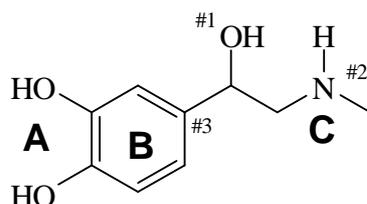


- The molecular structure of adrenaline (epinephrine), a hormone involved in the "fight or flight" response, is shown below.



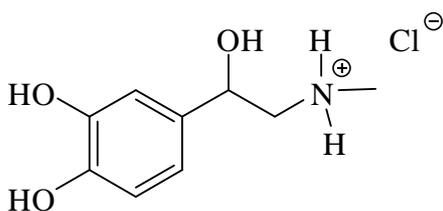
List the types of intermolecular interactions that each of the following sites on adrenaline would be involved in if dissolved in water.

**A H-bonding, dipole-dipole, dispersion forces**

**B dispersion forces**

**C H-bonding, dipole-dipole, dispersion forces**

Pharmaceuticals with amine groups are frequently supplied as their "hydrochloride salts". Draw the structure that would result if adrenaline were reacted with one equivalent of HCl. What **additional** intermolecular forces would be present if this form of adrenaline were dissolved in water?



**With this form present, ion-dipole interactions would be introduced.**

Provide the requested information for each of the indicated sites on adrenaline.

Atom	Geometric arrangement of the electron pairs around the atom	Hybridisation of the atom	Geometry around the atom	Approximate angles around the atom
# <sup>1</sup> O	<b>tetrahedral</b>	<i>sp</i> <sup>3</sup>	<b>bent</b>	<b>109°</b>
# <sup>2</sup> N	<b>tetrahedral</b>	<i>sp</i> <sup>3</sup>	<b>trigonal pyramidal</b>	<b>109°</b>
# <sup>3</sup> C	<b>trigonal planar</b>	<i>sp</i> <sup>2</sup>	<b>trigonal planar</b>	<b>120°</b>