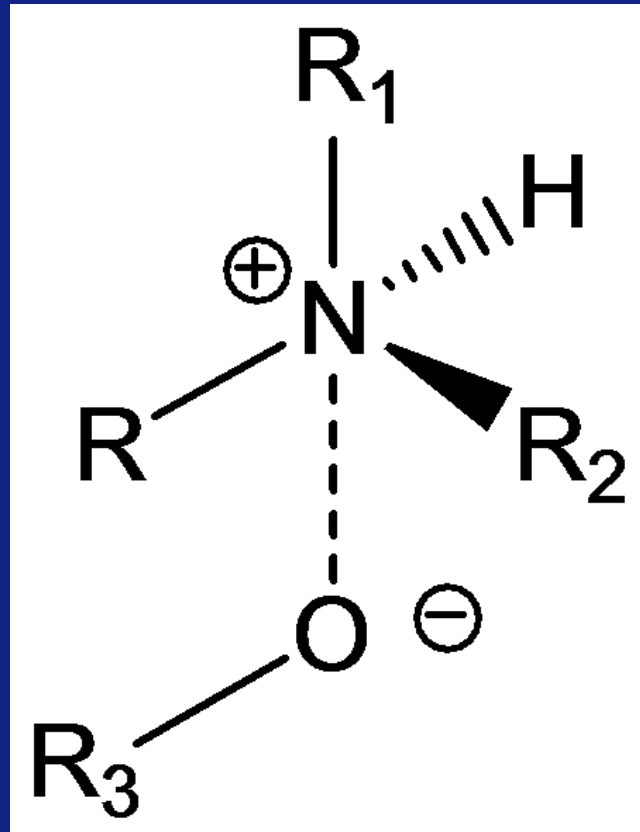
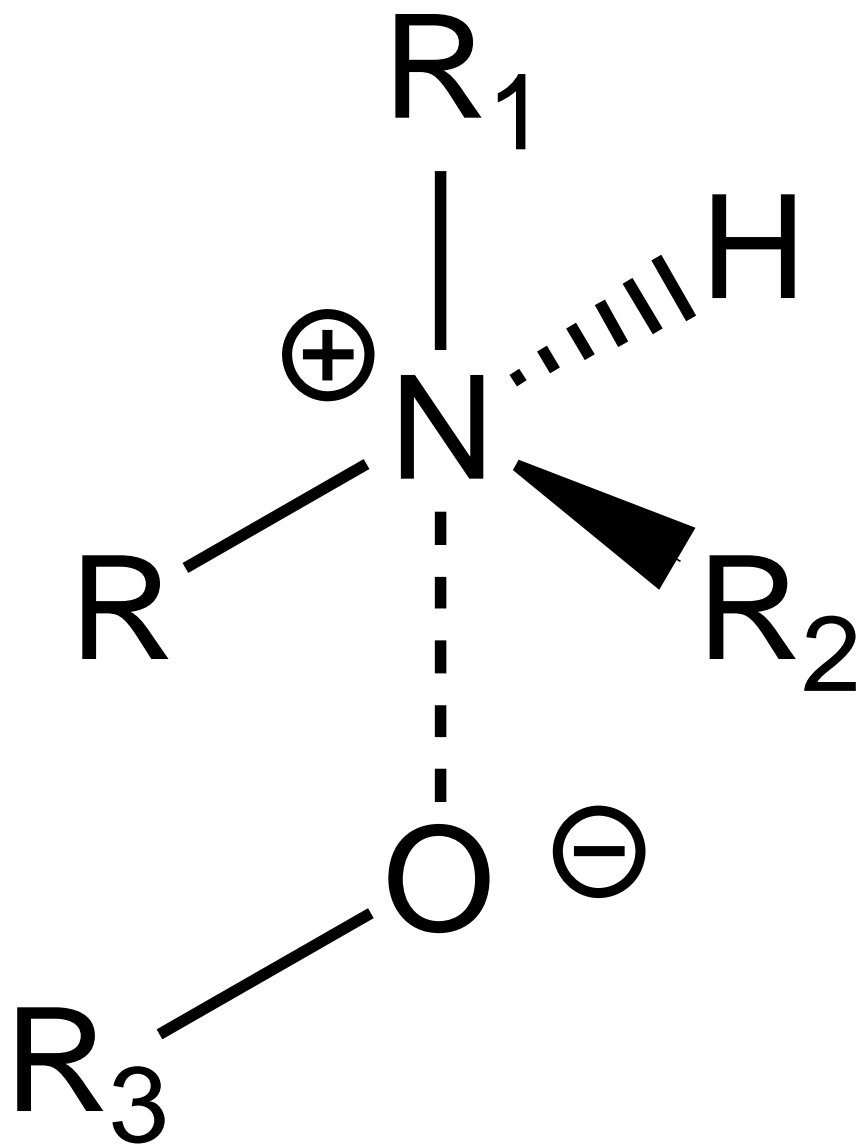


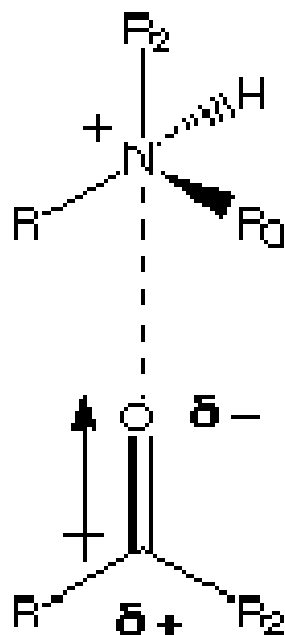
Drug-Receptor Bonding

Ionic : the strongest type of non-covalent bond. This results from the attraction of ions with opposite charges.



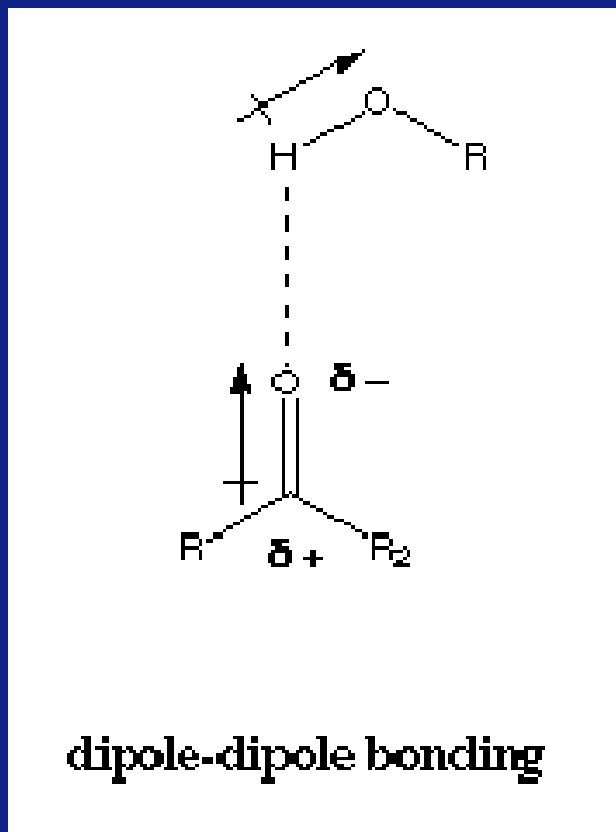


Ion-Dipole : results when there is an attraction between an ion and the partial charge of a dipole of the opposite polarity.



ion-dipole bonding

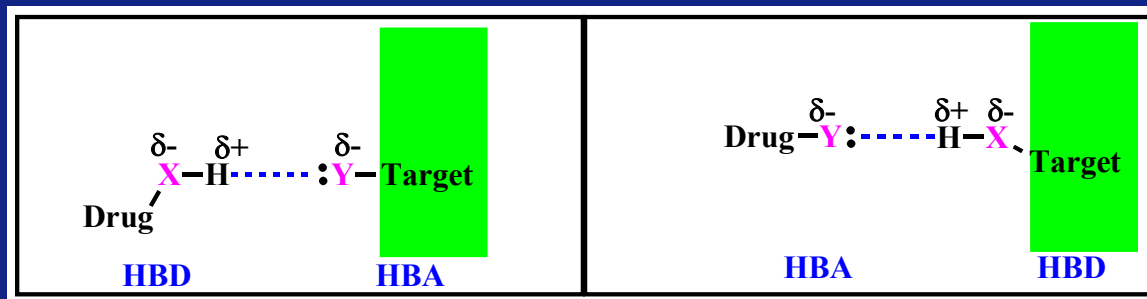
Dipole-Dipole : Here a partially positive atom in a dipole is attracted to a partially negative atom in another dipole.



Hydrogen Bonding: A dipole-dipole interaction where one of the constituents is a hydrogen atom attached to a heteroatom.

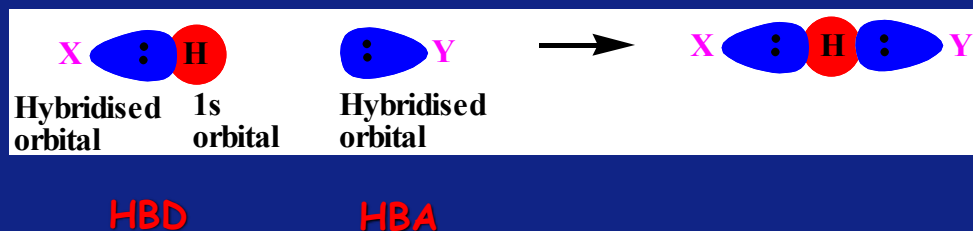
Hydrogen bonds

- Vary in strength
- Weaker than electrostatic interactions but stronger than van der Waals interactions.
- A hydrogen bond takes place between an electron deficient hydrogen and an electron rich heteroatom (N or O).
- The electron deficient hydrogen is usually attached to a heteroatom (O or N).
- The electron deficient hydrogen is called a hydrogen bond donor (HBD).
- The electron rich heteroatom is called a hydrogen bond acceptor (HBA).



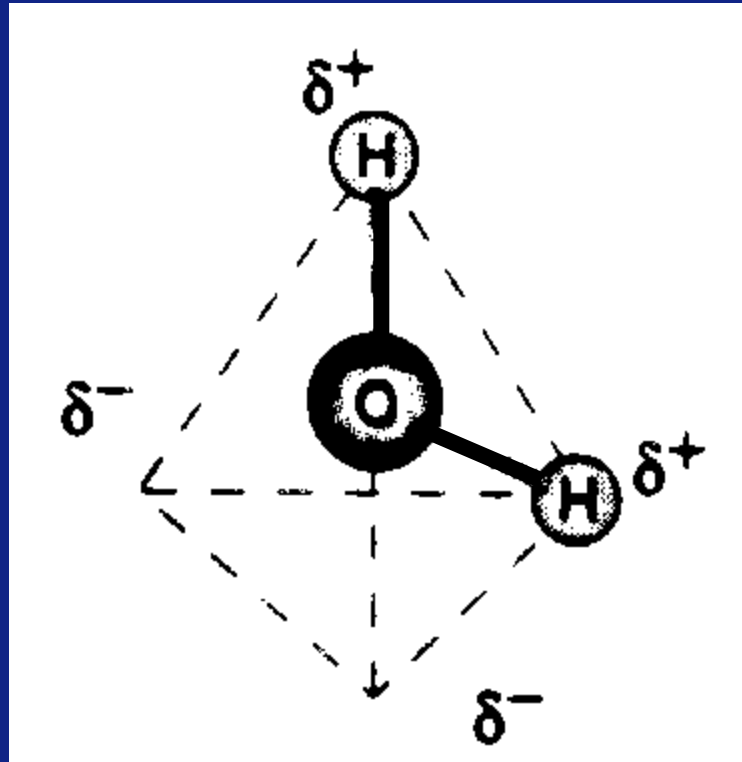
Hydrogen bonds

- The interaction involves orbitals and is directional.
- Optimum orientation is where the X-H bond points directly to the lone pair on Y such that the angle between X, H and Y is 180°.

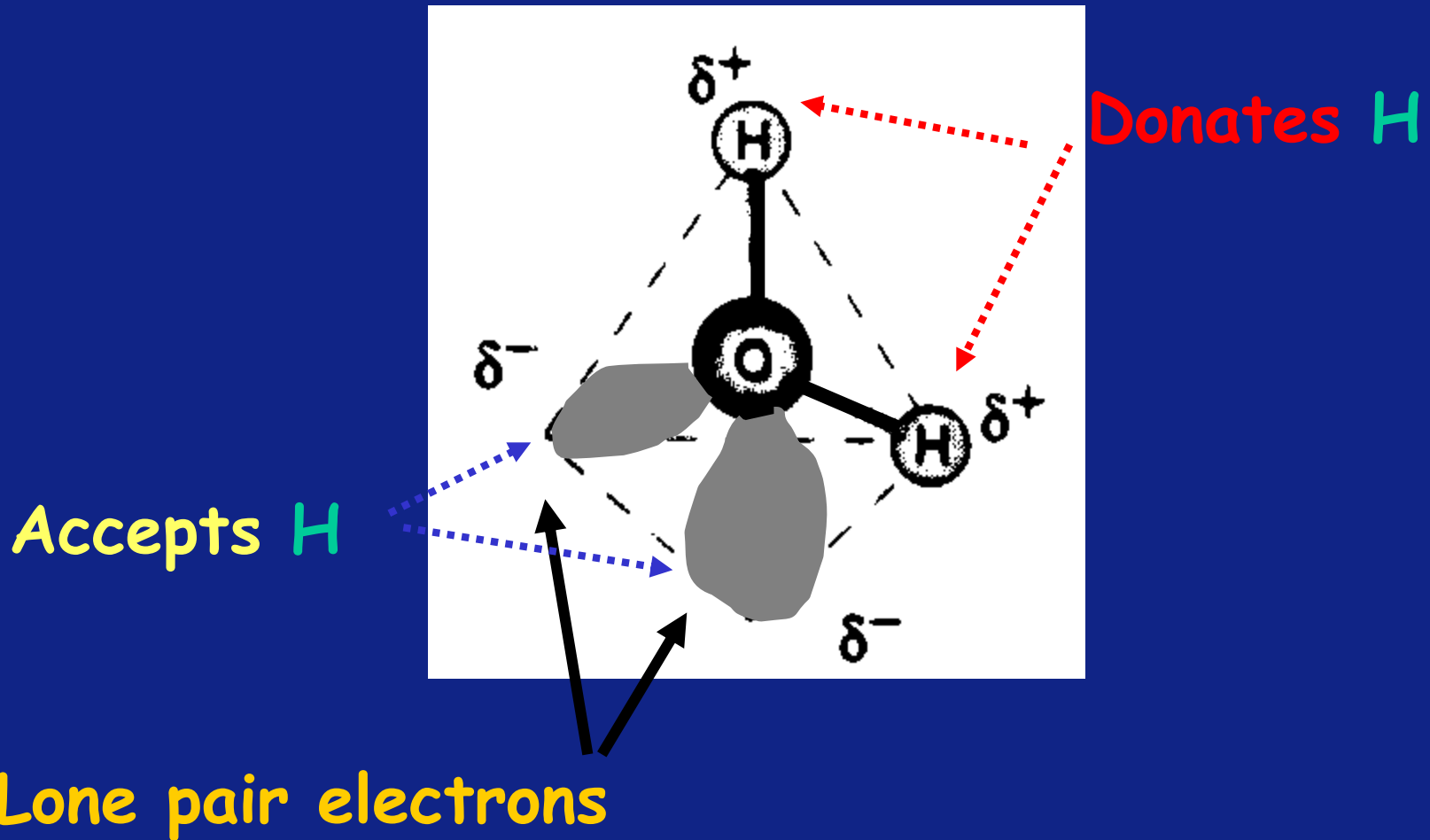


Hydrogen bonds

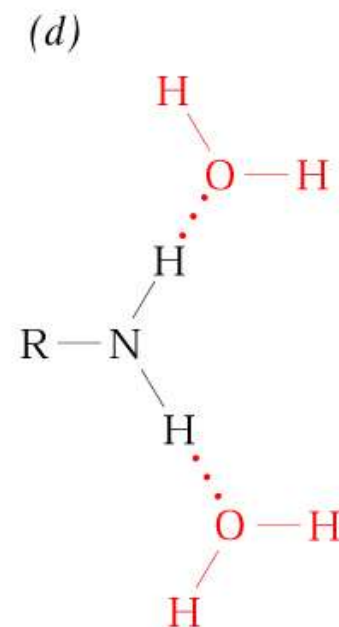
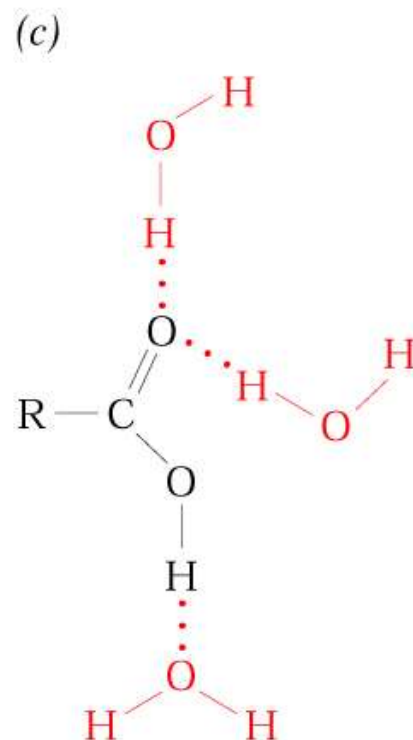
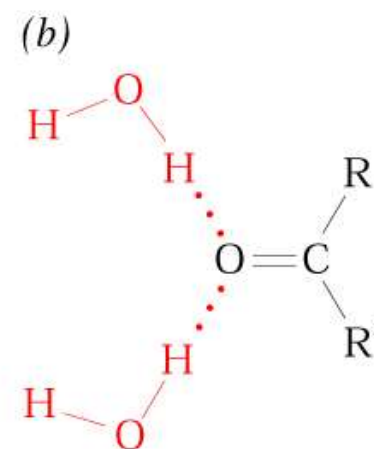
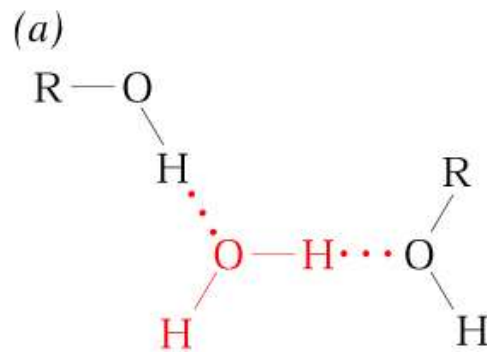
- Examples of strong hydrogen bond acceptors
 - carboxylate ion, phosphate ion, tertiary amine.
- Examples of moderate hydrogen bond acceptors
 - carboxylic acid, amide oxygen, ketone, ester, ether, alcohol.
- Examples of poor hydrogen bond acceptors
 - sulfur, fluorine, chlorine, aromatic ring, amide nitrogen, aromatic amine.
- Example of good hydrogen bond donors
 - Quaternary ammonium ion.

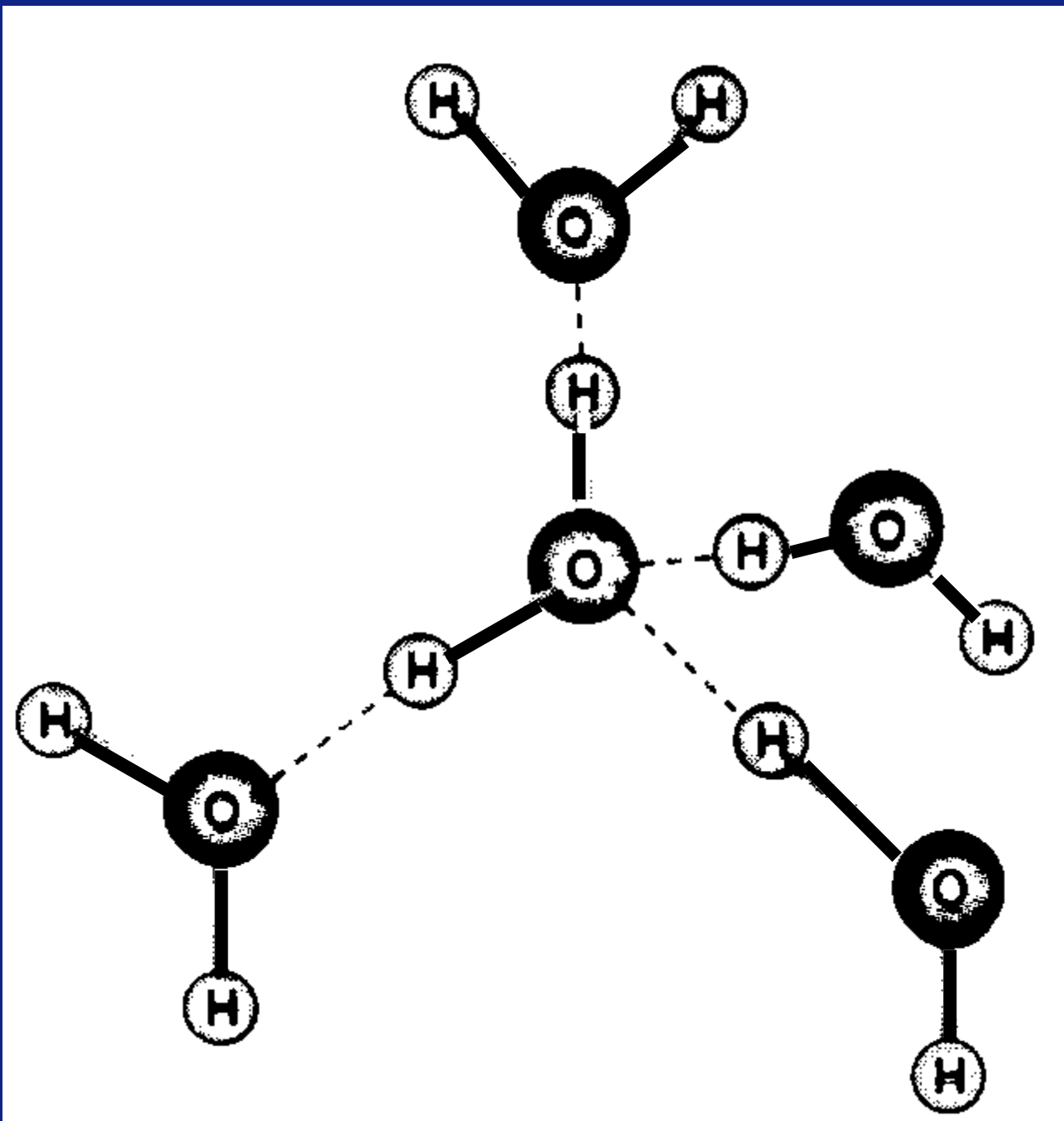


Water can act as an H-bond Donor or Acceptor

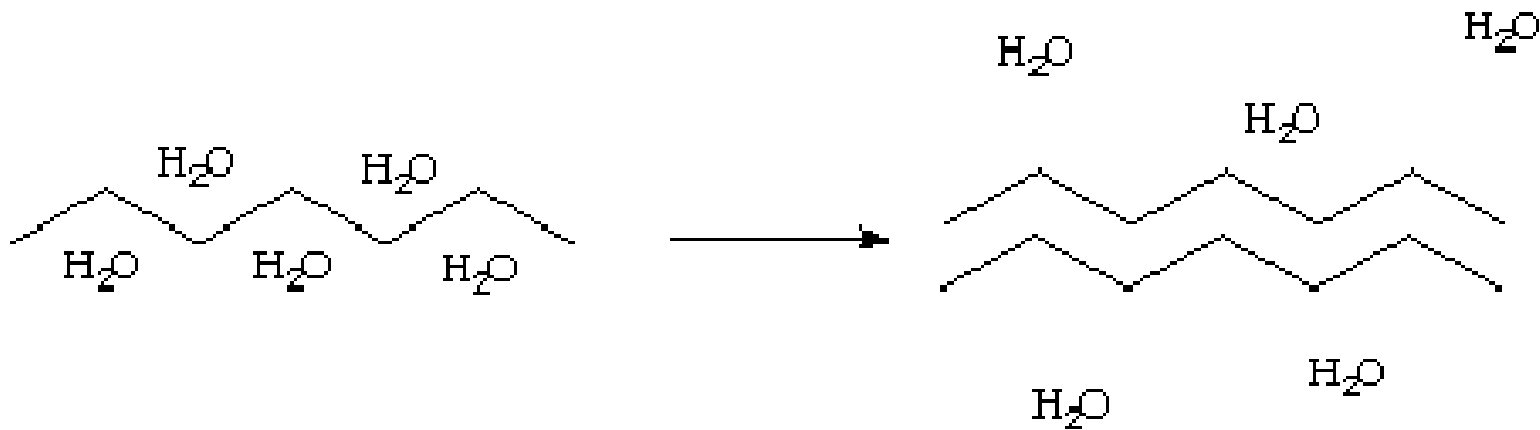


Examples of H-bonding interactions



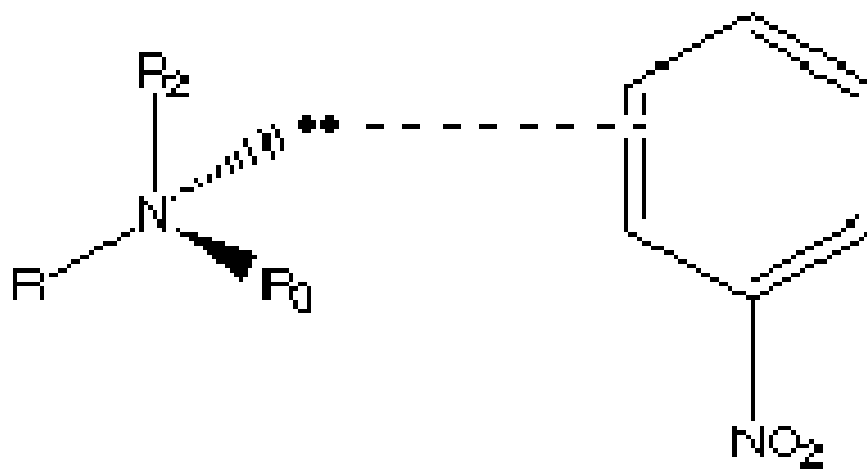


The Hydrophobic Effect : when two alkyl chains approach one another, water is extruded from the space in between them, resulting in an increase in entropy, and thus a decrease in energy.



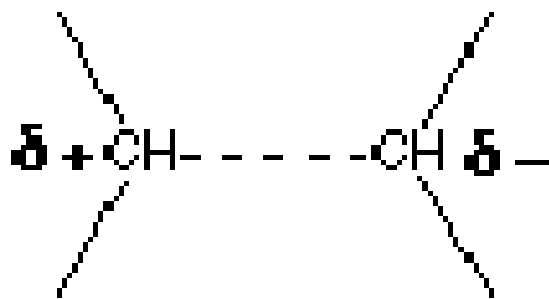
the hydrophobic effect

Charge-Transfer Complexes : a lone pair of electrons is "shared" with a neighboring group that has considerable π character.



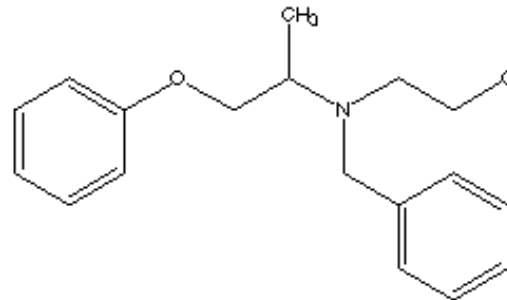
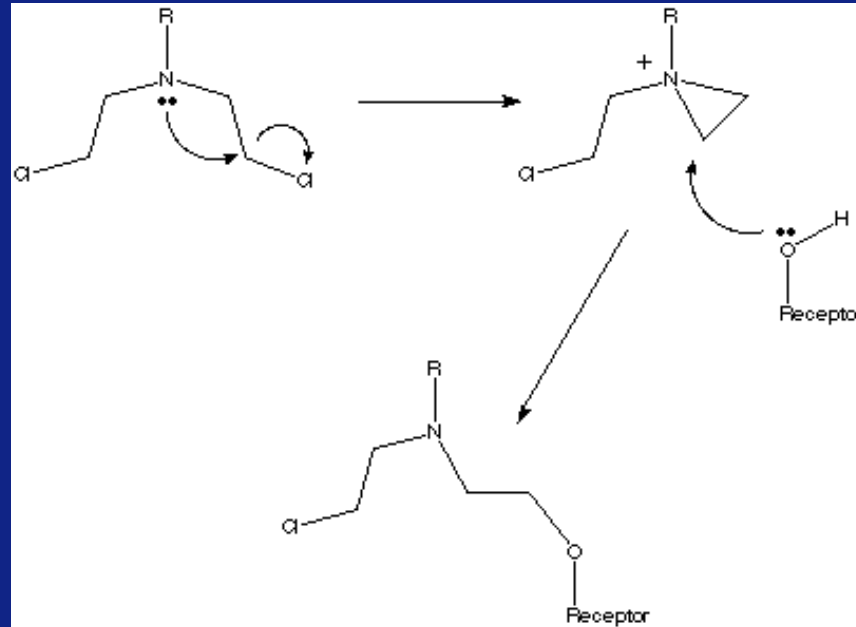
charge-transfer complex

Van der Waals Forces : one carbon in a chain approaches another carbon on a neighboring chain, causing a perturbation known as an **induced dipole**. These opposite partial charges then attract one another.



Van der Waals forces

➤ Drugs may also bind to receptors using **covalent bonding**. This may be a permanent bond, in which case the receptor or enzyme target is "killed", or it may be transient.



phenoxybenzamine

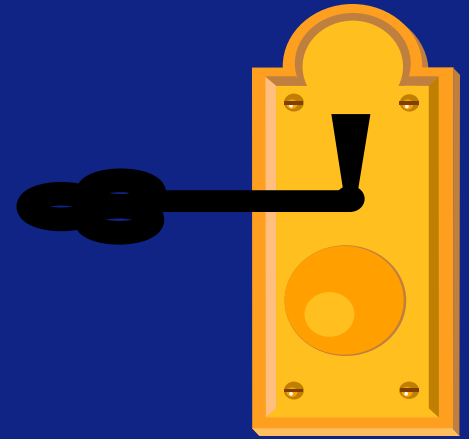
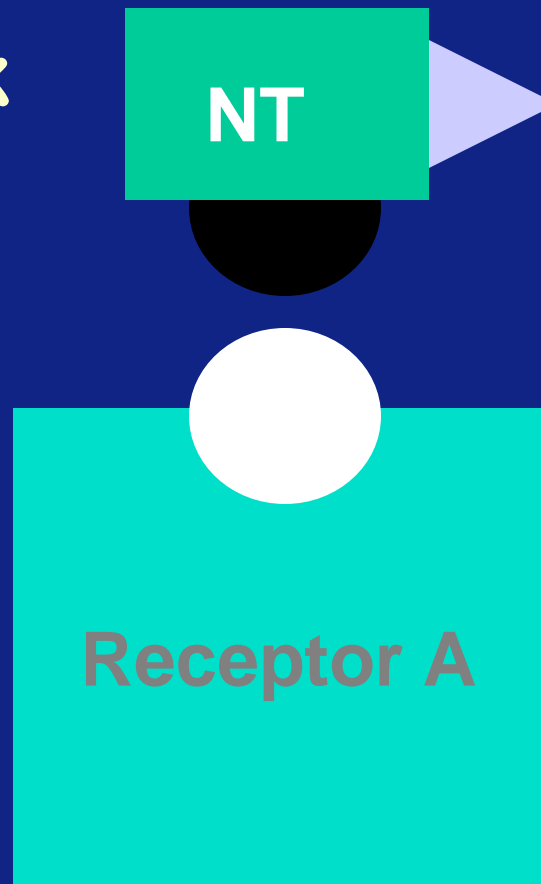
Drug Interaction with Receptor

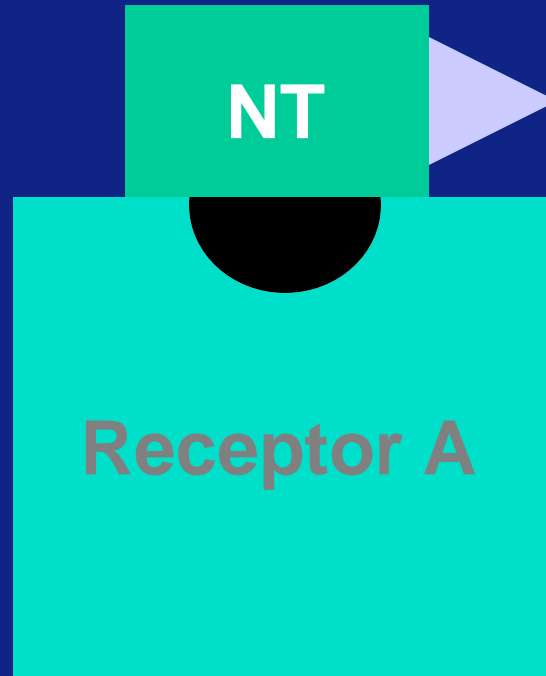
Lock & Key Model

- NT binds to receptor

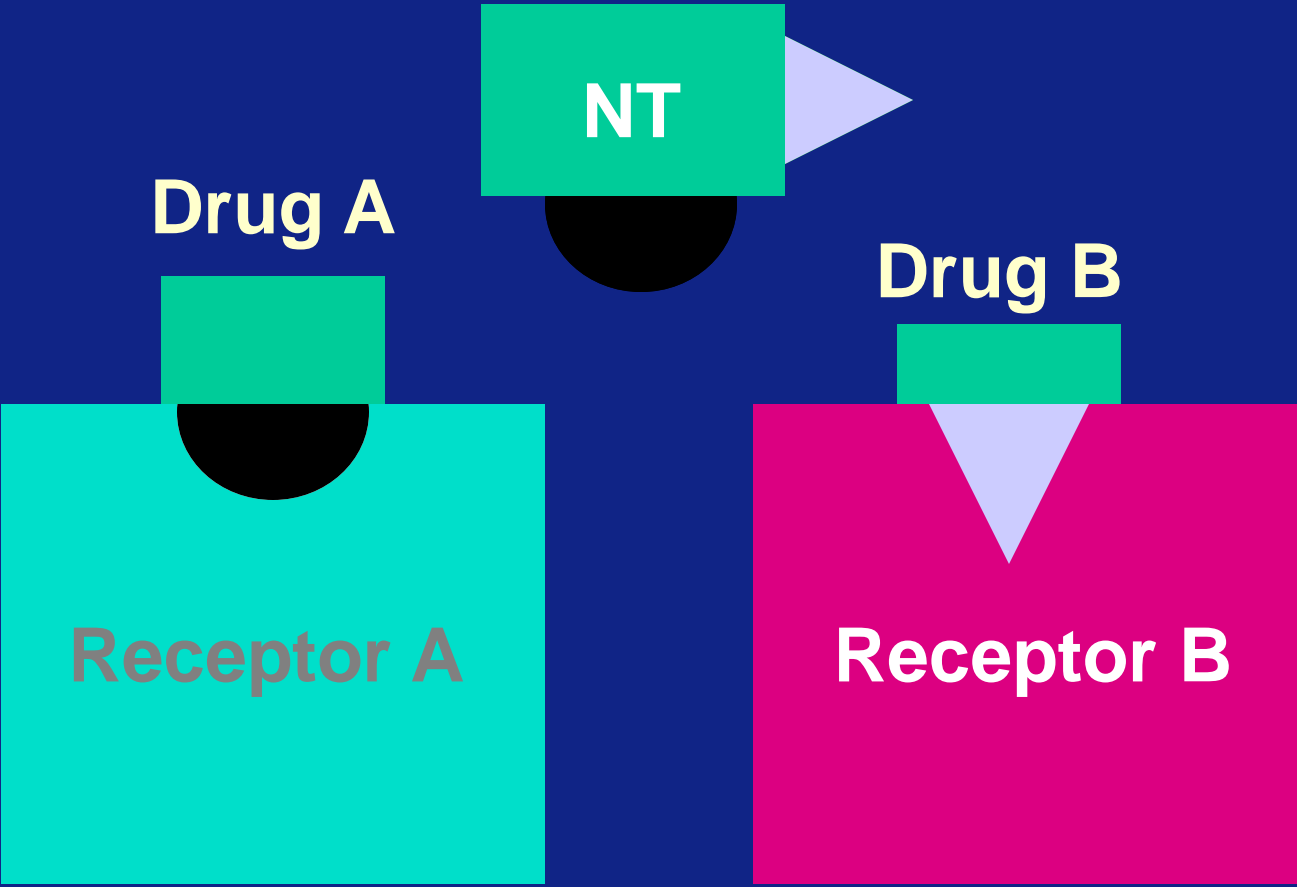
NT = key

Receptor = lock









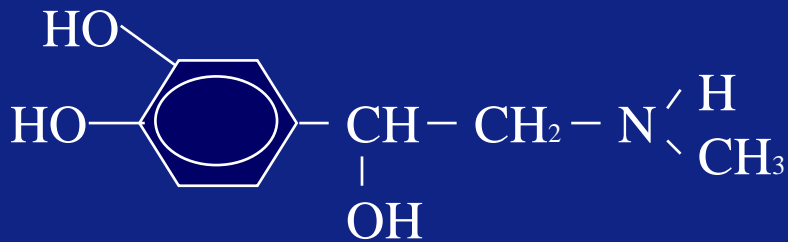
Drug A

NT

Drug B

Receptor A

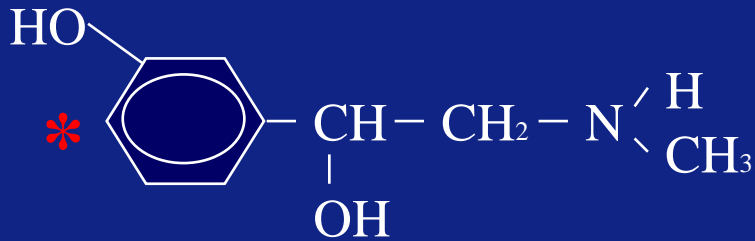
Receptor B



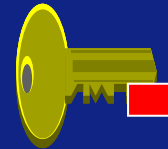
ADRENALINE =



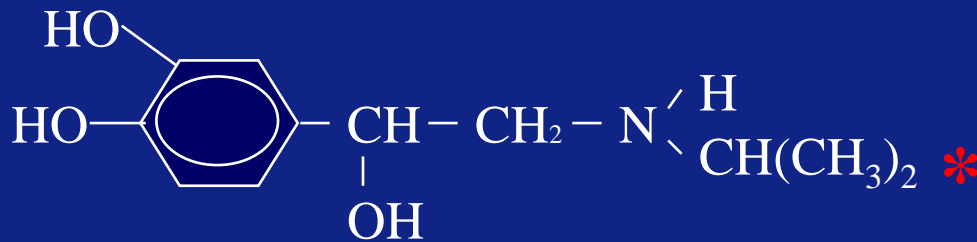
Activates α and β adrenoceptors



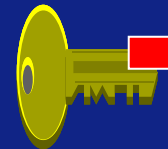
PHENYLEPHRINE =



Activates α adrenoceptors

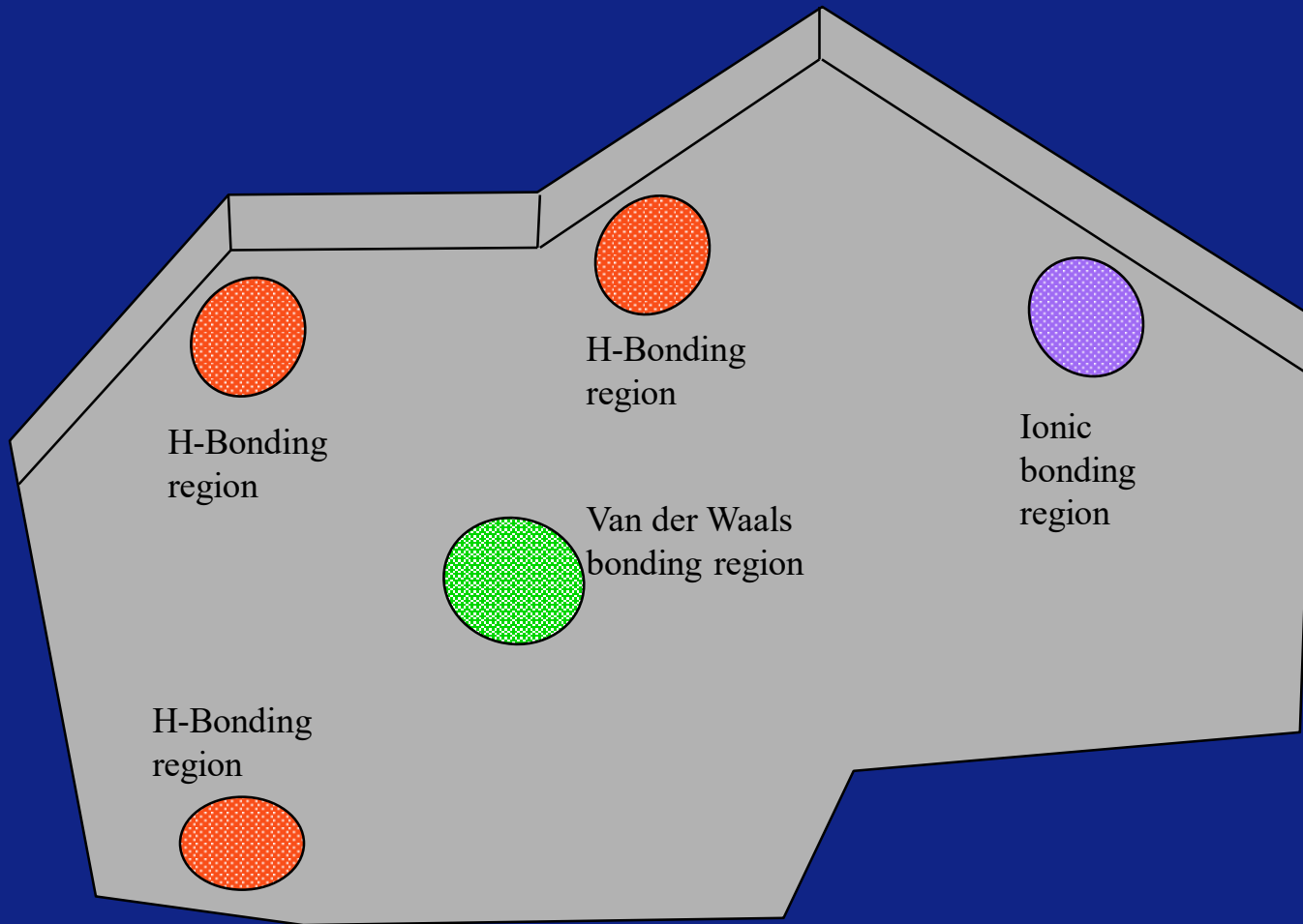


ISOPRENALINE =

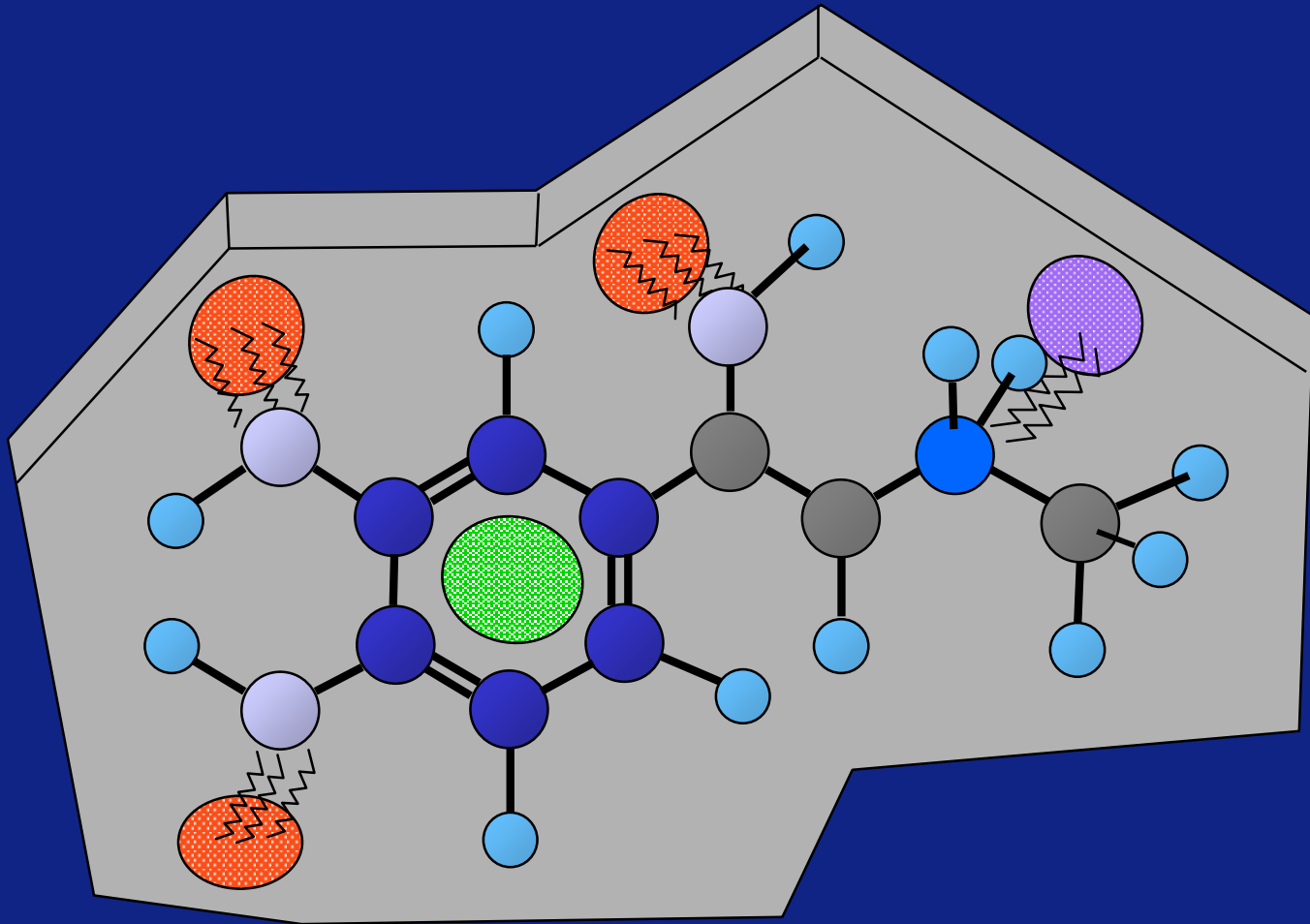


Activates β receptors

α -Adrenoceptor

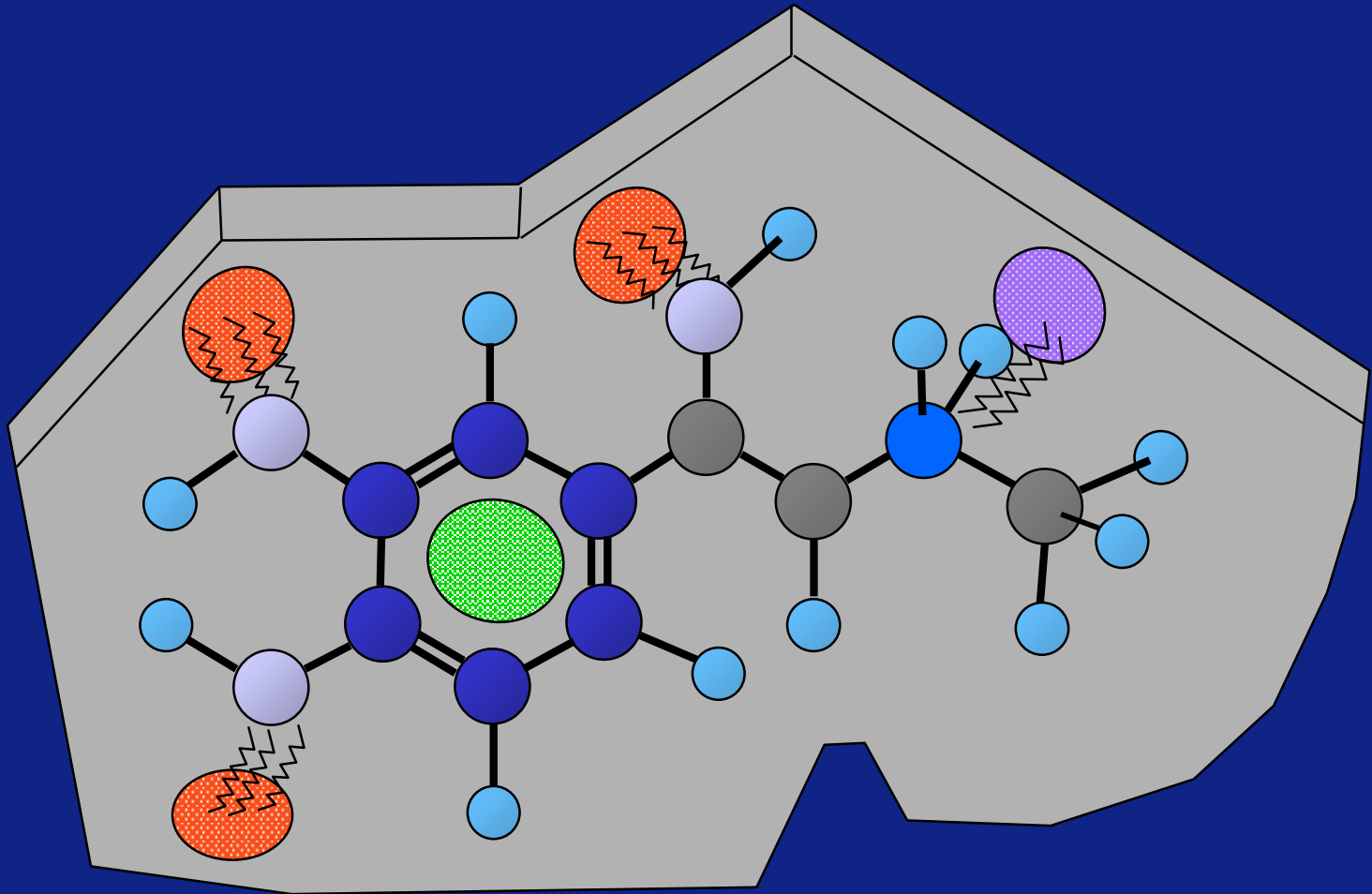


α -Adrenoceptor



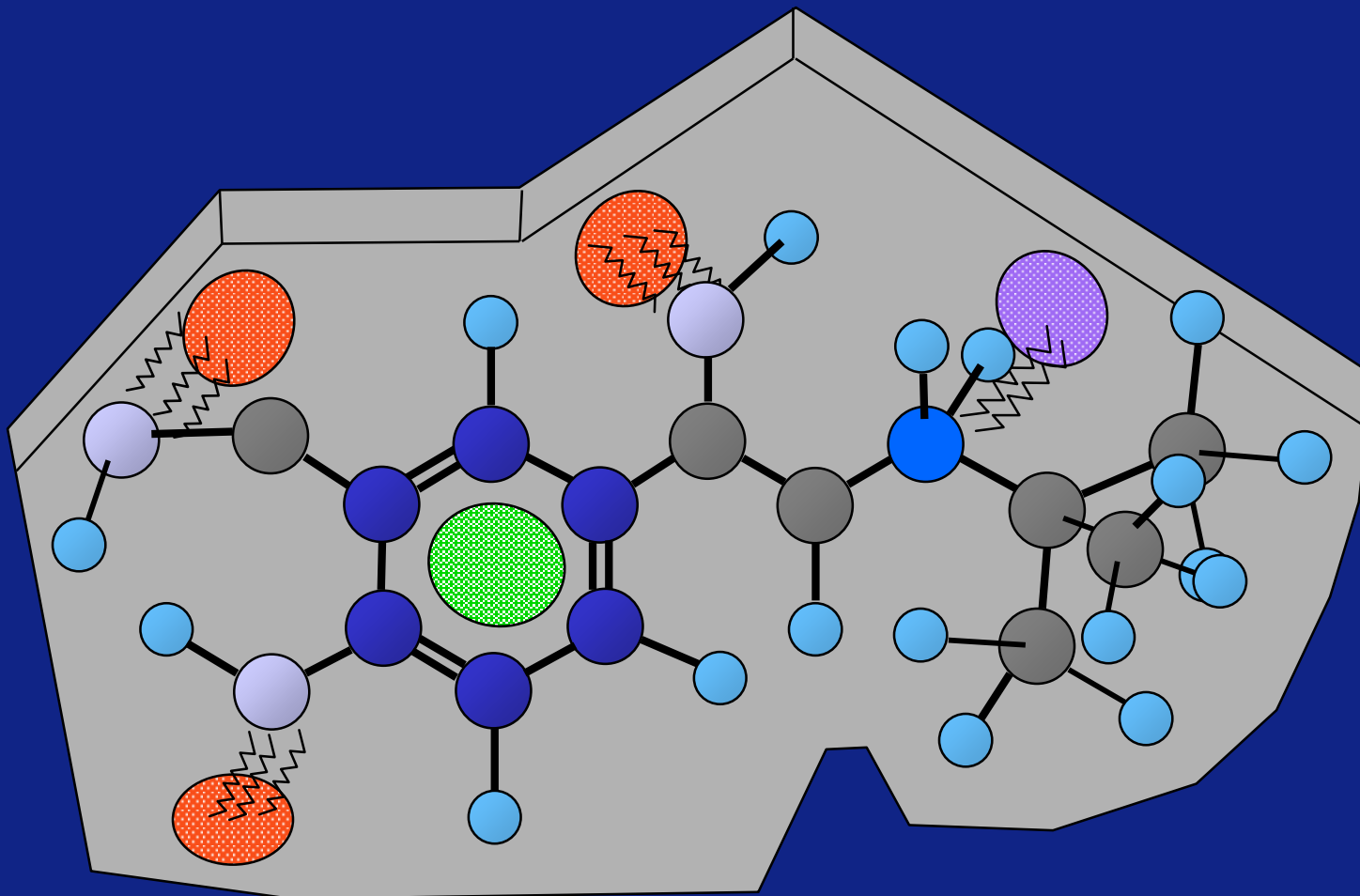
ADRENALINE

β -Adrenoceptor



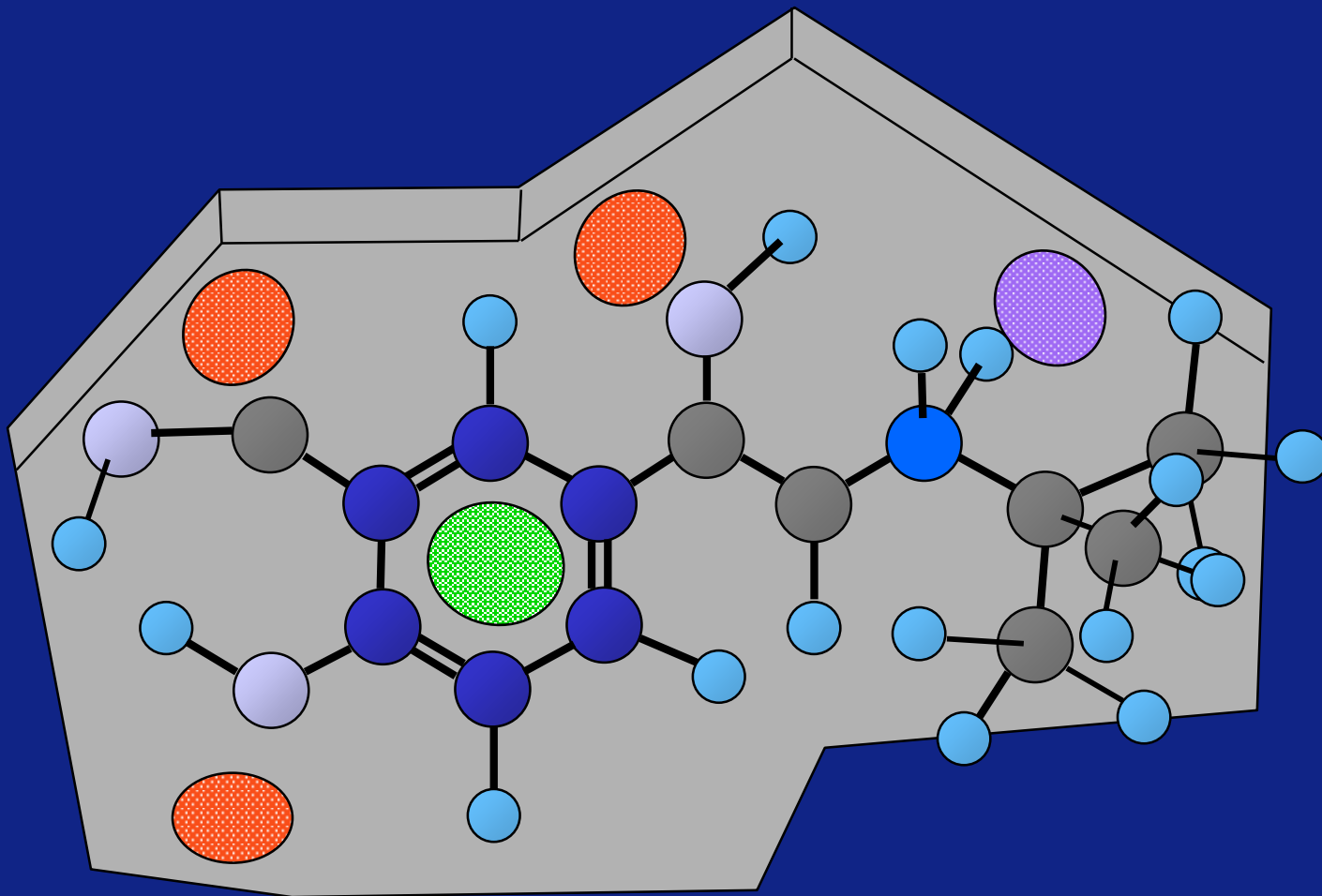
ADRENALINE

β -Adrenoceptor



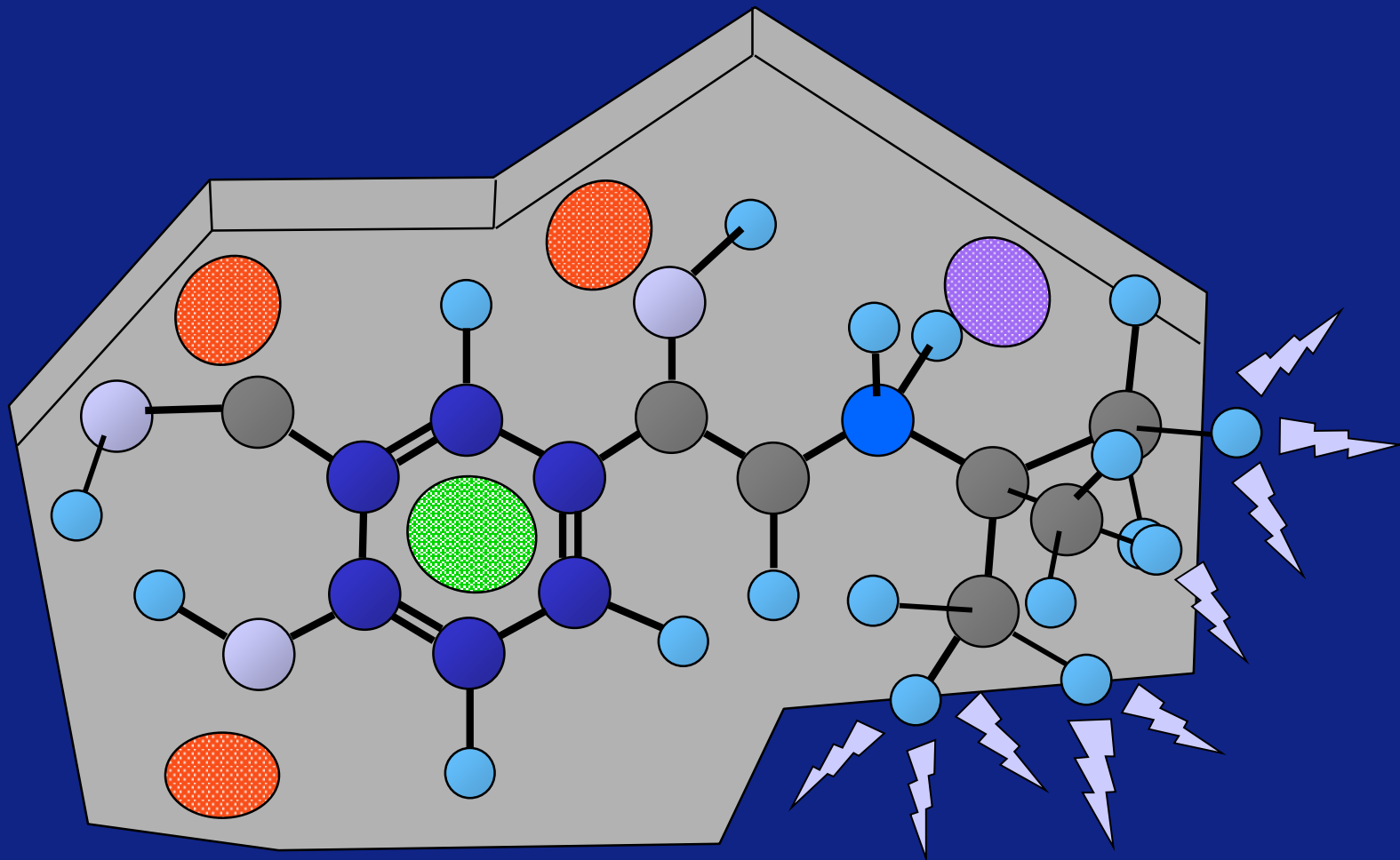
SALBUTAMOL

α -Adrenoceptor



SALBUTAMOL

α -Adrenoceptor



SALBUTAMOL