(6) **Today**

Section 2.1 and 2.2: The Multiple Roles of Water

Next Class (7)

Sections 2.3 - 2.5: Buffers and Solubility IN the Aqueous World

(8) **Second Class from Today**

Chap 3: Amino Acids, Peptides, and Proteins

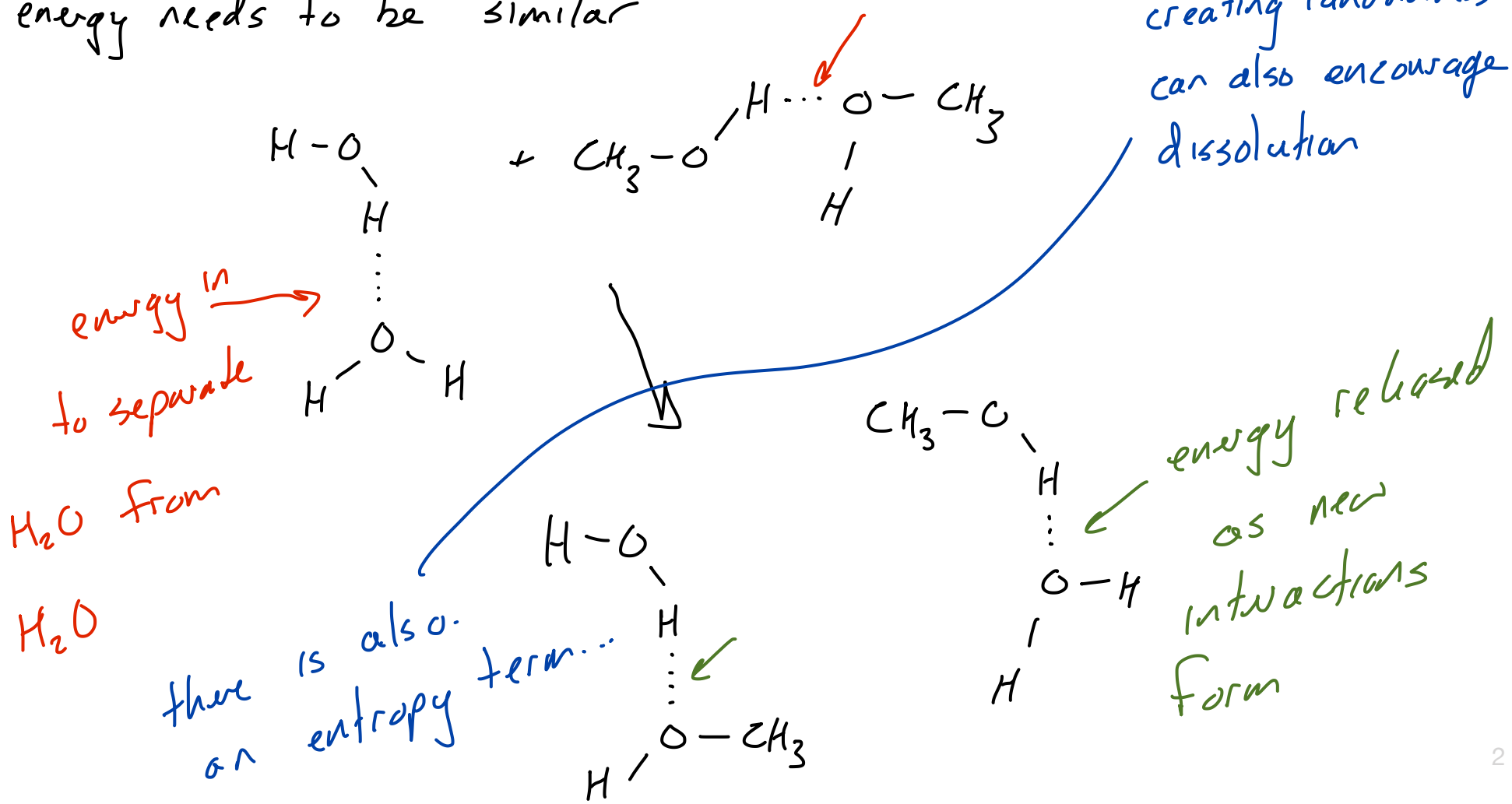
Third Class from Today (9)

Chap 3: Amino Acids, Peptides, and Proteins

Solubility like dissolves like

The solute and the solvent interactions have to be similar to the solute - solute and solvent - solvent interactions ...

energy needs to be similar



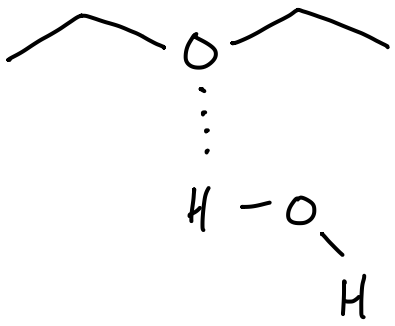
Solubility

Ether is slightly soluble in H_2O

molecules that have H-bond acceptors

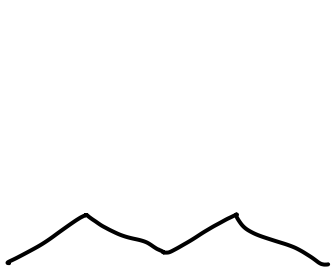
H-bond with H_2O ... and this

increases there H_2O solubility

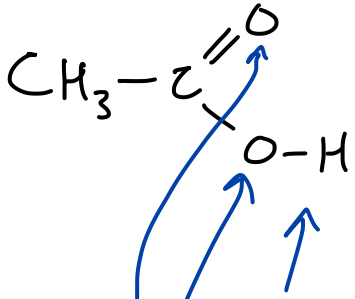


Degrees of Solubility

Ether 60 g/L



.001 g/L



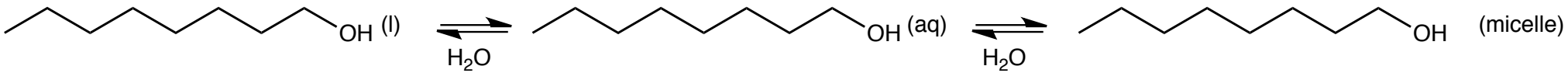
+ 100% miscible in water

H-bond donor +

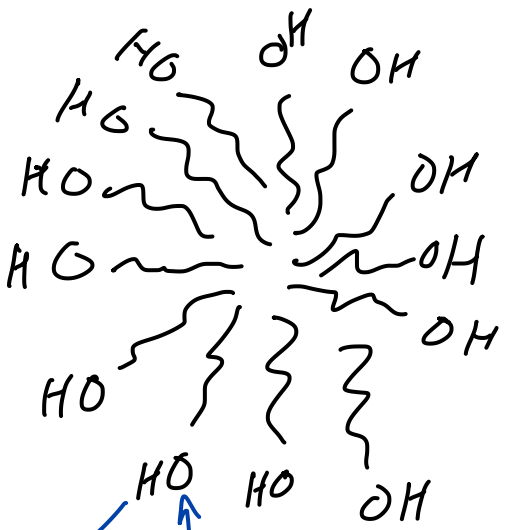
H-bond acceptor

with an H bond donor/acceptor on the organic molecule

3 C atoms can be dragged 100% into aqueous soln



two layers form when octanol is added to H_2O



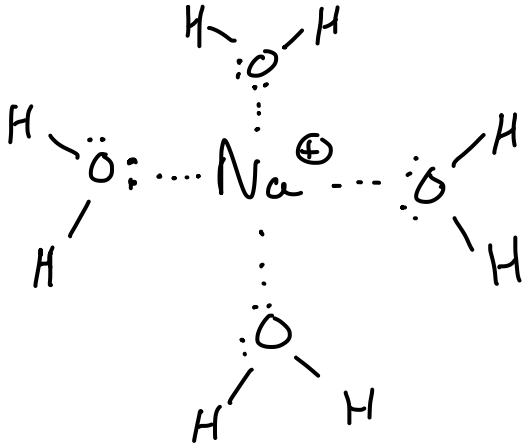
but a small amount of octanol dissolves and the aqueous octanols can form micelles

H-bond donor

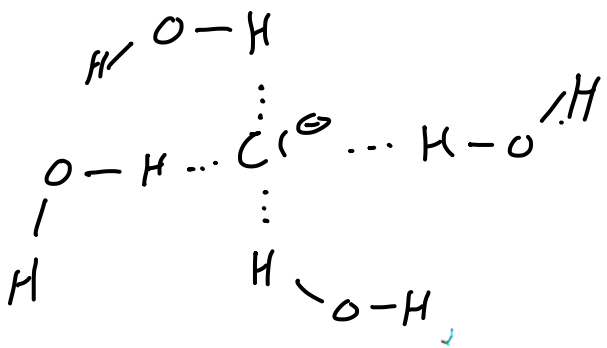
H-bond acceptors

intract well with water

Ions like Ca^{2+} and Fe^{2+}



$NaCl(s) + H_2O \rightarrow Na^{\oplus}(aq) + Cl^{\ominus}(aq)$



No problems with some metals... like Na^+, K^+, but Fe^{2+} + Ca^{2+} ....

Fe^{2+} is not a stable oxidation state

$\downarrow O_2$

rust Fe^{3+}

also, iron carbonates are not soluble

$CaCl_2$ soluble

$\downarrow H_2O$

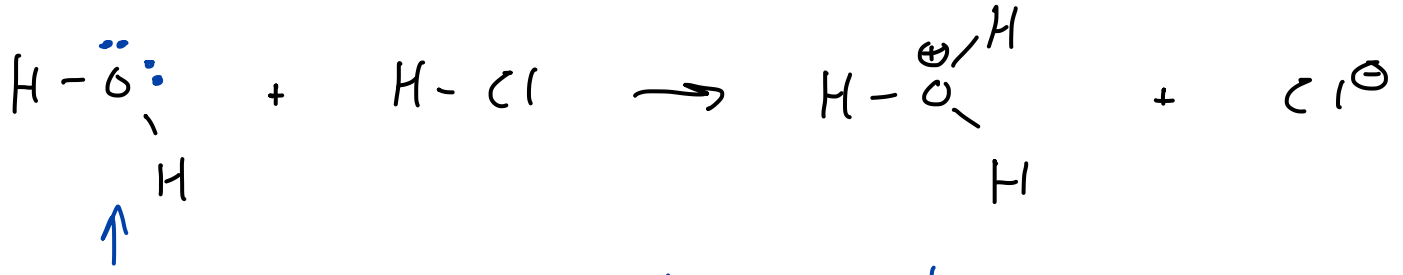
Ca^{2+}

$\downarrow CO_2 + H_2O$

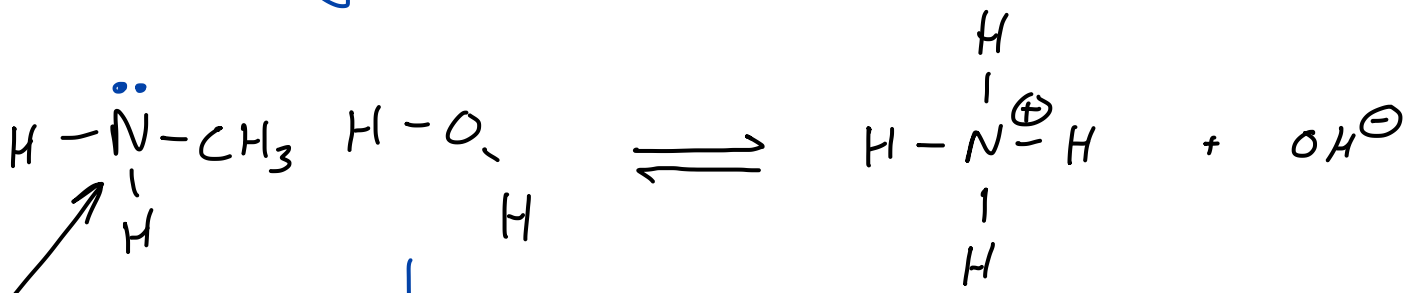
$CaCO_3$ not particularly soluble in water

Fig 2.1.3 Human Heavy Chain Ferritin proteins to move ions around

https://bio.libretexts.org/@api/deki/files/54270/4zjk_Ferritin_120Fes.png?revision=1

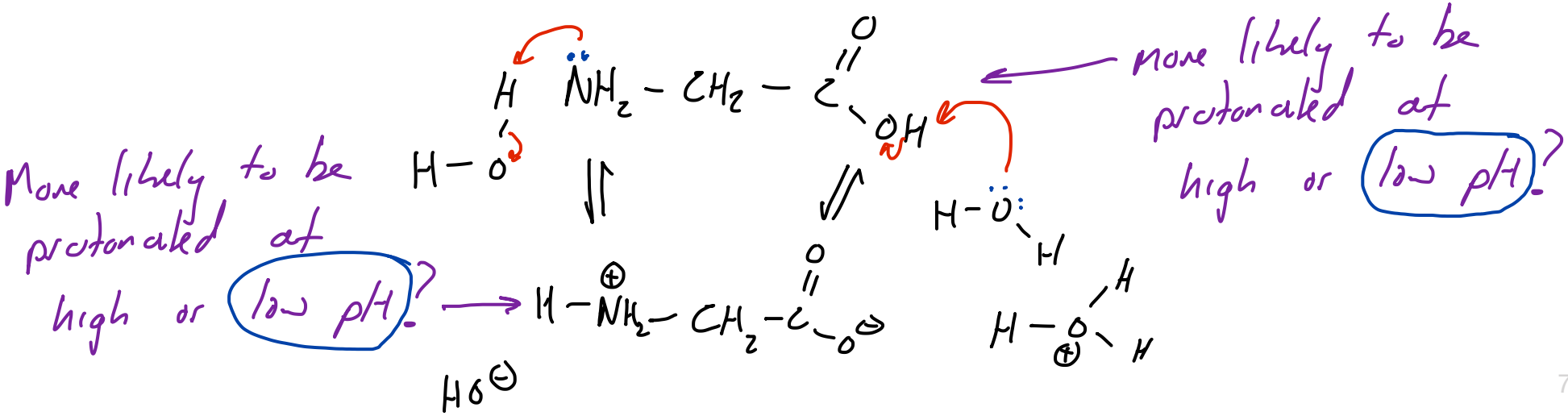


H_2O acting as a proton acceptor

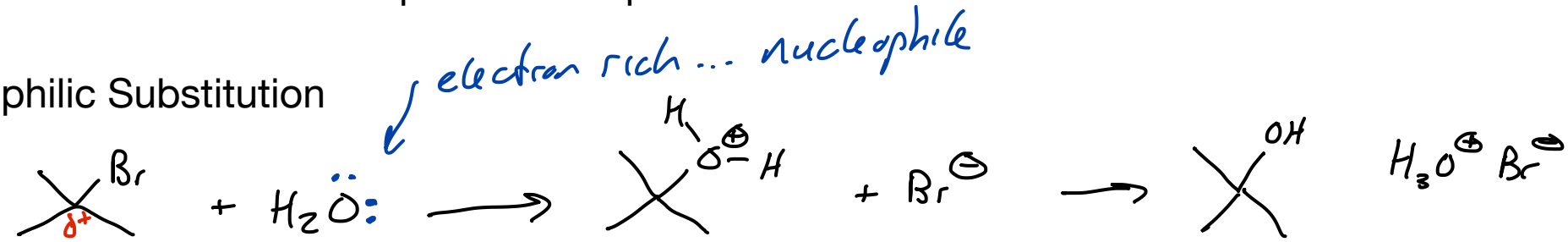


amine

proton donor Bronsted-Lowry acid

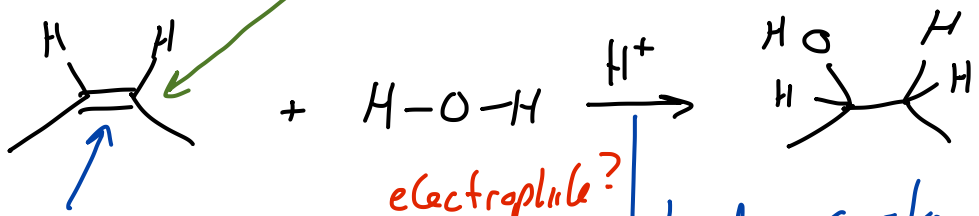


Nucleophilic Substitution



among other places we see π bonds in fatty acids

Hydration of an Alkene



e⁻ rich nucleophile

electrophile?

kinda sorta...

catalytic amount of H^+ H_3O^+ as electrophile

Acyl Substitution

Aspirin

acetylsalicylic acid

ASA

ester linkage seen in lipids

so if your aspirin smells like vinegar, don't use it!