

HYDROGEN BONDING

Hydrogen bonding is a very important kind of intermolecular interaction in biological chemistry. It is a prevalent force in water and any reaction that takes place in it; it is the force that holds the two strands of the DNA helix together; and it is the most important force determining the structure of protein molecules.

Hydrogen is the most abundant element in the universe. It is ubiquitous in the molecules of life: most are **hydrocarbons**, and of course water is H₂O.

When hydrogen is bonded to an electron-withdrawing element, especially oxygen, it is a good candidate for H-bonding.

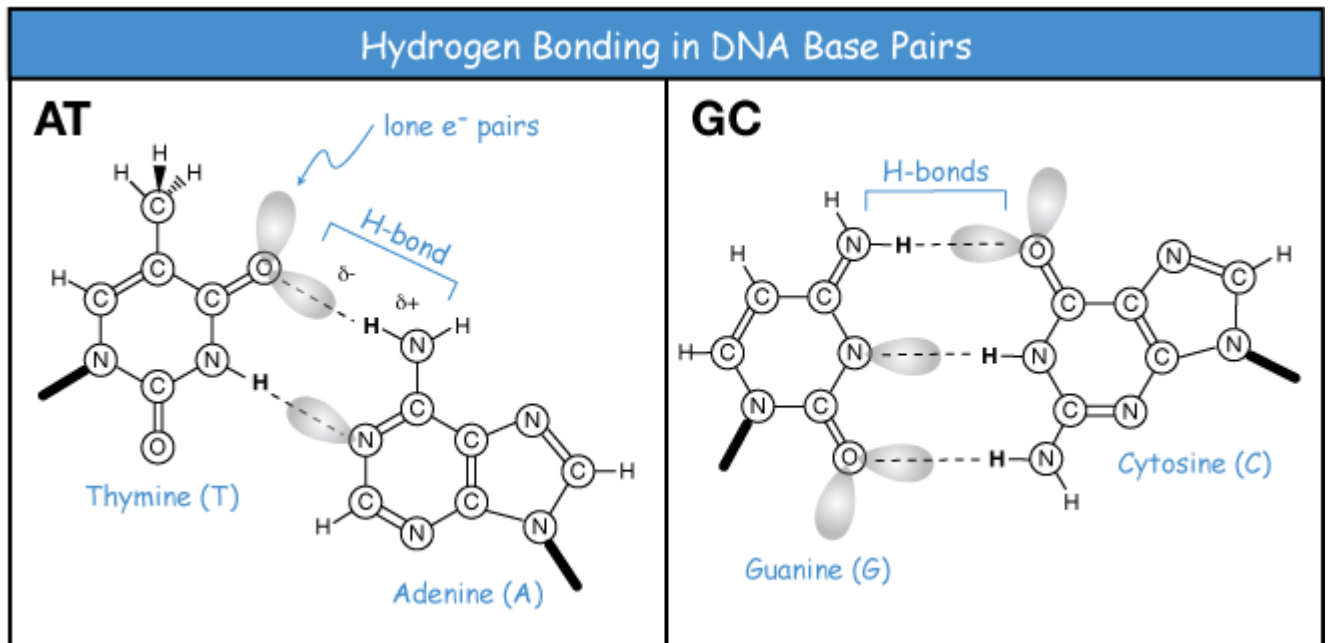
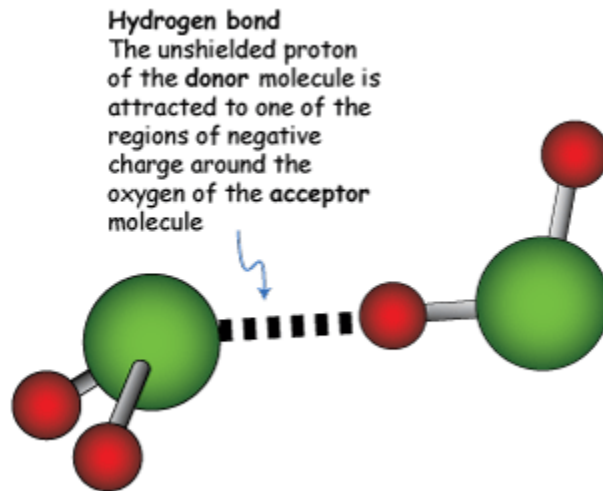
The essence of H-bonding is the attraction between an essentially bare proton (because it is attached to an electron-withdrawing atom) and an electron-rich atom, such as oxygen, which usually bonds in such a way as to expose two lone electron pairs.

The diagram below shows a H-bond between two water molecules.

The H-bonds between the bases of DNA are shown in the figure below. AT pairs are held together by two H-bonds and GC pairs by three.

Similar H-bonds hold the bases of RNA together to give RNA molecules their unique structures.

The alpha-helices and beta sheets, as well as other structural elements of proteins are held in place by H-bonds.



Source: <http://www.dracruz.com/IntermolecularForces.html>