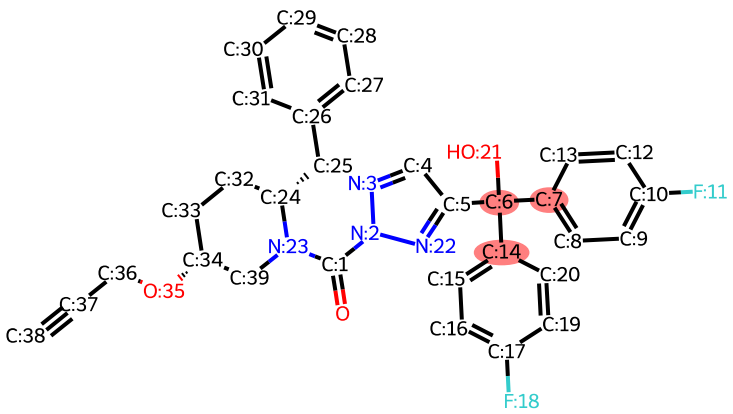
Reaction Report for *DH_376*, Priority 3

Selected Position: `C:6 c:7 C:6 c:14`

Selected Forward Reaction: Grignard_carbonyl

Product

Reaction site highlighted at position `C:6 c:7 C:6 c:14`

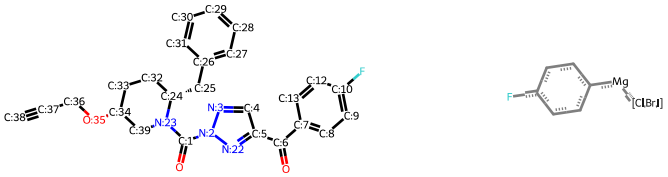


Product SMILES: `O=[C:1]([n:2]1[n:3][cH:4][c:5]([C:6]([c:7]2[cH:8][cH:9][c:10]([F:11])[cH:12][cH:13]2)([c:14]2[cH:15][cH:16][c:17]([F:18])[cH:19][cH:20]2)[OH:21])[n:22]1)[N:23]1[C@@H:24]([CH2:25][c:26]2[cH:27][cH:28][cH:29][cH:30][cH:31]2)[CH2:32][CH2:33][C@@H:34]([O:35][CH2:36][C:37]#[CH:38])[CH2:39]1`

Proposed Transitions

Transition 1

- **Forward Reaction:** Grignard_carbonyl
- **Is Chemically Valid:** True
- **Is Template-based:** True
- **Reasoning:** This is a general template for the synthesis via Grignard addition to a ketone. The second reactant represents a Grignard reagent derived from a (specifically 4-fluoro-chlorobenzene, -bromobenzene, or -iodobenzene).
- **Is Smiles Valid:** False
- **Reactant 1:** `O=[C:1]([n:2]1[n:3][cH:4][c:5]([C:6](=O)[c:7]2[cH:8][cH:9][c:10](F)[cH:12][cH:13]2)[n:22]1)[N:23]1[C@@H:24]([CH2:25][c:26]2[cH:27][cH:28][cH:29][cH:30][cH:31]2)[CH2:32][CH2:33][C@@H:34]([O:35][CH2:36][C:37]#[CH:38])[CH2:39]1`
- **Reactant 2:** `Fc1ccc(cc1)[Mg][Cl,Br,I]`

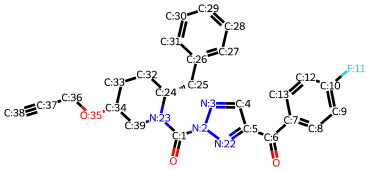


Reactants for Transition 1

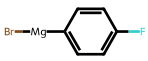
Transition 2

- **Forward Reaction:** Grignard_carbonyl
- **Is Chemically Valid:** True
- **Is Template-based:** False
- **Reasoning:** This permutation is valid. The reaction involves the addition of a Grignard reagent to a ketone, a standard method for synthesizing tertiary alcohols. A major side reaction is the deprotonation of the terminal alkyne, requiring at least two equivalents of the Grignard reagent for the reaction to proceed to completion. The reaction should be compatible with the other functional groups under anhydrous, low-temperature conditions.

- **Is Smiles Valid:** True
- **Reactant 1:** `O=[C:1]([n:2]1[n:3][cH:4][c:5]([C:6](=O)[c:7]2[cH:8][cH:9][c:10]([F:11])[cH:12][cH:13]2)[n:22]1)[N:23]1[C@@H:24]([CH2:25][c:26]2[cH:27][cH:28][cH:29][cH:30][cH:31]2)[CH2:32][CH2:33][C@@H:34]([O:35][CH2:36][C:37]#[CH:38])[CH2:39]1`
- **Reactant 2:** `Fc1ccc([Mg]Br)cc1`



R1

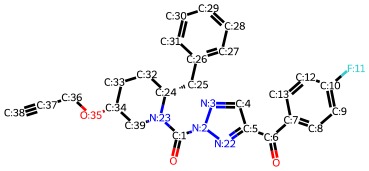


R2

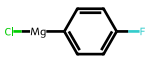
Reactants for Transition 2

Transition 3

- **Forward Reaction:** Grignard_carbonyl
- **Is Chemically Valid:** True
- **Is Template-based:** False
- **Reasoning:** This permutation is valid. The reaction involves the addition of a Grignard reagent to a ketone, a standard method for synthesizing tertiary alcohols. A major side reaction is the deprotonation of the terminal alkyne, requiring at least two equivalents of the Grignard reagent for the reaction to proceed to completion. The reaction should be compatible with the other functional groups under anhydrous, low-temperature conditions.
- **Is Smiles Valid:** True
- **Reactant 1:** `O=[C:1]([n:2]1[n:3][cH:4][c:5]([C:6](=O)[c:7]2[cH:8][cH:9][c:10]([F:11])[cH:12][cH:13]2)[n:22]1)[N:23]1[C@@H:24]([CH2:25][c:26]2[cH:27][cH:28][cH:29][cH:30][cH:31]2)[CH2:32][CH2:33][C@@H:34]([O:35][CH2:36][C:37]#[CH:38])[CH2:39]1`
- **Reactant 2:** `Fc1ccc([Mg]Cl)cc1`



R1

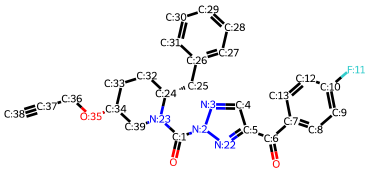


R2

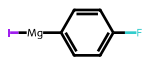
Reactants for Transition 3

Transition 4

- **Forward Reaction:** Grignard_carbonyl
- **Is Chemically Valid:** True
- **Is Template-based:** False
- **Reasoning:** This permutation is valid. The reaction involves the addition of a Grignard reagent to a ketone, a standard method for synthesizing tertiary alcohols. A major side reaction is the deprotonation of the terminal alkyne, requiring at least two equivalents of the Grignard reagent for the reaction to proceed to completion. The reaction should be compatible with the other functional groups under anhydrous, low-temperature conditions.
- **Is Smiles Valid:** True
- **Reactant 1:** `O=[C:1]([n:2]1[n:3][cH:4][c:5]([C:6](=O)[c:7]2[cH:8][cH:9][c:10]([F:11])[cH:12][cH:13]2)[n:22]1)[N:23]1[C@@H:24]([CH2:25][c:26]2[cH:27][cH:28][cH:29][cH:30][cH:31]2)[CH2:32][CH2:33][C@@H:34]([O:35][CH2:36][C:37]#[CH:38])[CH2:39]1`
- **Reactant 2:** `Fc1ccc([Mg]I)cc1`



R1

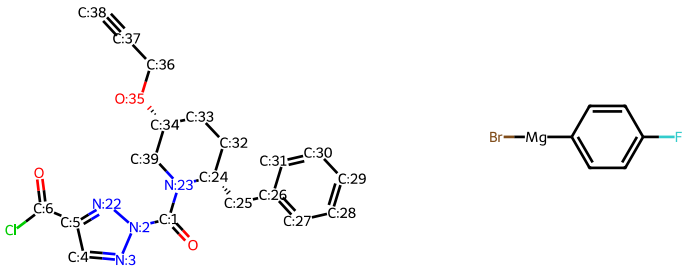


R2

Reactants for Transition 4

Transition 5

- **Forward Reaction:** Grignard_carbonyl
- **Is Chemically Valid:** True
- **Is Template-based:** False
- **Reasoning:** This permutation is valid. The reaction involves the addition of two equivalents of a Grignard reagent to an acid chloride. A major side reaction is the deprotonation of the terminal alkyne, requiring at least three equivalents of the Grignard reagent for the reaction to proceed to completion. Acid chlorides are highly reactive and may require careful temperature control.
- **Is Smiles Valid:** True
- **Reactant 1:** `O=[C:1]([n:2]1[n:3][cH:4][c:5]([C:6](=O)Cl)[n:22]1)[N:23]1[C@@H:24]([CH2:25][c:26]2[cH:27][cH:28][cH:29][cH:30][cH:31]2)[CH2:32][CH2:33][C@@H:34]([O:35][CH2:36][C:37]#[CH:38])[CH2:39]1`
- **Reactant 2:** `Fc1ccc([Mg]Br)cc1`

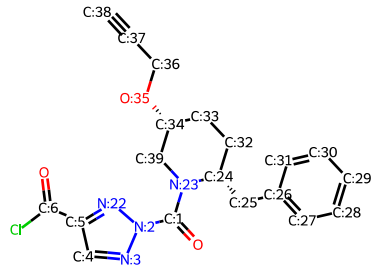


R1 R2

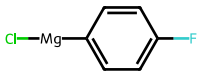
Reactants for Transition 5

Transition 6

- **Forward Reaction:** Grignard_carbonyl
- **Is Chemically Valid:** True
- **Is Template-based:** False
- **Reasoning:** This permutation is valid. The reaction involves the addition of two equivalents of a Grignard reagent to an acid chloride. A major side reaction is the deprotonation of the terminal alkyne, requiring at least three equivalents of the Grignard reagent for the reaction to proceed to completion. Acid chlorides are highly reactive and may require careful temperature control.
- **Is Smiles Valid:** True
- **Reactant 1:** `O=[C:1]([n:2]1[n:3][cH:4][c:5]([C:6](=O)Cl)[n:22]1)[N:23]1[C@@H:24]([CH2:25][c:26]2[cH:27][cH:28][cH:29][cH:30][cH:31]2)[CH2:32][CH2:33][C@@H:34]([O:35][CH2:36][C:37]#[CH:38])[CH2:39]1`
- **Reactant 2:** `Fc1ccc([Mg]Cl)cc1`



R1

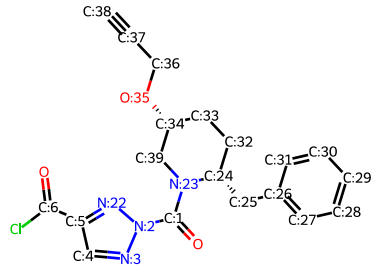


R2

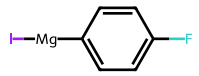
Reactants for Transition 6

Transition 7

- **Forward Reaction:** Grignard_carbonyl
- **Is Chemically Valid:** True
- **Is Template-based:** False
- **Reasoning:** This permutation is valid. The reaction involves the addition of two equivalents of a Grignard reagent to an acid chloride. A major side reaction is the deprotonation of the terminal alkyne, requiring at least three equivalents of the Grignard reagent for the reaction to proceed to completion. Acid chlorides are highly reactive and may require careful temperature control.
- **Is Smiles Valid:** True
- **Reactant 1:** `O=[C:1]([n:2]1[n:3][cH:4][c:5]([C:6](=O)Cl)[n:22]1)[N:23]1[C@@H:24]([CH2:25][c:26]2[cH:27][cH:28][cH:29][cH:30][cH:31]2)[CH2:32][CH2:33][C@@H:34]([O:35][CH2:36][C:37]#[CH:38])[CH2:39]1`
- **Reactant 2:** `Fc1ccc([Mg]I)cc1`



R1

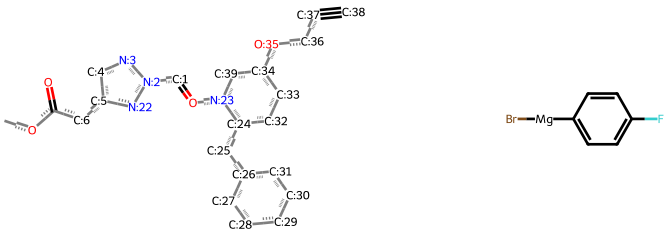


R2

Reactants for Transition 7

Transition 8

- **Forward Reaction:** Grignard_carbonyl
- **Is Chemically Valid:** True
- **Is Template-based:** False
- **Reasoning:** This permutation is valid. The reaction involves the addition of two equivalents of a Grignard reagent to an ester, a standard method for symmetrical tertiary alcohols. A major side reaction is the deprotonation of the terminal alkyne, requiring at least three equivalents of the Grignard reagent for the reaction to proceed to completion.
- **Is Smiles Valid:** False
- **Reactant 1:** `COc(=O)[C:6][c:5]1[n:22][n:2]([C:1]=O[N:23]2[C@@H:24]([CH2:25][c:26]3[cH:27][cH:28][cH:29][cH:30][cH:31]3)[CH2:32][CH2:33][C@@H:34]([O:35][CH2:36][C:37]#[CH:38])[CH2:39]2)[n:3][cH:4]1`
- **Reactant 2:** `Fc1ccc([Mg]Br)cc1`

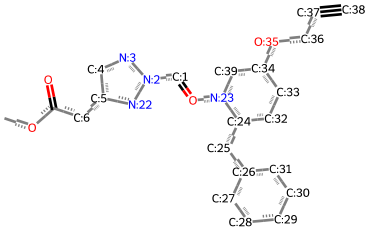


R1 R2

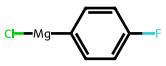
Reactants for Transition 8

Transition 9

- **Forward Reaction:** Grignard_carbonyl
- **Is Chemically Valid:** True
- **Is Template-based:** False
- **Reasoning:** This permutation is valid. The reaction involves the addition of two equivalents of a Grignard reagent to an ester, a standard method for symmetrical tertiary alcohols. A major side reaction is the deprotonation of the terminal alkyne, requiring at least three equivalents of the Grignard reagent for the reaction to proceed to completion.
- **Is Smiles Valid:** False
- **Reactant 1:** `COc(=O)[C:6][c:5]1[n:22][n:2]([C:1]=O[N:23]2[C@@H:24]([CH2:25][c:26]3[cH:27][cH:28][cH:29][cH:30][cH:31]3)[CH2:32][CH2:33][C@@H:34]([O:35][CH2:36][C:37]#[CH:38])[CH2:39]2)[n:3][cH:4]1`
- **Reactant 2:** `Fc1ccc([Mg]Cl)cc1`



R1

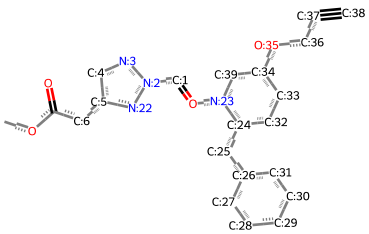


R2

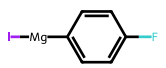
Reactants for Transition 9

Transition 10

- **Forward Reaction:** Grignard_carbonyl
- **Is Chemically Valid:** True
- **Is Template-based:** False
- **Reasoning:** This permutation is valid. The reaction involves the addition of two equivalents of a Grignard reagent to an ester, a standard method for symmetrical tertiary alcohols. A major side reaction is the deprotonation of the terminal alkyne, requiring at least three equivalents of the Grignard reagent for the reaction to proceed to completion.
- **Is Smiles Valid:** False
- **Reactant 1:** `COc(=O)[C:6][c:5]1[n:22][n:2]([C:1]=O[N:23]2[C@@H:24]([CH2:25][c:26]3[cH:27][cH:28][cH:29][cH:30][cH:31]3)[CH2:32][CH2:33][C@@H:34]([O:35][CH2:36][C:37]#[CH:38])[CH2:39]2)[n:3][cH:4]1`
- **Reactant 2:** `Fc1ccc([Mg]I)cc1`



R1

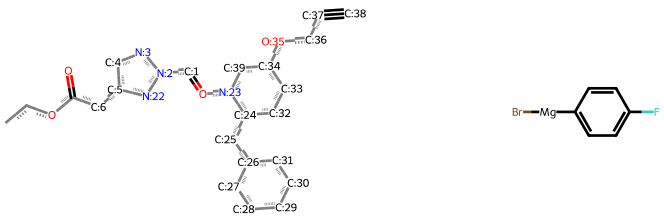


R2

Reactants for Transition 10

Transition 11

- **Forward Reaction:** Grignard_carbonyl
- **Is Chemically Valid:** True
- **Is Template-based:** False
- **Reasoning:** This permutation is valid. The reaction involves the addition of two equivalents of a Grignard reagent to an ester, a standard method for symmetrical tertiary alcohols. A major side reaction is the deprotonation of the terminal alkyne, requiring at least three equivalents of the Grignard reagent for the reaction to proceed to completion.
- **Is Smiles Valid:** False
- **Reactant 1:** `CCOc(=O)[C:6][c:5]1[n:22][n:2]([C:1]=O[N:23]2[C@@H:24]([CH2:25][c:26]3[cH:27][cH:28][cH:29][cH:30][cH:31]3)[CH2:32][CH2:33][C@@H:34]([O:35][CH2:36][C:37]#[CH:38])[CH2:39]2)[n:3][cH:4]1`
- **Reactant 2:** `Fc1ccc([Mg]Br)cc1`

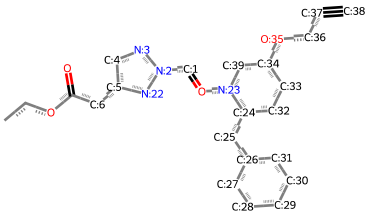


R1 R2

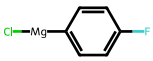
Reactants for Transition 11

Transition 12

- **Forward Reaction:** Grignard_carbonyl
- **Is Chemically Valid:** True
- **Is Template-based:** False
- **Reasoning:** This permutation is valid. The reaction involves the addition of two equivalents of a Grignard reagent to an ester, a standard method for symmetrical tertiary alcohols. A major side reaction is the deprotonation of the terminal alkyne, requiring at least three equivalents of the Grignard reagent for the reaction to proceed to completion.
- **Is Smiles Valid:** False
- **Reactant 1:** `CCOc(=O)[C:6][c:5]1[n:22][n:2]([C:1]=O[N:23]2[C@@H:24]([CH2:25][c:26]3[cH:27][cH:28][cH:29][cH:30][cH:31]3)[CH2:32][CH2:33][C@@H:34]([O:35][CH2:36][C:37]#[CH:38])[CH2:39]2)[n:3][cH:4]1`
- **Reactant 2:** `Fc1ccc([Mg]Cl)cc1`



R1

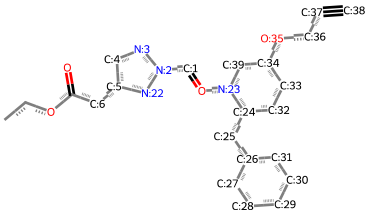


R2

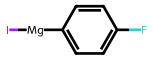
Reactants for Transition 12

Transition 13

- **Forward Reaction:** Grignard_carbonyl
- **Is Chemically Valid:** True
- **Is Template-based:** False
- **Reasoning:** This permutation is valid. The reaction involves the addition of two equivalents of a Grignard reagent to an ester, a standard method for symmetrical tertiary alcohols. A major side reaction is the deprotonation of the terminal alkyne, requiring at least three equivalents of the Grignard reagent for the reaction to proceed to completion.
- **Is Smiles Valid:** False
- **Reactant 1:** `CCOc(=O)[C:6][c:5]1[n:22][n:2]([C:1]=O[N:23]2[C@@H:24]([CH2:25][c:26]3[cH:27][cH:28][cH:29][cH:30][cH:31]3)[CH2:32][CH2:33][C@@H:34]([O:35][CH2:36][C:37]#[CH:38])[CH2:39]2)[n:3][cH:4]1`
- **Reactant 2:** `Fc1ccc([Mg]I)cc1`



R1



R2

Reactants for Transition 13