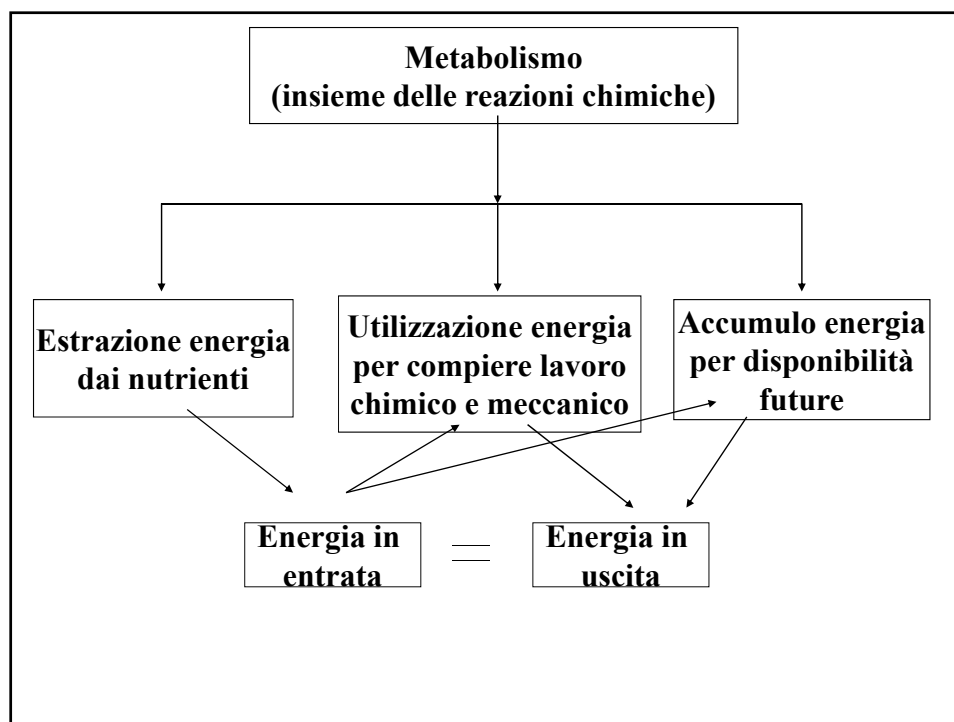


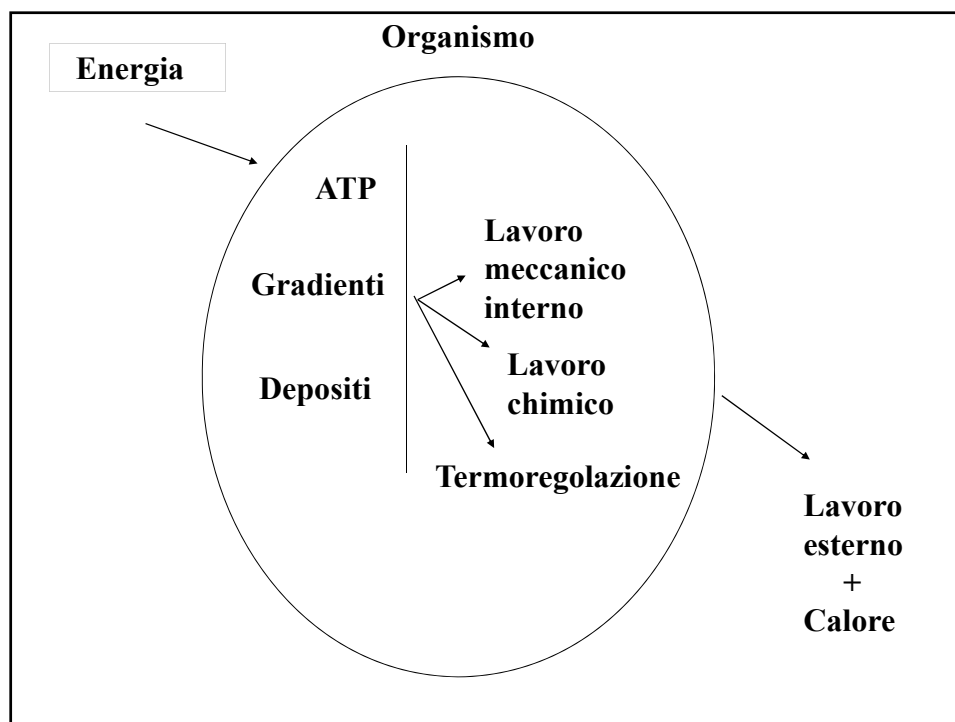
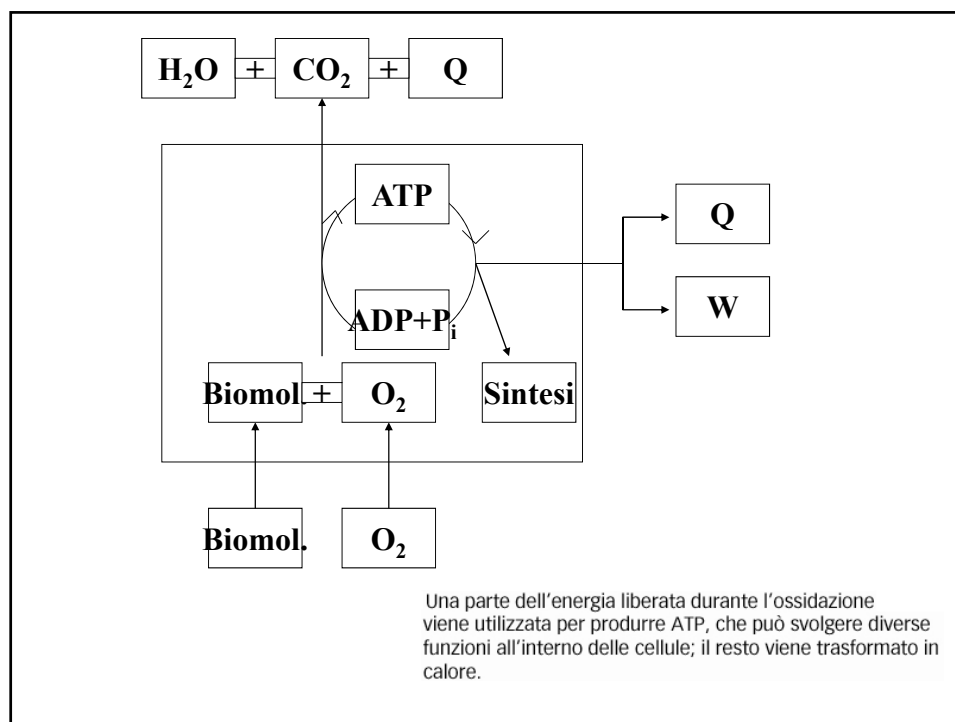


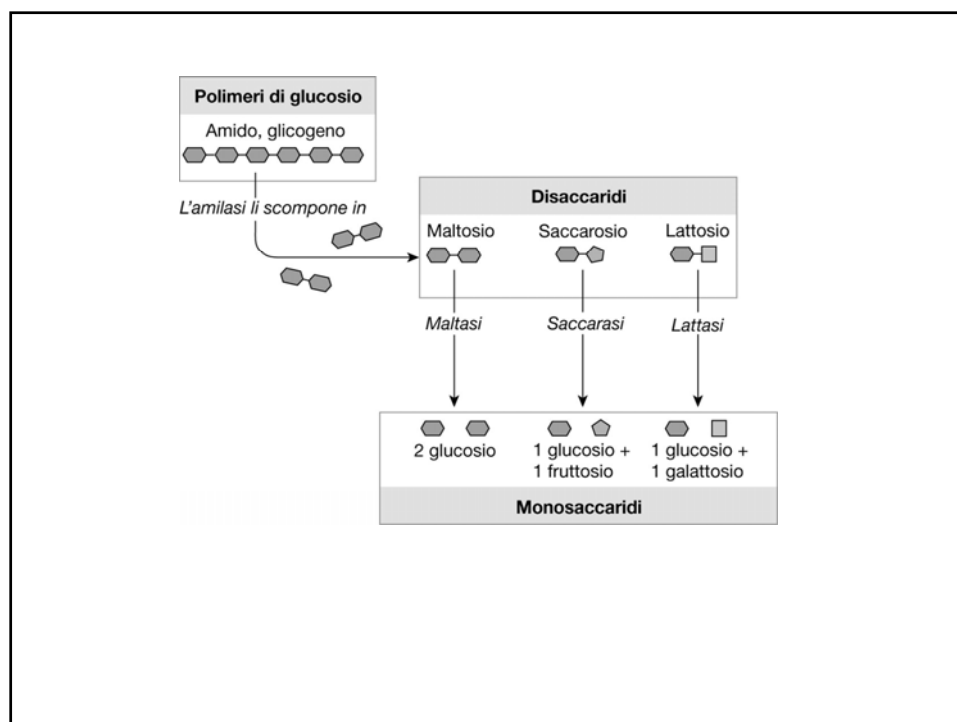
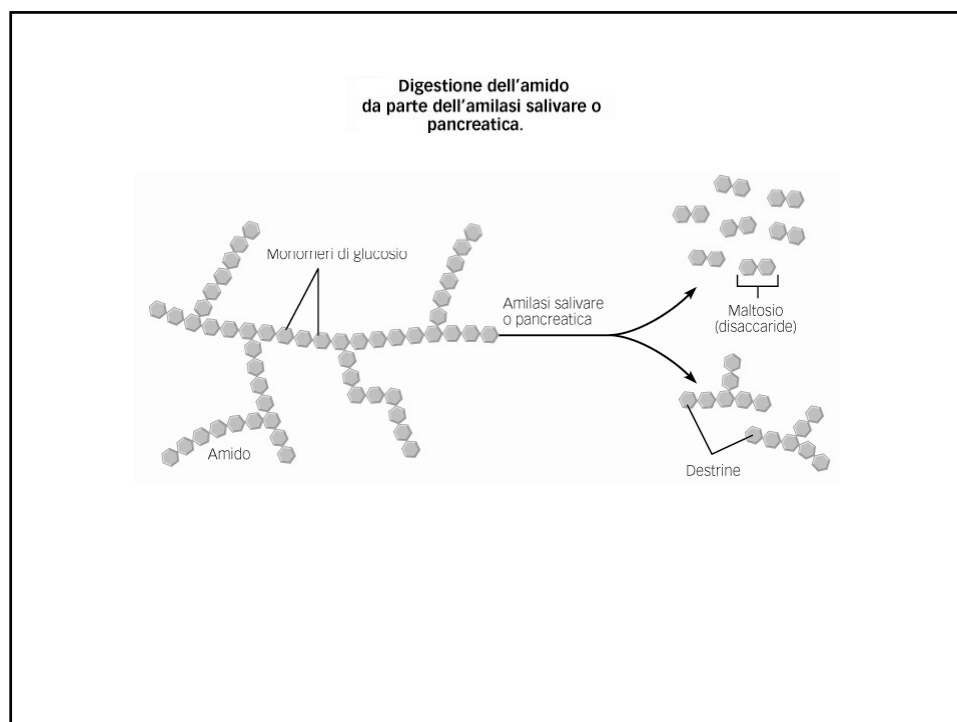
Corso di Laurea Magistrale in
"Medicina e Chirurgia"

Biofisica e Fisiologia I

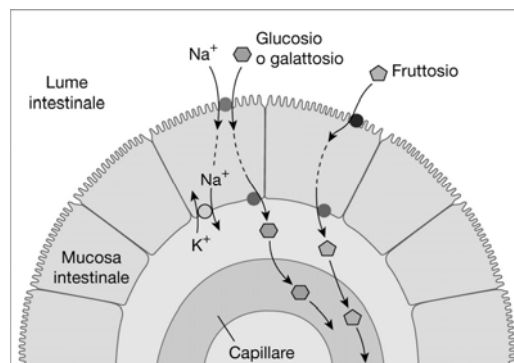
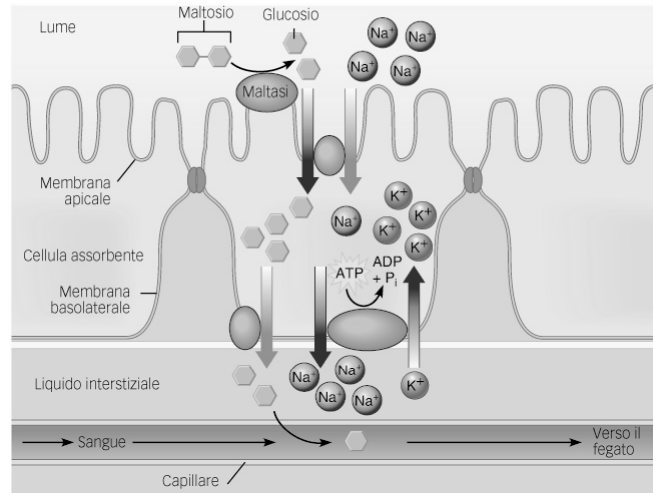
Metabolismo energetico





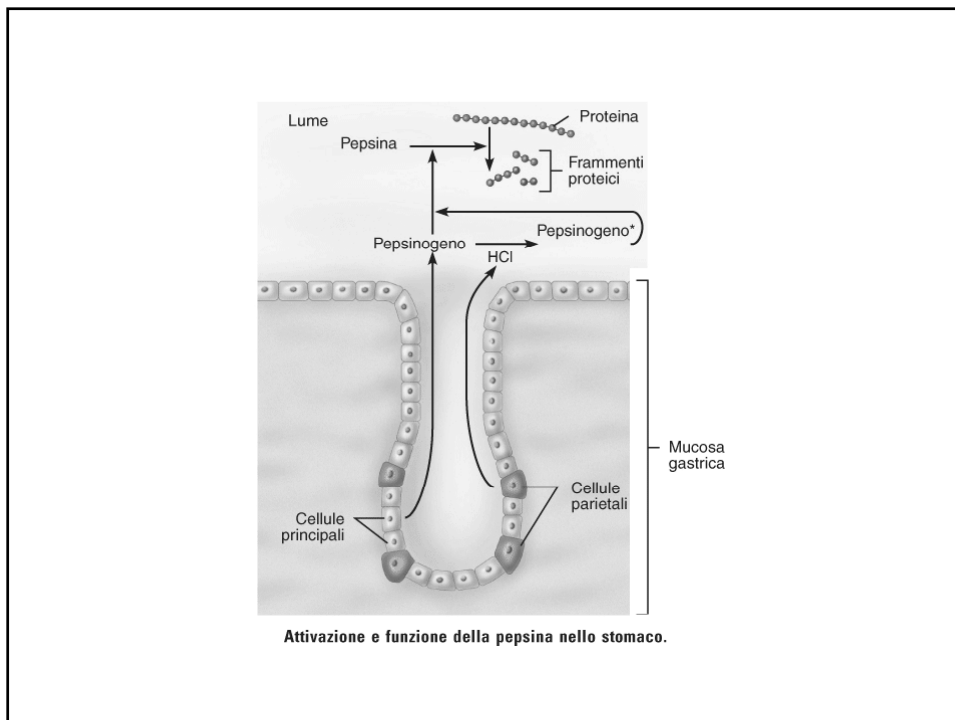
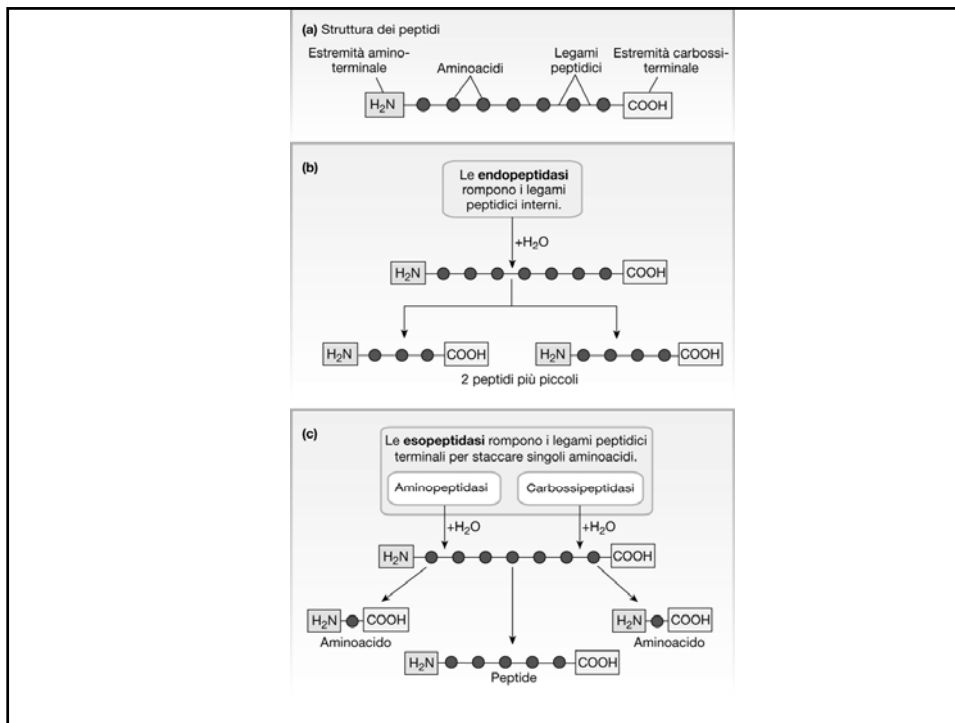


Digestione e assorbimento del maltosio

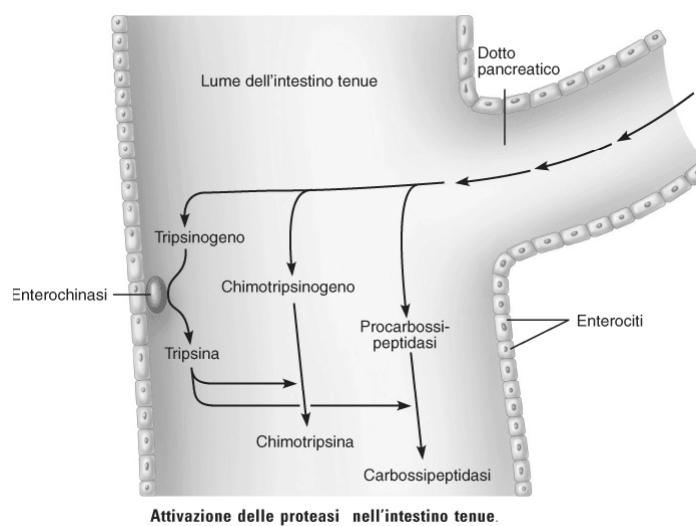
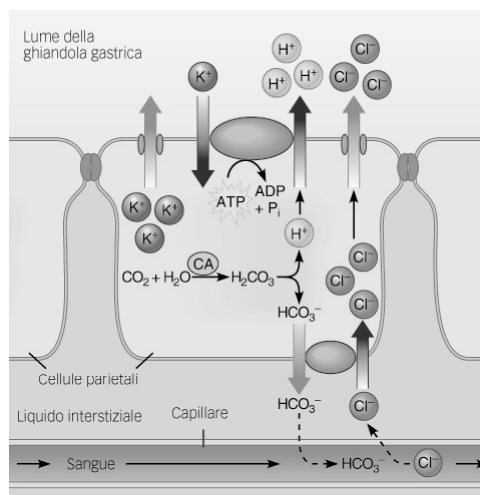


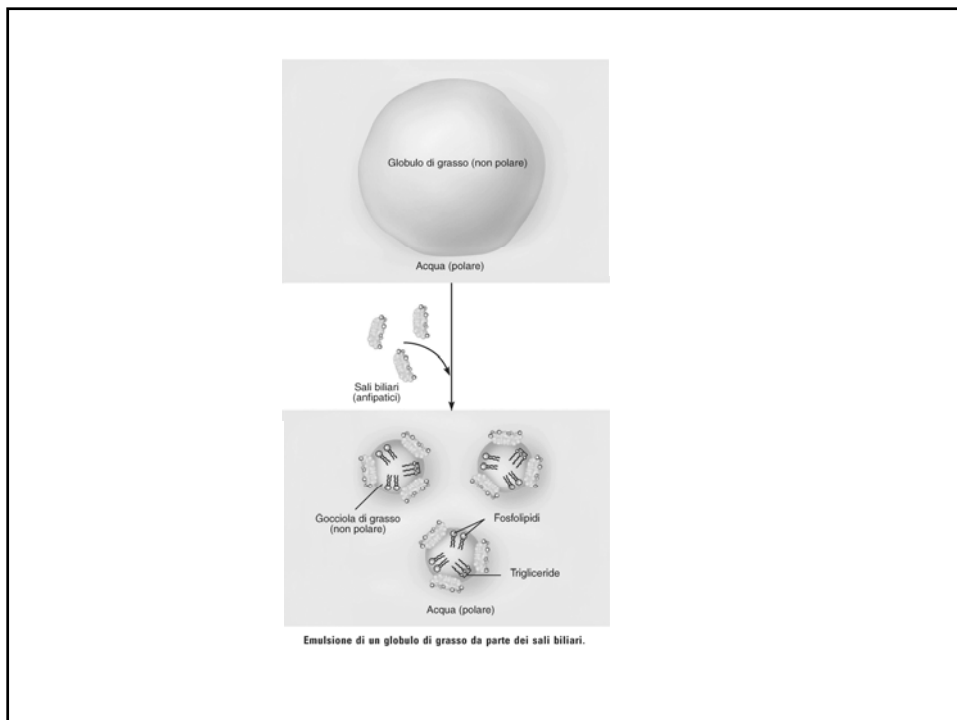
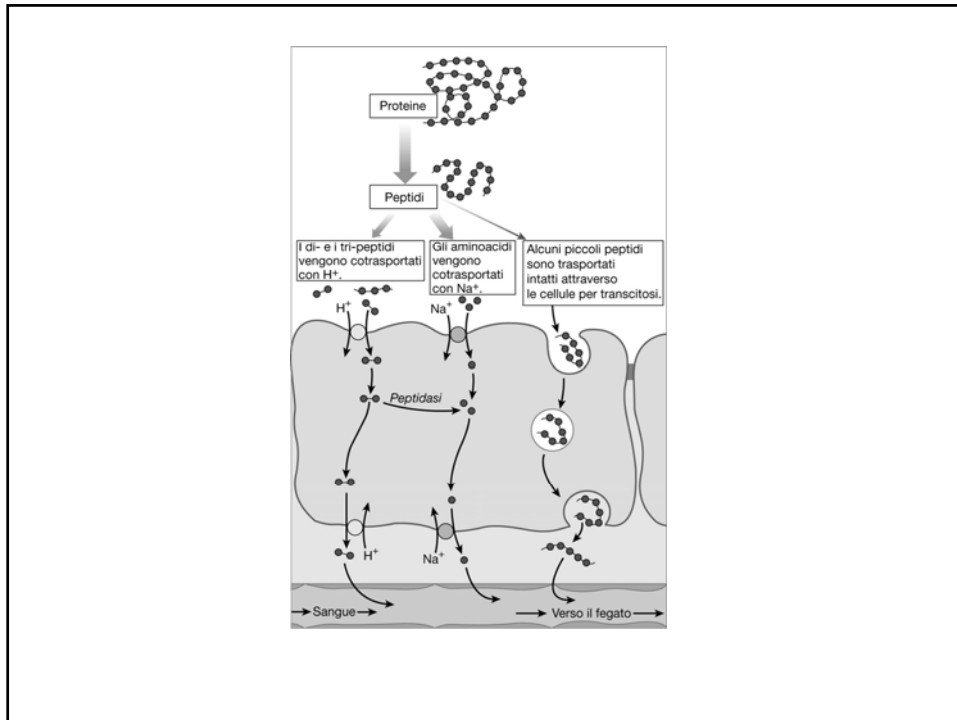
Il glucosio entra nelle cellule con il Na⁺ mediante il cotrasportatore SGLT ed esce attraverso il trasportatore GLUT2. Il fruttosio entra mediante il GLUT5 ed esce con il GLUT2.

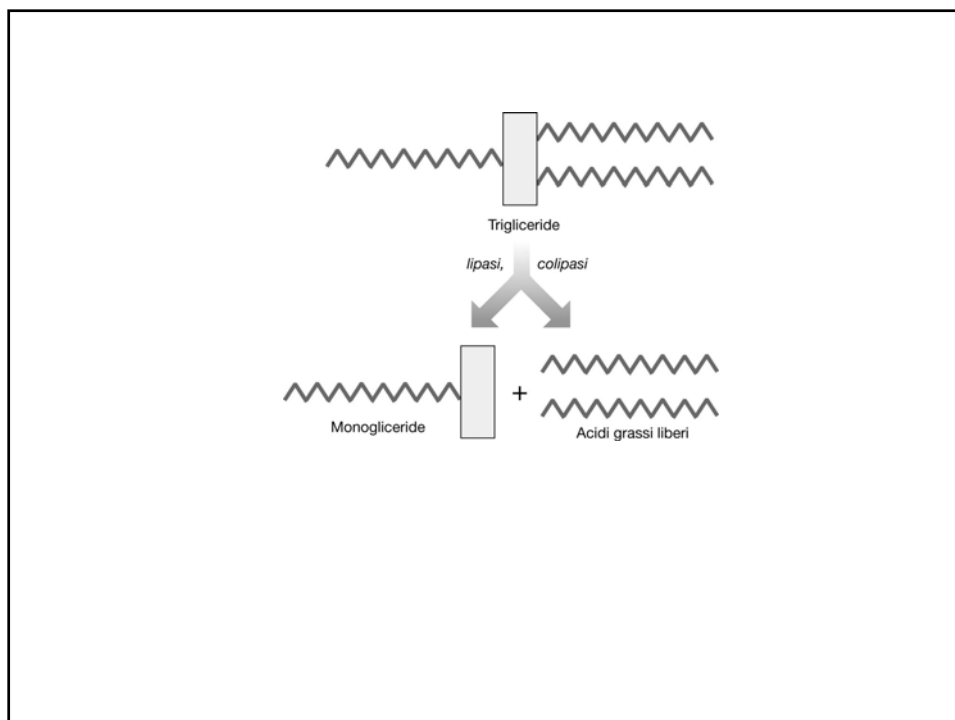
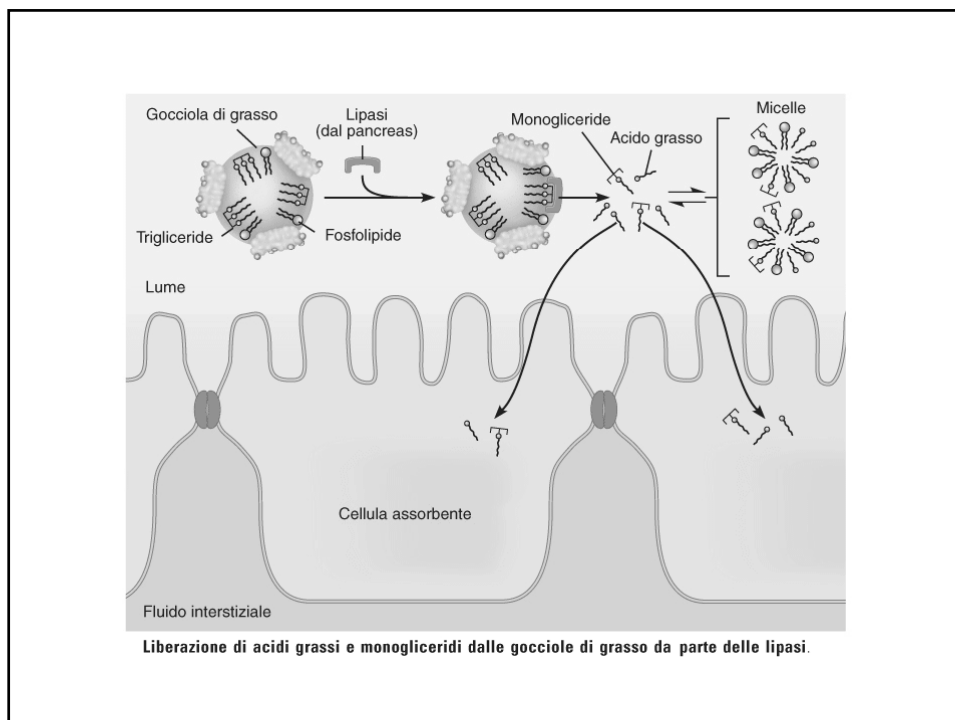
- LEGENDA**
- SGLT
 - GLUT2
 - GLUT5

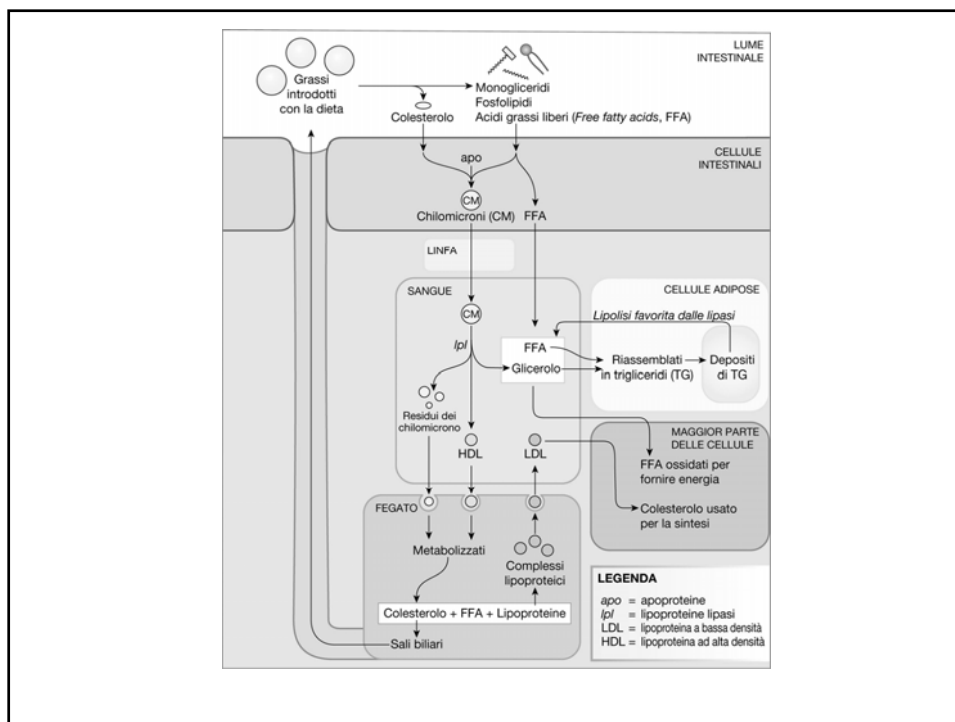
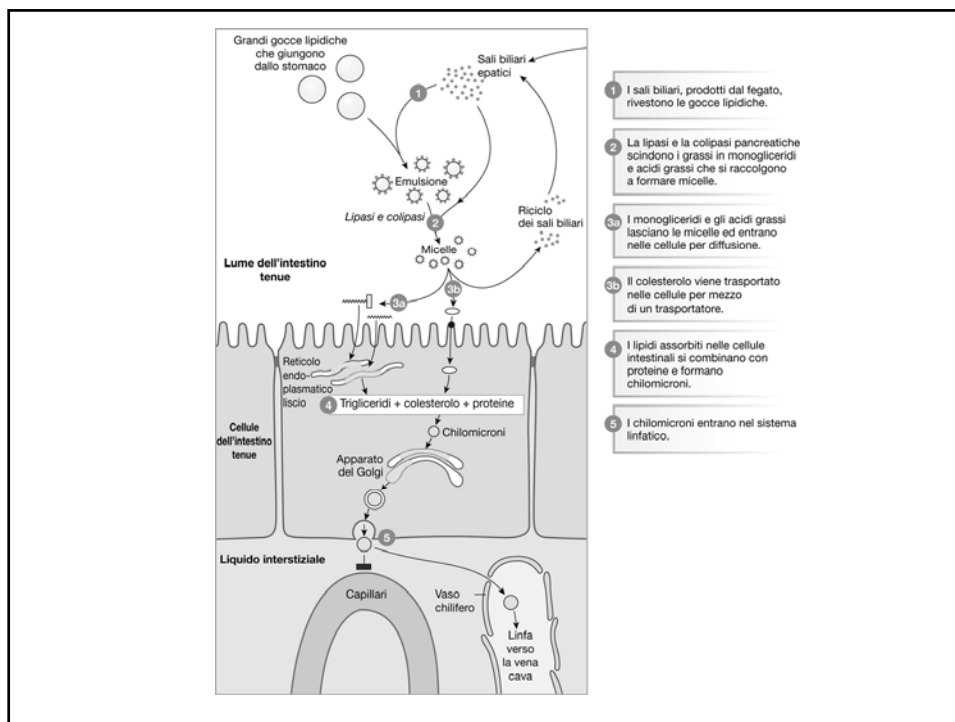


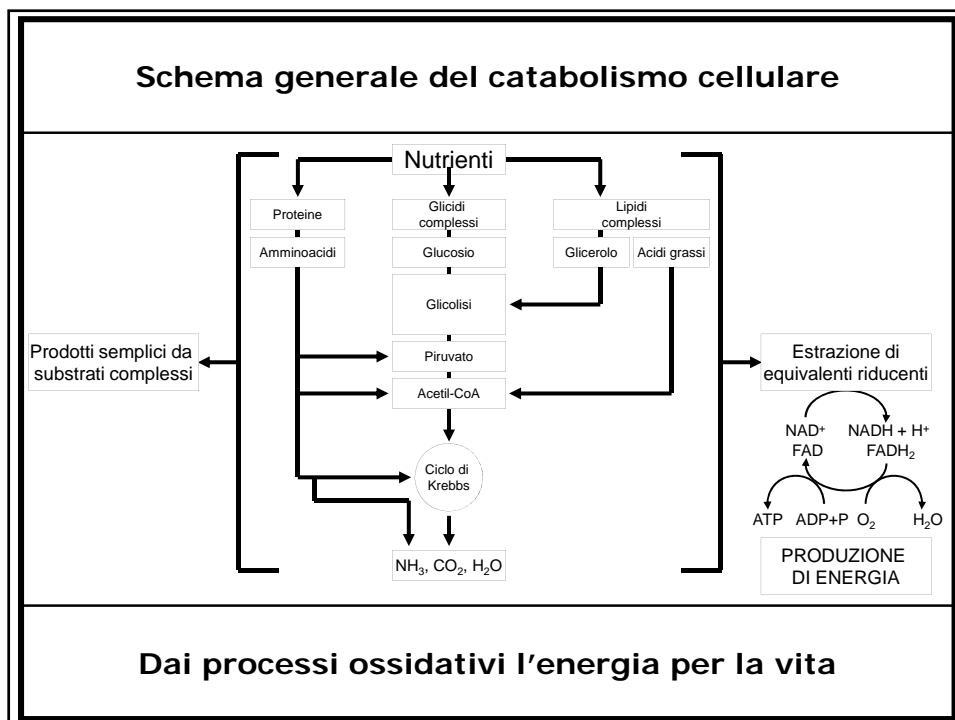
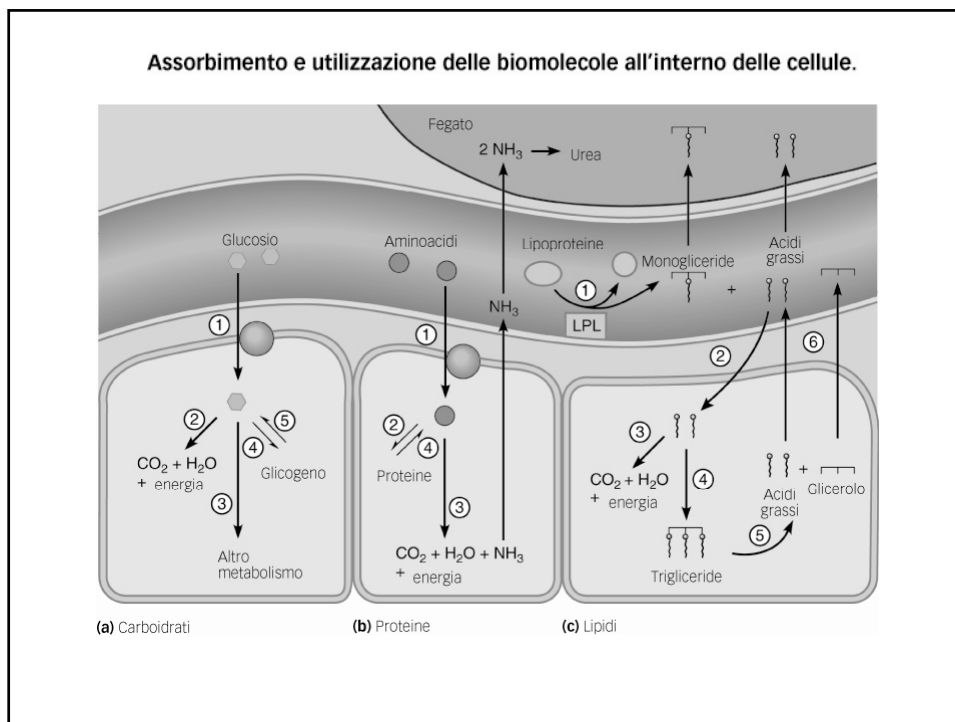
Meccanismo della secrezione acida dello stomaco



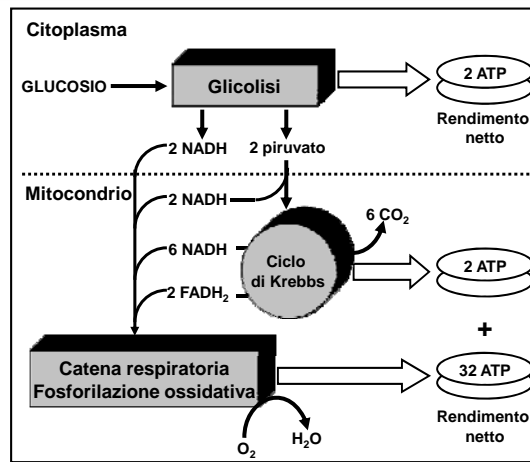






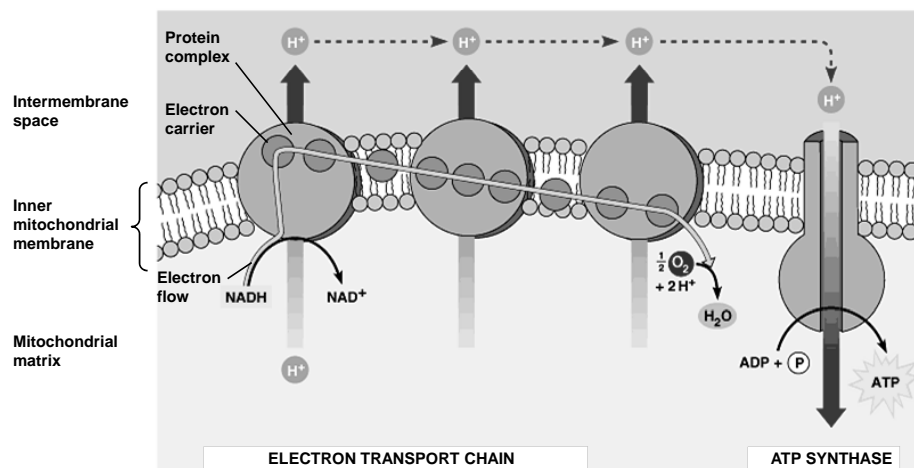


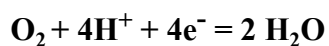
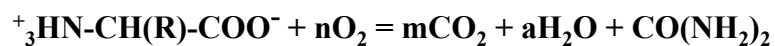
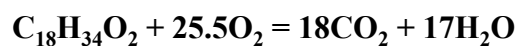
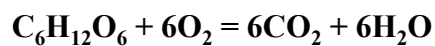
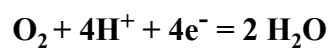
Confronto fra anaerobiosi ed aerobiosi



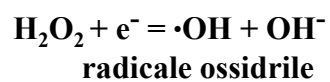
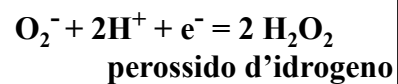
In aerobiosi si produce molto più ATP che in anaerobiosi (36 vs 2, rispettivamente)

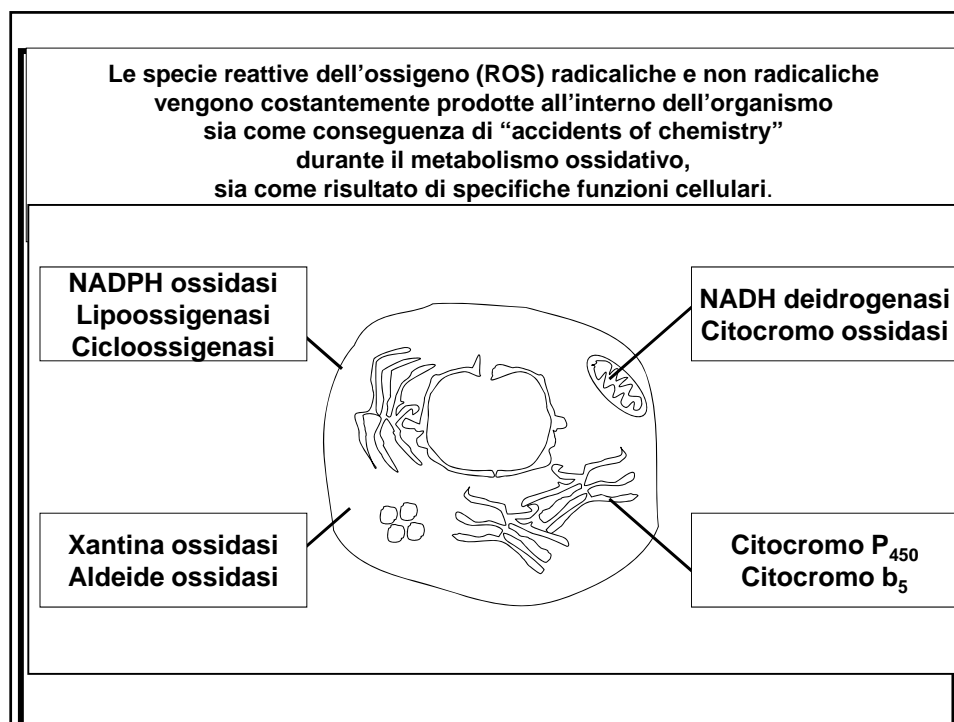
Il trasporto di elettroni è accoppiato alla produzione di ATP (chemiosmosi)





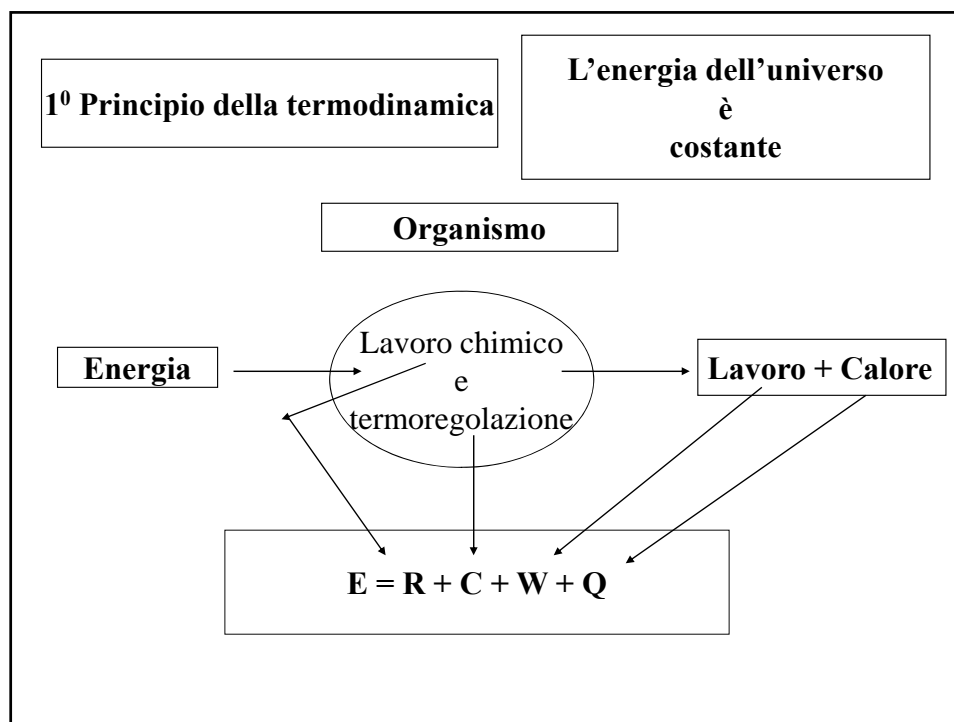
Quando, uno dopo l'altro, gli elettroni sono catturati dall'ossigeno, si formano, come prodotti intermedi, alcune specie di ossigeno reattivo (ROS).





Le reazioni a catena dei radicali danneggiano importanti molecole biologiche in vitro e, pertanto, i ROS sono considerati tradizionalmente come particelle ad elevata pericolosità.

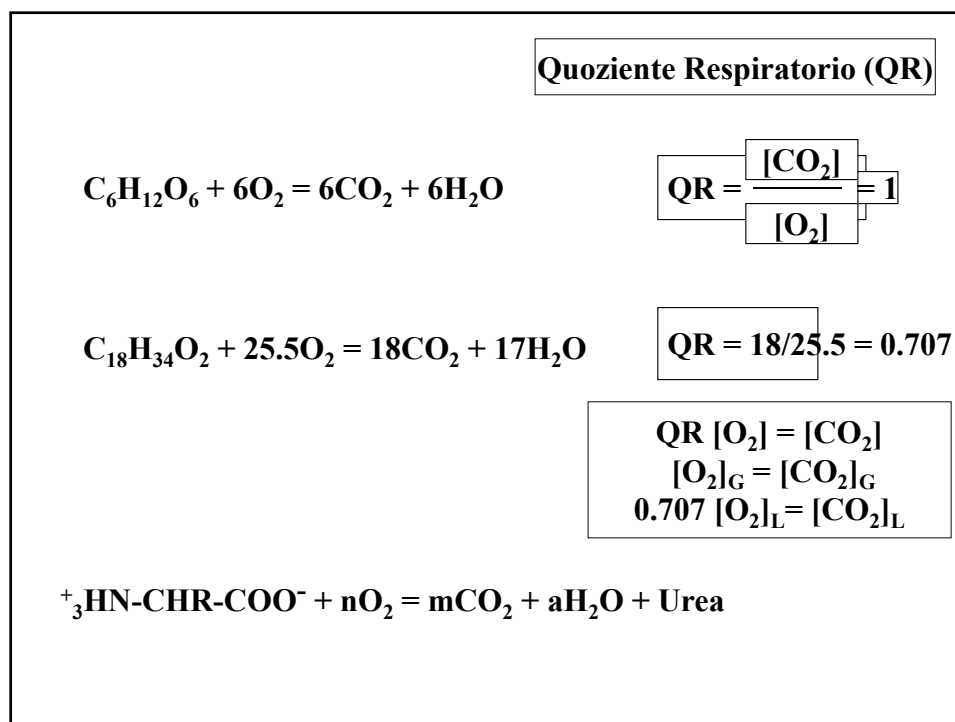
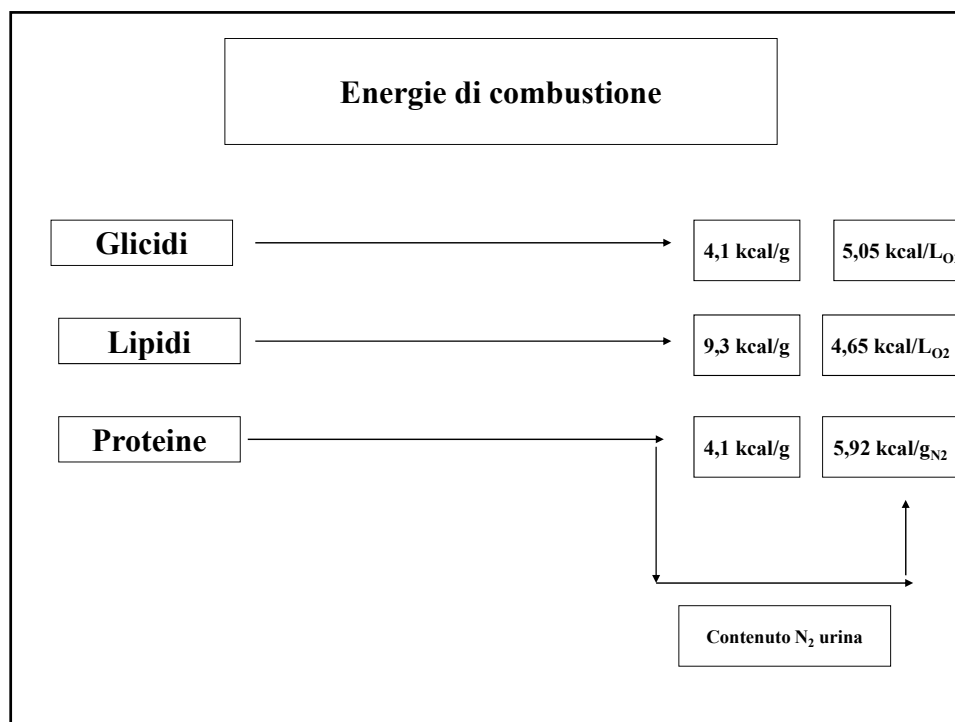
I ROS possono causare severi danni alle macromolecole biologiche, specialmente DNA, lipidi e proteine. Il danno ossidativo a carico di queste importanti molecole sembra essere coinvolto in una grande varietà di patologie cronic-degenerative tra le quali, l'aterosclerosi e il cancro.

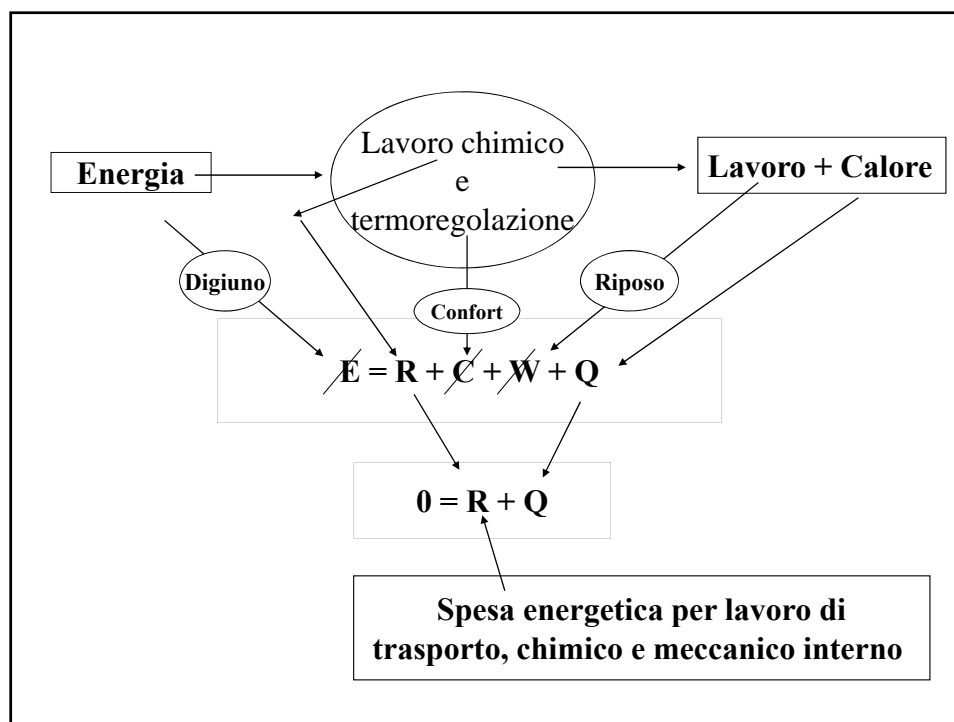
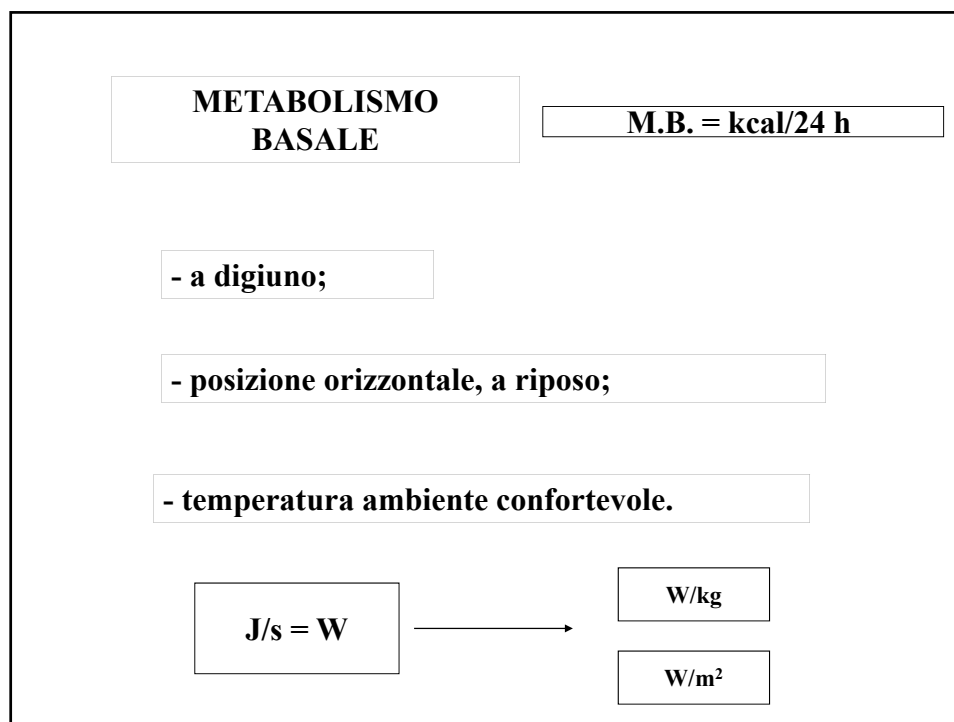


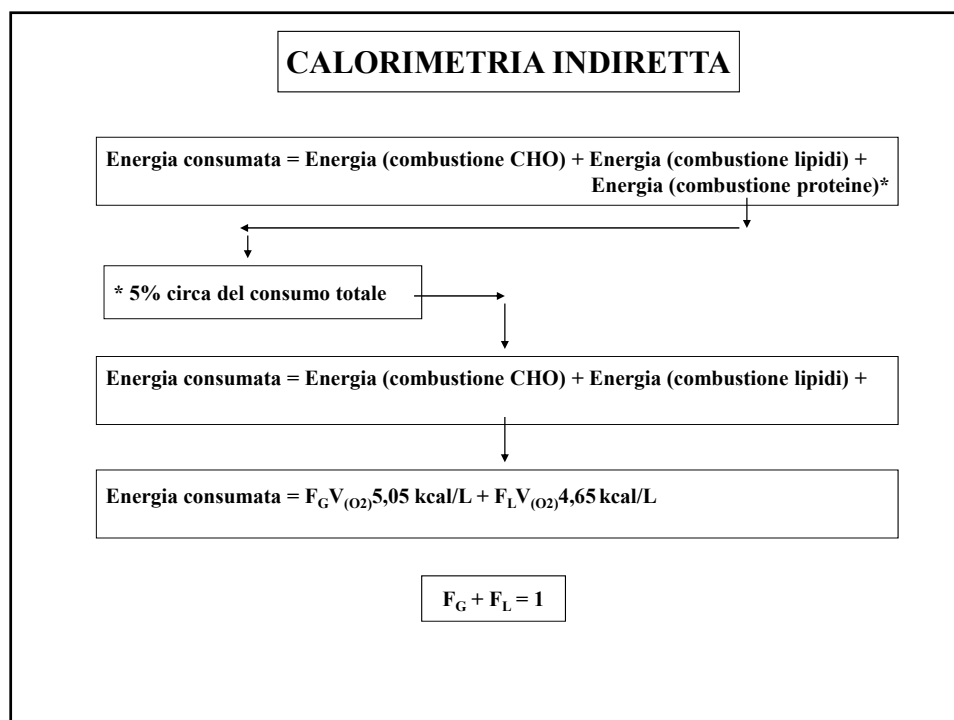
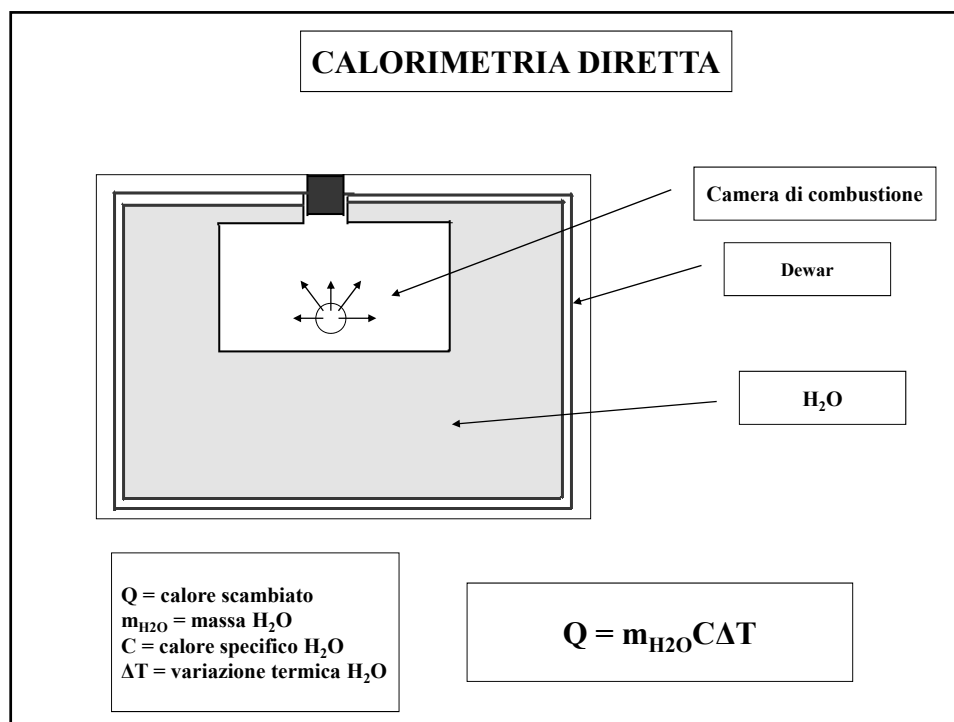
$$\text{Consumo metabolico} = \frac{[\text{Energia spesa}]}{\Delta t}$$

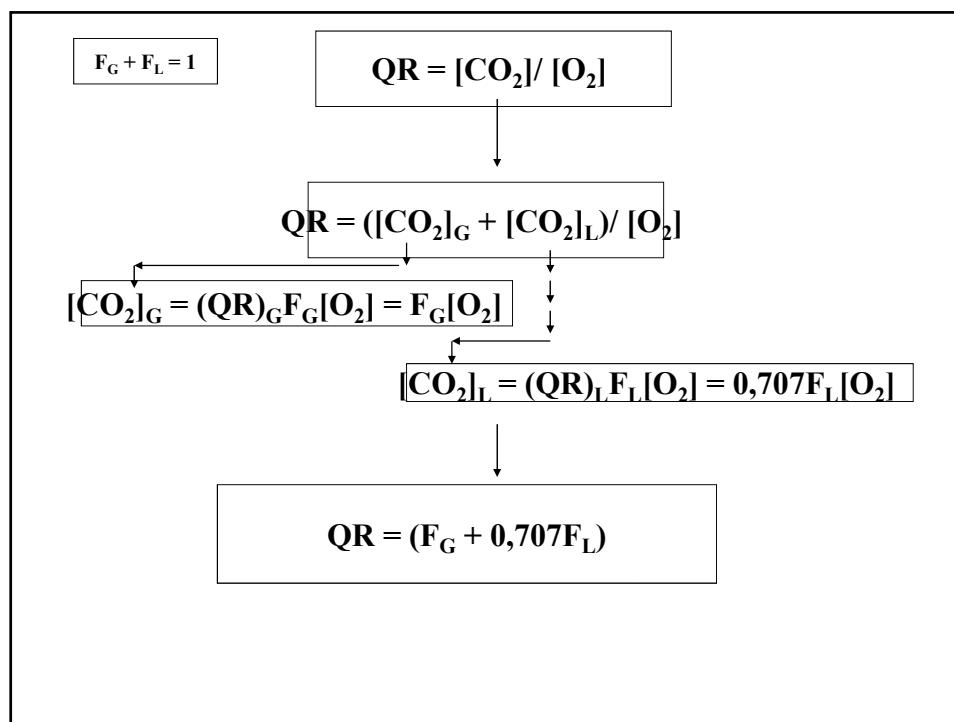
Energia in kcal o in kJ

$$1 \text{ kcal} = 4.182 \text{ kJ}$$



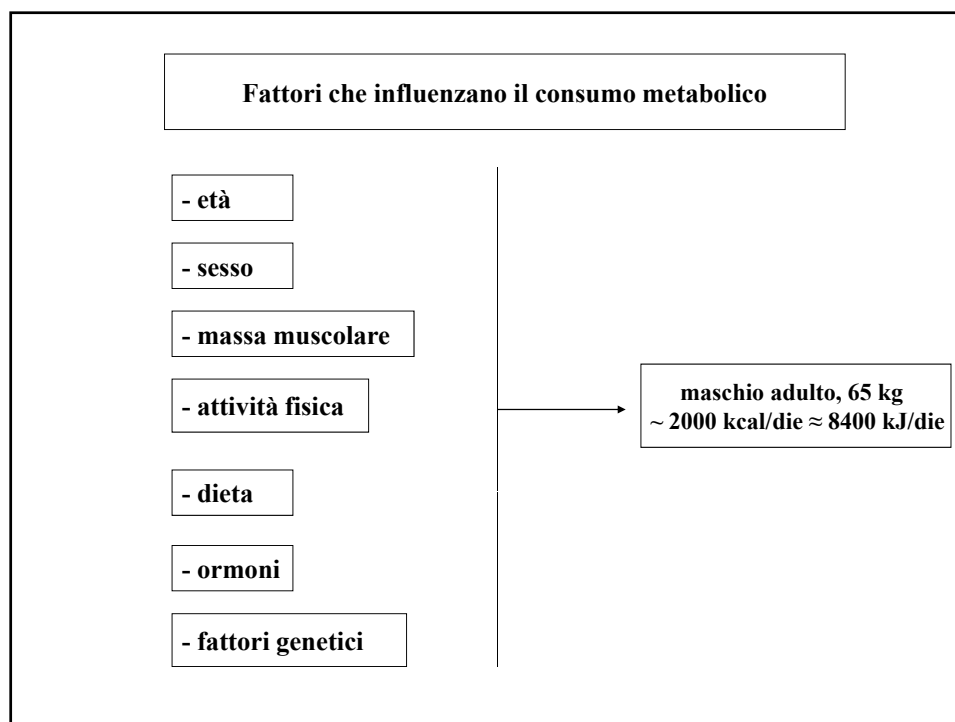
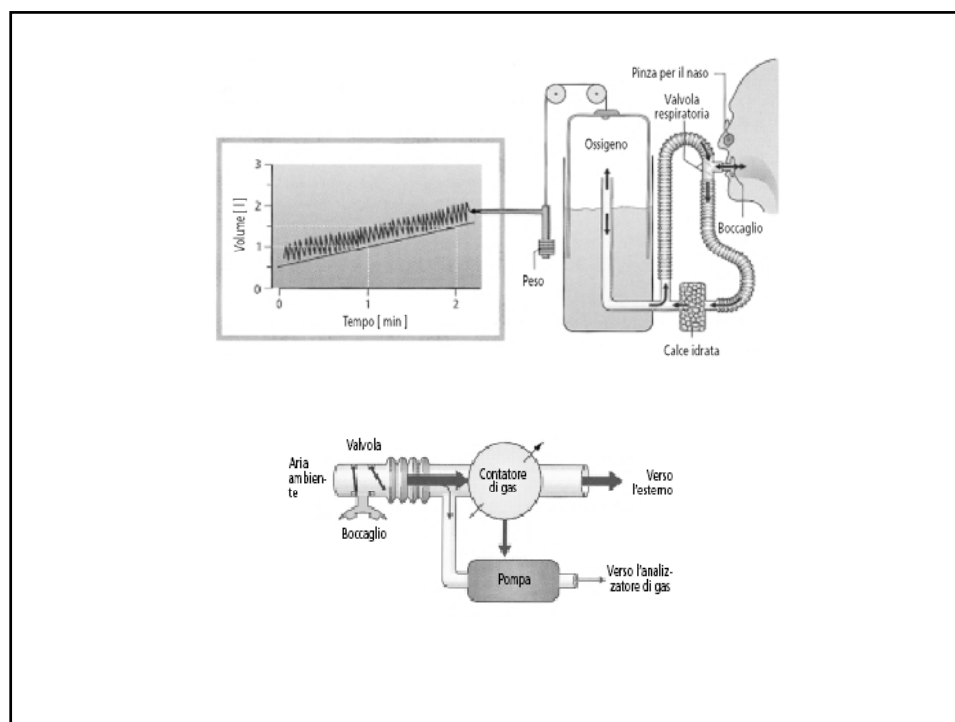






CALORIMETRIA INDIRETTA

Q.R.	1.0	0.9	0.82	0.8	0.7
kJ/L _{O2}	21.1	20.6	20.2	20.1	19.6
Kcal/L _{O2}	5.05	4.93	4.83	4.81	4.69



METABOLISMO DI RIPOSO

(Soggetto di sesso maschile 75 kg, consumo $O_2 = 250-300$ mL/min)

1,20 – 1,45 kcal/min (85-100 W)
1700 – 2100 kcal/die

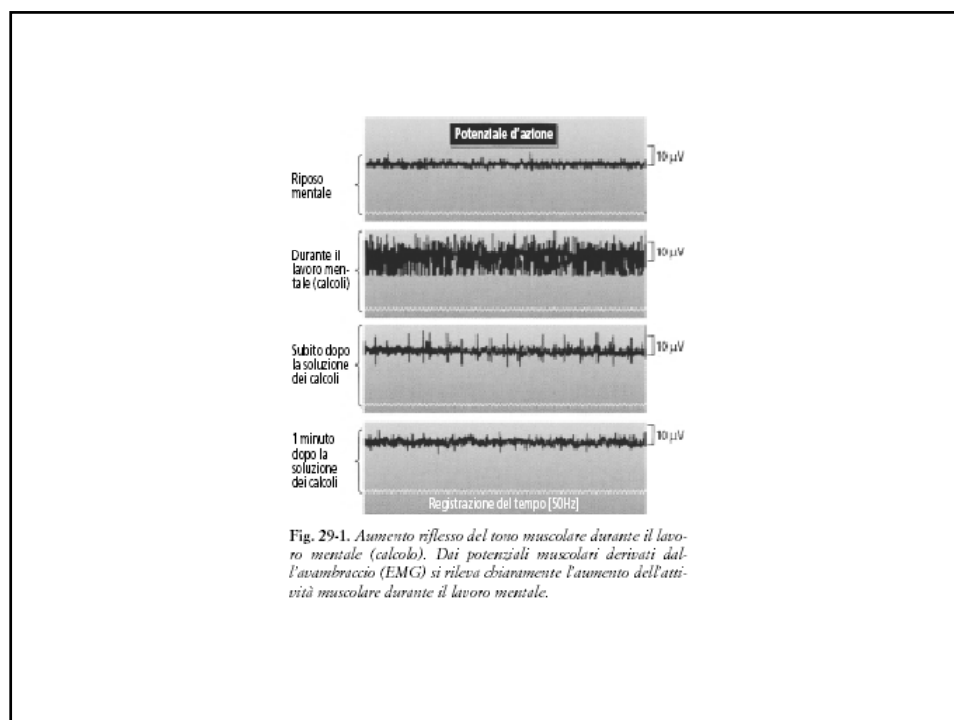
10% lavoro cardiaco
25% funzioni fegato
20% attività cervello
20% attività muscolo
20% altri organi

METABOLISMO DI RIPOSO

- DIMINUISCE DURANTE IL SONNO (-20%)
- AUMENTA DURANTE LA DIGESTIONE
- AUMENTA NELLA TERMOREGOLAZIONE
NELL'ATTIVITA' POSTURALE

ATTIVITA'	DISPENDIO ENERGETICO
Sedentaria	< 1,15 kcal/min
Leggera	>1,15
Moderata	>1,67
Pesante	>3,33
Molto pesante	>5,00

ATTIVITA'	DISPENDIO ENERGETICO
Riposo	1,2 kcal/min
Marcia (4 km/h)	2,5
Corsa (12 km/h)	15,0
Ciclismo in piano (21 km/h)	11,0
Nuoto	12,0
Lavori domestici	3,0 – 8,0



DISPONIBILITA' DI ENERGIA

Adulto, 75 kg, massa muscolare 28 kg

ATP : 4 kJ

Glicogeno: 4600 kJ

CP : 15 kJ

Lipidi : 300000 kJ

TABELLA 22-2 Destino dei nutrienti nello stato assimilativo	
Carboidrati, assorbiti principalmente come glucosio	
1.	Usati immediatamente per produrre energia tramite le vie aerobiche*
2.	Usati per la sintesi di lipoproteine nel fegato
3.	Accumulati come glicogeno nel fegato e nei muscoli
4.	Quelli in eccesso vengono convertiti in grassi e accumulati nel tessuto adiposo: glucosio → piruvato → acetil-CoA → acidi grassi
Proteine, assorbite principalmente come aminoacidi	
1.	La maggior parte degli aminoacidi raggiunge i tessuti per la sintesi proteica*
2.	Se necessari per formare energia, gli aminoacidi vengono trasformati nel fegato in composti intermedi che entrano nel metabolismo aerobico
3.	Quelli in eccesso vengono convertiti in grassi e accumulati nel tessuto adiposo: aminoacidi → acetil-CoA → acidi grassi
Lipidi, assorbiti principalmente come trigliceridi	
1.	Accumulati come grassi principalmente nel fegato e nel tessuto adiposo*
*Destino principale.	

