**PROCHIRALITY**
Prochiral molecules are those that can be converted from an achiral molecule to a chiral molecule in a single step.

Prochirality may be the result of an sp\(^2\) carbon being converted to a chiral sp\(^3\) carbon via a reaction (see Nu acyl addition below) or by substitution of a “prochiral” substituent (usually hydrogen) with another substituent that results in a chiral center.

**PRO-R and PRO-S SUBSTITUENTS**

*Ha is referred to as "pro-R"
*Hb is referred to as "pro-S"

**PROCHIRALITY IN NUCLEOPHILIC ACYL ADDITIONS**
Prochiral carbonyl carbons are carbons that when reacted with a nucleophile result in the formation of a new chiral center.
The carbonyl group has a trigonal planar geometry (sp$^2$). The two sides of the carbonyl group (front and back) are referred to as "faces". When the priorities of three substituents of the carbonyl group are oriented in a clockwise fashion (highest --> lowest), front face is called the Re face and the back face is referred to as the Si face.

Nucleophiles may attack carbonyl groups from the Re face or the Si face. The stereochemistry of the product depends on the priorities of the substituents and the priority of the nucleophile.
1. \( \text{MgBr} \) 
2. \( \text{H}^+ \)

Nu reacts on the Re face

Stereochemistry of the new chiral center is \( S \)

1. \( \text{NaBH}_4 \) 
2. \( \text{H}^+ \)

Nu reacts on the Re face

Stereochemistry of the new chiral center is \( R \)