Palladium-Catalyzed α -Arylation of Zinc Amide Enolates

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General Methods. All reactions were performed in a nitrogen glovebox or with Schlenk techniques under N₂. THF was distilled from sodium/benzophenone. Methylene chloride was distilled from calcium hydride. Anhydrous grade dioxane and DMF were purchased and were used and stored in a nitrogen glovebox. All aryl halides, bases, zinc chloride, amides, α -bromo acid bromides, acid chlorides, acid anhydrides, diethylamine (redistilled), dimethylamine, and morpholine were obtained from commercial supplies and used without further purification. Zinc metal (granular, 20 mesh) was obtained from Mallinckrodt and activated according to a literature procedure.¹ BINAP, DPPF, P(*t*-Bu)₃, PCy₃, 2-(dicyclohexylphosphino)-2'-(*N,N*-dimethylamino)biphenyl were purchased from commercial suppliers. Pd(dba)₂² was prepared according to literature procedures, or obtained from commercial suppliers. Pentaphenylferrocenyl di-*t*-butylphosphine (Q-phos)³, and {P(*t*-Bu)₃}PdBr₂⁴ were prepared by literature procedures, or obtained as a gift from Johnson-Matthey. ¹H and ¹³C{¹H} NMR spectra were obtained on 400 or 500 MHz spectrometers, with the chemical shifts referenced to residual protiated (¹H) or deuterated solvent (¹³C). GC analyses were obtained with a DB-1301 narrow bore column for high temperature ramp applications (max. 120 °C/min).

General Procedure for the Preparation of α -Bromo Amides. A solution of bromoacetyl bromide (0.05 mol), 2-bromopropionyl bromide (0.05 mol), or α -bromoisobutyryl bromide in methylene chloride (5 mL) was added dropwise via syringe to a stirred, cooled solution of diethylamine (0.1 mol) in methylene chloride (45 mL) at -10 °C. The reaction was stirred at -10 °C for 15 min and then warmed to room temperature over 1 h. The mixture was then filtered to remove the crystallized amine hydrobromide. The filtrate was poured into 50 mL of water and extracted with methylene chloride and chloroform. The combined extracts were dried over MgSO₄, filtered and concentrated. The α -bromoamides were purified by Kugelröhr distillation. 2-Bromo-2,*N,N*-trimethyl-propionamide was prepared from α -bromoisobutyryl bromide and dimethylamine.

General Procedure for the Preparation of Reformatsky Reagents from α -Bromo Amides. Reformatsky reagents were formed by the addition of the corresponding amide in 5 mL of THF to a suspension of 2 equiv of activated zinc in 30 mL of THF under nitrogen at 0 °C. The reaction was allowed to warm to room temperature. After 3 h at room temperature, the resulting white solid Reformatsky reagent was filtered, dried under vacuum, and used without further purification.

BrZnCH₂C(O)NEt₂·THF.⁵ ¹H NMR (C₆D₆) δ 3.61 (4H, m), 3.13 (4H, br s), 2.21 (2H, br s), 1.38 (4H, m), 0.98 (3H, br t, 6.8 Hz), 0.85 (3H, br t, 6.8 Hz); ¹³C{¹H} NMR (C₆D₆) δ 182.38, 68.34, 44.22, 44.07, 41.30, 25.62, 13.59, 13.51.

BrZnCHCH₃C(O)NEt₂·THF. ¹H NMR (C₆D₆) δ 3.75 (1H, br s), 3.59 (4H, m), 2.78 (4H, br s), 1.82 (3H, br s), 1.39 (4H, m), 1.09 (3H, br s), 0.86 (3H, br s); ¹³C{¹H} NMR (C₆D₆) δ 183.94, 68.03, 43.21, 42.52, 41.56, 29.49, 25.70, 14.23, 13.69.

2-Bromo-*N,N*-diethylacetamide.⁶ ¹H NMR (CDCl₃) δ 1.14 (t, 7.2 Hz, 3H), 1.26 (t, 7.2 Hz, 3H), 3.39 (q, 7.2 Hz, 2H), 3.40 (q, 7.2 Hz, 2H), 3.85 (s, 2H); ¹³C{¹H} NMR (CDCl₃) δ 12.27, 14.13, 26.27, 40.29, 42.71, 165.61.

2-Bromo-*N,N*-diethylpropionamide. ^1H NMR (CDCl_3) δ 1.13 (t, 7.2 Hz, 3H), 1.24 (t, 7.2 Hz, 3H), 1.82 (d, 6.8 Hz, 3H), 3.26 (m, 2H), 3.53 (m, 2H), 4.53 (q, 6.8 Hz, 1H); $^{13}\text{C}\{^1\text{H}\}$ NMR (CDCl_3) δ 12.28, 14.57, 21.74, 38.47, 40.74, 42.14, 168.28; Anal. Calc'd for $\text{C}_7\text{H}_{14}\text{BrNO}$: C, 40.40; H, 6.78; N, 6.73. Found: C, 40.21; H, 7.05; N, 6.74.

General Procedure for the Arylation of Isolated Reformatsky Reagents of Amides. In the drybox, a solution of $\text{Pd}(\text{dba})_2$ (11.5 mg, 0.0200 mmol), Q-phos (14.3 mg, 0.0200 mmol), and aryl halide (1.00 mmol) in 8 mL of dioxane was added to a round-bottom flask containing a stirred solution of the isolated Reformatsky reagent generated from the α -bromo amide (1.20 mmol) in dioxane (10 mL). The flask was sealed with a rubber septum and removed from the drybox. The reaction mixture was stirred at room temperature and monitored by GC analysis. Upon consumption of the aryl halide, the reaction mixture was poured into 40 mL of saturated aqueous NH_4Cl and extracted with ether. The combined ether extracts were washed with brine, dried over MgSO_4 , filtered and concentrated. The residue was purified by chromatography on silica gel. The reaction conditions and results are shown in Table 1.

Preparation of Rieke activated zinc.⁷ The activation of zinc was conducted under an argon atmosphere in a dry-box. In a 250 mL two-necked round bottom flask connected with a column were dissolved lithium (0.100 mol) and naphthalene (0.100 mol) with THF (40 mL). The dark green mixture was stirred for 2 h at room temperature. To this mixture was added zinc chloride (0.0500 mol) in THF (45 mL) dropwise over 20 min. The resultant mixture was filtered. The solid was washed with pentane, diethyl ether, and THF. The activated zinc was dried under vacuum for 6 h, and stored in a drybox under a nitrogen atmosphere.

Procedure for arylation of zinc enolates generated from 2-bromo-*N,N*-diethylacetamide and 2-bromo-*N,N*-diethylpropanamide with Rieke activated zinc. The reactions were conducted under a nitrogen atmosphere in a drybox. Rieke activated zinc dust (49.0 mg, 0.750 mmol) was suspended in THF (1.0 mL) in a 4 mL screw-capped vial. To this mixture was added dropwise the α -bromoamide (0.550 mmol) by syringe, and the vial was capped. The reaction mixture was stirred at room temperature for 30 min. To the resulting heterogeneous solution was added a solution of aryl bromide (0.500 mmol), $\text{Pd}(\text{dba})_2$ (2.8 mg, 5.00 μmol) and Q-phos (3.6 mg, 5.00 μmol) in THF (1.0 mL). The vial was sealed with a cap containing PTFE septum and removed from the drybox. The resulting solution was stirred for 6 h. After this time, the solvent was evaporated, the residue was dissolved in methylene chloride with application of sonication, and this methylene chloride solution was loaded directly onto a silica gel column. Conditions for elution are provided along with the spectroscopic and analytical data for each product.

Procedure for arylation of amides starting from 2-bromo-2-methylpropanamide. The reactions were conducted under a nitrogen atmosphere in a drybox. Activated zinc dust (0.750 mmol) was suspended in THF (0.5 mL) in a 10 mL round bottom flask. To this mixture was added dropwise a solution of 2-bromo-2-methylpropanamide (0.600 mmol) dissolved in THF (0.7 mL), and the flask was capped with a rubber septum. The reaction mixture was stirred at room temperature for 30 min. To this heterogeneous solution was added a solution of the aryl bromide (0.500 mmol) and $\{\text{P}(t\text{-Bu})_3\}\text{PdBr}_2$ (12.5 μmol) in 4.8 mL of toluene. The flask was

removed from the dry-box. The resulting solution was stirred for 24 h. The reaction mixture was loaded directly onto a silica gel column and separated by chromatography.

Table S1. Effect of reaction parameters on the palladium-catalyzed α -arylation of the Reformatsky reagent of morpholine isobutyramide.

Entry	equiv amide	equiv Zn*	solvent 1	solvent 2	Pd / L	Yield ^a
1	1.1	1.5	THF	THF	2.5% {(tBu) ₃ P}PdBr ₂	0%
2	2	4	THF	THF	0.5% {(tBu) ₃ P}PdBr ₂	0%
3	2	4	THF	THF	2.5% {(tBu) ₃ P}PdBr ₂	50%
4	2	4	THF	THF	5% Pd(dba) ₂ / 5% Q-phos	20%
5	2	4	1,4-dioxane	1,4-dioxane	2.5% {(tBu) ₃ P}PdBr ₂	90%
6	2	4	THF	30% THF / 70% toluene	2.5% {(tBu) ₃ P}PdBr ₂	90%
7	2	4	THF	20% THF / 80% toluene	2.5% {(tBu) ₃ P}PdBr ₂	100%
8	2	4	THF	10% THF / 90% toluene	2.5% {(tBu) ₃ P}PdBr ₂	100%
9	1.2	1.5	THF	20% THF / 80% toluene	2.5% {(tBu) ₃ P}PdBr ₂	100%

^a Yields were determined by ¹H NMR spectroscopy with 1,3,5-Trimethoxybenzene as internal standard.

General Procedure for the α -arylation of amides from alkali metal enolates and ZnCl₂. The reactions were conducted under a nitrogen atmosphere. In a 10 mL round bottom flask sealed with a rubber septum was dissolved *sec*-Butyllithium (430 μ L, 0.600 mmol, 1.4 M in cyclohexane) with THF (4 mL) at -78°C . To this solution was added amide (0.600 mmol) dropwise at -78°C . The resultant mixture was stirred for 1 h at -78°C . The solution of the enolate was allowed to warm to room temperature. The septum was fastened to the flask with electrical tape, and the flask was brought into a drybox. To the solution of enolate was added zinc chloride (163.5 mg, 1.20 mmol). The resulting solution was stirred for 10 min at room temperature. To this solution was added a solution of 0.500 mmol aryl bromide, Pd(dba)₂ and Q-phos in THF (1 mL). The amounts of catalyst components are provided in the tables of the main paper. The resulting reaction mixture was stirred for 24 h at room temperature. After this time, the solvent was evaporated, the residue was dissolved in methylene chloride with application of sonication, and this methylene chloride solution was loaded directly onto a silica column. Conditions for elution are provided along with the spectroscopic and analytical data for each product.

Procedure for arylation with 4-bromophenol and 4-bromoaniline. The reactions were conducted under a nitrogen atmosphere. *sec*-Butyllithium (430 μ L, 0.600 mmol, 1.4 M in cyclohexane) was dissolved in THF (4 mL) in a 10 mL round bottom flask sealed with a rubber septum at -78°C . To this solution was added the amide (0.600 mmol) dropwise at -78°C . The resulting mixture was stirred for 1 h at -78°C . The solution of the enolate was allowed to warm to room temperature. The septum was fastened to the flask with electrical tape, and the flask was brought into a drybox. To the solution of enolate was added zinc chloride. The resulting solution was stirred for 10 min at room temperature. In separate reaction vessel in a drybox, aryl halide (0.500 mmol) in THF (1.0 mL) was slowly added to KH (0.525 mmol). Gas evolution occurred

immediately. The reaction mixture was stirred for 10 min at room temperature. This suspension was mixed with $\{P(t\text{-Bu})_3\}PdBr_2$. The amount of catalyst in each reaction is provided in the Tables of the main paper. To this resultant suspension was added the THF solution of zinc enolate. The resulting reaction mixture was stirred for 12 h at room temperature. After this time, the reaction mixture was diluted with Et_2O (30 mL). The resulting solution was washed with saturated NH_4Cl (aq) (25 mL), and back-extracted with Et_2O (3 x 30 mL). The organic phase was dried over $MgSO_4$, filtered, and concentrated at reduced pressure. The residue was then purified by flash column chromatography on silica gel. Conditions for elution are provided along with the spectroscopic and analytical data for each product.

Preparation of *N,N*-diethylpentanamide. In a flame-dried 500 mL round bottom flask sealed with a rubber septum, pentanoyl chloride (11.8 mL, 0.0994 mol) was dissolved in dichloromethane (200 mL) under a nitrogen atmosphere. The flask was placed in a cold bath of acetone and dry ice at $-60\text{ }^{\circ}C$ (13 mL, 0.125 mol) over 20 min. Then, triethylamine (14 mL, 0.100 mol) was added to the reaction mixture at $-50\text{ }^{\circ}C$. The resulting solution was allowed to warm to room temperature. The reaction mixture was stirred for 1 h at room temperature. The reaction was treated with 0.1 N hydrochloric acid solution (200 mL), then saturated sodium bicarbonate solution (200 mL), and then water (200 mL). Each organic layer was combined and dried over sodium sulfate. After filtration, the dichloromethane solution was concentrated, and the product (12.9 g, 82%) was purified by vacuum distillation (pressure: 17 mmHg; oven temp: $118\text{ }^{\circ}C$; temp inside: $107\text{ }^{\circ}C$). 1H NMR (400 MHz, C_6D_6): δ 3.21 (2H, t, $J=7.1$ Hz), 2.71 (2H, t, $J=7.1$ Hz), 2.01 (2H, t, $J=7.2$ Hz), 1.70 (2H, quintet, $J=7.4$ Hz), 1.29 (2H, dt, $J=7.4$ Hz, 7.6 Hz), 0.97 (3H, t, $J=7.2$ Hz), 0.86 (3H, t, $J=7.2$ Hz), 0.69 (3H, t, $J=7.2$ Hz). ^{13}C NMR (100 MHz, C_6D_6): δ 171.20, 41.99, 40.46, 33.16, 28.25, 23.20, 14.79, 14.57, 13.79.

Preparation of 2-bromo-*N,N*,2-trimethylpropanamide. In a flame-dried, 250 mL round bottom flask was placed a solution of dimethylamine in THF (100 mL, 0.200 mol, 2.0 M). The flask was sealed with a rubber septum and flushed with nitrogen. The flask was placed in a bath of acetone and dry-ice at $-78\text{ }^{\circ}C$. To the solution of dimethylamine was slowly added α -bromo isobutyryl acid bromide (12.4 mL, 0.100 mol). The bath was allowed to warm to room temperature over 5 h, while the reaction mixture was stirred. The reaction mixture was washed with brine (100 mL). The aqueous wash was back-extracted with diethyl ether (3 x 100 mL). The organic layers were combined and dried with anhydrous sodium sulfate. After filtration, the ethereal solution was concentrated *in vacuo*. The product (17.6 g, 91%) was purified by vacuum distillation (pressure: 16 mmHg; oven temp: $135\text{ }^{\circ}C$; temp inside: $94\text{ }^{\circ}C$). 1H NMR (400 MHz, C_6D_6): δ 2.66 (6H, s), 1.77 (6H, s). ^{13}C NMR (100 MHz, C_6D_6): δ 169.85, 58.05, 38.88, 32.96.

Preparation of 1-morpholinopropan-1-one. In a flame-dried 500 mL round bottom flask, pyridine (40 mL, 0.495 mol) was dissolved in dichloromethane (200 mL) under a nitrogen atmosphere. The flask was placed in an ice bath at $0\text{ }^{\circ}C$. To the solution of pyridine was slowly added propionyl anhydride (15.5 mL, 0.120 mol) and morpholine (8.6 mL, 0.0983 mol) at $0\text{ }^{\circ}C$. The ice bath was removed. The reaction mixture was stirred at room temperature for 2 h. The reaction mixture was washed with 1 N hydrochloric acid (300 mL), then with 1 N NaOH solution (200 mL), and then with water (200 mL). The aqueous layers were back-extracted with dichloromethane (3 x 100 mL). The organic layers were combined, mixed with hexane (100 mL) and dried with anhydrous sodium sulfate. After filtration, the dichloromethane solution was

concentrated *in vacuo*. The product (11.2 g, 80%) was purified by vacuum distillation (pressure: 17 mmHg; oven temp: 150 °C; temp inside: 118 °C). ¹H NMR (400 MHz, C₆D₆): δ 3.42 (2H, br s), 3.26 (2H, br s), 3.13 (2H, br s), 2.65 (2H, br s), 1.79 (2H, q, *J*=7.6 Hz), 1.08 (3H, t, *J*=7.2 Hz). ¹³C NMR (100 MHz, C₆D₆): δ 171.63, 67.25, 66.85, 45.88, 42.41, 26.47, 9.87.

Preparation of 2-bromo-2-methyl-1-morpholinopropan-1-one. In a flame-dried 500 mL round bottom flask sealed with a rubber septum, α-bromo isobutyryl acid bromide (12.1 mL, 0.0979 mol) was dissolved in dichloromethane (200 mL) under a nitrogen atmosphere. The flask was placed in a bath of acetone and dry-ice at -78 °C. To the solution of α-bromo isobutyryl acid bromide was added morpholine (10.5 mL, 0.120 mol) dropwise. Then, triethylamine (14 mL, 0.100 mol) was added to the reaction mixture at -65 °C. The reaction was allowed to warm to room temperature. The reaction mixture was stirred for 1 h at room temperature. The resulting solution was washed with 0.1 N hydrochloric acid (200 mL), saturated sodium bicarbonate solution (200 mL), and then water (200 mL). The aqueous layers were washed with 100 mL of dichloromethane three times. The organic layers were combined and dried over sodium sulfate. After filtration, the dichloromethane solution was concentrated. The product (20.2 g, 87 %) was purified by vacuum distillation (pressure: 17 mmHg; oven temp: 164 °C; temp inside: 128 °C). ¹H NMR (400 MHz, C₆D₆): δ 3.40 (4H, t, *J*=4.4 Hz), 3.27 (4H, t, *J*=4.4 Hz), 1.70 (6H, s). ¹³C NMR (100 MHz, C₆D₆): δ 168.87, 66.86, 57.57, 46.93, 32.86.

Synthesis of 2-(6-methoxynaphthalene-2-yl)propionic acid methyl ester. In a flame-dried 50 mL two necked round bottom flask sealed with rubber septa was dissolved (*S*)-(+)-6-methoxy-α-methyl-2-naphthaleneacetic acid (2.38 g, 10.4 mmol) with dichloromethane (10 mL) under a nitrogen atmosphere. The flask was placed in an ice water bath. To the solution of naproxen was slowly added thionyl chloride (0.91 mL, 12.4 mmol) at 0 °C. The reaction mixture was stirred at 0 °C for 20 min. Then, methanol (10 mL) was added to the reaction mixture at 0 °C. The ice-water bath was removed, and the solution was allowed to warm to room temperature. The resulting solution was washed with saturated aqueous NH₄Cl (10 mL). The organic layer was collected, and the aqueous solution was back-extracted with dichloromethane (3 x 10 mL). The combined organic layers were dried over anhydrous MgSO₄. The solution was concentrated *in vacuo* after filtration. The crude product was purified by chromatography on silica gel, eluting with 10% ethyl acetate in 90% hexane. A white powder was obtained (2.30 g, 91%). ¹H NMR (400 MHz, CDCl₃) δ 7.72 (1H, s), 7.70 (1H, s), 7.67 (1H, d, *J* = 0.7 Hz), 7.40 (1H, dd, *J* = 8.4 Hz, 1.6 Hz), 7.14 (1H, dd, *J* = 8.8 Hz, 2.4 Hz), 7.11 (1H, d, *J* = 2.4 Hz), 3.91 (3H, s), 3.86 (1H, q, *J* = 7.2 Hz), 3.67 (3H, s), 1.58 (3H, d, *J* = 7.2 Hz); ¹³C{¹H} NMR (CDCl₃) δ 175.3, 157.8, 135.8, 133.8, 129.4, 129.1, 127.4, 126.4, 126.1, 119.2, 105.7, 55.5, 52.2, 45.5, 18.8.

Procedure for palladium-catalyzed α-arylation of zinc enolate of *N,N*-diethyl propionamide in the presence of the optically active Naproxen derivative. The reactions were conducted under a nitrogen atmosphere. Into a 10 mL round bottom flask sealed with a rubber septum was added a solution of *sec*-butyllithium (430 μL, 0.600 mmol, 1.4 M in cyclohexane) and THF (4 mL). The solution was cooled to -78 °C. To this solution was added *N,N*-diethyl propionamide (85 μL, 0.590 mmol) dropwise at -78 °C. The resultant mixture was stirred for 1 h at -78 °C. The solution of the enolate was allowed to warm to room temperature. The septum was fastened to the flask with electrical tape, and the flask was brought into a drybox. To the solution of

enolate was added zinc chloride (164 mg, 1.20 mmol). The resulting solution was stirred for 10 min at room temperature. To this solution was added a solution of 1-*tert*-butyl-4-bromobenzene (107 mg, 0.500 mmol), 2-(6-methoxynaphthalene-2-yl)propionic acid methyl ester (122 mg, 0.500 mmol), Pd(dba)₂ (2.8 mg, 5.0 μmol) and Q-phos (3.6 mg, 5.00 μmol) in THF (1 mL). The resulting reaction mixture was stirred for 24 h at room temperature. After this time, the solvent was evaporated, the residue was dissolved in methylene chloride with application of sonication, and this methylene chloride solution was loaded directly onto a silica column and eluted with 10% ethyl acetate in 90% hexane. 2-(4-*tert*-Butylphenyl)-*N,N*-diethylpropanamide was obtained (118 mg, 90%). HPLC analysis of the recovered (*S*)-Naproxen methyl ester (113 mg, 92%) indicated an enantiomeric excess of 99% [Chiralcel® OD-H column, eluting with *n*-hexane:*i*-PrOH-95:5, 1.0 mL/min, 254 nm; (*R*) enantiomer(minor) tR 7.0, (*S*) enantiomer(major) tR 7.9 min].

2-(4-*tert*-Butylphenyl)-*N,N*-diethylacetamide. (Table 1, Entry 1; Table 2, Entry 1; Table 5, Entry 1) Purified by chromatography on silica gel (hexane / ethyl acetate = 90 / 10). ¹H NMR (400 MHz, CDCl₃): δ 7.33 (2H, d, *J* = 8.0 Hz), 7.18 (2H, d, *J* = 8.4 Hz), 3.66 (2H, s), 3.39 (2H, q, *J* = 7.2 Hz), 3.31 (2H, q, *J* = 7.2 Hz), 1.30 (9H, s), 1.13 (3H, t, *J* = 7.2 Hz), 1.10 (3H, t, *J* = 7.2 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 170.26, 149.36, 132.37, 128.28, 125.46, 42.31, 40.23, 40.11, 34.35, 31.30; Anal. Calc'd for C₁₆H₂₅NO: C, 77.68; H, 10.19; N, 5.66. Found: C, 77.42; H, 10.16; N, 5.45.

2-(4-*tert*-Butylphenyl)-*N,N*-diethylpropanamide. (Table 1, Entry 2) Purified by chromatography on silica gel (hexane / ethyl acetate = 90 / 10). ¹H NMR (400 MHz, CDCl₃): δ 7.31 (2H, d, *J* = 8.4 Hz), 7.19 (2H, d, *J* = 8.0 Hz), 3.80 (1H, q, *J* = 6.8 Hz), 3.48 (1H, dq, *J* = 13.6 Hz, 6.8 Hz), 3.30 (2H, m, *J* = 7.0 Hz), 3.11 (1H, dq, *J* = 14.4 Hz, 7.2 Hz), 1.43 (3H, d, *J* = 7.2 Hz), 1.30 (9H, s), 1.09 (3H, t, *J* = 7.2 Hz), 0.99 (3H, t, *J* = 7.2 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 173.20, 149.56, 139.44, 127.05, 125.77, 42.68, 41.87, 40.48, 34.58, 31.56, 21.10, 14.42, 13.10; Anal. Calc'd for C₁₇H₂₇NO: C, 78.11; H, 10.41; N, 5.36. Found: C, 78.17; H, 10.39; N, 5.29.

Ethyl 4-((diethylcarbamoyl)methyl)benzoate. (Table 1, Entry 3) Purified by chromatography on silica gel (hexane / ethyl acetate = 75 / 25). ¹H NMR (400 MHz, CDCl₃): δ 8.00 (2H, d, *J* = 8.4 Hz), 7.34 (2H, d, *J* = 8.4 Hz), 4.37 (2H, q, *J* = 7.2 Hz), 3.75 (2H, s), 3.40 (2H, q, *J* = 7.2 Hz), 3.29 (2H, q, *J* = 7.2 Hz), 1.39 (3H, t, *J* = 7.2 Hz), 1.13 (3H, t, *J* = 7.2 Hz), 1.11 (3H, t, *J* = 7.2 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 169.15, 166.28, 140.58, 129.67, 128.78, 128.62, 60.72, 42.21, 40.62, 40.03, 14.18, 14.10, 12.74; Anal. Calc'd for C₁₅H₂₁NO₃: C, 68.42; H, 8.04; N, 5.32. Found: C, 68.20; H, 8.16; N, 5.37.

Ethyl 4-(1-(diethylcarbamoyl)ethyl)benzoate. (Table 1, Entry 4) Purified by chromatography on silica gel (hexane / ethyl acetate = 85 / 15). ¹H NMR (400 MHz, CDCl₃): δ 8.00 (2H, d, *J* = 8.4 Hz), 7.36 (2H, d, *J* = 8.4 Hz), 4.37 (2H, q, *J* = 7.2 Hz), 3.89 (1H, q, *J* = 6.8 Hz), 3.52 (1H, m), 3.28 (2H, m), 3.13 (1H, m), 1.46 (3H, d, *J* = 7.2 Hz), 1.39 (3H, t, *J* = 7.2 Hz), 1.09 (3H, t, *J* = 7.2 Hz), 1.00 (3H, t, *J* = 7.2 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 171.88, 166.28, 147.45, 129.98, 128.87, 127.18, 60.79, 42.97, 41.50, 40.20, 20.66, 14.23, 14.14, 12.65; Anal. Calc'd for C₁₆H₂₃NO₃: C, 69.29; H, 8.36; N, 5.05. Found: C, 68.98; H, 8.41; N, 5.14.

***N,N*-Diethyl-2-(4-nitrophenyl)propanamide.** (Table 1, Entry 5; Table 6, Entry 7) Purified by chromatography on silica gel (hexane / ethyl acetate = 60 / 40). ¹H NMR (400 MHz, CDCl₃): δ 8.18 (2H, d, *J*=8.7 Hz), 7.50 (2H, d, *J*=8.7 Hz), 4.00 (1H, q, *J*=6.9 Hz), 3.50 (1H, dq, *J*=13.6 Hz, 6.9 Hz), 3.25 (3H, m), 1.49 (3H, d, *J*=6.9 Hz), 1.10 (3H, t, *J*=7.1 Hz), 1.08 (3H, t, *J*=7.1 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 171.63, 149.92, 146.95, 128.46, 124.09, 42.76, 41.95, 40.66, 20.76, 14.59, 12.91; Anal. Calc'd for C₁₃H₁₈N₂O₃: C, 62.38; H, 7.25; N, 11.19. Found: C, 62.32; H, 7.27; N, 11.12.

2-(4-Cyanophenyl)-*N,N*-diethylacetamide. (Table 1, Entry 6; Table 2, Entry 3; Table 5, Entry 8) Purified by chromatography on silica gel (Hexane / ethyl acetate = 30 / 70). ¹H NMR (400 MHz, CDCl₃): δ 7.61 (2H, d, *J* = 8.4 Hz), 7.38 (2H, d, *J* = 8.4 Hz), 3.75 (2H, s), 3.40 (2H, q, *J* = 7.2 Hz), 3.33 (2H, q, *J* = 7.2 Hz), 1.17 (3H, t, *J* = 7.6 Hz), 1.13 (3H, t, *J* = 7.2 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 168.84, 141.23, 132.38, 130.04, 118.97, 110.78, 42.55, 40.57, 40.52, 14.50, 13.06; Anal. Calc'd for C₁₃H₁₆N₂O: C, 72.19; H, 7.46; N, 12.95. Found: C, 72.07; H, 7.23; N, 12.69.

***N,N*-Diethyl-2-(4-methoxyphenyl)acetamide.** (Table 1, Entry 7; Table 5, Entry 3) Purified by chromatography on silica gel (hexane / ethyl acetate = 30 / 70). ¹H NMR (400 MHz, CDCl₃): δ 7.17 (2H, d, *J* = 8.6 Hz), 6.85 (2H, d, *J* = 8.6 Hz), 3.78 (3H, s), 3.63 (2H, s), 3.38 (2H, q, *J* = 7.1 Hz), 3.29 (2H, q, *J* = 7.1 Hz), 1.11 (3H, t, *J* = 7.1 Hz), 1.09 (3H, t, *J* = 7.1 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 170.32, 158.20, 129.54, 127.38, 113.88, 55.11, 42.16, 39.98, 39.83, 14.10, 12.81; Anal. Calc'd for C₁₃H₁₉NO₂: C, 70.56; H, 8.65; N, 6.33. Found: C, 70.31; H, 8.90; N, 6.28.

***N,N*-Diethyl-2-(3-methoxy-phenyl)propionamide.** (Table 1, Entry 8) Purified by chromatography on silica gel (hexane/ethyl acetate = 75/25). ¹H NMR (CDCl₃) δ 1.01 (t, 7.2 Hz, 3H), 1.10 (t, 7.2 Hz, 3H), 1.44 (d, 7.2 Hz, 3H), 3.11 (m, 1H), 3.23 (m, 1H), 3.34 (m, 1H), 3.52 (m, 1H), 3.79 (s, 3H), 3.80 (q, 7.2 Hz, 1H), 6.78 (m, 1H), 6.85 (m, 2H), 7.23 (t, 8.0 Hz, 1H); ¹³C{¹H} NMR (CDCl₃) δ 12.73, 14.14, 20.84, 40.20, 41.52, 43.80, 55.12, 112.07, 112.59, 119.61, 129.65, 144.00, 159.82, 172.45; Anal. Calc'd for C₁₄H₂₁NO₂: C, 71.46; H, 8.99; N, 5.95. Found: C, 71.31; H, 9.13; N, 5.77.

***N,N*-Diethyl-2-(4-trifluoromethylphenyl)acetamide.** (Table 1, Entry 9; Table 5, Entry 14) Purified by chromatography on silica gel (hexane / ethyl acetate = 80 / 20). ¹H NMR (400 MHz, CDCl₃): δ 7.58 (2H, d, *J* = 8.0 Hz), 7.39 (2H, d, *J* = 8.0 Hz), 3.75 (2H, s), 3.41 (2H, q, *J* = 7.2 Hz), 3.32 (2H, q, *J* = 7.2 Hz), 1.16 (3H, t, *J* = 7.2 Hz), 1.14 (3H, t, *J* = 7.2 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 169.09, 139.57 (q, *J* < 2 Hz), 129.22, 128.95 (q, 32.4 Hz), 125.40 (q, 3.9 Hz), 124.15 (q, 272.3 Hz), 42.32, 40.28, 40.26, 14.26, 12.87; Anal. Calc'd for C₁₃H₁₉NO₂: C, 70.56; H, 8.65; N, 6.33. Found: C, 70.70; H, 8.51; N, 6.58.

***N,N*-Diethyl-2-(4-(trifluoromethyl)phenyl)propanamide.** (Table 1, Entry 10; Table 6, Entry 1) Purified by chromatography on silica gel (hexane / ethyl acetate = 80 / 20). ¹H NMR (400 MHz, CDCl₃): δ 7.57 (2H, d, *J*=8.1 Hz), 7.43 (2H, d, *J*=8.1 Hz), 3.92 (1H, q, *J*=6.9 Hz), 3.51 (1H, dq, *J*=13.6 Hz, 6.8 Hz), 3.28 (2H, m), 3.14 (1H, dq, *J*=14.4 Hz, 7.2 Hz), 1.46 (3H, d, *J*=6.9 Hz), 1.10 (3H, t, *J*=7.1 Hz), 1.04 (3H, t, *J*=7.1 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 172.13, 146.55, 129.14 (q, 32.3 Hz), 127.85, 125.83 (q, 3.7 Hz), 124.31 (q, 270.3 Hz), 42.88, 41.85, 40.55, 20.91, 14.46,

12.91; Anal. Calc'd for C₁₄H₁₈F₃NO: C, 61.53; H, 6.64; N, 5.13. Found: C, 61.81; H, 6.71; N, 5.17.

Methyl 4-((diethylcarbamoyl)methyl)benzoate. (Table 2, Entry 2; Table 5, Entry 6) Purified by chromatography on silica gel (hexane / ethyl acetate = 85 / 15). ¹H NMR (400 MHz, CDCl₃): δ 7.99 (2H, d, *J* = 8.0 Hz), 7.34 (2H, d, *J* = 8.0 Hz), 3.90 (3H, s), 3.75 (2H, s), 3.40 (2H, q, *J* = 7.2 Hz), 3.30 (2H, q, *J* = 7.2 Hz), 1.13 (3H, t, *J* = 7.2 Hz), 1.11 (3H, t, *J* = 7.2 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 169.32, 166.94, 140.88, 129.90, 128.87, 128.66, 52.06, 42.40, 40.77, 40.25, 14.27, 12.92; Anal. Calc'd for C₁₄H₁₉NO₃: C, 67.45; H, 7.68; N, 5.62. Found C, 67.47; H, 7.85; N, 5.50.

***N,N*-Diethyl-2-(4-nitrophenyl)acetamide.** (Table 2, Entry 4; Table 5, Entry 11) Purified by chromatography on silica gel (hexane / ethyl acetate = 30 / 70). ¹H NMR (400 MHz, CDCl₃): δ 8.19 (2H, d, *J* = 8.8 Hz), 7.44 (2H, d, *J* = 8.8 Hz), 3.79 (2H, s), 3.41 (2H, q, *J* = 7.2 Hz), 3.34 (2H, q, *J* = 7.2 Hz), 1.18 (3H, t, *J* = 7.2 Hz), 1.14 (3H, t, *J* = 7.2 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 168.51, 146.91, 143.11, 129.97, 123.69, 42.40, 40.45, 40.14, 14.38, 12.92.

***N,N*-Diethyl-2-mesitylacetamide.** (Table 2, Entry 5; Table 5, Entry 17) Purified by chromatography on silica gel (hexane/ethyl acetate=80/20). ¹H NMR (400 MHz, CDCl₃): δ 6.84 (2H, s), 3.61 (2H, s), 3.44 (2H, q, *J* = 7.2 Hz), 3.39 (2H, q, *J* = 7.1 Hz), 2.24 (3H, s), 2.21 (6H, s), 1.24 (3H, t, *J* = 7.1 Hz), 1.12 (3H, t, *J* = 7.1 Hz). ¹³C NMR (400 MHz, CDCl₃): δ 169.49, 136.77, 135.96, 130.48, 128.88, 42.23, 40.65, 33.78, 21.03, 20.41, 14.51, 13.30; Anal. Calc'd for C₁₅H₂₃NO: C, 77.21; H, 9.93; N, 6.00. Found C, 76.89; H, 9.93; N, 6.13.

***N,N*-Diethyl-2-(2-fluorophenyl)acetamide.** (Table 2, Entry 6; Table 5, Entry 16) Purified by chromatography on silica gel (hexane / ethyl acetate = 90 / 10). ¹H NMR (400 MHz, CDCl₃): δ 7.33-7.27 (1H, m), 7.26-7.20 (1H, m), 7.12-7.01 (2H, m), 3.70 (2H, s), 3.40 (2H, q, *J* = 7.2 Hz), 3.34 (2H, q, *J* = 7.2 Hz), 1.15 (3H, t, *J* = 7.6 Hz), 1.13 (3H, t, *J* = 7.2 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 169.35, 160.78 (d, 122.1 Hz), 131.13 (d, 1.7 Hz), 128.66 (d, 4.2 Hz), 124.33 (d, 1.4 Hz), 122.90 (7.6 Hz), 115.32 (d, 10.9 Hz), 42.46, 40.49, 33.41 (d, 0.95 Hz), 14.35, 13.10.

2-(4-(Dimethylamino)phenyl)-*N,N*-diethylpropanamide. (Table 2, Entry 7) Purified by chromatography on silica gel (hexane / ethyl acetate = 92.5 / 7.5). ¹H NMR (400 MHz, CDCl₃): δ 7.14 (2H, d, *J* = 8.4 Hz), 6.69 (2H, d, *J* = 8.8 Hz), 3.73 (1H, q, *J* = 6.8 Hz), 3.51 (1H, dq, *J* = 13.6 Hz, 6.4 Hz), 3.36 (1H, dq, *J* = 14.4 Hz, 7.2 Hz), 3.21 (1H, dq, *J* = 13.2 Hz, 6.8 Hz), 3.09 (1H, dq, *J* = 14.8 Hz, 7.6 Hz), 2.92 (6H, s), 1.39 (3H, d, *J* = 6.8 Hz), 1.08 (3H, t, *J* = 7.2 Hz), 1.01 (3H, t, *J* = 7.2 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 173.54, 149.53, 130.61, 128.08, 113.13, 42.29, 41.74, 40.88, 40.39, 21.26, 14.49, 13.07.

Methyl 4-(1-(diethylcarbamoyl)ethyl)benzoate. (Table 2, Entry 8) Purified by chromatography on silica gel (hexane / ethyl acetate = 90 / 10). ¹H NMR (400 MHz, CDCl₃): δ 7.99 (2H, d, *J* = 8.4 Hz), 7.36 (2H, d, *J* = 8.4 Hz), 3.91 (3H, s), 3.89 (1H, q, *J* = 6.8 Hz), 3.51 (1H, dq, *J* = 13.6 Hz, 6.4 Hz), 3.3-3.19 (2H, m), 3.11 (1H, dq, *J* = 14.8 Hz, 7.6 Hz), 1.45 (3H, d, *J* = 7.2 Hz), 1.09 (3H, t, *J* = 6.8 Hz), 0.99 (3H, t, *J* = 7.2 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 172.23, 167.12, 147.88, 130.36, 128.87, 127.57, 52.29, 43.32, 41.85, 40.56, 20.95, 14.47, 12.99.

2-(4-*tert*-Butylphenyl)-*N,N*,2-trimethylpropanamide. (Table 3, Entry 1) Purified by chromatography on silica gel (hexane / ethyl acetate = 90 / 10). ¹H NMR (400 MHz, C₆D₆): δ 7.23 (2H, d, *J*=8.5 Hz), 7.14 (2H, d, *J*=8.6 Hz), 2.44 (6H, broad), 1.57 (6H, s), 1.22 (9H, s). ¹³C NMR (100 MHz, C₆D₆): δ 175.68, 149.19, 144.70, 126.32, 125.21, 47.05, 37.71, 34.68, 31.80, 28.96.

2-(4-(Trifluoromethyl)phenyl)-*N,N*,2-trimethylpropanamide. (Table 3, Entry 2) Purified by chromatography on silica gel (dichloromethane / methanol / triethylamine = 99 / 0.5 / 0.5). ¹H NMR (400 MHz, CDCl₃): δ 7.60 (2H, d, *J*=8.2 Hz), 7.35 (2H, d, *J*=8.2 Hz), 2.96 (3H, br s), 2.49 (3H, br s), 1.56 (6H, s). ¹³C NMR (100 MHz, CDCl₃): δ 175.40, 150.83, 128.77 (q, 32.4 Hz), 126.07 (q, 3.7 Hz), 125.33, 124.27 (q, 270.5 Hz), 47.26, 38.39 (broad), 37.30 (broad), 28.28; Anal. Calc'd for C₁₃H₁₆F₃NO: C, 60.22; H, 6.22; N, 5.40. Found: C, 60.18; H, 6.14; N, 5.31.

2-(4-Chlorophenyl)-*N,N*,2-trimethylpropanamide. (Table 3, Entry 3) Purified by chromatography on silica gel (dichloromethane / methanol / triethylamine = 99 / 0.5 / 0.5). ¹H NMR (400 MHz, C₆D₆): δ 7.05 (2H, d, *J*=8.7 Hz), 6.81 (2H, d, *J*=8.6 Hz), 2.19 (6H, broad), 1.39 (6H, s). ¹³C NMR (400 MHz, C₆D₆): δ 174.90, 146.15, 132.47, 129.54, 126.94, 46.97, 37.59, 28.72; Anal. Calc'd for C₁₂H₁₆ClNO: C, 63.85; H, 7.14; N, 6.21. Found C, 64.05; H, 7.31; N, 5.93.

2-(4-Methoxyphenyl)-*N,N*,2-trimethylpropanamide. (Table 3, Entry 4) Purified by chromatography on silica gel (dichloromethane / methanol / triethylamine = 99 / 0.5 / 0.5). ¹H NMR (400 MHz, C₆D₆): δ 7.04 (2H, d, *J*=8.8 Hz), 6.74 (2H, d, *J*=8.8 Hz), 3.31 (3H, s), 2.42 (6H, broad), 1.54 (6H, s). ¹³C NMR (100 MHz, C₆D₆): δ 175.78, 158.79, 139.67, 126.49, 114.88, 55.10, 46.79, 37.70, 29.07; Anal. Calc'd for C₁₃H₁₉NO₂: C, 70.56; H, 8.65; N, 6.33. Found C, 70.19; H, 8.45; N, 6.07.

2-(4-(Dimethylamino)phenyl)-*N,N*,2-trimethylpropanamide. (Table 3, Entry 5) Purified by chromatography on silica gel (dichloromethane / methanol / triethylamine = 99 / 0.5 / 0.5). ¹H NMR (400 MHz, C₆D₆): δ 7.13 (2H, d, *J*=8.8 Hz), 6.57 (2H, d, *J*=8.8 Hz), 2.57 (6H, br), 2.52 (6H, s), 1.62 (6H, s). ¹³C NMR (100 MHz, C₆D₆): δ 176.24, 149.59, 135.59, 126.10, 113.74, 46.63, 40.65, 37.84, 29.10; Anal. Calc'd for C₁₄H₂₂N₂O: C, 71.76; H, 9.46; N, 11.95. Found C, 71.46; H, 9.60; N, 11.65.

2-(4-Benzoylphenyl)-*N,N*,2-trimethylpropanamide. (Table 3, Entry 6) Purified by chromatography on silica gel (dichloromethane / methanol / triethylamine = 99 / 0.5 / 0.5). ¹H NMR (400 MHz, C₆D₆): δ 7.73 (4H, m), 7.13 (1H, m), 7.05 (4H, m), 2.07 (6H, broad), 1.47 (6H, s). ¹³C NMR (100 MHz, C₆D₆): δ 195.53, 175.04, 151.96, 138.63, 136.41, 132.52, 131.41, 130.49, 128.76, 125.33, 47.61, 37.75, 28.65; Anal. Calc'd for C₁₉H₂₁NO₂: C, 77.26; H, 7.17; N, 4.74. Found C, 77.04; H, 6.97; N, 4.71.

2-(3-Fluorophenyl)-*N,N*,2-trimethylpropanamide. (Table 3, Entry 7) Purified by chromatography on silica gel (hexane / ethyl acetate = 88 / 12). ¹H NMR (400 MHz, CDCl₃): δ 7.30 (1H, br), 6.99 (1H, br), 6.92 (2H, m), 2.95 (3H, br s), 2.52 (3H, br s), 1.53 (6H, s). ¹³C NMR

(100 MHz, CDCl₃): δ 175.63, 163.38 (d, 244.7 Hz), 149.44 (d, 6.7 Hz), 130.59 (d, 8.2 Hz), 120.75 (d, 2.8 Hz), 113.33 (d, 20.8 Hz), 111.98 (d, 22.0 Hz), 47.08, 38.34, 37.33, 28.25.

***N,N*,2-trimethyl-2-(pyridin-2-yl)propanamide.** (Table 3, Entry 8) Purified by chromatography on silica gel (dichloromethane / methanol / triethylamine = 99 / 0.5 / 0.5). ¹H NMR (400 MHz, C₆D₆): δ 8.41 (1H, d, *J*=4.8 Hz), 6.98 (1H, td, *J*=7.7 Hz, 1.8 Hz), 6.89 (1H, broad), 6.55 (1H, ddd, *J*=7.3 Hz, 4.9 Hz, 1.0 Hz), 2.39 (6H, broad), 1.72 (6H, s). ¹³C NMR (100 MHz, C₆D₆): δ 175.03, 166.18, 149.57, 136.76, 121.38, 120.79, 50.26, 37.43, 27.89.

***N,N*-Dimethyl-2-thiophen-3-yl-isobutyramide.** (Table 3, Entry 9) Purified by chromatography on silica gel (hexane / ethyl acetate = 95 / 5). ¹H NMR (400 MHz, CDCl₃): δ 7.30 (1H, dd, *J*=5.2 Hz, 3.2 Hz), 6.99 (1H, dd, *J*=3.2 Hz, 1.6 Hz), 6.90 (1H, dd, *J*=4.8 Hz, 1.2 Hz), 2.91-2.62 (6H, broad), 1.55 (6H, s). ¹³C NMR (100 MHz, CDCl₃): δ 175.80, 148.29, 126.62, 126.21, 117.99, 44.70, 37.78 (broad), 28.41.

2-(4-Chlorophenyl)-*N,N*-diethylacetamide. (Table 5, Entry 2) Purified by chromatography on silica gel (dichloromethane / methanol = 95 / 5). ¹H NMR (400 MHz, CDCl₃): δ 7.28 (2H, d, *J*=8.3 Hz), 7.19 (2H, d, *J*=8.4 Hz), 3.65 (2H, s), 3.39 (2H, q, *J*=7.1 Hz), 3.30 (2H, q, *J*=7.1 Hz), 1.12 (6H, t, *J*=7.1 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 169.80, 134.17, 132.73, 130.35, 128.87, 42.52, 40.43, 40.17, 14.48, 13.11; Anal. Calc'd for C₁₂H₁₆ClNO: C, 63.85; H, 7.14; N, 6.21. Found: C, 64.13; H, 6.88; N, 6.07.

2-(2-Methoxyphenyl)-*N,N*-dimethylacetamide.⁸ (Table 5, Entry 4) Purified by chromatography on silica gel (hexane / ethyl acetate = 70 / 30). ¹H NMR (400 MHz, CDCl₃): δ 7.27-7.20 (2H, m), 6.93-6.85 (2H, m), 3.82 (3H, s), 3.69 (2H, s), 3.00 (3H, s), 2.97 (3H, s). ¹³C NMR (100 MHz, CDCl₃): δ 171.66, 156.93, 130.12, 128.13, 124.00, 120.81, 110.42, 55.53, 37.66, 35.69, 34.65.

***N,N*-Dimethyl-2-thiophen-3-yl-isobutyramide.** (Table 3, Entry 9) Purified by chromatography on silica gel (hexane / ethyl acetate = 95 / 5). ¹H NMR (400 MHz, CDCl₃): δ 7.30 (1H, dd, *J*=5.2 Hz, 3.2 Hz), 6.99 (1H, dd, *J*=3.2 Hz, 1.6 Hz), 6.90 (1H, dd, *J*=4.8 Hz, 1.2 Hz), 2.91-2.62 (6H, broad), 1.55 (6H, s). ¹³C NMR (100 MHz, CDCl₃): δ 175.80, 148.29, 126.62, 126.21, 117.99, 44.70, 37.78 (broad), 28.41.

Methyl 4-((dimethylcarbamoyl)methyl)benzoate. (Table 5, Entry 7) Purified by chromatography on silica gel (hexane / ethyl acetate = 60 / 40). ¹H NMR (400 MHz, CDCl₃): δ 7.99 (2H, d, *J*=8.3 Hz), 7.33 (2H, d, *J*=8.2 Hz), 3.90 (3H, s), 3.77 (2H, s), 3.00 (3H, s), 2.97 (3H, s). ¹³C NMR (100 MHz, CDCl₃): δ 170.35, 167.03, 140.55, 130.03, 129.07, 128.81, 52.20, 40.99, 37.82, 35.78.

2-(2-Cyanophenyl)-*N,N*-diethylacetamide. (Table 5, Entry 9) Purified by chromatography on silica gel (hexane / ethyl acetate = 50 / 50). ¹H NMR (400 MHz, CDCl₃): δ 7.64 (1H, d, *J*=7.7 Hz), 7.56 (1H, t, *J*=7.5 Hz), 7.47 (1H, d, *J*=7.7 Hz), 7.36 (1H, t, *J*=7.6 Hz), 3.91 (2H, s), 3.42 (4H, m), 1.24 (3H, t, *J*=7.1 Hz), 1.15 (3H, t, *J*=7.1 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 168.27, 139.86, 133.01, 132.79, 130.86, 127.53, 118.14, 113.27, 42.69, 40.89, 38.69, 14.55, 13.20.

2-(4-Cyanophenyl)-*N,N*-dimethylacetamide.⁹ (Table 5, Entry 10) Purified by chromatography on silica gel (hexane / ethyl acetate = 45 / 55). ¹H NMR (400 MHz, CDCl₃): δ 7.61 (2H, d, *J* = 8.2 Hz), 7.42 (2H, d, *J* = 8.2 Hz), 3.98 (2H, s), 3.06 (3H, s), 3.05 (3H, s). ¹³C NMR (100 MHz, CDCl₃): δ 172.40, 139.57, 132.73, 130.02, 118.75, 111.18, 40.80, 38.52, 36.98.

2-(4-Benzoylphenyl)-*N,N*-diethylacetamide. (Table 5, Entry 12) Purified by chromatography on silica gel (dichloromethane / methanol / triethylamine = 98 / 1 / 1). ¹H NMR (400 MHz, CDCl₃): δ 7.78 (2H, d, *J*=7.6 Hz), 7.76 (2H, d, *J*=7.6 Hz), 7.58 (1H, t, *J*=7.4 Hz), 7.47 (2H, t, *J*=7.6 Hz), 7.41 (2H, d, *J*=7.6 Hz), 3.90 (2H, s), 3.42 (2H, q, *J*=7.2 Hz), 3.34 (2H, q, *J*=7.2 Hz), 1.15 (3H, t, *J*=7.2 Hz), 1.12 (3H, t, *J*=6.8 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 196.34, 170.58, 139.92, 137.53, 136.13, 132.46, 130.52, 129.99, 128.81, 128.31, 42.84, 40.84, 40.61, 14.13, 12.88.

2-(4-Acetylphenyl)-*N,N*-diethylacetamide. (Table 5, Entry 13) Purified by chromatography on silica gel (dichloromethane / methanol / triethylamine = 98 / 1 / 1). ¹H NMR (400 MHz, CDCl₃): δ 7.92 (2H, d, *J*=8.4 Hz), 7.37 (2H, d, *J*=8.0 Hz), 3.75 (2H, s), 3.40 (2H, q, *J*=7.6 Hz), 3.31 (2H, q, *J*=6.8 Hz), 2.59 (3H, s), 1.13 (6H, t, *J*=7.2 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 197.93, 169.40, 141.25, 135.82, 129.23, 128.81, 42.54, 40.80, 40.43, 26.76, 14.44, 13.06; Anal. Calc'd for C₁₄H₁₉NO₂: C, 72.07; H, 8.21; N, 6.00. Found C, 71.71; H, 8.60; N, 6.33.

2-(4-(Dimethylamino)phenyl)-*N,N*-diethylacetamide. (Table 5, Entry 15) Purified by chromatography on silica gel (dichloromethane / methanol / triethylamine = 98 / 1 / 1). ¹H NMR (400 MHz, C₆D₆): δ 7.26 (2H, d, *J*=8.6 Hz), 6.59 (2H, d, *J*=8.7 Hz), 3.54 (2H, s), 3.23 (2H, q, *J*=7.1 Hz), 2.84 (2H, q, *J*=7.1 Hz), 2.50 (6H, s), 0.99 (3H, t, *J*=7.1 Hz), 0.65 (3H, t, *J*=7.1 Hz). ¹³C NMR (100 MHz, C₆D₆): δ 170.42, 150.13, 129.95, 124.52, 113.61, 42.48, 40.93, 40.71, 40.40, 14.63, 13.60; Anal. Calc'd for C₁₄H₂₂N₂O: C, 71.76; H, 9.46; N, 11.95. Found C, 71.60; H, 9.72; N, 12.28.

2-Mesityl-*N,N*-dimethylacetamide. (Table 5, Entry 18) Purified by chromatography on silica gel (hexane / ethyl acetate = 82 / 18). ¹H NMR (400 MHz, CDCl₃): δ 6.84 (2H, s), 3.61 (2H, s), 3.13 (3H, s), 2.98 (3H, s), 2.24 (3H, s), 2.21 (6H, s). ¹³C NMR (100 MHz, CDCl₃): δ 170.57, 136.76, 136.06, 130.26, 128.90, 37.39, 35.80, 33.79, 21.04, 20.35.

***N,N*-Diethyl-2-(pyridin-3-yl)acetamide.** (Table 5, Entry 19) Purified by chromatography on silica gel (dichloromethane / methanol / triethylamine = 98 / 1 / 1). ¹H NMR (400 MHz, C₆D₆): δ 8.55 (1H, s), 8.45 (1H, broad d, *J*=3 Hz), 7.48 (1H, d, *J*=7.8 Hz), 6.74 (1H, broad dd, *J*=7.6 Hz, 4 Hz), 3.18 (2H, s), 3.12 (2H, q, *J*=7.1 Hz), 2.61 (2H, q, *J*=7.1 Hz), 0.90 (3H, t, *J*=7.1 Hz), 0.56 (3H, t, *J*=7.1 Hz). ¹³C NMR (100 MHz, C₆D₆): δ 168.69, 151.03, 148.78, 136.83, 132.22, 123.69, 42.34, 40.65, 37.78, 14.64, 13.50.

***N,N*-Diethyl-2-thiophen-3-yl-acetamide.** (Table 5, Entry 20) Purified by chromatography on silica gel (hexane / ethyl acetate = 90 / 10). ¹H NMR (400 MHz, CDCl₃): δ 7.30 (1H, dd, *J*=4.8 Hz, 2.8 Hz), 7.10-7.09 (1H, m), 7.05 (1H, dd, *J*=5.2 Hz, 1.6 Hz), 3.72 (2H, s), 3.41 (2H, q, *J*=6.8 Hz), 3.33 (2H, q, *J*=7.2 Hz), 1.15 (3H, t, *J*=6.8 Hz), 1.13 (3H, t, *J*=6.8 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 169.99, 135.49, 128.47, 125.93, 121.95, 42.64, 40.39, 35.89, 14.47, 13.15.

***N,N*-Diethyl-2-(2-methoxynaphthalen-6-yl)acetamide.** (Table 5, Entry 21) Purified by chromatography on silica gel (dichloromethane / methanol / triethylamine = 98 / 1 / 1). ¹H NMR (400 MHz, CDCl₃): δ 7.68 (2H, t, *J*=8.2 Hz), 7.60 (1H, s), 7.37 (1H, dd, *J*=8.0 Hz, 1.8 Hz), 7.12 (2H, m), 3.88 (3H, s), 3.80 (2H, s), 3.39 (2H, q, *J*=6.8 Hz), 3.29 (2H, q, *J*=7.2 Hz), 1.12 (3H, t, *J*=7.2 Hz), 1.06 (3H, t, *J*=7.2 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 170.29, 157.51, 133.45, 130.74, 129.14, 129.08, 127.63, 127.17, 126.96, 118.93, 105.64, 55.33, 42.40, 40.98, 40.18, 14.31, 13.04.

***N,N*-Diethyl-2-(4-hydroxyphenyl)acetamide.** (Table 5, Entry 22) Purified by chromatography on silica gel (hexane / ethyl acetate = 30 / 70). ¹H NMR (400 MHz, CDCl₃): δ 8.25 (1H, broad), 6.99 (2H, d, *J*=8.4 Hz), 6.70 (2H, d, *J*=8.5 Hz), 3.61 (2H, s), 3.40 (2H, q, *J*=7.1 Hz), 3.33 (2H, q, *J*=7.1 Hz), 1.13 (3H, t, *J*=7.2 Hz), 1.11 (3H, t, *J*=7.3 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 171.81, 155.86, 129.80, 125.94, 116.09, 42.75, 40.74, 39.94, 14.33, 13.09.

2-(4-Aminophenyl)-*N,N*-diethylacetamide. (Table 5, Entry 23) Purified by chromatography on silica gel (hexane / ethyl acetate = 30 / 70). ¹H NMR (400 MHz, CDCl₃): δ 7.05 (2H, d, *J*=8.4 Hz), 6.69 (2H, d, *J*=8.4 Hz), 3.58 (2H, s), 3.37 (2H, q, *J*=7.1 Hz), 3.33 (2H, broad), 3.29 (2H, q, *J*=7.1 Hz), 1.11 (3H, t, *J*=7.1 Hz), 1.08 (3H, t, *J*=7.1 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 170.88, 144.28, 129.71, 126.16, 116.10, 42.47, 40.32, 40.28, 14.42, 13.14.

***N,N*-Diethyl-3-methylbut-3-enamide.** (Table 5, Entry 24) Purified by chromatography on silica gel (pentane / diethyl ether = 89 / 11). ¹H NMR (400 MHz, CDCl₃): δ 4.90 (1H, s), 4.77 (1H, s), 3.38 (2H, q, *J*=7.2 Hz), 3.30 (2H, q, *J*=7.2 Hz), 3.07 (2H, s), 1.80 (3H, s), 1.17 (3H, t, *J*=7.2 Hz), 1.13 (3H, t, *J*=7.2 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 170.04, 140.30, 113.14, 43.33, 42.41, 40.12, 22.92, 14.48, 13.14.

2-(4-Chlorophenyl)-*N,N*-diethylpropanamide. (Table 6, Entry 2) Purified by chromatography on silica gel (hexane / ethyl acetate = 80 / 20). ¹H NMR (400 MHz, CDCl₃): δ 7.28 (2H, d, *J*=7.6 Hz), 7.22 (2H, d, *J*=8.4 Hz), 3.81 (1H, q, *J*=6.9 Hz), 3.50 (1H, dq, *J*=13.6 Hz, 6.8 Hz), 3.27 (2H, m, *J*=7.2 Hz), 3.12 (1H, dq, *J*=14.4 Hz, 7.2 Hz), 1.43 (3H, d, *J*=6.9 Hz), 1.08 (3H, t, *J*=7.1 Hz), 1.02 (3H, t, *J*=7.1 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 172.53, 141.08, 132.66, 129.09, 128.87, 42.53, 41.83, 40.52, 21.09, 14.54, 13.00.

***N,N*-Diethyl-2-*o*-tolylpropanamide.** (Table 6, Entry 3) Purified by chromatography on silica gel (hexane / ethyl acetate = 80 / 20). ¹H NMR (400 MHz, CDCl₃): δ 7.14 (4H, m), 3.90 (1H, q, *J*=6.8 Hz), 3.56 (1H, dq, *J*=13.6, 6.8 Hz), 3.19 (1H, dq, *J*=13.6, 6.8 Hz), 3.08 (1H, dq, *J*=14.4, 7.2 Hz), 2.93 (1H, dq, *J*=14.4, 7.2 Hz), 2.37 (3H, s), 1.36 (3H, d, *J*=6.8 Hz), 1.09 (3H, t, *J*=7.1 Hz), 0.92 (3H, t, *J*=7.1 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 173.32, 141.11, 134.33, 130.69, 127.01, 126.83, 126.56, 41.45, 40.29, 39.79, 19.39, 19.33, 13.98, 12.87.

***N,N*-Diethyl-2-(2-methoxyphenyl)propanamide.** (Table 6, Entry 4) Purified by chromatography on silica gel (hexane / ethyl acetate = 80 / 20). ¹H NMR (400 MHz, C₆D₆): δ 7.62 (1H, dd, *J*=7.6 Hz, 1.6 Hz), 7.02 (1H, dt, *J*=7.8 Hz, 1.6 Hz), 6.84 (1H, t, *J*=7.5 Hz), 6.53 (1H, d, *J*=8.2 Hz), 4.40 (1H, q, *J*=6.8 Hz), 3.39 (1H, dq, *J*=13.6 Hz, 6.8 Hz), 3.25 (3H, s), 3.09 (1H, dq, *J*=13.6 Hz, 6.8 Hz), 3.00 (1H, dq, *J*=14.4, 7.2 Hz), 2.74 (1H, dq, *J*=14.4 Hz, 7.2 Hz),

1.63 (3H, d, $J=6.8$ Hz), 0.98 (3H, t, $J=7.1$ Hz), 0.62 (3H, t, $J=7.1$ Hz). ^{13}C NMR (100 MHz, C_6D_6): δ 173.20, 156.37, 132.00, 128.58, 128.23, 121.96, 110.99, 55.40, 41.60, 40.54, 35.80, 20.28, 14.47, 13.45.

***N,N*-Diethyl-2-(2-fluorophenyl)propanamide.** (Table 6, Entry 5) Purified by chromatography on silica gel (hexane / ethyl acetate = 90 / 10). ^1H NMR (400 MHz, CDCl_3): δ 7.39-7.35 (1H, m), 7.24-7.18 (1H, m), 7.12-7.08 (1H, m), 7.05-7.01 (1H, m), 4.22 (1H, q, $J=6.8$ Hz), 3.48 (1H, dq, $J=13.6$ Hz, 6.7 Hz), 3.33-3.22 (2H, m), 3.15 (1H, dq, $J=14.7$ Hz, 7.2 Hz), 1.43 (3H, d, $J=6.8$ Hz), 1.09 (3H, t, $J=7.1$ Hz), 1.00 (3H, t, $J=7.1$ Hz). ^{13}C NMR (100 MHz, CDCl_3): δ 172.51, 159.25 (d, 242.6 Hz), 129.26 (d, 14.8 Hz), 128.76 (d, 3.8 Hz), 128.47 (d, 8.3 Hz), 124.81 (d, 3.2 Hz), 115.35 (d, 22.4 Hz), 41.75, 40.49, 34.69, 19.52, 14.26, 12.97.

2-(4-Cyanophenyl)-*N,N*-diethylpropanamide. (Table 6, Entry 6) Purified by chromatography on silica gel (hexane / ethyl acetate = 60 / 40). ^1H NMR (400 MHz, CDCl_3): δ 7.61 (2H, d, $J=8.3$ Hz), 7.44 (2H, d, $J=8.3$ Hz), 3.93 (1H, q, $J=6.9$ Hz), 3.48 (1H, dq, $J=13.6$ Hz, 6.9 Hz), 3.22 (3H, m), 1.46 (3H, d, $J=6.9$ Hz), 1.10 (3H, t, $J=7.1$ Hz), 1.06 (3H, t, $J=7.1$ Hz). ^{13}C NMR (100 MHz, CDCl_3): δ 171.69, 147.83, 132.64, 128.34, 118.85, 110.76, 42.94, 41.88, 40.59, 20.70, 14.52, 12.89.

***N,N*-Diethyl-2-(2-methoxynaphthalen-6-yl)propanamide.** (Table 6, Entry 8) Purified by chromatography on silica gel (hexane / ethyl acetate = 80 / 20). ^1H NMR (400 MHz, CDCl_3): δ 7.69 (2H, dd, $J=8.6$ Hz, 4.8 Hz), 7.62 (1H, s), 7.40 (1H, dd, $J=8.5$ Hz, 1.7 Hz), 7.12 (2H, m), 3.95 (1H, q, $J=6.8$ Hz), 3.89 (3H, s), 3.53 (1H, dq, $J=13.6$ Hz, 6.9 Hz), 3.36 (1H, dq, $J=14.4$ Hz, 7.2 Hz), 3.23 (1H, dq, $J=13.6$ Hz, 6.9 Hz), 3.09 (1H, dq, $J=14.4$ Hz, 7.2 Hz), 1.50 (3H, d, $J=6.8$ Hz), 1.09 (3H, t, $J=7.1$ Hz), 0.98 (3H, t, $J=7.1$ Hz). ^{13}C NMR (100 MHz, CDCl_3): δ 172.97, 157.66, 137.80, 133.57, 129.31, 129.25, 127.51, 126.37, 125.63, 119.06, 105.74, 55.44, 43.19, 41.75, 40.40, 21.16, 14.41, 12.99; Anal. Calc'd for $\text{C}_{18}\text{H}_{23}\text{NO}_2$: C, 75.76; H, 8.12; N, 4.91. Found C, 75.47; H, 7.95; N, 4.70.

***N,N*-Diethyl-2-(4-methoxyphenyl)propanamide.** (Table 6, Entry 9) Purified by chromatography on silica gel (hexane / ethyl acetate = 92.5 / 7.5). ^1H NMR (400 MHz, CDCl_3): δ 7.19 (2H, d, $J=8.4$ Hz), 6.84 (2H, d, $J=8.8$ Hz), 3.79 (3H, s), 3.38 (1H, q, $J=6.8$ Hz), 3.50 (1H, dq, $J=13.2$ Hz, 6.4 Hz), 3.33 (1H, dq, $J=14.4$ Hz, 7.6 Hz), 3.23 (1H, dq, $J=14.0$ Hz, 6.8 Hz), 3.11 (1H, dq, $J=15.2$ Hz, 8.0 Hz), 1.41 (3H, d, $J=6.8$ Hz), 1.08 (3H, t, $J=7.2$ Hz), 1.00 (3H, t, $J=6.8$ Hz). ^{13}C NMR (100 MHz, CDCl_3): δ 173.23, 158.49, 134.78, 128.46, 114.31, 55.45, 42.39, 41.79, 40.44, 21.28, 14.49, 13.05.

***N,N*-Diethyl-2-(4-methylsulfanyl-phenyl)-propionamide.** (Table 6, Entry 10) Purified by chromatography on silica gel (hexane / ethyl acetate = 95 / 5). ^1H NMR (400 MHz, CDCl_3): δ 7.20 (4H, broad), 3.79 (1H, q, $J=6.8$ Hz), 3.50 (1H, dq, $J=14.0$ Hz, 7.2 Hz), 3.31 (1H, dq, $J=14.8$ Hz, 7.2 Hz), 3.22 (1H, dq, $J=13.6$ Hz, 7.2 Hz), 3.11 (1H, dq, $J=14.4$ Hz, 6.8 Hz), 2.46 (3H, s), 1.41 (3H, d, $J=6.4$ Hz), 1.08 (3H, t, $J=7.0$ Hz), 1.01 (3H, t, $J=7.0$ Hz). ^{13}C NMR (100 MHz, CDCl_3): δ 172.71, 139.43, 136.63, 127.87, 127.12, 42.57, 41.72, 40.37, 21.02, 16.01, 14.41, 12.93.

***N,N*-Diethyl-2-(pyridin-3-yl)propanamide.** (Table 6, Entry 11) Purified by chromatography on silica gel (hexane / ethyl acetate = 95 / 5). ¹H NMR (400 MHz, CDCl₃): δ 8.51 (2H, broad), 7.75 (1H, d, *J*=7.9 Hz), 7.28 (1H, m), 3.90 (1H, q, *J*=6.9 Hz), 3.49 (1H, dq, *J*=13.6 Hz, 6.9 Hz), 3.25 (3H, m), 1.47 (3H, d, *J*=6.9 Hz), 1.09 (3H, t, *J*=7.1 Hz), 1.08 (3H, t, *J*=7.1 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 172.11, 148.88, 148.16, 138.23, 135.42, 124.12, 42.05, 40.75, 40.28, 20.92, 14.76, 13.06.

***N,N*-Diethyl-2-thiophen-3-yl-propionamide.** (Table 6, Entry 12) Purified by chromatography on silica gel (hexane / ethyl acetate = 95 / 5). ¹H NMR (400 MHz, CDCl₃): δ 7.26 (1H, dd, *J*=4.4 Hz, 1.6 Hz), 7.06 (1H, m), 7.03 (1H, dd, *J*=5.2 Hz, 1.6 Hz), 3.98 (1H, q, *J*=6.8 Hz), 3.50 (1H, dq, *J*=13.2 Hz, 7.2 Hz), 3.35 (1H, dq, *J*=14.8 Hz, 7.2 Hz), 3.27 (1H, dq, *J*=14.0 Hz, 7.2 Hz), 3.19 (1H, dq, *J*=14.4 Hz, 7.2 Hz), 1.44 (3H, d, *J*=6.8 Hz), 1.11 (3H, t, *J*=7.0 Hz), 1.06 (3H, t, *J*=7.2 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 172.92, 142.73, 127.22, 125.99, 120.72, 42.02, 40.58, 38.32, 20.40, 14.65, 13.08.

***N,N*-Diethyl-2-(4-hydroxyphenyl)propanamide.** (Table 6, Entry 13) Purified by chromatography on silica gel (hexane / ethyl acetate = 75 / 25). ¹H NMR (400 MHz, CDCl₃): δ 7.86 (1H, broad), 7.09 (2H, d, *J*=8.5 Hz), 6.84 (2H, d, *J*=8.5 Hz), 3.79 (1H, q, *J*=6.8 Hz), 3.48 (1H, dq, *J*=14.0 Hz, 7.1 Hz), 3.36 (1H, dq, *J*=14.0 Hz, 7.1 Hz), 3.25 (1H, dq, *J*=13.6 Hz, 6.9 Hz), 3.14 (1H, dq, *J*=14.4 Hz, 7.2 Hz), 1.41 (3H, d, *J*=6.9 Hz), 1.09 (3H, t, *J*=7.1 Hz), 1.01 (3H, t, *J*=7.1 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 174.15, 155.83, 133.19, 128.36, 116.07, 42.36, 42.07, 40.79, 20.99, 14.32, 12.93.

2-(4-Aminophenyl)-*N,N*-diethylpropanamide. (Table 6, Entry 14) Purified by chromatography on silica gel (hexane / ethyl acetate = 75 / 25). ¹H NMR (400 MHz, CDCl₃): δ 7.05 (2H, d, *J*=8.3 Hz), 6.64 (2H, d, *J*=8.4 Hz), 3.71 (1H, q, *J*=6.8 Hz), 3.49 (3H, broad), 3.33 (1H, dq, *J*=14.4 Hz, 7.2 Hz), 3.21 (1H, dq, *J*=13.6 Hz, 6.9 Hz), 3.10 (1H, dq, *J*=14.0 Hz, 7.1 Hz), 1.38 (3H, d, *J*=6.8 Hz), 1.07 (3H, t, *J*=7.1 Hz), 1.00 (3H, t, *J*=7.1 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 173.42, 144.99, 132.79, 128.29, 115.73, 42.40, 41.73, 40.37, 21.22, 14.43, 13.00.

2,3-Dimethyl-but-3-enoic acid diethylamide. (Table 6, Entry 15) Purified by chromatography on silica gel (Pentane / diethyl ether = 97 / 3). ¹H NMR (400 MHz, CDCl₃): δ 4.84 (1H, s), 4.81 (1H, s), 3.57 (1H, dq, *J*=14.4 Hz, 7.2 Hz), 3.42 (1H, dq, *J*=14.4 Hz, 7.2 Hz), 3.27 (1H, q, *J*=6.8 Hz), 3.17 (2H, m), 1.74 (3H, br s), 1.26 (3H, d, *J*=6.8 Hz), 1.16 (3H, t, *J*=7.2 Hz), 1.11 (3H, t, *J*=7.2 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 172.83, 145.78, 112.04, 44.37, 41.79, 40.38, 20.49, 17.26, 14.61, 13.03.

2-(4-*tert*-Butylphenyl)-*N,N*-diethylpentanamide. (Table 7, Entry 1) Purified by chromatography on silica gel (hexane / ethyl acetate = 90 / 10). ¹H NMR (400 MHz, CDCl₃): δ 7.30 (2H, d, *J*=8.3 Hz), 7.22 (2H, d, *J*=8.3 Hz), 3.63 (1H, t, *J*=7.3 Hz), 3.34 (3H, m), 3.15 (1H, dq, *J*=14.4 Hz, 7.2 Hz), 2.06 (1H, m), 1.66 (1H, m), 1.29 (11H, s), 1.08 (3H, t, *J*=7.1 Hz), 1.04 (3H, t, *J*=7.1 Hz), 0.90 (3H, t, *J*=7.4 Hz). ¹³C NMR (100 MHz, CDCl₃): δ 172.60, 149.43, 137.89, 127.48, 125.51, 48.18, 41.88, 40.57, 37.82, 34.46, 31.46, 21.26, 14.61, 14.20, 13.09.

***N,N*-Diethyl-2-(4-methoxyphenyl)pentanamide.** (Table 7, Entry 2) Purified by chromatography on silica gel (hexane / ethyl acetate = 80 / 20). ¹H NMR (400 MHz, CDCl₃): δ

7.22 (2H, d, $J=8.7$ Hz), 6.83 (2H, d, $J=8.7$ Hz), 3.78 (3H, s), 3.60 (1H, t, $J=7.3$ Hz), 3.40 (2H, m), 3.27 (1H, dq, $J=13.6$ Hz, 6.8 Hz), 3.14 (1H, dq, $J=14.4$ Hz, 7.2 Hz), 2.03 (1H, m), 1.64 (1H, m), 1.24 (2H, m), 1.06 (3H, t, $J=7.2$ Hz), 1.04 (3H, t, $J=7.1$ Hz), 0.89 (3H, t, $J=7.3$ Hz). ^{13}C NMR (100 MHz, CDCl_3): δ 172.77, 158.51, 133.27, 129.01, 114.13, 55.42, 47.89, 41.85, 40.59, 37.91, 21.25, 14.75, 14.29, 13.13.

***N,N*-Diethyl-2-(2-methoxyphenyl)pentanamide.** (Table 7, Entry 3) Purified by chromatography on silica gel (hexane / ethyl acetate = 80 / 20). ^1H NMR (400 MHz, CDCl_3): δ 7.37 (1H, dd, $J=7.6$ Hz, 1.6 Hz), 7.19 (1H, td, $J=7.8$ Hz, 1.7 Hz), 6.91 (1H, td, $J=7.5$ Hz, 0.8 Hz), 6.86 (1H, d, $J=8.2$ Hz), 4.23 (1H, t, $J=7.2$ Hz), 3.85 (3H, s), 3.40 (1H, dq, $J=13.6$ Hz, 6.8 Hz), 3.28 (2H, m), 3.11 (1H, dq, $J=14.4$ Hz, 7.2 Hz), 2.00 (1H, m), 1.60 (1H, m), 1.32 (1H, m), 1.18 (1H, m), 1.06 (3H, t, $J=7.1$ Hz), 0.96 (3H, t, $J=7.1$ Hz), 0.89 (3H, t, $J=7.3$ Hz). ^{13}C NMR (100 MHz, CDCl_3): δ 173.24, 156.14, 129.64, 128.32, 127.72, 121.28, 110.35, 55.65, 41.50, 40.37, 39.81, 36.89, 21.19, 14.41, 14.34, 13.08.

Methyl 4-(1-(diethylcarbamoyl)butyl)benzoate. (Table 7, Entry 4) Purified by chromatography on silica gel (hexane / ethyl acetate = 80 / 20). ^1H NMR (400 MHz, CDCl_3): δ 7.97 (2H, d, $J=8.2$ Hz), 7.39 (2H, d, $J=8.2$ Hz), 3.90 (3H, s), 3.72 (1H, t, $J=7.2$ Hz), 3.44 (1H, dq, $J=13.6$ Hz, 6.8 Hz), 3.30 (2H, m), 3.15 (1H, dq, $J=13.6$ Hz, 6.9 Hz), 2.08 (1H, m), 1.66 (1H, m), 1.24 (2H, m), 1.07 (3H, t, $J=7.1$ Hz), 1.04 (3H, t, $J=7.1$ Hz), 0.90 (3H, t, $J=7.3$ Hz). ^{13}C NMR (100 MHz, CDCl_3): δ 171.72, 167.15, 146.44, 130.16, 128.87, 128.10, 52.24, 48.87, 41.90, 40.71, 37.70, 21.26, 14.71, 14.20, 13.05.

2-(4-Cyanophenyl)-*N,N*-diethylpentanamide. (Table 7, Entry 5) Purified by chromatography on silica gel (hexane / ethyl acetate = 80 / 20). ^1H NMR (400 MHz, CDCl_3): δ 7.60 (2H, d, $J=8.3$ Hz), 7.45 (2H, d, $J=8.3$ Hz), 3.73 (1H, t, $J=7.1$ Hz), 3.35 (3H, m), 3.17 (1H, m), 2.07 (1H, m), 1.67 (1H, m), 1.25 (2H, m), 1.08 (6H, t, $J=7.1$ Hz), 0.91 (3H, t, $J=7.3$ Hz). ^{13}C NMR (100 MHz, CDCl_3): δ 171.30, 146.53, 132.64, 128.93, 119.05, 110.90, 48.74, 42.05, 40.88, 37.75, 21.26, 14.89, 14.18, 13.10.

2-(4-(Trifluoromethyl)phenyl)-1-morpholinoethanone. (Table 8, Entry 1) Purified by chromatography on silica gel (dichloromethane / methanol / triethylamine = 98 / 1 / 1). ^1H NMR (400 MHz, CDCl_3): δ 7.59 (2H, d, $J=8.0$ Hz), 7.37 (2H, d, $J=8.0$ Hz), 3.77 (2H, br s), 3.66 (4H, br s), 3.56 (2H, br t, $J=4.5$ Hz), 3.45 (2H, br). ^{13}C NMR (100 MHz, CDCl_3): δ 168.92, 139.03, 129.47 (q, 32.2 Hz), 129.35, 125.83 (q, 3.9 Hz), 124.27 (q, 270.4 Hz), 66.93, 66.61, 46.60, 42.38, 40.41.; Anal. Calc'd for $\text{C}_{13}\text{H}_{14}\text{F}_3\text{NO}_2$: C, 57.14; H, 5.16; N, 5.13. Found C, 56.91; H, 5.14; N, 5.00.

2-(4-Methoxyphenyl)-1-morpholinoethanone.¹⁰ (Table 8, Entry 2) Purified by chromatography on silica gel (hexane / ethyl acetate = 70 / 30). ^1H NMR (400 MHz, C_6D_6): δ 7.16 (2H, d, $J=8.4$ Hz), 6.77 (2H, d, $J=8.6$ Hz), 3.65 (2H, s), 3.44 (2H, t, $J=4.8$ Hz), 3.30 (3H, s), 3.23 (2H, t, $J=4.6$ Hz), 2.99 (2H, t, $J=4.7$ Hz), 2.78 (2H, t, $J=4.7$ Hz). ^{13}C NMR (100 MHz, C_6D_6): δ 171.84, 159.48, 130.44, 127.24, 114.89, 66.86, 66.49, 55.19, 47.07, 43.32, 40.33.

2-(4-Methylsulfanyl-phenyl)-1-morpholin-4-yl-ethanone. (Table 8, Entry 3) Purified by chromatography on silica gel (hexane / ethyl acetate = 70 / 30). ^1H NMR (400 MHz, CDCl_3): δ

7.22 (2H, d, $J=8.4$ Hz), 7.16 (2H, d, $J=8.0$ Hz), 3.69 (2H, s), 3.64 (4H, broad), 3.51 (2H, t, $J=4.6$ Hz), 3.43 (2H, t, $J=4.2$ Hz), 2.48 (3H, s). ^{13}C NMR (100 MHz, CDCl_3): δ 169.80, 137.22, 131.75, 129.26, 127.29, 67.00, 66.68, 46.70, 42.38, 40.43, 16.14.

1-Morpholin-4-yl-2-(4-trifluoromethylsulfanyl-phenyl)-ethanone. (Table 8, Entry 4) Purified by chromatography on silica gel (hexane / ethyl acetate = 70 / 30). ^1H NMR (400 MHz, CDCl_3): δ 7.62 (2H, d, $J=8.4$ Hz), 7.31 (2H, d, $J=8.0$ Hz), 3.75 (2H, s), 3.66 (4H, broad), 3.56 (2H, t, $J=4.6$ Hz), 3.46 (2H, t, $J=4.6$ Hz). ^{13}C NMR (100 MHz, CDCl_3): δ 168.95, 138.26, 136.88, 130.16, 129.73 (q, 306.5 Hz), 123.11 (q, 2.5 Hz), 66.98, 66.62, 46.67, 42.42, 40.34.

1-(4-(2-Morpholino-2-oxoethyl)phenyl)ethan-1-one. (Table 8, Entry 5) Purified by chromatography on silica gel (hexane / ethyl acetate = 55 / 45). ^1H NMR (400 MHz, CDCl_3): δ 7.92 (2H, d, $J=8.0$ Hz), 7.36 (2H, d, $J=8.4$ Hz), 3.90 (2H, s), 3.67 (4H, br s), 3.52 (2H, br t, $J=4.6$ Hz), 3.44 (2H, br t, $J=4.6$ Hz), 2.60 (3H, s). ^{13}C NMR (100 MHz, CDCl_3): δ 197.84, 170.38, 139.90, 136.22, 129.15, 129.08, 66.81, 66.46, 46.96, 42.95, 40.81, 26.84.

Methyl 4-(2-morpholino-2-oxoethyl)benzoate. (Table 8, Entry 6) Purified by chromatography on silica gel (hexane / ethyl acetate = 20 / 80). ^1H NMR (400 MHz, C_6D_6): δ 8.11 (2H, d, $J=8.3$ Hz), 7.09 (2H, d, $J=8.4$ Hz), 3.49 (3H, s), 3.39 (2H, t, $J=4.6$ Hz), 3.24 (2H, s), 3.18 (2H, t, $J=4.7$ Hz), 2.97 (2H, t, $J=4.8$ Hz), 2.63 (2H, t, $J=4.6$ Hz). ^{13}C NMR (100 MHz, C_6D_6): δ 168.29, 166.85, 141.23, 130.58, 129.76, 129.50, 67.00, 66.62, 51.96, 46.56, 42.55, 40.91, 71.84, 159.48, 130.44, 127.24, 114.89, 66.86, 66.49, 55.19, 47.07, 43.32, 40.33; Anal. Calc'd for $\text{C}_{14}\text{H}_{17}\text{NO}_4$: C, 63.87; H, 6.51; N, 5.32. Found C, 63.93; H, 6.70; N, 5.13.

4-(2-Morpholino-2-oxoethyl)benzonitrile. (Table 8, Entry 7) Purified by chromatography on silica gel (hexane / ethyl acetate = 20 / 80). ^1H NMR (400 MHz, C_6D_6): δ 6.99 (2H, d, $J=8.2$ Hz), 6.76 (2H, d, $J=8.0$ Hz), 3.34 (2H, t, $J=4.7$ Hz), 3.17 (2H, t, $J=4.8$ Hz), 3.01 (2H, s), 2.98 (2H, t, $J=4.8$ Hz), 2.54 (2H, t, $J=4.6$ Hz). ^{13}C NMR (100 MHz, C_6D_6): δ 167.71, 140.79, 132.53, 130.08, 119.10, 111.67, 66.98, 66.57, 46.39, 42.55, 40.46; Anal. Calc'd for $\text{C}_{13}\text{H}_{14}\text{N}_2\text{O}_2$: C, 67.81; H, 6.13; N, 12.17. Found C, 67.94; H, 6.05; N, 11.90.

1-Morpholino-2-(4-nitrophenyl)ethanone. (Table 8, Entry 8) Purified by chromatography on silica gel (hexane / ethyl acetate = 20 / 80). ^1H NMR (400 MHz, C_6D_6): δ 7.84 (2H, d, $J=8.7$ Hz), 6.81 (2H, d, $J=8.7$ Hz), 3.36 (2H, t, $J=4.6$ Hz), 3.20 (2H, t, $J=4.7$ Hz), 3.03 (4H, broad), 2.58 (2H, t, $J=4.7$ Hz). ^{13}C NMR (100 MHz, C_6D_6): δ 167.62, 147.57, 142.93, 130.25, 123.99, 66.99, 66.60, 46.37, 42.58, 40.09.

2-Mesityl-1-morpholinoethanone. (Table 8, Entry 9) Purified by chromatography on silica gel (hexane/ethyl acetate=80/20). ^1H NMR (400 MHz, CDCl_3): δ 6.86 (2H, s), 3.69 (4H, broad), 3.61 (6H, broad), 2.25 (3H, s), 2.22 (6H, s). ^{13}C NMR (400 MHz, CDCl_3): δ 169.46, 136.76, 136.40, 129.83, 129.10, 67.29, 66.91, 46.22, 42.49, 33.60, 21.09, 20.42; Anal. Calc'd for $\text{C}_{15}\text{H}_{21}\text{NO}_2$: C, 72.84; H, 8.56; N, 5.66. Found C, 72.63; H, 8.15; N, 5.38.

2-(4-Hydroxyphenyl)-1-morpholinoethanone. (Table 8, Entry 10) Purified by chromatography on silica gel (hexane / ethyl acetate = 40 / 60). ^1H NMR (400 MHz, CDCl_3): δ 7.6-7.3 (1H, br s),

7.02 (2H, d, $J=8.8$ Hz), 6.73 (2H, d, $J=8.8$ Hz), 3.65 (6H, br s), 3.52 (2H, br t, $J=4.4$ Hz), 3.47 (2H, br t, $J=4.4$ Hz). ^{13}C NMR (100 MHz, CDCl_3): δ 170.99, 155.62, 129.83, 125.75, 116.09, 66.92, 66.63, 46.72, 42.51, 39.95.

2-(4-(Trifluoromethyl)phenyl)-1-morpholinopropan-1-one. (Table 9, Entry 1) Purified by chromatography on silica gel (hexane / ethyl acetate = 70 / 30). ^1H NMR (400 MHz, C_6D_6): δ 7.30 (2H, d, $J=8.1$ Hz), 6.96 (2H, d, $J=8.1$ Hz), 3.51 (1H, br), 3.28 (3H, br), 3.14 (1H, br), 3.00 (1H, br), 2.71 (2H, br), 2.58 (1H, br), 1.38 (3H, t, $J=6.8$ Hz). ^{13}C NMR (100 MHz, CDCl_3): δ 171.62, 145.90 (q, 1.8 Hz), 129.50 (q, 33.2 Hz), 127.79, 126.18 (q, 3.6 Hz), 124.21 (q, 270.3 Hz), 66.95, 66.48, 46.18, 43.04, 42.60, 20.68.

2-(4-Chlorophenyl)-1-morpholinopropan-1-one. (Table 9, Entry 2) Purified by chromatography on silica gel (hexane / ethyl acetate = 70 / 30). ^1H NMR (400 MHz, CDCl_3): δ 7.30 (2H, d, $J=8.5$ Hz), 7.18 (2H, d, $J=8.4$ Hz), 3.83 (1H, q, $J=6.8$ Hz), 3.75 (1H, broad), 3.66 (1H, broad), 3.53 (3H, broad), 3.40 (1H, broad), 3.29 (1H, broad), 3.19 (1H, broad), 1.43 (3H, d, $J=6.8$ Hz). ^{13}C NMR (100 MHz, CDCl_3): δ 171.97, 140.46, 132.96, 129.36, 128.76, 66.98, 66.53, 46.19, 42.65, 42.59, 20.75.

2-(4-Methoxyphenyl)-1-morpholinopropan-1-one. (Table 9, Entry 3) Purified by chromatography on silica gel (hexane / ethyl acetate = 60 / 40). ^1H NMR (400 MHz, C_6D_6): δ 7.07 (2H, d, $J=6.8$ Hz), 6.74 (2H, d, $J=6.7$ Hz), 3.67 (1H, broad), 3.39 (1H, q, $J=6.8$ Hz), 3.44 (1H, m), 3.30 (2H, m), 3.23 (2H, m), 2.99 (2H, m), 2.85 (3H, s), 1.54 (3H, t, $J=6.8$ Hz). ^{13}C NMR (100 MHz, C_6D_6): δ 172.10, 159.30, 135.03, 128.92, 114.95, 67.12, 66.69, 55.12, 46.33, 42.87, 42.72, 21.77.

1-Morpholino-2-*o*-tolylpropan-1-one. (Table 9, Entry 4) Purified by chromatography on silica gel (hexane / ethyl acetate = 70 / 30). ^1H NMR (400 MHz, C_6D_6): δ 7.33 (1H, d, $J=7.1$ Hz), 6.97 (3H, m), 3.75 (1H, broad), 3.52 (1H, q, $J=6.8$ Hz), 3.29 (2H, broad), 3.20 (1H, broad), 2.97 (1H, broad), 2.70 (2H, broad), 2.61 (1H, broad), 1.99 (3H, s), 1.45 (3H, d, $J=6.8$ Hz). ^{13}C NMR (100 MHz, C_6D_6): δ 172.31, 141.40, 134.47, 131.24, 127.60, 127.38, 127.33, 67.08, 66.36, 45.94, 42.91, 40.40, 19.62, 19.42.

2-(2-Fluorophenyl)-1-morpholinopropan-1-one. (Table 9, Entry 5) Purified by chromatography on silica gel (hexane / ethyl acetate = 75 / 25). ^1H NMR (400 MHz, CDCl_3): δ 7.31 (1H, td, $J=7.7$ Hz, 1.7 Hz), 7.23 (1H, m), 7.12 (1H, td, $J=7.5$ Hz, 1.1 Hz), 7.04 (1H, m), 4.22 (1H, q, $J=6.8$ Hz), 3.70 (2H, m), 3.54 (3H, dd, $J=15.5$ Hz, 6.5 Hz), 3.42 (1H, m), 3.28 (1H, m), 3.18 (1H, m), 1.44 (3H, d, $J=6.8$ Hz). ^{13}C NMR (100 MHz, CDCl_3): δ 172.02, 159.53 (d, 242.7 Hz), 128.85 (d, 8.2 Hz), 128.63 (d, 3.8 Hz), 128.61 (d, 14.8 Hz), 125.05 (d, 3.3 Hz), 115.59 (d, 22.5 Hz), 66.76 (d, 42.1 Hz), 45.98, 42.67, 34.79, 34.77, 19.10.

Ethyl 4-(1-morpholino-1-oxopropan-2-yl)benzoate. (Table 9, Entry 6) Purified by chromatography on silica gel (hexane / ethyl acetate = 70 / 30). ^1H NMR (400 MHz, CDCl_3): δ 8.01 (2H, d, $J=8.2$ Hz), 7.32 (2H, d, $J=8.2$ Hz), 4.38 (2H, q, $J=7.1$ Hz), 3.31 (1H, q, $J=6.8$ Hz), 3.78 (1H, broad), 3.67 (1H, broad), 3.49 (3H, broad), 3.37 (1H, broad), 3.26 (1H, broad), 3.12 (1H, broad), 1.47 (3H, d, $J=6.8$ Hz), 1.39 (3H, t, $J=7.1$ Hz). ^{13}C NMR (100 MHz, CDCl_3): δ

171.64, 166.39, 147.03, 130.48, 129.44, 127.36, 66.90, 66.42, 61.16, 46.13, 43.36, 42.59, 20.58, 14.49.

2-(4-Benzoylphenyl)-1-morpholinopropan-1-one. (Table 9, Entry 7) Purified by chromatography on silica gel (hexane / ethyl acetate = 40 / 60). ^1H NMR (400 MHz, C_6D_6): δ 7.71 (4H, d, $J=8.0$ Hz), 7.07 (5H, m), 3.54 (1H, broad), 3.36 (1H, q, $J=6.7$ Hz, broad), 3.34 (1H, br), 3.30-3.00 (3H, m), 2.71 (3H, broad), 1.48 (3H, d, $J=6.8$ Hz). ^{13}C NMR (100 MHz, C_6D_6): δ 195.56, 171.15, 147.27, 138.56, 137.11, 132.52, 131.36, 130.51, 128.76, 127.82, 67.05, 66.59, 46.25, 43.34, 42.91, 21.27.

2-(2-Methoxynaphthalen-6-yl)-1-morpholinopropan-1-one. (Table 9, Entry 8) Purified by chromatography on silica gel (hexane / ethyl acetate = 60 / 40). ^1H NMR (400 MHz, CDCl_3): δ 7.71 (1H, br d, $J=11.6$ Hz), 7.69 (1H, br d, $J=12.4$ Hz), 7.59 (1H, br s), 7.34 (1H, br d, $J=8.4$ Hz), 7.16-7.12 (2H, m), 3.97 (1H, q, $J=6.8$ Hz), 3.91 (3H, s), 3.80 (1H, m), 3.68 (1H, m), 3.55 (2H, m), 3.43 (2H, s), 3.34 (1H, m), 3.07 (1H, m), 1.51 (3H, d, $J=6.8$ Hz). ^{13}C NMR (100 MHz, CDCl_3): δ 172.47, 157.82, 137.09, 133.63, 129.29, 129.24, 127.86, 126.09, 125.63, 119.35, 105.76, 66.99, 66.51, 55.50, 46.18, 43.35, 42.55, 20.90.

2-(4-*tert*-Butylphenyl)-2-methyl-1-morpholinopropan-1-one. (Table 10, Entry 1) Purified by chromatography on silica gel (hexane / ethyl acetate = 90 / 10). ^1H NMR (400 MHz, CDCl_3): δ 7.34 (2H, d, $J=8.4$ Hz), 7.15 (2H, d, $J=8.4$ Hz), 3.37 (8H, broad), 1.53 (6H, s), 1.31 (9H, s). ^{13}C NMR (100 MHz, CDCl_3): δ 175.43, 149.62, 143.12, 125.93, 124.66, 66.23 (broad) this peak must be combined peaks of two or morpholine carbons, 47.43 (broad), 46.66, 43.64 (broad), 34.60, 31.53, 28.41; Anal. Calc'd for $\text{C}_{18}\text{H}_{27}\text{NO}_2$: C, 72.22; H, 7.07; N, 4.68. Found C, 71.97; H, 7.09; N, 5.00.

2-(4-(Trifluoromethyl)phenyl)-2-methyl-1-morpholinopropan-1-one. (Table 10, Entry 2) Purified by chromatography on silica gel (dichloromethane / methanol = 99.5 / 0.5). ^1H NMR (400 MHz, C_6D_6): δ 7.28 (2H, d, $J=8.2$ Hz), 6.87 (2H, d, $J=8.1$ Hz), 2.99 (8H, br s), 1.33 (6H, s). ^{13}C NMR (100 MHz, C_6D_6): δ 173.46, 151.20, 129.05 (q, 32.1 Hz), 126.34 (q, 3.7 Hz), 125.88, 125.23 (270.2 Hz), 66.54 (br), 47.27, 45.17 (br), 28.59.

2-(4-Chlorophenyl)-2-methyl-1-morpholinopropan-1-one. (Table 10, Entry 3) Purified by chromatography on silica gel (hexane / ethyl acetate = 70 / 30). ^1H NMR (400 MHz, C_6D_6): δ 7.03 (2H, d, $J=8.5$ Hz), 6.75 (2H, d, $J=8.5$ Hz), 3.02 (8H, broad), 1.33 (6H, s). ^{13}C NMR (100 MHz, C_6D_6): δ 173.83, 145.69, 132.65, 129.54, 126.97, 66.62 (broad), 46.86, 48-43 (broad) flat peak; Anal. Calc'd for $\text{C}_{14}\text{H}_{18}\text{ClNO}_2$: C, 62.80; H, 6.78; N, 5.23. Found C, 62.61; H, 6.48; N, 4.95.

2-(4-Methoxyphenyl)-2-methyl-1-morpholinopropan-1-one. (Table 10, Entry 4) Purified by chromatography on silica gel (hexane / ethyl acetate = 70 / 30). ^1H NMR (400 MHz, CDCl_3): δ 7.15 (2H, d, $J=8.8$ Hz), 6.88 (2H, d, $J=8.8$ Hz), 3.81 (3H, s), 3.24 (8H, broad), 1.51 (6H, s). ^{13}C NMR (100 MHz, CDCl_3): δ 175.41, 158.23, 138.41, 126.02, 114.44, 66.63 (broad), 55.45, 47 (broad), 46.44, 44 (broad), 28.58.

2-(4-(Dimethylamino)phenyl)-2-methyl-1-morpholinopropan-1-one. (Table 10, Entry 5) Purified by chromatography on silica gel (dichloromethane / methanol = 99.5 / 0.5). ¹H NMR (400 MHz, C₆D₆): δ 7.07 (2H, d, *J*=8.9 Hz), 6.54 (2H, d, *J*=8.8 Hz), 3.15 (8H, broad), 2.51 (6H, s), 1.57 (6H, s). ¹³C NMR (100 MHz, C₆D₆): δ 175.10, 149.68, 134.96, 126.15, 113.56, 66.90, 46.54, 45.90 (broad), 40.59, 29.13.

2-Methyl-1-morpholino-2-(pyridin-2-yl)propan-1-one. (Table 10, Entry 6) Purified by chromatography on silica gel (dichloromethane / methanol = 99.5 / 0.5). ¹H NMR (400 MHz, CDCl₃): δ 8.58 (1H, d, *J*=4.4 Hz, broad), 7.69 (1H, td, *J*=7.7 Hz, 1.8 Hz), 7.24 (1H, d, *J*=8.2 Hz), 7.18 (1H, dd, *J*=4.9 Hz, 0.67 Hz), 3.25 (8H, broad), 1.60 (6H, s). ¹³C NMR (100 MHz, CDCl₃): δ 174.63, 164.79, 149.41, 137.28, 121.81, 120.34, 66.80 (broad), 49.66, 47.22 (broad), 43.71 (broad), 27.33.

2-Methyl-1-morpholin-4-yl-2-thiophen-3-yl-propan-1-one. (Table 10, Entry 7) Purified by chromatography on silica gel (hexane / ethyl acetate = 95 / 5). ¹H NMR (400 MHz, CDCl₃): δ 7.32 (1H, dd, *J*=5.2 Hz, 3.2 Hz), 7.00 (1H, dd, *J*=3.2 Hz, 1.6 Hz), 6.94 (1H, dd, *J*=5.2 Hz, 1.6 Hz), 3.42 (8H, broad), 1.55 (6H, s). ¹³C NMR (100 MHz, CDCl₃): δ 174.61, 147.92, 126.93, 126.17, 118.16, 66.74 (broad), 47-43 (broad), 44.65, 28.48.

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***N,N*-Diethylpentanamide.**
¹H NMR

¹³C NMR

2-Bromo-*N,N*,2-trimethylpropanamide.
¹H NMR

¹³C NMR

1-Morpholinopropan-1-one.
¹H NMR

¹³C NMR

2-Bromo-2-methyl-1-morpholinopropan-1-one.

^1H NMR

^{13}C NMR

***N,N*-Diethyl-2-(4-nitrophenyl)acetamide** (Table 2, Entry 4; Table 5, Entry 11).

¹H NMR

¹³C NMR

***N,N*-Diethyl-2-(2-fluorophenyl)acetamide** (Table 2, Entry 6; Table 5, Entry 16).

¹H NMR

¹³C NMR

2-(4-(Dimethylamino)phenyl)-*N,N*-diethylpropanamide (Table 2, Entry 7).

¹H NMR

¹³C NMR

Methyl 4-(1-(diethylcarbamoyl)ethyl)benzoate (Table 2, Entry 8).

¹H NMR

¹³C NMR

2-(4-*tert*-Butylphenyl)-*N,N*,2-trimethylpropanamide. (Table 3, Entry 1)

¹H NMR

¹³C NMR

2-(3-Fluorophenyl)-*N,N*,2-trimethylpropanamide (Table 3, Entry 7).
¹H NMR

¹³C NMR

***N,N*,2-Trimethyl-2-(pyridin-2-yl)propanamide** (Table 3, Entry 8).

¹H NMR

¹³C NMR

***N,N*-Dimethyl-2-thiophen-3-yl-isobutyramide** (Table 3, Entry 9).

¹H NMR

¹³C NMR

***N,N*-Diethyl-2-(4-methylsulfonyl-phenyl)-acetamide** (Table 5, Entry 5).
¹H NMR

¹³C NMR

Methyl 4-((dimethylcarbamoyl)methyl)benzoate (Table 5, Entry 7).

¹H NMR

¹³C NMR

2-(2-Cyanophenyl)-*N,N*-diethylacetamide (Table 5, Entry 9).

¹H NMR

¹³C NMR

2-(4-Benzoylphenyl)-*N,N*-diethylacetamide (Table 5, Entry 12).

¹H NMR

¹³C NMR

2-Mesityl-*N,N*-dimethylacetamide (Table 5, Entry 18).

¹H NMR

¹³C NMR

***N,N*-Diethyl-2-(pyridin-3-yl)acetamide** (Table 5, Entry 19).

¹H NMR

¹³C NMR

***N,N*-Diethyl-2-thiophen-3-yl-acetamide** (Table 5, Entry 20).

¹H NMR

¹³C NMR

¹H NMR ¹³C NMR

***N,N*-Diethyl-2-(4-hydroxyphenyl)acetamide** (Table 5, Entry 22).

¹H NMR

¹³C NMR

2-(4-Aminophenyl)-*N,N*-diethylacetamide (Table 5, Entry 23).

¹H NMR

¹³C NMR

***N,N*-Diethyl-3-methylbut-3-enamide** (Table 5, Entry 24).

¹H NMR

¹³C NMR

2-(4-Chlorophenyl)-*N,N*-diethylpropanamide (Table 6, Entry 2).

¹H NMR

¹³C NMR

***N,N*-Diethyl-2-*o*-tolylpropanamide** (Table 6, Entry 3).

¹H NMR

¹³C NMR

***N,N*-Diethyl-2-(2-methoxyphenyl)propanamide** (Table 6, Entry 4).

¹H NMR

¹³C NMR

***N,N*-Diethyl-2-(2-fluorophenyl)propanamide** (Table 6, Entry 5).

¹H NMR

¹³C NMR

2-(4-Cyanophenyl)-*N,N*-diethylpropanamide (Table 6, Entry 6).

¹H NMR

¹³C NMR

***N,N*-Diethyl-2-(4-methoxyphenyl)propanamide** (Table 6, Entry 9).

¹H NMR

¹³C NMR

***N,N*-Diethyl-2-(4-methylsulfanyl-phenyl)-propionamide** (Table 6, Entry 10).

¹H NMR

¹³C NMR

***N,N*-Diethyl-2-(pyridin-3-yl)propanamide** (Table 6, Entry 11).

¹H NMR

¹³C NMR

***N,N*-Diethyl-2-thiophen-3-yl-propionamide** (Table 6, Entry 12).

¹H NMR

¹³C NMR

***N,N*-Diethyl-2-(4-hydroxyphenyl)propanamide** (Table 6, Entry 13).

¹H NMR

¹³C NMR

2-(4-Aminophenyl)-*N,N*-diethylpropanamide (Table 6, Entry 14).

¹H NMR

¹³C NMR

2,3-Dimethyl-but-3-enoic acid diethylamide (Table 6, Entry 15).

^1H NMR

^{13}C NMR

2-(4-*tert*-Butylphenyl)-*N,N*-diethylpentanamide (Table 7, Entry 1).

¹H NMR

¹³C NMR

***N,N*-Diethyl-2-(4-methoxyphenyl)pentanamide (Table 7, Entry 2).**

¹H NMR

¹³C NMR

***N,N*-Diethyl-2-(2-methoxyphenyl)pentanamide** (Table 7, Entry 3).

¹H NMR ¹³C NMR

Methyl 4-(1-(diethylcarbamoyl)butyl)benzoate (Table 7, Entry 4).

¹H NMR

¹³C NMR

2-(4-Cyanophenyl)-*N,N*-diethylpentanamide (Table 7, Entry 5).

¹H NMR

¹³C NMR

¹H NMR ¹³C NMR

1-Morpholin-4-yl-2-(4-trifluoromethylsulfonyl-phenyl)-ethanone (Table 8, Entry 4).

¹H NMR

¹³C NMR

1-(4-(2-Morpholino-2-oxoethyl)phenyl)ethan-1-one (Table 8, Entry 5).

¹H NMR

¹³C NMR

1-Morpholino-2-(4-nitrophenyl)ethanone (Table 8, Entry 8).

¹H NMR

¹³C NMR

2-(4-Hydroxyphenyl)-1-morpholinoethanone (Table 8, Entry 10).

¹H NMR

¹³C NMR

2-(4-(Trifluoromethyl)phenyl)-1-morpholinopropan-1-one (Table 9, Entry 1).

¹H NMR

¹³C NMR

¹H NMR

2-(4-Methoxyphenyl)-1-morpholinopropan-1-one (Table 9, Entry 3).

¹H NMR

¹³C NMR

1-Morpholino-2-*o*-tolylpropan-1-one (Table 9, Entry 4).

¹H NMR

¹³C NMR

2-(2-Fluorophenyl)-1-morpholinopropan-1-one (Table 9, Entry 5).

¹H NMR ¹³C NMR

Ethyl 4-(1-morpholino-1-oxopropan-2-yl)benzoate (Table 9, Entry 6).

¹H NMR

¹³C NMR

2-(4-Benzoylphenyl)-1-morpholinopropan-1-one (Table 9, Entry 7).

¹H NMR

¹³C NMR

2-(2-Methoxynaphthalen-6-yl)-1-morpholinopropan-1-one (Table 9, Entry 8).

¹H NMR

¹³C NMR

2-(4-(Trifluoromethyl)phenyl)-2-methyl-1-morpholinopropan-1-one (Table 10, Entry 2).
¹H NMR

¹³C NMR

2-(4-Methoxyphenyl)-2-methyl-1-morpholinopropan-1-one (Table 10, Entry 4).

¹H NMR

¹³C NMR

2-(4-(Dimethylamino)phenyl)-2-methyl-1-morpholinopropan-1-one (Table 10, Entry 5).
¹H NMR

¹³C NMR

2-Methyl-1-morpholino-2-(pyridin-2-yl)propan-1-one (Table 10, Entry 6).

¹H NMR

¹³C NMR

2-Methyl-1-morpholin-4-yl-2-thiophen-3-yl-propan-1-one (Table 10, Entry 7).

^1H NMR

^{13}C NMR