Supporting Information

TsOH·H₂O-Mediated N-amidation of Quinoline N-oxides:
Facile and Regioselective Synthesis of N-(quinolin-2-yl)amides

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1. General information
Commercially available reagents were used as received without further purification. Unless otherwise specified, all reagents were carried out in air at room temperature. All unknown products were characterized by $^1$H NMR, $^{13}$C NMR spectroscopy, and high-resolution mass spectrometry (HRMS). $^1$H and $^{13}$C NMR spectra were recorded on a Bruker NMR spectrometer (400 MHz and 100 MHz, respectively) and Chemical shifts were calibrated using residual undeuterated solvent as an internal reference ($^1$H NMR: DMSO 2.50 ppm, $^{13}$C NMR: DMSO 40.0 ppm). Column chromatography was performed on silica gel (200-300 mesh) using ethyl acetate (EA)/petroleum ether (PE) as eluents.

2. Experimental Section
General procedure for the synthesis of N-(quinolin-2-yl)amides

\[
\text{R}^1\text{N}^-\text{O}^+\text{Ts}^-\text{H}_2\text{O} \quad \text{(TsOH·H}_2\text{O)} \quad \text{N} \text{-oxide (0.3 mmol), nitriles (2.1mmol) and TsOH·H}_2\text{O (0.36mmol)}
\]

\[
\xrightarrow{150^\circ\text{C}} \quad \text{R}^1\text{N}^-\text{O}^+\text{Ts}^-\text{H}_2\text{O} \quad \text{(TsOH·H}_2\text{O)} \quad \text{N} \text{-oxide (0.3 mmol), nitriles (2.1mmol) and TsOH·H}_2\text{O (0.36mmol)}
\]

In a pressure tube was placed quinoline-N-oxide (0.3 mmol), nitriles (2.1 mmol) and TsOH·H$_2$O (0.36 mmol), and then the resulting solution was stirred at 150°C for about 12h (monitored by TLC). After completion of the reaction, the reaction was cooled to room temperature, then water (10mL) was added to the reaction mixture, it was extracted with CH$_2$Cl$_2$ (10 mL x 2) and the combined organic layers were washed with brine and dried over anhydrous Na$_2$SO$_4$. After removal of the solvent in vacuo, the crude product was subjected to silica gel column chromatography to afford the product 3.

Large-scale synthesis of 3a

\[
\text{R}^1\text{N}^-\text{O}^+\text{Ts}^-\text{H}_2\text{O} \quad \text{(TsOH·H}_2\text{O)} \quad \text{N} \text{-oxide (8 mmol, 1.16g), benzonitrile (56 mmol, 5.77g) and TsOH·H}_2\text{O (9.6mmol, 1.82g)}
\]

In a pressure tube was placed quinoline-N-oxide (8 mmol, 1.16g), benzonitrile (56 mmol, 5.77g) and TsOH·H$_2$O (9.6 mmol, 1.82g), and then the resulting solution was stirred at 150°C for about 12h (monitored by TLC). After completion of the reaction, the reaction was cooled to room temperature, then water (10 mL) was added to the reaction mixture, it was extracted with CH$_2$Cl$_2$ (10 mL x 2) and the combined organic layers were washed with brine and dried over anhydrous Na$_2$SO$_4$. After removal of the solvent in vacuo, the crude product was subjected to silica gel column chromatography to afford 1.62g of 3a, yield 82%.

Preparation of 2-$d_1$-Quinoline-N-Oxide

D$_2$O (1.5 mL), NaOH (200 mg, 5 mmol), quinoline-N-oxide (258 mg, 2.0 mmol) were weighed into 30 mL pressure tube sealed with rubber plugs. The reaction mixture was stirred at 100 °C for overnight. After cooling to room temperature, the mixture was then extracted with EtOAc (3 x 10 mL). The combined organic phase was washed with saturated NaCl solution (3 x 5 mL), dried over MgSO$_4$, and filtered. EtOAc was removed under reduced pressure to obtain the crude product 2-$d_1$-quinoline N-Oxide. It was further purified by flash column chromatography and percentage of $d$-incorporation was determined by $^1$H NMR. Peak areas at 8.73 ppm and 8.56 ppm were compared to obtain the deuterium incorporation. Deuterium incorporation was detected to be 91% by $^1$H NMR (see $^1$H spectrum).
KIE Experiment

Quinoline N-oxide 1a and 2-d₁-quinoline N-oxide 1a-d₁ (1:1) (totally 0.2 mmol, deuterium ratio has been calculated), PhCN (1.4 mmol, 7 equiv), TsOH·H₂O (0.24 mmol, 1.2 equiv) were added into a pressure tube. The reaction mixture was stirred at 150 °C for 3 h. After cooling to room temperature, residual starting material (mixture of 2-d₁-quinoline-N-oxide and quinolone-N-oxide) was recovered by column chromatography on silica gel (200-300 mesh), which was characterized by ¹H NMR spectroscopy. The experiments were repeated three times, and calculated KIE values are 2.24, 2.15 and 2.21. The average \( k_H/k_D = 2.20 \) was calculated based on the isolated yields. Representative ¹H NMR spectra copy was shown below:
3. Characterization of products

*N-(quinolin-2-yl)benzamide (3a)*

![Chemical Structure](image)

$^{1}$H NMR (400MHz, d$_6$– DMSO) δ: 11.18 (s, 1 H), 8.42 – 8.35 (m, 2 H), 8.14 – 8.12 (m, 2 H), 7.92 – 7.89 (m, 2 H), 7.73 – 7.69 (m, 1 H), 7.61 – 7.57 (m, 1 H), 7.53 – 7.47 (m, 3 H); $^{13}$C NMR (100 MHz, d$_6$– DMSO) δ: 167.0, 152.5, 147.0, 138.5, 134.5, 132.7, 132.6, 130.5, 128.9, 128.8, 128.3, 127.6, 126.4, 125.7, 116.1.

*N-(4-methylquinolin-2-yl)benzamide(3b)*

![Chemical Structure](image)

$^{1}$H NMR (400MHz, d$_6$– DMSO) δ: 11.05 (s, 1 H), 8.24 (s, 1 H), 8.12 – 8.10 (m, 2 H), 8.02 (d, $J$= 8.0 Hz, 1 H), 7.88 (d, $J$= 8.4 Hz, 1 H), 7.71 (t, $J$= 8.0 Hz, 1 H), 7.62 – 7.58 (m, 1 H), 7.54 – 7.50 (m, 3 H), 2,69 (s, 3 H); $^{13}$C NMR (100 MHz, d$_6$– DMSO) δ: 166.9, 152.2, 146.8, 146.6, 134.5, 132.6, 130.2, 128.9, 128.7, 128.1, 126.3, 125.5, 124.7, 116.9, 19.3.

*N-(5-methylquinolin-2-yl)benzamide(3c)*

![Chemical Structure](image)

$^{1}$H NMR (400MHz, d$_6$– DMSO) δ: 11.13 (s, 1 H), 8.47 (d, $J$= 9.2 Hz, 1 H), 8.39 (d, $J$= 9.2 Hz, 1 H), 8.12 – 8.10 (m, 2 H), 7.73 (d, $J$= 8.4 Hz, 1 H), 7.60 – 7.57 (m, 2 H), 7.54 – 7.50 (m, 2 H), 7.32 (d, $J$= 7.2 Hz, 1 H), 2.63 (s, 3 H); $^{13}$C NMR (100 MHz, d$_6$– DMSO) δ: 167.0, 152.1, 147.3, 135.3, 135.3, 134.5, 132.6, 130.2, 128.9, 128.7, 126.1, 125.9, 125.5, 115.5, 18.8; HRMS (ESI) m/z calcd. for C$_{17}$H$_{15}$N$_2$O [M+H]$^+$: 263.1179, found 263.1175.

*N-(6-methylquinolin-2-yl)benzamide (3d)*

![Chemical Structure](image)

$^{1}$H NMR (400MHz, d$_6$ – DMSO) δ: 11.10 (s, 1 H), 8.32 (d, $J$= 8.8 Hz, 1 H), 8.28 (d, $J$= 8.8 Hz, 1 H), 8.11 – 8.09 (m, 2 H), 7.78 (d, $J$= 8.4 Hz, 1 H), 7.68 (s, 1 H), 7.60 – 7.59 (m, 1 H), 7.57 – 7.50 (m, 3 H), 2.46 (s, 3 H); $^{13}$C NMR (100 MHz, d$_6$– DMSO) δ: 166.9, 151.7, 145.3, 137.8, 135.1, 134.5, 132.6, 132.6, 128.9, 128.7, 127.4, 127.1, 126.3, 116.0, 21.5; HRMS (ESI) m/z calcd. for C$_{17}$H$_{15}$N$_2$O [M+H]$^+$: 263.1179, found 263.1177.

*N-(7-methylquinolin-2-yl)benzamide (3e)*

![Chemical Structure](image)

$^{1}$H NMR (400MHz, d$_6$ – DMSO) δ: 11.13 (s, 1 H), 8.35 (d, $J$= 8.8 Hz, 1 H), 8.31 (d, $J$= 8.8 Hz, 1 H), 8.13 – 8.11 (m, 2 H), 7.85 (d, $J$= 8.4 Hz, 1 H), 7.68 (s, 1 H), 7.63 – 7.61 (m, 1 H), 7.55 (t, $J$= 8.0 Hz, 2 H), 7.37 (dd, $J_1$= 1.6 Hz, $J_2$= 8.4 Hz, 1 H), 2.53 (s, 3 H); $^{13}$C NMR (100 MHz, d$_6$– DMSO) δ: 167.0, 152.4, 147.2, 140.4, 138.2, 134.5, 132.6,
128.9, 128.7, 127.8, 126.6, 124.4, 115.1, 22.0, HRMS (ESI) m/z calcd. for C₇H₇N₂O [M+H]⁺: 263.1179, found 263.1176.

N-(8-methylquinolin-2-yl)benzamide (3f)

\[
\begin{align*}
\text{N} & \quad \text{H} \\
\text{N} & \quad \text{C} \\
\text{O} & \quad \text{P}
\end{align*}
\]

\[\text{Me}\]

\[\text{NHCOPh}\]

\[^1\text{H NMR (400 MHz, d}^6\text{- DMSO)}: \delta = 10.86 (s, 1 H), 8.34 (d, J= 9.2 Hz, 1 H), 8.26 (d, J= 9.2 Hz, 1 H), 8.07 – 8.05 (m, 2 H), 7.74 (d, J= 7.6 Hz, 1 H), 7.61 – 7.51 (m, 4 H), 7.38 (t, J= 8.0 Hz, 1 H), 2.68 (s, 3 H); \]

\[^{13}\text{C NMR (100 MHz, d}^6\text{- DMSO)}: \delta = 167.0, 151.2, 145.7, 138.7, 135.5, 134.6, 132.5, 130.4, 128.8, 126.2, 126.1, 125.4, 115.9, 18.0; \]

HRMS (ESI) m/z calcd. for C₁₇H₁₅N₂O [M+H]⁺: 263.1179, found 263.1174.

N-(6-methoxyquinolin-2-yl)benzamide (3g)

\[
\begin{align*}
\text{N} & \quad \text{H} \\
\text{N} & \quad \text{C} \\
\text{O} & \quad \text{P}
\end{align*}
\]

\[\text{MeO}\]

\[\text{NHCOPh}\]

\[^1\text{H NMR (400MHz, d}^6\text{- DMSO)}: \delta = 11.04 (s, 1 H), 8.32 (d, J= 9.2 Hz, 1 H), 8.27 (d, J= 8.8 Hz, 1 H), 8.11 – 8.09 (m, 2 H), 7.80 (d, J= 6.8 Hz, 1 H), 7.60 – 7.57 (m, 1 H), 7.71 (t, J= 7.6 Hz, 2 H), 7.38 – 7.34 (m, 2 H), 3.87 (s, 3 H); \]

\[^{13}\text{C NMR (100 MHz, d}^6\text{- DMSO)}: \delta = 166.8, 157.0, 150.5, 142.6, 137.3, 134.6, 132.5, 129.1, 128.9, 128.7, 127.3, 122.7, 116.4, 106.5, 56.0. \]

N-(6-phenylquinolin-2-yl)benzamide (3h)

\[
\begin{align*}
\text{N} & \quad \text{H} \\
\text{N} & \quad \text{C} \\
\text{O} & \quad \text{P}
\end{align*}
\]

\[\text{Ph}\]

\[\text{NHCOPh}\]

\[^1\text{H NMR (400MHz, d}^6\text{- DMSO)}: \delta = 11.19 (s, 1 H), 8.45 (d, J= 9.2 Hz, 1 H), 8.39 (d, J= 9.2 Hz, 1 H), 8.24 (d, J= 2.0 Hz, 1 H), 8.12 – 8.12 (m, 2 H), 8.06 (dd, J₁= 2.4 Hz, J₂= 8.8 Hz, 1 H), 7.95 (d, J= 8.8 Hz, 1 H), 7.81 (d, J= 7.2 Hz, 2 H), 7.63 – 7.60 (m, 1 H), 7.55 – 7.49 (m, 4 H), 7.42 – 7.40 (m, 1 H); \]

\[^{13}\text{C NMR (100 MHz, d}^6\text{- DMSO)}: \delta = 167.0, 152.5, 146.4, 140.0, 138.9, 137.3, 134.5, 132.7, 129.6, 129.6, 128.9, 128.7, 127.3, 122.7, 116.4; \]

HRMS (ESI) m/z calcd. for C₂₂H₁₇N₂O [M+H]⁺: 325.1335, found 325.1337.

N-(6-fluoroquinolin-2-yl)benzamide (3i)

\[
\begin{align*}
\text{N} & \quad \text{H} \\
\text{N} & \quad \text{C} \\
\text{O} & \quad \text{P}
\end{align*}
\]

\[\text{F}\]

\[\text{NHCOPh}\]

\[^1\text{H NMR (400MHz, d}^6\text{- DMSO)}: \delta = 11.16 (s, 1 H), 8.38 (s, 2 H), 8.10 – 8.08 (m, 2 H), 7.91 (dd, J₁= 5.6 Hz, J₂= 9.6 Hz, 1 H), 7.75 (dd, J₁= 3.2 Hz, J₂= 9.2 Hz, 1 H), 7.65 – 7.62 (m, 1 H), 7.60 – 7.59 (m, 1 H), 7.54 – 7.50 (m, 2 H); \]

\[^{13}\text{C NMR (100 MHz, d}^6\text{- DMSO)}: \delta = 167.0, 160.7, 158.3, 152.0, 144.0, 138.1, 139.1, 134.4, 132.7, 130.3, 130.2, 128.9, 128.7, 126.8, 126.7, 120.4, 120.2, 117.0, 111.7, 111.5; \]

\[^{19}\text{F NMR (376 MHz, d}^6\text{- DMSO)}: \delta = -115.6; \]

HRMS (ESI) m/z calcd. for C₁₆H₁₂F₃N₂O [M+H]⁺: 267.0928, found 267.0923.

N-(6-chloroquinolin-2-yl)benzamide (3j)
\[ \text{H NMR (400MHz, d}_6^- \text{- DMSO)} \delta: 11.21 (s, 1 H), 8.39 (d, J= 9.2 Hz, 1 H), 8.35 (d, J= 8.8 Hz, 1 H), 8.09 (d, J= 9.2 Hz, 2 H), 8.04 (d, J= 2.4 Hz, 1 H), 7.86 (d, J= 8.8 Hz, 1 H), 7.70 (dd, J= 2.4 Hz, J= 8.8 Hz, 1 H), 7.62 – 7.59 (m, 1 H), 7.52 (t, J= 7.6 Hz, 2 H); ^{13}C NMR (100 MHz, d}_6^- \text{- DMSO)} \delta: 167.1, 152.9, 145.4, 137.9, 134.3, 132.7, 130.9, 129.9, 129.6, 128.9, 128.8, 127.0, 127.0, 117.0; HRMS (ESI) m/z calcd. for C\textsubscript{16}H\textsubscript{12}ClN\textsubscript{2}O [M+H]^-: 283.0633, found 283.0630.

\[ N-(6-bromoquinolin-2-yl)benzamide (3k) \]

\[ \text{H NMR (400 MHz, d}_6^- \text{- DMSO)} \delta: 11.21 (s, 1 H), 8.39 (d, J= 9.2 Hz, 1 H), 8.35 (d, J= 9.2 Hz, 1 H), 8.20 (d, J= 2.0 Hz, 1 H), 8.09 – 8.07 (m, 2 H), 7.80 – 7.79 (m, 2 H), 7.62 – 7.59 (m, 1 H), 7.54 – 7.50 (m, 2 H); ^{13}C NMR (100 MHz, d}_6^- \text{- DMSO)} \delta: 167.1, 152.9, 145.6, 137.8, 134.3, 133.4, 132.7, 130.3, 129.8, 128.9, 128.8, 127.6, 118.3, 116.9; HRMS (ESI) m/z calcd. for C\textsubscript{16}H\textsubscript{12}BrN\textsubscript{2}O [M+H]^-: 327.0128, found 327.0131.

\[ \text{methyl 2-benzamidoquinoline-6-carboxylate (3l)} \]

\[ \text{H NMR (400MHz, d}_6^- \text{- DMSO)} \delta: 11.30 (s, 1 H), 8.60 (d, J= 2.0 Hz, 1 H), 8.56 (d, J= 9.2 Hz, 1 H), 8.42 (d, J= 9.2 Hz, 1 H), 8.16 (dd, J= 2.0 Hz, J= 8.8 Hz, 1 H) 8.09 – 8.08 (m, 2 H), 7.91 (d, J= 8.8 Hz, 1 H), 7.64 – 7.60 (m, 1 H), 7.54 – 7.51 (m, 2 H); ^{13}C NMR (100 MHz, d}_6^- \text{- DMSO)} \delta: 167.2, 166.5, 154.3, 149.1, 140.1, 134.2, 132.8, 131.1, 129.5, 128.9, 128.8, 128.0, 126.4, 125.5, 116.6, 52.8; HRMS (ESI) m/z calcd. for C\textsubscript{18}H\textsubscript{15}N\textsubscript{2}O\textsubscript{3} [M+H]^-: 307.1077, found 307.1070.

\[ 2\text{-methyl-N-(quinolin-2-yl)benzamide (3m)} \]

\[ \text{H NMR (400MHz, d}_6^- \text{- DMSO)} \delta: 11.08 (s, 1 H), 8.42 – 8.35 (m, 2 H), 7.95 (d, J= 8.4 Hz, 1 H), 7.83 (d, J= 8.4 Hz, 1 H), 7.74 – 7.70 (m, 1 H), 7.54 – 7.50 (m, 2 H), 7.39 (d, J= 7.6 Hz, 1 H), 7.30 (d, J= 8.0 Hz, 1 H), 2.43 (s, 3 H); ^{13}C NMR (100 MHz, d}_6^- \text{- DMSO)} \delta: 169.4, 152.2, 146.9, 138.6, 136.7, 136.1, 130.4, 128.5, 128.1, 127.6, 126.3, 126.0, 125.6, 115.6, 20.0; HRMS (ESI) m/z calcd. for C\textsubscript{17}H\textsubscript{15}N\textsubscript{2}O [M+H]^-: 263.1179, found 263.1174.

\[ 3\text{-methyl-N-(quinolin-2-yl)benzamidene (3n)} \]

\[ \text{H NMR (400MHz, d}_6^- \text{- DMSO)} \delta: 11.06 (s, 1 H), 8.38 (s, 2 H), 7.94 - 7.87 (m, 4 H), 7.74 - 7.70 (m, 1 H), 7.52 - 7.48 (m, 1 H), 7.40 - 7.39 (m, 2 H), 2.38 (s, 3 H); ^{13}C NMR (100 MHz, d}_6^- \text{- DMSO)} \delta: 167.1, 152.4, 146.9, 138.5, 138.2, 134.4, 133.2, 130.5, 129.3, 128.8, 128.3, 127.6, 126.3, 125.8, 125.6, 116.0, 21.4; HRMS (ESI) m/z calcd. for C\textsubscript{17}H\textsubscript{15}N\textsubscript{2}O [M+H]^-: 263.1179, found 263.1172.

\[ \text{N-(6-bromoquinolin-2-yl)benzamide (3k)} \]

\[ \text{methyl 2-benzamidoquinoline-6-carboxylate (3l)} \]

\[ 2\text{-methyl-N-(quinolin-2-yl)benzamide (3m)} \]

\[ 3\text{-methyl-N-(quinolin-2-yl)benzamidene (3n)} \]

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4-methyl-N-(quinolin-2-yl)benzamide (3o)

\[
\begin{align*}
\text{H NMR (400MHz, d}_6\text{- DMSO) } &\delta: 11.09 (s, 1 H), 8.38 (s, 2 H), 8.02 (d, \text{ } J= 8.0 \text{ Hz}, 2 H), 7.93 (dd, \text{ } J_1= 8.0 \text{ Hz}, J_2= 0.8 \text{ Hz}, 1 H), 7.88 (d, \text{ } J= 8.4 \text{ Hz}, 1 H), 7.74 - 7.70 (m, 1 H), 7.52 - 7.48 (m, 1 H), 7.31 (d, \text{ } J= 7.6 \text{ Hz}, 2 H), 2.37 (s, 3 H); \\
\text{13C NMR (100 MHz, d}_6\text{- DMSO) } &\delta: 166.8, 152.5, 147.0, 142.8, 138.5, 131.6, 130.5, 129.5, 128.8, 128.3, 127.6, 126.3, 125.6, 116.0, 21.6; \text{ HRMS (ESI) } m/z \text{ calcd. for C}_{17}H_{15}N_2O [M+H]^+: 263.1179, \text{ found 263.1174.}
\end{align*}
\]

4-methoxy-N-(quinolin-2-yl)benzamide (3p)

\[
\begin{align*}
\text{H NMR (400MHz, d}_6\text{- DMSO) } &\delta: 10.98 (s, 1 H), 8.36 (s, 2 H), 8.12 (d, \text{ } J= 8.0 \text{ Hz}, 2 H), 7.93 - 7.87 (m, 2 H), 7.71 - 7.70 (m, 1 H), 7.49 - 7.48 (m, 1 H), 7.05 (d, \text{ } J= 8.4 \text{ Hz}, 2 H), 3.83 (s, 3 H); \\
\text{13C NMR (100 MHz, d}_6\text{- DMSO) } &\delta: 166.3, 162.9, 152.6, 147.0, 142.8, 138.4, 130.7, 130.4, 128.8, 126.3, 116.1, 114.1, 55.9.
\end{align*}
\]

4-fluoro-N-(quinolin-2-yl)benzamide (3q)

\[
\begin{align*}
\text{H NMR (400MHz, d}_6\text{- DMSO) } &\delta: 11.23 (s, 1 H), 8.36 (s, 2 H), 8.20 - 8.17 (m, 2 H), 7.92 - 7.87 (m, 2 H), 7.73 - 7.69 (m, 1 H), 7.49 (t, \text{ } J= 7.6 \text{ Hz}, 1 H), 7.33 (t, \text{ } J= 8.8 \text{ Hz}, 2 H); \text{13C NMR (100 MHz, d}_6\text{- DMSO) } \delta: 166.2, 166.0, 163.7, 152.4, 146.9, 138.6, 135.9, 135.8, 131.6, 131.5, 131.0, 130.5, 128.3, 127.6, 126.4, 125.7, 117.6, 117.4, 116.0, 115.9, 115.7; \text{19F NMR (379MHz, d}_6\text{- DMSO) } \delta: -107.9; \text{ HRMS (ESI) } m/z \text{ calcd. for C}_{18}H_{14}FNO [M+H]^+: 267.0928, \text{ found 267.0930.}
\end{align*}
\]

4-chloro-N-(quinolin-2-yl)benzamide (3r)

\[
\begin{align*}
\text{H NMR (400MHz, d}_6\text{- DMSO) } &\delta: 11.23 (s, 1 H), 8.38 (d, \text{ } J= 8.8 \text{ Hz}, 1 H), 8.33 (d, \text{ } J= 8.8 \text{ Hz}, 1 H), 8.10 - 8.08 (m, 2 H), 7.93 (d, \text{ } J= 8.0 \text{ Hz}, 1 H), 7.88 (d, \text{ } J= 8.4 \text{ Hz}, 1 H), 7.74 - 7.70 (m, 1 H), 7.58 (d, \text{ } J= 8.4 \text{ Hz}, 2 H), 7.56 - 7.49 (m, 1 H); \text{13C NMR (100 MHz, d}_6\text{- DMSO) } \delta: 166.1, 152.3, 146.9, 138.7, 137.6, 133.3, 130.7, 130.6, 129.0, 128.4, 127.7, 126.4, 125.9, 116.0; \text{ HRMS (ESI) } m/z \text{ calcd. for C}_{18}H_{14}ClNO [M+H]^+: 283.0633, \text{ found 283.0627.}
\end{align*}
\]

4-bromo-N-(quinolin-2-yl)benzamide (3s)
1H NMR (400MHz, d6- DMSO) δ: 11.26 (s, 1H), 8.41 (d, J= 8.8 Hz, 1 H), 8.34 (d, J= 9.2 Hz, 1 H), 8.03 - 8.01 (m, 2 H), 7.95 (dd, J1= 8.0 Hz, J2= 1.2 Hz, 1 H), 7.88 (d, J= 8.4 Hz, 1 H), 7.74 - 7.72 (m, 3 H), 7.56 - 7.51 (m, 1 H);13C NMR (100 MHz, d6- DMSO) δ: 166.2, 152.3, 146.9, 138.7, 133.6, 131.9, 130.8, 130.6, 128.4, 127.6, 126.5, 126.4, 125.8, 115.9; HRMS (ESI) m/z calcd. for C16H12BrN2O [M+H]+: 327.0128, found 327.0124.

N-(quinolin-2-yl)-4-(trifluoromethyl)benzamide (3t)

\[
\begin{align*}
\text{H NMR (400MHz, d6- DMSO) } & \text{ δ: 11.42 (s, 1 H), 8.42 (d, J= 8.8 Hz, 1 H), 8.36 (d, J= 9.2 Hz, 1 H), 8.25 (d, J= 8.0 Hz, 1 H), 7.96 (d, J= 9.2 Hz, 1 H), 8.36 (d, J= 8.4 Hz, 3 H), 7.76 - 7.72 (m, 1 H), 7.56 - 7.51 (m, 1 H);13C NMR (100 MHz, d6- DMSO) δ: 166.0, 152.1, 146.9, 138.8, 138.4, 130.6, 129.7, 128.4, 127.7, 126.4, 125.9, 125.9, 125.8, 115.9;19F NMR (376MHz, d6- DMSO) δ: -61.4;HRMS (ESI) m/z calcd. for C17H12F3N2O [M+H]+: 317.0896, found 317.0887.}
\end{align*}
\]

4-acetyl-N-(quinolin-2-yl)benzamide (3u)

\[
\begin{align*}
\text{H NMR (400MHz, d6- DMSO) } & \text{ δ: 11.35 (s, 1 H), 8.43 (d, J=8.8 Hz, 1 H), 8.36 (d, J= 9.2 Hz, 1 H), 8.20 - 8.18 (m, 2 H), 8.09 - 8.06 (m, 2 H), 7.97 (d, J= 8.0 Hz, 1 H), 7.89 (d, J= 8.4 Hz, 1 H), 7.75 (t, J= 7.2 Hz, 1 H), 7.56 - 7.52 (m, 1 H), 2.65 (s, 3 H);13C NMR (100 MHz, d6- DMSO) δ: 198.3, 166.3, 152.2, 146.9, 139.7, 138.7, 138.3, 130.6, 129.0, 128.6, 128.3, 127.6, 126.4, 125.8, 115.9, 27.5; HRMS (ESI) m/z calcd. for C18H15N2O2 [M+H]+: 291.1128, found 291.1130.}
\end{align*}
\]

N-(quinolin-2-yl)furan-2-carboxamide (3v)

\[
\begin{align*}
\text{H NMR (400MHz, d6- DMSO) } & \text{ δ: 10.93 (s, 1 H), 8.39 (d, J= 9.2 Hz, 1 H), 8.15 (d, J= 9.2 Hz, 1 H), 8.09 (s, 2 H), 7.98 (s, 1 H), 7.93 (d, J= 8.0 Hz, 1 H), 7.87 (d, J= 8.4 Hz, 1 H), 7.72 - 7.71 (m, 2 H), 7.51 (t, J= 7.2 Hz, 1 H), 6.73 - 6.71 (m, 1 H);13C NMR (100 MHz, d6- DMSO) δ: 157.4, 151.9, 147.3, 147.1, 146.9, 138.7, 130.6, 128.3, 127.6, 125.7, 116.4, 115.6, 112.7; HRMS (ESI) m/z calcd. for C14H11N2O2 [M+H]+: 239.0815, found 239.0814.}
\end{align*}
\]

N-(quinolin-2-yl)thiophene-3-carboxamide (3w)

\[
\begin{align*}
\text{H NMR (400MHz, d6- DMSO) } & \text{ δ: 11.01 (s, 1 H), 8.66 (dd, J1= 2.8 Hz, J2= 1.2 Hz, 1 H), 8.38 (s, 2 H), 7.94 (d, J= 8.0 Hz, 1 H), 7.88 (d, J= 8.4 Hz, 1 H), 7.78 (dd, J1= 5.2 Hz, J2= 1.2 Hz, 1 H), 7.73 - 7.72 (m, 1 H), 7.66 - 7.64 (m, 1 H), 7.52 - 7.48 (m, 1 H);13C NMR (100 MHz, d6- DMSO) δ: 162.1, 152.3, 146.9, 138.6, 137.5, 131.6, 130.5,}
\end{align*}
\]
128.3, 128.1, 127.5, 126.3, 125.6, 115.9; HRMS (ESI) m/z calcd. for C$_{18}$H$_{13}$N$_2$O$_2$ [M+H]$^+$: 255.0587, found 255.0582.

**N-(quinolin-2-yl)acetamide (3x)**

![](image)

$^1$H NMR (400MHz, d$_6$– DMSO) δ: 10.83 (s, 1 H), 8.33 (d, J= 8.8 Hz, 1 H), 8.28 (d, J= 9.2 Hz, 1 H), 7.90 (d, J= 12.0 Hz, 1 H), 7.81 – 7.79 (m, 1 H), 7.71 – 7.68 (m, 1 H), 7.49 – 7.45 (m, 1 H), 2.15 (s, 3 H);$^{13}$C NMR (100 MHz, d$_6$– DMSO) δ: 170.5, 152.2, 146.8, 138.8, 130.5, 128.3, 127.3, 126.1, 125.4, 114.8, 24.6.

**N-(quinolin-2-yl)pivalamide (3y)**

$^1$H NMR (400MHz, d$_6$– DMSO) δ: 10.13 (s, 1 H), 8.32 (d, J= 8.8 Hz, 1 H), 8.24 (d, J= 9.2 Hz, 1 H), 7.86 - 7.80 (m, 2 H), 7.65 (t, J= 7.2 Hz, 1 H), 7.41 (t, J= 7.6 Hz, 1 H), 1.28 (s, 9 H);$^{13}$C NMR (100 MHz, d$_6$– DMSO) δ: 178.2, 152.6, 146.9, 138.3, 130.3, 128.2, 127.4, 126.2, 125.2, 115.7, 40.1, 27.4.

**N-(quinolin-2-yl)cyclohexanecarboxamide (3z)**

$^1$H NMR (400MHz, d$_6$– DMSO) δ: 10.69 (s, 1 H), 8.31 (s, 2 H), 7.88 (dd, J$_1$= 8.0 Hz, J$_2$= 0.8 Hz, 1 H), 7.79 (d, J= 8.4 Hz, 1 H), 7.70 – 7.66 (m, 1 H), 7.48 – 7.44 (m, 1 H), 2.59 – 2.53 (m, 1 H), 1.83 (d, J= 12.0 Hz, 2 H), 1.75 – 1.72 (m, 2 H), 1.64 – 1.62 (m, 1 H), 1.43 -1.36 (m, 2 H), 1.28 – 1.15 (m, 3 H);$^{13}$C NMR (100 MHz, d$_6$– DMSO) δ: 176.3, 152.5, 146.9, 138.6, 130.4, 128.2, 127.4, 126.2, 125.3, 114.9, 44.9, 29.5, 25.9, 25.7; HRMS (ESI) m/z calcd. for C$_{16}$H$_{19}$N$_2$O$_2$ [M+H]$^+$: 255.1492, found 255.1487.

**3-phenyl-N-(quinolin-2-yl)propanamide (3aa)**

$^1$H NMR (400MHz, d$_6$– DMSO) δ: 10.86 (s, 1 H), 8.33 (s, 2 H), 7.89 (dd, J$_1$= 8.0 Hz, J$_2$= 0.8 Hz, 1 H), 7.79 (d, J= 8.4 Hz, 1 H), 7.71 - 7.67 (m, 1 H), 7.49 - 7.45 (m, 1 H), 7.28 - 7.27 (m, 4 H), 7.19 - 7.15 (m, 1 H), 2.94 (t, J= 7.2 Hz, 2 H), 2.78 (t, J= 8.4 Hz, 2 H);$^{13}$C NMR (100 MHz, d$_6$– DMSO) δ: 172.5, 152.2, 146.9, 141.6, 138.8, 130.5, 128.8, 128.3, 127.4, 126.5, 126.1, 125.3, 114.8, 38.4, 31.2; HRMS (ESI) m/z calcd. for C$_{16}$H$_{19}$N$_2$O$_2$ [M+H]$^+$: 277.1335, found 277.1383.

**N-(quinolin-2-yl)cinnamamide (3ab)**

$^1$H NMR (400MHz, d$_6$– DMSO) δ: 11.09 (s, 1 H), 8.50 (d, J= 8.8 Hz, 1 H), 8.36 (d, J= 9.2 Hz, 1 H), 7.91 (d, J=
7.6 Hz, 1 H), 7.84 (d, J= 8.4 Hz, 1 H), 7.74 – 7.69 (m, 2 H), 7.64 – 7.62 (m, 2 H), 7.50 – 7.40 (m, 4 H), 7.14 (d, J=
15.6 Hz, 1 H); $^{13}$C NMR (100 MHz, d$_6$-DMSO) δ: 165.1, 152.4, 147.0, 141.9, 138.8, 135.1, 130.5, 130.5, 129.5,
128.4, 128.3, 127.4, 126.2, 125.4, 122.4, 115.0; HRMS (ESI) $m/z$ calcd. for C$_{18}$H$_{15}$N$_2$O [M+H]$^+$: 275.1179, found
275.1177.

4. Reference
5. Copies of $^1$H NMR and $^{13}$C NMR spectra

$N$-(quinolin-2-yl)benzamide (3a)
N-(4-methylquinolin-2-yl)benzamide(3b)
*N*-(5-methylquinolin-2-yl)benzamide(3c)
N-(6-methylquinolin-2-yl)benzamide (3d)
N-(7-methylquinolin-2-yl)benzamide (3e)
N-(8-methylquinolin-2-yl)benzamide (3f)
N-(6-methoxyquinolin-2-yl)benzamide (3g)
$N$-(6-phenylquinolin-2-yl)benzamide (3h)
N-(6-fluoroquinolin-2-yl)benzamide (3i)
N-(6-chloroquinolin-2-yl)benzamide (3j)
N-(6-bromoquinolin-2-yl)benzamide (3k)
methyl 2-benzamidoquinoline-6-carboxylate (3l)
2-methyl-N-(quinolin-2-yl)benzamide (3m)
3-methyl-N-(quinolin-2-yl)benzamide (3n)
4-methyl-N-(quinolin-2-yl)benzamide (3o)
4-methoxy-N-(quinolin-2-yl)benzamide (3p)
4-fluoro-N-(quinolin-2-yl)benzamide (3q)
4-chloro-N-(quinolin-2-yl)benzamide (3r)
4-bromo-N-(quinolin-2-yl)benzamide(3s)
$N$-(quinolin-2-yl)-4-(trifluoromethyl)benzamide (3t)
4-acetyl-N-(quinolin-2-yl)benzamide(3u)
N-(quinolin-2-yl)furan-2-carboxamide(3v)
N-(quinolin-2-yl)thiophene-3-carboxamide(3w)
N-(quinolin-2-yl)acetamide (3x)
$N$-(quinolin-2-yl)pivalamide(3y)
$N$-(quinolin-2-yl)cyclohexanecarboxamide (3z)
3-phenyl-N-(quinolin-2-yl)propanamide (3aa)
N-(quinolin-2-yl)cinnamamide (3ab)