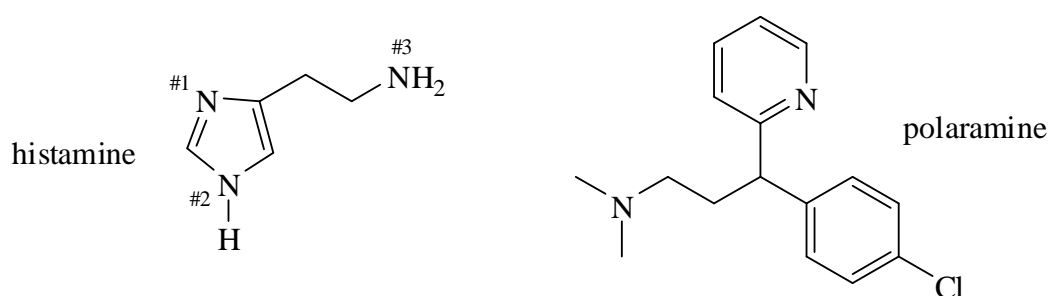


Marks
6

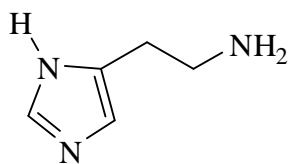
- The structures of histamine and polaramine are shown below.



Indicate the hybridisation and geometry of bonds around each of the nitrogen atoms in histamine.

	Hybridisation	Geometry of bonds
N #1:	sp^2	bent
N #2:	sp^2	trigonal planar
N #3:	sp^3	trigonal pyramidal

Draw a tautomer of histamine.



In histamine, only one of the nitrogen atoms in the ring is easily protonated (basic). Indicate which it is and explain why.

N#1 is basic. It has a lone pair directed away from the ring that is *not* involved in the π bonding of the aromatic ring. The lone pair can be used to accept a proton.

The "lone pair" on N#2 is part of the aromatic system.

ANSWER CONTINUES ON THE NEXT PAGE

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3

The release of histamine in the body triggers nasal secretions and constriction of airways. Polaramine is one of many anti-histamine compounds used to treat allergies. Explain what structural features of polaramine might make it a suitable anti-histamine agent.

Polaramine has a basic aromatic N and an aliphatic N separated by 5 bonds, as does histamine.

It is therefore likely that it will compete with histamine for the binding sites of certain enzymes in the body and thus block the effects of histamine.

(+)-2-[*p*-Chloro- α -[2-(dimethylamino)ethyl]benzyl]pyridine is another name for polaramine. What does the (+) in this name mean?

The molecule is chiral and rotates plane polarised light in a clockwise direction.