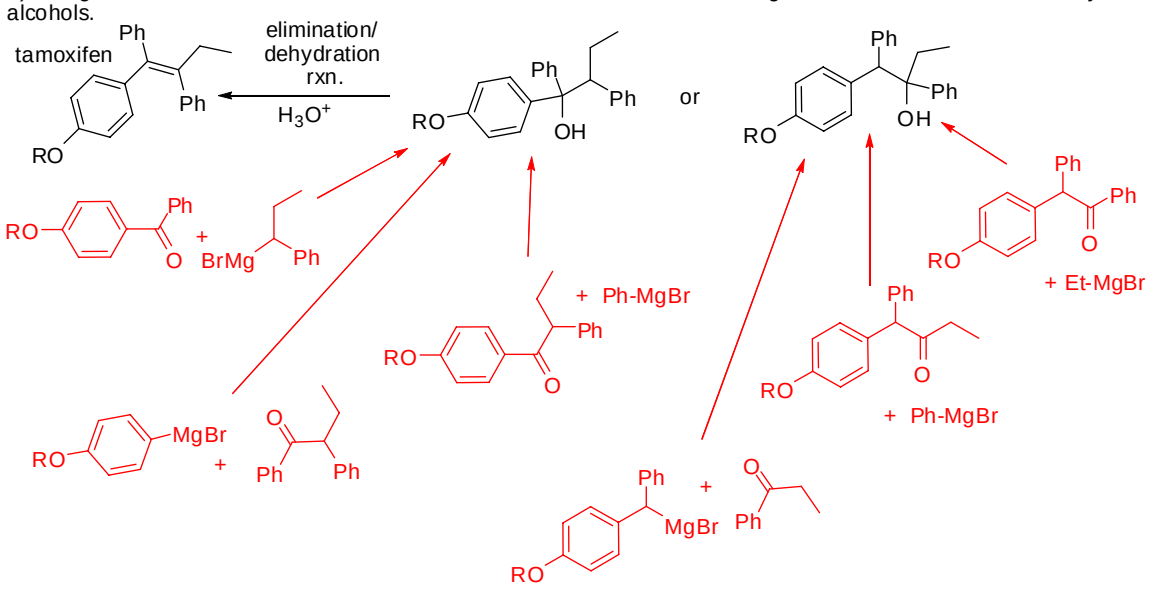
Recitation problem set 3/28/08

1. For decades, tamoxifen has been one of the most commonly used drugs for the treatment of breast cancer. At its core is a tetrasubstituted alkene which, in the structure of tamoxifen, is most easily generated by the elimination of a tertiary alcohol (shown).

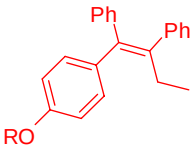
a) Using reactions discussed in class, draw at least two different reactions to generate either one of the tertiary alcohols.



b) The elimination or dehydration reaction is quite efficient. Why?

The elimination yields a stable alkene that is conjugated with several aromatic systems.

c) There is one problem with the elimination reaction strategy to synthesize tamoxifen: it yields a mixture of two products, only one of which is tamoxifen. Draw the other product and briefly explain why the other product forms.

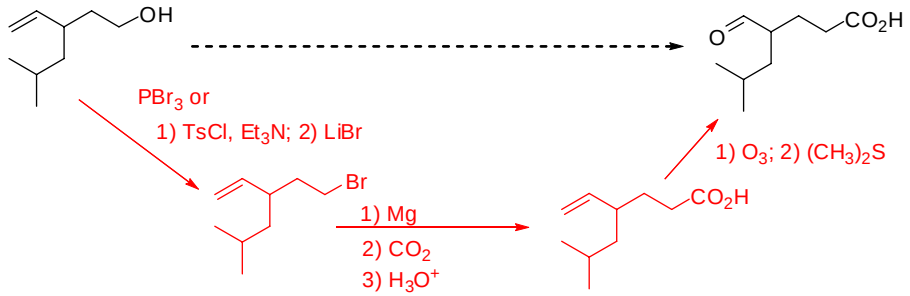


The other product is a stereoisomer that results from the elimination, a non-stereoselective reaction.

d) Briefly explain why a Wittig reaction would not be a good choice for the synthesis of the alkene in tamoxifen.

The Wittig reaction does not work well for tetrasubstituted alkenes because the oxaphosphetane intermediate is difficult to form with four large groups on two carbons of a four member ring. In other words, steric hindrance prevents the reaction from being efficient.

2. Suggest a series of reactions that will transform the molecule on the left to the product on the right.



3. The common disaccharide core of all human blood groups (A, B and O) is N-acetyl-D-glucosamine (β 1->3) D-galactose. N-acetyl-D-glucosamine replaces the C-2 alcohol of D-glucose with an N-acetyl-amine group (shown below). Based on your knowledge of saccharide structure, draw the structure of the common disaccharide core of all human blood groups.

N-acetyl-amine=  (bonded through N)