Synthesis of a limonoid, azadiradione

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1) Name the starting material.
2) Hint: product has a phosphorous NMR shift around 140 ppm.
3) Hint: nitromethane is a solvent. A tricyclic system is formed.
4) Hint: oxidative demercuration. Can you propose a mechanism?
5) Name of reagent?

9) Hint: an alkyl nitrite is formed.
10) Named reaction. Can you come up with a mechanism?
11) 1M HCl
12) N(CH₃)₄BH(OAc)₃, -78 °C
13) 2, EtOH, reflux then 12M HCl, 10 °C
14) NaOEt, EtOH, 70 °C
15) BrCH₂OCH₃, TBAI, DIPEA, 70 °C

16) L-selectride (excess)
17) BzOH, DEAD, PPh₃ then NaOH, EtOH
18) Zn/Ag, CH₂I₂ then substrate, 0 °C
19) DMP
20) Li, NH₃, THF then DMP
21) LDA, PhSeBr then 30% H₂O₂ in H₂O/pyridine
22) TMSBr, DCM
23) Ac₂O, DMAP

11) Hint: a hemiacetal is formed. Can you rationalize its diastereoselectivity?
12) Hint: selective hemiacetal reduction.
13) Name the two reactions occurring in this step. How would you prepare 2?
17) Hint: selective reaction at C16 (according to IUPAC atom numbering for steroids). Name the reaction.
18) Name the reaction.