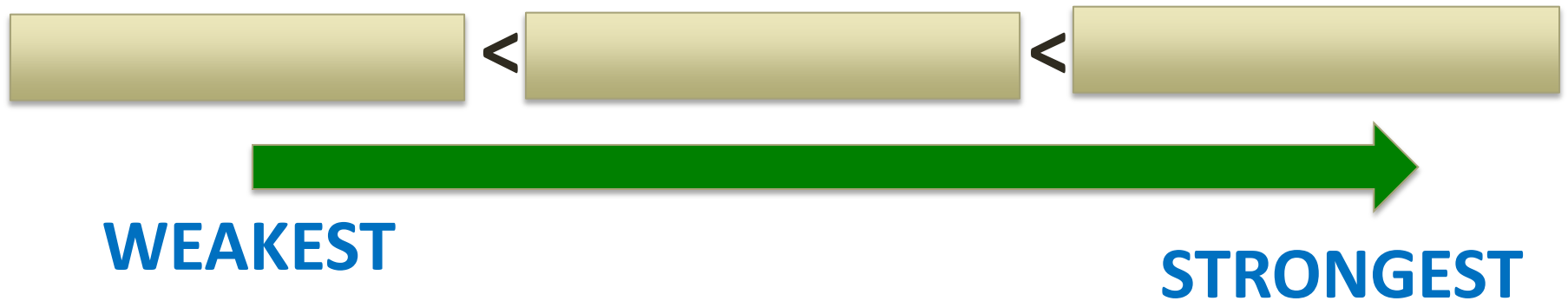


# Jumpstart #?????

- 1) Draw the Lewis dot diagram of  $\text{NH}_3$
- 2) Based on your drawing is  $\text{NH}_3$  polar or non polar?

# INTER molecular forces (forces between neighboring molecules)



# Dipole - Dipole

**ONLY OCCURS IN POLAR MOLECULES**

Partially negative portion of one polar molecule  
attracted to

Partially positive portion of the second polar molecule



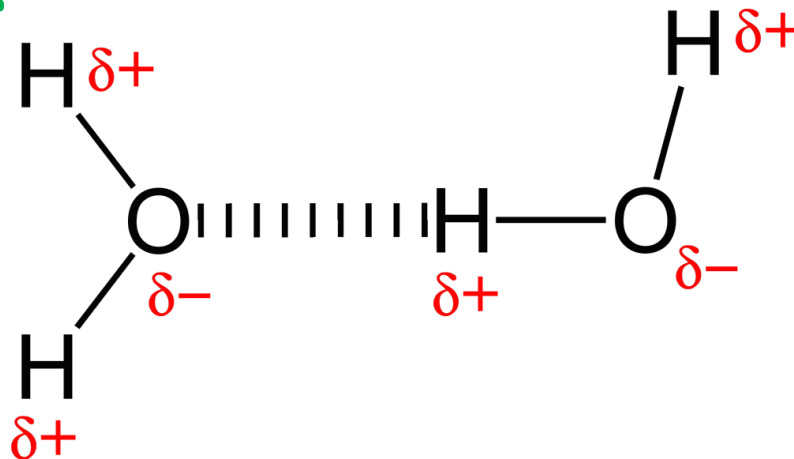
Example:  
2 molecules of HI



# Hydrogen Bonding

A TYPE OF DIPOLE-DIPOLE!  
(Strongest Kind!)

Must have:  
"H-NOF"



ATTRACTION BETWEEN:

the partially negative part of a lone pair on an O, F, or N atom

Hydrogen end of an O-H, N-H, or F-H bond

- +

# Important Example of H-Bonding

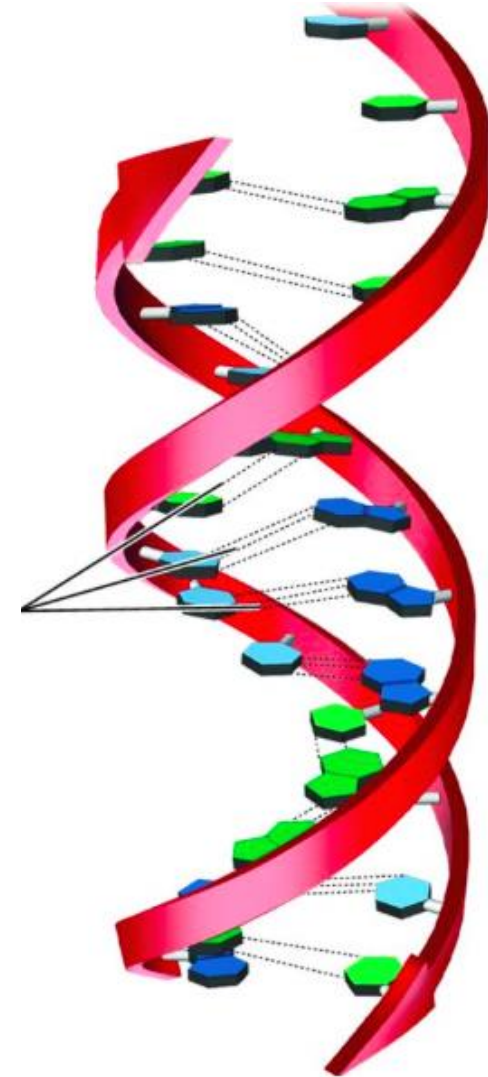
**DNA** Alpha helix shape-

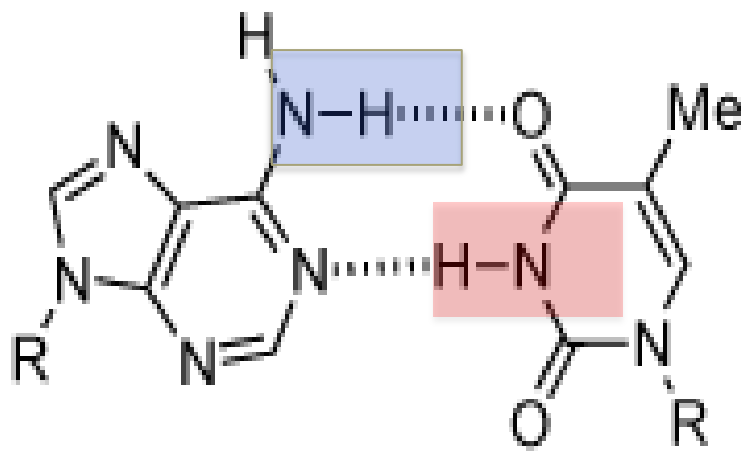
Nucleic acids “bond” A to T and C to G



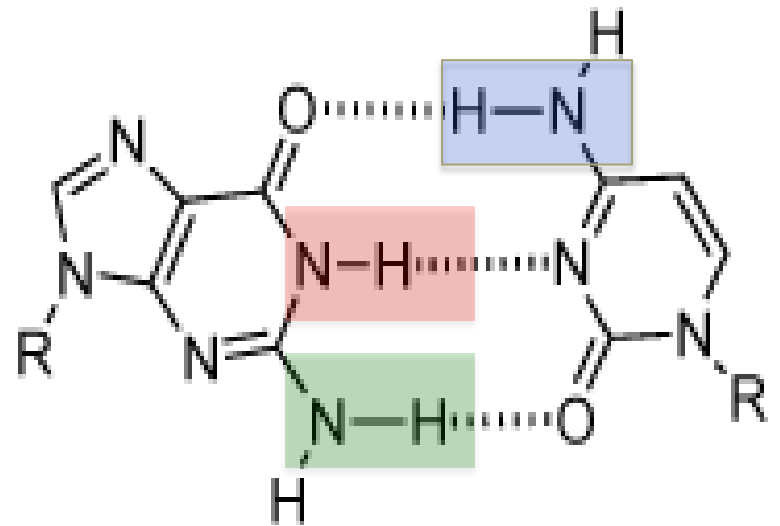
Generic DNA picture

**H bonds**



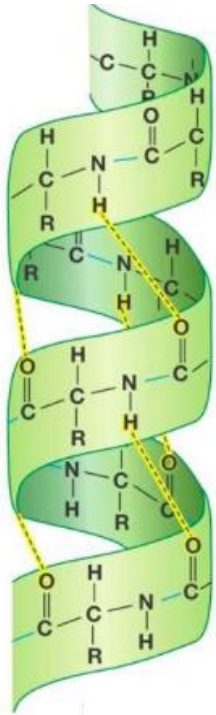


A·T base pair

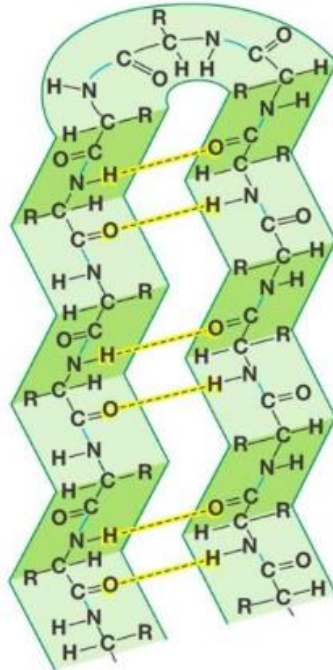


G·C base pair

# H bonding in protein shapes

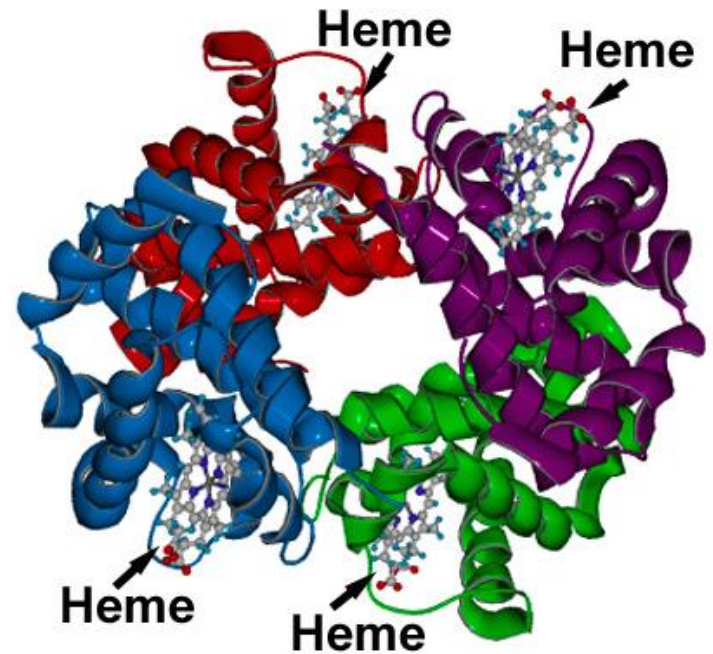


Alpha helix



Beta sheets

**Proteins** – chain of amino acids  
Secondary structures: beta sheets and alpha helix

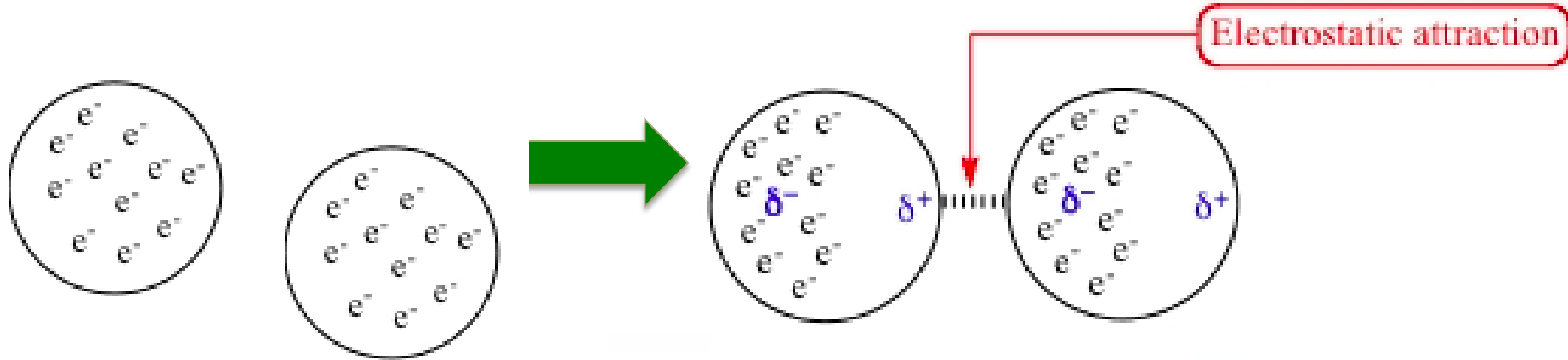


**Hemoglobin protein**

# London Forces

**VERY WEAK and TEMPORARY!!!!**

Caused by temporary **unequal** electron distribution that makes weak and temporary dipoles.



Example  $I_2$





# Interactions in solids

## Combination of:

intramolecular AND intermolecular forces  
in a “large” or “bulk” scale

## 3 types

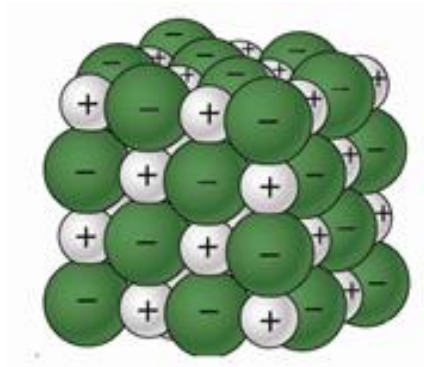
Ionic Lattice

Metallic

Network covalent

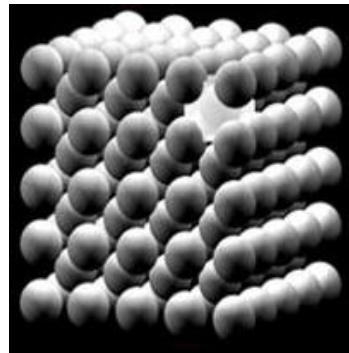
**Ionic lattice** - ions stack in an ordered fashion to form crystals

Example: NaCl



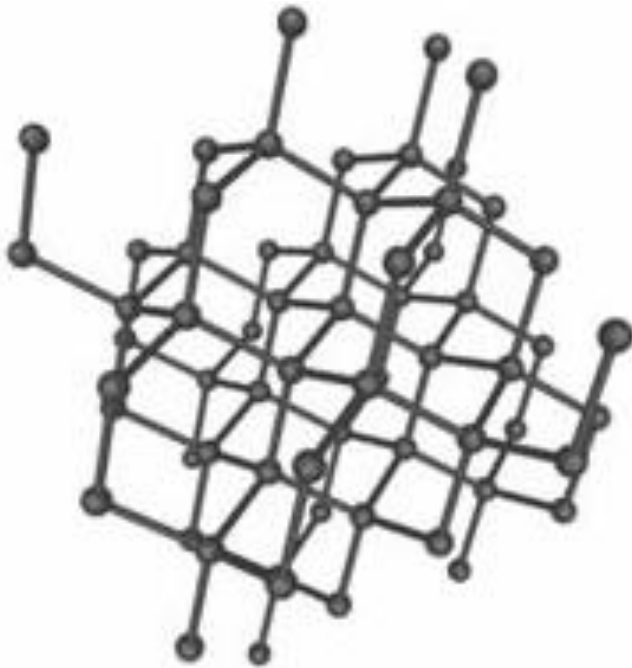
**Metallic** – Metal ions stack in an ordered fashion held together by the “sea of electrons” and the positive metal ions

Example: Fe

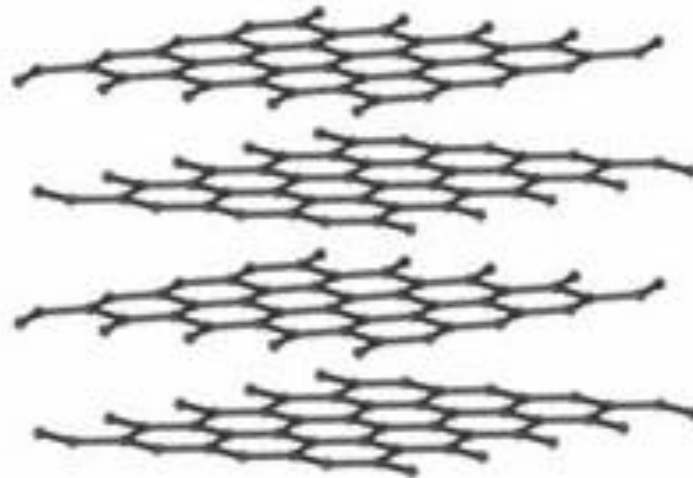


**Network covalent** – covalently bonded atoms in a continuous network

Example: Carbon



**Diamonds**



**graphite**