Universidad Nacional Autónoma de México

Química Orgánica IV (1606) Laboratorio Semestre 2025 - 2



M. en C. Arturo García Zavala

N OH

Práctica 9

Aminoácidos y péptidos I Síntesis del ácido hipúrico

Aminoácidos

$$\begin{array}{c}
R_1 \\
H_2N & \alpha \\
0
\end{array}$$

El grupo ácido carboxílico y el grupo amina se encuentran unidos al mismo átomo de carbono.

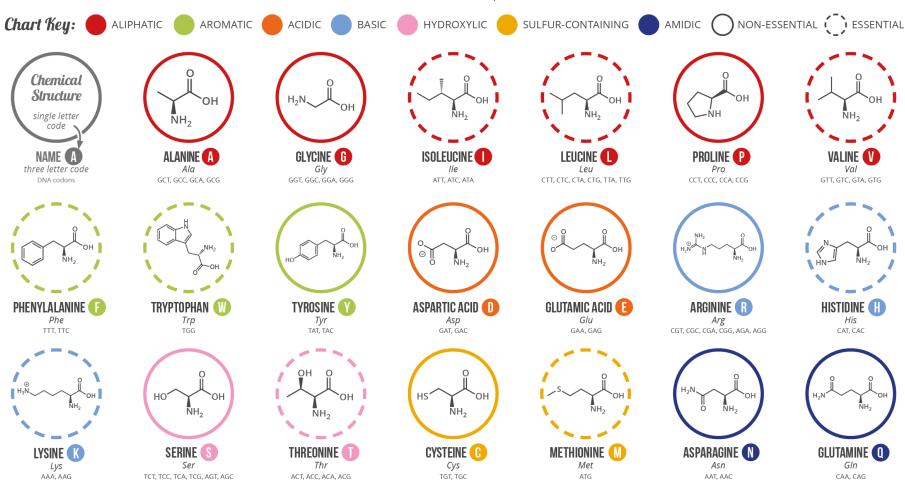
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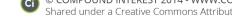
anión

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.



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.





Síntesis de aminoácidos

Síntesis de Strecker

O 1)
$$NH_4CI$$
, $NaCN$ NH_2

R 2) $HCI_{(ac)} \Delta$ R C

Síntesis de Hell-Volhard-Zelinsky (HVZ) con posterior S_N2

Enlace peptídico

Fundamental para la formación de proteínas

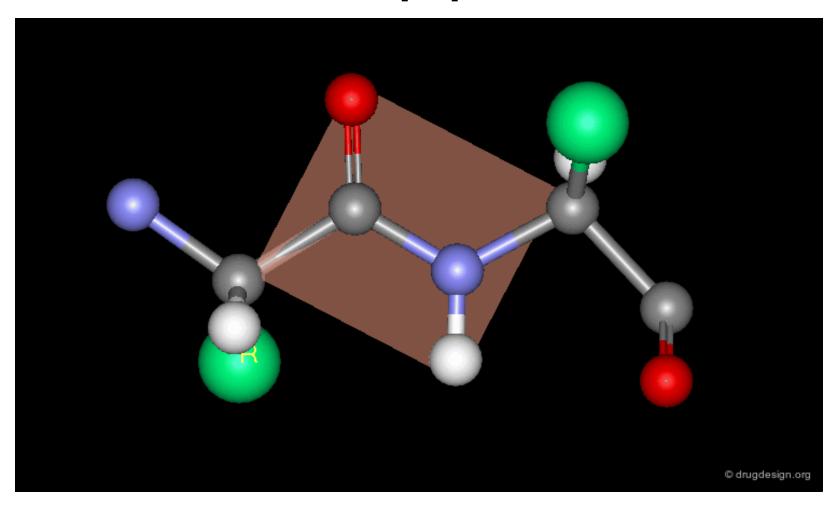
Formación (en los ribosomas):

$$H_2N$$
 $\downarrow O$
 $\downarrow O$

Características:

- -Tipo amida
- -Estable
- -Plano
- -Rígido
- -Posee resonancia

Enlace peptídico

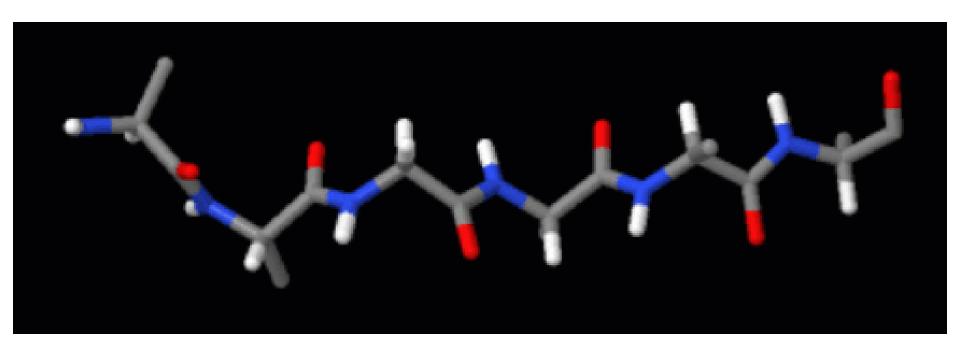


"Peptide Bonds are Planar"

Recuperado de: https://www.drugdesign.org/chapters/protein-structure/#peptide-bonds-are-planar

Acceso: 6 de abril de 2025

Polipéptido

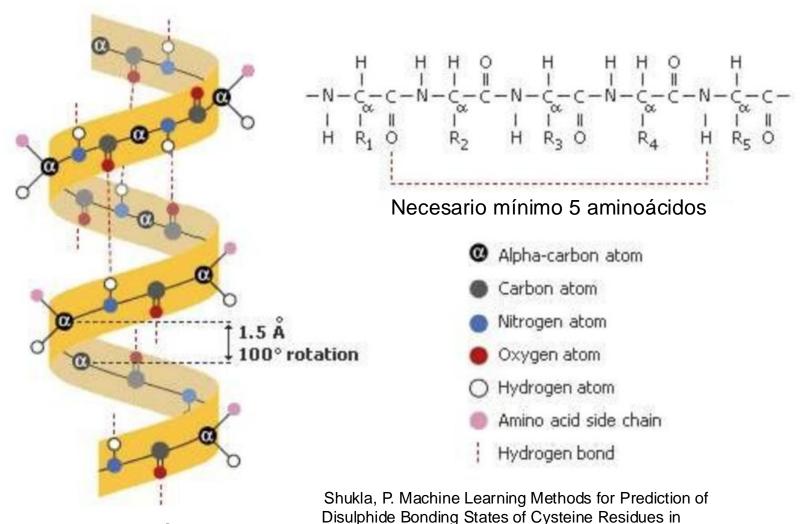


Conformación de una hebra beta en una lámina beta retorcida de la proteína LysC, ID PDB: 6SSC.

Adaptado de: https://proteopedia.org/wiki/index.php/Sheets in Proteins ocultando todas las hebras excepto una.

Plegamiento de proteínas: Hélices a

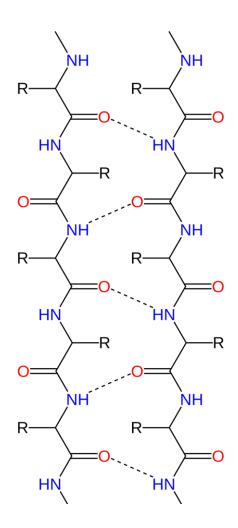
Interacciones de enlaces de hidrógeno entre el grupo amino y el carboxilo del enlace peptídico



Proteins.

Plegamiento de proteínas: Láminas β

Paralela

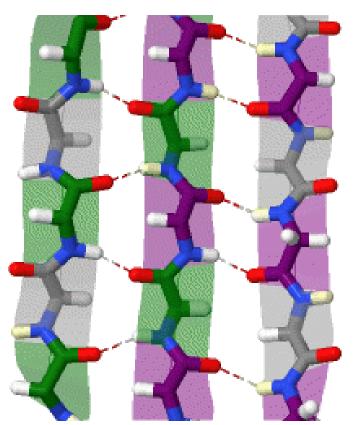


Antiparalela

Plegamiento de proteínas

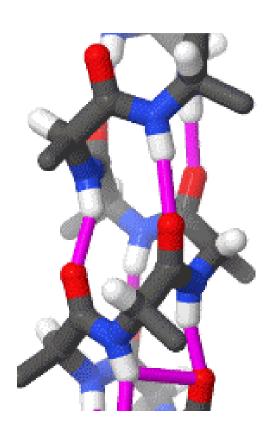
mol

Láminas β (paralela)



Animación de una lámina beta: https://proteopedia.org/wiki/index.p hp/Beta sheet

Hélices a



Polipéptido formando una hélice alfa:

http://proteopedia.org/wiki/index
.php/Alpha helix

Enlace peptídico

Formación (en el lab):

Poco electrofílico 🗵

$$OH + H_2N OH$$



Enlace "peptídico"



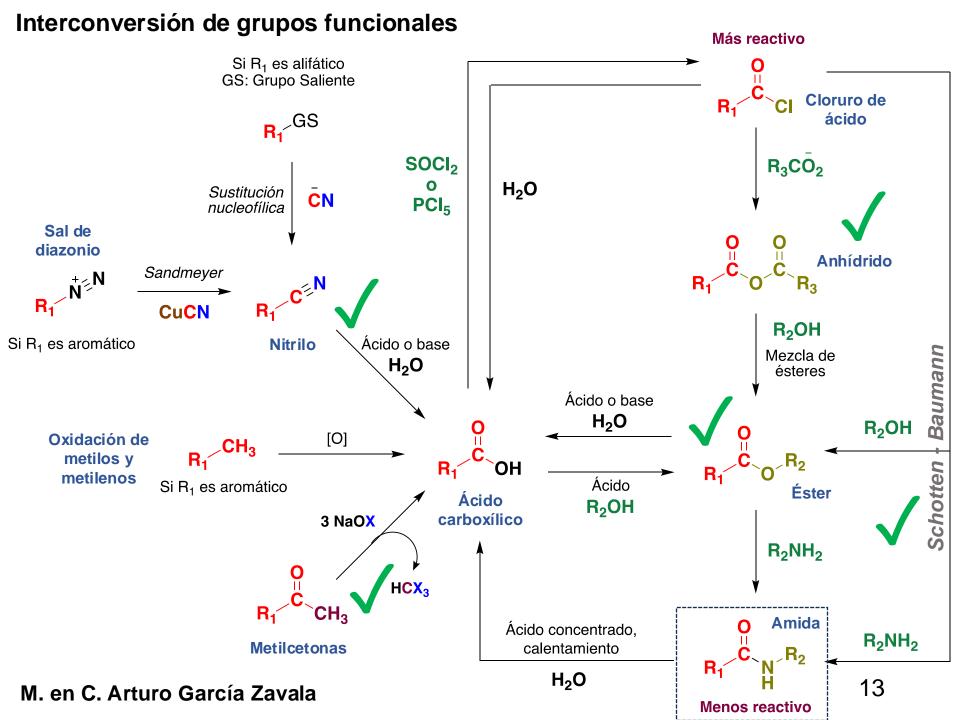
-Reacción de Schotten-Baumann

$$O$$
 $CI + H_2N$
 O
 O
 O
 O

Ácido hipúrico

Más electrofílico ©





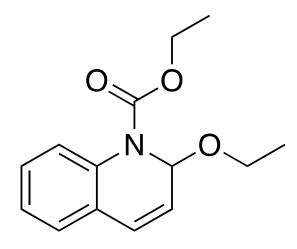
Agentes acoplantes

(generan intermediarios más electrofílicos, activación del COOH)

Sales de aminio

$$N+$$
 $N+$
 N
 N
 PF_6
 $N+$
 $N+$
 $N+$
 $N+$
 $N+$

Formación de anhídridos mixtos





Carbodiimidas

EEDQ

REVIEW



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Peptide Coupling Reagents, More than a Letter Soup

Ayman El-Faham*,†, † and Fernando Albericio*,†, $^{S,\parallel}$

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