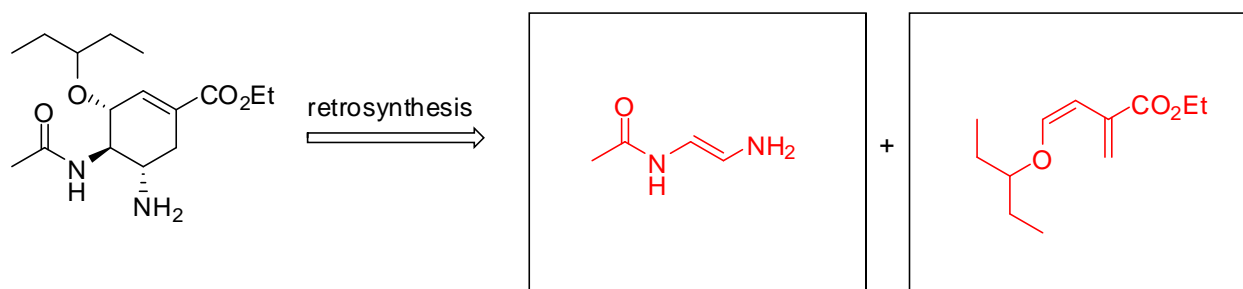


1. The potential for an avian influenza flu epidemic is still very real and, when contracted, the disease is fatal in over 50% of cases. One of the most promising therapeutics in the fight against avian influenza virus is the drug oseltamivir, also known by its commercial name tamiflu. The fear of a pandemic and the value of oseltamivir in combating such an event has prompted many countries to stockpile supplies of the drug. Consequently, the synthesis of the drug has not always met the demand.

Organic chemists around the world have been focused on addressing this challenge by creating new more efficient syntheses of oseltamivir. One common technique used by organic chemists in developing a new synthesis is called retrosynthetic analysis. It involves analyzing the structure of a target molecule to determine reactions that could be used to create the molecule from simpler starting materials.

a) Apply retrosynthetic analysis to oseltamivir and suggest a reaction that could be used to create the molecule. (6 pts.)

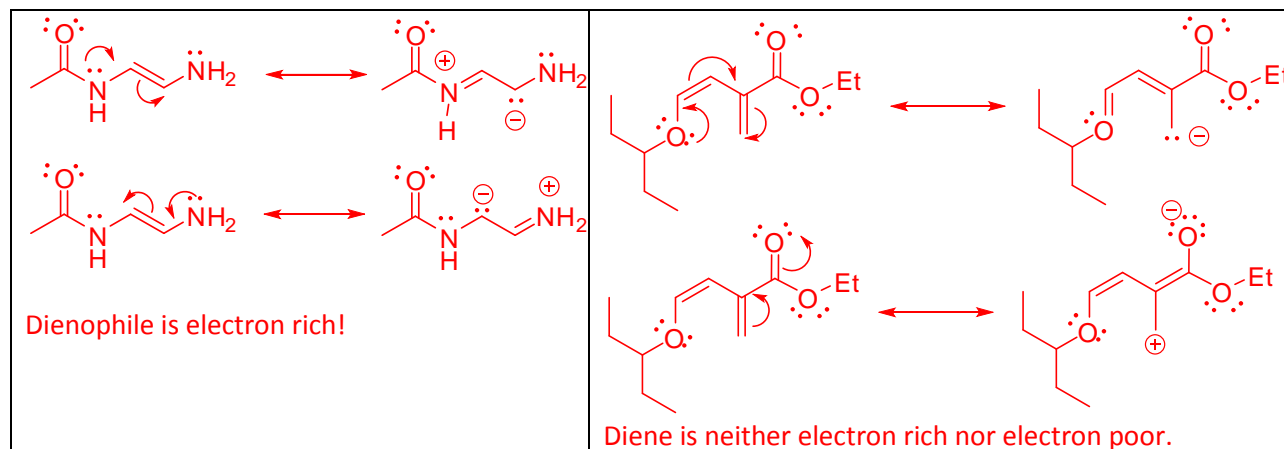
Scheme 1. Oseltamivir Retrosynthesis



b) What's the name of the reaction you have shown? (2 pts.)

Diels-Alder reaction.

c) Analyze the two reagents in your reaction. Using resonance structures, show whether the alkene portion of both reagents would be electron rich or electron poor? Draw two resonance structures for each reagent. (8 pts.)



d) Based on your answer to part c, do you think your reaction would be efficient for the synthesis of oseltamivir? Is the nature of these reagents typical of similar reactions seen in class? (4 pts.)

No, the electronic nature of the two reagents are not complimentary, so I would not expect the components to react efficiently. In fact, in this combination the dienophile is electron rich, which is the opposite of what we typically see. The diene has one electron releasing group and one electron withdrawing group leading to countering effects. Usually the diene is electron rich in the Diels-Alder reaction.

/20 total pts.