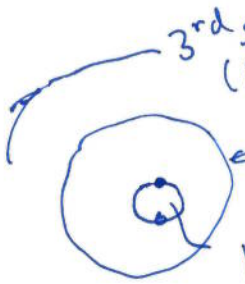
Chemistry

- stability of atoms → full outer shell



ions → gain or lose electrons to give a full shell

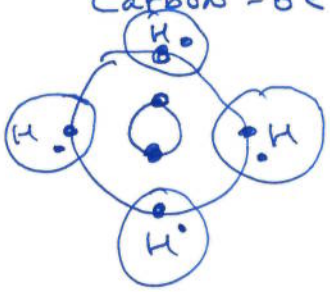
Li : 3 e

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

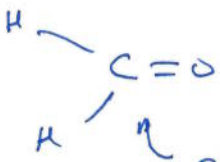
bonds (covalent)

C – 4
N – 3
O – 2
H – 1
} 2nd shell

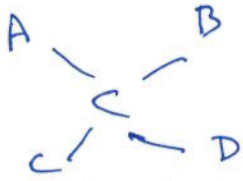
Carbon – 6e



Carbon

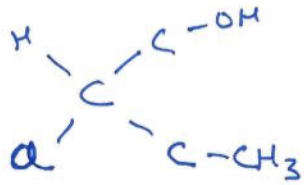


planer



tetrahydral

- four diff groups → chiral



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

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

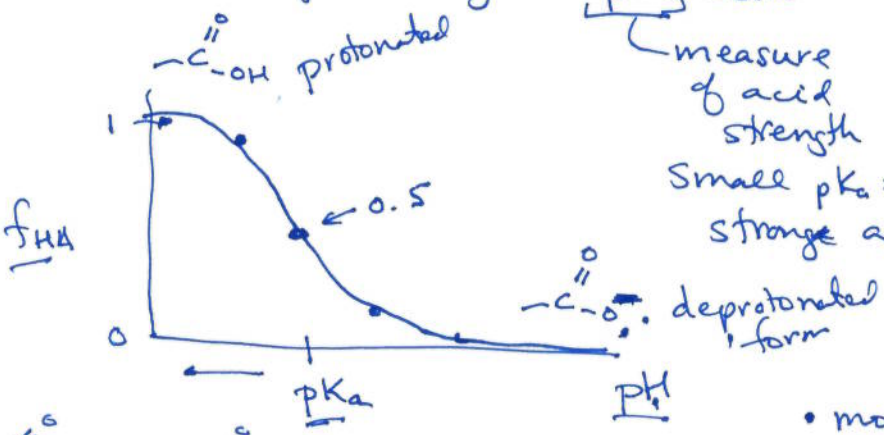
low pH ⇒ high $[H^+]$

f_{HA} - fraction protonated.

⇒ predict given pKa acid

pKa – measure of acid strength

Small pKa = strong acid



$-C(=O)-OH \rightleftharpoons -C(=O)-O^-$

$-NH_3^+ \rightleftharpoons -NH_2$

- molecules with no charges can pass through membranes.

Biology

- Prokaryotic cells
- Eukaryotic cell
- Virus.

] compare & contrast

difference & similarities

- organelle function
  - ribosome, golgi, Endo reticulum.

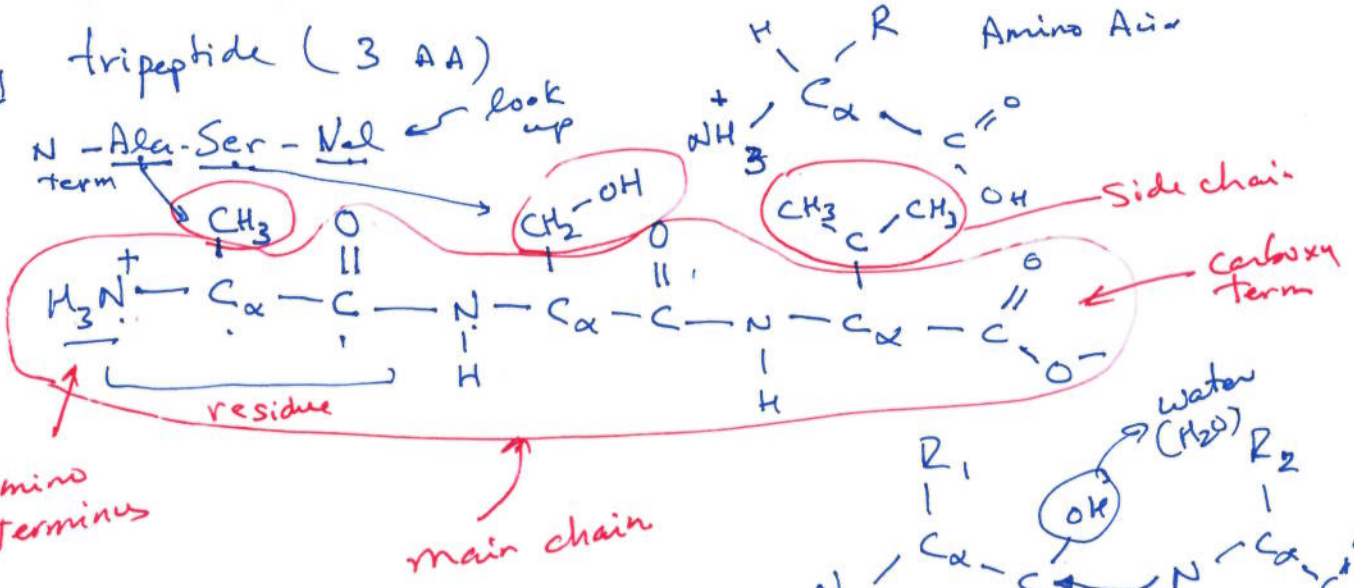
Protein structure

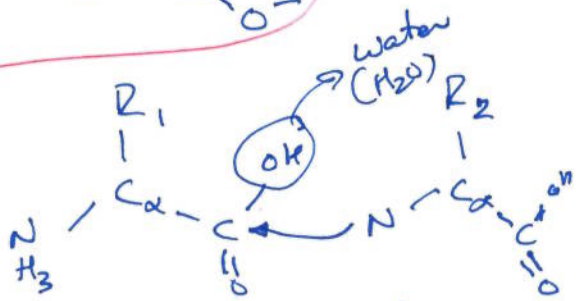
- primary – A.A. sequence (N → C term) (")
- Secondary – mainchain structures < α-helix / β-sheet (")

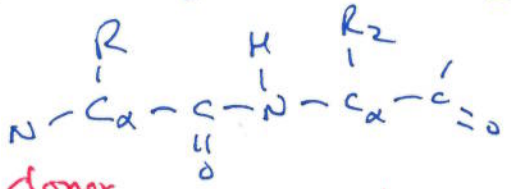
functional forms:
- tertiary – complete structure one chain (all proteins) (folded form)
- quaternary – multiple chain (Ab)

Primary

tripeptide (3 AA)

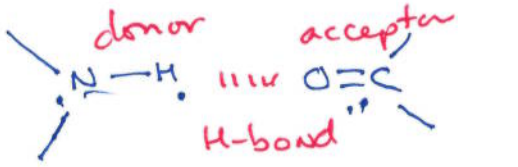


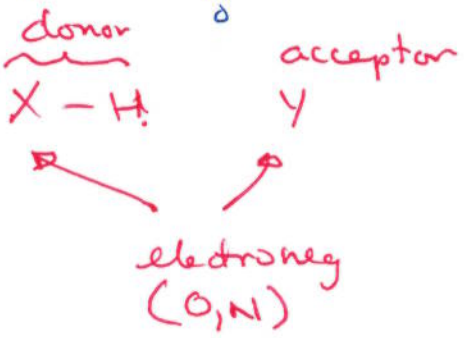




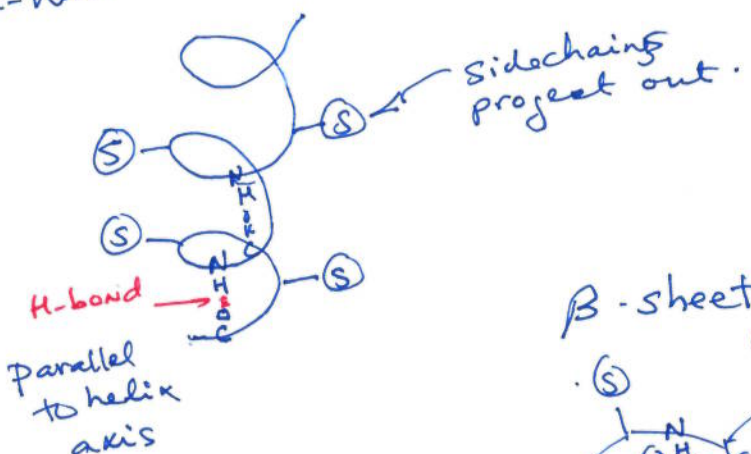
Secondary

- mainchain H-bonds

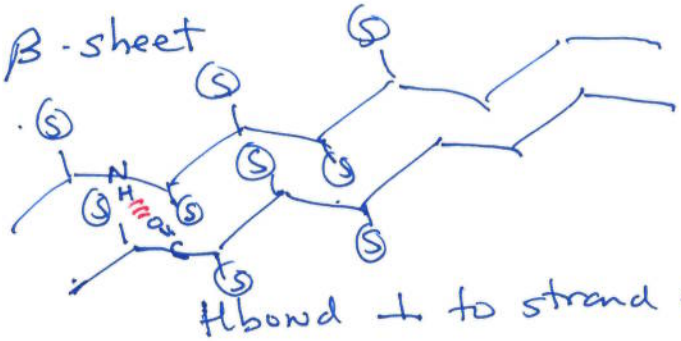




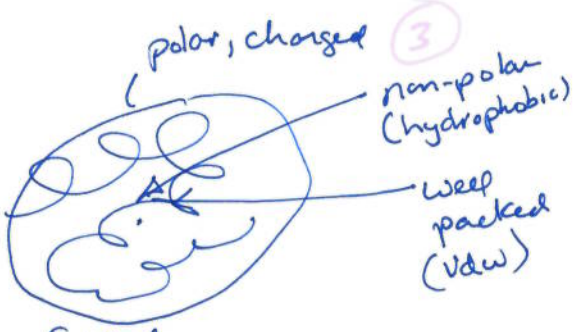
α-helix



β-sheet



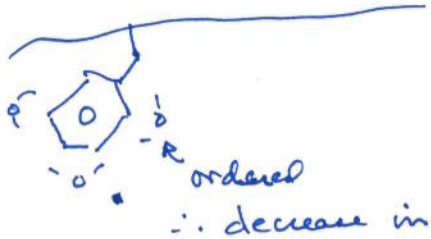
Tertiary Structure



folded.

- stabilized by disorder of unfolded chain

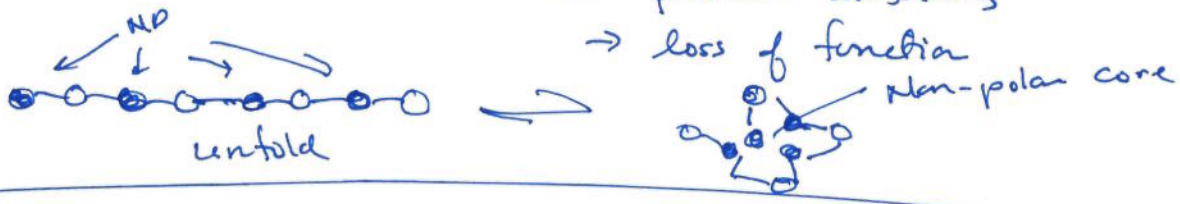
- Vdw → good packing in core
- Hydrophobic effect. (water released from non-polar burial ⇒ increase in disorder of water)
- H-bonds



∴ 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

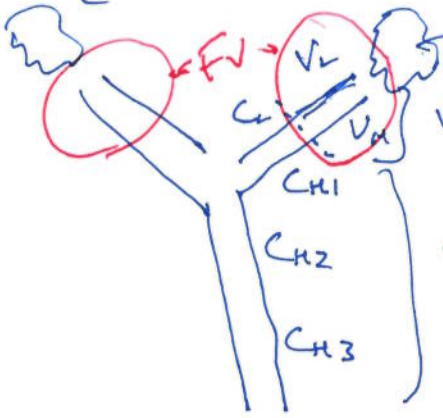


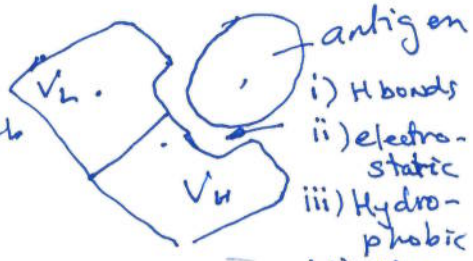
Immunology

- T_C
- T_H
- B
- Plasma

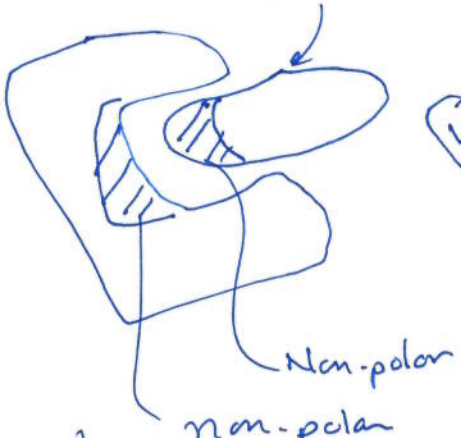
} know what cells do

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

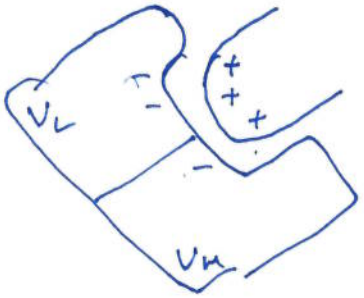




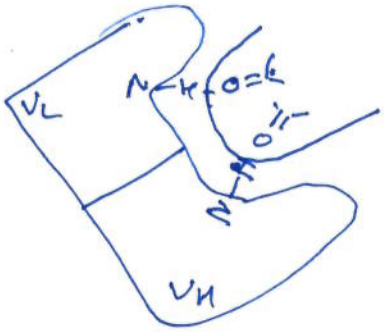
Pollen



E. coli



flu



Vdw	✓	✓	✓
Hbonds	X	X	✓
Hydro	✓	X	X
elect	X	✓	X