*Organic Letters***Supporting Information to Accompany:****Oxazolidine Ring Opening and Isomerization to (*E*)-Imines.****Asymmetric Synthesis of Aryl- α -Fluoroalkyl Amino Alcohols**

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Experimental Section

General: Unless otherwise noted all reactions were run under a nitrogen atmosphere, solvents and reagents were transferred by syringe or stainless steel cannula. Anhydrous grade tetrahydrofuran (THF), toluene and *tert*-butyl methyl ether (MTBE) were purchased from Aldrich in Sure/SealTM bottles and used as received. Final reaction mixtures were dried over MgSO₄. Melting points are uncorrected. Unless otherwise noted, ¹H NMR (500 MHz), ¹³C NMR (125 MHz) were recorded in CDCl₃ and ¹⁹F NMR (470 MHz) spectra were recorded in CDCl₃ on a Bruker AMX 500 or a Bruker Avance 500 instruments. Chemical shifts are reported in ppm (δ units) downfield of internal tetramethylsilane [(CH₃)₄Si], residual CHCl₃; or benzotrifluoride (C₆H₅CF₃, -61.5 ppm); coupling constants are reported in hertz (Hz). Multiplicities are as follows: s = singlet, d = doublet, t = triplet, q = quartet, dd = doublet of doublets, m = multiplet. HPLC analysis was performed using a Zorbax Rx-C8 column, eluent: 0.1% aqueous H₃PO₄ / CH₃CN (70:30 to 5:95 over 25 min, hold 5 min), flow: 2 mL / min, 35°C, UV detection: 220 nm, 10 μ L injection. Low resolution mass spectra (LRMS) were recorded using atmospheric pressure ionization (API) techniques. Optical rotations were recorded on a Perkin-Elmer 241 polarimeter.

Representative Procedure for the Synthesis of Oxazolidines. (*S*)-2-amino-1-butanol (1.0 g, 11.2 mmol) was dissolved in toluene (23 mL). Pyridinium *p*-toluenesulfonate (141 mg, 0.56 mmol, 5 mol%) and trifluoroacetaldehyde methyl hemiacetal (1.75 g, 13.5 mmol, 1.2 eq) were added and the solution was heated for 3 h at reflux with azeotropic removal of methanol / water (Dean-Stark trap). After cooling to room temperature, the solution was filtered through a pad of silica gel and washed

with toluene:MTBE (50 mL, 1:1) and MTBE (50 mL). The filtrate was concentrated to afford oxazolidine **2a** (1.53g, 61% yield, dr = 2.3:1, 75wt% in toluene) that was used without further purification. **(4S)-4-Ethyl-2-trifluoromethyl-oxazolidine (2a)**. Colorless oil. Major isomer: ^1H NMR δ 4.98 (m, 1H), 4.17 (app t, 1H), 3.38 (m, 1H), 3.30 (app t, 1H), 2.18 (br s, 1H), 1.74-1.67 (m, 1H), 1.60-1.48 (m, 1H), 1.03 (t, 3H, $J = 7.5$); ^{13}C NMR δ 123.4 (q, $J = 282$), 87.5 (q, $J = 34$), 72.1, 59.0, 25.3, 10.8. Minor isomer: ^1H NMR δ 4.92 (m, 1H), 4.09 (app t, 1H), 3.54 (app t, 1H), 3.38 (m, 1H), 2.43 (br s, 1H), 1.66-1.62 (m, 1H), 1.60-1.48 (m, 1H), 0.99 (t, 3H, $J = 7.5$); ^{13}C NMR δ 123.2 (q, $J = 283$), 87.2 (q, $J = 34$), 71.8, 59.3, 26.3, 10.8; LRMS calcd for $\text{C}_6\text{H}_{10}\text{F}_3\text{NO}$: 169.14; found: 170.1 [M+1].

(4S)-4-Isopropyl-2-trifluoromethyl-oxazolidine (2b). Colorless oil. Major isomer: ^1H NMR δ 4.96 (m, 1H), 4.10 (app t, 1H), 3.35 (app t, 1H), 3.12 (m, 1H), 2.17 (br s, 1H), 1.61 (m, 1H), 1.07 (d, 3H, $J = 6.7$), 0.93 (d, 3H, $J = 6.7$); ^{13}C NMR δ 123.4 (q, $J = 284$), 88.0 (q, $J = 34$), 71.2, 63.9, 31.8, 20.3. Minor isomer: ^1H NMR δ 4.90 (m, 1H), 4.07 (app t, 1H), 3.59 (app t, 1H), 3.12 (m, 1H), 2.39 (br s, 1H), 1.61 (m, 1H), 1.03 (d, 3H, $J = 6.7$), 0.87 (d, 3H, $J = 6.7$); ^{13}C NMR δ 123.3 (q, $J = 283$), 87.3 (q, $J = 34$), 71.0, 64.6, 32.0, 19.6; LRMS calcd for $\text{C}_7\text{H}_{12}\text{F}_3\text{NO}$: 183.17; found: 184.2 [M+1].

(4S)-4-Isobutyl-2-trifluoromethyl-oxazolidine (2c). Colorless oil. Major isomer: ^1H NMR δ 4.94 (m, 1H), 4.14 (app t, 1H), 3.50-3.43 (m, 1H), 3.21 (app t, 1H), 2.11 (br s, 1H), 1.68 (m, 1H), 1.52 (m, 1H), 1.34 (m, 1H), 0.93 (m, 6H); ^{13}C NMR δ 123.4 (q, $J = 283$), 87.5 (q, $J = 34$), 72.6, 56.0, 41.5, 26.2, 22.6, 22.5. Minor isomer: ^1H NMR δ 4.88 (m, 1H), 4.06 (app t, 1H), 3.50-3.43 (m, 2H), 2.30 (br s, 1H), 1.68 (m, 1H), 1.52 (m, 1H), 1.34 (m, 1H), 0.93 (m, 6H); ^{13}C NMR δ 123.2 (q, $J = 283$), 87.2 (q, $J = 34$), 72.3, 56.3, 42.2, 25.9, 22.8, 22.2; LRMS calcd for $\text{C}_8\text{H}_{14}\text{F}_3\text{NO}$: 197.20; found: 196.3 [M-1].

(4S)-4-Benzyl-2-trifluoromethyl-oxazolidine (2d). Colorless oil. Major isomer: ^1H NMR δ 7.34-7.19 (m, 5H), 4.96 (m, 1H), 4.02 (m, 1H), 3.73-3.68 (m, 1H), 3.44 (app t, 1H), 3.03 (dd, 1H, $J = 13.7, 5.7$), 2.77 (m, 1H), 2.32 (app t, 1H); ^{13}C NMR δ 136.9, 128.8, 128.5, 126.9, 123.4 (q, $J = 283$), 87.4 (q, $J = 34$), 71.7, 58.0, 38.2. Minor isomer: ^1H NMR δ 7.34-7.19 (m, 5H), 4.91 (m, 1H), 4.02 (m, 1H), 3.73-3.68 (m, 2H), 2.89 (dd, 1H, $J = 13.3, 6.7$), 2.77 (m, 1H), 2.53 (app t, 1H); ^{13}C NMR δ

138.5, 129.0, 128.7, 126.5, 123.3 (q, $J = 283$), 87.2 (q, $J = 34$), 71.9, 59.1, 39.9; LRMS calcd for $C_{11}H_{12}F_3NO$: 231.21; Found: 230.2 [M-1].

(4S)-4-*tert*-Butyl-2-trifluoromethyl-oxazolidine (2e). Colorless oil. Major isomer: 1H NMR δ 4.96 (m, 1H), 3.98 (app q, 1H), 3.52 (app t, 1H), 3.26 (m, 1H), 2.27 (br s, 1H), 0.96 (s, 9H); ^{13}C NMR δ 123.5 (q, $J = 284$), 88.0 (q, $J = 34$), 68.3, 66.3, 31.8, 26.2. Minor isomer: 1H NMR δ 4.93 (m, 1H), 3.98 (app q, 1H), 3.67 (app t, 1H), 3.26 (m, 1H), 2.27 (br s, 1H), 0.93 (s, 9H); ^{13}C NMR δ 123.4 (q, $J = 283$), 87.0 (q, $J = 34$), 68.2, 67.0, 32.1, 26.2; LRMS calcd for $C_8H_{14}F_3NO$: 197.20; found: 196.3 [M-1].

(4S)-4-(2-Methylsulfonyl-ethyl)-2-trifluoromethyl-oxazolidine (2f). Colorless oil. Major isomer: 1H NMR δ 4.98 (m, 1H), 4.19 (app t, 1H), 3.56 (app q, 1H), 3.34 (app t, 1H), 2.68-2.56 (m, 2H), 2.29 (app t, 1H), 2.15 (s, 3H), 1.95-1.76 (m, 2H); ^{13}C NMR δ 123.2 (q, $J = 283$), 87.2 (q, $J = 34$), 71.8, 56.6, 31.6, 31.0, 15.1. Minor isomer: 1H NMR δ 4.95 (m, 1H), 4.12 (app t, 1H), 3.70-3.58 (m, 2H), 2.68-2.56 (m, 3H), 2.13 (3H, s), 1.95-1.76 (m, 2H); ^{13}C NMR δ 123.1 (q, $J = 283$), 87.0 (q, $J = 34$), 71.7, 56.0, 32.5, 31.0, 14.9; LRMS calcd for $C_7H_{12}F_3NOS$: 215.24; found: 216.0 [M+1].

(4S)-4-Pentafluoroethyl-2-trifluoromethyl-oxazolidine (2g). Colorless oil. Major isomer: 1H NMR δ 5.06 (m, 1H), 4.79 (dt, 1H, $J = 9.0, 3.6$), 4.13 (app t, 1H), 3.44 (m, 1H), 3.22 (app t, 1H), 2.12 (m, 1H), 1.69 (m, 1H), 1.53 (m, 1H), 1.34 (m, 1H), 0.95 (m, 6H); ^{13}C NMR δ 118.9 (qt, $J = 287, 35$), 112.4 (qt, $J = 260, 35$), 87.5 (dd, $J = 25, 24$), 72.7, 56.2, 41.8, 22.6, 22.5. Minor isomer: 1H NMR δ 4.95 (m, 1H), 4.05 (app t, 1H), 3.44 (m, 1H), 3.38 (app t, 1H), 2.23 (br s, 1H), 1.69 (m, 1H), 1.53 (m, 1H), 1.34 (m, 1H), 0.95 (m, 6H); ^{13}C NMR δ 118.8 (qt, $J = 286, 35$), 111.8 (qt, $J = 262, 36$), 87.0 (dd, $J = 26, 23$), 72.3, 56.4, 42.0, 22.8, 22.3; LRMS calcd for $C_9H_{14}F_5NO$: 247.21; found: 248.0 [M+1].

(4S)-4-Difluoromethyl-2-trifluoromethyl-oxazolidine (2h). Colorless oil. Major isomer: 1H NMR δ 5.53 (dt, 1H, $J = 55.4, 3.7$), 4.79 (dt, 1H, $J = 9.0, 3.6$), 4.07 (app t, 1H), 3.32 (m, 1H), 3.16 (app t, 1H), 2.04 (br s, 1H), 1.69 (m, 1H), 1.50 (m, 1H), 1.33 (m, 1H), 0.94 (m, 6H); ^{13}C NMR δ 113.6 (q, $J = 245$), 88.6 (q, $J = 26$), 72.0, 55.9, 41.3, 26.1, 22.5. Minor isomer: 1H NMR δ 5.66 (dt,

1H, $J = 55.2, 3.1$), 4.68 (m, 1H), 3.97 (app t, 1H), 3.41 (m, 1H), 3.32 (m, 1H), 2.04 (br s, 1H), 1.69 (m, 1H), 1.50 (m, 1H), 1.33 (m, 1H), 0.94 (m, 6H); ^{13}C NMR δ 113.7 (q, $J = 244$), 88.7 (q, $J = 26$), 71.5, 56.4, 42.1, 25.8, 22.6, 22.2; LRMS calcd for $\text{C}_8\text{H}_{15}\text{F}_2\text{NO}$: 179.21; found: 178.3 [M-1].

Representative procedure for Oxazolidine Ring Opening / Isomerization / Organometallic Addition Sequence. To a solution of oxazolidine **2a** (226 mg, 1 mmol, 75wt% in toluene) in THF (2 mL) at 0-5 °C was added Me_3SiCl (152 μL , 1.20 mmol, 1.2 eq) and $\text{LiN}(\text{SiMe}_3)_2$ (1.20 mL, 1.20 mmol, 1.2 eq, 1 M in THF). The solution was let stir 30 min, the cooling bath was removed and the mixture was let warm to rt for 1 h. In a separate flask was charged bromobenzene (316 μL , 3 mmol, 3.0 eq) in THF (6 mL). The solution was cooled to -78 °C and $n\text{-BuLi}$ (1.88 mL, 3 mmol, 3.0 eq, 1.6 M in hexanes) was added. After stirring for 15 min, the solution of imine was transferred via cannula and the mixture was let stir at -78 °C for 2 h. The reaction was quenched with 1N HCl (2 mL), let warm to rt for 30 min, NaOH (5 mL, 2.5N) was added and the solution was extracted with MTBE (15 mL). The layers were separated, the organic layer was washed with brine (2 mL), dried with MgSO_4 and concentrated under vacuum. Chromatography of the residue (20% EtOAc in hexanes) gave amino alcohol **3a** (241 mg, 97% yield, dr = 49:1). **(1S,2S)-2-(2,2,2-Trifluoro-1-phenyl-ethylamino)-butan-1-ol (3a)**. White solid. mp: 52.9-53.7 °C $[\alpha]_{\text{D}}^{20} +53.4$ (c 0.58, MeOH); ^1H NMR δ 7.38-7.34 (m, 5H), 4.26 (q, 1H, $J = 7.5$), 3.51 (dd, 1H, $J = 10.9, 3.9$), 3.33 (dd, 1H, $J = 10.9, 7.5$), 2.53 (m, 1H), 2.12 (br s, 2H), 1.52-1.46 (m, 1H), 1.43-1.35 (m, 1H), 0.86 (t, 3H, $J = 7.5$); ^{13}C NMR δ 134.4, 129.0, 128.7, 128.5, 125.5 (q, $J = 282$), 63.8, 61.9 (q, $J = 29$), 57.4, 23.4, 9.7; ^{19}F NMR δ -73.3; HPLC $t_{\text{R}} = 4.5$ min; LRMS calcd for $\text{C}_{12}\text{H}_{16}\text{F}_3\text{NO}$: 247.26; found: 248.0 [M+1].

(1S,2S)-3-Methyl-2-(2,2,2-trifluoro-1-phenyl-ethylamino)-butan-1-ol (3b). Colorless oil. $[\alpha]_{\text{D}}^{20} +51.9$ (c 0.70, MeOH); ^1H NMR δ 7.41-7.33 (m, 5H), 4.26 (q, 1H, $J = 7.5$), 3.48 (dd, 1H, $J = 10.9, 3.9$), 3.35 (dd, 1H, $J = 10.9, J = 7.7$), 2.46-2.42 (m, 1H), 2.19 (br s, 1H), 1.96 (br s, 1H), 1.88-1.80 (m, 1H), 0.91 (d, 3H, $J = 7.2$), 0.90 (d, 3H, $J = 7.2$); ^{13}C NMR δ 134.6, 129.0, 128.7, 128.6, 125.5 (q, $J = 282$), 62.3 (q, $J = 28$), 61.4, 28.2, 19.0, 17.4; ^{19}F NMR δ -73.2; HPLC $t_{\text{R}} = 9.3$ min; LRMS calcd for $\text{C}_{13}\text{H}_{18}\text{F}_3\text{NO}$: 261.28; found: 262.0 [M+1].

(1S,2S)-4-Methyl-2-(2,2,2-trifluoro-1-phenyl-ethylamino)-pentan-1-ol (3c). Colorless oil. $[\alpha]_D^{20} +49.3$ (*c* 0.71, MeOH); ^1H NMR δ 7.40-7.35 (m, 5H), 4.27 (q, 1H, *J* = 7.5), 3.52 (dd, 1H, *J* = 10.9, 3.8), 3.27 (dd, 1H, *J* = 10.9, 7.2), 2.66 (m, 1H), 2.15 (br s, 2H), 1.56 (m, 1H), 1.34 (m, 1H), 1.20 (m, 1H), 0.88 (d, 3H, *J* = 6.6), 0.77 (d, 3H, *J* = 6.5); ^{13}C NMR δ 134.6, 129.0, 128.7, 128.5, 125.4 (q, *J* = 282), 64.4, 61.9 (q, *J* = 29), 54.6, 40.7, 24.8, 23.1, 22.3; ^{19}F NMR δ -73.1; HPLC t_R = 7.6 min; LRMS calcd for $\text{C}_{14}\text{H}_{20}\text{F}_3\text{NO}$: 275.31; found: 276.2 [M+1].

(1S,2S)-3-Phenyl-2-(2,2,2-trifluoro-1-phenyl-ethylamino)-propan-1-ol (3d). Colorless oil. $[\alpha]_D^{20} +51.0$ (*c* 0.96, MeOH); ^1H NMR δ 7.36-7.31 (m, 5H), 7.27-7.23 (m, 2H), 7.22-7.19 (m, 1H), 7.07 (d, 2H, *J* = 6.9), 4.17 (q, 1H, *J* = 7.4), 3.42 (dd, 1H, *J* = 10.9, 3.8), 3.27 (dd, 1H, *J* = 10.9, 7.0), 2.84-2.74 (m, 2H), 2.64 (dd, 1H, *J* = 13.5, 7.1), 2.23 (br s, 2H); ^{13}C NMR δ 137.9, 134.0, 129.1, 129.0, 128.7, 128.5, 126.5, 125.3 (q, *J* = 282), 63.8, 62.0 (q, *J* = 29), 57.2, 37.5; ^{19}F NMR δ -73.2; HPLC t_R = 10.5 min; LRMS calcd for $\text{C}_{17}\text{H}_{18}\text{F}_3\text{NO}$: 309.33; found: 310.1 [M+1].

(1S,2S)-3,3-Dimethyl-2-(2,2,2-trifluoro-1-phenyl-ethylamino)-butan-1-ol (3e). Colorless oil. $[\alpha]_D^{20} +29.8$ (*c* 1.28, MeOH); ^1H NMR δ 7.42-7.36 (m, 5H), 4.34 (q, 1H, *J* = 7.5), 3.52 (dd, 1H, *J* = 11.1, 4.1), 3.38 (dd, 1H, *J* = 11.1, 6.6), 2.39 (dd, 1H, *J* = 6.5, 4.3), 1.79 (br s, 2H), 0.96 (s, 9H); ^{13}C NMR δ 135.5, 129.0, 128.8, 128.6, 125.6 (q, *J* = 282), 65.7, 64.6 (q, *J* = 28), 61.9, 34.8, 27.2; ^{19}F NMR δ -73.0; HPLC t_R = 12.6 min; LRMS calcd for $\text{C}_{14}\text{H}_{20}\text{F}_3\text{NO}$: 275.31; found: 276.2 [M+1].

(1S,2S)-4-Methylsulfanyl-2-(2,2,2-trifluoro-1-phenyl-ethylamino)-butan-1-ol (3f). Colorless oil. $[\alpha]_D^{20} +50.6$ (*c* 0.54, MeOH); ^1H NMR δ 7.41-7.39 (m, 5H), 4.27 (q, 1H, *J* = 7.5), 3.52 (dd, 1H, *J* = 11.0, 4.0), 3.38 (dd, 1H, *J* = 10.9, 6.6), 2.78 (1H, app quint), 2.59-2.46 (m, 2H), 2.11 (br s, 1H), 2.09 (s, 3H), 1.77-1.68 (m, 2H); ^{13}C NMR δ 134.6, 129.0, 128.7, 128.3, 125.3 (q, *J* = 282), 63.9, 62.0 (q, *J* = 29), 55.8, 30.4, 30.2, 15.3; HPLC t_R = 11.9 min; LRMS calcd for $\text{C}_{13}\text{H}_{18}\text{F}_3\text{NOS}$: 293.35; found: 294.4 [M+1].

(1S,2S)-4-Methyl-2-(2,2,2-trifluoro-1-naphthalen-1-yl-ethylamino)-pentan-1-ol (4a). Colorless oil. $[\alpha]_D^{20} -12.9$ (*c* 0.67, MeOH); ^1H NMR δ 8.12 (m, 1H), 7.88 (t, 2H, *J* = 9.4), 7.77 (d, 1H, *J* = 7.0), 7.58 (t, 1H, *J* = 7.3), 7.52 (q, 2H, *J* = 7.7), 5.25 (m, 1H), 3.49 (dd, 1H, *J* = 11.0, 3.7), 3.27 (dd, 1H, *J* = 11.0, 6.8), 2.72 (m, 1H), 2.20 (br s, 2H), 1.52 (m, 1H), 1.35 (m, 1H), 1.22 (m, 1H), 0.86 (d,

3H, $J = 6.6$), 0.65 (d, 3H, $J = 6.5$); ^{13}C NMR δ 133.8, 131.9, 130.9, 129.5, 129.1, 126.7, 125.9 (q, $J = 282$), 125.8, 125.3, 122.3, 64.5, 56.5 (br weak), 55.3, 40.8, 24.7, 23.0, 22.3; ^{19}F NMR δ -73.0 (br); HPLC $t_{\text{R}} = 11.1$ min; LRMS calcd for $\text{C}_{18}\text{H}_{22}\text{F}_3\text{NO}$: 325.37; found: 326.1 [M+1].

(1S,2S)-2-[1-(4-Bromo-phenyl)-2,2,2-trifluoro-ethylamino]-4-methyl-pentan-1-ol (4b).

Colorless oil. $[\alpha]_{\text{D}}^{20} +57.0$ (c 1.37, MeOH); ^1H NMR δ 7.52 (d, 2H, $J = 8.4$), 7.29 (d, 2H, $J = 8.3$), 4.26 (q, 1H, $J = 7.3$), 3.53 (dd, 1H, $J = 10.9, 3.6$), 3.28 (dd, 1H, $J = 10.9, 7.2$), 2.62 (m, 1H), 2.32 (br s, 1H), 1.79 (br s, 1H), 1.56 (m, 1H), 1.32 (m, 1H), 1.22 (m, 1H), 0.88 (d, 3H, $J = 6.6$), 0.78 (d, 3H, $J = 6.5$); ^{13}C NMR δ 133.6, 131.9, 130.2, 125.1 (q, $J = 281$), 123.2, 64.5, 61.4 (q, $J = 29$), 54.6, 40.6, 24.8, 23.1, 22.3; ^{19}F NMR δ -73.5; HPLC $t_{\text{R}} = 12.0$ min; LRMS calcd for $\text{C}_{14}\text{H}_{19}\text{BrF}_3\text{NO}$: 354.21; found: 355.0 [M+1].

(1S,2S)-4-Methyl-2-[2,2,2-trifluoro-1-(4-methoxy-phenyl)-ethylamino]-pentan-1-ol (4c).

Colorless oil. $[\alpha]_{\text{D}}^{20} +60.9$ (c 0.81, MeOH); ^1H NMR δ 7.32 (d, 2H, $J = 8.6$), 6.91 (d, 2H, $J = 8.7$), 4.23 (q, 1H, $J = 7.4$), 3.79 (s, 3H), 3.52 (dd, 1H, $J = 10.9, 3.8$), 3.26 (dd, 1H, $J = 10.9, 7.3$), 2.64 (m, 1H), 2.16 (br s, 2H), 1.56 (m, 1H), 1.33 (m, 1H), 1.19 (m, 1H), 0.88 (d, 3H, $J = 6.6$), 0.77 (d, 3H, $J = 6.6$); ^{13}C NMR δ 160.0, 129.7, 126.3, 125.5 (q, $J = 281$), 114.1, 64.4, 61.3 (q, $J = 29$), 55.1, 54.5, 40.7, 24.8, 23.2, 22.3; ^{19}F NMR δ -73.6; HPLC $t_{\text{R}} = 6.4$ min; LRMS calcd for $\text{C}_{15}\text{H}_{22}\text{F}_3\text{NO}_2$: 305.34; found: 306.1 [M+1].

(1S,2S)-4-Methyl-2-[2,2,2-trifluoro-1-(3-trifluoromethyl-phenyl)-ethylamino]-pentan-1-ol (4d).

Colorless oil. $[\alpha]_{\text{D}}^{20} +46.5$ (c 0.74, MeOH); ^1H NMR δ 7.66 (s, 1H), 7.62 (m, 2H), 7.50 (t, 1H, $J = 7.7$), 4.35 (q, 1H, $J = 7.2$), 3.52 (dd, 1H, $J = 11.0, 3.7$), 3.29 (dd, 1H, $J = 11.0, 7.0$), 2.62 (m, 1H), 2.03 (br s, 2H), 1.55 (m, 1H), 1.31 (m, 1H), 1.21 (m, 1H), 0.87 (d, 3H, $J = 6.6$), 0.75 (d, 3H, $J = 6.5$); ^{13}C NMR δ 135.8, 131.9, 131.2 (q, $J = 32$), 129.3, 125.9, 125.5, 125.1 (q, $J = 282$), 123.8 (q, $J = 272$), 64.5, 61.7 (q, $J = 29$), 54.9, 40.6, 24.8, 23.1, 22.3; ^{19}F NMR δ -61.6, -73.4; HPLC $t_{\text{R}} = 13.0$ min; LRMS calcd for $\text{C}_{15}\text{H}_{19}\text{F}_6\text{NO}$: 343.31; found: 344.0 [M+1].

(1S,2S)-4-Methyl-2-[2,2,2-trifluoro-1-(2-methylsulfanyl-phenyl)-ethylamino]-pentan-1-ol (4e).

Colorless oil. $[\alpha]_{\text{D}}^{20} +22.6$ (c 1.08, MeOH); ^1H NMR δ 7.53 (d, 1H, $J = 77.7$), 7.36-7.30 (m, 2H), 7.24 (t, 1H, $J = 7.1$), 5.12 (q, 1H, $J = 7.5$), 3.54 (dd, 1H, $J = 11.0, 3.6$), 3.28 (dd, 1H, $J = 11.0, 7.0$),

2.65 (m, 1H), 2.46 (s, 3H), 2.20 (br s, 2H), 1.54 (m, 1H), 1.39 (m, 1H), 1.19 (m, 1H), 0.88 (d, 3H, $J = 6.5$), 0.76 (d, 3H, $J = 6.5$); ^{13}C NMR δ 138.7, 134.1, 129.2, 128.3, 127.8, 126.2, 125.6 (q, $J = 282$), 64.1, 56.5 (q, $J = 29$), 54.9, 40.6, 24.7, 23.1, 22.2, 17.4; ^{19}F NMR δ -73.1; HPLC $t_{\text{R}} = 10.8$ min; LRMS calcd for $\text{C}_{15}\text{H}_{22}\text{F}_3\text{NOS}$: 321.40; found: 322.0 $[\text{M}+1]$.

(1S,2S)-4-Methyl-2-[2,2,2-trifluoro-1-(3-fluoro-4-methoxy-phenyl)-ethylamino]-pentan-1-ol

(4f). Colorless oil. $[\alpha]_{\text{D}}^{20} +54.1$ (c 1.09, MeOH); ^1H NMR δ 7.12 (d, 2H, $J = 20.9, 11.9$), 6.93 (t, 1H, $J = 8.5$), 4.19 (q, 1H, $J = 7.3$), 3.87 (s, 3H), 3.52 (dd, 1H, $J = 10.9, J = 3.7$), 3.26 (dd, 1H, $J = 10.9, 7.2$), 2.62 (m, 1H), 1.95 (br s, 2H), 1.54 (m, 1H), 1.31 (m, 1H), 1.19 (m, 1H), 0.86 (d, 3H, $J = 6.6$), 0.76 (d, 3H, $J = 6.6$); ^{13}C NMR δ 152.2 (d, $J = 247$), 148.1 (d, $J = 11$), 127.2, 125.2 (q, $J = 281$), 124.6, 116.0 (d, $J = 19$), 113.1, 64.4, 61.0 (q, $J = 29$), 56.0, 54.4, 40.5, 24.89, 23.1, 22.2; ^{19}F NMR δ -73.7, -135.8; HPLC $t_{\text{R}} = 9.0$ min; LRMS calcd for $\text{C}_{15}\text{H}_{21}\text{F}_4\text{NO}_2$: 323.33; found: 324.1 $[\text{M}+1]$.

(1S,2S)-4-Methyl-2-(2,2,2-trifluoro-1-pyridin-3-yl-ethylamino)-pentan-1-ol (4g). Colorless oil.

$[\alpha]_{\text{D}}^{20} +55.2$ (c 0.78, MeOH); ^1H NMR δ 8.58 (s, 1H), 8.53 (d, 1H, $J = 3.6$), 7.83 (d, 1H, $J = 7.8$), 7.33 (dd, 1H, $J = 7.8, 4.9$), 4.38 (q, 1H, $J = 7.3$), 3.60 (dd, 1H, $J = 10.9, 3.5$), 3.36 (dd, 1H, $J = 10.9, 7.0$), 2.65 (m, 1H), 1.60 (m, 1H), 1.35-1.23 (m, 2H), 0.89 (d, 3H, $J = 6.6$), 0.79 (d, 3H, $J = 6.6$); ^{13}C NMR δ 149.8, 149.7, 136.1, 130.9, 125.1 (q, $J = 282$), 123.7, 64.3, 59.8 (q, $J = 29$), 54.8, 40.5, 24.7, 23.0, 22.3; ^{19}F NMR δ -73.6; HPLC $t_{\text{R}} = 3.2$ min; LRMS calcd for $\text{C}_{13}\text{H}_{19}\text{F}_3\text{N}_2\text{O}$: 276.30; found: 277.1 $[\text{M}+1]$.

(1S,2S)-4-Methyl-2-(2,2,2-trifluoro-1-furan-2-yl-ethylamino)-pentan-1-ol (4h). Colorless oil.

$[\alpha]_{\text{D}}^{20} +58.8$ (c 0.84, MeOH); ^1H NMR δ 7.40 (s, 1H), 6.37 (dd, 1H, $J = 14.8, 3.2$), 4.35 (q, 1H, $J = 7.2$), 3.53 (dd, 1H, $J = 11.0, 3.7$), 3.29 (dd, 1H, $J = 11.0, 7.1$), 2.73 (m, 1H), 2.12 (br s, 2H), 1.55 (m, 1H), 1.27 (m, 1H), 1.17 (m, 1H), 0.86 (d, 3H, $J = 6.6$), 0.81 (d, 3H, $J = 6.6$); ^{13}C NMR δ 148.1, 143.1, 124.6 (q, $J = 282$), 110.6, 109.6, 64.4, 55.9 (q, $J = 31$), 55.2, 40.8, 24.7, 22.9, 22.5; ^{19}F NMR δ -73.8; HPLC $t_{\text{R}} = 8.0$ min; LRMS calcd for $\text{C}_{12}\text{H}_{18}\text{F}_3\text{NO}_2$: 265.27; found: 266.1 $[\text{M}+1]$.

(1S,2S)-4-Methyl-2-(2,2,3,3,3-pentafluoro-1-phenyl-propylamino)-pentan-1-ol (4i). Colorless

oil. $[\alpha]_{\text{D}}^{20} +60.6$ (c 0.87, MeOH); ^1H NMR δ 7.37 (m, 5H), 4.29 (dd, 1H, $J = 15.7, 11.9$), 3.47 (dd,

1H, $J = 10.9, 3.6$), 3.24 (dd, 1H, $J = 10.9, 7.2$), 2.58 (m, 1H), 2.04 (br s, 2H), 1.54 (m, 1H), 1.30 (m, 1H), 1.17 (m, 1H), 0.87 (d, 3H, $J = 6.6$), 0.75 (d, 3H, $J = 6.5$); ^{13}C NMR δ 134.3, 129.0, 128.8, 128.7, 119.2 (dt, $J = 287, 36$), 114.5 (qt, $J = 258, 35$), 64.6, 30.2 (app t, $J = 22$), 54.7, 40.4, 24.7, 23.2, 22.3; ^{19}F NMR δ -79.8, -114.6 (d, $J = 268$), -126.6 (d, $J = 273$); HPLC $t_{\text{R}} = 12.6$ min; LRMS calcd for $\text{C}_{15}\text{H}_{20}\text{F}_5\text{NO}$: 325.32; found: 326.1 [M+1].

(1S,2S)-4-Methyl-2-[2,2,3,3,3-pentafluoro-1-(3-trifluoromethyl-phenyl)-propylamino]-pentan-1-ol (4j). Colorless oil. $[\alpha]_{\text{D}}^{20} +48.3$ (c 0.69, MeOH); ^1H NMR δ 7.65 (m, 2H), 7.60 (m, 1H), 7.53 (m, 1H), 4.40 (dd, 1H, $J = 15.7, 11.9$), 3.50 (dd, 1H, $J = 10.9, 3.5$), 3.29 (dd, 1H, $J = 10.8, 7.3$), 2.55 (m, 1H), 2.06 (br s, 2H), 1.54 (m, 1H), 1.31 (m, 1H), 1.20 (m, 1H), 0.88 (d, 3H, $J = 6.6$), 0.75 (d, 3H, $J = 6.5$); ^{13}C NMR δ 135.6, 132.2, 131.1 (q, $J = 33$), 129.3, 125.9, 125.8, 123.8 (q, $J = 272$), 119.1 (dt, $J = 287, 36$), 114.3 (qt, $J = 258, 34$), 64.7, 60.0 (app t, $J = 22$), 54.8, 40.3, 24.8, 23.2, 22.2; ^{19}F NMR δ -61.6, -79.7, -113.9 (d, $J = 268$), -126.8 (d, $J = 273$); HPLC $t_{\text{R}} = 15.6$ min; LRMS calcd for $\text{C}_{16}\text{H}_{19}\text{F}_8\text{NO}$: 393.32; found: 393.9 [M+1].

(1S,2S)-4-Methyl-2-[2,2,3,3,3-pentafluoro-1-(2-methylsulfanyl-phenyl)-propylamino]-pentan-1-ol (4k). Colorless oil. $[\alpha]_{\text{D}}^{20} +29.9$ (c 0.81, MeOH); ^1H NMR δ 7.50 (d, 1H, $J = 7.7$), 7.37 (d, 1H, $J = 7.9$), 7.33 (t, 1H, $J = 7.1$), 7.26 (t, 1H, $J = 6.3$), 5.21 (dd, 1H, $J = 19.9, 7.7$), 3.47 (dd, 1H, $J = 11.0, 3.5$), 3.25 (dd, 1H, $J = 10.9, 6.8$), 2.56 (m, 1H), 2.46 (s, 3H), 1.96 (br s, 2H), 1.56 (m, 1H), 1.37 (m, 1H), 1.18 (m, 1H), 0.88 (d, 3H, $J = 6.6$), 0.76 (d, 3H, $J = 6.6$); ^{13}C NMR δ 139.1, 134.2, 129.3, 128.4, 128.2, 126.2, 119.3 (dt, $J = 287, 36$), 114.6 (qt, $J = 259, 36$), 64.4, 55.1, 54.7 (app t, $J = 19$), 40.4, 24.6, 23.3, 22.2, 17.5; ^{19}F NMR δ -80.3, -113.7 (d, $J = 273$), -128.0 (d, $J = 268$); HPLC $t_{\text{R}} = 14.8$ min; LRMS calcd for $\text{C}_{16}\text{H}_{22}\text{F}_5\text{NOS}$: 371.41; found: 372.0 [M+1].

(1S,2S)-2-(2,2-Difluoro-1-phenyl-ethylamino)-4-methyl-pentan-1-ol (4l). Colorless oil. $[\alpha]_{\text{D}}^{20} +69.0$ (c 0.78, MeOH); ^1H NMR δ 7.40-7.32 (5m, H), 5.79 (dt, 1H, $J = 56.0, 4.8$), 4.08 (dt, 1H, $J = 11.0, 4.8$), 3.49 (dd, 1H, $J = 10.8, 3.8$), 3.22 (dd, 1H, $J = 10.8, 7.5$), 2.59 (m, 1H), 2.06 (br s, 2H), 1.54 (m, 1H), 1.39 (m, 1H), 1.19 (m, 1H), 0.88 (d, 3H, $J = 6.6$), 0.76 (d, 3H, $J = 6.5$); ^{13}C NMR δ 136.0, 128.8, 128.7, 128.4, 117.0 (t, $J = 245$), 64.6, 62.4 (dd, $J = 21, 23$), 54.1, 40.8, 24.9, 23.4, 22.2; ^{19}F NMR δ -123.0 (d, $J = 273$), -125.33 (d, $J = 273$); HPLC $t_{\text{R}} = 2.3$ min; LRMS calcd for $\text{C}_{14}\text{H}_{21}\text{F}_2\text{NO}$: 257.32; found: 258.1 [M+1].

(1S,2S)-2-[2,2-Difluoro-1-(3-trifluoromethyl-phenyl)-ethylamino]-4-methyl-pentan-1-ol (4m).

Colorless oil. $[\alpha]_D^{20} +53.8$ (*c* 0.90, MeOH); ^1H NMR δ 7.65-7.60 (m, 3H), 7.53 (t, 1H, $J = 7.7$), 5.82 (dt, 1H, $J = 56.2, 4.5$), 4.18 (dt, 1H, $J = 11.4, 4.5$), 3.53 (dd, 1H, $J = 10.9, 3.8$), 3.28 (dd, 1H, $J = 10.9, 7.3$), 2.57 (m, 1H), 2.03 (br s, 2H), 1.57 (m, 1H), 1.38 (m, 1H), 1.23 (m, 1H), 0.90 (d, 3H, $J = 6.6$), 0.77 (d, 3H, $J = 6.5$); ^{13}C NMR δ 137.2, 131.8, 131.1 (q, $J = 32$), 129.3, 125.4 (m), 123.9 (q, $J = 272$), 116.4 (t, $J = 246$), 64.5, 62.0 (app t, $J = 22$), 54.3, 40.5, 24.9, 23.2, 22.1; ^{19}F NMR δ -61.6, -122.9 (d, $J = 277$), -126.0 (d, $J = 277$); HPLC $t_R = 4.9$ min; LRMS calcd for $\text{C}_{15}\text{H}_{20}\text{F}_5\text{NO}$: 325.32; found: 326.1 [M+1].

(1S,2S)-2-[2,2-Difluoro-1-(2-methylsulfanyl-phenyl)-ethylamino]-4-methyl-pentan-1-ol (4n).

Colorless oil. $[\alpha]_D^{20} +36.1$ (*c* 0.84, MeOH); ^1H NMR δ 7.46 (d, 1H, $J = 7.6$), 7.34-7.30 (m, 2H), 7.26-7.20 (m, 1H), 5.95 (dt, 1H, $J = 56.0, 4.4$), 4.74 (m, 1H), 3.53 (dd, 1H, $J = 10.9, 3.7$), 3.24 (dd, 1H, $J = 10.9, 7.2$), 2.61 (m, 1H), 2.48 (s, 3H), 1.56 (m, 1H), 1.47 (m, 1H), 1.20 (m, 1H), 0.90 (d, 3H, $J = 6.5$), 0.78 (d, 3H, $J = 6.5$); ^{13}C NMR δ 138.2, 134.7, 129.0, 128.5, 127.2, 125.8, 116.3 (t, $J = 245$), 64.5, 58.2 (app t, $J = 22$), 54.8, 40.9, 24.9, 23.5, 22.0, 16.8; ^{19}F NMR δ -122.9 (d, $J = 277$), -124.8 (d, $J = 273$), HPLC $t_R = 3.5$ min; LRMS calcd for $\text{C}_{15}\text{H}_{23}\text{F}_2\text{NOS}$: 303.41; found: 304.1 [M+1].