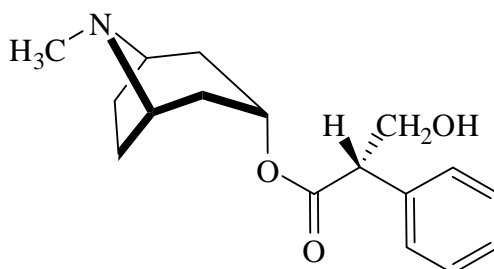


- The tropane alkaloid (-)-hyoscyamine is found in certain plants of the *Solanaceae* family. It is an anticholinergic agent that works by blocking the action of acetylcholine at parasympathetic sites in smooth muscle, secretory glands and the central nervous system.



Give the molecular formula of (-)-hyoscyamine.

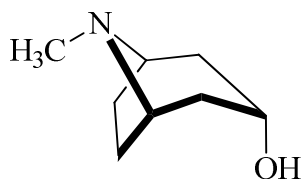


List the functional groups present in (-)-hyoscyamine.

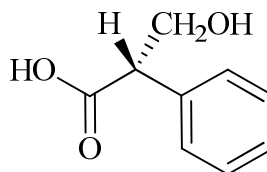
amine, alcohol, ester, aromatic ring (arene)

Hydrolysis of (-)-hyoscyamine results in two fragments, tropine and tropic acid. Draw each of these fragments.

tropine



tropic acid



What is the stereochemistry at the tropic acid stereocentre? Write (*R*) or (*S*).

(*S*)

Is tropine optically active? Explain your answer.

No. It is a *meso*-isomer (*i.e.* has a plane of symmetry) and therefore optically inactive.

It is superimposable on its mirror image.