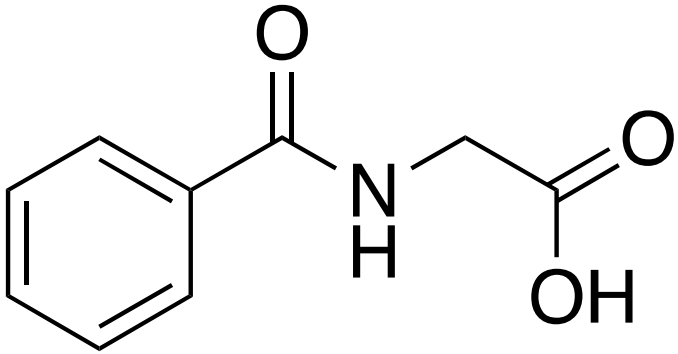
Universidad Nacional Autónoma de México

Química Orgánica IV (1606)
Laboratorio
Semestre 2025 - 2

M. en C. Arturo García Zavala



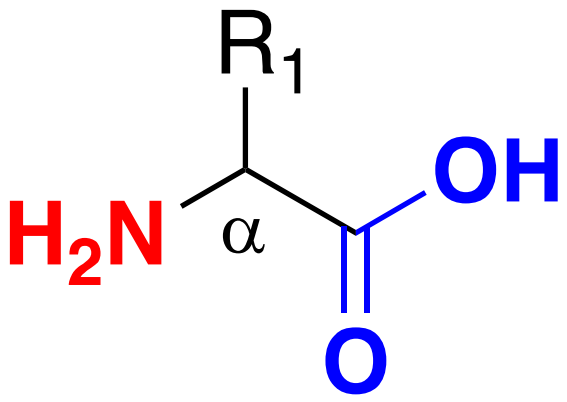
Práctica 9

Aminoácidos y péptidos I

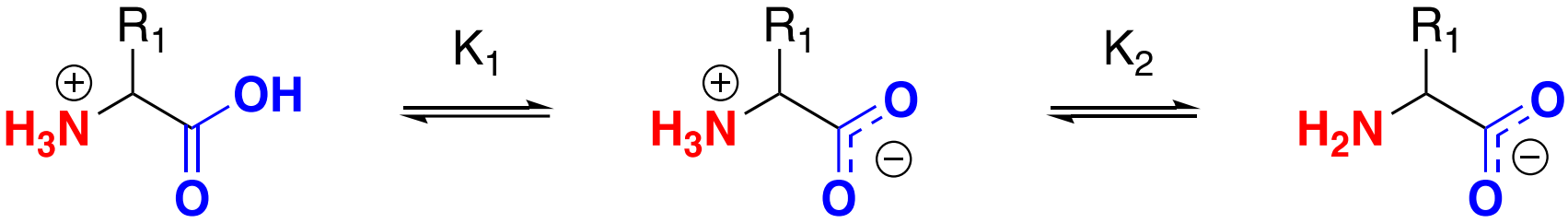
Síntesis del ácido hipúrico

7/4/2025

Aminoácidos



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

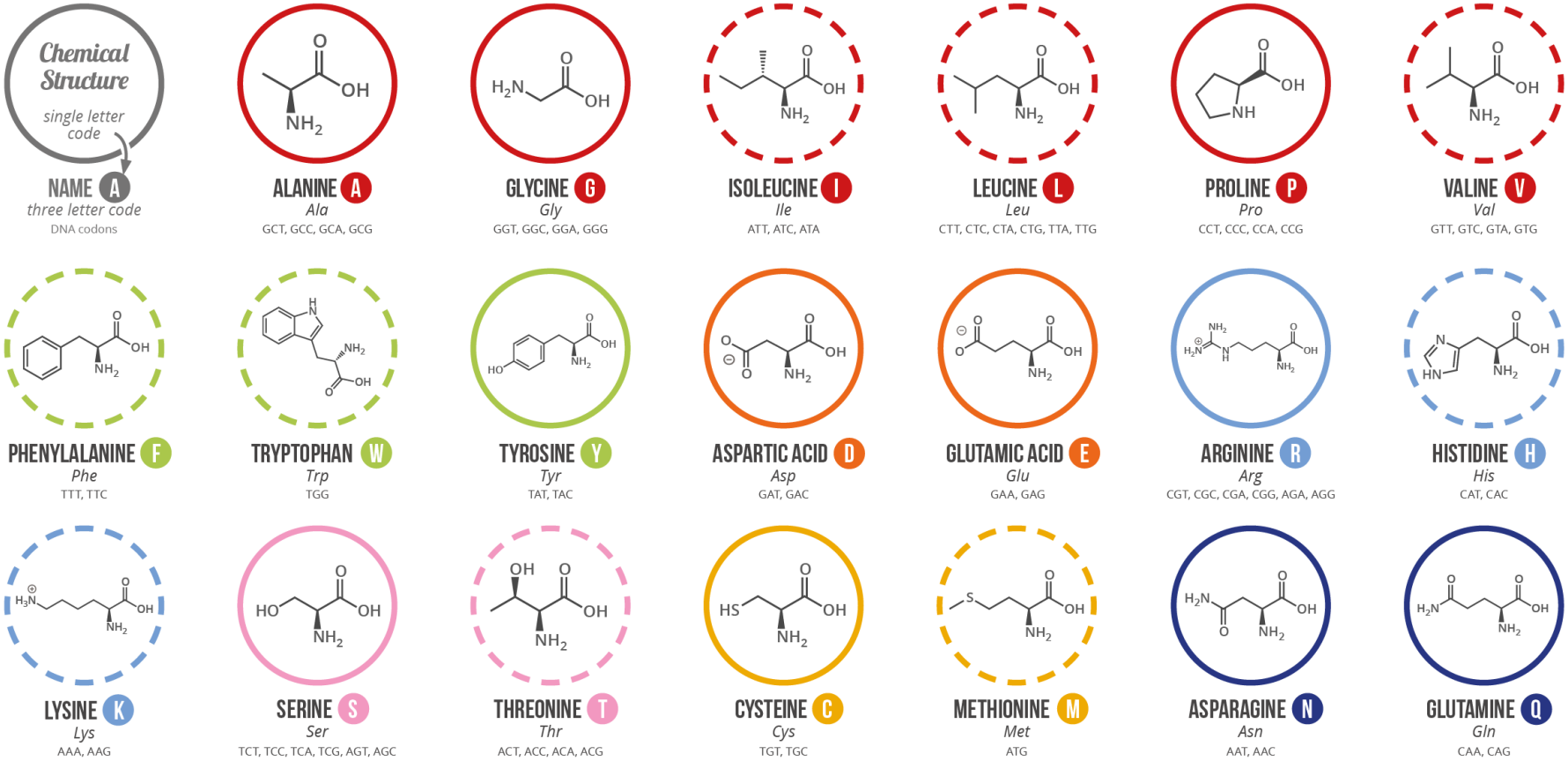


catión zwitterión anión

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.

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



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.

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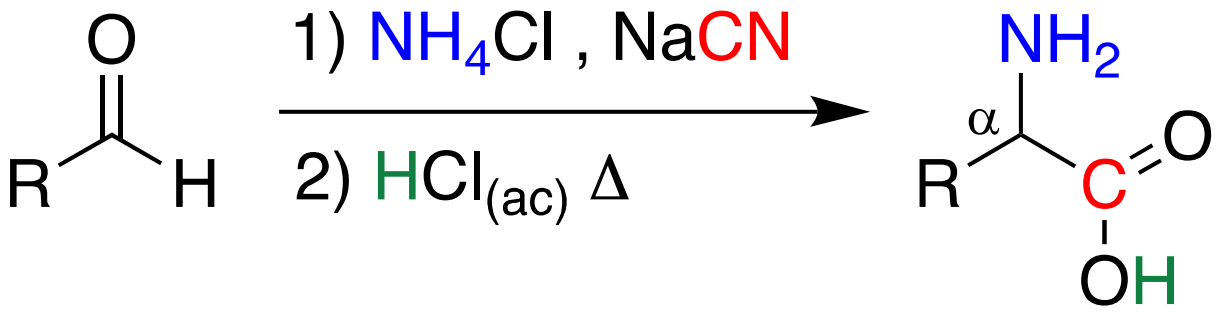
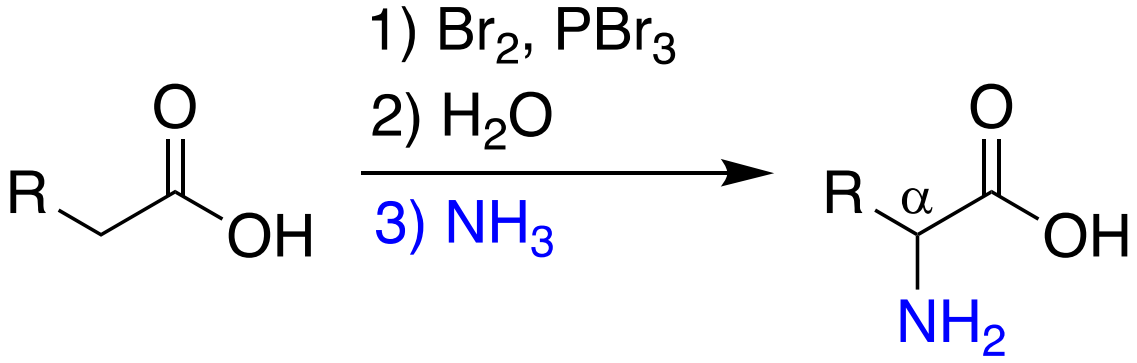
Síntesis de aminoácidos

Síntesis de Strecker



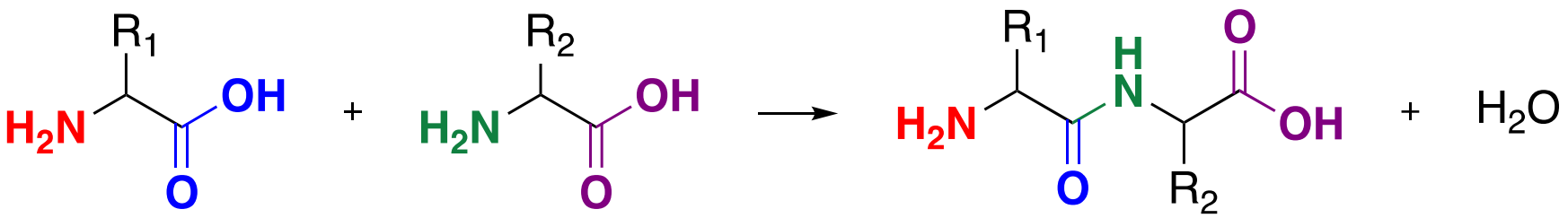
Síntesis de Hell-Volhard-Zelinsky (HVZ) con posterior S_N2



Enlace peptídico

Fundamental para la formación de proteínas

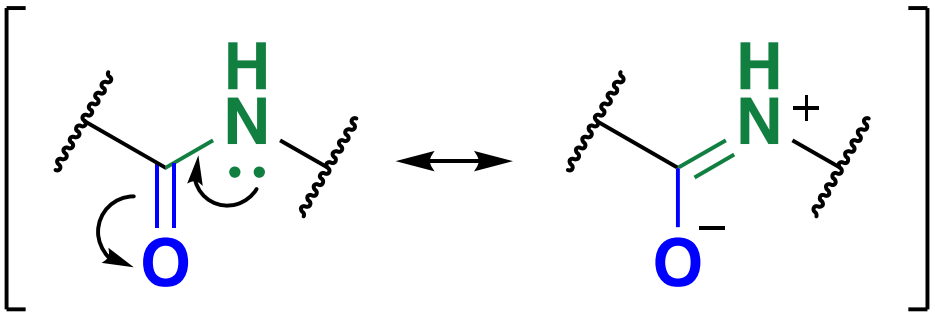
Formación (en los ribosomas):



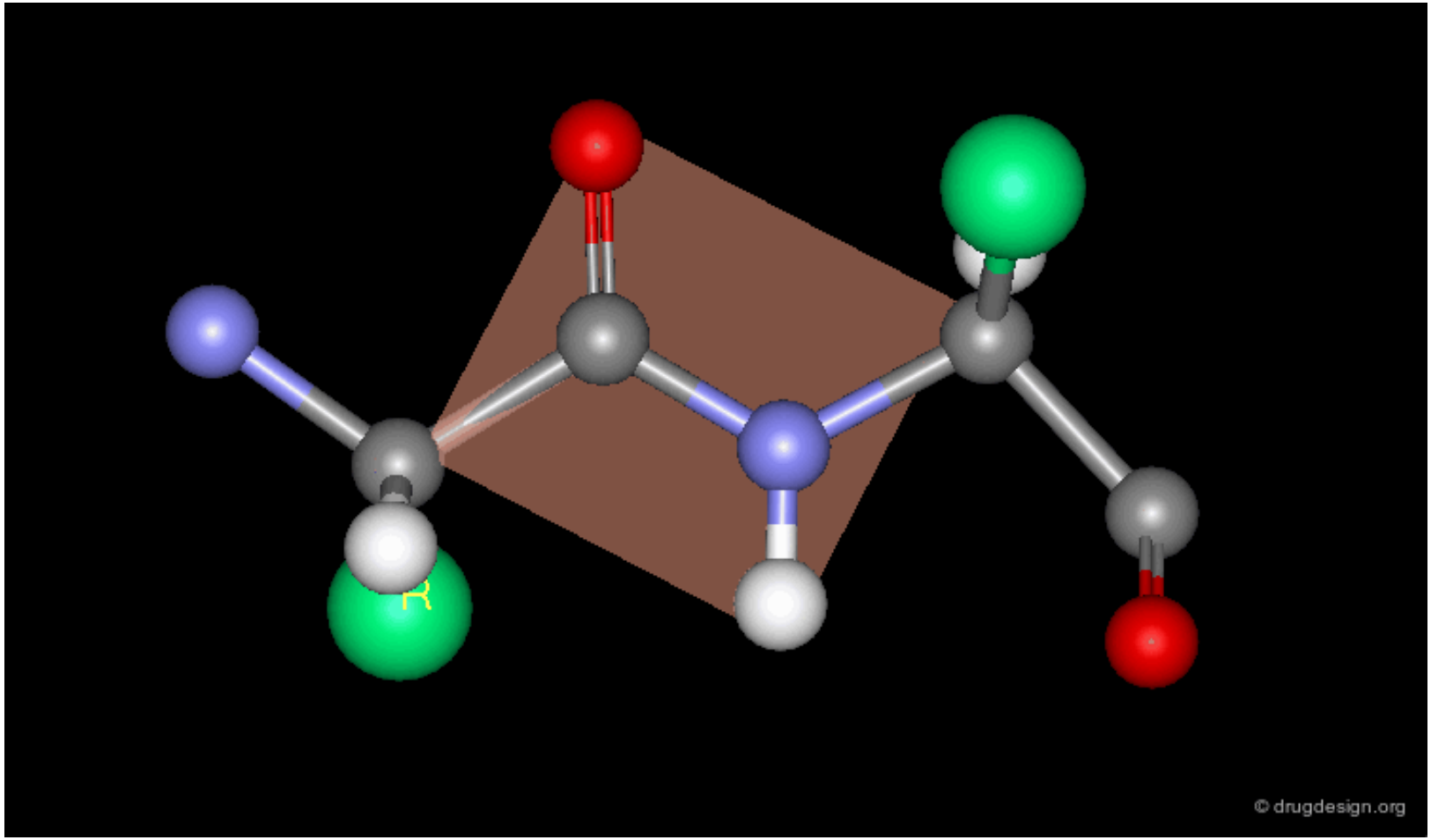
dipéptido

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

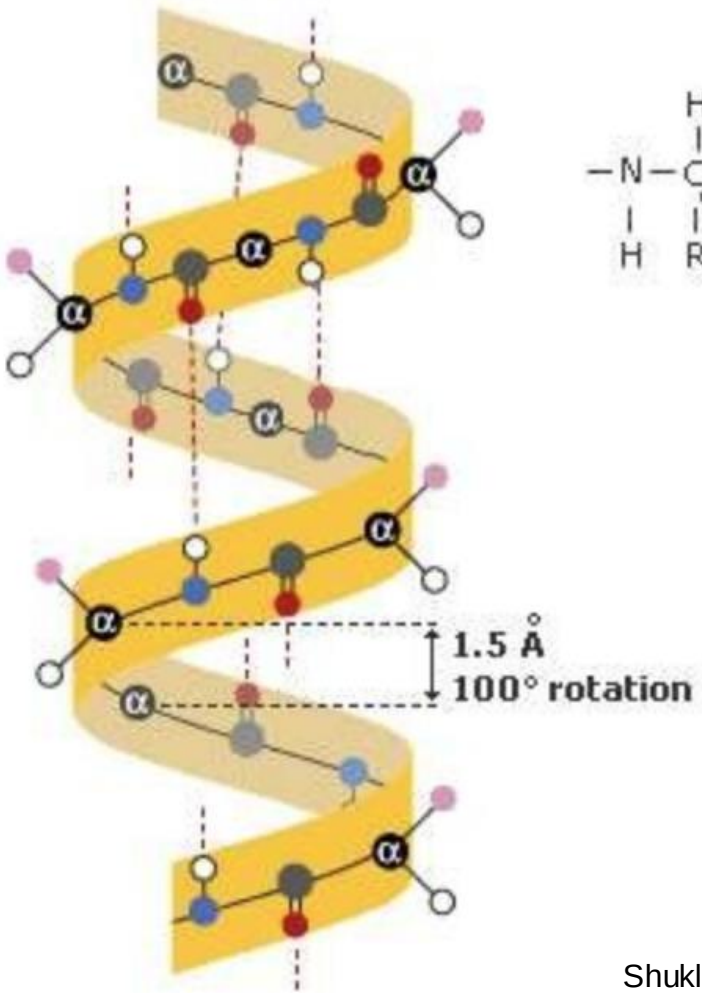
Polipéptido

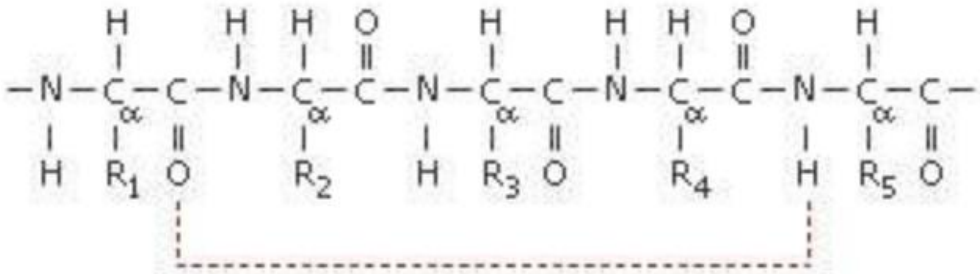
Conformación de una hebra beta en una lámina beta retorcida de la proteína LysC, ID PDB: 6SSC.

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

Plegamiento de proteínas: Hélices α

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



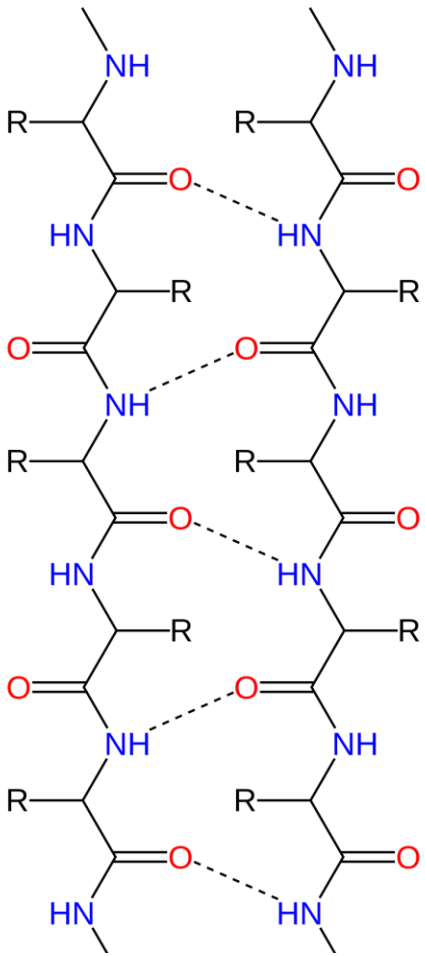


Necesario mínimo 5 aminoácidos

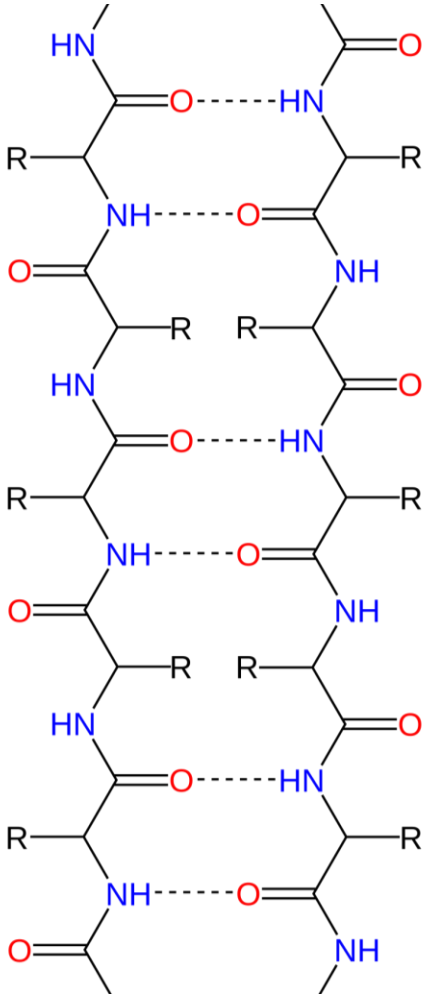
Shukla, P. Machine Learning Methods for Prediction of Disulphide Bonding States of Cysteine Residues in Proteins.

Plegamiento de proteínas: Láminas β

Paralela

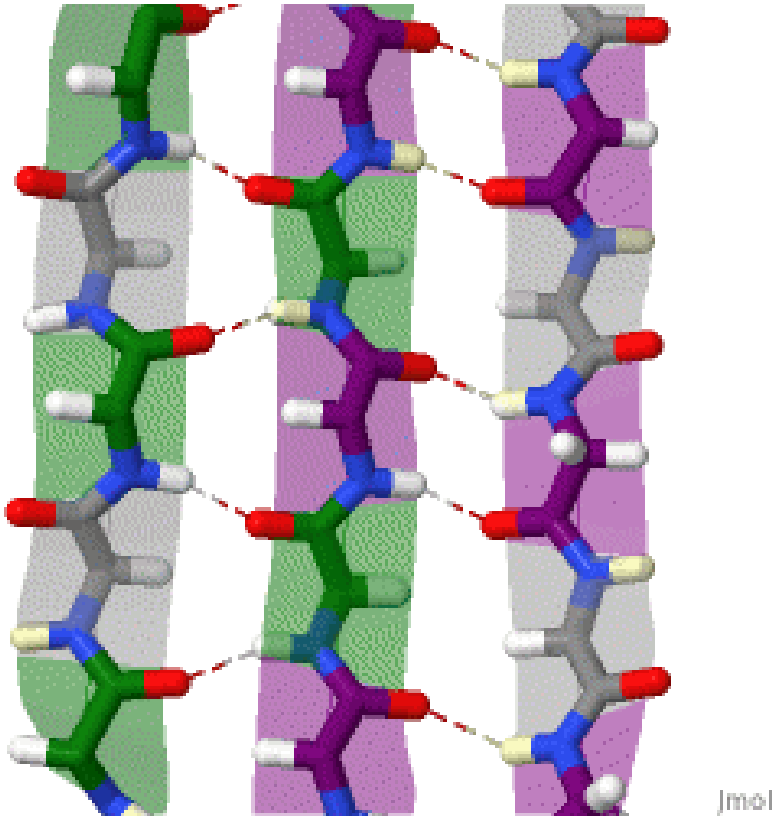


Antiparalela



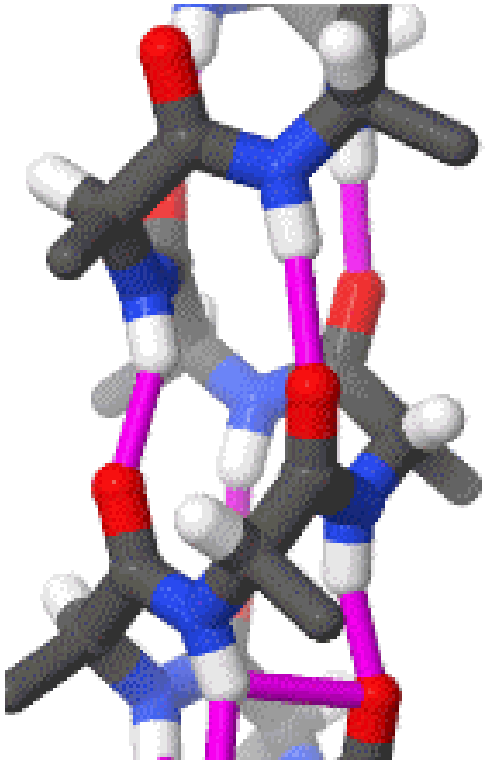
Plegamiento de proteínas

Láminas β
(paralela)



Animación de una lámina beta:
https://proteopedia.org/wiki/index.php/Beta_sheet

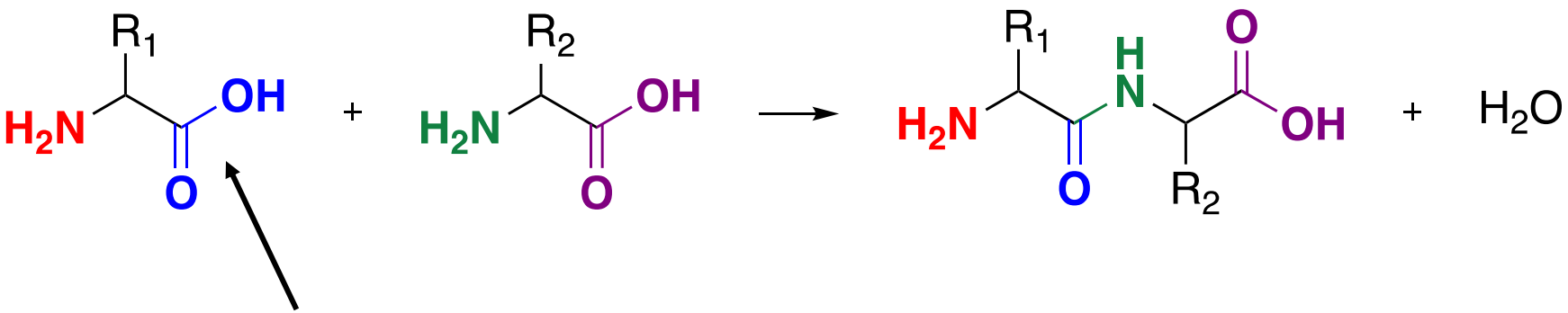
Hélices α



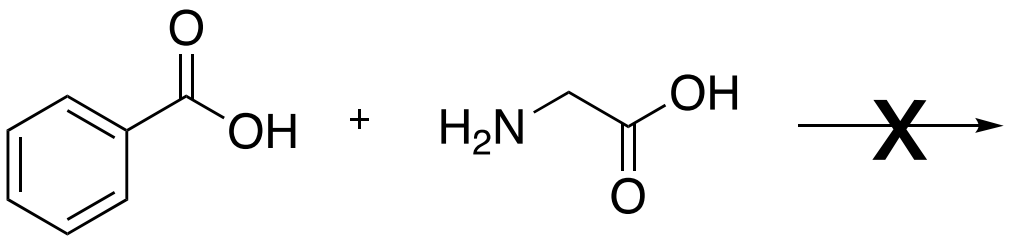
Polipéptido formando una hélice alfa:
http://proteopedia.org/wiki/index.php/Alpha_helix

Enlace peptídico

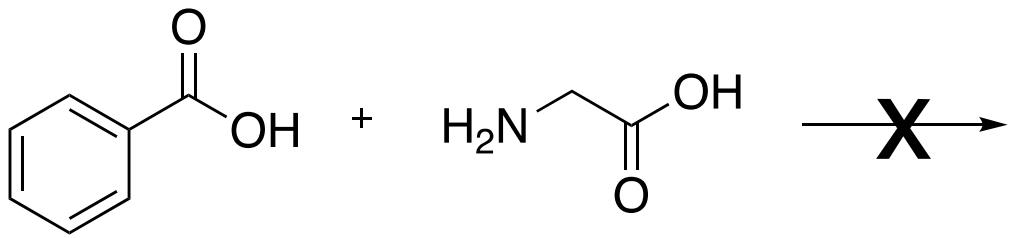
Formación (en el lab):



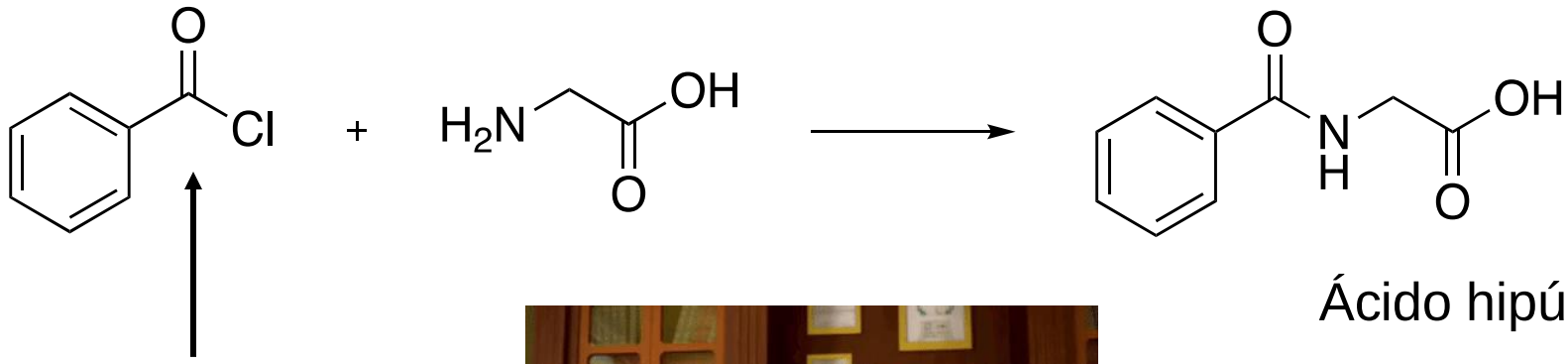
Poco electrofílico ☹



Enlace “peptídico”



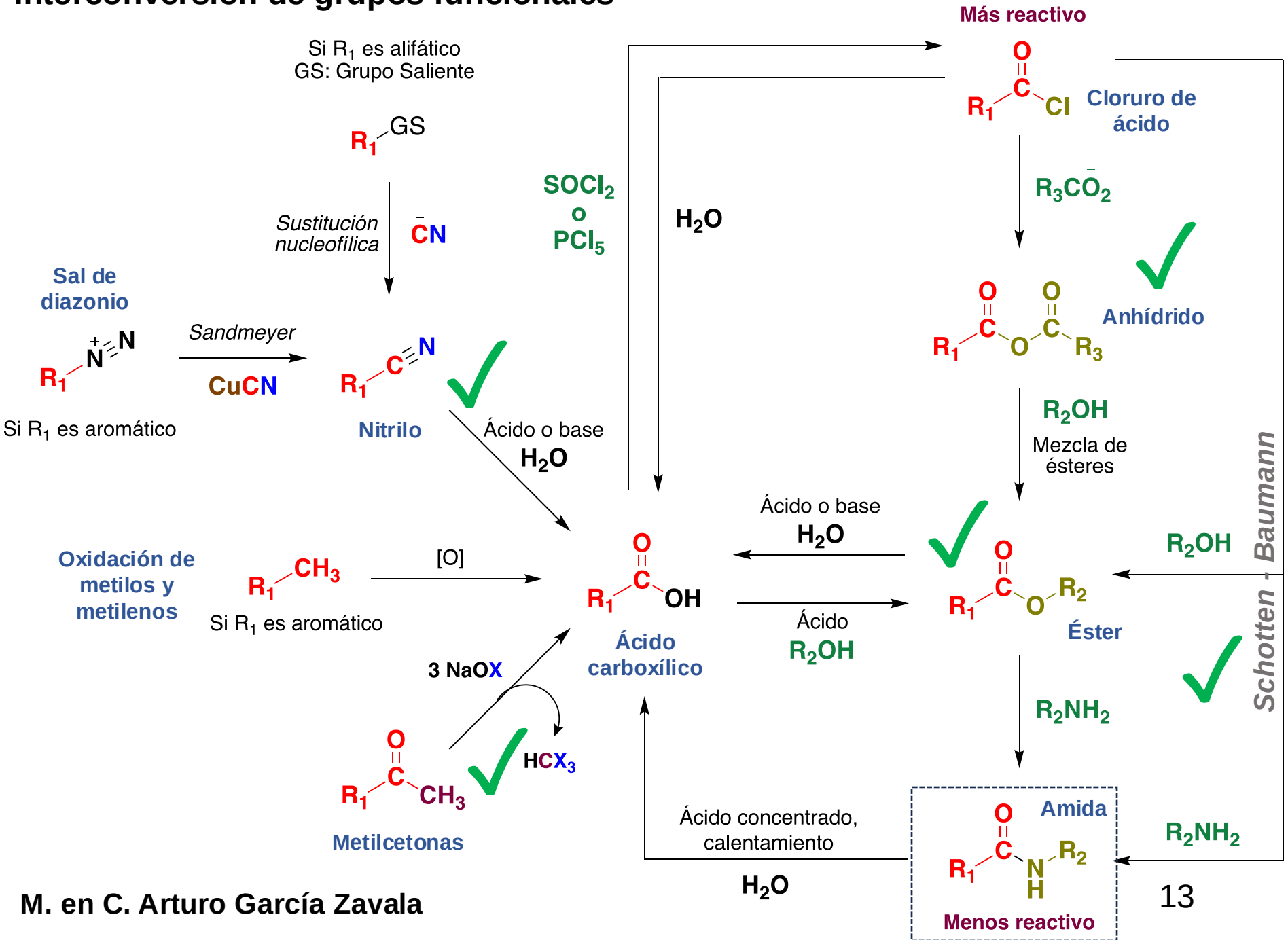
-Reacción de Schotten-Baumann



Ácido hipúrico

Más electrofílico ☺

Interconversión de grupos funcionales



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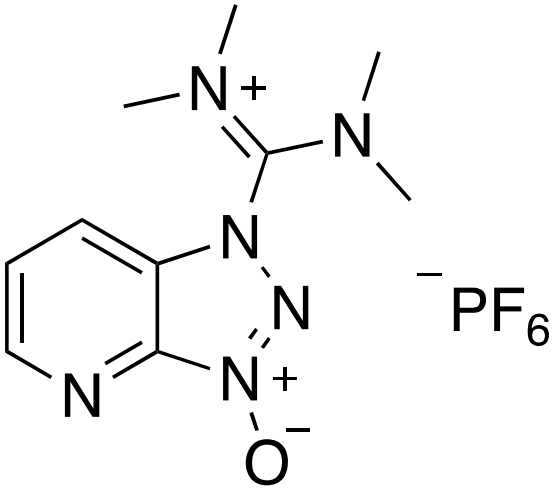
Agentes acoplantes

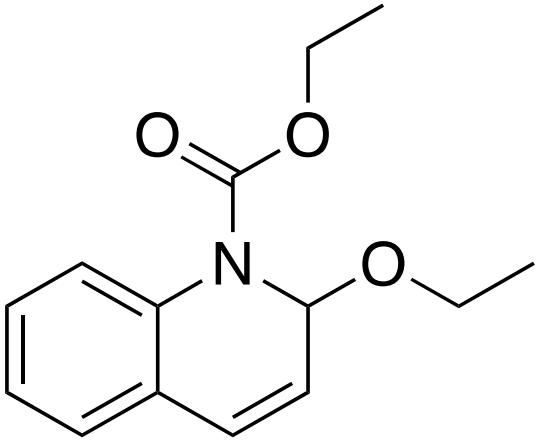
(generan intermediarios más electrofílicos, activación del COOH)

Sales de aminio



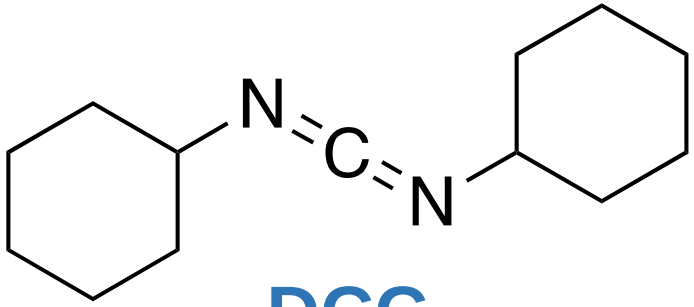
HATU

Formación de anhídridos mixtos



EEDQ

Carbodiimidas



DCC

CHEMICAL REVIEWS

REVIEW

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Peptide Coupling Reagents, More than a Letter Soup

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