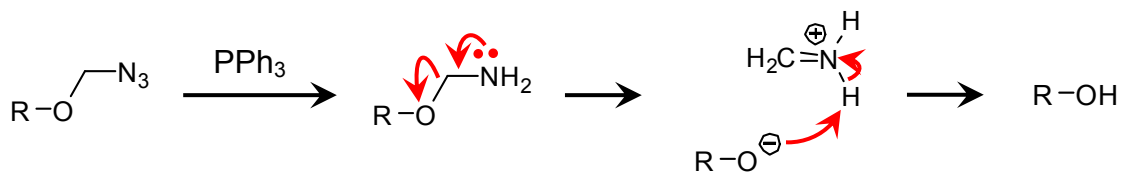
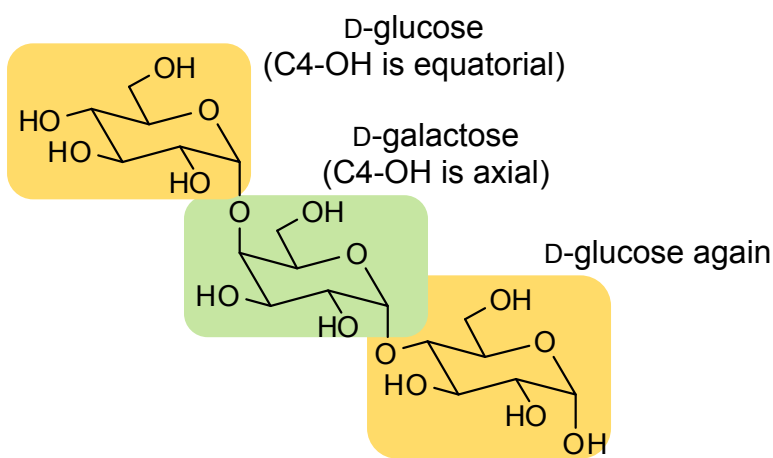


Workshop 22 Solutions  
Solid-Phase Synthesis of Oligosaccharides

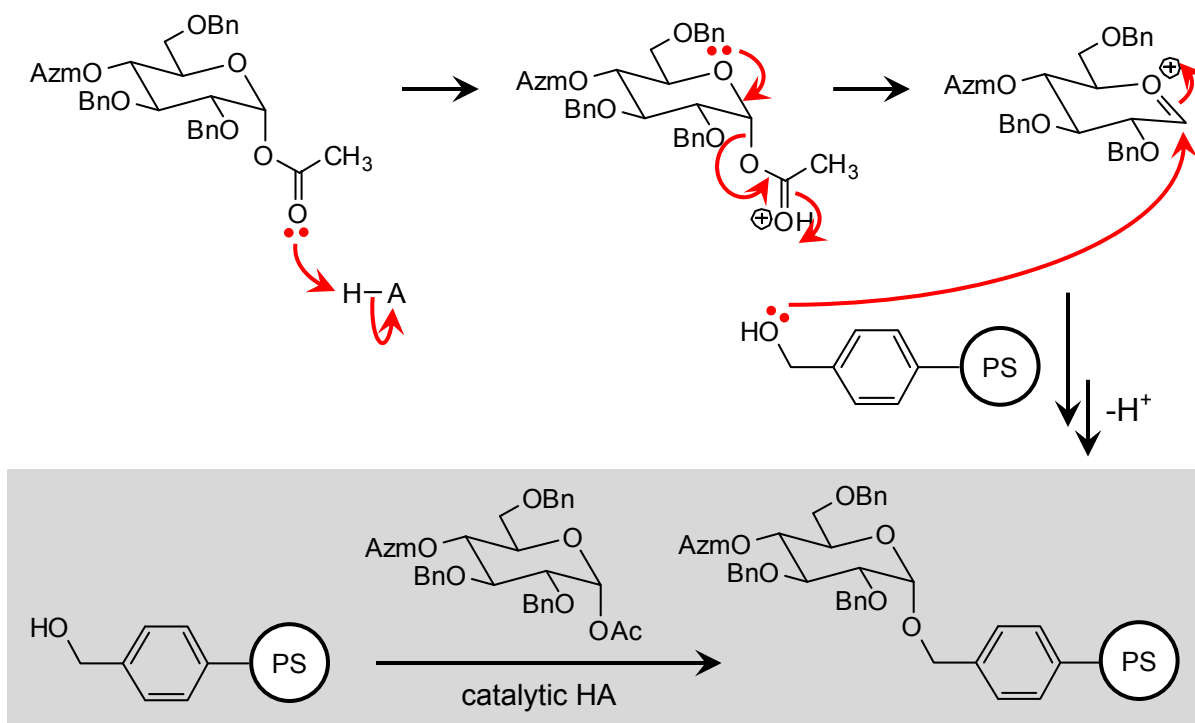
1.



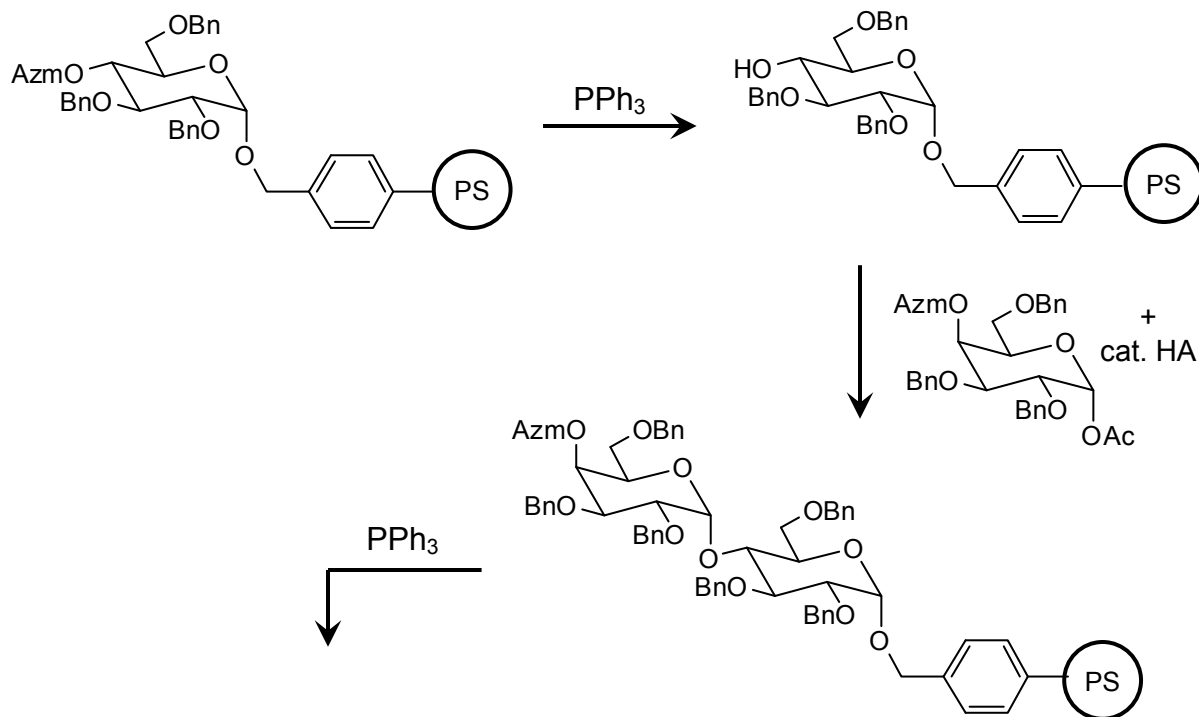
2. Solid-phase synthesis involves building a molecule from starting material building blocks, block by block, on a solid support. Here our building blocks will be sugars, and our product has three:

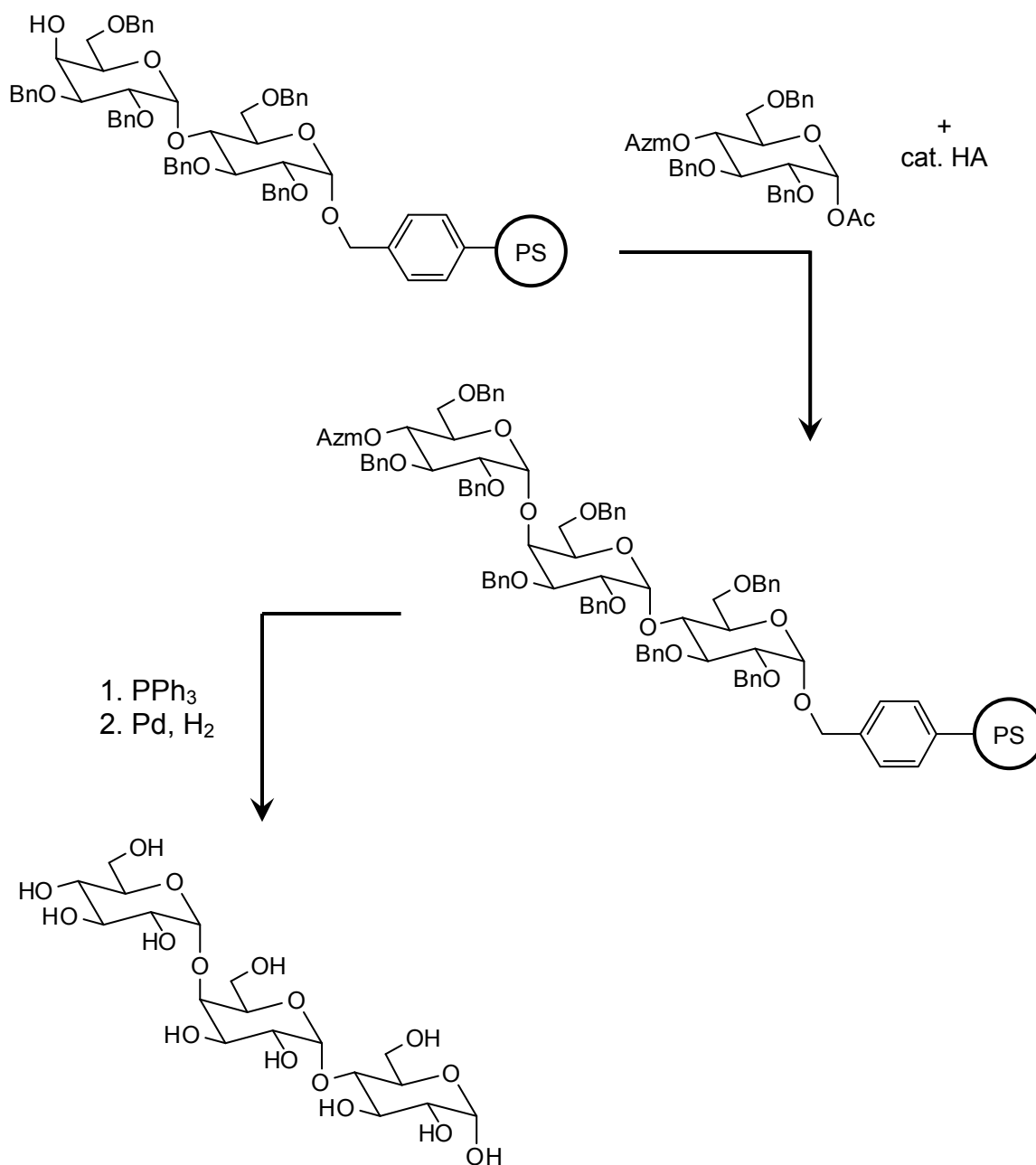


So the order we need to follow to make the trisaccharide is glucose-galactose-glucose. Which end of the chain will we build from? On each of our two sugar building blocks given in the problem, C1 has an  $-OAc$  group, which is a good enough leaving group to be displaced by an alcohol in catalytic acid when it is at the anomeric (C1) position. (We discussed this in class as being one way that glycosidic bonds are formed in the lab.) That alcohol can be another sugar, or it could be the alcohol group on the solid support (see next page):



That would be a way to put our first building block on the solid support. To add our second building block, we'll first need to create an  $-OH$  to attach it to. We can do this by deprotecting the support-bound glucose:





In step 2 of this last process, the hydrogenation not only removes benzyl (Bn) protecting groups, it also removes the sugar from the solid phase (because that connection is also benzylic).