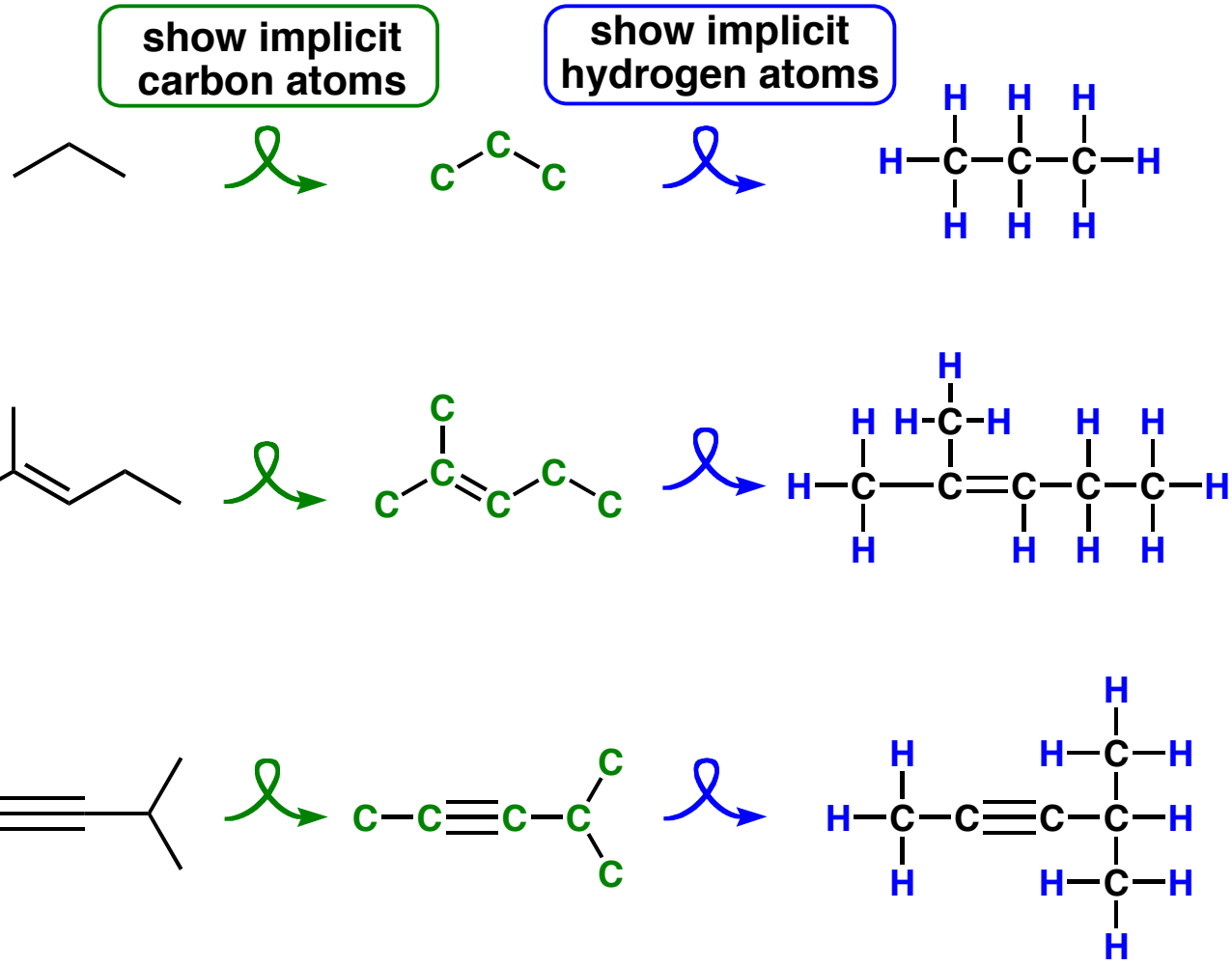
Implied Atoms in Drawings

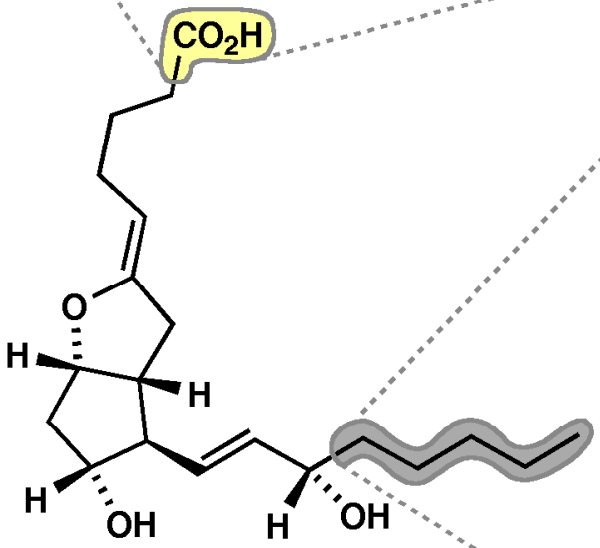


To properly interpret line-angle diagrams, it is very important to identify all of the **implied atoms** – those carbon and hydrogen atoms that are not explicitly drawn. The missing hydrogen atoms in line-angle drawings are implied by the rules of chemical bonding, consistent with the building blocks of carbon to which they are attached.

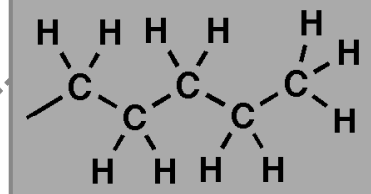
Structure Drawing Conventions

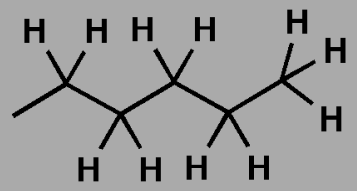
The carboxylic acid functional group has been abbreviated as its functional group formula

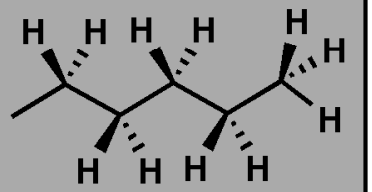
—CO_2H is —C(=O)—O—H



prostacyclin

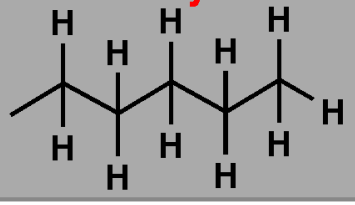






These are various ways to interpret the highlighted portion of prostacyclin's line-angle drawing. The five carbon atoms in the zigzag representation are to be viewed as lying in a plane parallel to the page. Implied hydrogen atoms are connected to each vertex completing the 4-electron-pair-domain of the neutral carbon atom building block. Tetrahedral geometry enforces the hydrogen atoms to the locations shown at the left, above and below the plane. The drawing below is not consistent with all five carbon atoms in the plane and carbon having tetrahedral geometry.

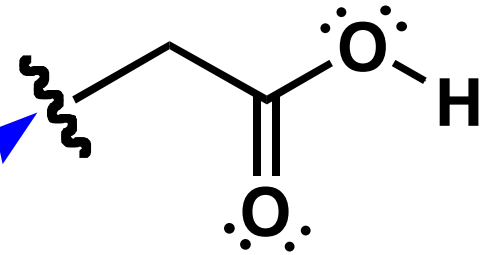
incorrectly drawn



Shortcut Conventions

- The carbon chain is represented as zigzag lines
- Leave out C and H when not necessary
- Show electron lone pairs and formal charges
- When only a small portion of the structure is of interest, use a partial structure convention, like this:

partial structure convention



But don't get fooled by forgetting the implied hydrogen atoms!

It's easy to confuse these structures....

...but it is much more difficult to confuse these!