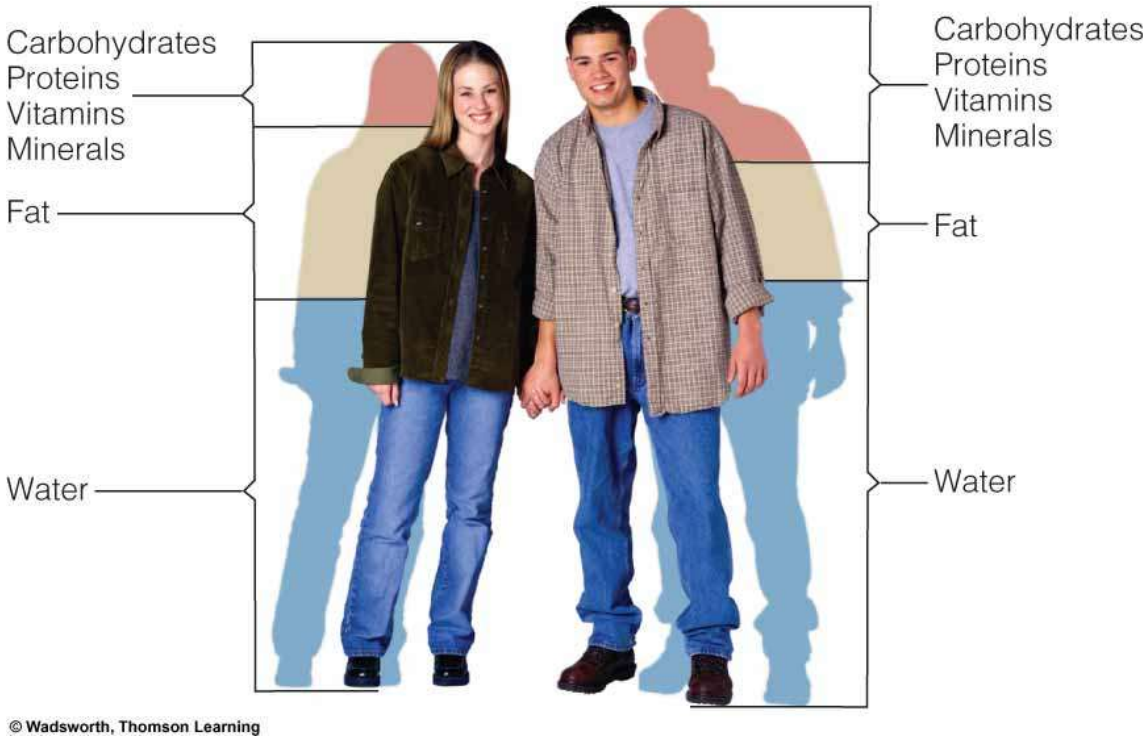
OSNOVE PREHRANE PROGRAM

- Uvod - osnovni pojmi
- Energija
- Ogljikovi hidrati
- Maščobe
- Beljakovine
- Vitamini
- Minerali
- Alkohol
- Voda



OSNOVE PREHRANE PROGRAM

PREDAVANJA

- Seminarske vaje

VAJE

- Prehransko računovodstvo
- Izivi

Magnelli
1914

- ***Prehrana je veda o potrebah po hranilnih snoveh in človekovi prehrani o pomenu in medsebojnih učinkih sestavin hrane in sicer glede na življenjske procese, ohranjanja zdravja in zdravljenja bolezni.***
- ***Prehrana je znanost, ki daje osnove za optimalno prehrano zdravega in bolnega človeka (humana prehrana). Interdisciplinarni značaj.***
- ***Uravnotežena prehrana je tista prehrana, ki vsebuje vse esencialne hranilne snovi v takšnih količinah in razmerjih, za maksimalen potek vseh funkcij organizma, ne sme pa vsebovati nobenih snovi v takšnih količinah in koncentracijah, da bi kakor koli zmanjšale ali ogrožale dobro počutje in zdravje človeka.***

- Young (2001) je opredelil hranilo v postgenomski dobi kot »neko opredeljeno (fizikalno, kemično, fiziološko) sestavino živila, naravno ali narejeno, ki služi kot energijski substrat, ali kot predhodnik za sintezo makromolekul ali drugih komponent, ki so potrebne za normalno celičnodiferenciacijo, rast, popravilo, zaščito ali/in vzdrževanje normalnih signalnih molekul,kofaktorjev ali determinant, ki omogočajo normalno funkcijo, strukturo in/ali integritetocelic in organov«.

Ta precej kompleksna opredelitev zajema kot hranila še snovi, ki katalizirajo reakcije in omogočajo združevanje mehanističnih struktur.

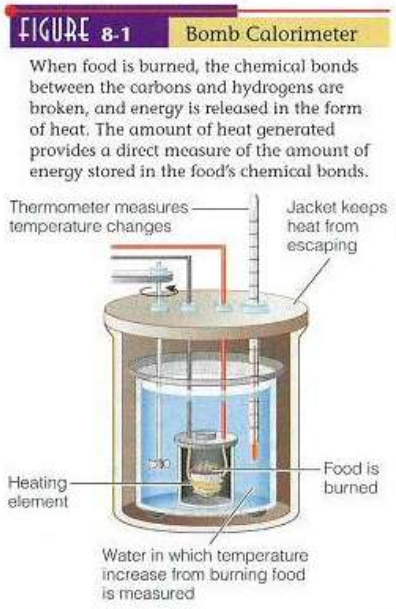
ENERGIJA

$E=mc^2$

ENERGIJA

Merjenje porabe energije:

- Direktno



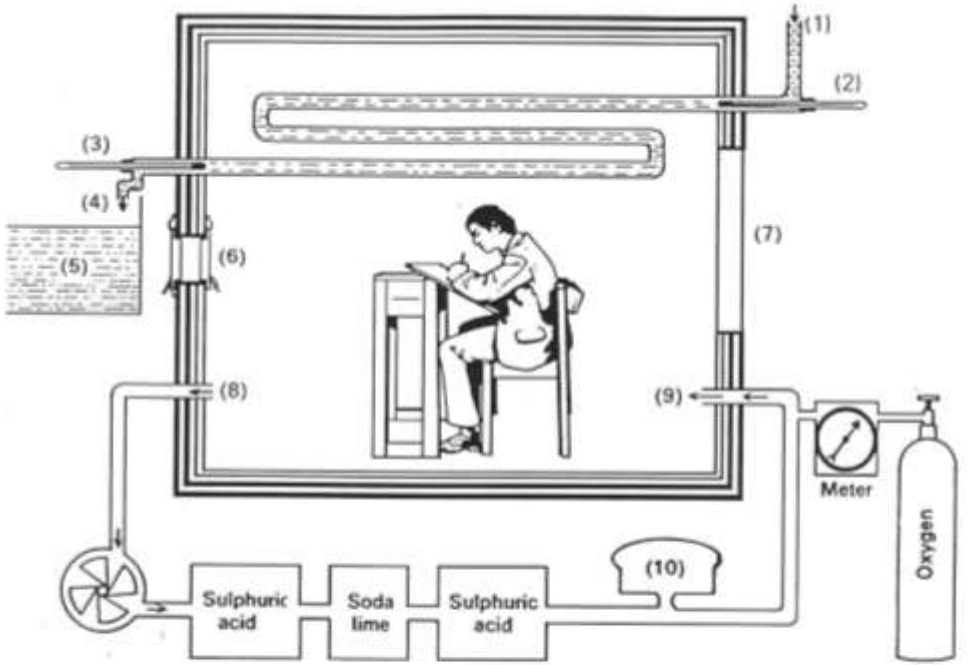
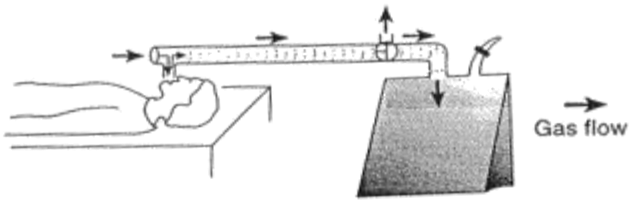


Fig. 3.1 The Atwater chamber. The walls of the chamber are insulated. Heat produced by the subject is absorbed by water passing in at (1) and out at (4), with temperatures at these points measured by thermometers (2) and (3), and the volume of water flowing through being measured at (5). Food is introduced and excreta removed through the porthole (6) and the subject may be observed through the window (7). Air leaves the chamber at (8) and passes through a pump and then over sulphuric acid and soda-lime to absorb water and carbon dioxide. Pressure changes are monitored at (10) and oxygen measured by a gas meter is added to the system at (9) to equalize the pressure. (From Bell G H. Davidson J N, Scarborough H 1968 Textbook of physiology and biochemistry, 7th edn. Livingstone, Edinburgh.)

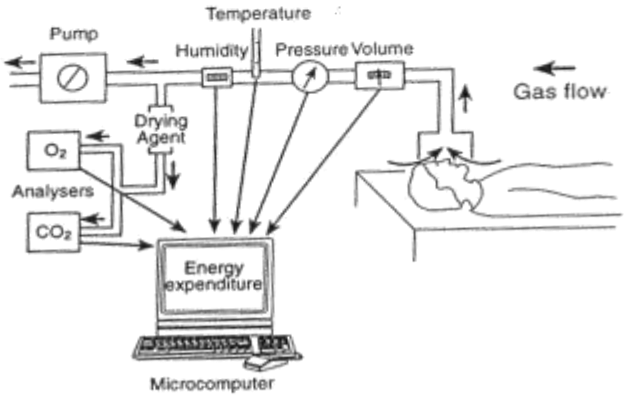
ENERGIJA

- Indirektno



The Douglas bag

The Kofrani-Michaelis respirometer



A ventilated hood indirect calorimeter

Fig. 5.1 Most commonly used devices for indirect calorimetry. *Source*: Garrow JS, James WPT (eds). *Human nutrition and dietetics*, 9th ed. Edinburgh: Churchill Livingstone, 1993.

ENERGIJA

Značilne vrednosti za BP odraslih živali različnih vrst in človeka

	Teža	Poraba energije kcal/dan/žival	Poraba energije kcal/kg	Poraba energije kcal/m^2
Krava	500	7470	14,9	1530
Moški	70	1700	24,3	950
Ženska	57	1347	23,6	828

Manjša kot je žival intenzivnejšo ima presnovo

ENERGIJA

Primerjava bazalnih presnov različnih živali in človeka

$PM = TM^{0,75}$; BP = PM x 70 kcal

	Telesna masa (kg)	Presnovna masa (kg)	Bazalna presnova (kcal)
Prašič	100	31,6	2212
Človek	80	26,7	1869
Pes	20	9,4	658
Kunec	5	3,3	231
Podgana	0,35	0,5	35
Miš	0,02	0,05	3,5

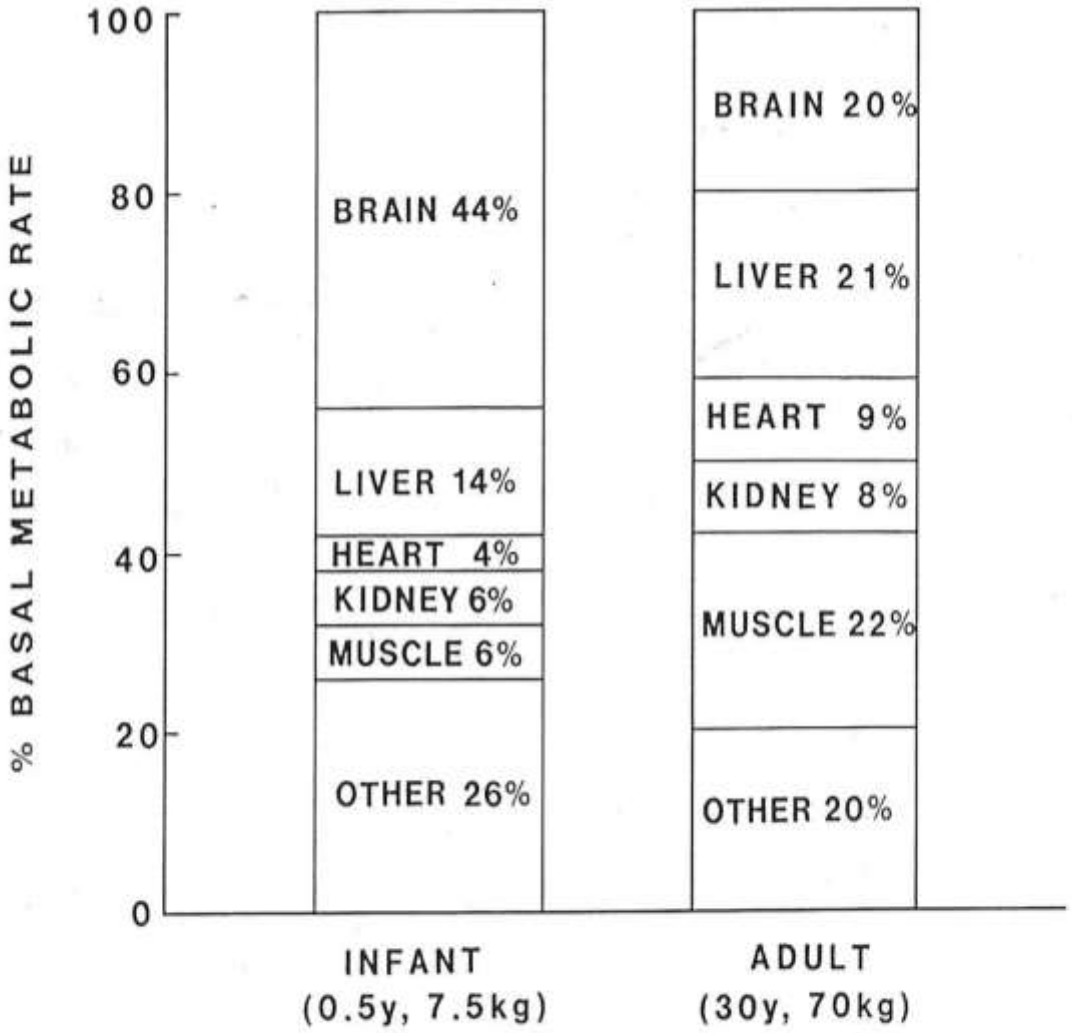
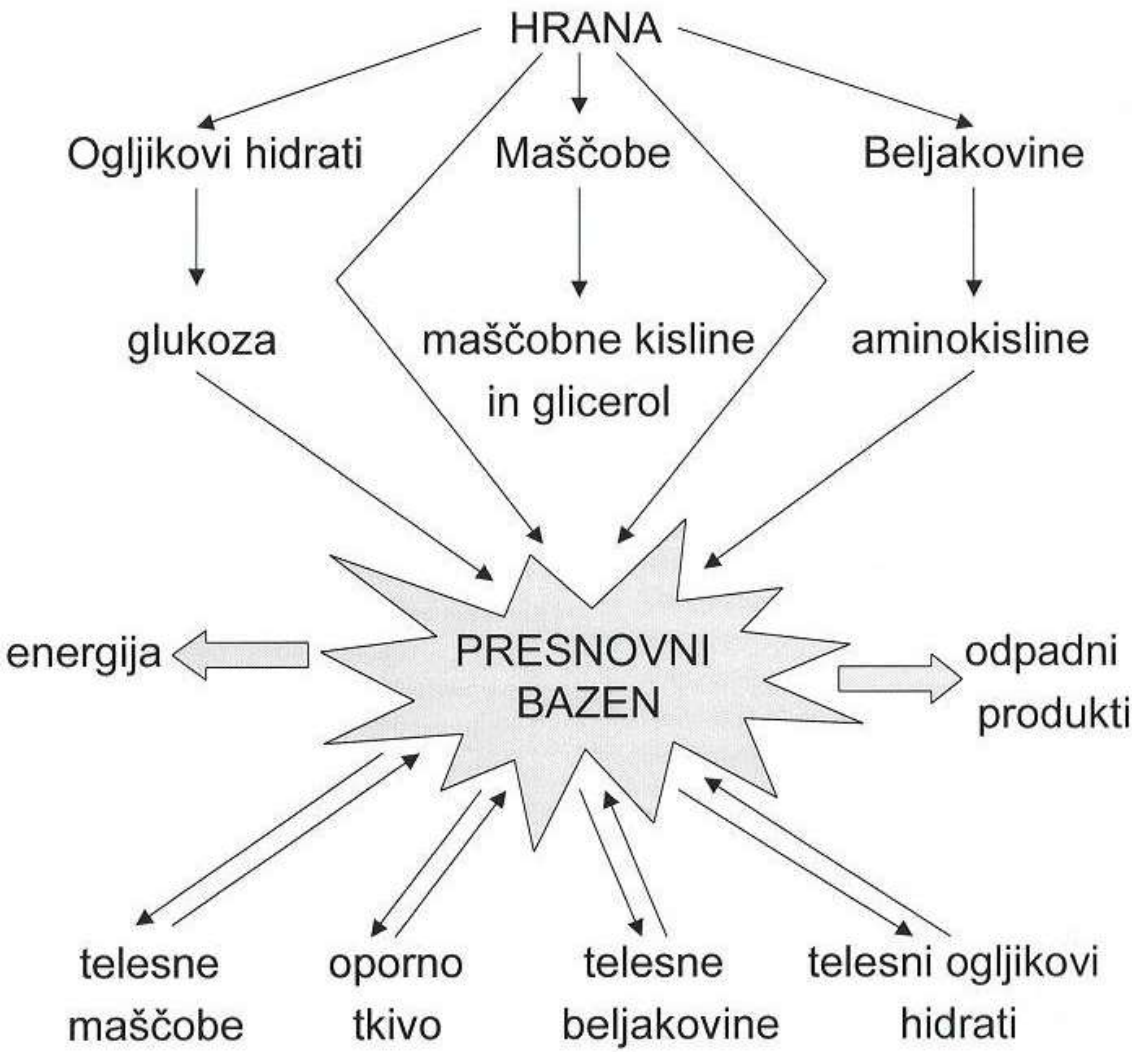


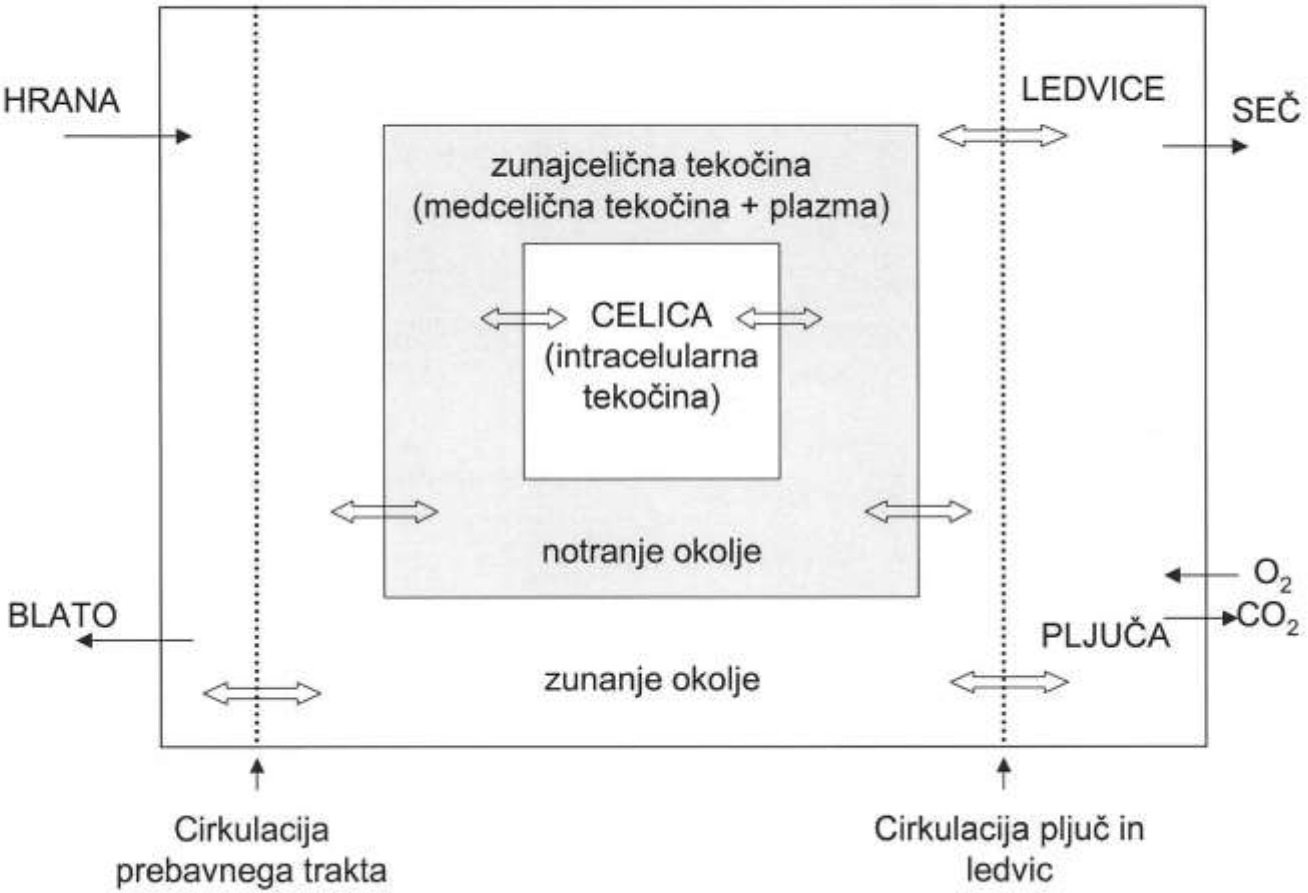
Fig. 4.1 The estimated distribution of energy expenditure in an infant (0.5 years, 7.5 kg) with a basal metabolic rate of 1.63 MJ (390 kcal)/day, and an adult (30 years, 70 kg) with a basal metabolic rate of 7.03 MJ (1680 kcal)/day.

Fizikalne in fiziološke sežigne vrednosti hranljivih snovi pri mešani prehrani

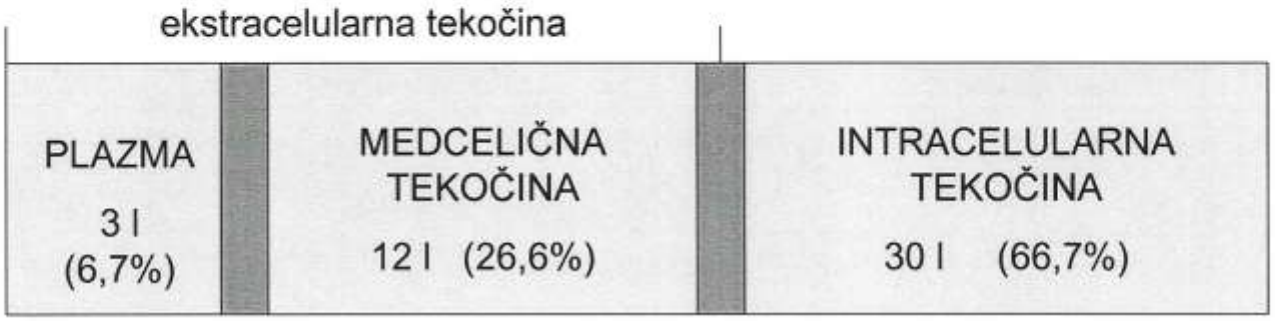
HRANLJIVA SNOV	FIZIKALNA SEŽIGNA VREDNOST		PREBAVLJIVOST %	IZGUBE S SEČEM		FIZIOLOŠKA SEŽIGNA VREDNOST	
	kJ/g	kcal/g		kJ/g	kcal/g	kJ/g	kcal/g
Beljakovine	22,4	5,35	92	5,23	1,25	17	4
Maščobe	38,9	9,30	95	/	/	37	9
Ogljikovi hidrati	17,1	4,10	97	/	/	17	4
Alkohol	29,7	7,10	100	sledovi		29	7

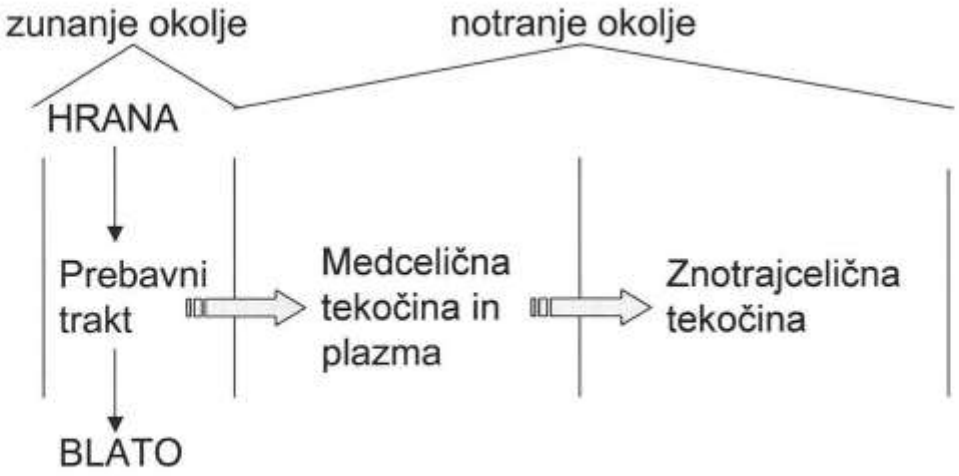
IZMENJAVA HRANILNIH SNOVI PREKO PRESNOVNEGA BAZENA



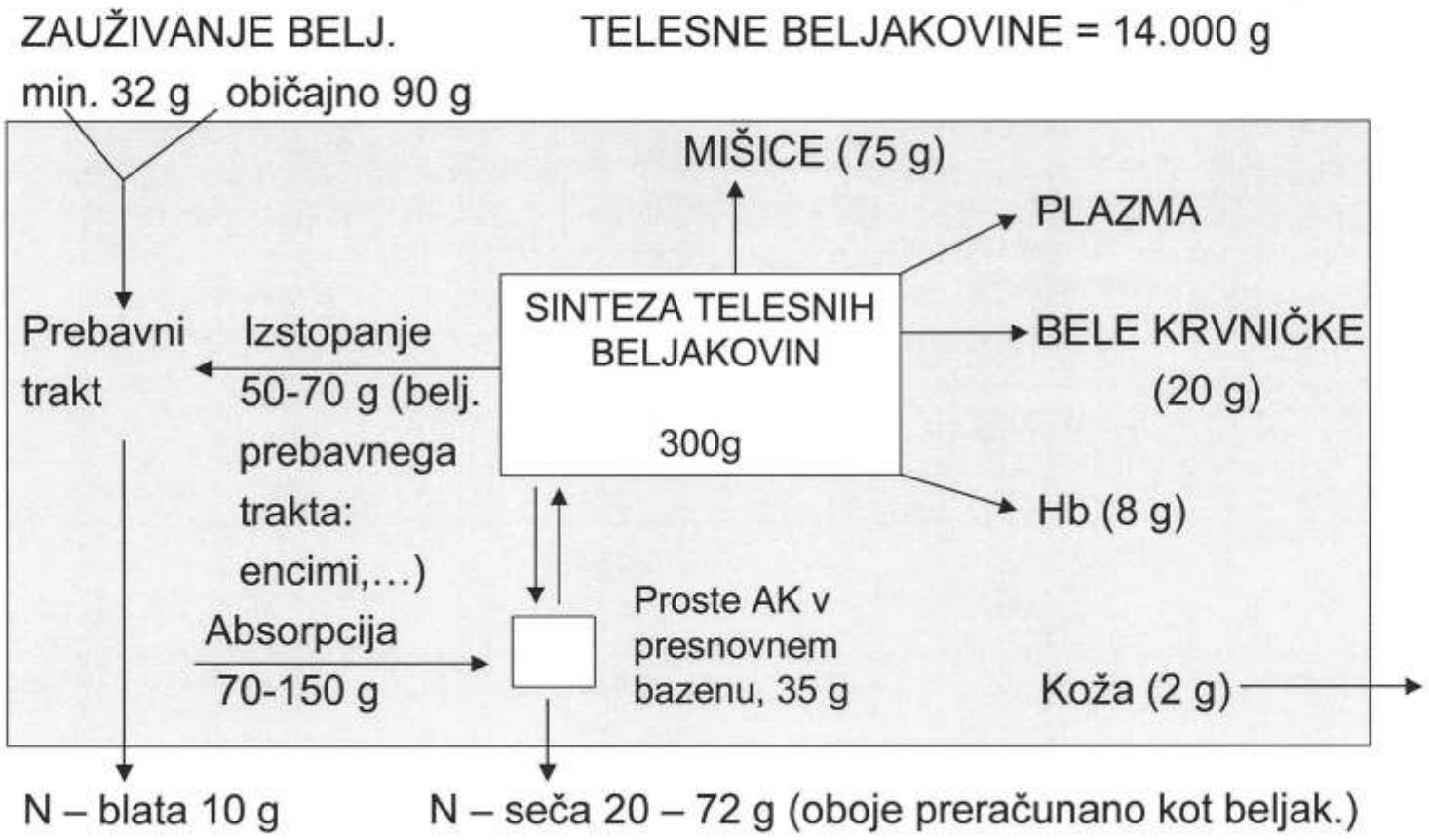

HRANA
LEDVICE
SEČ
zunajcelična tekočina
(medcelična tekočina + plazma)
CELICA
(intracelularna
tekočina)
notranje okolje
O_2
CO_2
PLJUČA
BLATO
zunanje okolje
Cirkulacija
prebavnega trakta
Cirkulacija pljuč in
ledvic

Porazdelitev telesnih tekočin pri 70 kg težkem človeku

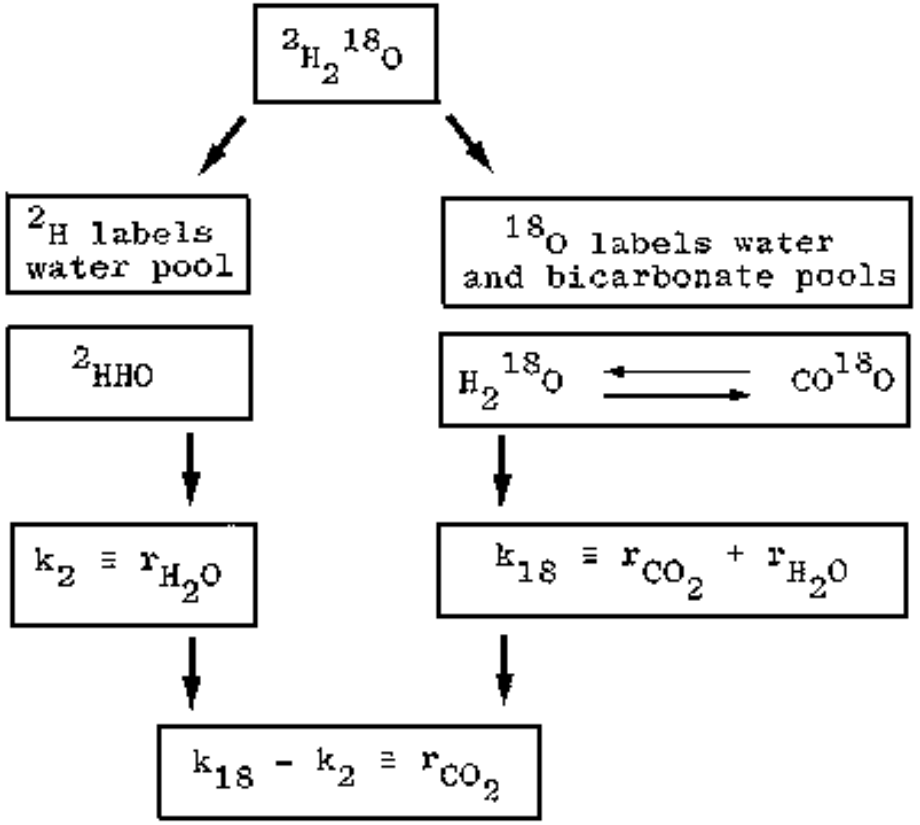




Dnevno obračanje beljakovin pri 70 kg težkem moškem



Principle of the doubly-labelled water method



k = experimentally-determined rate constant

r = production rate

From: The Doubly-labelled Water Method for Measuring Energy Expenditure: A consensus Report by the IDECG working group, Vienna, 1990
http://www.unu.edu/unupress/food2/UID05E/uid05e00.htm#Contents

- A method of indirectly estimating energy expenditure. The subject ingests a known volume of water labelled with two isotopes (2H218O). The deuterium (2H2) and oxygen (18O) diffuse throughout the body's water, and their disappearance rate from the body fluid (e.g. in blood, urine, or saliva) is measured. When a subject is loaded with 2H218O, the decrease in 18O is a measure for H2O output plus CO2 outputs, and the decrease in 2H2 is a measure of H2O output alone. Therefore, CO2 output can be obtained by the difference. CO2 output is converted to energy expenditure using the energy equivalent of CO2, calculated using additional information on the substrate mixture respired (see respiratory quotient).