

5.451

Final Exam

October 25th, 11:30-1pm

A natural product will be shown and you will be asked to draw the starting materials or an early intermediate and then draw out the steps of the biosynthetic pathway. A mechanism that is detailed enough to illustrate that you understand the chemistry that is happening in these enzymatically catalyzed steps is required. Partial credit will be given.

There will be a question for the following natural product families. A few of the questions will resemble what was covered in class or on the problem sets. A few of the questions will be less straightforward.

1. Type I polyketide

Know the building blocks malonyl, methylmalonyl CoA

Know the ACP, KS, AT, KR (+NADPH), DH and ER(+NADPH) domains

Be able to draw the intermediates that occur after the action of each PKS

"module"

2. Nonribosomal peptide synthetase

Know the important catalytic domains C, Cy, A, PCP

Know the tailoring reactions that can occur

3. Flavonoid/stillbenes.

Draw out the linear intermediate made from 3 malonyls and 1 coumaroyl

Know where stillbene biosynthesis diverges from flavonoids and how

Be familiar with the enzymes that act on chalcone and how they work

4. Deoxygenated sugars.

5. Terpene.

Emphasis will be on the cyclization.

6. Alkaloid

Only enzymatic reactions similar to the ones pointed out in class will be covered (ornithine (tropane and pyrrolizidine); tyrosine (tetrahydroisoquinolines); tryptophan (ergot))