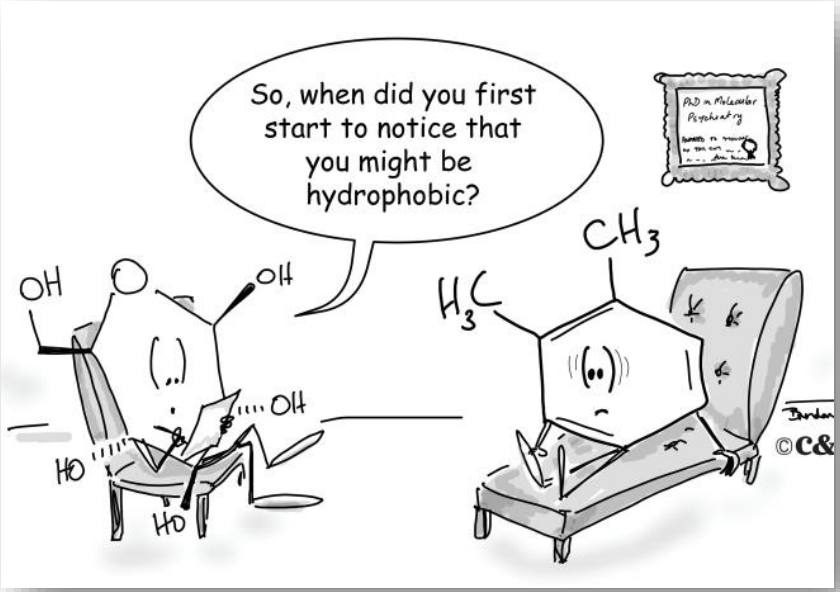
Aminoácidos y lípidos



Prof. Ulises Urzúa
Depto Oncología Básica y Clínica
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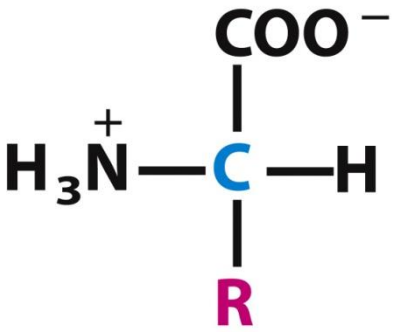
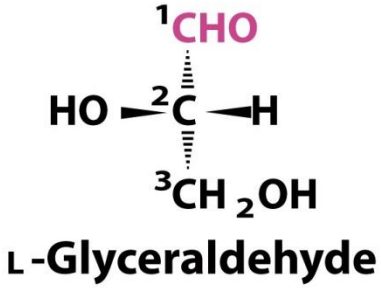
Universidad de Chile



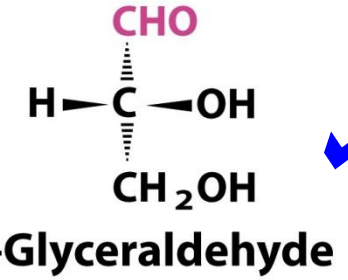
-Unidades repetitivas que constituyen las proteínas de todos los organismos vivos.

- Contienen un carbono asimétrico (α) al cual se enlazan 4 grupos: hidrógeno, amino, carboxilo y un grupo lateral, R, que distingue a cada aminoácido

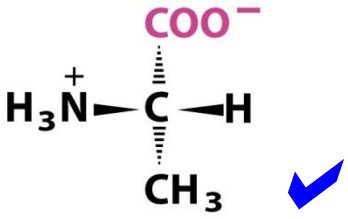
Así como los carbohidratos presentes en la naturaleza son isómeros D, los aminoácidos naturales son siempre L



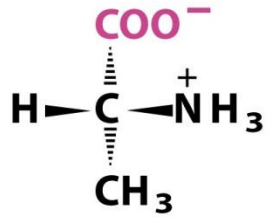
L-Glyceraldehyde



D-Glyceraldehyde

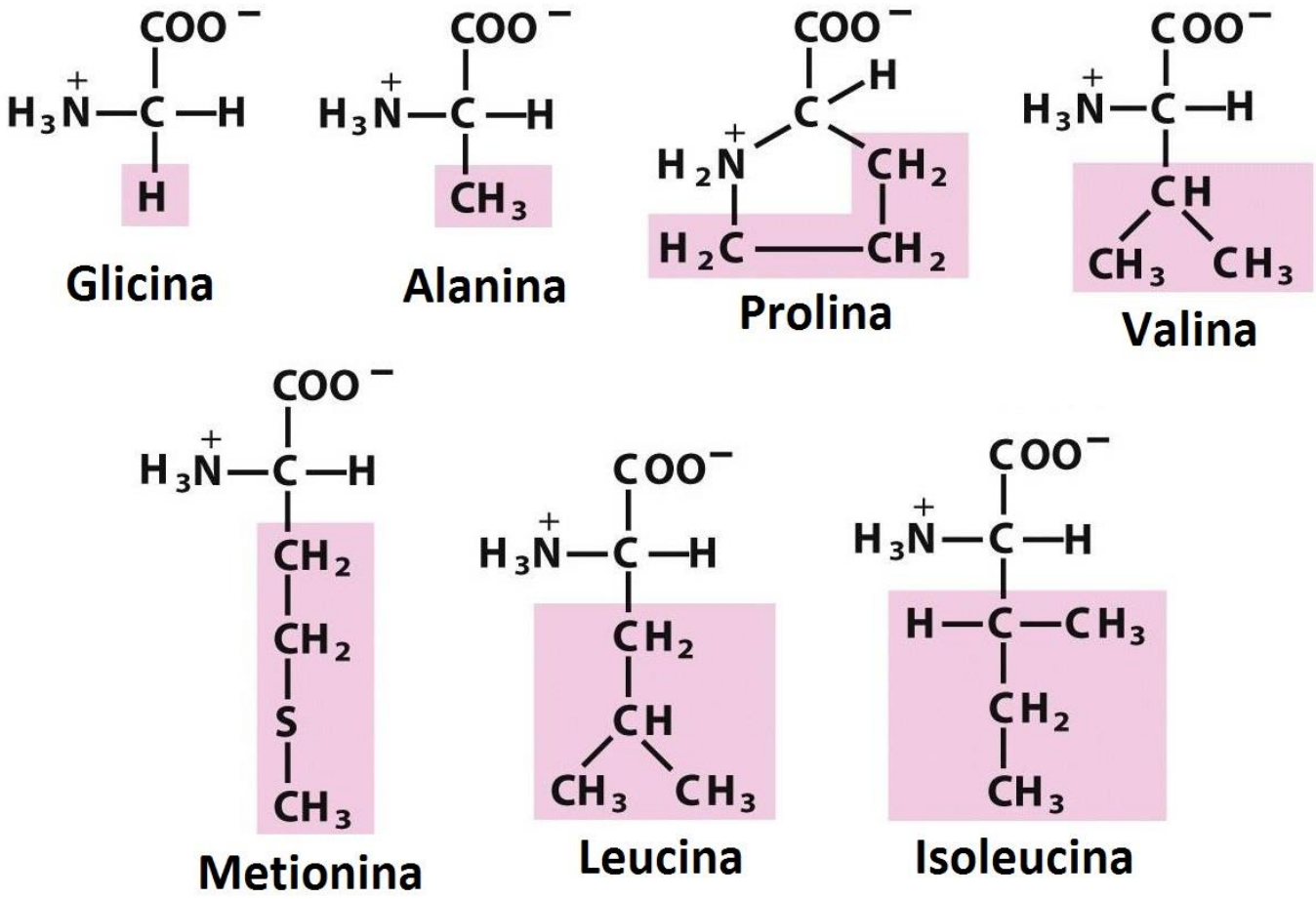


L-Alanine

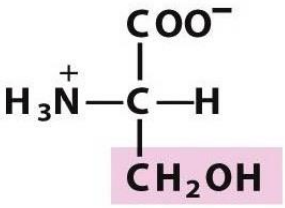


D-Alanine

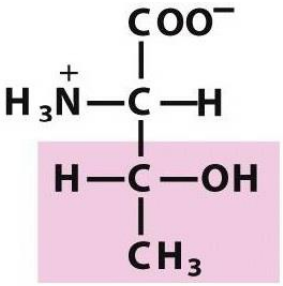
Apolares, R alifático



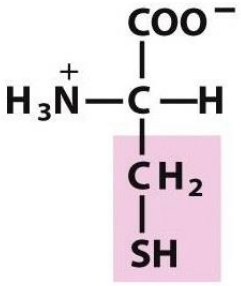
Polares, R sin carga



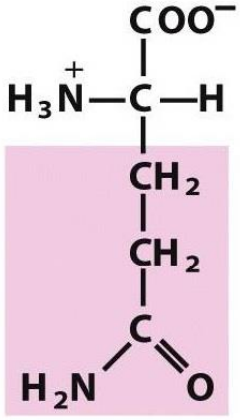
Serina



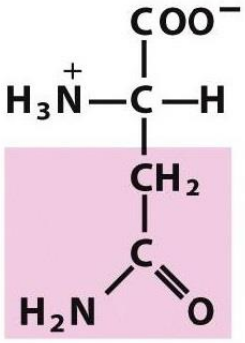
Treonina



Cisteina

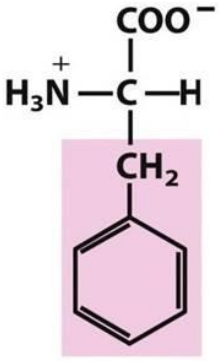


Glutamina

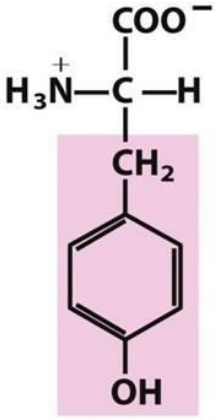


Asparragina

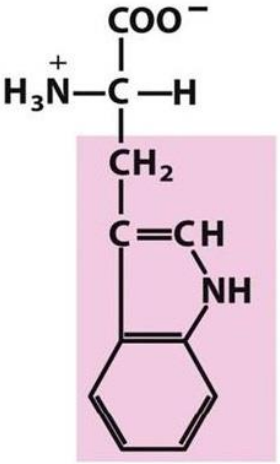
Aromáticos



Fenilalanina

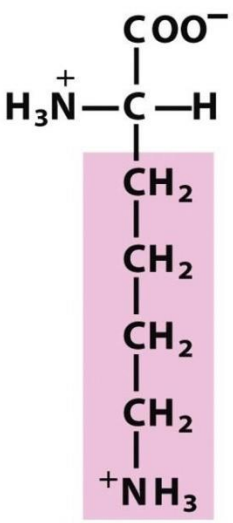


Tirosina

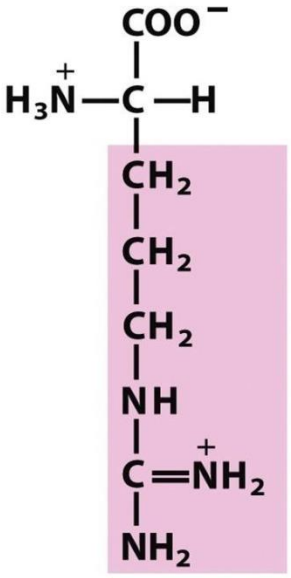


Triptofano

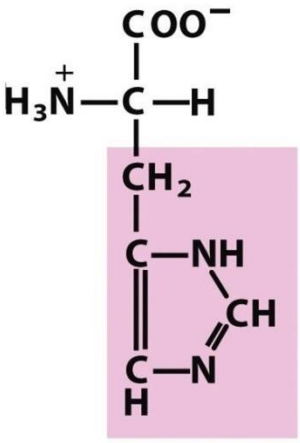
R con carga positiva "básicos"



Lisina

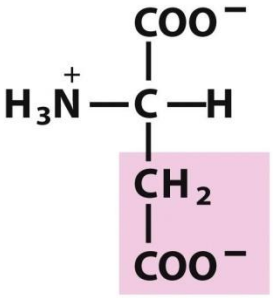


Arginina

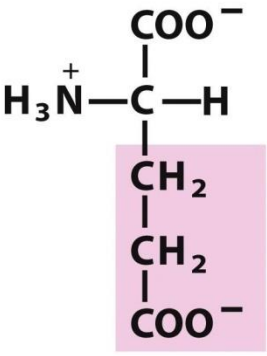


Histidina

R con carga negativa, "ácidos"

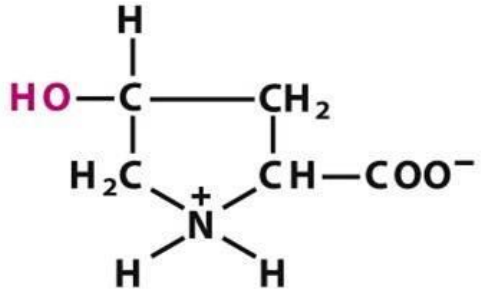


Aspartato

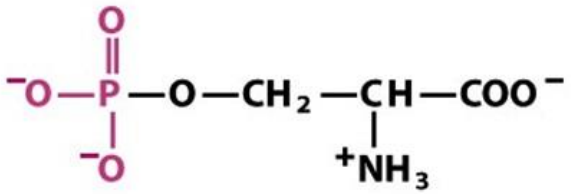


Glutamato

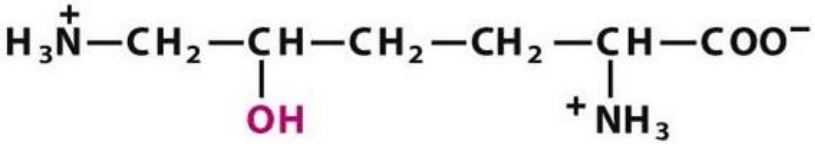
Aminoacidos poco comunes y aminoácidos modificados



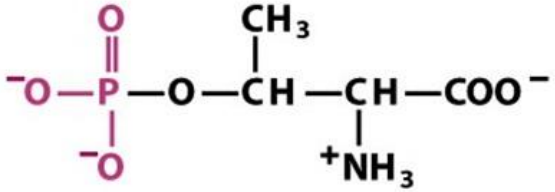
4-Hydroxyproline



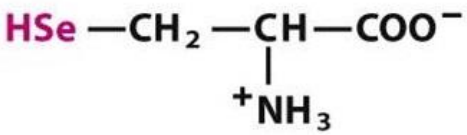
Phosphoserine



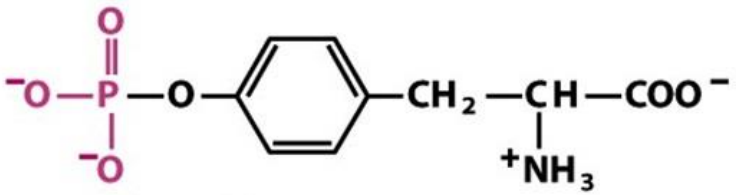
5-Hydroxylysine



Phosphothreonine

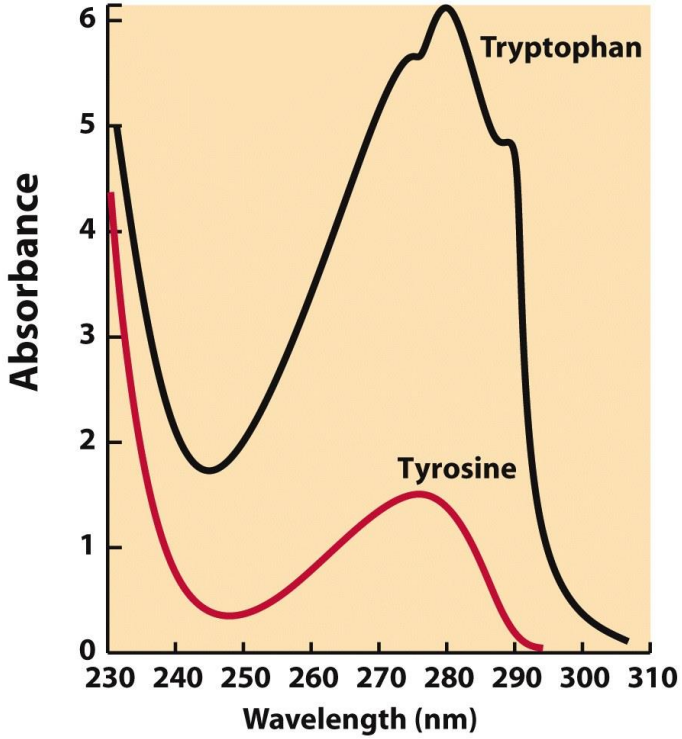


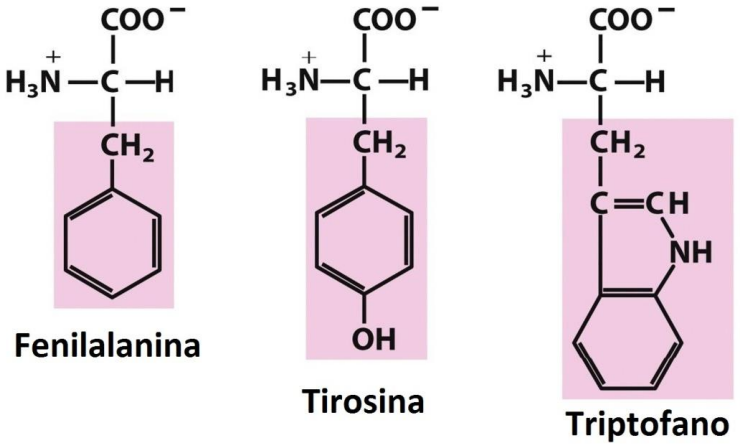
Selenocysteine

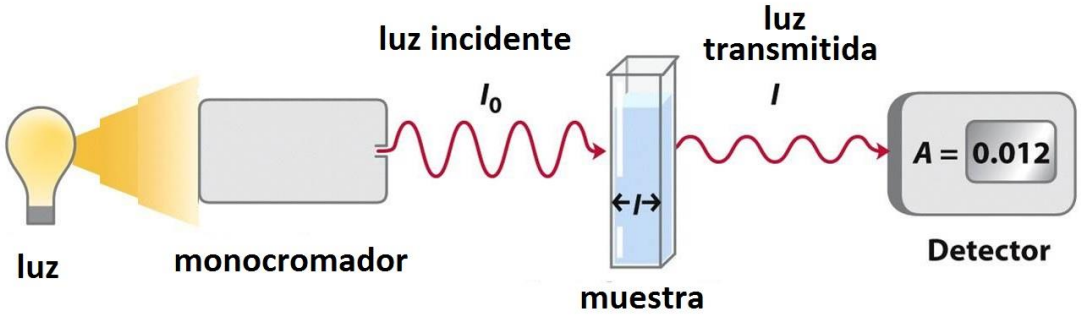


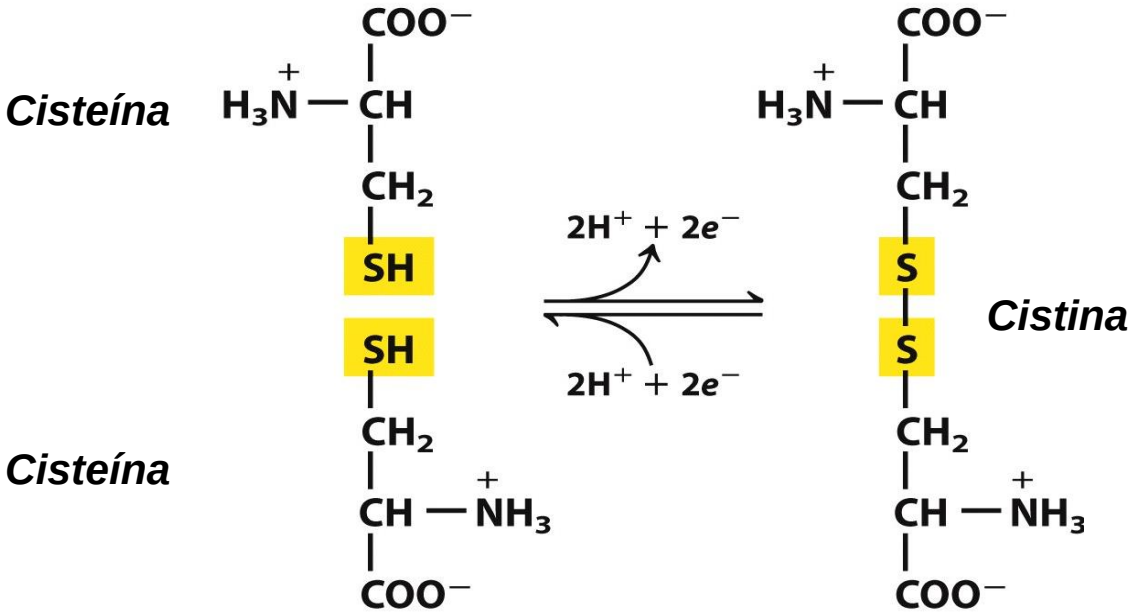
Phosphotyrosine

Absorción de luz UV por aminoácidos aromáticos

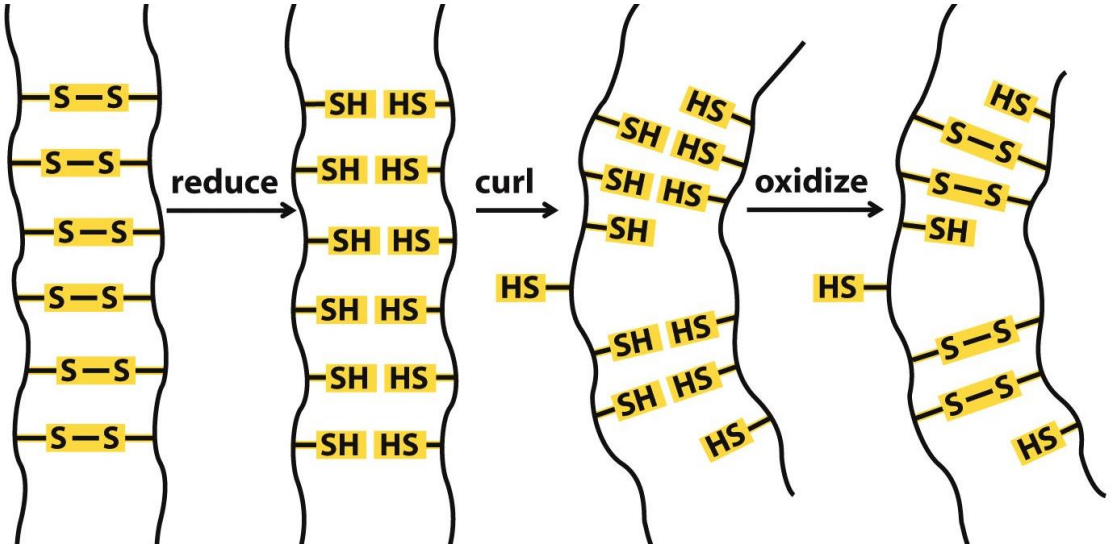


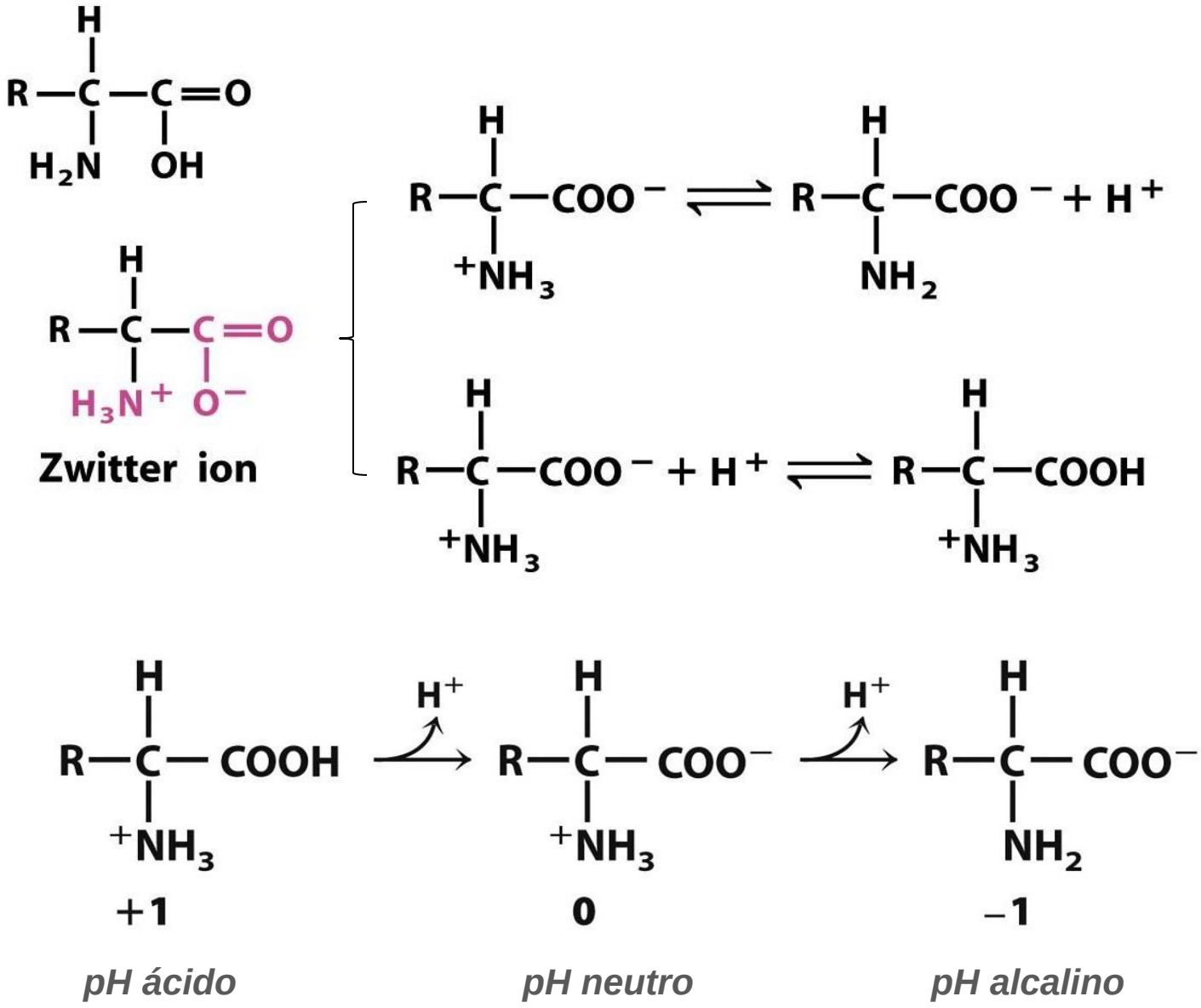


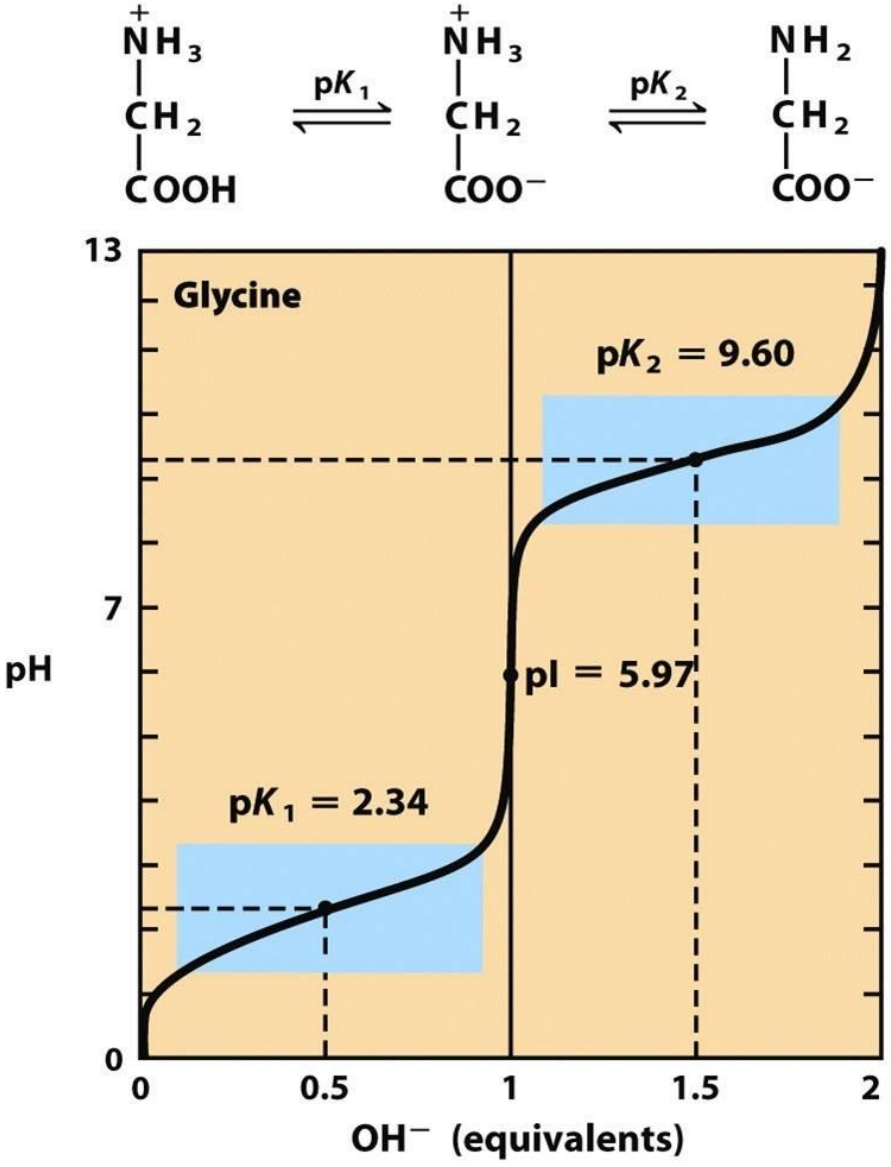




Los puentes disulfuro entre residuos de cisteina estabilizan la estructura de muchas proteínas




Zwitter ion
+1
0
−1
pH ácido
pH neutro
pH alcalino



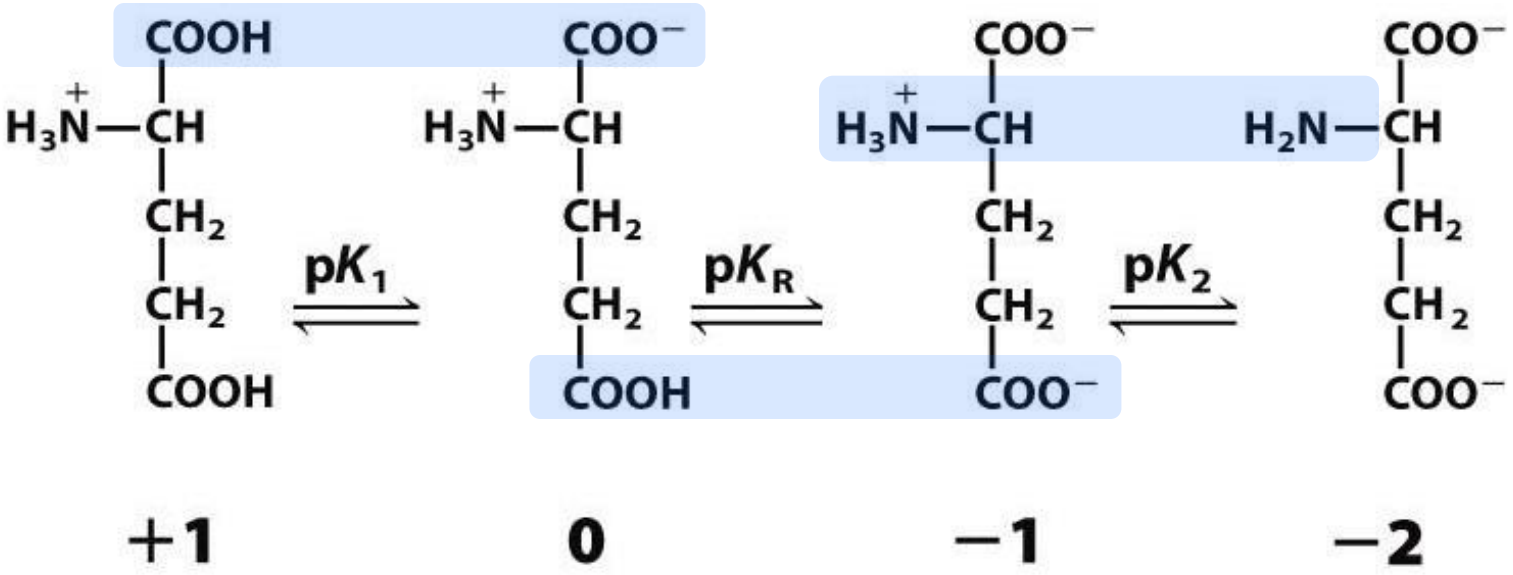
$$pI = (pK_1 + pK_2)/2$$

$$pI = (2.34 + 9.60)/2$$

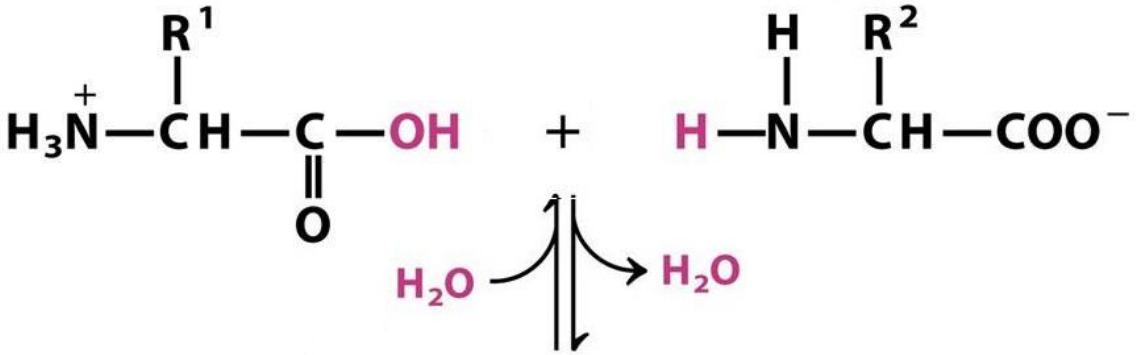
$$pI = 5.97$$

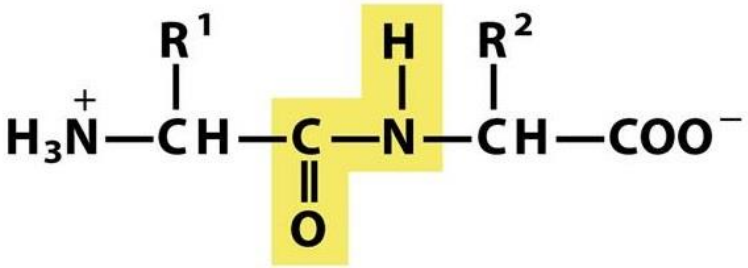
Algunos aminoácidos poseen grupos R laterales que pueden ionizarse (ya que poseen –COOH y –NH_2), y por lo tanto contribuyen a la carga neta del aminoácido.

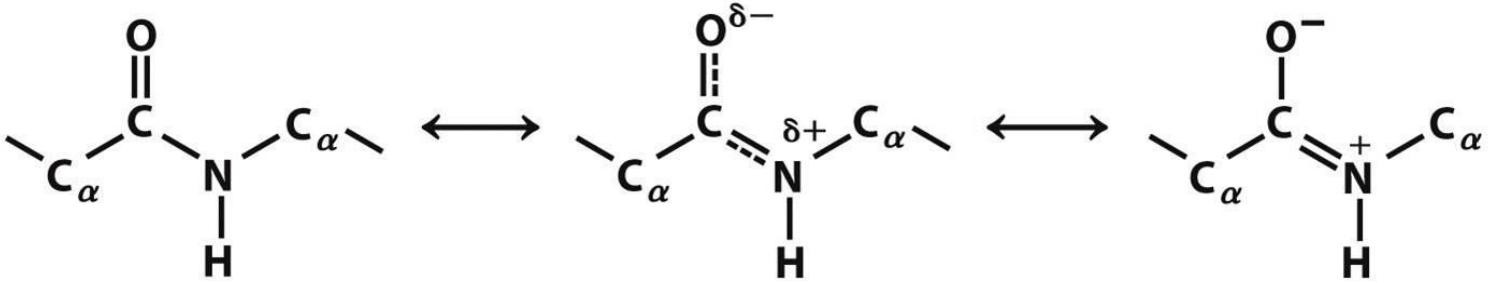
Ej: GLUTAMATO

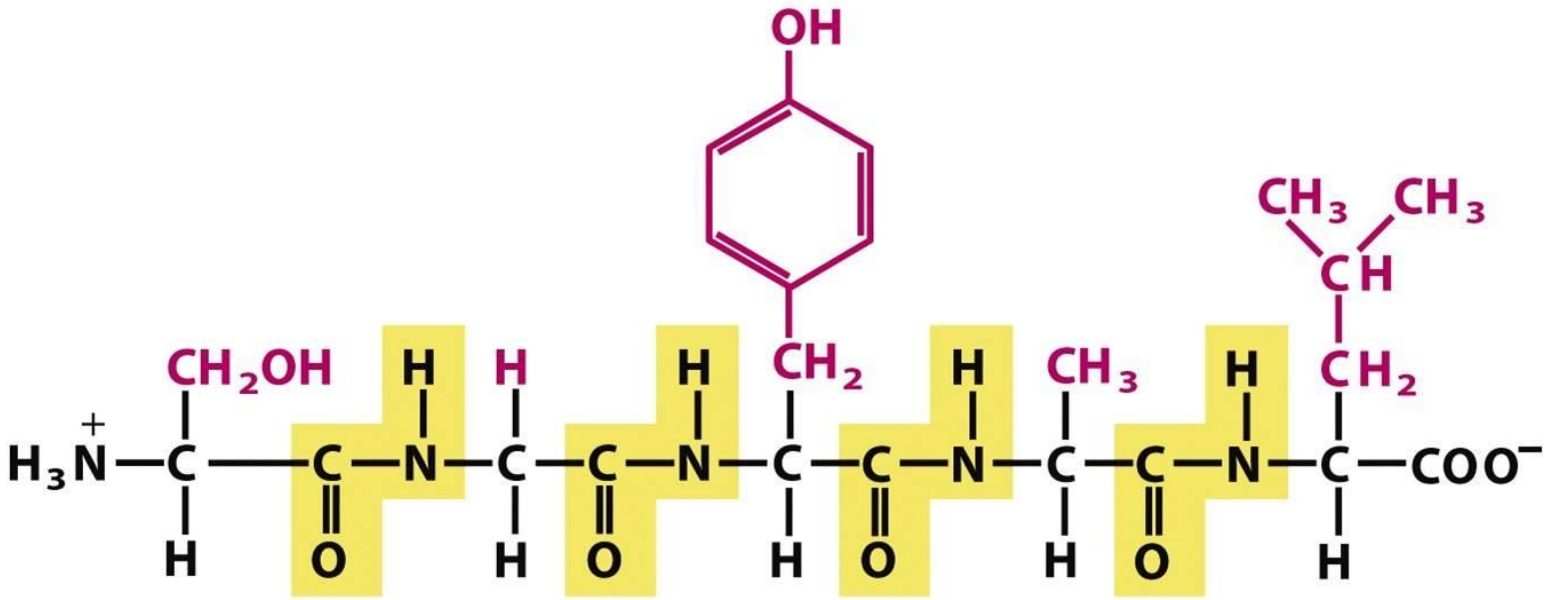


$$pI = (pK_1 + pKR)/2$$









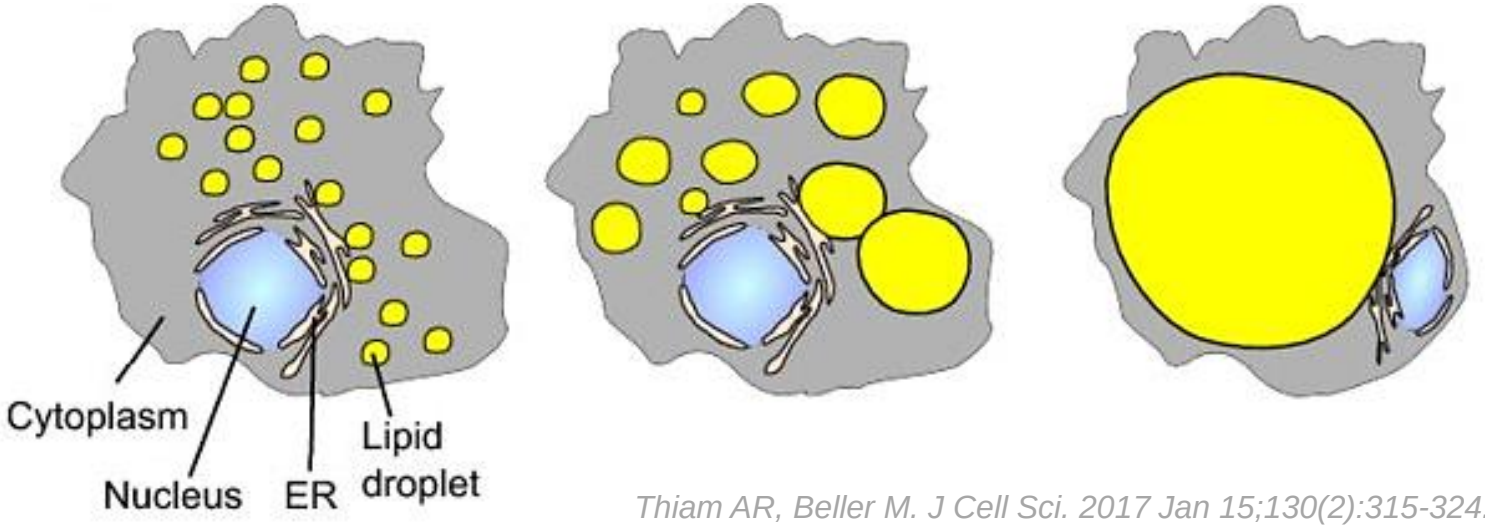
extremo
amino terminal

extremo
carboxilo terminal

Lípidos

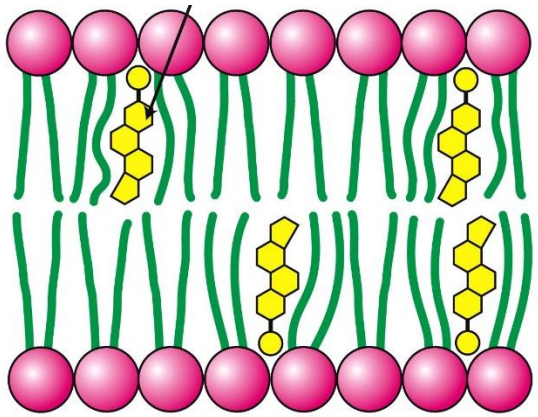
- *Insolubles en agua.*

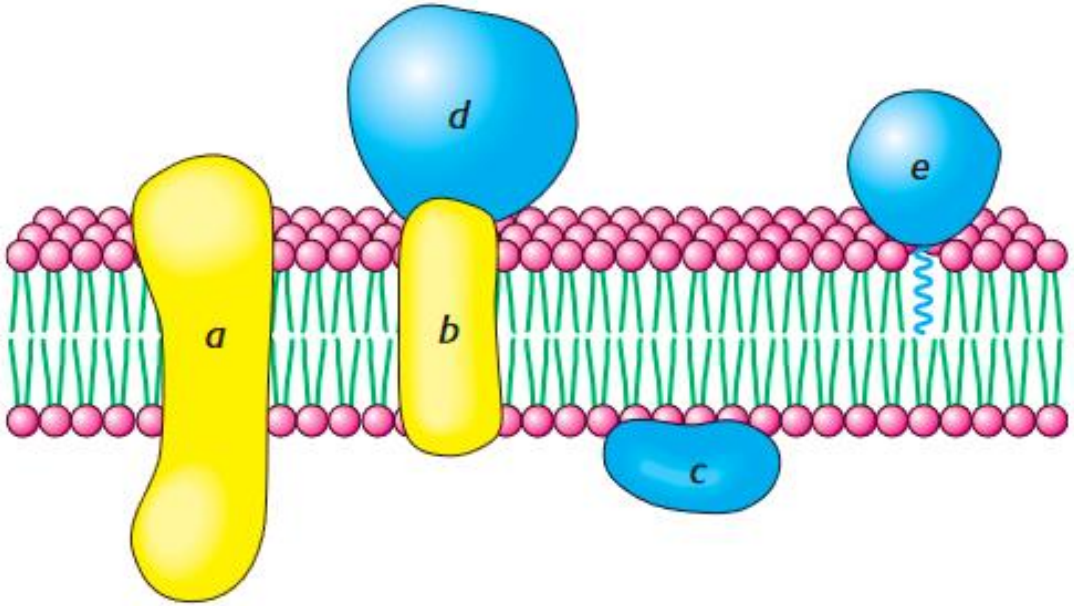
- *Reserva energética.*



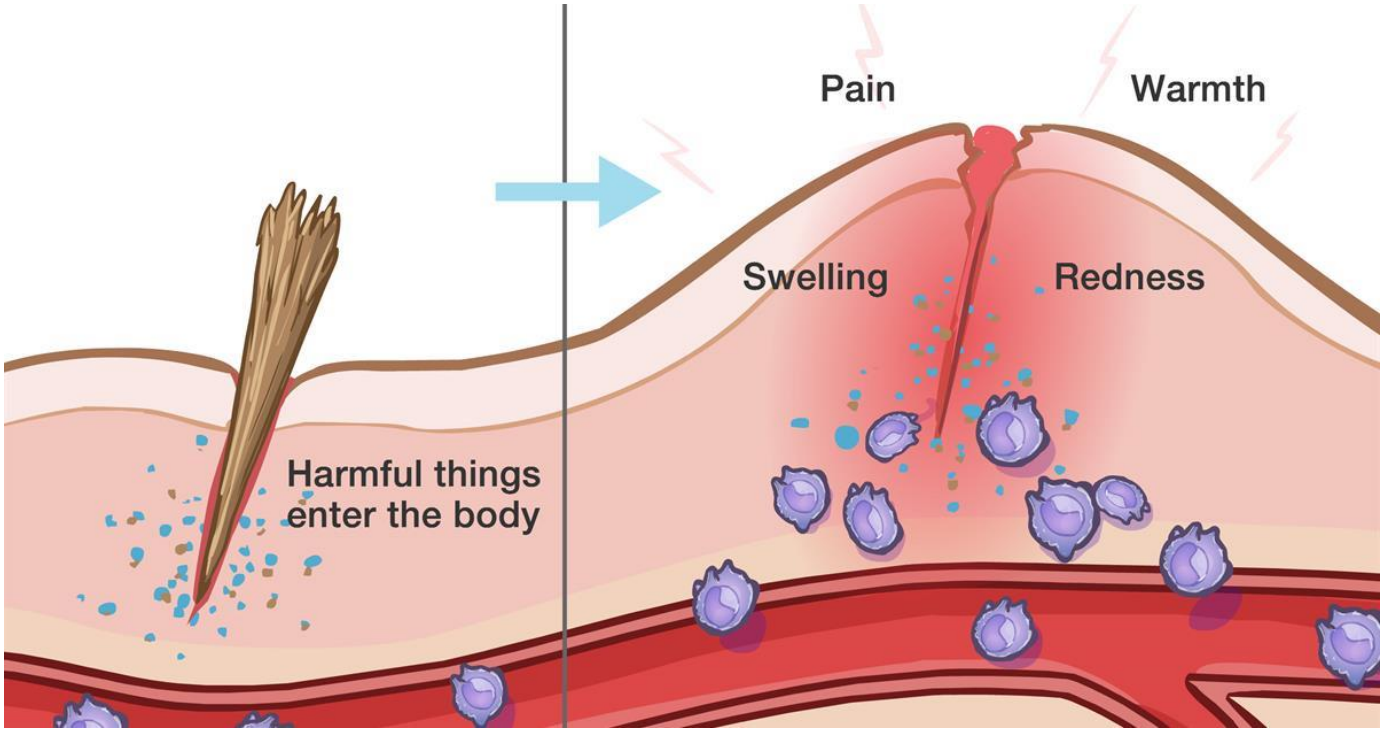
Thiam AR, Beller M. J Cell Sci. 2017 Jan 15;130(2):315-324.

- *Membranas biológicas. Fosfolípidos y esteroles*

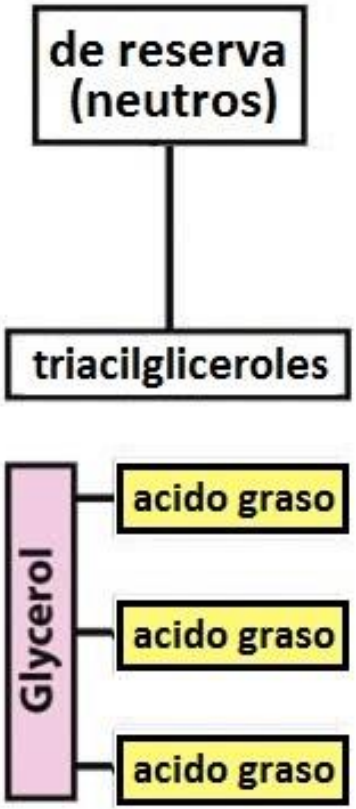


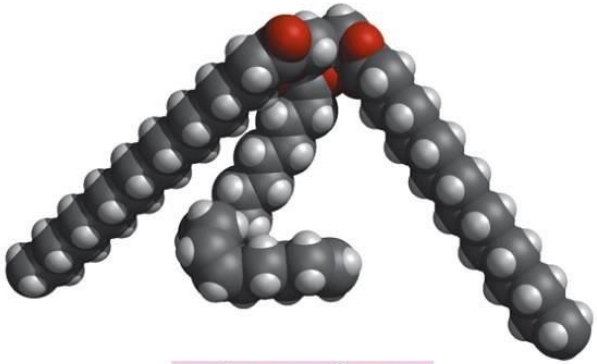


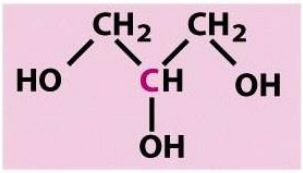
- *Señalización celular: Fosfatidilinositol, esteroles y derivados, eicosanoides*



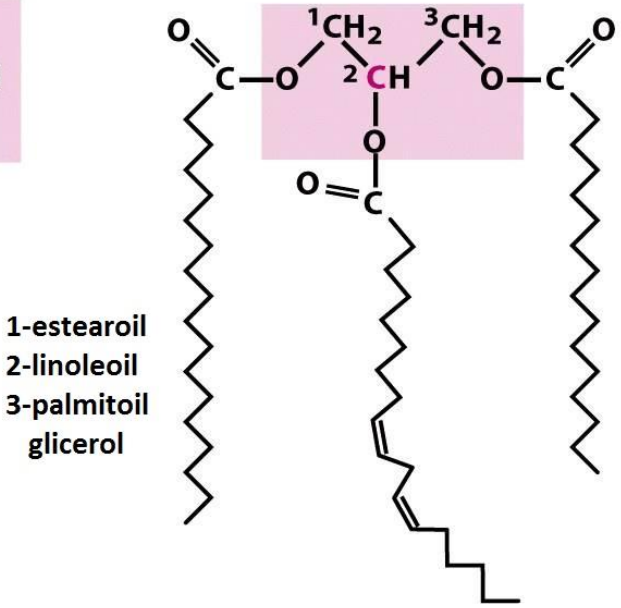
Lípidos - TAG





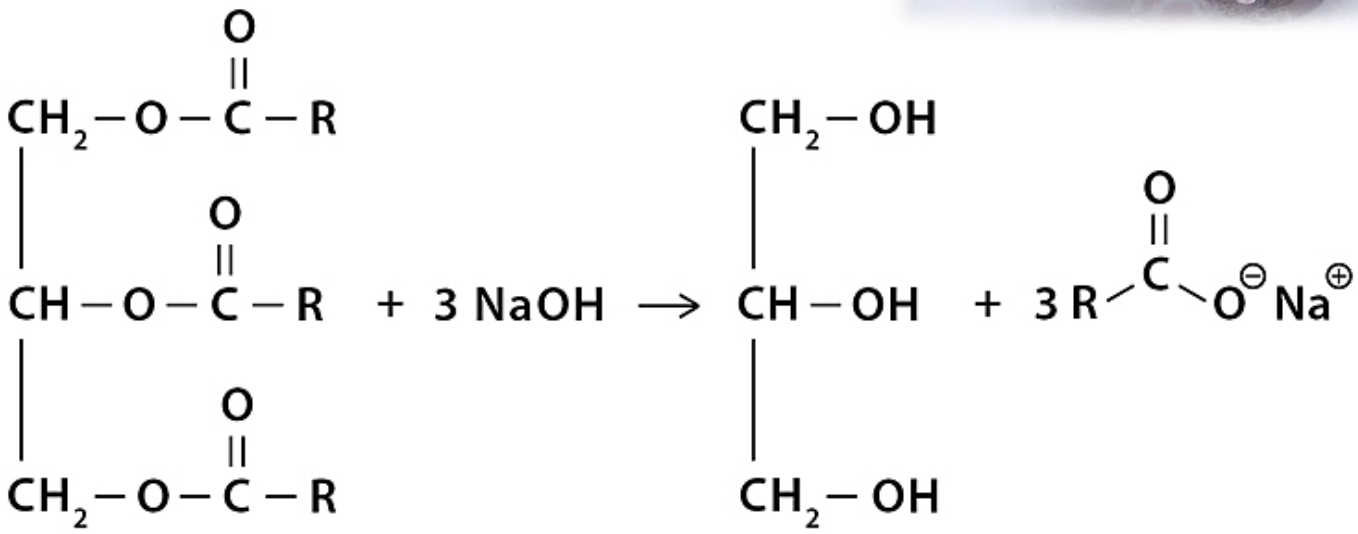


Glicerol

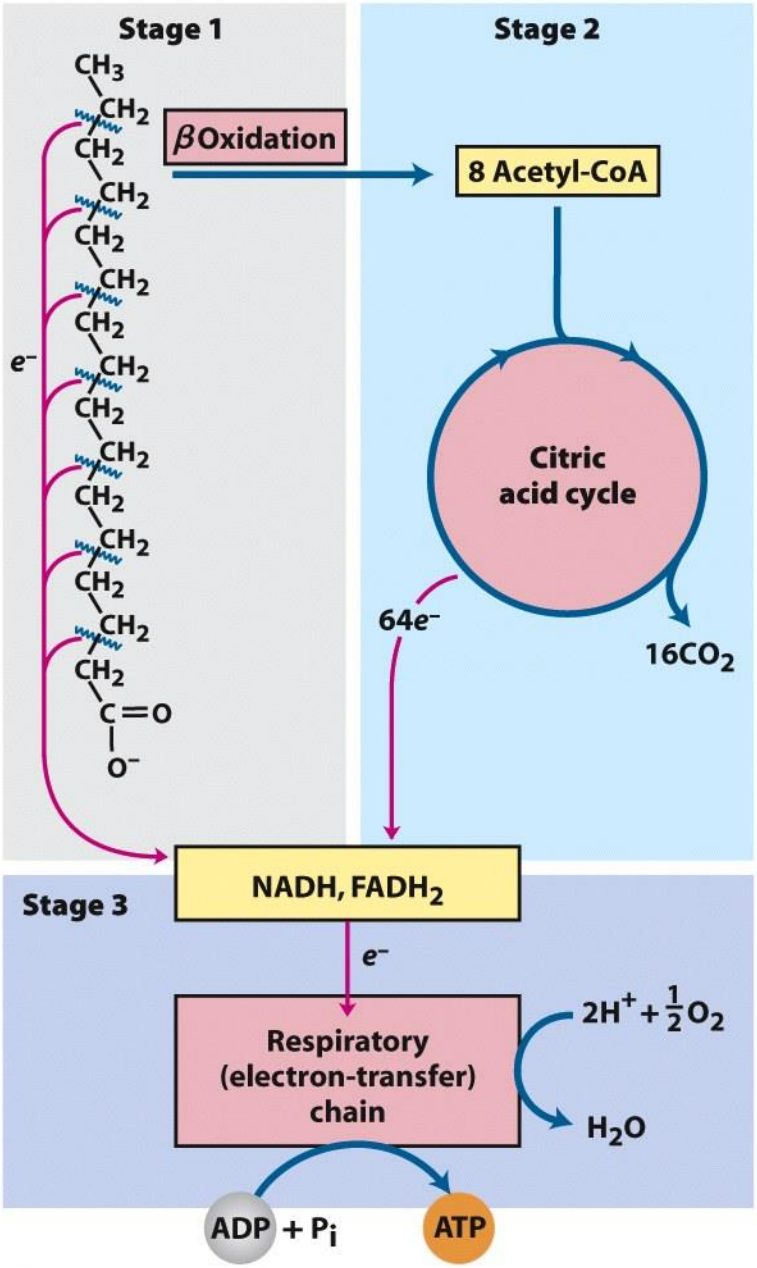


1-estearoil
2-linoleoil
3-palmitoil
glicerol

Lípidos - saponificación

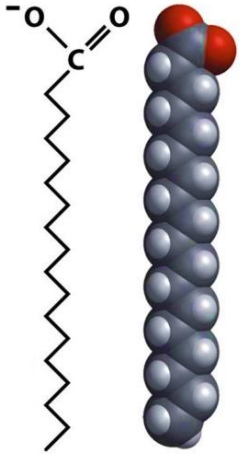


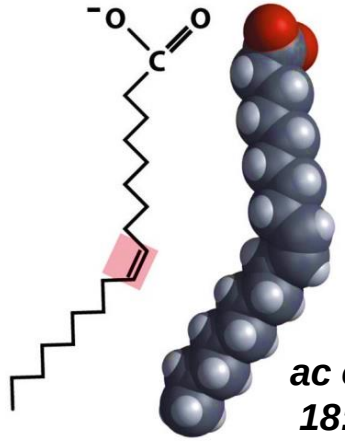
Lípidos – oxidación biológica de ácidos grasos



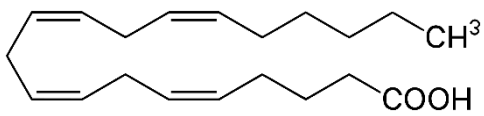
Lípidos – acidos grasos

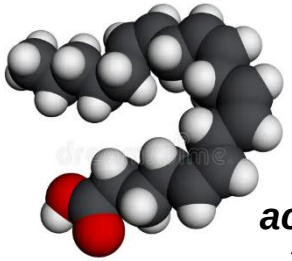
ac esteárico
18:0





ac oleico
18:1(Δ^9)



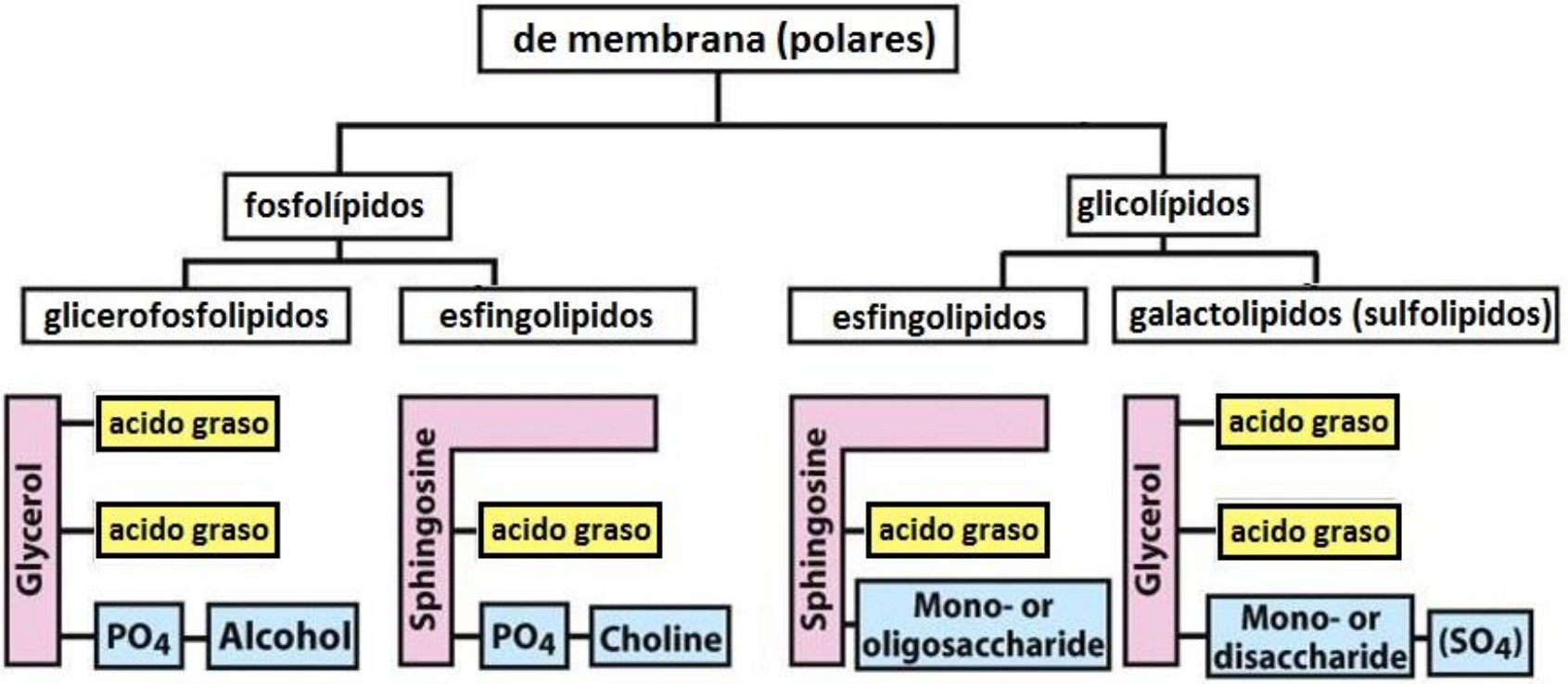


ac araquidónico
20:4($\Delta^{5,8,11,14}$)

TABLE 10–1 Some Naturally Occurring Fatty Acids: Structure, Properties, and Nomenclature

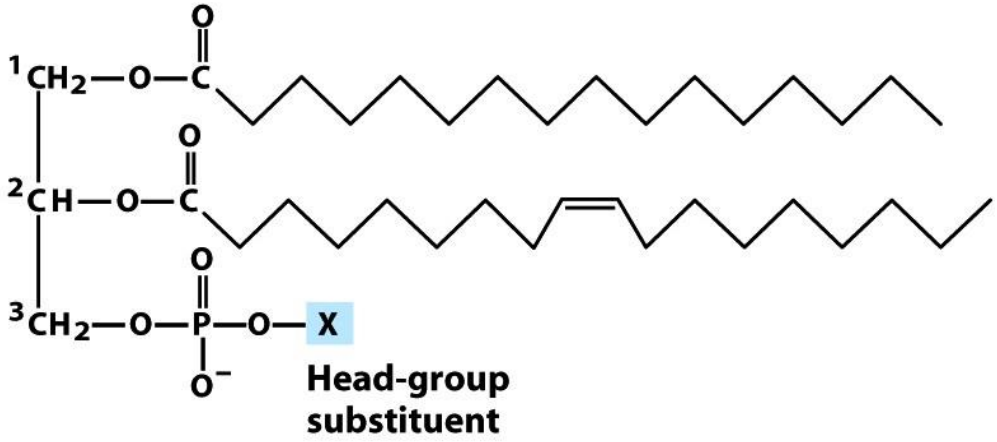
Carbon skeleton	Structure*	Systematic name†	Common name (derivation)	Melting point (°C)
18:0	$CH_3(CH_2)_{16}COOH$	*n*-Octadecanoic acid	Stearic acid	69.6
18:1(Δ^9)	$CH_3(CH_2)_7CH{=}CH(CH_2)_7COOH$	*cis*-9-Octadecenoic acid	Oleic acid	13.4
18:2($\Delta^{9,12}$)	$CH_3(CH_2)_4CH{=}CHCH_2CH{=}CH(CH_2)_7COOH$	*cis*-,*cis*-9,12-Octadecadienoic acid	Linoleic acid	1–5
18:3($\Delta^{9,12,15}$)	$CH_3CH_2CH{=}CHCH_2CH{=}CHCH_2CH{=}CH(CH_2)_7COOH$	*cis*-,*cis*-,*cis*-9,12,15-Octadecatrienoic acid	α-Linolenic acid	−11

Lípidos


de membrana (polares)
fosfolípidos
glicolípidos
glicerofosfolipidos
esfingolipidos
esfingolipidos
galactolipidos (sulfolipidos)
Glycerol
acido graso
acido graso
PO4
Alcohol
Sphingosine
acido graso
PO4
Choline
Sphingosine
acido graso
Mono- or oligosaccharide
Glycerol
acido graso
acido graso
Mono- or disaccharide
(SO4)

Lípidos - glicerofosfolipidos

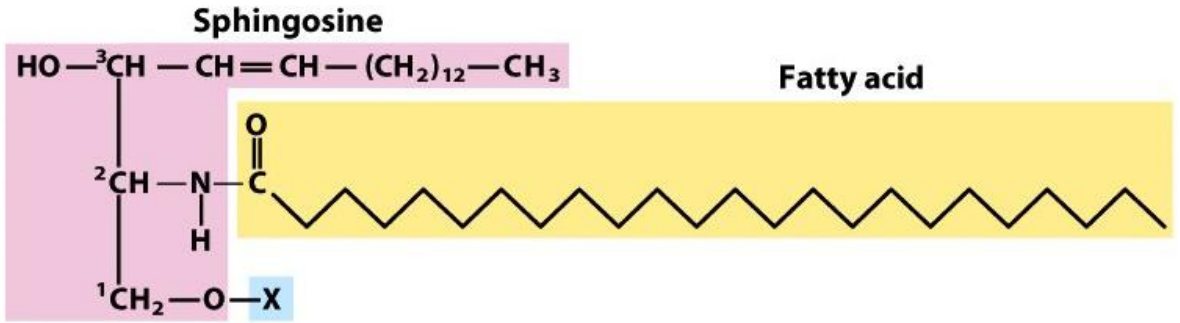
Glycerophospholipid (general structure)

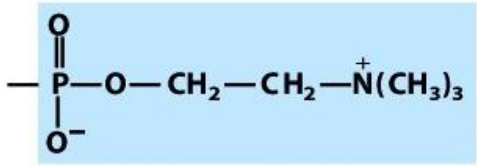
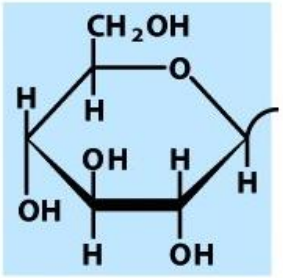


Name of glycerophospholipid	Name of X	Formula of X	Net charge (at pH 7)
Phosphatidic acid	—	—H	– 1
Phosphatidylethanolamine	Ethanolamine	—CH_2—CH_2—$\overset{+}{N}H_3$	0
Phosphatidylcholine	Choline	—CH_2—CH_2—$\overset{+}{N}(CH_3)_3$	0
Phosphatidylserine	Serine	—CH_2—$\underset{\displaystyle COO^-}{\overset{\displaystyle \overset{+}{N}H_3}{CH}}$—$CH_2$	– 1
Phosphatidylglycerol	Glycerol	—CH_2—$\underset{\displaystyle OH}{CH}$—$CH_2$—OH	– 1

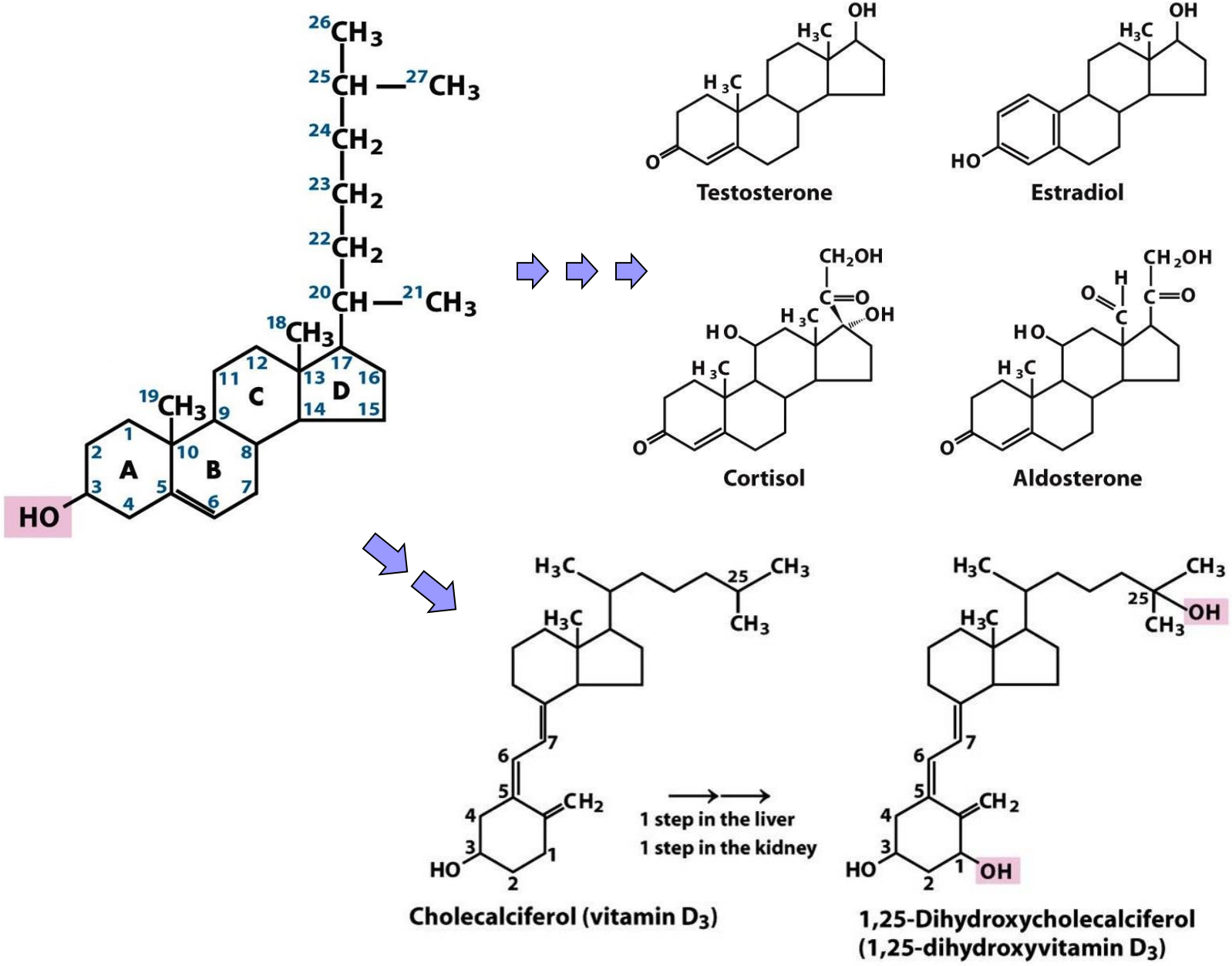
Lípidos - esfingolipidos

Sphingolipid (general structure)



Name of sphingolipid	Name of X—O	Formula of X
Ceramide	—	—H
Sphingomyelin	Phosphocholine	
Neutral glycolipids Glucosylcerebroside	Glucose	

Lípidos - esteroles



GRACIAS!!

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