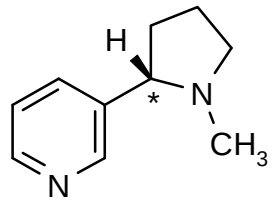
Chem 260 Laboratory A
(optional)

CHIRALITY

1. Construct the nicotine molecule:
   It is easiest to start with carbon as default element and to draw all atoms except hydrogens as if they were carbons. Then change the appropriate atoms to nitrogen. Finally, Build/Add Hydrogens and Build/Model Build. Save your work as you go along, or suffer the consequences!



2. Optimize the structure with Molecular Mechanics. Save the file.
3. Notice that the carbon marked with a star is chiral (optically active). HyperChem can automatically find such atoms if you use Display/Labels/Chirality. It even claims there is another chiral centre, a nitrogen, but in fact there is rapid configuration about this nitrogen so that in practice the chirality is evened out.
4. Try changing the chirality (at the carbon) of your molecule. You can do this by placing the drawing cursor over the atom and making a shift-left-click.
5. Orient the molecule until it looks like one of those in the figure below. Save!
6. Select the molecule, copy and paste. Now you have two. Invert the configuration of one, so that you have the two different optical isomers in one diagram.
7. To move and rotate a single molecule, leaving the other fixed, first select on molecule and then use the appropriate icon tool but with the *right* mouse button. The left button acts on the whole diagram, the right button only operates on the selection.
8. Try to reproduce the picture below. Paste it into your report. (Before copying the image, do Edit/Setup Image and select Workspace and Metafile, not Bitmap.)