

## Proteínas

Moi abundantes

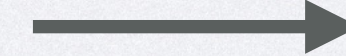
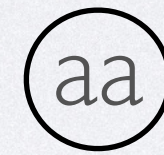
Alta importancia

Estruturalmente moi complexas

Unidade básica aa

Enlace covalente

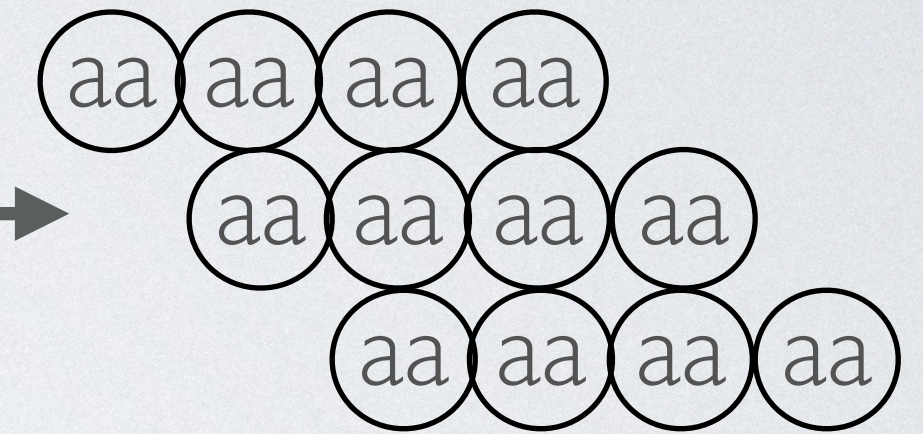
Aminoácido



Péptido



Proteína





# Proteínas

## Clasificación

### Función biológica

- Encimática
- Estructural
- Hormonal
- Almacenamiento
- Transporte...

### Nº cadenas

- Monoméricas
- Oligoméricas

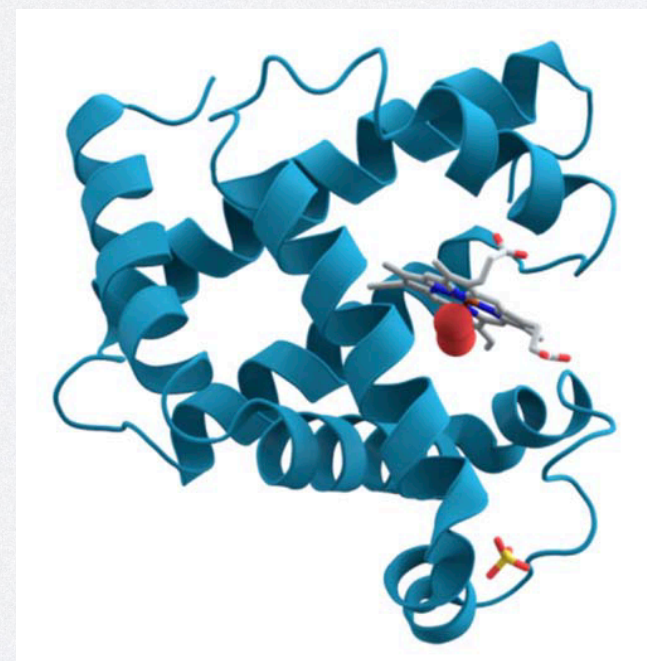
### Composición

- Simples (holoproteínas)
- Conjugadas (heteroproteínas)  
apoproteína + grupo prostético

### Forma

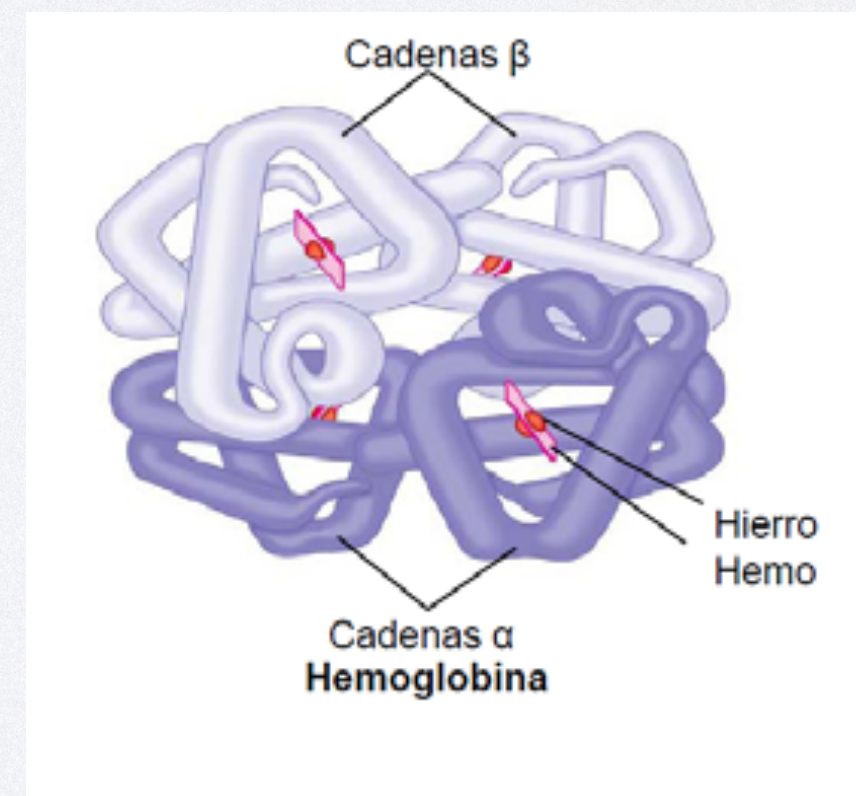
- Globular
- Fibrosa

Mioglobina



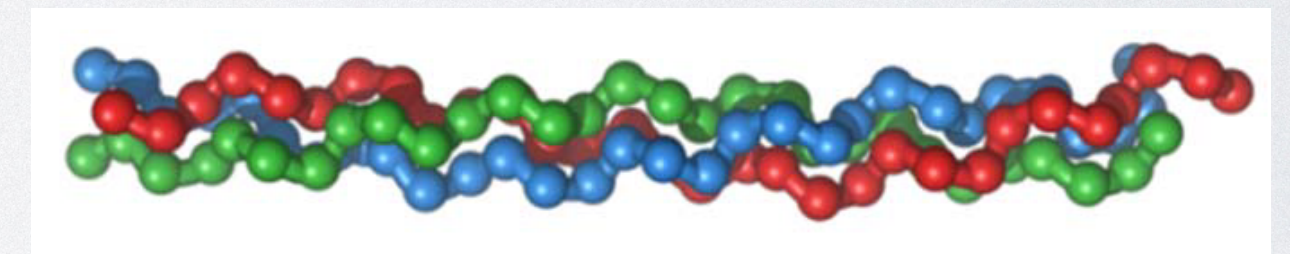
Autor: AzaToth, dominio publico vía <https://commons.wikimedia.org/wiki>

Hemoglobina



Campbell y Reece (2007) Biología. 7ª ed. Médica Panamericana.

Colágeno



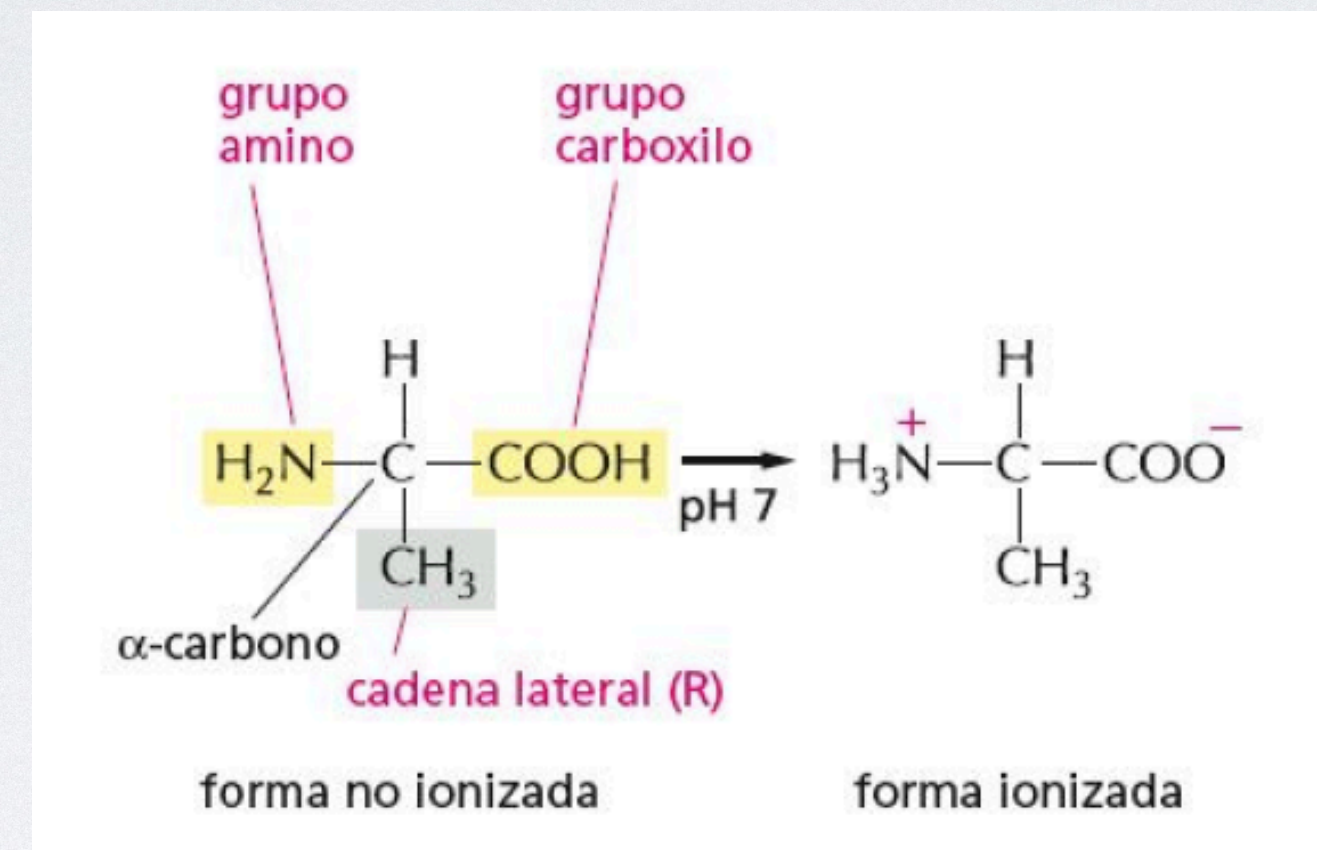
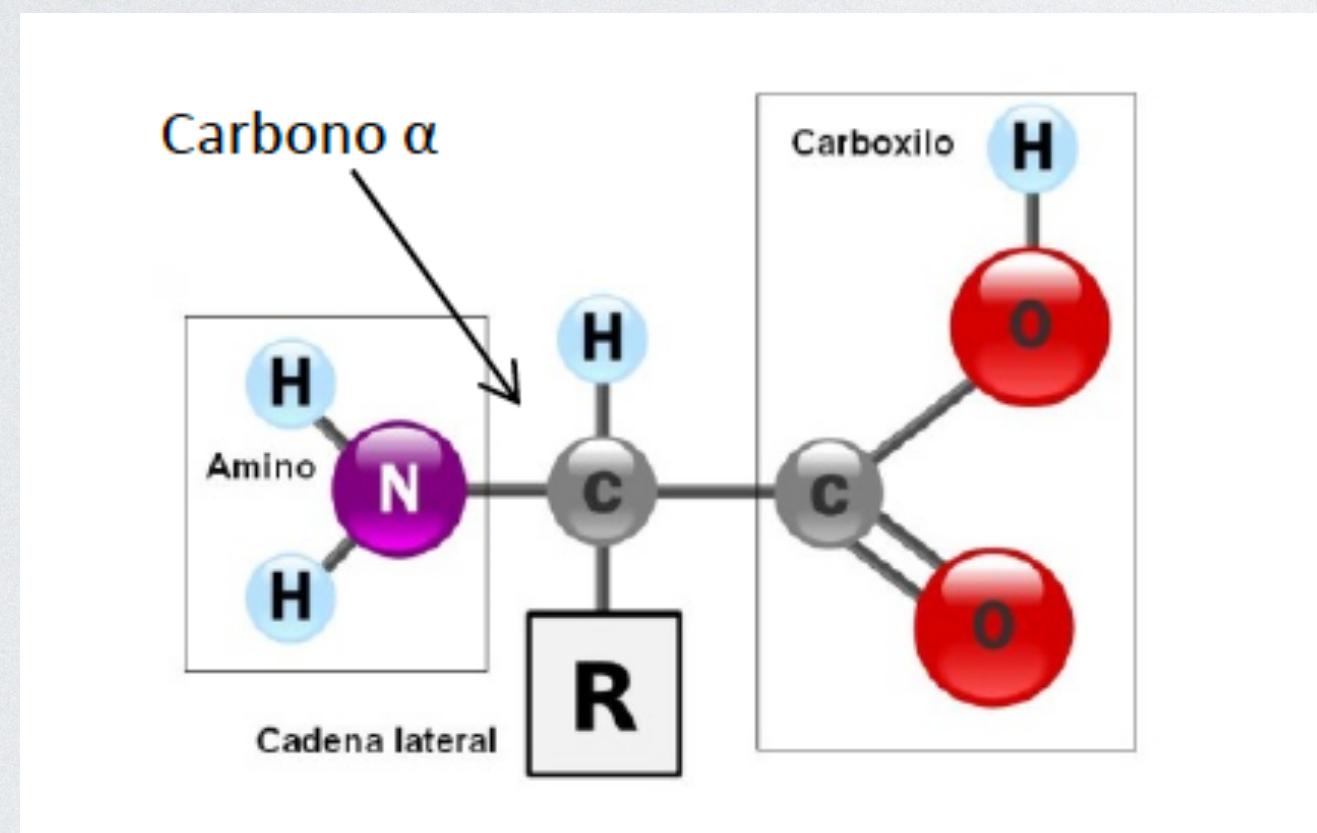
Autor: Vossman, vía <https://commons.wikimedia.org/wiki>



# Proteínas

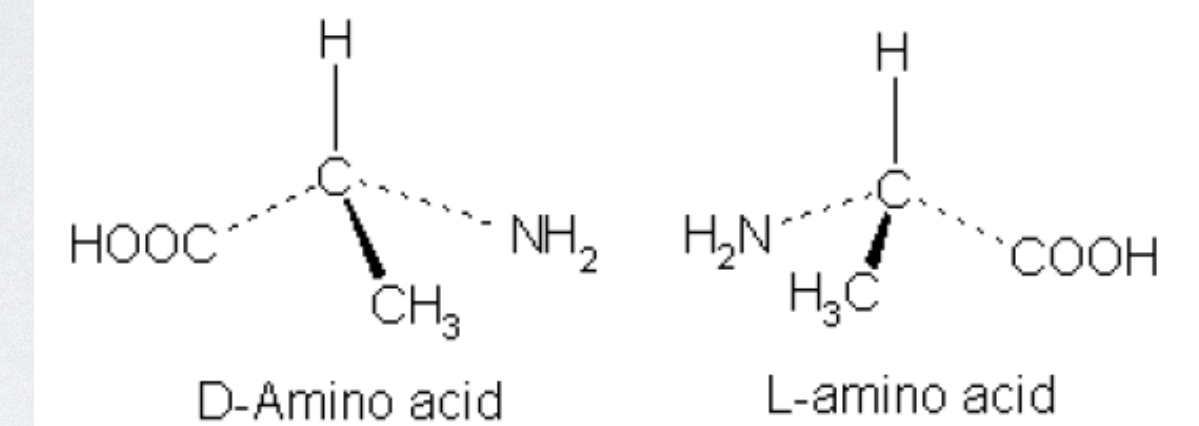
## Tema 2

Estructura de un aa

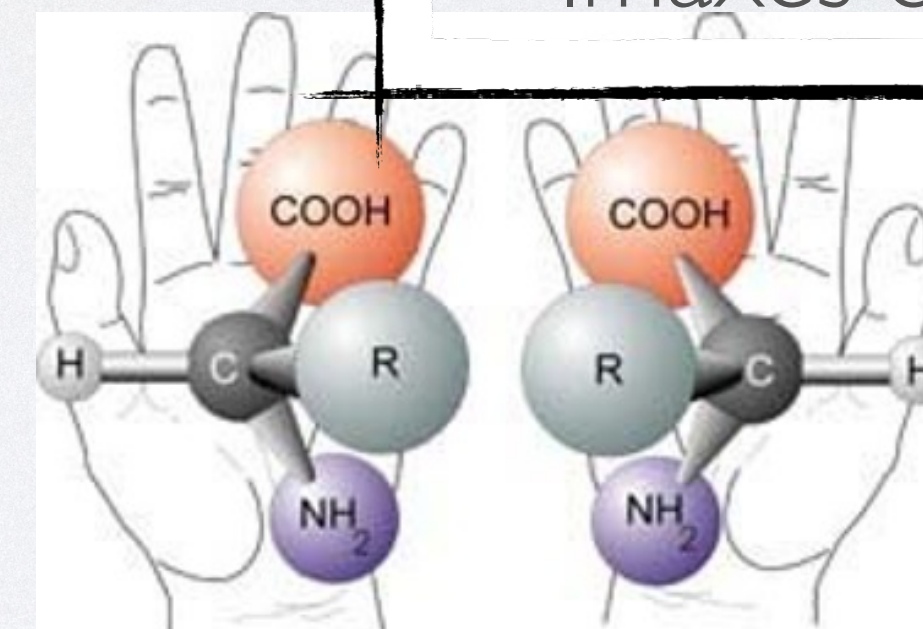


Sustancias anfóteras

Enantiómeros



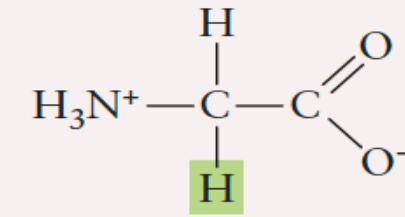
Imaxes especulares



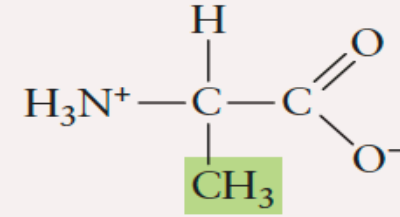


## Propiedades das cadeas laterais (R)

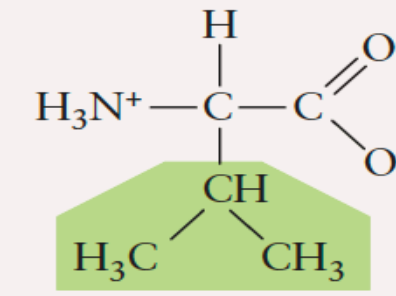
### Cadenas laterales no polares



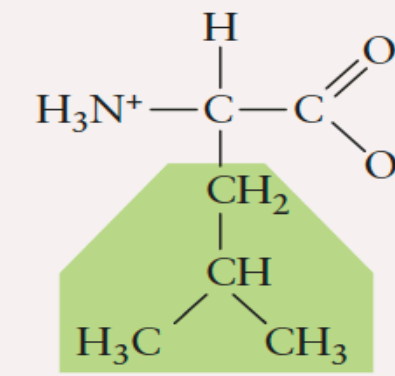
Glicina (G)  
Gly



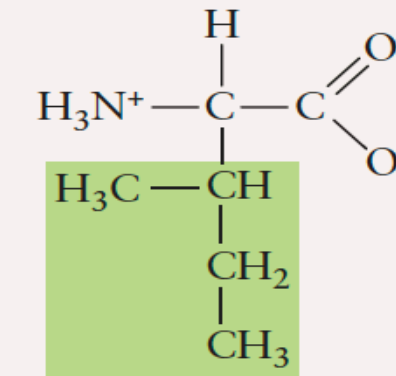
Alanina (A)  
Ala



Valina (V)  
Val

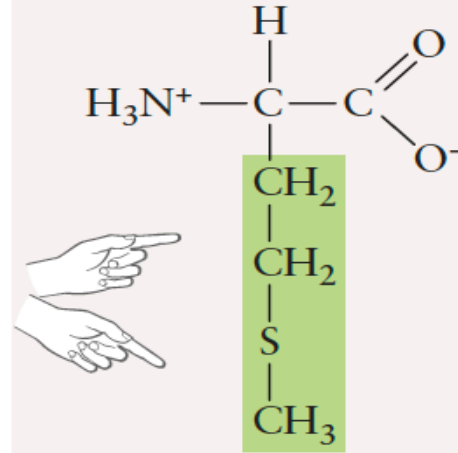


Leucina (L)  
Leu

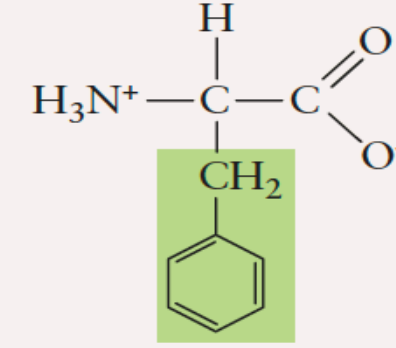


Isoleucina (I)  
Ile

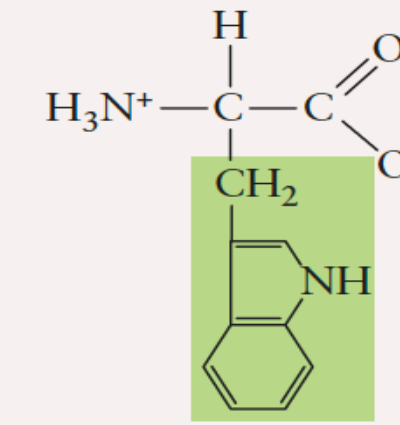
No hay átomos cargados ni electronegativos para formar enlaces de hidrógeno; no son solubles en agua



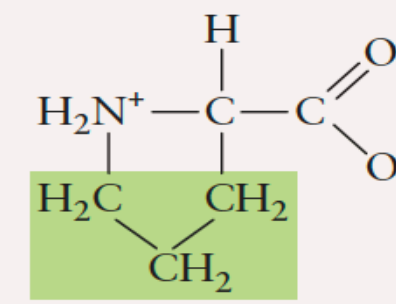
Metionina (M)  
Met



Fenilalanina (F)  
Phe



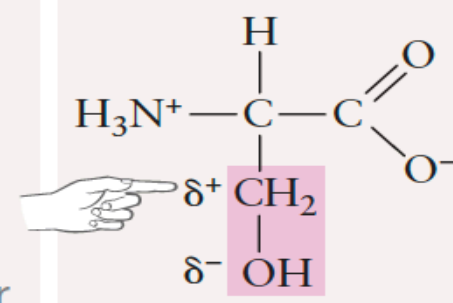
Triptófano (W)  
Trp



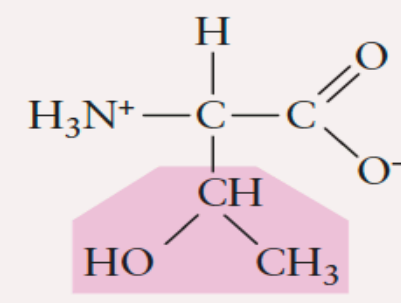
Prolina (P)  
Pro

### Cadenas laterales polares

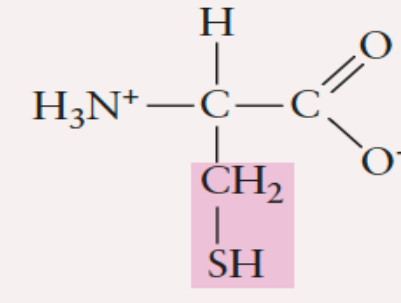
Cargas parciales que pueden formar enlaces de hidrógeno; solubles en agua



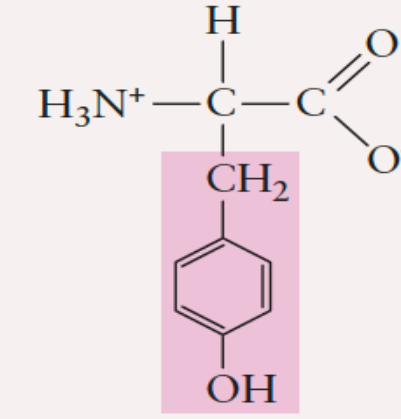
Serina (S)  
Ser



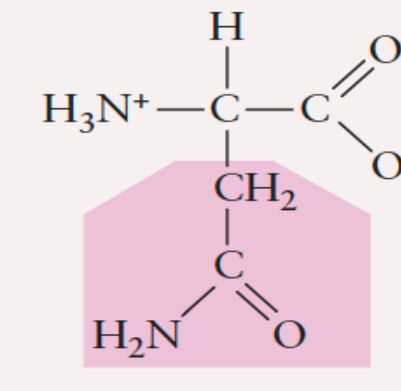
Treonina (T)  
Thr



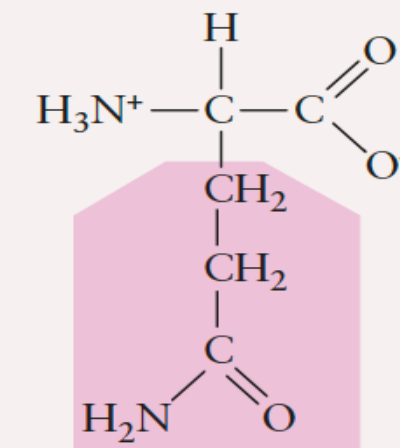
Cisteína (C)  
Cys



Tirosina (Y)  
Tyr



Asparagina (N)  
Asn

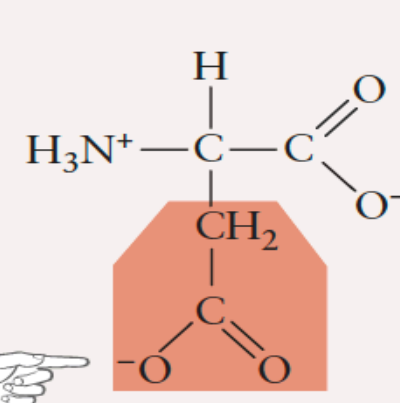


Glutamina (Q)  
Gln

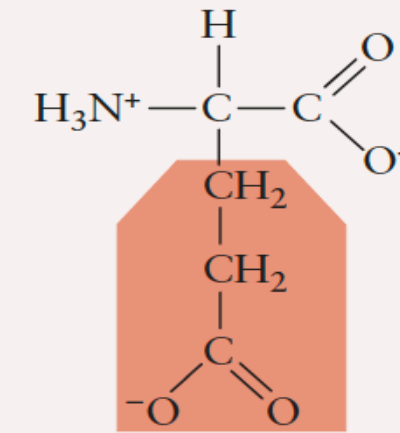
### Cadenas laterales con carga eléctrica

Las cadenas laterales cargadas forman enlaces de hidrógeno; muy solubles en agua

#### Ácidas

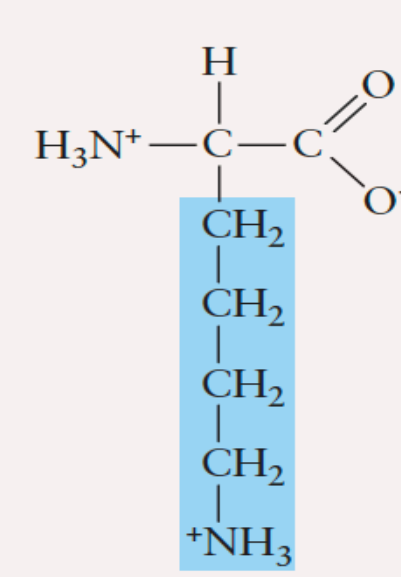


Aspartato (D)  
Asp

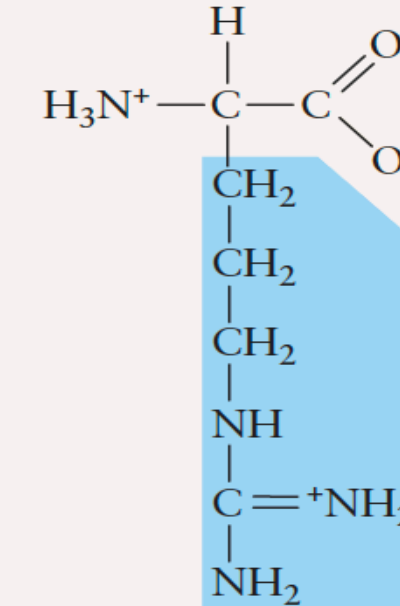


Glutamato (E)  
Glu

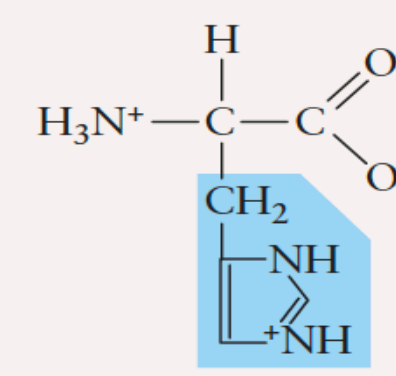
#### Básicas



Lisina (K)  
Lys



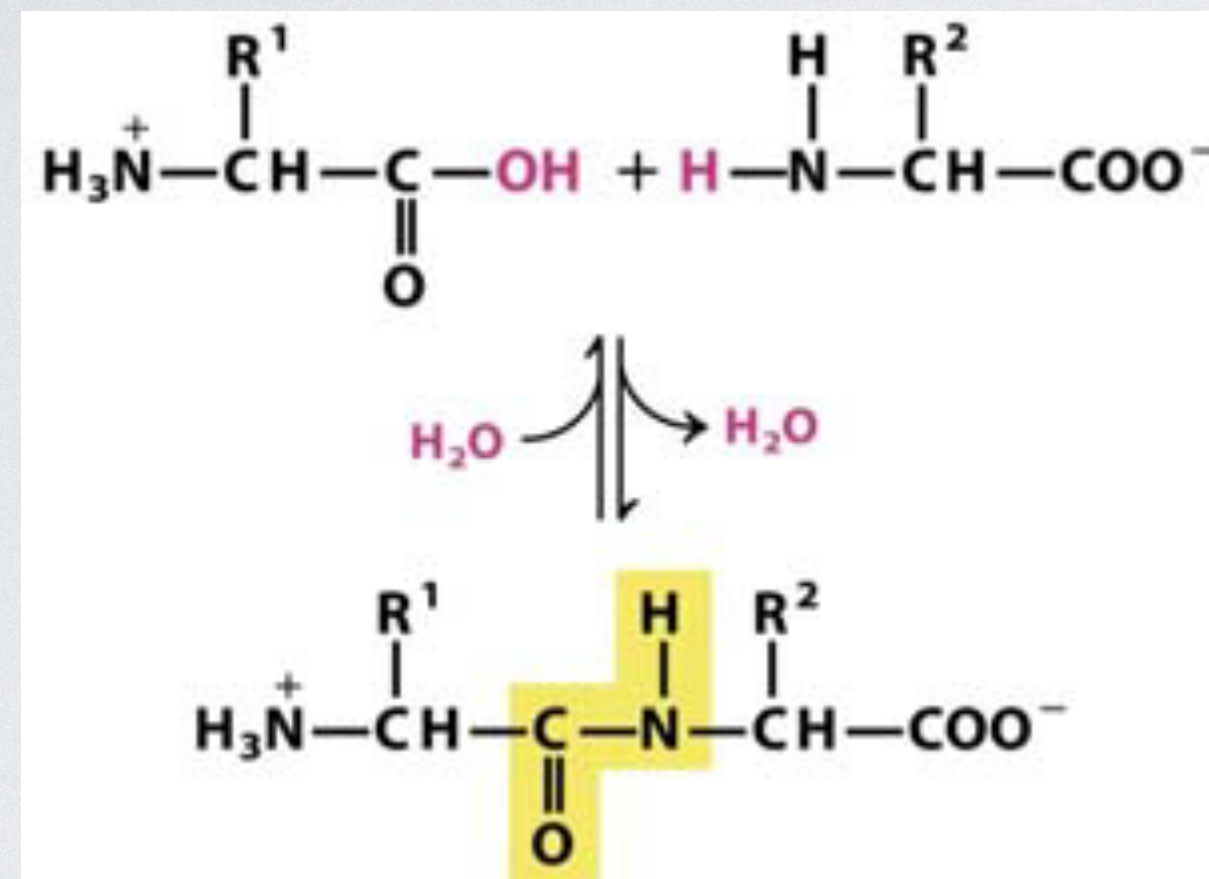
Arginina (R)  
Arg



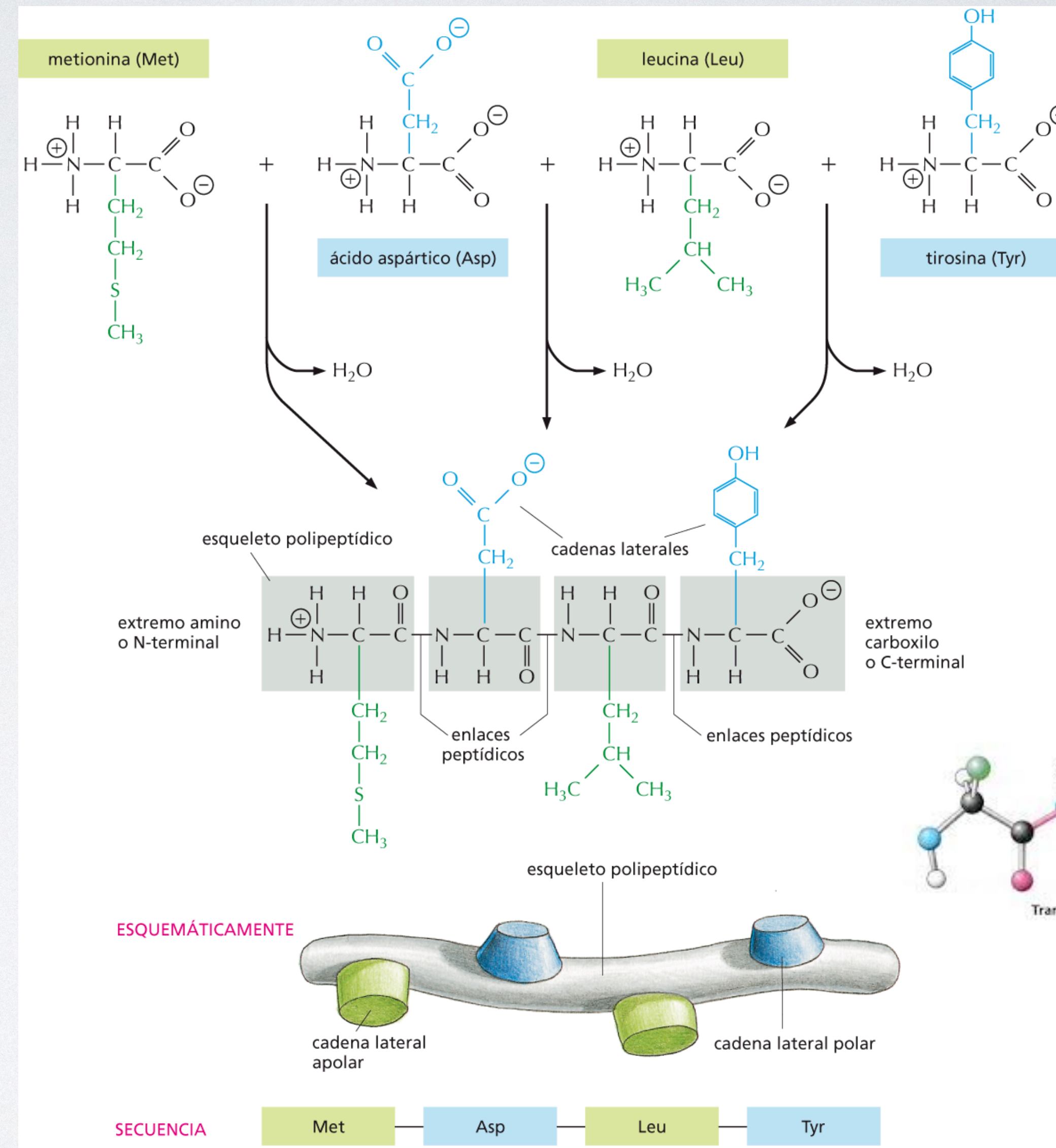
Histidina (H)  
His



# Enlace peptídico

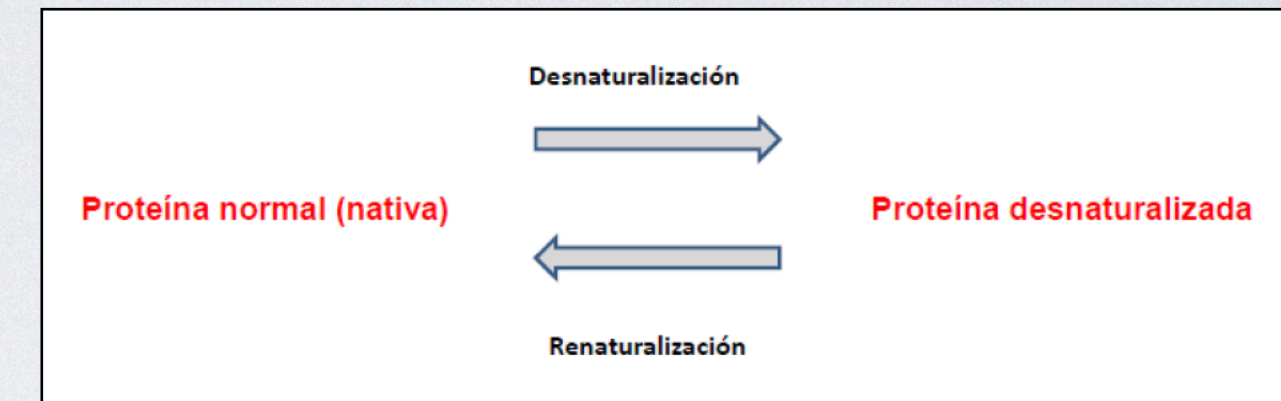
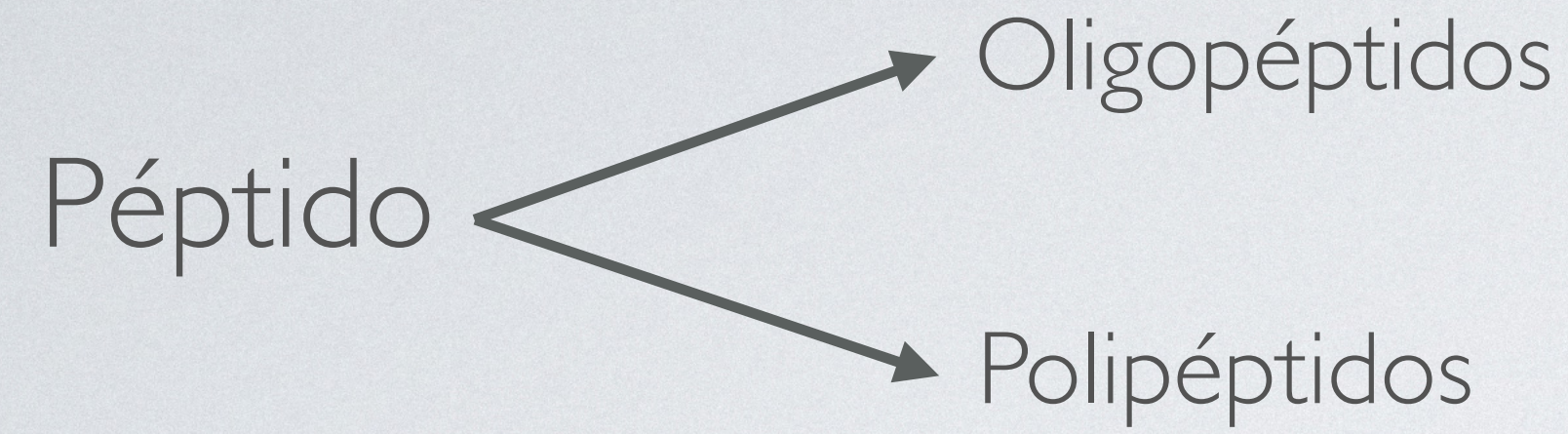


Nelson y Cox (2006). Lehninger principios de bioquímica. 4ª ed. Omega

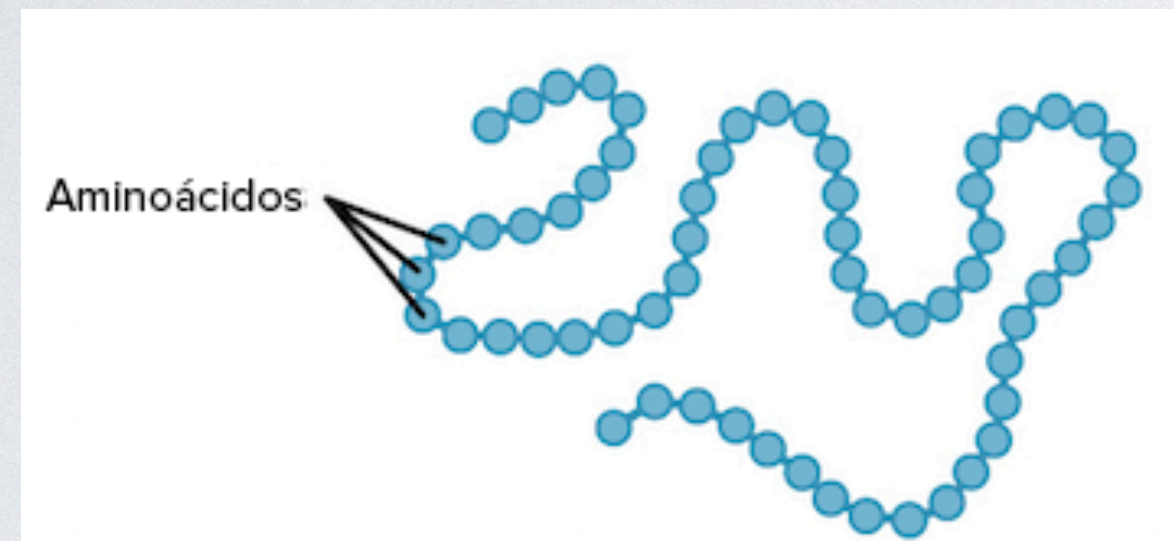




# Proteínas



Estructura primaria



Estructura secundaria



Estructura terciaria



Estructura cuaternaria



National Human Genome Research Institute

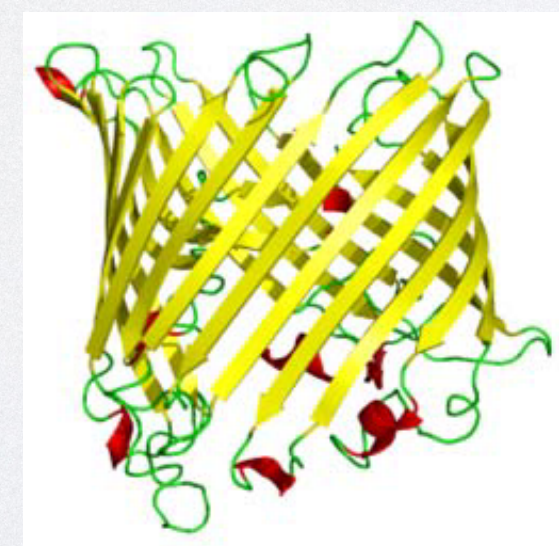
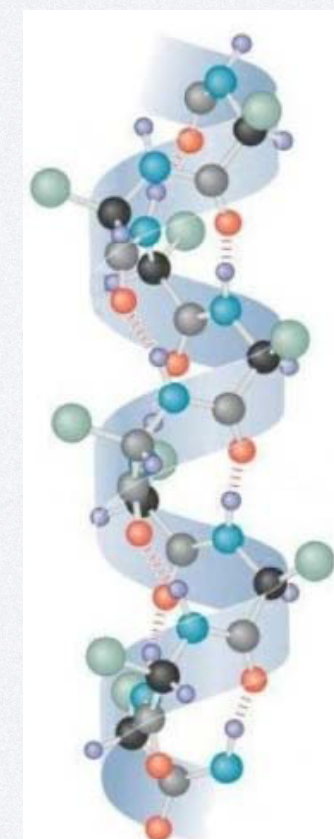


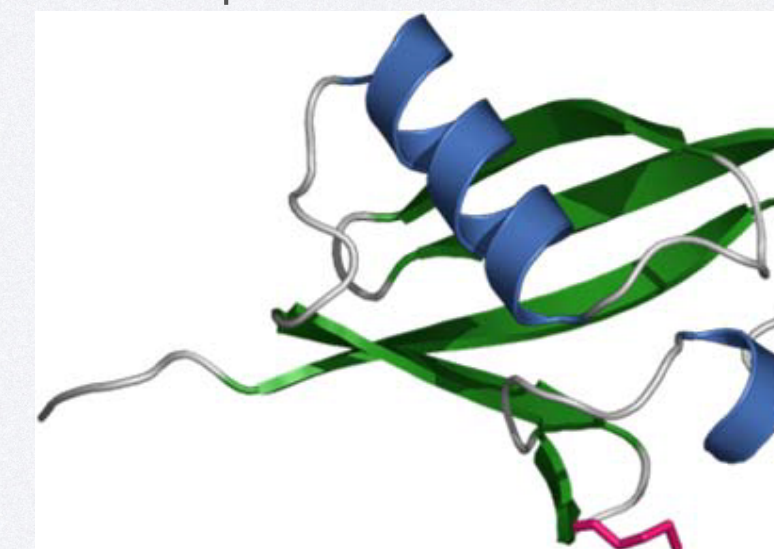
Lámina beta

National Institutes of Health.

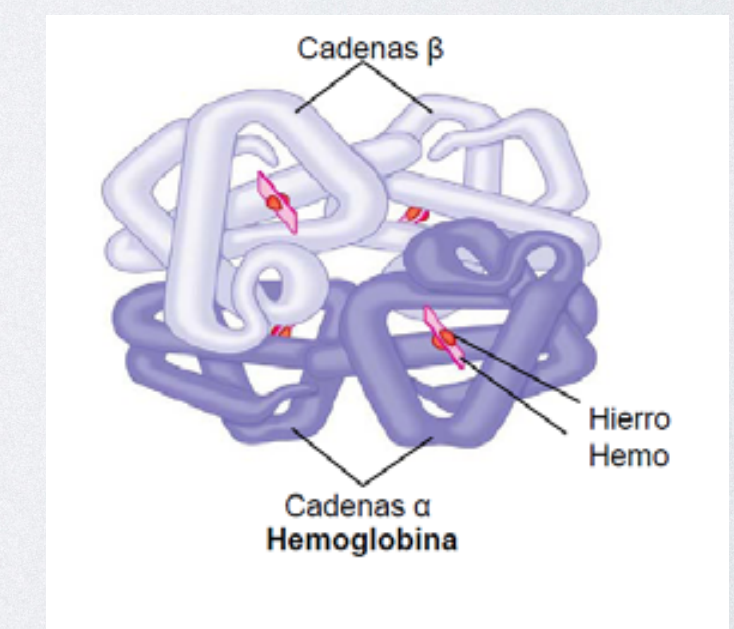


Hélice alfa

Ubiquitina



Hemoglobina

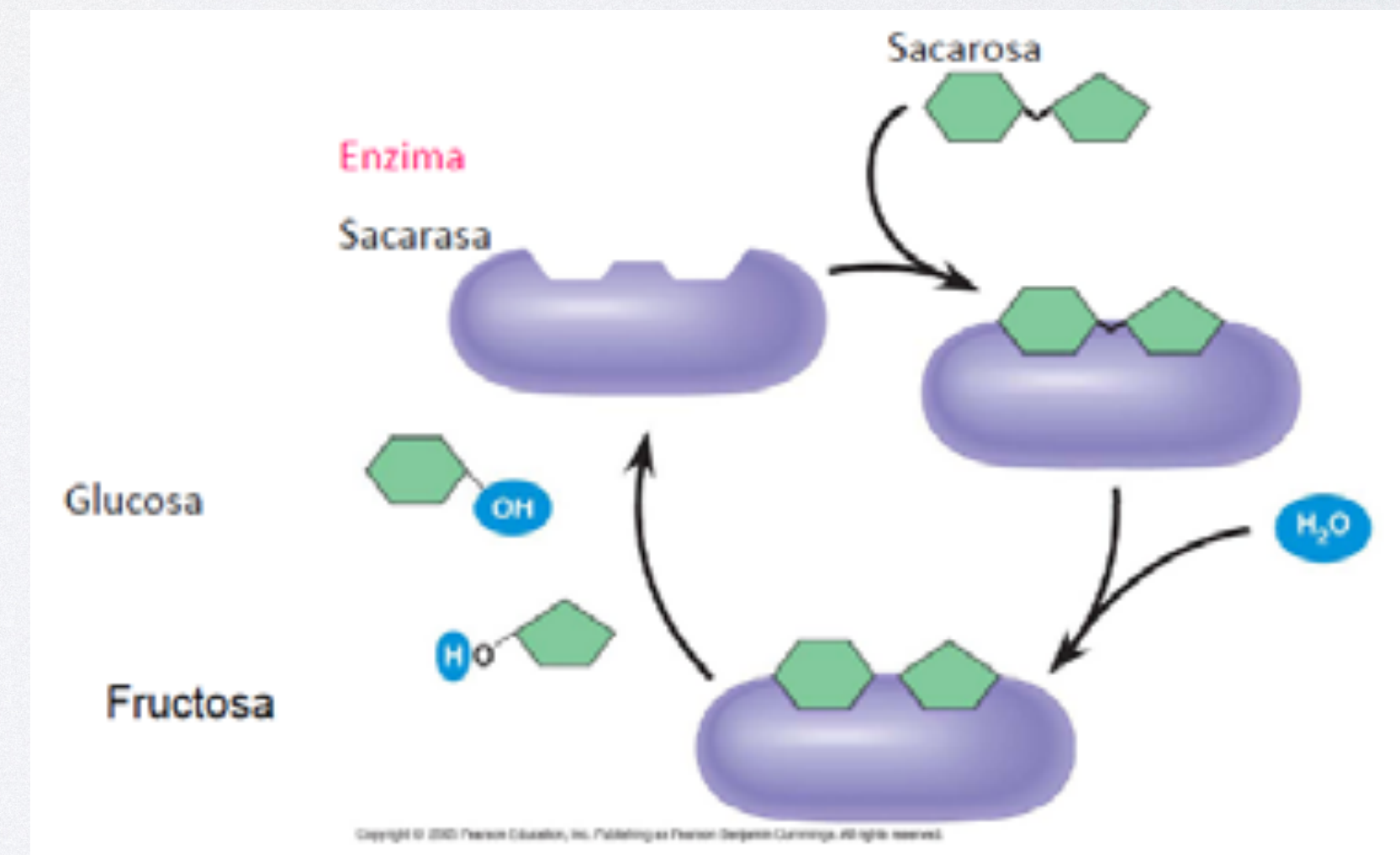
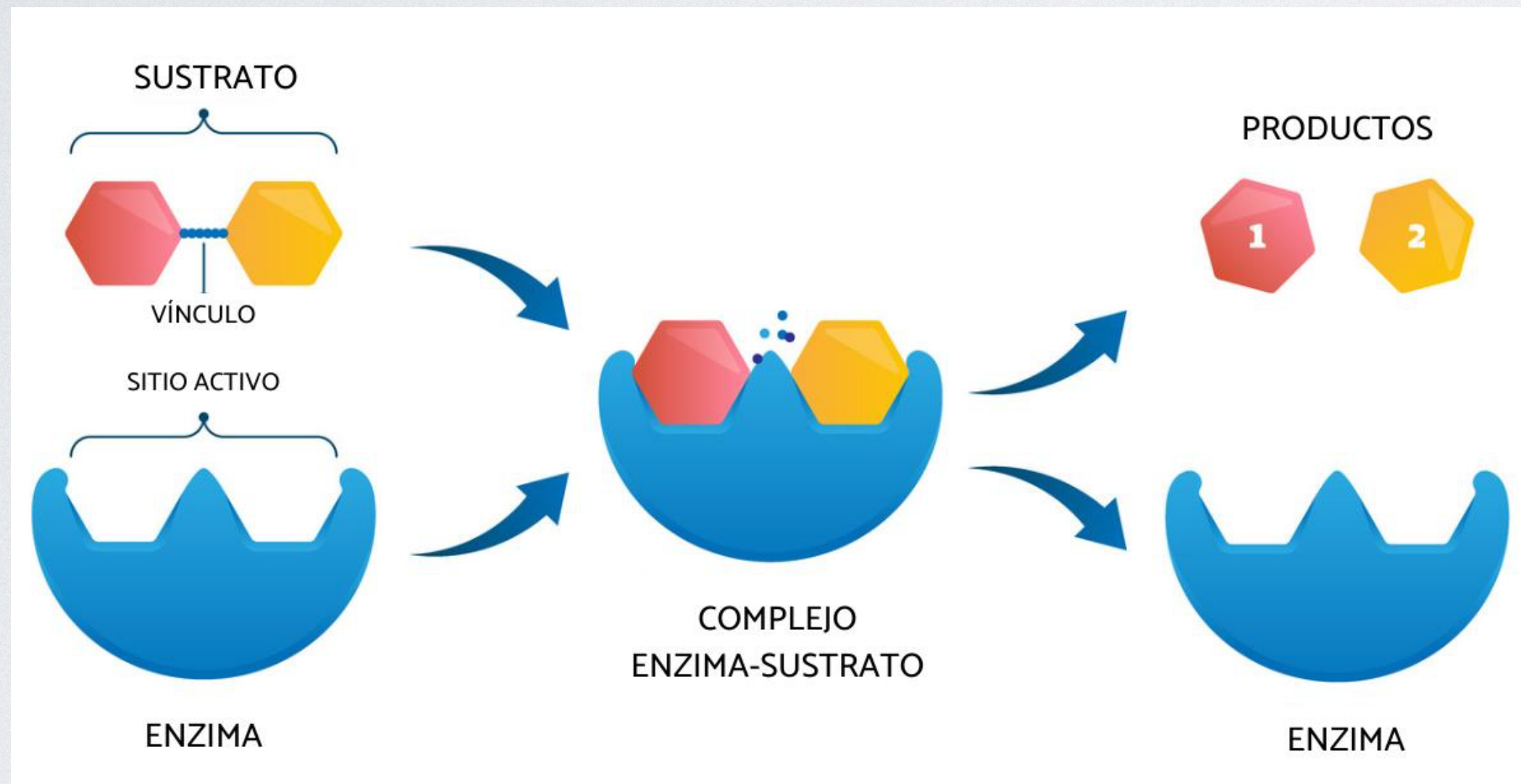


Campbell y Reece (2007) Biología. 7ª ed. Médica Panamericana.



### Encima

- Catalizadores biológicos
- Proteínas (excepto ribocimas)
- Centro activo

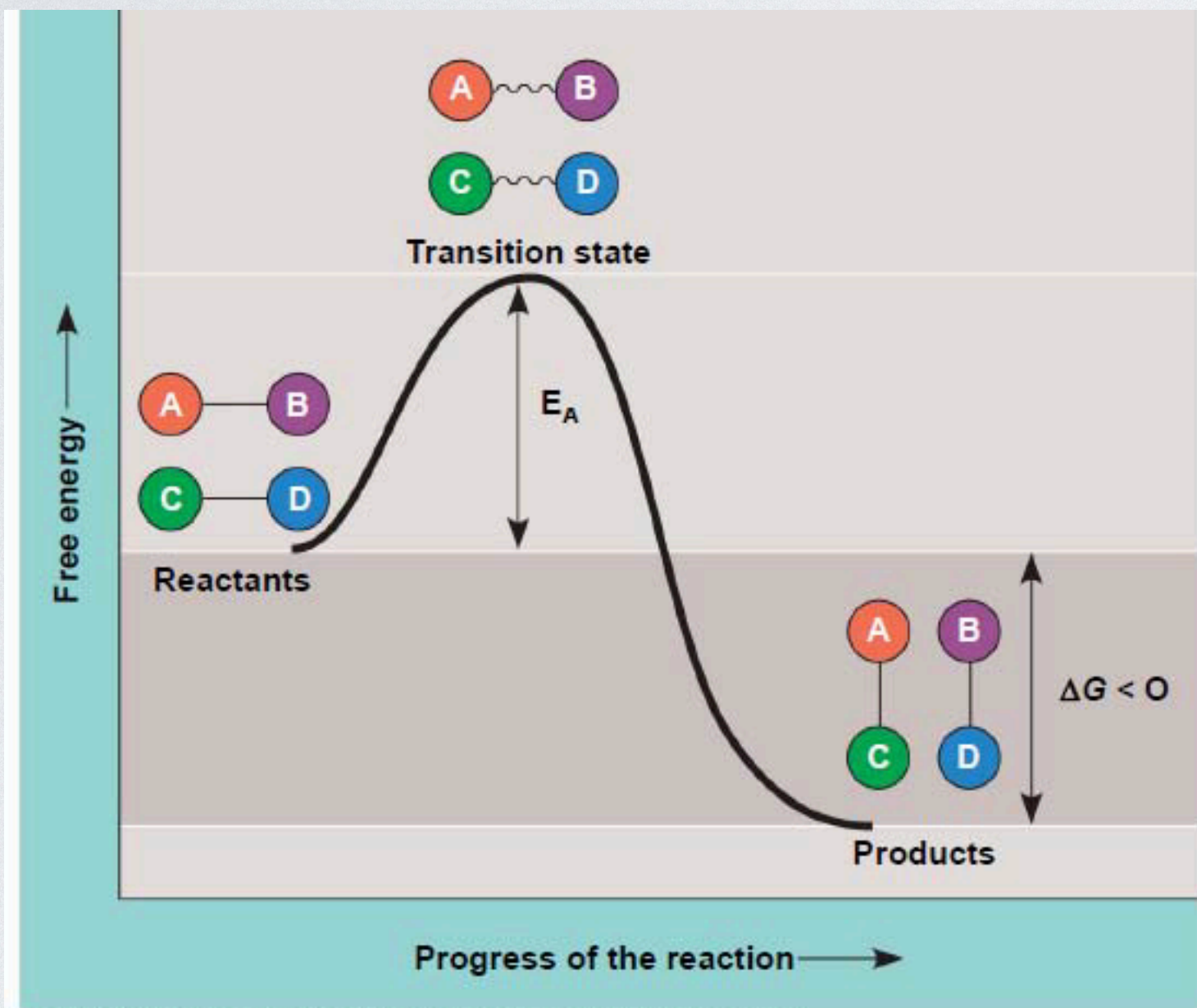




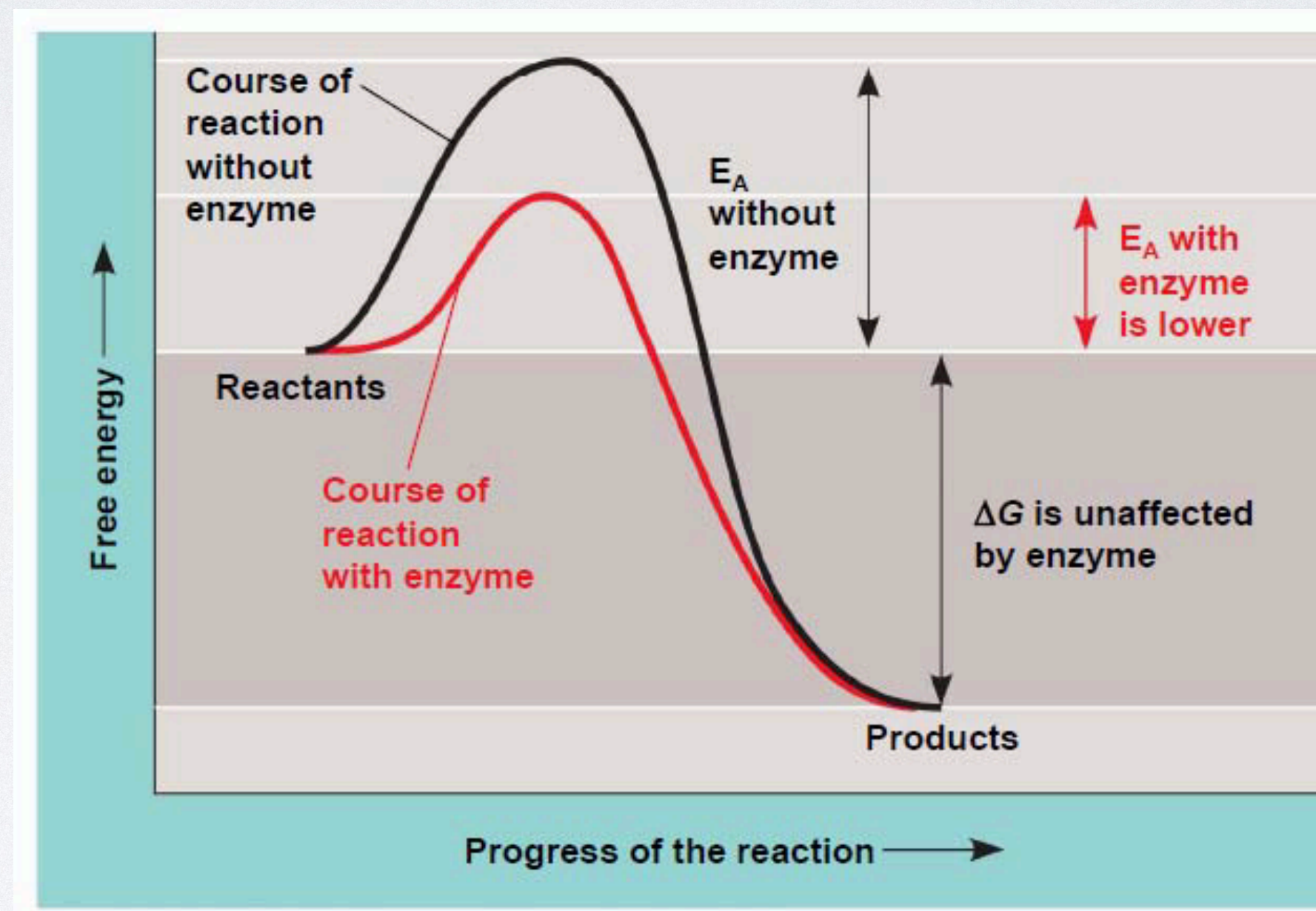
# Proteínas

## Tema 2

### Encima



Copyright © 2005 Pearson Education, Inc. Publishing as Pearson Benjamin Cummings. All rights reserved.



Copyright © 2005 Pearson Education, Inc. Publishing as Pearson Benjamin Cummings. All rights reserved.

$E_A$ : enerxía de activación

$\Delta G$ : enerxía libre

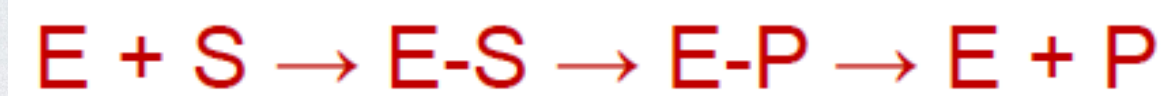
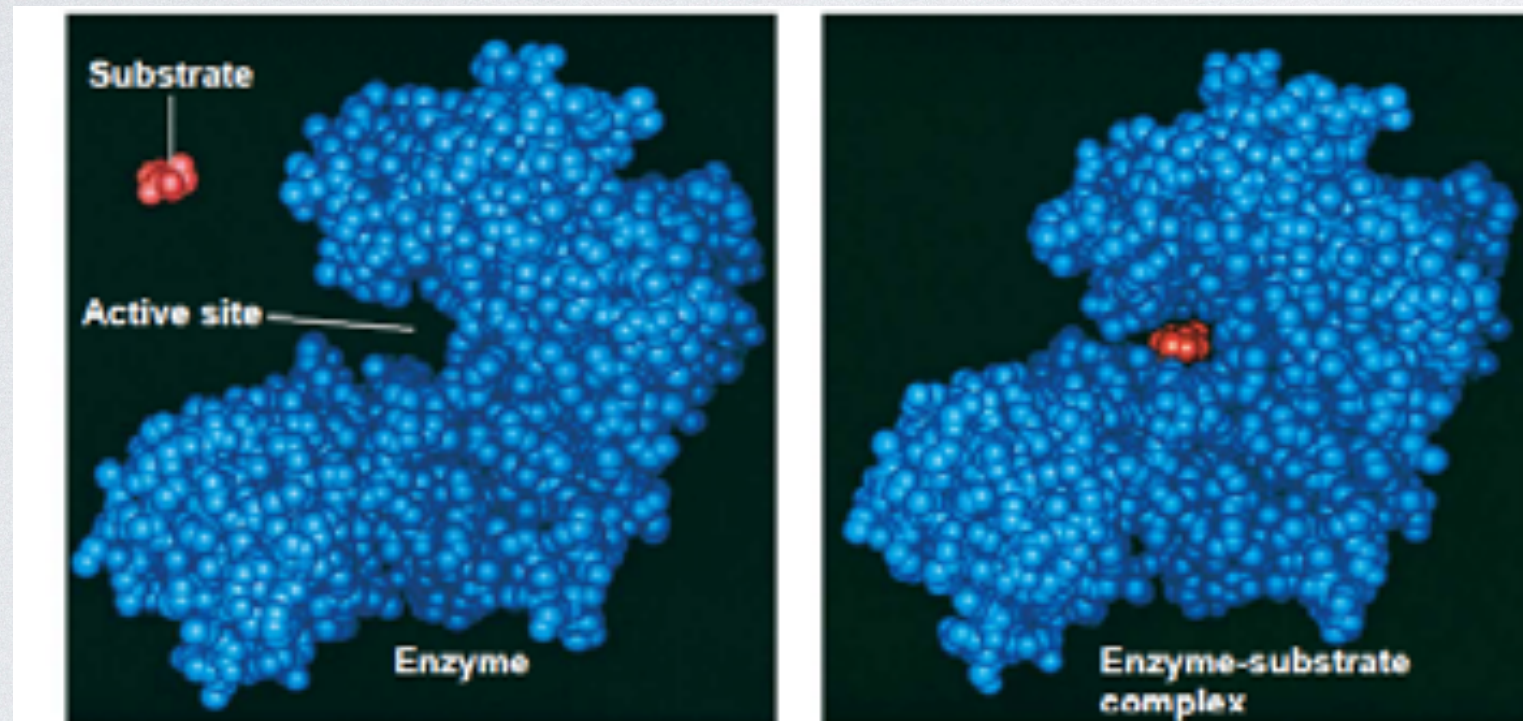


# Proteínas

## Encima

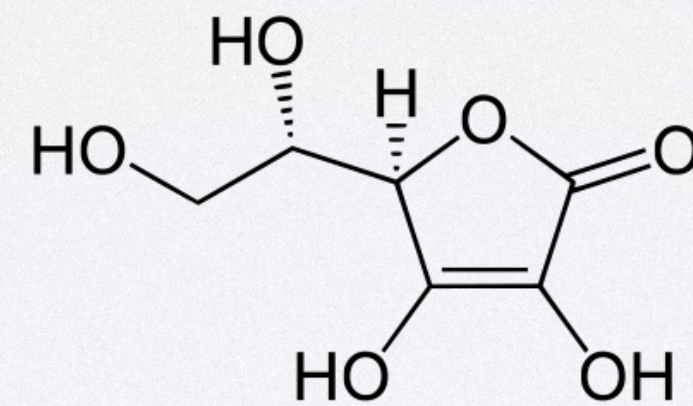
### Complexo E-S

#### Modelo de axuste inducido



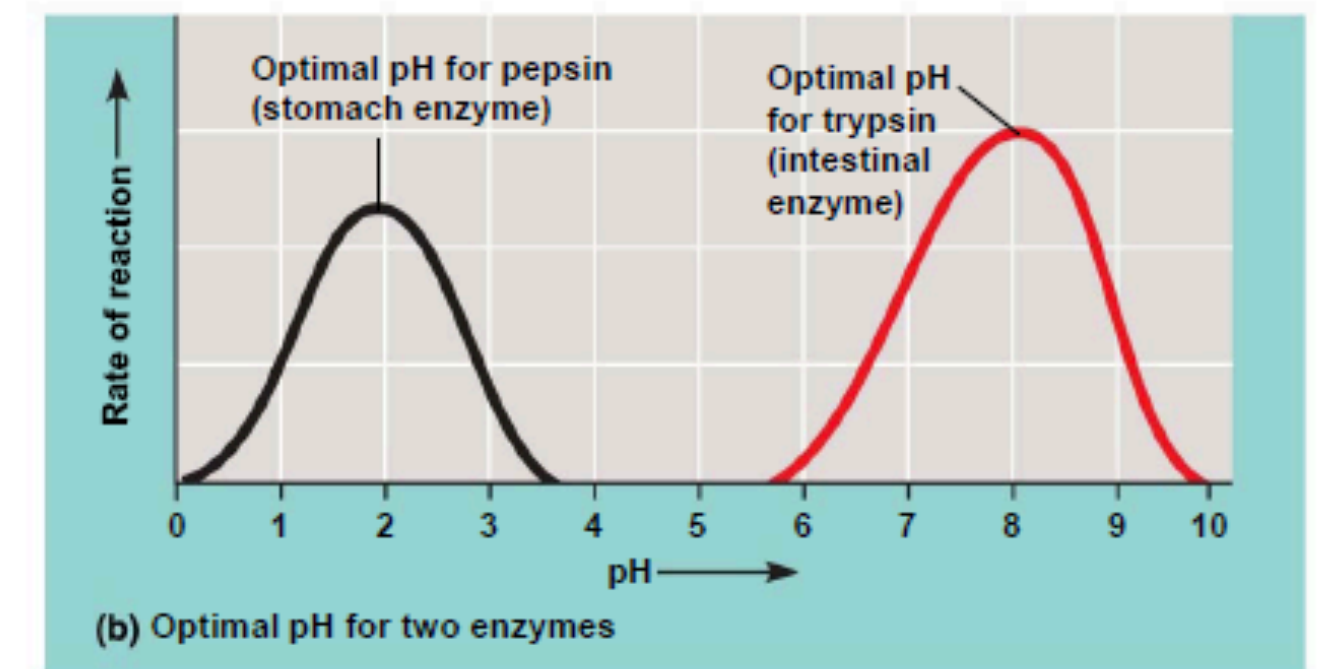
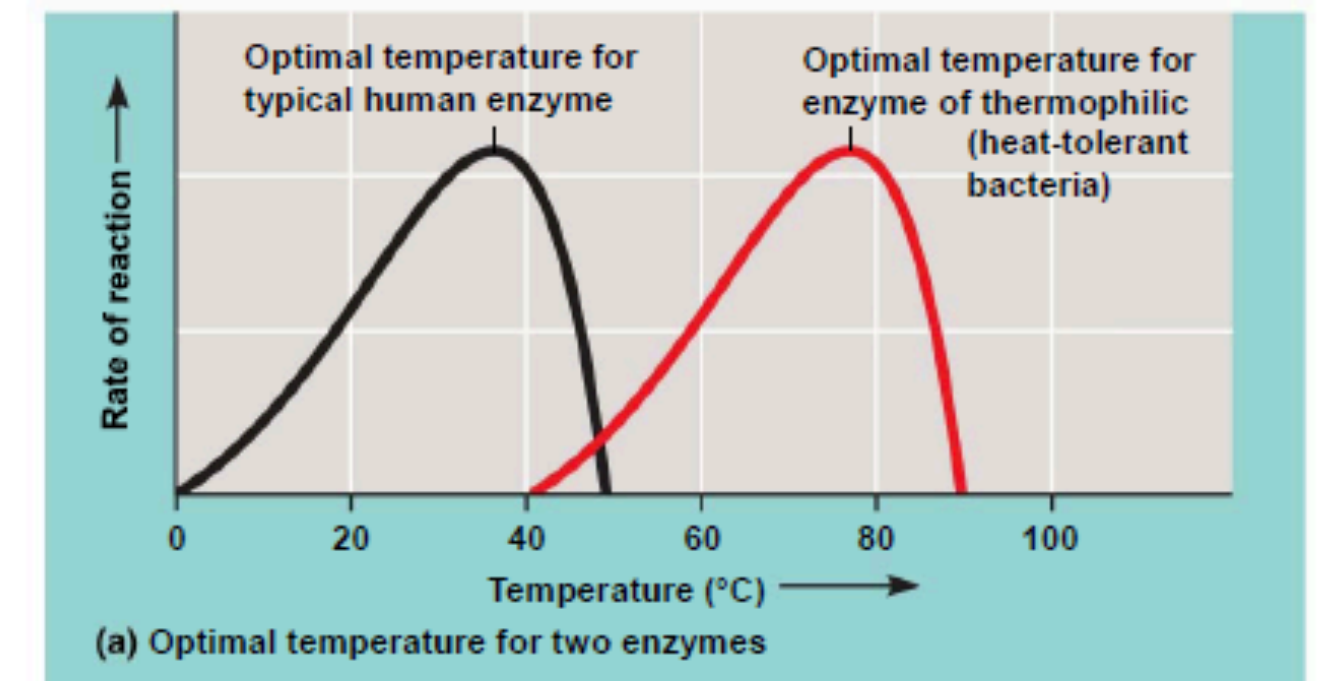
### Cofactores encimáticos

- Ións inorgánicos
- Coencimas (vitamina B, C, D)



Vitamina C

### Factores ambientais



Copyright © 2005 Pearson Education, Inc. Publishing as Pearson Benjamin Cummings. All rights reserved.



## Proteínas

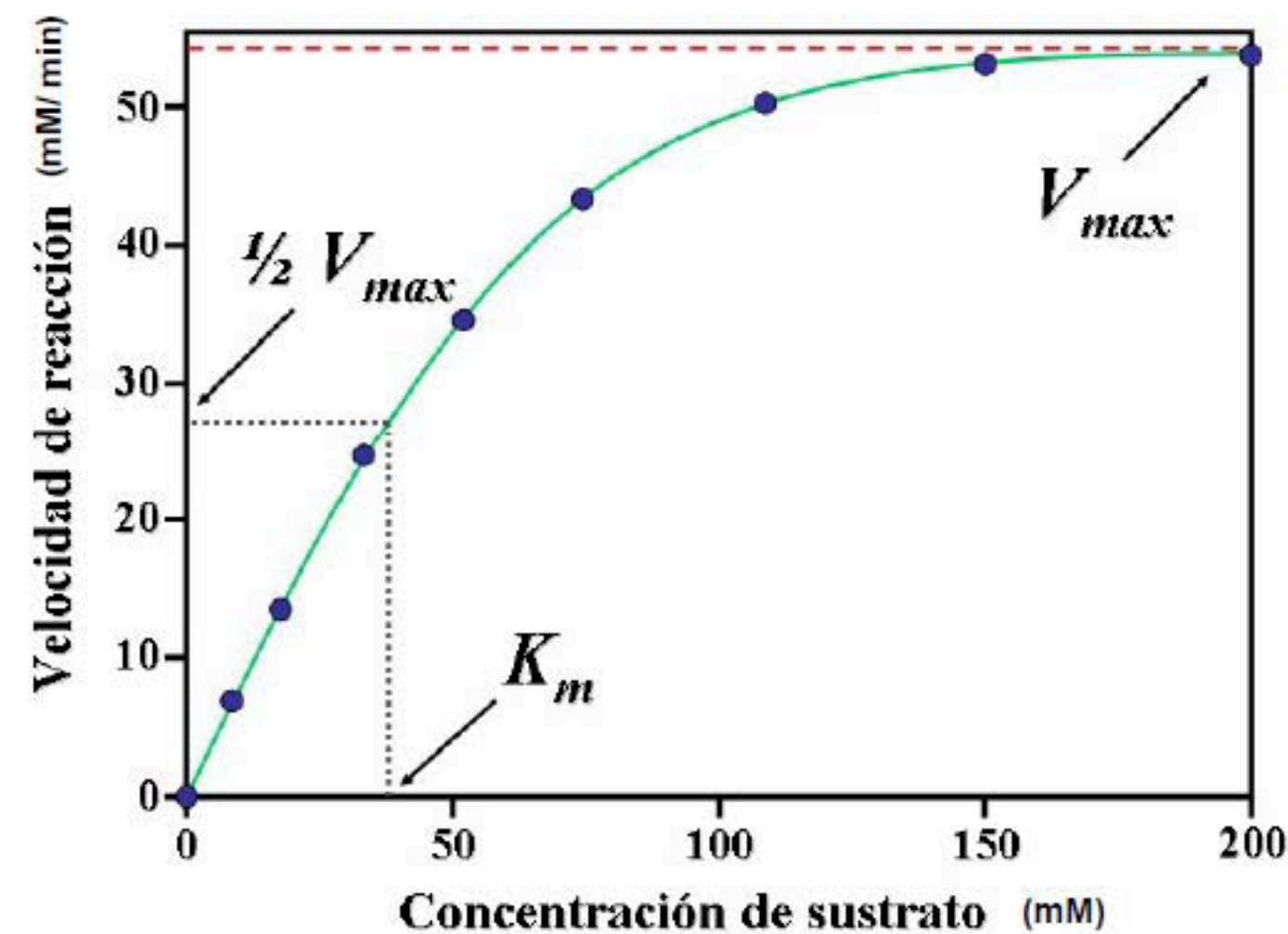
### Encima

### Cinética encimática

### Cinética micalina

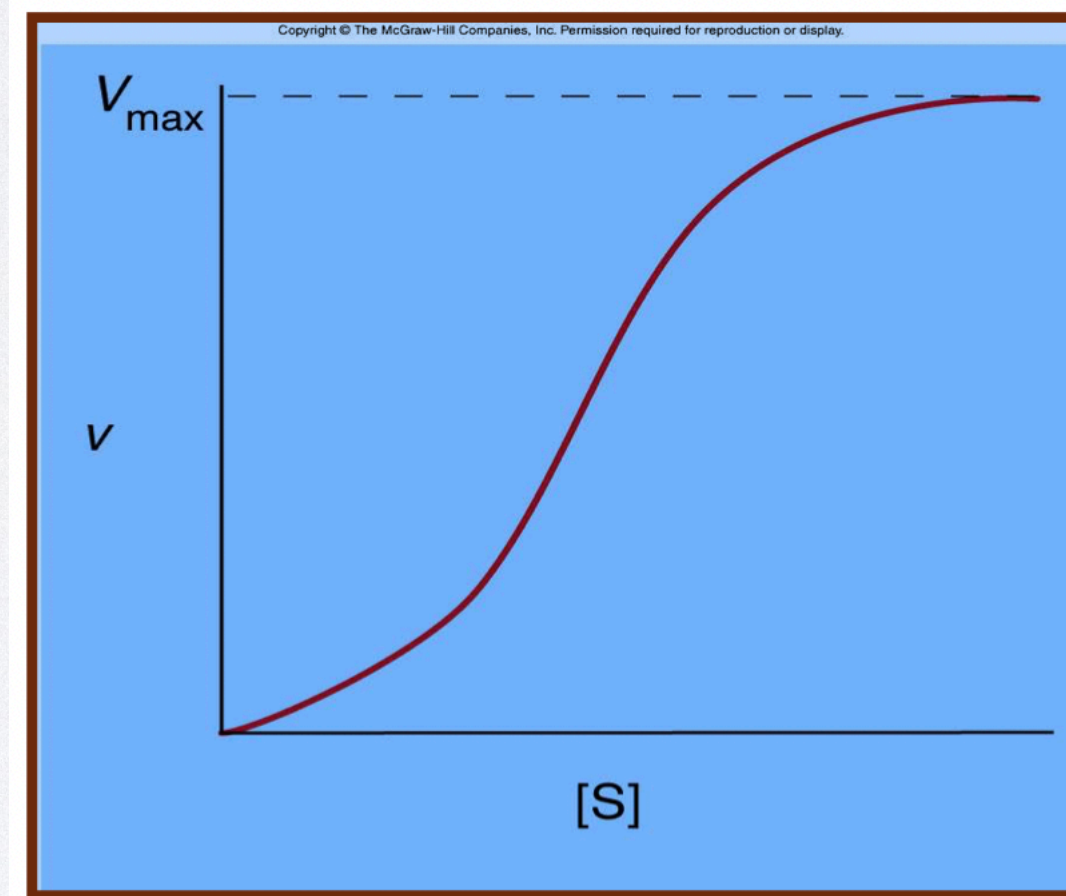
Ecuación de Michaelis-Menten

$$V_0 = \frac{V_{max} [S]}{K_m + [S]}$$



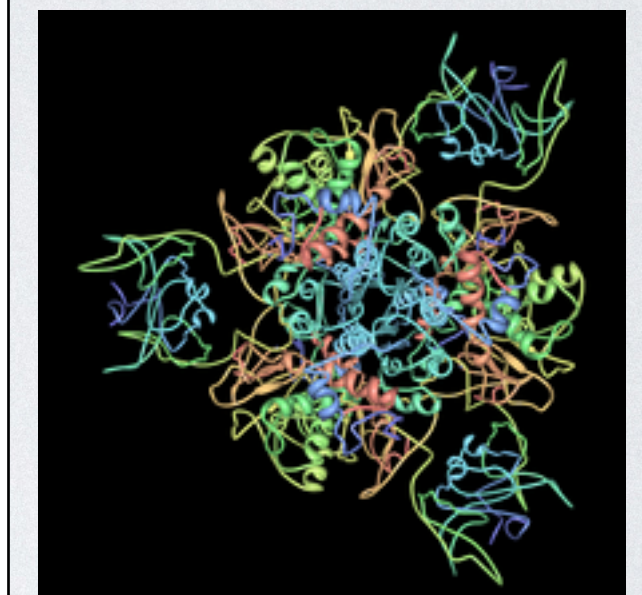
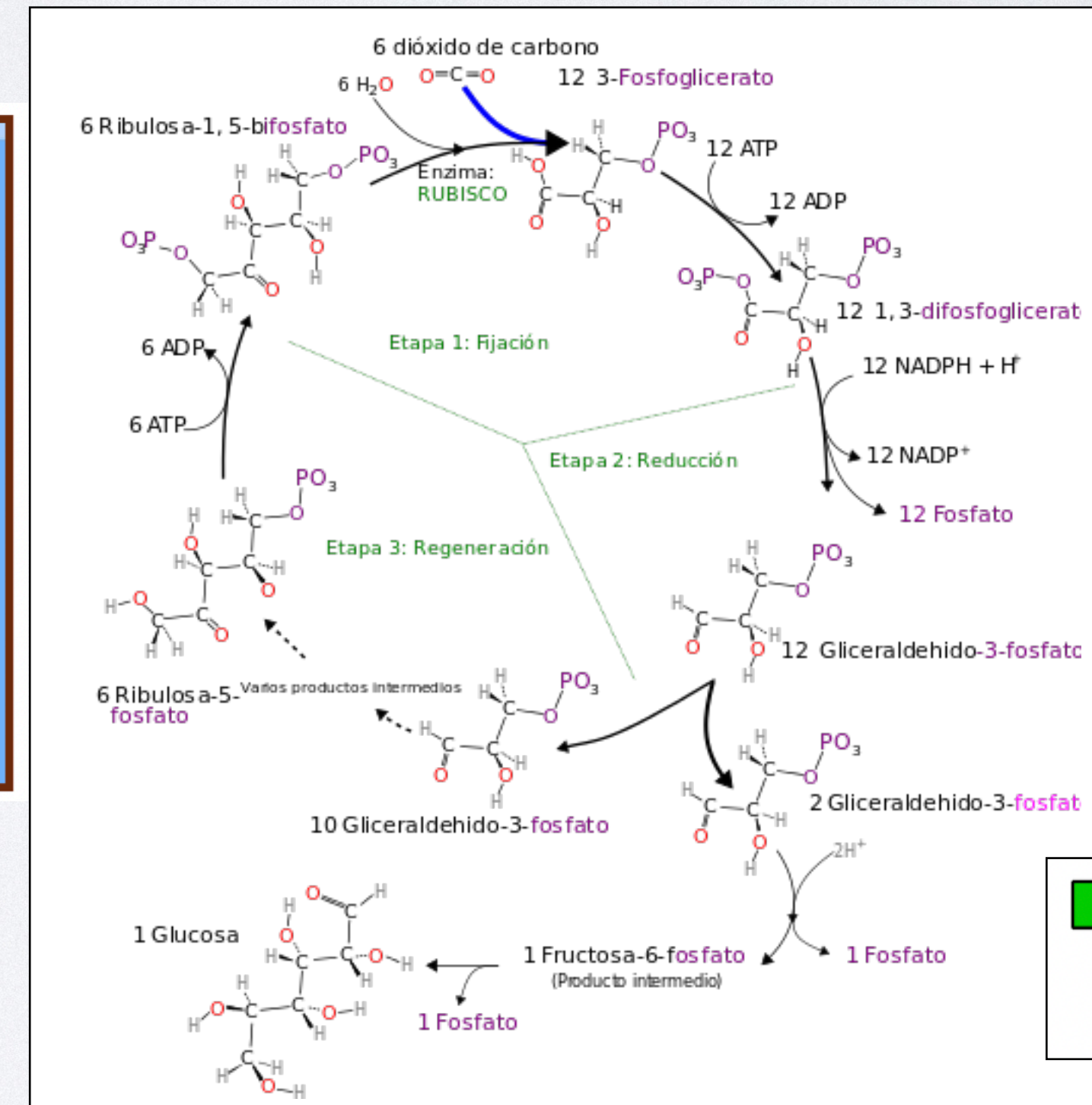
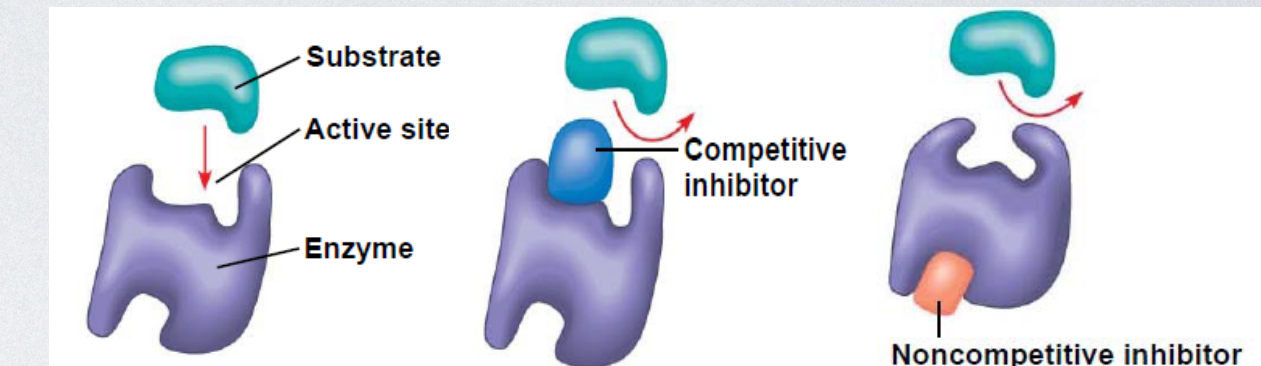
Constante de especificidade =  $K_{cat} / K_M$

### Cinética alostérica

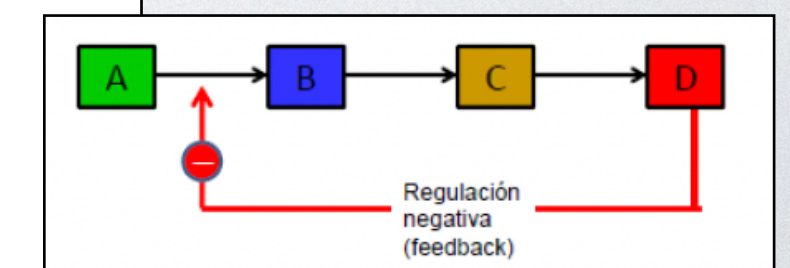


### Inhibición encimática

- Reversible
- Irreversible

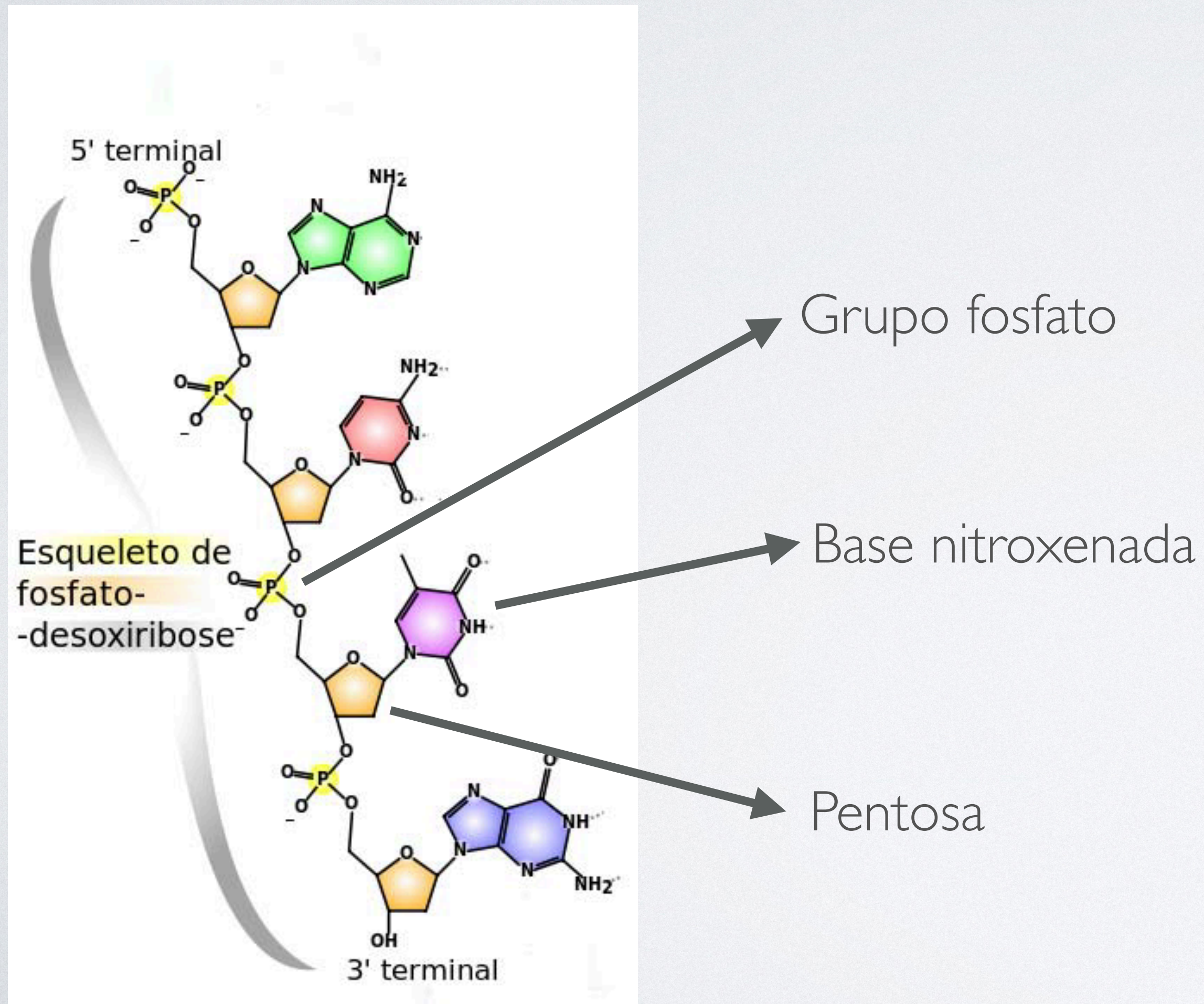
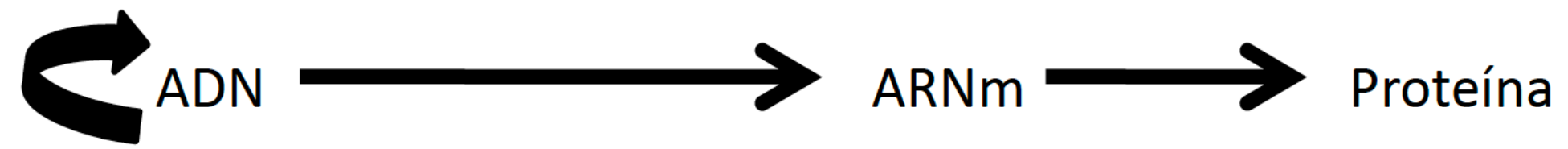


Aspartato carbamoiltransferasa

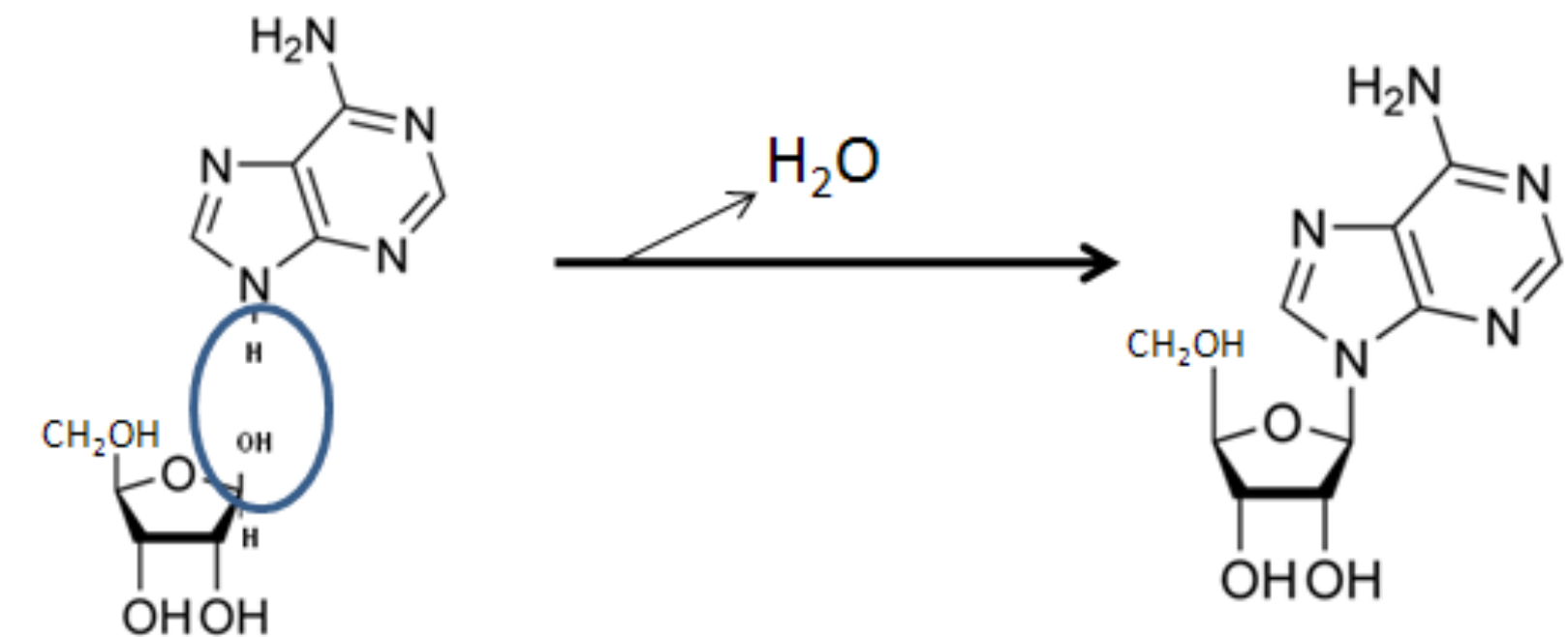




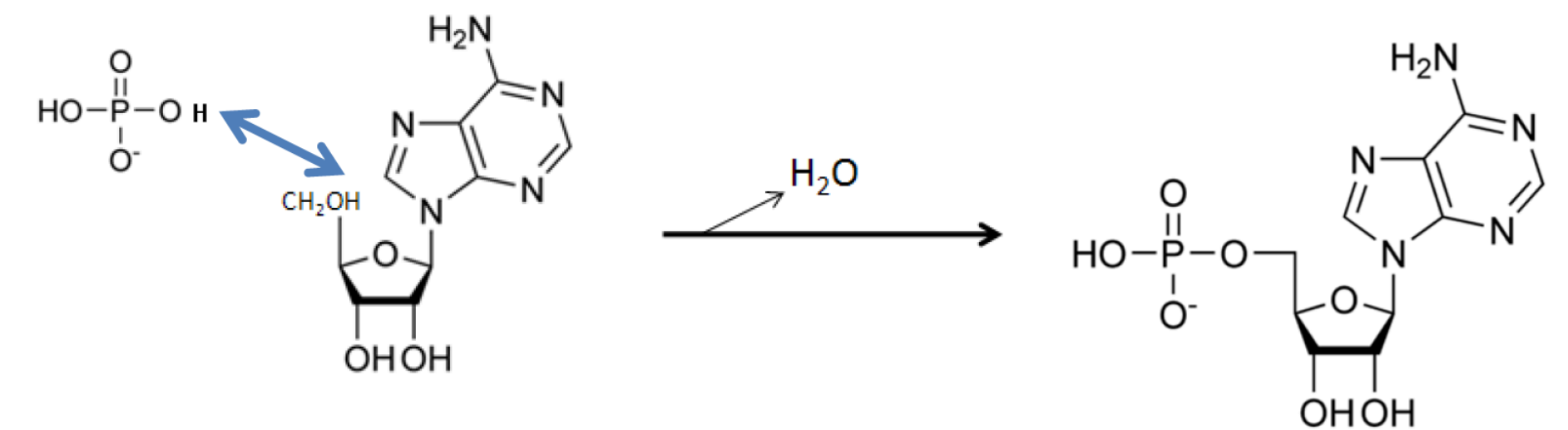
# Ácidos nucleicos



Base nitroxenada + pentosa = nucleósido



Base nitroxenada + pentosa + ác. fosfórico = nucleótido

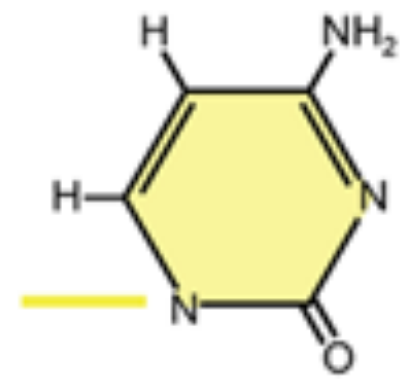




# Ácidos nucleicos

## Bases nitroxenadas

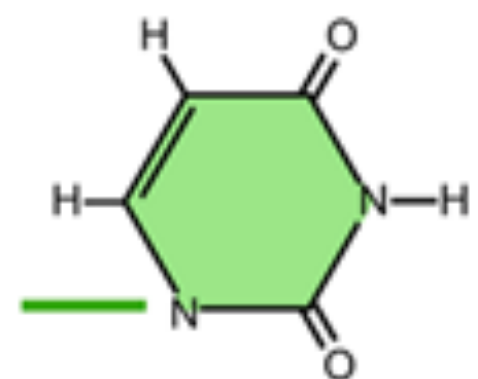
### Pirimidinas



Citosina: C



Timina: T



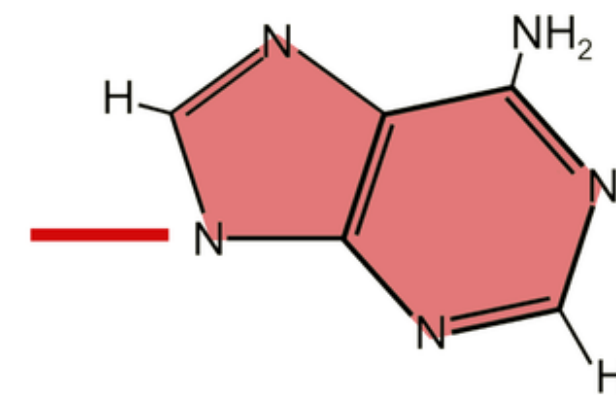
Uracilo: U

Presentes en AND e ARN

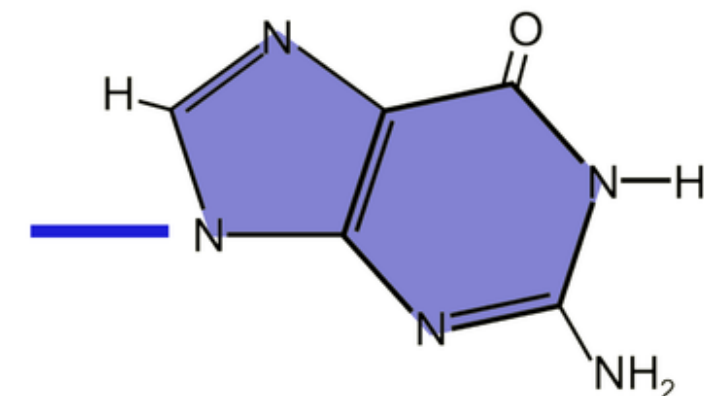
Presentes en ADN

Presentes en ARN

### Purinas



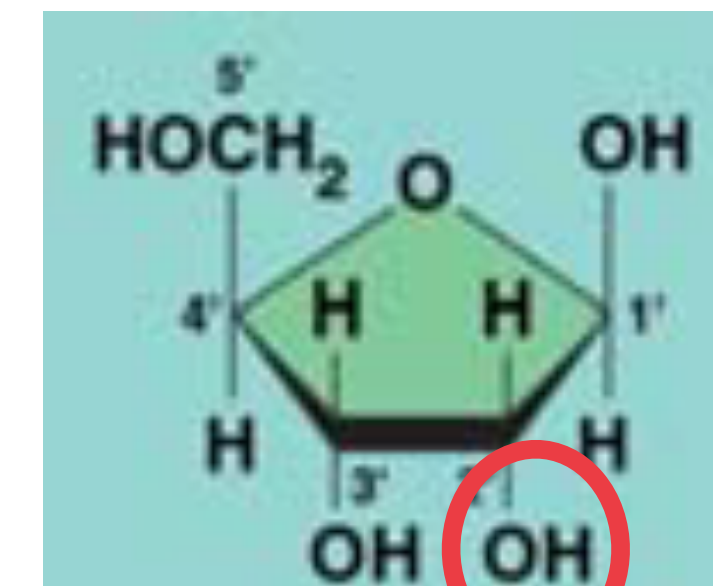
Adenina: A



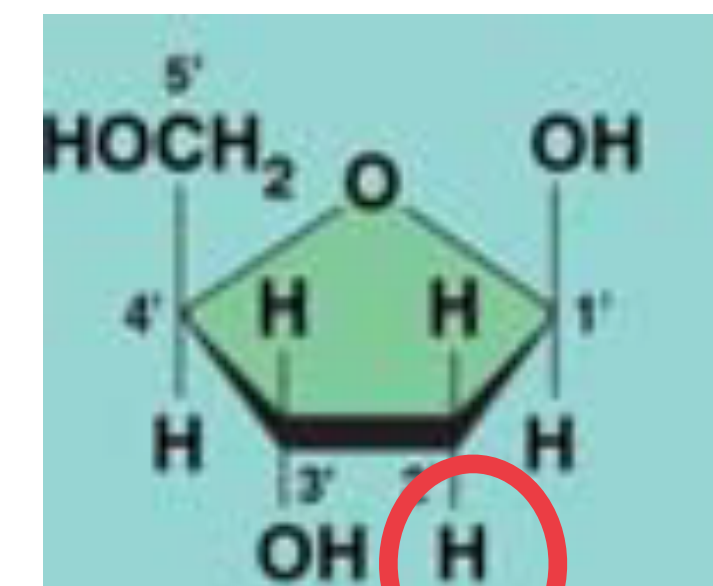
Guanina: G

## Pentosas

### Ribosa



### Desoxirribosa





# Ácidos nucleicos

## Nomenclatura

| Base         | Ribonucleósido | Desoxirribonucleósido |
|--------------|----------------|-----------------------|
| Adenina (A)  | Adenosina      | Desoxiadenosina       |
| Guanina (G)  | Guanosina      | Desoxiguanosina       |
| Citosina (C) | Citidina       | Desoxicitidina        |
| Uracilo (U)  | Uridina        | Desoxiuridina         |
| Timina (T)   |                | Desoxitimidina        |

*BASE + AZÚCAR = NUCLEÓSIDO (ribonucleósido o desoxirribonucleósido)*

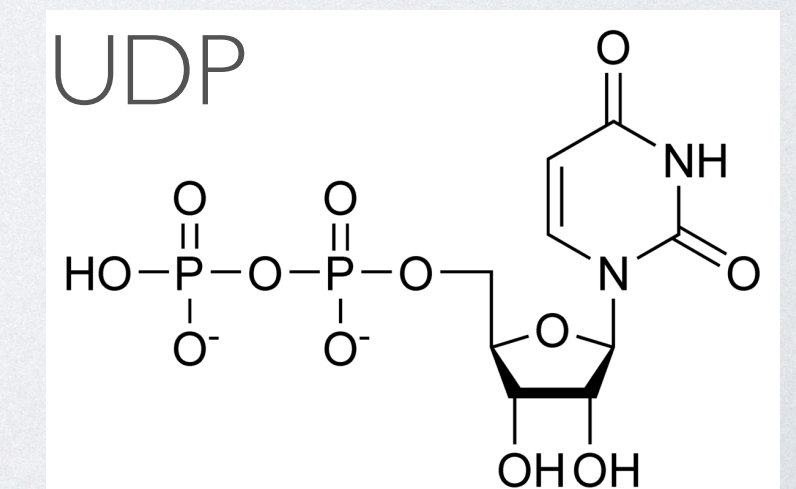
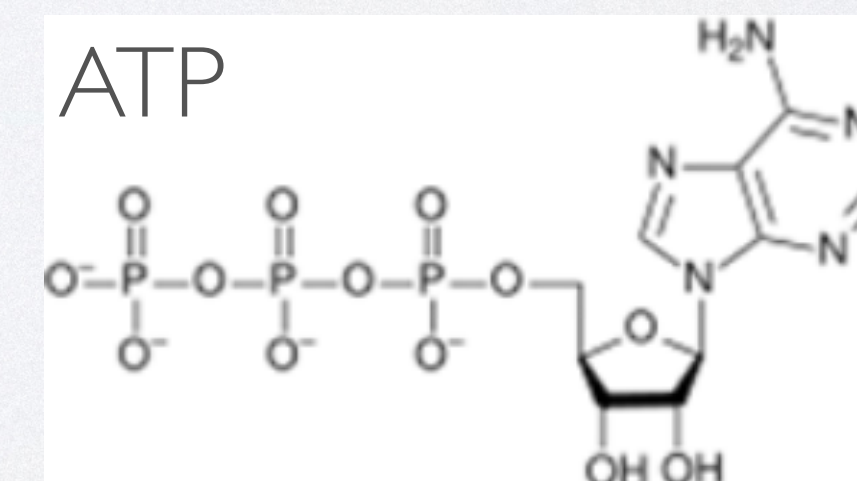
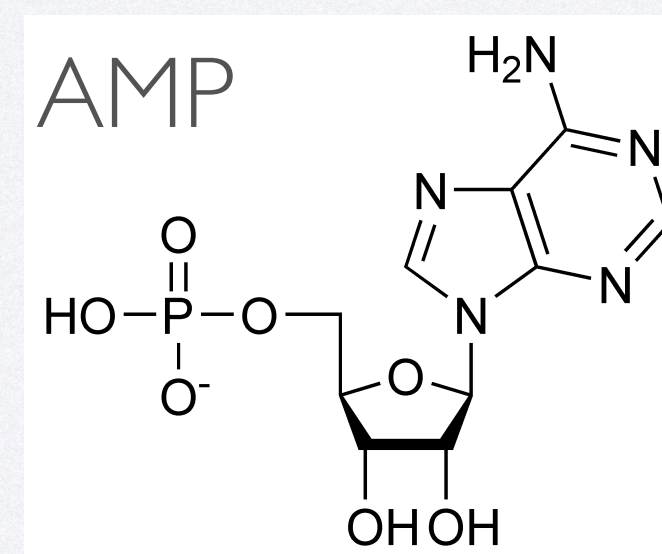
*BASE + AZÚCAR + FOSFATO = NUCLEÓTIDO (nucleósido monofosfato)*

*AMP = adenosina 5' monofosfato*

*dAMP = desoxiadenosina 5' monofosfato*

*UDP = uridina 5' difosfato (nucleosido difosfato)*

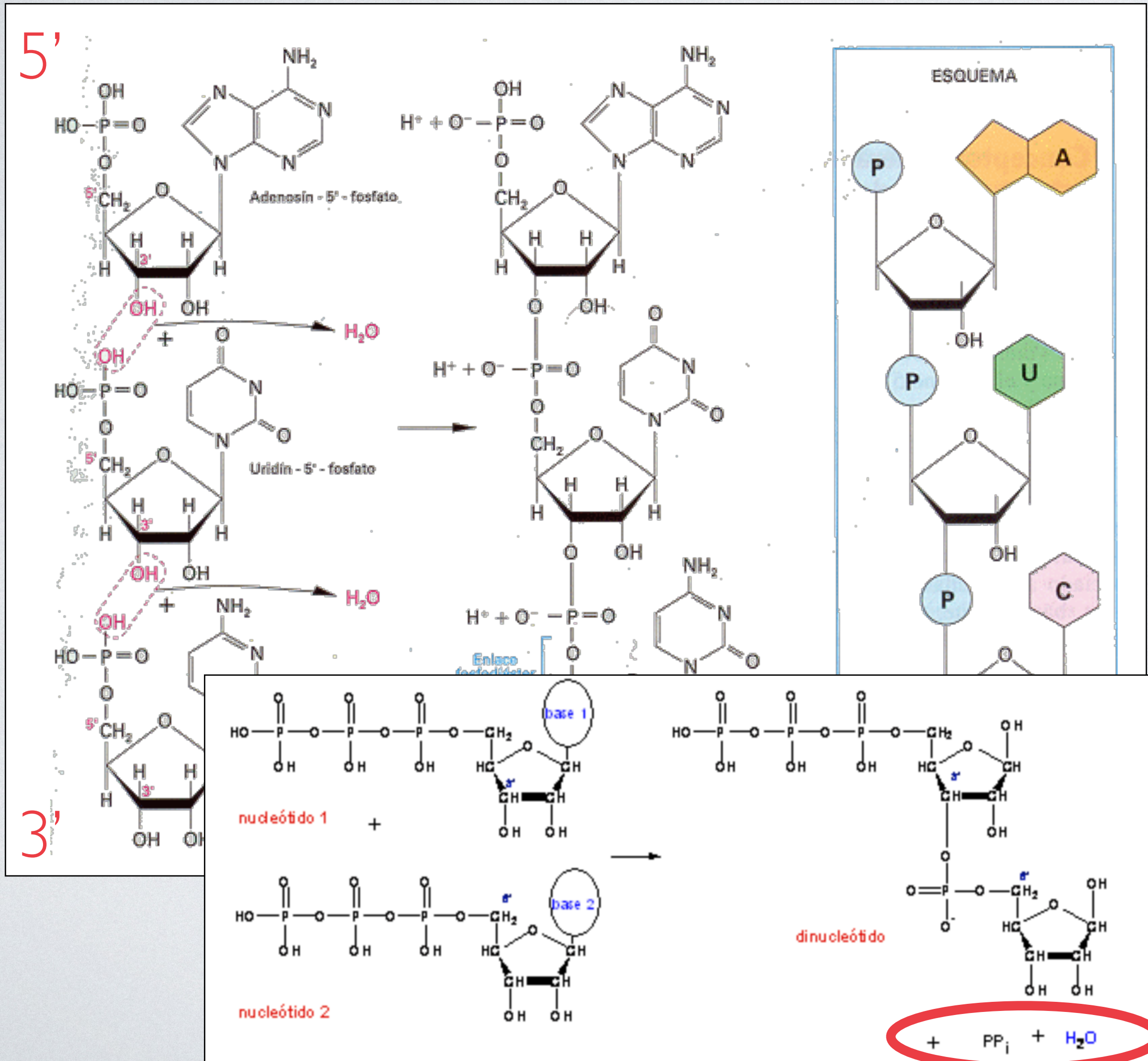
*ATP = adenosina 5' trifosfato (nucleósido trifosfato)*



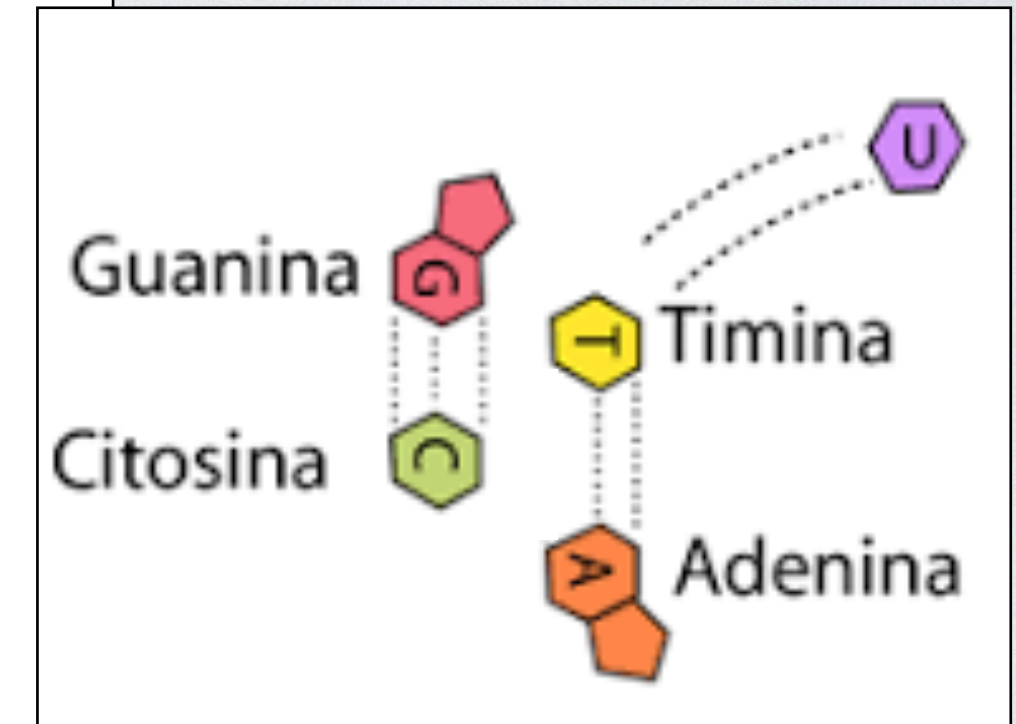
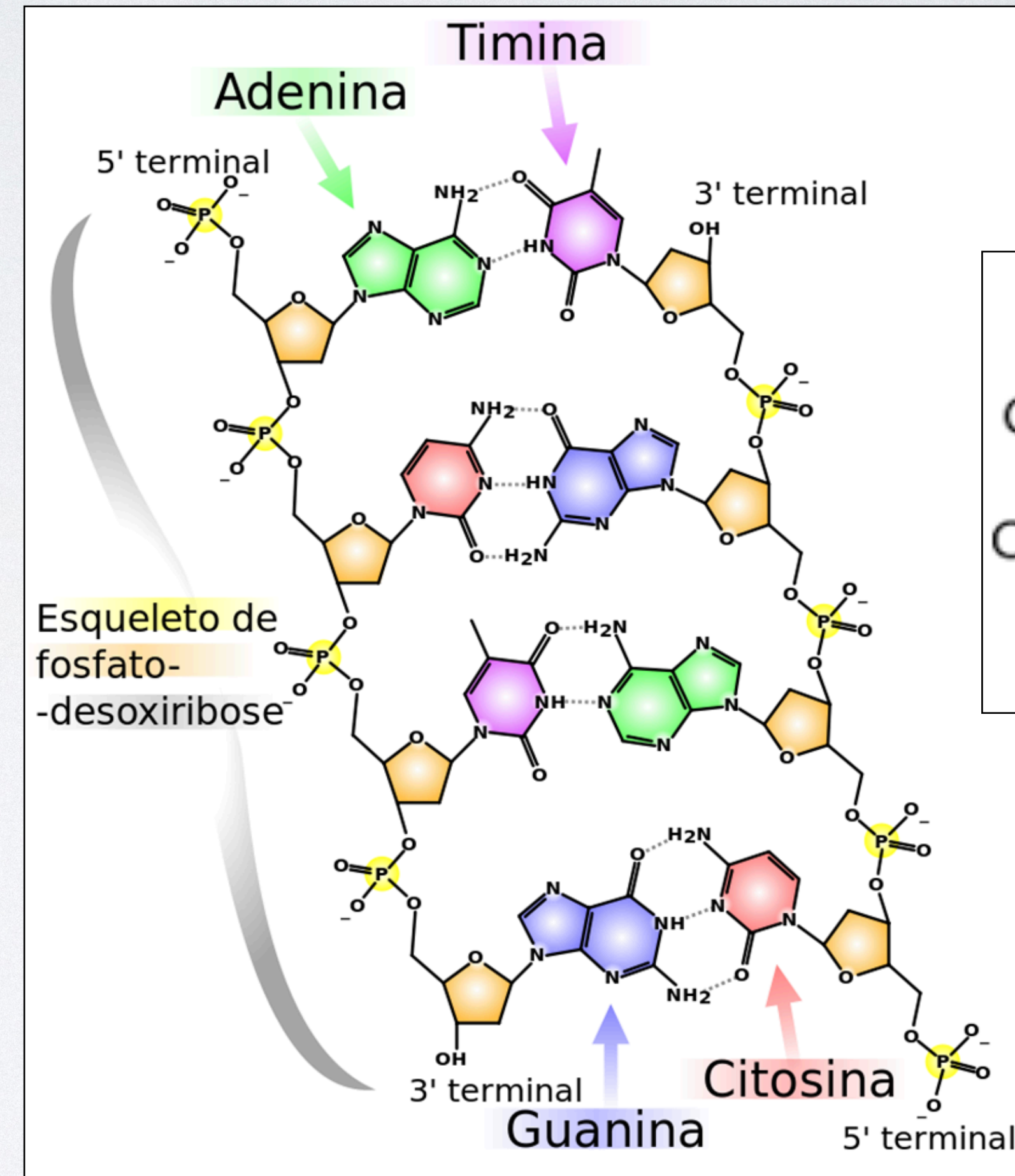


# Ácidos nucleicos

## Polimerización



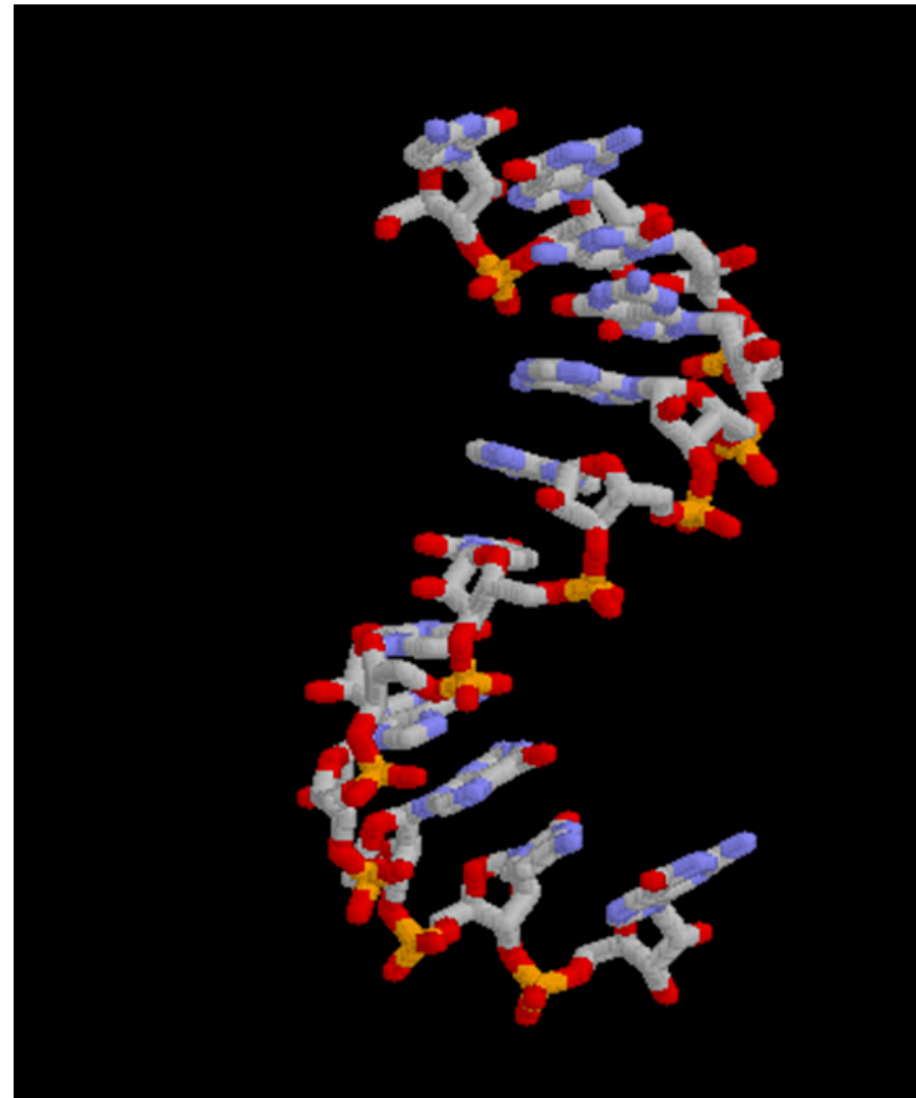
## Estrutura do DNA



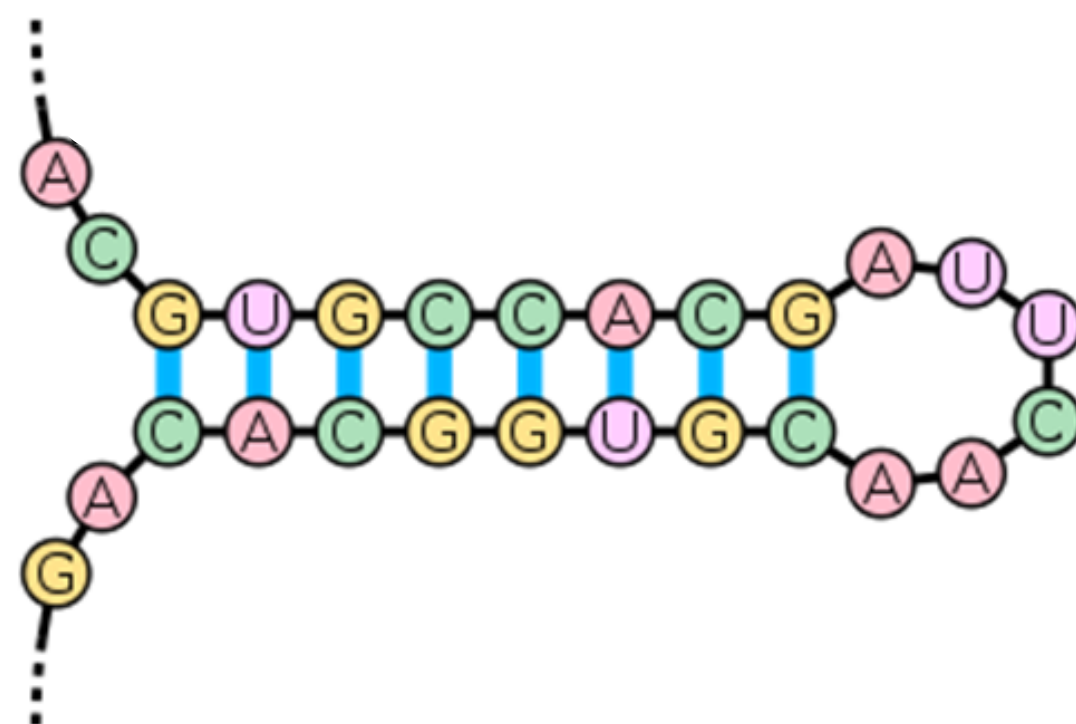


# Ácidos nucleicos

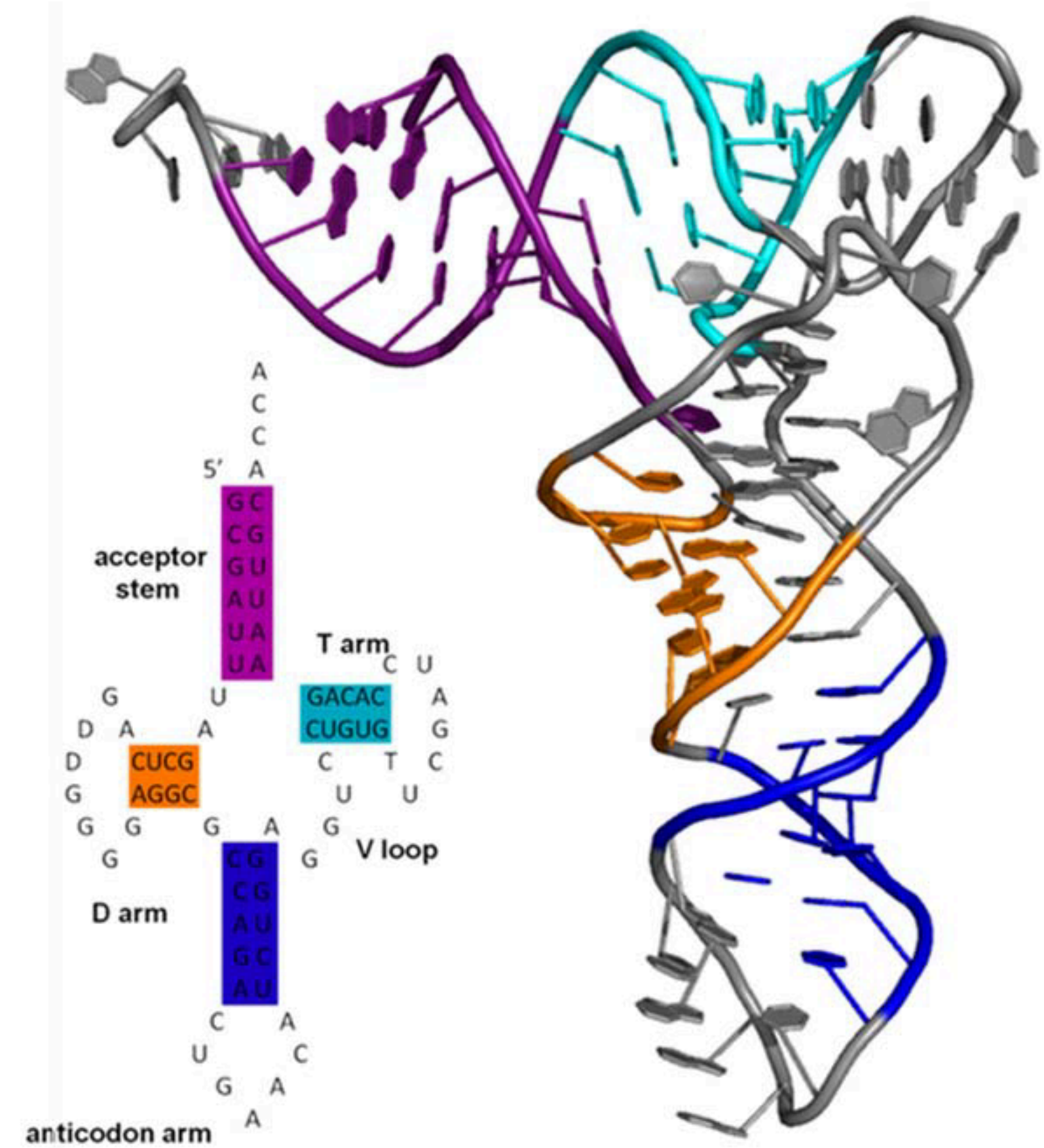
## Estrutura primaria



## Estrutura secundaria



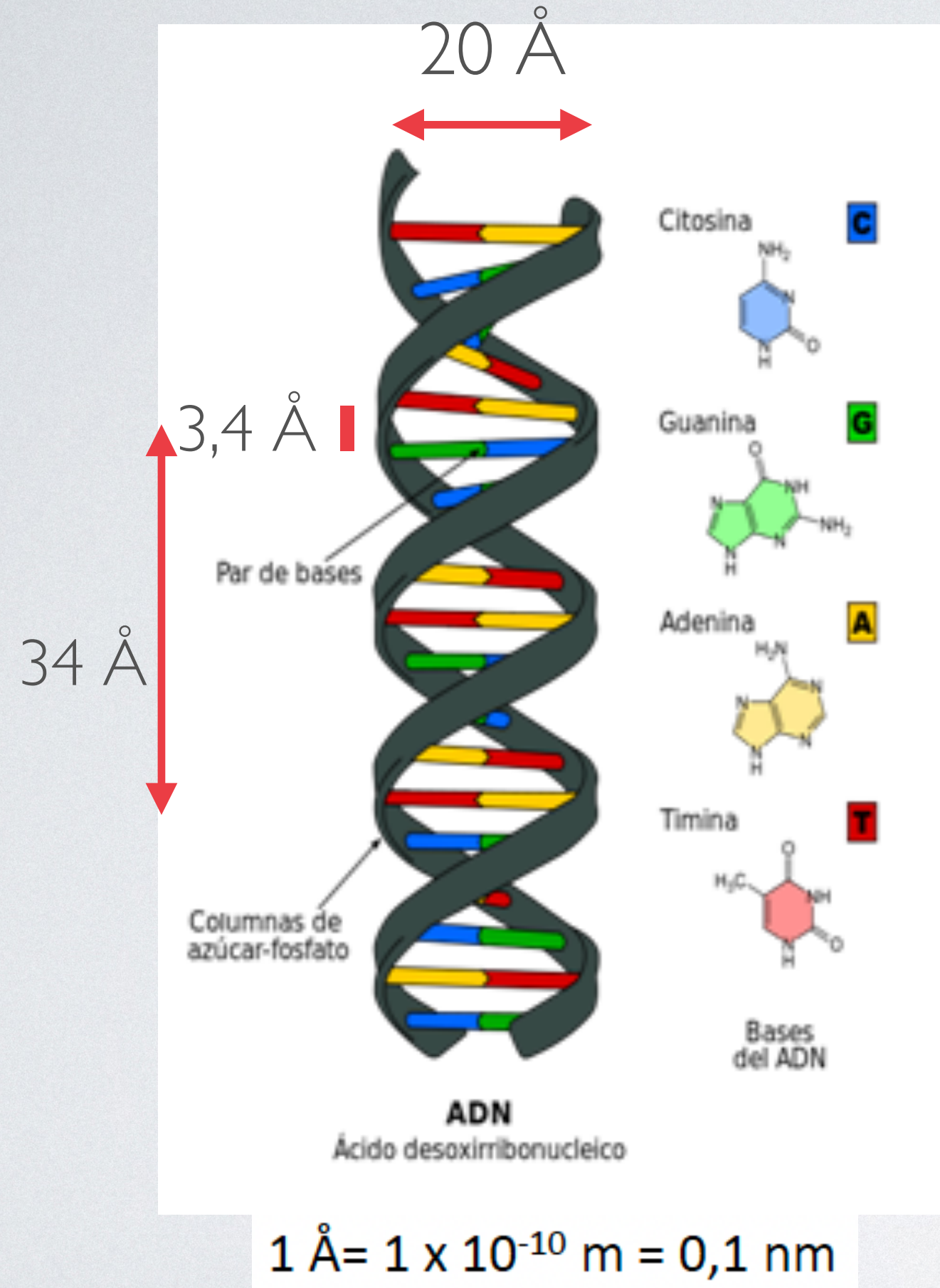
## Estrutura terciaria





## Ácidos nucleicos

### Estrutura secundaria do DNA



Esqueleto azúcar-fosfato

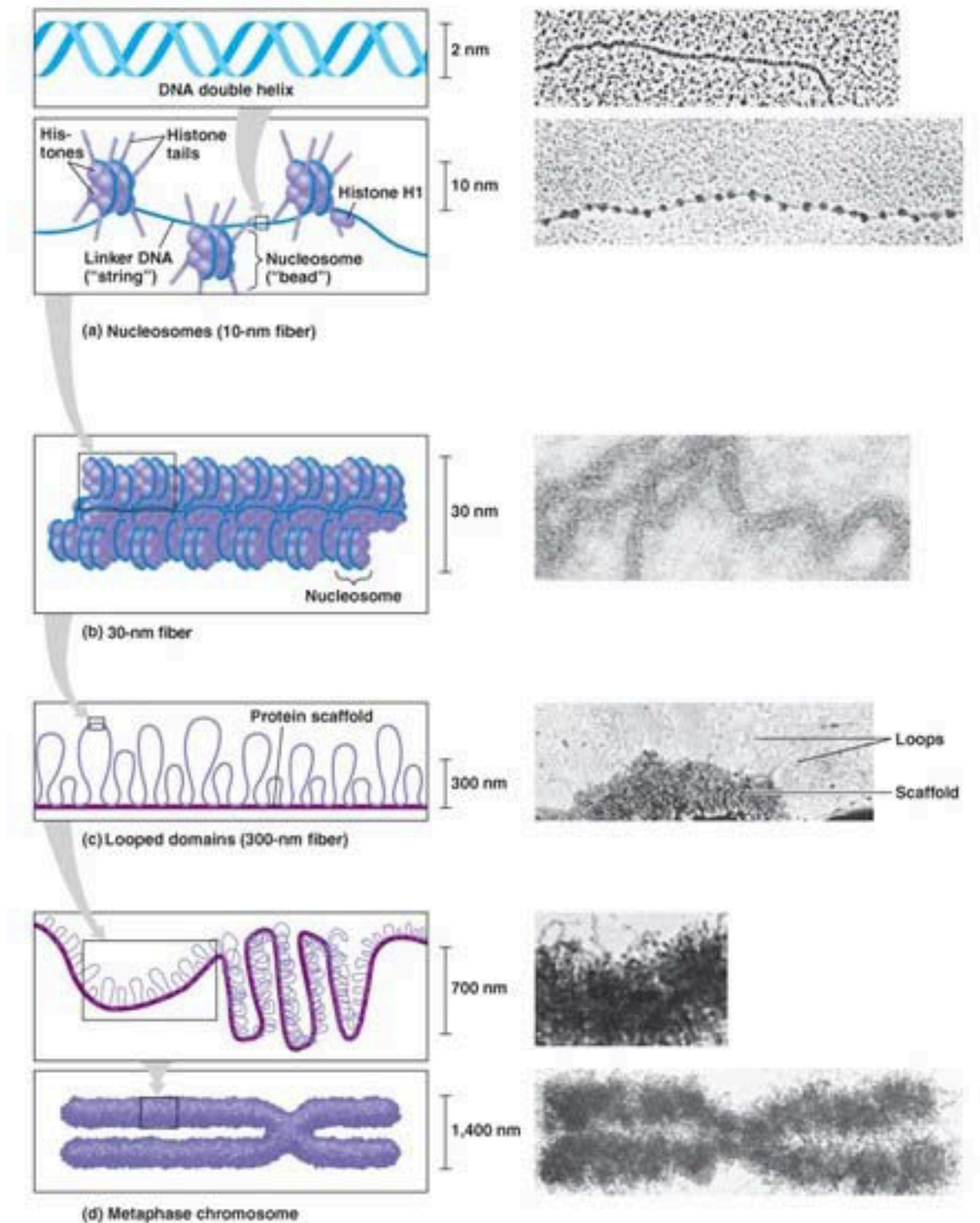
$A + G = C + T$  Reglas de Chargaff

$A = T$  y  $G = C$

Diferentes relaciones AT/GC

Distancia repetidas

### Niveis de embalaxe da cromatina





# Ácidos nucleicos

## Tema 2

### ○ARN codificante:

- ARN mensaxeiro (ARNm)

### ○ARN non codificante

- ARN de transmisión (ARNt)
- ARN ribosómico (ARNr)
- ARN reguladores

### ○Ribocimas



# Ácidos nucleicos

## Tema 2

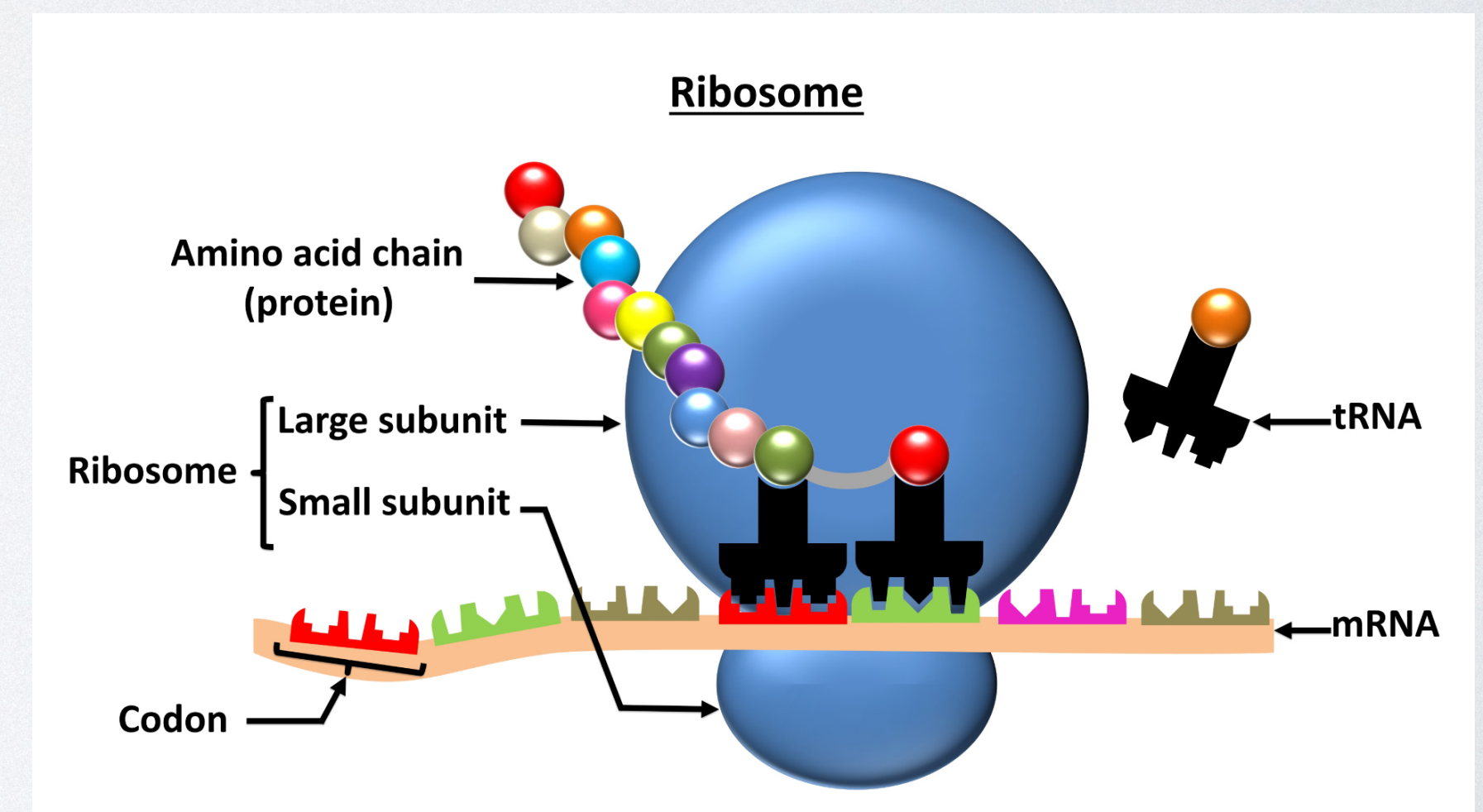
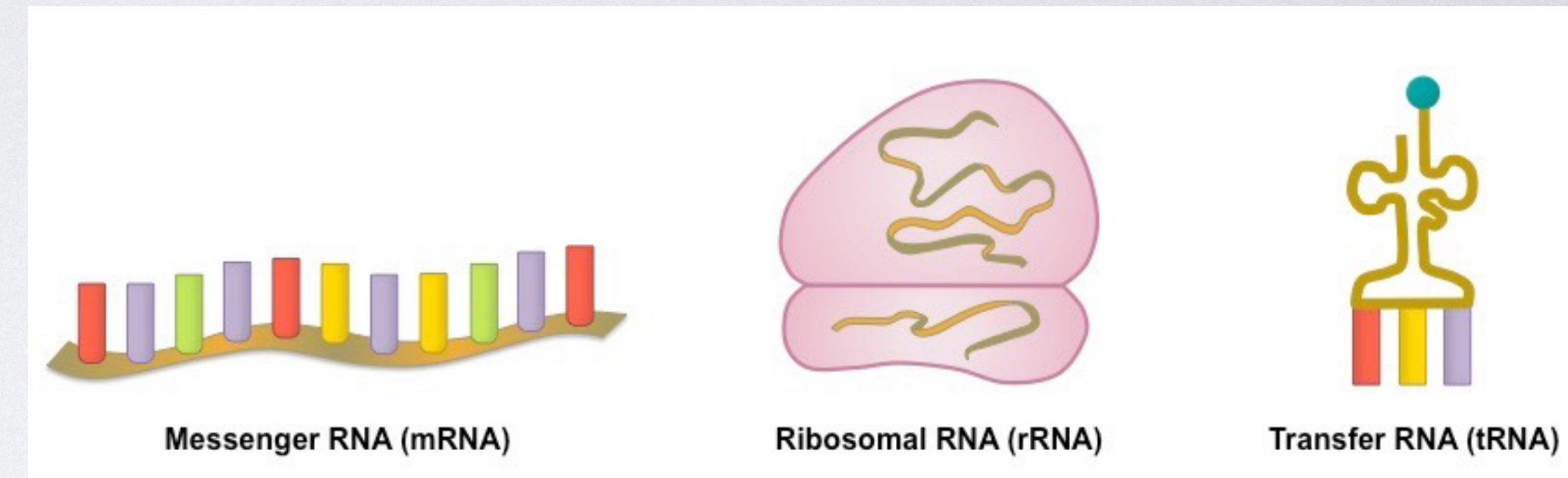
### ○ARN codificante:

- ARN mensajero (ARNm)

### ○ARN non codificante

- ARN de transmisión (ARNt)
- ARN ribosómico (ARNr)
- ARN reguladores

### ○Ribocimas





# Ácidos nucleicos

## Tema 2

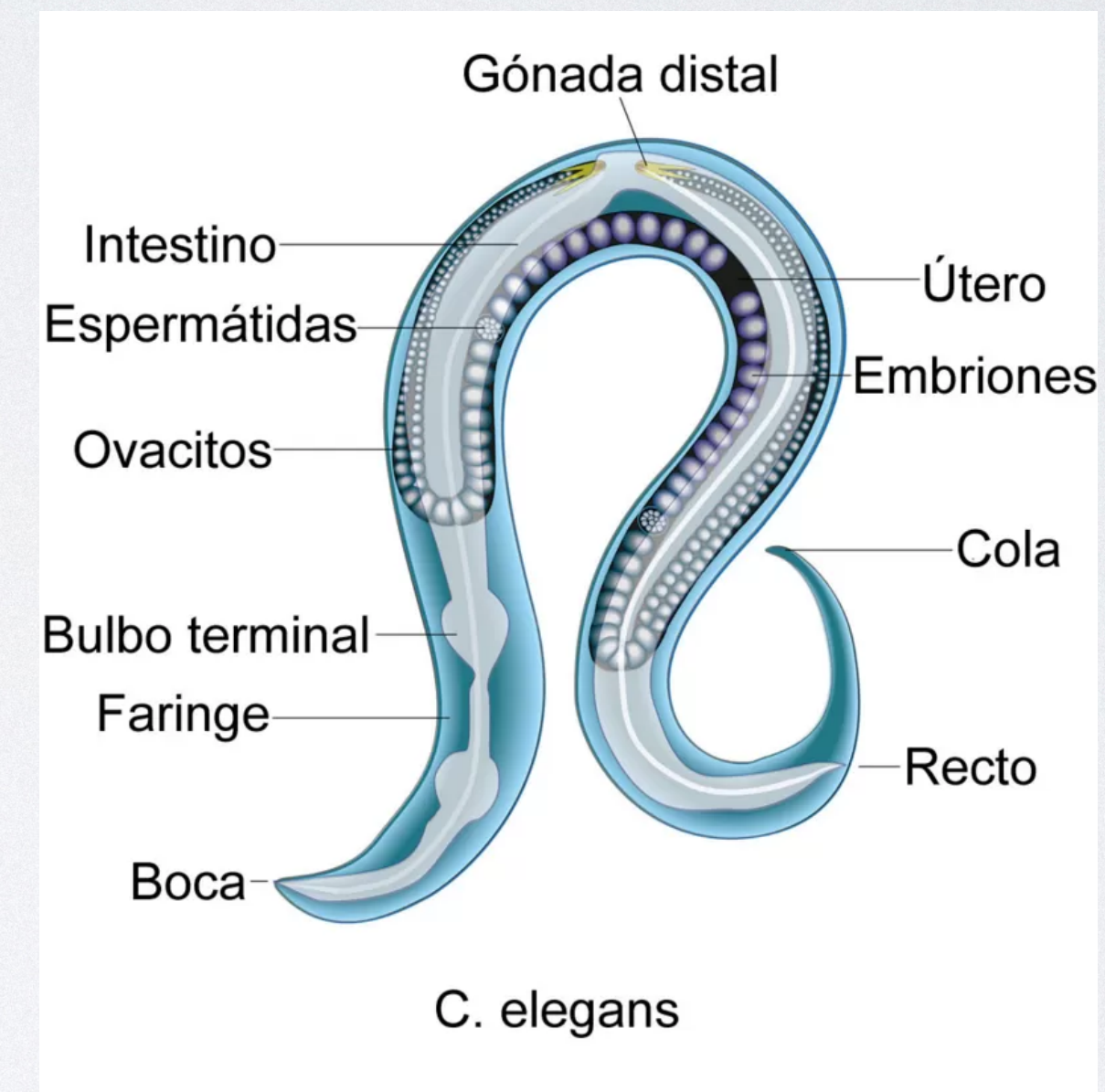
### ○ARN codificante:

- ARN mensajero (ARNm)

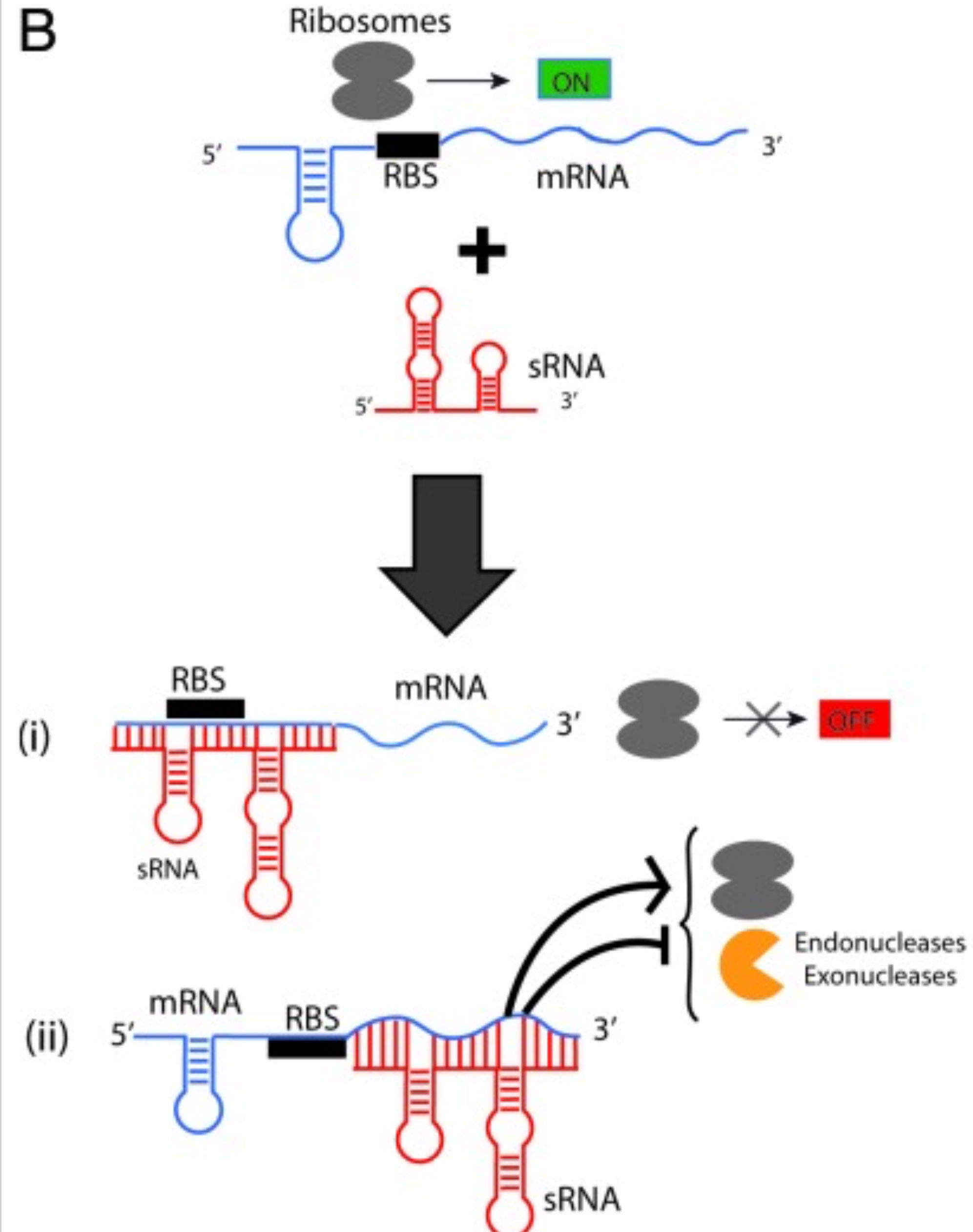
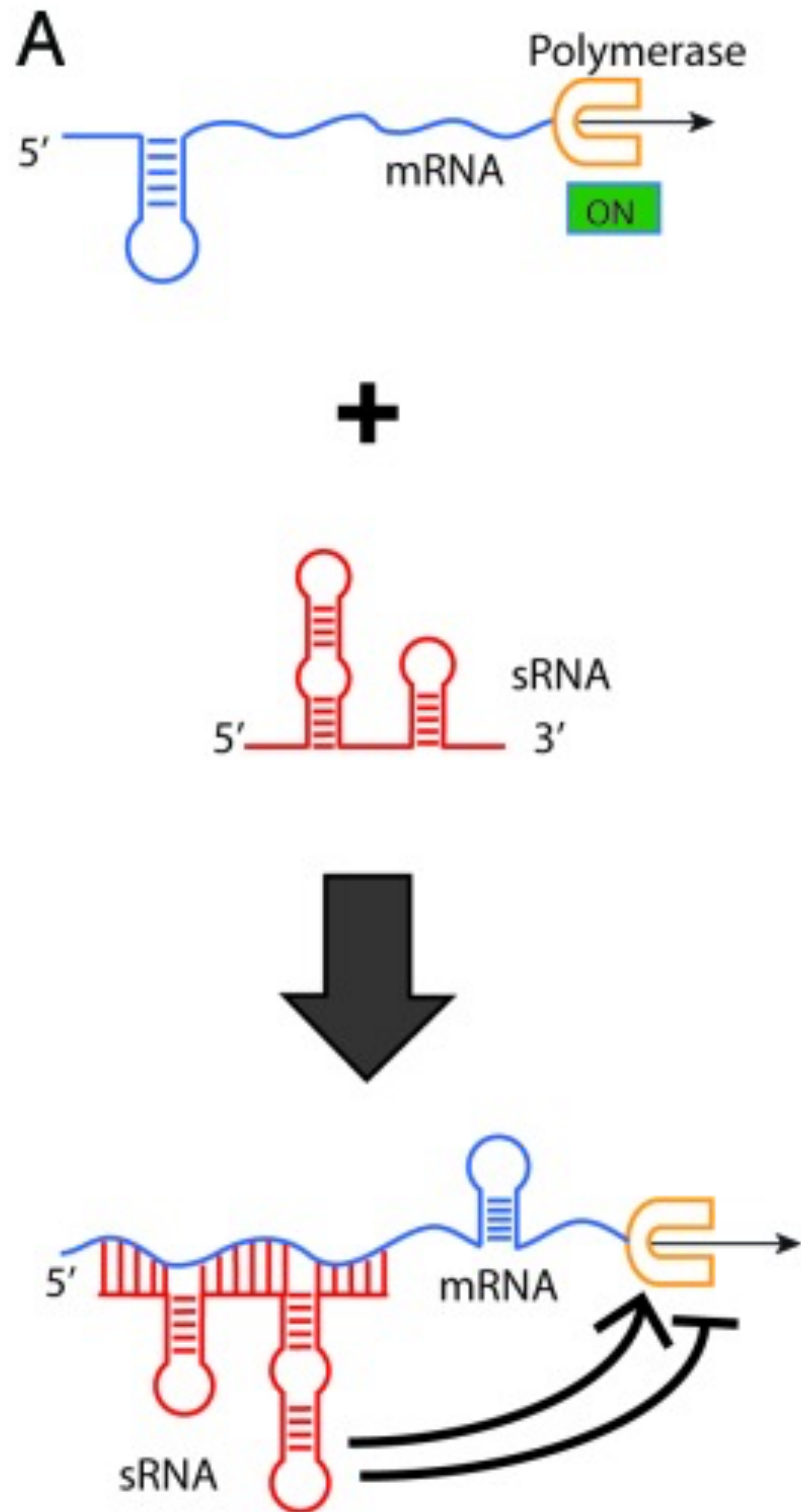
### ○ARN non codificante

- ARN de transmisión (ARNt)
- ARN ribosómico (ARNr)
- ARN reguladores

### ○Ribocimas









# Ácidos nucleicos

## Tema 2

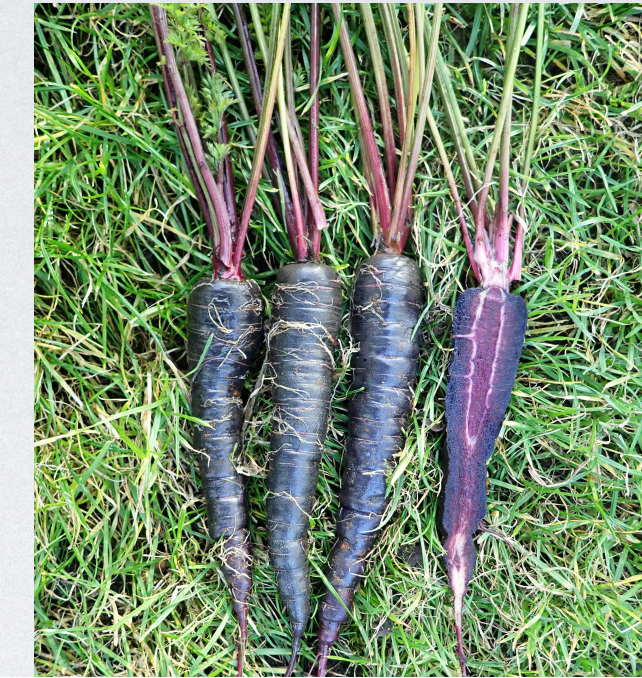
### ○ARN codificante:

- ARN mensajero (ARNm)

### ○ARN non codificante

- ARN de transmisión (ARNt)
- ARN ribosómico (ARNr)
- ARN reguladores

### ○Ribocimas





### ○ARN codificante:

- ARN mensajero (ARNm)

### ○ARN non codificante

- ARN de transmisión (ARNt)
- ARN ribosómico (ARNr)
- ARN reguladores

### ○Ribocimas

