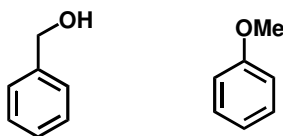


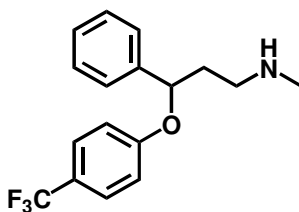
## MOBT5102 Tutorial Wednesday August 20<sup>th</sup> 2007 @ 2pm

The following are sample MOBT 5102 Questions for Mat Todd's lectures.

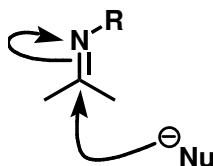
1. Describe three ways to distinguish between these molecules by physical/spectroscopic means.



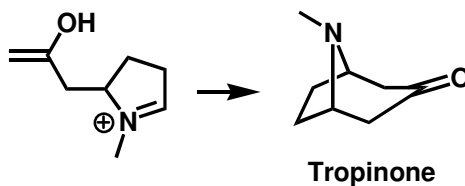
2. How many different proton environments are there in prozac, below?



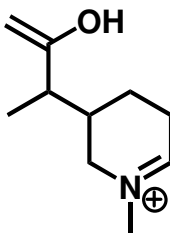
3. The imine below is acting as an electrophile. Show how a tautomeric form can act as a nucleophile.



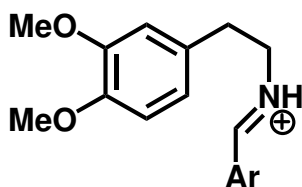
4. Supply arrows for the following reaction.



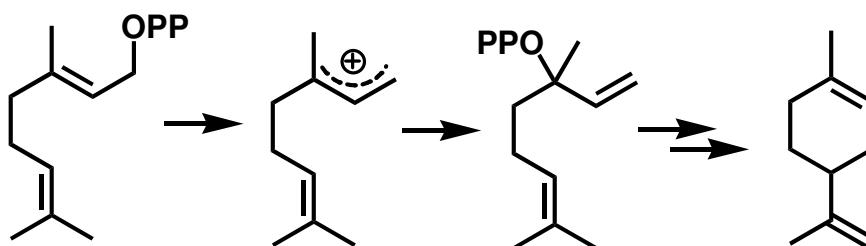
If the starting material for this reaction were as shown below, and the mechanism of reaction were the same, what would be the product?



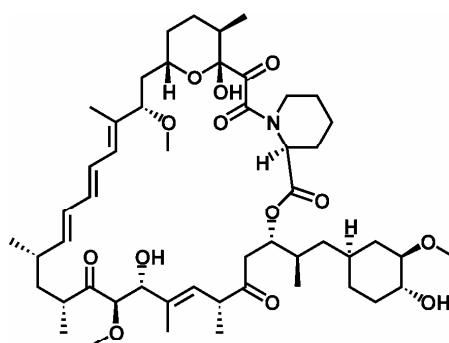
5. Supply arrows to show how the molecule below reacts to close the second ring in this alkaloid synthesis.



6. We saw this rearrangement in the biosynthesis of terpenes. Why is it necessary?



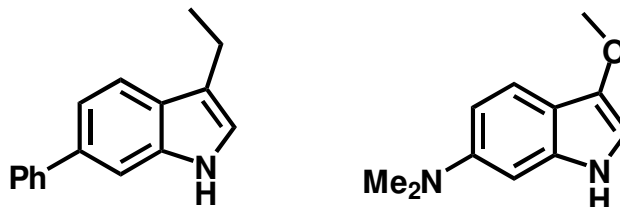
7. Below is the structure of a polyketide molecule similar to one you have seen.



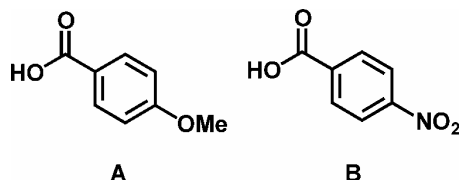
Rapamycin

- Give three reasons why this molecule might be difficult to synthesise in the lab.
- Why don't enzymes have to worry about the reasons you have just mentioned?
- If the chemical synthesis is difficult, how might we be able to make variants of this structure?

8. Which of the two molecules below would you expect to have the lower logP? For this molecule, suggest a modification to its structure that would raise the logP.

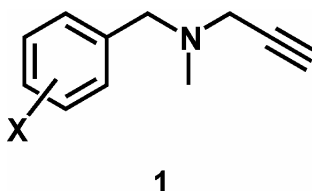


9. Below are two similar benzoic acids. Which will have the larger  $\sigma$ , and why?



10. A study was carried out on the inhibition of the enzyme monamine oxidase. Several different propargyl amine drugs of the general structure **1** were synthesised and their biological activity evaluated. The following Quantitative Structure Activity Relationship was found when the X group on the aromatic ring was varied:

$$\log (1/C) = 0.39 \pi + 1.19 \sigma + 0.76 E_s + \text{constant}$$



For each of the following statements, say whether you agree with the statement, and explain why.

- There is probably a hydrophobic binding pocket for the aromatic ring in the enzyme's active site.
- When X is large, inhibition of the enzyme is better.
- We should expect inhibition of the enzyme to be better when X is  $-\text{NO}_2$  compared to  $-\text{OMe}$ .

11. Explain the meanings of the terms 'prodrug' and 'pharmacophore.'