Asymmetric synthesis of $\beta^2$-amino acids: 2-substituted-3-aminopropanoic acids from N-acryloyl SuperQuat derivatives

James E. Beddow, Stephen G. Davies,* Kenneth B. Ling, Paul M. Roberts, Angela J. Russell, Andrew D. Smith and James E. Thomson

Department of Organic Chemistry, Chemistry Research Laboratory, University of Oxford, Mansfield Road, Oxford, OX1 3TA, UK

e-mail: steve.davies@chem.ox.ac.uk

Experimental

General experimental

All reactions involving organometallic or other moisture sensitive reagents were carried out under a nitrogen or argon atmosphere using standard vacuum line techniques and glassware that was flame dried and cooled under nitrogen before use. The solvents were dried according to the procedure outlined by Grubbs and co-workers.$^1$ Water was purified by an Elix® UV-10 system. All other solvents were used as supplied (analytical or HPLC grade) without prior purification. Organic layers were dried over MgSO$_4$. Thin layer chromatography was performed on aluminium plates coated with 60 F$_{254}$ silica. The plates were visualised using UV light (254 nm), iodine, 1% aq. KMnO$_4$ or 10% ethanolic phosphomolybdic acid. Flash column chromatography was performed on Kieselgel 60 silica.

Elemental analyses were recorded by the microanalysis service of the Inorganic Chemistry Laboratory, University of Oxford, UK. Melting points were recorded on a Gallenkamp Hot Stage apparatus and are uncorrected. Optical rotations were recorded on a Perkin–Elmer 241 polarimeter with a water-jacketed 10 cm cell. Specific rotations are reported in $10^{-1}$ deg cm$^2$ g$^{-1}$ and concentrations in g/100 mL. IR spectra were recorded on a Bruker Tensor 27 FTIR spectrometer as either a thin film on NaCl plates (film), a chloroform cell (CHCl$_3$) or a KBr disc (KBr), as stated. Selected characteristic peaks are reported in cm$^{-1}$. NMR spectra were recorded on Bruker Avance spectrometers in the deuterated solvent stated. The field was locked by external referencing to the relevant deuteron resonance. Low-resolution mass spectra were recorded on either

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a VG MassLab 20–250 or a Micromass Platform 1 spectrometer. Accurate mass measurements were run on either a Bruker MicroTOF and were internally calibrated with polyanaline in positive and negative modes, or a Micromass GCT instrument fitted with a Scientific Glass Instruments BPX5 column (15 m × 0.25 mm) using amyl acetate as a lock mass.

General Procedure 1: Lithium Amide addition

\( n\)-BuLi (2.5 M, 1.6 eq) was added dropwise to a stirred solution of amine (1.6–2.0 eq) in THF (0.13 mL/mmol) at –78 °C. After stirring for 30 min at –78 °C, a solution of the acceptor (1.0 eq) in THF (0.08 mL/mmol) also at –78 °C was added dropwise via cannula. The resulting solution was stirred for between 10 min and 4 h before the addition of sat. aq. NH₄Cl solution. The product was extracted with ether (3 ×), the combined organic extracts were washed with aq. citric acid solution (10% w/v), sat. aq. NaHCO₃ solution and brine. The resultant organic solution was dried and concentrated in vacuo.

General Procedure 2: Tandem addition/alkylation

\( n\)-BuLi (2.5 M, 1.6 eq) was added dropwise to a stirred solution of amine (1.6 eq) in THF (0.5 mL/mmol) at –78 °C. After stirring for 30 min at –78 °C, a solution of the acceptor (1.0 eq) in THF (0.08 mL/mmol) also at –78 °C was added via cannula. The resulting solution was stirred for between 10 min and 4 h at –78 °C before the alkyl halide (1.6 eq) was added. The mixture was stirred at –78 °C for a further 2 h before allowing it to warm to rt over 16 h. The solvent was removed in vacuo and the resulting residue taken up in ether. The organic layer was washed with aq. citric acid solution (10% w/v) and sat. aq. NaHCO₃ solution, then dried and concentrated in vacuo.

General Procedure 3: Stepwise enolate alkylation

LiHMDS (1.1 eq, 1.0 M) was added dropwise to a solution of the (β-amino carbonyl)-oxazolidinone (1.0 eq) in THF (0.05 mL/mmol) at –78 °C. After 30 min, the alkyl halide (1.5 eq) was added and the resultant mixture stirred at –78 °C for a further 2 h before allowing it to warm to rt over 16 h. The solvent was removed in vacuo and the residue taken up in ether. The organic layer was washed with sat. aq. NH₄Cl solution and brine then dried and concentrated in vacuo.
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General Procedure 4: Tandem Enolate Trapping

$n$-BuLi (2.5 M, 1.6 eq) was added dropwise to a stirred solution of amine (1.6 eq) in THF (0.5 mL/mmol) at −78 °C. After stirring for 30 min at −78 °C a solution of the acceptor (1.0 eq), in THF (0.08 mL/mmol) at −78 °C, was added via cannula. The resulting solution was stirred between 2 h and 4 h at −78°C before triethylsilyl chloride (1.6 eq) was added. The mixture was stirred at −78 °C for a further 30 min before being allowed to warm to rt. The solvent was then removed \textit{in vacuo}.

General Procedure 5: Stepwise Enolate Trapping

LiHMDS (1.1 eq) was added dropwise to a solution of the $N$-$\beta$-amino oxazolidinone (1.0 eq) in THF (0.05 mL/mmol) at −78 °C. The resulting solution was stirred at −78 °C for 30 min. Triethylsilyl chloride (1.5 eq) was added in one portion and the mixture stirred at −78 °C for a further 30 min before being allowed to warm to rt. The solvent was then removed \textit{in vacuo}.

General Procedure 6: Lithium Hydroxide Cleavage of Auxillary

LiOH (5.0 eq) in H$_2$O (3 mL/mmol) was added to a stirred solution of the acyl oxazolidinone (1.0 eq) in THF (30 mL/mmol) and the resulting solution was stirred at rt for 24 h. After which time the solution was acidified to pH 3 with sat. aq. KHSO$_4$ solution. The product was then extracted with EtOAc (3 ×), the combined organic extracts were dried and concentrated \textit{in vacuo}.

General Procedure 7: Hydrogenolysis of Benzyl Protecting Groups

Pd (10% wt on C, 0.5g/g $\beta$-amino acid) was added to a degassed solution of the $\beta$-amino acid (1.0 eq) in MeOH (20 mL/g)/H$_2$O (2 mL/g)/AcOH (0.5 mL/g). The suspension was stirred under H$_2$ (1 atm) for 24 h before being filtered though Celite®. The Celite® pad was then further washed with MeOH and the filtrate was concentrated \textit{in vacuo}.

General Procedure 8: Lithium Methoxide Cleavage of Auxiliary

$n$-BuLi (3.0 eq, 1.6 M) was added dropwise to MeOH (2 mL/mmol) at 0°C. After 5 min a solution of the acyl oxazolidinone (1.0 eq) in MeOH (2 mL/mmol) was added dropwise. The resulting mixture was stirred at 0 °C for 30 min before being allowed to warm to rt then stirred for a further 15 h. The solvent was removed \textit{in vacuo} and the residue partitioned between sat. aq. NH$_4$Cl solution and EtOAc. The aqueous layer
was extracted with EtOAc (2 ×). The combined organic extracts were washed with brine, dried and then concentrated in vacuo.

**General Procedure 9: Ester Hydrolysis**

To a stirred solution of the ester (1.0 eq) in THF (15 mL/mmol ester) was added lithium hydroxide (5.0 eq) in water (1.5 mL/mmol LiOH) and the mixture either stirred at rt or heated at reflux for 15 h. The crude reaction mixture was worked up as specified.

**General Procedure 10: Alkylation of Ethyl Acetoacetate**

To a suspension of potassium tert-butoxide (1.1 eq) in THF (2.5 mL/mmol base) was added ethyl acetoacetate (1.0 eq) and tert-butanol (0.1 eq) at 0°C. The resulting clear solution was stirred for 30 min and then alkyl halide (0.99 eq) was added. The solution was stirred at 70 °C for 12 h. The reaction was quenched with water (0.13 mL/mmol base), and then sat. aq. NaHCO₃ was added and the product extracted with ether (3 ×). The combined organic extracts were dried and the solvents removed in vacuo to yield the crude product.

**General Procedure 11: Formation of 2-Alkylacrylate Esters**

To a stirred solution of ethyl-2-alkyl-3-oxo-butyrate (1.0 eq) in THF (8 mL/mmol reactant) was added LiHMDS (1.0 M, 1.1 eq) at −78°C. The solution was stirred for 30 min then paraformaldehyde (xs) was added as a solid in one portion. The suspension was allowed to warm to rt and stirred for 6 h then filtered through Celite® to remove excess paraformaldehyde. The filtrate was concentrated in vacuo to yield the crude product.

**General Procedure 12: Acylation of Oxazolidinone**

Oxalyl chloride (1.86 eq) was added to a solution of the carboxylic acid (1.25 eq) in ether (10 mL/mmol acid). The solution was stirred for 1 h at rt. Et₃N (1.86 eq) was added dropwise and the solution stirred for a further 30 min. The supernatant was decanted and the solvent removed in vacuo. The crude acid chloride was taken up in THF (1 mL/mmol) and used without further purification.

To a stirred solution of the oxazolidinone (1.0 eq) in THF (3 mL/mmol) at −78 °C was added n-BuLi (2.5 M, 1.1 eq) dropwise. After stirring for 15 min, the acid chloride was added as the solution in THF followed by a THF wash (0.5 mL/mmol acid chloride). The solution was stirred at −78 °C for 30 min before warming to rt
over 2 h. The reaction was quenched by the addition of sat. aq. NH₄Cl and the product extracted with ethyl acetate (3 ×). The combined organic extracts were washed with brine, dried and the solvents removed in vacuo.

**General Procedure 13: Tandem addition / 2,6-di-tert-butylphenol quench**

*n*-BuLi (2.5 M, 1.6 eq) was added dropwise to a stirred solution of amine (1.6 eq) in THF (0.5 mL/mmol) at −78 °C. After stirring for 30 min at −78 °C, a solution of the acceptor (1.0 eq) in THF (0.08 mL/mmol) also at −78 °C was added via cannula. The resulting solution was stirred for 30 min at −78 °C and then a solution of 2,6-di-tert-butylphenol (3.0 eq) in THF (0.16 mL/mmol) was added dropwise via syringe. The mixture was stirred at −78 °C for a further 30 min before being allowed to warm to rt over 16 h. The solvent was removed in vacuo and the residue taken up in ether. The organic layer was washed with aq. citric acid solution (10% w/v) and sat. aq. NaHCO₃ solution, dried and concentrated in vacuo.

**General Procedure 14: Tandem addition / 2-pyridone quench**

To a stirred solution of amine (1.6 eq) in THF (0.5 mL/mmol) at −78 °C was added *n*-BuLi (2.5 M, 1.6 eq) dropwise. After stirring for 30 min at −78 °C a solution of the acceptor (1.0 eq) in THF (0.08 mL/mmol) also at −78 °C was added via cannula. The resulting solution was stirred for 30 min at −78 °C before a solution of 2-pyridone (3.0 eq) in THF (0.06 mL/mmol) was added dropwise via syringe. The mixture was stirred at −78 °C for a further 30 min before being allowed to warm to rt over 16 h. The solvent was removed in vacuo and the residue taken up in ether. The organic layer was washed with aq. citric acid solution (10% w/v) and sat. aq. NaHCO₃ solution, then dried and concentrated in vacuo.

**General Procedure 15: Lithium Hydroperoxide Cleavage of Auxiliary**

LiOH (6.0 eq) in H₂O (3 mL/mmol) and H₂O₂ (2 mL/mmol) was added to a stirred solution of the acyl oxazolidinone (1.0 eq) in THF (9 mL/mmol) at 0 °C. The resulting solution was allowed to warm to rt and stirred for 24 h before addition of Na₂SO₃ solution. The solution was acidified to pH 3 with sat. aq. KHSO₄ solution. The product was then extracted with EtOAc (3 ×), the combined organic extracts were dried and concentrated in vacuo.

**General Procedure 16: Aldol reactions with 9-BBNOTf**
To a stirred solution of β-amino-N-acyl oxazolidinone in DCM at 0°C was added 9-BBNOTf (0.5 M in hexanes, 1.2 eq) followed by Hüning’s base (1.4 eq) after 10 mins. The resulting solution was stirred for a further 20 mins at 0°C before cooling to –78 °C followed by addition of an aldehyde (1.5 eq). The resulting solution was stirred for a further 30 mins at –78 °C before warming to 0 °C and stirring for a further 1 hr. The reaction was quenched with 1:1 (v/v) MeOH/H2O2(30% aq. solution), allowed to warm to rt and extracted with DCM (3 ×). The combined organic layers were washed with sat. aq. NaHCO3, dried and concentrated in vacuo to yield a crude product.

(S)-4-iso-Propyl-3-acryloyl-oxazolidin-2-one 3

To a stirred solution of acrylic acid (0.75 mL, 10.9 mmol, 1.25 eq) in ethyl acetate (60 mL) at 0 °C was added Et3N (1.51 mL, 10.9 mmol, 1.25 eq) followed by acryloyl chloride (0.88 mL, 10.9 mmol, 1.25 eq) over 2 min. The resulting solution was stirred at 0 °C for 40 min then at rt for 30 min. The suspension was filtered and the filtrate concentrated in vacuo. The residue was taken up in hexane (50 mL) and the resulting suspension filtered and the filtrate concentrated in vacuo again. The anhydride was dissolved in THF (1.5 mL) and used immediately.

To a suspension of oxazolidinone 1 (1.0 g, 8.69 mmol, 1.0 eq) and LiCl (0.46 g, 10.9 mmol, 1.25 eq) in THF (10 mL) was added Et3N (1.50 mL, 10.9 mmol, 1.25 eq), the anhydride, followed by a THF wash (1.5 mL). The suspension was stirred at rt for 4 h before removal of the solvent in vacuo. The residue was taken up in ethyl acetate (100 mL) and washed with aq. HCl (1 M, 25 mL), dried and the solvent removed in vacuo to yield the crude product 3. Purification was achieved by column chromatography (silica, 4:1 pentane:ether, v/v) to yield the pure product 3 as a white crystalline solid (1.03 g, 65%); mp 45–46°C (lit.2 44–45°C); [α]D25
+116.4 (c 2.0, CHCl3) \{lit.2 [α]D +110 (c 1.0, CHCl3)\}; δH (400MHz, CDCl3) 0.89 (3H, d, J6.9, CHMe2), 0.94 (3H, d, J7.1, CHMe2), 2.36–2.46 (1H, m, CHMe2), 4.24 (1H, dd, JAB 9.1, JAX 3.2, CH2), 4.31 (1H, dd, JBA 9.1, JBX 8.3, CH=C=CH2), 4.50 (1H, ddd, JXB 8.3, JXA 3.4, JXC 3.4, NCH), 5.89 (1H, dd, JAX 10.5, JAB 1.9, CH=C=CH2), 6.54 (1H, dd, JBX 17.0, JBA 1.8, CH=C=CH2), 7.52 (1H, dd, JXB 17.0, JXA 10.4, CH=C=CH2).

(S)-5,5-Dimethyl-4-iso-propyl-3-acryloyl-oxazolidin-2-one 4

To a stirred solution of acrylic acid (1.65 mL, 24 mmol, 1.25 eq) in ethyl acetate (120 mL) at 0 °C was added Et₃N (3.33 mL, 24 mmol, 1.25 eq) followed by acryloyl chloride (1.95 mL, 24 mmol, 1.25 eq) over 2 min. The resulting solution was stirred at 0 °C for 40 min then at rt for 30 min. The suspension was filtered and the filtrate concentrated in vacuo. The residue was taken up in hexane (100 mL) and the resulting suspension filtered and the filtrate concentrated in vacuo again. The anhydride was dissolved in THF (3 mL) and used immediately.

To a suspension of oxazolidinone 2 (3.0 g, 19.1 mmol, 1.0 eq) and LiCl (1.0 g, 24 mmol, 1.25 eq) in THF (18 mL) was added Et₃N (3.3 mL, 24 mmol, 1.25 eq), the anhydride, followed by a THF wash (3 mL). The suspension was stirred at rt for 4 h before removal of the solvent in vacuo. The residue was taken up in ethyl acetate (250 mL) and washed with aq. HCl (1M, 50 mL), dried and the solvent removed in vacuo to yield the crude product 4. Purification was achieved by column chromatography (silica, 4:1 pentane:ether, v/v) to yield the pure product 4 as a white crystalline solid (2.9 g, 72%); mp 56–57°C (lit. 3 56–57°C); [α]D +55.3 (c 2.0, CHCl₃); νmax/cm⁻¹ (CHCl₃) 1773, 1700; δH (400MHz, CDCl₃) 0.96 (3H, d, J₆.₈, CHMe₂), 1.04 (3H, d, J 7.0, CHMe₂), 1.40 (3H, s, CMe₂), 1.52 (3H, s, CMe₂), 2.13–2.21 (1H, m, CHMe₂), 4.22 (1H, d, J 3.4, NCH), 5.90 (1H, dd, JAX 10.5, JAB 1.9, CH=CH₂), 6.54 (1H, dd, JBX 17.0, JBA 1.9, CH=CH₂), 7.56 (1H, dd, JXB 17.0, JXA 10.4, CH=CH₂).

(S)-4-iso-Propyl-3-’(N,N-dibenzylamino)propanoyl]oxazolidin-2-one 6

N-Acryloyl-oxazolidinone 3 (149 mg, 0.8 mmol, 1.0 eq) was reacted with dibenzylamine (0.23 mL, 1.7 mmol, 1.6 eq) and n-BuLi (0.48 mL, 1.7 mmol, 1.6 eq) according to General Procedure 1. Purification by column chromatography (silica, 9:1 pentane:ether, v/v) afforded 6 as a viscous, colourless oil (200mg, 66%); [α]D +53.5 (c 0.4, CHCl₃); νmax/cm⁻¹ (CHCl₃) 1773, 1700; δH (400MHz, CDCl₃) 0.91 (3H, d, J 6.8, CHMe₂), 2.31–2.40 (1H, m, CHMe₂), 2.82–2.98 (2H, m, CH₂NBn₂), 3.15–3.20 (2H, m, COCH₂), 3.60 (2H, d, J 13.5, NCH₂Ph), 3.69 (2H, d, J 13.5, NCH₂Ph), 4.14 (2H, d, J 5.6, OCH₂), 4.33–4.39 (1H, m, NCH), 7.19–7.40 (10H, m, Ph); δC (100MHz, CDCl₃) 14.6, 18.0, 28.3, 33.3, 48.9, 58.0, 71.0, 75.0, 125.0, 128.0, 130.0, 132.0, 142.0, 150.0, 163.0, 181.0.

58.4, 63.2, 126.9, 128.2, 128.8, 139.4, 153.9, 172.0; m/z (ESI⁺) 381 (MH⁺, 100%); HRMS (ESI⁺) 381.2184 (C₂₃H₂₉N₂O₃ requires 381.2178).

\((S)-5,5\text{-Dimethyl-4-ISO-propyl-3-[3'}-(N,N\text{-dibenzylamino})\text{propanoyl]}\text{oxazolidin-2-one 7}\)

\[\text{\begin{align*}
\text{\text{N-Acryloyl-oxazolidinone 4 (296 mg, 1.40 mmol, 1.0 eq) was reacted with dibenzylamine (0.44 mL, 2.30 mmol, 1.6 eq) and } n\text{-BuLi (0.91 mL, 2.3 mmol, 1.6 eq) according to General Procedure 1. Purification by column chromatography (silica, 9:1 pentane:ether, v/v) afforded 7 as a viscous, colourless oil (525 g, 92%); } \alpha_{D}^{25} +17.5 \text{ (c 1.6, CHCl}_3) \text{; } \nu_{\text{max/cm}^{-1}} \text{ (CHCl}_3) 1772, 1700; \delta_{\text{H}} \text{ (400MHz, CDCl}_3) 0.96 \text{ (3H, d, } J 6.8, \text{CHMe}_2), 1.04 \text{ (3H, d, } J 7.0, \text{CHMe}_2), 1.37 \text{ (3H, s, CMe}_2), 1.52 \text{ (3H, s, CMe}_2), 2.11–2.19 \text{ (1H, m, CHMe}_2), 2.93–3.00 \text{ (2H, m, CH}_2\text{NBn}_2), 3.16–3.23 \text{ (1H, m, COCH}_2), 3.28–3.35 \text{ (1H, m, COCH}_2), 3.68 \text{ (4H, app s, N(CH}_2\text{Ph})_2), 4.16 \text{ (1H, d, } J 3.2, \text{NCH}), 7.25–7.44 \text{ (10H, m, Ph); } \delta_{\text{C}} \text{ (100MHz, CDCl}_3) 17.1, 21.4, 28.8, 29.5, 33.0, 49.0, 57.9, 66.2, 82.8, 126.9, 128.2, 128.9, 140.4, 153.6, 172.6; m/z (ESI⁺) 409 (MH⁺, 100%); HRMS (ESI⁺) 409.2488 (C₂₅H₃₃N₂O₃ requires 409.2491).}
\end{align*}\]

\((4S,aR)-5,5\text{-Dimethyl-4-ISO-propyl-3-[3'}-[N-benzyl-N-(a-methylbenzyl)amino]propanoyl]}\text{oxazolidin-2-one 9}\)

\[\text{\begin{align*}
\text{\text{N-Acryloyl-oxazolidinone 4 (296 mg, 1.40 mmol, 1.0 eq) was reacted with } (R)-N\text{-benzyl-(N-}\alpha\text{-methylbenzyl)amine (485 mg, 2.30 mmol, 1.6 eq) and } n\text{-BuLi (1.39 mL, 2.22 mmol, 1.6 eq) according to General Procedure 1. Purification by column chromatography (silica, 7:3 pentane:ether, v/v) yielded 9 (442 mg, 75%) as a white crystalline solid; mp 67–69 °C; } \alpha_{D}^{25} +26.9 \text{ (c 3.05, CHCl}_3) \text{; } \nu_{\text{max/cm}^{-1}} \text{ (KBr) 1777, 1699; } \delta_{\text{H}} \text{ (400MHz, CDCl}_3) 0.92 \text{ (3H, d, } J 6.8, \text{CHMe}_2), 1.01 \text{ (3H, d, } J 6.8, \text{CHMe}_2), 1.35 \text{ (3H, s, CMe}_2), 1.45(3H, d, } J 6.8, \text{NCHMe}), 1.50 \text{ (3H, s, CMe}_2), 2.09–2.19 \text{ (1H, m, CHMe}_2), 2.78–2.85 \text{ (1H, m, COCH}_2\text{CH}_2), 3.03–3.12 \text{ (2H, m, COCH}_2\text{CH}_2 \text{ and COCH}_2\text{), 3.13–3.20 (1H, m, COCH}_2\text{), 3.58 (1H, d, } J 13.8, \text{NCH}_2\text{Ph), 3.70 (1H, d, } J 13.8, \text{NCH}_2\text{Ph), 3.96 (1H, q, } J 6.8, \text{NCHPh), 4.13 (1H, d, } J 3.3, \text{NCH}_2\text{Pr), 7.22–7.45 \text{ (10H, m, Ph); } \delta_{\text{C}} \text{ (100MHz, CDCl}_3) 16.4, 17.1, 21.4, 28.8, 29.5, 33.5, 45.1, 54.5, 58.5, 66.2, 82.7, 126.7,}
\end{align*}\]
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127.5, 127.8, 128.1, 128.5, 140.3, 143.5, 153.5, 172.7; m/z (ESI⁺) 423 (MH⁺, 100%); HRMS (ESI⁺) 423.2658 (C₂₆H₃₅N₂O₃ requires 423.2648).

\((4S,\alpha S)-5,5\text{-Dimethyl-4-iso-propyl-3-}\{3'-[N-benzyl-N-(\alpha\text{-methylbenzyl})amino]propanoyl\}oxazolidin-2\text{-one}\ 10\)

\[
\begin{align*}
\text{ON} & \quad \text{OO} \\
\text{N} & \quad \text{Ph} \\
\text{N-} & \quad \text{Acryloyl-oxazolidinone} \ 4
\end{align*}
\]

\(N\text{-Acryloyl-oxazolidinone } 4\) (296 mg, 1.40 mmol, 1.0 eq) was reacted with \((S\text{-N-benzyl-(N-\alpha\text{-methylbenzyl})amine}\) (485 mg, 2.30 mmol, 1.6 eq) and \(n\text{-BuLi}\) (1.4 mL, 2.22 mmol, 1.6 eq) according to \textbf{General Procedure 1}. Purification by column chromatography (silica, 7:3 pentane:ether, v/v) furnished 10 (501 mg, 85%) as a yellow viscous oil; (Found C 75.8, H 8.5, N 6.6%. C₂₆H₃₄N₂O₃ requires C 73.9, H 8.1, N 6.6%); \([\alpha]_{D}^{25} +1.7\) (c 2.9, CHCl₃); \(\nu_{\text{max}}/\text{cm}^{-1}\) (film) 1772, 1700; \(\delta_{\text{H}} (400\text{MHz, CDCl}_3) 0.91 (3\text{H, d, } J 6.8, \text{CHMe}_2), 0.99 (3\text{H, d, } J 6.8, \text{CHMe}_2), 1.33 (3\text{H, s, } \text{CMe}_2), 1.43 (3\text{H, d, } J 6.8, \text{NCHMe}), 1.49 (3\text{H, s, } \text{CMe}_2), 2.08–2.18 (1\text{H, m, } \text{CHMe}_2), 2.75–2.80 (1\text{H, m, } \text{COCH}_2\text{CH}_2), 2.89–3.12 (2\text{H, m, } \text{COCH}_2\text{CH}_2 \text{and} \text{COCH}_2), 3.21–3.27 (1\text{H, m, } \text{COCH}_2), 3.58 (1\text{H, d, } J 13.8, \text{NCH}_2\text{Ph}), 3.65 (1\text{H, d, } J 13.8, \text{NCH}_2\text{Ph}), 3.96 (1\text{H, q, } J 6.8, \text{NCHPh}), 4.10 (1\text{H, d, } J 3.3, \text{NCCHPr}), 7.21–7.44 (10\text{H, m, } \text{Ph}); \delta_{\text{C}} (100\text{MHz, CDCl}_3) 16.2, 17.0, 21.4, 28.8, 29.5, 33.5, 45.1, 54.4, 58.4, 66.2, 82.7, 126.7, 127.5, 127.8, 128.1, 128.6, 140.3, 143.5, 153.5, 172.7; m/z (ESI⁺) 423 (MH⁺, 100%); HRMS (ESI⁺) 423.2653 (C₂₆H₃₅N₂O₃ requires 423.2648).

\((2'S,4S)-5,5\text{-Dimethyl-4-iso-propyl-3-}\{3'-(N,N-dibenzylamino)-2'-methylpropanoyl\}oxazolidin-2\text{-one}\ 11\)

\[
\begin{align*}
\text{Bn}_2\text{N} & \quad \text{ON} \\
\text{Me} & \quad \text{O} \\
\text{Bn}_2\text{N} & \quad \text{Me}
\end{align*}
\]

\(\text{Method A}\)

\(N\text{-Acryloyl-oxazolidinone } 4\) (1.48 g, 7.0 mmol, 1.0 eq) was reacted with dibenzylamine (2.18 mL, 11.5 mmol, 1.6 eq) and \(n\text{-BuLi}\) (4.34 mL, 11.5 mmol, 1.6 eq), followed by methyl iodide (0.65 mL, 10.5 mmol, 1.5 eq) according to \textbf{General Procedure 2}, to give 11 in 96% de. Purification by column chromatography (silica, 19:1 pentane:ether, v/v) afforded 11 (2.60 g, 88%) as a white crystalline solid (Found: C, 73.8; H, 7.8; N, 6.6%. C₂₆H₃₄N₂O₃ requires C, 73.9; H, 8.1; N, 6.6%); mp 82–83°C; \([\alpha]_{D}^{25} +12.0\) (c 1.6, CHCl₃); \(\nu_{\text{max}}/\text{cm}^{-1}\) (CHCl₃) 1772, 1700; \(\delta_{\text{H}} (400\text{MHz, CDCl}_3) 0.96 (3\text{H, d, } J 6.8, \text{CHMe}_2), 1.01 (3\text{H, d, } J 7.0, \text{CHMe}_2), 1.22 (3\text{H, d, } J 6.8, \text{COCHMe}), 1.43 (3\text{H, s, } \text{CMe}_2), 1.53 (3\text{H, s, } \text{CMe}_2), 2.10–2.20 (1\text{H, m, } \text{CHMe}_2), 2.89–3.12 (2\text{H, m, } \text{COCH}_2\text{CH}_2 \text{and} \text{COCH}_2), 3.21–3.27 (1\text{H, m, } \text{COCH}_2), 3.58 (1\text{H, d, } J 13.8, \text{NCH}_2\text{Ph}), 3.65 (1\text{H, d, } J 13.8, \text{NCH}_2\text{Ph}), 3.96 (1\text{H, q, } J 6.8, \text{NCHPh}), 4.10 (1\text{H, d, } J 3.3, \text{NCCHPr}), 7.21–7.44 (10\text{H, m, } \text{Ph}); \delta_{\text{C}} (100\text{MHz, CDCl}_3) 16.2, 17.0, 21.4, 28.8, 29.5, 33.5, 45.1, 54.4, 58.4, 66.2, 82.7, 126.7, 127.5, 127.8, 128.1, 128.6, 140.3, 143.5, 153.5, 172.7; m/z (ESI⁺) 423 (MH⁺, 100%); HRMS (ESI⁺) 423.2653 (C₂₆H₃₅N₂O₃ requires 423.2648).
2.50 (1H, dd, $J_{AB}$ 12.7, $J_{AX}$ 6.7, $CH_2NBn_2$), 2.90 (1H, dd, $J_{BA}$ 12.7, $J_{BX}$ 7.5, $CH_2NBn_2$), 3.52 (2H, d, $J_{13.7}$, $NC\textsubscript{2}H_2\textsubscript{Ph}$), 3.68 (2H, d, $J_{13.8}$, $NC\textsubscript{2}H_2\textsubscript{Ph}$), 4.19 (1H, d, $J_{3.4}$, $NCH\textsubscript{Pr}$), 4.21–4.24 (1H, m, COCHMe), 7.21–7.39 (10H, m, Ph); $\delta_C$ (100MHz, CDCl$_3$) 16.5, 17.0, 21.4, 21.5, 28.7, 29.6, 36.3, 56.9, 58.3, 66.1, 82.5, 126.8, 128.1, 129.0, 139.1, 153.2, 176.8; $m/z$ (ESI$^+$) 423 (MH$^+$, 100%); HRMS (ESI$^+$) 423.2652 ($C_{26}H_{35}N_2O_3$ requires 423.2648).

**Method B**

$\beta$-Amino-oxazolidinone 7 (100 mg, 0.24 mmol, 1.0 eq) was reacted with LiHMDS (0.30 mL, 0.2 mmol, 1.1 eq), followed by methyl iodide (23 µL, 0.37 mmol, 1.5 eq) according to General Procedure 3, to give 11 in 96% de. Purification by column chromatography (silica, 9:1 pentane:ether, v/v) afforded 11 (95 mg, 94%) with identical physical and spectroscopic properties to those described above.

**X-Ray crystal structure determination for 11**

Data were collected using an Enraf-Nonius $\kappa$-CCD diffractometer with graphite monochromated Mo-$K\alpha$ radiation using standard procedures at 190K. The structure was solved by direct methods, all non-hydrogen atoms were refined with anisotropic thermal parameters. Hydrogen atoms were added at idealised positions. The structure was refined using CRYSTALS.$^4$

X-ray crystal structure data for 11 [$C_{26}H_{34}N_2O_3$]: $M = 422.57$, monoclinic, space group P 2$_1$, $a = 14.1180(3)$ Å, $b = 6.1198(2)$ Å, $c = 14.4072(4)$ Å, $\beta = 108.4415(11)^\circ$, $V = 1180.85(6)$ Å$^3$, $Z = 4$, $\mu = 0.077$ mm$^{-1}$, colourless block, crystal dimensions = 0.2 $\times$ 0.2 $\times$ 0.2 mm$^3$. A total of 2840 unique reflections were measured for $5 < \theta < 27$ and 2657 reflections were used in the refinement. The final parameters were $wR_2 = 0.0354$ and $R_1 = 0.0335$ [$I>3\sigma(I)$]. Crystallographic data (excluding structure factors) has been deposited with the Cambridge Crystallographic Data Centre as supplementary publication number CCDC 616167. Copies of the data can be obtained, free of charge, on application to CCDC, 12 Union Road, Cambridge CB2 1EZ, UK [fax: +44(0)-1223-336033 or e-mail: deposit@ccdc.cam.ac.uk].

$$^{(4S,2'S,aR)-5,5-Dimethyl-4-iso-propyl-3-[3'-[N-benzyl-N-(\alpha-methylbenzyl)amino]-2'-methylpropanoyl]oxazolidin-2-one\ 12}$$

Method A

**N-Acryloyl-oxazolidinone 4** (150 mg, 0.71 mmol, 1.0 eq) was reacted with \((R)-N\text{-benzyl-}(N\text{-}\alpha\text{-methylbenzyl})\text{amine (240 mg, 1.14 mmol, 1.6 eq)}\) and \(n\text{-BuLi (0.46 mL, 1.14 mmol, 1.6 eq)}\), followed by MeI (71 µL, 2.27 mmol, 1.6 eq) according to General Procedure 2, giving 12 in 93% de. Purification by column chromatography (silica, 9:1 pentane:ether, v/v) furnished 12 (235 mg, 76%) as a white crystalline solid; mp 125–127 °C; \([\alpha]_D^{25} +28.7\) (c 1.05, CHCl3); \(\nu_{\text{max}}/\text{cm}^{-1}\) (KBr) 1752, 1702; \(\delta_{\text{H}}\) (400MHz, CDCl3) 0.94 (3H, d, \(J\) 6.8, CHMe2), 1.01 (3H, d, \(J\) 6.8, CHMe2), 1.10 (3H, d, \(J\) 6.8, COCHMe), 1.35 (3H, d, \(J\) 6.8, NCHMe), 1.45 (3H, s, CMe2), 1.53 (3H, s, CMe2), 2.11–2.18 (1H, m, CHMe2), 2.25 (1H, dd, \(J_{\text{AB}}\) 12.9, \(J_{\text{AX}}\) 6.3, COCHCH2), 3.09 (1H, dd, \(J_{\text{BA}}\) 12.9, \(J_{\text{BX}}\) 8.3, COCHCH2), 3.58 (2H, AB q, \(J\) 4.8, NCH2Ph), 3.92 (1H, q, \(J\) 6.8, NCHPh), 3.99–4.06 (1H, m, COCHMe), 4.22 (1H, d, \(J\) 3.3, NCH\(^\text{Pr}\)), 7.21–7.34 (10H, m, Ph); \(\delta_{\text{C}}\) (100MHz, CDCl3) 14.0, 16.4, 17.0, 21.4, 28.7, 29.6, 37.0, 52.9, 54.9, 57.3, 66.1, 82.4, 126.7, 127.8, 128.1, 128.2, 128.5, 140.2, 142.2, 153.5, 172.0; \(m/z\) (ESI\(^+\)) 437 (MH\(^+\), 100%); HRMS (ESI\(^+\)) 437.2803 (C\(_{27}\)H\(_{36}\)N\(_2\)O\(_3\) requires 437.2804).

Method B

**β-Amino-oxazolidinone 9** (150 mg, 0.37 mmol, 1.0 eq) was reacted with LiHMDS (0.80 mL, 0.80 mmol, 1.1 eq), followed by MeI (35 µL, 0.55 mmol, 1.5 eq) according to General Procedure 3, giving 12 in 96% de. Purification by column chromatography (silica, 9:1 pentane:ether, v/v) furnished 12 (138 mg, 86%) as a white crystalline solid with identical physical and spectroscopic properties to those described above.

\((4S,2'S,\alpha S)-5,5\text{-Dimethyl}-4\text{-iso-propyl-3-}[3'-[N\text{-benzyl-N-(}\alpha\text{-methylbenzyl})\text{amino]-2'-methylpropanoylo} \text{oxazolidin-2-one 13}\)

Method A

**N-Acryloyl-oxazolidinone 4** (150 mg, 0.71 mmol, 1.0 eq) was reacted with \((R)-N\text{-benzyl-}(N\text{-}\alpha\text{-methylbenzyl})\text{amine (240 mg, 1.14 mmol, 1.6 eq)}\) and \(n\text{-BuLi (0.46 mL, 1.14 mmol, 1.6 eq)}\), followed by MeI (71 µL, 2.27 mmol, 1.6 eq) according to General Procedure 2, giving 13 in 95% de. Purification by
column chromatography (silica, 9:1 pentane:ether, v/v) furnished 13 (201 mg, 65%) as a yellow oil; $[\alpha]^2_B = 12.3$ (c 1.1, CHCl$_3$); $\nu_{max}$/cm$^{-1}$ (film) 1773, 1699; $\delta_H$ (400MHz, CDCl$_3$) 0.92 (3H, d, J 6.8, CHMe$_2$), 1.00 (3H, d, J 7.1, CHMe$_2$), 1.02 (3H, dd, J 6.8, COCHMe), 1.39 (3H, s, CMe$_2$), 1.41 (3H, d, J 7.1, NCHMe), 1.51 (3H, s, CMe$_2$), 2.09–2.19 (1H, m, CHMe$_2$), 2.63 (1H, dd, $J_{AB}$ 13.0, $J_{AX}$ 7.3, COCHCH$_2$), 2.74 (1H, dd, $J_{BA}$ 13.0, $J_{BX}$ 6.8, COCHCH$_2$), 3.42 (1H, d, $J_{AB}$ 13.0, $J_{AX}$ 7.3, COCHCH$_2$), 3.72 (1H, d, J 14.2, NCH$_2$Ph), 3.90 (1H, d, J 7.1, NCH$_2$Ph), 4.01–4.10 (1H, m, COCHMe), 4.12 (1H, d, J 3.3, NCH$iPr$), 7.22–7.42 (10H, m, Ph); $\delta_C$ (100MHz, CDCl$_3$) 16.6, 16.6, 16.9, 21.4, 21.4, 28.7, 29.6, 32.8, 55.0, 58.1, 61.6, 82.4, 126.7, 127.9, 128.1, 128.3, 128.5, 128.9, 140.3, 142.0, 155.2, 176.9; $m/z$ (ESI$^+$) 437 (MH$^+$, 100%); HRMS (ESI$^+$) 437.2809 (C$_{27}$H$_{36}$N$_2$O$_3$ requires 437.2804).

**Method B**

$\beta$-Amino-oxazolidinone 10 (100 mg, 0.23 mmol, 1.0 eq) was reacted with LiHMDS (0.26 mL, 1.0 M, 0.26 mmol, 1.1 eq), followed by MeI (25 µL, 0.36 mmol, 1.5 eq) according to General Procedure 3, giving 13 in 96% de. Purification by column chromatography (silica, 9:1 pentane:ether, v/v) yielded 13 (90 mg, 87%) as a yellow oil with identical physical and spectroscopic properties to those described above.

$\text{(2'S,4'S)-5,5-Dimethyl-4-\textit{iso}-propyl-3-[3'-(N,N-dibenzylamino)-2'-benzyl-propanoyl]oxazolidin-2-one 14}$

$N$-Acryloyl-oxazolidinone 4 (333 mg, 1.58 mmol, 1.0 eq) was reacted with dibenzylamine (0.49 mL, 2.53 mmol, 1.6 eq) and n-ButLi (1.01 mL, 2.53 mmol, 1.6 eq), followed by benzylbromide (0.28 mL, 21.5 mmol, 1.5 eq) according to General Procedure 2, giving 14 in 97% de. Purification by column chromatography (silica, 9:1 pentane:ether, v/v) afforded 14 (670 mg, 85%) as a white crystalline solid (Found: C, 76.6; H, 7.7; N, 5.5%. C$_{32}$H$_{38}$N$_2$O$_3$ requires C, 77.1; H, 7.7; N, 5.6%); mp 75–76 °C; $[\alpha]^2_B = +15.0$ (c 1.8, CHCl$_3$); $\nu_{max}$/cm$^{-1}$ (CHCl$_3$) 1772, 1709; $\delta_H$ (400MHz, CDCl$_3$) 0.62 (3H, d, J 7.2, CHMe$_2$), 0.76 (3H, d, J 7.1, CHMe$_2$), 1.43 (3H, s, CMe$_2$), 1.48 (3H, s, CMe$_2$), 1.93–2.01 (1H, m, CHMe$_2$), 2.56 (1H, dd, $J_{AB}$ 12.6, $J_{AX}$ 6.2, $CH_2$NBn$_2$), 2.83 (1H, dd, $J_{AB'}$ 13.6, $J_{AX'}$ 9.1, $CH_2$Ph), 2.91 (1H, dd, $J_{BA}$ 12.6, $J_{BX}$ 8.0, $CH_2$NBn$_2$), 3.00 (1H, d, $J_{BA'}$ 13.6, $J_{BX'}$ 6.2, $CH_2$Ph), 3.65 (2H, d, J 13.7, NCH$_2$Ph), 3.79 (2H, d, J 13.6, NCH$_2$Ph), 4.13 (1H, d, J 2.8, NCH$iPr$), 4.74–4.85 (1H, m, COCH), 7.14–7.36 (15H, m, Ph); $\delta_C$ (100MHz, CDCl$_3$) 16.3, 21.0,
(2'S,4'S)-5,5-Dimethyl-4-iso-propyl-3-[3'-(N,N-dibenzylamino)-2'-allyl-propanoyl]oxazolidin-2-one 15

N-Acryloyl-oxazolidinone 4 (333mg, 1.58mmol, 1.0eq) was reacted with dibenzyamine (0.486mL, 2.53mmol, 1.6eq) and n-BuLi (1.01mL, 2.5M, 2.53mmol, 1.6eq), followed by allylbromide (0.205mL, 21.5mmol, 1.5eq) according to General Procedure 2, giving 15 in 96% de. Purification by column chromatography (silica, 9:1 pentane:ether, v/v) afforded 15 (582mg, 82%) as a colourless, viscous oil; \([\alpha]_D^{25} +24.6\) (c 1.6, CHCl_3); \(\nu_{\text{max}}/\text{cm}^{-1}\) (CHCl_3) 1769, 1697; \(\delta_{\text{H}}(400\text{MHz, CDCl}_3)\) 0.96 (3H, d, J 6.8, CHMe_2), 1.01 (3H, d, J 7.0, CHMe_2), 1.44 (3H, s, CMe_2), 1.53 (3H, s, CMe_2), 2.10–2.21 (1H, m, CHMe_2), 2.31–2.39 (1H, m, CH_2CH=CH_2), 2.41–2.50 (1H, m, CH_2CH=CH_2), 2.56 (1H, dd, J_{AB} 12.7, J_{AX} 6.2, CH_2NBn_2), 2.87 (1H, dd, J_{BA} 15.0, J_{BX} 8.0, CH_2NBn_2), 3.59 (2H, d, J 7.5, NC_4H_9Ph), 3.63 (2H, d, J 7.7, NC_4H_9Ph), 4.21 (1H, d, J 2.8, NCH), 4.42–4.48 (1H, m, COCH), 5.00–5.11 (2H, m, CH=CH_2), 5.74–5.89 (1H, m, CH=CH_2), 7.15–7.37 (10H, m, Ph); \(\delta_{\text{C}}(100\text{MHz, CDCl}_3)\) 16.9, 21.4, 21.4, 28.8, 29.6, 35.4, 41.0, 55.8, 58.3, 66.5, 82.5, 117.0, 126.9, 128.1, 129.1, 135.4, 138.9, 153.5, 175.5; \(m/z\) (ESI\(^+\)) 499 (100%); HRMS (ESI\(^+\)) 499.2964 (C_{32}H_{39}N_2O_3 requires 499.2961).

(2'S,4'S)-5,5-Dimethyl-4-iso-propyl-3-[3'-(N,N-dibenzylamino)-2'-ethyl-propanoyl]oxazolidin-2-one 16

N-Acryloyl-oxazolidinone 4 (333mg, 1.58mmol, 1.0 eq) was reacted with dibenzyamine (0.49 mL, 2.53 mmol, 1.6 eq) and n-BuLi (1.01 mL, 2.53 mmol, 1.6 eq), followed by ethylidiodide (0.19 mL, 21.5 mmol, 1.5 eq) according to General Procedure 2, giving 16 in 96% de. Purification by column chromatography (silica, 9:1 pentane:ether, v/v) afforded 16 (429 mg, 62%) as a white crystalline solid (Found: C, 74.5; H, 8.1; N, 6.45%. C_{27}H_{36}N_2O_3 requires C, 74.3; H, 8.3, N, 6.4%); mp 78–79 °C; \([\alpha]_D^{25} +20.0\) (c 2.3, CHCl_3); \(\nu_{\text{max}}/\text{cm}^{-1}\) (CHCl_3) 1770, 1695; \(\delta_{\text{H}}(400\text{MHz, CDCl}_3)\) 0.93 (3H, t, J 7.5, CH_2Me), 0.99 (3H, d, J 6.8, CHMe_2), 1.05 (3H, d, J 7.1, CHMe_2), 1.45 (3H, s, CMe_2), 1.54 (3H, s, CMe_2), 1.61–1.72 (2H, m, CH_2Me), 2.14–2.23 (1H, m, CHMe_2), 2.55 (1H, dd, J_{AB} 12.7, J_{AX} 5.9, CH_2NBn_2), 2.89 (1H, dd, J_{BA} 12.7, J_{BX} 8.3, CH_2NBn_2),
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3.60 (4H, AB q, $J_{13.7}$, NCH$_2$Ph), 4.24 (1H, d, $J_{2.9}$, NCH$_2$Pr), 4.24–4.31 (1H, m, COCH$_2$), 7.21–7.38 (10H, m, Ph); $\delta_C$ (100MHz, CDCl$_3$) 11.5, 17.0, 21.4, 21.5, 24.3, 28.8, 29.6, 42.6, 55.8, 58.3, 66.4, 82.4, 126.9, 128.1, 129.1, 138.9, 153.5, 176.3; $m/z$ (ESI$^+$) 437 (MH$^+$, 100%); HRMS (ESI$^+$) 437.2813 (C$_{27}$H$_{37}$N$_2$O$_3$ requires 437.2804).

(2'S,4S)-5,5-Dimethyl-4-iso-propyl-3-[3'-(N,N-dibenzylamino)-2'-iso-propyl-propanoyl]oxazolidin-2-one 17

N-Acryloyl-oxazolidinone 4 (333 mg, 1.58 mmol, 1.0 eq) was reacted with dibenzylamine (0.486 mL, 2.53 mmol, 1.6 eq) and $n$-BuLi (1.01 mL, 2.53 mmol, 1.6 eq), followed by 2-iodopropane (0.237 mL, 21.5 mmol, 1.5 eq) according to General Procedure 2, giving 17 in 96% de. Purification by column chromatography (silica, 9:1 pentane:ether, v/v) afforded 17 as a colourless, viscous oil (57 mg, 8%); $[\alpha]_{D}^{25} +12.0$ (c 0.1, CHCl$_3$); $\delta_H$ (400MHz, CDCl$_3$) 0.89 (3H, d, $J_{6.1}$, COCHCH$_2$Me), 0.91 (3H, d, $J_{6.3}$, COCHCHMe$_2$), 1.05 (3H, d, $J_{6.8}$, CHMe$_2$), 1.12 (3H, d, $J_{7.1}$, CHMe$_2$), 1.38 (3H, s, CMe$_2$), 1.54 (3H, s, CMe$_2$), 1.81 (1H, m, COCHCHMe$_2$), 2.22 (1H, m, CHMe$_2$), 2.56 (1H, dd, $J_{AB} 12.7$, $J_{AX} 3.8$, CH$_2$NBn$_2$), 3.04 (1H, dd, $J_{BA} 12.7$, $J_{AB} 10.4$, CH$_2$NBn$_2$), 3.46 (2H, d, $J_{13.7}$, NCH$_2$Ph), 3.66 (2H, d, $J_{13.6}$, NCH$_2$Ph), 4.24 (1H, d, $J_{2.7}$, NCH$_2$). 

(4S,$\alpha$R)-5,5-Dimethyl-4-iso-propyl-3-[1'-triethylsilyloxy-3'-[N-benzyl-N-(\alpha-methylbenzyl)amino]prop-1'-enyl]oxazolidin-2-one 18

Method A

N-Acryloyl-oxazolidinone 4 (80 mg, 0.38 mmol, 1.0 eq) was reacted with (R)-N-benzyl-(N-\(\alpha\)-methylbenzyl)amine (130 mg, 0.61 mmol, 1.6 eq) and $n$-BuLi (0.24 mL, 0.61 mmol, 1.6 eq), followed by triethylsilyl chloride (64 µL, 0.61 mmol, 1.6 eq) according to General Procedure 4 furnishing 18 and starting material 4 in a 4:1 ratio; $\nu_{max}/$cm$^{-1}$ (film) 1756; $\delta_H$ (400MHz, CDCl$_3$) 0.60 (6H, q, $J_{7.9}$, Si(CH$_2$Me)$_2$), 0.91 (9H, t, $J_{7.9}$, Si(CH$_2$Me)$_3$), 1.04 (3H, d, $J_{6.8}$, CHMe$_2$), 1.06 (3H, d, $J_{7.3}$, CHMe$_2$), 1.41 (3H, d, $J_{6.8}$, NCHMe), 1.44 (6H, s, CMe$_2$), 1.98–2.06 (1H, m, CHMe$_2$), 3.10 (1H, dd, $J_{AB} 14.4$, $J_{AX} 8.8$
COCH$_2$, 3.31 (1H, dd, $J_{BA}$ 14.4, $J_{BX}$ 4.6 COCH$_2$), 3.36 (1H, d, $J$ 14.1 NCH$_2$Ph), 3.56 (1H, d, $J$ 2.5, NCH$_2$Pr), 3.62 (1H, d, $J$ 14.1 NCH$_2$Ph), 3.87 (1H, q, $J$ 6.8, NCHMe), 5.17 (1H, dd, $J_{XA}$ 8.8, $J_{XB}$ 4.6 C=CH$_2$), 7.18–7.45 (10H, m, Ph); $\delta$C (100MHz, CDCl$_3$) 5.1, 6.6, 16.1, 16.5, 20.7, 22.2, 29.7, 29.7, 44.7, 53.7, 57.5, 67.9, 80.5, 103.8, 126.6, 126.7 127.7, 128.0, 128.5, 140.0, 140.7, 143.3, 154.9; $m/z$ (ESI$^+$) 537 (MH$^+$, 30%); HRMS (ESI$^+$) 537.3513 (C$_{32}$H$_{48}$N$_2$O$_3$Si requires 537.3511).

**Method B**

(4S,aR)-9 (80 mg, 0.19 mmol, 1.0 eq) was reacted with LiHMDS (0.21 mL, 0.21 mmol, 1.1 eq), followed by triethylsilyl chloride (48 µL, 0.29 mmol, 1.5 eq) according to **General Procedure 5** to yield 18 and recovered starting material 9 in a 5:1 ratio with identical spectroscopic properties as those described above.

(4S,aS)-5,5-Dimethyl-4-iso-propyl-3-{1'-triethylsilyloxy-3'-[N-benzyl-N-(a-methylbenzyl)amino]prop-1'-enyl}-oxazolidin-2-one 19

![Structure](image)

**Method A**

N-Acryloyl-oxazolidinone 4 (80 mg, 0.38 mmol, 1.0 eq) was reacted with (S)-N-benzyl-(N-α-methylbenzyl)amine (130 mg, 0.61 mmol, 1.6 eq) and n-BuLi (0.24 mL, 0.61 mmol, 1.6 eq), followed by triethylsilyl chloride (64 µL, 0.61 mmol, 1.6 eq) according to **General Procedure 4** to give 19 and returned starting material 4 in a 2:1 ratio; $\nu_{max}$/cm$^{-1}$ (film) 1759; $\delta$H (400MHz, CDCl$_3$) 0.60 (6H, q, $J$ 8.1, Si(CH$_2$Me)$_3$), 0.96 (9H, t, $J$ 8.1, Si(CH$_2$Me)$_3$), 1.04 (3H, d, $J$ 6.8, CHMe$_2$), 1.05 (3H, d, $J$ 7.3, CHMe$_2$), 1.37 (3H, d, $J$ 6.8, NCHMe), 1.44 (6H, s, CMe$_2$), 1.97–2.05 (1H, m, CHMe$_2$), 3.08 (1H, dd, $J_{AB}$ 14.4, $J_{AX}$ 4.4 CCHCH$_2$), 3.34 (1H, dd, $J_{BA}$ 14.4, $J_{BX}$ 9.1, CCHCH$_2$), 3.47 (1H, d, $J$ 13.9, NCH$_2$Ph), 3.57 (1H, d, $J$ 2.3, NCH$_2$Pr), 3.62 (1H, d, $J$ 13.9 NCH$_2$Ph), 3.92 (1H, q, $J$ 6.8, NCHMe), 5.17 (1H, dd, $J_{XA}$ 9.1, $J_{XB}$ 4.5, C=CH$_2$), 7.18–7.43 (10H, m, Ph); $\delta$C (100MHz, CDCl$_3$) 5.1, 6.6, 16.1, 16.5, 20.7, 22.2, 29.7, 29.7, 44.7, 53.7, 57.5, 67.9, 80.5, 103.8, 126.6, 126.7 127.7, 127.8, 128.0, 128.5, 140.5, 141.0 143.2, 154.9; $m/z$ (ESI$^+$) 537 (MH$^+$, 30%); HRMS (ESI$^+$) 537.3513 (C$_{32}$H$_{48}$N$_2$O$_3$Si requires 537.3511).

**Method B**
(4S,αS)-10 (80 mg, 0.19 mmol, 1.0 eq) was reacted with LiHMDS (0.21 mL, 0.21 mmol, 1.1 eq), followed by triethylsilyl chloride (48 µL, 0.29 mmol, 1.5 eq) according to General Procedure 5 to yield 19 and returned starting material 10 in a 3:1 ratio with identical spectroscopic properties as those described above.

**Methyl (S)-3-(N,N-dibenzylamino)-2-methyl propanoate 28**

\[
\begin{align*}
\text{Bn}_2N & \quad \text{CO}_2\text{Me} \\
\text{Me} & \quad \text{Bn}_2N
\end{align*}
\]

3'-Amino-2'-methyl-oxazolidinone 11 (200 mg, 0.47 mmol, 1.0 eq) was reacted with n-BuLi (890 µL, 1.6 M, 1.42 mmol, 3.0 eq) according to General Procedure 8. Purification by column chromatography (silica, 49:1 to 19:1 pentane:ether, v/v) afforded (S)-28 as a colourless oil (137 mg, 98%); \([\alpha]_D^{25} +9.9\) (c 0.5, CHCl₃); \(\nu_{\text{max}}/\text{cm}^{-1} (\text{CHCl}_3) 1728; \delta_{\text{H}} (400\text{MHz, CDCl}_3) 1.13 (3\text{H}, \text{d}, J 6.2, \text{CHMe}) , 2.44 (1\text{H}, \text{dd}, J_{\text{AB}} 16.1, J_{\text{AX}} 10.1, \text{CCHC}_2), 2.75–2.82 (2\text{H}, \text{m}, \text{CCHCH}_2, \text{CCHCH}_2), 3.50 (2\text{H}, \text{d}, J 13.4, \text{NCH}_2\text{Ph}), 3.64 (2\text{H}, \text{d}, J 13.4, \text{NCH}_2\text{Ph}), 3.66 (3\text{H}, \text{s}, \text{OMe}), 7.22–7.42 (10\text{H}, \text{m}, \text{Ph}); \delta_{\text{C}} (100\text{MHz, CDCl}_3) 15.3, 38.6, 51.4, 57.4, 58.4, 126.9, 128.1, 128.9, 139.2, 176.2; \text{m/z} (\text{ESI}^+) 298 (\text{MH}^+, 100\%); \text{HRMS (ESI}^+) 298.1803 (\text{C}_{19}\text{H}_{24}\text{NO}_2 \text{requires 298.1807}).

**Method A:**

3'-Amino-2'-methyl-oxazolidinone 11 (1.20 g, 2.84 mmol, 1.0 eq) was reacted with LiOH (596 mg, 14.2 mmol, 5.0 eq) according to General Procedure 6. The crude mixture of products was treated with Pd (400mg, 10% wt on C) under \text{H}_2 (1\text{atm}) according to General Procedure 7. The solvent was removed \textit{in vacuo} and the residue co-evaporated with aq. HCl (2 M). Purification by ion exchange chromatography (Dowex 50W-X8, 1M aq. NH₄OH eluent) yielded the free amino acid (S)-25 as a white crystalline solid (246 mg, 84\%); mp 175–177°C \{lit.\textsuperscript{5} 179–181°C\}; \([\alpha]_D^{25} +17.0\) (c 1.0, \text{H}_2\text{O}) \{lit.\textsuperscript{5} \([\alpha]_D^{25} +14.2\) (c 1.0, \text{H}_2\text{O})\}; \delta_{\text{H}} (200\text{MHz, CDCl}_3) 1.05 (3\text{H}, \text{d}, J 7.3, \text{CHMe}), 2.44–2.51 (1\text{H}, \text{d}, J_{\text{AB}} 12.8, J_{\text{AX}} 7.3, \text{CCHCH}_2), 2.97 (1\text{H}, \text{dd}, J_{\text{BA}} 12.8, J_{\text{BX}} 8.3, \text{CCHCH}_2).

**Method B:**

β-Amino ester 28 (100 mg, 0.34 mmol, 1.0 eq) was treated with Pd (50 mg, 10% wt on C) under H₂ (1 atm) according to **General Procedure 7**. The crude product was treated with LiOH (71 mg, 1.70 mmol, 5.0 eq) according to **General Procedure 9**. The solvents were removed *in vacuo* and the residue co-evaporated with aq. HCl (2 M). Purification by ion exchange chromatography yielded the free amino acid (S)-25 as a white crystalline solid (33 mg, 95%) with identical spectroscopic properties to those described above.

**Methyl (S)-3-(N,N-dibenzylamino)-2-benzyl-propanoate 29**

![Chemical Structure](attachment:image.png)

3'-Amino-2'-benzyl-oxazolidinone 14 (200 mg, 0.40 mmol, 1.0 eq) was treated with n-BuLi (750 μL, 1.20 mmol, 3.0 eq) according to **General Procedure 8**. Purification by column chromatography (silica, 49:1 to 19:1 pentane:ether, v/v) afforded (S)-29 as a colourless oil (148 mg, 99%); [α]$_D^{25}$ +22.7 (c 1.1, CHCl$_3$); $\nu_{\text{max}}$/cm$^{-1}$ (CHCl$_3$) 1731; $\delta$H (400MHz, CDCl$_3$) 2.57 (1H, dd, $J_{AB}$ 12.6, $J_{AX}$ 5.8, CCH$_2$N), 2.81 (2H, d, $J_{7.4}$, CH$_2$Ph), 2.88 (1H, dd, $J_{BA}$ 12.6, $J_{BX}$ 9.1, CCH$_2$N), 3.00–3.07 (1H, m, CCH$_2$), 3.48 (2H, d, $J_{13.5}$, NCH$_2$Ph), 3.60 (3H, s, OMe), 3.71 (2H, d, $J_{13.5}$, NCH$_2$Ph), 7.11–7.39 (15H, m, Ph); $\delta$C (100MHz, CDCl$_3$) 36.5, 46.9, 51.4, 55.9, 58.5, 126.3, 127.0, 128.4, 128.7, 129.0, 139.1, 139.2, 174.9; m/z (ESI$^+$) 374 (MH$^+$, 100%); HRMS (ESI$^+$) 374.2101 (C$_{25}$H$_{28}$NO$_2$ requires 374.2120).

(S)-3-Amino-2-benzyl propanoic acid 31

![Chemical Structure](attachment:image.png)

β-Amino ester 29 (373 mg, 1.00 mmol, 1.0 eq) was treated with Pd (200mg, 10% wt on C) under H₂ (1 at atm) according to **General Procedure 7**. The crude product was treated with LiOH (210 mg, 5.00 mmol, 5.0 eq) according to **General Procedure 9**. The solvents were removed *in vacuo* and the residue co-evaporated with aq. HCl (2 M). Purification by ion exchange chromatography (Dowex 50W-X8, 1M aq. NH$_4$OH eluent) yielded the free amino acid (S)-31 as a white crystalline solid (160 mg, 89%); mp 212–213°C {lit. 6 for (R)-31 [α]$_D^{25}$ +17.8 (c 1.0, H$_2$O)}; δH (400MHz, D$_2$O) 2.85 (1H, dd, $J_{AB}$ 12.5, $J_{AX}$ 6.0, CCH$_2$N), 2.95 (1H, dd, $J_{BA}$ 12.5, $J_{BX}$ 9.0, CCH$_2$N), 3.00–3.13 (3H, m, CCH$_2$Ph and CCH$_2$), 7.17–7.42 (5H, m, Ph).

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**Methyl (S)-3-\((N,N\text{-dibenzylamino})\)-2-ethyl-propanoate 30**

\[ \text{Bn}_2\text{N} \quad \text{Et} \quad \text{CO}_2\text{Me} \]

3'-Amino-2'-ethyl-oxazolidinone 16 (200 mg, 0.46 mmol, 1.0 eq) was treated with \(n\)-BuLi (860 \( \mu \)L, 1.37 mmol, 1.6 M, 3.0 eq) according to **General Procedure 8**. Purification by column chromatography (silica, 49:1 to 19:1 pentane:ether, v/v) afforded \((S)-30\) as a colourless oil (137 mg, 96%); \([\alpha]_D^{25} +31.2\ (c\ 0.9, \text{CHCl}_3)\); \(\nu_{\text{max}}/\text{cm}^{-1}\) (CHCl\(_3\)) 1728; \(\delta_{\text{H}}\) (400MHz, CDCl\(_3\)) 0.85 (3H, t, \(J\ 7.5\), CHCH\(_2\)Me), 1.48–1.56 (2H, m, CHC\(_2\)Me), 1.97 (1H, dd, \(J_{AB}\ 12.4\), \(J_{AX}\ 5.5\), CHCH\(_2\)N), 2.63–2.70 (1H, m, C\(_{\text{H}}\)), 2.79 (1H, dd, \(J_{BA}\ 12.4\), \(J_{BX}\ 9.3\), C(3)H\(_2\)), 3.44 (2H, d, \(J_{13.6}\), NCH\(_2\)Ph), 3.67 (3H, s, OMe), 3.70 (2H, d, \(J_{13.6}\), NCH\(_2\)Ph), 7.22–7.38 (10H, m, Ph); \(\delta_{\text{C}}\) (100MHz, CDCl\(_3\)) 11.8, 23.5, 46.5, 51.3, 56.0, 58.4, 126.9, 128.1, 128.9, 139.2, 175.6; \(m/z\) (ESI\(^+\)) 312 (MH\(^+\), 100%); HRMS (ESI\(^+\)) 312.1960 (C\(_{20}\)H\(_{26}\)NO\(_2\) requires 312.1964).

\((S)-3\)-Amino-2-ethyl propanoic acid 32

\[ \text{H}_2\text{N}\quad \text{CO}_2\text{Me} \quad \text{CO}_2\text{H} \]

\(\beta\)-Amino ester 30 (357 mg, 1.15 mmol, 1.0 eq) was treated with Pd (200mg, 10% wt on C) under H\(_2\) (1atm) according to **General Procedure 7**. The crude product was treated with LiOH (241 mg, 5.75 mmol, 5.0 eq) according to **General Procedure 9**. The solvents were removed \textit{in vacuo} and the residue co-evaporated with aq. HCl (2 M). Purification by ion exchange chromatography (Dowex 50W-X8, 1M aq. NH\(_4\)OH eluent) yielded the free amino acid (\(S\)-32) as a white crystalline solid (125 mg, 93%); mp 220–221\(^\circ\)C {lit.\(^7\) 206–207\(^\circ\)C}; \([\alpha]_D^{25} = -6.8\ (c\ 0.4, \text{H}_2\text{O})\) {lit.\(^7\) for (\(R\)-32) \([\alpha]_D^{25} = +4.5\ (c\ 1.0, \text{H}_2\text{O})\)}; \(\delta_{\text{H}}\) (400MHz, D\(_2\)O) 0.78 (3H, t, \(J_{7.4}\), CH\(_2\)Me), 1.44–1.51 (2H, m, CH\(_2\)Me), 2.31–2.39 (1H, m, C(2)H\(_2\)), 2.91 (1H, dd, \(J_{AB}\ 12.9\), \(J_{AX}\ 5.1\), C(3)H\(_2\)), 3.00 (1H, dd, \(J_{BA}\ 12.9\), \(J_{BX}\ 8.6\), C(3)H\(_2\)).

**Ethyl 2-benzyl-3-oxo-butyrate 33**

\[ \text{O} \quad \text{CO}_2\text{Et} \quad \text{CO}_2\text{Et} \]

Potassium \(\text{tert}\)-butoxide (4.31 g, 38.4 mmol, 1.1 eq) was treated with ethyl acetoacetate (4.77 mL, 37.7 mmol, 1.0 eq) and \(\text{tert}\)-butanol (335 \( \mu \)L, 3.5 mmol, 0.1 eq) followed by benzylbromide (4.45 mL, 37.4 mmol, 1.0 eq) according to **General Procedure 8**. Purification by column chromatography (silica, 49:1 to 19:1 pentane:ether, v/v) afforded \((S)-33\) as a colourless oil (173 mg, 93%); \([\alpha]_D^{25} = +30.9\ (c\ 1.0, \text{CHCl}_3\))

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mmol, 0.99 eq) according to General Procedure 10. Purification by column chromatography (silica, 19:1 pentane: ether, v/v) afforded 33 as a colourless oil (7.25 g, 88%); $\delta$$_H$ (200MHz, CDCl$_3$) 1.18 (3H, t, J 7.2, CH$_2$Me), 2.17 (3H, s, CO$_2$Me), 3.14 (2H, d, J 7.2, CH$_2$Ph), 3.76 (1H, t, J 7.6, CHCH$_2$Ph), 4.13 (2H, q, J 7.2, CH$_2$Me), 7.08–7.29 (5H, m, Ph).

**Ethyl 2-benzyl acrylate 36**

![Ethyl 2-benzyl acrylate](image)

Ethyl 2-benzyl-3-oxo-butyrate 33 (3.0 g, 14 mmol, 1.0 eq) was treated with LiHMDS (15 mL, 1.0 M, 15 mmol, 1.1 eq) followed by paraformaldehyde (2.5 g, xs) according to General Procedure 11. Purification by column chromatography (silica, 49:1 pentane: ether, v/v) afforded 36 as a colourless oil (2.1 g, 80%); $\delta$$_H$ (200MHz, CDCl$_3$) 1.25 (3H, t, J 7.2, OCH$_2$Me), 3.62 (2H, app s, CH$_2$Ph), 4.17 (2H, q, J 7.1, OCH$_2$Me), 5.42–5.46 (1H, m, C=CPh), 6.21–6.25 (1H, m, C=CH$_2$), 7.13–7.32 (5H, m, Ph).

**2-Benzyl acrylic acid 39**

![2-Benzyl acrylic acid](image)

Ethyl 2-benzyl acrylate 36 (2.5 g, 13 mmol, 1.0 eq) was treated with LiOH (2.8 g, 66 mmol, 5.0 eq) according to General Procedure 9. Upon cooling, the mixture was acidified to pH 2 and the product extracted with ether (3×100 mL). The combined organic extracts were dried and the solvents removed in vacuo to afford 39 as a white crystalline solid which was used without further purification (2.1 g, quant.); mp 61–63°C (lit. 66–68°C); $\delta$$_H$ (200MHz, CDCl$_3$) 3.63 (2H, app s, CH$_2$Ph), 5.56–5.60 (1H, m, C=CH$_2$), 6.37–6.41 (1H, m, C=CH$_2$), 7.14–7.39 (5H, m, Ph).

**Ethyl 2-ethyl-3-oxo-butyrate 34**

Potassium tert-butoxide (8.8 g, 77 mmol, 1.1 eq) was treated with ethyl acetoacetate (9.6 mL, 75 mmol, 1.0 eq) and tert-butanol (670 μL, 7.0 mmol, 0.1 eq) followed by ethyl iodide (6.0 mL, 75 mmol, 0.99 eq) according to General Procedure 10. Purification by column chromatography (silica, 19:1 pentane: ether, v/v) afforded 34 as a colourless oil (8.8 g, 74%); $\delta$$_H$ (200MHz, CDCl$_3$) 0.89 (3H, t, J 7.5, CHCH$_2$Me), 1.24

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(3H, t, $J \approx 7.2$, OCH$_2$Me), 1.76–1.90 (2H, m, CHCH$_2$Me), 2.19 (3H, s, COMe), 3.30 (1H, t, $J \approx 7.4$, CHCH$_2$Me), 4.16 (2H, q, $J \approx 7.2$, OCH$_2$Me).

**Ethyl 2-ethyl acrylate 37**

![Ethyl 2-ethyl acrylate](image1)

Ethyl 2-ethyl-3-oxo-butrate 34 (5.0 g, 32 mmol, 1.0 eq) was treated with LiHMDS (35 mL, 1.0 M, 35 mmol, 1.1 eq) followed by paraformaldehyde (2.5 g, xs) according to **General Procedure 11**. Purification by column chromatography (silica, 49:1 pentane: ether, v/v) afforded 37 as a colourless oil (3.5 g, 85%); $\delta$$_H$ (400MHz, CDCl$_3$) 1.05 (3H, t, $J \approx 7.4$, CH$_2$Me), 1.28 (3H, t, $J \approx 7.2$, OCH$_2$Me), 2.27–2.34 (2H, m, CH$_2$Me), 4.16 (2H, q, $J \approx 7.1$, OCH$_2$Me), 5.47–5.51 (1H, m, C=CH$_2$), 6.06–6.10 (1H, m, C=CH$_2$).

**2-Ethyl acrylic acid 40**

![2-Ethyl acrylic acid](image2)

Ethyl 2-ethyl acrylate 37 (2.6 g, 20 mmol, 1.0 eq) was treated with LiOH (5.4 g, 101 mmol, 5.0 eq) according to **General Procedure 9**. Upon cooling, the mixture was acidified to pH 2 and the product extracted with ether (3 × 50 mL). The combined organic extracts were dried and the solvents removed in vacuo to yield 40 as a colourless oil which was used without further purification (1.98 g, 99%); $\delta$$_H$ (200MHz, CDCl$_3$) 1.05 (3H, t, $J \approx 7.4$, CH$_2$Me), 2.28 (2H, app q, $J \approx 7.4$, CH$_2$Me), 5.57 (1H, app d, $J \approx 1.4$, C=CH$_2$), 6.20 (1H, app d, $J \approx 0.8$, C=CH$_2$).

**Ethyl 2-iso-propyl-3-oxo-butrate 35**

![Ethyl 2-iso-propyl-3-oxo-butrate](image3)

Potassium tert-butoxide (8.8 g, 77 mmol, 1.1 eq) was treated with ethyl acetoacetate (9.6 mL, 75 mmol, 1.0 eq) and tert-butanol (670 μL, 7.0 mmol, 0.1 eq) followed by 2-iodopropane (7.48 mL, 75 mmol, 0.99 eq) according to **General Procedure 10**. Purification by column chromatography (silica, 19:1 pentane: ether, v/v) afforded 35 as a colourless oil (8.0 g, 62%); $\delta$$_H$ (200MHz, CDCl$_3$) 0.90 (3H, d, $J \approx 6.7$, CHMe$_2$), 0.95 (3H, d, $J \approx 6.7$, CHMe$_2$), 1.24 (3H, t, $J \approx 7.1$, CH$_2$Me), 2.20 (3H, s, COMe), 2.35–2.44 (1H, m, CHMe$_2$), 3.15 (1H, d, $J \approx 9.5$, CHCHMe$_2$), 4.16 (2H, q, $J \approx 7.1$, CH$_2$Me).

**Ethyl 2-iso-propyl acrylate 38**
Ethyl 2-iso-propyl-3-oxo-butyrate 35 (3.0 g, 17 mmol, 1.0 eq) was treated with LiHMDS (19 mL, 1.0 M, 19 mmol, 1.1 eq) followed by paraformaldehyde (2.5 g, xs) according to **General Procedure 11**. Purification by column chromatography (silica, 49:1 pentane: ether, v/v) afforded 38 as a colourless oil (1.98 g, 82%); \( \delta_H \) (200 MHz, CDCl\(_3\)) 1.05 (6H, d, \( J = 6.8 \), CHMe\(_2\)), 1.24 (3H, t, \( J = 7.0 \), CH\(_2\)Me), 2.76–2.82 (1H, m, CHMe\(_2\)), 4.18 (2H, q, \( J = 7.1 \), CH\(_2\)Me), 5.47 (1H, app s, C=CH\(_2\)), 6.08 (1H, app s, C=CH\(_2\)).

**2-iso-Propyl acrylic acid 41**

Ethyl 2-iso-propyl acrylate 38 (1.0 g, 7.0 mmol, 1.0 eq) was treated with lithium hydroxide (1.5 g, 35.2 mmol, 5.0 eq) according to **General Procedure 9**. Upon cooling, the mixture was acidified to pH 2 and the product extracted with ether (3 × 50 mL). The combined organic extracts were dried and the solvents removed in vacuo to yield 41 as a colourless oil which was used without further purification (0.8 g, 99%); \( \delta_H \) (200 MHz, CDCl\(_3\)) 1.09 (6H, d, \( J = 6.8 \), CHMe\(_2\)), 2.75–2.83 (1H, sep, \( J = 6.8 \), CHMe\(_2\)), 5.63 (1H, d, \( J = 0.9 \), C=CH\(_2\)), 6.28 (1H, d, \( J = 0.9 \), C=CH\(_2\)).

**Methyl 2-phenyl acrylate 43**

To a stirred solution of methyl pyruvate (4.42 mL, 49 mmol, 1.0 eq) in THF (200 mL) was added phenyl magnesium bromide (49.5 mL, 1.0 M in THF, 49 mmol, 1.01 eq) dropwise with cooling to 0 °C. After addition was complete, the mixture was heated to 60 °C for 30 min, cooled, and quenched by the addition of water (10 mL). The resulting precipitate was dissolved with aq. HCl (1 M, 2 × 50 mL). The mixture was extracted with ethyl acetate (3 × 100 mL) and the combined organic layers washed with brine (2 × 50 mL), dried and the solvents removed in vacuo. The crude \( \alpha \)-hydroxy ester 42 was dissolved in toluene (500 mL) and pTSA (1.0 g, 5.0 mmol, 0.1 eq) was added. The resulting mixture was refluxed under Dean and Stark conditions for 4 h. Upon cooling the reaction mixture was washed with sat. aq. NaHCO\(_3\) (50 mL), brine (50 mL), dried and the solvent removed in vacuo. Purification by bulb-to-bulb distillation (bp 160–165°C/2 mmHg) afforded 43 as a pale yellow oil (5.6 g, 70%); \( \delta_H \) (400 MHz, CDCl\(_3\)) 3.84 (3H, s, OMe), 5.92 (1H, d, \( J = 1.2 \), C=CH\(_2\)), 6.39 (1H, d, \( J = 1.2 \), C=CH\(_2\)), 7.32–7.44 (5H, m, Ph).
2-Phenylacrylic acid 44

Methyl 2-phenylacrylate 43 (4.5 g, 28 mmol, 1.0 eq) was treated with LiOH (3.5 g, 83 mmol, 3.0 eq) according to General Procedure 9. Upon acidification to pH 2 with sat. aq. KHSO₄, the product was extracted with ethyl acetate (3 × 50 mL). The combined organic extracts were dried and the solvents removed in vacuo to afford 44 as a white crystalline solid (4.0 g, 97%); mp 100–102°C (lit.⁹ mp 107–108°C); ʻH (200MHz, CDCl₃) 6.04 (1H, d, ʻJ 1.1, C=C₆H₄), 6.57 (1H, d, ʻJ 1.1, C=C₆H₄), 7.31–7.51 (5H, m, Ph).

(S)-5,5-Dimethyl-4-iso-propyl-3-(2'-methylacryloyl)oxazolidin-2-one 45

To a stirred solution of oxazolidinone 2 (3.0 g, 19.1 mmol, 1.0 eq) in THF (60 mL) at −78 °C was added n-BuLi (7.7 mL, 2.5 M, 19.3 mmol, 1.01 eq) dropwise. The solution was stirred at −78 °C for 15 min before methacryloyl chloride (2.1 mL, 21.0 mmol, 1.1 eq) was added. The resulting solution was stirred at −78 °C for 30 min then at 0 °C for a further 15 min before quenching with sat. aq. NH₄Cl (5 mL). Upon warming to rt, the product was extracted with ether (3 × 30 mL). The combined organic extracts were washed with brine (30 mL), dried and the solvents removed in vacuo. Purification by column chromatography (silica, 7:3 pentane:ether, v/v) afforded 45 as a white crystalline solid (3.4 g, 79%); mp 56–57°C; [α]₂⁵⁺44.5 (c 2.2, CHCl₃); v_max/cm⁻¹ (CHCl₃) 1782, 1685, 1639; ʻH (400MHz, CDCl₃) 0.97 (3H, d, ʻJ 11.8, CHMe₂), 1.02 (3H, d, ʻJ 13.5, CHMe₂), 1.40 (3H, s, CMe₂), 1.51 (3H, s, CMe₂), 2.05 (3H, dd, JₓA 1.5, JₓB 1.2, H₂C=CMe), 2.10–2.21 (1H, m, CHMe₂), 4.18 (1H, d, ʻJ 3.4, NCH²Pr), 5.39–5.41 (2H, m, H₂C=C); ʻC (100MHz, CDCl₃) 17.0, 19.4, 21.4, 21.4, 29.0, 29.5, 66.1, 82.9, 120.0, 140.0, 152.7, 171.7; m/z (ESI⁺) 248 (MNa⁺, 100%); HRMS (ESI⁺) 226.1448 (C₁₂H₂₀NO₃ requires 226.1443).

(S)-5,5-Dimethyl-4-iso-propyl-3-(2'-benzylacryloyl)oxazolidin-2-one 46

2-Benzylacrylic acid 39 (1.00 g, 6.2 mmol, 1.25 eq) was reacted with oxalyl chloride (810 µL, 9.3 mmol, 1.86 eq) and Et3N (1.29 mL, 9.3 mmol, 1.86 eq), followed by oxazolidinone 2 (780 mg, 4.9 mmol, 1.0 eq) and n-BuLi (2.17 mL, 2.5 M, 5.4 mmol, 1.1 eq) according to General Procedure 12. Purification by column chromatography (silica, 4:1 pentane:ether, v/v) afforded 46 as a white crystalline solid (1.27 g, 85%); mp 54–55°C; [α]D 25 +16.0 (c 1.5, CHCl3); νmax/cm–1 (CHCl3) 1780, 1684, 1636; δH (400MHz, CDCl3) 0.91 (3H, d, J 7.1, CHMe2), 0.92 (3H, d, J 6.6, CHMe2), 1.26 (3H, s, CMe2), 1.49 (3H, s, CMe2), 2.10 (1H, m, CHMe2), 3.79 (2H, s, CH2Ph), 4.15 (1H, d, J 3.3, NCiPr), 5.34 (1H, app s, C=CH2), 5.51 (1H, app s, C=CH2), 7.19–7.32 (5H, m, Ph); δC (100MHz, CDCl3) 16.8, 21.3, 21.4, 28.8, 29.5, 39.6, 66.0, 82.7, 120.4, 126.6, 137.3, 143.4, 152.6, 170.8; m/z (CI+) 302 (MH+, 100%); HRMS (CI+) 302.1738 (C18H24NO3 requires 302.1756).

(S)-5,5-Dimethyl-4-iso-propyl-3-(2'-ethylacryloylo)oxazolidin-2-one 47

![Chemical Structure](image)

2-Ethylacrylic acid 40 (2.02 g, 20.2 mmol, 1.25 eq) was reacted with oxalyl chloride (2.64 mL, 30.3 mmol, 1.86 eq), and Et3N (4.22 mL, 30.3 mmol, 1.86 eq), followed by oxazolidinone 2 (2.54 g, 16.2 mmol, 1.0 eq) and n-BuLi (7.13 mL, 2.5 M, 17.8 mmol, 1.1 eq) according to General Procedure 12. Purification by column chromatography (silica, 7:3 pentane:ether, v/v) afforded 47 as a colourless, viscous oil (3.30 g, 68%); [α]D 25 +33.3 (c 2.7, CHCl3); νmax/cm–1 (CHCl3) 1780, 1684, 1636; δH (400MHz, CDCl3) 1.01 (3H, d, J 6.8, CHMe2), 1.05 (3H, d, J 7.0, CHMe2), 1.13 (3H, t, J 7.5, CH2Me), 1.42 (3H, s, CMe2), 1.53 (3H, s, CMe2), 2.12–2.22 (1H, m, CHMe2), 2.34–2.51 (2H, m, CH2Me), 4.22 (1H, d, J 3.3, NCiPr), 5.35–5.39 (2H, m, C=CH2); δC (100MHz, CDCl3) 11.9, 17.0, 21.5, 21.5, 26.2, 29.0, 29.6, 66.1, 82.8, 116.8, 146.0, 153.2, 171.2; m/z (CI+) 240 (MH+, 100%); HRMS (CI+) 240.1601 (MH+ C13H22NO3 requires 240.1600).

(S)-5,5-Dimethyl-4-iso-propyl-3-(2'-iso-propylacryloyl)oxazolidin-2-one 48

![Chemical Structure](image)

2-iso-Propylacrylic acid 41 (200 mg, 1.8 mmol, 1.25 eq) was reacted with oxalyl chloride (230 µL, 2.6 mmol, 1.86 eq), and Et3N (370 µL, 2.6 mmol, 1.86 eq), followed by oxazolidinone 2 (220 mg, 1.4 mmol, 1.0 eq) and n-BuLi (620 µL, 2.5 M, 1.5 mmol, 1.1 eq) according to General Procedure 12. Purification by column chromatography (silica, 4:1 pentane:ether, v/v) afforded 48 as a colourless, viscous oil (210 mg,
2-Phenylacrylic acid 44 (2.00 g, 20.2 mmol, 1.25 eq) was reacted with oxalyl chloride (1.76 mL, 30.3 mmol, 1.86 eq), and Et3N (4.22 mL, 30.3 mmol, 1.86 eq), followed by oxazolidinone 2 (1.69 g, 16.2 mmol, 1.0 eq) and n-BuLi (4.75 mL, 2.5 M, 17.8 mmol, 1.1 eq) according to General Procedure 12. Purification by column chromatography (silica, 7:3 pentane:ether, v/v) afforded 49 as a white crystalline solid (4.24 g, 91%); mp 73–74°C; \( [\alpha]_D^{25} +29.0 \) (c 1.2, CHCl3); \( \nu_{\text{max}}/\text{cm}^{-1} \) (CHCl3) 1782, 1685, 1636; \( \delta_{\text{H}} \) (400MHz, CDCl3) 1.01 (3H, d, \( J = 6.8, \text{CHMe}_2 \)), 1.06 (3H, d, \( J = 7.0, \text{CHMe}_2 \)), 1.11 (3H, d, \( J = 6.9, \text{COCCHMe}_2 \)), 1.18 (3H, d, \( J = 6.8, \text{COCCHMe}_2 \)), 1.41 (3H, s, \text{CMe}_2), 1.53 (3H, s, \text{CMe}_2), 2.15–2.22 (1H, m, \text{CCHMe}_2), 2.71–2.82 (1H, m, \text{COCHMe}_2), 4.23 (1H, d, \( J = 3.2, \text{NCCH}_3 \)), 5.28 (1H, d, \( J = 1.2, \text{C=CCH}_2 \)), 5.35 (1H, d, \( J = 1.2, \text{C=CCH}_2 \)); \( \delta_{\text{C}} \) (100MHz, CDCl3) 17.0, 20.4, 21.4, 21.5, 29.0, 29.6, 31.2, 66.0, 82.6, 114.8, 138.9, 150.3, 171.8; \( m/z \) (CI+) 254 (MH\(^+\), 17%), 158 (100); HRMS (CI+) 254.1750 (C\(_{14}\)H\(_{24}\)NO\(_3\) requires 254.1756).

\((S,5,5\text{-Dimethyl-4-iso-propyl-3-(2'-phenylacryloylo})\text{oxazolidin-2-one 49}\)

\(\text{CO}_2\text{H} \quad \text{Ph} \quad \text{ON} \quad \text{OO} \quad \text{Ph}\)

\((2'R,4S)-5,5\text{-Dimethyl-4-iso-propyl-3-[3'-(N,N-dibenzylamino)-2'-methyl-propanoylo})\text{oxazolidin-2-one 50 and (2'S,4S)-5,5-dimethyl-4-iso-propyl-3-[3'-(N,N-dibenzylamino)-2'-methyl-propanoylo})\text{oxazolidin-2-one 11}\)

\text{oxazolidin-2-one 11}\)

**Method A**

N-Acryloyl-oxazolidinone 45 (200 mg, 0.89 mmol, 1.0 eq) was reacted with dibenzylamine (0.342 mL, 1.78 mmol, 2.0 eq) and n-BuLi (0.712 mL, 1.78 mmol, 2.0 eq) according to General Procedure 1 to give a non-separable mixture of diastereoisomers 50 and 11 in a ratio of 66:34. Column chromatography (silica, 9:1
pentane:ether, v/v) afforded the 66:34 mixture of diastereoisomers 50 and 11 as a colourless, viscous oil (360 mg, 96%).

**Method B**

N-Acryloyl-oxazolidinone 45 (200 mg, 0.89 mmol, 1.0 eq) was reacted with dibenzylamine (0.34 mL, 1.78 mmol, 2.0 eq) and n-BuLi (0.71 mL, 1.78 mmol, 2.0 eq), followed by 2,6-di-tert-butylphenol (551 mg, 2.67 mmol, 3.0 eq) according to General Procedure 13 to give a mixture of diastereoisomers 50 and 11 in a ratio of 92:8. Column chromatography (silica, 49:1 to 9:1 pentane:ether, v/v) followed by recrystallisation from pentane/ether afforded 50 as a white crystalline solid (342 mg, 91%); mp 74–75°C; $[\alpha]_D^{25} +53.7$ (c 1.3, CHCl$_3$); $\nu_{max}/\text{cm}^{-1}$ (CHCl$_3$) 1769, 1697; $\delta$H (400MHz, CDCl$_3$) 1.00 (3H, d, $J$ 6.9, CHMe$_2$), 1.07 (3H, d, $J$ 7.0, CHMe$_2$), 1.17 (3H, d, J 6.8, COCHMe), 1.36 (3H, s, CMe$_2$), 1.54 (3H, s, CMe$_2$), 2.12–2.21 (1H, m, CHMe$_2$), 2.48 (1H, dd, $J_{AB}$ 12.4, $J_{AX}$ 7.8, CH$_2$NBn$_2$), 2.95 (1H, dd, $J_{BA}$ 12.4, $J_{BX}$ 6.7, CH$_2$NBn$_2$), 3.54 (2H, d, $J$ 13.8, NC$_2$H$_2$Ph), 3.77 (2H, d, J 13.8, NCH$_2$Ph), 4.19 (1H, d, J 3.4, NCH$_2$Pr), 4.22–4.30 (1H, m, COCH), 7.16–7.41 (10H, m, Ph); $\delta$C (100MHz, CDCl$_3$) 15.6, 17.1, 21.3, 21.5, 28.8, 29.5, 36.1, 57.1, 58.3, 66.3, 82.6, 126.9, 128.1, 129.0, 139.2, 153.4, 176.5; m/z (ESI$^+$) 423 (MH$^+$, 100%); HRMS (ESI$^+$) 423.2658 (C$_{26}$H$_{35}$N$_2$O$_3$ requires 423.2658).

**Method C**

N-Acryloyl-oxazolidinone 45 (150 mg, 0.67 mmol, 1.0 eq) was reacted with dibenzylamine (0.26 mL, 1.34 mmol, 2.0 eq) and n-BuLi (0.84 mL, 1.34 mmol, 2.0 eq) according to General Procedure 14, to give a mixture of diastereoisomers 50 and 11 in a ratio of 98:2. Purification by column chromatography (silica, 9:1 pentane:ether, v/v) furnished 50 (245 mg, 87%) with identical physical and spectroscopic properties as those described previously.

(2'R,4S)-5,5-dimethyl-4-iso-propyl-3-[3'-(N,N-dibenzylamino)-2'-benzyl-propanoyl]oxazolidin-2-one 51 and (2'S,4S)-5,5-Dimethyl-4-iso-propyl-3-[3'-(N,N-dibenzylamino)-2'-benzyl-propanoyl]oxazolidin-2-one 14

![Diagram of (2'R,4S)-5,5-dimethyl-4-iso-propyl-3-[3'-(N,N-dibenzylamino)-2'-benzyl-propanoyl]oxazolidin-2-one 51 and (2'S,4S)-5,5-Dimethyl-4-iso-propyl-3-[3'-(N,N-dibenzylamino)-2'-benzyl-propanoyl]oxazolidin-2-one 14]

**Method A**
N-Acryloyl-oxazolidinone (46) (200 mg, 0.67 mmol, 1.0 eq) was reacted with dibenzylamine (0.26 mL, 1.34 mmol, 2.0 eq) and n-BuLi (0.84 mL, 1.6 M, 1.34 mmol, 2.0 eq) according to General Procedure 1 to give a non-separable mixture of diastereoisomers 51 and 14 in a ratio of 20:80. Column chromatography (silica, 9:1 pentane:ether, v/v) afforded the mixture of diastereoisomers 51 and 14 as a colourless, viscous oil (274 mg, 82%).

**Method B**

N-Acryloyl-oxazolidinone (46) (133 mg, 0.44 mmol, 1.0 eq) was reacted with dibenzylamine (0.17 mL, 0.88 mmol, 2.0 eq) and n-BuLi (0.35 mL, 0.88 mmol, 2.0 eq), followed by 2,6-di-tert-butylphenol (274 mg, 1.33 mmol, 3.0 eq) according to General Procedure 13 to give a non-separable mixture of diastereoisomers 51 and 14 in a ratio of 79:21. Column chromatography (silica, 49:1 to 9:1 pentane:ether, v/v) afforded the mixture of diastereoisomers 51 and 14 as a colourless, viscous oil (173 mg, 79%).

**Method C**

N-Acryloyl-oxazolidinone (46) (100 mg, 0.34 mmol, 1.0 eq) was reacted with dibenzylamine (0.13 mL, 0.68 mmol, 2.0 eq) and n-BuLi (0.27 mL, 0.68 mmol, 2.0 eq), followed by 2-pyridone (97 mg, 1.02 mmol, 3.0 eq) according to General Procedure 14 to give a non-separable mixture of diastereoisomers 51 and 14 in a ratio of 90:10. Column chromatography (silica, 49:1 to 9:1 pentane:ether, v/v) afforded the mixture of diastereoisomers 51 and 14 as a colourless, viscous oil (144 mg, 85%). Data for (2'R,4S)-syn diastereoisomer 51: \[\alpha\]_D^21 +26.1 (c 1.0, CHCl_3); \nu_{max}/\text{cm}^{-1} (CHCl_3) 1770, 1696; \delta_H (400MHz, CDCl_3) 0.72 (3H, s, CMe_2), 0.99 (3H, d, J 6.8, CHMe_2), 1.05 (3H, d, J 6.7, CHMe_2), 1.41 (3H, s, CMe_2), 2.07–2.15 (1H, m, CHMe_2), 2.65 (1H, dd, J_{AB} 12.4, J_{AX} 7.2, CH_2Ph), 2.69 (1H, dd, J_{AB} 13.2, J_{AX} 10.4, CH_2NBn_2), 2.97 (1H, dd, J_{BX} 12.4, J_{BX} 6.8, CH_2Ph), 3.08 (1H, dd, J_{BA} 13.2, J_{BX} 4.6, CH_2NBn_2), 3.66 (2H, d, J 14.2, N(CH_2Ph)_2), 3.79 (2H, d, J 14.2, N(CH_2Ph)_2), 3.93 (1H, d, J 3.2, NCH(Ph)Pr), 4.79–4.84 (1H, m, COCH), 7.29 (15H, m, Ph); \delta_C (100MHz, CDCl_3) 17.1, 21.3, 21.3, 27.6, 29.4, 37.1, 43.0, 56.5, 58.3, 66.5, 82.4, 126.2, 126.8, 128.1, 128.2, 128.4, 129.1, 139.0, 139.3, 153.3, 175.1; \text{m/z} (ESI^+) 499 (MH^+, 66%), 210 (100); HRMS (ESI^+) 499.2951 (C_{32}H_{39}N_2O_3 requires 499.2955).

(2'R,4S)-5,5-Dimethyl-4-iso-propyl-3-[3'-(N,N-dibenzylamino-2'-ethyl-propanoyl]oxazolidin-2-one 52 and (2'S,4S)-5,5-dimethyl-4-iso-propyl-3-[3'-(N,N-dibenzylamino)-2'-ethyl-propanoyl]oxazolidin-2-one 16
Method A

N-Acryloyl-oxazolidinone 47 (100 mg, 0.42 mmol, 1.0 eq) was reacted with dibenzylamine (0.16 mL, 0.83 mmol, 2.0 eq) and n-BuLi (0.52 mL, 1.6 M, 0.83 mmol, 2.0 eq) according to General Procedure 1 to give an inseparable mixture of returned starting material 47 and diastereoisomers 52 and 16 in a ratio of 17:72:11 respectively. Column chromatography (silica, 9:1, pentane:ether, v/v) afforded the mixture of diastereoisomers 52 and 16 as a colourless, viscous oil (126 mg, 69%).

Method B

N-Acryloyl-oxazolidinone 47 (105 mg, 0.44 mmol, 1.0 eq) was reacted with dibenzylamine (0.169 mL, 0.88 mmol, 2.0 eq) and n-BuLi (0.352 mL, 0.88 mmol, 2.0 eq), followed by 2,6-di-tert-butylphenol (274 mg, 1.33 mmol, 3.0 eq) according to General Procedure 13 to give a non-separable mixture of diastereoisomers 52 and 16 in a ratio of 92:8. Column chromatography (silica, 49:1 to 9:1 pentane:ether, v/v) afforded the mixture of diastereoisomers 52 and 16 as a colourless, viscous oil (115 mg, 60%).

Method C

N-Acryloyl-oxazolidinone 47 (41 mg, 0.17 mmol, 1.0 eq) was reacted with dibenzylamine (35 µL, 0.28 mmol, 1.6 eq) and n-BuLi (0.11 mL, 0.28 mmol, 1.6 eq) according to General Procedure 14, giving a mixture of diastereoisomers 52 and 16 in a ratio of 97:3. Purification by column chromatography (silica, 9:1 pentane:ether, v/v) furnished 52 as a colourless oil (56 mg, 79%); [α]D25 +12.5 (c 1.0, CHCl3); νmax/cm–1 (film) 1773, 1698; δH (400MHz, CDCl3) 0.84 (3H, t, J 7.6, CH2Me), 1.02 (3H, d, J 6.8, CHMe2), 1.08 (3H, d, J 7.1, CHMe2), 1.38 (3H, s, CMe2), 1.53 (3H, s, CMe2), 1.52–1.70 (2H, m, CH2Me) 2.13–2.21 (1H, m, CHMe2), 2.53 (1H, dd, JAB 12.4, JAX 6.6, COCH2H2N), 2.91 (1H, dd, JBA 12.4, JBX 7.3, COCH2H2N), 3.61 (2H, d, J 13.6, NCH2Ph), 3.69 (2H, d, J 14.0, NCH2Ph), 4.19 (1H, d, J 3.4, NCH2Pr), 4.28–4.34 (1H, m, COCHCH2), 7.18–7.38 (10H, m, Ph); δC (100MHz, CDCl3) 11.7, 17.1, 21.4, 24.0, 28.8, 29.6, 42.5, 56.1, 58.2, 66.5, 82.4, 126.8 127.9, 128.1, 129.2, 138.9, 139.0, 153.5, 176.1; m/z (ESI+) 437 (MH+, 100%); HRMS (ESI+) 437.2800 (C27H37N2O3 requires 437.2804).

(2'R,4S)-5,5-Dimethyl-4-iso-propyl-3-[3'-(N,N-dibenzylamino)-2'-iso-propyl-propanoyl]oxazolidin-2-one 53 and (2'S,4S)-5,5-dimethyl-4-iso-propyl-3-[3' (N,N-dibenzylamino)-2'-iso-propyl-propanoyl]
oxazolidin-2-one 17

Method A

N-Acryloyl-oxazolidinone 48 (113 mg, 0.45 mmol, 1.0 eq) was reacted with dibenzyamine (0.17 mL, 0.89 mmol, 2.0 eq) and n-BuLi (0.36 mL, 0.89 mmol, 2.0 eq) according to General Procedure 1 to give an inseparable mixture of returned starting material 48 and diastereoisomers 53 and 17 in a ratio of 20:74:6 respectively. Column chromatography (silica, 9:1, pentane:ether, v/v) afforded the mixture of diastereoisomers 53 and 17. Recrystallisation from pentane/ether gave 53 as a white crystalline solid (130 mg, 65%); mp 70–71°C; [α]D25 –11.9 (c 0.1, CHCl3); νmax/cm–1 (CHCl3) 1768, 1702; δH (400MHz, CDCl3) 0.89 (3H, d, J 6.8, COCHCHMe2), 0.91 (3H, d, J 6.7, COCHCHMe2), 1.05 (3H, d, J 6.9, CHMe2), 1.13 (3H, d, J 7.1, CHMe2), 1.39 (3H, s, CMe2), 1.54 (3H, s, CMe2), 1.77–1.83 (1H, m, COCHCHMe2), 2.17–2.26 (1H, m, CHMe2), 2.56 (1H, dd, JAB 12.6, JAX 3.8, CH2NBn2), 3.05 (1H, dd, JBA 12.6, JBX 10.0, CH2NBn2), 3.50 (2H, d, J 13.7, NCH2Ph), 3.76 (2H, d, J 13.7, NCH2Ph), 4.22 (1H, d, J 2.9, NCiPr), 4.36–4.44 (1H, m, COCH), 7.20–7.35 (10H, m, Ph); δC (100MHz, CDCl3) 17.3, 19.9, 20.4, 21.0, 21.6, 29.0, 29.7, 30.5, 46.0, 54.2, 58.0, 66.7, 82.0, 126.8, 128.0, 129.3, 138.7, 153.7, 175.8; m/z (ESI+) 451 (MH+, 100%); HRMS (ESI+) 451.2966 (C28H39N2O3 requires 451.2961).

Method B

N-Acryloyl-oxazolidinone 48 (111 mg, 0.44 mmol, 1.0 eq) was reacted with dibenzyamine (0.17 mL, 0.88 mmol, 2.0 eq) and n-BuLi (0.35 mL, 0.88 mmol, 2.0 eq), followed by 2,6-di-tert-butylphenol (274 mg, 1.33 mmol, 3.0 eq) according to General Procedure 13 to give a mixture of diastereoisomers 53 and 17 in a ratio of 82:18. Column chromatography (silica, 49:1 to 9:1 pentane:ether, v/v) afforded the mixture of diastereoisomers 53 and 17 as a colourless, viscous oil (119 mg, 60%).

Method C

N-Acryloyl-oxazolidinone 48 (50 mg, 0.20 mmol, 1.0 eq) was reacted with dibenzyamine (61 µL, 0.31 mmol, 1.6 eq) and n-BuLi (0.12 mL, 0.31 mmol, 1.6 eq) according to General Procedure 14, giving a mixture of diastereoisomers 53 and 17 in a ratio of 95:5. Purification by column chromatography (silica, 9:1 pentane:ether, v/v) furnished 53 (70 mg, 78%) with identical physical and spectroscopic properties to those described above.
(2'R,4S)-5,5-Dimethyl-4-iso-propyl-3-[3'-(N,N-dibenzylamino)-2'-phenyl-propanoyl]oxazolidin-2-one 54 and (2'S,4S)-5,5-dimethyl-4-iso-propyl-3-[3'-(N,N-dibenzylamino)-2'-phenyl-propanoyl]oxazolidin-2-one 55

**Method A**

N-Acryloyl-oxazolidinone 49 (200 mg, 0.89 mmol, 1.0 eq) was reacted with dibenzylamine (0.34 mL, 1.78 mmol, 2.0 eq) and n-BuLi (0.71 mL, 1.78 mmol, 2.0 eq) according to General Procedure 1 to give a non-separable mixture of diastereoisomers 54 and 55 in a ratio of 62:38. Column chromatography (silica, 49:1 to 9:1 pentane:ether, v/v) afforded the mixture of diastereoisomers 54 and 55 as a colourless viscous oil (293 mg, 68%).

**Method B**

N-Acryloyl-oxazolidinone 49 (200 mg, 0.89 mmol, 1.0 eq) was reacted with dibenzylamine (0.34 mL, 1.78 mmol, 2.0 eq) and n-BuLi (0.71 mL, 1.78 mmol, 2.0 eq) followed by 2,6-di-tert-butylphenol (548 mg, 2.67 mmol, 3.0 eq) according to General Procedure 13 to give a non-separable mixture of diastereoisomers 54 and 55 in a ratio of 40:60. Column chromatography (silica, 49:1 to 9:1 pentane:ether, v/v) afforded the mixture of diastereoisomers 54 and 55 as a colourless viscous oil (267 mg, 62%) each with identical spectroscopic properties as described previously.

**Method C**

N-Acryloyl-oxazolidinone 49 (50 mg, 0.18 mmol, 1.0 eq) was reacted with dibenzylamine (55 µL, 0.28 mmol, 1.6 eq) and n-BuLi (0.11 mL, 0.28 mmol, 1.6 eq) according to General Procedure 14. Column chromatography (silica, 9:1 pentane:ether, v/v) furnished an inseparable mixture of diastereoisomers 54 and 55 (65 mg, 75%) in a ratio of 12:88 as a colourless viscous oil; Data for mixture; $[\alpha]_{D}^{25} +4.5$ (c 1.1, CHCl$_3$); $\nu$max/cm$^{-1}$ (CHCl$_3$) 1771, 1699; $\delta$H (400MHz, CDCl$_3$) major diastereisomer 55: 0.92 (3H, s, CMe$_2$), 1.04 (3H, d, J 6.3, CHMe$_2$), 1.12 (3H, d, J 6.6, CHMe$_2$), 1.44 (3H, s, CMe$_2$), 2.11–2.22 (1H, m, CHMe$_2$), 2.82 (1H, dd, $J_{AB}$ 12.8, $J_{AX}$ 6.1 COCHCH$_2$), 3.36 (1H, dd, $J_{BA}$ 12.8, $J_{BX}$ 7.6, COCHCH$_2$), 3.68 (4H, app s, NCH$_2$Ph), 4.03 (1H, d, J 2.8, NC$H$Pr), 5.50–5.56 (1H, m, COCHCH$_2$), 7.14–7.40 (15H, m, Ph); $\delta$C (100MHz, CDCl$_3$) 17.1, 21.3, 21.5, 28.2, 29.5, 46.9, 57.1, 58.2, 67.1, 82.7, 126.8, 126.8, 127.3, 127.8, 128.4,
(4S,2'R,R)-5,5-Dimethyl-4-iso-propyl-3-{3'-[N-benzyl-N-(α-methylbenzyl)amino]-2'-methyl-propanoyl}oxazolidin-2-one 56 and (4S,2'S,S)-5,5-dimethyl-4-iso-propyl-3-{3'-[N-benzyl-N-(α-methylbenzyl)amino]-2'-methyl-propanoyl}oxazolidin-2-one 12

\[
\begin{align*}
\text{Ph} & \quad \text{Me} \\
\text{ON} & \quad \text{Me} \\
\text{ON} & \quad \text{Me} \\
\text{ON} & \quad \text{Me} \\
\text{Ph} & \quad \text{Ph} \\
\text{syn-} & \quad \text{anti-} \\
\end{align*}
\]

\(N\)-Acryloyl-oxazolidinone 45 (150 mg, 0.67 mmol, 1.0 eq) was reacted with \((R)\)-N-benzyl-(\(N\)-\(\alpha\)-methylbenzyl)amine (283 mg, 1.34 mmol, 2.0 eq) and \(n\)-BuLi (0.84 mL, 1.34 mmol, 1.6 eq) according to General Procedure 14, giving a mixture of diastereoisomers 56 and 12 in a ratio of 98:2. Purification by column chromatography (silica, 9:1 pentane/ether, v/v) furnished 56 (240 mg, 82%) as a colourless oil; \([\alpha]^{25}_D\) +51.4 (c 1.5, CHCl\(_3\)); \(\nu_{\text{max}}/\text{cm}^{-1}\) (CHCl\(_3\)) 1769, 1698; \(\delta_{1H}\) (400MHz, CDCl\(_3\)) 0.95 (3H, d, \(J = 6.8\), CHMe\(_2\)), 1.02 (3H, d, \(J = 6.8\), CHMe\(_2\)), 1.17 (3H, d, \(J = 6.8\), COCHMe), 1.35 (3H, s, CMe\(_2\)), 1.43 (3H, d, \(J = 6.8\), NCHMe), 1.50 (3H, s, CMe\(_2\)), 2.08–2.17 (1H, m, CHMe\(_2\)), 2.60 (1H, dd, \(J_{AB} = 12.6, J_{AX} = 8.3\) COCHCH\(_2\)), 2.77 (1H, dd, \(J_{AB} = 12.6, J_{BX} = 6.1\) COCHCH\(_2\)), 3.43 (1H, d, \(J = 14.4\), NCH\(_2\)Ph), 3.82 (1H, d, \(J = 14.4\), NCH\(_2\)Ph), 3.98 (1H, q, \(J = 7.1\), NCHPh), 4.06–4.16 (1H, m, COCHMe), 4.14 (1H, d, \(J = 3.3\), NCH\(_{iP}r\)), 7.19–7.40 (10H, m, Ph); \(\delta_{13C}\) (100MHz, CDCl\(_3\)) 15.5, 16.7, 17.0, 21.3, 21.3, 28.8, 29.5, 36.6, 53.1, 54.6, 57.8, 66.3, 82.5, 126.6 127.8, 128.1, 128.2, 128.7, 128.9, 140.3, 141.6, 153.5, 176.7; \(m/z\) (ESI\(^+\)) 437 (MH\(^+\), 100%); HRMS (ESI\(^+\)) 437.2814 (C\(_{27}\)H\(_{36}\)N\(_2\)O\(_3\) requires 437.2804).

(4S,2'R,S)-5,5-Dimethyl-4-iso-propyl-3-{3'-[N-benzyl-N-(\(\alpha\)-methylbenzyl)amino]-2'-methyl-propanoyl}oxazolidin-2-one 57 and (4S,2'S,S)-5,5-dimethyl-4-iso-propyl-3-{3'-[N-benzyl-N-(\(\alpha\)-methylbenzyl)amino]-2'-methyl-propanoyl}oxazolidin-2-one 13

\[
\begin{align*}
\text{Ph} & \quad \text{Me} \\
\text{ON} & \quad \text{Me} \\
\text{ON} & \quad \text{Me} \\
\text{ON} & \quad \text{Me} \\
\text{Ph} & \quad \text{Ph} \\
\text{syn-} & \quad \text{anti-} \\
\end{align*}
\]

\(N\)-Acryloyl-oxazolidinone 45 (150 mg, 0.67 mmol, 1.0 eq) was reacted with \((S)\)-N-benzyl-(\(N\)-\(\alpha\)-methylbenzyl)amine (283 mg, 1.34 mmol, 2.0 eq) and \(n\)-BuLi (0.84 mL, 1.34 mmol, 2.0 eq) according to General Procedure 14, giving a mixture of diastereoisomers 57 and 13 in a ratio of 84:16. Column chromatography (silica, 9:1 pentane:ether, v/v) furnished an inseparable mixture of 57 and 13 (349 mg, 90%)
as a yellow oil. $[\alpha]_{D}^{25} +12.9$ (c 0.7, CHCl$_3$); $\nu_{\text{max}}$/cm$^{-1}$ (CHCl$_3$) 1770, 1694; Data for the major diastereoisomer 57; $\delta$H (400MHz, CDCl$_3$) 1.02 (3H, d, $J$ 6.1, CHMe$_2$), 1.04 (3H, d, $J$ 7.2, CHMe$_2$), 1.07 (3H, d, $J$ 5.8, COCHMe), 1.36 (3H, s, CMe$_2$), 1.41 (3H, d, $J$ 6.8, NCHMe), 1.52 (3H, s, CMe$_2$), 2.12–2.22 (1H, m, CHMe$_2$), 2.24 (1H, dd, $J_{AB}$ 12.6, $J_{AX}$ 7.5 COCHC$_2$), 3.11 (1H, dd, $J_{BA}$ 12.6, $J_{BX}$ 6.5, COCHC$_2$), 3.63 (2H, d, $J$ 2.4, NC$_2$H$_5$Ph), 4.02 (1H, q, $J$ 7.1, NC$_2$H$_5$Ph), 4.06–4.15 (1H, m, COCHMe), 4.17 (1H, d, $J$ 2.8, NCH$_2$Pr), 7.18–7.40 (10H, m, Ph); $\delta$C (100MHz, CDCl$_3$) 13.3, 15.4, 17.1, 21.4, 21.5, 28.7, 29.5, 36.6, 52.6, 54.5, 56.6, 66.3, 82.5, 126.7 127.8, 128.1, 128.3, 128.6, 128.9, 140.3, 142.4, 153.4, 176.8; m/z (ESI$^+$) 437 (MH$^+$, 100%); HRMS (ESI$^+$) 437.2802 (C$_{27}$H$_{36}$N$_2$O$_3$ requires 437.2804).

(4S,2'R,aR)-5,5-Dimethyl-4-iso-propyl-3-{3'-[N-benzyl-N-(a-methylbenzyl)amino]-2'-benzylpropanoyl}oxazolidin-2-one 58 and (4S,2'S,aR)-5,5-dimethyl-4-iso-propyl-3-{3'-[N-benzyl-N-(a-methylbenzyl)amino]-2'-benzylpropanoyl}oxazolidin-2-one 59

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\begin{align*}
\text{N-Acryloyl-oxazolidinone 46 (100 mg, 0.34 mmol, 1.0 eq) was reacted with (R)-N-benzyl-(N-\alpha-methylbenzyl)amine (144 mg, 0.68 mmol, 2.0 eq) and n-BuLi (0.27 mL, 0.68 mmol, 2.0 eq) according to General Procedure 14, giving a mixture of diastereoisomers 58 and 59 in a ratio of 86:14. Column chromatography (silica, 9:1 pentane:ether, v/v) afforded an inseparable mixture of 58 and 59 (150 mg, 86%), as a colourless, viscous oil. Data for major diastereoisomer 58: $[\alpha]_{D}^{21} +72.2$ (c 1.0, CHCl$_3$); $\nu_{\text{max}}$/cm$^{-1}$ (CHCl$_3$) 1769, 1695; $\delta$H (400MHz, CDCl$_3$) 0.75 (3H, s, CMe$_2$), 0.98 (3H, d, $J$ 6.8, CHMe$_2$), 1.06 (3H, d, $J$ 7.1, CHMe$_2$), 1.44 (3H, s, CMe$_2$), 1.54 (3H, d, $J$ 6.8, NCHMe), 2.08–2.17 (1H, m, CHMe$_2$), 2.77 (1H, dd, $J_{AB}$ 13.4, $J_{AX}$ 10.9, COCH$_2$), 2.81–2.88 (2H, m, COCH$_2$Ph), 3.24 (1H, dd, $J$BA 13.4, $J$BX 4.6, COCH$_2$), 3.58 (1H, d, $J$ 14.2, CH$_2$Ph), 3.95 (1H, d, $J$ 3.3, NCH$_2$Pr), 3.96 (1H, d, $J$ 14.2, CH$_2$Ph), 4.13 (1H, q, $J$ 6.8, NCHMe), 4.66–4.77 (1H, m, COCH$_2$), 7.14–7.48 (15H, m, Ph); $\delta$C 17.0, 17.1, 21.2, 21.3, 27.7, 29.4, 37.0, 43.7, 52.7, 54.7, 58.1, 66.4, 82.5, 126.2, 126.7, 126.8, 128.0, 128.2, 128.3, 128.4, 128.9, 129.3, 139.7, 140.3, 141.6, 153.3, 175.3; m/z (ESI$^+$) 513 (MH$^+$, 6%), 409 (100); HRMS (ESI$^+$) 513.3112 (C$_{33}$H$_{41}$N$_2$O$_3$ requires 513.3122).} 
\end{align*}
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(4S,2'R,αS)-5,5-Dimethyl-4-iso-propyl-3-{3'-[N-benzyl-N-(α-methylbenzyl)amino]-2'-benzyl-propanoyl}oxazolidin-2-one 60 and (4S,2'S,αS)-5,5-dimethyl-4-iso-propyl-3-{3'-[N-benzyl-N-(α-methylbenzyl)amino]-2'-benzyl-propanoyl}oxazolidin-2-one 61

N-Acryloyl-oxazolidinone 46 (100 mg, 0.34 mmol, 1.0 eq) was reacted with (S)-N-benzyl-(N-α-methylbenzyl)amine (144 mg, 0.68 mmol, 2.0 eq) and n-BuLi (0.272 mL, 0.68 mmol, 2.0 eq) according to General Procedure 14, giving a mixture of diastereoisomers 60 and 61 in a ratio of 92:8. Column chromatography (silica, 9:1 pentane:ether, v/v) afforded an inseparable mixture of 60 and 61 in a ratio of 92:8 (155 mg, 89%), as a colourless, viscous oil. Data for 60: [α]^{21}_D +5.1 (c 1.2, CHCl₃); ν_{max}/cm⁻¹ (CHCl₃) 1768, 1697; δ_H (400MHz, CDCl₃) 0.71 (3H, s, CMe₂), 1.00 (3H, d, J 6.8, CHMe₂), 1.07 (3H, d, J 7.1, CHMe₂), 1.41 (3H, s, CMe₂), 1.45 (3H, d, J 6.8, NCHMe), 2.07–2.17 (1H, m, CHHMe₂), 2.46 (1H, dd, J_AB 12.6, J_AX 7.6, COCH₂H), 2.54 (1H, dd, J_A'B' 13.5, J_A'X' 10.7, COCH₂H₂Ph), 2.99 (1H, dd, J_BA' 13.5, J_BX' 4.7, COCH₂H₂Ph), 3.10 (1H, dd, J_BA 12.6, J_BX 6.4, COCH₂H₂), 3.66 (1H, d, J 14.2, CH₂Ph), 3.80 (1H, d, J 14.2, CH₂Ph), 3.93 (1H, d, J 3.0, NCH²Pr), 4.14 (1H, q, J 6.8, NCHMe), 4.67–4.77 (1H, m, COCH₂H₂), 7.09–7.44 (15H, m, Ph); δ_C 13.8, 17.2, 21.3, 27.7, 29.4, 36.9, 43.5, 52.3, 54.7, 56.7, 66.6, 82.5, 126.2, 126.8, 126.8, 128.0, 128.2, 128.3, 128.4, 129.0, 129.1, 139.6, 140.1, 142.1, 153.4, 175.4; m/z (ESI⁺) 513 (MH⁺, 7%), 409 (100); HRMS (ESI⁺) 513.3113 (C₃₂H₃₉N₂O₃ requires 513.3112).

(4S,2'R,αR)-5,5-Dimethyl-4-iso-propyl-3-{3'-[N-benzyl-N-(α-methylbenzyl)amino]-2'-ethyl-propanoyl}oxazolidin-2-one 62 and (4S,2'S,αR)-5,5-dimethyl-4-iso-propyl-3-{3'-[N-benzyl-N-(α-methylbenzyl)amino]-2'-ethyl-propanoyl}oxazolidin-2-one 63

N-Acryloyl-oxazolidinone 47 (30 mg, 0.13 mmol, 1.0 eq) was reacted with (R)-N-benzyl-(N-α-methylbenzyl)amine (45 µL, 0.28 mmol, 1.6 eq) and n-BuLi (0.11 mL, 0.28 mmol, 1.6 eq) according to General Procedure 14, giving a mixture of diastereoisomers 62 and 63 in a ratio of 98:2. Purification by column chromatography (silica, 9:1 pentane:ether, v/v) furnished 62 (50 mg, 88%) as a colourless oil; [α]^{25}_D +75.2 (c 1.3, CHCl₃); ν_{max}/cm⁻¹ (film) 1772, 1698; δ_H (400MHz, CDCl₃) 0.84 (3H, t, J 7.3, CH₂Me), 0.95 (3H, d, J 6.8, CHMe₂), 1.02 (3H, d, J 7.1, CHMe₂), 1.35 (3H, s, CMe₂), 1.41 (3H, d, J 7.1, NCHMe), 1.51
(4S,2'R,aS)-5,5-Dimethyl-4-iso-propyl-3-{3'-[N-benzyl-N-(α-methylbenzyl)amino]-2'-ethyl-propanoyl}oxazolidin-2-one 64 and (4S,2'S,aS)-5,5-Dimethyl-4-iso-propyl-3-{3'-[N-benzyl-N-(α-methylbenzyl)amino]-2'-ethyl-propanoyl}oxazolidin-2-one 65

N-Acryloyloxazolidinone 47 (30 mg, 0.13 mmol, 1 eq) was reacted with (S)-N-benzyl-(N-α-methylbenzyl)amine (45 µL, 0.28 mmol, 1.6 eq) and n-BuLi (0.11 mL, 0.28 mmol, 1.6 eq) according to General Procedure 14, giving a mixture of diastereoisomers 64 and 65 in a ratio of 89:11. Purification by column chromatography (silica, 9:1 pentane:ether, v/v) furnished 64 (47 mg, 81%) as a colourless viscous oil; [α]D25 7.2 (c 0.9, CHCl3); νmax/cm–1 (CHCl3) 1775, 1698; δH (400MHz, CDCl3) 0.79 (3H, t, J 7.6, CH2Me), 1.03 (3H, d, J 6.8, CHMe2), 1.15 (3H, d, J 6.8, CHMe2), 1.38 (3H, s, CMe2), 1.40 (3H, d, J 7.1, NCHMe), 1.40–1.60 (2H, m, CH2Me), 1.52 (3H, s, CMe2), 2.16–2.25 (1H, m, CHMe2), 2.26 (1H, d, JAB 12.6, JAX 6.6, COCH2N), 3.08 (1H, dd, JBA 12.6, JBX 7.3, COCH2N), 3.52 (1H, d, J 14.0, NCH2Ph), 3.70 (1H, d, J 14.0, NCH2Ph), 4.02 (1H, q, J 6.8, NCHPh), 4.18–4.29 (1H, m, COCH2), 4.20 (1H, d, J 2.8, NCH2Pr), 7.20–7.39 (10H, m, Ph); δC (100MHz, CDCl3) 11.6, 14.3, 17.1, 21.4, 23.7, 28.8, 29.6, 43.0, 51.5, 54.4, 56.6, 66.5, 66.5, 82.3, 126.7, 127.8, 128.1, 128.3, 128.8, 140.1, 142.0, 153.5, 176.2; m/z (ESI+) 451 (MH+, 100%); HRMS (ESI+) 451.2961 (C28H39N2O3 requires 451.2961).
N-Acryloyl-oxazolidinone 48 (50 mg, 0.20 mmol, 1.0 eq) was reacted with (R)-N-benzyl-(N-α-methylbenzyl)amine (45 µL, 0.31 mmol, 1.6 eq) and n-BuLi (0.13 mL, 0.28 mmol, 2.0 eq) according to General Procedure 14, giving a mixture of diastereoisomers 66 and 67 in a ratio of 92:8. Purification by column chromatography (silica, 9:1 pentane:ether, v/v) furnished 66 (80 mg, 87%) as a colourless oil; \([\alpha]_D^{25} +39.3\) (c 0.9, CHCl₃); \(v_{\text{max}}/\text{cm}^{-1}\) (CHCl₃) 1771, 1700; \(\delta_\text{H}\) (400MHz, CDCl₃) 0.91 (3H, J 6.8, COCHCH₂Me₂), 0.93 (3H, d, J 6.8, COCHCH₂Me₂), 1.02 (3H, d, J 6.8, NCHCH₂Me₂), 1.08 (3H, d, J 7.1, NCHCH₂Me₂), 1.35 (3H, s, CMe₂), 1.40 (3H, d, J 7.0, NCHMe), 1.51 (3H, s, CMe₂), 1.77–1.86 (1H, m, COCHCH₂), 2.10–2.19 (1H, m, NCHCH₂Me₂), 2.66 (1H, dd, J_{AB} 12.9, J_{AX} 6.2, COCHCH₂), 3.04 (1H, dd, J_{BA} 12.9, J_{BX} 9.9, COCHCH₂), 3.62 (2H, app s, NC₃H₂Ph), 4.06 (1H, q, J 7.0, NC₃HMe), 4.12 (1H, d, J 3.4, NC₃HiPr), 4.26–4.34 (1H, m, COCHCH₂Me₂) 7.18–7.36 (10H, m, Ph); \(\delta_\text{C}\) (100MHz, CDCl₃) 14.3, 17.3, 19.9, 20.3, 20.3, 21.6, 21.7, 29.5, 46.3, 49.7, 54.2, 57.4, 66.6, 82.0, 126.6 126.7, 127.8, 128.0, 128.2, 129.1, 139.8, 142.8, 153.7, 175.4; m/z (ESI⁺) 465 (MH⁺, 100%); HRMS (ESI⁺) 465.3108 (C₂₉H₄₁N₂O₃ requires 465.3117).

(4S,2'R,aS)-5,5-Dimethyl-4-iso-propyl-3-{3'-[N-benzyl-N-(α-methylbenzyl)amino]-2'-iso-propyl-propanoyl}oxazolidin-2-one 68 and (4S,2'S,aS)-5,5-dimethyl-4-iso-propyl-3-{3'-[N-benzyl-N-(α-methylbenzyl)amino]-2'-iso-propyl-propanoyl}oxazolidin-2-one 69

N-Acryloyl-oxazolidinone 48 (50 mg, 0.20 mmol, 1.0 eq) was reacted with (S)-N-benzyl-(N-α-methylbenzyl)amine (45 µL, 0.31 mmol, 1.6 eq) and n-BuLi (0.13 mL, 0.28 mmol, 1.6 eq) according to General Procedure 14, giving a mixture of diastereoisomers 68 and 69 in a ratio of 97:3. Purification by column chromatography (silica, 9:1 pentane:ether, v/v) furnished 68 (79 mg, 85%) as a colourless, viscous oil; \([\alpha]_D^{25}−45.3\) (c 1.9, CHCl₃); \(v_{\text{max}}/\text{cm}^{-1}\) (CHCl₃) 1772, 1698; \(\delta_\text{H}\) (400MHz, CDCl₃) 0.85 (3H, J 6.8, COCHCH₂Me₂), 0.87 (3H, d, J 6.8, COCHCH₂Me₂), 1.07 (3H, d, J 6.8, NCHCH₂Me₂), 1.16 (3H, d, J 7.1, NCHCH₂Me₂), 1.39 (3H, s, CMe₂), 1.42 (3H, d, J 6.3, NCHMe), 1.55 (3H, s, CMe₂), 1.70–1.81 (1H, m, COCHCH₂Me₂), 2.18–2.29 (2H, m, NCHCH₂Me₂ and COCHCH₂), 3.20 (1H, dd, J_{BA} 13.8, J_{BX} 8.9, COCHCH₂), 3.29 (1H, d, J 13.6, NCH₂Ph), 3.85 (1H, d, J 13.6, NCH₂Ph), 3.98 (1H, q, J 6.3, NCHMe), 4.23 (1H, d, J 4.1, NCH₂Pr), 4.29–4.37 (1H, m, COCHCH₂) 7.18–7.39 (10H, m, Ph); \(\delta_\text{C}\) (100MHz, CDCl₃) 17.1, 17.3, 19.9, 20.4, 21.1, 21.4, 21.6, 29.7, 30.4, 46.6, 49.8, 54.6, 57.0, 66.7, 82.0, 126.2 126.8, 127.8, 128.0, 128.5, 129.0, 139.9, 141.0, 153.7, 175.9; m/z (ESI⁺) 465 (MH⁺, 100%); HRMS (ESI⁺) 465.3104 (C₂₉H₄₁N₂O₃ requires 465.3117).
(4S,2'R,aR)-5,5-Dimethyl-4-iso-propyl-3-\{3'-[N-benzyl-N-(\alpha-methylbenzyl)amino]-2'-phenylpropanoyl\}oxazolidin-2-one 70 and (4S,2'S,aR)-5,5-dimethyl-4-iso-propyl-3-\{3'-[N-benzyl-N-(\alpha-methylbenzyl)amino]-2'-phenylpropanoyl\}oxazolidin-2-one 71

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\text{\begin{align*}
\text{N-Acryloyl-oxazolidinone 49 (50 mg, 0.17 mmol, 1.0 eq) was reacted with (R)-N-benzyl-(N-\alpha-methylbenzyl)amine (60 \mu L, 0.28 mmol, 1.6 eq) and n-BuLi (0.11 mL, 0.28 mmol, 1.6 eq) according to General Procedure 14 furnished a mixture of diastereoisomers 71 and 70 in the ratio 93:7. Column chromatography (silica, 9:1 pentane:ether, v/v) furnished the mixture of diastereoisomers 71 and 70 (57 mg, 68\%) in a ratio of 98:2 as a colourless viscous oil; data for 71: } & \frac{[\alpha]}{D}^ {25} +59.2 (c 0.3, CHCl_3); \nu_{\text{max}}/\text{cm}^{-1} (\text{CHCl}_3) 1772, 1698; \delta_H (400MHz, CDCl_3) 0.88 (3H, s, CMe_2), 1.00 (3H, d, J 6.5, CHMe_2), 1.07 (3H, d, J 7.1, CHMe_2), 1.32 (3H, d, J 6.8, NCHMe) 1.42 (3H, s, CMe_2), 2.08–2.17 (1H, m, CHMe_2), 2.90 (1H, dd, J_{AB} 13.1, J_{AX} 6.3, COCHC_2), 3.30 (1H, dd, J_{BA} 13.1, J_{BX} 8.1, COCHC_2), 3.55 (1H, d, J 13.9, CH_2Ph), 3.72 (1H, d, J 13.9 CH_2Ph), 3.97 (1H, q, J 6.8, NCCHMe), 5.31–5.38 (1H, m, COCHC_2), 7.16–7.35 (15H, m, Ph); \delta_C (100MHz, CDCl_3) 15.4, 17.1, 21.2, 21.2, 28.2, 29.4, 47.8, 53.9, 54.7, 58.1, 67.0, 82.6, 126.7, 127.3, 127.9, 128.0, 128.1, 128.4, 128.7, 128.8, 128.9, 137.6, 140.1, 142.6, 153.5, 173.3; m/z (ESI\(^+\)) 499 (MH\(^+\), 100\%); HRMS (ESI\(^+\)) 499.2959 (C_{32}H_{39}N_2O_3 requires 499.2961).
\end{align*}}

(4S,2'R,aS)-5,5-Dimethyl-4-iso-propyl-3-\{3'-[N-benzyl-N-(\alpha-methylbenzyl)amino]-2'-phenylpropanoyl\}oxazolidin-2-one 72 and (4S,2'S,aS)-5,5-dimethyl-4-iso-propyl-3-\{3'-[N-benzyl-N-(\alpha-methylbenzyl)amino]-2'-phenylpropanoyl\}oxazolidin-2-one 73

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\text{N-Acryloyl-oxazolidinone 49 (50 mg, 0.17 mmol, 1.0 eq) was reacted with (S)-N-benzyl-(N-\alpha-methylbenzyl)amine (60 \mu L, 0.28 mmol, 1.6 eq) and n-BuLi (0.11 mL, 0.28 mmol, 2.0 eq) according to General Procedure 14 furnished a mixture of diastereoisomers 73 and 72 in the ratio 66:34. Column chromatography (silica, 9:1 pentane:ether, v/v) furnished the mixture of diastereoisomers 73 and 72 (57 mg, 68\%) in a ratio of 97:3 as a colourless viscous oil; } [\alpha]_{D}^{22} + 8.6 (c 1.0, CHCl_3); \nu_{\text{max}}/\text{cm}^{-1} (\text{CHCl}_3) 1773, 1696; \delta_H (400MHz, CDCl_3) 0.92 (3H, s, CMe_2), 1.04 (3H, d, J 6.8, CHMe_2), 1.16 (3H, d, J 7.1, CHMe_2),
3'-Amino-2'-methyl-oxazolidinone 50 (1.20 g, 2.84 mmol, 1.0 eq) was reacted with LiOH (596 mg, 14.2 mmol, 5.0 eq) according to General Procedure 6. The crude mixture of products was treated with Pd (400 mg, 10% wt on C) under H2 (1 atm) according to General Procedure 7. The solvent was removed in vacuo, the residue co-evaporated with aq. HCl (2 M). Purification by ion exchange chromatography (Dowex 50W-X8, 1M aq. NH4OH eluent) yielded the free amino acid (R)-25 as a white crystalline solid (260 mg, 89%); mp 175–177°C {lit.10 179–181°C}; [α]D25 −12.4 (c 1.0, H2O) {lit.10 for (S)-25 [α]D25 +14.2 (c 1.0, H2O)}; δH (200MHz, D2O) 1.05 (3H, d, J 7.3, CCHMe), 2.44–2.51 (1H, m, CCH2), 2.84 (1H, dd, JAB 12.8, JAX 5.5, COCHC2H2N), 2.60–2.69 (1H, m, COCH2), 2.77 (1H, dd, JAB 12.8, JBX 8.8, COCHC2H2N), 3.42 (2H, d, J 13.4, NCH2Ph), 3.67 (3H, s, OMe), 3.70 (2H, d, J 13.4, NCH2Ph), 7.18–7.35 (10H, m, Ph); δC (100MHz, CDCl3) 14.4, 17.1, 21.3, 28.2, 29.5, 47.9, 53.3, 54.7, 57.4, 64.1, 72.6, 126.6, 126.7, 127.9, 128.0, 128.1, 128.4, 128.7, 128.8, 137.3, 140.0, 142.1, 153.5, 173.3; m/z (ESI+) 499 (MH+, 100%); HRMS (ESI+) 499.2954 (C32H39N2O3 requires 499.2961).

Methyl (R)-3-(N,N-dibenzylamino)-2-ethyl propanate 30

3'-Amino-2'-ethyl-oxazolidinone 52 (741 mg, 1.70 mmol, 1.0 eq) was treated with n-BuLi (3.19 mL, 5.10 mmol, 3.0 eq) according to General Procedure 8. Purification by column chromatography (silica, 9:1 pentane:ether, v/v) furnished (R)-30 as a colourless oil (444 mg, 85%); [α]D32 −32.7 (c 1.0, CHCl3); vmax/cm−1 (CHCl3) 1730; δH (400MHz, CDCl3) 0.85 (3H, t, J 7.3, CH2Me), 1.46–1.54 (2H, m, CH2Me), 2.47 (1H, dd, JAB 12.8, JAX 5.5, COCHC2H2N), 2.60–2.69 (1H, m, COCH2), 2.77 (1H, dd, JAB 12.8, JBX 8.8, COCHC2H2N), 3.42 (2H, d, J 13.4, NCH2Ph), 3.67 (3H, s, OMe), 3.70 (2H, d, J 13.4, NCH2Ph), 7.18–7.35 (10H, m, Ph); δC

(100MHz, CDCl$_3$) 11.8, 23.5, 46.5, 51.3, 55.9, 58.4, 126.9, 128.1, 128.1, 128.9, 128.9, 139.2, 175.6; m/z (ESI$^+$) 312 (MH$^+$, 100%); HRMS (ESI$^+$) 312.1966 (C$_{20}$H$_{26}$NO$_2$ requires 312.1964).

(R)-3-Amino-2-ethyl-propanoic acid 32

$\beta$-Amino ester 30 (444 mg, 1.43 mmol, 1.0 eq) was treated with Pd (400 mg, 10% wt on C) under H$_2$ (1 atm) according to General Procedure 7. The crude product was then treated with LiOH (290 mg, 8.0 mmol, 5.0 eq) according to General Procedure 9. The solvents were removed in vacuo and the residue was co-evaporated with aq. HCl (2 M). Purification by ion exchange chromatography (Dowex 50W-X8, 1 M aq. NH$_4$OH eluent) furnished the free amino acid (R)-32 as a white crystalline solid (123 mg, 82%); mp 210–212°C; $[\alpha]_D^{22}$ $-7.4$ (c 1.0, H$_2$O); $\delta$H (400MHz, D$_2$O) 0.76 (3H, t, J 7.2, CH$_2$Me), 1.43–1.50 (2H, m, C$_2$H$_2$Me), 2.32–2.39 (1H, m, CCH$_2$), 2.92 (1H, dd, J$_{AX}$ 13.7, J$_{AB}$ 6.9, COCHC$_2$H), 2.97 (1H, dd, J$_{BX}$ 12.8, J$_{BA}$ 6.9, COCHCH$_2$).

Methyl (R)-3-dibenzylamine-2-iso-propyl-propanate 78

3'-Amino-2'-iso-propyl-oxazolidinone 53 (711 mg, 1.58 mmol, 1.0 eq) was treated with n-BuLi (2.97 mL, 4.74 mmol, 3.0 eq) according to General Procedure 8. Purification by column chromatography (silica, 9:1 pentane:ether, v/v) furnished (R)-78 as a colourless oil (401 mg, 78%); $[\alpha]_D^{22}$ $-28.1$ (c 1.7, CHCl$_3$); $\nu_{\text{max}}$/cm$^{-1}$ (CHCl$_3$) 1730; $\delta$H (400MHz, CDCl$_3$) 0.81 (3H, d, J 6.3, CHMe$_2$), 0.88 (3H, d, J 6.8, CHMe$_2$), 1.71–1.82 (1H, m, CHMe$_2$), 2.41–2.56 (2H, m, COCH and COCHCH$_2$N), 2.77 (1H, dd, J$_{BA}$ 12.4, J$_{BX}$ 8.8, COCHCH$_2$N), 3.32 (2H, d, J 13.4, NCH$_2$Ph), 3.65 (3H, s, OMe), 3.74 (2H, d, J 13.4, NCH$_2$Ph), 7.19–7.34 (10H, m, Ph); $\delta$C (100MHz, CDCl$_3$) 20.5, 20.8, 29.2, 41.9, 51.1, 54.4, 58.4, 126.9, 128.1, 128.1, 129.0, 139.2, 175.1; m/z (ESI$^+$) 326 (MH$^+$, 100%); HRMS (ESI$^+$) 326.2126 (C$_{21}$H$_{28}$NO$_2$ requires 326.2126).

(R)-3-Amino-2-iso-propyl propanoic acid 79

β-Amino ester 78 (401 mg, 1.23 mmol, 1.0 eq) was treated with Pd (400 mg, 10% wt on C) under H₂ (1 atm) according to **General Procedure 7**. The crude product was then treated with LiOH (230 mg, 5.5 mmol, 5.0 eq) according to **General Procedure 9**. The solvents were removed *in vacuo* and the residue was co-evaporated with aq. HCl (2 M). Purification by ion exchange chromatography (Dowex 50W-X8, 1 M aq. NH₄OH eluent) furnished the free amino acid (R)-79 as a white crystalline solid (81 mg, 93%); mp 212–214°C {lit.¹¹ 220–221°C}; [α]²⁵_D -13.1 (c 1.01, H₂O) {lit.¹¹ [α]²⁵_D -11.4 (c 1.0, H₂O)}; δ_H (200MHz, D₂O) 0.76 (3H, d, J 7.2, CHMe₂), 0.82 (3H, d, J 7.2, CHMe₂), 1.72–1.93 (1H, m, CHMe₂), 2.12–2.28 (1H, m, COCH), 2.92 (1H, dd, J_AB 13.7, J_AX 5.0, COCH₂), 2.97(1H, dd, J_BA 13.7, J_BX 8.8, COCH₂).

**((S)-3-Amino-2-phenyl-propanoic acid (S)-81**

3'-Amino-2'-phenyl-oxazolidinone 71 (688 mg, 1.38 mmol, 1.0 eq) was treated with LiOH (340 mg, 7.8 mmol, 6.0 eq) and hydrogen peroxide (2.8 mL, 2.8 mmol, 2.0 eq) according to **General Procedure 15** to furnish a mixture of the acid (S)-80 and chiral auxiliary 2. This mixture was subsequently treated with Pd (800 mg, 10% wt on C) under H₂ (1 atm) according to **General Procedure 7**. The residue was co-evaporated with aq. HCl (2 M) then purified by ion exchange chromatography (Dowex 50W-X8, 1 M aq. NH₄OH eluent) to furnish the free amino acid (S)-81 as a white crystalline solid (195 mg, 95%); mp 230–232°C {lit.¹² 224–225°C}; [α]²⁵_D +93.0 (c 1.0, H₂O) {lit.¹² [α]²⁵_D +95.0 (c 1.0, H₂O)}; δ_H (200MHz, D₂O) 3.19 (1H, dd, J_AB 12.8, J_AX 7.3, COCH₂), 2.97 (1H, dd, J_BA 12.8, J_BX 7.8, COCH₂), 3.62–3.72 (1H, m, COCH), 7.14–7.39 (5H, m, Ph).

**((4S,2'S,3'R)-5,5-Dimethyl-4-iso-propyl-3-[[2'-(N,N-dibenzylamino)methyl]-3'-hydroxybutanoyl] oxazolidin-2-one 83**

3'-Amino-oxazolidinone 7 (100 mg, 0.24 mmol, 1.0 eq), 9-BBNOTf (0.58 mL, 0.29 mmol, 1.2 eq), Hünig’s base (0.06 mL, 0.34 mmol, 1.4 eq) and acetaldehyde (0.02 mL, 0.36 mmol, 1.5 eq, distilled from CaCl₂) were reacted according to **General Procedure 16**. Purification by column chromatography (silica, 9:1

petrol:ether v/v) gave 83 as a viscous pale yellow oil (72 mg, 65%); \([\alpha]_D^{22} + 119.4 (c 0.5, \text{CHCl}_3); \nu_{\text{max}}/\text{cm}^{-1} (\text{film}) 3425, 1771, 1693; \delta_\text{H} (400\text{MHz, CDCl}_3) 0.96 (3\text{H, d, } J 6.8, \text{CHMe}_2), 1.00 (3\text{H, d, } J 7.2, \text{CHMe}_2), 1.12 (3\text{H, d, } J 5.8, \text{C(OH)}\text{Me}), 1.39 (3\text{H, s, CMe}_2), 1.52 (3\text{H, s, CMe}_2), 2.04–2.22 (1\text{H, m, CHMe}_2), 2.72–2.78 (1\text{H, m, CH}_2\text{NBn}_2), 3.02–3.07 (1\text{H, m, CH}_2\text{NBn}_2), 3.26 (2\text{H, d, } J 13.3, \text{N(CH}_2\text{Ph})_2), 3.89–4.03 (1\text{H, m, HO}), 6.35 (1\text{H, br s, OH}); \delta_\text{C} (100\text{MHz, CDCl}_3) 17.1, 20.9, 21.3, 21.6, 28.6, 29.4, 46.7, 56.2, 58.4, 67.6, 70.9, 82.9, 127.5, 128.2, 129.3, 137.2, 153.5, 172.9; m/z (ESI\textsuperscript{+}) 453 (MH\textsuperscript{+}, 100%); HRMS (ESI\textsuperscript{+}) 453.2746 (C\textsubscript{27}H\textsubscript{37}N\textsubscript{2}O\textsubscript{4} requires 453.2753).

(4S,2'S,3'S)-5,5-Dimethyl-4-iso-propyl-3-\{2'-\(N,N\)-dibenzylamino)methyl\}-3'-hydroxy-3'-phenylpropanoyl\}oxazolidin-2-one 84

\[
\text{Bn}_2\text{N} \quad \text{N} \quad \text{O} \quad \text{O} \quad \text{Ph} \\
\text{OH} \quad \text{Bn}_2\text{N} \quad \text{N} \quad \text{O} \quad \text{Bn}_2\text{N}
\]

3'-Amino-oxazolidinone 7 (100 mg, 0.24 mmol, 1.0 eq), 9-BBN\textsuperscript{OTf} (0.58 mL, 0.29 mmol, 1.2 eq), Hünig’s base (0.06 mL, 0.34 mmol, 1.4 eq) and benzaldehyde (0.04 mL, 0.36 mmol, 1.5 eq, distilled from CaH\textsubscript{2}) were reacted according to \textbf{General Procedure 16}. Purification by column chromatography (silica, 9:1 petrol:ether v/v) gave 84 as a pale yellow crystalline solid (44 mg, 36%); mp 112–114°C; \([\alpha]_D^{22} +88.2 (c 1.0, \text{CHCl}_3); \nu_{\text{max}}/\text{cm}^{-1} (\text{KBr}) 3414, 1786, 1655; \delta_\text{H} (400\text{MHz, CDCl}_3) 0.53 (3\text{H, s, CMe}_2), 0.88 (3\text{H, d, } J 6.8, \text{CHMe}_2), 0.93 (3\text{H, d, } J 6.8, \text{CHMe}_2), 1.35 (3\text{H, s, CMe}_2), 1.97–2.07 (1\text{H, m, CHMe}_2), 2.77–2.85 (1\text{H, m, CHCH}_2\text{N}), 3.26–3.32 (1\text{H, m, CHCH}_2\text{N}), 3.35 (2\text{H, d, } J 13.3, \text{N(CH}_2\text{Ph})_2), 3.70 (1\text{H, d, } J 3.41, \text{NCH}_2\text{Pr}), 4.26 (2\text{H, d, } J 13.3, \text{N(CH}_2\text{Ph})_2), 4.80 (1\text{H, d, } J 9.2, \text{CHOH}), 4.87–4.96 (1\text{H, m, COCH}), 7.10–7.52 (15\text{H, m, Ph}); \delta_\text{C} (100\text{MHz, CDCl}_3) 17.0, 21.2, 21.4, 27.2, 29.2, 46.8, 56.4, 58.4, 66.1, 78.5, 82.8, 127.5, 127.9, 127.6, 128.3, 128.7, 129.5, 136.9, 141.7, 153.2, 171.7); m/z (ESI\textsuperscript{+}) 515 (MH\textsuperscript{+}, 100%); HRMS (ESI\textsuperscript{+}) 515.2914 (C\textsubscript{32}H\textsubscript{30}N\textsubscript{2}O\textsubscript{4} requires 515.2910).

\textbf{X-Ray crystal structure determination for 84}

Data were collected using an Enraf-Nonius \(\kappa\)-CCD diffractometer with graphite monochromated Mo-\(K\alpha\) radiation using standard procedures at 190K. The structure was solved by direct methods, all non-hydrogen
atoms were refined with anisotropic thermal parameters. Hydrogen atoms were added at idealised positions.

The structure was refined using CRYSTALS.\textsuperscript{13}

X-ray crystal structure data for 84 [C\textsubscript{32}H\textsubscript{38}N\textsubscript{2}O\textsubscript{4}]: \(M = 514.66\), orthorhombic, space group P 2\textsubscript{1} 2\textsubscript{1} 2\textsubscript{1}, \(a = 8.6876(2)\) Å, \(b = 14.8422(3)\) Å, \(c = 22.3552(4)\) Å, \(V = 2882.5(1)\) Å\textsuperscript{3}, \(Z = 4\), \(\mu = 0.078\) mm\textsuperscript{-1}, colourless block, crystal dimensions = \(0.1 \times 0.1 \times 0.1\) mm\textsuperscript{3}. A total of 3676 unique reflections were measured for \(5 < \theta < 27\) and 2810 reflections were used in the refinement. The final parameters were \(wR_2 = 0.0433\) and \(R_1 = 0.0375\) \([I>3\sigma(I)]\). Crystallographic data (excluding structure factors) has been deposited with the Cambridge Crystallographic Data Centre as supplementary publication number CCDC 616168. Copies of the data can be obtained, free of charge, on application to CCDC, 12 Union Road, Cambridge CB2 1EZ, UK [fax: +44(0)-1223-336033 or e-mail: deposit@ccdc.cam.ac.uk].

\((4S,2'S,3'R)-5,5\text{-}\text{Dimethyl}-4\text{-}\text{iso-propyl}-3\text{-}{\{2'-(N,N\text{-}dibenzylamino)methyl\}}\text{-}3'\text{-}\text{hydroxy}-4'\text{-methylpentanoyl}\text{oxazolidin-2-one}\ 85\)

\begin{center}
\includegraphics[width=0.3\textwidth]{image}
\end{center}

3'-Amino-oxazolidinone 7 (100 mg, 0.24 mmol, 1.0 eq), 9-BBNOTf (0.58 mL, 0.29 mmol, 1.2 eq), Hünig’s base (0.06 mL, 0.34 mmol, 1.4 eq) and \textit{iso}-butyraldehyde (0.03 mL, 0.36 mmol, 1.5 eq, distilled from CaCl\textsubscript{2}) were reacted according to \textbf{General Procedure 16}. Purification by column chromatography (silica, 9:1 petrol:ether v/v) afforded 85 as a colourless crystalline solid (74 mg, 64%); mp. 44–46°C; \([\alpha]\)\textsubscript{D}\textsuperscript{20} +107.6 (c 2.0, CHCl\textsubscript{3}); \(\nu\)\textsubscript{max}/cm\textsuperscript{-1} (KBr) 3429, 1774, 1649; \(\delta\)\textsubscript{H} (400MHz, CDCl\textsubscript{3}) 0.90–1.01 (12H, m, CHMe\textsubscript{2}, C(OH)CHMe\textsubscript{2}), 1.38 (3H, s, CMe\textsubscript{2}), 1.53 (3H, s, CMe\textsubscript{2}), 1.57–1.61 (1H, m, C(OH)CHMe\textsubscript{2}), 2.12–2.19 (1H, m, CHMe\textsubscript{2}), 2.77 (1H, dd, \(J\)\textsubscript{AB} 12.1, \(J\)\textsubscript{AX} 3.0, CHCH\textsubscript{2}N), 3.09 (1H, dd, \(J\)\textsubscript{BA} 12.1, \(J\)\textsubscript{BX} 10.9, CHCH\textsubscript{2}N), 3.25 (2H, d, \(J\) 13.4, N(CH\textsubscript{2}Ph)\textsubscript{2}), 3.81–3.83 (2H, m, CHO\textsubscript{H}, O\textsubscript{H}), 4.10–4.15 (3H, m, N(CH\textsubscript{2}Ph)\textsubscript{2}, NCH\textsubscript{Pr}), 4.51 (1H, m, CO\textsubscript{H}), 7.27–7.36 (10H, m, Ph); \(\delta\)\textsubscript{C} (100MHz, CDCl\textsubscript{3}) 15.2, 17.1, 20.0, 21.4, 21.5, 28.6, 29.5, 31.1, 42.9, 56.7, 58.2, 66.5, 78.5, 82.9, 127.4, 128.6, 129.4, 137.1, 153.3, 173.2; \(m/z\) (ESI\textsuperscript{+}) 481 (MH\textsuperscript{+}, 100%); HRMS (ESI\textsuperscript{+}) 481.3059 (C\textsubscript{29}H\textsubscript{41}N\textsubscript{2}O\textsubscript{4} requires 481.3066).

\textbf{X-Ray crystal structure determination for 85}

\textsuperscript{13} P. W. Betteridge, J. R. Carruthers, R. I. Cooper, C. K. Prout and D. J. Watkin, CRYSTALS, 2004, Issue 12, Chemical Crystallography Laboratory, University of Oxford, UK.
Data were collected using an Enraf-Nonius κ-CCD diffractometer with graphite monochromated Mo-Kα radiation using standard procedures at 190K. The structure was solved by direct methods, all non-hydrogen atoms were refined with anisotropic thermal parameters. Hydrogen atoms were added at idealised positions. The structure was refined using CRYSTALS.\textsuperscript{14}

X-ray crystal structure data for 85 [C\textsubscript{29}H\textsubscript{40}N\textsubscript{2}O\textsubscript{4}]: \( M = 480.65 \), orthorhombic, space group \( P\,2_1\,2_1\,2_1 \), \( a = 11.5661(2) \) Å, \( b = 12.0490(2) \) Å, \( c = 20.5677(4) \) Å, \( V = 2866.31(9) \) Å\textsuperscript{3}, \( Z = 4 \), \( \mu = 0.074 \) mm\textsuperscript{−1}, colourless plate, crystal dimensions = 0.2 × 0.1 × 0.1 mm\textsuperscript{3}. A total of 3648 unique reflections were measured for \( 5 < \theta < 27 \) and 2582 reflections were used in the refinement. The final parameters were \( wR_2 = 0.0502 \) and \( R_1 = 0.0426 \) \([I>2\sigma(I)]\). Crystallographic data (excluding structure factors) has been deposited with the Cambridge Crystallographic Data Centre as supplementary publication number CCDC 616169. Copies of the data can be obtained, free of charge, on application to CCDC, 12 Union Road, Cambridge CB2 1EZ, UK [fax: +44(0)-1223-336033 or e-mail: deposit@ccdc.cam.ac.uk].

\[ (4S,2'S,3'R,\alpha R)-5,5\text{-dimethyl-4-iso-propyl-3-(2'\text{-}[N-benzyl-N-(\alpha\text{-methylbenzyl)}amino]methyl)-3'-hydroxybutanoyl]oxazolidin-2-one \text{ 86} \text{ and } (4S,2'S,3'S,\alpha R)-5,5\text{-dimethyl-4-iso-propyl-3-(2'\text{-}[N-benzyl-N-(\alpha\text{-methylbenzyl)}amino]methyl)-3'-hydroxybutanoyl]oxazolidin-2-one \text{ 87}\]

3'-Amino-oxazolidinone 9 (236 mg, 0.56 mmol, 1.0 eq), 9-BBNOTf (0.5 M in hexanes, 1.34 mL, 0.23 mmol, 1.2 eq), Hünigs base (0.14 mL, 0.27 mmol, 1.4 eq) and acetaldehyde (0.05 mL, 0.84 mmol, 1.5 eq, distilled from CaCl\textsubscript{2}) were reacted according to \textbf{General Procedure 16}. Purification by column chromatography (silica, 9:1 petrol:ether, v/v) gave an inseparable 92:8 mixture of diastereoisomers \textbf{86} and \textbf{87} (178 mg, 68%) as a colourless oil. Data for major diastereoisomer \textbf{86}: \( \nu_{\text{max}}/\text{cm}^{-1} \) (film) 3443, 1771, 1693; \( \delta_{\text{H}} \) (400MHz, CDCl\textsubscript{3}) 0.88 (3H, d, \( J = 6.8 \) Hz, CHMe\textsubscript{2}), 0.95 (3H, d, \( J = 6.8 \) Hz, CHMe\textsubscript{2}), 1.14 (3H, d, \( J = 6.1 \) Hz, CHMe), 1.38 (3H, s, CMe\textsubscript{2}), 1.50 (3H, s, CMe\textsubscript{2}), 1.59 (3H, d, \( J = 7.1 \) Hz, NCHMe), 2.07–2.14 (1H, m, CHMe\textsubscript{2}), 2.53 (1H, dd, \( J_{\text{AB}} = 12.8 \), \( J_{\text{AX}} = 2.9 \), CHCH\textsubscript{2}N), 3.01 (1H, d, \( J = 13.6 \) Hz, NCH\textsubscript{2}Ph), 3.09–3.15 (1H, m, CHCH\textsubscript{2}N), 4.02–4.09 (1H, m, CHO\textsubscript{H}), 4.12–4.16 (2H, m, NCH\textsubscript{2}Pr and NCHMe), 4.20 (1H, d, \( J = 13.9 \) Hz, NCH\textsubscript{2}Ph), 4.37–4.43 (1H, m, COCH), 7.27–7.39 (10H, m, Ph); \( \delta_{\text{C}} \) (100MHz, CDCl\textsubscript{3}) 16.9, 18.7, 21.1, 21.3, 21.6, 28.6, 29.5, 49.7, 52.8,

\textsuperscript{14} P. W. Betteridge, J. R. Carruthers, R. I. Cooper, C. K. Prout and D. J. Watkin, CRYSTALS, 2004, Issue 12, Chemical Crystallography Laboratory, University of Oxford, UK.
3'-Amino-oxazolidinone 10 (93 mg, 0.22 mmol, 1.0 eq), 9-BBNOTf (0.5 M in hexanes, 0.52 mL, 0.26 mmol, 1.2 eq), Hünig’s base (0.05 mL, 0.31 mmol, 1.4 eq) and acetaldehyde (0.02 mL, 0.33 mmol, 1.5 eq, distilled from CaCl$_2$) were reacted according to General Procedure 16. Purification by column chromatography (silica, 9:1 petrol:ether, v/v) gave an inseparable 94:6 mixture of diastereoisomers 88 and 89 as a yellow oil (89 mg, 86%). Data for major diastereoisomer 88; $\nu_{\text{max}}$/cm$^{-1}$ (film) 3426, 1772, 1694; $\delta_{\text{H}}$(400MHz, CDCl$_3$) 0.98 (3H, d, $J$ 6.8, CHMe$_2$), 1.02–1.05 (6H, m, CHMe$_2$ and CHMe), 1.38–1.40 (6H, m, CMe$_2$ and NCHMePh), 1.52 (3H, s, CMe$_2$), 2.13–2.20 (1H, m, CHMe$_2$), 2.88–2.95 (2H, m, CHC$_2$N), 3.45 (1H, d, $J$ 13.4, NCH$_2$Ph), 3.67–3.75 (1H, m, CHOH), 4.07 (1H, d, $J$ 13.4, NCH$_2$Ph), 4.12 (1H, d, $J$ 3.3, NCl$iPr$), 4.12–4.18 (1H, q, $J$ 6.8, NCHMePh), 4.29–4.34 (1H, m, COCH), 7.25–7.37 (10H, m, Ph); $\delta_{\text{C}}$(100MHz, CDCl$_3$) 9.9, 17.2, 20.8, 21.4, 21.6, 28.6, 29.5, 46.9, 51.4, 54.4, 56.0, 66.5, 70.7, 82.9, 127.3, 127.4, 128.3, 128.6, 129.3, 138.1, 141.7, 153.5, 173.3; m/z (ESI$^+$) 467 (MH$^+$, 100%); HRMS (ESI$^+$) 467.2907 (C$_{28}$H$_{39}$N$_2$O$_4$ requires 467.2910).

(4S,2'S,3'R,aS)-5,5-Dimethyl-4-iso-propyl-3-(2'-{(N-benzyl-N-(alpha-methylbenzyl)amino)methyl}-3'-hydroxybutanoyl)oxazolidin-2-one 88 and (4S,2'S,3'S,aS)-5,5-Dimethyl-4-iso-propyl-3-(2'-{(N-benzyl-N-(alpha-methylbenzyl)amino)methyl}-3'-hydroxybutanoyl)oxazolidin-2-one 89

3'-Amino-oxazolidinone 9 (100 mg, 0.24 mmol, 1.0 eq), 9-BBNOTf (0.5 M in hexanes, 0.57 mL, 0.28 mmol, 1.2 eq), Hünig’s base (0.06 mL, 0.33 mmol, 1.4 eq) and iso-butyraldehyde (0.03 mL, 0.35 mmol, 1.5 eq, distilled from CaH$_2$) were reacted according to General Procedure 16. Purification by column chromatography (silica, 4:1 petrol:ether, v/v) gave 90 as a colourless oil (49 mg, 42%); $\left[\alpha\right]_{D}^{23} +402.0$ (c 0.5,
(4S,2'S,3'S,aR)-5,5-Dimethyl-4-iso-propyl-3-({2'-[N-benzyl-N-(α-methylbenzyl)amino)methyl]-3'-hydroxy-3'-phenyl propanoyl)oxazolidin-2-one 91

3'-Amino-oxazolidinone 9 (100 mg, 0.24 mmol, 1.0 eq), 9-BBNOTf (0.5 M in hexanes, 0.57 mL, 0.28 mmol, 1.2 eq), Hünig’s base (0.06 mL, 0.33 mmol, 1.4 eq) and benzaldehyde (0.04 mL, 0.35 mmol, 1.5 eq, distilled from CaH2) were reacted according to General Procedure 16. Purification by column chromatography (silica, 4:1 petrol:ether, v/v) gave 91 as a colourless, viscous oil (65 mg, 52%); [α]D23 +462.4 (c 0.5, CHCl3); νmax/cm–1 (film) 3427, 1769, 1692; δH (400MHz, CDCl3) 0.51 (3H, s, CMe2), 0.83 (3H, d, J 6.8, CHMe2), 0.89 (3H, d, J 6.8, CHMe2), 1.34 (3H, s, CMe2), 1.70 (3H, d, J 7.0, NCHMe), 1.96–2.03 (1H, m, CHMe2), 2.61 (1H, dd, JAB 12.8, JAX 1.9, CHCH2N), 3.05 (1H, d, J 13.6, NCH2Ph), 3.34 (1H, app. t, J 11.9, CHCH2N), 3.70 (1H, d, J 3.3, NCHPr), 4.22–4.32 (2H, m, NCHMe and NCH2Ph), 4.84 (1H, d, J 9.1, CHO), 4.88–4.93 (1H, m, COCH), 7.16–7.44 (15H, m, Ph); δC (100MHz, CDCl3) 17.3, 19.4, 21.6, 21.8, 27.7, 29.6, 47.0, 53.4, 54.9, 58.0, 66.5, 79.0, 83.1, 127.9, 128.1, 128.3, 128.0, 128.6, 128.7, 129.1, 129.4, 129.7, 138.1, 138.2, 142.1, 153.6, 172.4; m/z (ESI+) 529 (MH+, 100%); HRMS (ESI+) 529.3065 (C30H43N2O4 requires 529.3066).
(4S,2'S,3'R,aS)-5,5-dimethyl-4-iso-propyl-3-({2'-[N-benzyl-N-(α-methylbenzyl)amino]methyl}-3'-hydroxy-4'-methylpentanoyl)oxazolidin-2-one 92

\[
\begin{align*}
\text{Ph} & \quad \text{N} \quad \text{O} \\
\text{O} & \quad \text{Ph} \\
\end{align*}
\]

3'-Amino-oxazolidinone 10 (100 mg, 0.24 mmol, 1.0 eq), 9-BBNOTf (0.5 M in hexanes, 0.57 mL, 0.28 mmol, 1.2 eq), Hünig’s base (0.06 mL, 0.33 mmol, 1.4 eq) and iso-butyraldehyde (0.03 mL, 0.35 mmol, 1.5 eq, distilled from CaH2) were reacted according to General Procedure 16. Purification by column chromatography (silica, 4:1 petrol:ether, v/v) gave 92 as a colourless oil (33 mg, 28%); \([\alpha]_D^{23} +70.8 \ (c\ 1.0, \ \text{CHCl}_3)\);

\[
\nu_{\text{max}}/\text{cm}^{-1} \ (\text{film}) \ 3441, 1771, 1683; \ \delta_{\text{H}} \ (400\text{MHz, CDCl}_3) \ 0.88 \ (3H, d, J 6.8, C(OH)CHMe_2), 0.90 \ (3H, d, J 7.1, C(OH)CHMe_2), 0.99 \ (3H, d, J 6.8, CHMe_2), 1.04 \ (3H, d, J 6.8, CHMe_2), 1.37 \ (3H, s, CMe_2), 1.39 \ (3H, d, J 7.1, NCHMe), 1.49–1.53 \ (1H, m, C(OH)CHMe_2), 1.53 \ (3H, s, CMe_2), 2.14–2.22 \ (1H, m, CHMe_2), 2.91–2.98 \ (2H, m, CHCH_2N), 3.45 \ (1H, d, J 13.4, NCH_2Ph), 3.52 \ (1H, dd, J 2.5, 8.6, CCHMe_2), 4.05 \ (1H, d, J 13.4, NCH_2Ph), 4.11 \ (1H, d, J 3.0, NCHPr), 4.18 \ (1H, q, J 6.8, NCHMe), 4.43–4.49 \ (1H, m, COCH), 5.90 \ (1H, br s, CHOCH), 7.26–7.36 \ (10H, m, Ph); \ \delta_{\text{C}} \ (100\text{MHz, CDCl}_3) \ 10.7, 15.8, 17.5, 20.3, 21.8, 21.9, 29.0, 29.9, 31.4, 43.4, 52.0, 54.8, 56.6, 67.0, 78.8, 83.3, 127.6, 127.7, 128.7, 128.8, 128.9, 138.5, 141.9, 153.7, 174.1; \ m/z \ (\text{ESI}^+) \ 495 \ (\text{MH}^+, 100\%); \ \text{HRMS} \ (\text{ESI}^+) \ 495.3218 \ (\text{C}_{30}\text{H}_{43}\text{N}_2\text{O}_4 \text{requires 495.3223}).
\]

(4S,2'S,3'S,aS)-5,5-Dimethyl-4-iso-propyl-3-({2'-[N-benzyl-N-(α-methylbenzyl)amino]methyl}-3'-hydroxy-3'-phenyl-propanoyl)oxazolidin-2-one 93

\[
\begin{align*}
\text{Ph} & \quad \text{N} \quad \text{O} \\
\text{O} & \quad \text{Ph} \\
\end{align*}
\]

3'-Amino-oxazolidinone 10 (100 mg, 0.24 mmol, 1.0 eq), 9-BBNOTf (0.5 M in hexanes, 0.57 mL, 0.28 mmol, 1.2 eq), Hünig’s base (0.06 mL, 0.33 mmol, 1.4 eq) and benzaldehyde (0.04 mL, 0.35 mmol, 1.5 eq, distilled from CaH2) were reacted according to General Procedure 16. Purification by column chromatography (silica, 9:1 petrol:ether, v/v) gave 93 as a mixture of diastereoisomers in a ratio of 77:23, with 93 as the major product. Purification by column chromatography (silica, 9:1 petrol:ether, v/v) gave 93 as a yellow oil (86 mg, 68%, 80% de); \([\alpha]_D^{23} +70.8 \ (c\ 1.0, \ \text{CHCl}_3)\);

\[
\nu_{\text{max}}/\text{cm}^{-1} \ (\text{film}) \ 3427, 1771, 1692; \ \delta_{\text{H}} \ (400\text{MHz, CDCl}_3) \ 0.52 \ (3H, s, CMe_2), 0.90 \ (3H, d, J 6.8, CHMe_2), 0.96 \ (3H, d, J 6.8, CHMe_2), 1.35 \ (3H, s, CMe_2), 1.45 \ (3H, d, J 6.8, CHMe), 1.99–2.06 \ (1H, m, CHMe_2), 2.95 \ (1H, dd, J_{AB} 12.6, J_{AX} 2.5, \text{CHCH}_2\text{N}), 3.22–3.26 \ (1H, m, \text{CHCH}_2\text{N}), 3.51 \ (1H, d, J 12.6, \text{NCH}_2\text{Ph}), 3.68 \ (1H, d, J 3.3, \text{NCHPr}), 4.22–4.30 \ (2H, m,
NCH₂Ph and NCH₃Me), 4.51 (1H, d, J 9.1, CHO), 4.78–4.84 (1H, m, CH₃), 7.14–7.42 (15H, m, Ph); δc (100MHz, CDCl₃) 9.7, 17.1, 21.3, 21.4, 27.3, 29.2, 47.0, 51.8, 54.6, 56.1, 66.3, 78.3, 82.9, 127.4, 127.6, 127.8, 127.5, 128.2, 128.4, 128.5, 129.5, 137.8, 141.5, 141.8, 153.3, 172.1; m/z (ESI⁺) 529 (MH⁺, 100%); HRMS (ESI⁺) 529.3062 (C₃₃H₄₁N₂O₄ requires 529.3066).

Methyl (2S,3R)-2-(N,N-dibenzylamino)methyl-3-hydroxybutanoate 94

Aldol adduct 83 (147 mg, 0.32 mmol, 1.0 eq), n-BuLi (2.5 M, 0.13 mL, 0.32 mmol, 1.0 eq) were reacted according to General Procedure 8. Purification by column chromatography (silica, 4:1 petrol:ether, v/v) gave 94 as a colourless oil (103 mg, 97%); [α]D²² +80.0 (c 0.4, CHCl₃); νmax/cm⁻¹ (film) 3443, 1643; δh (400MHz, CDCl₃) 1.14 (3H, d, J 6.1, CHMe), 2.71 (1H, dd, J₁₂.5, J₃₄.2, CHCH₂N), 2.76–2.82 (1H, m, COCH), 3.05 (1H, dd, J₁₁.9, J₂₂.9, CHCH₂N), 3.31 (2H, d, J 13.1, N(CH₂Ph)₂), 3.66 (3H, s, OMe), 3.79–3.86 (1H, m, CHO), 3.91 (2H, d, J 13.1, N(CH₂Ph)₂), 7.27–7.38 (10H, m, Ph); δc (100MHz, CDCl₃) 21.7, 50.4, 52.1, 55.8, 59.0, 70.8, 127.9, 129.0, 129.7, 137.7, 173.3; m/z (ESI⁺) 328 (MH⁺, 100%); HRMS (ESI⁺) 328.1912 (C₂₀H₂₆NO₃ requires 328.1913.

Methyl (2S,3R)-2-aminomethyl-3-hydroxybutanoate hydrochloride 95

β-Amino ester 94 (50 mg, 0.15 mmol, 1.0 eq) was treated with Pd (10% wt on C, 25mg) under H₂ (1atm) according to General Procedure 7. HCl (2M in ether, 0.09mL, 0.18mmol, 1.2eq) was added to the filtrate and the solvents removed in vacuo. Trituration with ether furnished 95 (28 mg, quant.) as a colourless, viscous oil; [α]D³⁰ –6.7 (c 0.85, MeOH) {lit.¹⁵ [α]D³⁰ –7.0 (c 0.85, MeOH)}; δh (400MHz, CDCl₃) 1.28 (3H, d, J 6.3, CHMe), 2.73–2.77 (1H, m, COCH), 3.28–3.33 (2H, m, CHCH₂NH₂), 3.78 (3H, s, OMe), 4.19–4.25 (1H, m, CHO).