Supporting Information

Synthesis of Substituted 1,2-Dihydroquinolines and Quinolines from Aromatic Amines and Alkynes by Gold(I)-Catalyzed Tandem Hydroamination-Hydroarylation under Microwave-Assisted Conditions

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Experimental Section

General. All manipulations with air-sensitive reagents were carried out under a dry nitrogen atmosphere. Solvents were dried using standard methods and distilled before use. Amine and alkyne substrates were received from commercial sources and used without further purification. Unless otherwise noted, all reactions were prepared in flame or oven-dried glassware in a nitrogen-filled Vacuum Atmospheres inert atmosphere box and performed in sealed vessels. The reactions under microwave-assisted conditions were conducted on a CEM Focused instrument. NMR spectra were recorded on Bruker AMX-300/400 spectrometer at 300/400 MHz for $^1$H NMR and 75/100 MHz for $^{13}$C NMR in CDCl$_3$ with tetramethylsilane (TMS) as internal standard. The chemical shifts are expressed in ppm and coupling constants are given in Hz. Data for $^1$H NMR are recorded as follows: chemical shift (ppm), multiplicity (s, singlet; d, doublet; t, triplet; q, quarter; m, multiplet), coupling constant (Hz), integration. Data for $^{13}$C NMR are reported in terms of chemical shift ($\delta$, ppm). IR spectra were obtained with a Nicolet AV-360 spectrophotometer. Lower resolution mass spectra or high-resolution mass spectra (HRMS) were obtained on a Finnigan GC-MS 4021 or a Finnigan MAT-8430 instrument using the electron impact ionization technique (70 ev), respectively. Thin-layer chromatography (TLC) was carried out on glass supported plate and compounds were visualized by iodine or UV light.

General Procedure of the Catalytic Reactions under Thermal Conditions. To a mixture of gold catalyst (0.025 mmol) and NH$_4$PF$_6$ (0.075 mmol) in dry solvent (1.0 mL) was added $m$-anisidine (0.5 mmol) and phenylacetylene (2.5 mmol) with stirring. The reaction mixture was capped and stirred for 12−24 h at 80−100 °C. The product 4Aa was purified by flash chromatography on silica gel (eluent: hexane/methylene chloride = 4:1 or 2:1).

Typical Procedure for the Synthesis of 1,2-Dihydroquinoline Derivatives under Microwave-Assisted Conditions. To a mixture of 1c (15.6 mg, 0.025 mmol) and silver triflate (6.5 mg, 0.025 mmol) in acetonitrile (1.0 mL) in a microwave reaction vessel was
added amine (0.5 mmol) and alkyne (2.5 mmol). The vessel was sealed and subjected to microwave-irradiation at a power of 19–47 W for 25–70 min. The product 4 was purified by flash chromatography on silica gel (eluent: hexane/methylene chloride = 4:1 or 2:1).

7-Methoxy-2-methyl-2,4-di-p-tolyl-1,2-dihydroquinoline (4Ab):

\[ \text{4Ab} \]

\(^1\)H NMR (CDCl\(_3\), TMS, 300 MHz): \( \delta \) 1.79 (s, 3H), 2.37 (s, 3H), 2.43 (s, 3H), 3.80 (s, 3H), 4.24 (br, 1H), 5.54 (s, 1H), 6.16 (s, 1H), 6.17 (d, 1H, \( J = 9.2 \) Hz), 6.89 (d, 1H, \( J = 9.2 \) Hz), 7.21 (m, 4H), 7.30 (d, 2H, \( J = 9.2 \) Hz), 7.48 (d, 2H, \( J = 8.1 \) Hz). \(^{13}\)C NMR (CDCl\(_3\), TMS, 75 MHz): \( \delta \) 21.4, 21.6, 30.6, 55.5, 57.3, 99.2, 102.9, 114.6, 125.7, 127.0, 127.6, 127.7, 129.3, 129.5, 135.5, 136.8, 137.2, 137.4, 145.1, 146.5, 160.9. IR (film): \( \nu \) 3382, 2962, 2924, 1613, 1515, 1168, 815 cm\(^{-1}\). MS: \( m/z \) (% relative intensity) 355(M\(^+\), 2), 340(100), 297(13), 264(25), 163(14); HRMS: \( m/z \) calcd for C\(_{24}\)H\(_{22}\)NO (M\(^+\) - CH\(_3\)) 340.1701, found 340.1701.

7-Methoxy-2-methyl-2,4-di-(4-trifluoromethyl-phenyl)-1,2-dihydroquinoline (4Ac):

\[ \text{4Ac} \]

\(^1\)H NMR (CDCl\(_3\), TMS, 300 MHz): \( \delta \) 1.80 (s, 3H), 3.78 (s, 3H), 4.28 (br, 1H), 5.53 (s, 1H), 6.18 (d, 1H, \( J = 8.3 \) Hz), 6.21 (s, 1H), 6.75 (d, 1H, \( J = 8.3 \) Hz), 7.45 (d, 2H, \( J = 7.9 \) Hz), 7.64 (q, 6H, \( J = 8.5 \) Hz). \(^{13}\)C NMR (CDCl\(_3\), TMS, 75 MHz): \( \delta \) 30.1, 55.2, 57.1, 99.1, 103.2, 113.4, 125.2 (m), 125.5 (m), 125.7, 126.3, 127.3, 129.2, 135.3, 143.1, 144.3, 152.5,
2,4-Dihexyl-7-methoxy-2-methyl-1,2-dihydroquinoline (4Ae):

\[
\begin{align*}
\text{MeO} & \quad \text{H} & \quad \text{NMeO} \\
\text{4Ae} & & \\
\end{align*}
\]

\(^1\)H NMR (CDCl\(_3\), TMS, 400 MHz): \(\delta 0.91\) (m, 6H), 1.24 (s, 3H), 1.44 (m, 18H), 2.34 (m, 2H), 3.63 (br, 1H), 3.77 (s, 3H), 5.11 (s, 1H), 6.01 (d, 1H, \(J = 2.9\) Hz), 6.18 (d, 1H, \(J = 8.4\) Hz), 7.01 (d, 1H, \(J = 8.4\) Hz). \(^{13}\)C NMR (CDCl\(_3\), TMS, 75 MHz): \(\delta 14.5, 23.1, 24.7, 28.8, 29.7, 30.2, 30.4, 32.2, 32.3, 32.5, 44.7, 55.0, 55.4, 98.8, 102.2, 114.7, 124.5, 124.8, 133.1, 145.7, 160.4.\) IR (film): \(\nu 3381, 3057, 2929, 1597, 1463, 1223, 698\) cm\(^{-1}\). MS: \(m/z\) (% relative intensity) 343(M\(^+\), 1), 328(9), 259(18), 258(100), 187(26); HRMS: \(m/z\) calcd for C\(_{23}\)H\(_{37}\)NO (M\(^+\)) 343.2875, found 343.2881.

6-Methoxy-2-methyl-2.4-diphenyl-8-(1-phenylvinyl)-1,2-dihydroquinoline (4'Ba):

\[
\begin{align*}
\text{MeO} & \quad \text{H} & \quad \text{NMeO} \\
\text{4'Ba} & & \\
\end{align*}
\]

\(^1\)H NMR (CDCl\(_3\), TMS, 300 MHz): \(\delta 1.55\) (s, 3H), 3.64 (s, 3H), 4.24 (br, 1H), 5.42 (s, 1H), 5.76 (s, 1H), 5.88 (s, 1H), 6.59 (s, 1H), 6.61 (s, 1H), 7.32 (m, 15H). \(^{13}\)C NMR (CDCl\(_3\), TMS, 75 MHz): \(\delta 29.9, 55.8, 56.8, 112.1, 115.8, 116.6, 122.2, 124.3, 125.2, 126.5, 126.9, 127.5, 128.1, 128.2, 128.6, 128.8, 129.0, 130.4, 134.9, 136.4, 139.5, 139.7, 146.4, 148.2, 151.0.\) IR (film): \(\nu 3390, 3057, 2929, 1597, 1463, 1223, 698\) cm\(^{-1}\). MS: \(m/z\) (% relative intensity) 429(M\(^+\), 3), 415(29), 414(100), 350(19), 84(79); HRMS: \(m/z\) calcd
for C_{36}H_{24}NO (M^+) 414.1858, found 414.1862.

2-Methyl-6-phenoxy-2,4-diphenyl-1,2-dihydroquinoline (4Ca):

![Chemical Structure 4Ca]

$^1$H NMR (CDCl$_3$, TMS, 300 MHz): $\delta$ 1.81 (s, 3H), 4.21 (br, 1H), 5.75 (s, 1H), 6.59 (d, 1H, $J = 7.9$ Hz), 6.76 (m, 2H), 6.89 (d, 2H, $J = 7.9$ Hz), 6.91 (m, 1H), 7.30 (m, 10H), 7.60 (d, 2H, $J = 7.9$ Hz). $^{13}$C NMR (CDCl$_3$, TMS, 75 MHz): $\delta$ 30.0, 57.2, 114.1, 116.7, 118.5, 121.0, 121.5, 121.8, 125.4, 126.9, 127.6, 128.3, 128.5, 128.9, 129.4, 130.0, 135.5, 138.9, 139.9, 147.2, 148.6, 159.1. IR (film): $\nu$ 3390, 3057, 3027, 1596, 1488, 1224, 699 cm$^{-1}$. MS: m/z (% relative intensity) 389(M$^+$, 1), 375(17), 374(44), 312(19), 84(100); HRMS: m/z calcd for C$_{27}$H$_{20}$NO (M$^+$ - CH$_3$) 374.1545, found 374.1536.

2-Methyl-6-phenoxy-2,4-diphenyl-8-(1-phenylvinyl)-1,2-dihydroquinoline (4'Ca):

![Chemical Structure 4'Ca]

$^1$H NMR (CDCl$_3$, TMS, 300 MHz): $\delta$ 1.58 (s, 3H), 4.36 (br, 1H), 5.44 (s, 1H), 5.74 (s, 1H), 5.86 (s, 1H), 6.77 (s, 2H), 6.94 (m, 3H), 7.28 (m, 17H). $^{13}$C NMR (CDCl$_3$, TMS, 75 MHz): $\delta$ 30.1, 57.0, 116.6, 117.0, 118.1, 121.7, 121.9, 122.4, 125.2, 126.6, 126.8, 127.0, 127.6, 128.2, 128.3, 128.4, 128.6, 128.9, 129.4, 130.0, 135.9, 137.3, 139.2, 139.5, 145.9, 146.3, 148.2, 159.0. IR (film): $\nu$ 3408, 3058, 2924, 1586, 1490, 1445, 1223, 697 cm$^{-1}$. MS: m/z (% relative intensity) 477(7), 449(23), 341(35), 84(88), 57(100); HRMS: m/z calcd for C$_{36}$H$_{29}$NO (M$^+$) 491.2249, found 491.2271.
2,6-Dimethyl-2,4-diphenyl-1,2-dihydroquinoline (4Da):

\[
\text{H} \quad \text{N} \quad \text{H}_3\text{C} \\
\text{4Da}
\]

\(^1\)H NMR (CDCl\(_3\), TMS, 300 MHz): \(\delta\) 1.80 (s, 3H), 2.17 (s, 3H), 4.15 (br, 1H), 5.69 (s, 1H), 6.53 (d, 1H, \(J = 7.9\) Hz), 6.76 (s, 1H), 6.89 (d, 1H, \(J = 7.9\) Hz), 7.31 (m, 1H), 7.39 (m, 7H), 7.61 (m, 2H). \(^{13}\)C NMR (CDCl\(_3\), TMS, 75 MHz): \(\delta\) 21.0, 30.4, 57.4, 113.7, 120.8, 125.8, 126.8, 126.9, 127.2, 127.7, 128.6, 128.8, 129.4, 129.8, 129.9, 136.3, 140.0, 141.3, 149.3. IR (film): \(\nu\) 3381, 3022, 1631, 1493, 1443, 699 cm\(^{-1}\). MS: \(m/z\) (% relative intensity) 311(M\(^+\), 3), 297(26), 296(100), 234(36), 141(15); HRMS: \(m/z\) calcd for C\(_{23}\)H\(_{21}\)N (M\(^+\)) 311.1674, found 311.1665.

6-Chloro-2-methyl-2,4-diphenyl-1,2-dihydroquinoline (4Ga):

\[
\text{Cl} \quad \text{H} \quad \text{N} \\
\text{4Ga}
\]

\(^1\)H NMR (CDCl\(_3\), TMS, 300 MHz): \(\delta\) 1.80 (s, 3H), 4.23 (br, 1H), 5.70 (s, 1H), 6.51 (d, 1H, \(J = 8.4\) Hz), 6.89 (s, 1H), 6.90 (d, 1H, \(J = 7.9\) Hz), 7.29 (m, 1H), 7.39 (m, 7H), 7.56 (m, 2H). \(^{13}\)C NMR (CDCl\(_3\), TMS, 75 MHz): \(\delta\) 30.4, 57.6, 114.6, 122.1, 122.3, 125.7, 126.1, 127.4, 128.1, 128.8, 129.0, 129.3, 130.5, 135.4, 139.1, 142.1, 148.7. IR (film): \(\nu\) 3393, 3057, 2923, 1598, 1484, 699 cm\(^{-1}\). MS: \(m/z\) (% relative intensity) 331(M\(^+\), 4), 318(29), 317(22), 316(100), 254(41), 201(47); HRMS: \(m/z\) calcd for C\(_{22}\)H\(_{18}\)NCl (M\(^+\)) 331.1128, found 331.1124.

6-Fluoro-2-methyl-2,4-diphenyl-1,2-dihydroquinoline (4Ha):
1H NMR (CDCl3, TMS, 300 MHz): δ 1.79 (s, 3H), 4.16 (br, 1H), 5.77 (s, 1H), 6.53 (m, 1H), 6.68 (m, 1H), 6.77 (m, 1H), 7.27 (m, 1H), 7.39 (m, 7H), 7.56 (d, 2H, J = 8.0 Hz).
13C NMR (CDCl3, TMS, 75 MHz): δ 29.9, 57.1, 112.5 (d, JCF = 23.9 Hz), 113.7 (d, JCF = 7.6 Hz), 115.2 (d, JCF = 22.8 Hz), 125.3, 126.9, 127.7, 128.4, 128.5, 128.9, 130.5, 135.3, 138.8, 139.4, 148.4, 154.1, 157.2. IR (film): ν 3397, 3059, 2925, 1491, 1445, 699 cm⁻¹. MS: m/z (% relative intensity) 315(M⁺, 3), 301(18), 300(100), 238(34), 222(15); HRMS: m/z calcd for C21H15NF (M⁺ - CH₃) 300.1189, found 300.1190.

2-Methyl-2,4-diphenyl-1,2-dihydro-benzo[h]quinoline (4Ia):

1H NMR (CDCl3, TMS, 300 MHz): δ 1.93 (s, 3H), 5.03 (br, 1H), 5.80 (s, 1H), 7.16 (m, 2H), 7.28 (m, 1H), 7.41 (m, 9H), 7.65 (m, 2H), 7.79 (m, 1H), 7.90 (m, 1H). 13C NMR (CDCl3, TMS, 75 MHz): δ 30.9, 57.7, 115.1, 116.9, 120.2, 122.3, 125.0, 125.4, 125.8, 126.3, 127.3, 127.7, 128.7, 128.9, 129.2, 129.6, 134.7, 137.0, 138.5, 140.3, 149.5. IR (film): ν 3424, 3055, 2923, 1515, 1398, 699 cm⁻¹. MS: m/z (% relative intensity) 347(M⁺, 5), 333(24), 332(100), 270(31), 254(19); HRMS: m/z calcd for C25H18N (M⁺ - CH₃) 332.1439, found 332.1433.

5,8-Dimethoxy-2-methyl-2,4-diphenyl-1,2-dihydroquinoline (4Ja):
$^1$H NMR (CDCl$_3$, TMS, 300 MHz): $\delta$ 1.73 (s, 3H), 3.28 (s, 3H), 3.89 (s, 3H), 5.08 (br, 1H), 5.75 (s, 1H), 6.12 (d, 1H, $J = 8.8$ Hz), 6.69 (d, 1H, $J = 8.8$ Hz), 7.30 (m, 8H), 7.51 (d, 2H, $J = 7.8$ Hz). $^{13}$C NMR (CDCl$_3$, TMS, 75 MHz): $\delta$ 30.1, 55.5, 55.9, 56.1, 100.1, 110.2, 110.8, 125.2, 126.1, 126.6, 127.1, 127.4, 128.2, 130.7, 135.1, 135.4, 141.1, 142.6, 148.5, 151.2. IR (film): $\nu$ 3399, 2934, 2832, 1606, 1494, 1247, 699 cm$^{-1}$. MS: $m/z$ (% relative intensity) 357(M$^+$, 2), 343(12), 342(47), 312(23), 84(100); HRMS: $m/z$ calcd for C$_{23}$H$_{20}$NO$_2$ (M$^+$ - CH$_3$) 342.1494, found 342.1497.

5,7-Dimethoxy-2-methyl-2,4-diphenyl-1,2-dihydroquinoline (4Ka):

$^1$H NMR (CDCl$_3$, TMS, 300 MHz): $\delta$ 1.70 (s, 3H), 3.32 (s, 3H), 3.79 (s, 3H), 4.38 (br, 1H), 5.56 (s, 1H), 5.82 (s, 1H), 5.93 (s, 1H), 7.27 (m, 8H), 7.52 (d, 2H, $J = 7.3$ Hz). $^{13}$C NMR (CDCl$_3$, TMS, 75 MHz): $\delta$ 29.5, 55.0, 55.1, 56.2, 89.9, 92.1, 103.9, 125.3, 126.1, 126.6, 127.1, 127.3, 128.0, 128.2, 134.8, 142.8, 146.5, 148.3, 158.0, 161.2. IR (film): $\nu$ 3399, 2934, 2832, 1606, 1494, 1247, 699 cm$^{-1}$. MS: $m/z$ (% relative intensity) 357(M$^+$, 1), 342(19), 84(55), 57(43), 43(100); HRMS: $m/z$ calcd for C$_{23}$H$_{20}$NO$_2$ (M$^+$ - CH$_3$) 342.1494, found 342.1488.

5,7-Dimethoxy-2-methyl-2,4-diphenyl-8-(1-phenylvinyl)-1,2-dihydroquinoline (4'Ka):
1H NMR (CDCl₃, TMS, 300 MHz): δ 1.60 (s, 3H), 3.39 (s, 3H), 3.64 (s, 3H), 4.91 (br, 1H), 5.43 (s, 1H), 5.65 (s, 1H), 5.90 (s, 1H), 6.12 (s, 1H), 7.29 (m, 15H). 13C NMR (CDCl₃, TMS, 75 MHz): δ 29.7, 55.2, 55.6, 56.1, 87.0, 104.6, 108.6, 117.7, 125.3, 126.1, 126.2, 126.4, 127.2, 127.3, 127.7, 128.1, 128.3, 128.5, 135.6, 140.0, 142.3, 143.0, 143.9, 148.0, 157.1, 158.2. IR (film): ν 3392, 3055, 2957, 1593, 1328, 1142, 699 cm⁻¹. MS: m/z (% relative intensity) 446(43), 444(100), 429(21), 379(28), 213(27); HRMS: m/z calcd for C₃₂H₂₉NO₂ (M⁺) 459.2198, found 459.2187.

2,4-Bis(4-ethynylphenyl)-7-methoxy-2-methyl-1,2-dihydroquinoline (4Af):

1H NMR (CDCl₃, TMS, 300 MHz): δ 1.75 (s, 3H), 3.06 (s, 1H), 3.11 (s, 1H), 3.77 (s, 3H), 4.22 (br, 1H), 5.48 (s, 1H), 6.16 (m, 2H), 6.78 (d, 1H, J = 9.1 Hz), 7.28 (m, 2H), 7.46 (m, 6H). 13C NMR (CDCl₃, TMS, 75 MHz): δ 30.0, 55.2, 57.1, 76.6, 77.4, 83.4, 83.6, 98.9, 102.9, 113.6, 120.6, 121.1, 125.3, 126.2, 127.2, 128.9, 132.0, 132.2, 135.3, 140.1, 144.4, 149.4, 160.8. IR (film): ν 3393, 3272, 2955, 1603, 1502, 1273, 1167 cm⁻¹. MS: m/z (% relative intensity) 375(M⁺, 3), 361(20), 360(100), 274(22), 153(44), 136(47); HRMS: m/z calcd for C₂₇H₂₁NO (M⁺) 375.1623, found 375.1618.

2,4-Bis(4’-ethynylbiphenyl-4-yl)-7-methoxy-2-methyl-1,2-dihydroquinoline (4Ag):
$^1$H NMR (CDCl$_3$, TMS, 300 MHz): $\delta$ 1.82 (s, 3H), 3.13 (s, 1H), 3.15 (s, 1H), 3.78 (s, 3H), 4.28 (br, 1H), 5.60 (s, 1H), 6.17 (m, 2H), 6.90 (d, 1H, $J = 9.2$ Hz), 7.45 (d, 2H, $J = 8.1$ Hz), 7.60 (m, 1H). $^{13}$C NMR (CDCl$_3$, TMS, 75 MHz): $\delta$ 30.2, 55.2, 57.1, 77.8, 83.5, 83.6, 98.9, 102.8, 113.9, 121.0, 125.9, 126.5, 126.8, 126.9, 127.1, 127.2, 127.3, 129.5, 132.5, 132.6, 135.2, 138.7, 139.1, 139.3, 141.1, 141.2, 144.6, 148.4, 160.7. IR (film): $\nu$ 3393, 3295, 3044, 1612, 1490, 1266, 738 cm$^{-1}$. MS: $m/z$ (% relative intensity) 513(18), 512(80), 153(98), 136(91), 106(100); HRMS: $m/z$ calcd for C$_{39}$H$_{29}$NO (M$^+$) 527.2249, found 527.2236.

2,4-Bis(3-ethynylphenyl)-7-methoxy-2-methyl-1,2-dihydroquinoline (4Ah):

$^1$H NMR (CDCl$_3$, TMS, 400 MHz): $\delta$ 1.76 (s, 3H), 3.10 (s, 2H), 3.78 (s, 3H), 4.22 (br, 1H), 5.48 (s, 1H), 6.18 (m, 2H), 6.79 (d, 1H, $J = 8.9$ Hz), 7.34 (m, 2H), 7.48 (m, 1H), 7.51 (s, 1H), 7.56 (d, 1H, $J = 7.8$ Hz), 7.68 (s, 1H). $^{13}$C NMR (CDCl$_3$, TMS, 75 MHz): $\delta$ 30.0, 55.1, 57.1, 77.0, 77.3, 83.5, 83.8, 98.9, 102.9, 113.5, 122.0, 122.1, 126.2, 126.3, 127.2, 128.2, 128.5, 129.0, 129.5, 130.6, 131.1, 132.5, 134.9, 139.7, 144.3, 149.0, 160.8. IR (film): $\nu$ 3383, 3289, 2966, 1614, 1514, 1166, 797 cm$^{-1}$. MS: $m/z$ (% relative intensity) 375(M$^+$, 3), 360(100), 274(22), 149(30), 136(15); HRMS: $m/z$ calcd for C$_{27}$H$_{21}$NO (M$^+$)
375.1623, found 375.1614.

2,4-Bis(3,5-diethynylphenyl)-7-methoxy-2-methyl-1,2-dihydroquinoline (4Ai):

\[
\text{MeO} \quad \text{N} \quad \text{H}
\]

\[4\text{Ai}\]

\(^1\)H NMR (CDCl\(_3\), TMS, 400 MHz): \(\delta\) 1.74 (s, 3H), 3.10 (s, 4H), 3.78 (s, 3H), 4.16 (br, 1H), 5.42 (s, 1H), 6.18 (m, 2H), 6.75 (d, 1H, \(J = 8.4\) Hz), 7.45 (s, 2H), 7.50 (s, 1H), 7.59 (s, 1H), 7.65 (s, 2H). \(^{13}\)C NMR (CDCl\(_3\), TMS, 75 MHz): \(\delta\) 29.8, 55.2, 57.1, 78.0, 78.1, 82.5, 82.7, 99.0, 103.2, 113.0, 122.5, 122.6, 125.0, 126.0, 127.2, 129.6, 132.8, 134.1, 134.6, 139.9, 144.0, 149.2, 161.0. IR (film): \(\nu\) 3392, 3290, 2915, 1614, 1167, 883 cm\(^{-1}\). MS: \(m/z\) (% relative intensity) 408(94), 298(25), 186(31), 171(100), 149(46); HRMS: \(m/z\) calcd for C\(_{31}\)H\(_{21}\)NO (M\(^+\)) 423.1623, found 423.1621.

**Typical Procedure for the Synthesis of Quinoline Derivatives under Microwave-Assisted Conditions.** To a mixture of 1c (15.6 mg, 0.025 mmol) and silver triflate (6.5 mg, 0.025 mmol) in acetonitrile (1.0 mL) in a microwave reaction vessel was added 2-aminoacetophenone or 2-aminobenzophenone (0.5 mmol) and alkyne (1 mmol). The vessel was sealed and subjected to microwave-irradiation at a power of 20–30 W for 30 min. The product 5 was purified by flash chromatography on silica gel (eluent: hexane/methylene chloride = 4:1).

\[
\text{N} \quad \text{5Lf}
\]

\[5\text{Lf}\]

\(^1\)H NMR (CDCl\(_3\), TMS, 400 MHz): \(\delta\) 2.78 (s, 3H), 3.20 (s, 1H), 7.57 (m, 1H), 7.66 (m, 2H), 7.74 (m, 2H), 8.02 (d, 1H, \(J = 8.3\) Hz), 8.16(m, 3H). \(^{13}\)C NMR (CDCl\(_3\), TMS, 75
2-(3-Ethynylphenyl)-4-methylquinoline (5Lh):

\[
\text{\textbf{5Lh}}
\]

$^1$H NMR (CDCl$_3$, TMS, 400 MHz): $\delta$ 2.77 (s, 3H), 3.16 (s, 1H), 7.50 (m, 1H), 7.57 (m, 2H), 7.72 (m, 2H), 8.00 (d, 1H, $J$ = 9.1 Hz), 8.19 (m, 1H), 8.31 (s, 1H). $^{13}$C NMR (CDCl$_3$, TMS, 75 MHz): $\delta$ 19.0, 77.4, 83.6, 119.5, 122.6, 123.6, 126.2, 127.3, 127.9, 128.8, 129.4, 130.3, 131.2, 132.7, 140.0, 145.0, 155.9. IR (film): $\nu$ 3293, 3058, 2922, 1600, 1549, 1273, 759 cm$^{-1}$. MS: $m/z$ (% relative intensity) 243(M$^+$, 100), 228(50), 153(13), 106(10); HRMS: $m/z$ calcd for C$_{18}$H$_{13}$N (M$^+$) 243.1048, found 243.1045.

2-(3,5-Diethynylphenyl)-4-methylquinoline (5Li):

\[
\text{\textbf{5Li}}
\]

$^1$H NMR (CDCl$_3$, TMS, 400 MHz): $\delta$ 2.78 (s, 3H), 3.16 (s, 2H), 7.59 (m, 1H), 7.70 (s, 2H), 7.75 (m, 1H), 8.02 (d, 1H, $J$ = 8.3 Hz), 8.18 (d, 1H, $J$ = 8.4 Hz), 8.29 (s, 2H). $^{13}$C NMR (CDCl$_3$, TMS, 75 MHz): $\delta$ 19.0, 78.1, 82.6, 119.3, 123.0, 123.6, 126.5, 127.5, 129.6, 130.4, 131.4, 135.9, 140.3, 145.3, 148.1, 154.8. IR (film): $\nu$ 3292, 2922, 2855, 1600, 1549, 1273, 759 cm$^{-1}$. MS: $m/z$ (% relative intensity) 267(M$^+$, 100), 252(31), 153(13), 106(10); HRMS: $m/z$ calcd for C$_{20}$H$_{13}$N (M$^+$) 267.1048, found 267.1041.
Gram-Scale Catalytic Synthesis of Quionline Derivative (5La) Using Gold(I) Complexes. To a mixture of 1c (0.6 mmol), silver triflate (0.6 mmol), and 4 Å MS (0.4 g) in toluene (15 mL) was added 2-aminoacetophenone (2.7 g, 20 mmol) and phenylacetylene (4.1 g, 40 mmol) with stirring. The reaction mixture was capped and stirred for 36 h at 100 °C. The product 5La was purified by flash chromatography on silica gel (eluent: hexane/methylene chloride = 4:1).

Procedure for the 1a/AgOTf-Catalyzed Reaction of m-Anisidine with Phenylacetylene at Room Temperature. To a mixture of 1a (0.025 mmol) and AgOTf (0.025 mmol) in CH₃NO₂ (1.0 mL) was added m-anisidine (0.5 mmol) and phenylacetylene (1 mmol) with stirring. The reaction mixture was capped and stirred for 30 min at room temperature. The product 6Aa was purified by flash chromatography on silica gel (eluent: hexane/methylene chloride = 40:1).

(E)-3-Methoxy-N-(1-phenylethylidene)aniline (6Aa):

\[
\begin{align*}
\text{N} & \quad \text{OMe} \\
\text{6Aa}
\end{align*}
\]

\(^1\text{H NMR} (\text{CDCl}_3, \text{TMS}, 400 \text{ MHz}): \delta 2.27 (s, 3H), 3.83 (s, 3H), 6.41 (m, 2H), 6.66 (m, 1H), 7.26 (m, 1H), 7.47 (m, 3H), 8.00 (m, 2H). \ ^{13}\text{C NMR} (\text{CDCl}_3, \text{TMS}, 75 \text{ MHz}): \delta 17.4, 55.2, 105.0, 108.9, 111.7, 127.2, 128.4, 129.8, 130.5, 139.4, 153.1, 160.3, 165.6. \ \text{IR (film): } \nu 2835, 1684, 1598, 1497 \text{ cm}^{-1}. \ \text{MS: } m/z (\% \text{ relative intensity}) 225(M^+, 12), 210(15), 123(100), 94(19); \text{HRMS: } m/z \text{ calcd for C}_{15}H_{13}NO (M^+) 225.1154, \text{ found 225.1154.}

Procedure for the Reaction of (E)-3-Methoxy-N-(1-phenylethylidene)aniline (6Aa) with Phenylacetylene Catalyzed by 1a/AgOTf. To a mixture of 1a (0.025 mmol) and AgOTf (0.025 mmol) in CH₃NO₂ (1.0 mL) was added 6Aa (0.5 mmol) and phenylacetylene (1 mmol) with stirring. The reaction mixture was capped and stirred for
4 h at 35 °C. The product 4Aa was purified by flash chromatography on silica gel (eluent: hexane/methylene chloride = 4:1).

**Typical Procedure for 1a/AgSbF$_6$-Catalyzed Reactions of Indoline (2N) with Alkynes at Room Temperature.** To a mixture of 1a (0.025 mmol) and AgSbF$_6$ (0.025 mmol) in dry solvent (1.0 mL) was added indoline (0.5 mmol) and alkyne (2.5 mmol) with stirring. The reaction mixture was capped and stirred at room temperature. The product was purified by flash chromatography on silica gel (eluent: hexane/methylene chloride = 4:1).

1-(2,4-Diphenylbut-3-yn-2-yl)indoline (7Na):

![7Na](image)

$^1$H NMR (CDCl$_3$, TMS, 300 MHz): δ 1.84 (s, 3H), 3.02 (m, 2H), 3.53 (m, 1H), 3.79 (m, 1H), 5.95 (d, 1H, $J$ = 7.9 Hz), 6.64 (t, 1H, $J$ = 7.9 Hz), 6.74 (t, 1H, $J$ = 7.9 Hz), 7.09 (d, 1H, $J$ = 7.9 Hz), 7.30 (m, 8H), 7.82 (d, 2H, $J$ = 7.0 Hz). $^{13}$C NMR (CDCl$_3$, TMS, 75 MHz): δ 28.3, 33.2, 50.6, 60.5, 85.1, 89.9, 112.7, 118.5, 123.1, 123.9, 125.9, 126.1, 127.2, 128.0, 128.1, 128.6, 131.5, 131.9, 145.6, 150.2. IR (film): ν 2923, 2848, 1604, 1482 cm$^{-1}$. MS: $m$/z (% relative intensity) 325(M$^+$, 11), 205(100), 202(38), 119(56); HRMS: $m$/z calcd for C$_{24}$H$_{21}$N (M$^+$) 323.1674, found 323.1666.

4-Methyl-4,6-bis(4-(trifluoromethyl)phenyl)-2,4-dihydro-1H-pyrrolo[3,2,1-ij]quinoline (4Nc):

![4Nc](image)

$^1$H NMR (CDCl$_3$, TMS, 300 MHz): δ 1.85 (s, 3H), 3.06 (m, 3H), 3.49 (m, 1H), 5.29 (s,
1H), 6.51 (t, 1H, J = 7.5 Hz), 6.72 (d, 1H, J = 7.5 Hz), 6.97 (d, 1H, J = 7.5 Hz), 7.47 (d, 
2H, J = 8.0 Hz), 7.62 (d, 4H, J = 8.6 Hz), 7.71 (d, 2H, J = 8.3 Hz). 13C NMR (CDCl3, 
TMS, 75 MHz): δ 23.3, 28.0, 46.4, 61.2, 115.3, 117.1, 122.3, 125.1, 125.3 (m), 125.4 (m), 
126.0, 126.6, 127.0, 128.3, 128.9, 129.2, 129.6, 129.9, 133.8, 142.0, 148.0, 149.3. MS: 
m/z (% relative intensity) 459(M⁺, 11), 444(100), 314(49), 153(15); HRMS: m/z calcd for 
C26H19NF6 (M⁺) 459.1422, found 459.1419.

4, 6-Dibutyl-4-methyl-2,4-dihydro-1H-pyrrolo[3,2,1-ij]quinoline (4Nd):

\[
\text{4Nd}
\]

1H NMR (CDCl3, TMS, 300 MHz): δ 1.00 (m, 6H), 1.27 (s, 3H), 1.43 (m, 7H), 1.62 (m, 
2H), 1.80 (m, 1H), 2.41 (m, 2H), 3.05 (m, 3H), 3.52 (m, 2H), 5.06 (s, 1H), 6.53 (t, 1H, J 
= 7.5 Hz), 6.91 (m, 2H). 13C NMR (CDCl3, TMS, 75 MHz): δ 14.1, 14.3, 22.7, 23.3, 25.2, 
27.5, 28.3, 30.8, 31.0, 40.5, 45.3, 58.3, 115.9, 117.2, 120.4, 123.6, 125.8, 126.4, 133.3, 
149.2. MS: m/z (% relative intensity) 283(M⁺, 5), 268(11), 227(17), 226(100), 183(13); 
HRMS: m/z calcd for C20H29N (M⁺) 283.2300, found 283.2295.

4, 6-Dihexyl-4-methyl-2,4-dihydro-1H-pyrrolo[3,2,1-ij]quinoline (4Ne):

\[
\text{4Ne}
\]

1H NMR (CDCl3, TMS, 300 MHz): δ 0.89 (m, 6H), 1.20 (s, 3H), 1.35 (m, 15H), 1.54 (m, 
2H), 1.72 (m, 1H), 2.33 (m, 2H), 2.98 (m, 2H), 3.46 (m, 2H), 4.99 (s, 1H), 6.46 (t, 1H, J 
= 7.4 Hz), 6.85 (t, 2H, J = 7.1 Hz). 13C NMR (CDCl3, TMS, 100 MHz): δ 14.2, 22.8, 25.2, 
25.4, 28.3, 28.7, 29.3, 29.9, 31.4, 31.8, 32.0, 40.8, 45.3, 58.3, 115.9, 117.2, 120.4, 123.6, 
125.8, 126.4, 133.3, 149.2. MS: m/z (% relative intensity) 339(M⁺, 2), 255(20), 254(100), 
252(31), 183(14); HRMS: m/z calcd for C24H37N (M⁺) 339.2926, found 339.2913.
4, 6-Bis(4-methoxyphenyl)-4-methyl-2,4-dihydro-1H-pyrrolo[3,2,1-ij]quinoline (4Nj):

\[
\begin{align*}
\text{4Nj} & \\
\end{align*}
\]

\[\begin{array}{c}
\text{1H NMR (CDCl}_3, \text{TMS, 300 MHz):} \\
\delta 1.83 (s, 3H), 2.99 (m, 2H), 3.10 (m, 1H), 3.51 (d, 1H, \text{J} = 8.4 \text{ Hz}), 3.83 (s, 3H), 3.85 (s, 3H), 5.34 (s, 1H), 6.51 (t, 1H, \text{J} = 7.5 \text{ Hz}), 6.84 (d, 1H, \text{J} = 7.7 \text{ Hz}), 6.93 (m, 5H), 7.35 (d, 2H, \text{J} = 8.5 \text{ Hz}), 7.52 (d, 2H, \text{J} = 8.7 \text{ Hz}).
\end{array}\]

\[\begin{array}{c}
\text{13C NMR (CDCl}_3, \text{TMS, 75 MHz):} \\
\delta 24.0, 28.1, 46.3, 55.2, 55.3, 60.5, 113.5, 113.6, 116.4, 122.5, 124.3, 126.3, 128.0, 129.7, 129.8, 131.1, 133.4, 137.8, 144.4, 158.5, 159.0. \text{MS:} \\
\text{m/z (} \% \text{ relative intensity)} 383(\text{M}^+, 7), 369(26), 368(100), 276(30), 149(22); \text{HRMS: m/z} \\
\text{calcd for C}_{26}\text{H}_{25}\text{NO}_2 (\text{M}^+) 383.1885, \text{found 383.1881.}
\end{array}\]

4, 6-Bis(4-fluorophenyl)-4-methyl-2,4-dihydro-1H-pyrrolo[3,2,1-ij]quinoline (4Nk):

\[
\begin{align*}
\text{4Nk} & \\
\end{align*}
\]

\[\begin{array}{c}
\text{1H NMR (CDCl}_3, \text{TMS, 300 MHz):} \\
\delta 1.85 (s, 3H), 3.07 (m, 3H), 3.51 (d, 1H, \text{J} = 8.6 \text{ Hz}), 5.31 (s, 1H), 6.56 (t, 1H, \text{J} = 7.6 \text{ Hz}), 6.77 (d, 1H, \text{J} = 7.7 \text{ Hz}), 6.97 (d, 1H, \text{J} = 7.7 \text{ Hz}), 7.08 (m, 4H), 7.38 (m, 2H), 7.58 (m, 2H). \text{13C NMR (CDCl}_3, \text{TMS, 75 MHz):} \\
\delta 23.7, 28.0, 46.3, 60.7, 115.1 (m), 115.6, 116.7, 122.4, 124.7, 126.4, 129.3 (m), 129.9, 133.3, 134.4, 141.5, 148.2, 160.2, 160.7, 163.5, 164.0. \text{MS: m/z (} \% \text{ relative intensity)} 359(\text{M}^+, 7), 345(25), 344(100), 264(44), 262(10); \text{HRMS: m/z} \\
\text{calcd for C}_{24}\text{H}_{19}\text{NF}_2 (\text{M}^+) 359.1486, \text{found 359.1480.}
\end{array}\]

Procedure for the Conversion of 1-(2,4-Diphenylbut-3-yn-2-yl)indoline (7Na) to 4Na Catalyzed by 1a/AgSbF$_6$. To a mixture of 1a (5 mol %) and AgSbF$_6$ (5 mol %) in CH$_3$NO$_2$ (0.5 mL) was added 7Na (0.1 mmol) with stirring. The reaction mixture was
capped and stirred for 2 h at room temperature. The product $4Na$ was purified by flash chromatography on silica gel (eluent: hexane/methylene chloride = 4:1).

For characterization of $4Aa$, $4Ad$, $4Ea$, $4"Ea$, $4Fa$, $4Na$, $4Nb$, $5La$, $5Lb$, $5Lc$, $5Le$, $5Ma$, and $5Mb$ see the reference indicated specifically.

References:

Table S1. Catalyst Activity of Selected Gold Complexes.\textsuperscript{a}

\[
\begin{array}{llllll}
\text{entry} & \text{catalyst} & \text{additive} & \text{solvent} & \text{time (h)} & T \, (^\circ\text{C}) & \text{yield (\%)} \\
1 & \text{AuCl}_3 & \text{NH}_4\text{PF}_6 & \text{toluene} & 24 & 100 & 11 \\
2 & \text{AgOTf} & \text{none} & \text{toluene} & 24 & 100 & 35 \\
3 & (\text{PPh}_3)\text{AuOTf} & \text{none} & \text{toluene} & 24 & 100 & 76 \\
4 & \text{1b} & \text{NH}_4\text{PF}_6 & \text{toluene} & 24 & 100 & 80 \\
5 & \text{1b} & \text{HBF}_4 & \text{toluene} & 24 & 100 & 56 \\
6 & \text{1c}/\text{AgOTf} & \text{none} & \text{toluene} & 12 & 80 & 80 \\
7 & \text{1c} & \text{NH}_4\text{PF}_6 & \text{toluene} & 12 & 80 & 61 \\
8 & \text{1b} & \text{NH}_4\text{PF}_6 & \text{CH}_3\text{CN} & 24 & 100 & 51 \\
9 & \text{1b} & \text{NH}_4\text{PF}_6 & \text{CH}_3\text{CN} & 24 & 80 & 62 \\
10 & \text{1b} & \text{NH}_4\text{PF}_6 & \text{DMF} & 24 & 80 & 12 \\
11 & \text{1b} & \text{NH}_4\text{PF}_6 & \text{MeOH} & 24 & 100 & 53 \\
\end{array}
\]

\textsuperscript{a} Reactions conditions: \textit{m}-anisidine (0.5 mmol), alkyne (2.5 mmol), catalyst (0.025 mmol), \text{NH}_4\text{PF}_6 (0.075 mmol). \textsuperscript{b} Isolated yield based on \textit{m}-anisidine.
Table S2. Catalyst Activity of Selected Gold Complexes under Microwave Irradiation.$^a$

<table>
<thead>
<tr>
<th>entry</th>
<th>catalyst</th>
<th>yield (%)$^b$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ph$_3$PAuCl/AgOTf</td>
<td>66</td>
</tr>
<tr>
<td>2</td>
<td>1a/AgOTf</td>
<td>86</td>
</tr>
<tr>
<td>3</td>
<td>1b</td>
<td>43</td>
</tr>
<tr>
<td>4</td>
<td>1c/AgOTf</td>
<td>90(82$^c$)</td>
</tr>
<tr>
<td>5</td>
<td>1d/AgOTf</td>
<td>69</td>
</tr>
<tr>
<td>6</td>
<td>(tetrahydrothiophene)AuCl</td>
<td>76</td>
</tr>
</tbody>
</table>

$^a$ Reaction conditions: catalyst (5 mol %), NH$_4$PF$_6$ (15 mol %), CH$_3$CN (1 mL), 150 $^o$C with microwave irradiation, 25 min. $^b$ Determined by $^1$H NMR. $^c$ Isolated yield based on m-anisidine.
Table S3. Formation of Quinoline Derivative 5La from 1c/AgOTf-Catalyzed Reaction of 2L and 3a at Different Catalyst Loadings.$^a$

![Chemical structure of reactants and products]

<table>
<thead>
<tr>
<th>entry</th>
<th>catalyst loading</th>
<th>time (min)</th>
<th>yield (%)$^b$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>30</td>
<td>93</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>30</td>
<td>92$^c$</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>40</td>
<td>84$^c$</td>
</tr>
<tr>
<td>4</td>
<td>0.5</td>
<td>40</td>
<td>53$^c$</td>
</tr>
<tr>
<td>5</td>
<td>0.1</td>
<td>40</td>
<td>9$^c$</td>
</tr>
</tbody>
</table>

$^a$ Reaction conditions: CH$_3$CN (1 mL), 150 °C with microwave irradiation. $^b$ Isolated yield based on 2-aminoacetophenone. $^c$ Determined by $^1$H NMR.
**Scheme S1.** Gram-Scale Synthesis of Quinoline Derivative 5La

\[
\text{O} \quad \text{NH}_2
\]

20 mmol + 40 mmol

3 mol % 1c/AgOTf
4 A MS
toluene (15 mL)
100 °C, 36 h

\[
\text{N} \quad \text{Ph}
\]

5La

(3.9 g, 89% yield)
Figure S1. $^1$H NMR spectrum of 7-methoxy-2-methyl-2,4-di-$p$-tolyl-1,2-dihydroquinoline (4Ab)

Figure S2. $^{13}$C NMR spectrum of 7-methoxy-2-methyl-2,4-di-$p$-tolyl-1,2-dihydroquinoline (4Ab)
Figure S3. $^1$H NMR spectrum of 7-methoxy-2-methyl-2,4-di-(4-trifluoromethyl-phenyl)-1,2-dihydroquinoline (4Ac)

Figure S4. $^{13}$C NMR spectrum of 7-methoxy-2-methyl-2,4-di-(4-trifluoromethyl-phenyl)-1,2-dihydroquinoline (4Ac)
Figure S5. $^1$H NMR spectrum of 2,4-dihexyl-7-methoxy-2-methyl-1,2-dihydroquinoline (4Ae)

Figure S6. $^{13}$C NMR spectrum of 2,4-dihexyl-7-methoxy-2-methyl-1,2-dihydroquinoline (4Ae)
Figure S7. $^1$H NMR spectrum of 6-methoxy-2-methyl-2,4-diphenyl-8-(1-phenylvinyl)-1,2-dihydroquinoline (4'Ba)

Figure S8. $^{13}$C NMR spectrum of 6-methoxy-2-methyl-2,4-diphenyl-8-(1-phenylvinyl)-1,2-dihydroquinoline (4'Ba)
Figure S9. $^1$H NMR spectrum of 2-methyl-6-phenoxy-2,4-diphenyl-1,2-dihydroquinoline (4Ca)

Figure S10. $^{13}$C NMR of 2-methyl-6-phenoxy-2,4-diphenyl-1,2-dihydroquinoline (4Ca)
Figure S11. $^1$H NMR spectrum of 2-methyl-6-phenoxy-2,4-diphenyl-8-(1-phenylvinyl)-1,2-dihydroquinoline (4’Ca)

Figure S12. $^{13}$C NMR spectrum of 2-methyl-6-phenoxy-2,4-diphenyl-8-(1-phenylvinyl)-1,2-dihydroquinoline (4’Ca)
Figure S13. $^1$H NMR spectrum of 2,6-dimethyl-2,4-diphenyl-1,2-dihydroquinoline (4Da)

Figure S14. $^{13}$C NMR spectrum of 2,6-dimethyl-2,4-diphenyl-1,2-dihydroquinoline (4Da)
Figure S15. $^1$H NMR spectrum of 6-chloro-2-methyl-2,4-diphenyl-1,2-dihydroquinoline (4Ga)

Figure S16. $^{13}$C NMR spectrum of 6-chloro-2-methyl-2,4-diphenyl-1,2-dihydroquinoline (4Ga)
Figure S17. $^1$H NMR spectrum of 6-fluoro-2-methyl-2,4-diphenyl-1,2-dihydroquinoline (4Ha)

Figure S18. $^{13}$C NMR spectrum of 6-fluoro-2-methyl-2,4-diphenyl-1,2-dihydroquinoline (4Ha)
Figure S19. $^1$H NMR spectrum of 2-methyl-2,4-diphenyl-1,2-dihydro-benzo[h]quinoline (41a)

![Image of 1H NMR spectrum]

Figure S20. $^{13}$C NMR spectrum of 2-methyl-2,4-diphenyl-1,2-dihydro-benzo[h]quinoline (41a)

![Image of 13C NMR spectrum]
**Figure S21.** $^1$H NMR spectrum of 5,8-dimethoxy-2-methyl-2,4-diphenyl-1,2-dihydroquinoline (4Ja)

![1H NMR spectrum](image)

**Figure S22.** $^{13}$C NMR spectrum of 5,8-dimethoxy-2-methyl-2,4-diphenyl-1,2-dihydroquinoline (4Ja)

![$^{13}$C NMR spectrum](image)
Figure S23. $^1$H NMR spectrum of 5,7-dimethoxy-2-methyl-2,4-diphenyl-1,2-dihydroquinoline (4Ka)

Figure S24. $^{13}$C NMR spectrum of 5,7-dimethoxy-2-methyl-2,4-diphenyl-1,2-dihydroquinoline (4Ka)
**Figure S25.** $^1$H NMR spectrum of 5,7-dimethoxy-2-methyl-2,4-diphenyl-8-(1-phenylvinyl)-1,2-dihydroquinoline (4'Ka)

![H NMR spectrum](image)

**Figure S26.** $^{13}$C NMR spectrum of 5,7-dimethoxy-2-methyl-2,4-diphenyl-8-(1-phenylvinyl)-1,2-dihydroquinoline (4'Ka)

![C NMR spectrum](image)
Figure S27. $^1$H NMR spectrum of 2,4-bis(4-ethynylphenyl)-7-methoxy-2-methyl-1,2-dihydroquinoline (4Af)

Figure S28. $^{13}$C NMR spectrum of 2,4-bis(4-ethynylphenyl)-7-methoxy-2-methyl-1,2-dihydroquinoline (4Af)
Figure S29. $^1$H NMR spectrum of 2,4-bis(4’-ethynlbiphenyl-4-yl)-7-methoxy-2-methyl-1,2-dihydroquinoline (4Ag)

Figure S30. $^{13}$C NMR spectrum of 2,4-bis(4’-ethynlbiphenyl-4-yl)-7-methoxy-2-methyl-1,2-dihydroquinoline (4Ag)
Figure S31. $^1$H NMR spectrum of 2,4-bis(3-ethynylphenyl)-7-methoxy-2-methyl-1,2-dihydroquinoline (4Ah)

Figure S32. $^{13}$C NMR spectrum of 2,4-bis(3-ethynylphenyl)-7-methoxy-2-methyl-1,2-dihydroquinoline (4Ah)
Figure S33. $^1$H NMR spectrum of 2,4-bis(3,5-diethynylphenyl)-7-methoxy-2-methyl-1,2-dihydroquinoline (4Ai)

Figure S34. $^{13}$C NMR spectrum of 2,4-bis(3,5-diethynylphenyl)-7-methoxy-2-methyl-1,2-dihydroquinoline (4Ai)
Figure S35. $^1$H NMR spectrum of 2-(4-ethynylphenyl)-4-methylquinoline (5Lf)

Figure S36. $^{13}$C NMR spectrum of 2-(4-ethynylphenyl)-4-methylquinoline (5Lf)
Figure S37. $^1$H NMR spectrum of 2-(3-ethynylphenyl)-4-methylquinoline (5Lh)

Figure S38. $^{13}$C NMR spectrum of 2-(3-ethynylphenyl)-4-methylquinoline (5Lh)
Figure S39. $^1$H NMR spectrum of 2-(3,5-diethynylphenyl)-4-methylquinoline (5Li)

Figure S40. $^{13}$C NMR spectrum of 2-(3,5-diethynylphenyl)-4-methylquinoline (5Li)
Figure S41. $^1$H NMR spectrum of (E)-3-methoxy-N-(1-phenylethylidene)aniline (6Aa)

Figure S42. $^{13}$C NMR spectrum of (E)-3-methoxy-N-(1-phenylethylidene)aniline (6Aa)
Figure S43. $^1$H NMR spectrum of 1-(2,4-diphenylbut-3-yn-2-yl)indoline (7Na)

Figure S44. $^{13}$C NMR spectrum of 1-(2,4-diphenylbut-3-yn-2-yl)indoline (7Na)
Figure S45. $^1$H NMR spectrum of 4-methyl-4,6-bis(4-(trifluoromethyl)phenyl)-2,4-dihydro-$1H$-pyrrolo[3,2,1-$ij$]quinoline (4Nc)

Figure S46. $^{13}$C NMR spectrum of 4-methyl-4,6-bis(4-(trifluoromethyl)phenyl)-2,4-dihydro-$1H$-pyrrolo[3,2,1-$ij$]quinoline (4Nc)
Figure S47. $^1$H NMR spectrum of 4, 6-dibutyl-4-methyl-2,4-dihydro-$H$-pyrrolo[3,2,1-$ij$]quinoline (4Nd)

Figure S48. $^{13}$C NMR spectrum of 4, 6-dibutyl-4-methyl-2,4-dihydro-$H$-pyrrolo[3,2,1-$ij$]quinoline (4Nd)
**Figure S49.** $^1$H NMR spectrum of 4, 6-dihexyl-4-methyl-2,4-dihydro-$1H$-pyrrolo[3,2,1-$ij$]quinoline (4Ne)

**Figure S50.** $^{13}$C NMR spectrum of 4, 6-dihexyl-4-methyl-2,4-dihydro-$1H$-pyrrolo[3,2,1-$ij$]quinoline (4Ne)
**Figure S51.** $^1$H NMR spectrum of 4, 6-bis(4-methoxyphenyl)-4-methyl-2,4-dihydro-$IH$-pyrrolo[3,2,1-$ij$]quinoline (4Nj)

![Figure S51](image1)

**Figure S52.** $^{13}$C NMR spectrum of 4, 6-bis(4-methoxyphenyl)-4-methyl-2,4-dihydro-$IH$-pyrrolo[3,2,1-$ij$]quinoline (4Nj)

![Figure S52](image2)
Figure S53. $^1$H NMR spectrum of 4, 6-bis(4-fluorophenyl)-4-methyl-2,4-dihydro-$IH$-pyrrolo[3,2,1-$ij$]quinoline (4Nk)

Figure S54. $^{13}$C NMR spectrum of 4, 6-bis(4-fluorophenyl)-4-methyl-2,4-dihydro-$IH$-pyrrolo[3,2,1-$ij$]quinoline (4Nk)