A selective BACE-1 inhibitor for the treatment of Alzheimer’s disease

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Please provide a mechanism for this transformation.

1) Me₃Si (3 eq.), n-BuLi (3 eq.), then A

2) W, (Bu₄N)₂SO₄, NaOH (aq.)
3) DIBAL-H
4) NH₂OH • HCl, NaOAc

5) NaOCl
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6. X, iPrMgCl • LiCl
   then BF$_3$ • OEt$_2$
7. AcCl, DMAP, pyridine
8. HCO$_2$H

9. TEMPO, PIDA
10. CDI, then MeHNOMe • HCl
11. MeMgBr, then HCl
12. Xtalfluor-M (3.1 eq.),
   3 HF • Et$_3$N (2.2 eq.)

13. HCl (aq.)
14. Zn (4.5 eq.), AcOH/H$_2$O (1:1)

Can you propose a mechanism for the transformation in step 12?

Do you know an alternative name for CDI?

Name the heterocycles before and after conducting step 6.
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**KEY step:** This transformation has been performed on >500 g scale and provided F in 96% yield. Please provide a mechanism.

15) PhCONCS, then DMSO, TMS-Cl

16) Y (2 eq.), Z (30 mol%), Cul (10 mol%), NaI (2 equiv.), K$_2$CO$_3$, 4 Å MS
17) MeONH$_2$·HCl, pyridine

Name the heterocycles present in the final compound. Provide the IUPAC names according to Hantzsch-Widman nomenclature and the trivial names if applicable.

**BACE-1** is an aspartic acid protease that is responsible for the generation of amyloid-β peptides in neurons. Inhibition would prevent the accumulation and aggregation of Aβ in the brain of Alzheimer’s patients, thus could help slow or stop the disease.