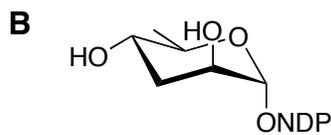
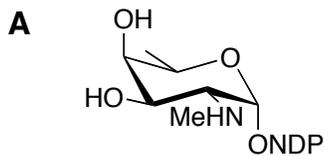


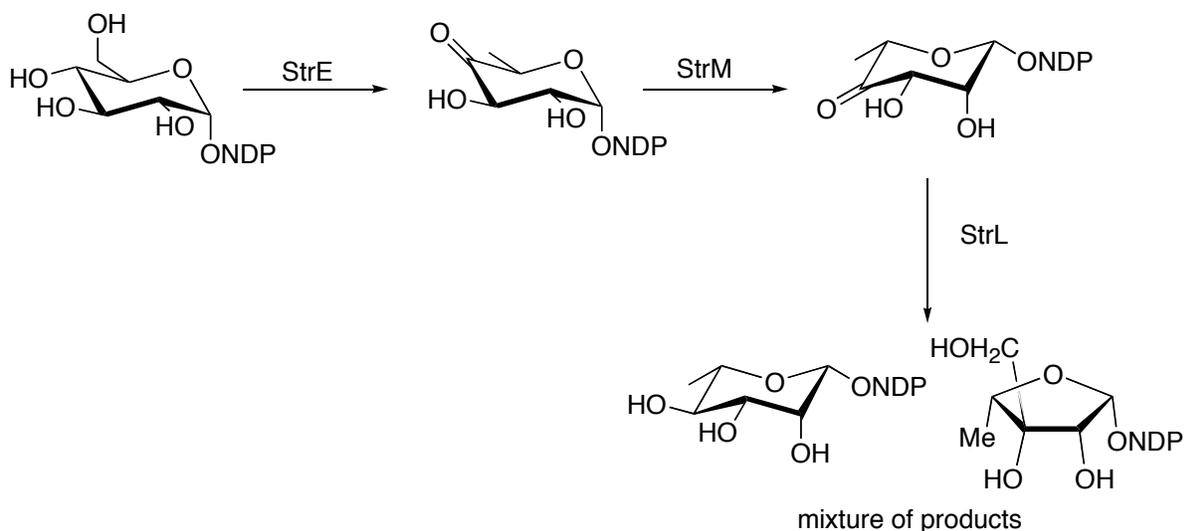
5.451 F2005  
Problem Set 2.

1. (30 pts) Draw a plausible biosynthetic pathway of the following sugars starting from glucose. Specific enzyme names and detailed mechanisms are not required, but indicate the general type of enzyme along with any cofactor that is used.



5.451 F2005  
Problem Set 2.

2. (30 pts) **A.** In a recent study, the “Des V” gene of the desosamine biosynthetic pathway was knocked out of a desosamine producing organism (see page 15 of the sugar handout, 9/22). Draw the structure of the saccharide that would be expected to be formed from this knockout strain. **B.** A non-specific reductase is present in the producing organism,; draw the structure of the saccharide that would be expected to be formed under these conditions. **C.** The “Des I” gene was knocked out of the producing organism (containing the nonspecific reductase) and replaced with StrM from the streptosamine pathway (shown below). Predict the structure of the sugar that would be expected to be produced from the knockoutDesI/StrMstrain .





**5.451 F2005**  
**Problem Set 2.**

4. (20 pts) Draw a likely biosynthetic scheme for the following compound starting from coumaroyl CoA and 3 units of malonyl CoA. Show all steps and indicate the general type of enzyme that would catalyze each transformation.

