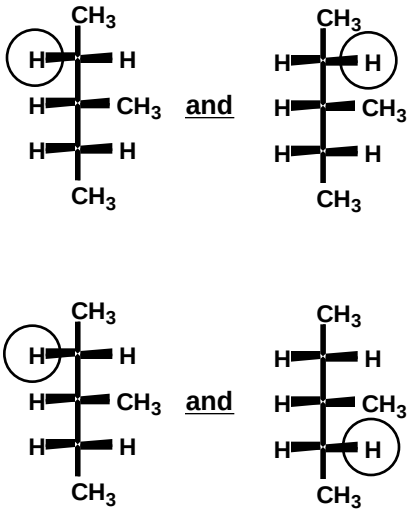
Text Related to Segment 6.04 ©2002 Claude E. Wintner

Once again in the previous segment, as we considered the four constitutionally identical methylene hydrogen atoms in 3-methylpentane, we chose certain specific pairs, finding them to be enantiotopic. And again, had we chosen other possible pairings, the result would have been different:

compare



In each pair the two formulae, including the "reporter" circles, are diastereomorphs; the particular groups (hydrogen atoms) being compared are diastereotopic.

identification of diastereotopic groups

Applying the test as above, we must come to the conclusion that the environments again are distinct, but that they differ more profoundly than do enantiotopic environments, because we generate two models that are diastereomorphous. Further consideration will reveal that this result comes about because the carbon atom to which the methylene hydrogens are attached is itself attached to a center that is stereogenic. One methylene hydrogen is "next to" a methyl group; the other is not. We call these two hydrogen atoms *diastereotopic.*

In sum, groups that are homotopic cannot be distinguished. To distinguish enantiotopic groups one needs to know one's right from one's left, that is, one needs to understand the concept of chirality, or to *be* chiral. (Enzymes are chiral!) To

distinguish diastereotopic groups one needs only to be able to perceive relationships of distance and/or size. (In principle, any reagent can "discover" or "report on" diastereotopism.) At first these ideas may seem abstract; we shall see that they have profound practical significance.