Polyhydroxylated amino cyclopentanes are an interesting class of glycosidase inhibitors. The reaction of chelated α-allyl glycine esters with croton aldehyde gave rise to the corresponding aldol products in good yield and selectivity. Those compounds could be converted into enantiopure polyhydroxylated amino cyclopentanes by ring closing metathesis, enzymatic separation and dihydroxylation. In the final deprotection step three different protection groups were removed simultaneously in excellent yield either by reduction or basic hydrolysis.