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# PIDA-Mediated 1,2-*ipso*-Migration in Mannich Bases of Imidazo[1,2-*a*]pyridines: Preparation of *N*-Acetoxymethyl/ Alkoxymethyl-*N*-arylimidazo[1,2-*a*]pyridine-3-amines

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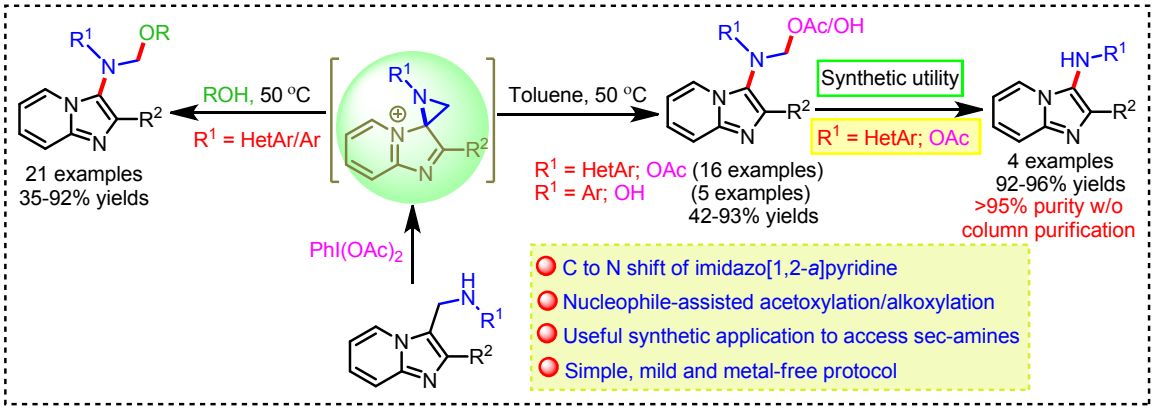



**ABSTRACT:** A PIDA-mediated 1,2-*ipso*-migration of imidazo[1,2-*a*]pyridine ring *via* the formation of aziridine intermediate in the Mannich bases derived from imidazo[1,2-*a*]pyridines, 2-pyridylamines or arylamines and formaldehyde is reported. The imidazo[1,2-*a*]pyridines bearing different substituents showed excellent migratory aptitude and resulted corresponding *N*-acetoxymethyl-, *N*-alkoxymethyl- and *N*-hydroxymethyl-*N*-arylimidazo[1,2-*a*]pyridine-3-amine derivatives in moderate to excellent (42 examples; 35-93%) yields. Radical trapping experiments confirmed the involvement of non-radical intermediate. The developed protocol is amenable for a scale-up reaction and synthetic utility of *N*-acetoxymethyl products was demonstrated by transforming them to the corresponding *N*-(pyridin-2-yl)imidazo[1,2-*a*]pyridin-3-amines.

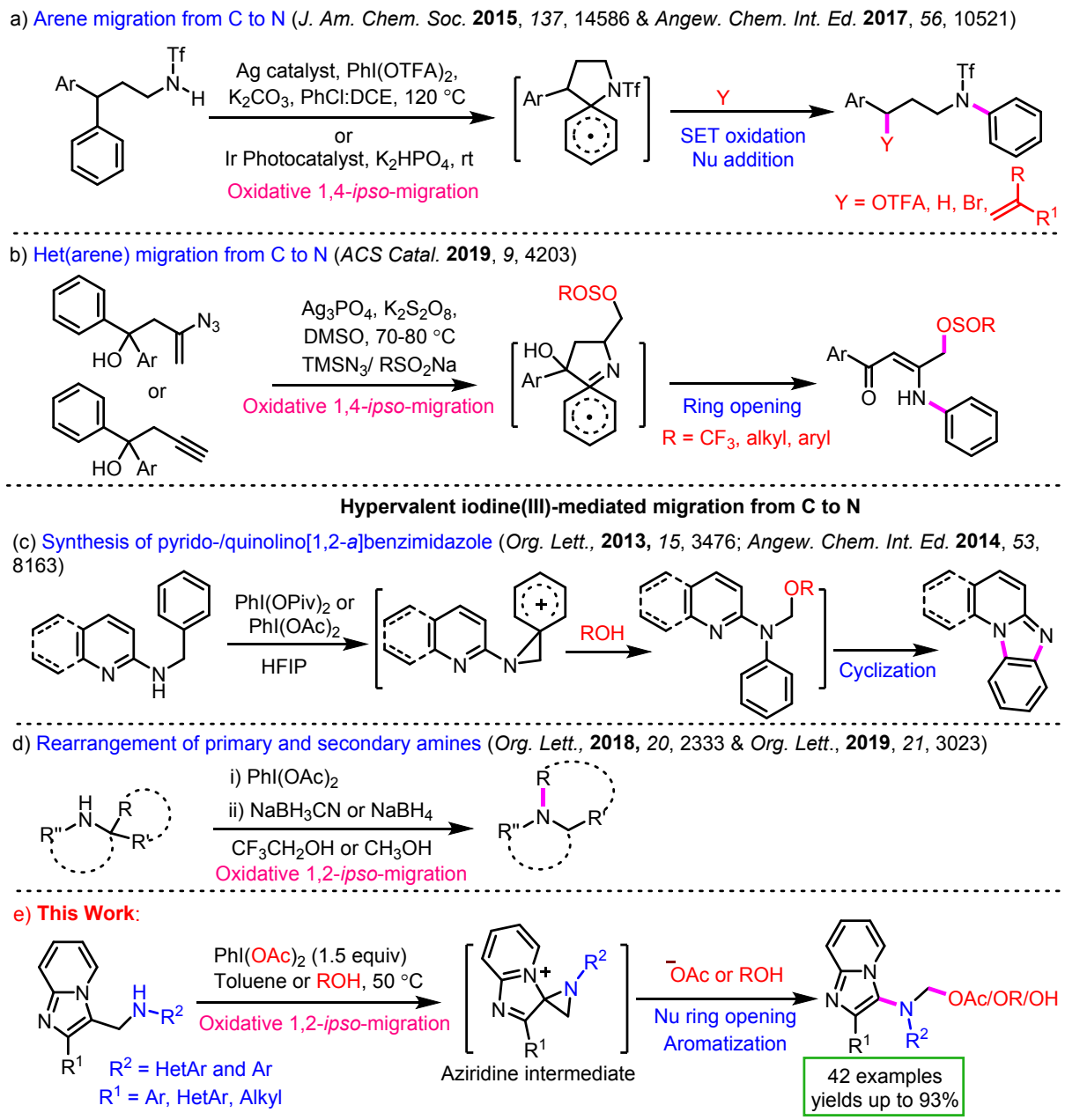
## INTRODUCTION

The intramolecular *ipso*-migration of arenes or heteroarenes *via* C-C bond cleavage is an interesting area of research in synthetic organic chemistry.[1] The intramolecular migration generally proceeds through the formation of 3, 4, 5 or 6-member spirocyclic intermediate or transition state followed by functionalization.[1a] Carbon to carbon migration of arenes and heteroarenes has been explored in great detail,[2] but migration from carbon to nitrogen of arene or heteroarene ring is rarely explored and limited only to triflic amides.[3] In this perspective, Shi and Nevado groups successively reported [1,4]-arene migration from C to N through radical intermediates *via* single electron transfer (SET) reaction (Scheme 1a).[3-4] Very recently, Bi group reported a [1,4]-arene migration from C to N followed by trifluoromethylation and/ or sulfonylation (Scheme 1b).[5] Both these approaches involve formation of 5-membered spirocyclic intermediate and subsequent functionalization.

On the other hand, hypervalent iodine(III) reagents have been considered as effective reagent for oxidative rearrangements due to their electrophilicity and good leaving group tendency as well as their environmentally-friendly behaviour.[6] These reagents have been successfully employed for the oxidative rearrangement of arene ring through ring expansion, ring contraction, or arene or heteroarene migration.[6d] However, oxidative migration reactions to heteroatoms other than the amidic nitrogen have remained under-explored. The Zhu and Antonchick group independently reported unprecedented oxidative demethylenation of *N*-benzyl-2-aminopyridines and *N*-benzyl-2-aminoquinolines to give coressponding pyrido[1,2-*a*]benzimidazoles and quinolino[1,2-*a*]benzimidazoles (Scheme 1c).[7] These reactions are reported to proceed through a rearranged *N*-(alkoxymethyl)-*N*-arylpyridin-2-amine intermediate that is generated *via* hypervalent iodine(III)-mediated *ipso*-1,2-arene migration from C to N atom. However, Zhu group failed to isolate the

*N*-(alkoxymethyl)-*N*-arylpyridin-2-amine intermediate in hexafluoroisopropanol (HFIP). Murai group reported phenyliodine(III) diacetate (PIDA)-mediated oxidative rearrangement of primary and secondary amines *via* 1,2-C to N migration of amines (Scheme 1d).[8]

**Scheme 1. Oxidative Rearrangement of Arene/Heteroarene from C to N**



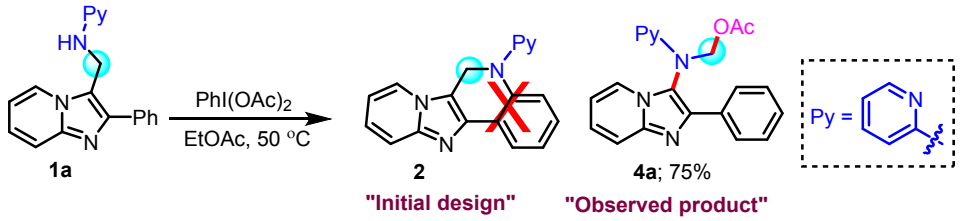

On the other hand, *N*-arylimidazo[1,2-*a*]pyridine-3-amines have attracted significant interest in medicinal chemistry due to their potential anticancer, antimalarial, anti-inflammatory,

antifibrosis and HIV-1 reverse transcriptase inhibitor activities.[9] Owing to their interesting biological properties and our interest towards synthesis and functionalization of imidazo[1,2-*a*]pyridines,[10] herein, we report PIDA-mediated [1,2]-*ipso*-migration of heteroaryl ring in Mannich bases derived from imidazo[1,2-*a*]pyridines, 2-pyridylamines or arylamines and formaldehyde to give the corresponding *N*-acetoxymethyl/*N*-alkoxymethyl-*N*-aryl-imidazo[1,2-*a*]pyridine-3-amines under mild and simple reaction conditions.

## RESULTS AND DISCUSSION

Our studies commenced with the reaction of Mannich base *i.e.* *N*-((2-phenylimidazo[1,2-*a*]pyridin-3-yl)methyl)pyridin-2-amine (**1a**) using iodobenzene diacetate as an oxidant in EtOAc at 50 °C. We expected that intramolecular amination would yield a 6-membered cyclic product *i.e.* 5-(pyridin-2-yl)-5,6-dihydropyrido[2',1':2,3]imidazo[4,5-*c*]quinoline (**2**). However, ((2-phenylimidazo[1,2-*a*]pyridin-3-yl)(pyridin-2-yl)amino)methyl acetate (**4a**) was obtained in 75% yield within 3 h (Scheme 2). The molecular structure of **4a** was established by the $^{1}H$, $^{13}C$ NMR, and HRMS spectroscopic data and was further confirmed unambiguously by a single-crystal X-ray diffraction analysis (CCDC No. 1957417, Supporting Information).

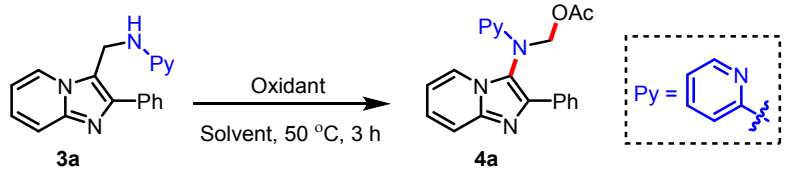
**Scheme 2. Intial Design and Observed Reaction of 1a with PIDA.**




In order to find optimum conditions for this rearrangement reaction, the reaction of **1a** with PIDA was performed in different solvents such as 1,2-dicholoroethane (DCE), toluene, THF, 1,4-dioxane, DMSO, DMF, DMA, $H_2O$ and MeOH. When the reaction was performed in DCE and toluene, yield of **4a** increased to 82% and 90%, respectively (Table 1, entries 1 *vs* 2 and 3).

While in other solvents (THF, 1,4-Dioxane, DMSO, DMF and DMA) yield of **4a** decresed significantly (Table 1, entries 4-8). The use of environmentally benign solvent such as water with or without phase-transfer-catalyst (SLS) did not improve the yield of **4a** (Table 1, entries 9-10). On the other hand, *N*-(methoxymethyl)-2-phenyl-*N*-(pyridin-2-yl)imidazo[1,2-*a*]pyridin-3-amine (**6aa**) was obtained in 90% yield with traces of **4a** when methanol was used as solvent (Table 1, entry 11). The decreasing amount of PIDA (1.2 equiv.) showed a detrimental effect on the yield of **4a** (Table 1, entry 12). The use of [hydroxy(tosyloxy)iodo]benzene (HTIB, Koser's reagent), bis(trifluoroacetoxy)iodo)benzene (PIFA) and organo-catalytic conditions[11] did not produce the desired product **4a** (entry 13-15).

**Table 1. Optimization of Reaction Conditions for 4a.**[a]




**3a** **4a**

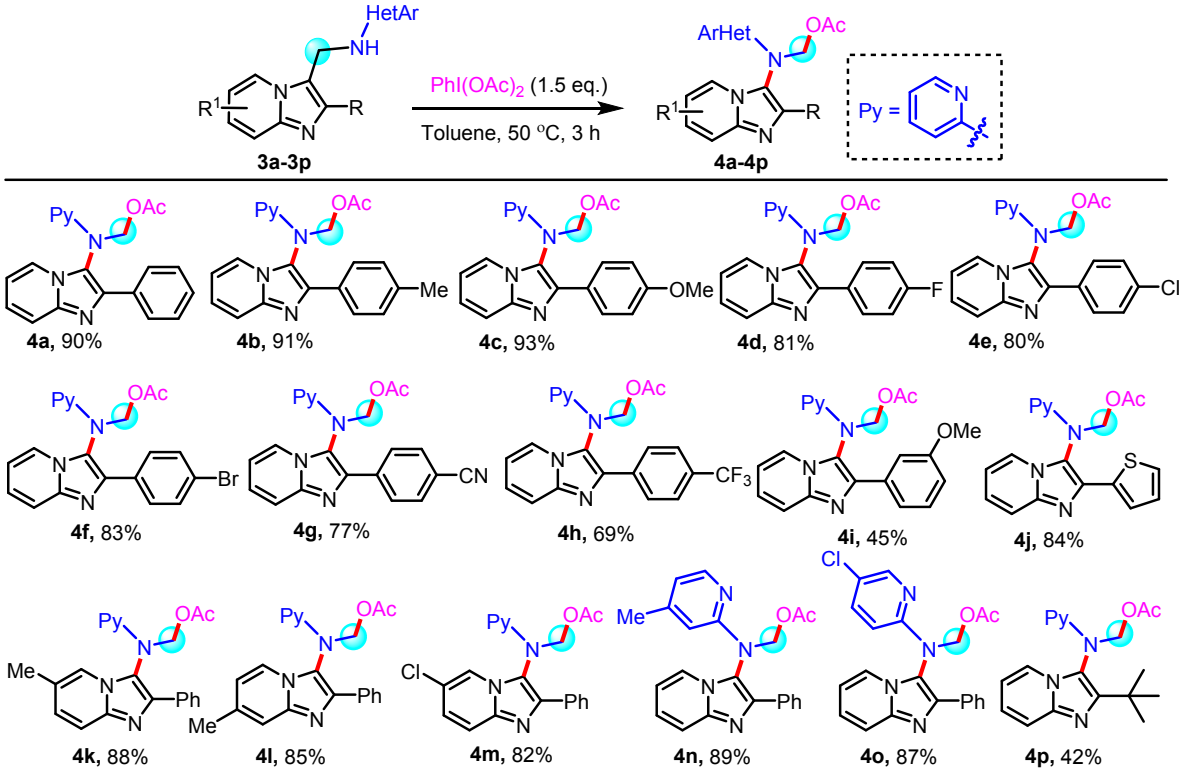
| entry | oxidant | solvent | % yield **4a**[b] |
|---|---|---|---|
| 1 | $PhI(OAc)_2$ | EtOAc | 75 |
| 2 | $PhI(OAc)_2$ | 1,2-DCE | 82 |
| **3** | **$PhI(OAc)_2$** | **Toluene** | **90** |
| 4 | $PhI(OAc)_2$ | THF | 37 |
| 5 | $PhI(OAc)_2$ | 1,4-Dioxane | 48 |
| 6 | $PhI(OAc)_2$ | DMSO | 39 |
| 7 | $PhI(OAc)_2$ | DMF | 70 |
| 8 | $PhI(OAc)_2$ | DMA | 29 |
| 9 | $PhI(OAc)_2$ | $H_2O$ | 7 |
| 10[c] | $PhI(OAc)_2$ | $H_2O$ | 16 |
| 11 | $PhI(OAc)_2$ | MeOH | <5[d] |
| 12[e] | $PhI(OAc)_2$ | Toluene | 83 |
| 13 | HTIB | Toluene | -[f] |
| 14 | $PhI(OCOCF_3)_2$ | Toluene | -[f] |
| 15[g] | PhI + *m*-CPBA | Toluene | Traces |

[a]Reaction conditions: **3a** (0.5 mmol), oxidant (1.5 equiv.), solvent (5 mL), 50 °C, 3 h. [b]Isolated yield. [c]SLS (20 mol %) was used. [d]*N*-methoxymethyl product **6aa** was obtained in 90% yield. [e]1.2 equiv. of PIDA was used. [f]No reaction. [g]PhI (20 mol %) with *m*-CPBA (3 equiv.) and AcOH

(5 equiv.) was used. SLS = Sodium lauryl sulfate; DMSO = dimethyl sulfoxide; DMF = *N,N*-dimethyl formamide; DMA = *N,N*-dimethyl acetamide; THF = tetrahydrofuran; *m*-CPBA = *meta*-chloroperbenzoic acid.

With the optimized conditions in hand (Table 1, entry 3), the scope and generality of the methodology was investigated systematically (Scheme 3). In the beginning, Mannich bases of imidazo[1,2-*a*]pyridine with various substituents (-Me, -OMe, -F, -Cl, -Br, -CN and $CF_3$) on C-2 aryl ring were reacted and corresponding *N*-acetoxymethyl products (**4a-i**) were obtained in good to excellent (45-93%) yields. Mannich bases with the electron-donating groups at the *para*-position on C-2 aryl ring provided better yields than those with electron-withdrawing groups on C-2 aryl ring (compare **4a** and **4b-c** *vs* **4d-h**, Scheme 3).

**Scheme 3. Substrate Scope for Preparation of *N*-Acetoxymethyl Derivatives 4.**[a,b]




[a]Reaction conditions: **3** (0.5 mmol), PIDA (1.5 equiv.), toluene (5 mL), 50 °C, 3 h. [b]Isolated yields.

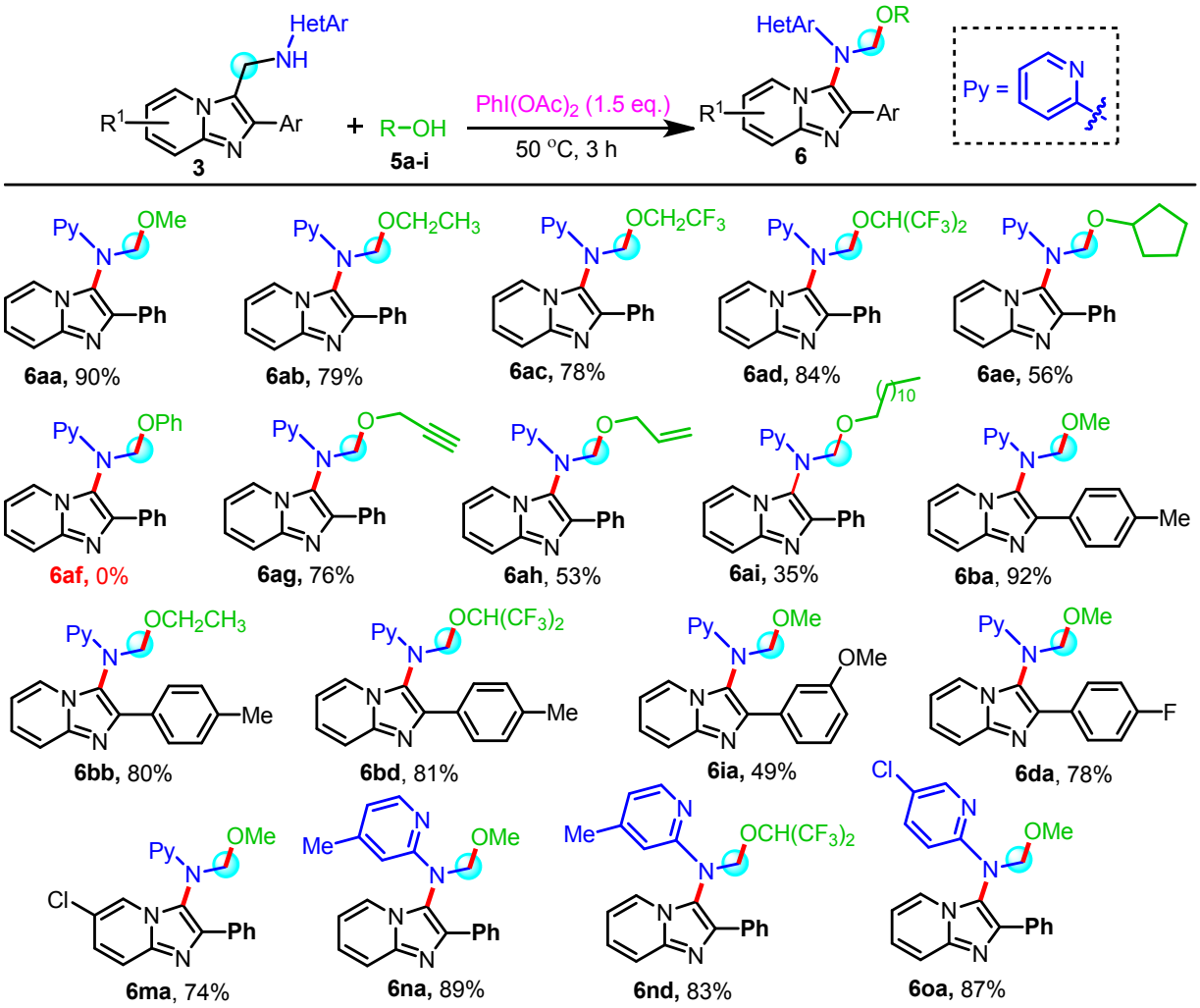
Similarly, Mannich base with thiophene ring at the C-2 position afforded the desired *N*-acetoxymethyl product **4j** in 84% yield. Mannich bases decorated with substituents (-Me and –Cl) at different positions on imidazo[1,2-*a*]pyridine nucleus and 2-aminopyridine ring delivered the corresponding acetoxylated products (**4k-o**) in high (82-89%) yield under the identical reaction conditions. Interestingly, the *tert*-butyl group at C-2 position of Mannich base also afforded the desired product **4p** in 42% yield. However, in the case of *N*-methyl-1-(2-phenylimidazo[1,2-*a*]pyridin-3-yl)methanamine **3q** (Mannich base derived from methylamine and 2-phenylimidazo[1,2-*a*]pyridine), we could not isolate the desired product **4q** due to the formation of complex reaction mixture (Scheme S2; SI).

During the reaction condition optimization studies it was observed that the use of methanol as solvent resulted *N*-methoxymethyl product **6aa** in 90% yield along with a trace amount (>5%) of *N*-acetoxymethyl product **4a** (Table 1, entry 11). It might be due to the relatively high nucleophilicity of methoxy group as compared to the acetate group, which facilitated the ring opening of aziridine intermediate better than the acetate group resulting in formation of *N*-methoxymethyl product. The structure of **6aa** was established by the $^{1}H$, $^{13}C$ NMR, and HRMS spectroscopic data and was further confirmed unambiguously by a single-crystal X-ray diffraction analysis (CCDC No. 1913162, See SI).

We thus took up a systematic study to evaluate substrate scope for the formation of *N*-alkoxymethyl products by employing different alcohols **5** as solvent with **3a** (Scheme 4). Different alcohols such as methanol, ethanol, 2-triflurorethanol, HFIP and cyclopentanol smoothly reacted with **3a** and delivered the desired *N*-alkoxymethyl products **6aa**-**6ae** in 56-90% yields. A long-chain alcohol *i.e.* lauryl alcohol also reacted and gave the desired product **6ai** in 35% yield; while phenol could not afford the respective product **6af**, most likely due to the weak nucleophilicity of phenol.[12] Propargyl alcohol (**5g**) and allyl alcohol (**5h**) also reacted well and

furnished the respective products **6ag** and **6ah** in 76% and 53% yields, respectively. This transformation is interesting from the view-point of medicinal chemistry as it further opens scope of post-modification.

**Scheme 4. Substrate Scope for Alkoxylated Derivatives**[a,b]



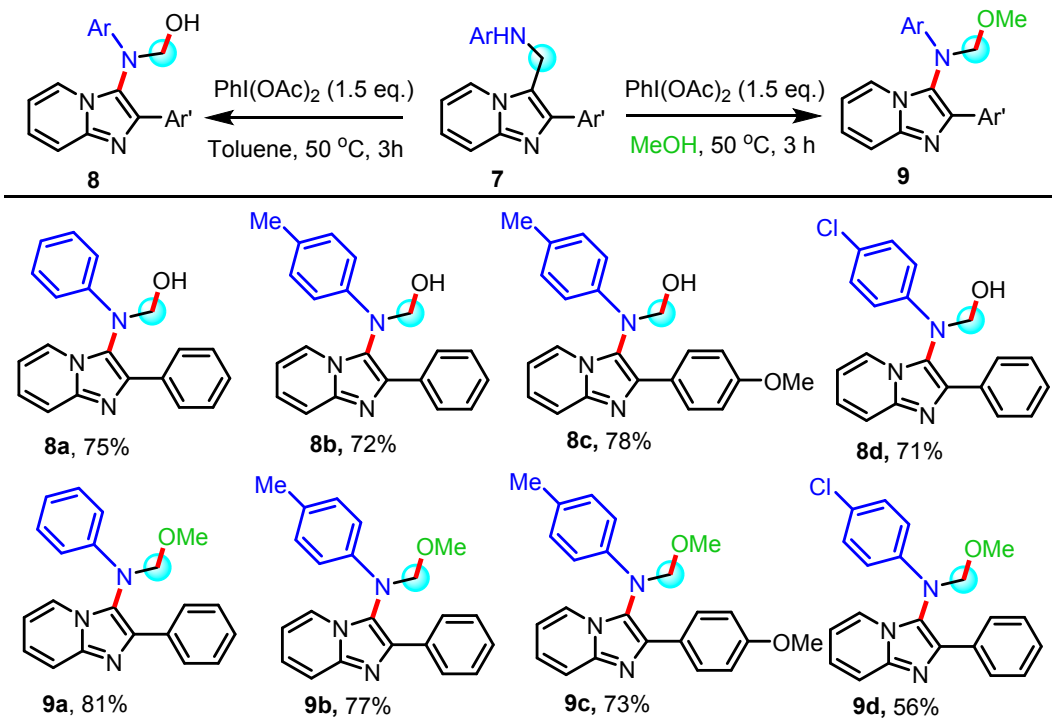

[a]Reaction conditions: **3** (0.5 mmol), PIDA (1.5 equiv.), ROH (5 mL), 50 °C for 3 h. [b]Isolated yields.

The Mannich bases bearing methyl (**3b**), methoxy (**3i**) and fluoro (**3d**) groups on the C-2 aryl ring, chloro (**3l**) group on imidazo[1,2-*a*]pyridine nucleus also reacted smoothly with different alcohols (MeOH, EtOH and HFIP) in the presence of PIDA to give the corresponding *N*-alkoxymethyl products (**6ba-6ma**) in good to excellent (49-92%) yields. Similarly, Mannich

bases with methyl (**3n**) and chloro (**3o**) groups on the 2-aminopyridine ring also participated well in the reaction and gave corresponding *N*-alkoxylmethyl products (**6na-6oa)** in 83-89% yields. As in case of toluene, reaction of **3q** in MeOH also resulted in an unseperable mixture and we could not isolate the desired *N*-methoxymethyl product **6qa** (Scheme S2; SI).

Next, the scope of the reaction for Mannich bases derived from imidazo[1,2-*a*]pyridines and anilines (**7**) was studied (Scheme 5). Interestingly, reaction of different Mannich bases with substituted *N*-aryl rings (**7a-d**) with PIDA in toluene afforded (aryl(2-aryllimidazo[1,2-*a*]pyridin-3-yl)amino)methanols (**8a-d**) 71-78% yields. It is believed that *N*-hydoxymethyl products (**8**) are generated by hydrolysis of *N*-acetoxymethyl products. Results from these reactions indicated that the pyridyl ring has no specific role in the 1,2-*Ipso*-migration of imidazo[1,2-*a*]pyridine core in Mannich bases, however it might have stabilized *N*-acetoxymethyl derivatives. On the other hand, reaction of **7a-d** with PIDA in methanol produced the corresponding *N*-methoxymethyl derivatives (**9a-d**) in moderate to excellent yields (56-81%). Structure of **8** and **9** was confirmed by NMR ($^{1}$H, $^{13}$C) and HRMS analysis (see SI). Further, structure of **8a** was also elucidated by single-crystal X-ray diffraction analysis (CCDC 1986133; See SI). Compound **8a** is crystallized in monoclinic $P2_1/c$ space group with two molecules per asymmetric unit. It forms intermolecular hydrogen bonding dimeric structure through the alcohol O1-H as donor and $N_2$ as acceptor with H---A bond length of 1.99 Å and D-H-A bond angle of 176.1° (Fig S4, SI). It is worth mentioning that the reaction of *N*-((1-tosyl-1*H*-indol-3-yl)methyl)aniline with PIDA in toluene resulted 1-tosyl-1*H*-indole-3-carbaldehyde instead of the desired rearranged product (Scheme S1, SI). The formation of 3-formylindole derivative can be explained *via* PIDA mediated oxidation of secondary amine to imine followed by hydrolysis.[13]

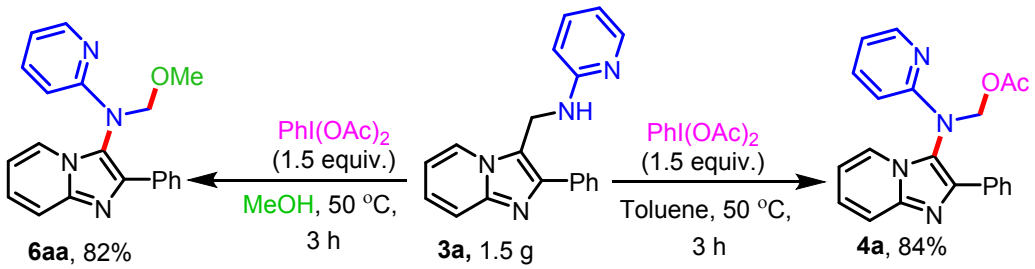
**Scheme 5. Substrate Scope for Mannich Bases Derived from Arylamines.**[a,b]




[a]Reaction conditions: **7** (0.5 mmol), PIDA (1.5 equiv.), MeOH (5 mL) or toluene (5 mL), 50 °C for 3 h. [b]Isolated yields.

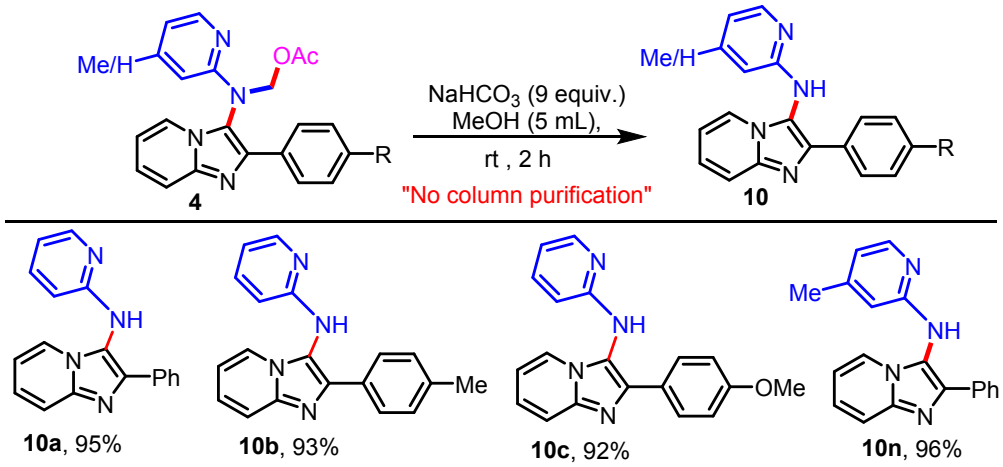
Furthermore, to evaluate the potentiality of the developed methodology for the large-scale synthesis of *N*-acetoxymethyl and *N*-alkoxymethyl compounds, we performed gram-scale reaction of **3a** (1.5 g) under standard reaction conditions in toluene and MeOH (Scheme 6). To our expectation, the desired products **4a** and **6aa** were obtained in 84% and 82% yields, respectively, without significant change in the efficacy of the reaction.

**Scheme 6. Gram Scale Experiment**



To demonstrate the synthetic utility of the developed protocol, *N*-acetoxymethyl derivatives (**4a-c** and **4n**) were stirred with $NaHCO_3$ for 2 h in MeOH to obtain corresponding 3-(pyridin-2-yl)aminoimidazo[1,2-*a*]pyridines (**10a-c** and **10n**) (Scheme 7). The products **10** were obtained in excellent yields (92-96%) and high purity (>95%, HPLC) without using column chromatography (See; SI). The 3-arylaminoimidazo[1,2-*a*]pyridines are generally prepared by the Groebke-Blackburn-Bienaymé reaction which require isocyanides as one of the substrate.[14] The developed method provides a simple and straightforward synthetic strategy for the preparation of bioactive 3-arylaminoimidazo[1,2-*a*]pyridines.[9a, 9c]

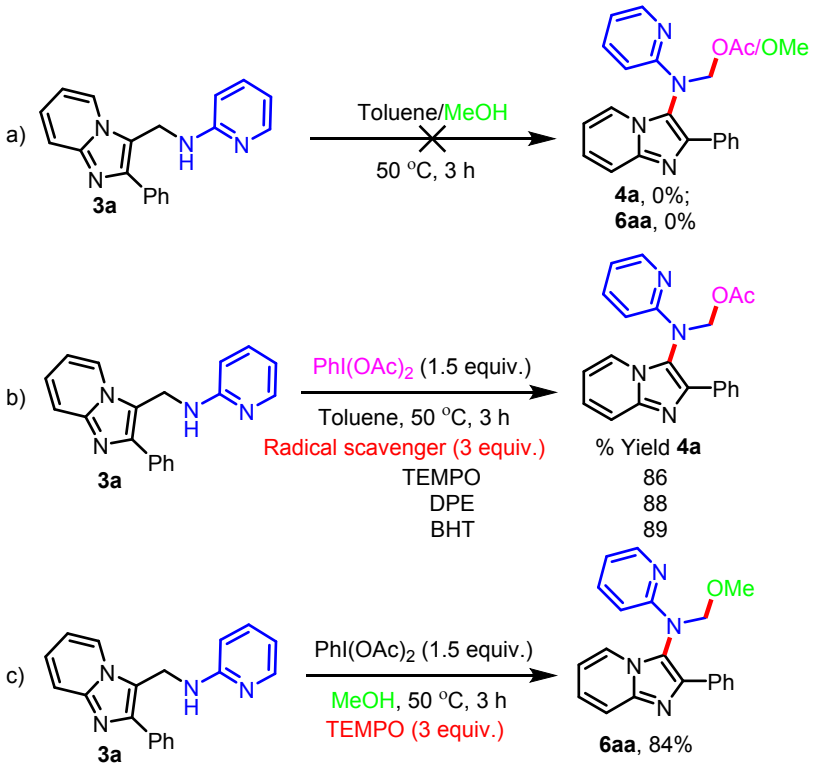
**Scheme 7. Synthetic Utility: Removal of *N*-Acetoxymethyl from 4.**




To gain an insight into the mechanism for the oxidative 1,2-migration followed by functionalization, a set of control experiments were performed (Scheme 8). First, to confirm the role of PIDA, we performed the reaction of **1a** in toluene and methanol in the absence of PIDA. The reaction did not produce the corresponding products **4a** and **6aa**, justifying the essential role of PIDA in the reaction (Scheme 8a). Second, reaction of **3a** under standard reaction conditions in the presence of different radical scavengers including 2,2,6,6-tetramethylpiperidine-1-oxy (TEMPO), 1,2-diphenylethylene (DPE) and butylated hydroxytoluene (BHT) resulted **4a** in 86%, 88% and 89% yields, respectively (Scheme 8b). Similarly, product **6aa** was also formed in 84%

yield from the reaction of **3a** with PIDA in methanol in the presence of TEMPO (Scheme 8c). The results from radical scavengers experiments ruled out the involvement of the radical pathway which is in stark contrast to what is observed by Murai in the PIDA-mediated direct 1,2-C-to-N migration of amines.[8] Based on these results and effect of substituents on C-2 aryl ring on the yields of products, we believe that the reaction involves a non-radical, ionic mechanism.

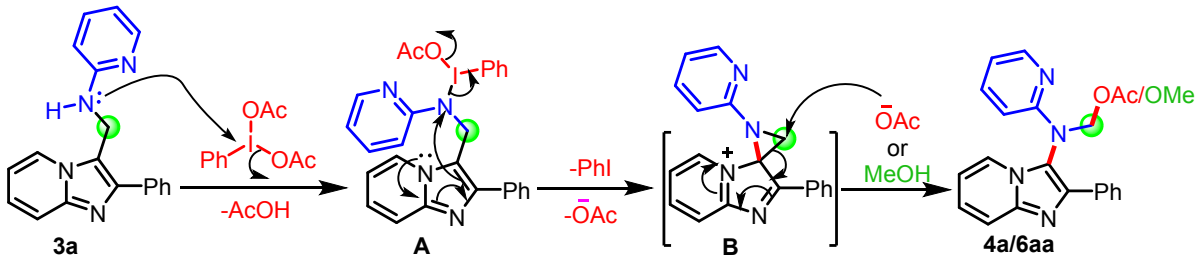
**Scheme 8. Control Experiments**




Based on the control experiments and literature reports,[7, 15] a plausible mechanistic pathway is depicted in Scheme 9. It is believed that initially, the reaction of **3** with PIDA gives the iodinated intermediate **A** with the removal of acetic acid. The intermediate **A** is further converted into a Wheland-type aziridine intermediate **B** *via* nucleophilic *ipso*-attack of imidazo[1,2-*a*]pyridinyl group and subsequent removal of iodobenzene and acetate group . The intermediate **B** is then

attacked by acetate/alkoxy nucleophile at methylene carbon initially and triggers aziridine ring opening to form [1,2]-*ipso*-migrated *N*-acetoxylmethyl or *N*-alkoxymethyl product **4a**/**6aa**.

**Scheme 9. Proposed Reaction Mechanism**




## CONCLUSIONS

In summary, this report delineates a novel protocol for the preparation of *N*-acetoxymethyl-, *N*-alkoxymethyl- and *N*-hydroxymethyl-*N*-arylimidazo[1,2-*a*]pyridine-3-amines in moderate to excellent yields through PIDA-mediated [1,2]-*ipso*-migration in Mannich bases derived from imidazo[1,2-*a*]pyridines, 2-aminopyridines/arylamines and formaldehyde. The reaction is believed to proceed through [1,2]-*ipso*-heteroaryl migration *via* the formation of a Wheland-type aziridine intermediate followed by nucleophile-assisted ring opening reaction. The protocol is amenable for a scale-up reaction and the *N*-acetoxymethyl products **4** were easily transformed to the corresponding 2-aryl-*N*-(pyridin-2-yl)imidazo[1,2-*a*]pyridin-3-amines (**10**) by treating with $NaHCO_3$ in methanol. Given the high pharmaceutical importance of 3-arylaminoimidazo[1,2-*a*]pyridine derivatives, the newly developed methodology will be useful for the synthesis of variety of 3-arylaminoimidazo[1,2-*a*]pyridines under metal-free and mild reaction conditions.

# EXPERIMENTAL SECTION

## 1. General information

Melting points were determined in open capillary tubes on EZ-Melt automated melting point apparatus and are uncorrected. All the compounds were fully characterized by 1 H, 13C, and IR and further confirmed by ESI-HRMS analysis. Reactions were monitored by using thin-layer chromatography (TLC) on 0.2 mm silica gel F254 plates (Merck). $^{1}$H and $^{13}$C NMR spectra were recorded on 400 MHz and 100 MHz instruments, respectively, with $CDCl_3$ as the solvent using TMS as an internal standard. Peak multiplicities of $^{1}$H-NMR signals were designated as s (singlet), d (doublet), dd (doublet of doublet), dt (doublet of triplet), td (triplet of doublet), t (triplet), q (quartet), m (multiplet), etc. Chemical shifts ($\delta$) and coupling constants ($J$) are reported in parts per million (ppm) relative to the residual signal of TMS in deuterated solvents and hertz, respectively. ESI-HRMS were recorded using Q-TOF LC/MS. IR spectra were recorded using an FT-IR spectrophotometer, and values are reported in $cm^{-1}$. Column chromatography was performed over silica gel (60-120 mesh) using EtOAc–*n*-hexane as an eluent. All the chemicals were obtained from the commercial suppliers and used without further purification. The Mannich bases of imidazo[1,2-*a*]pyridines (**3** and **7**) were prepared either by the reaction of 2-arylimidazo[1,2-*a*]pyridines (5.33 mmol) and 2-aminopyridines in TBHP[10a] or by reductive amination of 2-aryllimidazo[1,2-*a*]pyridine-3-carbaldehyde (5.33 mmol) with arylamines.[16]

## 2. Experimental Procedure

### 2.1 Experimental procedure for the preparation of *N*-acetoxymethyl or *N*-hydroxymethyl products (4 and 8).

To a solution of **3** or **7** (0.5 mmol; 1 equiv.) in toluene (5 mL) was added $PhI(OAc)_2$ (1.5 equiv.) at room temperature and the reaction mixture was stirred at 50 °C for 3 h. After completion of the reaction, observed by TLC, the mixture was allowed to attain room temperature. The reaction mixture was poured into water (20 mL) and extracted with ethyl acetate (3 × 15 mL). The combined organic layer was dried over anhydrous $Na_2SO_4$ and evaporated under vacuum. The resulting crude solid was purified by column chromatography (silica gel 60-120 mesh) using EtOAc-*n*-hexane as an eluent to afford **4** or **8**.

**2.2 Experimental procedure for the preparation of *N*-alkoxymethyl products (6 and 9).**

To a solution of **3** or **7** (0.5 mmol; 1 equiv.) in alcohol (5 mL) was added $PhI(OAc)_2$ (1.5 equiv.) at room temperature and the reaction mixture was stirred at 50 °C for 3 h. After completion of the reaction, alcohol was evaporated under vacuum. The resulting crude solid was purified by column chromatography (silica gel 60-120 mesh) using EtOAc-*n*-hexane as an eluent to afford **6** or **9**.

**2.3 Experimental procedure for the preparation of 3-(pyridin-2-yl)aminoimidazo[1,2-a]pyridines (10).**

To a solution of **4** (0.14 mmol; 1 equiv.) in MeOH (5 mL) was added $NaHCO_3$ (9 equiv.) and the reaction mixture was stirred for 2 h at room temperature. After completion of the reaction, methanol was evaporated under vacuum. The obtained reaction mixture was extracted with water (20 mL) and EtOAc (3 × 10 mL). The combined organic layer was dried over anhydrous $Na_2SO_4$ and evaporated under vacuum. The resulting crude solid was washed with diethyl ether to get the pure off-white solid **10.**

**3. Characterization data of new substrates and final products.**

*N-((2-(4-Fluorophenyl)imidazo[1,2-a]pyridin-3-yl)methyl)pyridin-2-amine (**3d**):* White solid; 1.1 g, 65% yield; The eluent used was ethyl acetate/petroleum ether (6:4 *v/v*); mp = 178-180 °C; $^1H$

NMR (400 MHz, $CDCl_3$): $\delta$ = 8.12 (d, $J$ = 4.2 Hz, 1H), 8.06 (d, $J$ = 6.8 Hz, 1H), 7.67 – 7.64 (m, 2H), 7.55 (d, $J$ = 9.0 Hz, 1H), 7.44 – 7.40 (m, 1H), 7.18-7.14 (m, 1H), 7.06 – 7.01 (m, 2H), 6.73 (t, $J$ = 6.5 Hz, 1H), 6.64 (dd, $J$ = 6.5, 5.5 Hz, 1H), 6.51 (d, $J$ = 8.3 Hz, 1H), 5.01 (t, $J$ = 5.0 Hz, 1H), 4.91 (d, $J$ = 4.8 Hz, 2H) ppm; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 162.5 (d, $J_{C\text{-}F}$ = 246 Hz), 158.1, 147.9, 144.9, 143.4, 137.4, 130.0 (d, $J_{C\text{-}F}$ = 3 Hz), 129.9 (d, $J_{C\text{-}F}$ = 8 Hz), 124.9, 124.2, 117.2, 116.7, 115.6 (d, $J_{C\text{-}F}$ = 22 Hz), 113.6, 112.4, 108.4, 35.4 ppm; HRMS (ESI) calcd for $C_{19}H_{16}FN_4^+$ $[M + H]^+$ 319.1354, found 319.1351.

*N-((2-(3-Methoxyphenyl)imidazo[1,2-a]pyridin-3-yl)methyl)pyridin-2-amine* (***3i***)**:** Off-white solid; 1.28 g, 73% yield; The eluent used was ethyl acetate/petroleum ether (65:35, *v/v*); mp = 154-156 °C; $^1H$ NMR (400 MHz, $CDCl_3$): δ 8.19 – 8.17 (m, 2H), 7.64 (d, $J$ = 8.8 Hz, 1H), 7.46 – 7.42 (m, 1H), 7.38 (s, 1H), 7.34 – 7.33 (m, 1H), 7.21 (t, $J$ = 7.6 Hz, 1H), 6.94 – 6.90 (m, 1H), 6.80 (t, $J$ = 6.8 Hz, 1H), 6.68 – 6.65 (m, 1H), 6.49 (d, $J$ = 8.4 Hz, 1H), 5.03 (d, $J$ = 4.4 Hz, 2H), 4.83 (s, 1H), 3.83 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) 159.9, 158.1, 148.0, 145.0, 144.4, 137.4, 135.4, 129.6, 124.8, 124.4, 120.8, 117.4, 117.2, 114.2, 113.6, 113.4, 112.4, 108.3, 55.3, 35.6; HRMS (ESI) calcd for $C_{20}H_{19}N_4O^+$ $[M + H]^+$ 331.1553, found 331.1548.

*N-((6-Chloro-2-phenylimidazo[1,2-a]pyridin-3-yl)methyl)pyridin-2-amine (**3m**)*: White solid; 1.05 g, 59% yield; The eluent used was ethyl acetate/petroleum ether (6:4 *v/v*); mp = 160-162 °C (lit.,[17] 172.2−173.4 °C); $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ = 8.23 (d, $J$ = 1.3 Hz, 1H), 8.11 (dd, $J$ = 5.1, 1.1 Hz, 1H), 7.67 – 7.65 (m, 2H), 7.46 (dd, $J$ = 9.5, 0.8 Hz, 1H), 7.44 – 7.40 (m, 1H), 7.37-7.30 (m, 3H), 7.08 (dd, $J$ = 9.5, 2.0 Hz, 1H), 6.65 – 6.62 (m, 1H), 6.53 (d, $J$ = 8.3 Hz, 1H), 5.21 (t, $J$ = 5.1 Hz, 1H), 4.90 (d, $J$ = 4.9 Hz, 2H) ppm; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 158.1, 147.8, 145.1, 143.2, 137.4, 133.4, 128.6, 128.17, 128.10, 126.1, 122.5, 120.5, 117.9, 117.4, 113.6, 108.5, 35.4 ppm; HRMS (ESI) calcd for $C_{19}H_{16}ClN_4^+$ $[M + H]^+$ 335.1058, found 335.1056.

*((2-Phenylimidazo[1,2-a]pyridin-3-yl)(pyridin-2-yl)amino)methyl acetate (**4a**)*: White solid; 161 mg, 90% yield; The eluent used was ethyl acetate/petroleum ether (1:3 *v/v*); mp = 195-196 °C; FT-IR (neat): 3741, 3093, 1728, 1504, 1350, 1049, 979, 840, 686 $cm^{-1}$; $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ = 8.42 – 8.40 (m, 1H), 7.94 – 7.91 (m, 2H), 7.85 (d, *J* = 6.8 Hz, 1H), 7.70 (d, *J* = 9.0 Hz, 1H), 7.48 – 7.43 (m, 1H), 7.40 – 7.36 (m, 2H), 7.33 – 7.25 (m, 2H), 6.91 (ddd, *J* = 7.3, 5.0, 0.9 Hz, 1H), 6.79 (td, *J* = 6.7, 1.2 Hz, 1H), 6.42 (d, *J* = 10.3 Hz, 1H), 6.27 (d, *J* = 8.4 Hz, 1H), 5.69 (d, *J* = 10.2 Hz, 1H), 1.89 (s, 3H) ppm; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 170.6, 155.5, 148.6, 143.2, 139.7, 138.8, 132.7, 128.6, 128.2, 126.8, 125.6, 122.5, 119.7, 118.0, 116.8, 112.5, 107.9, 74.2, 20.9 ppm; HRMS (ESI) calcd for $C_{21}H_{19}N_4O_2^+$ $[M + H]^+$ 359.1503, found 359.1503.

*(Pyridin-2-yl(2-(p-tolyl)imidazo[1,2-a]pyridin-3-yl)amino)methyl acetate (**4b**)*. White solid; 169 mg, 91% yield; The eluent used was ethyl acetate/petroleum ether (1:3 *v/v*); mp = 195-196 °C; FT-IR (neat): 3723, 3070, 1732, 1590, 1468, 1352, 1228, 923, 769, 691 $cm^{-1}$; $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ = 8.40 – 8.38 (m, 1H), 7.83 – 7.79 (m, 3H), 7.67 (dt, *J* = 9.0, 1.1 Hz, 1H), 7.45 – 7.40 (m, 1H), 7.27 – 7.23 (m, 1H, overlapped with $CDCl_3$ residual signal), 7.17 (d, *J* = 8.0 Hz, 2H), 6.90-6.87 (m, 1H), 6.76 (td, *J* = 6.7, 1.1 Hz, 1H), 6.42 (d, *J* = 10.2 Hz, 1H), 6.23 (d, *J* = 8.4 Hz, 1H), 5.64 (d, *J* = 10.2 Hz, 1H), 2.33 (s, 3H), 1.90 (s, 3H) ppm; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 170.6, 155.5, 148.6, 143.1, 139.7, 138.7, 138.1, 129.8, 129.4, 126.7, 125.4, 122.5, 119.4, 117.9, 116.8, 112.3, 108.0, 74.4, 21.2, 20.9 ppm; HRMS (ESI) calcd for $C_{22}H_{21}N_4O_2^+$ $[M + H]^+$ 373.1659, found 373.1651.

*((2-(4-Methoxyphenyl)imidazo[1,2-a]pyridin-3-yl)(pyridin-2-yl)amino)methyl acetate (**4c**):* White solid; 180 mg, 93% yield; The eluent used was ethyl acetate/petroleum ether (3:7, *v/v*); mp = 167-169 °C; FT-IR (neat): 3726, 3086, 1728, 1589, 1473, 1350, 1234, 933, 779, 694 $cm^{-1}$; $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ = 8.41 – 8.39 (m, 1H), 7.87 – 7.83 (m, 2H), 7.82 (dt, *J* = 6.8, 1.2 Hz,

1H), 7.66 (dt, *J* = 9.0, 1.1 Hz, 1H), 7.45 – 7.41 (m, 1H), 7.27 – 7.22 (m, 1H, overlapped with $CDCl_3$ residual signal), 6.92 – 6.87 (m, 3H), 6.76 (td, *J* = 6.7, 1.1 Hz, 1H), 6.41 (d, *J* = 10.2 Hz, 1H), 6.24 (d, *J* = 8.4 Hz, 1H), 5.67 (d, *J* = 10.2 Hz, 1H), 3.81 (s, 3H), 1.91 (s, 3H) ppm; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 170.7, 159.7, 155.5, 148.6, 143.1, 139.6, 138.8, 128.1, 125.4, 125.3, 122.4, 118.8, 117.8, 116.8, 114.1, 112.3, 108.0, 74.3, 55.2, 21.0 ppm; HRMS (ESI) calcd for $C_{22}H_{21}N_4O_3^+$ $[M + H]^+$ 389.1608, found 389.1598.

*((2-(4-Fluorophenyl)imidazo[1,2-a]pyridin-3-yl)(pyridin-2-yl)amino)methyl acetate (**4d**)*: White solid; 152 mg, 81% yield; The eluent used was ethyl acetate/petroleum ether (1:3, *v/v*); mp = 177-179 °C; FT-IR (neat): 3749, 3113, 1735, 1589, 1392, 1273, 937, 840, 744 $cm^{-1}$; $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ = 8.41 (d, *J* = 4.6 Hz, 1H), 7.92 – 7.89 (m, 2H), 7.84 (d, *J* = 6.8 Hz, 1H), 7.69 (d, *J* = 9.1 Hz, 1H), 7.49 – 7.44 (m, 1H), 7.31 – 7.27 (m, 1H), 7.07 (t, *J* = 8.7 Hz, 2H), 6.92 (dd, *J* = 6.8, 5.2 Hz, 1H), 6.81 (t, *J* = 6.6 Hz, 1H), 6.37 (d, *J* = 10.2 Hz, 1H), 6.26 (d, *J* = 8.4 Hz, 1H), 5.72 (d, *J* = 10.2 Hz, 1H), 1.91 (s, 3H) ppm; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 170.6, 162.7 (d, $J_{C\text{-}F}$ = 246 Hz), 155.4, 148.7, 143.1, 138.9, 138.8, 128.9 (d, $J_{C\text{-}F}$ = 3.0 Hz), 128.7 (d, $J_{C\text{-}F}$ = 8.0 Hz), 125.7, 122.5, 119.4, 118.0, 117.0, 115.6 (d, $J_{C\text{-}F}$ = 22 Hz), 112.6, 107.8, 74.1, 20.9 ppm; HRMS (ESI) calcd for $C_{21}H_{18}FN_4O_2^+$ $[M + H]^+$ 377.1408, found 377.1420.

*((2-(4-Chlorophenyl)imidazo[1,2-a]pyridin-3-yl)(pyridin-2-yl)amino)methyl acetate (**4e**):* White solid; 166 mg, 80% yield; The eluent used was ethyl acetate/petroleum ether (1:3, *v/v*); mp = 164-166 °C; FT-IR (neat): 3745, 3016, 1735, 1589, 1496, 1350, 1273, 987, 760, 709 $cm^{-1}$; $^1H$ NMR (400 MHz, $CDCl_3$): δ 8.44 (d, *J* = 4.0 Hz, 1H), 7.92 – 7.89 (m, 3H), 7.65 (d, *J* = 9.6 Hz, 1H), 7.53 – 7.48 (m, 1H), 7.41 – 7.32 (m, 3H), 7.25 (dd, *J* = 9.6, 2.0 Hz, 1H), 6.96 (dd, *J* = 7.2, 4.8 Hz, 1H), 6.43 (d, *J* = 10.4 Hz, 1H), 6.31 (d, *J* = 8.4 Hz, 1H), 5.67 (d, *J* = 10.4 Hz, 1H), 1.94 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) δ 170.6, 155.2, 148.8, 141.5, 140.8, 139.0, 132.3,

128.8, 128.6, 127.0, 126.9, 121.0, 120.6, 120.3, 118.5, 117.2, 107.9, 74.1, 20.9; HRMS (ESI) calcd for $C_{21}H_{18}ClN_4O_2^+$ $[M + H]^+$ 393.1113, found 393.1115.

*((2-(4-Bromophenyl)imidazo[1,2-a]pyridin-3-yl)(pyridin-2-yl)amino)methyl acetate (**4f**):* White solid; 181 mg, 83% yield; The eluent used was ethyl acetate/petroleum ether (1:4, *v/v*); mp = 174-176 °C; FT-IR (neat): 3741, 2978, 1735, 1589, 1473, 1350, 1141, 933, 779, 609 $cm^{-1}$; $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ = 8.40 – 8.38 (m, 1H), 7.83 – 7.78 (m, 3H), 7.67 (d, $J$ = 9.1 Hz, 1H), 7.50 – 7.42 (m, 3H), 7.30 – 7.27 (m, 1H), 6.91 (dd, $J$ = 6.9, 5.2 Hz, 1H), 6.79 (td, $J$ = 6.8, 0.8 Hz, 1H), 6.34 (d, $J$ = 10.3 Hz, 1H), 6.23 (d, $J$ = 8.4 Hz, 1H), 5.69 (d, $J$ = 10.3 Hz, 1H), 1.90 (s, 3H) ppm; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 170.6, 155.3, 148.7, 143.2, 138.8, 138.6, 131.8, 131.7, 128.4, 125.8, 122.5, 122.4, 119.8, 118.1, 117.0, 112.7, 107.8, 74.1, 20.9 ppm; HRMS (ESI) calcd for $C_{21}H_{18}BrN_4O_2^+$ $[M + H]^+$ 437.0608, found 437.0593.

*((2-(4-Cyanophenyl)imidazo[1,2-a]pyridin-3-yl)(pyridin-2-yl)amino)methyl acetate (**4g**)*: Colorless semi-solid; 147.5 mg, 77% yield; The eluent used was ethyl acetate/petroleum ether (1:3, *v/v*); FT-IR (neat): 3749, 2954, 2242, 1736, 1589, 1485, 1349, 1248, 970, 759, 701 $cm^{-1}$; $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ = 8.40 (d, $J$ = 4.0 Hz, 1H), 8.04 (d, $J$ = 8.4 Hz, 2H), 7.83 (d, $J$ = 6.8 Hz, 1H), 7.68 (d, $J$ = 9.1 Hz, 1H), 7.64 (d, $J$ = 8.3 Hz, 2H), 7.49 – 7.45 (m, 1H), 7.34 – 7.29 (m, 1H), 6.93 (dd, $J$ = 7.3, 5.0 Hz, 1H), 6.83 (t, $J$ = 6.8 Hz, 1H), 6.32 (d, $J$ = 10.4 Hz, 1H), 6.25 (d, $J$ = 8.3 Hz, 1H), 5.72 (d, $J$ = 10.4 Hz, 1H), 1.89 (s, 3H) ppm; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 170.5, 155.0, 148.8, 143.4, 139.0, 137.5, 137.3, 132.5, 132.4, 127.2, 126.4, 122.6, 121.0, 118.8, 118.3, 117.3, 113.1, 111.4, 107.8, 74.0, 20.9 ppm; HRMS (ESI) calcd for $C_{22}H_{18}N_5O_2^+$ $[M + H]^+$ 384.1455, found 384.1443.

*(Pyridin-2-yl(2-(4-(trifluoromethyl)phenyl)imidazo[1,2-a]pyridin-3-yl)amino)methyl acetate (**4h**):* White solid; 147 mg, 69% yield; The eluent used was ethyl acetate/petroleum ether (1:3, *v/v*); mp = 144-146 °C; FT-IR (neat): 3749, 3047, 1732, 1573, 1435, 1276, 948, 767, 701 $cm^{-1}$;

$^1$H NMR (400 MHz, $CDCl_3$): $\delta$ = 8.40 (d, $J$ = 5.0 Hz, 1H), 8.03 (d, $J$ = 8.1 Hz, 2H), 7.84 (d, $J$ = 6.9 Hz, 1H), 7.70 (d, $J$ = 9.1 Hz, 1H), 7.62 (d, $J$ = 8.1 Hz, 2H), 7.47 (t, $J$ = 8.0 Hz, 1H), 7.30 (t, $J$ = 7.8 Hz, 1H), 6.92 (t, $J$ = 6.0 Hz, 1H), 6.82 (t, $J$ = 6.8 Hz, 1H), 6.33 (d, $J$ = 10.4 Hz, 1H), 6.26 (d, $J$ = 8.4 Hz, 1H), 5.72 (d, $J$ = 10.3 Hz, 1H), 1.88 (s, 3H) ppm; $^{13}$C{$^1$H} NMR (100 MHz, $CDCl_3$) $\delta$ = 170.6, 155.2, 148.8, 143.3, 138.9, 138.2, 136.3, 129.9 (q, $J_{C\text{-}F}$ = 32 Hz), 127.0, 126.1, 125.6 (q, $J_{C\text{-}F}$ = 3.0 Hz), 124.1 (q, $J_{C\text{-}F}$ = 270 Hz), 122.6, 120.6, 118.3, 117.1, 112.9, 107.8, 74.0, 20.9 ppm; HRMS (ESI) calcd for $C_{22}H_{18}F_3N_4O_2^+$ $[M + H]^+$ 427.1376, found 427.1359.

*((2-(3-Methoxyphenyl)imidazo[1,2-a]pyridin-3-yl)(pyridin-2-yl)amino)methyl acetate (**4i**)*: White solid; 87 mg, 45% yield; The eluent used was ethyl acetate/petroleum ether (3:7, *v/v*); mp = 97-99 °C; $^1$H NMR (400 MHz, $CDCl_3$): δ 8.42 (d, $J$ = 5.2 Hz, 1H), 7.87 (d, $J$ = 6.8 Hz, 1H), 7.72 (d, $J$ = 9.2 Hz, 1H), 7.52 – 7.46 (m, 3H), 7.32 – 7.27 (m, 2H), 6.94 – 6.87 (m, 2H), 6.82 (t, $J$ = 6.8 Hz, 1H), 6.42 (d, $J$ = 10.0 Hz, 1H), 6.28 (d, $J$ = 8.4 Hz, 1H), 5.72 (d, $J$ = 10.4 Hz, 1H), 3.77 (s, 3H), 1.92 (s, 3H); $^{13}$C{$^1$H} NMR (100 MHz, $CDCl_3$) δ 170.6, 159.8, 155.6, 148.6, 143.1, 139.6, 138.8, 134.0, 129.7, 125.6, 122.5, 119.9, 119.2, 118.1, 116.9, 114.9, 112.6, 111.6, 108.0, 74.2, 55.2, 20.9; HRMS (ESI) calcd for $C_{22}H_{21}N_4O_3^+$ $[M + H]^+$ 389.1608, found 389.1598.

*(Pyridin-2-yl(2-(thiophen-2-yl)imidazo[1,2-a]pyridin-3-yl)amino)methyl acetate (**4j**)*: White solid; 153 mg, 84% yield; The eluent used was ethyl acetate/petroleum ether (3:7, *v/v*); mp = 116-118 °C; FT-IR (neat): 3774, 3016, 1743, 1589, 1473, 1357, 1273, 933, 732 cm$^{-1}$; $^1$H NMR (400 MHz, $CDCl_3$): δ 8.41 (m, 1H), 7.88 (dt, $J$ = 6.8, 1.2 Hz, 1H), 7.69 (dt, $J$ = 9.1, 1.1 Hz, 1H), 7.48 (dd, $J$ = 3.6, 1.1 Hz, 1H), 7.43 (ddd, $J$ = 9.2, 7.2, 1.9 Hz, 1H), 7.32 – 7.26 (m, 2H), 7.05 (dd, $J$ = 5.1, 3.7 Hz, 1H), 6.90 (ddd, $J$ = 7.6, 5.2, 1.2 Hz, 1H), 6.81 (td, $J$ = 6.8, 1.1 Hz, 1H), 6.55 (d, $J$ = 10.3 Hz, 1H), 6.22 (d, $J$ = 8.4 Hz, 1H), 5.69 (d, $J$ = 10.3 Hz, 1H), 2.99 (s, unassigned impurity), 1.99 (s, 3H); $^{13}$C{$^1$H} NMR (100 MHz, $CDCl_3$) δ 170.6, 155.2, 148.5, 143.3, 138.7, 136.0, 135.4, 127.8, 126.1, 125.8, 124.9, 122.6, 118.6, 117.8, 117.0, 112.6, 108.0, 74.2, 42.7

(unassigned impurity), 21.1. ppm; HRMS (ESI) calcd for $C_{19}H_{17}N_4O_2S^+$ $[M + H]^+$ 365.1067, found 365.1058.

*((6-Methyl-2-phenylimidazo[1,2-a]pyridin-3-yl)(pyridin-2-yl)amino)methyl acetate (**4k**):* White solid; 164 mg, 88% yield; The eluent used was ethyl acetate/petroleum ether (1:3, *v/v*); mp = 169-171 °C; FT-IR (neat): 3734, 3047, 1735, 1589, 1473, 1342, 1219, 933, 786, 725 $cm^{-1}$; $^1H$ NMR (400 MHz, $CDCl_3$): δ 8.43 (dd, *J* = 5.0, 1.0 Hz, 1H), 7.92 – 7.90 (m, 2H), 7.63 – 7.59 (m, 2H), 7.46 (m, 1H), 7.40 – 7.34 (m, 2H), 7.35 – 7.26 (m, 1H), 7.14 (dd, *J* = 9.1, 1.8 Hz, 1H), 6.98 – 6.88 (m, 1H), 6.36 (d, *J* = 10.2 Hz, 1H), 6.27 (d, *J* = 8.4 Hz, 1H), 5.78 (d, *J* = 10.2 Hz, 1H), 2.29 (s, 3H), 1.89 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) δ 170.6, 155.6, 148.6, 142.3, 139.6, 138.8, 132.9, 128.8, 128.6, 128.1, 126.8, 122.4, 120.1, 117.4, 116.8, 108.0, 74.1, 20.9, 18.3 ppm; HRMS (ESI) calcd for $C_{22}H_{21}N_4O_2^+$ $[M + H]^+$ 373.1659, found 373.1649.

*((7-Methyl-2-phenylimidazo[1,2-a]pyridin-3-yl)(pyridin-2-yl)amino)methyl acetate (**4l**):* White solid; 158 mg, 85% yield; The eluent used was ethyl acetate/petroleum ether (1:3, *v/v*); mp = 163-165 °C; FT-IR (neat): 3741, 3078, 1728, 1589, 1473, 1350, 1211, 933, 779, 694 $cm^{-1}$; $^1H$ NMR (400 MHz, $CDCl_3$): *δ* = 8.41 (dd, *J* = 5.0, 1.8 Hz, 1H), 7.90 (d, *J* = 7.2 Hz, 2H), 7.72 (d, *J* = 6.9 Hz, 1H), 7.46 – 7.42 (m, 2H), 7.36 (t, *J* = 7.2 Hz, 2H), 7.29 (t, *J* = 7.2 Hz, 1H), 6.90 (dd, *J* = 7.3, 5.0 Hz, 1H), 6.62 (dd, *J* = 7.0, 1.6 Hz, 1H), 6.42 (d, *J* = 10.2 Hz, 1H), 6.26 (d, *J* = 8.4 Hz, 1H), 5.67 (d, *J* = 10.2 Hz, 1H), 2.43 (s, 3H), 1.90 (s, 3H) ppm; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) *δ* = 170.7, 155.6, 148.5, 143.6, 139.3, 138.7, 136.6, 132.8, 128.6, 128.1, 126.7, 121.8, 119.2, 116.8, 116.4, 115.1, 108.0, 74.3, 21.4, 21.0 ppm; HRMS (ESI) calcd for $C_{22}H_{21}N_4O_2^+$ $[M + H]^+$ 373.1659, found 373.1645.

*((6-Chloro-2-phenylimidazo[1,2-a]pyridin-3-yl)(pyridin-2-yl)amino)methyl acetate (**4m**):* White solid; 161 mg, 82% yield; The eluent used was ethyl acetate/petroleum ether (1:3, *v/v*); mp = 170-172 °C; FT-IR (neat): 3742, 3011, 1733, 1470, 1352, 1210, 943, 730, 689 $cm^{-1}$; $^1H$ NMR

(400 MHz, $CDCl_3$): $\delta$ = 8.41 (d, $J$ = 4.0 Hz, 1H), 7.89 – 7.86 (m, 3H), 7.62 (d, $J$ = 9.5 Hz, 1H), 7.48 (t, $J$ = 8.2 Hz, 1H), 7.38 – 7.29 (m, 3H), 7.23 (dd, $J$ = 9.5, 2.0 Hz, 1H), 6.93 (t, $J$ = 6.1 Hz, 1H), 6.40 (d, $J$ = 10.4 Hz, 1H), 6.27 (d, $J$ = 8.4 Hz, 1H), 5.64 (d, $J$ = 10.3 Hz, 1H), 1.91 (s, 3H) ppm; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 170.6, 155.1, 148.7, 141.5, 140.7, 138.9, 132.3, 128.7, 128.5, 127.0, 126.8, 121.0, 120.5, 120.2, 118.4, 117.2, 107.8, 74.1, 20.9 ppm; HRMS (ESI) calcd for $C_{21}H_{18}ClN_4O_2^+$ $[M + H]^+$ 393.1113, found 393.1110.

*((4-Methylpyridin-2-yl)(2-phenylimidazo[1,2-a]pyridin-3-yl)amino)methyl acetate (**4n**):* White solid; 165.5 mg, 89% yield; The eluent used was ethyl acetate/petroleum ether (1:3, *v/v*); mp = 156-158 °C; FT-IR (neat): 3896, 2985, 1743, 1481, 1357, 1234, 918, 694 $cm^{-1}$; $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ = 8.25 (d, $J$ = 5.1 Hz, 1H), 7.92 – 7.90 (m, 2H), 7.82 (dt, $J$ = 6.8, 1.2 Hz, 1H), 7.69 (d, $J$ = 9.0 Hz, 1H), 7.38 – 7.34 (m, 2H), 7.31 – 7.24 (m, 2H, overlapped with $CDCl_3$ residual signal), 6.77 (td, $J$ = 6.8, 0.8 Hz, 1H), 6.72 (d, $J$ = 5.0 Hz, 1H), 6.37 (d, $J$ = 10.2 Hz, 1H), 6.06 (s, 1H), 5.66 (d, $J$ = 10.3 Hz, 1H), 2.10 (s, 3H), 1.86 (s, 3H) ppm; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 170.6, 155.7, 150.2, 148.2, 143.2, 139.6, 132.7, 128.6, 128.2, 126.8, 125.6, 122.6, 119.9, 118.4, 118.0, 112.5, 108.1, 74.4, 21.2, 20.9 ppm; HRMS (ESI) calcd for $C_{22}H_{21}N_4O_2^+$ $[M + H]^+$ 373.1659, found 373.1670.

*((5-Chloropyridin-2-yl)(2-phenylimidazo[1,2-a]pyridin-3-yl)amino)methyl acetate (**4o**):* White solid; 170.5 mg, 87% yield; The eluent used was ethyl acetate/petroleum ether (1:3, *v/v*); mp = 156-158 °C; FT-IR (neat): 3734, 3001, 1735, 1473, 1357, 1211, 933, 732, 686 $cm^{-1}$; $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ = 8.32 (d, $J$ = 2.5 Hz, 1H), 7.87 (d, $J$ = 7.8 Hz, 2H), 7.81 (d, $J$ = 6.8 Hz, 1H), 7.69 (d, $J$ = 9.1 Hz, 1H), 7.41 – 7.27 (m, 5H), 6.80 (t, $J$ = 6.8 Hz, 1H), 6.33 (d, $J$ = 10.3 Hz, 1H), 6.21 (d, $J$ = 8.8 Hz, 1H), 5.63 (d, $J$ = 10.3 Hz, 1H), 1.88 (s, 3H) ppm; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 170.5, 153.9, 147.1, 143.2, 139.7, 138.5, 132.5, 128.7, 128.4, 126.8, 125.8,

124.4, 122.4, 119.3, 118.1, 112.7, 108.9, 74.3, 20.9 ppm; HRMS (ESI) calcd for $C_{21}H_{18}ClN_4O_2^+$ $[M + H]^+$ 393.1113, found 393.1100.

*((2-(tert-Butyl)imidazo[1,2-a]pyridin-3-yl)(pyridin-2-yl)amino)methyl acetate* **(*4p*)**: White solid; 71 mg, 42% yield; The eluent used was ethyl acetate/petroleum ether (4:6, *v/v*); mp = 126-128 °C; $^1$H NMR (400 MHz, $CDCl_3$): δ 8.36 (d, *J* = 4.0 Hz, 1H), 7.86 (d, *J* = 6.8 Hz, 1H), 7.64 (d, *J* = 9.2 Hz, 1H), 7.45 – 7.40 (m, 1H), 7.22 (t, *J* = 8.0 Hz, 1H), 6.86 (dd, *J* = 7.2, 5.0 Hz, 1H), 6.73 (t, *J* = 6.8 Hz, 1H), 6.63 (d, *J* = 10.0 Hz, 1H), 6.04 (d, *J* = 8.4 Hz, 1H), 5.52 (d, *J* = 10.4 Hz, 1H), 2.06 (s, 3H), 1.41 (s, 9H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) δ 170.7, 155.9, 150.0, 148.3, 142.3, 138.3, 125.0, 122.6, 119.0, 117.6, 116.4, 111.8, 108.1, 76.0, 33.3, 30.0, 21.2; HRMS (ESI) calcd for $C_{19}H_{23}N_4O_2^+$ $[M + H]^+$ 339.1816, found 339.1425.

*N-(Methoxymethyl)-2-phenyl-N-(pyridin-2-yl)imidazo[1,2-a]pyridin-3-amine (**6aa**):* White solid; 148.5 mg, 90% yield; The eluent used was ethyl acetate/petroleum ether (35:65, *v/v*); mp = 116-117 °C; FT-IR (neat): 3074, 2916, 1631, 1589, 1473, 1346, 1242, 1141, 941, 771, 694 $cm^{-1}$; $^1$H NMR (400 MHz, $CDCl_3$): *δ* = 8.39 (d, *J* = 3.2 Hz, 1H), 7.97 – 7.94 (m, 3H), 7.68 (d, *J* = 9.1 Hz, 1H), 7.44 – 7.37 (m, 3H), 7.33 – 7.25 (m, 2H), 6.85 (dd, *J* = 6.7, 5.3 Hz, 1H), 6.78 (t, *J* = 6.6 Hz, 1H), 6.22 (d, *J* = 8.4 Hz, 1H), 5.94 (d, *J* = 9.5 Hz, 1H), 4.72 (d, *J* = 9.5 Hz, 1H), 3.36 (s, 3H) ppm; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) *δ* = 156.2, 148.6, 143.1, 138.7, 138.5, 133.0, 128.7, 128.1, 126.6, 125.4, 123.2, 121.1, 117.7, 116.1, 112.3, 107.8, 82.0, 56.6 ppm; HRMS (ESI) calcd for $C_{20}H_{19}N_4O^+$ $[M + H]^+$ 331.1553, found 331.1554.

*N-(Ethoxymethyl)-2-phenyl-N-(pyridin-2-yl)imidazo[1,2-a]pyridin-3-amine (**6ab**):* White solid; 136 mg, 79% yield; The eluent used was ethyl acetate/petroleum ether (32:68, *v/v*); mp = 120-122 °C; FT-IR (neat): 3062, 2978, 1967, 1635, 1589, 1427, 1350, 1234, 1141, 918, 732, 686 $cm^{-1}$; $^1$H NMR (400 MHz, $CDCl_3$): *δ* = 8.36 – 8.34 (m, 1H), 7.94 – 7.91 (m, 3H), 7.66 (d, *J* = 9.1 Hz, 1H), 7.41 – 7.34 (m, 3H), 7.31 – 7.22 (m, 2H, overlapped with $CDCl_3$ residual signal), 6.82 (dd,

$J$ = 6.6, 5.1 Hz, 1H), 6.75 (td, $J$ = 6.7, 1.2 Hz, 1H), 6.20 (d, $J$ = 8.6 Hz, 1H), 5.98 (d, $J$ = 10.0 Hz, 1H), 4.78 (d, $J$ = 9.9 Hz, 1H), 3.63 – 3.55 (m, 1H), 3.55 – 3.45 (m, 1H), 1.08 (t, $J$ = 7.0 Hz, 3H) ppm; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 156.4, 148.5, 143.1, 138.7, 138.5, 133.0, 128.6, 128.0, 126.7, 125.4, 123.3, 121.1, 117.7, 116.0, 112.1, 107.7, 80.0, 64.8, 15.2 ppm; HRMS (ESI) calcd for $C_{21}H_{21}N_4O^+$ $[M + H]^+$ 345.1710, found 345.1715.

*2-Phenyl-N-(pyridin-2-yl)-N-((2,2,2-trifluoroethoxy)methyl)imidazo[1,2-a]pyridin-3-amine (**6ac**):* Colorless viscous oil; 132 mg, 78% yield; The eluent used was ethyl acetate/petroleum ether (35:65, *v/v*); FT-IR (neat): 3060, 2952, 1633, 1590, 1470, 1229, 1113, 923, 789 $cm^{-1}$; $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ = 8.29 – 8.27 (m, 1H), 7.81 (d, $J$ = 7.0 Hz, 3H), 7.59 (d, $J$ = 9.1 Hz, 1H), 7.35 – 7.26 (m, 3H), 7.23 – 7.15 (m, 2H), 6.78 (dd, $J$ = 7.0, 5.2 Hz, 1H), 6.69 (t, $J$ = 6.8 Hz, 1H), 6.11 (d, $J$ = 8.4 Hz, 1H), 5.97 (d, $J$ = 10.1 Hz, 1H), 4.94 (d, $J$ = 10.1 Hz, 1H), 4.05 (q, $J$ = 8.8 Hz, 2H) ppm; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 155.8, 148.4, 143.2, 139.1, 138.8, 132.8, 128.7, 128.2, 126.7, 125.7, 123.9 (q, $J_{C\text{-}F}$ = 278 Hz), 122.9, 120.3, 117.8, 116.7, 112.5, 107.9, 81.7, 67.4 (q, $J_{C\text{-}F}$ = 34 Hz) ppm; HRMS (ESI) calcd for $C_{21}H_{18}F_3N_4O^+$ $[M + H]^+$ 339.1427, found 339.1425.

*N-(((1,1,1,3,3,3-Hexafluoropropan-2-yl)oxy)methyl)-2-phenyl-N-(pyridin-2-yl)imidazo[1,2-a]pyridin-3-amine (**6ad**):* White solid; 196 mg, 84% yield; The eluent used was ethyl acetate/petroleum ether (35:65, *v/v*); mp = 151-153 °C; FT-IR (neat): 3062, 2954, 1635, 1593, 1473, 1350, 1226, 1103, 933, 779, 702 $cm^{-1}$; $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ = 8.41 – 8.39 (m, 1H), 7.91 – 7.88 (m, 3H), 7.70 (d, $J$ = 9.1 Hz, 1H), 7.49-7.45 (m, 1H), 7.42 – 7.27 (m, 4H), 6.96-6.92 (m, 1H), 6.80 (td, $J$ = 6.8, 1.2 Hz, 1H), 6.23-6.20 (m, 2H), 5.55 (sept, $J$ = 6.1 Hz, 1H), 5.16 (d, $J$ = 10.8 Hz, 1H) ppm; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 155.1, 148.1, 143.3, 139.1, 139.0, 132.6, 128.8, 128.3, 126.6, 125.9, 122.94, 122.93, 121.8 (q, $J_{C\text{-}F}$ = 282 Hz), 119.8, 117.8,

117.1, 112.7, 108.1, 83.9, 75.8 (p, $J_{C\text{-}F}$ = 32 Hz) ppm; HRMS (ESI) calcd for $C_{22}H_{17}F_6N_4O^+$ $[M + H]^+$ 467.1301, found 467.1294.

*N-((Cyclopentyloxy)methyl)-2-phenyl-N-(pyridin-2-yl)imidazo[1,2-a]pyridin-3-amine* ***(6ae)****:* Colorless semi-solid; 107.5 mg, 56% yield; The eluent used was ethyl acetate/petroleum ether (3:7, *v/v*); FT-IR (neat): 3076, 2910, 1633, 1580, 1471, 1342, 1232, 1121, 939, 770, 697 $cm^{-1}$; $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ = 8.33 (dd, *J* = 5.0, 1.8 Hz, 1H), 7.96 – 7.93 (m, 3H), 7.65 (dt, *J* = 9.0, 1.2 Hz, 1H), 7.41 – 7.34 (m, 3H), 7.30-7.21 (m, 2H, overlapped with $CDCl_3$ residual signal), 6.80 (dd, *J* = 7.2, 5.0 Hz, 1H), 6.73 (td, *J* = 6.8, 0.9 Hz, 1H), 6.20 (d, *J* = 8.4 Hz, 1H), 5.99 (d, *J* = 9.8 Hz, 1H), 4.74 (d, *J* = 9.8 Hz, 1H), 4.07-4.03 (m, 1H), 1.65 – 1.41 (m, 8H) ppm; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 156.4, 148.5, 143.1, 138.7, 138.4, 133.1, 128.6, 128.0, 126.7, 125.4, 123.6, 121.2, 117.6, 115.9, 111.9, 107.7, 79.7, 78.2, 32.6, 32.3, 23.5, 23.4 ppm; HRMS (ESI) calcd for $C_{24}H_{25}N_4O^+$ $[M + H]^+$ 385.2023, found 385.2012.

*2-Phenyl-N-((prop-2-yn-1-yloxy)methyl)-N-(pyridin-2-yl)imidazo[1,2-a]pyridin-3-amine* ***(6ag)****:* White solid; 134.5 mg, 76% yield; The eluent used was ethyl acetate/petroleum ether (1:3, *v/v*); mp = 105-107 °C; FT-IR (neat): 3147, 2939, 1631, 1585, 1473, 1242, 995, 775, 694 $cm^{-1}$; $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ = 8.36 (d, *J* = 4.0 Hz, 1H), 7.96 – 7.91 (m, 3H), 7.70 (d, *J* = 8.9 Hz, 1H), 7.44 – 7.35 (m, 3H), 7.32 – 7.27 (m, 2H), 6.86 – 6.83 (m, 1H), 6.78 (t, *J* = 6.6 Hz, 1H), 6.24 (d, *J* = 8.4 Hz, 1H), 6.05 (d, *J* = 10.0 Hz, 1H), 4.89 (d, *J* = 10.0 Hz, 1H), 4.33 – 4.23 (m, 2H), 2.30 (t, *J* = 2.4 Hz, 1H), ppm; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 156.0, 148.5, 142.9, 138.6, 128.7, 128.2, 126.7, 125.93, 125.90, 123.4, 120.8, 117.5, 116.4, 112.5, 107.8, 79.8, 79.3, 74.4, 56.5 ppm; HRMS (ESI) calcd for $C_{22}H_{19}N_4O^+$ $[M + H]^+$ 355.1553, found 355.1556.

*N-((Allyloxy)methyl)-2-phenyl-N-(pyridin-2-yl)imidazo[1,2-a]pyridin-3-amine* ***(6ah)****:* White solid; 94 mg, 53% yield; The eluent used was ethyl acetate/petroleum ether (1:3, *v/v*); mp = 65-67 °C; FT-IR (neat): 3140, 2930, 1639, 1581, 1463, 1232, 991, 773, 697 $cm^{-1}$; $^1H$ NMR (400

MHz, $CDCl_3$): $\delta$ = 8.38 (s, 1H), 7.95 (d, *J* = 3.4 Hz, 3H), 7.69 (d, *J* = 9.1 Hz, 1H), 7.44 – 7.25 (m, 4H, overlapped with $CDCl_3$ residual signal), 6.86 – 6.75 (m, 2H), 6.23 (d, *J* = 8.5 Hz, 1H), 6.02 (d, *J* = 9.9 Hz, 1H), 5.85 – 5.76 (m, 1H), 5.17 – 5.07 (m, 2H), 4.83 (d, *J* = 9.9 Hz, 1H), 4.09 (s, 2H), ppm; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 156.3, 148.5, 143.1, 138.8, 138.5, 134.3, 133.0, 128.7, 128.0, 126.7, 125.4, 123.3, 121.0, 117.7, 116.8, 116.1, 112.2, 107.8, 79.7, 70.0 ppm; HRMS (ESI) calcd for $C_{22}H_{21}N_4O^+$ $[M + H]^+$ 357.1710, found 357.1725.

*N-((Dodecyloxy)methyl)-2-phenyl-N-(pyridin-2-yl)imidazo[1,2-a]pyridin-3-amine (**6ai**):* Yellow oil; 85 mg, 35% yield; The eluent used was ethyl acetate/petroleum ether (2:4, *v/v*); FT-IR (neat): 3240, 1597, 1481, 1350, 1249, 979, 756, 702 $cm^{-1}$; $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ = 8.35 – 8.33 (m, 1H), 7.94 – 7.91 (m, 3H), 7.66 (dt, *J* = 9.0, 1.2 Hz, 1H), 7.42 – 7.34 (m, 3H), 7.31 – 7.22 (m, 2H, overlapped with $CDCl_3$ residual signal), 6.83 – 6.80 (m, 1H), 6.74 (td, *J* = 6.7, 1.1 Hz, 1H), 6.22 (d, *J* = 8.6 Hz, 1H), 5.95 (d, *J* = 9.8 Hz, 1H), 4.77 (d, *J* = 9.8 Hz, 1H), 3.54-3.48 (m, 1H), 3.42-3.47 (m, 1H), 1.61 – 1.52 (m, 2H), 1.44 (t, *J* = 6.5 Hz, 2H), 1.25 (br s, 16H), 0.88-0.85 (m, 3H) ppm; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 156.4, 148.5, 143.1, 138.7, 138.4, 133.0, 128.6, 128.0, 126.7, 125.4, 123.4, 121.2, 117.6, 116.0, 112.1, 107.7, 80.3, 69.4, 31.9, 29.7, 29.66, 29.63, 29.61, 29.5, 29.4, 29.38, 29.35, 26.0, 22.6, 14.1 ppm; HRMS (ESI) calcd for $C_{31}H_{41}N_4O^+$ $[M + H]^+$ 485.3275, found 485.3243.

*N-(Methoxymethyl)-N-(pyridin-2-yl)-2-(p-tolyl)imidazo[1,2-a]pyridin-3-amine (**6ba**):* White solid; 158 mg, 92% yield; The eluent used was ethyl acetate/petroleum ether (35:65, *v/v*); mp = 126-128 °C; FT-IR (neat): 3078, 2924, 1586, 1473, 1350, 1273, 941, 779 $cm^{-1}$; $^1H$ NMR (400 MHz, $CDCl_3$): δ = 8.36 – 8.34 (m, 1H), 7.92 (dt, *J* = 6.8, 1.2 Hz, 1H), 7.82 (d, *J* = 8.2 Hz, 2H), 7.66 (d, *J* = 9.0, 1H), 7.39 (m, 1H), 7.26 – 7.22 (m, 1H, overlapped with $CDCl_3$ residual signal), 7.17 (d, *J* = 8.0 Hz, 2H), 6.83 – 6.80 (m, 1H), 6.75 (td, *J* = 6.8, 1.2 Hz, 1H), 6.19 (d, *J* = 8.4 Hz, 1H), 5.91 (d, *J* = 9.6 Hz, 1H), 4.69 (d, *J* = 9.6 Hz, 1H), 3.34 (s, 3H), 2.33 (s, 3H) ppm; $^{13}C\{^1H\}$

NMR (100 MHz, $CDCl_3$): δ = 156.2, 148.5, 142.9, 138.6, 138.5, 138.0, 130.0, 129.4, 126.5, 125.5, 123.2, 120.8, 117.5, 116.1, 112.3, 107.8, 81.9, 56.6, 21.3 ppm; HRMS (ESI) calcd for $C_{21}H_{21}N_4O^+$ $[M + H]^+$ 345.1710, found 345.1711.

*N-(Ethoxymethyl)-N-(pyridin-2-yl)-2-(p-tolyl)imidazo[1,2-a]pyridin-3-amine (**6bb**):* White solid; 143 mg, 80% yield; The eluent used was ethyl acetate/petroleum ether (35:65, *v/v*); mp = 150-152 °C; FT-IR (neat): 3075, 2933, 1581, 1478, 1352, 1279, 931, 789 $cm^{-1}$; $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ = 8.35 – 8.33 (m, 1H), 7.92 (d, $J$ = 6.8 Hz, 1H), 7.83 (d, $J$ = 8.2 Hz, 2H), 7.68 (d, $J$ = 9.0 Hz, 1H), 7.41 – 7.36 (m, 1H), 7.27-7.22 (m, 1H, overlapped with $CDCl_3$ residual signal), 7.17 (d, $J$ = 7.9 Hz, 2H), 6.82-6.79 (m, 1H), 6.75 (td, $J$ = 6.8, 1.1 Hz, 1H), 6.20 (d, $J$ = 8.6 Hz, 1H), 5.98 (d, $J$ = 9.9 Hz, 1H), 4.76 (d, $J$ = 9.9 Hz, 1H), 3.63 – 3.55 (m, 1H), 3.53 – 3.45 (m, 1H), 2.33 (s, 3H), 1.08 (t, $J$ = 7.1 Hz, 3H) ppm; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 156.3, 148.5, 142.9, 138.5, 138.4, 138.0, 129.9, 129.4, 126.5, 125.5, 123.3, 120.8, 117.5, 116.0, 112.2, 107.7, 80.0, 64.7, 21.3, 15.2 ppm; HRMS (ESI) calcd for $C_{22}H_{23}N_4O^+$ $[M + H]^+$ 359.1866, found 359.1878.

*N-(((1,1,1,3,3,3-Hexafluoropropan-2-yl)oxy)methyl)-N-(pyridin-2-yl)-2-(p-tolyl)imidazo[1,2-a]pyridin-3-amine (**6bd**):* White solid; 194 mg, 81% yield; The eluent used was ethyl acetate/petroleum ether (35:65, *v/v*); mp = 154-156 °C; FT-IR (neat): 3086, 1643, 1589, 1473, 1350, 1219, 941, 732, 686 $cm^{-1}$; $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ = 8.38 – 8.36 (m, 1H), 7.85 (d, $J$ = 6.8 Hz, 1H), 7.76 (d, $J$ = 8.2 Hz, 2H), 7.66 (d, $J$ = 9.0 Hz, 1H), 7.46 – 7.41 (m, 1H), 7.28 – 7.24 (m, 1H, overlapped with $CDCl_3$ residual signal), 7.18 (d, $J$ = 7.8 Hz, 2H), 6.92 – 6.89 (m, 1H), 6.77 (td, $J$ = 6.8, 1.2 Hz, 1H), 6.20-6.17 (m, 2H), 5.52 (sept, $J$ = 6.1 Hz, 1H), 5.12 (d, $J$ = 10.7 Hz, 1H), 2.34 (s, 3H) ppm; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 155.1, 148.0, 143.3, 139.2, 139.0, 138.3, 129.8, 129.5, 126.5, 125.8, 122.87, 122.86, 121.8 (q, $J_{C\text{-}F}$ = 281 Hz), 119.4, 117.7, 117.0, 112.5, 108.2, 83.9, 75.8 (p, $J_{C\text{-}F}$ = 32 Hz), 21.3 ppm; HRMS (ESI) calcd for $C_{23}H_{19}F_6N_4O^+$ $[M + H]^+$ 481.1458, found 481.1438.

*N-(Methoxymethyl)-2-(3-methoxyphenyl)-N-(pyridin-2-yl)imidazo[1,2-a]pyridin-3-amine* ***(6ia)****:* Off-white solid; 88 mg, 49% yield; The eluent used was ethyl acetate/petroleum ether (4:6, *v/v*); mp = 136-138 °C; $^1$H NMR (400 MHz, $CDCl_3$): δ 8.38 (dd, *J* = 4.8, 2.0 Hz, 1H), 7.97 (d, *J* = 6.8 Hz, 1H), 7.69 (d, *J* = 8.8 Hz, 1H), 7.56 – 7.51 (m, 2H), 7.45 – 7.41 (m, 1H), 7.31 – 7.26 (m, 2H, overlapped with $CDCl_3$ residual signal), 6.89 – 6.84 (m, 2H), 6.79 (t, *J* = 6.8 Hz, 1H), 6.23 (d, *J* = 8.4 Hz, 1H), 5.94 (d, *J* = 9.6 Hz, 1H), 4.75 (d, *J* = 9.6 Hz, 1H), 3.78 (s, 3H), 3.38 (s, 3H); $^{13}$C{$^1$H} NMR (100 MHz, $CDCl_3$) δ 159.9, 156.3, 148.6, 143.0, 138.6, 138.5, 134.3, 129.7, 125.5, 123.2, 121.3, 119.1, 117.8, 116.2, 114.7, 112.4, 111.4, 107.8, 82.0, 56.6, 55.2; HRMS (ESI) calcd for $C_{21}H_{21}N_4O_2^+$ $[M + H]^+$ 361.1659, found 361.1648.

*2-(4-Fluorophenyl)-N-(methoxymethyl)-N-(pyridin-2-yl)imidazo[1,2-a]pyridin-3-amine* ***(6da)****:* White solid; 136 mg, 78% yield; The eluent used was ethyl acetate/petroleum ether (35:65, *v/v*); mp = 168-170 °C; FT-IR (neat): 3086, 1589, 1473, 1396, 1234, 933, 779, 694 cm$^{-1}$; $^1$H NMR (400 MHz, $CDCl_3$): *δ* = 8.34 (d, *J* = 4.0 Hz, 1H), 7.92 – 7.88 (m, 3H), 7.64 (d, *J* = 9.0 Hz, 1H), 7.39 (t, *J* = 7.2 Hz, 1H), 7.24 (t, *J* = 8.0 Hz, 1H, overlapped with $CDCl_3$ residual signal), 7.04 (t, *J* = 8.6 Hz, 2H), 6.82 (t, *J* = 5.4 Hz, 1H), 6.75 (t, *J* = 6.7 Hz, 1H), 6.19 (d, *J* = 8.4 Hz, 1H), 5.84 (d, *J* = 9.5 Hz, 1H), 4.73 (d, *J* = 9.5 Hz, 1H), 3.34 (s, 3H) ppm; $^{13}$C{$^1$H} NMR (100 MHz, $CDCl_3$) *δ* = 162.6 (d, $J_{C\text{-}F}$, 246 Hz), 156.1, 148.6, 143.1, 138.5, 138.0, 129.2 (d, $J_{C\text{-}F}$, 3 Hz), 128.5 (d, $J_{C\text{-}F}$, 8 Hz), 125.6, 123.2, 120.8, 117.6, 116.3, 115.6 (d, $J_{C\text{-}F}$, 22 Hz), 112.4, 107.7, 81.8, 56.6 ppm; HRMS (ESI) calcd for $C_{20}H_{18}FN_4O^+$ $[M + H]^+$ 349.1459, found 349.1475.

*6-Chloro-N-(methoxymethyl)-2-phenyl-N-(pyridin-2-yl)imidazo[1,2-a]pyridin-3-amine* ***(6ma)****:* White solid; 135 mg, 74% yield; The eluent used was ethyl acetate/petroleum ether (35:65, *v/v*); mp = 180-182 °C; FT-IR (neat): 3034, 1632, 1470, 1351, 1232, 981, 789, 689 cm$^{-1}$; $^1$H NMR (400 MHz, $CDCl_3$): *δ* = 8.37 – 8.35 (m, 1H), 7.99 (d, *J* = 1.4 Hz, 1H), 7.90 (d, *J* = 7.2 Hz, 2H), 7.60 (d, *J* = 9.5 Hz, 1H), 7.45-7.41 (m, 1H), 7.38 – 7.34 (m, 2H), 7.32 – 7.28 (m, 1H), 7.20 (dd, *J*

= 9.5, 1.9 Hz, 1H), 6.86 (dd, *J* = 6.8, 5.1, 1H), 6.22 (d, *J* = 8.7 Hz, 1H), 5.89 (d, *J* = 9.5 Hz, 1H), 4.67 (d, *J* = 9.5 Hz, 1H), 3.37 (s, 3H), ppm; $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 155.9, 148.7, 141.4, 139.7, 138.7, 132.5, 128.8, 128.4, 126.9, 126.6, 121.6, 121.2, 120.8, 118.1, 116.5, 107.6, 81.8, 56.5 ppm; HRMS (ESI) calcd for $C_{20}H_{18}ClN_4O^+$ $[M + H]^+$ 365.1164, found 365.1173.

*N-(Methoxymethyl)-N-(4-methylpyridin-2-yl)-2-phenylimidazo[1,2-a]pyridin-3-amine* ***(6na)****:* White solid; 153 mg, 89% yield; The eluent used was ethyl acetate/petroleum ether (35:65, *v/v*); mp = 162-164 °C; FT-IR (neat): 3039, 1635, 1473, 1357, 1242, 987, 779, 686 $cm^{-1}$; $^{1}H$ NMR (400 MHz, $CDCl_3$): $\delta$ = 8.20 (d, *J* = 5.1 Hz, 1H), 7.95 – 7.90 (m, 3H), 7.69 (dt, *J* = 9.0, 1.1 Hz, 1H), 7.38 – 7.34 (m, 2H), 7.31 – 7.23 (m, 2H, overlapped with $CDCl_3$ residual signal), 6.76 (td, *J* = 6.8, 1.0 Hz, 1H), 6.66 (d, *J* = 5.1 Hz, 1H), 6.03 (s, 1H), 5.89 (d, *J* = 9.6 Hz, 1H), 4.66 (d, *J* = 9.6 Hz, 1H), 3.31 (s, 3H), 2.09 (s, 3H) ppm; $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 156.4, 149.8, 148.2, 142.9, 138.3, 132.8, 128.7, 128.1, 126.6, 125.7, 123.3, 121.3, 117.7, 117.5, 112.4, 108.0, 82.1, 56.5, 21.2 ppm; HRMS (ESI) calcd for $C_{21}H_{21}N_4O_2^+$ $[M + H]^+$ 345.1710, found 345.1736.

*N-(((1,1,1,3,3,3-Hexafluoropropan-2-yl)oxy)methyl)-N-(4-methylpyridin-2-yl)-2 phenylimidazo[1,2-a]pyridin-3-amine* ***(6nd)****:* White solid; 199 mg, 83% yield; The eluent used was ethyl acetate/petroleum ether (3:7, *v/v*); mp = 163-164 °C; FT-IR (neat): 3047, 1612, 1357, 1226, 945, 736, 682 $cm^{-1}$; $^{1}H$ NMR (400 MHz, $CDCl_3$): $\delta$ = 8.22 (d, *J* = 5.2 Hz, 1H), 7.90 – 7.86 (m, 3H), 7.68 (d, *J* = 9.0 Hz, 1H), 7.40 – 7.36 (m, 2H), 7.33 – 7.26 (m, 2H, overlapped with $CDCl_3$ residual signal), 6.78 (t, *J* = 6.7 Hz, 1H), 6.75 (d, *J* = 5.1 Hz, 1H), 6.18 (d, *J* = 10.8 Hz, 1H), 6.01 (s, 1H), 5.57 (sept, *J* = 6.0 Hz, 1H), 5.10 (d, *J* = 10.8 Hz, 1H), 2.10 (s, 3H) ppm; $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 155.3, 150.5, 147.7, 143.3, 139.0, 132.7, 128.8, 128.3, 126.6, 125.9, 123.03, 123.01, 121.9 (q, $J_{C\text{-}F}$ = 281 Hz), 120.0, 118.6, 117.7, 112.6, 108.3, 84.0, 75.8 (p, $J_{C\text{-}F}$ = 32 Hz), 21.2 ppm; HRMS (ESI) calcd for $C_{23}H_{19}F_6N_4O^+$ $[M + H]^+$ 481.1458, found 481.1475.

*N-(5-Chloropyridin-2-yl)-N-(methoxymethyl)-2-phenylimidazo[1,2-a]pyridin-3-amine* ***(6oa)***: White solid; 158 mg, 87% yield; The eluent used was ethyl acetate/petroleum ether (35:65, *v/v*); mp = 150-152 °C; FT-IR (neat): 3086, 1581, 1496, 1234, 956, 756, 694 $cm^{-1}$; $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ = 8.29 (d, *J* = 2.6 Hz, 1H), 7.90 (t, *J* = 6.5 Hz, 3H), 7.66 (d, *J* = 9.0 Hz, 1H), 7.39 – 7.24 (m, 5H, overlapped with $CDCl_3$ residual signal), 6.78 (t, *J* = 6.8 Hz, 1H), 6.16 (d, *J* = 8.9 Hz, 1H), 5.83 (d, *J* = 9.6 Hz, 1H), 4.70 (d, *J* = 9.6 Hz, 1H), 3.34 (s, 3H) ppm; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 154.7, 147.0, 143.1, 138.7, 138.3, 132.8, 128.7, 128.2, 126.6, 125.6, 123.6, 123.1, 120.7, 117.8, 112.5, 108.7, 82.1, 56.7 ppm; HRMS (ESI) calcd for $C_{20}H_{18}ClN_4O^+$ $[M + H]^+$ 365.1164, found 365.1157.

*N-((2-Phenylimidazo[1,2-a]pyridin-3-yl)methyl)aniline (****7a****):* Off-white solid; 1.11 g, 70% yield; The eluent used was ethyl acetate/petroleum ether (55:45, *v/v*); mp = 180-182 °C (lit.,[18] 191-192 °C); $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ = 8.13 (d, *J* = 6.9 Hz, 1H), 7.82 – 7.79 (m, 2H), 7.70 (d, *J* = 9.1 Hz, 1H), 7.48 – 7.44 (m, 2H), 7.41 – 7. 37 (m, 1H), 7.31 – 7.24 (m, 3H), 6.87 – 6.83 (m, 2H), 6.78 (dd, *J* = 8.7, 1.2 Hz, 2H), 4.72 (s, 2H), 3.88 (br s, 1H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 147.6, 145.2, 144.7, 133.9, 129.4, 128.7, 128.3, 128.0, 124.9, 124.1, 118.4, 117.6, 116.4, 113.1, 112.5, 38.2; HRMS (ESI) calcd for $C_{20}H_{18}N_3^+$ $[M + H]^+$ 300.1495, found 300.1498.

*4-Methyl-N-((2-phenylimidazo[1,2-a]pyridin-3-yl)methyl)aniline (****7b****):* White solid; 1.23 g, 74% yield; The eluent used was ethyl acetate/petroleum ether (6:4, *v/v*); mp = 181-183 °C; $^1H$ NMR (400 MHz, $CDCl_3$): δ 8.17 – 8.15 (m, 1H), 7.83 – 7.80 (m, 3H), 7.72 – 7.69 (m, 1H), 7.49 – 7.45 (m, 3H), 7.41 – 7.37 (m, 1H), 7.29 – 7.25 (m, 1H), 7.10 (d, *J* = 8.3 Hz, 3H), 6.86 (td, *J* = 6.8, 1.2 Hz, 1H), 6.71 (d, *J* = 8.4 Hz, 2H), 4.71 (s, 2H), 3.70 (s, 1H), 2.32 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 145.3, 145.2, 144.7, 134.0, 130.0, 128.8, 128.4, 128.0, 127.8, 124.9, 124.2, 117.6, 116.7, 113.3, 112.5, 38.6, 20.4; HRMS (ESI) calcd for $C_{21}H_{20}N_3^+$ $[M + H]^+$ 314.1652, found 314.1652.

*N-((2-(4-Methoxyphenyl)imidazo[1,2-a]pyridin-3-yl)methyl)-4-methylaniline (**7c**):* White solid; 0.914 g, 50% yield; The eluent used was ethyl acetate/petroleum ether (7:3, *v/v*); mp = 176-178 °C; $^1$H NMR (400 MHz, $CDCl_3$): δ 8.13 (dt, *J* = 6.9, 1.2 Hz, 1H), 7.77 – 7.73 (m, 2H), 7.68 (dt, *J* = 9.0, 1.2 Hz, 1H), 7.25 (ddd, *J* = 9.1, 6.7, 1.3 Hz, 1H), 7.10 (d, *J* = 8.0 Hz, 2H), 7.02 – 6.98 (m, 2H), 6.84 (td, *J* = 6.8, 1.2 Hz, 1H), 6.72 – 6.69 (m, 2H), 4.68 (s, 2H), 3.87 (s, 3H), 2.32 (s, 3H); $^{13}$C{$^1$H} NMR (100 MHz, $CDCl_3$): δ 159.6, 145.4, 145.1, 144.6, 129.9, 129.6, 127.7, 126.6, 124.7, 124.0, 117.4, 116.0, 114.2, 113.3, 112.3, 55.3, 38.7, 20.4; HRMS (ESI) calcd for $C_{22}H_{22}N_3O^+$ $[M + H]^+$ 344.1757, found 344.1732.

*4-Chloro-N-((2-phenylimidazo[1,2-a]pyridin-3-yl)methyl)aniline (**7d**)*: Off-white solid; 0.266 g, 15% yield; The eluent used was ethyl acetate/petroleum ether (6:4, *v/v*); mp = 143-145 °C; $^1$H NMR (400 MHz, $CDCl_3$): δ 8.11 (d, *J* = 6.8 Hz, 1H), 7.78 (d, *J* = 7.2 Hz, 2H), 7.70 (d, *J* = 9.2 Hz, 1H), 7.47 (t, *J* = 7.6 Hz, 2H), 7.42 – 7.38 (m, 1H), 7.30 – 7.26 (m, 1H), 7.22 (d, *J* = 8.4 Hz, 2H), 6.88 (t, *J* = 6.8 Hz, 1H), 6.69 (d, *J* = 8.3 Hz, 2H), 4.69 (s, 2H), 3.87 (s, 1H); $^{13}$C{$^1$H} NMR (100 MHz, $CDCl_3$) δ 146.1, 145.3, 144.9, 133.8, 129.3, 128.8, 128.4, 128.1, 125.0, 123.9, 123.2, 117.7, 116.0, 114.2, 112.6, 38.4; HRMS (ESI) calcd for $C_{20}H_{17}ClN_3^+$ $[M + H]^+$ 334.1106, found 334.1098.

*(Phenyl(2-phenylimidazo[1,2-a]pyridin-3-yl)amino)methanol (**8a**):* White solid; 119 mg, 75% yield; The eluent used was ethyl acetate/petroleum ether (35:65, *v/v*); mp = 135-137 °C; $^1$H NMR (400 MHz, $CDCl_3$): δ 7.86 (d, *J* = 7.4 Hz, 2H), 7.79 (d, *J* = 6.8 Hz, 1H), 7.45 (d, *J* = 9.0 Hz, 1H), 7.26 – 7.22 (m, 5H), 7.10 (dd, *J* = 9.1, 6.6 Hz, 1H), 6.93 (t, *J* = 7.3 Hz, 1H), 6.85 (d, *J* = 8.2 Hz, 2H), 6.62 (t, *J* = 6.7 Hz, 1H), 5.37 (d, *J* = 11.5 Hz, 1H), 5.13 (d, *J* = 11.2 Hz, 1H); $^{13}$C{$^1$H} NMR (100 MHz, $CDCl_3$): δ 144.9, 142.5, 138.4, 132.5, 129.7, 128.6, 128.0, 126.5, 125.4, 123.1, 122.1, 120.6, 117.2, 114.3, 112.3, 76.1; HRMS (ESI) calcd for $C_{20}H_{18}N_3O^+$ $[M + H]^+$ 316.1444, found 316.1431.

*((2-Phenylimidazo[1,2-a]pyridin-3-yl)(p-tolyl)amino)methanol (**8b**):* Off-white solid; 119 mg, 72% yield; The eluent used was ethyl acetate/petroleum ether (35:65, *v/v*); mp = 140-142 °C; $^{1}$H NMR (400 MHz, $CDCl_3$) δ 7.92 (d, *J* = 7.3 Hz, 2H), 7.83 (d, *J* = 6.8 Hz, 1H), 7.53 (d, *J* = 9.1 Hz, 1H), 7.34 – 7.25 (m, 3H), 7.16 – 7.13 (m, 1H), 7.07 (d, *J* = 8.0 Hz, 2H), 6.78 (d, *J* = 8.1 Hz, 2H), 6.67 – 6.63 (m, 1H), 5.34 (br s, 1H), 5.13 (br s, 1H), 2.29 (s, 3H); $^{13}$C{$^{1}$H} NMR (100 MHz, $CDCl_3$): δ 142.5, 138.5, 132.8, 130.3, 129.9, 128.0, 127.1, 126.6, 125.3, 123.1, 122.3, 117.4, 114.3, 113.5, 112.2, 76.5, 20.4; HRMS (ESI) calcd for $C_{21}H_{20}N_3O^+$ $[M + H]^+$ 330.1601, found 330.1599.

*((2-(4-Methoxyphenyl)imidazo[1,2-a]pyridin-3-yl)(p-tolyl)amino)methanol (**8c**):* White solid; 140 mg, 78% yield; The eluent used was ethyl acetate/petroleum ether (4:6, *v/v*); mp = 118-120 °C; $^{1}$H NMR (400 MHz, $CDCl_3$): δ 7.88 – 7.86 (m, 2H), 7.82 (dt, *J* = 6.8, 1.2 Hz, 1H), 7.54 (dt, *J* = 9.0, 1.1 Hz, 1H), 7.16 (ddd, *J* = 9.0, 6.7, 1.3 Hz, 1H), 7.09 – 7.04 (m, 2H), 6.89 – 6.84 (m, 2H), 6.80 – 6.75 (m, 2H), 6.67 (td, *J* = 6.8, 1.1 Hz, 1H), 5.32 (br s, 1H), 5.15 (br s, 1H), 3.81 (s, 3H), 2.29 (s, 3H); $^{13}$C{$^{1}$H} NMR (100 MHz, $CDCl_3$): δ 159.5, 142.6, 142.5, 138.7, 130.3, 129.9, 127.9, 125.5, 125.1, 122.9, 121.4, 117.2, 114.2, 114.1, 112.1, 76.4, 55.2, 20.4; HRMS (ESI) calcd for $C_{22}H_{22}N_3O_2^+$ $[M + H]^+$ 360.1707, found 360.1693.

*((4-Chlorophenyl)(2-phenylimidazo[1,2-a]pyridin-3-yl)amino)methanol (**8d**)*: White solid; 124 mg, 71% yield; The eluent used was ethyl acetate/petroleum ether (45:55, *v/v*); mp = 173-175 °C; $^{1}$H NMR (400 MHz, $CDCl_3$): δ 7.84 – 7.82 (m, 2H), 7.77 (dd, *J* = 6.6, 1.4 Hz, 1H), 7.50 – 7.46 (m, 1H), 7.26 – 7.24 (m, 3H), 7.20 – 7.12 (m, 3H), 6.77 (d, *J* = 8.8 Hz, 2H), 6.67 (t, *J* = 6.8 Hz, 1H), 5.30 (d, *J* = 11.6 Hz, 1H), 5.12 (d, *J* = 11.6 Hz, 1H); $^{13}$C{$^{1}$H} NMR (100 MHz, $CDCl_3$) δ 143.7, 142.6, 138.6, 132.4, 129.6, 128.6, 128.2, 126.5, 125.7, 125.5, 122.8, 121.6, 117.4, 115.6, 112.5, 76.2; HRMS (ESI) calcd for $C_{20}H_{17}ClN_3O^+$ $[M + H]^+$ 350.1055, found 350.1051.

*N-(Methoxymethyl)-N,2-diphenylimidazo[1,2-a]pyridin-3-amine (**9a**):* White solid; 133 mg, 81% yield; The eluent used was ethyl acetate/petroleum ether (35:65, *v/v*); mp = 183-185 °C; $^{1}$H NMR (400 MHz, $CDCl_3$): δ 8.00 – 7.98 (m, 2H), 7.87 (dt, *J* = 6.8, 1.2 Hz, 1H), 7.68 (dt, *J* = 9.1, 1.1 Hz, 1H), 7.41 (m, 2H), 7.36 – 7.30 (m, 2H), 7.32 – 7.20 (m, 2H), 6.98 (m, 1H), 6.88 – 6.84 (m, 2H), 6.75 (td, *J* = 6.8, 1.1 Hz, 1H), 5.26 (d, *J* = 10.2 Hz, 1H), 4.75 (d, *J* = 10.2 Hz, 1H), 3.28 (s, 3H); $^{13}$C{$^{1}$H} NMR (100 MHz, $CDCl_3$): δ 145.2, 142.8, 138.7, 133.2, 129.8, 128.7, 128.0, 126.7, 125.3, 123.4, 122.5, 120.9, 117.7, 114.5, 112.2, 85.6, 55.5; HRMS (ESI) calcd for $C_{21}H_{20}N_3O^+$ $[M + H]^+$ 330.1601, found 330.1597.

*N-(Methoxymethyl)-2-phenyl-N-(p-tolyl)imidazo[1,2-a]pyridin-3-amine (**9b**):* White solid; 132 mg, 77% yield; The eluent used was ethyl acetate/petroleum ether (38:62, *v/v*); mp = 180-182 °C; $^{1}$H NMR (400 MHz, $CDCl_3$): δ 8.00 (d, *J* = 7.1 Hz, 2H), 7.87 (d, *J* = 6.8 Hz, 1H), 7.67 (d, *J* = 9.0 Hz, 1H), 7.41 (t, *J* = 7.5 Hz, 2H), 7.33 (t, *J* = 7.3 Hz, 1H), 7.29 – 7.19 (m, 1H), 7.09 (d, *J* = 8.1 Hz, 2H), 6.77 (d, *J* = 8.1 Hz, 2H), 6.74 – 6.72 (m, 1H), 5.23 (d, *J* = 10.5 Hz, 1H), 4.73 (d, *J* = 10.3 Hz, 1H), 3.27 (s, 3H), 2.31 (s, 3H); $^{13}$C{$^{1}$H} NMR (100 MHz, $CDCl_3$): δ 142.9, 142.7, 138.6, 133.3, 130.3, 130.2, 128.7, 128.0, 126.7, 125.2, 123.4, 122.8, 117.6, 114.6, 112.2, 85.8, 55.4, 20.5; HRMS (ESI) calcd for $C_{22}H_{22}N_3O^+$ $[M + H]^+$ 344.1757, found 344.1755.

*N-(Methoxymethyl)-2-(4-methoxyphenyl)-N-(p-tolyl)imidazo[1,2-a]pyridin-3-amine (**9c**):* Colourless semi-solid; 137 mg, 73% yield; The eluent used was ethyl acetate/petroleum ether (4:6, *v/v*); $^{1}$H NMR (400 MHz, $CDCl_3$): δ 7.93 (d, *J* = 8.4 Hz, 2H), 7.86 (d, *J* = 6.8 Hz, 1H), 7.65 (d, *J* = 9.0 Hz, 1H), 7.24 – 7.20 (m, 1H), 7.08 (d, *J* = 8.1 Hz, 2H), 6.94 (d, *J* = 8.4 Hz, 2H), 6.77 – 6.72 (m, , 3H), 5.21 (d, *J* = 10.3 Hz, 1H), 4.73 (d, *J* = 10.3 Hz, 1H), 3.84 (s, 3H), 3.27 (s, 3H), 2.30 (s, 3H); $^{13}$C{$^{1}$H} NMR (100 MHz, $CDCl_3$): δ 159.5, 143.0, 142.7, 138.6, 130.2, 130.1, 128.0, 125.9, 125.0, 123.3, 121.9, 117.4, 114.5, 114.2, 112.0, 85.7, 55.5, 55.2, 20.5; HRMS (ESI) calcd for $C_{23}H_{24}N_3O_2^+$ $[M + H]^+$ 374.1863, found 374.1857.

*N-(4-Chlorophenyl)-N-(methoxymethyl)-2-phenylimidazo[1,2-a]pyridin-3-amine (**9d**)*: Off-white solid; 101.5 mg, 56% yield; The eluent used was ethyl acetate/petroleum ether (35:65, *v/v*); mp = 161-163 °C; $^1$H NMR (400 MHz, $CDCl_3$): δ 7.97 – 7.94 (m, 2H), 7.86 (d, *J* = 6.4 Hz, 1H), 7.69 (d, *J* = 9.2 Hz, 1H), 7.43 – 7.39 (m, 2H), 7.35 – 7.31 (m, 1H), 7.27 – 7.21 (m, 3H), 6.79 – 6.72 (m, 3H), 5.21 (d, *J* = 10.0 Hz, 1H), 4.73 (d, *J* = 10.0 Hz, 1H), 3.27 (s, 3H); $^{13}$C{$^1$H} NMR (100 MHz, $CDCl_3$) δ 143.9, 142.8, 138.7, 133.0, 129.6, 128.7, 128.2, 126.6, 125.9, 125.4, 123.1, 122.0, 117.7, 115.8, 112.4, 85.6, 55.5; HRMS (ESI) calcd for $C_{21}H_{19}ClN_3O^+$ $[M + H]^+$ 364.1211, found 364.1206.

*2-Phenyl-N-(pyridin-2-yl)imidazo[1,2-a]pyridin-3-amine (**10a**)*: Off-white solid; 38 mg, 95% yield (HPLC purity: >98%.); mp = 224-226 °C (lit.,[19] 225-228 °C); FT-IR (neat): 3672, 3155, 1558, 1473, 1249, 987, 771 cm$^{-1}$; $^1$H NMR (400 MHz, $CDCl_3$): *δ* = 8.13 (d, *J* = 5.1 Hz, 1H), 8.09 – 8.06 (m, 2H), 7.89 (d, *J* = 7.0 Hz, 1H), 7.68 (d, *J* = 9.0 Hz, 1H), 7.59 (br s, 1H), 7.41 – 7.34 (m, 3H), 7.30 – 7.24 (m, 2H), 6.81 (td, *J* = 6.7, 1.1 Hz, 1H), 6.74 (dd, *J* = 7.1, 5.0 Hz, 1H), 6.12 (d, *J* = 8.4 Hz, 1H), ppm; $^{13}$C{$^1$H} NMR (100 MHz, $CDCl_3$) *δ* = 156.9, 148.5, 142.9, 139.3, 138.7, 133.1, 128.6, 127.9, 126.9, 125.1, 122.5, 117.8, 116.6, 115.6, 112.4, 106.5 ppm; HRMS (ESI) calcd for $C_{18}H_{15}N_4^+$ $[M + H]^+$ 287.1291, found 287.1299.

*N-(Pyridin-2-yl)-2-(p-tolyl)imidazo[1,2-a]pyridin-3-amine (**10b**):* White solid; 39 mg, 93% yield (HPLC purity: >95%.); mp = 222-224 °C (lit.,[19] 223-225 °C); FT-IR (neat): 3671, 3152, 1553, 1471, 1240, 989, 773 cm$^{-1}$; $^1$H NMR (400 MHz, $CDCl_3$): *δ* = 8.18 (d, *J* = 4.1 Hz, 1H), 7.97 (d, *J* = 7.4 Hz, 2H), 7.89 (d, *J* = 6.8 Hz, 1H), 7.67 (d, *J* = 9.0 Hz, 1H), 7.42-7.37 (m, 1H), 7.28-7.23 (m, 1H, overlapped with $CDCl_3$ residual signal), 7.18 (d, *J* = 8.2 Hz, 3H), 6.81 (t, *J* = 6.7 Hz, 1H), 6.76 (dd, *J* = 7.2, 5.0 Hz, 1H), 6.12 (d, *J* = 8.4 Hz, 1H), 2.34 (s, 3H) ppm; $^{13}$C{$^1$H} NMR (100 MHz, $CDCl_3$) *δ* = 156.9, 148.6, 142.9, 139.6, 138.6, 137.8, 130.3, 129.3, 126.8, 125.0,

122.5, 117.7, 116.2, 115.6, 112.2, 106.4, 21.2 ppm; HRMS (ESI) calcd for $C_{19}H_{17}N_4^+$ $[M + H]^+$ 301.1448, found 301.1435.

*2-(4-Methoxyphenyl)-N-(pyridin-2-yl)imidazo[1,2-a]pyridin-3-amine (**10c**):* Off-white solid; 41 mg, 92% yield (HPLC purity: >96%.); mp = 203-205 °C (lit.,[19] 218-221 °C); FT-IR (neat): 3674, 3148, 1543, 1461, 1230, 979, 763 $cm^{-1}$; $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ = 8.24 (d, $J$ = 5.0 Hz, 1H), 8.01 (d, $J$ = 8.5 Hz, 2H), 7.89 (d, $J$ = 6.8 Hz, 1H), 7.66 (d, $J$ = 9.0 Hz, 1H), 7.42 (t, $J$ = 7.7 Hz, 1H), 7.28 – 7.24 (m, 1H, overlapped with $CDCl_3$ residual signal), 6.93 (d, $J$ = 8.4 Hz, 2H), 6.83 – 6.78 (m, 2H), 6.69 (s, 1H), 6.14 (d, $J$ = 8.3 Hz, 1H), 3.83 (s, 3H) ppm; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 159.5, 156.8, 148.7, 142.9, 139.6, 138.6, 128.3, 125.8, 125.0, 122.4, 117.6, 115.7, 115.5, 114.0, 112.2, 106.4, 55.2 ppm; HRMS (ESI) calcd for $C_{19}H_{17}N_4O^+$ $[M + H]^+$ 317.1397, found 317.1406.

*N-(4-Methylpyridin-2-yl)-2-phenylimidazo[1,2-a]pyridin-3-amine (**10n**):* Brown solid; 40 mg, 96% yield (HPLC purity: >98%.); mp = 223-225 °C; FT-IR (neat): 3677, 3149, 1558, 1468, 1247, 985, 781 $cm^{-1}$; $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ = 8.08 – 8.04 (m, 3H), 7.88 (dt, $J$ = 6.8, 1.2 Hz, 1H), 7.67 (d, $J$ = 9.0 Hz, 1H), 7.39 – 7.36 (m, 2H), 7.31 – 7.23 (m, 2H, overlapped with $CDCl_3$ residual signal), 6.83 – 6.79 (m, 2H), 6.60 (d, $J$ = 5.1 Hz, 1H), 5.92 (s, 1H), 2.10 (s, 3H) ppm; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) $\delta$ = 156.9, 150.1, 148.3, 143.0, 139.5, 133.2, 128.6, 127.9, 127.0, 125.2, 122.6, 117.8, 117.3, 116.6, 112.4, 106.6, 21.1 ppm; HRMS (ESI) calcd for $C_{19}H_{17}N_4^+$ $[M + H]^+$ 301.1448, found 301.1460.

# ASSOCIATED CONTENT

## Supporting Information

The Supporting Information is available free of charge on the ACS Publications website at DOI:

Copies of $^{1}H$ and $^{13}C\{^{1}H\}$ NMR spectra of all the newly synthesized compounds, X-ray crystallographic data for compounds **4a** (CCDC No. 1957417), **6aa** (CCDC No. 1913162) and **8a** (CCDC No. 1986133).

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**Notes**

The authors declare no competing financial interest.

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