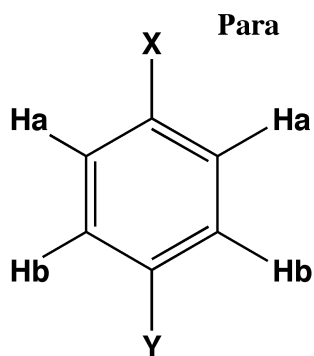
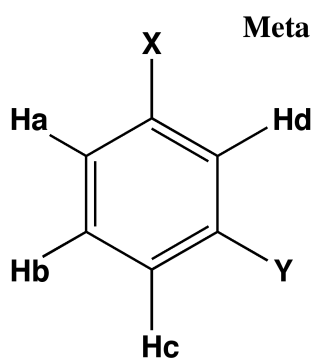
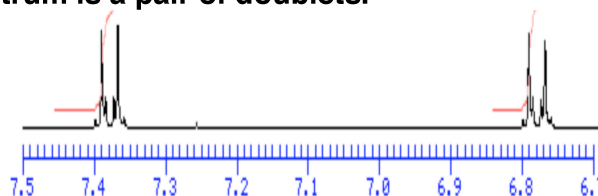


Ortho, Meta, Para NMR "Explainer"



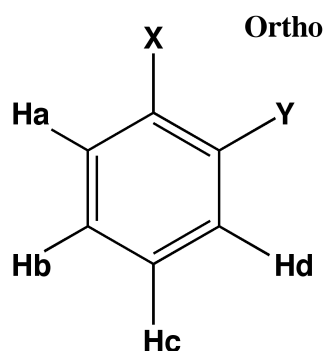
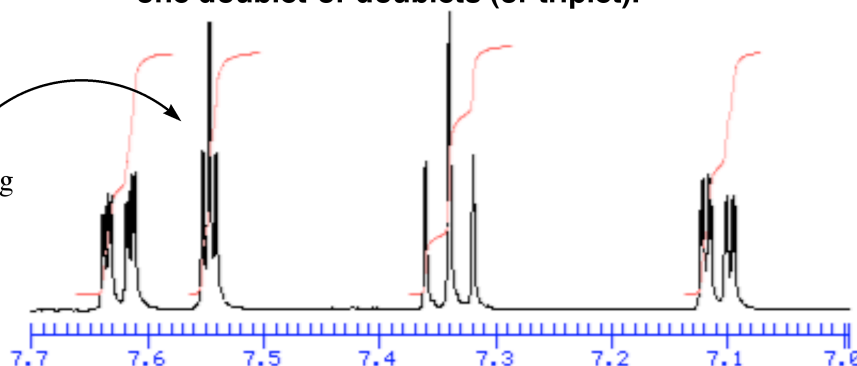
The two Ha's are equivalent (produce 1 chemical shift)
The two Hb's are equivalent (produce a second chemical shift)
Ha and Hb are coupled to each other, and therefore the spectrum is a pair of doublets.



All four H's are unique, so there are 4 chemical shifts.
Ha and Hc are each coupled to one other H (Hb), so each appears as a doublet. Hb will be complex, since it is split by 2 different H's. It could appear as a doublet of doublets, or as a triplet, depending. Hd is isolated so it will look like a singlet unless there is some small long-range coupling.

So, four chemical shifts: 2 doublets, one singlet, and one doublet-of-doublets (or triplet).

This is Hd. Small long range coupling is visible in this example.



Again, all four H's are unique so there are 4 chemical shifts. Ha and Hd are each coupled to one other H (Hb), so each appears as a doublet. Hb and Hc will be complex, since they are each split by 2 different H's. Each could appear as a doublet of doublets, or as a triplet, depending.

So, four chemical shifts: 2 doublets and two doublets-of-doublets (or triplets).

