Paths of analysis*

AS5

Synthia

October 10, 2022

1 Analysis parameters

Analysis type: Automatic Retrosynthesis

Rules: none selected

Filters: Exclude Diastereoselecitve reactions, Tunnels, FGI, FGI with protections

Max. paths returned: 50

Max. iterations: 2000

Commercial:

1. Max. molecular weight - 1000 g/mol
2. Max. price - 1500 $/g

Published:

1. Max. molecular weight - 1000 g/mol
2. Popularity - 5

My Stockroom:

1. Max. molecular weight - 1000 g/mol

Reaction scoring formula: TUNNEL_COEF*FGI_COEF*STEP*20+1000000*(CONFLICT+NON_SELECTIVITY+FILTERS+PROTECT)

Chemical scoring formula: SMALLER^ 3,SMALLER^ 1.5

Min. search width: 400

Max. reactions per product: 60

Strategies: none selected

FGI Coeff: 0

Tunnels Coeff: 0

JSON Parameters: {}

2 Paths

5 paths found. *Paths are sorted by score. Reactions are sorted in appearance order for each path.*

2.1 Path 1

Score: `125.08`

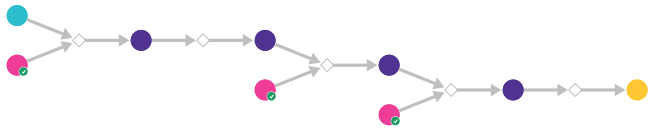
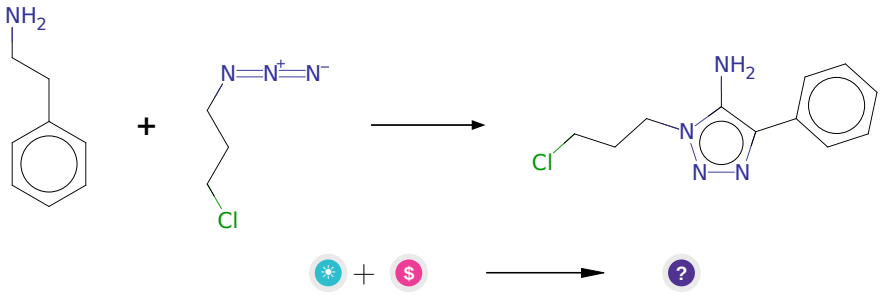


Figure 1: Outline of path 1

2.1.1 Synthesis of 1,2,3-triazoles from azides and nitrile derivatives



Substrates:

1. 1-azido-3-chlor-propan
2. Phenethylamine - *available at Sigma-Aldrich*

Products:

1. Nc1c(-c2ccccc2)nnn1CCCCl

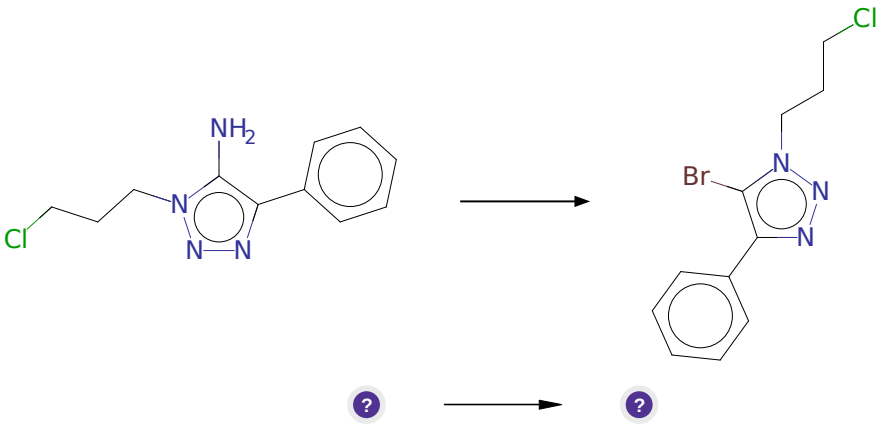
Typical conditions: anhydrous potassium carbonate.DMSO

Protections: none

Reference: DOI: *10.1002/jhet.5570280216*

Retrosynthesis ID: 295117

2.1.2 Sandmeyer Reaction



Substrates:

1. Nc1c(-c2ccccc2)nnn1CCCCl

Products:

1. ClCCCn1nnc(-c2ccccc2)c1Br

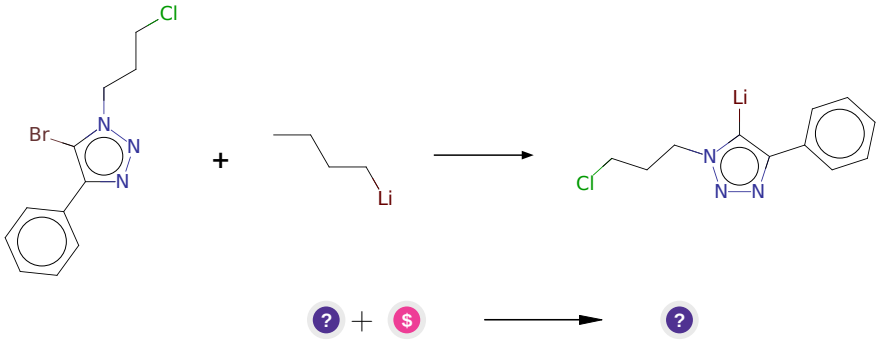
Typical conditions: IsoAmONO or t-BuONO.CuBr2.MeCN or HBr.CuBr2.NaNO2

Protections: none

Reference: *10.1002/chem.201600278* and *10.1016/j.bmcl.2011.12.131* and *10.1016/j.ejmech.2013.01.046* and *10.1021/jm0002782* and *10.1002/ejoc.201300443* and *10.1021/jo052589w*(SI,page S3) and *10.1021/jm800527x* and *10.1016/j.bmcl.2015.04.098* and *10.1021/ja034563x*

Retrosynthesis ID: 29904

2.1.3 Br/Li exchange



Substrates:

1. ClCCCn1nnc(-c2ccccc2)c1Br
2. n-BuLi - *available at Sigma-Aldrich*

Products:

1. [Li]c1c(-c2ccccc2)nnn1CCCCl

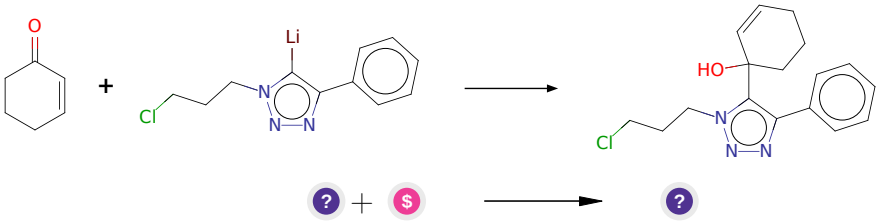
Typical conditions: nBuLi.or.tBuLi.THF.-78C

Protections: none

Reference: *10.1002/ejoc.201101490* and *10.1016/j.tet.2012.03.058* and *10.1016/j.tetlet.2015.01.032* and *10.1021/ja0541175* and *10.1016/j.tetlet.2016.06.123*

Retrosynthesis ID: 30672

2.1.4 Addition of electrophiles to lithiated arenes/heteroarenes



Substrates:

1. [Li]c1c(-c2ccccc2)nnn1CCCCl
2. 2-Cyclohexen-1-one - *available at Sigma-Aldrich*

Products:

1. OC1(c2c(-c3ccccc3)nnn2CCCCl)C=CCCC1

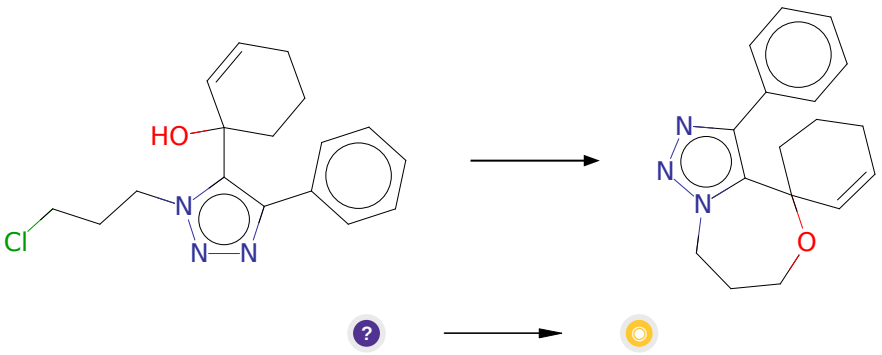
Typical conditions: THF.-78 deg C

Protections: none

Reference: *10.1021/ml300335r* and *10.1021/acs.jmedchem.6b00866*

Retrosynthesis ID: 31008139

2.1.5 Alkylation of tertiary alcohols



Substrates:

1. OC1(c2c(-c3ccccc3)nnn2CCCCl)C=CCCC1

Products:

1. C1=CC2(CCC1)OCCCn1nnc(-c3ccccc3)c12

Typical conditions: K2CO3.acetone.heat

Protections: none

Reference: *10.1016/S0040-4020(01)90106-1* and *10.1021/acs.analchem.5b04461* and *10.3390/molecules24091643*

Retrosynthesis ID: 31010930

2.2 Path 2

Score: `125.08`

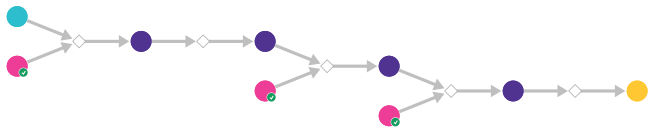
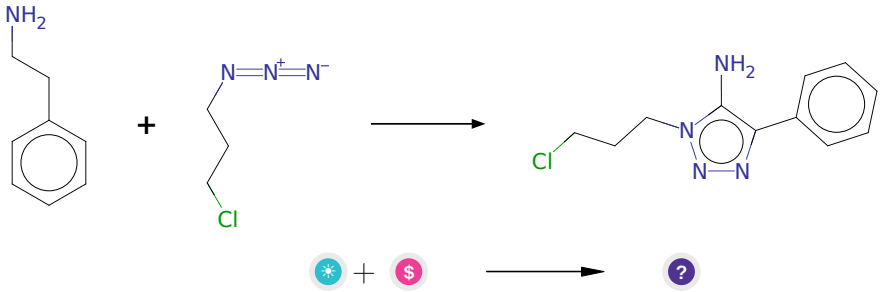


Figure 2: Outline of path 2

2.2.1 Synthesis of 1,2,3-triazoles from azides and nitrile derivatives



Substrates:

1. 1-azido-3-chlor-propan
2. Phenethylamine - *available at Sigma-Aldrich*

Products:

1. Nc1c(-c2ccccc2)nnn1CCCCl

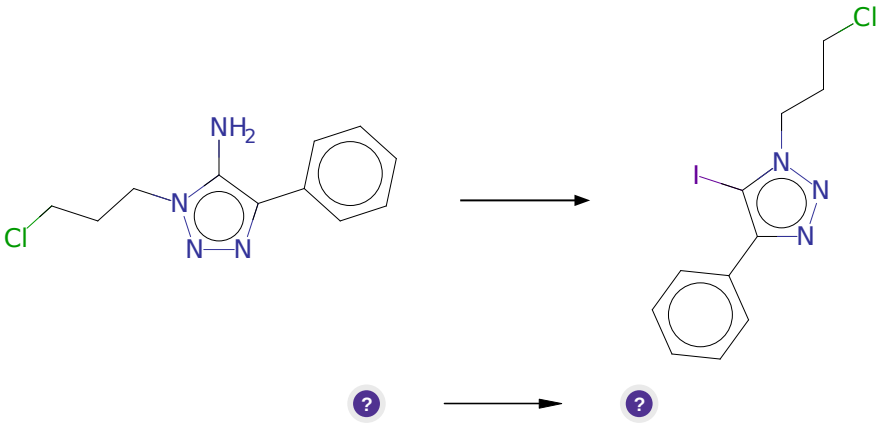
Typical conditions: anhydrous potassium carbonate.DMSO

Protections: none

Reference: DOI: *10.1002/jhet.5570280216*

Retrosynthesis ID: 295117

2.2.2 Synthesis of iodoarenes



Substrates:

1. Nc1c(-c2ccccc2)nnn1CCCCl

Products:

1. ClCCCn1nnc(-c2ccccc2)c1I

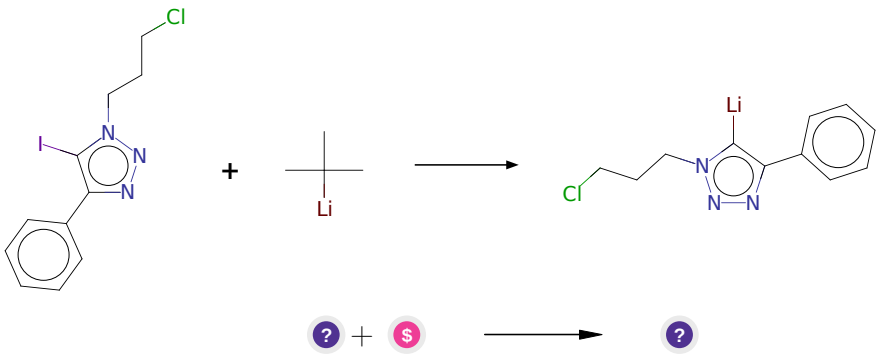
Typical conditions: MeCN.p-TSOH.NaNO2.KI.0 to 25C

Protections: none

Reference: *10.1002/anie.201407653* (SI, page S2) and *10.1002/anie.201409691* and *10.1021/ja312148q* and *10.1021/op300198a* and *10.1002/ejoc.201001436* and *10.1055/s-0028-1087981* and *10.1016/j.bmcl.2011.08.006* and *10.1021/ja0446404* and *10.3762/bjoc.12.36* and *10.1021/acs.orglett.5b01248* and *10.1055/s-2006-958936*

Retrosynthesis ID: 29903

2.2.3 I/Li exchange



Substrates:

1. ClCCCn1nnc(-c2ccccc2)c1I
2. t-BuLi - *available at Sigma-Aldrich*

Products:

1. [Li]c1c(-c2ccccc2)nnn1CCCCl

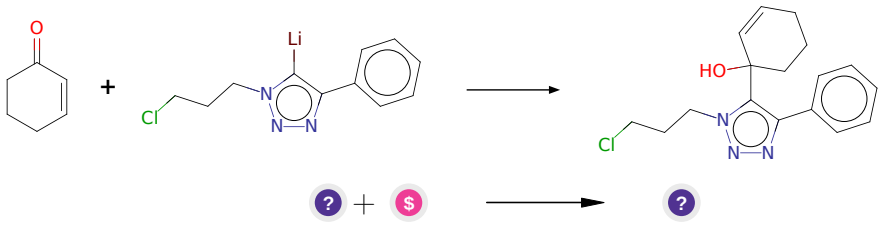
Typical conditions: nBuLi.or.tBuLi.THF.-78C

Protections: none

Reference: *10.1016/j.tet.2004.09.111* and *10.1039/c3ob41082j* And *10.1016/j.bmc.2012.03.056* And *10.1002/chem.201300292*

Retrosynthesis ID: 30673

2.2.4 Addition of electrophiles to lithiated arenes/heteroarenes



Substrates:

1. [Li]c1c(-c2ccccc2)nnn1CCCCl
2. 2-Cyclohexen-1-one - *available at Sigma-Aldrich*

Products:

1. OC1(c2c(-c3ccccc3)nnn2CCCCl)C=CCCC1

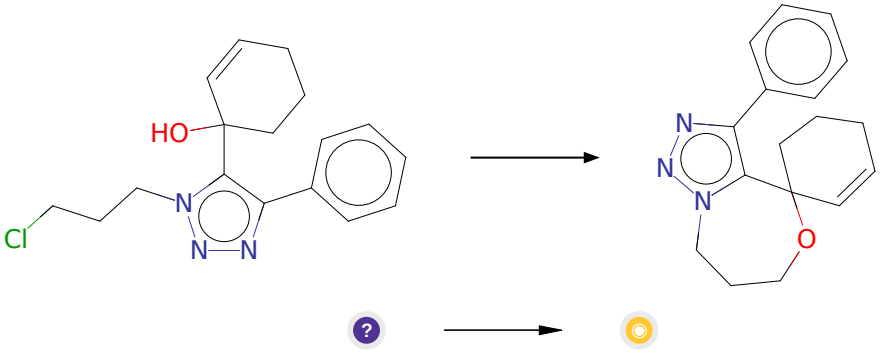
Typical conditions: THF.-78 deg C

Protections: none

Reference: *10.1021/ml300335r* and *10.1021/acs.jmedchem.6b00866*

Retrosynthesis ID: 31008139

2.2.5 Alkylation of tertiary alcohols



Substrates:

1. OC1(c2c(-c3ccccc3)nnn2CCCCl)C=CCCC1

Products:

1. C1=CC2(CCC1)OCCCn1nnc(-c3ccccc3)c12

Typical conditions: K2CO3.acetone.heat

Protections: none

Reference: *10.1016/S0040-4020(01)90106-1* and *10.1021/acs.analchem.5b04461* and *10.3390/molecules24091643*

Retrosynthesis ID: 31010930

2.3 Path 3

Score: `151.35`

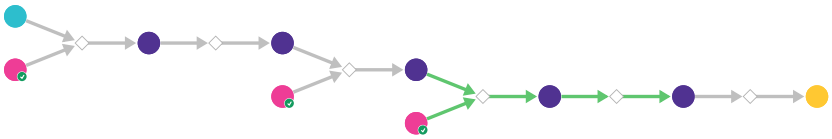
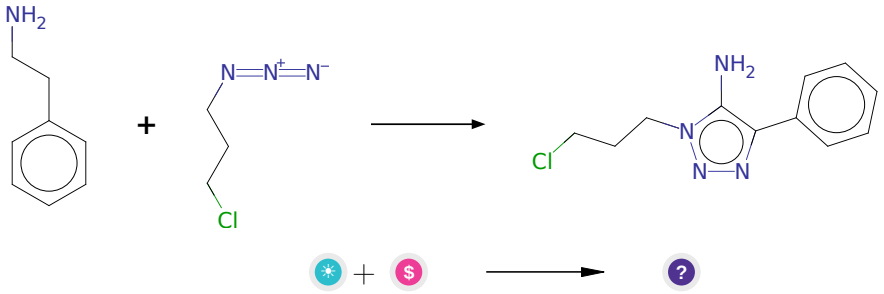


Figure 3: Outline of path 3

2.3.1 Synthesis of 1,2,3-triazoles from azides and nitrile derivatives



Substrates:

1. 1-azido-3-chlor-propan
2. Phenethylamine - *available at Sigma-Aldrich*

Products:

1. Nc1c(-c2ccccc2)nnn1CCCCl

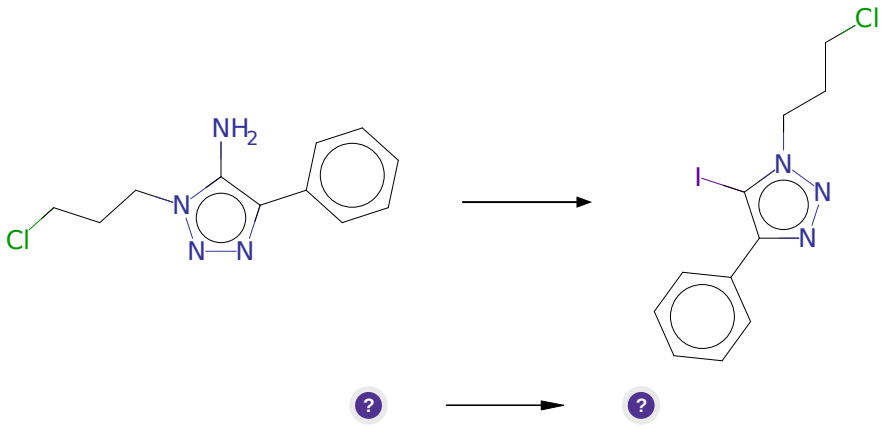
Typical conditions: anhydrous potassium carbonate.DMSO

Protections: none

Reference: DOI: *10.1002/jhet.5570280216*

Retrosynthesis ID: 295117

2.3.2 Synthesis of iodoarenes



Substrates:

1. Nc1c(-c2ccccc2)nnn1CCCCl

Products:

1. ClCCCn1nnc(-c2ccccc2)c1I

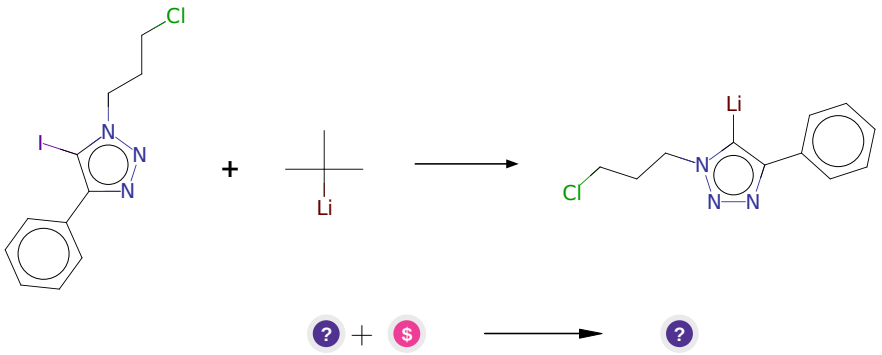
Typical conditions: MeCN.p-TSOH.NaNO2.KI.0 to 25C

Protections: none

Reference: *10.1002/anie.201407653* (SI, page S2) and *10.1002/anie.201409691* and *10.1021/ja312148q* and *10.1021/op300198a* and *10.1002/ejoc.201001436* and *10.1055/s-0028-1087981* and *10.1016/j.bmcl.2011.08.006* and *10.1021/ja0446404* and *10.3762/bjoc.12.36* and *10.1021/acs.orglett.5b01248* and *10.1055/s-2006-958936*

Retrosynthesis ID: 29903

2.3.3 I/Li exchange



Substrates:

1. ClCCCn1nnc(-c2ccccc2)c1I
2. t-BuLi - *available at Sigma-Aldrich*

Products:

1. [Li]c1c(-c2ccccc2)nnn1CCCCl

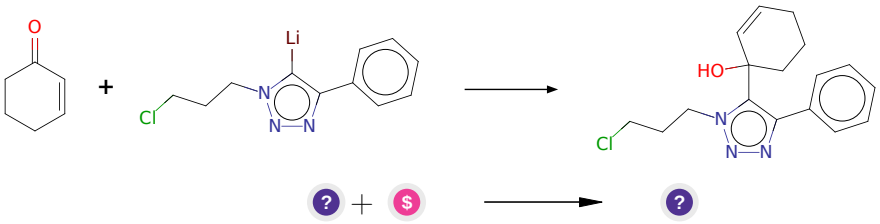
Typical conditions: nBuLi.or.tBuLi.THF.-78C

Protections: none

Reference: *10.1016/j.tet.2004.09.111* and *10.1039/c3ob41082j* And *10.1016/j.bmc.2012.03.056* And *10.1002/chem.201300292*

Retrosynthesis ID: 30673

2.3.4 Addition of electrophiles to lithiated arenes/heteroarenes



Substrates:

1. [Li]c1c(-c2ccccc2)nnn1CCCCl
2. 2-Cyclohexen-1-one - *available at Sigma-Aldrich*

Products:

1. OC1(c2c(-c3ccccc3)nnn2CCCCl)C=CCCC1

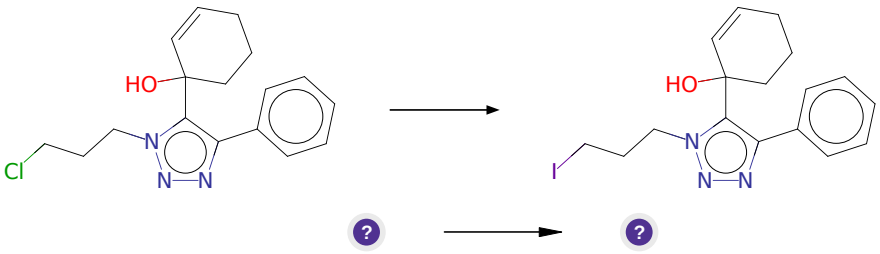
Typical conditions: THF.-78 deg C

Protections: none

Reference: *10.1021/ml300335r* and *10.1021/acs.jmedchem.6b00866*

Retrosynthesis ID: 31008139

2.3.5 Synthesis of alkyl iodides from alkyl chlorides



Substrates:

1. OC1(c2c(-c3ccccc3)nnn2CCCCl)C=CCCC1

Products:

1. OC1(c2c(-c3ccccc3)nnn2CCCI)C=CCCC1

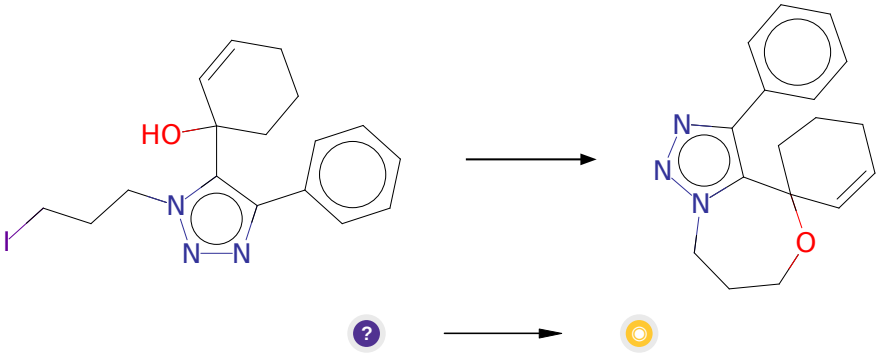
Typical conditions: NaI.acetone.heat

Protections: none

Reference: *10.1039/B812607K* and *10.1021/jm030222i*

Retrosynthesis ID: 31010848

2.3.6 Alkylation of tertiary alcohols



Substrates:

1. OC1(c2c(-c3ccccc3)nnn2CCCI)C=CCCC1

Products:

1. C1=CC2(CCC1)OCCCn1nnc(-c3ccccc3)c12

Typical conditions: K2CO3.acetone.heat

Protections: none

Reference: *10.1039/P29910000147* and *10.1038/ncomms7703*

Retrosynthesis ID: 31010959

2.4 Path 4

Score: `151.35`

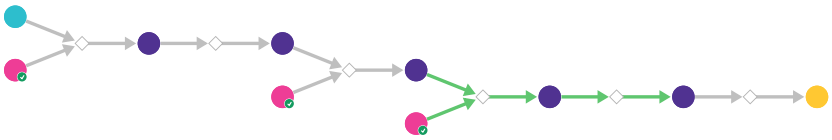
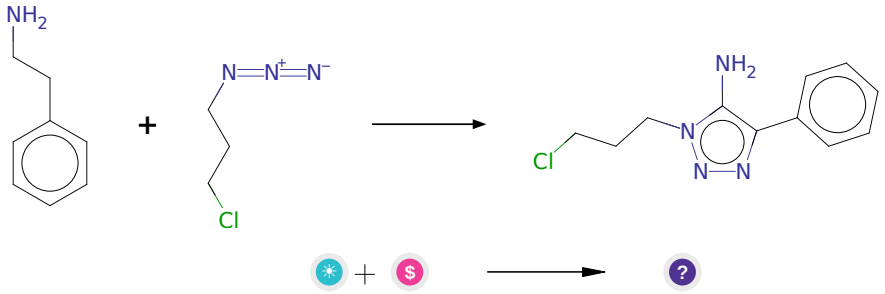


Figure 4: Outline of path 4

2.4.1 Synthesis of 1,2,3-triazoles from azides and nitrile derivatives



Substrates:

1. 1-azido-3-chlor-propan
2. Phenethylamine - *available at Sigma-Aldrich*

Products:

1. Nc1c(-c2ccccc2)nnn1CCCCl

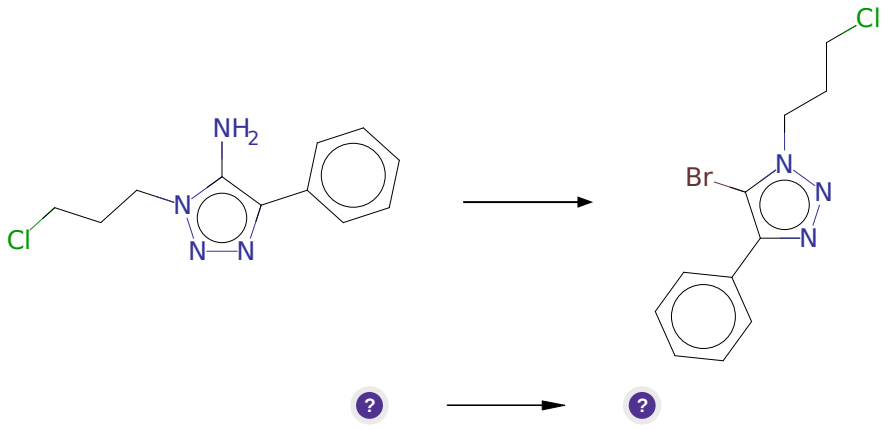
Typical conditions: anhydrous potassium carbonate.DMSO

Protections: none

Reference: DOI: *10.1002/jhet.5570280216*

Retrosynthesis ID: 295117

2.4.2 Sandmeyer Reaction



Substrates:

1. Nc1c(-c2ccccc2)nnn1CCCCl

Products:

1. ClCCCn1nnc(-c2ccccc2)c1Br

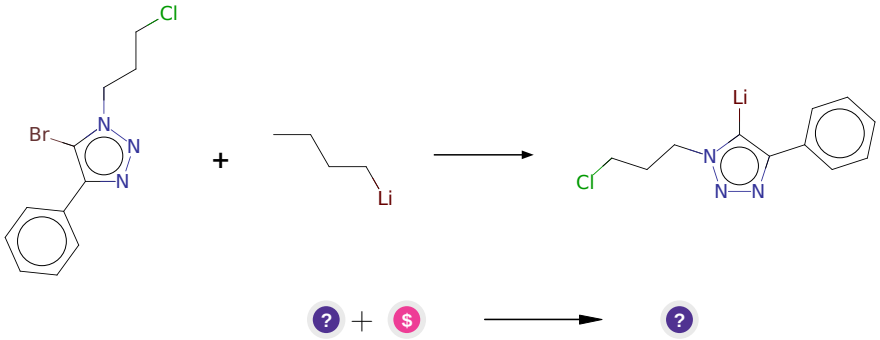
Typical conditions: IsoAmONO or t-BuONO.CuBr2.MeCN or HBr.CuBr2.NaNO2

Protections: none

Reference: *10.1002/chem.201600278* and *10.1016/j.bmcl.2011.12.131* and *10.1016/j.ejmech.2013.01.046* and *10.1021/jm0002782* and *10.1002/ejoc.201300443* and *10.1021/jo052589w*(SI,page S3) and *10.1021/jm800527x* and *10.1016/j.bmcl.2015.04.098* and *10.1021/ja034563x*

Retrosynthesis ID: 29904

2.4.3 Br/Li exchange



Substrates:

1. ClCCCn1nnc(-c2ccccc2)c1Br
2. n-BuLi - *available at Sigma-Aldrich*

Products:

1. [Li]c1c(-c2ccccc2)nnn1CCCCl

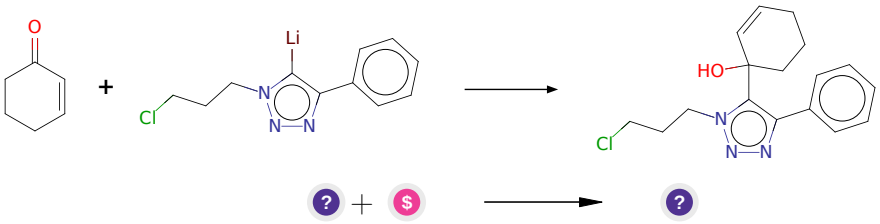
Typical conditions: nBuLi.or.tBuLi.THF.-78C

Protections: none

Reference: *10.1002/ejoc.201101490* and *10.1016/j.tet.2012.03.058* and *10.1016/j.tetlet.2015.01.032* and *10.1021/ja0541175* and *10.1016/j.tetlet.2016.06.123*

Retrosynthesis ID: 30672

2.4.4 Addition of electrophiles to lithiated arenes/heteroarenes



Substrates:

1. [Li]c1c(-c2ccccc2)nnn1CCCCl
2. 2-Cyclohexen-1-one - *available at Sigma-Aldrich*

Products:

1. OC1(c2c(-c3ccccc3)nnn2CCCCl)C=CCCC1

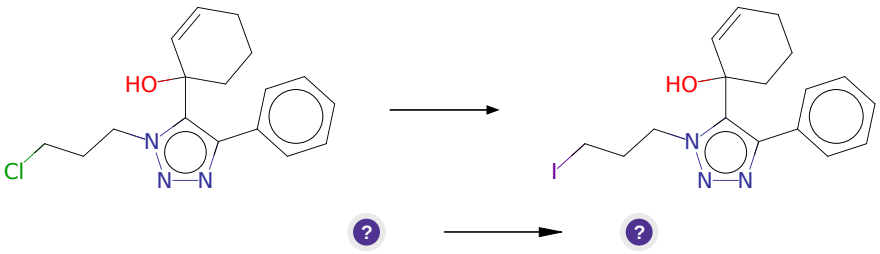
Typical conditions: THF.-78 deg C

Protections: none

Reference: *10.1021/ml300335r* and *10.1021/acs.jmedchem.6b00866*

Retrosynthesis ID: 31008139

2.4.5 Synthesis of alkyl iodides from alkyl chlorides



Substrates:

1. OC1(c2c(-c3ccccc3)nnn2CCCCl)C=CCCC1

Products:

1. OC1(c2c(-c3ccccc3)nnn2CCCI)C=CCCC1

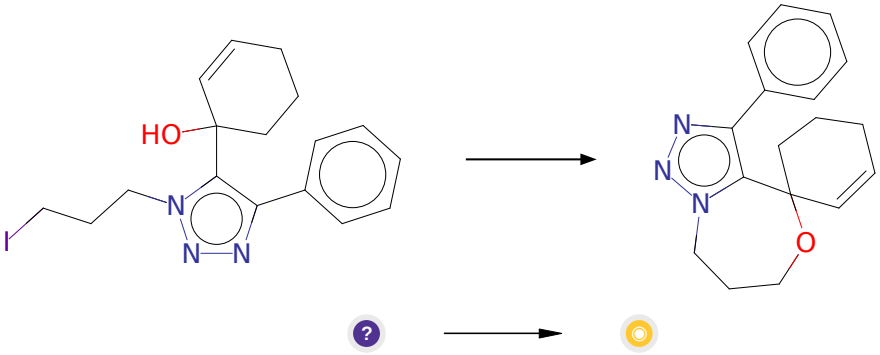
Typical conditions: NaI.acetone.heat

Protections: none

Reference: *10.1039/B812607K* and *10.1021/jm030222i*

Retrosynthesis ID: 31010848

2.4.6 Alkylation of tertiary alcohols



Substrates:

1. OC1(c2c(-c3ccccc3)nnn2CCCI)C=CCCC1

Products:

1. C1=CC2(CCC1)OCCCn1nnc(-c3ccccc3)c12

Typical conditions: K2CO3.acetone.heat

Protections: none

Reference: *10.1039/P29910000147* and *10.1038/ncomms7703*

Retrosynthesis ID: 31010959

2.5 Path 5

Score: `176.35`

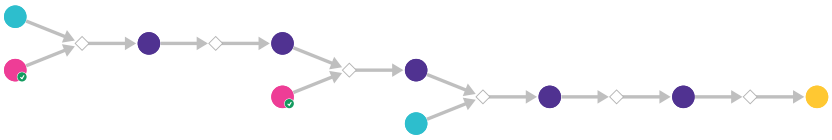
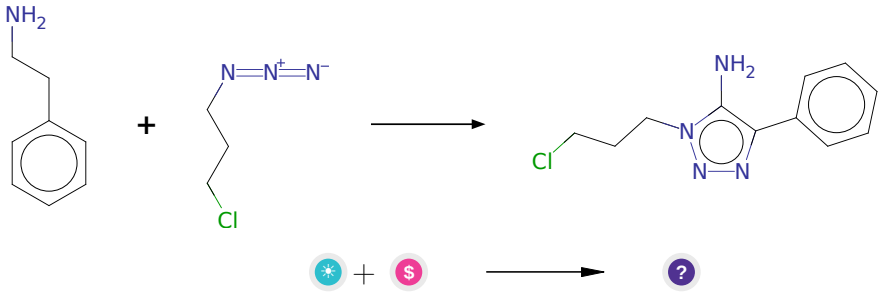


Figure 5: Outline of path 5

2.5.1 Synthesis of 1,2,3-triazoles from azides and nitrile derivatives



Substrates:

1. 1-azido-3-chlor-propan
2. Phenethylamine - *available at Sigma-Aldrich*

Products:

1. Nc1c(-c2ccccc2)nnn1CCCCl

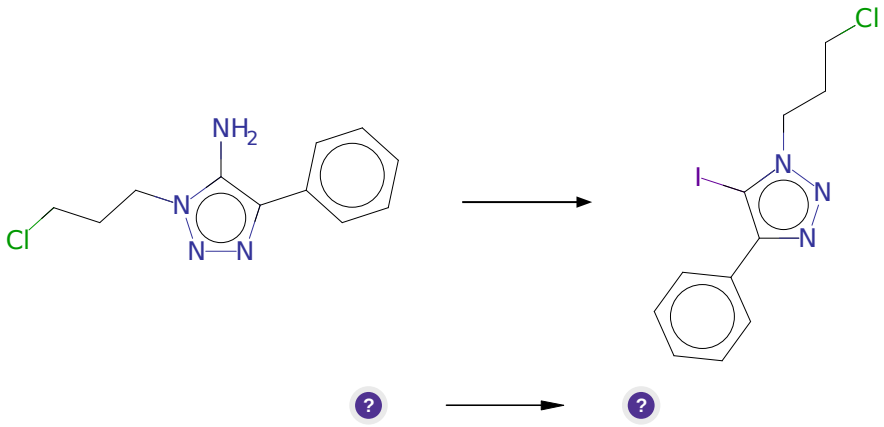
Typical conditions: anhydrous potassium carbonate.DMSO

Protections: none

Reference: DOI: *10.1002/jhet.5570280216*

Retrosynthesis ID: 295117

2.5.2 Synthesis of iodoarenes



Substrates:

1. Nc1c(-c2ccccc2)nnn1CCCCl

Products:

1. ClCCCn1nnc(-c2ccccc2)c1I

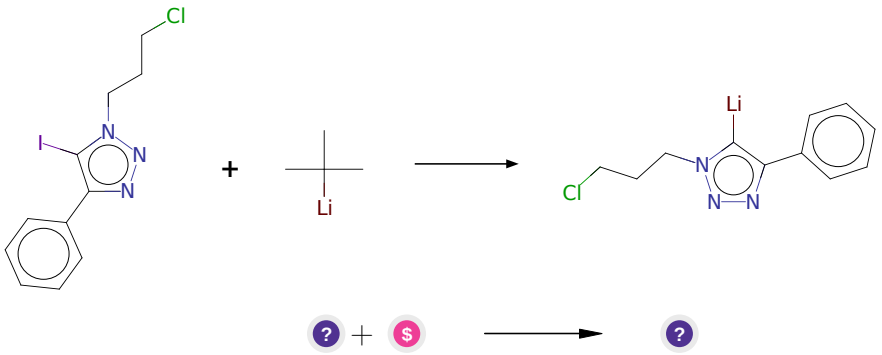
Typical conditions: MeCN.p-TSOH.NaNO2.KI.0 to 25C

Protections: none

Reference: *10.1002/anie.201407653* (SI, page S2) and *10.1002/anie.201409691* and *10.1021/ja312148q* and *10.1021/op300198a* and *10.1002/ejoc.201001436* and *10.1055/s-0028-1087981* and *10.1016/j.bmcl.2011.08.006* and *10.1021/ja0446404* and *10.3762/bjoc.12.36* and *10.1021/acs.orglett.5b01248* and *10.1055/s-2006-958936*

Retrosynthesis ID: 29903

2.5.3 I/Li exchange



Substrates:

1. ClCCCn1nnc(-c2ccccc2)c1I
2. t-BuLi - *available at Sigma-Aldrich*

Products:

1. [Li]c1c(-c2ccccc2)nnn1CCCCl

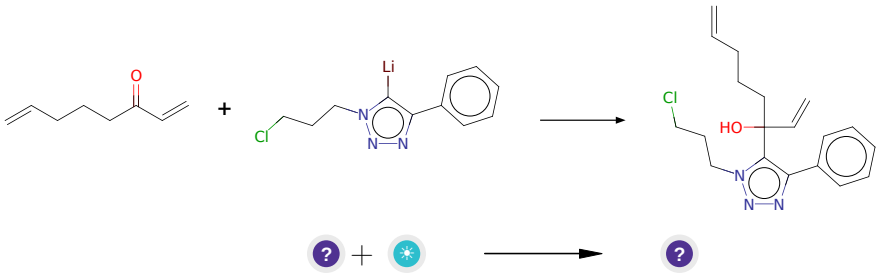
Typical conditions: nBuLi.or.tBuLi.THF.-78C

Protections: none

Reference: *10.1016/j.tet.2004.09.111* and *10.1039/c3ob41082j* And *10.1016/j.bmc.2012.03.056* And *10.1002/chem.201300292*

Retrosynthesis ID: 30673

2.5.4 Addition of electrophiles to lithiated arenes/heteroarenes



Substrates:

1. [Li]c1c(-c2ccccc2)nnn1CCCCl
2. octa-1,7-dien-3-one

Products:

1. C=CCCCC(O)(C=C)c1c(-c2ccccc2)nnn1CCCCl

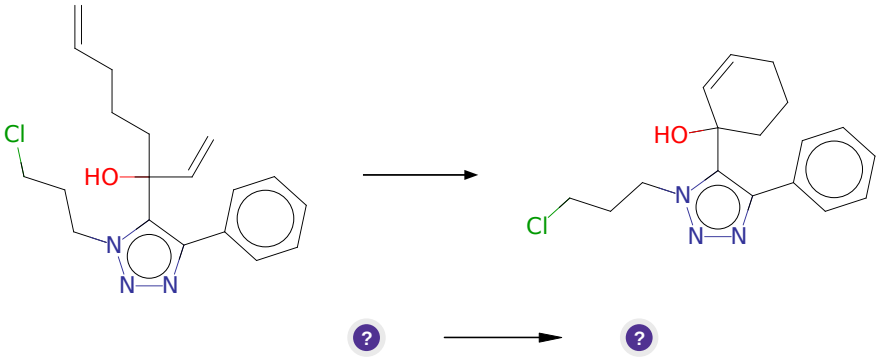
Typical conditions: THF.-78 deg C

Protections: none

Reference: *10.1021/ml300335r* and *10.1021/acs.jmedchem.6b00866*

Retrosynthesis ID: 31008139

2.5.5 Ring-Closing Metathesis



Substrates:

1. C=CCCCC(O)(C=C)c1c(-c2ccccc2)nnn1CCCCl

Products:

1. OC1(c2c(-c3ccccc3)nnn2CCCCl)C=CCCC1

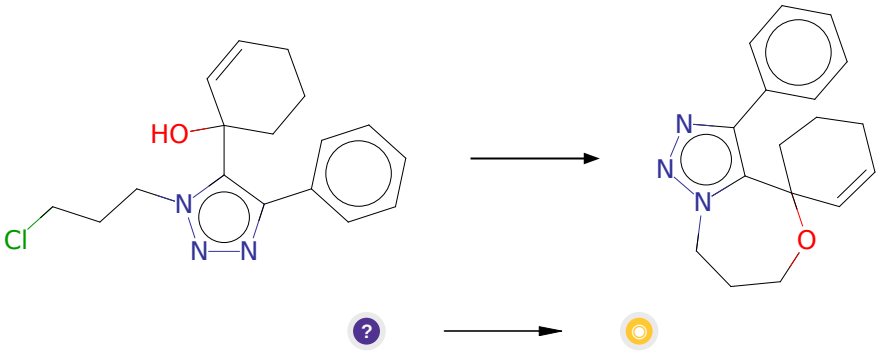
Typical conditions: catalyst e.g. Hoveyda-Grubbs . solvent e.g. CH2Cl2

Protections: none

Reference: DOI: *10.1002/anie.200800693* and *10.1021/acs.orglett.8b04003* and *10.1021/jo0264729* and *10.1021/ja072334v* and *10.1002/ejoc.201001102*

Retrosynthesis ID: 31014187

2.5.6 Alkylation of tertiary alcohols



Substrates:

1. OC1(c2c(-c3ccccc3)nnn2CCCCl)C=CCCC1

Products:

1. C1=CC2(CCC1)OCCCn1nnc(-c3ccccc3)c12

Typical conditions: K2CO3.acetone.heat

Protections: none

Reference: *10.1016/S0040-4020(01)90106-1* and *10.1021/acs.analchem.5b04461* and *10.3390/molecules24091643*

Retrosynthesis ID: 31010930