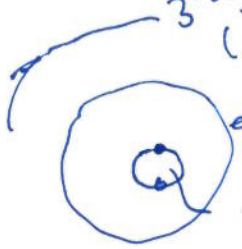
Chemistry

- stability of atoms → full outer shell



ions → gain or lose electrons to give a full shell.

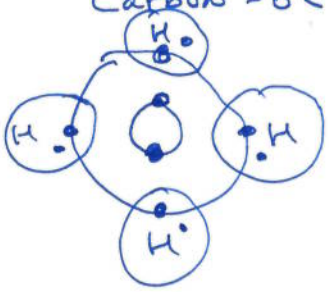
Li: 3 e

Li^+: 2e (full 1ST shell)

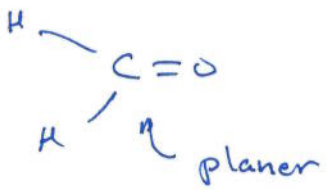
bonds (covalent)

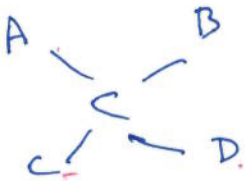
C – 4
N – 3
O – 2
H – 1
} 2nd shell

Carbon – 6 e

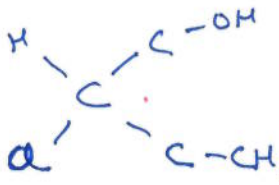


Carbon





– four diff groups → chiral



– two mirror images (enatiomer)
↳ may have diff biological effects)

pH: $pH = -\log H^+$

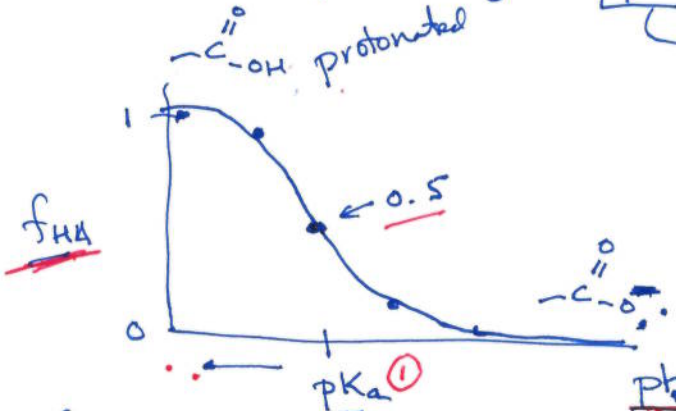
low pH ⇒ high $[H^+]$

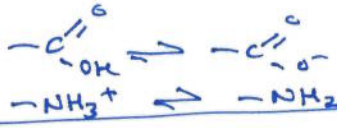
f_{HA} – fraction protonated.

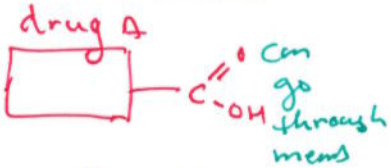
⇒ predict given pK_a acid

↳ measure of acid strength

Small pK_a = strong acid





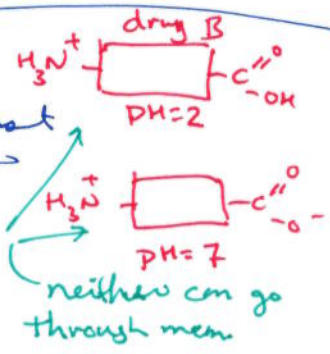


- molecules with no charges can pass through membranes

Biology

- Prokaryotic cells
- Eukaryotic cell
- Virus

] compare & contrast → differences & Similarities



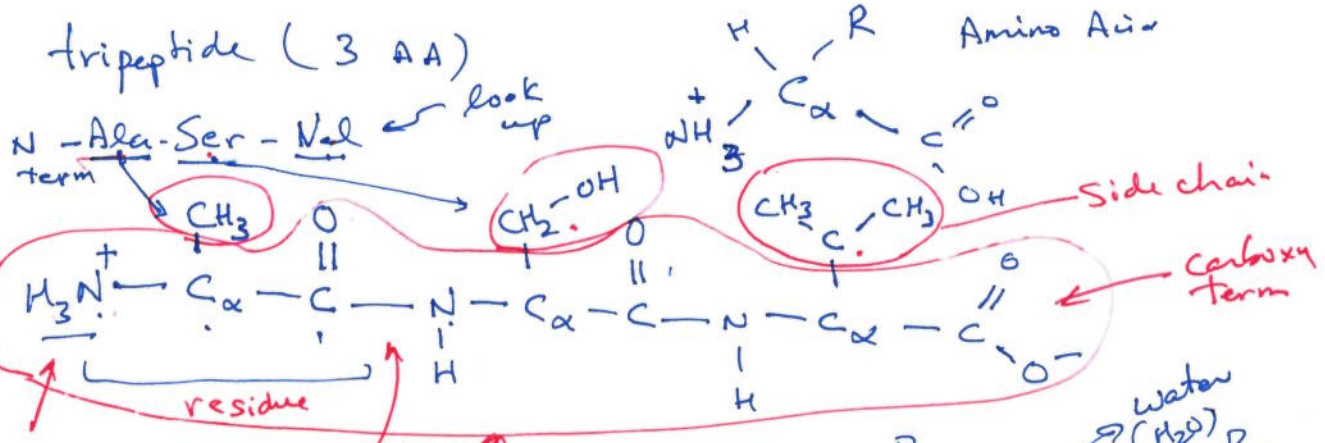
– organelle functia
– ribosome, golgi, Endo reticulum.

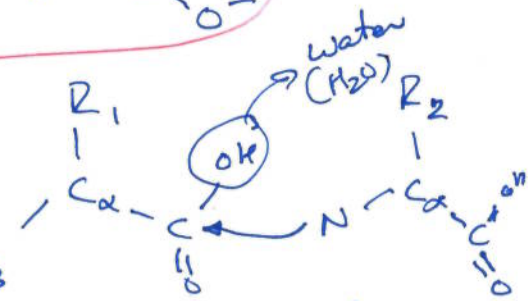
Protein structure

- primary – A.A. sequence (N → C term) (")
- Secondary – mainchain structures < α-helix, β-sheet (")
- functional forms { tertiary – complete structure one chain (all proteins) (folded form); quaternary – multiple chain (Ab)

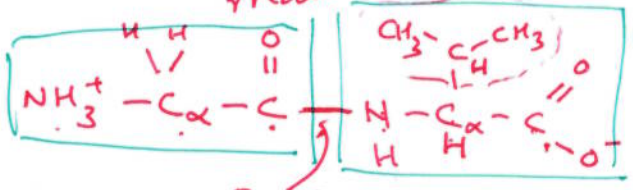
Primary

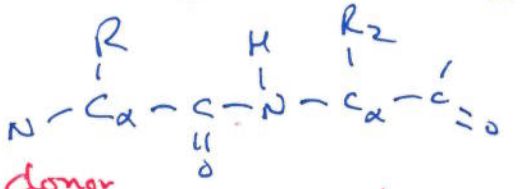
tripeptide (3 AA)





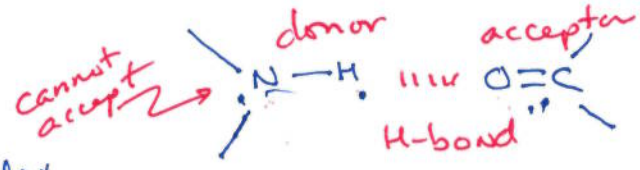
Gly - Val



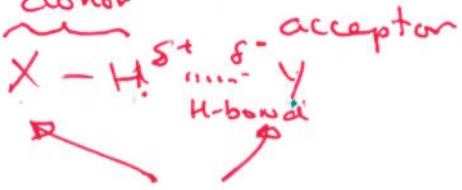


Secondary

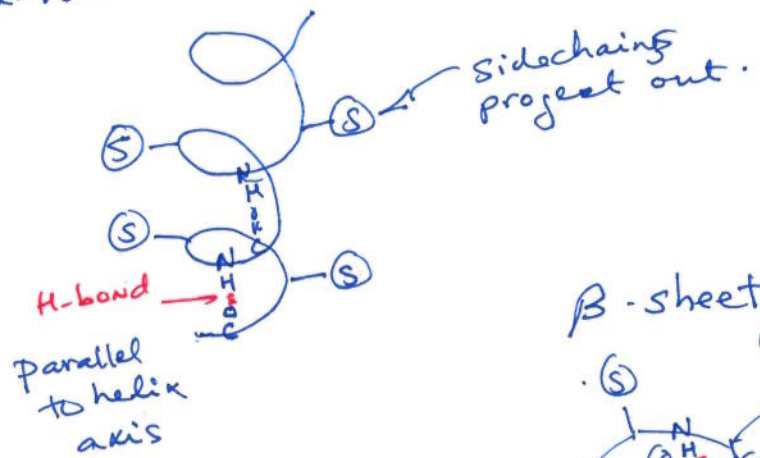
- mainchain H-bonds

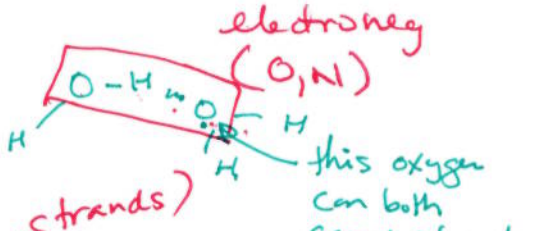


general rule



α-helix

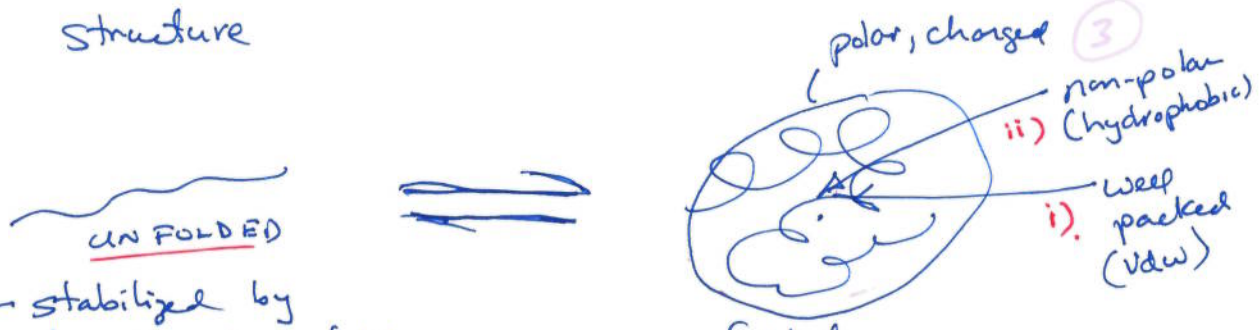




β-sheet (2-strands)

Hbond ⊥ to strand directio

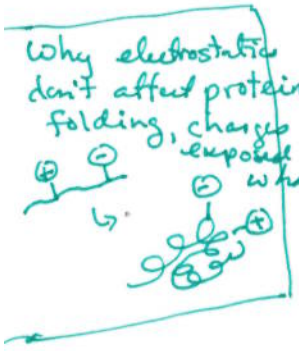
Tertiary Structure

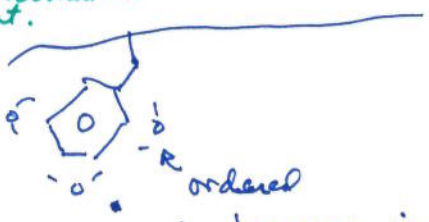


UNFOLDED ⇌ folded.

- stabilized by disorder of unfolded chain (high disorder)
- Vdw → good packing in core
- Hydrophobic effect. (water released from non-polar burial ⇒ increase in disorder of water)
- H-bonds

Why electrostatic don't affect protein folding, charges are exposed no matter what.

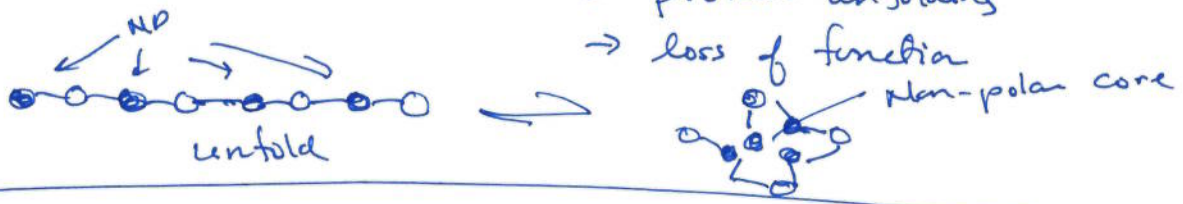




∴ decrease in disorder (increase in order)

Disease → single protein → multiple structures (Normal) ⇒ lead to disease

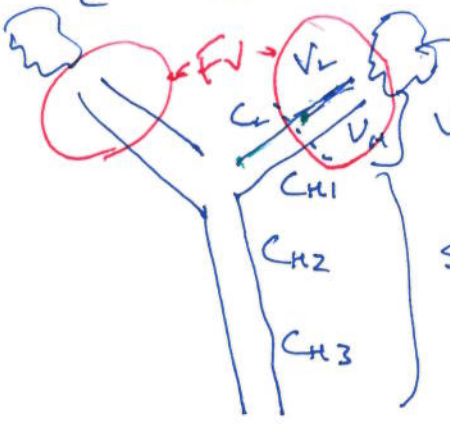
mutation → change an amino acid → protein unfolding → loss of function

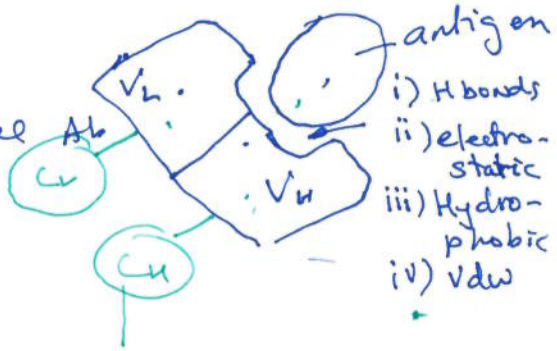


Immunology

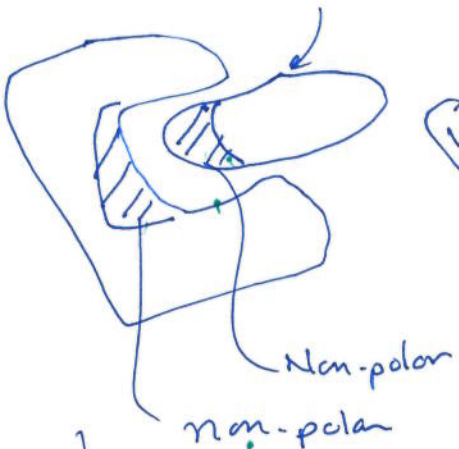
T_C
T_H
B
Plasma
} know what cells do

T_C → how kill cancer cells (T_H req. to activate)

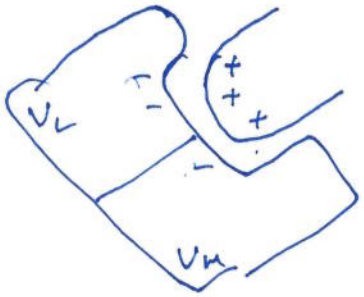




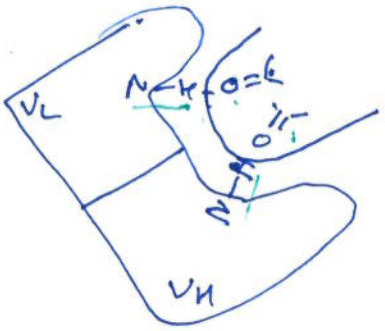
Pollen



E. coli



flu



vdw	✓	✓	✓
Hbonds	X	X	✓
Hydrophobic	✓	X	X
elect	X	✓	X