Supporting Information-I

Trimethylsilyldiazomethane as a Versatile Stitching Agent for the Introduction of Aziridines into Functionalized Organic Molecules

Hong Ren and William D. Wulff*
Department of Chemistry, Michigan State University
East Lansing, MI 48824
E-mail: wulff@chemistry.msu.edu

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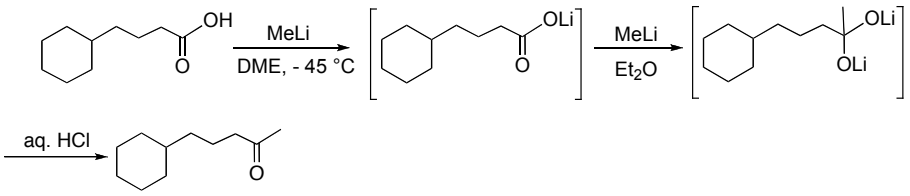
General information

All experiments were performed under an argon atmosphere. Flasks were flame-dried and cooled under argon before use. All solvents such as benzene, dichloromethane, ether, triethylamine, toluene, THF, DMF and CH_3CN were dried if used in the reaction. ACS-grade hexanes and ethyl acetate were used as purchased. Triphenylborate and trimethylsilyldiazomethane were used as purchased from Aldrich. Cyclohexanebutyric acid, hex-5-ynoic acid, 5-ethoxy-5-oxopentanoic acid, 4-bromobutanoic acid, and levulinic acid were used as purchased. VAPOL and VANOL were purified by column chromatography with 9:1 hexanes/ethyl acetate.

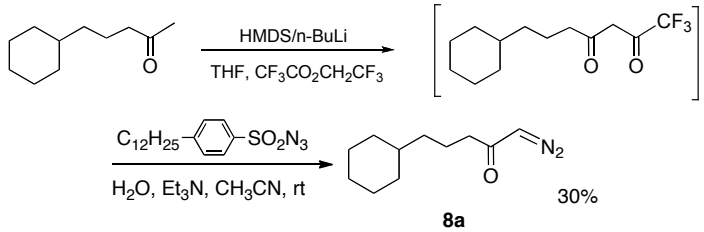
Melting points were measured on a Thomas Hoover capillary melting point apparatus. ^{1}H NMR and ^{13}C NMR were recorded on a Varian 300 MHz or VXR-500 MHz instrument in $CDCl_3$ unless otherwise noted. $CHCl_3$ was used as the internal standard for both ^{1}H NMR (δ = 7.24) and ^{13}C NMR (δ = 77.0). Column chromatography was performed with silica gel 60 (230 – 450 mesh). Analytical thin-layer chromatography (TLC) was performed on silica gel plates with F-254 indicator. Visualization was by short wave (254 nm) and long wave (365 nm) ultraviolet light, or by staining with phosphomolybdic acid in ethanol.

HPLC analyses were carried out using a Varian Prostar 210 Solvent Delivery Module with a Prostar 330 PDA Detector and a Prostar Workstation.

General procedure for the preparation of diazoketones with the azide transfer method



Procedure for the synthesis of 5-cyclohexylpentan-2-one***:*** The following procedure is adapted from one for related methyl ketones[1]. To a flame-dried 100 mL round-bottomed flask, fitted with a magnetic stirrer and an argon balloon was added DME (7.5 mL) and MeLi (7.5 mL, 12 mmol) at – 45°C. A solution of cyclohexanebutyric acid **7a** (1.7 g, 10 mmol) in DME (7.5 mL) was added dropwise. The mixture was allowed to stir for 2 h, followed by the addition of MeLi (7.5 mL, 12 mmol) at 0°C. Stirring was continued at room temperature for 3 hours. Then the mixture was siphoned into a vigorously stirred flask charged with conc HCl (1.8 mL) and H_2O (30 mL). The mixture was stirred for about 30 min, and then NaCl was added to saturate the solution, followed by the separation of the organic and aqueous phases. The aqueous phase was washed with Et_2O, dried over $MgSO_4$, filtered and concentrated under reduced pressure. Purification of the product by column chromatography on silica gel (1:25 ether /pentane) gave the pure methyl ketone as a clear oil in 49% isolated yield (0.82 g, 4.9 mmol). *Spectral data :* R_f = 0.25 (1:25 ether /pentane). ^{1}H NMR (500 MHz, $CDCl_3$) δ 0.70–0.88 (m, 2H), 1.02–1.22 (m, 6H), 1.43–1.62 (m, 7H), 2.03 (s, 3H), 2.36–2.40 (t, 2H, *J* = 7.0 Hz); ^{13}C NMR (125 MHz, $CDCl_3$) δ 21.83, 27.12, 26.94, 31.22, 32.28, 36.63, 38.45, 40.55, 208.12.



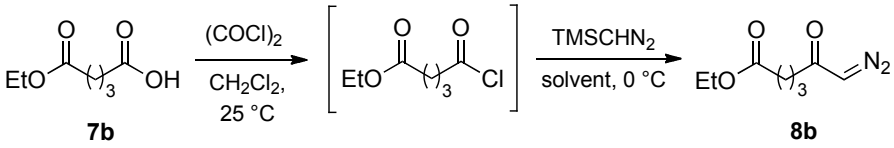
8a

Procedure for the synthesis of 5-cyclohexyl-1-diazopentan-2-one ***8a****:* The following procedure is adapted from one for related diazoketone[2] .To a 250 mL round bottomed flask was added dry tetrahydrofuran (25 mL) and 1,1,1,3,3,3-hexamethyldisilazane (16.5 mmol, 3.89 mL). The mixture was then cooled to 0 °C while n-butyllithium (16.5 mmol, 7.01 mL) in hexane was added dropwise. After stirring for 10 min, the resulting solution was cooled to –78°C, and a solution of methyl ketone (2.52 g, 15.0 mmol) in dry tetrahydrofuran (25 mL) was added slowly over 10 min. Stirring was continued for 30 min at –78°C, and then 2,2,2-trifluoroethyl trifluoroacetate (16.5 mmol, 2.48 mL) was added rapidly via syringe (over 5 sec). After 10 min, the reaction mixture was poured into

a separatory funnel containing 5% aqueous hydrochloric acid (50 mL) and diethyl ether (25 mL). The aqueous layer was separated and extracted with diethyl ether. The combined organic layers were washed with saturated sodium chloride solution, dried over anhydrous sodium sulfate, filtered, and concentrated under reduced pressure using a rotary evaporator. The crude product was immediately dissolved in acetonitrile (23 mL). Water (0.25 mL), triethylamine (22.5mmol, 3.20 mL), and a solution of 4-dodecylbenzenesulfonyl azide[3] (7.88 g, 22.5 mmol) in acetonitrile (23 mL) were then added to the solution. The mixture was allowed to stir at room temperature for 12 h and then was poured into a separatory funnel containing diethyl ether (23 mL) and aqueous 5% sodium hydroxide. The organic phase was separated, washed successively with 5% aq NaOH, water and saturated sodium chloride, dried over anhydrous sodium sulfate, filtered, and concentrated at reduced pressure. Purification of the product by column chromatography on silica gel (1:4 ethyl acetate/hexane) gave 5-cyclohexyl-1-diazopentan-2-one **8a.** Pure product is only obtained if the column chromatography is repeated at least two times which then gives **8a** as a yellow oil in 30% isolated yield (0.87 g, 4.5 mmol). *Spectral data for **8a**[4]:* R_f = 0.25 (1:4 ethyl acetate /hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 0.75–0.83 (m, 2H), 1.01–1.20 (m, 6H), 1.50–1.63 (m, 7H), 2.21 (bs, 2H), 5.21 (bs, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 22.82, 26.52, 26.84, 33.42, 37.13, 37.65, 41.55, 54.32, 195.53.

General Considerations for the optimization of the synthesis of diazo ketones: Illustrated for ethyl 6-diazo-5-oxohexanoate 8b.

Shioiri's protocol for the Arndt-Eistert synthesis of esters with aryl acid chlorides involved 1.2 equiv $TMSCHN_2$ and 1.2 equiv of Et_3N; but, for aliphatic acid chlorides, the presence of Et_3N was deterimental and 2.0 equiv of $TMSCHN_2$ was required to achieve optimal results.[5,6] While $TMSCHN_2$ is commercially available, for the sake of efficiency, it seemed highly desirable to determine if the need for excess $TMSCHN_2$ was evitable. As can be seen for the alkylation of acid chloride, the yield of the diazoketone **8b** does drop off slightly as the amount of $TMSCHN_2$ is dropped from 2.5 to 1.1 equiv, but hardly a significant amount when atom efficiency is considered. Acetonitrile is the solvent of choice although THF, which was shown equally effective by Shioiri, was not examined in the present study.[5] Entry 5 and 6 reveal that slightly higher yields could be obtained for reaction at room temperature



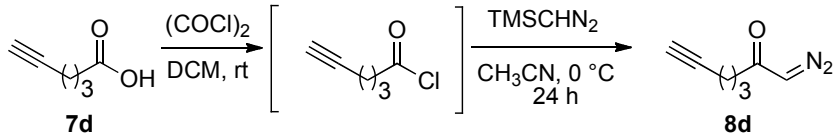
7b **8b**

entry [a]	solvent	equiv $TMSCHN_2$	yield **8b** (%) [b]
1	CH_3CN	2.5	77
2	CH_3CN	2.0	73
3	CH_3CN	1.5	74
4	CH_3CN	1.1	70
5 [c]	CH_3CN	1.1	82
6 [c,d]	CH_3CN	1.1	91
7	hexane	1.1	20
8	ether	1.1	13
9	toluene	1.1	21
10	CH_2Cl_2	1.1	27
11	EtOH	1.1	0
12 [d]	DMF	1.1	68

[a] The acid **7b** was reacted with oxalyl chloride for 1h and then after volatiles were removed, the acid chloride was reacted with of $TMSCHN_2$ at 0 °C for 12 h at 0.2 M in the appropriate solvent. The reaction was quenched with satd $NaHCO_3$. [b] Yield after purification on silica gel. c Reaction with $TMSCHN_2$ at 25 °C. [d] No quench with satd $NaHCO_3$.

but this was found not to be the case for other diazoketones. Most importantly, 1.1 equiv of $TMSCHN_2$ was found to be suitable for all of the functionalized diazoketones.

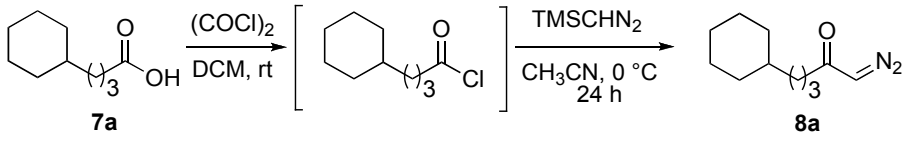
General procedure for the synthesis of diazo ketone 8a-k with trimethylsilyldiazomethane ($TMSCHN_2$) as a stable and safe substitute for diazomethane – Illustrated for the synthesis of 5-cyclohexyl-1-diazopentan-2-one 8d.



7d **8d**

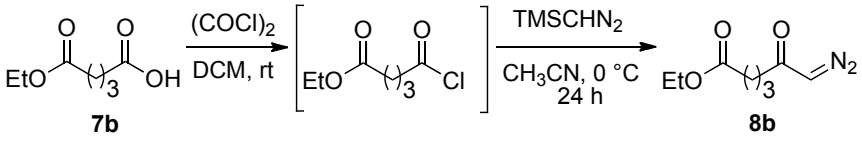
The following procedure is one that is modified from that reported by Shroiri in that it uses only 1.1 equiv of $TMSCHN_2$ and workup with sat aq $NaHCO_3$ is not employed.[5,6] A 250 mL flame-dried round-bottomed flask with stir bar was charged with hex-5-ynoic acid **7d** (1.7 g, 15 mmol) and CH_2Cl_2 (15 mL). Oxalyl chloride $(COCl)_2$ (2.85 g, 22.5 mmol) was then added slowly at room temperature. Stirring was continued for 1 h, and then the reaction mixture was concentrated by rotary evaporation to give a brown liquid which can be used for the next step without further purification.

The residual from the above step was dissolved in CH_3CN (75 mL), followed by the addition of $TMSCHN_2$ (16.5 mmol, 8.3 mL) at 0°C. The reaction mixture was allowed to stir for 24 h. Volatiles were then removed by rotary evaporation. Purification of the product by column chromatography on silica gel (1:6 ethyl acetate/hexane) gave the pure 1-diazohept-6-yn-2-one **8d** as a yellow oil in 66% isolated yield (1.35 g, 9.9 mmol). When the reaction was run at room temperature according to the general procedure described above, a 60% yield of compound **8d** was obtained. *Spectral data for **8d*** [7]: R_f = 0.2 (1:6 ethyl acetate /hexanes). ^{1}H NMR (500 MHz, CDCl3) δ 1.57–1.61 (m, 2H), 1.82–1.83 (m, 1H), 2.00-2.03 (m, 2H), 2.23 (bs, 2H), 5.24 (bs, 1H); ^{13}C NMR (125 MHz, CDC_{l3}) δ 17.24, 32.10, 38.67, 53.94, 68.87, 82.82, 193.76.



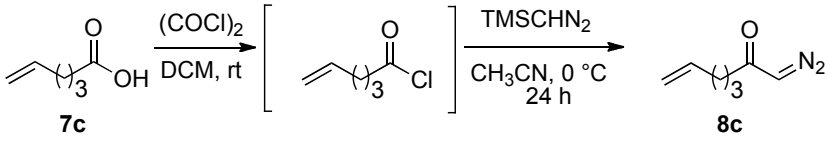
7a **8a**

*5-cyclohexyl-1-diazopentan-2-one **8a**:* cyclohexanebutyric acid **7a** (0.34g, 2.0 mmol) was reacted according to the general procedure described above except that the reaction mixture from the second step was quenched with sat. $NaHCO_3$, extracted with ether and dried over $NaSO_4$. Purification of **8a** by column chromatography on silica gel (1:4 ethyl acetate/hexane) gave the pure *5-cyclohexyl-1-diazopentan-2-one **8a*** as a yellow oil in 73% isolated yield (0.28 g, 1.5 mmol). The same reaction at room temperature gave **8a** in 59% yield and the same reaction at 25 °C with 2.0 equiv of $TMSCHN_2$ gave 62% yield.



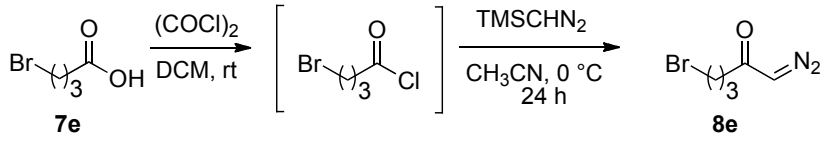
7b **8b**

*ethyl 6-diazo-5-oxohexanoate **8b***: 5-ethoxy-5-oxopentanoic acid **7b** (0.32g, 2.0 mmol) was reacted according to the general procedure described above except that the reaction mixture from the second step was quenched with sat. $NaHCO_3$, extracted with ether and dried over $NaSO_4$. Purification of **8b** by column chromatography on silica gel (1:3 ethyl acetate/hexane) gave the pure ethyl 6-diazo-5-oxohexanoate **8b** as a yellow oil in 70% isolated yield (0.26 g, 1.4 mmol). When the reaction was run at room temperature according to the same procedure, a 91% yield of compound **8b** was obtained. *Spectral data for **8b***[8]: R_f = 0.2 (1:3 ethyl acetate /hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 1.14–1.17 (t, 3H, *J* = 7.0 Hz), 1.82–1.88 (m, 2H), 2.25-2.29 (m, 4H), 4.00-4.05 (q, 2H, *J* = 7.0 Hz), 5.23 (bs, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 14.00, 20.03, 33.08, 39.47, 54.27, 60.16, 172.77, 193.88.



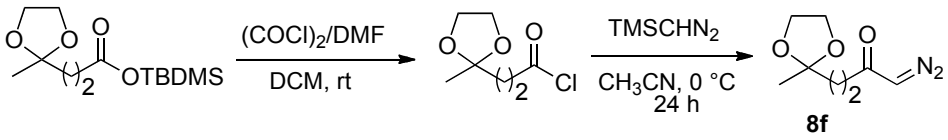
7c **8c**

*1-diazohept-6-en-2-one **8c**:* Hex-5-enoic acid [9] **7c** (1.6 g, 14 mmol) was reacted according to the general procedure described above. Purification of **8c** by column chromatography on silica gel (1:6 ethyl acetate/hexanes) gave the pure diazoketone as a clear yellow liquid in 69% isolated yield (1.28 g, 9.00 mmol). When the reaction was run at room temperature according to the general procedure described above, a 65% yield of compound **8c** was obtained. *Spectral data for **8c**[10]*: R_f = 0.2 (1:6 ethyl acetate /hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 1.56–1.62 (m, 2H), 1.93–1.97 (m, 2H), 2.19 (bs, 2H), 4.83-4.91 (m, 2H), 5.21 (bs, 1H), 5.96-5.68 (m, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 23.88, 32.72, 39.78, 53.75, 114.53, 137.28, 194.66. These data match that reported for this compound.



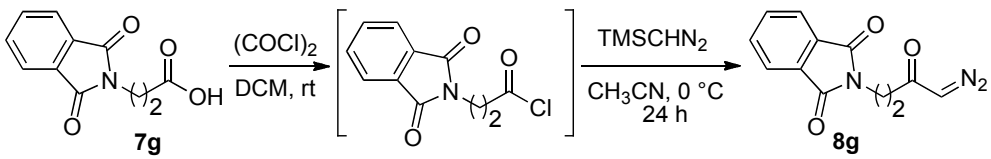
7e **8e**

*5-bromo-1-diazopentan-2-one **8e**:* 4-bromobutanoic acid **7e** (0.33 g, 2.0 mmol) was reacted according to the general procedure described above. Purification of **8e** by column chromatography on silica gel (1:6 ethyl acetate/hexanes) gave the pure diazoketone as a clear yellow liquid in 78% isolated yield (0.30 mg, 1.6 mmol). Compound **8e** gradually turned orange at room temperature after evaporation of solvent by rotary evaporator to remove most of the solvent. The yield was calculated from the ^{1}H NMR spectrum after integration of solvent peaks. Removing all solvents by high vacuum was detrimental to the compound. Therefore, this compound should be used immediately after purification by column chromatography. *Spectral data for **8e**[11]*: R_f = 0.2 (1:6 ethyl acetate /hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 2.13-2.18 (m, 2H), 2.48 (bs, 2H), 3.41-3.44 (m, 2H), 5.27 (bs, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 27.55, 33.07, 37.75, 54.68, 193.21.



8f

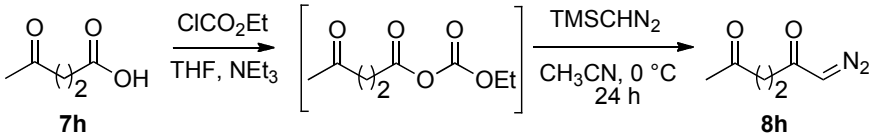
*1-diazo-4-(2-methyl-1,3-dioxolan-2-yl)butan-2-one **8f**: tert*-butyldimethylsilyl 3-(2-methyl-1,3-dioxolan-2-yl)propanoate[12] (0.15 g, 1.8 mmol) was reacted according to the general procedure described above with the exception that a few drops of DMF were added for the preparation of acid chloride. Purification of **8f** by column chromatography on silica gel (1:1 ethyl acetate/hexanes) gave the pure diazoketone as a clear yellow liquid in 52% isolated yield (170 mg, 0.920 mmol). *Spectral data for **8f**[13]*: R_f = 0.20 (1:1 ethyl acetate /hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 1.25 (s, 3H), 1.93–1.96 (t, 2H, *J* = 7.5 Hz), 2.35 (bs, 2H), 3.83-3.91 (m, 4H), 5.21 (bs, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 14.37, 24.09, 33.89, 54.45, 64.91, 109.40, 194.63.



7g **8g**

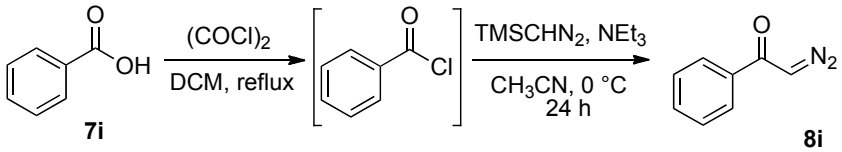
*2-(4-diazo-3-oxobutyl)isoindoline-1,3-dione **8g**:* 3-(1,3-dioxoisoindolin-2-yl)propanoic acid[14] **7g** (0.88 g, 4.0 mmol) was reacted

according to the general procedure described above. Purification of **8g** by column chromatography on silica gel (1:9 ethyl acetate/dichloromethane) gave the pure diazoketone as a light yellow solid (mp 126-128 °C) in 82% isolated yield (0.8 g, 3.3 mmol). *Spectral data for* ***8g***[15]: R_f = 0.2 (1:9 ethyl acetate /dichloromethane). ^{1}H NMR (500 MHz, $CDCl_3$) δ 2.72 (bs, 2H), 3.96-3.99 (t, 2H, *J* = 7.5 Hz), 5.29 (bs, 1H), 7.66-7.70 (m, 2H), 7.78-7.81 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 33.70, 38.53, 55.25, 123.27, 131.96, 133.99, 167.97, 191.26.



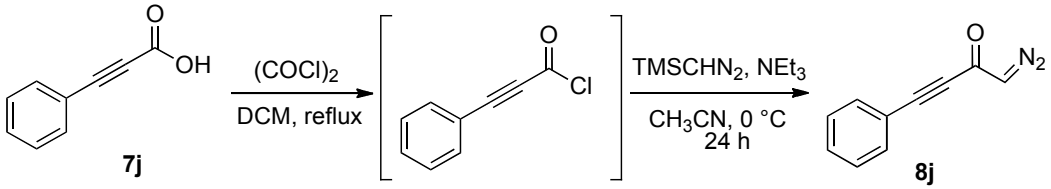
7h **8h**

1-diazohexane-2,5-dione ***8h*** *was prepared as follow*: A flame-dried flask was charged with levulinic acid **7h** (0.23 g, 2.0 mmol) and THF (10 mL). Then 1.05 eq. of TEA was added at 0°C, followed by the addition of 1.05 eq of ethyl chloroformate. The mixture was stirred for 2 h. After filtration and concentration at reduced pressure, the anhydride was obtained which could be used in the next step without further purification. The anhydride was dissolved in CH_3CN (10 mL) at 0°C, followed by the addition of $TMSCHN_2$ (2.2 mmol, 1.1 mL). Stirring was continued overnight. The solvent was then removed by rotary evaporator. The residual was dissolved in ether, and washed with sat. $NaHCO_3$ and water, dried over Na_2SO_4 and concentrated. Purification of **8h** by column chromatography on silica gel (1:1 ethyl acetate/hexanes) gave the pure diazoketone as a clear yellow liquid in 30% isolated yield (84 mg, 0.60 mmol). *Spectral data for* ***8h***[16]: R_f = 0.30 (1:1 ethyl acetate /hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 2.16 (s, 3H), 2.56 (s, 2H), 2.75-2.78 (t, *J* = 6.0 Hz, 2H), 5.28 (bs, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 29.03, 35.41, 39.49, 53.94, 194.83, 207.82.



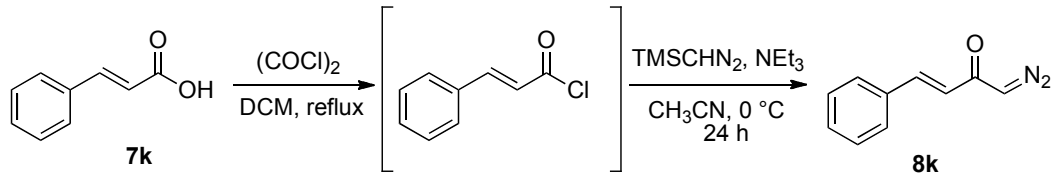
7i **8i**

2-diazo-1-phenylethanone ***8i***: Benzoic acid **7i** (0.24 g, 2.0 mmol) was reacted according to the general procedure described above with the exception that 1.2 eq. of triethylamine was added after the addition of $TMSCHN_2$ (2.2 mmol, 1.1 mL). Purification of **8i** by column chromatography on silica gel (1: 6 ethyl acetate/hexanes) gave the pure diazoketone as a yellow solid (mp 52-54 °C) in 55% isolated yield (160 mg, 1.10 mmol). *Spectral data for* ***8i***[17]*:* R_f = 0.2 (1:6 ethyl acetate) ^{1}H NMR (500 MHz, $CDCl_3$) δ 5.91 (bs, 1H), 7.37-7.41 (m, 2H), 7.47-7.50 (m, 1H), 7.71- 7.73 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 54.42, 126.89, 128.89, 132.95, 136.87, 186.61.



7j **8j**

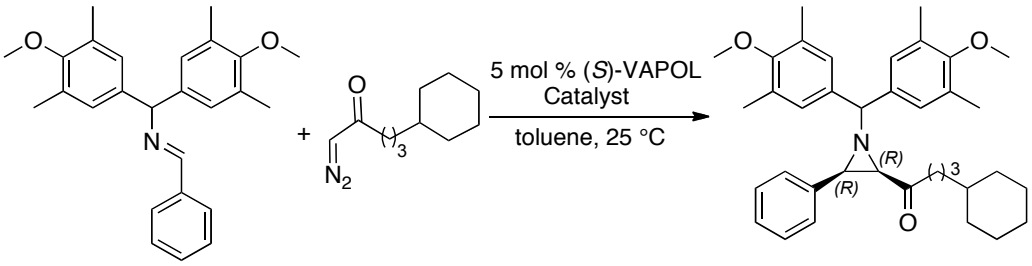
1-diazo-4-phenylbut-3-yn-2-one ***8j****:* Phenylpropiolic acid **7j** (0.29 g, 2.0 mmol) was reacted according to the general procedure described above with the exception that 1.2 eq. of triethylamine was added after the addition of $TMSCHN_2$. Purification of **8j** by column chromatography on silica gel (1: 9 ethyl acetate/hexanes) gave the pure diazoketone as a clear yellow liquid in 15% isolated yield (51 mg, 0.3 mmol). *Spectral data for* ***8j***[18]: R_f = 0.2 (1:3 ethyl acetate /hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 5.58 (bs, 1H), 7.34-7.42 (m, 3H), 7.51-7.54 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 53.92, 89.92, 96.34, 127.99, 128.83, 133.84, 135.82, 184.21.



7k **8k**

*(E)-1-diazo-4-phenylbut-3-en-2-one **8k***: (E)-cinnamic acid **7k** (0.3 g, 2 mmol) was reacted according to the general procedure described above with the exception that 1.2 eq. of triethylamine was added after the addition of $TMSCHN_2$. The ^1H NMR spectrum of the crude reaction mixture indicated that the desired diazo compound **8k** was not present due to the absence of the characteristic diazo methine peak at δ 5.6 that has been reported for this compound.[19]

General procedure for the catalytic asymmetric aziridination of diazo ketones 8a-g – Illustrated for the preparation of 1-((2R,3R)-1-(bis(4-methoxy-3,5-dimethyl-phenyl)methyl)-3-phenylaziridin-2-yl)-4-cyclohexylbutan-1-one 10a.

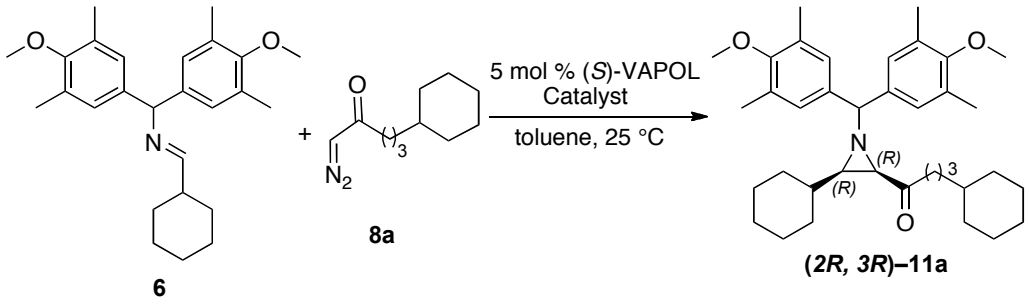


5 **8a** **(*2R, 3R*)-10a**

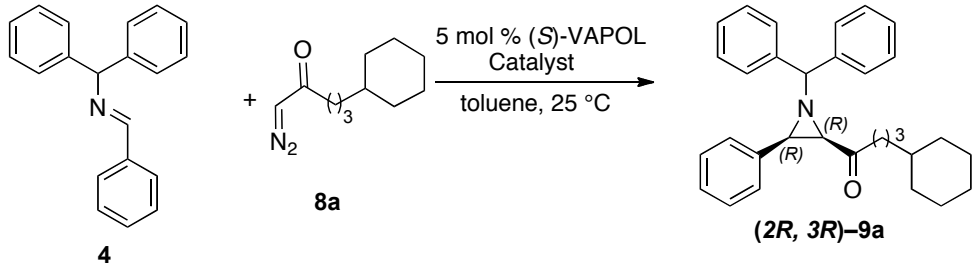
Procedure for catalyst preparation[20]: To a flame-dried 50 mL Schlenk flask, fitted with a magnetic stirrer and filled with argon, was added (*S*)-VAPOL (26.9 mg, 0.0500 mmol) and triphenylborate (58 mg, 0.20 mmol). Dry toluene (2 mL) was added under an argon flow, followed by the addition of water (0.9 μL, 0.05 mmol). After capping the flask, the mixture was heated at 80 ºC for 1 h with stirring. Thereafter a vacuum was gradually applied to remove solvent (0.05 mm Hg). The vacuum was maintained for 30 min at 80 ºC. Then the flask was cooled down under argon flow to room temperature.

Procedure for the aziridination reaction[20]: Aldimine **5** (387 mg, 1.00 mmol) and dry toluene (2 mL) were added to this Schlenk flask under an argon flow. Thereafter, 5-cyclohexyl-1-diazopentan-2-one **8a** (232 mg, 1.20 mmol) was added via syringe. Stirring was continued at room temperature for 24 h. The mixture was then diluted with 15 mL of hexanes and transferred to a 100 mL round bottom flask. The Schlenk flask was rinsed with dichloromethane. Concentration of the solvent followed by applying high vacuum (0.05 mm Hg) for 30 minutes provided the crude aziridine as an off-white solid. The *cis/trans* ratios were determined by the ^1H NMR spectrum of the crude reaction mixture by integration of the aziridine methine protons. The coupling constants of the cis (7-8 Hz) and the trans (2-3 Hz) were used to differentiate the two isomers. Purification of the product by column chromatography (35 mm x 400 mm column) on silica gel with an elutant mixture of ethyl acetate:hexanes (1:9) gave the pure aziridine (mp 45-47 °C) as a white solid in 72% isolated yield (400 mg, 0.72 mmol). *Cis/trans* ratio: 100:1. The optical purity of **10a** was determined to be 99% ee by HPLC analysis (CHIRALCEL OD-H column, 99:1 hexanes:2-propanol, 222 nm, flow rate 0.7 mL/min). Retention times: R_t = 8.24 min (major enantiomer) and R_t = 6.70 min (minor enantiomer). *Spectral data for (2R, 3R)-**10a***: R_f = 0.15 (1:9 ethyl acetate/hexanes). ^1H NMR (500 MHz, $CDCl_3$) δ 0.60-1.30 (m, 11H), 1.45-1.65 (m, 5H), 1.85-2.00 (m, 1H), 2.21 (s, 6H), 2.24 (s, 6H), 2.56-2.59 (d, 1H, *J* = 7 Hz), 3.12-3.20 (d, 1H, *J* = 7 Hz), 3.59 (s, 1H), 3.63 (s, 3H), 3.67 (s, 3H), 7.12-7.14 (d, 4H, *J* = 7 Hz), 7.16-7.25 (m, 3H), 7.27-7.30 (d, 2H, *J* = 7 Hz); ^{13}C NMR (125 MHz, $CDCl_3$) (1 sp^3 carbon missing) δ 16.09, 16.15, 20.09, 26.19, 26.56, 33.01,33.03, 36.58, 37.21, 40.87, 49.17, 52.74, 59.40, 59.43, 77.64, 127.23, 127.35, 127.65, 127.72, 127.90, 130.56, 130.58, 135.36, 137.71, 137.87, 155.98, 156.05, 207.09; IR (thin film) 2922s, 1697m, 1483s, 1221s cm^{-1}; mass spectrum, *m/z* (% rel intensity) 553 M^+ (2), 283 (100), 269 (100), 238 (46); Anal calcd for $C_{37}H_{47}NO_3$: C, 80.25; H, 8.55; N, 2.53. Found: C, 79.73; H,

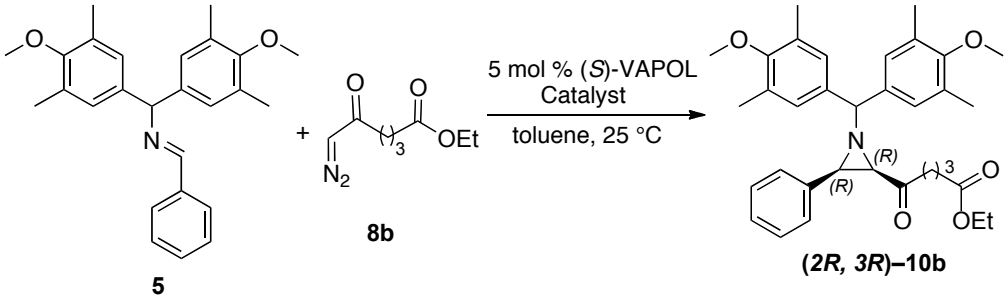
8.55; N, 2.32; $[\alpha]^{23}_D$ = +54.0 (*c* 1.0, CH_2Cl_2) on 99% ee material (HPLC).



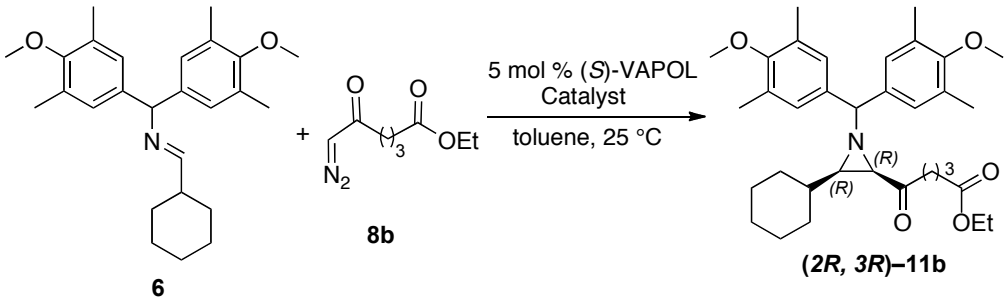
1-((2R,3R)-1-(bis(4-methoxy-3,5-dimethylphenyl)methyl)-3-cyclohexylaziridin-2-yl)-4-cyclohexylbutan-1-one ***11a***: Aldimine **6** (275 mg, 0.700 mmol) was reacted with 5-cyclohexyl-1-diazopentan-2-one **8a** (163mg, 0.840 mmol) according to the general procedure described above with the exception that the catalyst loading was 10 mol%. Purification of the product by column chromatography on silica gel (1:15 ethyl acetate/hexanes) gave the pure aziridine as a viscous oil in 82% isolated yield (319 mg, 0.570 mmol). The optical purity of **11a** was determined to be 95% ee by HPLC analysis (CHIRALCEL OD-H column, 98:2 hexanes:2-propanol, 222 nm, flow 0.7 mL/min). Retention times: R_t = 5.05 min (major enantiomer) and R_t = 5.98 min (minor enantiomer). *Spectral data for (2R, 3R)-* ***11a***: R_f = 0.15 (1:15 ethyl acetate:hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 0.42-0.58 (m, 1H), 0.70-1.70 (m, 25H), 1.40-1.58 (t, 1H, *J* = 7.5 Hz), 2.21(s, 6H), 2.22 (s, 6H), 2.26-2.27 (d, 1H, *J* = 7.5 Hz), 2.40-2.50 (m, 2H), 3.30 (s, 1H), 3.64 (s, 3H), 3.66 (s, 3H), 6.96 (s, 2H), 7.03 (s, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) (1 sp^3 carbon missing) δ 16.08, 16.19, 21.20, 25.40, 25.52, 26.13, 26.34, 26.65, 30.44, 30.98, 33.22, 33.24, 36.07, 37.01, 37.48, 42.41, 49.99, 54.85, 59.58, 59.66, 78.11, 127.35, 128.38, 130.34, 130.50, 137.77, 138.12, 155.83, 156.22, 207.77; IR (thin film) 2924s, 1701w, 1483s, 1221s cm^{-1}; mass spectrum, *m/z* (% rel intensity) 559 M^+ (0.77), 283 (100), 95 (16), 55 (38); Anal calcd for $C_{37}H_{53}NO_3$: C, 79.38; H, 9.54; N, 2.50. Found: C, 79.11; H, 9.26; N, 2.41; $[\alpha]^{23}_D$ = +91.8 (*c* 1.0, CH_2Cl_2) on 95% ee material (HPLC).



1-((2R,3R)-1-benzhydryl-3-phenylaziridin-2-yl)-4-cyclohexylbutan-1-one ***9a***: Aldimine **4** (271 mg, 1.00 mmol) was reacted with 6-diazo-5-oxohexanoate **8a** (232 mg, 1.20 mmol) according to the above mentioned procedure. Purification of the product by column chromatography on silica gel (1:15 ethyl acetate/hexanes) gave the pure aziridine (mp 138-139 °C) as a white solid in 66% isolated yield (289 mg, 0.66 mmol). The optical purity of **9a** was determined to be 92% ee by HPLC analysis (CHIRALCEL OD-H column, 99:1 hexanes:2-propanol, 222 nm, flow 0.7 mL/min). Retention times: R_t = 6.92 min (major enantiomer) and R_t = 10.64 min (minor enantiomer). *Spectral data for (2R, 3R)–* ***9a***: R_f = 0.15 (1:15 ethyl acetate/hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 0.60-0.90 (m, 4H), 1.01-1.37 (m, 7H), 1.58-1.71 (m, 4H), 2.00-2.07 (m, 1H), 2.28-2.34 (m, 1H), 2.77-2.79 (d, 1H, *J* = 7 Hz), 3.33-3.52 (d, 1H, *J* = 7 Hz), 3.96 (s, 1H), 7.23-7.40 (m, 11H), 7.60-7.63 (t, 4H, *J* = 6.5 Hz); ^{13}C NMR (125 MHz, $CDCl_3$) (1 sp^2 and sp^3 carbon missing) δ 20.16, 26.29, 26.66, 33.07, 33.13, 36.60, 37.25, 40.95, 49.20, 52.85, 78.45, 127.25, 127.38, 127.43, 127.49, 127.53, 127.75, 128.07, 128.55, 135.19, 142.33, 142.50, 206.82; IR (thin film) 2918m, 1709s, 1653s, 1456w cm^{-1}; mass spectrum, *m/z* (% rel intensity) 437 M^+ (1.82), 270 (100), 167 (95), 118 (43); Anal calcd for $C_{31}H_{35}NO$: C, 85.08; H, 8.06; N, 3.20. Found: C, 85.00; H, 7.89; N, 3.22; $[\alpha]^{23}_D$ = +55.5 (*c* 1.0, CH_2Cl_2) on 92% ee material (HPLC).

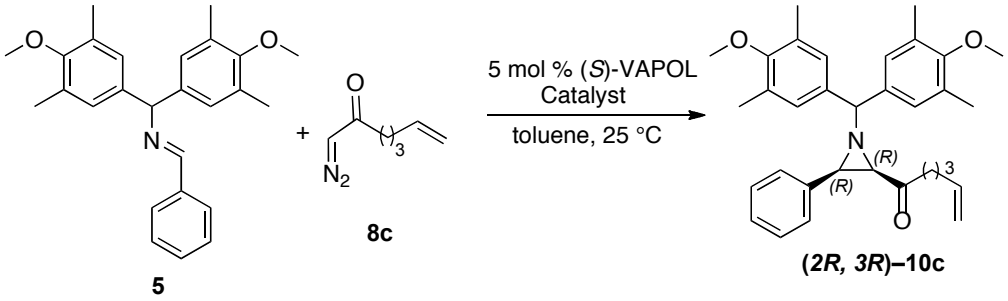


ethyl5-((2R,3R)-1-(bis(4-methoxy-3,5-dimethylphenyl)methyl)-3-phenylaziridin-2-yl)-5-oxopentanoate ***10b****:* Aldimine **5** (387 mg, 1.00mmol) was reacted with *ethyl 6-diazo-5-oxohexanoate* **8b** (222 mg, 1.20 mmol) according to the above mentioned procedure. Purification of the product by column chromatography on silica gel (1:6 ethyl acetate/hexanes) gave the pure aziridine as a viscous oil in 76% isolated yield (412 mg, 0.760 mmol). The optical purity of **10b** was determined to be 99% ee by HPLC analysis (CHIRALCEL OD-H column, 99:1 hexanes:2-propanol, 222 nm, flow 0.7mL/min). Retention times: R_t = 19.36 min (major enantiomer) and R_t = 28.56 min (minor enantiomer). *Spectral data for (2R, 3R)–****10b***: R_f = 0.15 (1:6 ethyl acetate/hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 1.18-1.22 (t, 3H, *J* = 7 Hz), 1.40-1.65 (m, 2H), 1.80-2.15 (m, 3H), 2.24 (s, 6H), 2.26 (s, 6H), 2.27-2.30 (m, 1H), 2.61-2.63 (d, 1H, *J* = 7.5 Hz), 3.20-3.21 (d, 1H, *J* = 7.5 Hz), 3.63 (s, 1H), 3.65(s, 3H), 3.69 (s, 3H), 4.01-4.07 (q, 2H, *J* = 7 Hz), 7.15-7.31 (m, 9H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 14.11, 16.13, 16.16, 18.05, 33.02, 39.68, 49.20, 52.55, 59.48, 59.50, 60.04, 77.67, 127.34, 127.36, 127.65, 127.73, 128.00, 130.65, 130.71, 135.23, 137.65, 137.80, 156.06, 156.12, 172.95, 206.21; IR (thin film) 2934m, 1734s, 1653m, 1456s cm^{-1}; mass spectrum, *m/z* (% rel intensity) 543 M^+ (0.12), 283 (100), 91 (24), 55 (14); Anal calcd for $C_{34}H_{41}NO_5$: C, 75.11; H, 7.60; N, 2.58. Found: C, 74.77; H, 7.71; N, 2.35; $[\alpha]^{23}_D$ = –52.4 (*c* 1.0, CH_2Cl_2) on 99% ee material (HPLC).

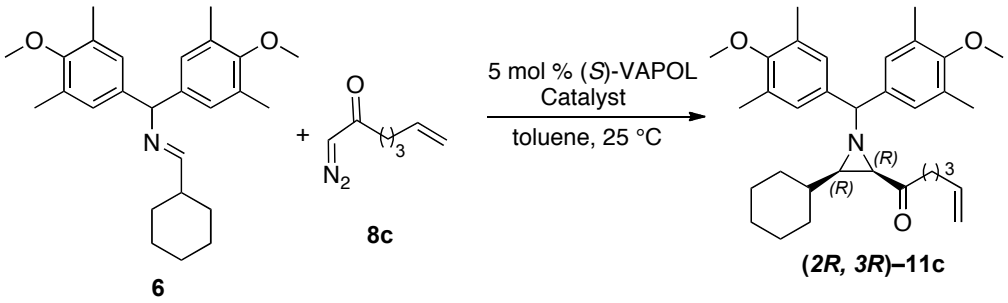


ethyl 5-((2R,3R)-1-(bis(4-methoxy-3,5-dimethylphenyl)methyl)-3-cyclohexylaziridin-2-yl)-5-oxopentanoate ***11b*****:** Aldimine **6** (196.5 mg, 0.5000 mmol) was reacted with *ethyl 6-diazo-5-oxohexanoate* **8b** (111 mg, 0.600 mmol) according to the above mentioned procedure with the exception that the catalyst loading was 10 mol%. Purification of the product by column chromatography on silica gel (1:5 ethyl acetate/hexanes) gave the pure aziridine as a colorless viscous oil in 92% isolated yield (254 mg, 0.460 mmol). The optical purity of **11b** was determined to be 97% ee by HPLC analysis (CHIRALCEL OD-H column, 99:1 hexanes:2-propanol, 222 nm, flow 0.7mL/min). Retention times: R_t = 8.37 min (major enantiomer) and R_t = 11.04 min (minor enantiomer). *Spectral data for (2R, 3R)–****11b***: R_f = 0.20 (1:5 ethyl acetate/hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 0.40-0.60 (m, 1H), 0.80-1.40 (m, 11H), 1.40-1.60 (m, 3H), 1.85-1.95 (m, 3H), 2.19 (s, 6H), 2.20 (s, 6H), 2.10-2.27 (m, 2H), 2.53-2.55 (m, 2H), 3.29 (s, 1H), 3.61 (s, 3H), 3.64 (s, 3H), 4.04-4.09 (q, 2H, *J* = 7 Hz), 6.96 (s, 2H), 7.02 (s, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 14.06, 15.92, 16.00, 18.76, 25.22, 25.35, 25.96, 30.28, 30.83, 33.11, 36.04, 40.80, 49.77, 54.71, 59.40, 59.47, 60.12, 77.93, 127.17, 128.19, 130.21, 130.41, 137.61, 137.90, 155.72, 156.10, 172.91, 206.60; IR (thin film) 2928m, 1734s, 1485m, 1375w cm^{-1}; mass spectrum, *m/z* (%

rel intensity) 549 M^+ (0.62), 283 (100), 268 (14), 55 (10); Anal calcd for $C_{34}H_{47}NO_5$: C, 74.28; H, 8.62; N, 2.55. Found: C, 74.05; H, 8.78; N, 2.34; $[\alpha]^{23}_D$ = +86.3 (*c* 1.0, CH_2Cl_2) on 97% ee material (HPLC).

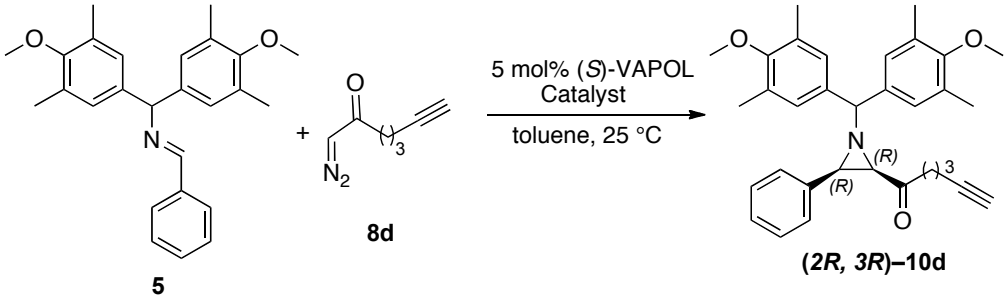


1-((2R,3R)-1-(bis(4-methoxy-3,5-dimethylphenyl)methyl)-3-phenylaziridin-2-yl)hex-5-en-1-one ***10c***: Aldimine **5** (387 mg, 1.00 mmol) was reacted with 1-diazohept-6-en-2-one **8c** (166 mg, 1.20 mmol) according to the general procedure described above. Purification of the product by column chromatographyon silica gel (1:12 ethyl acetate/hexanes) gave the pure aziridine as a colorless viscous oil in 77% isolated yield (380 mg, 0.770 mmol). The optical purity of **10c** was determined to be 99% ee by HPLC analysis (CHIRALCEL OD-H column, 98:2 hexanes:2-propanol, 222 nm, flow 0.5 mL/min). Retention times: R_t = 9.89 min (major enantiomer) and R_t = 8.22 min (minor enantiomer). *Spectral data for (2R, 3R)–****10c***: R_f = 0.15 (1:12 ethyl acetate/hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 1.27-1.31 (m, 1H), 1.39-1.43 (m, 1H), 1.73-1.79 (m, 2H), 1.99-2.06 (m, 1 H), 2.26-2.37 (m, 1 H), 2.28 (s, 6H), 2.31 (s, 6H), 2.65-2.67 (d, 1H, *J* = 7.5 Hz), 3.24-3.25 (d, 1H, *J* = 7.5 Hz), 3.67 (s, 1H), 3.69 (s, 3H), 3.73 (s, 3H), 4.86-4.90 (m, 2H), 5.57-5.64 (m, 1H), 7.20-7.24 (m, 5H), 7.26-7.30 (m, 2H), 7.36-7.38 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 16.15, 16.18, 21.96, 32.76, 39.91, 49.27, 52.76, 59.48, 59.51, 76.75, 114.67, 127.30, 127.40, 127.66, 127.75, 127.98, 130.64, 130.67, 135.34, 137.72, 137.85, 137.96, 156.03, 156.08, 206.91; IR (thin film) 3060w, 2934m, 1699m, 1485s, 1221s cm^{-1}; mass spectrum, *m/z* (% rel intensity) 497 M^+ (0.27), 283 (100), 91 (27), 41 (16); Anal calcd for $C_{33}H_{39}NO_3$: C, 79.64; H, 7.90; N, 2.81. Found: C, 79.37; H, 7.61; N, 2.67; $[\alpha]^{23}_D$ = +52.1 (*c* 1.0, CH_2Cl_2) on 99% ee material (HPLC).

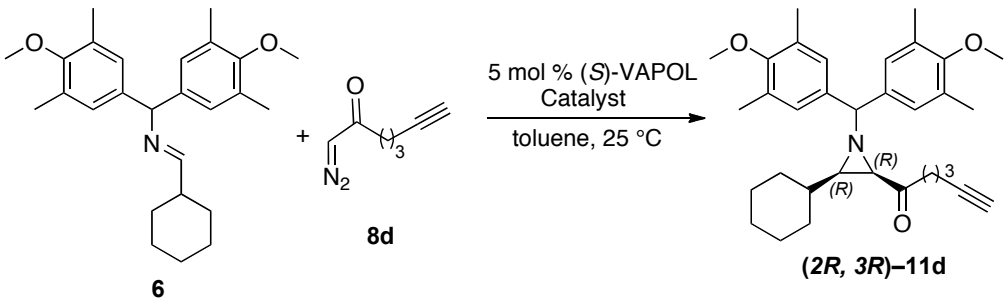


1-((2R,3R)-1-(bis(4-methoxy-3,5-dimethylphenyl)methyl)-3-cyclohexylaziridin-2-yl)hex-5-en-1-one ***11c*****:** Aldimine **6** (196.5 mg, 0.5000 mmol) was reacted with 1-diazohept-6-en-2-one **8c** (83 mg, 0.60 mmol) according to the general procedure described above with the exception that the catalyst loading was 10 mol%. Purification of the product by column chromatography on silica gel (1:12 ethyl acetate/hexanes) gave the pure aziridine as a colorless viscous oil in 72% isolated yield (182 mg, 0.360 mmol). The optical purity of **11c** was determined to be 95% ee by HPLC analysis (CHIRALCEL OD-H column, 98:2 hexanes:2-propanol, 222 nm, flow 0.7 mL/min). Retention times: R_t = 4.42 min (major enantiomer) and R_t = 5.47 min (minor enantiomer). *Spectral data for (2R, 3R)–****11c***: R_f = 0.2 (1:12 ethyl acetate/hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 0.44-0.56 (m, 1H), 0.91-1.30 (m, 7H), 1.40-1.63 (m, 5H), 1.75-1.78 (t, 1H, *J* = 7.5 Hz), 1.98-2.00 (m, 2H), 2.21 (s, 6H), 2.22 (s, 6H), 2.27-2.28 (d, 1H, *J* = 7.5 Hz), 2.47-2.50 (t, 2H, *J* = 7.5 Hz), 3.30 (s, 1H), 3.64 (s, 3H), 3.65 (s, 3H), 4.91-4.96 (m, 2H), 5.68-5.74(m, 1H), 6.98 (s, 2H), 7.04 (s, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 16.03, 16.12, 22.90, 25.34, 25.48, 26.08, 30.38, 30.94, 33.00, 36.05, 41.22, 49.92, 54.90, 59.53, 59.59, 78.08, 115.07,

127.32, 128.31, 130.30, 130.47, 137.73, 137.91, 138.02, 155.80, 156.18, 207.42; IR (thin film) 2928m, 1699m, 1483m, 1221m cm^{-1}; mass spectrum, *m/z* (% rel intensity) 503 M^+ (0.82), 283 (100), 95 (30), 55 (59); Anal calcd for $C_{33}H_{45}NO_3$: C, 78.69; H, 9.00; N, 2.78. Found: C, 79.09; H, 8.89; N, 2.73; $[\alpha]^{23}_D$ = +96.4 (*c* 1.0, CH_2Cl_2) on 95% ee material (HPLC).

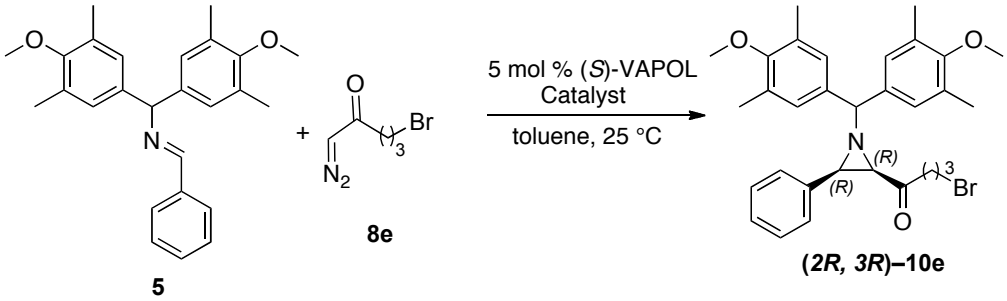


1-((2R,3R)-1-(bis(4-methoxy-3,5-dimethylphenyl)methyl)-3-phenylaziridin-2-yl)hex-5-yn-1-one ***10d****:* Adimine **5** (387 mg, 1.00 mmol) was reacted with 1-diazohept-6-yn-2-one **8d** (164 mg, 1.20 mmol) according to the general procedure described above. Purification of the product by column chromatography on silica gel (1:12 ethyl acetate/hexanes) gave the pure aziridine as a colorless viscous oil in 89% isolated yield (440 mg, 0.890 mmol). The optical purity of **10d** was determined to be 99% ee by HPLC analysis (CHIRALCEL OD-H column, 99:1 hexanes:2-propanol, 222 nm, flow 0.5 mL/min). Retention times: R_t = 15.61 min (major enantiomer) and R_t = 7.92 min (minor enantiomer). *Spectral data for (2R, 3R)–****10d***: R_f = 0.15 (1:12 ethyl acetate/hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 1.40-1.48 (m, 1H), 1.52-1.62 (m, 1H), 1.82-2.02 (m, 3H), 2.14-2.22 (m, 1H), 2.31 (s, 6H), 2.34 (s, 6H), 2.46-2.54 (m, 1H), 2.71-2.73 (d, 1H, *J* = 7.5 Hz), 3.29-3.31 (d, 1H, *J* = 7.5 Hz), 3.71 (s, 3H), 3.73 (s, 1H), 3.75 (s, 3H), 7.25-7.26 (m, 5H), 7.29-7.32 (m, 2H), 7.39-7.41(m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 16.05, 16.10, 17.42, 21.63, 39.31, 49.16, 52.52, 59.34, 59.37, 68.57, 77.55, 83.55, 127.25, 127.29, 127.57, 127.62, 127.93, 130.54, 130.61, 135.15, 137.62, 137.75, 155.96, 156.01, 206.18; IR (thin film) 2947m, 2118w, 1695s, 1221s cm^{-1}; mass spectrum, *m/z* (% rel intensity) 495 M^+ (0.18), 283 (100), 118 (79), 91 (77); HRMS (ES+) calcd for $C_{33}H_{38}NO_3$ *m/z* 496.2852 (M^++1), meas 496.2852; $[\alpha]^{23}_D$ = +45.6 (*c* 1.0, CH_2Cl_2) on 99% ee material (HPLC).

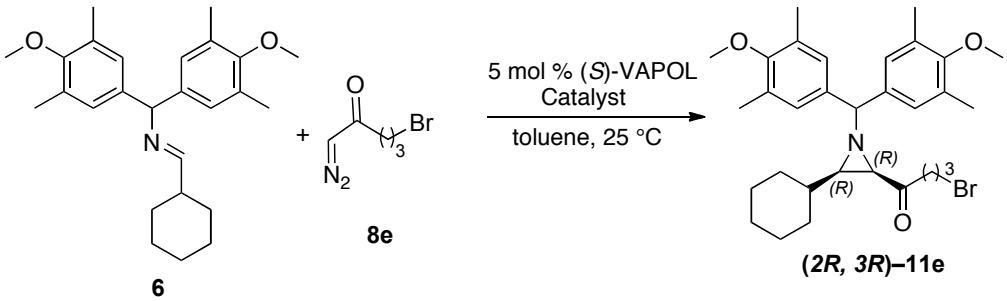


1-((2R,3R)-1-(bis(4-methoxy-3,5-dimethylphenyl)methyl)-3-cyclohexylaziridin-2-yl)hex-5-yn-1-one ***11d****:* Aldimine **6** (196.5mg, 0.5000 mmol) was reacted with 1-diazohept-6-yn-2-one **8d** (82 mg, 0.60 mmol) according to the general procedure described above with the exception that the catalyst loading was 10 mol%. Purification of the product by column chromatography on silica gel (1:12 ethyl acetate/hexanes) gave the pure aziridine as a colorless viscous oil in 79% isolated yield (199 mg, 0.390 mmol). The optical purity of **11d** was determined to be 96% ee by HPLC analysis (CHIRALCEL OD-H column, 99.5:0.5hexanes:2-propanol, 222 nm, flow 0.7 mL/min). Retention times: R_t = 9.24 min (major enantiomer) and R_t = 14.86 min (minor enantiomer). *Spectral data for (2R, 3R)–****11d***: R_f = 0.15 (1:12 ethyl acetate/hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 0.46-0.58 (m, 1H), 0.84-1.22 (m, 5H), 1.26-1.38 (m, 2H), 1.40-1.60 (m, 3H), 1.69-1.82 (m, 3H), 1.85-1.90 (t, 1H, *J* = 7.5 Hz), 2.12-2.19 (m, 2H), 2.21 (s, 6H), 2.22 (s, 6H), 2.29-2.31 (d, 1H, *J* = 7.0 Hz), 2,63-2.64 (m, 2H), 3.31 (s, 1H), 3.64 (s, 3H), 3.65 (s, 3H), 6.99 (s, 2H), 7.05 (s, 2H); ^{13}C NMR (125 MHz, $CDCl_3$)

δ 15.96, 16.06, 17.60, 22.25, 25.25, 25.40, 25.99, 30.31, 30.87, 36.06, 40.33, 49.85, 54.79, 59.44, 59.50, 68.91, 77.96, 83.45, 127.22, 128.21, 130.24, 130.45, 137.67, 137.93, 155.71, 156.07, 206.98. IR (thin film) 2928m, 2118w, 1697w, 1483m, 1221s cm^{-1}; mass spectrum, *m/z* (% rel intensity) 501 M^+ (0.19), 283 (100), 95 (26), 55 (33); HRMS (ES+) calcd for $C_{33}H_{44}NO_3$ *m/z* 502.3321(M^++1), meas 502.3287; $[\alpha]^{23}_D$ = +96.8 (*c* 1.0, CH_2Cl_2) on 96% ee material (HPLC).

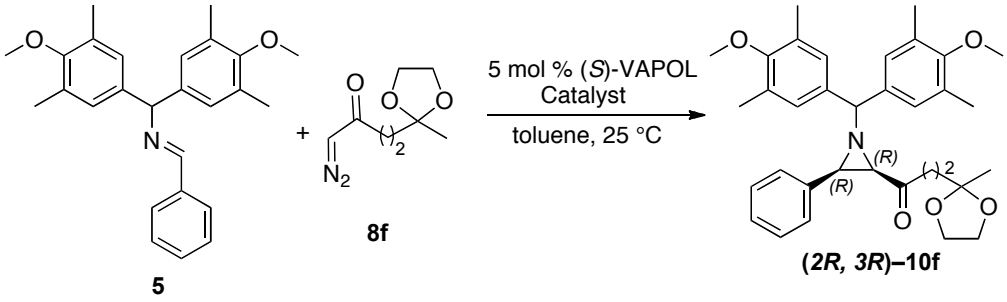


1-((2R,3R)-1-(bis(4-methoxy-3,5-dimethylphenyl)methyl)-3-phenylaziridin-2-yl)-4-bromobutan-1-one ***10e****:* Aldimine **5** (387 mg, 1.00 mmol) was reacted with 5-bromo-1-diazopentan-2-one **8e** (230 mg, 1.20 mmol) according to the general procedure described above. Purification of the product by column chromatography on silica gel (1:9 ethyl acetate/hexanes) gave the pure aziridine (mp 42-44°C) as a white solid in 85% isolated yield (469 mg, 0.850 mmol). The optical purity of **10e** was determined to be 95% ee by HPLC analysis (CHIRALCEL OD-H column, 99:1 hexanes:2-propanol, 222 nm, flow 0.7 mL/min). Retention times: R_t = 14.06 min (major enantiomer) and R_t = 10.57 min (minor enantiomer). *Spectral data for (2R, 3R)–****10e***: R_f = 0.2 (1:9 ethyl acetate/hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 1.67-1.73 (m, 1H), 1.81-1.86 (m, 1H), 2.12-2.18 (m, 1H), 2.27 (s, 6H), 2.29 (s, 6H), 2.48-2.55 (m, 1H), 2.64-2.66 (d, 1H, *J* = 7.5 Hz), 3.03-3.14 (m, 2H), 3.24-3.26 (d, 1H, *J* = 7.0 Hz), 3.64 (s, 1H), 3.68 (s, 3H), 3.71 (s, 3H), 7.27-7.24 (m, 5H), 7.26-7.29 (m, 2H), 7.33-7.35 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 16.12, 16.20, 25.83, 32.93, 38.88, 49.18, 52.50, 59.43, 59.46, 77.62, 127.29, 127.39, 127.56, 127.65, 128.05, 130.64, 130.74, 135.07, 137.57, 137.70, 156.01, 156.04, 205.88; IR (thin film) 2880w, 1701s, 1485s, 1221s cm^{-1}; mass spectrum, *m/z* (% rel intensity) 551 M^+ (0.15, Br^{81}), 549 M^+ (0.28, Br^{79}), 283 (100), 253 (54), 118 (100); Anal calcd for $C_{31}H_{36}BrNO_3$: C, 67.63; H, 6.59; N, 2.54. Found: C, 67.28; H, 6.42; N, 2.40; $[\alpha]^{23}_D$ = –42.0 (*c* 1.0, CH_2Cl_2) on 95% ee material (HPLC).

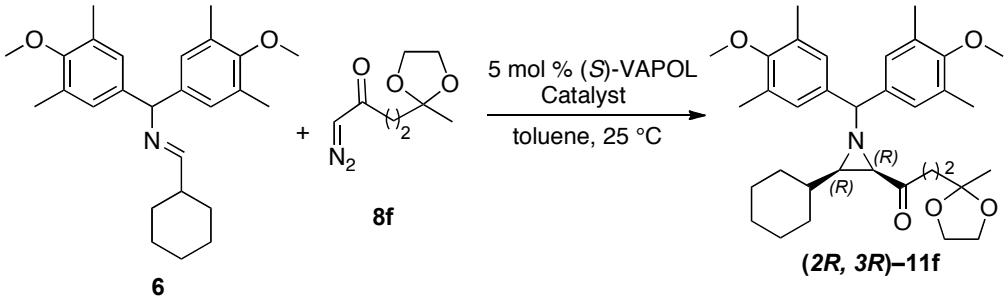


1-((2R,3R)-1-(bis(4-methoxy-3,5-dimethylphenyl)methyl)-3-cyclohexylaziridin-2-yl)-4-bromobutan-1-one ***11e***: Aldimine **6** (196.5 mg, 0.5000 mmol) was reacted with 5-bromo-1-diazopentan-2-one **8e** (115 mg, 0.600 mmol) according to the general procedure described above with the exception that the catalyst loading was 10 mol%. Purification of the product by column chromatography on silica gel (1:12 ethyl acetate/hexanes) gave the pure aziridine as a colorless viscous oil in 61% isolated yield (170 mg, 0.310 mmol). The optical purity of **11e** was determined to be 92% ee by HPLC analysis (CHIRALCEL OD-H column, 99:1 hexanes:2-propanol, 222 nm, flow 0.7 mL/min). Retention times: R_t = 6.58 min (major enantiomer) and R_t = 8.02 min (minor enantiomer). *Spectral data for (2R, 3R)–****11e***: R_f = 0.2 (1:15 ethyl acetate:hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 0.51-0.53 (m, 1H), 0.90-1.1.16 (m, 5H), 1.28-1.1.59 (m, 5H), 1.77-1.81 (t, 1H, *J* = 7.0 Hz), 2.04-2.09 (m, 2H), 2.22 (s, 12H), 2.28-2.30 (d, 1H, *J* = 7.0

Hz), 2.67-2.71 (m, 2H), 3.31 (s, 1H), 3.37-3.39 (m, 2H), 3.67 (s, 3H), 3.73 (s, 3H), 6.98 (s, 2H), 7.05 (s, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 16.02, 16.15, 25.28, 25.43, 26.37, 29.61, 30.34, 30.91, 33.18, 36.26, 39.81, 49.90, 54.81, 59.51, 59.57, 78.02, 127.23, 128.18, 130.32, 130.55, 137.63, 137.87, 155.77, 156.11, 206.44; IR (thin film) 2926s, 1701m, 1485s, 1221s cm^{-1}; mass spectrum, *m/z* (% rel intensity) 557 M^+ (0.06, ^{81}Br), 555 M^+ (0.11, ^{79}Br), 283 (100), 192 (39), 55 (39). Anal calcd for $C_{31}H_{42}BrNO_3$: C, 66.90; H, 7.61; N, 2.52. Found: C, 66.88; H, 7.96; N, 2.39. $[\alpha]^{23}_D$ = +85.6 (*c* 1.0, CH_2Cl_2) on 92% ee material (HPLC).

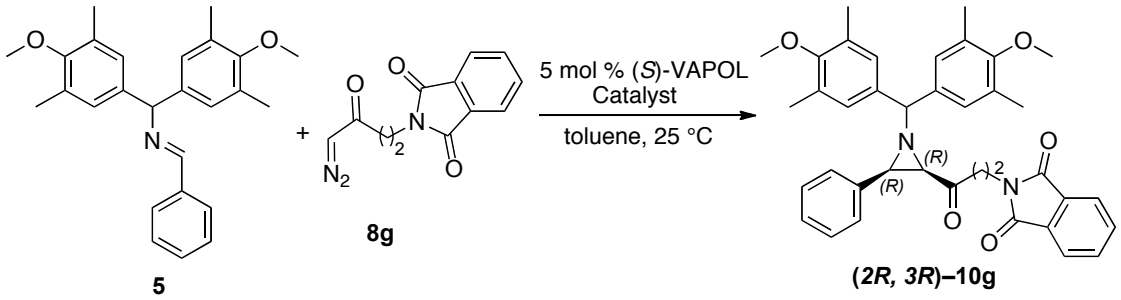


1-((2R,3R)-1-(bis(4-methoxy-3,5-dimethylphenyl)methyl)-3-phenylaziridin-2-yl)-3-(2-methyl-1,3-dioxolan-2-yl)propan-1-one ***10f***: Aldimine **5** (38.7mg, 0.100 mmol) was reacted with 1-diazo-4-(2-methyl-1,3-dioxolan-2-yl)butan-2-one **8f** (22.0 mg, 0.120 mmol) according to the general procedure described above. Purification of the product by column chromatography on silica gel (1:3 ethyl acetate/hexanes) gave the pure aziridine as a colorless viscous oil in 88% isolated yield (48 mg, 0.090 mmol). The optical purity of **10f** was determined to be 97% ee by HPLC analysis (CHIRALCEL OD-H column, 98:2 hexanes:2-propanol, 222 nm, flow 0.7 mL/min). Retention times: R_t = 13.31 min (major enantiomer) and R_t = 29.99 min (minor enantiomer). *Spectral data for (2R, 3R)–**10f***: R_f = 0.15 (1:3 ethyl acetate/hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 1.09 (s, 3H), 1.42-1.48 (m, 1H), 1.60-1.66 (m, 1H), 2.01-2.07 (m, 1H), 2.24 (s, 6H), 2.25 (s, 6H), 2.32-2.39 (m, 1H), 2.62-2.63 (d, 1H, *J* = 7.5 Hz), 3.17-3.18 (d, 1H, *J*=7.0 Hz), 3.61 (s, 1H), 3.64 (s, 3H), 3.67 (s, 3H), 3.68-3.70 (m, 2H), 3.80-3.82 (m, 2H), 7.14-7.20 (m, 5H), 7.21-7.24 (m, 2H), 7.30-7.32 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 16.44, 16.46, 23.81, 31.92, 36.11, 49.50, 53.16, 59.80, 59.81, 64.70, 64.72, 78.07, 109.48, 127.57, 127.78, 127.98, 128.06, 128.29, 130.93, 130.98, 135.70, 137.99, 138.11, 156.36, 156.40, 206.51; IR (thin film) 2942m, 1653s, 1485s, 1221s cm^{-1}; mass spectrum, *m/z* (% rel intensity) 543 M^+ (0.42), 283 (100), 91 (71), 87 (90). Anal calcd for $C_{34}H_{41}NO_5$: C, 75.11; H, 7.60; N, 2.58. Found: C, 74.06 ; H, 7.89; N, 2.47. $[\alpha]^{23}_D$ = +42.1 (*c* 1.0, CH_2Cl_2) on 97% ee material (HPLC).

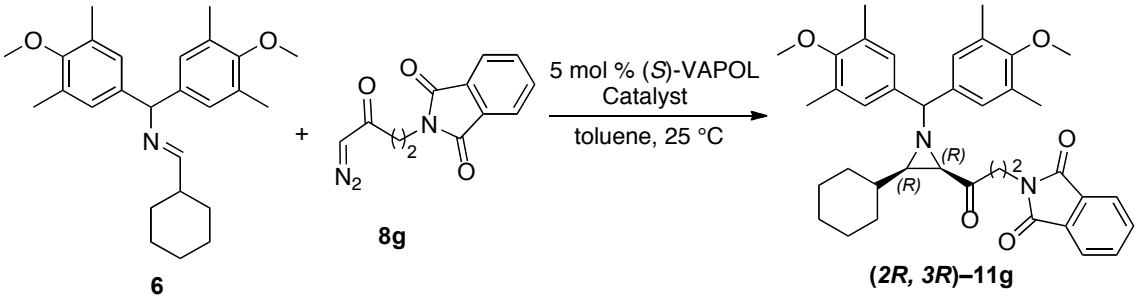


1-((2R,3R)-1-(bis(4-methoxy-3,5-dimethylphenyl)methyl)-3-cyclohexylaziridin-2-yl)-3-(2-methyl-1,3-dioxolan-2-yl)propan-1-one ***11f*****:** Aldimine **6** (79 mg, 0.20 mmol) was reacted with 1-diazo-4-(2-methyl-1,3-dioxolan-2-yl)butan-2-one **8f** (44 mg, 0.24 mmol) according to the general procedure described above with the exception that the catalyst loading was 10 mol%. Purification of the product by column chromatography on silica gel (2:9 ethyl acetate/hexanes) gave the pure aziridine as a viscous oil in 64% isolated yield (70 mg, 0.13 mmol). The optical purity of **11f** was determined to be 91% ee by HPLC analysis (CHIRALCEL OD-H column, 99:1 hexanes:2-propanol, 222 nm, flow 0.7 mL/min). Retention times: R_t = 9.47 min (major enantiomer) and R_t = 14.11 min (minor enantiomer). *Spectral data for (2R, 3R)–**11f***: R_f = 0.2 (2:9 ethyl acetate:hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 0.48-0.50 (m, 1H),

0.86-1.15 (m, 5H), 1.26 (s, 3H), 1.27-1.32 (m, 2H), 1.41-1.57 (m, 3H), 1.74-1.77 (t, 1H, *J* = 7.0 Hz), 1.85-1.90 (m, 2H), 2.20 (s, 6H), 2.21 (s, 6H), 2.29-2.30 (d, 1H, *J* = 7.0 Hz), 2.51-2.61 (m, 2H), 3.30 (s, 1H), 3.64 (s, 3H), 3.66 (s, 3H), 3.82-3.90 (m, 4H), 6.97 (s, 2H), 7.04 (s, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 16.04, 16.13, 23.82, 25.34, 25.51, 26.11, 30.38, 30.94, 32.51, 36.06, 36.88, 50.03, 54.70, 59.54, 59.61, 64.57, 64.60, 78.15, 109.27, 127.36, 128.35, 130.30, 130.48, 137.73, 138.07, 155.81, 156.20, 206.67; IR (thin film) 2928s, 1701m, 1650s, 1558m cm^{-1}; mass spectrum, *m/z* (% rel intensity) 549 M^+ (0.23), 283 (100), 87 (87), 43 (50); HRMS (ES+) calcd for $C_{34}H_{48}NO_5$ *m/z* 550.3532 (M^++1), meas 550.3546; $[\alpha]^{23}_D$ = +79.4 (*c* 1.0, CH_2Cl_2) on 91% ee material (HPLC).



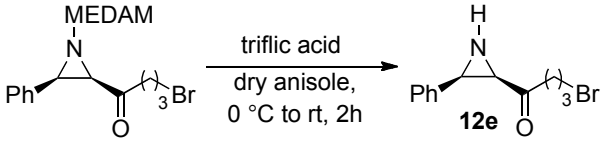
2-(3-((2R,3R)-1-(bis(4-methoxy-3,5-dimethylphenyl)methyl)-3-phenylaziridin-2-yl)-3-oxopropyl)-1H-indene-1,3(2H)-dione ***10g***: Aldimine **5** (379 mg, 1.00 mmol) was reacted with 2-(4-diazo-3-oxobutyl)isoindoline-1,3-dione **8g** (292 mg, 1.20 mmol) according to the general procedure described above. Purification of the product by column chromatography on silica gel (1:2 ethyl acetate/hexanes) gave the pure aziridine (mp 134-136 °C) as a white solid in 85% isolated yield (550 mg, 0.850 mmol). The optical purity of **10g** was determined to be 98% ee by HPLC analysis (CHIRALCEL OD-H column, 98:2 hexanes:2-propanol, 222 nm, flow 0.7 mL/min). Retention times: R_t = 38.18 min (major enantiomer) and R_t = 78.62 min (minor enantiomer). *Spectral data for (2R, 3R)–**10g***: R_f = 0.2 (1:2 ethyl acetate/hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 2.26 (s, 6H), 2.29 (s, 6H), 2.40-2.47 (m, 1H), 2.70-2.71 (d, 1H, *J* = 7.0 Hz), 2.80-2.87 (m, 1H), 3.26-3.27 (d, 1H, *J* = 7.0 Hz), 3.58-3.71 (m, 3H), 3.65 (s, 3H), 3.69 (s, 3H), 7.07-7.10 (m, 1H), 7.17-7.21 (m, 6H), 7.30-7.32 (d, 2H, *J* = 7.5 Hz), 7.63-7.66 (m, 2H), 7.75-7.76 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 20.73, 31.93, 38.83, 49.06, 52.15, 59.25, 59.27, 60.07, 77.44, 122.81, 127.14, 127.23, 127.36, 127.46, 127.91, 130.46, 130.64, 131.77, 133.51, 134.72, 137.41, 137.60, 155.91, 155.92, 167.39, 204.02; IR (thin film) 2928m, 1716s, 1653m, 1485m cm^{-1}; mass spectrum, *m/z* (% rel intensity) 602 M^+ (1.03), 283 (100), 160 (75), 55 (62); Anal calcd for $C_{38}H_{38}N_2O_5$: C, 75.72; H, 6.35; N, 4.65. Found: C, 76.09; H, 6.68; N, 4.54; $[\alpha]^{23}_D$ = +50.9 (*c* 1.0, CH_2Cl_2) on 98% ee material (HPLC).



2-(3-((2R,3R)-1-(bis(4-methoxy-3,5-dimethylphenyl)methyl)-3-cyclohexylaziridin-2-yl)-3-oxopropyl)-1H-indene-1,3(2H)-dione ***11g***: Aldimine **6** (160 mg, 0.400 mmol) was reacted with 2-(4-diazo-3-oxobutyl)isoindoline-1,3-dione **8g** (97 mg, 0.48 mmol) according to the general procedure described above with the exception that the catalyst loading was 10 mol%. Purification of the product by column chromatography on silica gel (2:7 ethyl acetate/hexanes) gave the pure aziridine (mp 63-65 °C) as a white foamy solid in 63% isolated yield (150 mg, 0.25 mmol). The optical purity of **11g** was determined to be 87% ee by HPLC analysis (CHIRALCEL OD-H column, 97:3 hexanes:2-propanol, 222 nm, flow 0.7 mL/min). Retention times: R_t = 13.18 min (major enantiomer) and R_t = 18.47 min (minor enantiomer). *Spectral data for (2R, 3R)–**11g***: R_f = 0.2 (2:7 ethyl acetate:hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 0.45-0.47 (m, 1H), 0.82-1.08 (m, 6H), 1.20-1.29 (m, 2H), 1.37-1.49 (m, 2H), 1.71-1.74 (t, 1H, *J* = 7.0 Hz), 2.17

(s, 6H), 2.18 (s, 6H), 2.24-2.25 (d, 1H, *J* = 7.0 Hz), 2.92-2.97 (m, 2H), 3.28 (s, 1H), 3.62 (s, 3H), 3.65 (s, 3H), 3.84-3.90 (m, 2H), 6.96 (s, 2H), 7.03 (s, 2H), 7.67-7.68 (m, 2H), 7.79-7.81 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 16.33, 16.41, 25.54, 25.65, 26.31, 30.62, 31.26, 33.05, 36.79, 40.09, 50.28, 54.95, 59.82, 59.89, 78.35, 123.45, 127.51, 128.48, 130.63, 130.95, 132.33, 134.18, 137.86, 138.23, 156.15, 156.45, 168.19, 205.18; IR (thin film) 2828m, 1772m, 1717s, 1485m cm^{-1}; mass spectrum, *m/z* (% rel intensity) 608 M^+ (1.79), 283 (100), 160 (75), 55 (74); Anal calcd for $C_{38}H_{44}N_2O_5$: C, 74.97; H, 7.29; N, 4.60. Found: C, 75.06; H, 7.54; N, 4.50; $[\alpha]^{23}_D$ = +72.6 (*c* 1.0, CH_2Cl_2) on 87% ee material (HPLC).

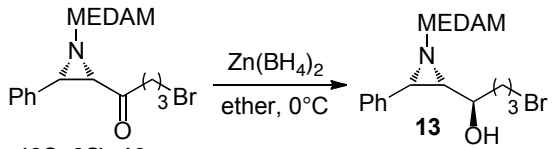
General procedure for the deprotection of the *N*-MEDAM aziridine 10e.



***(2R, 3R)*–10e** 84% yield

To a 25 mL flame-dried round bottom flask filled with argon was added compound **10e** (110 mg, 0.200 mmol, 99% ee) and 2.2 mL of freshly distilled anisole at room temperature.[21] The flask was cooled to 0 ºC and triflic acid (88 μL, 1.0 mmol) was added. The ice-bath was removed and the reaction mixture was stirred for 2 h at room temperature. The reaction mixture was quenched by addition of saturated aq Na_2CO_3 until the pH was greater than 9. After addition of 3 mL ether and 1 mL water, the organic layer was separated and the water layer was extracted with ether (5 mL × 3). The combined organic layer was washed with NaCl (aq. sat.) (2 x 10 mL) and dried over $MgSO_4$. The ether was removed by rotary evaporation. Purification of the product by column chromatography on silica gel (1:1 ether/hexanes as eluent) afforded **12e** as a clear viscous oil in 84% isolated yield (45 mg, 0.17 mmol). *Spectral data for (2R, 3R)–**12e***: R_f = 0.2 (1:1 ethyl acetate:hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 1.89-2.01 (m, 3H), 2.59 (bs, 2H), 3.01-3.09 (m, 1H), 3.19-3.27 (m, 2H), 3.62-3.64 (d, 1H, *J* = 6.0 Hz), 7.26-7.38 (m, 5H); ^{13}C NMR (125 MHz, $CDCl_3$) (1 sp^3 carbon and 1 carbonyl carbon missing) δ 25.92, 32.81, 39.67, 43.90, 127.35, 127.79, 127.99, 128.20; IR (thin film) 3310m, 2922m, 1701s, 1385m cm^{-1}; HRMS (ES+) calcd for $C_{12}H_{14}{}^{79}BrNO$ *m/z* 268.0377 (M^++1), meas 268.0328.

General procedure for preparation of (*R*)-1-((2*S*,3*S*)-1-(bis(4-methoxy-3,5-dimethylphenyl)methyl)-3-phenylaziridin-2-yl)-4-bromobutan-1-ol 13 via reduction of 10e with zinc borohydride.



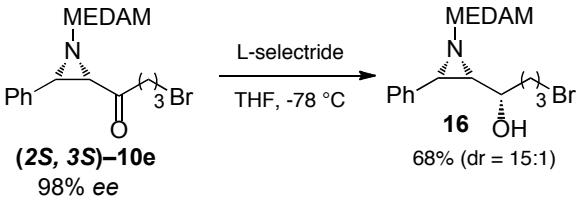
(2*S*, 3*S*)–10e
98% *ee*

91% (dr > 50:1)

An ethereal solution of zinc chloride (1.36 g, 10.0 mmol) was added dropwise to a stirred suspension of sodium borohydride (25 mmol) in dry diethyl ether (60 mL).[22] The mixture was stirred at room temperature under argon atmosphere for 12 h. The solid that formed (NaCl) was allowed to settle and the liquid was removed and stored in a stoppered bottle under argon atmosphere at –18 °C and was used as a 0.144 M zinc borohydride solution in diethyl ether. To an ice-cold solution of the compound **10e** (55 mg, 0.1 mmol, 98% ee) in dry diethyl ether (40 mL) was dropwise added a solution of zinc borohydride (0.30 mL). After 2 h, the reaction was quenched with water, and then the solution was stirred for another 30 min. The aqueous layer was extracted with diethyl ether and the combined organic layer was washed with brine, dried over magnesium sulfate, filtered, and concentrated under vacuum to afford a light-yellow oil. Purification of the product by silica gel chromatography (1:4 ethylacetate/hexanes as eluent) gave **13** as a white foamy solid (mp 55-57 °C) in 91 % isolated yield (50 mg, 0.91 mmol). No trace of the diastereomer **16** could be observed by ^{1}H NMR in the crude reaction mixture (dr ≥50:1). The stereochemistry of the product was assigned based on a related reduction of

an aziridinyl ketone reported previously.[21] *Spectral data for (1R, 2S, 3S)–**13***: R_f = 0.2 (1:4 ethyl acetate:hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 1.08-1.09 (d, 1H, *J* = 3.0 Hz), 1.12-1.20 (m, 1H), 1.24-1.32 (m, 1H), 1.56-1.68 (m, 2H), 1.91-1.94 (dd, 1H, *J* = 6.5 Hz, 8.5 Hz), 2.16 (s, 6H), 2.27 (s, 6H), 2.82-2.83 (d, 1H, *J* = 6.0 Hz), 3.10-3.12 (t, 2H, *J* = 6.5 Hz), 3.16-3.18 (m, 1H), 3.57 (s, 1H), 3.62 (s, 3H), 3.69 (s, 3H), 7.04 (s, 2H), 7.10 (s, 2H), 7.21-7.23 (t, 1H, *J* = 7.5 Hz), 7.29-7.32 (t, 2H, *J* = 7.5 Hz), 7.43-7.45 (d, 2H, *J* = 7.5 Hz); ^{13}C NMR (125 MHz, $CDCl_3$) δ 16.43, 16.54, 28.63, 33.55, 34.05, 46.60, 50.89, 59.79, 59.91, 68.96, 78.31, 127.19, 127.64, 127.71, 128.51, 128.54, 130.65, 130.89, 137.08, 138.29, 138.75, 156.10, 156.57; IR (thin film) 3466m, 2920s, 1483s, 1221s cm^{-1}; HRMS (ES+) calcd for $C_{31}H_{39}NO_3{}^{79}Br$ *m/z* 552.2113 (M^++1), meas. 552.2092; $[\alpha]^{23}_D$ = +112.3 (*c* 1.0, CH_2Cl_2) on 98% ee material (HPLC).

General procedure for preparation of (*S*)-1-((2*S*,3*S*)-1-(bis(4-methoxy-3,5-dimethylphenyl)methyl)-3-phenylaziridin-2-yl)-4-bromobutan-1-ol 16 via reduction of 10e with L-selectride.

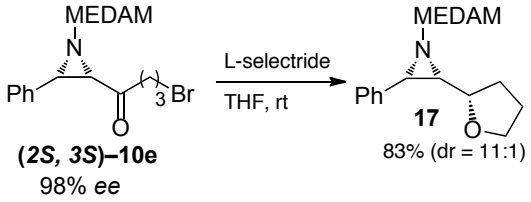


(*2S, 3S*)–10e
98% *ee*

68% (dr = 15:1)

To a solution of ketoaziridine **10e** (55 mg, 0.10 mmol) in 1 mL of THF under argon at –78 °C was added L-Selectride (1M solution in THF, 0.20 mL, 0.20 mmol).[22] The mixture was stirred for 60 min at –78 °C and then the reaction mixture was treated with 10% aqueous sodium hydroxide and the organic layer was separated. The aqueous layer was extracted with ethyl acetate (3 X 3 mL) and the combined organic extracts were dried over magnesium sulfate, filtered, and concentrated under vacuum. Purification of the product by silica gel chromatography (1:4 ethylacetate/hexanes as eluent) gave **16** as a viscous oil in 68 % yield (37 mg, 0.068 mmol). The ratio of the two diastereomers **13** and **16** was 1:15 observed by ^{1}H NMR in the crude reaction mixture. The stereochemistry of the products was assigned based on a related reduction of aziridinyl ketone reported previously.[22] *Spectral data for (1S, 2S, 3S)–**16***: R_f = 0.2 (1:4 ethyl acetate:hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 1.30-1.39 (m, 2H), 1.59-1.65 (m, 2H), 1.86-1.89 (dd, 1H, *J* = 7.0 Hz, 8.0 Hz), 2.16 (s, 6H), 2.27 (s, 6H), 2.89-2.90 (d, 1H, *J* = 7.0 Hz), 3.05-3.12 (m, 3H), 3.59 (s, 1H), 3.62 (s, 3H), 3.67 (s, 3H), 7.11 (s, 2H), 7.12 (s, 2H), 7.20-7.22 (t, 1H, *J* = 7.5 Hz), 7.27-7.30 (t, 2H, *J* = 7.5 Hz), 7.39-7.40 (d, 2H, *J* = 7.5 Hz); ^{13}C NMR (125 MHz, $CDCl_3$) δ 16.45, 16.56, 28.60, 32.71, 33.80, 47.45, 51.75, 59.79, 59.90, 68.81, 78.03, 127.18, 127.57, 127.65, 127.83, 128.32, 130.76, 131.58, 136.76, 138.17, 139.47, 156.09, 156.69; IR (thin film) 3422s, 2924s, 1483s, 1221s cm^{-1}; HRMS (ES+) calcd for $C_{31}H_{39}NO_3{}^{79}Br$ *m/z* 552.2113 (M^++1), meas 552.2092; $[\alpha]^{23}_D$ = +83.2 (*c* 1.0, CH_2Cl_2) on 98% ee material (HPLC).

Preparation of (2*S*,3*S*)-1-(bis(4-methoxy-3,5-dimethylphenyl)methyl)-2-phenyl-3-((*S*)-tetrahydrofuran-2-yl)aziridine 17.



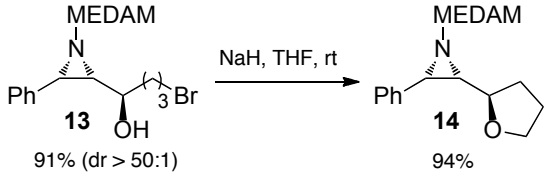
(*2S, 3S*)–10e
98% *ee*

83% (dr = 11:1)

When the above mentioned L-selectride reduction of compound **10e** (0.275 g, 0.500 mmol) was carried out at room temperature for 24 h, compound **17** was isolated after silica gel chromatography (1:5 ethylacetate / hexanes as eluent) as a white foamy solid (mp 110-112 °C) in 83% yield (0.190 g, 0.415 mmol). *Spectral data for (S, S, S)–**17***: R_f = 0.2 (1:5 ethyl acetate:hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 1.41-1.54 (m, 2H), 1.59-1.76 (m, 2H), 1.90-1.93 (dd, 1H, *J* = 6.5 Hz, 8.5 Hz), 2.20 (s, 6H), 2.27 (s, 6H), 2.75-2.76 (d,

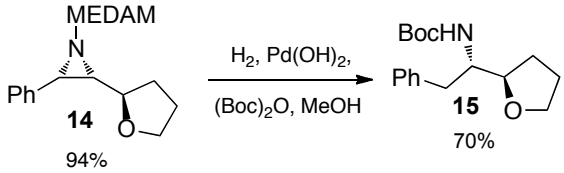
1H, *J* = 6.5 Hz), 3.31-3.36 (q, 1H, 7.5 Hz), 3.56-3.60 (m, 1H), 3.64 (s, 1H), 3.64-3.70 (m, 1H), 3.66 (s, 3H), 3.70 (s, 3H), 7.10 (s, 2H), 7.12 (s, 2H), 7.14-7.17 (m, 1H), 7.21-7.25 (m, 2H), 7.33-7.35 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 16.14, 16.15, 25.36, 28.76, 44.59, 50.13, 59.52, 59.57, 67.43, 76.75, 78.72, 126.41, 127.65, 127.77, 127.95, 128.19, 129.98, 130.24, 137.47, 138.18, 138.78, 155.62, 155.79; IR (thin film) 2963s, 1485s, 1221s,1016s cm^{-1}; HRMS (ES+) calcd for $C_{31}H_{38}NO_3$ *m/z* 472.2852 (M^++1), meas 472.2840; $[\alpha]^{23}_D$ = +28.6 (*c* 1.0, CH_2Cl_2) on 98% ee material (HPLC).

Preparation of (2*S*,3*S*)-1-(bis(4-methoxy-3,5-dimethylphenyl)methyl)-2-phenyl-3-((*R*)-tetrahydrofuran-2-yl)aziridine 14.



(2*S*,3*S*)-1-(bis(4-methoxy-3,5-dimethylphenyl)methyl)-2-phenyl-3-((*R*)-tetrahydrofuran-2-yl)aziridine **14** was prepared by treating compound **13** (83 mg, 0.15 mmol) with NaH (60%, 12 mg, 0.30 mmol) in THF (6 mL) at room temperature for 24 h. The reaction mixture was quenched by addition of 10 mL of H_2O. The aqueous layer was extracted with ethyl acetate (3 X 3 mL) and the combined organic extracts were dried over sodium sulfate, filtered, and concentrated under vacuum. Purification of the product by silica gel chromatography (1:3 ethylacetate/hexanes as eluent) gave **14** as a white foamy solid (mp 54-56 °C) in 94 % yield (65 mg, 0.14 mmol). *Spectral data for (S, S, R)–**14***: R_f = 0.25 (1:3 ethyl acetate:hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 1.05-1.09 (m, 1H), 1.57-1.67 (m, 3H), 1.84-1.87 (dd, 1H, *J* = 6.5 Hz, 8.0 Hz), 2.18 (s, 6H), 2.27 (s, 6H), 2.83-2.84 (d, 1H, *J* = 6.5 Hz), 3.29-3.31 (q, 1H, 7.5 Hz), 3.48-3.52 (m, 1H), 3.56 (s, 1H), 3.63 (s, 3H), 3.68 (s, 3H), 3.66-3.70 (m, 1H), 7.10 (s, 2H), 7.12 (s, 2H), 7.16-7.19 (m, 1H), 7.24-7.28 (m, 2H), 7.39-7.40 (d, 2H, *J* = 7.0 Hz); ^{13}C NMR (125 MHz, $CDCl_3$) δ 16.43, 25.85,30.61, 47.24, 49.69, 59.80, 59.94, 68.50, 76.33, 78.50, 126.82, 127.82, 128.13, 128.19, 128.50, 130.62, 130.63, 137.39, 138.62, 139.06, 156.03, 156.34; IR (thin film) 2947s, 1483s, 1221s,1016s cm^{-1}; HRMS (ES+) calcd for $C_{31}H_{38}NO_3$ *m/z* 472.2852 (M^++1), meas 472.2836; $[\alpha]^{23}_D$ = +73.4 (*c* 1.0, CH_2Cl_2) on 98% ee material (HPLC).

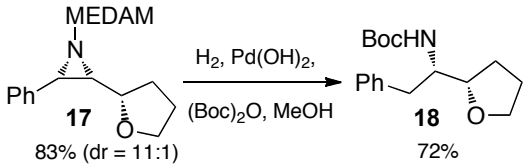
Reductive ring-opening/deprotection/Boc-protection sequence for conversion of tetrahydrofurylaziridines to *tert*-butyl ((*S*)-2-phenyl-1-((*R*)-tetrahydrofuran-2-yl)ethyl)carbamate 15.



To a 25 mL round bottom flask fitted with a magnetic stir bar was added tetrahydrufurylaziridine **14** (47 mg, 0.10 mmol), $Pd(OH)_2$ (44 mg, 0.025 mmol, $Pd(OH)_2$ on carbon powder, 20% Pd, *ca*. 60% moisture), $(Boc)_2O$ (65 mg, 0.30 mmol) and methanol (3 mL). The flask was then equipped with a 3-way valve connected to vacuum and a hydrogen balloon. The flask was opened to vacuum for a few seconds, and then switched to the hydrogen balloon; this manipulation was repeated three times. The reaction mixture was allowed to stir at room temperature for 24 h. It was then filtered through a Celite pad and concentrated under vacuum. Purification of the product by silica gel chromatography (1:7 ethylacetate/hexanes as eluent) gave **15** as a white solid (mp 98-99 °C) in 70 % yield (20 mg, 0.070 mmol). *Spectral data for (1R, 2S)–**15***: R_f = 0.15 (1:7 ethyl acetate:hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 1.37 (s, 9H), 1.77-1.78 (m, 1H), 1.89-1.98 (m, 3H), 2.82 (bs, 1H), 3.62-3.64 (dd, 1H, *J* = 4.5 Hz, 14.0 Hz), 3.76-3.83 (m, 2H), 3.87 (bs, 1H), 3.91-3.96 (m, 1H), 4.41 (bs, 1H), 7.20-7.23 (m, 3H), 7.28-7.31 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 25.69, 28.29, 28.39, 36.94, 54.32, 68.44, 79.16, 80.31, 126.19, 128.27, 129.65, 137.90, 155.45; IR (thin film) 3370s, 3030m, 2964s, 1684s, 1525s, 1365m,

1262s cm^{-1}; HRMS (ES+) calcd for $C_{17}H_{26}NO_3$ *m/z* 292.1913 (M^++1), meas 292.1916; $[\alpha]^{23}_D = -5.6$ (*c* 1.0, CH_2Cl_2) on 98% ee material (HPLC).

Reductive ring-opening/deprotection/Boc-protection sequence for conversion of tetrahydrofurylaziridines to tert-butyl ((S)-2-phenyl-1-((S)-tetrahydrofuran-2-yl)ethyl)carbamate 18.



Tetrahydrufurylaziridine **17** (47 mg, 0.10 mmol), was subjected to the same ring-opening/deprotection/Boc-protection sequence to afford compound **18** as a viscous oil in 72% yield (21 mg, 0.72 mmol). *Spectral data for (1R, 2R)–**18***: R_f = 0.17 (1:5 ethyl acetate:hexanes). ^{1}H NMR (500 MHz, $CDCl_3$) δ 1.37 (s, 9H), 1.59-1.66 (m, 1H), 1.78-1.85 (m, 3H), 2.80-2.90 (m, 2H), 3.67-3.87 (m, 4H), 4.72-4.74 (d, 1H, *J* = 9.0 Hz), 7.17-7.27 (m, 5H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 26.04, 28.11, 28.35, 39.95, 54.09, 68.56, 78.47, 79.08, 126.17, 128.29, 129.46, 138.48, 155.93; IR (thin film) 3341m, 2976s, 1713s, 1496s, 1169s cm^{-1}; HRMS (ES+) calcd for $C_{17}H_{26}NO_3$ *m/z* 292.1913 (M^++1), meas 292.1924; $[\alpha]^{23}_D = -23.0$ (*c* 1.0, CH_2Cl_2) on 98% ee material (HPLC).

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