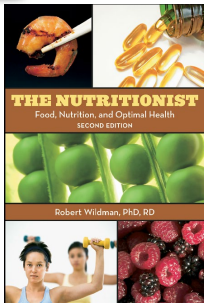


Table 5.2 Approximate Fatty Acid Composition of Common Triglyceride Sources

Type of Fat	*SFA (%)*	*MUFA (%)*	*PUFA (%)*
Butter fat	66	30	4
Beef fat	52	44	4
Lard	41	47	12
Coconut oil	87	6	2
Palm kernel oil	81	11	2
Palm oil	49	37	9
Vegetable shortening	28	44	28
Peanut oil	18	49	33
Margarine	17	49	34
Soybean oil	15	24	61
Olive oil	14	77	9
Corn oil	13	25	62
Sunflower oil	11	20	69
Safflower oil	10	13	77
Canola oil	6	62	32

SFA = saturated fatty acid; monounsaturated fatty acid (MUFA); polyunsaturated fatty acid (PUFA).

Diet composition

LIPIDS

U2

Table 5.3 Approximate Fat and Cholesterol Content of Various Foods (by Weight)

	Fat (%)	*Cholesterol (%)*
Animal foods		
Beef	32	<1
Bologna	29	1
Butter	82	2
chicken, white meat	4	<1
Cheese, cheddar	32	1
Cheese, cottage (4%)	4	1
Codfish	<1	Trace
Egg, whole	12	4
Egg, white	<1	Trace
Halibut	3	Trace
Hamburger	13	<1
Lamb chops	36	1
Mackerel	6	Trace
Margarine	82	0
Milk (whole)	3	<1
Milk (skim)	Trace	Trace
Pork chops	21	1
Pork sausage	46	1
Salmon	4	Trace
Plant foods		
Avocados	13	0
Bread (white)	4	<1
Cereals and grains	1–2	0
Crackers	1	0
Fruits	<1	0
Leafy vegetables	<1	0
Legumes	<1	0
Margarine	82	0
Root vegetables	<1	0

Percentage of a food's mass that is attributable to fat. To determine grams of fat in a food simply multiply the percentage by the weight (grams) of the food.

TABELLA 20.1 CONTENUTO IN GRASSI DI ALCUNI ALIMENTI

Alimento	g/100 g di sostanza edibile
Oli	100
Burro, margarina	84
Maionese	70
Formaggi, salumi	20-40
Carni grasse (oca, maiale)	20-40
Carni magre	3-10
Uova	9
Frutta secca oleosa	40-60
Latte intero	3,6
Cioccolato (fondente, al latte)	33-36

Valori nutrizionali per 100 grammi di prodotto

TIPI DI CARNE	PROTEINE	GRASSI G	KCAL	COLESTEROLO (MG)
Cavallo	19,8	6,6	145	61
Bovino adulto magro	21,3	3,1	113	70
Vitello	20,3	2,7	107	71
Maiale (bistecca)	21,3	8	157	62
Agnello	20,0	8,8	159	70
Capretto	19,2	5,0	122	71
Coniglio	19,9	4,3	118	52
Pollo (intero con pelle)	19,0	10,6	171	93
Pollo (petto)	23,3	0,8	100	60
Tacchino (fesa)	24	1,2	107	50
Oca	15.8	34.4	373	80
Struzzo	20.9	0.9	92	57
Anatra	21.4	8.2	159	110
Fagiano	24,3	5,2	144	71

(Fonte Dati: INRAN, Istituto Nazionale di Ricerca per gli Alimenti e la Nutrizione)

Diet composition

LIPIDS

Table 1 Some uses, effects, possible methods, and desired compositions of various structured lipids[a]

Product Type	Uses and Effects	Potential Methods for Synthesis	Desired Composition
Medium and Long Chain Triacylglycerols (MLCTs)	• Parenteral and enteral feeding • Rapid energy source • Treatments of lipid malabsorption and metabolic syndromes	Acidolysis of long chain TAGs with medium chain FFAs using *sn*-1,3-specific lipases	*sn*-MLM TAGs
Human Milk Fat (HMF) Analogues	• Infant Formula • Infant formula enriched with ARA, DHA, and MCFAs • Increased lipid absorption for infants	Interesterification/acidolysis of high oleic TAGs/ FFAs and oils with palmitic acid located at the *sn*-2 using *sn*-1,3-specific lipases	*sn*-OPO TAGs and other TAGs containing ARA, DHA, and MCFAs
Cocoa Butter Alternatives	• Chocolate • Confectionaries • Bakery products	Acidolysis of vegetable oils high in oleic acid at the *sn*-2 position and palmitic and stearic FFAs using *sn*-1,3-specific lipases	*sn*-POP TAGs *sn*-StOSt TAGs *sn*-POSt TAGs
Reduced Calorie Fats and Low trans/*trans*-free Fats	• Snack foods • *trans*-Free margarines • Shortenings • Sauces • Baked chips • Baked goods • Reduces health implications of *trans*-fatty acids	Interesterification of SCFA TAGs with LCFA TAGs Enzymatic interesterification of saturated fats with unsaturated oils	TAGs containing SCFAs TAGs with intermediate properties of substrates
Monoacylglycerols (MAGs)	• Emulsifiers • Emulsifiers with essential fatty acids	Ethanolysis of various TAGs using *sn*-1,3-specific lipases	2-MAG 2-MAG with essential fatty acids
Diacylglycerols (DAGs)	• Emulsifiers DAG oils • Hypotriglyceridemic effects • Anti-obesity effects	Glycerolysis with various FFAs using *sn*-1,3-specific lipases	*sn*-1,3 DAG
Structured Phospholipids (PLs)	• Emulsifiers	Hydrolysis of *sn*-2 acyl group using PLA_2 phospholipase	PLs with 1 acyl group attached (lysophospholipids)
	• Phospholipids enriched with n-3 and MCFAs • More bioavailable carrier of fatty acids	Acidolysis/transesterification of various FFAs/ethyl esters with lipases or PLA_1 and PLA_2 phospholipases	PLs enriched with various fatty acids
	• Enzymatic degumming	Hydrolyzing acyl groups on PLs with PLA_1 or PLA_2	Hydratable PLs

[a]Where abbreviations are as described; TAG, triacylglycerol; FFA, free fatty acids; M, medium chain fatty acid; L, long chain fatty acid; ARA, arachidonic acid; DHA, docosahexaenoic acid; P, palmitic acid; O, oleic acid; St, stearic acid; SCFA, short chain fatty acid; LCFA, long chain fatty acid; MCFA, medium chain fatty acid; PLA_1, phospholipase A_1; PLA_2, phospholipase A_2

Diet composition

U2

LIPIDS

The digestion of fat and cholesterol requires bile and lipase enzymes and the assistance of the lymphatic circulation.

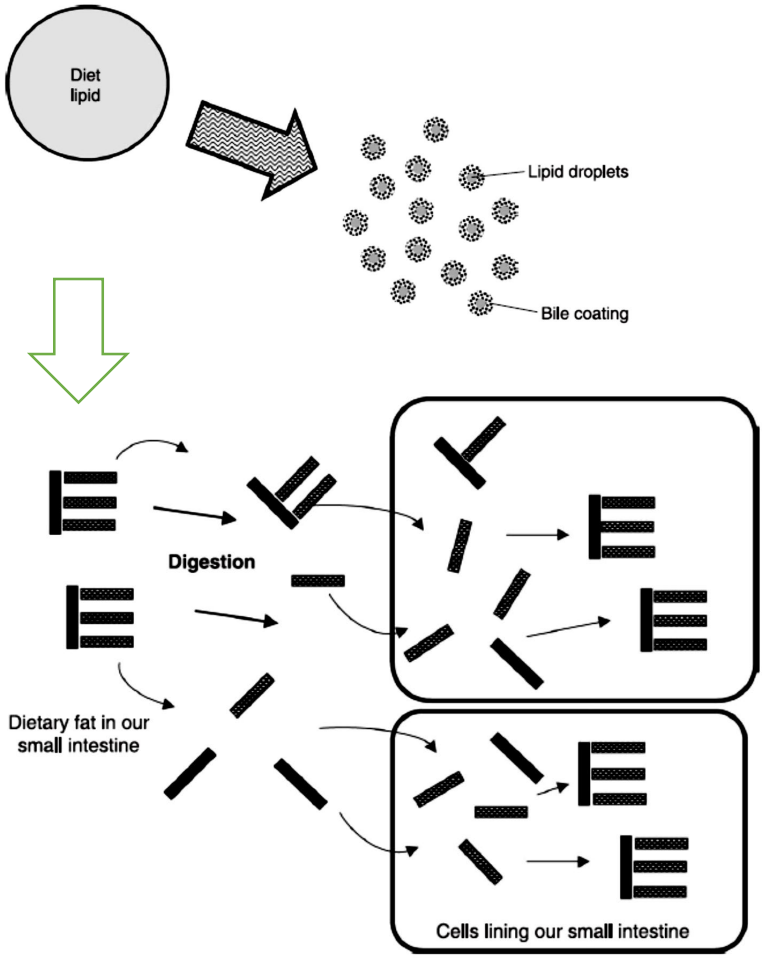
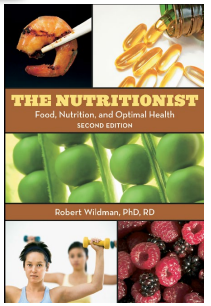


Figure 5.6 Triglyceride are digested to fatty acids, monoglycerides and some glycerol, all of which move into the cells lining our small intestine. Triglycerides are put back together inside these cells and put into chylomicrons to enter circulation (lymphatic).



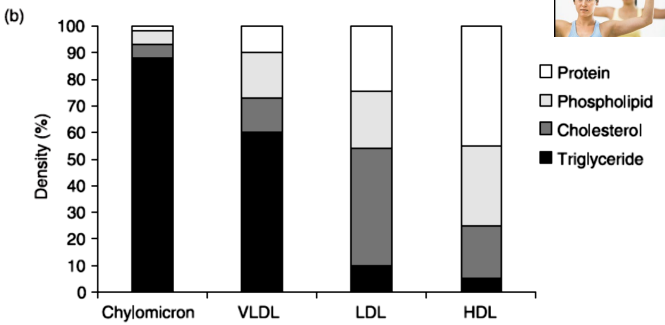


Figure 5.9 (a) Lipoproteins are lipids encased in a water-soluble protein shell. (b) Our blood contains several types of lipoproteins, which can be separated based upon their density (lipid to protein ratio). Chylomicrons are the biggest and have the highest ratio, opposite to HDL.

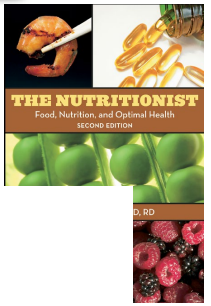
Table 5.5 The Most Abundant Lipoproteins

Lipoprotein Class	*Site of Production*	*General Activity*	*Fate*
Chylomicrons	Small intestine	Transport dietary fat and cholesterol from digestive tract. Much of the fat is deposited in fat and muscle tissue	Chylomicron remnants containing cholesterol and remaining fat are removed from the blood by the liver
Very low density lipoproteins (VLDLs)	Liver	Delivery of fat and cholesterol from the liver to tissue throughout the body	As they circulate they deposit fat in fat tissue and other tissue and become LDLs
Low density lipoproteins (LDLs)	Derived from VLDL in circulation	Deposit cholesterol in tissue throughout our body	Eventually removed from the blood by the liver and to a lesser degree other tissue
High density lipoproteins (HDLs)	Produced by the liver and small intestine	Circulate and pick up cholesterol from tissue throughout the body	Eventually removed from circulation primarily by the liver

Diet composition

U2

LIPIDS



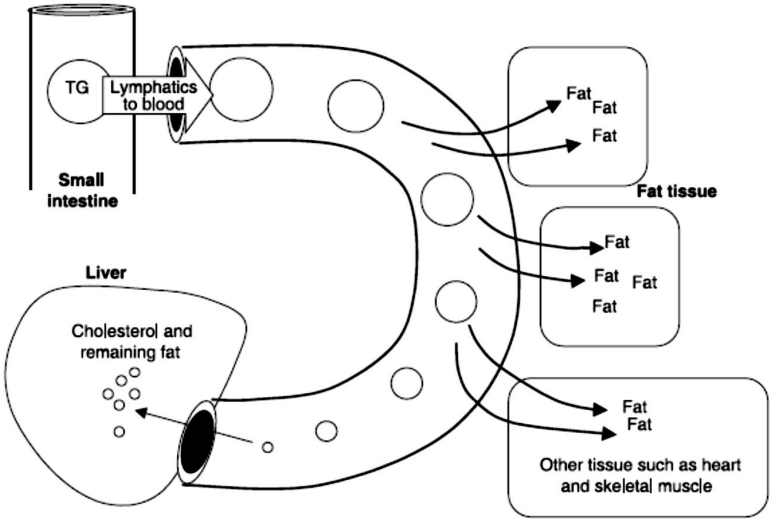


Figure 5.7 Chylomicrons are made in the cells that line the wall of our small intestine and they carry a lot of fat and a lesser amount of cholesterol from the diet. They enter the lymphatic circulation and then the blood and then deposit nearly all of their fat before being removed by our liver.

Body fat is primarily derived from food fat and secondarily from fat production in fat tissue and the liver.

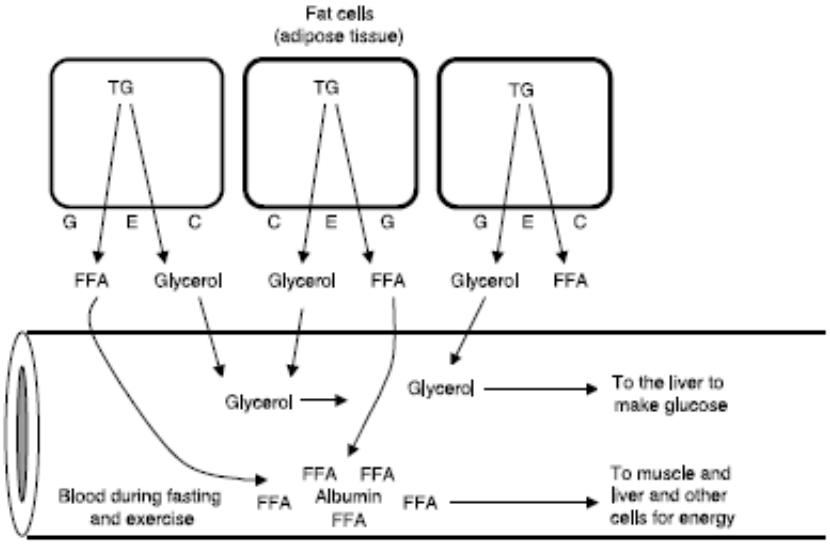


Figure 5.8 Circulating glucagon (G), epinephrine (E) and cortisol (C) tell our fat cells to breakdown their triglyceride (TG) to free fatty acids (FFA) and glycerol.

Body fat is broken down to serve as energy in-between meals and during exercise.

LARN - Livelli di assunzione di riferimento per la popolazione italiana: LIPIDI.

LARN PER LIPIDI				
		SDT Obiettivo nutrizionale per la prevenzione	**AI** Assunzione adeguata	**RI** Intervallo di riferimento per l'assunzione di nutrienti
LATTANTI	Lipidi totali SFA PUFA PUFA n-6 PUFA n-3 Acidi grassi *trans*	<10% En Il meno possibile	40% En EPA-DHA 250 mg + DHA 100 mg	 5-10% En 4-8% En 0,5-2,0% En
BAMBINI-ADOLESCENTI	Lipidi totali SFA PUFA PUFA n-6 PUFA n-3 Acidi grassi *trans*	<10% En Il meno possibile	 EPA-DHA 250 mg 1-2 anni +DHA 100 mg	1-3 anni: 35-40% En >4 anni: 20-35% En* 5-10% En 4-8% En 0,5-2,0% En
ADULTI E ANZIANI	Lipidi totali SFA PUFA PUFA n-6 PUFA n-3 Acidi grassi *trans* Colesterolo	<10% En Il meno possibile <300 mg	 EPA-DHA 250 mg	20-35% En* 5-10% En 4-8% En 0,5-2,0% En
GRAVIDANZA E ALLATTAMENTO	Lipidi totali SFA PUFA PUFA n-6 PUFA n-3 Acidi grassi *trans* Colesterolo	<10% En Il meno possibile <300 mg	 EPA-DHA 250 mg +DHA 100-200 mg	20-35% En* 5-10% En 4-8% En 0,5-2,0% En

U2

En = energia totale della dieta.
PUFA = acidi grassi polinsaturi.
PUFA n-3 = acidi grassi polinsaturi della serie n-3.
PUFA n-6 = acidi grassi polinsaturi della serie n-6.
LC-PUFA = acidi grassi polinsaturi a lunga catena.
DHA = acido docosaesaenoico.
(1) I valori più elevati dell'intervallo (RI) sono da considerare in caso di diete a basso apporto di carboidrati. Negli altri casi l'assunzione di lipidi totali deve essere ≤ 30% En.

Per intervallo d'età 6-12 mesi si intende il secondo semestre di vita. % En: percentuale dell'energia totale della dieta; SFA: acidi grassi saturi; PUFA: acidi grassi polinsaturi; PUFA n-6: acidi grassi polinsaturi della serie n-6; PUFA n-3: acidi grassi polinsaturi della serie n-3; EPA: acido eicosapentanoico; DHA: acido docosaesaenoico. *I valori più elevati dell'intervallo sono coerenti con diete in cui l'apporto di carboidrati sia vicino al limite inferiore del corrispondente RI; negli altri casi si raccomanda di mantenere valori ≤30% En. La quantità di acidi grassi monoinsaturi (MUFA) da assumere con la dieta viene calcolata per differenza, considerando l'SDT per gli SFA e l'RI per i PUFA. L'evidenza scientifica non consente di definire in alcun caso il livello massimo tollerabile di assunzione (tolerable upper intake level, UL).

Diet composition

U2

LIPIDS

Molecola	Effetti	Note
fitosteroli	Diminuiscono l'assorbimento di colesterolo a livello intestinale; sono in grado di abbassare il colesterolo (di circa il 15-20%)	
CLA (acido linoleico coniugato)	mantenimento/trofismo della massa magra	Non provato*
Lecitine e fosfolipidi	Diminuzione del colesterolo plasmatico	
Acidi grassi ω-3 e ω-6	Acidi grassi essenziali trofismo della pelle	
Acidi grassi linoleico e α-linolenico	sviluppo mentale e cognitivo	
Acidi grassi polinsaturi a lunga catena ω-3	sviluppo cerebrale; sviluppo e funzione cognitiva; regolare funzionalità dell'apparato cardiovascolare; metabolismo dei lipidi, in particolare trigliceridi	
DHA (acido docosaesaenoico)	salute materna; regolare funzionalità dell'apparato cardiovascolare; funzione visiva; funzione cerebrale; metabolismo lipidico, in particolare trigliceridi	
Squalene	Effetti: antiossidante	

Diet composition

U2

PROTEINS - What Role Do Proteins Play in the Human Body?

Much of the structure and function of our body is based on proteins.
Thus, protein and individual amino acids must function in our body in a number of ways. For instance, proteins can function as:

For instance, proteins can function as:

- enzymes (regulate chemical reactions)
- structural proteins (yield form to cells and tissue)
- contractile proteins (provide basis for muscle contraction)
- antibodies (help protect us from foreign entities)
- transport proteins (help transport substances in our blood)
- protein hormones (insulin, glucagon, and growth hormone)
- clotting factors (allow our blood to clot to stop a hemorrhage)
- receptors on cells (allow hormones and neurotransmitters to function)

Table 6.2 Select Substances Made from Amino Acids

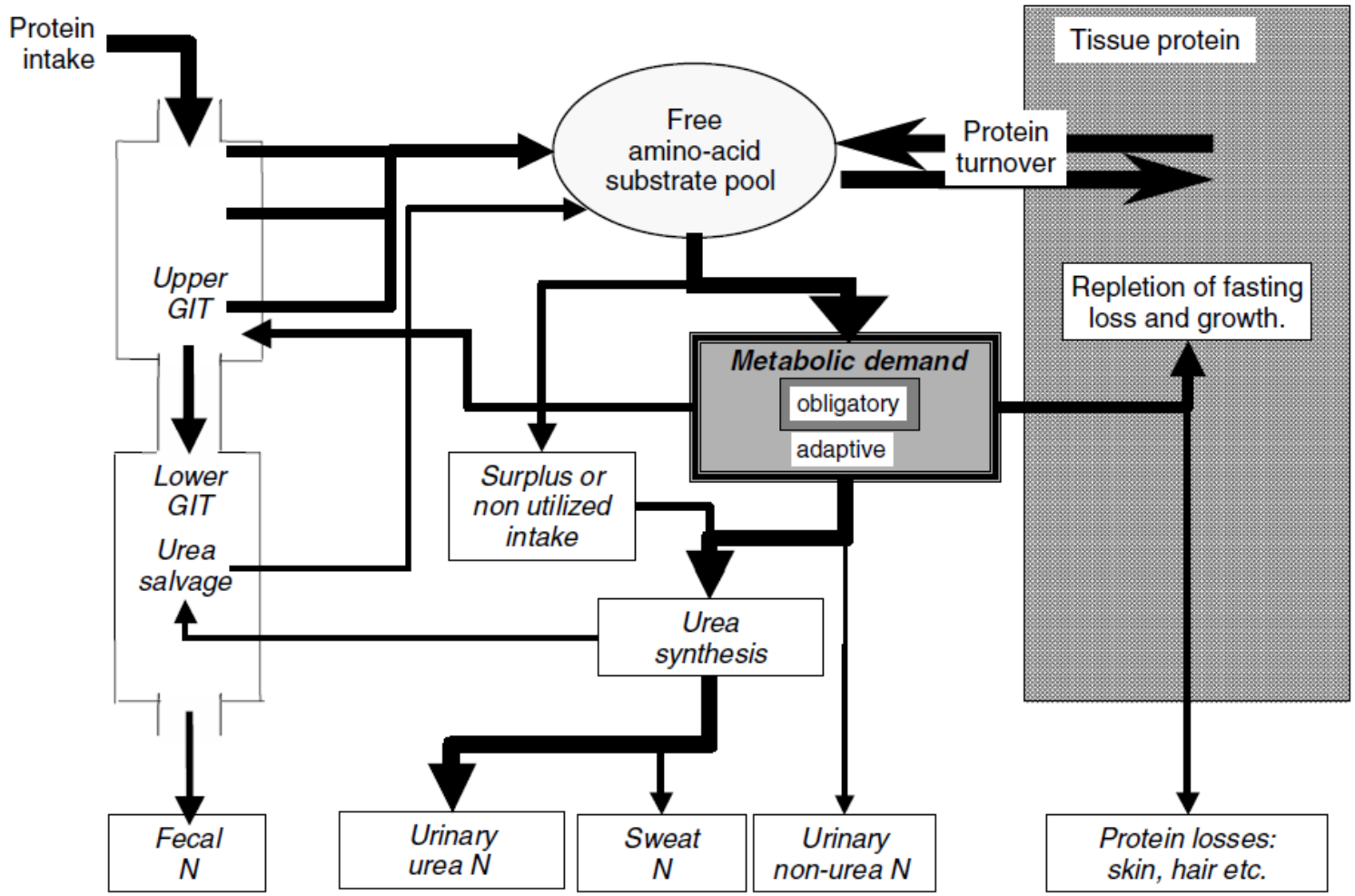
Amino Acid	*Substances Made From the Amino Acid(s)*
Tryptophan	Serotonin
Lysine and methionine	Carnitine
Methionine, glycine and arginine	Creatine
Aspartic acid and glutamine	Pyrimidines
Aspartic acid, glutamine and glycine	Purines
Tyrosine or phenylalanine	Epinephrine, norepinephrine, thyroid hormone, dopamine

Individual amino acids can be used to make certain hormones and neurotransmitters such as epinephrine, serotonin, norepinephrine, and thyroid hormone. In fact, most neurotransmitters are derived from amino acids. Amino acids are also used to make other important substances such as creatine, choline, carnitine, nucleic acids, and the vitamin niacin. Last, amino acids can be used by some tissue as an energy source or can be converted to glucose or fat depending upon our current nutritional/metabolic state (that is, fasting, fed, exercise).

Diet composition

U2

PROTEINS – Nitrogen balance



1 Schematic representation of the metabolic demands for amino acids.

Diet composition

U2

PROTEINS – Nitrogen balance

Nitrogen is a fundamental component of amino acids, which are the molecular building blocks of protein. Therefore, measuring nitrogen inputs and losses can be used to study protein metabolism.

Positive nitrogen balance is associated with periods of growth, hypothyroidism, tissue repair, and pregnancy. This means that the intake of nitrogen into the body is greater than the loss of nitrogen from the body, so there is an increase in the total body pool of protein.

Negative nitrogen balance is associated with burns, serious tissue injuries, fevers, hyperthyroidism, wasting diseases, and during periods of fasting. This means that the amount of nitrogen excreted from the body is greater than the amount of nitrogen ingested. A negative nitrogen balance can be used as part of a clinical evaluation of malnutrition.

Nitrogen balance is the traditional method of **determining dietary protein requirements**. Determining dietary protein requirements using nitrogen balance requires **that all nitrogen inputs and losses are carefully collected**, to ensure that all nitrogen exchange is accounted for. In order to control nitrogen inputs and losses, nitrogen balance studies usually require participants to eat very specific diets (so total nitrogen intake is known) and stay in the study location for the duration of the study (to collect all nitrogen losses). Because of these conditions, it can be difficult to study the dietary protein requirements of certain populations using the nitrogen balance technique (e.g. children).

Dietary nitrogen, from metabolising proteins and other nitrogen-containing compounds, has been linked to changes in genome evolution. Species which primarily obtain energy from metabolising nitrogen-rich compounds use more nitrogen in their DNA than species which primarily break down carbohydrates for their energy

Diet composition

U2

PROTEINS – Nitrogen balance

The most important aspect and defining characteristic of protein from a nutritional standpoint is its amino acid composition. There are multiple systems which rate proteins by their usefulness to an organism based on their relative percentage of amino acids and, in some systems, the digestibility of the protein source. They include biological value, net protein utilization, and PDCAAS (Protein Digestibility Corrected Amino Acids Score) which was developed by the FDA as a modification of the Protein efficiency ratio (PER) method. The PDCAAS rating was adopted by the US Food and Drug Administration (FDA) and the Food and Agricultural Organization of the United Nations/World Health Organization (FAO/WHO) in 1993 as "the preferred 'best'" method to determine protein quality.

Complete Protein Sources: Animal based protein sources from such as beef, pork, fish, poultry, eggs, milk, and milk products are among the more complete protein sources. In addition, soy, quinoa, amaranth, buckwheat, and spirulina are complete or nearly complete plant based protein sources. **Complete proteins contain all essential amino acids in proportion with human protein.**

Incomplete Protein Sources: Plant-based foods such as wheat, corn, fruits, and vegetables are considered incomplete or lower biological value as the levels of essential amino acid within their protein does not match our essential amino acid needs as closely.

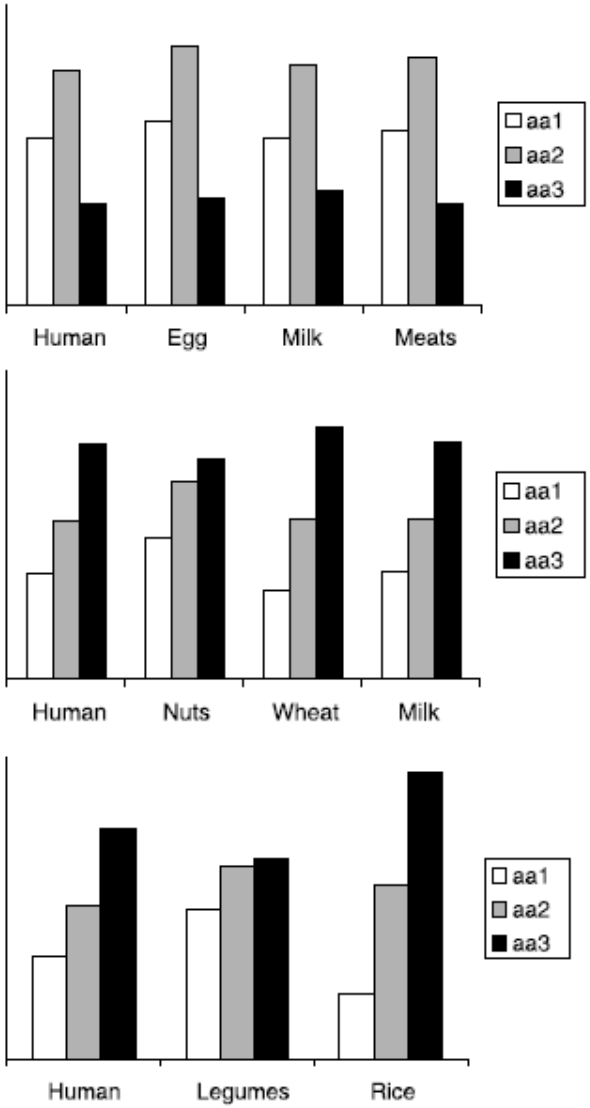
Because the limiting amino acids within plant foods varies, strategic combinations of different plant foods will provide adequate quantities of all the essential amino acids. This practice is called “complementing” proteins

Diet composition

PROTEINS – Nitrogen balance

For example, we could combine cereals (oats, wheat, rice, rye) or nuts and seeds (walnuts, cashews, almonds, pecans, and sunflower, pumpkin, and sesame seeds) which are low in lysine but a good source of methionine, with legumes (beans, peas, lentils, garbanzos (chick peas)) which are low in methionine but a good source of lysine.
While considered a complete protein source, soy is limited in lysine as well and often used in a complementing scheme.

The practice of complementing proteins may be best served within the same or adjacent meals for strict vegetarians with lower daily protein intakes (for example, below RDA); however, for less restrictive vegetarians, complementing within the same day is fine.



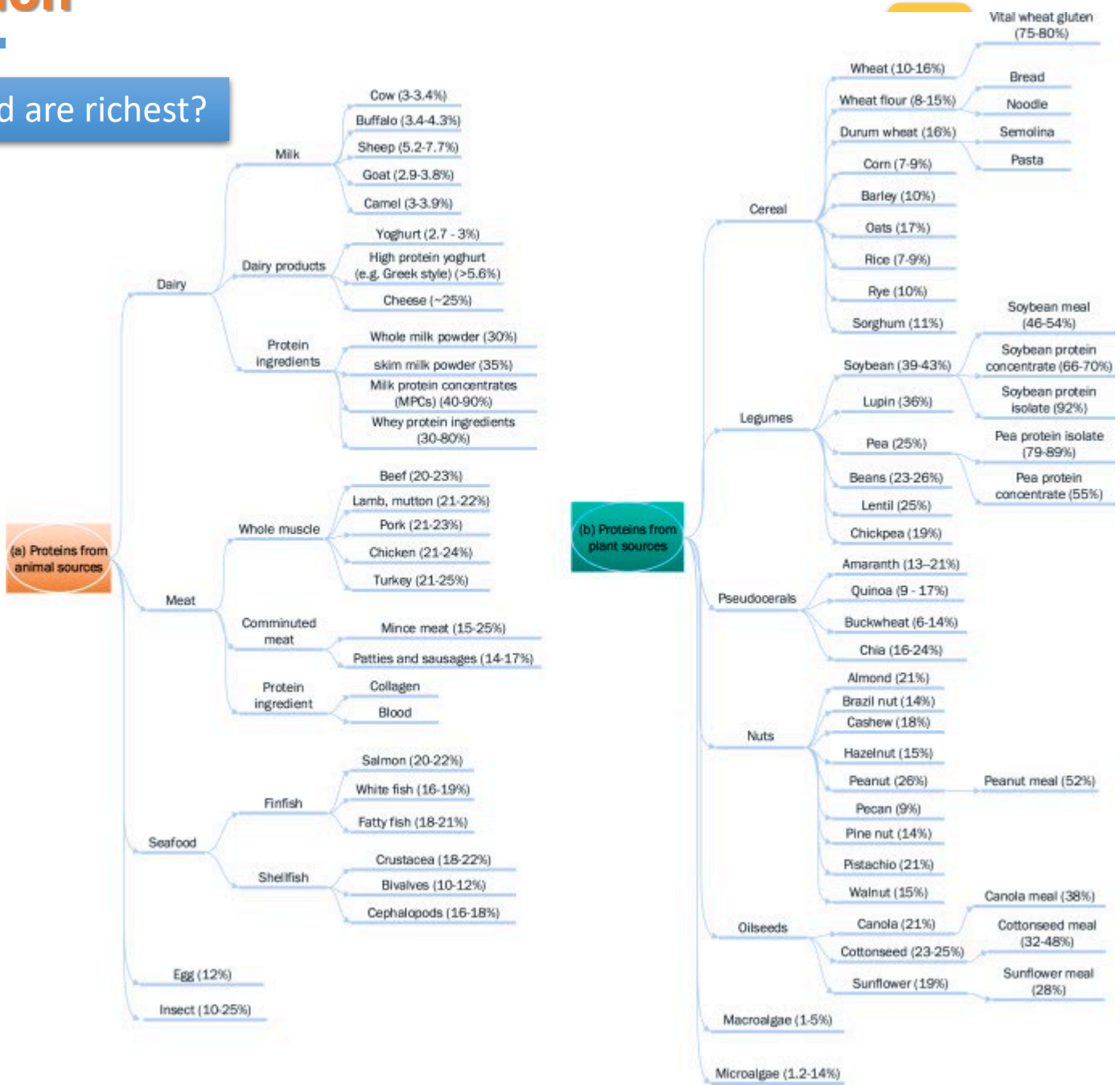
4 Example content of three essential amino acid (aa) in human protein and three high biological value protein sources (top). Comparison of two lower biological value protein sources (nuts and wheat) to human protein and milk (middle). Eating two lower biological value foods allows them to complement each other to make a higher biological value meal (bottom). Here, the limitations of legumes to provide aa3 is compensated for by the abundance of aa3 in rice. The opposite is true for rice and aa1. (Note: the three amino acids are not necessarily the same in the different graphics)

LARN PER LE PROTEINE- SINUT rev 2014								
		Peso corporeo	AR Fabbisogno medio		PRI Assunzione raccomandata per la popolazione		SDT Obiettivo nutrizionale per la prevenzione	
		(kg)	(g/kg×die)	(g/die)	(g/kg×die)	(g/die)	(g/kg×die)	(g/die)
LATTANTI	6-12 mesi	8,6	1,11	9	1,32	11		
BAMBINI-ADOLESCENTI								
	1-3 anni	13,7	0,82	11	1,00	14		
	4-6 anni	20,6	0,76	16	0,94	19		
	7-10 anni	31,4	0,81	25	0,99	31		
Maschi	11-14 anni	49,7	0,79	39	0,97	48		
	15-17 anni	66,6	0,79	50	0,93	62		
Femmine	11-14 anni	50,7	0,77	39	0,95	48		
	15-17 anni	55,7	0,72	40	0,90	50		
ADULTI								
Maschi	18-29 anni	70,0	0,71	50	0,90	63		
	30-59 anni	70,0	0,71	50	0,90	63		
	60-74 anni	70,0					1,1	77
	≥75 anni	70,0					1,1	77
Femmine	18-29 anni	60,0	0,71	43	0,90	54		
	30-59 anni	60,0	0,71	43	0,90	54		
	60-74 anni	60,0					1,1	66
	≥75 anni	60,0					1,1	66
GRAVIDANZA	I trimestre			+0,5		1		
	II trimestre			7		8		
	III trimestre			21		26		
ALLATTAMENTO	I semestre			17		21		
	II semestre			11		14		

AR, PRI e SDT corrispondono al valore medio giornaliero su un ragionevole intervallo di tempo. Per le fasce d'età si fa riferimento all'età anagrafica; ad esempio per 4-6 anni s'intende il periodo fra il compimento del quarto e del settimo anno di vita. L'intervallo 6-12 mesi corrisponde al secondo semestre di vita. Il peso corporeo indicato è esemplificativo e non rappresenta un valore normativo per la popolazione. AR, PRI ed SDT sono corretti per la qualità proteica attribuita alla dieta italiana. Per la gravidanza si considera un incremento ponderale totale di 12 kg. AR e PRI fanno riferimento all'aumento dei fabbisogni durante la gestazione (in relazione a donne normopeso; vedi anche Tabella 8). Per le donne in allattamento, si considera una produzione di latte pari a 0,81 L/die per il primo semestre e a 0,58 L/die successivamente. L'evidenza scientifica non consente di definire il livello massimo tollerabile di assunzione (UL) per nessuno dei gruppi d'interesse

Diet composition

PROTEINS – Which food are richest?



Diet composition

U2

PROTEINS – Which food are richest?

Table 6.3 Approximate Protein Content of Various Foods

Food	*Amount*	*Protein (g)*
Beef	3 ounces	22
Pork	3 ounces	21
Cod, poached	32 ounces	21
Oysters	32 ounces	14
Milk	1 cup	8
Cheddar cheese	1 ounces	7
Egg	1 large	6
Peanut butter	1 tablespoon	5
Potato	1	3
Bread	1 slice	2
Banana	1 medium	1
Carrots, sliced	2 cups	1
Apple	1	2
Sugar, oil		0

the protein content will vary. In general, foods of animal origin will have greater protein content than plants and plant-derived foods. Among the foods that have the highest protein content (percent of calories) are water-packed tuna and egg whites. Being an animal, tuna (and other fish) contain skeletal muscle for locomotion. Thus, eating finned or shellfish provides protein sources that are fairly similar to human skeletal muscle proteins. Meanwhile, the predominant protein in egg whites is albumin (for example, ovalbumin and conalbumin) and ovomucoid, globulins, and lysozymes. Another popular protein source with this group, because of its protein density, is milk. The principal proteins in milk are caseins and whey, which are actually families of related proteins.

Cereal grains produce a vast array of proteins (including albumins); however, the most interesting proteins may be gliadin and glutenin. When these proteins are mixed with water, such as when we make dough, gluten is formed. Gluten provides the structural basis for the network that traps gases produced by yeast when dough rises.

Soy lacks these proteins, and ingredients need to be added to soy flour to make it rise to a light bread.

Diet composition

PROTEINS –Foods' AA profiles?

Essential Amino acid profiles of common protein sources. Each EAA (mg/g protein) is ranked by colour according to the amount of EAA in the protein source compared to the other sources (dark green is highest and white lowest). n.d. = not determined.

Essential Amino acids	Basic		Neutral	Neutral (branched chain)			Aromatic		Sulphur AA
(mg/g protein)	Histidine	Lysine	Threonine	Isoleucine	Leucine	Valine	Phenylalanine + Tyrosine	Tryptophan	Methionine + Cysteine
Animal proteins									
Cow milk	28	84	47	53	99	65	95	14	30
Sheep milk	29	90	49	54	105	69	99	17	33
Goat milk	30	97	54	69	105	80	111	15	42
Caseins	31	85	46	59	102	76	114	14	33
Whey protein	16	109	88	74	121	69	75	17	52
Beef	31	70	36	40	65	46	61	10	35
Pork	37	76	40	39	71	47	68	11	30
Chicken	34	100	46	52	85	51	40	n.d.	31
Marine Fish	7	76	65	50	96	84	38	20	30
Freshwater Fish	33	33	38	38	57	44	52	6	14
Whole egg	25	78	51	57	91	64	98	12	47
Egg white (albumin)	17	62	36	46	68	49	77	10	38
Egg yolk	33	104	71	65	115	72	114	18	50
House cricket (adult)	24	55	37	47	74	54	83	7	24
Plant proteins									
Wheat flour	26	27	31	37	75	47	85	13	41
Durum wheat	23	24	30	26	70	44	73	13	36
Corn	27	29	36	39	128	51	100	8	44
Cornmeal	27	29	26	38	109	46	88	5	32
Oat	25	43	35	39	76	54	91	9	43
Rice	26	28	37	45	88	63	82	14	44
Rice protein concentrate	17	21	28	34	62	45	104	11	39
Rice protein isolate	17	23	29	34	64	44	86	12	40
Sorghum	18	16	29	34	127	43	76	n.d.	7
Soybean	28	73	47	54	90	55	99	16	31
Isolated soy protein	25	56	39	49	56	51	94	13	26
Soy protein concentrate	25	62	36	45	76	47	86	12	28
Pea protein concentrate	24	67	38	44	76	49	97	9	19
Fava beans	31	63	39	35	85	48	77	8	27
Chickpea	23	55	32	38	65	37	82	10	22
Lentil	29	69	44	35	71	46	71	5	26
Lupin	39	45	40	40	69	41	80	10	13
Amaranth	27	43	31	19	43	21	55	n.d.	41
Quinoa	19	24	67	8	24	9	27	10	6
Buckwheat protein	25	52	35	38	68	52	80	17	42
Hemp protein isolate	32	27	34	36	65	47	83	10	32
Hemp seed protein meal	33	39	38	36	69	47	77	11	38
Peanuts	25	39	22	35	70	40	88	7	16
Microalgae	26	66	52	45	93	61	98	n.d.	27
Microalgae cultured	28	72	53	44	92	62	101	n.d.	26
Microalgae products	22	70	49	51	91	62	96	n.d.	29

Diet composition

U2

PROTEINS – Biological value?

Biological value (BV) is a measure of the proportion of absorbed protein from a food which becomes incorporated into the proteins of the organism's body. It captures how readily the digested protein can be used in protein synthesis in the cells of the organism. Proteins are the major source of nitrogen in food. BV assumes protein is the only source of nitrogen and measures the proportion of this nitrogen absorbed by the body which is then excreted. The remainder must have been incorporated into the proteins of the organisms body. A ratio of nitrogen incorporated into the body over nitrogen absorbed gives a measure of protein "usability" – the BV.

BV = (Nr / Na) * 100

Where:
Na = nitrogen absorbed in proteins on the test diet
Nr = nitrogen incorporated into the body on the test di

Net protein utilization

NPU= nitrogen incorporated into the body Nr/ nitrogen ingested Ni

Protein efficiency ratio

PER = gain in body mass (g)/ protein intake (g)

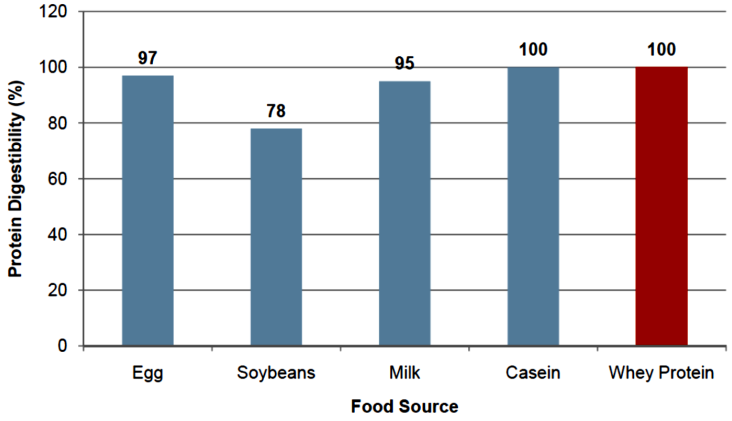
Diet composition

U2

PROTEINS – biological quality

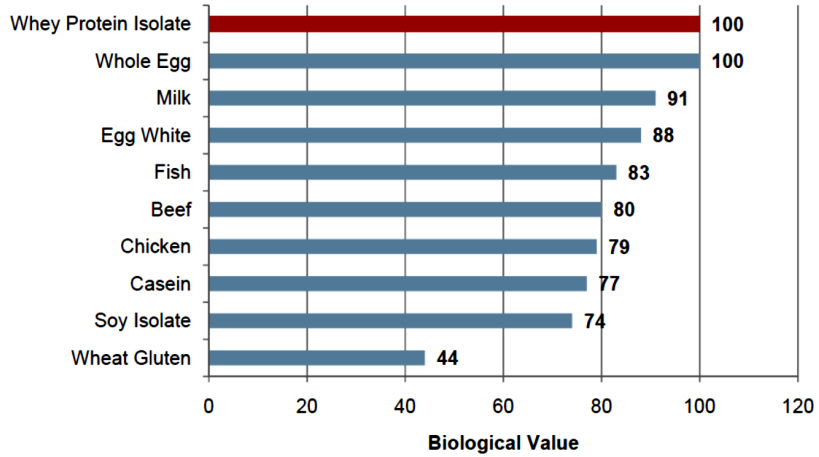
PROTEIN DIGESTIBILITY

- Proportion of protein that is absorbed by the body



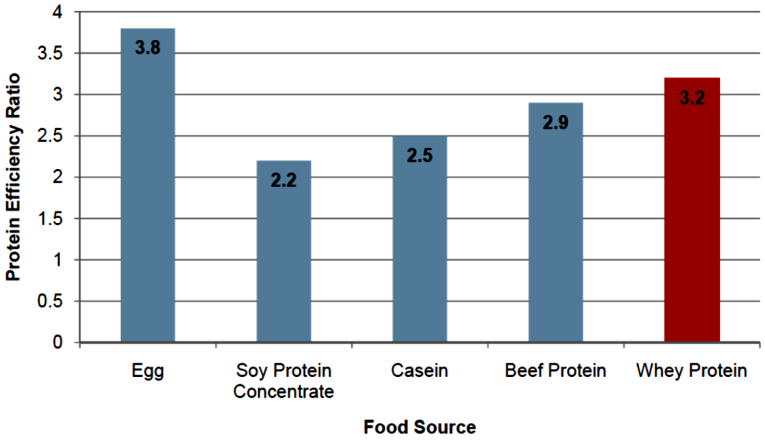
BIOLOGICAL VALUE

- Proportion of absorbed protein that is retained for growth and maintenance

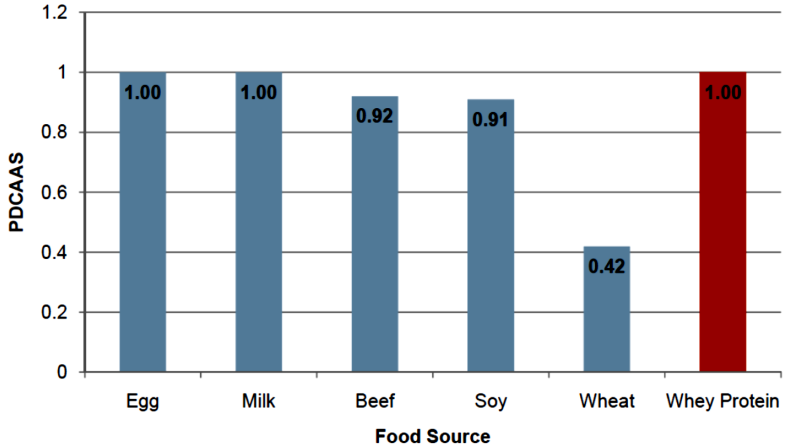


PROTEIN EFFICIENCY RATIO (PER)

- Gain in body weight per unit (g) of protein consumed



PDCAAS



Diet composition

U2

PROTEINS – biological quality

Protein digestibility-corrected amino acid score (PDCAAS) is a method of evaluating the quality of a protein based on both the amino acid requirements of humans and their ability to digest it.

The PDCAAS rating was adopted by the US FDA and the Food and Agricultural Organization of the United Nations/World Health Organization (FAO/WHO) in 1993 as "the preferred 'best'" method to determine protein quality

Using the PDCAAS method, the protein quality rankings are determined by comparing the amino acid profile of the specific food protein against a standard amino acid profile with the highest possible score being a 1.0. This score means, after digestion of the protein, it provides per unit of protein 100% or more of the indispensable amino acids required.

The formula for calculating the PDCAAS percentage is:
(mg of limiting amino acid in 1 g of test protein / mg of same amino acid in 1 g of reference protein) x fecal true digestibility percentage

Diet composition

U2

PROTEINS – bioactive peptides

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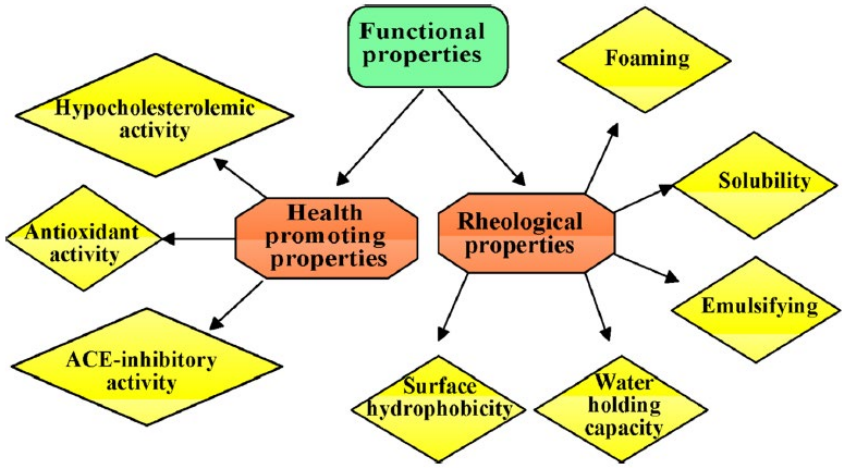
REVIEW ARTICLE

Bioactive food derived peptides: a review on correlation between structure of bioactive peptides and their functional properties

Zohreh Karami[1] · Behrouz Akbari-adergani[2]

Abstract The presence of bioactive peptides has already been reported in many foods such as milk, fermented products, plant and marine proteins. Bioactive peptides are sequences between 2 and 20 amino acids that can inhibit chronic diseases by modulating and improving physiological functions, so these peptides contribute in holding the consumer health. Also, bioactive peptides can affect pro-health or functional properties of food products. Fractionation of the protein hydrolysate revealed a direct relationship between their structure and functional activity. So, this review focuses on different factors effecting on bioactive peptide structures, biological and functional properties such as antihypertensive, antioxidative, hypocholesterolemic, water-holding capacity, foaming capacity, emulsifying properties and solubility. Also, this review looks at the identified bioactive peptides from food protein sources as potential ingredients of health promoting functional foods.

Fig. 1 Functional properties of bioactive peptides and hydrolysates



Diet composition

U2

ELSEVIER

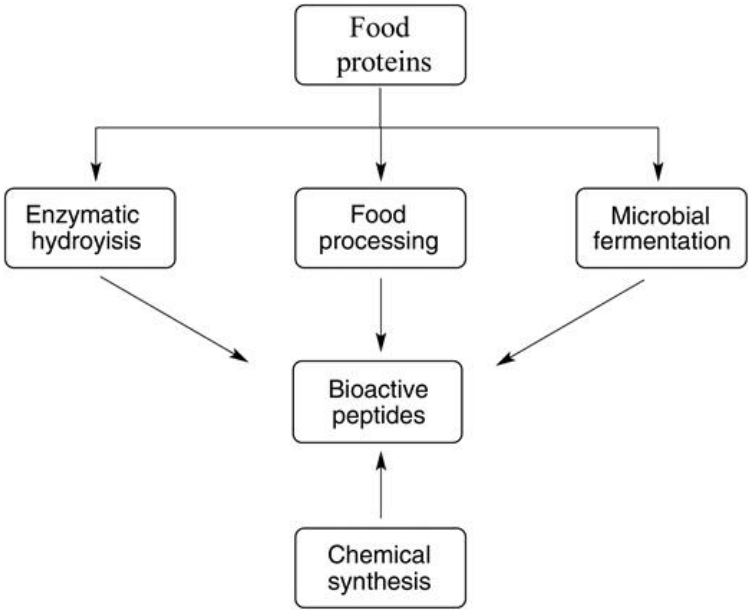
Food-derived peptides with biological activity: from research to food applications

Rainer Hartmann and Hans Meisel

Examples of bioactive peptides derived from food.

Effect	Origin	Encrypting protein(s)	Name/remarks/sequence (in single-letter code)	Ref
ACE inhibitory/ hypotensive	Soy	Soy protein	NWGPLV	[39]
	Fish	Fish muscle protein	LKP, IKP, LRP (derived from sardine, bonito, tuna, squid)	[40]
	Meat	Meat muscle protein	IKW, LKP	[41]
	Milk	α-LA, β-LG	Lactokinins (e.g. WLAHK, LRP, LKP)	[42••]
		α-, β-, κ-CN	Casokinins (e.g. FFVAP, FALPQY, VPP)	[43]
	Egg	Ovotransferrin	KVREGTTY	[44]
		Ovalbumin	Ovokinin (FRADHPPL)	[45]
			Ovokinin (2–7) (KVREGTTY)	
	Wheat	Wheat gliadin	IAP	[46]
	Broccoli	Plant protein	YPK	[47]
Immunomodulatory	Rice	Rice albumin	Oryzatensin (GYPMYPLR)	[48]
	Egg	Ovalbumin	Peptides not specified	[49••]
	Milk	α-, β-, κ-CN, α-LA	Immunopeptides (e.g. α_{S1}-immunocasokinin) (TTMPLW)	[11]
	Wheat	Wheat gluten	Immunopeptides	[28]
Cytomodulatory	Milk	α-, β-CN	α-Casomorphin (HIQKED(V)), β-casomorphin-7 (YPFPGPI)	[50]
Opioid agonist	Wheat	Wheat gluten	Gluten-exorphins A4, A5 (GYYPT), B4, B5, and C (YPISL)	[51,52]
	Milk	α -LA, β-LG	α-Lactorphins, β-lactorphins	[53]
		α-, β-CN	Casomorphins	
Opioid antagonist	Milk	Lactoferrin	Lactoferroxins	[10]
		κ-CN	Casoxins	
Antimicrobial	Egg	Ovotransferrin	OTAP-92 (f109–200)[a]	[49••]
		Lysozyme	Peptides not specified	
	Milk	Lactoferrin	Lactoferricin	[27]
		α-, β-, κ-CN	Casecidins, isracidin, kappacin	[54]
Antithrombotic	Milk	κ-CN (glycomacropeptide)	κ-CN (f106–116)[a], casoplatelin	[29]
Mineral binding, anticariogenic	Milk	α-, β-CN	Caseinophosphopeptides	[55••]
Hypocholesterolemic	Soy	Glycinin	LPYPR	[56•]
	Milk	β-LG	IIAEK	[31]
Antioxidant	Fish	Sardine muscle	MY	[57]
	Wheat	Wheat germ protein	Peptides not specified	[58]
	Milk	α-LA, β-LG	MHIRL, YVEEL, WYSLAMAASDI	[59]

CN, casein; LA, lactalbumin; LG, lactoglobulin.
[a] f, fragment.

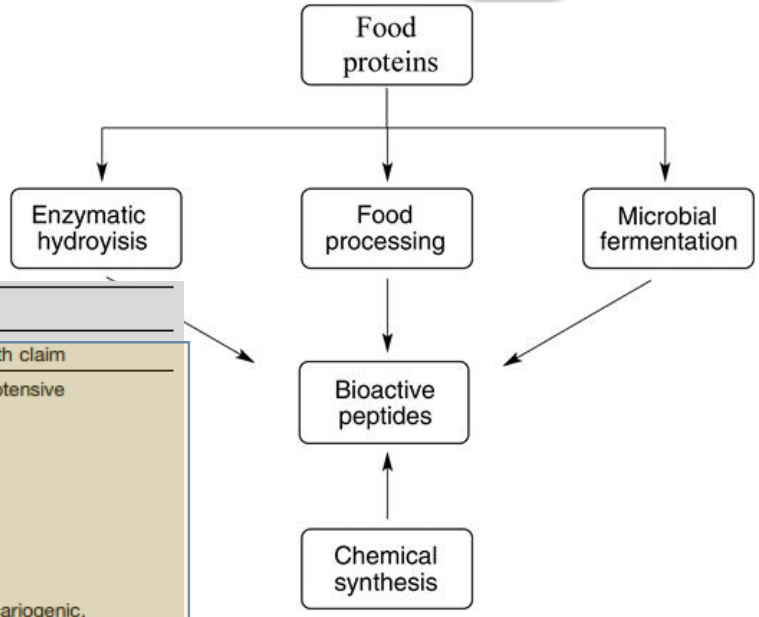


Diet composition

U2

Food-derived peptides with biological activity: from research to food applications

Rainer Hartmann and Hans Meisel



Examples of commercially available functional foods or food ingredients carrying bioactive peptides.

Product name	Manufacturer	Type of food	Bioactive peptides	Health claim
Calpis AMEEL S (Japan) or Calpico (Europe)	Calpis Co., Japan	Sour milk	VPP, IPP from β- and κ-CN	Hypotensive
Evolus	Valio, Finland	Fermented milk, calcium-enriched	VPP, IPP from β- and κ-CN	
BioZate	Davisco, USA	β-LG hydrolysate	Whey peptides	
C12 Peption	DMV, Netherlands	Ingredient	Casein-derived dodecapeptide FFVAPFPEVFGK	
Peptide Soup	NIPPON, Japan	Soup	Bonito-derived peptides	
Casein DP Peptio Drink	Kanebo, Japan	Soft drink	Casein-derived dodecapeptide FFVAPFPEVFGK	
BioPURE-GMP	Davisco, USA	Whey protein hydrolysate	Glycomacropeptide	Anticariogenic, antimicrobial, antithrombotic
CholesteBlock	Kyowa Hakko, Japan	Drink powder	Soy peptides bound to phospholipids	Hypocholesterolemic
CSPHP				
ProDiet F200	Ingredia, France	Milk drink, confectionery	α_{S1}-CN (f91–100)[a]: YLGYLEQLLR	Reduces stress
Capolac	Arla Foods, Denmark	Ingredient	CPP	Helps mineral absorption
Tekkotsu Inryou	Suntory, Japan	Soft drink	CPP	
Kotsu Kotsu calcium	Asahi, Japan	Soft drink	CPP	
CE90CPP	DMV, Netherlands	Ingredient	CPP (20%)	
Glutamin peptide WGE80GPA WGE80GPN WGE80GPU	DMV, Netherlands	Dry milk protein hydrolysate	Glutamine-rich peptides	Immunomodulatory

Information gathered from [3•,7,60].
[a] f, fragment.

Diet composition

U2

PROTEINS – in food supplements and dietary products

Molecola	Effetti	
Proteine siero latte	Integrazione di amminoacidi ramificati	
Lattoferrina (bovina)	naturali difese dell'organismo (proprietà antiossidanti, immunomodulatrici ed antinfettive)	
Collageno idrolisato	funzionalità articolare	
Enzimi alfa galattosidasi Bromelina enzimi da maltodestrine fermentate lattasi (β-galattosidasi) papaina superossido-dismutasi (SOD)	 funzione digestiva; contrasto dei processi fermentativi naturali difese dell'organismo; funzione digestiva; funzione drenante funzione digestiva digestione del lattosio difese immunitarie; funzione digestiva Antiossidante	
Collageno	antiossidante; trofismo della pelle	
Omotaurina	funzioni cognitive	
Ornitina alfa-chetoglutarato (OKG)	trofismo e recupero muscolare	

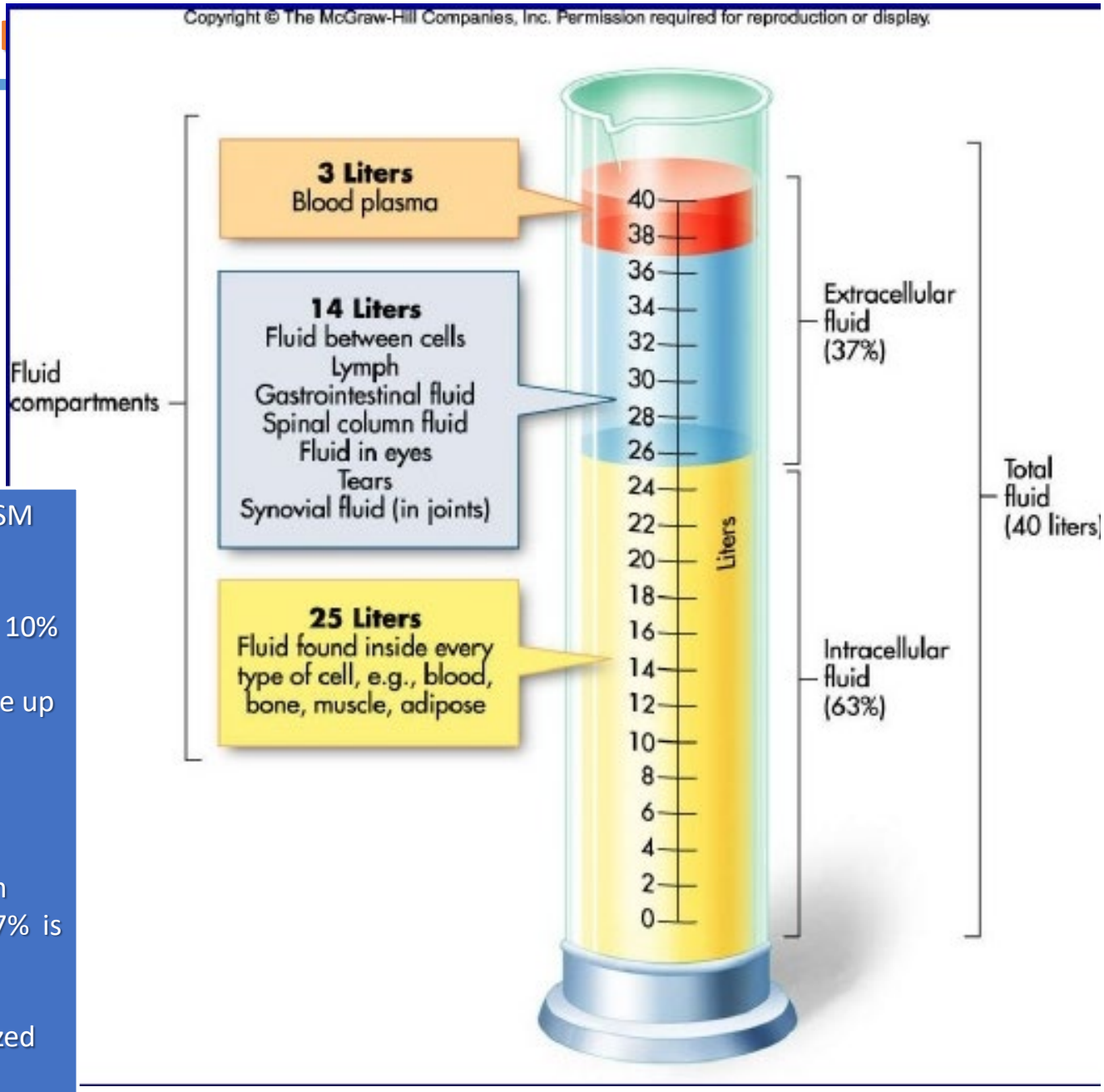
Diet composition

5. DRINK WATER EVERY DAY

WATER IN THE HUMAN ORGANISM

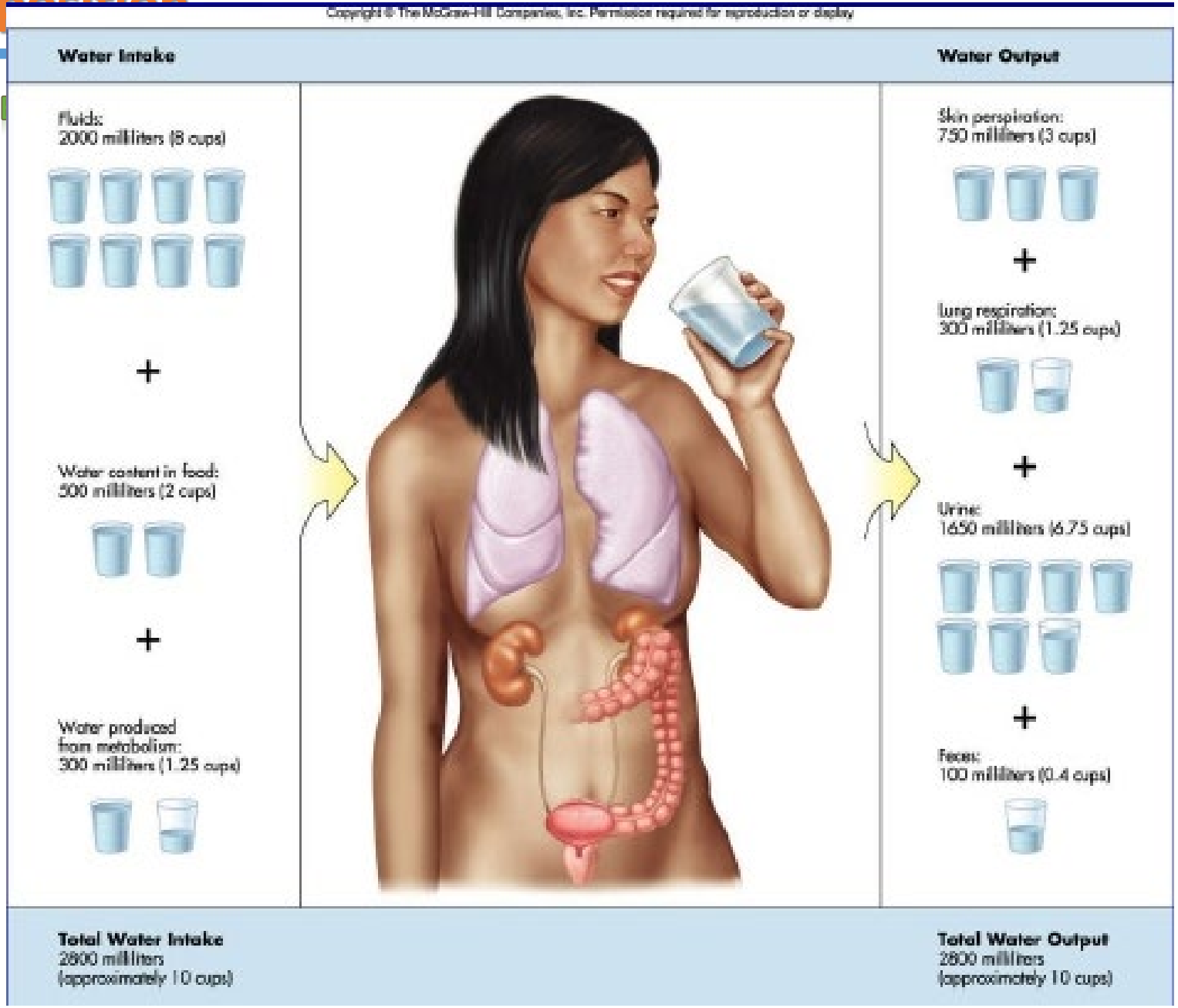
Approximately 75% of the muscles and internal organs and 10% of adipose tissue consist of water. The same skeleton is made up for over 30% from water.

63% of the total water present in our body it is localized inside cells and determines them the volume and the turgor. 6-7% is present in plasma, 2% in the sap and 23-25% is extracellular water, localized in the spaces between the cells.



Diet composition

5. DRINK WATER EVERY DAY



Diet composition

U2

5. DRINK WATER

EVERY DA

CONTENUTO % IN ACQUA DI ALCUNI ALIMENTI

ORTAGGI	78-96	CARNI	48- 77
FRUTTA	64-95	FORMAGGI	25 - 63
LATTE	87	PANE	29 - 37
PESCI	62 -84	BURRO	14
LEGUMI freschi	62-81	LEGUMI secchi	12 -14
UOVA	70-74		

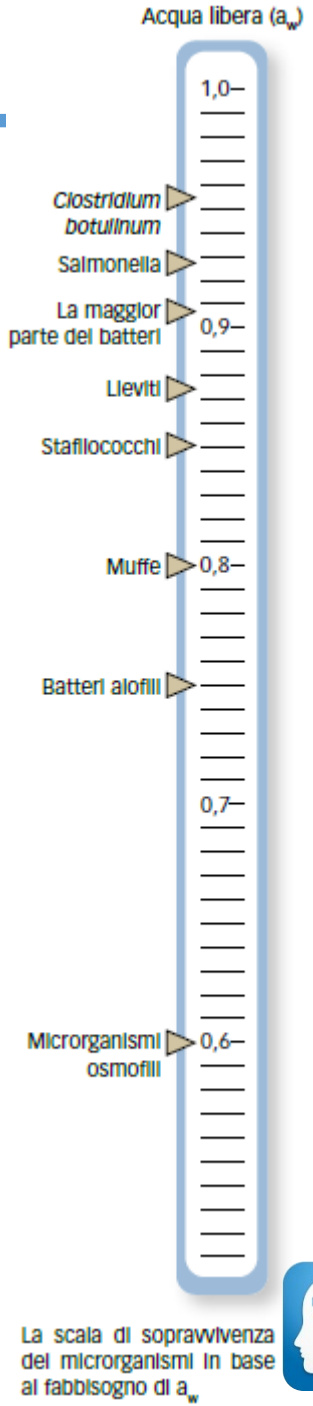
500-900 ml con gli alimenti
800-1500 ml con le bevande

Diet composition

ACQUA NEGLI ALIMENTI

L'acqua libera e l'acqua legata

Solo una parte dell'acqua complessivamente presente nell'alimento (**umidità totale**) è disponibile per l'attività batterica, in quanto una certa quantità è legata intimamente alla struttura chimica del prodotto.
L'acqua di cui i microrganismi possono effettivamente disporre viene definita **acqua libera**, **aw** (dall'inglese *activity water*).
La quantità di acqua libera in un alimento è influenzata da diversi fattori: l'umidità dell'alimento, il grado di umidità dell'ambiente in cui l'alimento viene confezionato, lo stato fisico dell'acqua (nel caso dei prodotti congelati l'acqua non è disponibile), la presenza di sostanze che trattengono l'acqua (quali l'acido tartarico, il sorbitolo, la glicerina ecc.), l'acidità, la temperatura ecc.
Di norma lo sviluppo dei microbi si verifica più velocemente per valori di aw compresi tra quasi 1 e 0,92 (la maggior parte degli alimenti freschi presenta valori di aw di circa 0,99); via via che l'aw si riduce, diminuisce il tasso di accrescimento microbico, fino ad arrivare a un limite minimo di aw oltre il quale si ha il blocco della crescita. Quando in un alimento si produce un abbassamento dell'aw, vengono dapprima inattivati i batteri, quindi, abbassando ancora il valore di aw, si arriva a controllare anche lo sviluppo dei lieviti e delle muffe, con conseguente ulteriore aumento del periodo di conservabilità del prodotto.
Nel concreto, la riduzione dell'aw negli alimenti può essere ottenuta per sottrazione diretta dell'acqua presente oppure addizionando agli alimenti dei soluti come il sale o lo zucchero.



Diet composition

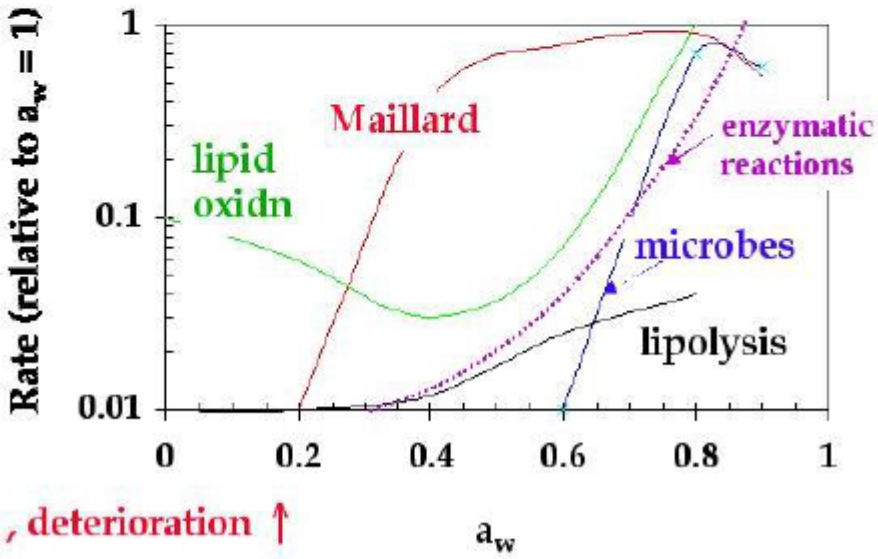
U2

ACQUA NEGLI ALIMENTI

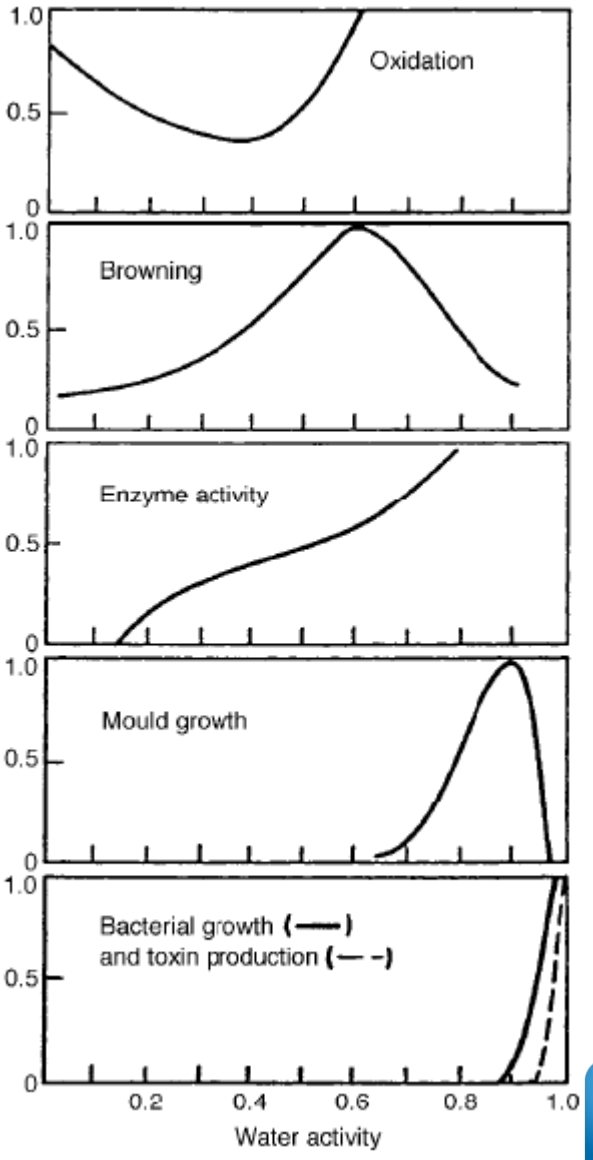
ATTIVITA' DELL'ACQUA

Indicata con la sigla a_w (water activity) rappresenta quella percentuale di acqua non legata che funge da mezzo di riproduzione batterica, da solvente per reazioni chimiche desiderabili oppure no.

- Food deterioration processes strong function of a_w



As a_w ↑ , deterioration ↑



Diet composition

U2

ACQUA NEGLI ALIMENTI

ATTIVITA' DELL'ACQUA

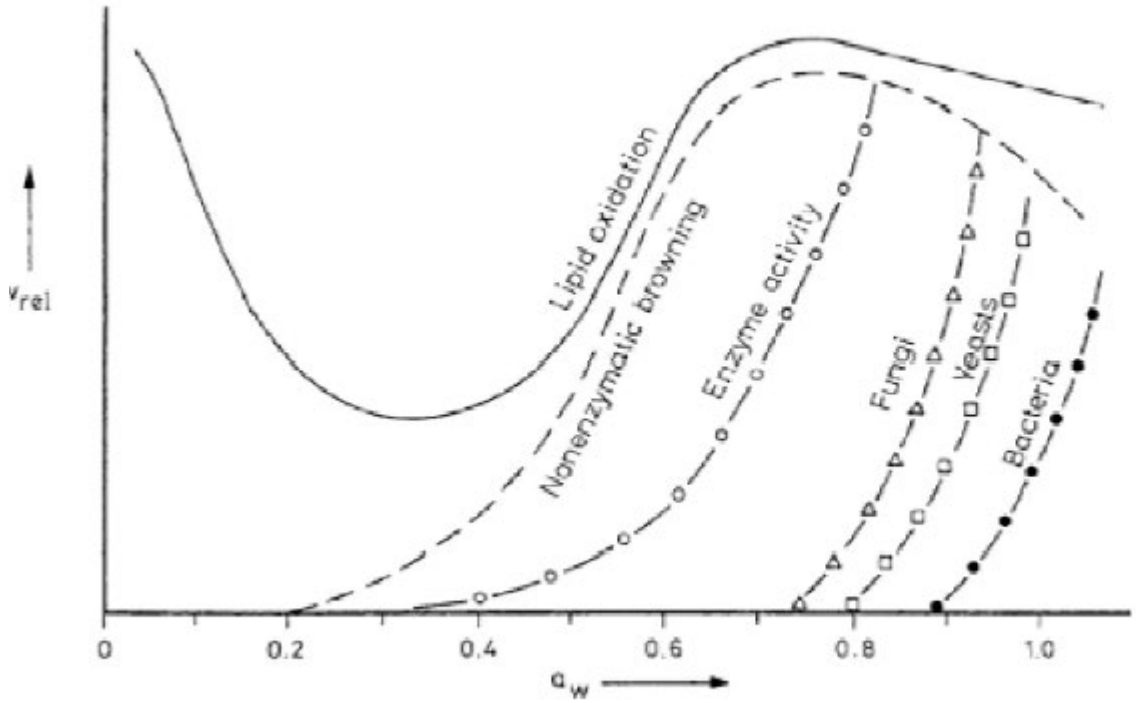


Fig. 0.4. Food shelf life (storage stability) as a function of water activity (according to *Labuza*, 1971)

U2

ACQUA NEGLI ALIMENTI

$$a_w = p_a / p_0 \qquad a\ T\ costante$$

Dove p_a è la pressione parziale dell'acqua sopra l'alimento
p_0 è la tensione di vapore dell'acqua pura a temperatura costante

questa relazione equivale alla legge di Raoult per un soluto non volatile in soluzione:

$$\chi_{solv} = p_{solv} / p_0$$

dove χ_{solv} è la frazione molare del solvente
p_{solv} è la tensione di vapore della soluzione
p_0 è la tensione di vapore del solvente puro

Diet composition

U2

ACQUA NEGLI ALIMENTI

L'attività libera dell'acqua è un parametro temperatura/dipendente secondo l'equazione di Clausius-Clapeyron.

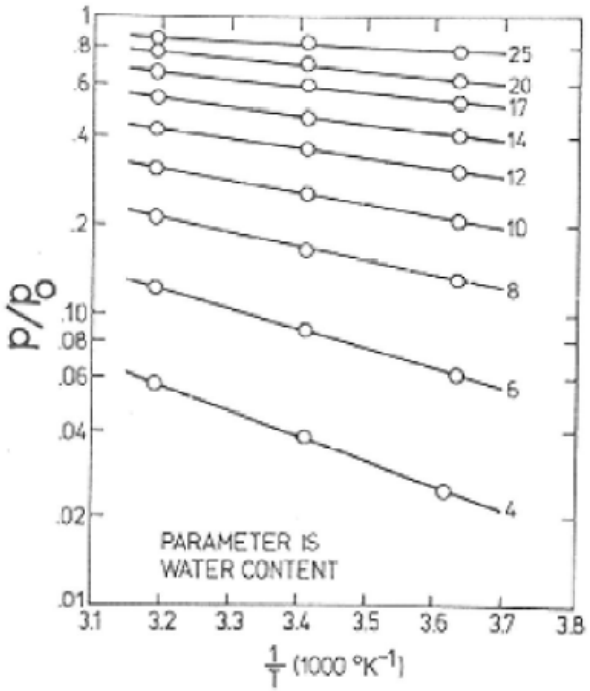
$$\frac{d \ln a_w}{d(1/T)} = \frac{-\Delta H}{R}$$

Dove:

T è la temperatura assoluta

R costante dei gas

ΔH è la variazione di entalpia di diffusione dell'acqua a volume costante.



Food Chemistry
Edited by
Owen R. Fennema

In figura è rappresentato l'andamento dei valori di p/p_0 in funzione della temperatura assoluta del sistema per campioni di amido di patata a differenti valori di % acqua sul peso secco (g H_2O/g amido).

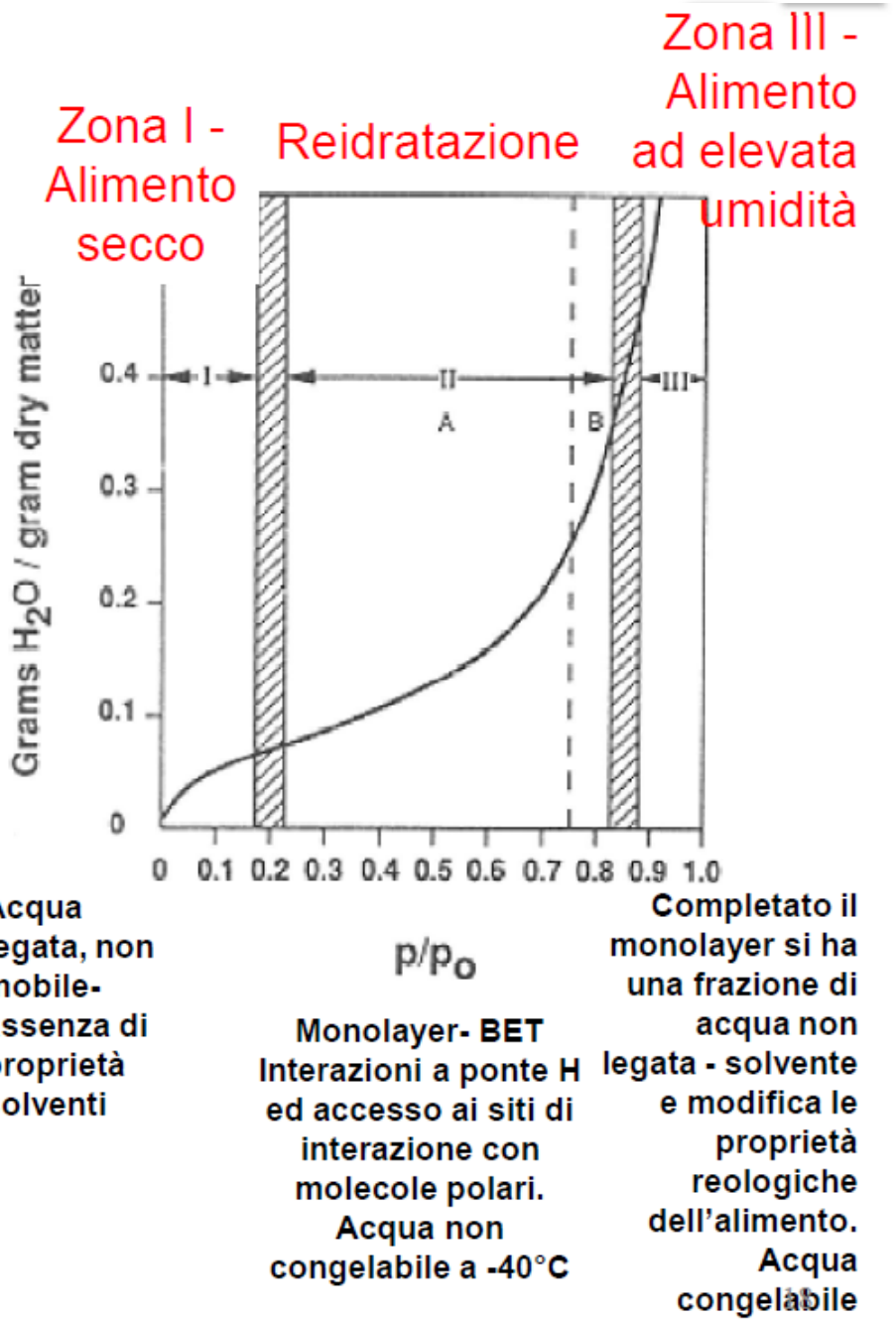
Il valore di a_w segue un andamento lineare (range 2-40°C) e diminuisce con l'inverso della temperatura assoluta del sistema a parità di % di acqua dell'alimento.

Diet composition

ACQUA NEGLI ALIMENTI

Relazione tra % di acqua contenuta in un alimento (g H_2O/g di peso secco) ed valore di a_w (a T costante).
Isoterma di sorpzione (Moisture Sorption Isotherm - MSI)

Descrive fenomeni quali:
- disidratazione e concentrazione;
- trasferimento di acqua tra gli ingredienti;
- determinazione della permeabilità da parte di un packaging;
- studio della stabilità.



Diet composition

U2

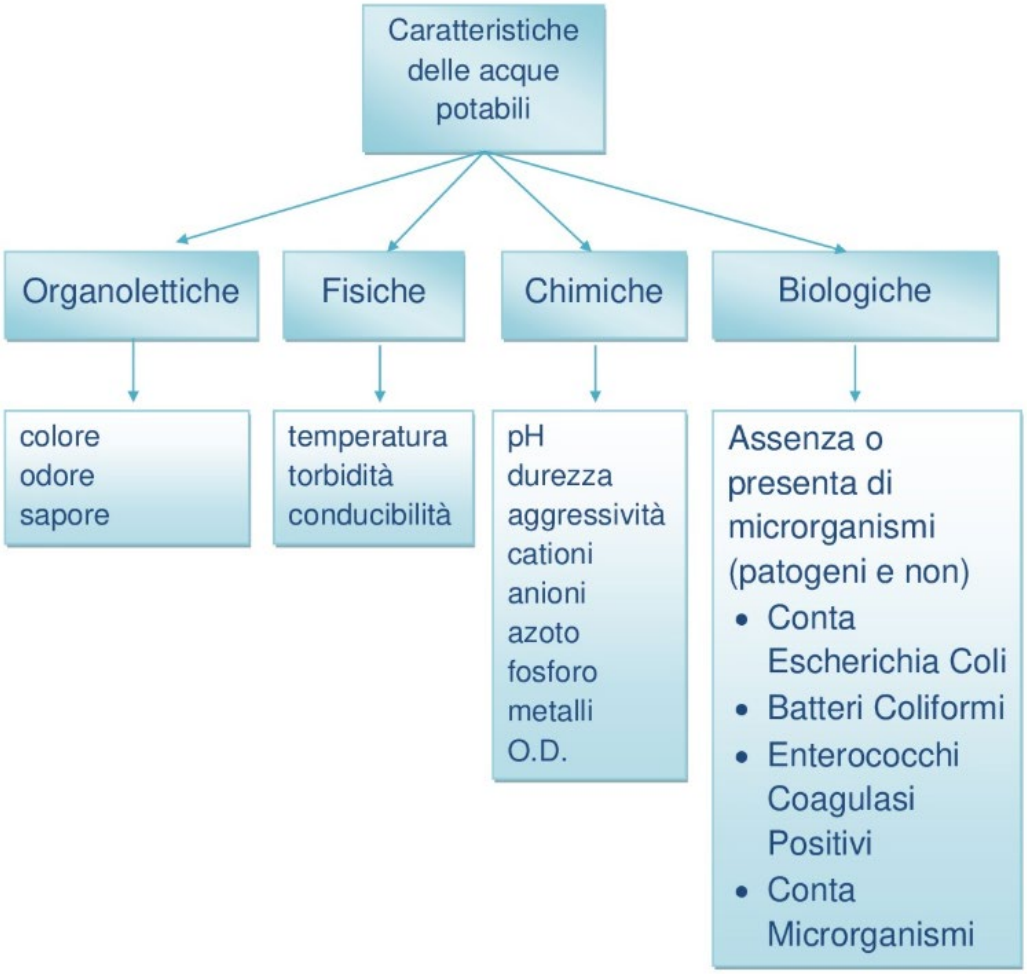
5. DRINK WATER

EVERY DAY

L'acqua destinata al consumo umano deve essere
salubre e pulita

INNOCUA: tossici e microrganismi dannosi
FRUIBILE: disponibile e distribuita in modo idoneo
ACCETTABILE: limpida, inodore, incolore, insapore.

REQUISITI DI QUALITA'
- **Criteri Idrogeologici**;
- **Criteri Organolettici**;
- **Criteri Fisici**;
- **Criteri Chimici**



Diet composition

U2

5. DRINK WATER

ACQUA MINERALE NATURALE	ACQUA DI SORGENTE	ACQUA DESTINATA AL CONSUMO UMANO
Origine profonda e protetta	Origine profonda e protetta	Qualsiasi origine
Batteriologicamente pura all'orogine	Batteriologicamente pura all'orogine	Trattamento di potabilizzazione
Composizione Chimica costante	Composizione Chimica costante	NO
Confezionamento all'origine	Confezionamento all'origine	NO
Proprietà favorevoli in etichetta e in pubblicità	NO	NO
Parametri chimici specifici	Parametri chimici delle acque destinate al consumo umano	Parametri chimici delle acque destinate al consumo umano
Capacità contenitori massimo 2 litri	Capacità contenitori anche oltre 2 litri	Capacità contenitori anche oltre 2 litri

Diet composition

U2

5. DRI

EVERY

Tabella 1 - Confronto fra rispettivi valori limite per i componenti principali (parametri di composizione) tra le due tipologie di acqua.

Parametri di composizione e altri	Unità di misura	Valori parametrici acque potabili (D. Lgs. 31/2001)	Valori limite acque minerali (Art. 5 D.M. 542/1992)
Conducibilità elettrica	µS/cm	2.500	-(1)
pH	Unità pH	≥6,5 e ≤9,5	-
Ossidabilità	mg/L O_2	5,0	-
Durezza	°F	15-50 (2)	-
Residuo fisso	mg/L	1.500 (3)	-
Cloruri	mg/L Cl^-	250	-
Solfati	mg/L SO_4^{2-}	250	-
Bicarbonato	mg/L HCO_3^-	-	-
Sodio	mg/L Na^+	200	-
Potassio	mg/L K^+	-	-
Calcio	mg/L Ca^{++}	-	-
Magnesio	mg/L Mg^{++}	-	-

(1) Quando non è riportato alcun dato, significa che nessun valore è previsto.

(2) Il limite inferiore vale per le acque sottoposte a trattamento di addolcimento o di dissalazione.

(3) È un valore massimo consigliato, indicato nella tabella C – "Parametri indicatori" dell'Allegato I del D. Lgs 31/2001.

Diet composition

U2

5. DRINK WATER

EVERY DAY

Specie inorganiche:

Durezza Totale: data dai Sali di HCO_3^-, SO_4^{2-}, Cl^-, NO_3^-, di Ca^{2+} e Mg^{2+}; si esprime in °F e corrisponde a 10mg/L di $CaCO_3$ (dura se 18-20°F)

Durezza Temporanea: è dovuta ai bicarbonati di Ca^{2+} e Mg^{2+} che per ebollizione precipitano come carbonati insolubili e la CO_2 allontanata in forma gassosa.

$$Ca(HCO_3)_2 \leftrightarrows CaCO_3 + CO_2 + H_2O$$
$$Mg(HCO_3)_2 \leftrightarrows MgCO_3 + CO_2 + H_2O$$

Durezza Permanente: è dovuta alla presenza di SO_4^{2-}, Cl^-, NO_3^-, di Ca^{2+} e Mg^{2+} che rimangono in soluzione anche dopo ebollizione.

Diet composition

U2

5. DRINK WATER

EVERY DAY

Acque Minerali

Indicazioni aggiuntive

Possono essere riportate (non è obbligatorio) anche le seguenti indicazioni:

a) "oligominerale" o "leggermente mineralizzata", se il tenore dei sali minerali, calcolato come residuo fisso, non è superiore a 500 mg/l;

b) "minimamente mineralizzata", se il tenore di questi, calcolato come residuo fisso, non è superiore a 50 mg/l;

c) "ricca di sali minerali", se il tenore di questi, calcolato come residuo fisso, è superiore a 1500 mg/l;

d) "contenente bicarbonato" se il tenore di bicarbonato è superiore a 600 mg/l;

e) "solfata" se il tenore dei solfati è superiore a 200 mg/l;

f) "clorulata", se il tenore di cloruro è superiore a 200 mg/l;

g) "calcica", se il tenore di calcio è superiore a 150 mg/l;

h) "magnesiaca", se il tenore di magnesio è superiore a 50 mg/l;

i) "fluorata" o "contenente fluoro", se il tenore di fluoro è superiore a 1 mg/l;

l) "ferruginosa" o "contenente ferro", se il tenore di ferro bivalente è superiore a 1 mg/l;

Ad ognuno la sua acqua

BOARIO DANONE ACTIV	**SAN BENEDETTO**	**DANONE VITASNELLA**	**ROCCHETTA LA LEGGERA**	**SAN GEMINI**
Acqua minerale naturale ricca di calcio (131 mg/l). Residuo fisso: 636 mg/l. Indicata per le carenze di Calcio e per chi pratica sport.	Acqua oligominerale frizzante o naturale, povera di sodio (meno dello 0,0007%). Residuo fisso: 246 mg/l. Utile a chi soffre di pressione alta e deve seguire una dieta iposodica; agevola i processi digestivi.	Acqua oligominerale naturale ricca di calcio (70 mg), magnesio (22 mg), solfati (63 mg) e poverissima di sodio (solo 2 mg). Residuo fisso: 327 mg/l. Favorisce la diuresi e disintossica l'organismo	Acqua oligominerale naturale "leggera", povera di sali minerali. Residuo fisso: 176 mg/l. Benefici effetti sulla pelle, normalizzando il ricambio idrosalino; stimola la diuresi.	acqua minerale naturale ricca di calcio (328 mg/l) e di magnesio (17,50 mg/l). Residuo fisso: 899 mg/l. Indicata a chi ha bisogno di calcio.
VERA	**FERRARELLE**	**BRIO BLU ROCCHETTA**	**NORDA**	**LEVISSIMA**
Acqua oligominerale naturale e frizzante. Residuo fisso: 160 mg/l. Ottima acqua da tavola, ideale per disintossicare il fegato e per stimolare la diuresi.	Acqua minerale effervescente naturale, ricca di calcio (362 mg/l), Magnesio (18 mg/l) e Bicarbonato (1372 mg/l). Residuo fisso: 1270 mg/l. Aiuta la digestione, utile anche nell'osteoporosi e nell'ipertensione.	acqua oligominerale leggermente frizzante. Residuo fisso: 176 mg/l. Depura l'organismo dalle scorie e stimola la diuresi. Indicata a chi ha problemi di calcolosi renale.	Acqua minimamente mineralizzata, "leggerissima". Residuo fisso: 44.5 mg/l. Ottima acqua da tavola a bassissimo contenuto minerale, favorisce la diuresi ed è indicata nelle diete povere di sodio e nella cura dell'ipertensione.	acqua oligominerale. Residuo fisso: 0,3 mg/l. Povera di sali minerali, favorisce le funzioni renali e stimola la diuresi. Indicata in particolare a chi soffre di calcolosi

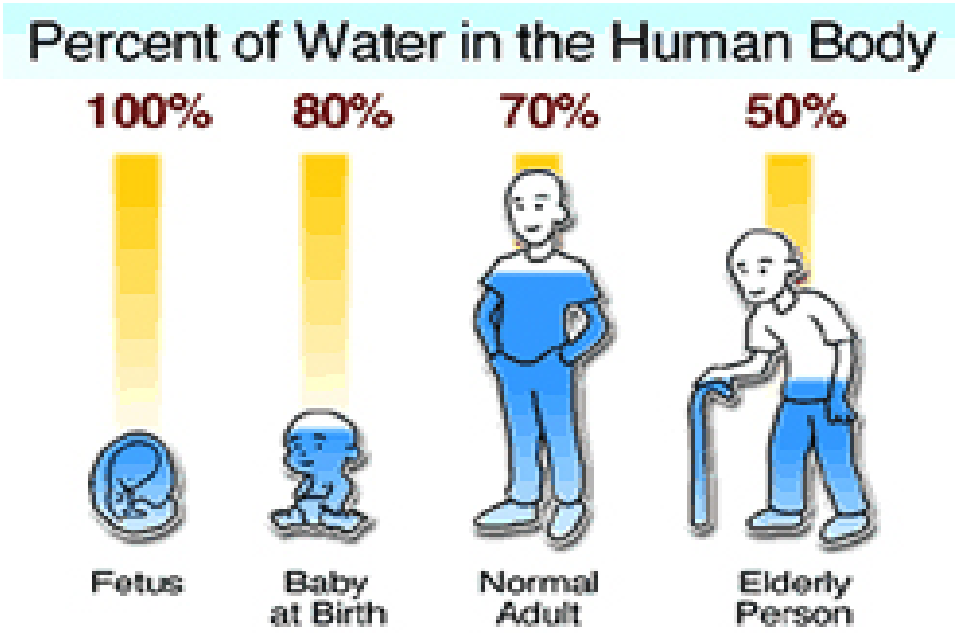
Ad ognuno la sua acqua

CATEGORIA	ACQUA MINERALE
Gravidanza	Acque oligominerali a contenuto di nitrati particolarmente basso o addirittura nullo (non superiore a 10 mg/l per il noto rischio di provocare metaemoglobinemia fetale). Per aumentare l'apporto di sali minerali, considerato l'aumentato fabbisogno della gestante, si consiglia di alternare acque oligominerali ad acque mediominerali, preferendo quelle calciche
Allattamento	I consigli sono simili a quelli dispensati per la gravidanza, con l'accortezza di bere maggiori quantità di acqua per favorire il ripristino della quota di liquidi persa con l'allattamento.
Diluizione del latte in polvere per neonati	Acque minimamente mineralizzate, praticamente prive di sali minerali per non alterare la formula nutritiva, attentamente calibrata, dell'alimento. Ancora una volta, si consiglia attenzione nella quantità di nitrati nell'acqua minerale, che dev'essere nulla o estremamente bassa
Depurativa	Oligominerale, per depurare l'organismo favorendo l'eliminazione di tossine
Calcolosi renale	Oligominerale o minimamente mineralizzata, per stimolare la diuresi e prevenire la formazione di calcoli o facilitarne l'eliminazione
Gotta ed iperuricemia	Oligominerale o minimamente mineralizzata a basso contenuto di sodio (2/3 litri al giorno) → emodiluizione dell'acido urico → stimolo sulla diuresi → aumentata escrezione urinaria di acido urico
Sport	Mediominerale, con un buon patrimonio di calcio, ferro, sodio, cloro e bicarbonato.
Ipertensione	Oligominerale a basso contenuto di sodio, associata ad una dieta altrettanto povera di sodio, utile negli stadi iniziali e come prevenzione nei soggetti predisposti
Osteoporosi	Acqua mineralizzata ricca di "calcio biodisponibile" (controllare la presenza di questa dicitura nell'etichetta)
Acidità gastrica, sport	Acqua minerale di tipo bicarbonato calcico
Anemia	Acqua minerale di tipo ferrugginoso
Carie	Acqua minerale fluorata
Ipercolesterolemia	Acque salso-solfate (aumentano l'escrezione degli acidi biliari con le feci)
Stipsi	Acqua solfata, con elevati Sali di magnesio

Diet composition

U2

5. DRINK WATER EVERY DAY



Functions in the Body:

- Water carries nutrients to your cells and carries waste from your body.
- Regulates body temperature.
- Dissolves vitamins, minerals, amino acids and other nutrients.
- Lubricates joints.

It is recommended that teens drink 6-8 glasses of water each day. This is in addition to around 4 cups of water you get from food each day. (2-2,5 l)

QUANTA ACQUA AL GIORNO?

1.Have children drink before heading out to play and call them in frequently for drinks.
2. To avoid overheating, encourage regular breaks in the shade when the sun is hot.
3.Keep drinks cool whenever possible and offer beverages that your child enjoys. All beverages,including water, milk, juice, soft-drinks, and other fluids, can help meet a child's hydration needs.
4. Remember that many foods have a high water content and contribute to total fluid intake. Fruits,vegetables, and some other foods are high in water conten

CHILDREN

1. A hydration programme should include advice on drinking, offering drinks at mealtime and in between meals.
2. Environmental temperatures inside should be moderate. In hot environments, it is recommended that intake of liquids be increased by 250 mL for each degree centigrade over 37ºC.
3. Increasing the intake of foods with a high content of water, such as soups or fruit and vegetables, which typically contain 80-90% water
4. Varying flavours and even colours can improve palatability of beverages offered and can help facilitate adequate hydration.

EDERLY

Age range	Daily adequate water intake[1]	
Infants		
0-6 months	**680** mL / day or **100-190** mL/ kg/day. From human milk / infant formula.	
6-12 months	**0.8-1.0** L / day. From human milk/infant formula and complementary foods and beverages.	
1-2 years	**1.1-1.2** L / day	
Children		
2-3 years	**1.3** L / day	
4-8 years	**1.6** L / day	
Adolescents	**Males**	**Females**
9-13 years	**2.1** L / day	**1.9** L / day
14-18 years	**2.5** L / day	**2.0** L / day
Adults*	**Males**	**Females**
›19 years	**2.5** L / day	**2.0** L /day

U2

Chronic mild hyperhydration
can cause chronic hyponatremia that affects the risk of falls and fractures in older people, due to two mechanisms related to it: (i) onset of mild cognitive impairment that can cause an unstable gait and, therefore, falls and (ii) increased bone fragility due to an increase in bone resorption, which is a possible mechanism of mobilization of sodium, and is therefore directly linked to hyponatremia

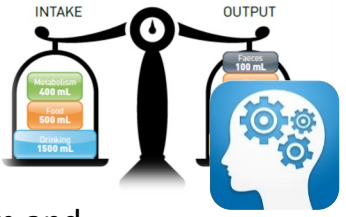
The acute hyperhydration
causes disturbances in the hydro electrolyte balance.
If the extracellular concentration of solutes decreases, the water is pushed into the intracellular space, causing cellular swelling.
The brain swelling leads to an increase in intracranial pressure, which can cause symptoms such as migraine, nausea, confusion and drowsiness and which can also have effects on behaviour and personality, a limitation of blood flow, which in turn may cause dysfunction charged to the central nervous system (hyponatremic encephalopathy).

1.High intake of natural water in excess of the actual body requirements.

2. Electrolyte deficiency - in the above example, this deficit is caused by high sweating.

3. Inability of the kidneys to provide one adequate compensation by increasing the urinary production rate.

Dehydration



Dehydration occurs when the body loses more water than it takes. It is often accompanied by
alterations in the balance of mineral salts or electrolytes, especially with regard to sodium and potassium concentrations.

Isotonic dehydration
when water and sodium are both lost in similar quantities through vomiting, diarrhea or due to inadequate intake and the osmotic passage of water from the intracellular space to the extracellular space does not occur. This type of dehydration is typical of young children.

Hypertonic dehydration
more water than sodium is lost (inadequate water intake, excessive sweating, osmotic diuresis and diuretics). This process is characterized by an osmotic passage of water from intracellular to extracellular fluids. This type of dehydration is more common in people with diabetes, and represents about 10-20% of all pediatric cases of dehydration caused by diarrhea.

Hypotonic dehydration
more sodium is lost compared to water. This is the case of strong sweating or fluid loss due to gastrointestinal disturbances, or compensation for water and electrolyte deficiency only through water intake. It is characterized by an osmotic passage of liquids from the extracellular spaces to the intracellular ones. It also occurs in case of excessive intake of normal water or other poor or completely sodium-free liquids. This type of dehydration accounts for about 10-15% of all pediatric dehydration cases caused by diarrhea, vomiting, bleeding, hyperglycemia, and antidepressants.

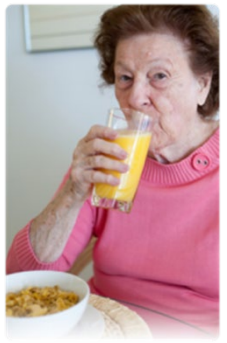
Disidratazione oltre una certa soglia

U2

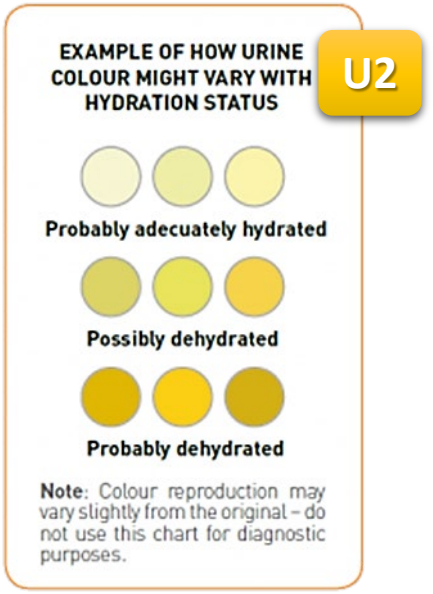
Reversibili attraverso una reidratazione

Prestazioni ridotte a causa di:

- Resistenza ridotta
- Aumento della fatica
- Emicrania
- Termoregolazione alterata
- Costipazione
- Motivazione ridotta
- Incremento dello sforzo percepito
- Alterazione stati d'animo
- Alterazione funzioni cognitive
  - Stato vigile
  - Concentrazione
  - Memoria a breve termine
  - Abilità aritmetiche
  - Abilità psichiche, motorie e visuali
  - Discriminazione percettiva



Dehydratation caused by



A slight dehydration is a common state, and is generally caused by the failure to take the correct amount of fluids throughout the day. In children, a common cause of dehydration is diarrhea.

Liquids are normally lost through normal body functions, such as sweating, breathing and eliminating urine. Common causes of dehydration include loss of water due to gastrointestinal disorders such as diarrhea and vomiting, excessive diuresis, and a high dispersion of water through the skin (sweating) and lungs (respiration) to because of heat and / or humidity, physical activity, fever or burns.

Diarrhea
He retched
Excessive diuresis
Sweating
Fever or burns
Climate
Physical activity
Air conditioning / heating

How much water can the body lose in one day?

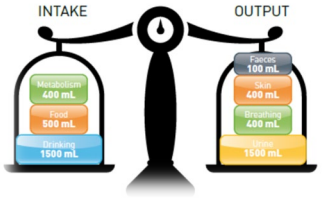
A normal adult who lives in a temperate climate loses about 2 to 2.5 liters of water a day as a result of exhaled breath, sweat, urine and other body secretions. The total amount depends on sex, body mass, weather conditions, worn clothes, activity levels and a whole host of other factors.

Our body loses water continuously but only drinks intermittently, so the water content inside it changes constantly.

For an average male person of about 80 kg, sitting at rest in a relaxing environment, the loss of water is normally around 300 ml / hr.
For an average woman weighing about 65kg, the losses are slightly less rapid, with a value of 250ml / hour.

If we accept a dehydration level of about 1% of the total weight as tolerable, this could occur within 2-3 hours. If we drink adequate quantities of water during meals and in the typical coffee or tea breaks that everyone usually takes, we can stay perfectly hydrated throughout the day

Bilancio dei fluidi = meccanismo omeostatico.



Rilevatori in diversi siti del corpo

Osmorecettori e barocettori nelle cellule

Vie neuronali →

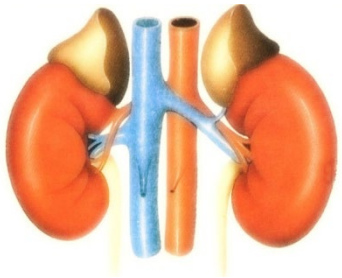
Centri integrativi

← Neuro ormoni

Diuresi, natriuresi, pressione sanguigna

Diminuisce il volume plasmatico ed aumenta l'osmolarità

Organi effettori (reni)

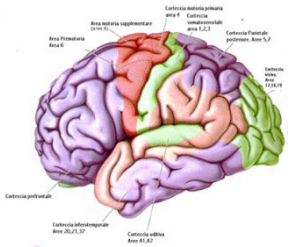


↑ riassorbimento dei fluidi
↓ osmolarità del plasma
↑ volume plasmatico

↑vasopressina o ADH

↑angiotensina*
In risposta della variazione del volume idrico extracellulare

Cervello



Stimolo della sete

Angiotensina
- Vasoattiva
- ↑ rilascio di ADH
- ↑rilascio di aldosterone che diminuisce anche il sodio escreto

Why do we not always respond to the physiological signals of thirst?

U2

can depend on several factors such as:

- ignorance of the benefits of taking fluids;
- we forget to drink;
- lack of appreciation of the taste of water;
- lack of thirst;
- absence of available water;
- need for frequent urination and related problems in the workplace
- Mechanism of thirst is jamming

The ability to feel thirst decreases with age; in addition, certain medications can affect hormonal response

With age, the body loses its ability to respond with the sensation of thirst to a lack of fluids, resulting in an increased risk of dehydration. Therefore, to ensure proper hydration, seniors should try to anticipate the body's needs and do not always wait to get thirsty before drinking

Treatment of hypertension and heart failure is based on 80% of drugs that work by blocking the production of angiotensin and / or by inhibiting the specific receptor. These drugs are also used to treat other contemporary diseases such as obesity, diabetes, cancer and Alzheimer's disease. The release of angiotensin in the blood is the physiological response to the dehydration of the extracellular compartment; therefore, there may be a correlation between the presence of mild long-term dehydration and the diseases listed above

Diet compo

5. DRINK WATER EVERY DAY

10. ACQUE MINERALI: QUALI SONO?

Se vuoi conoscere il contenuto totale di sali minerali (residuo fisso) nelle acque imbottigliate, leggi l'etichetta.

	Residuo fisso
Acque minimamente mineralizzate	meno di 50 mg/litro
Acque oligominerali	50-500 mg/litro
Acque minerali propriamente dette (acque medio minerali)	500-1500 mg/litro
Acque fortemente mineralizzate	più di 1500 mg/litro

FALSE CREDENZE SULL'ACQUA

1. Non è vero che l'acqua vada bevuta al di fuori dei pasti. Al limite, se si eccede nella quantità si allungheranno di un poco i tempi della digestione (per una diluizione dei succhi gastrici), ma una adeguata quantità di acqua (non oltre i 6-700 ml) è utile per favorire i processi digestivi, perché migliora la consistenza degli alimenti ingeriti.
2. Non è vero che l'acqua faccia ingrassare. L'acqua non contiene calorie, e le variazioni di peso dovute all'ingestione o eliminazione dell'acqua sono momentanee e ingannevoli.
3. Non è vero che bere molta acqua provochi maggiore ritenzione idrica. La ritenzione idrica dipende più dal sale e da altre sostanze contenute nei cibi che consumiamo che dalla quantità di acqua che ingeriamo.
4. Non è vero che occorra preferire le acque oligominerali rispetto alle acque maggiormente mineralizzate per mantenere la linea o "curare la cellulite". I sali contenuti nell'acqua favoriscono l'eliminazione di quelli contenuti in eccesso nell'organismo. Nei bambini, in particolare, sarebbe bene non utilizzare le acque oligominerali in modo esclusivo, ma bisognerebbe alternarle con quelle più ricche di minerali, in quanto una diuresi eccessiva può impoverire di sali minerali un organismo in crescita.
5. Non è vero che il calcio presente nell'acqua non sia assorbito dal nostro organismo. Ricerche recenti dimostrano il contrario. La capacità dell'intestino umano di assorbire il calcio contenuto nelle acque (spesso presente in quantità consistente) è considerata addirittura simile a quella relativa al calcio contenuto nel latte.
6. Non è vero che il calcio presente nell'acqua favorisca la formazione dei calcoli renali. Le persone predisposte a formare calcoli renali devono bere abbondantemente e ripetutamente nel corso della giornata, senza temere che il calcio contenuto nell'acqua possa favorire la formazione dei calcoli stessi: anzi, è stato dimostrato che anche le acque minerali ricche di calcio possono costituire al riguardo un fattore protettivo.
7. Non è vero che l'acqua gasata faccia male. Né l'acqua naturalmente gasata né quella addizionata con gas (normalmente anidride carbonica) creano problemi alla nostra salute, anzi l'anidride carbonica migliora la conservabilità del prodotto. Solo quando la quantità di gas è molto elevata si possono avere lievi problemi in individui che già soffrano di disturbi gastrici e/o intestinali.
8. Non è vero che le saune facciano dimagrire. Le saune fanno semplicemente eliminare sudore. Lo stesso organismo provvederà a reintegrare prontamente le perdite, cosicché nell'arco di poche ore il peso tornerà ad essere esattamente quello di prima.

7. alcoholic drinks: only in controlled amounts

1 U.A. (unità alcolica) = 12 grammi di etanolo

12 grammi di etanolo = 330 ml = 125 ml = 40 ml

1 grammo di etanolo = 7 Kcal

TABELLA 1 - QUANTITÀ DI ALCOL E APPORTO CALORICO DI ALCUNE BEVANDE ALCOLICHE

Bevanda alcolica	Misura standard	Quantità (ml)	Contenuto di alcol (g)	Apporto calorico (kcal)	Unità alcoliche (U.A.)
Vino da pasto (12 gradi)	1 bicchiere	125	12	84	1
Vino da pasto (11 gradi)	1 bicchiere	125	11	77	0.9
Vino da pasto (13.5 gradi)	1 bicchiere	125	13	91	1.1
Birra normale (4.5 gradi)	1 lattina	330	12	100	1
Birra doppio malto (8 gradi)	1 boccale	200	12	170	1
Vermouth dolce (16 gradi)	1 bicchierino	75	10	113	0.8
Vermouth secco (19 gradi)	1 bicchierino	75	10	82	0.8
Porto, aperitivi (20 gradi)	1 bicchierino	75	12	115	1
Brandy, Cognac, Grappa, Rhum, Vodka, Whisky (40 gradi)	1 bicchierino	40	13	94	1.1

EFFETTI ACUTI DELL'ALCOL

A seconda delle concentrazioni che l'alcol raggiunge nel sangue si hanno i ben noti effetti sul sistema nervoso e sull'organismo in generale.
L'abuso cronico di alcol è in grado di provocare una serie di danni a vari sistemi, nonché gravi squilibri nutritivi e seri rischi di malnutrizione. Le carenze nutrizionali che ne derivano amplificano la tossicità dell'etanolo sui vari sistemi. A carico del sistema nervoso centrale e periferico l'alcol provoca varie manifestazioni cliniche, che vanno dalla neuropatia periferica al tremore, fino a stati più gravi di allucinazioni, psicosi, demenza. A carico del sistema digerente l'alcol può provocare gastriti acute e croniche, emorragie, ulcere, cirrosi epatica e danni al pancreas. L'alcol agisce anche sul sistema cardiovascolare, contribuendo all'innalzamento della pressione arteriosa e facilitando la comparsa di vari tipi di cardiopatia. Anche quantità moderate di alcol sono coinvolte nell'aumento del rischio di insorgenza di vari tipi di tumore in diversi organi (soprattutto mammella, cavo orale, faringe e prime vie aeree, stomaco). Molto importanti sono anche le note interferenze fra l'alcol e svariati farmaci, interferenze che possono provocare reazioni indesiderate, nonché riduzione o potenziamento degli effetti dei farmaci assunti. Molti farmaci, per esempio, vengono metabolizzati nel fegato per azione degli stessi enzimi che metabolizzano l'alcol; l'assunzione di alcolici insieme a questi farmaci, quindi, comporta un rallentamento dello smaltimento sia dell'alcol che del farmaco, con conseguenti, pericolosissimi, fenomeni di sovradosaggio.

TABELLA 2 - VALORI INDICATIVI DI ALCOLEMIA (G DI ALCOL PER LITRO DI SANGUE) IN FUNZIONE DELLA QUANTITÀ DI ALCOL INGERITO (ESPRESSA IN U.A.) E DEL TEMPO TRASCORSO DALL'INGESTIONE (IN CONDIZIONI DI DIGIUNO)
In giallo i valori che superano i tassi consentiti dalla legge per la guida

ORE DALL'ASSUNZIONE (UOMINI)					
U.A.	1	2	3	4	5
1	0.13	0.01	0	0	0
2	0.38	0.26	0.14	0.02	0
3	0.63	0.51	0.39	0.27	0.15
4	0.88	0.76	0.64	0.52	0.40
5	1.13	1.01	0.89	0.77	0.65

ORE DALL'ASSUNZIONE (DONNE)					
U.A.	1	2	3	4	5
1	0.23	0.10	0	0	0
2	0.57	0.45	0.33	0.21	0.09
3	0.92	0.79	0.67	0.56	0.44
4	1.26	1.14	1.02	0.91	0.78
5	1.61	1.49	1.37	1.25	1.1

Tabella 3 - EFFETTI CLINICI NELL'ARCO DELLA PRIMA ORA DOPO L'ASSUNZIONE DI ALCOLICI A DIGIUNO

Quantità (U.A.)	Alcolemia (g per litro)	Effetti sulla capacità di attenzione, sulla capacità di guida e sull'organismo in generale
1-1.5 (M) 1 (F)	0.2-0.3	Alterazione del senso di benessere con comportamento imprudente, tendente alla sopravalutazione delle proprie capacità, alla euforia e alla sottovalutazione dei rischi. I riflessi sono già, se pur debolmente, alterati.
2 (M) 1.2 (F)	0.4	Diminuzione dell'elaborazione mentale di ciò che si percepisce con i sensi.
2.5 (M) 1.5 (F)	0.5	Riduzione della visione laterale (quindi, ad esempio, difficoltà ad accorgersi dei segnali stradali).
3-5 (M) 2.5-4 (F)	0.6-1.0	Ebbrezza e confusione nell'eloquio; comincia a peggiorare la coordinazione motoria.
6-13 (M) 4-10 (F)	1.1-3.0	Intossicazione sempre più grave a secondo dei livelli, atassia, nistagmo, visione confusa.
> 14 (M) > 11 (F)	3.1-5.0	Intossicazione ingravescente, convulsioni, ipotermia, iporeflessia, depressione respiratoria fino alla morte.

N.B.: I valori delle U.A. necessarie per raggiungere i vari livelli alcolemici sono diversi per maschi (M) e Femmine (F).

TABELLA 4 - LE PRINCIPALI INTERAZIONI TRA ALCOL E FARMACI

Farmaci	Effetto dell'etanolo
Sedativi, ipnotici, anticonvulsivanti, antidepressivi, ansiolitici, analgesici (come gli oppiacei)	Potenziamento degli effetti dell'etanolo
Sedativi, ipnotici, narcotici, antidepressivi, ansiolitici, analgesici, barbiturici, antipsicotici	Aumentata attività e/o concentrazione nel sangue
Anticoncezionali orali, anticoagulanti, antibiotici (tetracicline, chinoloni, ecc.)	Diminuita attività e/o concentrazione nel sangue
Antipsicotici (neurolettici), anticonvulsivanti, ipoglicemizzanti orali	Instabilità dei livelli del farmaco nel sangue
Paracetamolo, altri analgesici-antinfiammatori-antipiretici (anche acido acetil salicilico), ipoglicemizzanti orali (sulfaniluree), antibiotici, sulfamidici, alcuni antimicotici (metronidazolo)	Possibilità di effetti tossici o dannosi