Proteine

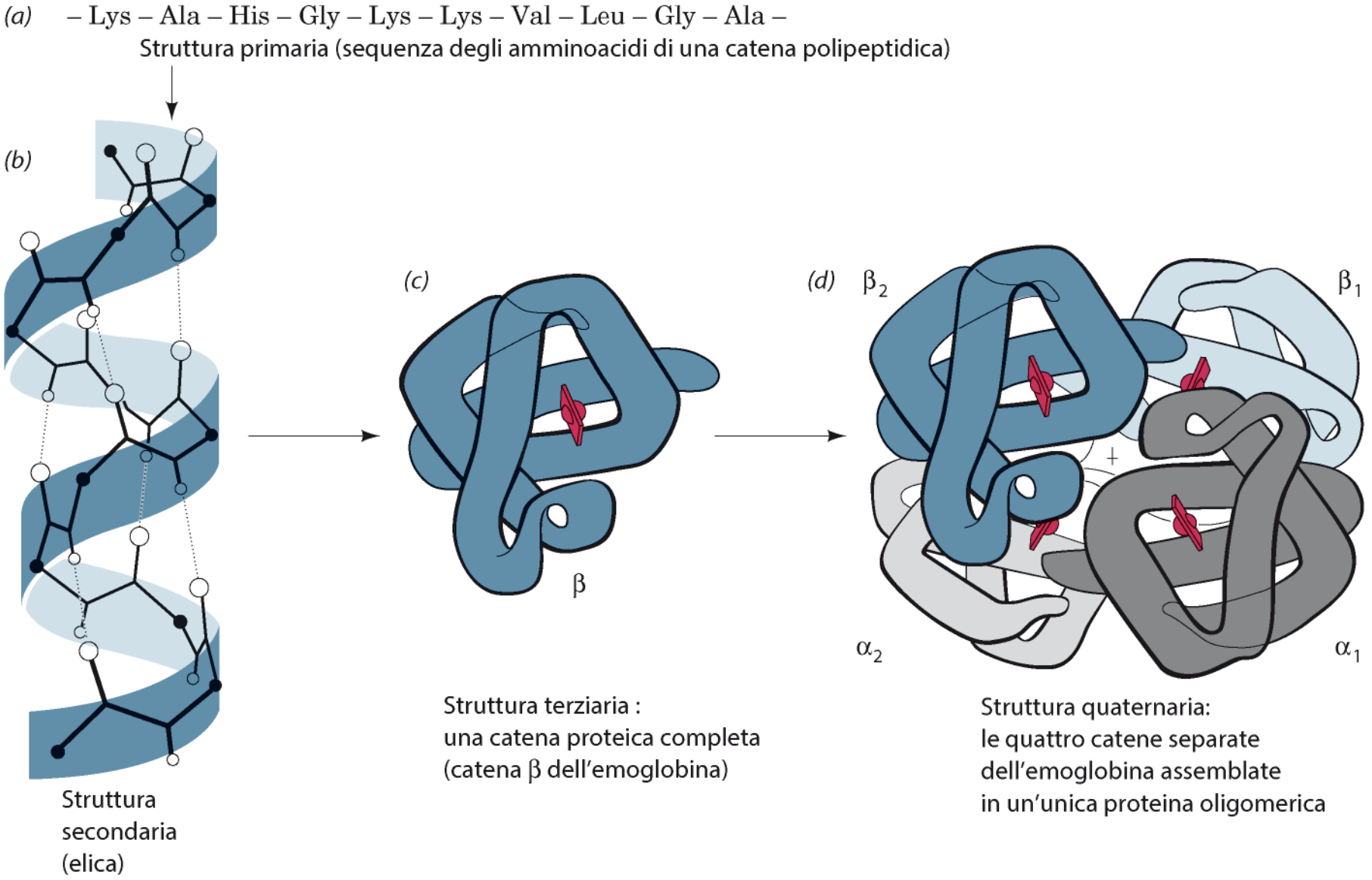
Le **proteine** (dal greco *proteios* = di primaria importanza) sono costituite da una o più **catene polipeptidiche**: eteropolimeri lineari di amminoacidi standard. Tali catene sono costituite da **un minimo di 50 amminoacidi** a un massimo di qualche migliaio.

Nelle cellule le proteine costituiscono il 50% della sostanza secca. Rappresentano il **14-18% del peso di un mammifero**.

Per la loro grande varietà qualitativa, per la dinamicità delle loro strutture e per la capacità che hanno di legarsi in modo selettivo ad altre molecole svolgono un numero elevato di funzioni:

1. Regolazione dell'espressione dei geni (fattori di trascrizione)
2. Catalatica (enzimi)
3. Trasporto (albumina e altri trasportatori di lipidi, zuccheri, ioni inorganici, ecc.)
4. Coagulazione del sangue (trombina, fibrinogeno, ecc.)
5. Difesa (anticorpi, recettori d'istocompatibilità, citochine, linfochine, ecc.)
6. Contrazione cellulare (miosina, actina, ecc.)
7. Biosegnalazione (recettore dell'insulina, recettore del glucagone, insulina e glucagone, ecc.)
8. Strutturale (collagene, elastina, ecc.)
9. Ecc.

Struttura primaria, secondaria, terziaria e quaternaria



Fabbisogno proteico

Le proteine corporee sono sottoposte a turnover, cioè a una continua degradazione e risintesi; gli amminoacidi che provengono dalle demolizioni in gran parte tornano ad essere utilizzati, ma il processo non è efficiente al 100% (soprattutto nei gatti). Una quota, pari nell'adulto a circa 1/5 del totale, segue il catabolismo ossidativo o viene deviata verso la sintesi di composti azotati non proteici (per es., gruppi eme e basi azotate). In conseguenza di ciò l'organismo ha bisogno di un apporto alimentare di azoto totale e di **amminoacidi essenziali**.

Il fabbisogno proteico è maggiore durante la crescita, aumenta in gravidanza e allattamento, nel corso e in seguito a stati patologici, quando oltre al ricambio è necessario garantire anche la formazione di nuove cellule.

Per un cane adulto, l'apporto proteico dovrebbe essere pari a circa 4 g/kg peso corporeo al giorno di proteine di alta qualità corrispondente all'incirca al 15-20% dell'energia totale (di queste il 70% devono essere di origine animale).

Le proteine in eccesso non possono essere immagazzinate: gli amminoacidi in eccesso subiscono metabolismo ossidativo (per produrre energia) o vengono convertiti in glucosio o acidi grassi.

Emivita di alcuni enzimi

TABELLA 21.1 Emivita di alcuni enzimi del fegato di ratto

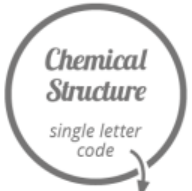
Enzima	Emivita (ore)
Enzimi a breve durata	
Ornitina decarbossilasi	0,2
RNA polimerasi I	1,3
Tirosina amminotransferasi	2,0
Serina deidratasi	4,0
PEP carbossilasi	5,0
Enzimi a lunga durata	
Aldolasi	118
GAPDH	130
Citocromo *b*	130
LDH	130
Citocromo *c*	130

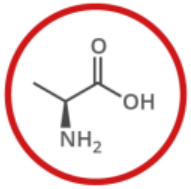
Fonte: Dice, J.F. e Goldberg, A.L. (1975). *Arch. Biochem. Biophys.* **170**, 214.

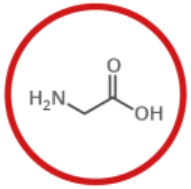
A GUIDE TO THE TWENTY COMMON AMINO ACIDS

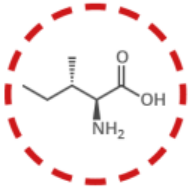
AMINO ACIDS ARE THE BUILDING BLOCKS OF PROTEINS IN LIVING ORGANISMS. THERE ARE OVER 500 AMINO ACIDS FOUND IN NATURE - HOWEVER, THE HUMAN GENETIC CODE ONLY DIRECTLY ENCODES 20. 'ESSENTIAL' AMINO ACIDS MUST BE OBTAINED FROM THE DIET, WHILST NON-ESSENTIAL AMINO ACIDS CAN BE SYNTHESISED IN THE BODY.

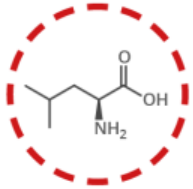
Chart Key: ALIPHATIC | AROMATIC | ACIDIC | BASIC | HYDROXYLIC | SULFUR-CONTAINING | AMIDIC | NON-ESSENTIAL | ESSENTIAL

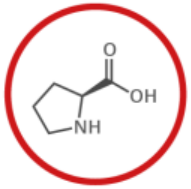


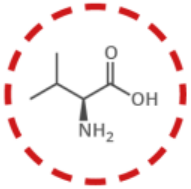

ALANINE A
ala

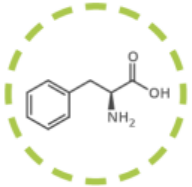

GLYCINE G
gly

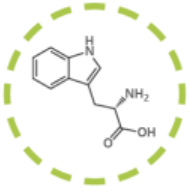

ISOLEUCINE I
ile

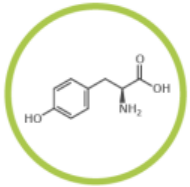

LEUCINE L
leu

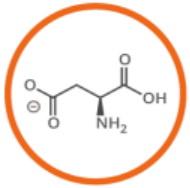

PROLINE P
pro

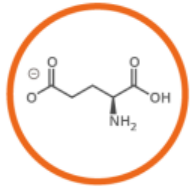

VALINE V
val

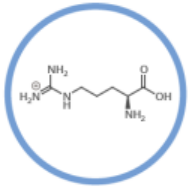

PHENYLALANINE F
phe

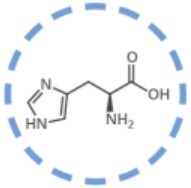

TRYPTOPHAN W
trp

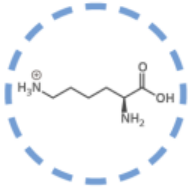

TYROSINE Y
tyr

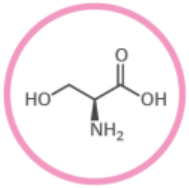

ASPARTIC ACID D
asp

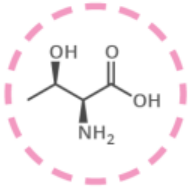

GLUTAMIC ACID E
glu

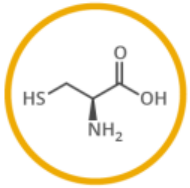

ARGININE R
arg

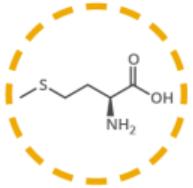

HISTIDINE H
his

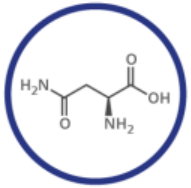

LYSINE K
lys

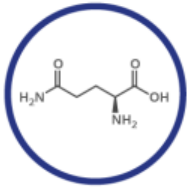

SERINE S
ser


THREONINE T
thr


CYSTEINE C
cys


METHIONINE M
met


ASPARAGINE N
asn


GLUTAMINE Q
gln

Note: This chart only shows those amino acids for which the human genetic code directly codes for. Selenocysteine is often referred to as the 21st amino acid, but is encoded in a special manner. In some cases, distinguishing between asparagine/aspartic acid and glutamine/glutamic acid is difficult. In these cases, the codes asx (B) and glx (Z) are respectively used.

© COMPOUND INTEREST 2014 - WWW.COMPOUNDCHEM.COM | Twitter: @compoundchem | Facebook: www.facebook.com/compoundchem
Shared under a Creative Commons Attribution-NonCommercial-NoDerivatives licence.

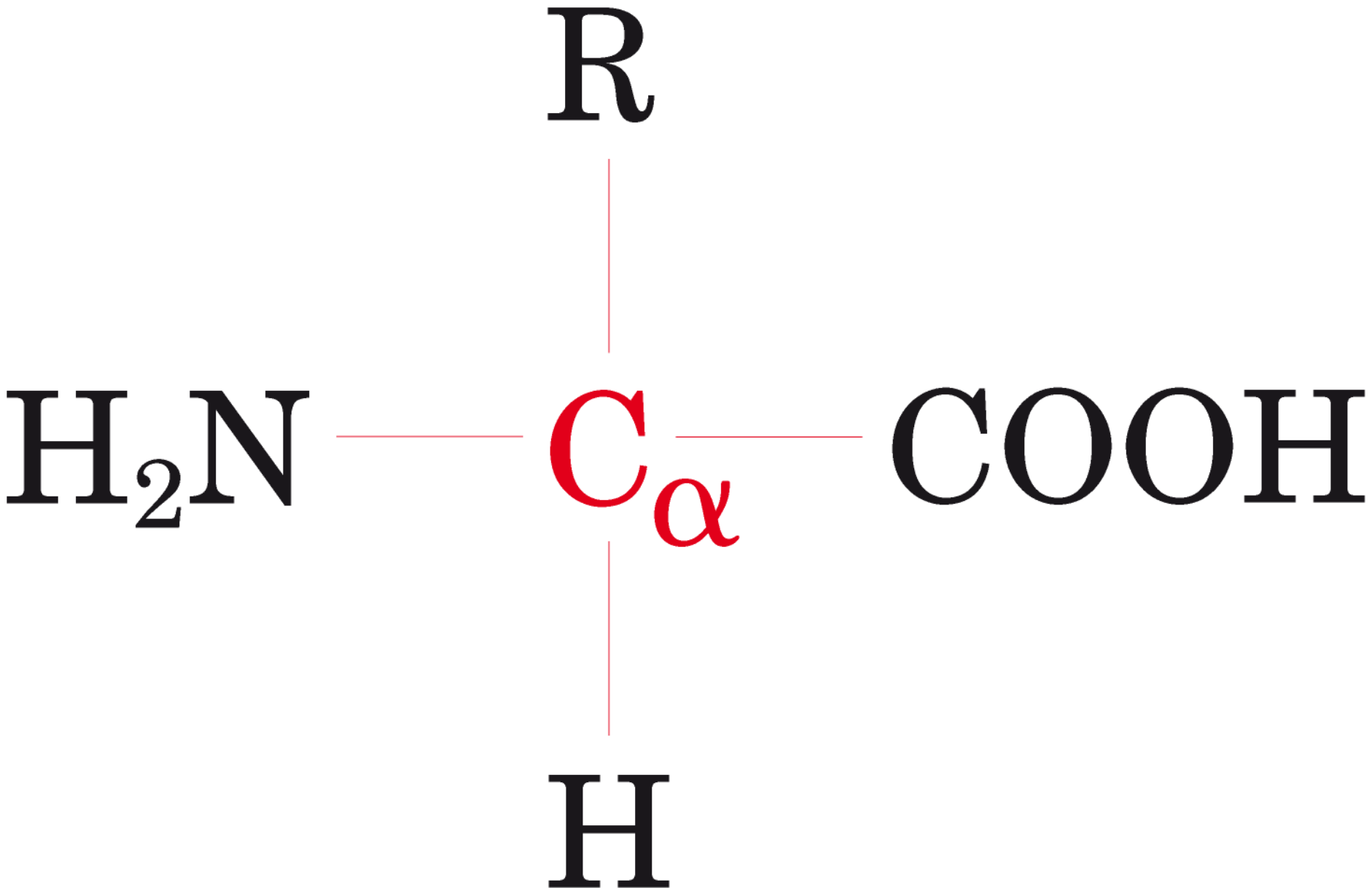
Alcuni amminoacidi devono essere assunti con la dieta

TABELLA 21.3 Amminoacidi essenziali e non essenziali nell'uomo

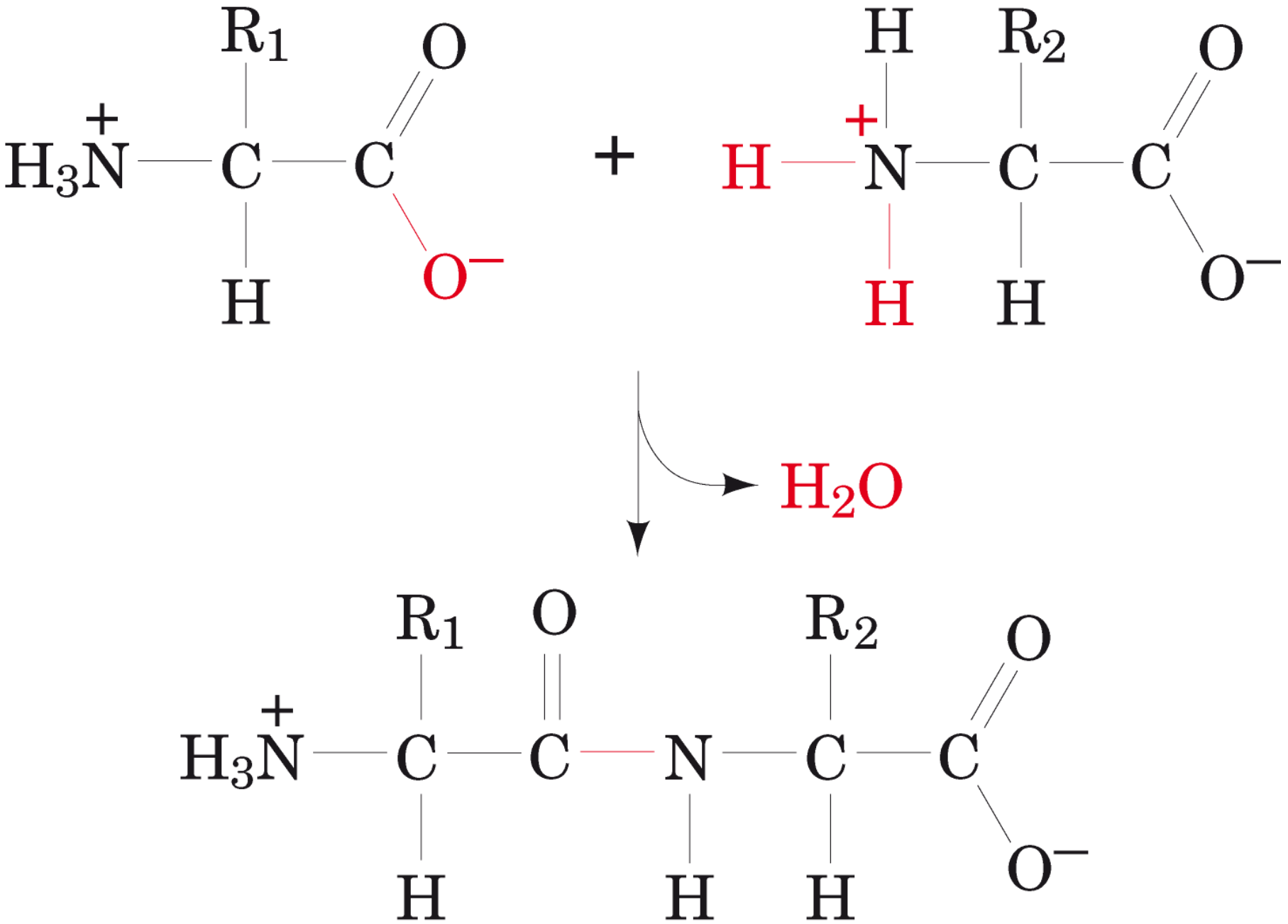
Essenziale	Non essenziale
Arginina[a]	Alanina
Fenilalanina	Asparagina
Istidina	Aspartato
Isoleucina	Cisteina
Leucina	Glicina
Lisina	Glutammato
Metionina	Glutammina
Treonina	Prolina
Triptofano	Serina
Valina	Tirosina

[a] Anche se i mammiferi sintetizzano arginina, la scindono quasi tutta per formare urea (Paragrafo 21.3A).

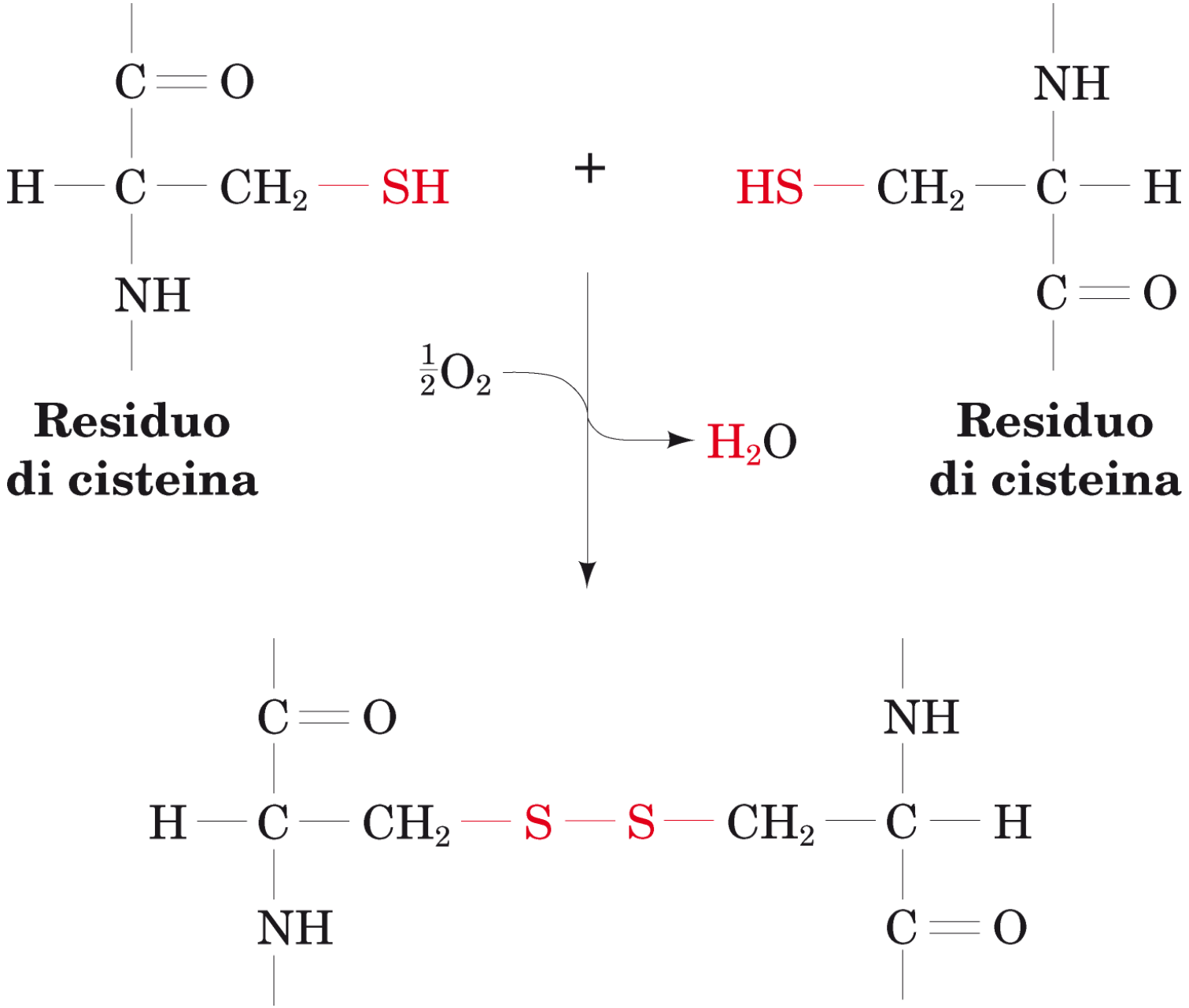
Struttura generale di un α-amminoacido



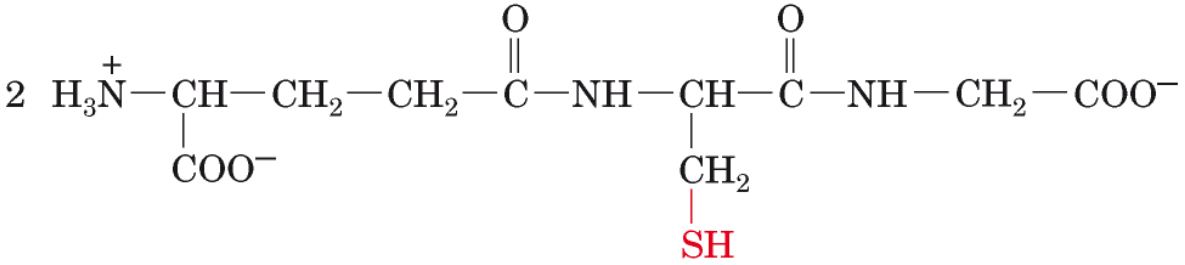
Condensazione di due amminoacidi



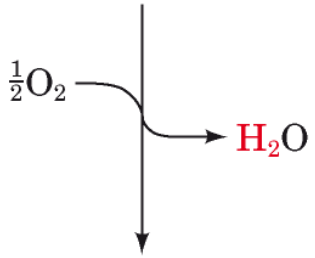
La cisteina può formare ponti disolfuro

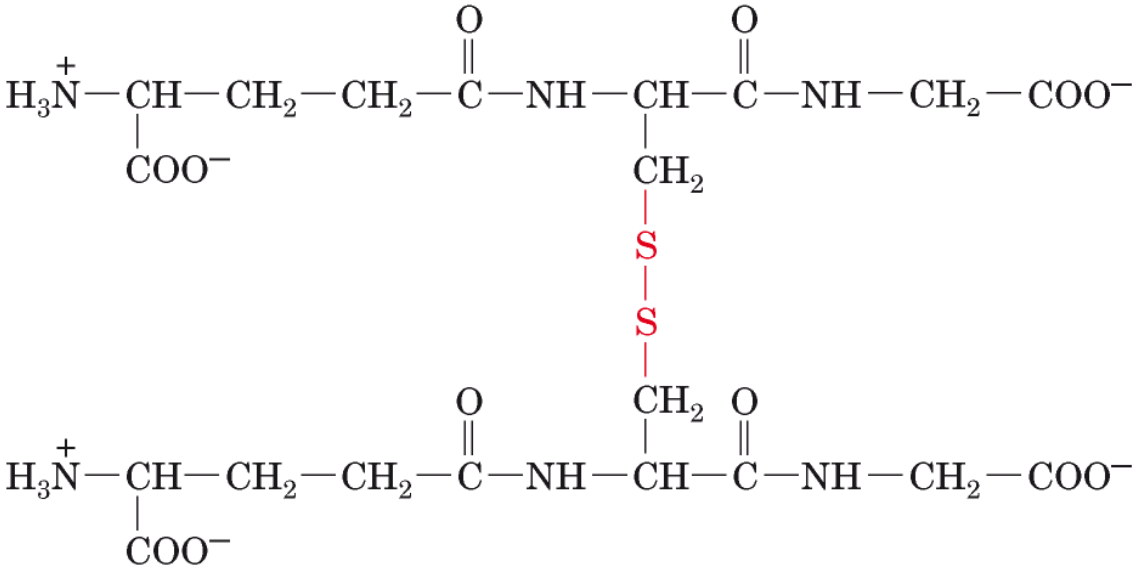


Dimerizzazione del glutatione



Glutatione (GSH)
(γ-Glutammilcisteinilglicina)





Glutatione disolfuro (GSSG)