Ch 3 amino acids

* Amino acids

- organic compounds contain amino group & carboxylic acid
هاد كلهن بنطبعه كتير

- Biological role : Building blocks of protein & also it could be metabolized or breaken down to produce energy, specially when all the Glucose storage is empty

lipid بتروحا ما بكون في

- standarded a.a : 20

- unstan. → antibiotics
→ Hormone
→ signal molecule
→ neurotransmitance

- Most of them are intermediate in metabolic path. or cycles

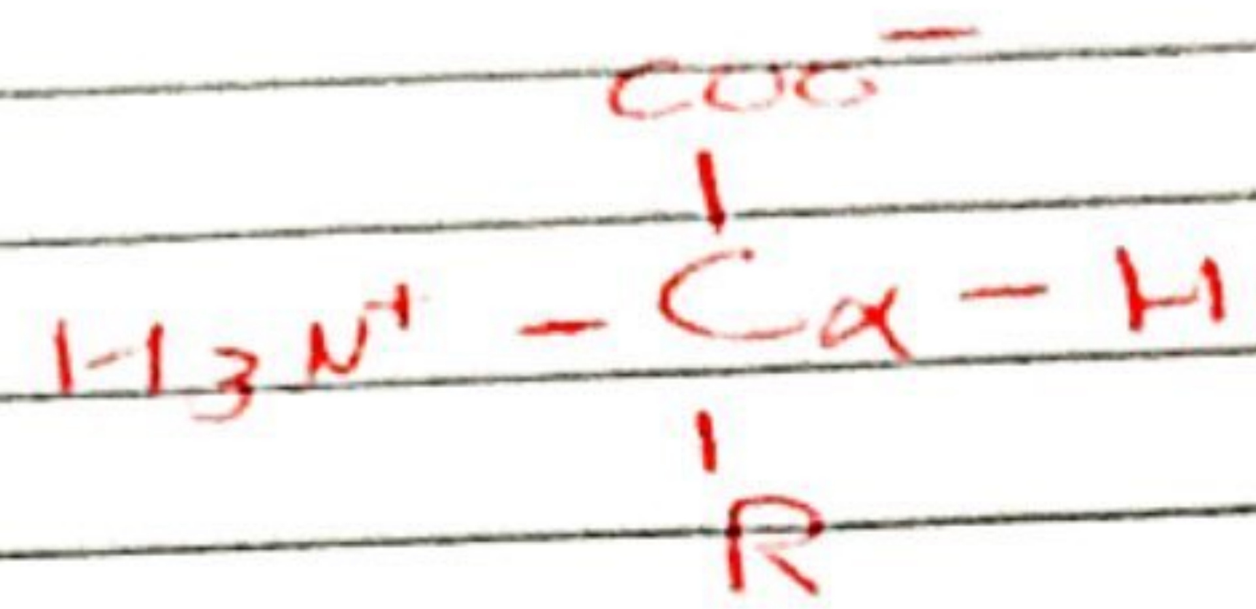
- A.A have α carbon (the first carbon atom that attaches to a functional Group)

e. Doc ليه مهم *

Because the arrangment
mean different things in
term of binding

- A.A are used to make P.P undergo a process called protein folding to produce 1 protein in active form & it will have 3D struct.

- A.A could be exist in 2 isomers L, D ماعدا Glycine [illegible] Mirror image



- Related to their ability to shift their poliraized light (optically active)

- Molecules are optically active they could be tested using old device where the molecule is added & a light source will be used to allow poliraized light to go through optically active molecule

At the end of the device their will be an observer & it can move this device by 90° degree, If the observer still see's the light when splits become horizantal this mean whatever optically active molecule is, it was able to change the polarity of light & that because of presence of L & D isomores

active molecule [illegible] polymeter tube [illegible] L or D isomar [illegible]

Five Apple

- Majority of a.a are of L Type
Why?

Ribosome mech. is designed to utilize L form & also most of our enzymes that can work on a.a they are designed to work with α

- D → could be found in certain organisms like bacteria in cell wall & scientist also discovered that with the aging process certain a.a is converted into D

- R-group → polar
  → non polar
  → basic, Acid
  → Some might have extra carbons & these carbons are designated with β, gama depending on how faraway from α carbon

- losine & Isolosine → have other chiral carbons (carbon atom that is attached to 4 different substituents & it is nonsuperimposable)
يعتبر mirror image ق؛ يلي ما comp. ? غالبًا
chiral إلو يعتبر بصير

* Each a.a atleast have 2 Ionizable Group

Group that could behave as acid & base & could become an ion

- Free a.a - Not in protein - atleast have 2 ionizable Groups some might have 3 (R-group)

- Typically Alanine - A -, valine - V - Leucine - L -, Isoleucine - I -

They are found inside the protein - in the core - because they allow to form hydrophobic core

protein fold. وكيش هم

- Methionine - M -, proline - P - phenylalanine - F -, Tryptophan - W -

Non polar & they don't have amino group, they have. mine group

↳ last carbon of R-group is covalently attached to the - N - of imine Group (amino gr. circle)

* Methionine - M - → silfer atom
* proline - P - → distrapter of 2° structure.

* Proline , Glycine → معرفين

Type of 2° structure is called β-turns

* Tryptophan , phenylalanine → They can absorb light in UV maximmilly 250-280nm 280nm because they have aromatic rings

is used to detict the presence of proteins or to determine concent.

* In absorbance these aromatic (a.a, acid...) can absorb light at all wavelength but typically we want the maximmam wavelength

* كل a.a بتقدر تمتص الضوء بس عالشكل اللي detect

* Aromatic → بتقدر كتير عالضوء

* Theronine -T- → second chiral carbone

* Theronine -T- & serine -S- , These hydroxyl Groups in many proteins they can be phosphorelated , they can reseve phosphate group , & they could be found in Glyco proteins & carbohydrates or sugars or monosac. could attach to these Groups

* Tyrosine - Y → Benzene ring with hydroxyl Group

* Cysteine - C → thiol Group
→ Most reactive Group of all a.a
→ could be used to make Disulfide bridges
↳ help to stabilize 3D stru. of protein & also thiol Group could be found in metalo proteins protein could be found in metal ions
↳ Co-ordenated with these thiol Groups

* Basic a.a → Glucine - G
Arginine - R, histidine - H -
commonly found in the active site of many enzymes spec. histidine because it can play as acid base at the physological pH

* Aliphatic → have hydrophobic tail that is linear

* 2 pKa

Carboxylic acid group around 2

Amino group around 9

* 3 pKa

||

||

hydroxyl Group

accurate طريقة دقيقة
way to classify a.a based on polarity or hydropho. of R-group

* Tyrosine

R-group aromatic ring non polar ring which mean non polar but als we have OH which is polar Also this Tyr. can loss it's proton which mean it can behave as acid

* So Most R-group are ampilic or amphiphatic which mean it's polar / non polar

- $\Delta G_{\text{side chain}} = 0$ for alanine because it don't have polar region in R-group (CH_3)

- $\Delta G = 0$ for Glycine

* Cystene → Most reactive Group
Group هاد
Can interact with other Group
by oxidation/reduction reaction, so
that 2 cystene join together by
Co. bond

Is the only that involves
in maintaning 3D structure
- Disulfide -

— 2 thcoil Group are olidized, O2
removed

* Some a.a once it corrpurated to P.P
it could be modificle

— Some a.a reseve phosphate Group
serine, therionine, tyrasine
(hydroxyl Group) هيك

— proline → could be hydroxylated, reseve OH
— histidine → " " methylated

* Sometimes in certain type of proteins a.a
Could be joined together by cov. bond
P.B بيك

* GFP protein → 2 cyclic, Give Green
Fluore. color
UV light لـ تعرضت مجرد

- Some a.a are of
other bioactive molecules like
/dopamine/GABA/thyroxine (hormon)
neuro transmeter

* A.A function → Energy production /
synthesis other biologically active
molecules/compounds

- A.A during translation with the
help of ribosome. they are joined together by
Co. bond called (p.b)

1.4 double bond / unique because of the
partial double bond character /
تعتبر نوع معين من تفاعلات اسمه
Condensation Dehydration - water lost -

* Resonance make rotation around p.b
very limited
تقلل
6 atoms layes on same level → M1 plane
↓
C & N of
co. bond & atoms

كل أحماض الامينية
R Group ↑
وممكن تكون
↑↓↑

Five Apple

* oxidation agents

- تتزيد مع العمر
- ex → free radicals
- Enzyme, lipid, DNA, organells ل ضرر
- عامل تحوي مسبرا
- Sometimes they are Generated by our cells as by products of certain reactions

* our cells have defense mechanisms oxidation agent ضد

حد هو شو للدفاع إلي أستخدم

↓

Glutathione

↳ will react with oxidation agents & neutrilize them

how?

2 Glutathione might react with oxidation agent so it will become reduced & 2 Glutathione become oxidized & this result of connection of it by Disulfide bond