

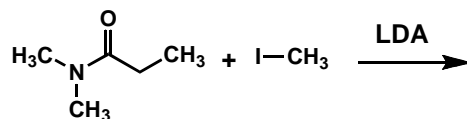
- 31-1.** (a) Chiral molecules may arise from achiral reactants. Show the mechanism of a prebiotic reaction for which this occurs.
- (b) A stereogenic center within a molecule can be inverted by an achiral reactant. Show the mechanism of an abiotic reaction for which this occurs.
- (c) How does the chiral pool of biomolecules differ from abiotic compounds?

31-2. On a recent trip to the Feldspar Nebula, you discovered a planet rich in vegetation and whose chiral pool consisted of the enantiomers of our amino acids. You became intrigued by a unique vegetable growing there, which looks a lot like a carrot, but grows pre-coated with ranch dressing.

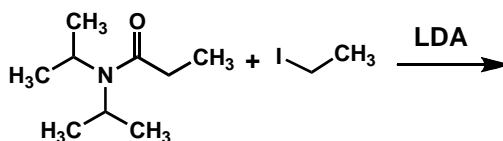
- (a) What event could have lead to the observed stereochemistry of Feldspar's chiral pool?
- (b) What would be the biochemical consequences of eating a Feldspar carrot?
- (c) What substances would you need in order to sequence the proteins contained within the Feldspar carrot. Briefly describe the sequence of experiments that you would need to perform.

31-3. Provide mechanisms for the following transformations that explain product stereochemistry.

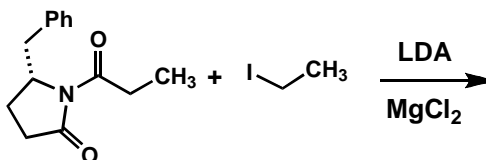
(a)



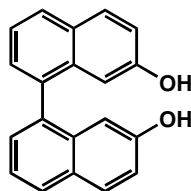
(b)



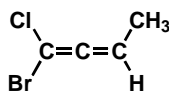
(c)



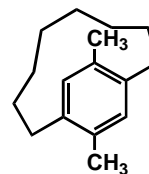
31-4 Draw a stereochemical depiction of both enantiomers of the chiral compounds below. What type of chirality does each enantiomer pair possess? Build models, if necessary.



binol



an allene



a cyclophane

31-5. You have an enantiopure sample of a non-natural amino acid. If you were given a racemic mixture of this amino acid, describe how you could resolve the racemic mixture and determine which resolved enantiomer has the identical stereochemistry to your sample.