One-Pot Synthesis of 3-Acetyl-2-aryl-3,4-dihydroquinazolines from *N*-[2-(Azidomethyl)phenyl]benzamides Utilizing Intramolecular Aza-*Wittig* Reaction

by **Kazuhiro Kobayashi***, **Naoki Matsumoto**, **Mika Nagashima**, and **Hiroki Inouchi**

Division of Applied Chemistry, Department of Chemistry and Biotechnology, Graduate School of Engineering, Tottori University, 4-101 Koyama-minami, Tottori 680-8552, Japan (phone/fax: +81-857-315263; e-mail: kkoba@chem.tottori-u.ac.jp)

A new and convenient method for the preparation of 3,4-dihydroquinazolines **5** with aryl and Ac groups at C(2) and N(3), respectively, has been developed. The key sequence is the formation of aza-phosphorane intermediates by the reaction of *N*-[2-(azidomethyl)phenyl]benzamides **1** with Ph_3P, followed by intramolecular aza-*Wittig* reaction and 3-acetylation, which can be conducted in one-pot.

Introduction. – A number of 3,4-dihydroquinazoline derivatives have recently been synthesized [1], and most of them have been shown to exhibit a wide variety of biological activities [1][2]. Therefore, over recent years, development of new methods for the preparation of these derivatives has attracted much attention [3]. However, an aryl group is very difficult to be introduced at C(2) by most of these previous methods. Herein, we report a new and efficient one-pot procedure for the preparation of 3-acetyl-2-aryl-3,4-dihydroquinazolines **5**, which relies on the intramolecular aza-*Wittig* reaction of the respective aza-phosphorane intermediates **2**, generated *in situ* by the reaction of *N*-[(2-azidomethyl)phenyl]benzamides **1** with Ph_3P, followed by acetylation. The structure of these dihydroquinazolines is similar to the core structure of the antitumor compound batracylin (*Fig.*) [4].

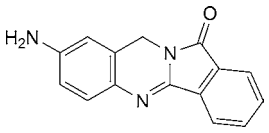
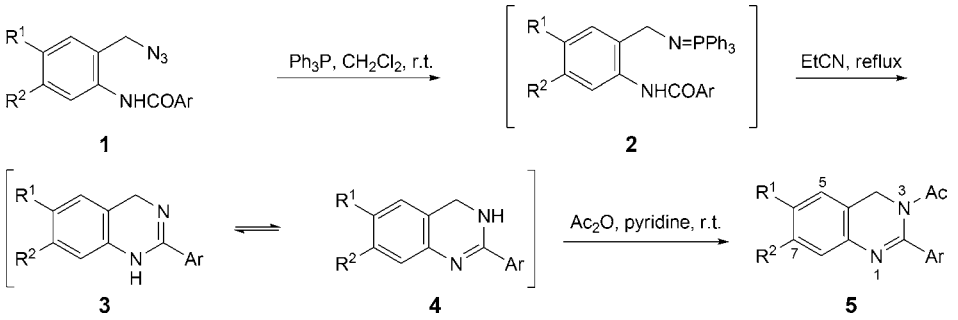


Figure. *Structure of batracylin*

Results and Discussion. – Our one-pot synthesis of 3-acetyl-2-aryl-3,4-dihydroquinazolines **5** from *N*-[(2-azidomethyl)phenyl]benzamides **1** was conducted according to the sequence outlined in the *Scheme*. The precursor *N*-[(azidomethyl)phenyl amides **1** can be prepared by a very easy three-step procedure from readily available 2-aminobenzenemethanols as described in [5]. Thus, these amino alcohols were *N*-aroylated with aroyl chloride in saturated aqueous $NaHCO_3$ solution to give the corresponding *N*-[2-(hydroxymethyl)phenyl]benzamides, which, on treatment with $SOCl_2$, afforded *N*-[2-(chloromethyl)phenyl]benzamides. Subsequent substitution of Cl with an N_3 group using NaN_3 provided **1**.

Scheme



These azido compounds, **1**, were allowed to react with Ph_3P in CH_2Cl_2 at room temperature to give the corresponding aza-phosphorane intermediates **2**. We first conducted the cyclization by heating the resulting mixture at reflux temperature, but the progress of the reaction was very reluctant. Replacing the solvent by MeCN did not accelerate the reaction rate considerably. When EtCN was used, the intramolecular aza-*Wittig* reaction proceeded relatively smoothly and was complete in 7–8 h to give *ca.* 1:1 mixtures of tautomeric isomers **3** and **4**, judging from their ^{1}H-NMR spectra in $CDCl_3$. Thus, after removing the solvent by evaporation, the resulting mixtures were subjected to acetylation with Ac_2O in pyridine at room temperature. It proceeded smoothly and with a high regioselectivity at N(3), as expected, to give, after concentration under reduced pressure and the subsequent purification of the residue by column chromatography on SiO_2, the corresponding 3-acetylated products **5** as the sole acetylated product. This high selectivity may be rationalized by the higher reactivity of N(3) due to its stronger basicity than that of N(1) and the lower reactivity of the N(1) due to the structural crowdedness. The possibility of the 1-acetyl-1,4-dihydroquinazoline structure could be excluded by NOESY analyses, which did not reveal any interaction between H–C(8) and acetyl H-atoms. The yields of **5** were generally fair-to-good, as compiled in the *Table*. However, as can be seen from *Entries 5* and *7–9*, the products bearing MeO group(s) on either of the two benzene rings were

Table 1. *Preparation of 3,4-Dihydroquinazoline Derivatives* **5**

Entry	**1**	**5**	Yield [%][a])
1	**1a** ($R^1 = R^2 = H$, Ar = Ph)	**5a**	70
2	**1b** ($R^1 = R^2 = H$, Ar = 3-Me–C_6H_4)	**5b**	71
3	**1c** ($R^1 = R^2 = H$, Ar = 3-Cl–C_6H_4)	**5c**	78
4	**1d** ($R^1 = R^2 = H$, Ar = 4-Cl–C_6H_4)	**5d**	72
5	**1e** ($R^1 = R^2 = H$, Ar = 3-MeO–C_6H_4)	**5e**	53
6	**1f** ($R^1 = H$, $R^2 = Cl$, Ar = Ph)	**5f**	66
7	**1g** ($R^1 = R^2 = MeO$, Ar = Ph)	**5g**	49
8	**1h** ($R^1 = R^2 = MeO$, Ar = 3-Cl–C_6H_4)	**5h**	46
9	**1i** ($R^1 = R^2 = MeO$, Ar = 4-Cl–C_6H_4)	**5i**	51

[a]) Yields of isolated products.

obtained in somewhat lower yields than those of the others, though we cannot provide any explicit explanation for this finding at the present time.

It is noteworthy that an attempt to obtain 3-acetyl-1,2-dihydro-2-methylquinazoline from *N*-[2-(azidomethyl)phenyl]acetamide under the same reaction conditions as described above was unsuccessful. Probably, the corresponding aza-phosphorane intermediate was formed successfully, judging from the TLC analyses on SiO_2. Unfortunately, however, heating the mixture including this intermediate resulted in the formation a considerably intractable mixture of products, from which no more than trace amount of the desired product was isolated. Transformation of *N*-[2-(azidomethyl)phenyl]-*N*-methylbenzamide, derived by *N*-methylation of **1a** with MeI using NaH as a base, to 1,4-dihydro-1-methyl-2-phenylquinazoline was attempted. This attempt also gave a similar result as described above. These findings may suggest that these expected products are too unstable to survive during the heating in EtCN.

In conclusion, we developed a convenient one-pot method for the synthesis of 2-aryl-3,4-dihydroquinazoline derivatives, involving intramolecular aza-*Wittig* reaction of the aza-phosphorane intermediates, generated *in situ* from *N*-[(2-azidomethyl)phenyl]benzamides and Ph_3P. The present method may be of use in organic synthesis because of the ease of operations, as well as the ready availability of the starting materials, and it may offer the possibility to access compounds of potential biological interest.

Experimental Part

General. All chemicals used were commercially available. All org. solvents were dried over appropriate drying agents and distilled prior to use. TLC: Silica gel *60 PF_{254}* (*Merck*). Column chromatography (CC): *Wako Gel C-200E.* M.p.: *Laboratory Devices MEL-TEMP II* melting-point apparatus; uncorrected. IR Spectra: *Perkin–Elmer Spectrum65* FT-IR spectrophotometer; $\tilde{\nu}$ in cm^{-1}. ^{1}H-NMR Spectra: *Bruker Biospin AVANCE II 600* FT NMR, *JEOL LA400* FT NMR, or *JEOL ECP500* FT NMR spectrometer (at 600, 400, or 500 MHz, resp.); δ in ppm rel. to Me_4Si as internal standard, *J* in Hz. ^{13}C-NMR Spectra: *JEOL ECP500* FT NMR spectrometer (at 125 MHz); δ in ppm rel. to Me_4Si as internal standard. HR-MS (DART, pos.): *Thermo Scientific Exactive* spectrometer; in *m*/*z*.

N-*[2-(Azidomethyl)phenyl]benzamides* (**1**). Prepared from the 2-aminobenzenemethanols, *via* the corresponding hydroxy amides and chloro amides, as described in [5] for the preparation of **1a**. The physical, spectroscopic, and anal. data for new compounds are as follows.

N-*[2-(Hydroxymethyl)phenyl]-3-methylbenzamide.* Yield: 85%. White solid. M.p. 110–111° (hexane/CH_2Cl_2). IR (KBr): 3263, 1643. ^{1}H-NMR (500 MHz): 2.32 (*t*, *J* = 5.7, 1 H); 2.43 (*s*, 3 H); 4.80 (*d*, *J* = 5.7, 2 H); 7.10 (*t*, *J* = 7.4, 1 H); 7.21 (*d*, *J* = 6.9, 1 H); 7.36–7.40 (*m*, 3 H); 7.71 (*d*, *J* = 6.9, 1 H); 7.77 (*s*, 1 H); 8.28 (*d*, *J* = 8.0, 1 H); 9.49 (br. *s*, 1 H). Anal. calc. for $C_{15}H_{15}NO_2$ (241.29): C 74.67, H 6.27, N 5.81; found: C 74.59, H 6.39, N 5.83.

N-*[2-(Chloromethyl)phenyl]-3-methylbenzamide.* Yield: 90%. Pale-yellow solid. M.p. 117–120° (hexane/CH_2Cl_2). IR (KBr): 3277, 1646. ^{1}H-NMR (500 MHz): 2.45 (*s*, 3 H); 4.70 (*s*, 2 H); 7.18 (*t*, *J* = 7.4, 1 H); 7.35 (*dd*, *J* = 8.0, 1.1, 1 H); 7.39–7.41 (*m*, 2 H); 7.45 (*dd*, *J* = 8.0, 7.4, 1 H); 7.73 (*d*, *J* = 6.9, 1 H); 7.79 (*s*, 1 H); 8.08 (*d*, *J* = 8.6, 1 H); 8.37 (br. *s*, 1 H). Anal. calc. for $C_{15}H_{14}ClNO$ (259.73): C 69.36, H 5.43, N 5.39; found: C 69.27, H 5.48, N 5.30.

N-*[2-(Azidomethyl)phenyl]-3-methylbenzamide* (**1b**). Yield: 72%. Pale-yellow solid. M.p. 74–76° (hexane/CH_2Cl_2). IR (KBr): 3300, 2082, 1649. ^{1}H-NMR (500 MHz): 2.46 (*s*, 3 H); 4.42 (*s*, 2 H); 7.19 (*td*, *J* = 7.4, 1.1, 1 H); 7.30 (*dd*, *J* = 8.0, 1.1, 1 H); 7.39–7.42 (*m*, 2 H); 7.44 (*ddd*, *J* = 8.0, 7.4, 1.1, 1 H); 7.70 (*dt*, *J* = 6.9, 1.7, 1 H); 7.76 (br. *s*, 1 H); 8.14 (*d*, *J* = 8.6, 1 H); 8.46 (br. *s*, 1 H). Anal. calc. for $C_{15}H_{14}N_4O$ (266.30): C 67.55, H 5.30, N 21.04; found: C 67.55, H 5.55, N 20.98.

N-*[2-(Hydroxymethyl)phenyl]-3-methoxybenzamide.* Yield: 75%. White solid. M.p. 103–104° (hexane/CH_2Cl_2). IR (KBr): 3322, 1656. ^{1}H-NMR (500 MHz): 2.30 (*t*, *J* = 5.7, 1 H); 3.88 (*s*, 3 H); 4.81 (*d*, *J* = 5.7, 2 H); 7.08–7.13 (*m*, 2 H); 7.21 (*dd*, *J* = 7.4, 1.7, 1 H); 7.38–7.41 (*m*, 2 H); 7.47 (*d*, *J* = 8.0, 1 H); 7.53 (*dd*, *J* = 12.3, 1.7, 1 H); 8.30 (*d*, *J* = 8.0, 1 H); 9.57 (br. *s*, 1 H). Anal. calc. for $C_{15}H_{15}NO_3$ (257.28): C 70.02, H 5.88, N 5.44; found: C 69.97, H 6.05, N 5.40.

N-*[2-(Chloromethyl)phenyl]-3-methoxybenzamide.* Yield: 75%. White solid. M.p. 120–123° (hexane/CH_2Cl_2). IR (KBr): 3264, 1640. ^{1}H NMR (500 MHz): 3.90 (*s*, 3 H); 4.71 (*s*, 2 H); 7.13 (*dd*, *J* = 8.0, 1.7, 1 H); 7.19 (*t*, *J* = 7.4, 1 H); 7.36 (*d*, *J* = 8.0, 1 H); 7.44 (*t*, *J* = 8.0, 1 H); 7.47 (*d*, *J* = 7.4, 1 H); 7.50 (*d*, *J* = 7.4, 1 H); 7.53 (br. *s*, 1 H); 8.11 (*d*, *J* = 8.0, 1 H); 8.42 (br. *s*, 1 H). Anal. calc. for $C_{15}H_{14}ClNO_2$ (275.73): C 65.34, H 5.12, N 5.08; found: C 65.06, H 5.19, N 5.08.

N-*[2-(Azidomethyl)phenyl]-3-methoxybenzamide* (**1e**). Yield: 99%. White solid. M.p. 77–79° (hexane/CH_2Cl_2). IR (KBr): 3203, 2105, 1647. ^{1}H-NMR (500 MHz): 3.90 (*s*, 3 H); 4.43 (*s*, 2 H); 7.12 (*d*, *J* = 8.0, 1 H); 7.19 (*t*, *J* = 7.4, 1 H); 7.31 (*d*, *J* = 7.4, 1 H); 7.42–7.47 (*m*, 3 H); 7.51 (br. *s*, 1 H); 8.16 (*d*, *J* = 8.0, 1 H); 8.53 (br. *s*, 1 H). Anal. calc. for $C_{15}H_{14}N_4O_2$ (282.30): C 63.82, H 5.00, N 19.85; found: C 63.72, H 5.08, N 19.81.

3-Chloro-N-*[2-(hydroxymethyl)-4,5-dimethoxyphenyl]benzamide.* Yield: 86%. Pale-yellow solid. M.p. 148–150° (hexane/CH_2Cl_2). IR (KBr): 3359, 3275, 1643, 1616. ^{1}H-NMR (500 MHz): 2.34 (*t*, *J* = 5.7, 1 H); 3.87 (*s*, 3 H); 3.94 (*s*, 3 H); 4.75 (*d*, *J* = 5.7, 2 H), 6.73 (*s*, 1 H); 7.43 (*t*, *J* = 7.4, 1 H); 7.53 (*d*, *J* = 7.4, 1 H); 7.79 (*d*, *J* = 7.4, 1 H); 7.91 (*s*, 1 H); 7.93 (*s*, 1 H); 9.38 (br. *s*, 1 H). Anal. calc. for $C_{16}H_{16}ClNO_4$ (321.76): C 59.73, H 5.01, N 4.35; found: C 59.61, H 5.09, N 4.32.

3-Chloro-N-*[2-(chloromethyl)-4,5-dimethoxyphenyl]benzamide.* Yield: 80%. Yellow solid. M.p. 125–128° (hexane/CH_2Cl_2). IR (KBr): 3285, 1645, 1612. ^{1}H-NMR (500 MHz): 3.91 (*s*, 3 H); 3.92 (*s*, 3 H); 4.67 (*s*, 2 H); 6.84 (*s*, 1 H); 7.47–7.60 (*m*, 3 H); 8.31 (br. *s*, 1 H); 7.81 (*s*, 1 H); 7.96 (*s*, 1 H). Anal. calc. for $C_{16}H_{15}Cl_2NO_3$ (340.05): C 56.49, H 4.44, N 4.12; found: C 56.22, H 4.49, N 4.08.

N-*[2-(Azidomethyl)-4,5-dimethoxyphenyl]-3-chlorobenzamide* (**1h**). Yield: 63%. White solid. M.p. 125–127° (hexane/CH_2Cl_2). IR (KBr): 3194, 2089, 1635, 1610. ^{1}H-NMR (400 MHz): 3.92 (*s*, 3 H); 3.94 (*s*, 3 H); 4.38 (*s*, 2 H), 6.80 (*s*, 1 H); 7.47 (*t*, *J* = 7.8, 1 H); 7.56 (*d*, *J* = 7.8, 1 H); 7.67 (*s*, 1 H); 7.77 (*d*, *J* = 7.8, 1 H); 7.93 (*s*, 1 H); 8.31 (br. *s*, 1 H). Anal. calc. for $C_{16}H_{15}ClN_4O_3$ (346.77): C 55.42, H 4.36, N 16.16; found: C 55.38, H 4.22, N 16.07.

4-Chloro-N-*[2-(hydroxymethyl)-4,5-dimethoxyphenyl]benzamide.* Yield: 65%. White solid. M.p. 156–159° (hexane/CH_2Cl_2). IR (KBr): 3373, 3309, 1656, 1622. ^{1}H-NMR (500 MHz): 2.30 (*t*, *J* = 5.7, 1 H); 3.87 (*s*, 3 H); 3.94 (*s*, 3 H); 4.75 (*d*, *J* = 5.7, 2 H); 6.72 (*s*, 1 H); 7.47 (*d*, *J* = 8.0, 2 H); 7.87 (*d*, *J* = 8.0, 2 H); 7.93 (*s*, 1 H); 9.38 (br. *s*, 1 H). Anal. calc. for $C_{16}H_{16}ClNO_4$ (321.76): C 59.73, H 5.01, N 4.35; found: C 59.44, H 5.19, N 4.32.

4-Chloro-N-*[2-(chloromethyl)-4,5-dimethoxyphenyl]benzamide.* Yield: 88%. Pale-yellow solid. M.p. 121–124° (hexane/CH_2Cl_2). IR (KBr): 3401, 1662, 1616. ^{1}H-NMR (500 MHz): 3.91 (*s*, 3 H); 3.93 (*s*, 3 H); 4.67 (*s*, 2 H); 6.83 (*s*, 1 H); 7.51 (*d*, *J* = 8.6, 2 H); 7.64 (*s*, 1 H); 7.89 (*d*, *J* = 8.6, 2 H); 8.22 (br. *s*, 1 H). Anal. calc. for $C_{16}H_{15}Cl_2NO_3$ (340.20): C 56.49, H 4.44, N 4.12; found: C 56.21, H 4.58, N 4.06.

N-*[2-(Azidomethyl)-4,5-dimethoxyphenyl]-4-chlorobenzamide* (**1i**).Yield: 85%. Pale-yellow solid. M.p. 165–167° (hexane/CH_2Cl_2). IR (KBr): 3268, 2098, 1645. ^{1}H-NMR (500 MHz): 3.91 (*s*, 3 H); 3.94 (*s*, 3 H); 4.37 (*s*, 2 H); 6.79 (*s*, 1 H); 7.50 (*d*, *J* = 8.6, 2 H); 7.70 (*s*, 1 H); 7.86 (*d*, *J* = 8.6, 2 H); 8.32 (br. *s*, 1 H). Anal. calc. for $C_{16}H_{15}ClN_4O_3$ (346.77): C 55.42, H 4.36, N 16.16; found: C 55.29, H 4.60, N 16.16.

*1-(2-Phenylquinazolin-3(4*H*)-yl)ethanone* (**5a**). *Representative Procedure.* A mixture of **1a** (0.15 g, 0.60 mmol) and Ph_3P (0.16 g, 0.72 mmol) in CH_2Cl_2 (3 ml) was stirred at r.t. for 5 h. The solvent was removed by evaporation, and EtCN (5 ml) was added. The soln. was heated at reflux temp. for 7.5 h. After cooling to r.t., the solvent was removed by evaporation, and pyridine and Ac_2O (0.2 ml each) were added. After stirring at the same temp. for 2 h, the soln. was concentrated under reduced pressure. The residue was purified by CC (SiO_2) to afford **5a** (87 mg, 70%). Pale-yellow viscous oil. R_f (AcOEt/hexane 1:3) 0.52. IR (KBr): 1683, 1610. ^{1}H-NMR (500 MHz): 1.74 (*s*, 3 H); 4.97 (*s*, 2 H); 7.20–7.25 (*m*, 2 H); 7.36 (*td*, *J* = 7.4, 1.7, 1 H); 7.46 (*d*, *J* = 8.0, 1 H); 7.48–7.55 (*m*, 3 H); 7.85 (*dd*, *J* = 8.0, 1.7, 2 H). ^{13}C-NMR: 25.14; 42.88; 125.09; 125.24; 126.48; 127.06; 128.44: 128.51; 128.97; 131.28; 136.43; 142.03; 153.97; 170.49. HR-MS: 251.1172 ($[M+H]^+$, $C_{16}H_{15}N_2O^+$; calc. 251.1184). Anal. calc. for $C_{16}H_{14}N_2O$ (250.30): C 76.78, H 5.64, N 11.19; found: C 76.70, H 5.60, N 11.18.

*1-[2-(3-Methylphenyl)quinazolin-3(4*H*)-yl]ethanone* (**5b**). White solid. M.p. 105–107° (hexane/CH_2Cl_2). IR (KBr): 1682, 1609. ^{1}H-NMR (500 MHz): 1.75 (*s*, 3 H); 2.44 (*s*, 3 H); 4.96 (*s*, 2 H); 7.19–7.24 (*m*, 2 H); 7.32–7.38 (*m*, 3 H); 7.45 (*d*, *J* = 7.4, 1 H); 7.60 (*d*, *J* = 7.4, 1 H); 7.69 (*s*, 1 H). ^{13}C-NMR: 21.37; 25.23; 42.91; 125.10; 125.26; 125.82; 126.55; 127.01; 128.46; 128.86; 128.95; 132.17; 136.46; 138.96; 142.14; 154.21; 170.64. HR-MS: 265.1328 ($[M+H]^+$, $C_{17}H_{17}N_2O^+$; calc. 265.1341). Anal. calc. for $C_{17}H_{16}N_2O$ (264.32): C 77.25, H 6.10, N 10.60; found: C 77.00, H 6.09, N 10.52.

*1-[2-(3-Chlorophenyl)quinazolin-3(4*H*)-yl]ethanone* (**5c**). Colorless viscous oil. R_f (AcOEt/hexane 1:5) 0.30. IR (neat): 1683, 1610. ^{1}H-NMR (500 MHz): 1.79 (*s*, 3 H); 4.96 (*s*, 2 H); 7.21 (*d*, *J* = 7.4, 1 H); 7.26 (*td*, *J* = 7.4, 1.1, 1 H); 7.37 (*ddd*, *J* = 8.0, 7.4, 1.7, 1 H); 7.42–7.51 (*m*, 3 H); 7.70 (*ddd*, *J* = 7.4, 1.7, 1.1, 1 H); 7.89 (*dd*, *J* = 1.7, 1.1, 1 H). ^{13}C-NMR: 25.13; 42.97; 125.31 (2 overlapped C);126.39; 126.62; 127.52; 128.41; 128.61; 130.20; 131.30; 135.23; 138.18; 141.78; 152.59; 170.20. HR-MS: 285.0791 ($[M+H]^+$, $C_{16}H_{14}ClN_2O^+$; calc. 285.0794). Anal. calc. for $C_{16}H_{13}ClN_2O$ (284.74): C 67.49, H 4.60, N 9.84; found: C 67.32, H 4.68, N 9.70.

*1-[2-(4-Chlorophenyl)quinazolin-3(4*H*)-yl]ethanone* (**5d**). White solid. M.p. 131–133° (hexane/CH_2Cl_2). IR (KBr): 1676, 1609. ^{1}H-NMR (500 MHz): 1.77 (*s*, 3 H); 4.94 (*s*, 2 H); 7.20 (*d*, *J* = 7.6, 1 H); 7.24 (*t*, *J* = 7.6, 1 H); 7.35 (*t*, *J* = 7.6, 1 H); 7.42 (*d*, *J* = 7.6, 1 H); 7.47 (*d*, *J* = 8.4, 2 H); 7.80 (*d*, *J* = 8.4, 2 H), ^{13}C-NMR: 25.10; 43.00; 125.21; 125.29; 126.44; 127.34; 128.57; 129.30; 129.78; 134.87; 137.56; 141.93; 152.86; 170.24. HR-MS: 285.0785 ($[M+H]^+$, $C_{16}H_{14}ClN_2O^+$; calc. 285.0794). Anal. calc. for $C_{16}H_{13}ClN_2O$ (284.74): C 67.49, H 4.60, N 9.84; found: C 67.40, H 4.51, N 9.54.

*1-[2-(3-Methoxyphenyl)quinazolin-3(4*H*)-yl]ethanone* (**5e**). Pale-yellow viscous oil. R_f (AcOEt/hexane 1:3) 0.43. IR (neat): 1683, 1607. ^{1}H-NMR (600 MHz): 1.77 (*s*, 3 H); 3.89 (s, 3 H); 4.96 (*s*, 2 H); 7.07 (*dt*, *J* = 7.7, 1.5, 1 H); 7.20 (*d*, *J* = 7.3, 1 H); 7.23 (*td*, *J* = 7.3, 1.0, 1 H); 7.34–7.37 (*m*, 2 H); 7.38 (*d*, 7.7, 1 H); 7.42 (*d*, *J* = 1.5, 1 H); 7.46 (*d*, *J* = 7.7, 1 H). ^{13}C-NMR: 25.09; 42.98; 55.52; 113.27; 117.61; 121.20; 125.19; 125.33; 126.61; 127.20; 128.53; 130.04; 137.87; 142.03; 153.97; 160.19; 170.68. HR-MS: 281.1289 ($[M+H]^+$, $C_{17}H_{17}N_2O_2^+$; calc. 281.1290). Anal. calc. for $C_{17}H_{16}N_2O_2$ (280.32): C 72.84, H 5.75, N 9.99; found: C 73.03, H 5.74, N 9.91.

*1-(7-Chloro-2-phenylquinazolin-3(4*H*)-yl)ethanone* (**5f**). White solid. M.p. 113–116° (hexane/CH_2Cl_2). IR (KBr): 1683, 1600. ^{1}H-NMR (500 MHz): 1.75 (*s*, 3 H); 4.94 (*s*, 2 H); 7.14 (*d*, *J* = 8.0, 1 H); 7.21 (*dd*, *J* = 8.0, 2.3, 1 H); 7.46 (*d*, *J* = 2.3, 1 H); 7.51 (*dd*, *J* = 8.0, 7.4, 2 H); 7.55 (*td*, *J* = 7.4, 1.1, 1 H); 7.83 (*dd*, *J* = 8.0, 1.1, 2 H). ^{13}C-NMR: 25.26; 42.47; 124.85; 125.06; 126.23; 126.85; 128.64; 129.10; 131.72; 133.85; 136.08; 143.16; 155.10; 170.49. HR-MS: 285.0788 ($[M+H]^+$, $C_{16}H_{14}ClN_2O^+$; calc. 285.0794). Anal. calc. for $C_{16}H_{13}ClN_2O$ (284.74): C 67.49, H 4.60, N 9.84; found: C 67.19, H 4.85, N 9.78.

*1-(6,7-Dimethoxy-2-phenylquinazolin-3(4*H*)-yl)ethanone* (**5g**). Pale-yellow viscous oil. R_f (AcOEt/hexane 1:1) 0.40. IR (neat): 1682, 1615. ^{1}H-NMR (500 MHz): 1.75 (*s*, 3 H); 3.91 (*s*, 3 H); 3.93 (*s*, 3 H); 4.92 (*s*, 2 H); 6.70 (*s*, 1 H); 7.04 (*s*, 1 H); 7.46–7.52 (*m*, 3 H); 7.82 (*dd*, *J* = 7.4, 1.7, 2 H). ^{13}C-NMR: 25.08; 42.49; 56.04; 56.13; 107.89; 108.71; 118.42; 128.31; 128.99; 131.02; 135.74; 136.54; 148.18; 148.85; 152.36; 170.66. HR-MS: 311.1382 ($[M+H]^+$, $C_{18}H_{19}N_2O_3^+$; calc. 311.1395). Anal. calc. for $C_{18}H_{18}N_2O_3$ (310.35): C 69.66, H 5.85, N 9.03; found: C 69.44, H 5.90, N 8.91.

*1-[2-(3-Chlorophenyl)-6,7-dimethoxyquinazolin-3(4*H*)-yl]ethanone* (**5h**). Yellow amorphous. R_f (AcOEt/hexane 1:2) 0.23. IR (neat): 1681, 1615. ^{1}H-NMR (500 MHz): 1.79 (*s*, 3 H); 3.92 (*s*, 3 H); 3.93 (*s*, 3 H); 4.90 (*s*, 2 H); 6.70 (*s*, 1 H); 7.03 (*s*, 1 H); 7.42 (*dd*, *J* = 8.0, 7.4, 1 H); 7.48 (*dt*, *J* = 8.0, 1.7, 1 H); 7.68 (*dd*, *J* = 7.4, 1.7, 1 H), 7.87 (*t*, *J* = 1.7, 1 H). ^{13}C-NMR: 25.02; 42.44; 56.07; 56.16; 107.86; 108.81; 118.41; 126.39; 128.21; 130.18; 130.99; 135.21; 135.50; 138.27; 148.50; 148.94; 150.88; 170.31. HR MS: 345.0992 ($[M+H]^+$, $C_{18}H_{18}ClN_2O_3^+$; calc. 345.1006). Anal. calc. for $C_{18}H_{17}ClN_2O_3$ (344.79): C 62.70, H 4.97, N 8.12; found: C 62.63, H 5.12, N 7.84.

*1-[2-(4-Chlorophenyl)-6,7-dimethoxyquinazolin-3(4*H*)-yl]ethanone* (**5i**). Pale-yellow solid. M.p. 173–176° (hexane/CH_2Cl_2). IR (KBr): 1682, 1614. ^{1}H NMR (500 MHz): 1.77 (*s*, 3 H); 3.91 (*s*, 3 H); 3.93 (*s*, 3 H); 4.89 (*s*, 2 H); 6.70 (*s*, 1 H); 7.02 (*s*, 1 H); 7.46 (*d*, *J* = 8.6, 2 H); 7.78 (*d*, *J* = 8.6, 2 H). ^{13}C-NMR: 25.03; 42.54; 56.05; 56.13; 107.84; 108.69; 118.40; 129.28; 129.53; 134.91; 135.56; 137.20; 148.35; 148.89; 151.18; 170.40. HR MS: 345.0990 ($[M+H]^+$, $C_{18}H_{18}ClN_2O_3^+$; calc. 345.1006). Anal. calc. for $C_{18}H_{17}ClN_2O_3$ (344.79): C 62.70, H 4.97, N 8.12; found: C 62.64, H 5.04, N 7.83.

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