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Synthesis and functionalization of 2-iodoimidazo[1,2-*a*]pyridines in palladium-catalysed amino-, aryloxy- and alkoxycarbonylations

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ABSTRACT

Imidazo[1,2-*a*]pyridines possessing carboxamido and ester functionalities in 2- and 6-positions were synthesised in palladium-catalysed amino- and alkoxy/aryloxycarbonylation using a great variety of amines and alcohols/phenols as *N*- and *O*-nucleophiles, respectively. The corresponding iodoheteroaromatics, used as substrates, were synthesised from the substituted 2-aminopyridines, terminal alkynes and iodine in copper-catalysed oxidative ring-closure—iodination reaction sequence. Mono- and dinuclear copper-2-aminopyridine complexes, used as pre-formed catalysts, were characterised by X-ray crystallography. The amides and esters were obtained in moderate to high yields mainly depending on the nucleophile and not on the structure of the 2-iodo[1,2-*a*]pyridine substrates.

1. Introduction

The importance of amides cannot be overemphasized since the carboxamido-functionalised compounds play crucial roles in various fields. They can be found as widely known simple achiral and chiral building blocks, compounds of biological importance and compounds of pharmacological interest [1]. There are great variety of straightforward high-yielding synthetic methods described in textbooks and treatises [2].

In addition to the conventional methods, for instance the carboxylic acid—acid chloride—carboxamide route, the discovery of the palladium-catalysed aminocarbonylation ('Heck-carbonylation') [3] provided a highly efficient solution for the introduction of carboxamide functionality. The efficiency is due to the formation of the highly active palladium-acyl intermediate, formed *in situ* via oxidative addition of the aryl/alkenyl halide (or its triflate surrogate) onto the palladium(0) species, followed by carbon monoxide insertion. Pd-acyl intermediate behaves as a highly efficient acylating agent. Consequently, even amine nucleophiles of low basicity and large steric hindrance can be acylated, *i.e.*, carboxamides of unprecedented structure can be synthesised. The palladium-catalysed carbonylations, among them aminocarbonylation, have been reviewed several times during the last two decades [4].

Regarding the type of the potential substrates, two families can be distinguished: iodoalkenes/alkenyl triflates can be aminocarbonylated to unsaturated carboxamides, aryl halides/triflates to aryl carboxamides. Both types of substrates have been investigated thoroughly regarding the variation of reaction conditions (temperature, carbon monoxide pressure) and catalyst [5].

Among aryl halides, the heteroaryl derivatives are of utmost importance enabling facile formation of the corresponding carboxamides [6]. Encouraged by the practical importance of imidazopyridine-based carboxamides with anxiolitic, sedative and hypnotic action [7–9] the potential application of this skeleton as substrate for further functionalization was considered. Furthermore, similar compounds are used in healing gastrointestinal problems and osteoporosis [10,11]. Imidazo[1,2-*a*]pyridine derivatives can be found among nonsteroidal antiinflammatory agents [12] and cardiotonics [13] as well (Fig. 1) (see Fig. 2).

In this paper the exploitation of copper-catalysed ring closure reaction and palladium-catalysed aminocarbonylation/alkoxycarbonylation/aryloxycarbonylation was considered for the synthesis of the great variety of imidazo[1,2-*a*]pyridine-based carboxamides and esters.

2. Results and discussion

Our approach toward the synthesis of imidazopyridine carboxamides

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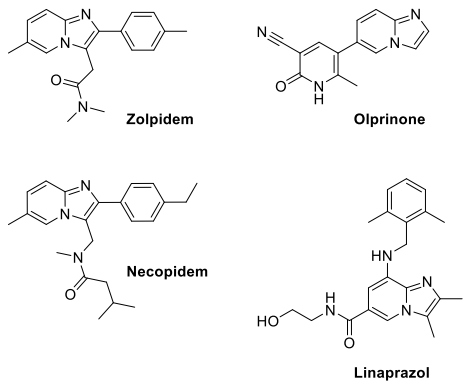


Fig. 1. Imidazo[1,2-*a*]pyridine-based carboxamides of pharmacological importance.

and esters is based on the combination of two metal-catalysed reactions: i) the cyclization of 2-aminopyridine and terminal alkynes in the presence of copper(II) complexes [14,15], ii) the palladium-catalysed carbonylation of the resulting 2-iodoimidazopyridines using *N*- and *O*-nucleophiles.

i) Synthesis of 2-iodoimidazo[1,2-*a*]piridine derivatives in ring-closure reactions

The 2-iodoimidazo[1,2-*a*]piridine derivatives (**10**–**17**) used as substrates in the next steps were synthesised from the corresponding 2-aminopyridine derivative (**1**–**6**), terminal alkyne (**7**–**9**) and iodine in the presence of Cu(aminopyridine)$_2$(OAc)$_2$ or Cu$_2$(aminopyridine)$_2$(OAc)$_4$ catalyst under oxygen atmosphere in acetonitril at reflux. It is worth mentioning that aminopyridines **1**–**6** acted simultaneously as ligands for Cu(II) catalyst and substrates in all ring-closure reaction. (The structure of the catalyst precursors are discussed below.) The target iodoimidazopyridine derivatives, obtained in an oxidative cyclization—iodination reaction sequence, were isolated in up to 67 % yields using a standard work-up procedure of the catalytic mixture.

Copper-complexes used as catalyst precursors were synthesised from all aminopyridines (**1**–**6**). Mono- (**Cu-2, Cu-3**, **Cu-4**, **Cu-5)** or dinuclear (**(Cu-1)$_2$**, **(Cu-6)$_2$**) complexes, containing the same aminopyridine derivative as that used in the corresponding cyclization, were obtained in good yields and characterized including X-ray crystallography. The molecular structures are proven by the single crystal structure determination unambigously. Bond distances and angles are in the expected range. It is interesting to note, that in the octahedral mononuclear complexes **Cu-2** and **Cu-5** the acetato ligands are in *trans* position, while they are *cis* in **Cu-3** and **Cu-4** which is hardly explainable by the steric hindrance given by the methyl groups. In the solid state structure of **Cu-4** there are two molecules in the asymmetric unit with slightly different conformation while for **Cu-2** and **Cu-5** we found half of the molecule in the asymmetric unit. Further details of the structure determination are shown in Table S1. Search of the Cambridge Structural Database (Version 5.45 Update September 2024) revealed, that the solid state structures of these copper-acetato complexes are unique and among the products only **11**, **12** and **14** have already been published [14].

ii) Functionalization of 2-iodoimidazo[1,2-*a*]pyridines in palladium-catalysed aminocarbonylation

The iodoarene functionality of the 2-iodoimidazo[1,2-*a*]pyridines (**10**–**17**) underwent aminocarbonylation under mild conditions (1 bar CO, 70 °C) in the presence of an *in situ* palladium(0) catalyst and the corresponding amine as *N*-nucleophile. A great variety of amines such as simple aliphatic primary and secondary amines (**a**), cycloaliphatic amines (**b**), simple and functionalised phenyl amines (**c**), amino acid esters (**d**), amino substituted pyridines (**e**), functionalised amino-*N*-heterocycles (**f**, **g**), amino-*S*-heterocycles (**h**), cyclic secondary amines (**i**), arylalkyl and heteroarylalkyl amines (**j**, **k**, **l**), picolylamines (**m**), hydroxyl-substituted aliphatic amines (**n**), amines of biological importance (heterocyclic primary (**o**, **p**) and secondary (**q**, **r**) amines), as well as ammonium carbamate (as ammonia surrogate) (**s**) were used (Scheme 2).

A standard procedure (evaporation of DMF, dissolution of the residue in chloroform followed by washing with water and brine, drying on sodium sulphate, evaporation of the solvent and column chromatography) was used for the isolation of the 2-carboxamidoimidazo[1,2-*a*]pyridine derivatives. The isolated yields are high (typically above 85 %) with the exception of some substituted aniline derivatives and nucleophiles containing phenolic hydroxy group(s) (Fig. 3). However, even in the latter cases, no aryloxycarbonylation was observed. The carbonylations were highly chemoselective toward aminocarbonylation also in the presence of aminoalcohols, *i.e.*, the *O,N*-heterodinucleophiles act as *N*-nucleophiles exclusively.

Moving toward amines of biological importance possessing more complicated structures, the high yields are maintained (Fig. 4). That is, the palladium-acyl complexes, formed via carbon monoxide insertion into the palladium-aryl bond, behave as strong acylating agents in all types of *N*-nucleophiles.

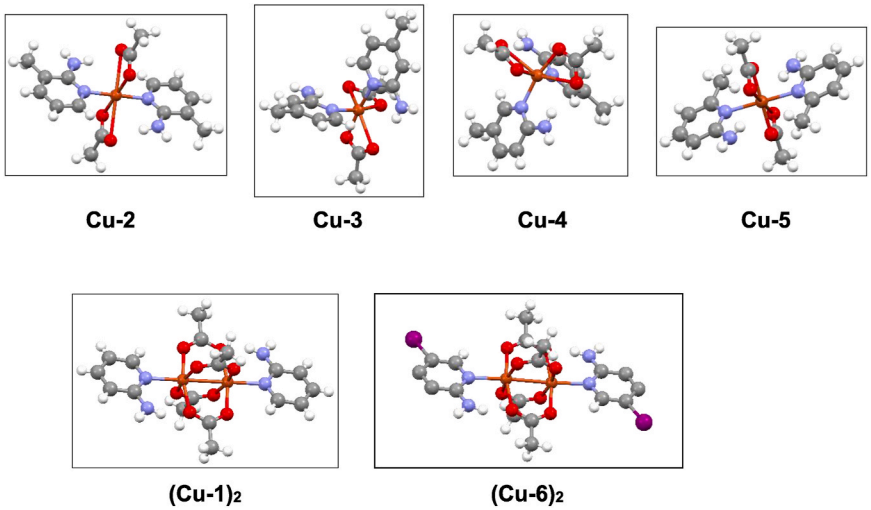
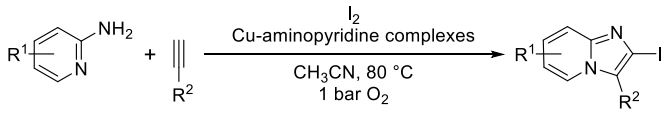


Fig. 2. X-ray structure of mononuclear (upper row) and dinuclear (bottom row) copper-2-aminopyridine complexes used as catalyst precursors.

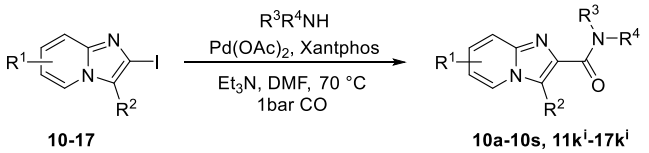


1 R^1 = H
2 R^1 = 3-CH_3
3 R^1 = 4-CH_3
4 R^1 = 5-CH_3
5 R^1 = 6-CH_3
6 R^1 = 5-I

7 R^2 = Ph
8 R^2 = ^{n}Bu
9 R^2 = cyclohexen-1-yl

10 R^1 = H, R^2 = Ph (67%)
11 R^1 = 8-CH_3, R^2 = Ph (62%)
12 R^1 = 7-CH_3, R^2 = Ph (52%)
13 R^1 = 6-CH_3, R^2 = Ph (46%)
14 R^1 = 5-CH_3, R^2 = Ph (32%)
15 R^1 = H, R^2 = ^{n}Bu (20%)
16 R^1 = H, R^2 = cyclohexen-1-yl (32%)
17 R^1 = 6-I, R^2 = Ph (23%)

Scheme 1. Copper-catalysed cyclization toward 2-iodoimidazo[1,2-*a*]pyridines.



10-17 **10a-10s, 11k^i-17k^i**

Scheme 2. Palladium-catalysed aminocarbonylation of 2-iodoimidazo[1,2-*a*] pyridines (**10**–**17**) toward carboxamides (**10a-10s, 11k^i-17k^i**). (R^1 substituents are indicated in Scheme 1.)

The substrate structure—reactivity relation was investigated with benzylamine as *N*-nucleophile. It can be stated that neither the position of the methyl substituents nor the substituent in position-3 have influenced the isolated yields substantially (Fig. 5). The diiodoimidazopyridine substrate (**17**) was successfully aminocarbonylated in both positions resulting in moderate isolated yield.

iii) Functionalization of 2-iodoimidazo[1,2-*a*]pyridines in palladium-catalysed alkoxycarbonylation

The alkoxycarbonylation of 2-iodoimidazo[1,2-*a*]pyridine (**10**) was investigated under mild conditions (1 bar CO, 70 °C) in the presence of an *in situ* palladium(0) catalyst and the corresponding alcohol as *O*-nucleophile (and solvent in the same time). Simple primary and secondary alcohols (methanol (**A^i**), ethanol (**A^{ii}**) and isopropyl alcohol (**A^{iii}**) were used (Scheme 3).

A standard work-up procedure (see above *ii)*) was used for the isolation of the 2-alkoxycarbonylimidazo[1,2-*a*]pyridine derivatives. The isolated yields (47–85 %) were strongly dependent on the alcohol nucleophiles used (Fig. 6). While high isolated yields were obtained with methanol and ethanol the yield dropped substantially by using isopropyl alcohol.

iv) Functionalization of 2-iodoimidazo[1,2-*a*]pyridines in palladium-catalysed aryloxycarbonylation

2-Iodoimidazo[1,2-a]pyridines (**10**–**17**) were investigated in aryloxycarbonylation under mild conditions (1 bar CO, 70 °C) in the presence of an *in situ* palladium(0) catalyst and the corresponding phenol as *O*-nucleophile. Various simple (**B-E**) and functionalised phenols (**F–R**) were used (Scheme 4).

A standard work-up procedure (see above *ii)*) was used for the isolation of the 2-aryloxycarbonylimidazo[1,2-a]pyridine derivatives. A wide range of isolated yields (29–90 %) were found dependending on the phenol nucleophiles used (Fig. 7).

In general, high yields were obtained with phenols of less bulky structures. Moderate yields (below 50 %) were obtained typically with phenols possessing *ortho* substituent(s). Testing the series of *para*-substituted phenols, the trifluoromethyl group, possessing a strong electron-withdrawing property, brought about the lowest yield.

The methyl substituents on the six-membered ring of the substrate have only slight influence on the reactivity. However, the 3-substituent, in an adjacent position to the iodoaryl functionality in position-2, resulted in more pronounced differences providing the highest yield in case of the n-Bu substituent.

3. Experimental

3.1. General methods, instrumentation and materials

^{1}H and ^{13}C NMR spectra were recorded in $CDCl_3$ on a Bruker Avance III 500 spectrometer at 500 and 125.7 MHz, respectively. Chemical shifts δ are reported in ppm relative to $CHCl_3$ (7.26 and 77.00 ppm for ^{1}H and ^{13}C, respectively), or DMSO-d_6 (2.50 and 39.50 ppm for ^{1}H and ^{13}C, respectively). Elemental analyses were measured on a 1108 Carlo Erba apparatus. The FT-IR spectra were taken in KBr pellets using an IMPACT 400 spectrometer (Nicolet) applying a DTGS detector in the region of 400–4000 cm^{-1}, the resolution was 4 cm^{-1}. The amount of the samples was *ca.* 0.5 mg. Mass spectrometry data have been obtained using an Agilent 6530 Accurate-Mass Q-TOF LC/MS mass spectrometer (Agilent Technologies, Singapore) equipped with an electrospray ion source.

Palladium(II) acetate, copper(II) acetate monohydrate, XantPhos (4,5-bis(diphenylphosphino)-9,9-dimethylxanthene) ligand, alkynes (phenylacetylene, 1-hexyne, 1-ethynylcyclohexene), 2-aminopyridines, amine and phenol nucleophiles and triethylamine base were purched from Sigma-Aldrich (St. Louis, MO,USA) and were used without any further purification. The solvents (dimethylformamide, chloroform, ethyl acetate, methanol, acetonitrile) were also purchased from Sigma-Aldrich. The acetonitrile was distilled over calcium hydride under argon atmosphere befor use. The alcohol nucleophiles (methanol, ethanol and propan-2-ol) were distilled over magnesium turnings before use. Precoated silica gel 60F254 plates were used for thin layer chromatography (TLC) and were also purchased from Sigma-Aldrich. Column chromatography was performed with 0.063–0.200 mm mesh silica gels.

It has to be noted that some of the amide and ester products are known compounds as indicated by the appropriate references. However, due to some novel analytical details the full characterization is given also in these cases.

3.2. Synthesis of copper(II) complex catalysts

In a 100 mL three-necked round bottom flask, equipped with a magnetic stirrer bar, a gas inlet and a reflux condenser with a balloon (filled with argon) at the top, 10 mmol of 2-aminopyridine derivative (0.941 g of 2-aminopyridine or 1.080 g of 3- or 4- or 5- or 6-methyl-2-aminopyridine or 2.200 g of 5-iodo-2-aminopyridine) and 5 mmol (0.998 g) of copper(II) acetate monohydrate were dissolved in dry

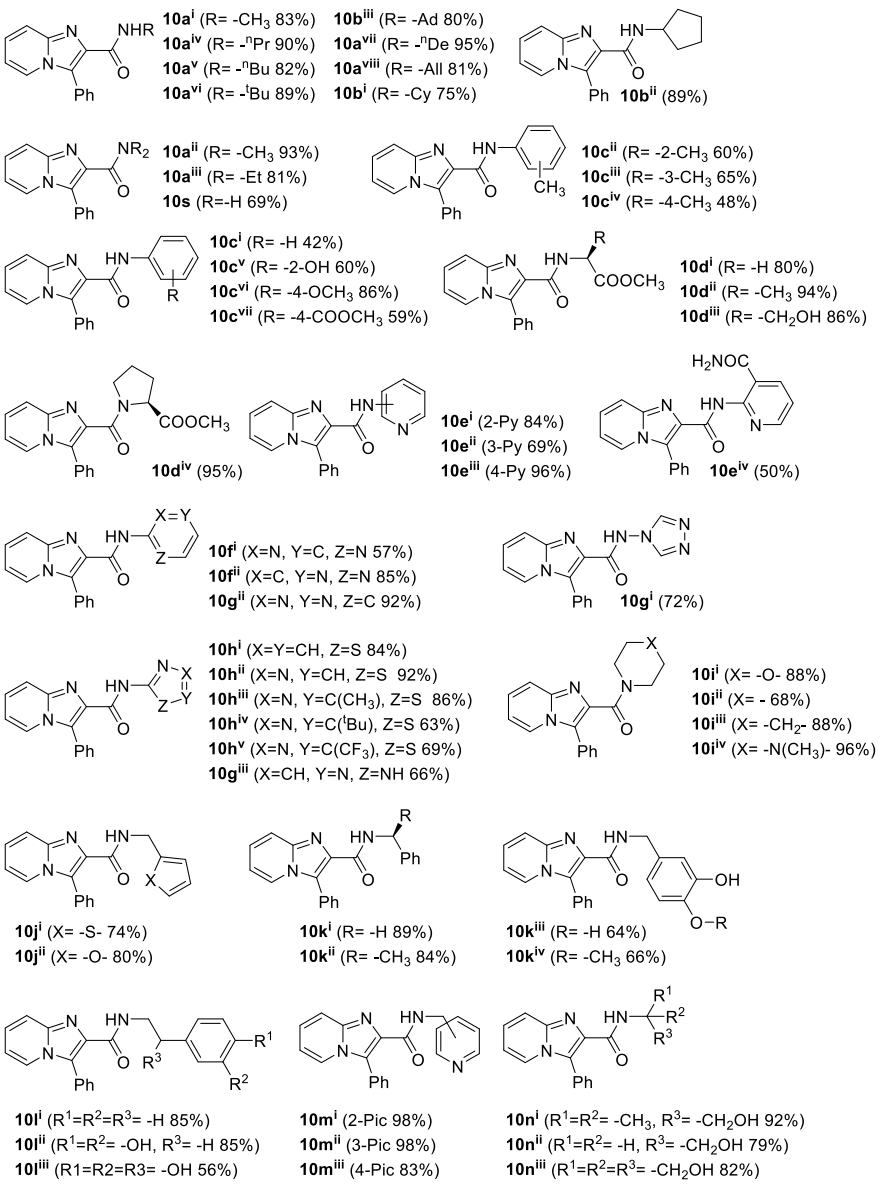


Fig. 3. Carboxamides obtained in the palladium-catalysed aminocarbonylation of **10**.

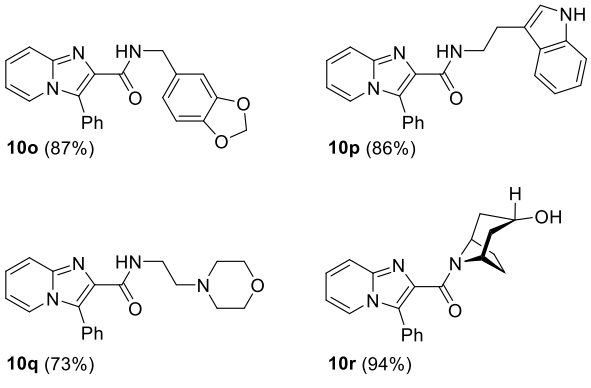


Fig. 4. Carboxamides obtained in the palladium-catalysed aminocarbonylation of **10** (in the presence of amines of biological relevance).

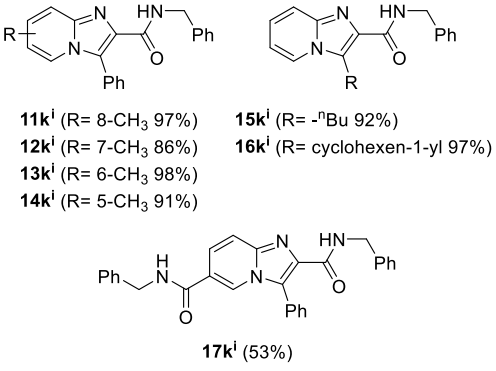
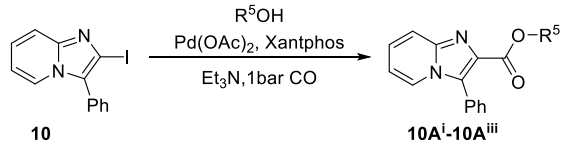


Fig. 5. Carboxamides obtained in the palladium-catalysed aminocarbonylation of **11**–**17** in the presence of benzylamine (**k^i**).

acetonitrile (15 mL). The reaction mixture was stirred and refluxed at 80 °C. After 24 h the solution was cooled to 0 °C. The formed crystals were collected by using a sintered glass funnel. The solvent was suctioned and the surface of the crystals were washed with ice cold acetonitrile (5 mL). The product was dried under vacuum. Some single crystals for the XRD analysis were grown from the saturated solution of



Scheme 3. Palladium-catalysed alkoxycarbonylation of 2-iodo-3-phenylimidazo[1,2-*a*]pyridine (**10**) toward 2-alkoxycarbonyl-3-phenylimidazo[1,2-*a*]pyridines (**10A^{i}-10A^{iii}**).

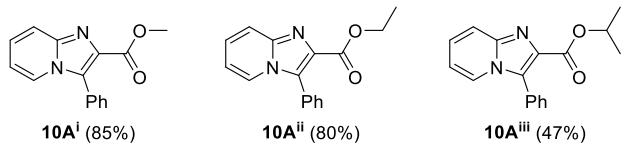
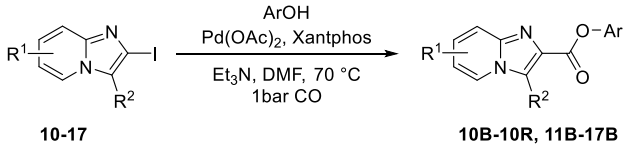


Fig. 6. Esters obtained in the palladium-catalysed alkoxycarbonylation of **10**.



Scheme 4. Palladium-catalysed aryloxycarbonylation of 2-iodoimidazo[1,2-*a*]pyridines (**10**–**17**) to 2-aryloxycarbonylimidazo[1,2-a]pyridines (**10B-10R**, **11B**–**17B**). (R^1 substituents are indicated in Scheme 1.)

the complexes (20 mg complex was dissolved in boiling acetonitrile) with slow evaporation at room temperature.

3.3. Synthesis of 2-iodoimidazo[1,2-a]pyridine derivatives

In a 250 mL three-necked round bottom flask, equipped with a magnetic stirrer bar, a gas inlet and a reflux condenser with a balloon (filled with oxigen) at the top, 20 mmol of 2-aminopyridine derivative (1.882 g of 2-aminopyridine or 2.163 g of 3- or 4- or 5- or 6-methyl-2-aminopyridine or 4.400 g of 5-iodo-2-aminopyridine), 10 mmol of alkyne (1.02 g of phenylacetylene or 0.821 g of hexyne or 1.062 g of 1-ethynylcyclohexene), 20 mmol of iodine (5.080 g) and 1 mmol of copper (II) complex were dissolved in 25 mL of dry acetonitrile. The reaction mixture was stirred and refluxed at 80 °C for 24 h. The reaction was monitored by GC and TLC. Then the reaction mixture was concentrated and evaporated to dryness. The residue was dissolved in chloroform (75 mL) and washed with saturated $Na_2S_2O_3$ solution (2 × 15 mL), water (3 × 20 mL) and brine (20 mL). The organic phase was dried over Na_2SO_4, filtered and evaporated to dryness to obtain a waxy residue. The pure 2-iodoimidazo[1,2-*a*]pyridine derivatives were isolated by column chromatography with $CHCl_3$/EtOAc eluent.

3.4. Aminocarbonylation of 3-substituted 2-iodoimidazo[1,2-a]pyridines under atmospheric carbon monoxide pressure

In a typical experiment $Pd(OAc)_2$ (5.6 mg, 0.025 mmol), Xantphos (14.5 mg, 0.025 mmol), 0.5 mmol of 2-iodoimidazo[1,2-*a*]pyridine derivative (160 mg of 2-iodo-3-phenylimidazo[1,2-*a*]pyridine or 167 mg of 2-iodo-5-methyl-3-phenylimidazo[1,2-*a*]pyridine or 162 mg of 3-(cyclohex-1-en-1-yl)-2-iodoimidazo[1,2-*a*]pyridine or 150 mg of 3-butyl-2-iodoimidazo[1,2-*a*]pyridine) and 0.75 mmmol of amine nucleophile (1.5 mmol of volatile amines: **a^{iii}**, **a^{iv}**, **a^{v}**, **a^{vi}**, **a^{viii}** or 1.5 mmol ammonium carbamate) and triethylamine (0.5 mL) were dissolved in DMF (10 mL) under argon in a 100 mL three-necked round bottom flask equipped with a magnetic stirrer bar, a gas inlet and a reflux condenser with a balloon (filled with argon) at the top. The argon atmosphere was changed to carbon monoxide by using a vacuum-carbon monoxide line. The reaction was conducted for the given reaction time upon stirring at 70 °C and analysed by TLC. The mixture was then concentrated and evaporated to dryness. The residue was dissolved in chloroform (20 mL) and washed with water (2 × 20 mL) and brine (20 mL). The organic phase was dried over Na_2SO_4, filtered and evaporated to dryness to obtain crystalline material or a waxy residue. All compounds were subjected to column chromatography (Silicagel 60 (Merck), 0.063–0.200 mm), EtOAc/$CHCl_3$, or MeOH/$CHCl_3$.

3.5. Aryloxycarbonylation of 3-substituted 2-iodoimidazo[1,2-a] pyridines under atmospheric carbon monoxide pressure

In a typical experiment $Pd(OAc)_2$ (5.6 mg, 0.025 mmol), Xantphos (14.5 mg, 0.025 mmol), 0.5 mmol of 2-iodoimidazo[1,2-*a*]pyridine derivative (160 mg of 2-iodo-3-phenylimidazo[1,2-*a*]pyridine or 167 mg of 2-iodo-5-methyl-3-phenylimidazo[1,2-*a*]pyridine or 162 mg of 3-(cyclohex-1-en-1-yl)-2-iodoimidazo[1,2-*a*]pyridine) and 1.0 mmol of phenol nucleophile and triethylamine (0.5 mL) were dissolved in DMF (10 mL) under argon in a 100 mL three-necked flask equipped with a magnetic stirrer bar, a gas inlet and a reflux condenser with a balloon (filled with argon) at the top. The argon atmosphere was changed to carbon monoxide by using a vacuum-carbon monoxide line. The reaction was conducted for the given reaction time upon stirring at 70 °C and analysed by TLC. The mixture was then concentrated and evaporated to dryness. The residue was dissolved in chloroform (20 mL) and washed with water (2 × 20 mL), saturated $NaHCO_3$ solution and brine (20 mL). The organic phase was dried over Na_2SO_4, filtered and evaporated to dryness to obtain crystalline material or a waxy residue. All compounds were subjected to column chromatography (Silicagel 60 (Merck), 0.063–0.200 mm), EtOAc/$CHCl_3$, or MeOH/$CHCl_3$.

3.6. Alkoxycarbonylation of 3-substituted 2-iodoimidazo[1,2-a]pyridines under atmospheric carbon monoxide pressure

In a typical experiment $Pd(OAc)_2$ (5.6 mg, 0.025 mmol), Xantphos (14.5 mg, 0.025 mmol), 160 mg of 2-iodo-3-phenylimidazo[1,2-*a*]pyridine (0.5 mmol) were dissolved in the corresponding alcohol (10 mL of methanol or ethanol, 2-propanol) under argon in a 100 mL three-necked flask equipped with a magnetic stirrer bar, a gas inlet and a reflux condenser with a balloon (filled with argon) at the top. The argon atmosphere was changed to carbon monoxide by using a vacuum-carbon monoxide line. The reaction was conducted for the given reaction time upon stirring at the correponding temperature (methanol: 65 °C, ethanol: 78 °C, 2-propanol 80 °C) and analysed by TLC. The mixture was then concentrated and evaporated to dryness. The residue was dissolved in chloroform (20 mL) and washed with water (2 × 20 mL) and brine (20 mL). The organic phase was dried over Na_2SO_4, filtered and evaporated to dryness to obtain crystalline material or a waxy residue. All compounds were subjected to column chromatography (Silicagel 60 (Merck), 0.063–0.200 mm), EtOAc/$CHCl_3$, or MeOH/$CHCl_3$.

3.7. Characterization of compounds

In general, full characterization is given for all compounds mentioned in this paper. There are several compounds below, which are known and some analytical data were also provided. (The corresponding references are cited below. In general, the published data are in good agreement with ours.) However, for comparision, all data are listed also in these cases.

3.7.1. Characterization of the 2-iodoimidazo[1,2-a]pyridines

2-Iodo-3-phenylimidazo[1,2-a]pyridine (**10**): Yield: 1072 mg (67 %); yellow solide material, mp. 90 °C; R_f (5 % EtOAc, 95 % $CHCl_3$) 0.44. δ_H (500 MHz, $CDCl_3$) 8.08 (1H, d, $J = 6.9$ Hz, 5-*H*), 7.63 (1H, d, $J = 9.1$ Hz, 8-*H*), 7.60–7.55 (4H, m), 7.52–7.49 (1H, m, 4-*H*-Ph), 7.20 (1H, ddd, $J =$ 9.1 Hz, 6.9 Hz, 1.1 Hz, 7-*H*), 6.77 (1H, ddd, $J = 6.9$ Hz, 6.8 Hz, 1.1 Hz, 6-

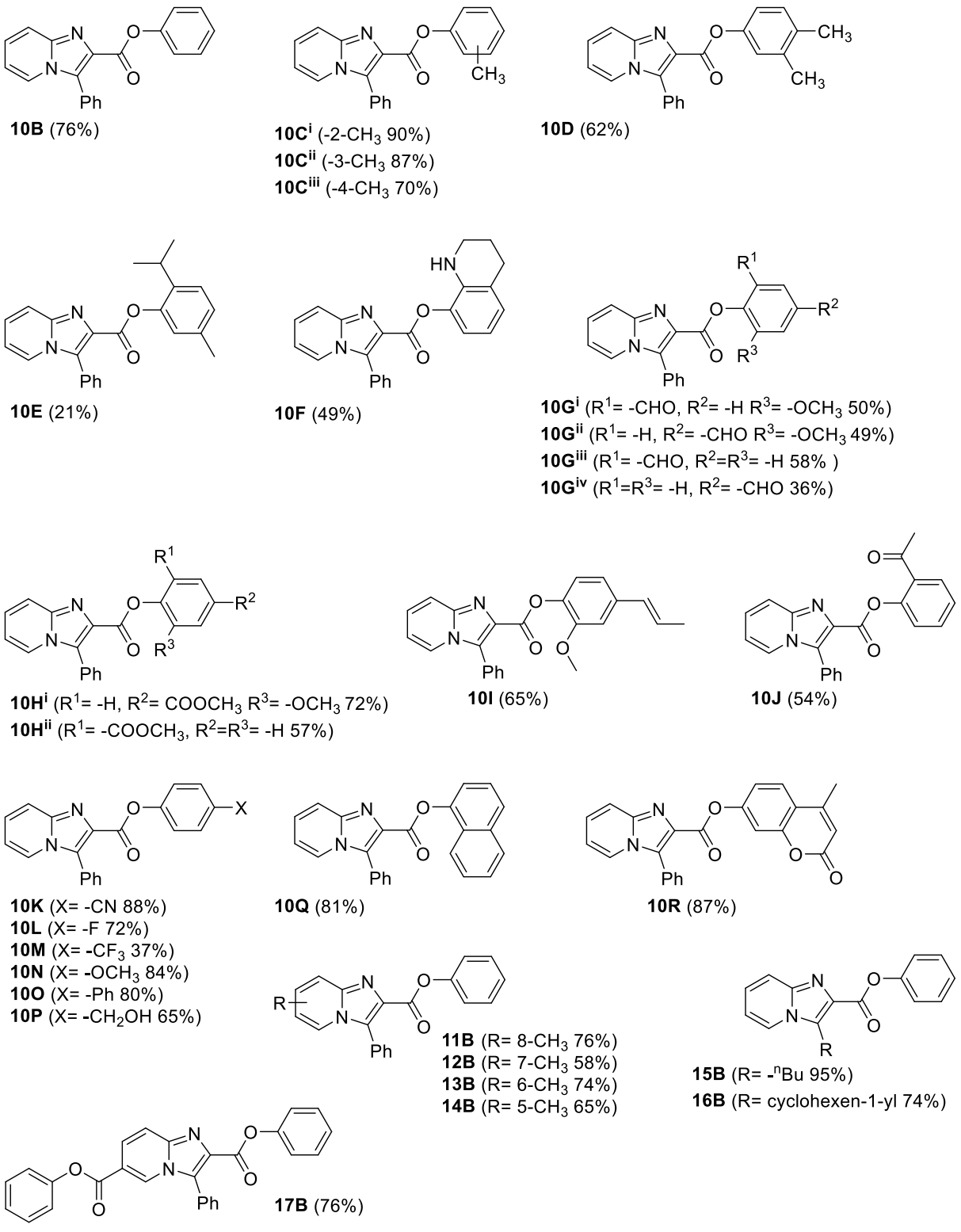


Fig. 7. Esters obtained in the palladium-catalysed aryloxycarbonylation of **10**–**17**.

H). δ_C (125.7 MHz, $CDCl_3$) 146.92, 130.09, 129.22, 129.14, 128.39, 126.98, 124.85, 123.16, 117.21, 112.78, 93.78 (2-*C*). IR (KBr, ν (cm^{-1})): 3099, 3056, 3025, 2924 ν(=CH, Ar), 1496, 1475, 1444 ν(C=C, Ar), 1341, 1299, 1219, 970, 760, 749 γ(=CH, Ar), 737, 698 γ(C=C, Ar), 560. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{13}H_{10}IN_2$ $[M+H]^+$: 320.9883; found: 320.9894.

2-Iodo-8-methyl-3-phenylimidazo[1,2-a]pyridine (**11**): Yield: 1036 mg (62 %); yellow solide material, mp. 128 °C; R_f (5 % EtOAc, 95 % $CHCl_3$) 0.42. δ_H (500 MHz, $CDCl_3$) 7.95 (1H, d, $J = 6.9$ Hz, 5-*H*), 7.60–7.53 (4H, m), 7.52–7.48 (1H, m, 4-*H*-Ph), 7.01 (1H, d, $J = 6.9$ Hz, 7-*H*), 6.69 (1H, t, $J = 6.9$ Hz, 6-*H*), 2.67 (3H, s, 8-*CH_3*). δ_C (125.7 MHz, $CDCl_3$) 147.41, 130.19, 129.15, 129.05, 128.74, 127.40, 127.12, 123.69, 121.09, 112.82, 93.02 (2-*C*), 17.04 (8-*CH_3*). IR (KBr, ν (cm^{-1})): 3122, 3108, 3060, 3025, 2969, 2950 ν(=CH, Ar), 2914, 2859 ν(CH_3), 1629, 1603,

1531, 1486, 1442 ν(C═C, Ar), 1346, 1329, 1299, 1230, 1026, 950, 777, 762, 747, 731, 702 γ(=CH, Ar), 697, 673 γ(C═C, Ar), 606, 588. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{14}H_{12}IN_2$ $[M+H]^+$: 335.0040; found: 335.0049.

2-Iodo-7-methyl-3-phenylimidazo[1,2-a]pyridine (**12**): Yield: 864 mg (52 %); pale yellow solide material, mp. 155 °C; (5 % EtOAc, 95 % $CHCl_3$) R_f 0.46. δ_H (500 MHz, $CDCl_3$) 7.97 (1H, d, J = 7.1 Hz, 5-*H*), 7.59–7.54 (4H, m), 7.51–7.47 (1H, m, 4-*H*-Ph), 7.38 (1H, brs, 8-*H*), 6.60 (1H, dd, J = 7.1 Hz, 1.4 Hz, 6-*H*), 2.43 (3H, s, 7-*CH_3*). δ_C (125.7 MHz, $CDCl_3$) 147.27, 136.06, 130.02, 129.15, 128.96, 128.56, 126.39, 122.39, 115.50, 115.40, 93.12 (2-*C*), 21.21 (7-*CH_3*). IR (KBr, ν (cm^{-1})): 3117, 3067, 3040, 3023, 2973, 2943 ν(=CH, Ar), 2905, 2870, 2849 ν(CH_3), 1649, 1491, 1463, 1442 ν(C═C, Ar), 1340, 1317, 1296, 1227, 974, 888, 775, 757, 745, 699 γ(=CH, Ar), 681, 604, 562 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{14}H_{12}IN_2$ $[M+H]^+$: 335.0040; found: 335.0050.

2-Iodo-6-methyl-3-phenylimidazo[1,2-a]pyridine (**13**): Yield: 767 mg (46 %); off white solide material, mp. 105 °C; R_f (5 % EtOAc, 95 % $CHCl_3$) 0.44. δ_H (500 MHz, $CDCl_3$) 7.85 (1H, brs, 5-*H*). 7.60–7.49 (6H, m), 7.06 (1H, dd J = 9.2 Hz, 1.4 Hz, 7-*H*), 2.30 (3H, s, 6-*CH_3*). δ_C (125.7 MHz, $CDCl_3$) 146.02, 130.16, 129.18, 129.04, 128.60, 128.03, 126.62, 122.58, 120.80, 116.47, 93.18 (2-*C*), 18.21 (6-*CH_3*). IR (KBr, ν (cm^{-1})): 3081, 3014, 2961 ν(=CH, Ar), 2914, 2852 ν(CH_3), 1630, 1599, 1507, 1441 ν(C═C, Ar), 1338, 1314, 1297, 1234, 962, 950, 808, 759 γ(=CH, Ar), 704 γ(C═C, Ar), 584. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{14}H_{12}IN_2$ $[M+H]^+$: 335.0040; found: 335.0039.

2-Iodo-5-methyl-3-phenylimidazo[1,2-a]pyridine (**14**)[16]: Yield: 534 mg (32 %); light brow solide material, mp. 101 °C; R_f (5 % EtOAc, 95 % $CHCl_3$) 0.38. δ_H (500 MHz, $CDCl_3$). 7.56–7.51 (2H, m), 7.49–7.46 (2H, m), 7.44–7.42 (2H, m), 7.12 (1H, dd, J = 9.4 Hz, 7.0 Hz, 7-*H*), 6.50 (1H, d, J = 7.0 Hz, 6-*H*), 2.10 (3H, s, 5-*CH_3*). δ_C (125.7 MHz, $CDCl_3$) 148.03, 135.81, 132.59, 131.90, 129.29, 128.05, 127.75, 124.99, 115.30, 113.55, 97.30 (2-*C*), 21.39 (5-*CH_3*). IR (KBr, ν (cm^{-1})): 3086, 3060, 3046, 3022, 2986, 2960, 2924 ν(=CH, Ar), 2890 ν(CH_3), 1634, 1536, 1509, 1431 ν(C═C, Ar), 1385, 1345, 1292, 1236, 1134, 955, 781, 773, 768 γ(=CH, Ar), 705 γ(C═C, Ar), 579. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{14}H_{12}IN_2$ $[M+H]^+$: 335.0040; found: 335.0054.

3-Butyl-2-iodoimidazo[1,2-a]pyridine (**15**): Yield: 600 mg (20 %); yellow solide material, mp. 71 °C; R_f (5 % EtOAc, 95 % $CHCl_3$) 0.38. δ_H (500 MHz, $CDCl_3$) 7.92 (1H, dt, J = 6.9 Hz, 1.2 Hz, 5-*H*), 7.56 (1H, dt, J = 9.1 Hz, 1.2 Hz, 8-*H*), 7.14 (1H, ddd, J = 9.1 Hz, 6.9 Hz, 1.2 Hz, 7-*H*), 6.82 (1H, ddd, J = 6.9 Hz, 6.8 Hz, 1.1 Hz, 6-*H*), 2.92 (2H, t, J = 7.6 Hz, Ar-*CH_2*-CH_2-), 1.62 (2H, m, –CH_2-*CH_2*-CH_2-), 1.43 (2H, tq, J = 7.8 Hz, 7.3 Hz, -*CH_2*-CH_3), 0.98 (3H, t, J = 7.3 Hz, –CH_2-*CH_3*). δ_C (125.7 MHz, $CDCl_3$) 146.50, 126.55, 123.65, 122.65, 117.18, 112.40, 93.40 (2-*C*), 29.42 (Ar-*CH_2*-CH_2-), 24.28 (–CH_2–*CH_2*-CH_2-), 22.37 (-*CH_2*-CH_3), 13.84 (–CH_2–*CH_3*). IR (KBr, ν (cm^{-1})): 3123, 3096, 3079, 3037, 2949, 2925 ν(=CH, Ar), 2864 ν(-CH_2, –CH_3), 1628, 1628, 1494, 1463 ν(C═C, Ar), 1346, 1329, 1313, 1290, 1204, 758 β_{as}(–CH_2–), 739 γ(=CH, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{11}H_{14}IN_2$ $[M+H]^+$: 301.0196; found: 301.0204.

3-(Cyclohex-1-en-1-yl*)-2-iodoimidazo[1,2-a]pyridine* (**16**): Yield: 1040 mg (32 %); yellow solide material, mp. 77 °C; R_f (5 % EtOAc, 95 % $CHCl_3$) 0.38. δ_H (500 MHz, $CDCl_3$) 7.97 (dt, 1H, J = 6.9 Hz, 1.0 Hz, 5-*H*), 7.54 (1H, dt, J = 9.1 Hz, 1.1 Hz, 8-*H*), 7.14 (1H, ddd, J = 9.1 Hz, 6.9 Hz, 1.0 Hz, 7-*H*), 6.76 (1H, ddd, J = 6.9 Hz, 6.8 Hz, 1.0 Hz, 6-*H*), 6.06–6.04 (1H, m), 2.33–2.29 (4H, m), 1.88–1.83 (2H, m), 1.82–1.77 (2H, m). δ_C (125.7 MHz, $CDCl_3$) 146.32, 134.76, 129.06, 126.33, 124.12, 123.56, 117.00, 112.30, 92.10 (2-*C*), 27.94, 25.68, 22.68, 21.86. IR (KBr, ν (cm^{-1})): 3132, 3105, 3070, 3029 ν(=CH-), 2990, 2939, 2925 ν(=CH, Ar), 2902, 2855, 2831 ν(–CH_2–), 1630, 1499, 1431 ν(C═C, Ar), 1344, 1330, 1306, 1291, 1204, 913, 749, 736 γ(=CH, Ar), 559. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{13}H_{14}IN_2$ $[M+H]^+$: 325.0196; found: 325.0198.

2,6-Diiodo-3-phenylimidazo[1,2-a]pyridine (**17**): Yield: 1026 mg (23 %); yellow solide material, mp. 148 °C; R_f (5 % EtOAc, 95 % $CHCl_3$) 0.56. δ_H (500 MHz, $CDCl_3$) 8.29 (1H, s, 5-*H*), 7.62–7.59 (2H, m, -Ph), 7.57–7.53 (3H, m, -Ph), 7.42 (1H, d, J = 9.4 Hz, 8-*H*), 7.37 (1H, d, J = 9.4 Hz, 7-*H*). δ_C (125.7 MHz, $CDCl_3$) 145.39, 132.83 130.10, 129.54, 129.42, 127.98, 127.75, 126.98, 118.11, 94.24 (2-*C*), 76.22 (6-*C*). IR (KBr, ν (cm^{-1})): 3056, 2996, 2920 ν(=CH, Ar), 1600, 1508 1486, 1442 ν(C═C, Ar), 1390, 1324, 1311, 1292, 1268, 1228, 1045, 966, 800, 762, 754 γ(=CH, Ar), 711, 697, 576. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{13}H_9I_2N_2$ $[M+H]^+$: 446.8850; found: 446.8853.

3.7.2. Characterization of the 2-carboxamido-imidazo[1,2-a]pyridines

N-Methyl-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**10a^{i}**): Yield: 104 mg (83 %); off white solide material, mp. 132 °C (subl.); R_f (5 % MeOH, 95 % $CHCl_3$) 0.40. δ_H (500 MHz, $CDCl_3$). 8.04 (1H, brd, J = 6.9 Hz, 5-*H*), 7.62–7.59 (3H, m, Ar, *-NH-*), 7.57–7.53 (3H, m, Ar), 7.51–7.47 (1H, m, 4-*H*-Ph), 7.30–7.27 (1H, m, 7-*H*), 6.83–6.79 (1H, m, 6-*H*), 2.99 (3H, d, J = 5.0 Hz, –CONH–*CH_3*). δ_C (125.7 MHz, $CDCl_3$) 163.39, 143.48, 135.35, 130.69, 129.11, 128.67, 128.11, 126.60, 126.07, 124.21, 118.02, 113.12, 25.65 (*CH_3*-). IR (KBr, ν (cm^{-1})): 3429 ν(NH), 3138, 3105, 3073, 3043, 3017 ν(=CH, Ar), 2937, 2867, 2838 ν(-CH_3), 1669 Amide I, 1572, 1568 ν(C═C, Ar), 1513 Amide II, 1341, 1264 Amide III, 1239, 755, 743 γ(=CH, Ar), 696 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{15}H_{14}N_3O$ $[M+H]^+$: 252.1131; found: 252.1134.

N,N-Dimethyl-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**10a^{ii}**): Yield: 124 mg (93 %); yellow solide material, mp. 118 °C; R_f (10 % MeOH, 90 % $CHCl_3$) 0.68. δ_H (500 MHz, $CDCl_3$) 8.20 (1H, d, J = 6.8 Hz, 5-*H*), 7.67 (1H, d, J = 9.0 Hz, 8-*H*), 760-7.59 (2H, m, Ar), 7.54–7.51 (2H, m, Ar), 7.47–7.44 (1H, m, 4-*H*-Ph), 7.28–7.25 (1H, m, 7-*H*), 6.85–6.82 (1H, m, 6-*H*), 3.07 (3H, s, -N-*CH_3*), 3.00 (3H, s, -N-*CH_3*). δ_C (125.7 MHz, $CDCl_3$) 165.83, 144.17, 138.07, 129.44, 129.17, 128.86, 128.15, 125.42, 124.13, 123.69, 118.33, 113.13, 38.60 (*CH_3*-), 35.14 (*CH_3*-). IR (KBr, ν (cm^{-1})): 3058, 3037 ν(=CH, Ar), 2923, 2858, 2799 ν(CH_3), 1636 Amide I, 1630, 1601, 1551, 1507, 1439 ν(C═C, Ar), 1398, 1357, 1340, 1272, 1263 Amide III, 1247, 1208, 1143, 1130, 1116, 1016, 905, 764, 752 γ(=CH, Ar), 739, 706 γ(C═C, Ar), 676, 600. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{16}H_{16}N_3O$ $[M+H]^+$: 266.1288; found: 266.1285.

N,N-Diethyl-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**10a^{iii}**): Yield: 119 mg (81 %); light yellow solide material, mp. 114 °C; R_f (5 % MeOH, 95 % $CHCl_3$) 0.67. δ_H (500 MHz, $CDCl_3$) 8.24 (1H, dt, J = 7.0 Hz, 1.0 Hz, 5-*H*), 7.67 (1H, dt, J = 9.1 Hz, 1.0 Hz, 8-*H*), 7.62–7.60 (2H, m, Ar), 7.54–7.50 (2H, m, Ar), 7.46–7.42 (1H, m, 4-*H*-Ph), 7.26 (1H, ddd, J = 9.3 Hz, 6.7 Hz, 1.1 Hz, 7-*H*), 6.83 (1H, dt, J = 6.7 Hz, 1.1 Hz, 6-*H*), 3.53 (2H, q, J = 7.1 Hz, -N-*CH_2*-CH_3), 3.34 (2H, q, J = 7.1 Hz, -N-*CH_2*-CH_3), 1.20 (3H, t, J = 7.2 Hz, -N–CH_2–*CH_3*), 0.93 (3H, t, J = 7.0 Hz, -N–CH_2–C*H_3*). δ_C (125.7 MHz, $CDCl_3$) 165.62, 144.47, 139.08, 129.18, 129.15, 128.71, 128.25, 125.12, 123.62, 122.96, 118.42, 112.98, 43.06 (-N-*CH_2*-CH_3), 39.41 (-N-*CH_2*-CH_3), 14.13 (-N–CH_2–*CH_3*), 12.74 (-N–CH_2–*CH_3*). IR (KBr, ν (cm^{-1})): 3111, 3061, 3026 ν(=CH, Ar), 2987, 2970, 2957, 2929, 2870, 2849 ν(–CH_2–, –CH_3), 1630 Amide I, 1606, 1555, 1506, 1455, 1431 ν(C═C, Ar), 1380, 1349, 1272 Amide III, 1260, 884, 789, 771, 753, 740 γ(=CH, Ar), 729, 703 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{18}H_{20}N_3O$ $[M+H]^+$: 294.1601; found: 294.1609.

3-Phenyl-N-propylimidazo[1,2-a]pyridine-2-carboxamide (**10a^{iv}**): Yield: 126 mg (90 %); pale yellow solide material, mp. 121 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.22. δ_H (500 MHz, $CDCl_3$) 8.04 (1H, dt, J = 7.0, 1.1 Hz, 5-*H*), 7.63–7.53 (6H, m, Ar, *-NH-*), 7.48 (1H, tt, J = 7.4, 1.4 Hz 4-*H*-Ph), 7.28 (1H, ddd, J = 9.8, 6.9, 1.2 Hz, 7-*H*), 6.80 (1H, dt, J = 6.9, 1.2 Hz, 6-*H*), 3.42–3.38 (2H, m, –NH–*CH_2*-CH_2-CH_3), 1.70–1.62 (2H, m, –NH–CH_2-*CH_2*-CH_3), 0.99 (3H, t, J = 7.4 Hz, –NH–CH_2-CH_2-*CH_3*). δ_C (125.7 MHz, $CDCl_3$) 162.77, 143.51, 135.48, 130.71, 129.08, 128.68, 128.20, 126.64, 126.01, 124.20, 118.052, 113.07, 40.77 (–NH–*CH_2*-CH_2-CH_3), 23.04 (–NH–CH_2-*CH_2*-CH_3), 11.53 (–NH–CH_2-CH_2-*CH_3*). IR (KBr, ν (cm^{-1})): 3249 ν(NH), 3105, 3090, 3061, 3023, 2955, 2923 ν(=CH, Ar), 2870, 2849 ν(–CH_2–, –CH_3), 1654 Amide I, 1559, 1522 ν(C═C, Ar), 1501 Amide II, 1478, 1430 ν(C═C, Ar), 1353, 1275, 1264,

1240 Amide III, 907, 769, 755 γ(=CH, Ar), 696 γ(C═C, Ar), 494. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{17}H_{18}N_3O$ $[M+H]^+$: 280.1444; found: 280.1441.

N-Butyl-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**10a^{v}**): Yield: 120 mg (82 %); pale yellow solide material, mp. 105 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.45. δ_H (500 MHz, $CDCl_3$) 8.04 (1H, dt, *J* = 7.0 Hz, 1.1 Hz, 5-*H*), 7.63–7.59 (3H, m, Ar), 7.56–7.53 (3H, m, Ar, -*NH*-), 7.48 (1H, tt, *J* = 7.4, 1.5 Hz, 4-*H*-Ph), 7.28 (1H, ddd, 9.5 Hz, 6.8 Hz, 1.1 Hz, 7-*H*), 6.80 (1H, dt, *J* = 7.0, 1.1 Hz, 6-*H*), 3.46–3.42 (2H, m, –NH–C*H*$_2$-$(CH_2)_2$–CH_3), 1.65–1.59 (2H, m, –NH–C*H*$_2$-CH_2-CH_2-CH_3), 1.47–1.39 (2H, m, –NH–$(CH_2)_2$–C*H*$_2$–C*H*$_3$), 0.95 (3H, t, *J* = 7.4 Hz, –NH–$(CH_2)_3$–*CH*$_3$). δ_C (125.7 MHz, $CDCl_3$) 162.74, 143.50, 135.49, 130.71, 129.09, 128.68, 128.20, 126.62, 126.00, 124.20, 118.05, 113.06, 38.81 (*CH*$_2$-$(CH_2)_2$–CH_3), 31.85 (–CH_2–*CH*$_2$-CH_2-CH_3), 20.24 (–$(CH_2)_2$–*CH*$_2$–CH_3), 13.79 (–$(CH_2)_3$–*CH*$_3$). IR (KBr, ν (cm^{-1})): 3282 ν(NH), 3102, 3088, 3037, 3023 ν(=CH, Ar), 2958, 2926, 2876, 2858 ν(–CH_2–, –CH_3), 1654 Amide I, 1564 ν(C═C, Ar), 1517 Amide II, 1501, 1480 ν(C═C, Ar), 1351, 1274 Amide III, 1262, 1245, 1189, 1015, 868, 768, 756, 741 γ(=CH, Ar), 693 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{18}H_{20}N_3O$ $[M+H]^+$: 294.1601; found: 294.1609.

N-(tert-Butyl)-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**10a^{vi}**): Yield: 131 mg (89 %); pale yellow solide material, mp. 76 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.58. δ_H (500 MHz, $CDCl_3$) 8.00 (1H, d, *J* = 6.9 Hz, 5-*H*), 7.61–7.57 (3H, m, Ar), 7.56–7.53 (2H, m, Ar), 7.49–7.46 (2H, m, 8-*H*, -*NH*-), 7.28–7.24 (1H, m, 7-*H*), 6.78 (1H, t, *J* = 6.9 Hz, 6-*H*), 1.49 (9H, s, –C(C*H*$_3$)$_3$). δ_C (125.7 MHz, $CDCl_3$). 162.09, 143.23, 136.33, 130.67, 129.02, 128.76, 128.40, 126.21, 125.91, 124.11, 117.94, 112.98, 50.97 (-*C*$(CH_3)_3$), 29.04 (-C(*CH*$_3$)$_3$). IR (KBr, ν (cm^{-1})): 3383, 3354 ν(NH), 3113, 3095, 3047, 2997, 2968 ν(=CH, Ar), 2927, 2905, 2867 ν(-CH_3), 1675 Amide I, 1561 ν(C═C, Ar), 1517 Amide II, 1505, 1457 ν(C═C, Ar), 1369, 1361, 1263 Amide III, 1223, 885, 752 γ(=CH, Ar), 694 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{18}H_{20}N_3O$ $[M+H]^+$: 294.1601; found: 294.1604.

N-Decyl-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**10a^{vii}**): Yield: 179 mg (95 %); off white solide material, mp. 43 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.38. δ_H (500 MHz, $CDCl_3$) 8.02 (1H, dt, *J* = 7.0 Hz, 1.0 Hz, 5-*H*), 7.61 (4H, m, Ar), 7.55–7.51 (2H, m, Ar, -*NH*-), 7.48–7.45 (1H, m, 4-*H*-Ph), 7.26 (1H, ddd, *J* = 9.2 Hz, 6.7 Hz, 1.1 Hz, 7-*H*), 6.78 (1H, dt, *J* = 7.0 Hz, 1.0 Hz, 6-*H*), 3.44–3.40 (2H, m, CONH–*CH*$_2$-), 1.65–1.59 (2H, m, CONH–CH_2–*CH*$_2$-), 1.41–1.35 (2H, m, -*CH*$_2$-), 1.33–1.26 (12H, m, 6·(-*CH*$_2$-)), 0.88 (3H, t, *J* = 6.9 Hz, -*CH*$_3$). δ_C (125.7 MHz, $CDCl_3$) 162.69, 143.47, 135.47, 130.70, 129.05, 128.66, 128.19, 126.59, 126.00, 124.16, 118.01, 113.08, 39.13, 31.87, 29.79, 29.54, 29.34, 29.28, 27.08, 22.65, 14.08 (-*CH*$_3$). IR (KBr, ν (cm^{-1})): 3414 ν_{as}(NH), 3355 ν_s(NH), 3108, 3081, 3052 ν(=CH, Ar), 3023, 2955, 2922, 2853 ν(–CH_2–, –CH_3), 1668 ν(C═C, Ar), 1648 Amide I, 1563 ν(C═C, Ar), 1513 Amide II, 1256 Amide III, 761, 754 γ(=CH, Ar), 703, 695 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{24}H_{32}N_3O$ $[M+H]^+$: 378.2540; found: 378.2546.

N-Allyl-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**10a^{viii}**) [16]: Yield: 112 mg (81 %); light brow solide material, mp. 134 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.28. δ_H (500 MHz, $CDCl_3$) 8.05 (1H, dt, *J* = 7.0 Hz, 1.0 Hz, 5-*H*), 7.67 (1H, t, *J* = 5.9 Hz, -*NH*-), 7.64–7.59 (3H, m, Ar), 7.57–7.54 (2H, m, Ar), 7.51–7.48 (1H, m, 4-*H*-Ph), 7.30 (1H, ddd, *J* = 9.5 Hz, 6.7 Hz, 1.0 Hz, 7-*H*), 6.82 (1H, dt, *J* = 7.0 Hz, 1.0 Hz, 6-*H*), 5.96 (1H, ddt, *J* = 17.1 Hz, 10,4 Hz, 5.7 Hz, –CH_2-*CH*═CH_2), 5.30 (1H, dq, *J* = 17,1 Hz, 1.5 Hz, –CH═CH-(*E*)-*H*), 5.17 (1H, dq, *J* = 10.4 Hz, 1.5 Hz, –CH═CH-(*Z*)-*H*), 4.08 (2H, tt, *J* = 5.9 Hz, 1.5 Hz, -*CH*$_2$-CH═CH_2). δ_C (125.7 MHz, $CDCl_3$) 162.58, 143.50, 135.18, 134.46, 130.69, 129.15, 128.70, 128.08, 126.83, 126.12, 124.22, 118.08, 116.35, 113.17, 41.47. IR (KBr, ν (cm^{-1})): 3239 ν(NH), 3105, 3089 ν(-CH═CH_2), 3073, 3030, 3015, 2980 ν(=CH, Ar), 2958, 2911 ν(–CH_2–), 1656 ν(C═C, –CH═CH_2), Amide I, 1560 ν(C═C, Ar), 1518 Amide II, 1502 ν(C═C, Ar), 1277 Amide III, 1268, 1245, 924, 908, 769, 758 γ(=CH, Ar), 696 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{17}H_{16}N_3O$ $[M+H]^+$: 278.1288; found: 278.1297.

N-Cyclohexyl-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**10b^{i}**) [16]: Yield: 120 mg (75 %); light yellow solide material, mp. 92 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.34. δ_H (500 MHz, $CDCl_3$) 8.04 (1H, brd, *J* = 7.0 Hz, 5-*H*), 7.63–7.59 (3H, m, Ar), 7.56–7.53 (2H, m, Ar), 7.50–7.46 (1H, m, 4-*H*-Ph), 7.44 (1H, brd, *J* = 8.0 Hz, -*NH*-), 7.30–7.26 (1H, m, 7-*H*), 6.80 (1H, dt, *J* = 6.9 Hz, 1.0 Hz, 6-*H*), 3.99–3.92 (1H, m), 2.05–2.00 (2H, m), 1.80–1.75 (2H, m), 1.67–1.62 (1H, m), 1.41–1.29 (4H, m), 1.27–1.18 (1H, m). δ_C (125.7 MHz, $CDCl_3$) 161.82, 143.46, 135.56, 130.71, 129.04, 128.64, 128.24, 126.71, 126.00, 124.18, 118.01, 113.06, 47.94, 33.27, 25.63, 25.07. IR (KBr, ν (cm^{-1})): 3399 ν(NH), 3052 ν(=CH, Ar), 2920, 2899, 2846 ν(–CH–, –CH_2-), 1672 Amide I, 1564 ν(C═C, Ar), 1506 Amide II, 1483, 1445 ν(C═C, Ar), 1339, 1259 Amide III, 1227, 752, 739 γ(=CH, Ar), 694 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{22}H_{22}N_3O$ $[M+H]^+$: 320.1757; found: 320.1771.

N-Cyclopentyl-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**10b^{ii}**) [16]: Yield: 136 mg (89 %); beige solide material, mp. 49 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.26. δ_H (500 MHz, $CDCl_3$) 8.04 (1H, d, *J* = 7.0 Hz, 5-*H*), 7.62 (1H, d, *J* = 9.2 Hz, 8-*H*), 7.61–7.59 (2H, m, Ar), 7.57–7.53 (2H, m, Ar), 7.51–7.47 (2H, m, Ar, -*NH*-), 7.31–7.27 (1H, m, 7-*H*), 6.81 (1H, t, *J* = 7.0 Hz, 6-*H*), 4.43–4.36 (1H, m, –NH–*CH*-$(CH_2)_2$-), 2.08–2.03 (2H, m, -*CH*$_2$-), 1.80–1.74 (2H, m, -*CH*$_2$-), 1.66–1.53 (4H, m, -$(CH_2)_2$-). δ_C (125.7 MHz, $CDCl_3$) 162.27, 143.44, 135.41, 130.72, 129.10, 128.69, 128.17, 126.65, 126.11, 124.21, 117.96, 113.12, 50.70, 33.23, 23.93. IR (KBr, ν (cm^{-1})): 3383 ν(NH), 3096, 3049, 3032 ν(=CH, Ar), 2959, 2867 ν(–CH_2–), 1660 Amide I, 1568, 1515, 1485, 1443 ν(C═C, Ar), 1362, 1341, 1278 Amide III, 1258, 1071, 1009, 912, 760, 754, 745 γ(=CH, Ar), 697 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calcd for $C_{19}H_{20}N_3O$ $[M+H]^+$: 306.1601; found: 306.1614.

N-((3s,5s,7s)-Adamantan-1-yl*)-3-phenylimidazo[1,2-a]pyridine-2-carboxamide* (**10b^{iii}**): Yield: 149 mg (80 %); beige solide material, mp. 168 °C (subl.), 183 °C (melt); R_f (5 % EtOAc, 95 % $CHCl_3$) 0.38. δ_H (500 MHz, $CDCl_3$) 7.99 (1H, dt, *J* = 7.0 Hz, 1.1 Hz, 5-*H*), 7.62 (1H, dt, *J* = 9.1 Hz, 1.1 Hz, 8-*H*), 7.59–7.53 (4H, m, Ar), 7.50–7.46 (1H, m, 4-*H*-Ph), 7.40 (1H, brs, -*NH*-), 7.30–7.26 (1H, m, 7-*H*), 6.79 (1H, dt, *J* = 6.5 Hz, 1.1 Hz, 6-*H*), 2.17 (6H, d, *J* = 2.5 Hz), 2.11 (3H, brs), 1.76–1.66 (6H, m). δ_C (125.7 MHz, $CDCl_3$) 161.75, 143.10, 136.20, 130.66, 129.04, 128.80, 128.38, 126.30, 126.01, 124.14, 117.88, 113.01, 51.77, 41.72, 36.44, 29.53. IR (KBr, ν (cm^{-1})): 3388, 3358 ν(NH), 3108, 3079, 3064, 3043 ν(=CH, Ar), 2923, 2903, 2848 ν(–CH_2–, –CH_3), 1672 Amide I, 1561 ν(C═C, Ar), 1507 Amide II, 1483, 1450 ν(C═C, Ar), 1357, 1342, 1291, 1277 Amide III, 1257, 1233, 1015, 877, 758, 751, 739 γ(=CH, Ar), 698 γ(C═C, Ar), 564. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{24}H_{26}N_3O$ $[M+H]^+$: 372.2070; found: 372.2069.

N,3-Diphenylimidazo[1,2-a]pyridine-2-carboxamide (**10c^{i}**): Yield: 66 mg (42 %); off white solide material mp. 140 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.83. δ_H (500 MHz, $CDCl_3$) 9.53 (1H, brs, -*NH*-Ph), 8.06 (1H, dt, *J* = 7.0 Hz, 1.0 Hz, 5-*H*), 7.78–7.75 (2H, m, Ar), 7.70–7.67 (1H, m, Ar), 7.65–7.63 (2H, m, Ar), 7.61–7.57 (2H, m, Ar), 7.55–7.51 (1H, m, 4-*H*-Ph), 7.37–7.32 (3H, m, Ar), 7.12 (1H, t, *J* = 7.5 Hz, Ar), 6.85 (dt, *J* = 7.0 Hz, 1.0 Hz, 1H, 6-*H*). δ_C (125.7 MHz, $CDCl_3$). 160.76, 143.40, 138.14, 135.21, 130.65, 129.38, 128.92, 128.86, 127.95, 127.39, 126.41, 124.26, 123.90, 119.73, 118.14, 113.39. IR (KBr, ν (cm^{-1})): 3351 ν(NH), 3278, 3193, 3123, 3105, 3063, 3020 ν(=CH, Ar), 1682 Amide I, 1594, 1558 ν(C═C, Ar), 1528 Amide II, 1510; 1439 ν(C═C, Ar), 1310 Amide III, 1242, 1162, 891, 754 γ(=CH, Ar), 693 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{20}H_{16}N_3O$ $[M+H]^+$: 314.1288; found: 314.1298.

3-Phenyl-N-(o-tolyl)imidazo[1,2-a]pyridine-2-carboxamide (**10c^{ii}**): Yield: 99 mg (60 %); off white solide material, mp. 129 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.64. δ_H (500 MHz, $CDCl_3$) 9.54 (1H, brs, -*NH*-), 8.22 (1H, d, *J* = 7.9 Hz), 8.08 (1H, brd, *J* = 7.0 Hz, 5-*H*), 7.69 (1H, d, *J* = 9.1 Hz, 8-*H*), 7.66–7.64 (2H, m), 7.60–7.57 (2H, m), 7.54–7.50 (1H, m), 7.35–7.32 (1H, m, 7-*H*), 7.24–7.20 (2H, m), 7.06 (1H, t, *J* = 7.4 Hz), 6.85 (1H, t, *J* = 6.8 Hz, 6-*H*), 2.48 (3H, s, -*CH*$_3$). δ_C (125.7 MHz, $CDCl_3$) 160.64, 143.37, 136.20, 135.43, 130.69, 130.26, 129.31, 128.82,

127.97, 127.91, 127.23, 126.68, 126.33, 124.24, 124.19, 121.75, 118.26, 113.36, 17.85 (-*CH*$_3$). IR (KBr, ν (cm^{-1})): 3375 ν(NH), 3107, 3084, 3070, 3012 ν(=CH, Ar), 2966, 2923, 2854 ν(-CH$_3$), 1689 Amide I, 1590 Amide II, 1559, 1534, 1507, 1457 ν(C=C, Ar), 1363, 1310, 1257 Amide III, 1226, 1167, 894, 755, 747 γ(=CH, Ar), 693, 645, 638, γ(C=C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{21}H_{18}N_3O$ $[M+H]^+$: 328.1444; found: 328.1449.

3-Phenyl-N-(m-tolyl)imidazo[1,2-a]pyridine-2-carboxamide (**10c^{iii}**): Yield: 106 mg (65 %); off white solide material, mp. 152 °C (subl.); R_f (10 % EtOAc, 90 % $CHCl_3$) 0.70. δ_H (500 MHz, $CDCl_3$) 9.48 (1H, brs, -*NH*-), 8.05 (1H, dt, J = 7.0, 1.1 Hz, 5-*H*), 7.69–7.63 (4H, m, Ar), 7.61–7.57 (2H, m, Ar), 7.53 (1H, tt, J = 7.3, 1.4 Hz, 4-*H*-Ph), 7.49 (1H, brd, J = 8.2 Hz, Ar), 7.33 (1H, ddd, J = 9.6, 6.8, 1.1 Hz 7-*H*), 7.23 (1H, t, J = 7.8 Hz, Ar), 6.94 (1H, brd, J = 7.5 Hz, Ar), 6.85–6.83 (1H, m, 6-*H*), 2.36 (3H, s, -*CH*$_3$) δ_C (125.7 MHz, $CDCl_3$) 160.69, 143.37, 138.82, 138.10, 135.32, 130.67, 129.34, 128.86, 128.70, 128.03, 127.30, 126.33, 124.67, 124.24, 120.27, 118.14, 116.73, 113.33, 21.50 (-*CH*$_3$). IR (KBr, ν (cm^{-1})): 3364 ν(NH), 3108, 3079, 3070, 3046, 3026, 2979, 2946, 2922 ν(=CH, Ar), 2905, 2852 ν(-CH$_3$), 1681 Amide I, 1592, 1561 ν(C=C, Ar), 1529 Amide II, 1511, 1452, 1445, 1440, 1424 ν(C=C, Ar), 1342, 1289 Amide III, 1264, 1230, 1181, 1163, 1014, 889, 782, 757, 751, 740 γ(=CH, Ar), 693 γ(C=C, Ar), 654, 553. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{21}H_{18}N_3O$ $[M+H]^+$: 328.1444; found: 328.1452.

3-Phenyl-N-(p-tolyl)imidazo[1,2-a]pyridine-2-carboxamide (**10c^{iv}**): Yield: 79 mg (48 %); off white solide material, mp. 173 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.66. δ_H (500 MHz, $CDCl_3$) 9.48 (1H, brs, -*NH*-), 8.06 (1H, brd, J = 7.0 Hz, 5-*H*), 7.68–7.63 (5H, m, Ar), 7.60–7.57 (2H, m, Ar), 7.55.7.51 (1H, m, 4-*H*-Ph), 7.34–7.30 (1H, m, 7-*H*), 7.16 (2H, d, J = 8.2 Hz, Ar), 6.86–6.82 (1H, m, 6-*H*), 2.35 (3H, s, -*CH*$_3$). δ_C (125.7 MHz, $CDCl_3$) 160.54, 143.35, 135.68, 135.31, 133.37, 130.68, 129.40, 129.31, 128.83, 128.02, 127.27, 126.37, 124.24, 119.68, 118.08, 113.35, 20.88 (-*CH*$_3$). IR (KBr, ν (cm^{-1})): 3376 ν(NH), 3111, 3090, 3073, 3049, 3023 ν(=CH, Ar), 2931, 2914, 2849 ν(-CH$_3$), 1683 Amide I, 1591 Amide II, 1560, 1519, 1505, 1404 ν(C=C, Ar), 1313, 1260 Amide III, 1162, 893, 809, 769, 752, 734 γ(=CH, Ar), 711 γ(C=C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{21}H_{18}N_3O$ $[M+H]^+$: 328.1444; found: 328.1442.

N-(2-Hydroxyphenyl)-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**10c^{v}**): Yield: 99 mg (60 %); off white solide material, mp. 160 °C (subl.); R_f (10 % MeOH, 90 % $CHCl_3$) 0.87. δ_H (500 MHz, DMSO-d_6) 10.33 (1H, brs, -*NH*-), 10.01 (1H, s, -*OH*), 8.26 (1H, d, J = 7.8 Hz), 8.14 (1H, d, J = 6.8 Hz, 5-*H*), 7.80 (1H, d, J = 9.0 Hz, 8-*H*), 7.65–7.63 (2H, m, Ar), 7.60–7.52 (3H, m, Ar), 7.46 (1H, t, J = 7.7 Hz, 7-*H*), 7.01 (1H, t, J = 6.5 Hz), 6.97 (1H, d, J = 7.6 Hz), 6.92 (1H, t, J = 7.3 Hz), 6.78 (1H, t, J = 7.2 Hz, 6-*H*). δ_C (125.7 MHz, DMSO-d_6) 160.31, 146.65, 143.41, 135.20, 131.26, 129.46, 129.00, 128.30, 127.61, 127.19, 126.97, 125.03, 123.96, 119.61, 119.32, 118.18, 115.13, 114.45. IR (KBr, ν (cm^{-1})): 3400 ν(OH), ν(NH), 3108, 3076, 3046, 2949, 2923 ν(=CH, Ar), 1675 Amide I, 1608, 1564 ν(C=C, Ar), 1529 Amide II, 1456 ν(C=C, Ar), 1358, 1281, 1228, 1165, 1101, 900, 753 γ(=CH, Ar), 696 γ(C=C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{20}H_{16}N_3O_2$ $[M+H]^+$: 330.1237; found: 330.1247.

N-(4-Methoxyphenyl)-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**10c^{vi}**): Yield: 148 mg (86 %); off white solide material, mp. 158 °C (subl.), 178 °C (melt); R_f (10 % EtOAc, 90 % $CHCl_3$) 0.52. δ_H (500 MHz, $CDCl_3$) 9.46 (1H, brs, -*NH*-), 8.06 (1H, d, J = 6.8 Hz, 5-*H*), 7.69–7.66 (3H, m, Ar), 7.64–7.62 (2H, m, Ar), 7.60–7.56 (2H, m, Ar), 7.54–7.51 (1H, m, 4-*H*-Ph), 7.36–7.33 (1H, m, 7-*H*), 6.89 (2H, d, J = 8.9 Hz), 6.87 (1H, m, 6-*H*), 3.81 (3H, s, -*OCH*$_3$). δ_C (125.7 MHz, $CDCl_3$) 160.23, 156.16, 143.21, 135.05, 131.44, 130.68, 129.36, 128.84, 127.89, 127.28, 126.58, 124.28, 121.33, 117.93, 114.10, 113.44, 55.49 (-*OCH*$_3$). IR (KBr, ν (cm^{-1})): 3376 ν(NH), 3105, 3067, 3043, 3028, 3014, 2955 ν(=CH, Ar), 2934, 2910, 2896, 2834 ν(CH$_3$), 1673 Amide I, 1595, 1561, 1525 1509 Amide II, 1445, 1412 ν(C=C, Ar), 1354, 1300, 1263 Amide III, 1242 ν_{as}(O–CH$_3$), 1164, 1037 ν_s(O–CH$_3$), 1009, 894, 827, 800, 750 γ(=CH, Ar), 739, 693 γ(C=C, Ar), 533, 438. HRMS (ESI-Q-TOF) *m/z* calcd for $C_{21}H_{18}N_3O_2$ $[M+H]^+$: 344.1394; found: 344.1394.

Methyl 4-(3-phenylimidazo[1,2-a]pyridine-2-carboxamido)-benzoate (**10c^{vii}**): Yield: 109 mg (59 %); pale yellow solide material, mp. 187 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.38. δ_H (500 MHz, $CDCl_3$) 9.72 (1H, brs, -*NH*-), 8.05 (1H, d, J = 7.0 Hz, 5-*H*), 8.03 (2H, d, J = 8.7 Hz), 7.84 (2H, d, J = 8.7 Hz), 7.66 (1H, d, J = 9.1 Hz, 8-*H*), 7.64–7.58 (4H, m, Ar), 7.56–7.53 (1H, m, 4-*H*-Ph), 7.36–7.32 (1H, m, 7-*H*), 6.87–6.84 (1H, m, 6-*H*), 3.91 (3H, s, -COO*CH*$_3$). δ_C (125.7 MHz, $CDCl_3$) 166.73, 160.90, 143.40, 142.36, 134.76, 130.79, 130.59, 129.52, 128.92, 127.76, 127.71, 126.59, 125.15, 124.28, 118.74, 118.19, 113.56, 51.92 (-COO*CH*$_3$). IR (KBr, ν (cm^{-1})): 3352 ν(NH), 3105, 3037, 2952, 2923 ν(=CH, Ar), 2893, 2849, 2831 ν(-CH$_3$), 1701 ν(C=O, ester), 1686 Amide I, 1606, 1590, 1563, 1523 ν(C=C, Ar), 1506 Amide II, 1429, 1407 ν(C=C, Ar), 1308, 1285 ν_{as}(C–*O*–C, ester), 1161, 1115 ν_s(C–*O*–C, ester), 1009, 890, 769, 756 γ(=CH, Ar), 743, 700, 693 γ(C=C, Ar), 646. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{22}H_{18}N_3O_3$ $[M+H]^+$: 372.1343; found: 372.1353.

Methyl (3-phenylimidazo[1,2-a]pyridine-2-carbonyl)glycinate (**10d^{i}**): Yield: 124 mg (80 %); pale yellow solide material, mp. 115 °C; R_f (30 % EtOAc, 70 % $CHCl_3$) 0.51. δ_H (500 MHz, $CDCl_3$) 8.05 (1H, d, J = 7.0 Hz, 5-*H*), 8.01 (1H, t, J = 5.8 Hz, -*NH*-), 7.66–7.63 (1H, m, 8-*H*), 7.61–7.59 (2H, m, Ar), 7.57–7.54 (2H, m, Ar), 7.51–7.48 (1H, m, 4-*H*-Ph), 7.31–7.28 (1H, m, 7-*H*), 6.82 (1H, t, J = 7.0 Hz, 6-*H*), 4.24 (2H, d, J = 5.8 Hz, -*CH*$_2$-COOCH$_3$), 3.78 (3H, s, COO*CH*$_3$). δ_C (125.7 MHz, $CDCl_3$) 170.27, 162.97, 143.58, 134.61, 130.63, 129.23, 128.73, 127.93, 127.03, 126.17, 124.17, 118.28, 113.30, 52.25, 40.84. IR (KBr, ν (cm^{-1})): 3410 ν(NH), 3085, 3069, 3047, 3003 ν(=CH, Ar), 2955, 2938, 2852 ν(–CH–, –CH$_2$-,-CH$_3$), 1741 ν(C=O ester), 1664 Amide I, 1568 ν(C=C, Ar), 1510 Amide II, 1445 ν(C=C, Ar), 1348, 1220 ν_{as}(C–*O*–C ester), 1181 ν_s(C–*O*–C ester), 914, 870, 756, 744 γ(=CH, Ar), 697 γ(C=C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{17}H_{16}N_3O_3$ $[M+H]^+$: 310.1186; found: 310.1184.

Methyl (3-phenylimidazo[1,2-a]pyridine-2-carbonyl)-L-alaninate (**10d^{ii}**): Yield: 152 mg (94 %); pale yellow solide material, mp. 103 °C; R_f (20 % EtOAc, 80 % $CHCl_3$) 0.56. δ_H (500 MHz, $CDCl_3$) 8.04 (1H, t, J = 7.0 Hz, 5-*H*), 7.98 (1H, d, J = 7.5 Hz, -*NH*-), 7.66–7.63 (1H, m, 8-*H*), 7.60–7.53 (4H, m, Ar), 7.51–7.47 (1H, m, 4-*H*-Ph), 7.31–7.28 (1H, m, 7-*H*), 6.81 (1H, t, J = 7.0 Hz, 6-*H*), 4.84–4.78 (1H, m, C*H*(CH$_3$)COOC*H*$_3$), 3.77 (3H, s, CH(CH$_3$)COOC*H*$_3$), 1.54 (3H, d, J = 7.5 Hz, CH(C*H*$_3$)COOCH$_3$). δ_C (125.7 MHz, $CDCl_3$) 173.34, 162.33, 143.59, 134.77, 130.64, 129.20, 128.73, 128.00, 126.99, 126.13, 124.15, 118.26, 113.25, 52.35, 47.62, 18.55. IR (KBr, ν (cm^{-1})): 3405 ν(NH), 3118, 3072, 3044, 2993 ν(=CH, Ar), 2952, 2851 ν(–CH–, –CH$_2$-,-CH$_3$), 1740 ν(C=O ester), 1660 Amide I, 1566 ν(C=C, Ar), 1507 Amide II, 1450 ν(C=C, Ar), 1333, 1307, 1213 ν_{as}(C–*O*–C ester), 1187 ν_s(C–*O*–C ester), 764, 754, 737 γ(=CH, Ar), 702 γ(C=C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{18}H_{18}N_3O_3$ $[M+H]^+$: 324.1343; found: 324.1341.

Methyl (3-phenylimidazo[1,2-a]pyridine-2-carbonyl)-L-serinate (**10d^{iii}**): Yield: 146 mg (86 %); beige solide material, mp. 120 °C; R_f (10 % MeOH, 90 % $CHCl_3$) 0.72. δ_H (500 MHz, $CDCl_3$) 8.31 (1H, d, J = 7.2 Hz, -*NH*-), 8.02 (1H, d, J = 6.8 Hz, 5-*H*), 7.63 (1H, brd, J = 9.1 Hz, 8-*H*), 7.58–7.49 (5H, m, Ar), 7.30–7.27 (1H, m, 7-*H*), 6.81 (1H, brt, J = 6.8 Hz), 4.88–4.85 (1H, m, -*CH*-), 4.14–4.04 (2H, m, -*CH*$_2$-), 3.81 (3H, s, -COO*CH*$_3$), 3.57 (1H, brs, –CH$_2$-*OH*). δ_C (125.7 MHz, $CDCl_3$) 170.93, 162.94, 143.57, 134.49, 130.62, 129.29, 128.75, 127.85, 127.19, 126.30, 124.13, 118.25, 113.37, 63,47, 54.65, 52.59. IR (KBr, ν (cm^{-1})): 3417 ν(NH, OH), 2999 ν(=CH, Ar), 2952, 2923, 2873, 2849 ν(–CH–, –CH$_2$-CH$_3$), 1739 ν(C=O, ester), 1663 Amide I, 1640, 1559 ν(C=C, Ar), 1507 Amide II, 1434 ν(C=C, Ar), 1364, 1327, 1262 ν_{as}(C–*O*–C, ester), 1235, 1207, 1078 ν_s(C–*O*–C, ester), 906, 754 γ(=CH, Ar), 741, 700 γ(C=C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{18}H_{18}N_3O_4$ $[M+H]^+$: 340.1292; found: 340.1298.

Methyl (3-phenylimidazo[1,2-a]pyridine-2-carbonyl)-L-prolinate (**10d^{iv}**): Yield: 166 mg (95 %); light brow solide material, mp. 110 °C; R_f (5 % MeOH, 95 % $CHCl_3$) 0.78. δ_H (500 MHz, $CDCl_3$) 8.19 (1H, d, J = 7.0 Hz, 5-*H*, rotamer A), 8.05 (1H, d, J = 7.0 Hz, 5-*H*, rotamer B), 7.70–7.68 (1H,

m, 7-*H*, rotamer A), 7.63–7.52 (9H, m, Ar, rotamer A + rotamer B), 7.48–7.44 (2H, m, 4-*H*-Ph, rotamer A + rotamer B), 7.27–7.22 (2H, m, 7-*H*, rotamer A + rotamer B), 6.84 (1H, t, $J = 7.0$ Hz, 6-*H*, rotamer A), 6.79 (1H, t, $J = 7.0$ Hz, 6-*H*, rotamer B), 5.42–5.40 (1H, m, rotamer A), 4.70–4.68 (1H, m, rotamer B), 3.93–3.89 (1H, m, rotamer A), 3.86–3.80 (1H, m, rotamer B), 3.79–3.74 (2H, m, rotamer A + rotamer B), 3.73 (3H, s, COOC*H*$_3$, rotamer A), 3.64 (3H, s, COOC*H*$_3$, rotamer B), 2.38–2.15 (4H, m, rotamer A), 2.04–1.89 (4H, m, rotamer A + rotamer B). δ_C (125.7 MHz, $CDCl_3$) rotamer A: 173.68, 163.89, 143.91, 137.63, 130.27, 129.00, 128.84, 128.64, 127.07, 125.45, 123.83, 118.48, 113.19, 61.00, 52.10, 48.94, 31.59, 25.09, rotamer B: 172.61, 163.45, 143.21, 137.13, 129.87, 128.86, 128.82, 128.14, 125.83, 125.30, 123.76, 118.42, 113.10, 59.22, 52.06, 47.21, 29.14, 22.25. IR (KBr, ν (cm^{-1})): 3044, 2974, 2946 ν(=CH, Ar), 2876, 2843 ν(–CH–, –CH_2-,-CH_3), 1743 ν(C═O ester), 1637 Amide I, 1505, 1433 ν(C═C, Ar), 1358, 1342, 1328, 1257, 1196 ν_{as}(C–*O*–C ester), 1172 ν_s(C–*O*–C ester), 756, 741 γ(=CH, Ar), 702 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{20}H_{20}N_3O_3$ $[M+H]^+$: 350.1499; found: 350.1497.

3-Phenyl-N-(pyridin-2-yl*)imidazo[1,2-a]pyridine-2-carboxamide* (**10e^{i}**): Yield: 132 mg (84 %); pale yellow solide material, mp. 172 °C; R_f (5 % MeOH, 95 % $CHCl_3$) 0.80. δ_H (500 MHz, $CDCl_3$) 10.14 (1H, brs, -*NH*-), 8.38–8.34 (2H, m, 6-*H*-Py, 3-*H*-Py), 8.04 (1H, dt, $J = 6.8$ Hz, 1.1 Hz, 5-*H*), 7.70–7.58 (6H, m, Ar), 7.56–7.52 (1H, m, 4-*H*-Ph), 7.31 (1H, ddd, $J = 9.1$ Hz, 6.9 Hz, 1.1 Hz, 7-*H*), 7.04 (1H, ddd, $J = 7.3$ Hz, 4.9 Hz, 0.95 Hz, 5-*H*-Py), 6.84 (1H, dt, $J = 6.9$ Hz, 1.1 Hz, 6-*H*). δ_C (125.7 MHz, $CDCl_3$) 161.25, 151.53, 148.01, 143.47, 138.03, 134.86, 130.60, 129.40, 128.88, 127.99, 127.59, 126.25, 124.13, 119.39, 118.53, 113.97, 113.45. IR (KBr, ν (cm^{-1})): 3351 ν(NH), 3108, 3067, 3052, 3002, 2962, 2949, 2922 ν(=CH, Ar), 1686 Amide I, 1573, 1561 ν(C═C, Ar), 1526 Amide II, 1509, 1435 ν(C═C, Ar), 1299 Amide III, 1258, 1157, 894, 772, 754, 734 γ(=CH, Ar), 713, 691 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{19}H_{15}N_4O$ $[M+H]^+$: 315.1240; found: 315.1239.

3-Phenyl-N-(pyridin-3-yl*)imidazo[1,2-a]pyridine-2-carboxamide* (**10e^{ii}**): Yield: 108 mg (69 %); off white solide material, mp. 160 °C (subl.); R_f (10 % MeOH, 90 % $CHCl_3$) 0.60. δ_H (500 MHz, $CDCl_3$) 9.59 (1H, brs, -*NH*-), 8.80 (1H, d, $J = 2.2$ Hz, 2-*H*-Py), 8.40–8.36 (2H, m, 6-*H*-Py, 4-*H*-Py), 8.07 (1H, dt, $J = 6.9$ Hz, 1.0 Hz, 5-*H*), 7.68 (1H, dt, $J = 9.1$ Hz, 1.1 Hz, 8-*H*), 7.64–7.58 (4H, m, Ar), 7.57–7.53 (1H, m, 4-*H*-Ph), 7.35 (1H, ddd, $J = 9.1$ Hz, 6.7 Hz, 1.2 Hz, 5-*H*-Py), 7.29–7.26 (1H, m, 7-*H*), 6.87 (1H, dt, $J = 6.9$ Hz, 1.0 Hz, 6-*H*). δ_C (125.7 MHz, $CDCl_3$) 161.20, 144.81, 143.47, 141.07, 134.99, 134.60, 130.58, 129.53, 128.92, 127.72, 127.65, 126.77, 126.62, 124.29, 123.59, 118.21, 113.58. IR (KBr, ν (cm^{-1})): 3333 ν(NH), 3102, 3092, 3086, 3052, 3035, 2924 ν(=CH, Ar), 1683 Amide I, 1586, 1558 ν(C═C, Ar), 1524 Amide II, 1507, 1481, 1408 ν(C═C, Ar), 1360, 1325, 1287, 1262, 1226, 1159, 892, 810, 757, 738 γ(=CH, Ar), 707, 700 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{19}H_{15}N_4O$ $[M+H]^+$: 315.1240; found: 315.1239.

3-Phenyl-N-(pyridin-4-yl*)imidazo[1,2-a]pyridine-2-carboxamide* (**10e^{iii}**): Yield: 151 mg (96 %); pale yellow solide material, mp. 140 °C; R_f (5 % MeOH, 95 % $CHCl_3$) 0.24. δ_H (500 MHz, $CDCl_3$) 9.68 (1H. brs, -*NH*-), 8.50 (2H, dd, $J = 4.5$ Hz, 1.5 Hz, 2-*H*-Py, 6-*H*-Py), 8.05 (1H, dt, $J = 6.9$ Hz, 1.0 Hz, 5-*H*), 7.68–7.65 (3H, m, 8-*H*, 3-*H*-Py, 5-*H*-Py), 7.63–7.58 (4H. m, Ar), 7.56–7.53 (1H, m, 4-*H*-Ph), 7.34 (1H, ddd, $J = 9.2$ Hz, 6.7 Hz, 1.1 Hz, 7-*H*), 6.86 (1H, dt, $J = 6.9$ Hz, 1.0 Hz, 6-*H*). δ_C (125.7 MHz, $CDCl_3$) 161.34, 150.58, 145.01, 143.43, 134.34, 130.53, 129.61, 128.94, 127.96, 127.58, 126.73, 124.30, 118.22, 113.71, 113.54. IR (KBr, ν (cm^{-1})): 3353 ν(NH), 3052, 3040, 3017, 2964, 2920 ν(=CH, Ar), 1688 Amide I, 1585 ν(C═C, Ar), 1516 Amide II, 1502, 1412 ν(C═C, Ar), 1327, 1211, 1161, 891, 819, 751 γ(=CH, Ar), 691, 659 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{19}H_{15}N_4O$ $[M+H]^+$: 315.1240; found: 315.1238.

N-(3-Carbamoylpyridin-2-yl*)-3-phenylimidazo[1,2-a]pyridine-2-carboxamide* (**10e^{iv}**): Yield: 89 mg (50 %); pale yellow solide material, mp. 208 °C; R_f (10 % MeOH, 90 % $CHCl_3$) 0.62. δ_H (500 MHz, DMSO-d_6) 12.35 (1H, s, -*NH*-), 8.45 (1H, dd, $J = 4.8$ Hz, 1.6 Hz, 6-*H*-Py), 8.32 (1H, brs, -*NH*-), 8.17–8.13 (2H, m, 5-*H* + 4-*H*-Py), 7.78 (1H, brs, -*NH*-), 7.75 (1H, d, $J = 9.1$ Hz, 8-*H*), 7.63–7.61 (2H, m, Ar), 7.58–7.51 (3H, m), 7.47–7.43 (1H, m, 7-*H*), 7.21 (1H, dd, $J = 7.7$ Hz, 4.8 Hz, 5-*H*-Py), 7.01 (1H, dt, $J = 7.0$ Hz, 1.1 Hz, 6-*H*). δ_C (125.7 MHz, DMSO-d_6) 169.32, 160.02, 150.96, 150.75, 143.40, 137.72, 135.63, 131.20, 129.39, 128.97, 128.40, 127.51, 127.40, 124.98, 119.08, 118.37, 118.25, 114.47. IR (KBr, ν (cm^{-1})): 3441 ν_{as}(NH ($CONH_2$)), 3361 ν_s(NH ($CONH_2$)), 3246 ν_{as}(NH sec.), 3191 ν(=CH, Ar), 1696 Amide I (prim.), 1654 Amide I (sec.), 1592, 1497, 1446, 1435 ν(C═C, Ar), 1386, 1307 Amide III, 1163, 900, 774, 754, 741 γ(=CH, Ar), 698 γ(C═C, Ar), 575. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{20}H_{16}N_5O_2$ $[M+H]^+$: 358.1299; found: 358.1288.

3-Phenyl-N-(pyrimidin-2-yl*)imidazo[1,2-a]pyridine-2-carboxamide* (**10f^{i}**): Yield: 90 mg (57 %); off white solide material, mp. 217 °C; R_f (10 % MeOH, 90 % $CHCl_3$) 0.80. δ_H (500 MHz, $CDCl_3$) 10.30 (1H, brs, -*NH*-), 8.66 (2H, d, $J = 4.8$ Hz), 8.11 (1H, dt, $J = 7.0$ Hz, 1.1 Hz, 5-*H*), 7.69–7.64 (3H, m, Ar), 7.55–7.51 (2H, m, Ar), 7.50–7.46 (1H, m, Ar), 7.33 (1H, ddd, $J = 9.5$ Hz, 6.8 Hz, 1.0 Hz, 7-*H*), 7.02 (1H, t, $J = 4.9$ Hz), 6.85 (1H, dt, $J = 7.0$ Hz, 1.1 Hz, 6-*H*). δ_C (125.7 MHz, $CDCl_3$) 159.93, 158.33, 157.78, 143.32, 134.49, 130.76, 129.22, 128.62, 128.37, 127.49, 126.47, 124.30, 118.46, 116.38, 113.60. IR (KBr, ν (cm^{-1})): 3382, 3370 ν(NH), 3111, 3079, 3046, 2990, 2920, 2852 ν(=CH, Ar), 1713, 1699 Amide I, 1576 ν(C═C, Ar), 1506 Amide II, 1482, 1434, 1418 ν(C═C, Ar), 1275 Amide III, 1220, 1152, 1124, 754, 740 γ(=CH, Ar), 696 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{18}H_{14}N_5O$ $[M+H]^+$: 316.1193; found: 316.1193.

3-Phenyl-N-(pyrazin-2-yl*)imidazo[1,2-a]pyridine-2-carboxamide* (**10f^{ii}**): Yield: 134 mg (85 %); pale yellow solide material, mp. 195 °C (subl.); R_f (10 % MeOH, 90 % $CHCl_3$) 0.80. δ_H (500 MHz, $CDCl_3$) 10.1 (1H, brs, -*NH*-), 9.65 (1H, d, $J = 1.1$ Hz), 8.43–8.31 (2H, m, Ar), 8.05 (1H, brd, $J = 6.9$ Hz, 5-*H*), 7.67 (1H, brd, $J = 9.1$ Hz, 8-*H*), 7.64–7.59 (4H, m, Ar), 7.57–7.54 (1H, m, Ar), 7.35–7.32 (1H, m, 7-*H*), 6.86 (1H, brt, $J = 6.8$ Hz, 6-*H*), δ_C (125.7 MHz, $CDCl_3$) 160.97, 148.32, 143.50, 142.30, 139.86, 136.97, 134.05, 130.53, 129.65, 128.98, 128.07, 127.62, 126.63, 124.24, 118.46, 113.72. IR (KBr, ν (cm^{-1})): 3351 ν(NH) 3108, 3088, 3056, 2922, 2851 ν(=CH, Ar), 1690 Amide I, 1563, 1534 ν(C═C, Ar), 1508 Amide II, 1412, 1295 Amide III, 1231, 1159, 1019, 1009, 893, 771, 757, 741 γ(=CH, Ar), 708 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calcd for $C_{18}H_{14}N_5O$ $[M+H]^+$: 316.1193; found: 316.1196.

3-Phenyl-N-(4H-1,2,4-triazol-4-yl*)imidazo[1,2-a]pyridine-2-carboxamide* (**10g^{i}**): Yield: 110 mg (72 %); off white solide material, mp. 198 °C; R_f (10 % MeOH, 90 % $CHCl_3$) 0.20. δ_H (500 MHz, DMSO-d_6) 12.18 (1H, brs, -*NH*-), 8.69 (2H, s, N–C*H*═N), 8.20 (1H, d, $J = 7.0$ Hz, 5-*H*), 7.76 (1H, d, $J = 9.1$ Hz, 8-*H*), 7.63–7.61 (2H, m, Ar), 7.58–7.47 (4H, m, 7-*H,* Ar), 7.05 (1H, dt, $J = 7.0$ Hz, 0.9 Hz, 6-*H*). δ_C (125.7 MHz, DMSO-d_6) 161.97, 144.32, 143.89, 132.62, 131.13, 129.67, 129.05, 128.26, 127.88, 127.75, 125.21, 118.21, 114.76. IR (KBr, ν (cm^{-1})): 3120 ν(NH), 3094, 3069, 3051 ν(=CH, Ar), 2920, 2851, 1692 Amide I, 1560, 1507 Amide II, 1443 ν(C═C, Ar), 1403, 1318, 1275, 1270 Amide III, 1234, 1160, 1067, 751 γ(=CH, Ar), 742, 732, 699 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{16}H_{13}N_6O$ $[M+H]^+$: 305.1145; found: 305.1156.

3-Phenyl-N-(pyridazin-3-yl*)imidazo[1,2-a]pyridine-2-carboxamide* (**10g^{ii}**): Yield: 145 mg (92 %); pale yellow solide material, mp. 170 °C (subl.); R_f (2 % MeOH, 98 % $CHCl_3$) 0.55. δ_H (500 MHz, DMSO-d_6) 10.47 (1H, s, -*NH*-), 9.02 (1H, dd, $J = 4.7$, 1.2 Hz, Ar), 8.39 (1H, dd, $J = 9.0$, 1.2 Hz, Ar), 8.20 (1H, dt, $J = 7.0$, 1.2 Hz, 5-*H*), 7.82 (1H, dt, $J = 9.1$, 1.2 Hz, 8-*H*), 7.72 (1H, dd, $J = 9.0$ Hz, 4.7 Hz, Ar), 7.68–7.66 (2H, m, Ar), 7.62–7.54 (3H, m, Ar), 7.51 (1H, ddd, $J = 9.3$, 6.7, 1.1 Hz, 7-*H*), 7.06 (1H, dt, $J = 6.7$, 1.1 Hz, 6-*H*). δ_C (125.7 MHz, DMSO-d_6) 161.59, 155.09, 149.27, 143.56, 133.93, 131.15, 129.73, 129.16, 129.13, 128.04, 127.89, 127.83, 125.21, 118.37, 118.34, 114.86. IR (KBr, ν (cm^{-1})): 3338 ν(NH), 3146, 3117, 3093, 3052, 2920, 2852 ν(=CH, Ar), 1690 Amide I, 1574, 1565, 1530 ν(C═C, Ar), 1507 Amide II, 1483, 1439 ν(C═C, Ar), 1354, 1270 Amide III, 1254, 1229, 1092, 893, 755, 738

γ(=CH, Ar), 706, 690 γ(C═C, Ar), 661, 577. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{18}H_{14}N_5O$ $[M+H]^+$: 316.1193; found: 316.1206.

3-Phenyl-N-(1H-1,2,4-triazol-3-yl)imidazo[1,2-a]pyridine-2-carboxamide (**10g^{iii}**): Yield: 101 mg (66 %); off white solide material, mp. 205 °C (subl.); R_f (20 % MeOH, 80 % $CHCl_3$) 0.74. δ_H (500 MHz, DMSO-d_6) 13.61 (1H, brs), 11.26 (1H, brs), 8.16 (1H, d, J = 7.0 Hz, 5-*H*), 7.76 (1H, d, J = 9.1 Hz, 8-*H*), 7.65–7.63 (2H, m), 7.60–7.52 (3H, m), 7.49–7.45 (1H, m, 7-*H*), 7.05–7.01 (1H, m, 6-*H*). δ_C (125.7 MHz, DMSO-d_6) 161.26, 149.31 (br), 148.34 (br), 143.60, 133.85 (br), 131.12, 129.61, 129.15, 128.02, 127.72, 125.11, 118.31, 114.70, IR (KBr, ν (cm^{-1})): 3420 ν(NH, amine), 3395 ν(NH, amide), 3170, 3118, 3074, 3054, 3028, 2996, 2961, 2920, 2855, 2805 ν(=CH, Ar), 1665 Amide I, 1584 Amide II, 1551, 1515, 1463 ν(C═C, Ar), 1345, 1270, 1236, 1168, 1039, 964, 895, 756 γ(=CH, Ar), 703, 692 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{16}H_{13}N_6O$ $[M+H]^+$: 305.1145; found: 305.1148.

3-Phenyl-N-(thiazol-2-yl)imidazo[1,2-a]pyridine-2-carboxamide (**10h^{i}**): Yield: 135 mg (84 %); light brown solide material, mp. +230 °C; R_f (20 % MeOH, 80 % $CHCl_3$) 0.92. δ_H (500 MHz, DMSO-d_6) 11.61 (1H, brs, -*NH*-), 8.33 (1H, s), 8.20 (1H, d, J = 7.0 Hz, 5-*H*), 7.79 (1H, d, J = 9.2 Hz, 8-*H*), 7.67–7.64 (2H, m), 7.63–7.55 (3H, m), 7.54 (1H, d, J = 3.5 Hz), 7.51–7.47 (1H, m, 7-*H*), 7.28 (1H, d, J = 3.5 Hz), 7.06–7.03 (1H, m, 6-*H*). δ_C (125.7 MHz, DMSO-d_6) 160.85, 157.63, 143.75, 138.36, 133.53, 131.08, 129.74, 129.21, 127.97, 127.85, 128.83, 125.16, 118.37, 114.79, 114.41. IR (KBr, ν (cm^{-1})): 3198, 3167, 3110 ν(=CH, Ar), 3082 ν(NH), 3061, 3043, 3002 ν(=CH, Ar), 1661 Amide I, 1560, 1522 Amide II, 1506, 1478 ν(C═C, Ar), 1316, 1278, 1264 Amide III, 1170, 1147, 893, 806, 748 γ(=CH, Ar), 733, 698 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{17}H_{13}N_4OS$ $[M+H]^+$: 321.0805; found: 321.0809.

3-Phenyl-N-(1,3,4-thiadiazol-2-yl)imidazo[1,2-a]pyridine-2-carboxamide (**10h^{ii}**): Yield: 147 mg (92 %); pale yellow solide material, mp. 210 °C (subl.); R_f (20 % MeOH, 80 % $CHCl_3$) 0.70. δ_H (500 MHz, DMSO-d_6) 12.32 (1H, brs, -*NH*-), 9.21 (1H, s, 5′-*H*), 8.19 (1H, d, J = 6.9 Hz, 5-*H*), 7.79 (1H, d, J = 9.1 Hz, 8-*H*), 7.66–7.64 (2H, m, Ar), 7.62–7.55 (3H, m, Ar), 7.51–7.48 (1H, m, 7-*H*), 7.06–7.04 (1H, m, 6-*H*). δ_C (125.7 MHz, DMSO-d_6) 161.24, 158.48, 149.46, 143.82, 133.20, 131.06, 129.81, 129.24, 128.53, 127.93, 127.73, 125.19, 118.44, 114.91. IR (KBr, ν (cm^{-1})): 3358 ν(NH), 3114, 3076, 2958, 2920, 2846 ν(=CH, Ar), 1690 Amide I, 1567, 1526 Amide II, 1506, 1413 ν(C═C, Ar), 1354, 1301, 1265, 1224, 1142, 1115, 892, 758, 746 γ(=CH, Ar), 701 γ(C═C, Ar), 621, 609. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{16}H_{12}N_5OS$ $[M+H]^+$: 322.0757; found: 322.0760.

N-(5-Methyl-1,3,4-thiadiazol-2-yl)-3-phenylimidazo[1,2-a]py-ridine-2-carboxamide (**10h^{iii}**): Yield: 144 mg (86 %); pale yellow solide material, mp. 171 °C (subl.), R_f (20 % MeOH, 80 % $CHCl_3$) 0.70. δ_H (500 MHz, $CDCl_3$) 10.92, (1H, brs, -*NH*-), 8.07 (1H, d, J = 7.0 Hz, 5-*H*), 7.67 (1H, d, J = 9.2 Hz, 8-*H*), 7.63–7.58 (4H, m), 7.57–7.54 (1H, m), 7.35 (1H, ddd, J = 9.7 Hz, 6.5 Hz, 0.9 Hz, 7-*H*), 6.89–6.86 (1H, m, 6-*H*), 2.71 (3H, s, -CH_3). δ_C (125.7 MHz, $CDCl_3$) 160.28, 159.97, 158.10, 143.80, 132.63, 130.46, 129.77, 129.04, 128.55, 127.15, 126.87, 124.23, 118.67, 113.96, 15.34. IR (KBr, ν (cm^{-1})): 3364, 3343 ν(NH), 3111, 3055, 2987, 2958 ν(=CH, Ar), 2923, 2849 ν(-CH_3), 1694 Amide I, 1633, 1604 ν(C═C, Ar), 1566, 1542, 1524 Amide II, 1508, 1487, 1433, 1354, 1301, 1257, 1224, 1148, 1118, 1012, 894, 769, 755, 740 γ(=CH, Ar), 707 γ(C═C, Ar), 627, 603. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{17}H_{14}N_5OS$ $[M+H]^+$: 336.0914; found: 336.0917.

N-(5-(tert-butyl)-1,3,4-thiadiazol-2-yl)-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**10h^{iv}**): Yield: 119 mg (63 %); beige solide material, mp. +230 °C; R_f (20 % MeOH, 80 % $CHCl_3$) 0.78. δ_H (500 MHz, DMSO-d_6) 12.09 (1H, brs, -*NH*-), 8.20 (1H, d, J = 6.8 Hz, 5-*H*), 7.78 (1H, d, J = 9.1 Hz, 8-*H*), 7.65–7.63 (2H, m, Ar), 7.62–7.54 (3H, m, Ar), 7.49 (1H, t, J = 7.9 Hz, 7-*H*), 7.05 (1H, t, J = 6.7 Hz, 6-*H*), 1.41 (9H, s, –C(CH_3)$_3$). δ_C (125.7 MHz, DMSO-d_6) 174.28, 161.05, 157.95, 143.81, 133.27, 131.04, 129.75, 129.20, 128.43, 127.90, 127.74, 125.19, 118.43, 114.88, 35.92, 31.01. IR (KBr, ν (cm^{-1})): 3358 ν(NH), 3141, 3102, 3064, 3040, 2964 ν(=CH, Ar), 2932, 2914, 2861 ν((CH_3)$_3$C-), 1692 Amide I, 1566 ν(C═C, Ar), 1519 Amide II, 1501, 1486 ν(C═C, Ar), 1363, 1302 Amide III, 1266, 1154, 1123, 900, 771, 756 γ(=CH, Ar), 696 γ(C═C, Ar), 612, 602, 594. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{20}H_{20}N_5OS$ $[M+H]^+$: 378.1383; found: 378.1388.

3-Phenyl-N-(5-(trifluoromethyl)-1,3,4-thiadiazol-2-yl)-imidazo[1,2-a]pyridine-2-carboxamide (**10h^{v}**): Yield: 134 mg (69 %); pale yellow solide material, mp. 190 °C (subl.) 212 °C (melt); R_f (20 % MeOH, 80 % $CHCl_3$) 0.78. δ_H (500 MHz, DMSO-d_6) 13.39 (1H, brs, -*NH*-), 8.19 (1H, d, J = 7 Hz, 5-*H*), 7.78 (1H, d, J = 9.2 Hz, 8-*H*), 7.66–7.64 (2H, m, Ar), 7.63–7.56 (3H, m, Ar), 7.52–7.49 (1H, m, 7-*H*), 7.08–7.05 (1H, m, 6-*H*). δ_C (125.7 MHz, DMSO-d_6) 162.11, 161.68, 151.19 (q, $J_{C\text{-}F}$ = 37.5 Hz), 143.93, 132.54, 131.05, 129.91, 129.29, 129.26, 128.13, 127.57, 125.26, 120.59 (q, $J_{C\text{-}F}$ = 272.0 Hz), 118.43, 115.09. δ_F (470.4 MHz, DMSO-d_6) −58.24. IR (KBr, ν (cm^{-1})): 3355 ν(NH), 3076, 3052, 2926, 2852 ν(=CH, Ar), 1695 Amide I, 1563, 1504 Amide II, 1480 ν(C═C, Ar), 1327, 1301, 1327, 1301 Amide III, 1184 ν(C–F), 1159 ν(C–F), 1112, 1035, 896, 763, 756 γ(=CH, Ar), 746, 699 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{17}H_{11}F_3N_5OS$ $[M+H]^+$: 390.0631; found: 390.0630.

Morpholino(3-phenylimidazo[1,2-a]pyridin-2-yl)methanone (**10i^{i}**) [16]: Yield: 135 mg (88 %); off white solide material, mp. 143 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.67. δ_H (500 MHz, $CDCl_3$) 8.18 (1H, d, J = 6.6 Hz, 5-*H*), 7.67 (1H, d, J = 9.0 Hz, 8-*H*), 7.58–7.53 (4H, m, Ar), 7.50–7.47 (1H, m, 4-*H*-Ph), 7.29–7.25 (1H, m, 7-*H*), 6.84 (1H, t, J = 6.6 Hz, 6-*H*), 3.75 (2H, brs), 3.68 (2H, brs), 3.54 (2H, brs), 3.39 (2H, brs). δ_C (125.7 MHz, $CDCl_3$) 164.83, 144.45, 137.26, 129.48, 129.29, 129.10, 128.03, 125.52, 124.53, 123.66, 118.47, 113.24, 66.76, 47.50, 42.43. IR (KBr, ν (cm^{-1})): 3114, 3060, 3034, 3003, 2965 ν(=CH, Ar), 2905, 2850 ν(–CH_2–), 1628 Amide I, 1552, 1501, 1460, 1438 ν(C═C, Ar), 1276 Amide III, 1255, 1233, 1113 ν(–CH_2–*O*–CH_2–, ether), 984, 848, 776, 758 γ(=CH, Ar), 703 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{18}H_{18}N_3O_2$ $[M+H]^+$: 308.1394; found: 308.1388.

(3-Phenylimidazo[1,2-a]pyridin-2-yl)(pyrrolidin-1-yl)methanone (**10i^{ii}**) [16]: Yield: 99 mg (68 %); off white solide material, mp. 133 °C; R_f (10 % MeOH, 90 % $CHCl_3$) 0.56. δ_H (500 MHz, $CDCl_3$) 8.16 (1H, d, J = 7.0 Hz, 5-*H*), 7.65 (1H, d, J = 9.0 Hz, 8-*H*), 7.62–7.60 (2H, m, Ar), 7.54–7.51 (2H, m, Ar), 7.46–7.43 (1H, m, 4-*H*-Ph), 7.26–7.23 (1H, m, 7-*H*), 6.82–6.79 (1H, m, 6-*H*), 3.62 (2H, t, J = 6.5 Hz), 3.57 (2H, d, J = 6.5 Hz), 1.90–1.80 (4H, m). δ_C (125.7 MHz, $CDCl_3$) 163.88, 144.00, 138.82, 129.75, 129.02, 128.78, 128.47, 125.23, 124.70, 123.71, 118.39, 113.02, 48.36, 46.02, 26.17, 24.16. IR (KBr, ν (cm^{-1})): 3064, 3023, 2987, 2970, 2952 ν(=CH, Ar), 2926, 2873, 2864 ν(–CH_2–), 1619 Amide I, 1551, 1508, 1433 ν(C═C, Ar), 1360, 1325, 1244, 759, 751 γ(=CH, Ar), 740, 706 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{18}H_{18}N_3O$ $[M+H]^+$: 292.1444; found: 292.1444.

(3-Phenylimidazo[1,2-a]pyridin-2-yl)(piperidin-1-yl)methanone (**10i^{iii}**) [16]: Yield: 90 mg (59 %); light brown solide material, mp. 137 °C; R_f (5 % MeOH, 95 % $CHCl_3$) 0.83. δ_H (500 MHz, $CDCl_3$) 8.24 (1H,dt, J = 7.0 Hz, 1.0 Hz, 5-*H*), 7.77 (1H, d, J = 9.0 Hz, 8-*H*), 7.60–7.58 (2H, m, Ar), 7.56–7.52 (2H, m, Ar), 7.49–7.45 (1H, m, 2-*H*-Ph), 7.32 (1H, ddd, J = 9.0 Hz, 7.0 Hz, 1.0 Hz, 7-*H*), 6.89 (dt, 1H, J = 7.0 Hz, 1.0 Hz, 6-*H*), 3.67 (2H, brs), 3.34–3.31 (2H, m), 1.55 (4H, brs), 1.22 (2H, brs). δ_C (125.7 MHz, $CDCl_3$) 163.83, 144.12, 137.36, 129.31, 129.30, 129.06, 127.72, 126.03, 123.69, 123.34, 118.12, 113.56, 48.09, 42.89, 26.12, 25.39, 24.46. IR (KBr, ν (cm^{-1})): 3085, 3058, 3005, 2962 ν(=CH, Ar), 2940, 2851 ν(–CH_2–), 1631 Amide I, 1502, 1445 ν(C═C, Ar), 1345, 1269, 1260 Amide III, 1230, 1139, 775, 753 γ(=CH, Ar), 707 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{19}H_{20}N_3O$ $[M+H]^+$: 306.1601; found: 306.1614.

(4-Methylpiperazin-1-yl)(3-phenylimidazo[1,2-a]pyridin-2-yl)-methanone (**10i^{iv}**): Yield: 154 mg (96 %); beige solide material, mp. 109 °C; R_f (20 % MeOH, 80 % $CHCl_3$) 0.80. δ_H (500 MHz, $CDCl_3$) 8.20 (1H, dt, J = 6.9 Hz, 1.1 Hz, 5-*H*), 7.67 (1H, dt, J = 9.2 Hz, 1.1 Hz, 8-*H*), 7.58–7.52 (4H, m, Ar), 7.48–7.44 (1H, m, 4-*H*-Ph), 7.26 (1H, ddd, J = 9.2 Hz, 6.9 Hz, 1.1 Hz, 7-*H*), 6.84 (1H, dt, J = 6.9 Hz, 1.1 Hz, 6-*H*), 3.77 (2H, brs,-

C*H*$_2$-), 3.49 (2H, brs, -C*H*$_2$-), 2.40 (2H, t, J = 2.6 Hz, -C*H*$_2$-), 2.23 (3H, s, N–C*H*$_3$), 2.11 (2H, t, J = 2.6 Hz, -C*H*$_2$-). δ_C (125.7 MHz, $CDCl_3$) 164.52, 144.50, 137.68, 129.39, 129.29, 128.97, 128.07, 125.41, 124.10, 123.63, 118.48, 113.18, 55.00, 54.50, 46.80, 45.92, 41.79. IR (KBr, ν (cm^{-1})): 3114, 3099, 3064, 3046, 2979, 2946, 2920 ν(=CH, Ar), 2896, 2858, 2802, 2781 ν(–CH_2–, –CH_3), 1633 Amide I, 1545, 1506, 1463, 1441 ν(C═C, Ar), 1357, 1296, 1286, 1250, 1227, 1168, 1148, 1130, 998, 767, 758 γ(=CH, Ar), 702 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{19}H_{21}N_4O$ $[M+H]^+$: 321.1710; found: 321.1718.

3-Phenyl-N-(thiophen-2-ylmethyl)imidazo[1,2-a]pyridine-2-carboxamide (**10j^{i}**): Yield: 123 mg (74 %); pale yellow solide material, mp. 120 °C; R_f (20 % EtOAc, 80 % $CHCl_3$) 0.72. δ_H (500 MHz, $CDCl_3$) 8.05 (1H, d, J = 7.0 Hz, 5-*H*), 7.92 (1H, t, J = 6.0 Hz, CH_2N*H*-), 7.63–7.55 (5H, m, Ar), 7.53–7.49 (1H, m, 4-*H*-Ph), 7.30–7.26 (1H, m, 7-*H*), 7.23 (1H, dd, J = 5.0 Hz, 1.0 Hz), 7.06 (1H, d, J = 3.5 Hz), 6.97 (1H, dd, J = 5.0 Hz, 3.5 Hz), 6.80 (1H, t, J = 7.0 Hz, 6-*H*), 4.81 (2H, d, J = 6.0 Hz, –NH–C*H*$_2$-). δ_C (125.7 MHz, $CDCl_3$) 162.42, 143.56, 141.16 135.00, 130.68, 129.20, 128.75, 128.06, 126.97, 126.86, 126.12, 126.05, 125.01, 124.19, 118.13, 113.2137.76. IR (KBr, ν (cm^{-1})): 3348, 3299 ν(NH), 3314, 3073, 3022 ν(=CH Ar), 2973, 2927, 2911 ν(–CH_2–), 1655 Amide I, 1563 ν(C═C, Ar), 1510 Amide II, 1478, 1344 ν(C═C, Ar), 1283 Amide III, 1261, 1239, 1189, 754 γ(=CH, Ar), 707, 697 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{19}H_{16}N_3OS$ $[M+H]^+$: 334.1009; found: 334.1009.

N-(Furan-2-ylmethyl)-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**10j^{ii}**): Yield: 127 mg (80 %); pale yellow solide material, mp. 148 °C; R_f (20 % EtOAc, 80 % $CHCl_3$) 0.72. δ_H (500 MHz, $CDCl_3$) 8.05 (1H, d, J = 7.0 Hz, 5-*H*), 7.85 (1H, t, J = 6.0 Hz, CH_2N*H*-), 7.63–7.60 (3H, m, Ar), 7.58–7.55 (2H, m, Ar), 7.53–7.50 (1H, m, 4-*H*-Ph), 7.39–7.38 (1H, m), 7.31–7.27 (1H, m, Ar), 6.82 (1H, dt, J = 7.0 Hz, 1.0 Hz, 6-*H*), 6.34–6.33 (1H, m, Ar), 6.30–6.29 (1H, m, Ar), 4.64 (2H, d, J = 6.0 Hz). δ_C (125.7 MHz, $CDCl_3$) 162.50, 151.57, 143.55, 142.13, 135.01, 130.69, 129.19, 128.73, 128.05, 126.97, 126.13, 124.20, 118.12, 113.20, 110.37, 107.41, 35.99. IR (KBr, ν (cm^{-1})): 3326 ν(NH), 3114, 3079, 3022 ν(=CH, Ar), 2949, 2930 ν(–CH_2–), 1656 Amide I, 1637, 1564 ν(C═C, Ar), 1503 Amide II, 1481 ν(C═C, Ar), 1351, 1287 Amide III, 1261, 1239, 1184, 1147, 1010 ν(–CH–*O*–CH–, ether), 756, 743 γ(=CH, Ar), 697 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{19}H_{16}N_3O$ $[M+H]^+$: 318.1237; found: 318.1246.

N-Benzyl-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**10k^{i}**) [16]: Yield: 146 mg (89 %); off white solide material, mp. 155 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.58. δ_H (500 MHz, $CDCl_3$) 8.06 (1H, dt, J = 7.0 Hz, 1.1 Hz, 5-*H*), 7.90 (1H, t, J = 6.0 Hz, -*NH*-), 7.65–7.63 (2H, m, 8-*H*, Ar), 7.61–7.56 (3H, m, Ar), 7.53–7.49 (1H, m, 4-*H*-Ph), 7.41–7.39 (2H, m, Ar), 7.37–7.33 (2H, m, Ar), 7.30–7.27 (2H, m, Ar), 6.82 (1H, t, J = 7.0 Hz, 6-*H*), 4.65 (2H, d, J = 6.0 Hz, –NH–C*H*$_2$-). δ_C (125.7 MHz, $CDCl_3$) 162.65, 143.53, 138.53, 135.19, 130.72, 129.18, 128.74, 128.61, 128.12, 127.98, 127.31, 126.90, 126.10, 124.21, 118.10, 113.17, 43.09. IR (KBr, ν (cm^{-1})): 3318 ν(NH), 3110, 3066, 3028, 3015, 2965 ν(=CH, Ar), 2911, 2844 ν(–CH_2–), 1652 Amide I, 1564 ν(C═C, Ar), 1511 Amide II, 1480 ν(C═C, Ar), 1352, 1278 Amide III, 1263, 1250, 970, 754 γ(=CH, Ar), 696 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{21}H_{18}N_3O$ $[M+H]^+$: 328.1444; found: 328.1452.

(S)-3-Phenyl-N-(1-phenylethyl)imidazo[1,2-a]pyridine-2-carboxamide (**10k^{ii}**): Yield: 144 mg (84 %); off white solide material, mp. 118 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.60. δ_H (500 MHz, $CDCl_3$) 8.04 (1H, dt, J = 7.0 Hz, 1.0 Hz, 5-*H*), 7.86 (1H, d, J = 8.2 Hz, -*NH*-), 7.64–7.59 (3H, m, Ar), 7.57–7.54 (2H, m, Ar), 7.51–7.48 (1H, m, 4-*H*-Ph), 7.46–7.44 (2H, m, Ar), 7.37–7.34 (2H, m, Ar), 7.30–7.25 (2H, m, Ar), 6.80 (1H, dt, J = 7.0 Hz, 1.0 Hz, 6-*H*), 5.37–5.31 (1H, m, C*H*(CH_3)Ph), 1.64 (3H, d, J = 7.0 Hz, CH–C*H*$_3$). δ_C (125.7 MHz, $CDCl_3$) 161.87, 143.64, 143.51, 135.28, 130.71, 129.13, 128.72, 128.58, 128.14, 127.13, 126.84, 126.33, 126.09, 124.19, 118.07, 113.15, 48.32, 22.27. IR (KBr, ν (cm^{-1})): 3405, 3395 ν(NH), 3065, 3023, 3000, 2975 ν(=CH, Ar), 2962, 2939, 2922 ν(–CH–, –CH_3),1671 Amide I, 1560 ν(C═C, Ar), 1505 Amide II, 1479, 1453, 1445 ν(C═C, Ar), 1337, 1263 Amide III, 1229, 1020, 884, 749, 736 γ(=CH, Ar), 705, 696 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{22}H_{20}N_3O$ $[M+H]^+$: 342.1601; found: 342.1603.

N-(3,4-dihydroxybenzyl)-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**10k^{iii}**): Yield: 120 mg (64 %); off white solide material, mp. 236 °C; R_f (5 % MeOH, 95 % $CHCl_3$) 0.44. δ_H (500 MHz, DMSO-d_6) 8.81 (1H, s, -*OH*), 8.70–8.67 (2H, m, -O*H*, -*NH*-), 8.13 (1H, d, J = 7.0 Hz, 5-*H*), 7.67 (1H, d, J = 9.1 Hz, 8-*H*), 7.59–7.49 (5H, m, Ar), 7.42–7.39 (1H, m, 7-*H*), 6.99–6.96 (1H, m, 6-*H*), 6.75 (1H, d, J = 1.5 Hz), 6.66 (1H, d, J = 8.0 Hz), 6.58 (1H, dd, J = 8.0 Hz, 1.5 Hz), 4.26 (2H, d, J = 6.2 Hz). δ_C (125.7 MHz, DMSO-d_6) 162.41, 145.50, 144.59, 143.40, 135.85, 131.22, 131.13, 129.18, 128.89, 128.62, 127.05, 126.11, 124.89, 118.91, 117.97, 115.76, 115.60, 114.11, 42.12. IR (KBr, ν (cm^{-1})): 3287 ν(NH, OH), 3090, 3043 ν(=CH, Ar), 2961, 2920 ν(CH_2), 1643 Amide I, 1601, 1570 Amide II, 1517, 1422 ν(C═C, Ar), 1355, 1294, 1283 Amide III, 1268, 1257, 1196, 1114, 977, 762 γ(=CH, Ar), 750, 736, 700 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{21}H_{18}N_3O_3$ $[M+H]^+$: 360.1343; found: 360.1355.

N-(4-Hydroxy-3-methoxybenzyl)-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**10k^{iv}**): Yield: 123 mg (66 %); pale yellow solide material, mp. 157 °C; R_f (5 % MeOH, 95 % $CHCl_3$) 0.64. δ_H (500 MHz, $CDCl_3$) 8.06 (1H, d, J = 6.7 Hz, 5-*H*), 8.02 (1H, brs, -*NH*-), 7.66 (1H, d, J = 9.0 Hz, 8-*H*), 7.63–7.62 (2H, m, Ar), 7.60–7.57 (2H, m, Ar), 7.54–7.51 (1H, m, Ar), 7.36–7.33 (1H, m, 7-*H*), 6.88–6.83 (4H, m, Ar), 6.65 (1H, brs, -O*H*$_{Ar}$), 4.54 (2H, d, J = 5.4 Hz), 3.79 (3H, s, -OC*H*$_3$). δ_C (125.7 MHz, $CDCl_3$) 161.91, 146.77, 145.20, 143.10, 134.37, 130.73, 130.04, 129.40, 128.82, 127.73, 127.17, 126.95, 124.31, 121.19, 117.68, 114.44, 113.67, 111.04, 55.91, 43.24. IR (KBr, ν (cm^{-1})): 3408 ν(OH), 3375 ν(NH), 3105, 3090, 2996 ν(=CH, Ar), 2940, 2867 ν(CH_2, CH_3), 1665 Amide I, 1601, 1568 Amie II, 1505, 1481, 1463 ν(C═C, Ar), 1357, 1274, 1262 Amide III, 1241, 1210 ν_{as}(Ar-*O*-CH_3, ether), 1156, 1036 ν_s(Ar-*O*-CH_3, ester), 758 γ(=CH, Ar), 698 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{22}H_{20}N_3O_3$ $[M+H]^+$: 374.1499; found: 374.1504.

N-phenethyl-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**10l^{i}**): Yield: 145 mg (85 %); off white solide material, mp. 110 °C; R_f (5 % MeOH, 95 % $CHCl_3$) 0.54.δ_H (500 MHz, $CDCl_3$) 8.07 (1H, d, J = 7.0 Hz, 5-*H*), 7.95 (1H, brs, -*NH*-), 7.70 (1H, d, J = 9.1 Hz, 8-*H*), 7.62–7.57 (4H, m, Ar), 7.55–7.51 (1H, m, Ar), 7.40–7.37 (1H, m, Ar), 7.34–7.31 (2H, m, Ar), 7.29–7.27 (2H, m, Ar), 7.26–7.23 (1H, m, Ar), 6.90 (1H, t, J = 6.7 Hz, 6-*H*), 3.73–3.69 (2H, m, -C*H*$_2$NH-), 2.98 (2H, t, J = 7.5 Hz, CH_2C*H*$_2$Ph). δ_C (125.7 MHz, $CDCl_3$) 161.80, 142.70, 139.14, 133.96, 130.71, 129.49, 128.86, 128.84, 128.54, 127.50, 127.30, 127.10, 126.33, 124.40, 117.46, 113.85, 40.66, 36.05. IR (KBr, ν (cm^{-1})): 3404 ν(NH), 3138, 3104, 3082, 3062, 3044, 3022 ν(=CH, Ar), 2945, 2929, 2878 ν(CH_2), 1665 Amide I, 1570 Amide II, 1509, 1483 ν(C═C, Ar), 1352, 1340, 1261 Amide III, 1246, 1128, 885, 757 γ(=CH, Ar), 743, 697 γ(C═C, Ar), 603. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{22}H_{20}N_3O$ $[M+H]^+$: 342.1601; found: 342.1605.

N-(3,4-dihydroxyphenethyl)-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**10l^{ii}**): Yield 158 mg (85 %); pale yellow solide material, mp. 187 °C; R_f (10 % MeOH, 90 % $CHCl_3$) 0.72, δ_H (500 MHz, DMSO-d_6) 8.76 (1H, s, -O*H*$_{Ar}$), 8.64 (1H, s, -O*H*$_{Ar}$), 8.34 (1H, t, J = 5.9 Hz, -*NH*-), 8.12 (1H, d, J = 7.0 Hz, 5-*H*), 7.66 (1H, d, J = 9.1 Hz, 8-*H*), 7.58–7.48 (5H, m, Ar), 7.40 (1H, ddd, J = 9.40 Hz, 6.80 Hz, 0.95 Hz, 7-*H*), 6.98–6.95 (1H, m, 6-*H*), 6.65 (1H, d, J = 8.0 Hz, Ar), 6.63 (1H, d, J = 1.8 Hz, Ar), 6.48 (1H, dd, J = 8.0 Hz, 1.8 Hz, Ar), 3.42–3.38 (2H, m, -C*H*$_2$-NH-), 2.65 (2H, t, J = 7.5 Hz, -C*H*$_2$-Ar). δ_C (125.7 MHz, DMSO-d_6) 162.54, 145.58, 144.00, 143.37, 135.89, 131.21, 130.71, 129.15, 128.89, 128.65, 126.99, 126.01, 124.86, 119.68, 117.99, 116.45, 116.01, 114.07, 40.80, 35.28. IR (KBr, ν (cm^{-1})): 3414 ν(OH, NH), 3107, 3018, 2955 ν(=CH, Ar), 2921, 2848, 2724 ν(CH_2), 1650 Amide I, 1603, 1565 Amide II, 1517, 1467, 1445 ν(C═C, Ar), 1361, 1296, 1278, 1255 Amide III, 1192 ν(C–OH), 1147, 1119, 948, 821, 755 γ(=CH, Ar), 696 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{22}H_{20}N_3O_2$ $[M+H]^+$: 374.1499; found: 374.1507.

N-(2-(3,4-Dihydroxyphenyl)-2-hydroxyethyl)-3-phenylimidazo[1,2-a]

pyridine-2-carboxamide (**10l^{iii}**): Yield: 109 mg (56 %); off white solide material, mp. 177 °C; R_f (10 % MeOH, 90 % $CHCl_3$) 0.56. δ_H (500 MHz, DMSO-d_6) 8.79 (2H, brs, -OH_{Ar}), 8.15 (1H, t, J = 5.9 Hz, -*NH*-), 8.12 (1H, d, J = 7.0 Hz, 5-*H*), 7.69 (1H, d, J = 9.1 Hz, 8-*H*), 7.58–7.49 (5H, m, Ar), 7.43–7.40 (1H, m, 7-*H*), 6.99–6.96 (1H, m, 6-*H*), 6.80 (1H, d, J = 1.6 Hz), 6.69 (H, d, J = 8.0 Hz), 6.62 (1H, dd, J = 8.0 Hz, 1.5 Hz), 5.40 (1H, brs), 4.57 (1H, brs), 3.53–3.48 (1H, m), 3.25–3.19 (1H, m). δ_C (125.7 MHz, DMSO-d_6) 162.48, 145.41, 144.80, 143.38, 135.55, 135.08, 131.23, 129.20, 128.89, 128.55, 127.12, 126.11, 124.90, 118.04, 117.28, 115.63, 114.15, 113.98, 71.62, 46.97. IR (KBr, ν (cm-1)): 3458 ν(OH), 3420 ν(NH, OH), 3113, 3046, 2973 ν(=CH, Ar), 2938, 2896 ν(CH_2), 1641 Amide I, 1612, 1581, 1569 Amide II, 1522, 1437 ν(C═C, Ar), 1280, 1258 Amide III, 1196, 1068, 906, 758 γ(=CH, Ar), 707 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{22}H_{20}N_3O_4$ $[M+H]^+$: 390.1448; found: 390.1457.

3-Phenyl-N-(pyridin-2-ylmethyl)imidazo[1,2-a]pyridine-2-carboxamide (**10m^{i}**): Yield: 161 mg (98 %); light brow solide material, mp. 146 °C; R_f (5 % MeOH, 95 % $CHCl_3$) 0.74. δ_H (500 MHz, $CDCl_3$) 8.59 (1H, d, J = 5.3 Hz, 6-*H*-Py), 8.41 (1H, t, J = 5.6 Hz, -*NH*-), 8.04 (1H, dt, J = 7.1 Hz, 1.0 Hz, 5-*H*), 7.66–7.60 (4H, m, Ar), 7.56–7.53 (2H, m, Ar), 7.50–7.47 (1H, m, 4-*H*-Ph), 7.35 (1H, d, J = 7.8 Hz, 3-*H*-Py), 7.27 (1H, ddd, J = 9.0 Hz, 7.0 Hz, 1.0 Hz, 7-*H*), 7.18 (1H, dd, J = 7.0 Hz, 5.3 Hz, 5-*H*-Py), 6.80 (1H, dt, J = 7.1 Hz, 1.0 Hz, 6-*H*), 4.78 (2H, d, J = 5.6 Hz, CH_2-Py). δ_C (125.7 MHz, $CDCl_3$) 162.94, 157.48, 149,20, 143.63, 136.70, 135.24, 130.70, 129.14, 128.71, 128.13, 126.82, 126.01, 124.15, 122.17, 121.86, 118.27, 113.17, 44.38. IR (KBr, ν (cm^{-1})): 3358 ν(NH), 3041 ν(=CH, Ar), 2905, 2864 ν(–CH_2–), 1669 Amide I, 1604, 1593, 1568 ν(C═C, Ar), 1508 Amide II, 1476, 1450, 1433 ν(C═C, Ar), 1360, 1142, 1259 Amide III, 1223, 898, 768, 759, 753 756, 740 γ(=CH, Ar), 701 γ(C═C, Ar), 648. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{20}H_{17}N_4O$ $[M+H]^+$: 329.1397; found: 329.1398.

3-Phenyl-N-(pyridin-3-ylmethyl)imidazo[1,2-a]pyridine-2-carboxamide (**10m^{ii}**): Yield: 161 mg (98 %); off white solide material, mp. 142 °C; R_f (5 % MeOH, 95 % $CHCl_3$) 0.58. δ_H (500 MHz, $CDCl_3$) 8.62 (1H, d, J = 1.5 Hz, 2-*H*-Py), 8.52 (1H, dd, J = 4.7 Hz, 1.5 Hz, 6-*H*-Py), 8.04 (1H, dt, J = 7.0 Hz, 1.0 Hz, 5-*H*), 8.01 (1H, t, J = 6.1 Hz, -N*H*-), 7.71 (1H, dt, J = 7.8 Hz, 2.0 Hz, 4-*H*-Py), 7.62–7.54 (5H, m, Ar), 7.52–7.48 (1H, m, 4-*H*-Ph), 7.29–7.23 (2H, m, 7-*H*, 5-*H*-Py), 6.81 (1H, dt, J = 7.0 Hz, 1.0 Hz, 6-*H*), 4.64 (2H, d, J = 6.1 Hz, CH_2-Py). δ_C (125.7 MHz, $CDCl_3$) 162.86, 149.32, 148.75, 143.56, 135.62, 134.85, 134.26, 130.65, 129.26, 128.76, 127.97, 127.02, 126.23, 124.21, 123.50, 118.08, 113.28, 40.48. IR (KBr, ν (cm^{-1})): 3291 ν(NH), 3110, 3079, 3028, 3018 ν(=CH, Ar), 2908, 2841 ν(–CH_2–), 1651 Amide I, 1637, 1577, 1561 ν(C═C, Ar), 1509 Amide II, 1475, 1426 ν(C═C, Ar), 1351, 1281 Amide III, 1260, 1241, 1174, 971, 915, 855, 791, 753 γ(=CH, Ar), 718, 700 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{20}H_{17}N_4O$ $[M+H]^+$: 329.1397; found: 329.1398.

3-Phenyl-N-(pyridin-4-ylmethyl)imidazo[1,2-a]pyridine-2-carboxamide (**10m^{iii}**): Yield: 136 mg (83 %); pale yellow solide material, mp. 143 °C; R_f (5 % MeOH, 95 % $CHCl_3$) 0.54. δ_H (500 MHz, $CDCl_3$) 8.56–8.55 (2H, m, 2-*H*-Py, 6-*H*-Py), 8.07–8.04 (2H, m, 5-*H*, -*NH*-),7.63–7.60 (3H, m, Ar), 7.58–7.55 (2H, m, Ar), 7.52–7.49 (1H, m, *4-H*-Ph), 7.32–7.29 (3H, m, 7-*H*, 3-*H*-Py, 5-*H*-Py), 6.83 (1H, dt, J = 7.0 Hz, 1.0 Hz, 6-*H*), 4.65 (2H, d, J = 6.4 Hz, CH_2-Py). δ_C (125.7 MHz, $CDCl_3$) 163.02, 149.90, 147.82, 143.61; 134.72, 130.64, 129.30, 128.78, 127.89, 127.13, 126.31, 124.25; 122.39, 118.13, 113.34, 41.82. IR (KBr, ν (cm^{-1})): 3241 ν(NH), 3107, 3085, 3051, 3028 ν(=CH, Ar), 2941, 2920, 2908 ν(–CH_2–), 1662 Amide I, 1601, 1579, 1564 ν(C═C, Ar), 1519 Amide II, 1501, 1482 ν(C═C, Ar), 1357, 1280 Amide III, 1266, 1248, 974, 756, 744 γ(=CH, Ar), 695 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{20}H_{17}N_4O$ $[M+H]^+$: 329.1397; found: 329.1399.

N-(1-Hydroxy-2-methylpropan-2-yl)-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**10n^{i}**): Yield: 142 mg (92 %); light brown solide material, mp. 122 °C; R_f (5 % MeOH, 95 % $CHCl_3$) 0.62. δ_H (500 MHz, $CDCl_3$) 8.01 (1H, d, J = 7.0 Hz, 5-*H*), 7.68 (1H, brs, -*NH*-), 7.61 (1H, d, J = 9.1 Hz, 8-*H*), 7.57–7.49 (5H, m, Ar), 7.31–7.28 (1H, m, 7-*H*), 6.81 (1H, t, J = 6.8 Hz, 6-*H*), 5.21 (1H, t, J = 5.8 Hz, CH_2–O*H*), 3.71 (2H, d, J = 5.8 Hz, –C(CH_3)$_2$–CH_2–OH), 1.44 (6H, s, C-(CH_3)$_2$). δ_C (125.7 MHz, $CDCl_3$) 163.56, 143.37, 135.18, 130.65, 129.28, 128.80, 128.01, 126.82, 126.26, 124.19, 118.02, 113.24, 70.98, 56.22, 25.04. IR (KBr, ν (cm^{-1})): 3420 ν(OH), 3277 ν(NH), 3090, 3054, 3031 ν(=CH, Ar), 2967, 2920, 2861, ν(–CH_2–, –CH_3), 1728, 1672 Amide I:, 1641, 1555 ν(C═C, Ar), 1509 Amide II, 1374 ν(C═C, Ar), 1364, 1282 Amide III, 1263, 1064 ν_s(C–O(H)), 1018, 919, 889, 766, 752 γ(=CH, Ar), 744, 706 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{18}H_{20}N_3O_2$ $[M+H]^+$: 310.1550; found: 310.1549.

N-(2-Hydroxyethyl)-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**10n^{ii}**) [16]: Yield: 111 mg (79 %); pale yellow solide material, mp. 139 °C; R_f (5 % MeOH, 95 % $CHCl_3$) 0.48. δ_H (500 MHz, $CDCl_3$) 8.02 (1H, d, J = 7.0 Hz, 5-*H*), 7.97 (1H, t, J = 5.6 Hz, -*NH*-), 7.59 (1H, d, J = 9.1 Hz, 8-*H*), 7.57–7.53 (4H, m, Ar), 7.51–7.48 (1H, m, 4-*H*-Ph), 7.30–7.26 (1H, m, 7-*H*), 6.81 (1H, t, J = 6.8 Hz, 6-*H*), 3.82 (2H, t, J = 5.0 Hz, -CH_2-OH), 3.61 (2H, dt, J = 5.6 Hz, 5.0 Hz, –NH–*C*H_2-CH_2-). δ_C (125.7 MHz, $CDCl_3$) 163.83, 143.50, 14.92, 130.66, 129.25, 128.73, 127.93, 126.92, 126.31, 124.20, 118.01, 113.29, 62.45, 42.30. IR (KBr, ν (cm^{-1})): 3410 ν(OH), 3244 ν(NH), 3090, 3046 ν(=CH, Ar), 2932, 2914, 2879, 2849 ν (–CH_2–), 1659 Amide I, 1570 ν(C═C, Ar), 1510 Amide II, 1482, 1464, 1460, 1443 ν(C═C, Ar), 1354, 1280 Amide III, 1263, 1233, 1088 ν_{as}(C–O(H)), 1074 ν_s(C–O(H)), 1017, 757 γ(=CH, Ar), 744, 697 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{16}H_{16}N_3O_2$ $[M+H]^+$: 282.1237; found: 282.1239.

N-(1,3-Dihydroxy-2-(hydroxymethyl)propan-2-yl)-3-phenyl-imidazo [1,2-a]pyridine-2-carboxamide (**10n^{iii}**): Yield: 140 mg (82 %); pale yellow solide material, mp. 203 °C; R_f (10 % MeOH, 90 % $CHCl_3$) 0.54. δ_H (500 MHz, DMSO-d_6) 8.09 (1H, d, J = 7.9 Hz 5-*H*), 8.07 (1H, brs, -*NH*-), 7.70 (1H, d, J = 9.0 Hz, 8-*H*), 7-59-7.49 (5H, m, Ar), 7.43–7.39 (1H, m, 7-*H*), 6.98–6.96 (1H, m, 6-*H*), 4.93 (3H, t, J = 5.3 Hz, –(CH_2–O*H*)$_3$), 3.63 (6H, d, J = 5.3 Hz, -(CH_2–OH)$_3$). δ_C (125.7 MHz, DMSO-d_6) 163.04, 143.21, 135.53, 131.25, 129.26, 128.90, 128.57, 127.27, 126.24, 124.90, 117.99, 114.19, 62.11, 60.92. IR (KBr, ν (cm^{-1})): 3364 ν(NH), 3335 ν(OH), 3105, 3073, 3052, 3020, 2952 ν(=CH, Ar), 2937, 2879 ν(–CH_2–), 1645 Amide I, 1563, 1508 Amide II, 1480, 1447 1480 ν(C═C, Ar), 1340, 1275 Amide III, 1261, 1250, 1120, 1055 ν_{as}(C–O(H)), 1029 ν_a(C–O(H)), 1016, 885, 758 γ(=CH, Ar), 743, 696 γ(C═C, Ar), 542. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{18}H_{20}N_3O_4$ $[M+H]^+$: 342.1448; found: 342.1457.

N-(Benzo[d][1,3]dioxol-5-ylmethyl)-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**10o**): Yield: 161 mg (87 %); off white solide material, mp. 165 °C; R_f (5 % MeOH, 95 % $CHCl_3$) 0.73. δ_H (500 MHz, $CDCl_3$) 8.06 (1H, d, J = 6.9 Hz, 5-*H*), 7.99 (1H, brs, -*NH*-), 7.64–7.61 (3H, m, Ar), 7.57 (2H, t, J = 7.4 Hz), 7.53–7.50 (1H, m, 4-*H*-Ph), 7.34–7.31 (1H, m, *7-H*), 6.89 (1H, s, Ar), 6.86–8.83 (2H, m, Ar), 6.79 (1H, d, J = 7.9 Hz, Ar), 5.94 (2H, s, -*O*-CH_2-*O*-), 4.54 (2H, d, J = 5.9 Hz, -CH_2-). δ_C (125.7 MHz, $CDCl_3$) 162.10, 147.84, 146.86, 143.14, 134.51, 132.40, 130.72, 129.34, 128.79, 127.80, 127.08, 126.71, 124.31, 121.27, 117.78, 113.52, 108.68, 108.24, 100.98, 42.94. IR (KBr, ν (cm^{-1})): 3414 ν(NH), 3143, 3117, 3088, 3040 ν(=CH, Ar), 2990, 2932, 2879 ν(CH_2), 1673, 1667 Amide I, 1568 Amide II, 1500, 1488, 1463, 1445 ν(C═C, Ar), 1259 Amide III, 1247 ν_{as}(-*O*–CH_2–O, ether), 1234, 1034 ν_s(-*O*–CH_2–O, ether), 924, 756 γ(=CH, Ar), 750, 743, 697 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{22}H_{18}N_3O_3$ $[M+H]^+$: 372.1343; found: 372.1337.

N-(2-(1H-Indol-3-yl)ethyl)-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**10p**) [16]: Yield: 163 mg (86 %); off white solide material, mp. 204 °C; R_f (5 % MeOH, 95 % $CHCl_3$) 0.46. δ_H (500 MHz, $CDCl_3$) 8.33 (1H, brs, -CHN*H*-), 8.05 (1H, d, J = 6.8 Hz, 5-*H*), 7.96 (1H, brs, –C(O)N*H*CH_2-), 7.69–7.65 (2H, m, Ar), 7.61–7.55 (4H, m, Ar), 7.54–7.51 (1H, m, Ar), 7.37–7.34 (2H, m, Ar), 7.19 (1H, t, J = 7.5 Hz), 7.12 (1H, t, J = 7.4 Hz), 7.09 (1H, s, -*NH*-CH-), 6.87 (1H, t, J = 6.8 Hz, 6-*H*), 3.82–3.78 (2H, m, -CH_2NH-), 3.12 (2H, t, J = 7.2 Hz, NHCH_2CH_2). δ_C (125.7 MHz, $CDCl_3$) 161.83, 142.66, 136.40, 133.99, 130.74, 129.48, 128.86, 127.32, 127.05, 124.37, 122.16, 121.91, 119.24, 118.86, 117.39, 113.85, 113.13, 111.17, 39.61, 25.60. IR (KBr, ν (cm^{-1})): 3358 ν(NH),

3286 ν(NH), 3111, 3058, 3011 ν(=CH, Ar), 2973, 2937, 2881 $\nu(CH_2)$, 1654 Amide I, 1576 Amide II, 1564, 1516, 1469, 1438 ν(C=C, Ar), 1351, 1336, 1273, 1261 Amide III, 1249, 751 γ(=CH, Ar), 738, 699 γ(C=C, Ar), 633. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{24}H_{21}N_4O$ $[M+H]^+$: 381.1710; found: 381.1712.

N-(2-Morpholinoethyl)-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**10q**): Yield: 128 mg (73 %); off white solide material, mp. 171 °C; R_f (5 % MeOH, 95 % $CHCl_3$) 0.36. δ_H (500 MHz, $CDCl_3$) 8.03 (1H, d, $J = 6.8$ Hz, 5-*H*), 7.85 (1H, brs, -*NH*-), 7.64 (1H, d, $J = 9.1$ Hz, 8-*H*), 7.60–7.54 (4H, m, Ar), 7.50 (1H, m, 4-*H*-Ph), 7.29 (1H, t, $J = 7.8$ Hz, 7-*H*), 6.81 (1H, t, $J = 6.8$ Hz, 6-*H*), 3.81 (4H, brs), 3.62 (2H, brs), 2.68–2.60 (6H, m). δ_C (125.7 MHz, $CDCl_3$) 163.05, 143.61, 135.30, 130.68, 129.17, 128.74, 128.17, 126.73, 126.03, 124.17, 118.24, 113.17, 66.65, 57.45, 53.41, 35.43. (KBr, ν (cm^{-1})):3407 ν(NH), 3135, 3108, 3088,3049, 2973, 2955, 2937, 2926 ν(=CH, Ar), 2887, 2843, 2823, 2796, 2767 $\nu(CH_2)$, 1662 Amide I, 1570, 1507, 1482, 1473, 1443 ν(C=C, Ar), 1354, 1337, 1294, 1270, 1262 Amide III, 1142, 1117, 1015, 871, 760 γ(=CH, Ar), 700 γ(C=C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{20}H_{23}N_4O_2$ $[M+H]^+$: 351.1816; found: 351.1821.

((1R,3r,5S)-3-Hydroxy-8-azabicyclo[3.2.1]octan-8-yl*)(3-phenyl-imidazo[1,2-a]pyridin*-2-yl*)methanone* (**10r**): Yield: 163 mg (94 %), pale yellow solide material, mp. 74 °C; R_f (10 % MeOH, 90 % $CHCl_3$) 0.48. δ_H (500 MHz, $CDCl_3$) 8.21 (1H, d, $J = 7.0$ Hz, 5-*H*), 7.77 (1H, d, $J = 9.0$ Hz, 8-*H*), 7.59–7.57 (2H, m, Ar), 7.55–7.52 (2H, m, Ar), 7.48–7.46 (1H, m, Ar), 7.35–7.32 (1H, m, 7-*H*), 6.91–6.88 (1H, m, 6-*H*), 4.78–4.76 (1H, m), 4.25–4.23 (1H, m), 4.08 (1H, brt, $J = 4.4$ Hz), 2.26–2.17 (2H, m), 2.09–2.04 (1H, m), 1.92–1.79 (4H, m), 1.66 (1H, d, $J = 14.5$ Hz), 1.55–1.48 (1H, m). δ_C (125.7 MHz, $CDCl_3$) 161.38, 143.83, 137.11, 129.51, 129.27, 129.17, 127.76, 126.24, 123.98, 123.79, 118.12, 113.72, 65.06, 55.42, 51.08, 40.58, 38.76, 28.30, 27.20. IR (KBr, ν (cm^{-1})): 3416 ν(OH), 3108, 3076 ν(=CH, Ar), 2971, 2937, 2919, 2870, ν(–CH–, $–CH_2$-), 1617 Amide I, 1575, 1552, 1505, 1442 ν(C=C, Ar), 1353, 1317, 1259, 1087 ν_{as}(C–O(H)), 1045 ν_s(C–O(H)), 1020, 902, 760 γ(=CH, Ar), 700 γ(C=C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{21}H_{22}N_3O_2$ $[M+H]^+$: 348.1707; found: 348.1708.

3-Phenylimidazo[1,2-a]pyridine-2-carboxamide (**10s**) [17]: Yield: 82 mg (69 %); pale yellow solide material, mp. 165 °C; R_f (2 % MeOH, 98 % $CHCl_3$) 0.71. δ_H (500 MHz, $CDCl_3$) 8.06 (1H, d, $J = 6.9$ Hz, 5-*H*), 7.66 (1H, d, $J = 9.2$ Hz, 8-*H*), 7.61–7.55 (4H, m, Ar), 7.53–7.49 (1H, m, 4-*H*-Ph), 7.39 (1H, brs, –CO–*NH_2*), 7.34–7.30 (1H, m, 7-*H*), 6.85–6.83 (1H, m, 6-*H*), 5.59 (1H, brs, CO–*NH_2*). δ_C (125.7 MHz, $CDCl_3$) 164.93, 143.59, 134.76, 130.63, 129.23, 128.78, 128.02, 127,19, 126.11, 124.17, 118.27, 113.29. IR (KBr, ν (cm^{-1})): 3379, 3202 ν(NH), 3108, 3085, 3046, 3029 ν(=CH, Ar), 1682 ν(C=C, Ar), 1658 Amide I, 1639, 1607 ν(C=C, Ar), 1580 Amide II, 1505 ν(C=C, Ar), 1412 Amide III, 1355, 1312, 1260, 1014, 754 γ(=CH, Ar), 740, 700 γ(C=C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{14}H_{12}N_3O$ $[M+H]^+$: 238.0975; found: 238.0983.

N-Benzyl-8-methyl-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**11k^i**): Yield: 165 mg (97 %); pale yellow solide material, mp. 139 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.70. δ_H (500 MHz, $CDCl_3$) 8.04 (1H, brs, -*NH*-), 7.92 (1H, d, $J = 7.0$ Hz, 5-*H*), 7.64–7.62 (2H, m, Ar), 7.59–7.55 (2H, m, Ar), 7.53–7.49 (1H, m, Ar), 7.44–7.42 (2H, m, Ar), 7.39–7.35 (2H, m, Ar), 7.32–7.29 (1H, m, Ar), 7.08 (1H, d, $J = 5.0$ Hz, 7-*H*), 6.74 (1H, t, $J = 6.2$ Hz, 6-*H*), 4.68 (2H, d, $J = 6$ Hz, -*CH_2*Ph), 2.64 (3H, s, 8-*CH_3*). δ_C (125.7 MHz, $CDCl_3$) 162.50, 143.71, 138.74, 134.77, 134.28, 130.76, 129.20, 128.73, 128.59, 127.99, 127.42, 127.26, 124.97, 122.02, 113.55, 43.00, 16.99.IR (KBr, ν (cm^{-1})): 3258 ν(NH), 3108, 3085, 3058, 3026, 3005, 2943 ν(=CH, Ar), 2911, 2855 ν(–CH_2–, CH_3), 1662 Amide I, 1564 ν(C=C, Ar), 1520 Amide II, 1499, 1477 1455 ν(C=C, Ar), 1357, 1268 Amide III, 1244, 959, 951, 772, 752 γ(=CH, Ar), 696 γ(C=C, Ar), 504. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{22}H_{20}N_3O$ $[M+H]^+$: 342.1601; found: 342.1603.

N-Benzyl-7-methyl-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**12k^i**): Yield: 147 mg (86 %); pale yellow solide material, mp. 111 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.56. δ_H (500 MHz, $CDCl_3$) 8.07 (1H, brs, -*NH*-), 7.94 (1H, d, $J = 7.1$ Hz, 5-*H*), 7.61 (2H, d, $J = 7.5$ Hz, Ar), 7.58–7.55 (2H, m, Ar), 7.52–7.49 (2H, m, Ar), 7.41–7.39 (3H, m, Ar), 7.35 (2H, t, $J = 7.5$ Hz), 7.29–7.26 (1H, m, Ar), 6.69 (2H, d, $J = 7.1$ Hz, 6-*H*), 4.64 (2H, d, $J = 6$ Hz, -*CH_2*Ph), 2.45 (3H, s, 7-*CH_3*). δ_C (125.7 MHz, $CDCl_3$) 162.19, 143.49, 138.51, 138.22, 133.99, 130.73, 129.25, 128.76, 128.59, 128.01, 127.86, 127.29, 126.68, 123.47, 116.38, 115.79, 43.12, 21.43. IR (KBr, ν (cm^{-1})): 3398, 3386 ν(NH), 3079, 3055, 3022, 3002, 2920 ν(=CH, Ar), 2852 ν(–CH_2–, CH_3), 1669 Amide I, 1661 Amide I, 1567 ν(C=C, Ar), 1516 Amide II, 1455 ν(C=C, Ar), 1342, 1322, 1272 Amide III, 1264, 1243, 1186, 1030, 970, 788, 777, 759 γ(=CH, Ar), 706, 699 γ(C=C, Ar), 613, 606, 597. 497. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{22}H_{20}N_3O$ $[M+H]^+$: 342.1601; found: 342.1600.

N-Benzyl-6-methyl-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**13k^i**): Yield: 167 mg (98 %); off white solide material, mp. 113 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.40. δ_H (500 MHz, $CDCl_3$) 8.01 (1H, brs, -*NH*-), 7.82 (1H, s, 5-*H*), 7.63–7.57 (4H, m, Ar), 7.55–7.51 (2H, m, Ar), 7.40 (2H, d, $J = 7.5$ Hz, Ar), 7.36–7.33 (2H, m, Ar), 7.30–7.26 (1H, m, Ar), 7.18 (1H, d, $J = 9.2$ Hz), 4.64 (2H, d, $J = 6.0$ Hz, -*CH_2*Ph), 2.31 (3H, s, 6-*CH_3*). δ_C (125.7 MHz, $CDCl_3$) 162.27, 142.22, 138.52, 134.40, 130.76, 130.02, 129.24, 128.78, 128.60, 128.03, 127.30, 126.74, 123.40, 121.67, 117.03, 43.11, 18.37. IR (KBr, ν (cm^{-1})): 3397 ν(NH), 3082, 3056, 3043, 3029, 2923 ν(=CH, Ar), 2858 ν(–CH_2–, CH_3), 1664 Amide I, 1565, 1536 ν(C=C, Ar), 1513 Amide II, 1481, 1455, 1442 ν(C=C, Ar), 1407, 1330, 1277 Amide III, 1263, 1251, 1209, 1030, 965, 950, 805, 752 γ(=CH, Ar), 740, 697 γ(C=C, Ar), 601, 502, 439. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{22}H_{20}N_3O$ $[M+H]^+$: 342.1601; found: 342.1601.

N-Benzyl-5-methyl-3-phenylimidazo[1,2-a]pyridine-2-carboxamide (**14k^i**): Yield: 155 mg (91 %); off white solide material, mp. 99 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.42. δ_H (500 MHz, $CDCl_3$) 7.96 (1H, brs, -*NH*-), 7.55–7.45 (6H, m, Ar), 7.37–7.26 (6H, m, Ar), 7.22 (1H, t, $J = 8.0$ Hz, 7-*H*), 6.55 (1H, d, $J = 6.6$ Hz), 4.59 (2H, d, $J = 5.8$ Hz, -*CH_2*Ph), 2.10 (3H, s, -*CH_3*). δ_C (125.7 MHz, $CDCl_3$) 162.08, 144.44, 138.44, 137.83, 135.33, 131.96, 131.24, 129.16, 128.56, 128.01, 127.47, 127.27, 126.65, 115.87, 114.70, 43.05, 21.41. IR (KBr, ν (cm^{-1})): 3402 ν(NH), 3049, 3023, 2982 ν(=CH, Ar), 2955, 2924, 2852 ν(–CH_2–, CH_3), 1673 Amide I, 1557 ν(C=C, Ar), 1507 Amide II, 1453 ν(C=C, Ar), 1391, 1274 Amide III, 1228, 1183, 781, 763 γ(=CH, Ar), 706 γ(C=C, Ar), 592, 568, 510. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{22}H_{20}N_3O$ $[M+H]^+$: 342.1601; found: 342.1603.

N-Benzyl-3-butylimidazo[1,2-a]pyridine-2-carboxamide (**15k^i**): Yield: 141 mg (92 %); pale yellow solide material, mp. 88 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.54. δ_H (500 MHz, $CDCl_3$) 8.14 (1H, d, $J = 7.0$ Hz, 5-*H*), 7.95 (1H, brs, -*NH*-), 7.55 (1H, d, $J = 9.1$ Hz), 7.42-7-39 (2H, m, Ar), 7.35 (2H, t, $J = 7.4$ Hz, Ar), 7.30–7.23 (2H, m, Ar), 6.91–6.87 (1H, m, 6-*H*), 4.68 (2H, d, $J = 6.0$ Hz, -*CH_2*-Ph), 3.41 (2H, t, $J = 7.7$ Hz, -*CH_2*-), 1.73–1.67 (2H, m, -C*H_2*-), 1.52–1.44 (2H, m, -C*H_2*-), 0.98 (3H, t, $J = 7.3$ Hz, -C*H_3*). δ_C (125.7 MHz, $CDCl_3$) 163.44, 142.82, 138.54, 133.78, 128.61, 128.41, 127.90, 127.29, 125.41, 123.62, 118.00, 113.00, 43.04, 29.92, 23.06, 22.68, 13.89. IR (KBr, ν (cm^{-1})): 3231 ν(NH), 3103, 3083, 3075, 3059, 3042, 3033 ν(=CH, Ar), 2965, 2933, 2875, 2855 ν(–CH_2–, CH_3), 1643 Amide I, 1572, 1532 ν(C=C, Ar), 1499 Amide II, 1455, 1430 ν(C=C, Ar), 1356, 1290, 1276, 1262 Amide III, 1238, 765 γ(=CH, Ar), 747, 699 γ(C=C, Ar), 492. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{19}H_{22}N_3O$ $[M+H]^+$: 308.1757; found: 308.1762.

N-Benzyl-3-(cyclohex-1-en-1-yl*)imidazo[1,2-a]pyridine-2-carboxamide* (**16k^i**): Yield: 161 mg (97 %); pale yellow solide material, mp. 142 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.38. δ_H (500 MHz, $CDCl_3$) 8.14 (1H, $J = 6.9$ Hz, 5-*H*), 7.93 (1H, brs, -*NH*-), 7.53 (1H, d, $J = 9.1$ Hz, 8-*H*), 7.41–7.39 (2H, m, Ar), 7.35 (2H, t, $J = 7.2$ Hz, Ar), 7.29–7.23 (2H, m, Ar), 6.86–6.83 (1H, m, 6-*H*), 6.02 (1H, brs, =C*H*), 4.68 (2H, d, $J = 5.7$ Hz, -C*H_2*Ph), 2.47 (2H, brs, -C*H_2*-), 2.36 (2H, brs, -C*H_2*-), 1.93–1.79 (2H, m, -C*H_2*-), 1.84–1.80 (2H, m, -C*H_2*-). δ_C (125.7 MHz, $CDCl_3$) 162.52, 142.77, 138.46, 133.81, 132.66, 129.12, 128.60, 127.94, 127.32, 127.30, 125.99, 124.42, 117.68, 112.98, 43.10, 28.51, 25.67, 22.79,

21.86. IR (KBr, ν (cm^{-1})): 3285 ν(NH), 3105, 3084, 3076, 3063, 3026 ν(=CH, Ar), 2949, 2920, 2899, 2870, 2855, 2826 ν(–CH_2–, CH_3), 1648 Amide I, 1554 ν(C═C, Ar), 1490 Amide II, 1354, 1324, 1272 Amide III, 1252, 1171, 921, 856, 759 γ(=CH, Ar), 745, 698 γ(C═C, Ar), 595. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{21}H_{22}N_3O$ $[M+H]^+$: 332.1757; found: 332.1765.

N [2],*N*^{6}*-Dibenzyl-3-phenylimidazo[1,2-a]pyridine-2,6-dicarboxamide* (**17k^{i}**): Yield: 122 mg (53 %); off white solide material, mp. 158 °C; R_f (5 % MeOH, 95 % $CHCl_3$) 0.64. δ_H (500 MHz, DMSO-d_6) 9.26 (1H, t, J = 5.7 Hz, -*NH*-), 9.01 (1H, t, J = 6.3 Hz, -*NH*-), 8.64 (1H, s, 5-*H*), 7.88 (1H, dd, J = 9.5 Hz, 1.5 Hz, 7-*H*), 7.74 (1H, d, J = 9.5 Hz, 8-*H*), 7.63–7.61 (2H, m, Ar), 7.58–7.51 (3H, m, Ar), 7.34–7.21 (10H, m, Ar), 4.47 (2H, d, J = 5.7 Hz, -*CH*$_2$-), 4.43 (2H, d, J = 6.3 Hz, -*CH*$_2$-). δ_C (125.7 MHz, DMSO-d_6) 164.23, 162.43, 143.61, 140.27, 139.72, 136.91, 131.36, 129.45, 128.94, 128.79, 128.67, 128.13, 127.81, 127.76, 127.33, 127.30, 127.13, 126.15, 125.41, 121.36, 117.39, 43.18, 42.50. IR (KBr, ν (cm^{-1})): 3332 ν(NH), 3300 ν(NH), 3085, 3064, 3029 ν(=CH, Ar), 2926 ν(–CH_2–), 1666 Amide I, 1648 Amide I, 1630, 1559 ν(C═C, Ar), 1536 ν(C═C, Ar + Amide II), 1520 ν(C═C, Ar + Amide II), 1495, 1307, 1261 Amide III, 1252 Amide III, 747 γ(=CH, Ar), 698 γ(C═C, Ar), 693. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{29}H_{25}N_4O_2$ $[M+H]^+$: 461.1972; found: 461.1975.

3.7.3. Characterization of the 2-alkoxycarbonyl-imidazo[1,2-a]pyridines

Methyl 3-phenylimidazo[1,2-a]pyridine-2-carboxylate (**10A^{i}**) [18]: Yield: 107 mg (85 %); pale yellow solide material, mp. 117 °C; R_f (20 % EtOAc, 80 % $CHCl_3$) 0.36. δ_H (500 MHz, $CDCl_3$) 7.98 (1H, dt, J = 7.0 Hz, 1.1 Hz, 5-*H*), 7.73 (1H, dt, J = 9.1 Hz, 1.1 Hz, 8-*H*), 7.59–7.50 (5H, m, Ar), 7.30–7.27 (1H, m, 7-*H*), 6.82 (1H, dt, J = 7.0 Hz, 1.0 Hz, 6-*H*), 3.90 (3H, s, -COOC*H*$_3$). δ_C (125.7 MHz, $CDCl_3$) 163.70, 144.29, 132.64, 130.51, 129.47, 128.84, 127.86, 126.26, 124.03, 119.01, 113.71, 51.90. IR (KBr, ν (cm^{-1})): 3143, 3108, 3073, 3049, 2991 ν(=CH, Ar), 2952, 2923, 2849 ν(-CH_3), 1704 ν(C═O, ester), 1554, 1507, 1437, 1383 ν(C═C, Ar), 1353, 1277, 1244 ν_{as}(C–*O*–C, ester), 1192, 1168 ν_s(C–*O*–C, ester), 757 γ(=CH, Ar), 739, 696 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{15}H_{13}N_2O_2$ $[M+H]^+$: 253.0972; found: 253.0974.

Ethyl 3-phenylimidazo[1,2-a]pyridine-2-carboxylate (**10A^{ii}**) [18]: Yield: 107 mg (80 %); light brown solide material, mp. 98 °C; R_f (20 % EtOAc, 80 % $CHCl_3$) 0.34. δ_H (500 MHz, $CDCl_3$) 7.95 (1H, dt J = 7.0 Hz, 1.0 Hz, 5-*H*), 7.73 (1H, dt, J = 9.1 Hz, 1.1 Hz, 8-*H*), 7.59–7.49 (5H, m, Ar), 7.27 (1H, ddd, J = 9.5 Hz, 6.7 Hz, 1.1 Hz, 7-*H*), 6.82–6.79 (1H, m, 6-*H*), 4.36 (2H, q, J = 7.1 Hz, COOC*H*$_2$CH$_3$), 1.32 (3H, t, J = 7.1 Hz, COOCH$_2$C*H*$_3$). δ_C (125.7 MHz, $CDCl_3$) 163.32, 144.32, 133.09, 130.58, 129.37, 129.34, 128.77, 128.12, 126.09, 124.02, 119.04, 113.61, 60.84, 14.23. IR (KBr, ν (cm^{-1})): 3096, 3040, 2973 ν(=CH, Ar), 2934, 2923, 2905, 2864 ν(–CH_2–, –CH_3), 1721 ν(C═O, ester), 1508, 1381 ν(C═C, Ar), 1283, 1224 ν_{as}(C–*O*–C, ester), 1185 ν_s(C–*O*–C, ester), 1039, 1024, 862, 755 γ(=CH, Ar), 743, 703 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{16}H_{15}N_2O_2$ $[M+H]^+$: 267.1128; found: 267.1136.

Isopropyl 3-phenylimidazo[1,2-a]pyridine-2-carboxylate (**10A^{iii}**) [19]: Yield: 69 mg (47 %); yellow solide material, mp. 86 °C; R_f (20 % EtOAc, 80 % $CHCl_3$) 0.38. δ_H (500 MHz, $CDCl_3$) 7.95 (1H, brd, J = 7.0 Hz, 5-*H*), 7.77 (1H, brd, J = 9.2 Hz, 8-*H*), 7.58–7.51 (5H, m, Ar), 7.30–7.27 (1H, m, 7-*H*), 6.84–6.81 (1H, m, 6-*H*), 5.28–5.20 (1H, m, -C*H*(CH_3)$_2$), 1.28 (6H, d, J = 6.3 Hz, –CH(C*H*$_3$)$_2$). δ_C (125.7 MHz, $CDCl_3$) 162.86, 144.30, 133.47, 130.67, 129.33, 129.17, 128.73, 128.33, 126.08, 124.05, 119.02, 113.62, 68.38, 21.76. IR (KBr, ν (cm^{-1})): 3099, 3067, 3023, 2975 ν(=CH, Ar), 2925, 2866, 2851 ν(–CH–, –CH_3), 1715 ν(C═O, ester), 1633, 1508, 1397 ν(C═C, Ar), 1281, 1222 ν_{as}(C–*O*–C, ester), 1185, 1107 ν_s(C–*O*–C, ester), 757 γ(=CH, Ar), 703 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{17}H_{17}N_2O_2$ $[M+H]^+$: 281.1285; found: 281.1289.

3.7.4. Characterization of the 3-aryloxycarbonyl-imidazo[1,2-a]pyridines

Phenyl 3-phenylimidazo[1,2-a]pyridine-2-carboxylate (**10B**): Yield: 119 mg (76 %); off white solide material, mp. 128 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.44. δ_H (500 MHz, $CDCl_3$) 8.02 (1H, brd, J = 7.0 Hz, 5-*H*), 7.80 (1H, brd, 9.1 Hz, 8-*H*), 7.60–7.54 (4H, m, Ar), 7.53–7.49 (1H, m, 4-*H*-Ph), 7.39–7.32 (3H, m, Ar), 7.22–7.20 (3H, m, Ar), 6.89–6.86 (1H, m, 6-*H*). δ_C (125.7 MHz, $CDCl_3$) 161.85, 150.73, 144.57, 132.17, 130.58, 130.54, 129.59, 129.25, 128.89, 127.73, 126.53, 125.70, 124.15, 121.82, 119.17, 113.96. IR (KBr, ν (cm^{-1})): 3111, 3090, 3058, 3037, 2923, 2852 ν(=CH, Ar), 1745 ν(C═O, ester), 1636, 1588, 1488, 1387 ν(C═C, Ar), 1284 ν_{as}(C–*O*–C, ester), 1220, 1194 ν_s(C–*O*–C, ester), 1165, 1146, 1134, 748, 742 γ(=CH, Ar), 695 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{20}H_{15}N_2O_2$ $[M+H]^+$: 315.1128; found: 315.1129.

Phenyl 8-methyl-3-phenylimidazo[1,2-a]pyridine-2-carboxylate (**11B**): Yield: 125 mg (76 %); off white solide material, mp. 148 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.84. δ_H (500 MHz, $CDCl_3$) 7.86 (1H, d, J = 7.0 Hz, 5-*H*), 7.58–7.49 (5H, m, Ar), 7.38–7.34 (2H, m, Ar), 7.22–7.20 (1H, m, Ar), 7.19–7.17 (2H, m, Ar), 7.14–7.12 (1H, m, 7-*H*), 6.81–6.78 (1H, m, 6-*H*), 2.77 (3H, s, 8-C*H*$_3$). δ_C (125.7 MHz, $CDCl_3$) 161.46, 150.75, 144.84, 131.20, 130.93, 130.65, 129.65, 129.20, 129.00, 128.90, 127.89, 125.79, 125.67, 122.04, 121.80, 114.38, 17.44. IR (KBr, ν (cm^{-1})): 3063, 3044, 2946, 2920 ν(=CH, Ar), 1745 ν(C═O, ester), 1592, 1551, 1493 ν(C═C, Ar), 1385, 1356, 1278 ν_{as}(C–*O*–C, ester), 1234, 1207, 1146 ν_s(C–*O*–C, ester), 980, 747 γ(=CH, Ar), 718, 689 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{21}H_{17}N_2O_2$ $[M+H]^+$: 329.1285; found: 359.1292.

Phenyl 7-methyl-3-phenylimidazo[1,2-a]pyridine-2-carboxylate (**12B**): Yield: 95 mg (58 %); pale yellow solide material, mp. 162 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.78. δ_H (500 MHz, $CDCl_3$) 7.92 (1H, d, J = 7.1 Hz, 5-*H*), 7.64 (1H, s, 8-*H*), 7.59–7.50 (5H, m, Ar), 7.38–7.35 (2H, m, Ar), 7.23–7.21 (3H, m Ar), 6.75 (1H, d, J = 7.0 Hz, 6-*H*), 2.47 (3H, s, 7-C*H*$_3$). δ_C (125.7 MHz, $CDCl_3$) 161.25, 150.68, 144.53, 138.84, 130.76, 130.60, 130.22, 129.70, 129.24, 128.91, 127.35, 125.72, 123.38, 121.77, 117.27, 116.70, 21.51.IR (KBr, ν (cm^{-1})): 3095, 3063, 3047, 2977, 2910, 2851 ν(=CH, Ar), 1724 ν(C═O, ester), 1650, 1547, 1481 ν(C═C, Ar), 1376, 1346, 1277 ν_{as}(C–*O*–C, ester), 1193 ν_s(C–*O*–C, ester), 1164, 1149, 1125, 987, 773, 764, 742 γ(=CH, Ar), 705, 691 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{21}H_{17}N_2O_2$ $[M+H]^+$: 329.1285; found: 329.1296.

Phenyl 6-methyl-3-phenylimidazo[1,2-a]pyridine-2-carboxylate (**13B**): Yield: 122 mg (74 %); pale yellow solide material, mp. 175 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.78. δ_H (500 MHz, $CDCl_3$) 7.81–7.80 (2H, m, 5-*H*, 8-*H*), 7.59–7.52 (5H, m, Ar), 7.39–7.35 (2H, m, Ar), 7.26–7.21 (4H, m, Ar), 2.33 (3H, s, 6-C*H*$_3$). δ_C (125.7 MHz, $CDCl_3$) 161.20, 150.69, 143.19, 130.93, 130.77, 130.62, 130.22, 129.72, 129.24, 128.95, 127.43, 125.72, 124.43, 121.76, 121.54, 118.01,18.42. IR (KBr, ν (cm^{-1})): 3060, 3034, 2968, 2946, 2914, 2848 ν(=CH, Ar), 1733 ν(C═O, ester), 1536, 1481 ν(C═C, Ar), 1382, 1282 ν_{as}(C–*O*–C, ester), 1193, 1170 ν_s(C–*O*–C, ester), 1115, 983, 810, 738 γ(=CH, Ar), 693 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{21}H_{17}N_2O_2$ $[M+H]^+$: 329.1285; found: 329.1292.

Phenyl 5-methyl-3-phenylimidazo[1,2-a]pyridine-2-carboxylate (**14B**): Yield: 107 mg (65 %); light yellow solide material, mp. 143 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.56. δ_H (500 MHz, $CDCl_3$) 7.79 (1H, d, J = 9.1 Hz, 8-*H*), 7.53–7.49 (3H, m, Ar), 7.47–7.43 (2H, m, Ar), 7.35–7.32 (2H, m, Ar), 7.29–7.26 (1H, m, Ar), 7.20–7.17 (1H, m, Ar), 7.14–7.12 (2H, m, Ar), 6.61 (1H, d, J = 6.8 Hz, 6-*H*), 2.12 (3H, s, 5-C*H*$_3$). δ_C (125.7 MHz, $CDCl_3$) 161.21, 150.63, 145.59, 137.59, 132.59, 131.81, 131.47, 130.74, 129.47, 129.16, 127.56, 127.10, 125.62, 121.71, 117.05, 115.33, 21.39. IR (KBr, ν (cm^{-1})): 3091, 3075, 3059, 3031, 2990, 2971, 2933 ν(=CH, Ar), 1742 ν(C═O, ester), 1639, 1586, 1518, 1485 ν(C═C, Ar), 1386, 1378, 1279 ν_{as}(C–*O*–C, ester), 1212, 1191 ν_s(C–*O*–C, ester), 1131, 782, 757 γ(=CH, Ar), 704, 695 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{21}H_{17}N_2O_2$ $[M+H]^+$: 329.1285; found: 329.1288.

Phenyl 3-butylimidazo[1,2-a]pyridine-2-carboxylate (**15B**): Yield: 140 mg (95 %); beige solide material, mp. 103 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.56. δ_H (500 MHz, $CDCl_3$) 8.02 (1H, d, J = 7.0 Hz, 5-*H*), 7.74 (1H, d, J = 9.2 Hz, 8-*H*), 7.46–7.43 (2H, m, Ar), 7.30–7.27 (4H, m, Ar), 6.95–6.92 (1H, m, 6-*H*), 3.35 (2H, t, J = 7.8 Hz, -C*H*$_2$-), 1.73–1.67 (2H, m, -C*H*$_2$-), 1.50–1.42 (2H, m, -C*H*$_2$-), 0.96 (2H, t, J = 7.3 Hz, -C*H*$_3$). δ_C

(125.7 MHz, $CDCl_3$) 162.72, 150.79, 144.14, 132.44, 131.20, 129.39, 125.83, 125.59, 123.42, 122.07, 119.43, 113.60, 29.87, 23.39, 22.62, 13.83. IR (KBr, ν (cm^{-1})): 3105, 3040, 2955, 2926 ν(=CH, Ar), 2867, 2855 ν(CH_2, CH_3), 1725 ν(C=O, ester), 1556, 1492 ν(C=C, Ar), 1380, 1285, 1278, 1254, 1191 ν_{as}(C–*O*–C, ester), 1163, 1155, 1076 ν_s(C–*O*–C, ester), 760, 744 γ(=CH, Ar), 734, 692 γ(C=C, Ar), 684. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{18}H_{19}N_2O_2$ $[M+H]^+$: 295.1441; found: 295.1442.

Phenyl 3-(cyclohex-1-en-1-yl*)imidazo[1,2-a]pyridine-2-carboxylate* (**16B**): Yield: 118 mg (74 %); off white solide material, mp. 125 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.54. δ_H (500 MHz, $CDCl_3$) 8.09 (1H, d, J = 6.9 Hz, 5-*H*), 7.71 (1H, d, J = 9.1 Hz, 8-*H*), 7.42 (2H, t, J = 7.7 Hz), 7.29–7.24 (4H, m, Ar), 6.89–6.86 (1H, m, 6-*H*), 6.04 (1H, brs), 2.40–2.28 (4H, m, -C*H*$_2$-C*H*$_2$-), 1.87–1.82 (2H, m, -C*H*$_2$-), 1.80–1,75 (2H, m, -C*H*$_2$-). δ_C (125.7 MHz, $CDCl_3$) 161.94, 150.88, 144.04, 133.41, 132.99, 131.03, 129.35, 126.77, 126.04, 125.73, 124.25, 121.97, 119.03, 113.51, 28.25, 25.64, 22.68, 21.75. IR (KBr, ν (cm^{-1})): 3105, 3085, 3058, 3035, 2987 ν(=CH, Ar), 2937, 2896, 2870, 2846, 2831 ν(–CH_2–), 1734 ν(C=O, ester), 1593, 1527, 1483 ν(C=C, Ar), 1383, 1273, 1213, 1192 ν_{as}(C–*O*–C, ester), 1164, 1146, 1136, 1105 ν_s(C–*O*–C, ester), 939, 909, 752, 744 γ(=CH, Ar), 734, 692 γ(C=C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{20}H_{19}N_2O_2$ $[M+H]^+$: 319.1441; found: 319.1451.

Diphenyl 3-phenylimidazo[1,2-a]pyridine-2,6-dicarboxylate (**17B**): Yield: 165 mg (76 %); off white solide material, mp. 151 °C (subl.), 183 melt; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.64. δ_H (500 MHz, $CDCl_3$) 8.93 (1H, s, 5-*H*), 8.02 (1H, dd, J = 9.5 Hz, 1.5 Hz, 7-*H*), 7.89 (1H, d, J = 9.5 Hz, 8-*H*), 7.64–7.55 (5H, m, Ar), 7.47–7.44 (2H, m, Ar), 7.41–7.38 (2H, m, Ar), 7.33–7.31 (1H, m, Ar), 7.26–7.23 (1H, m, Ar), 7.21–7.20 (4H, m, Ar). δ_C (125.7 MHz, $CDCl_3$) 163.06, 161.36, 150.57, 150.38, 144.95, 133.95, 131.81, 130.59, 130.17, 129.65, 129.35, 129.32, 129.18, 126.72, 126.40, 126.10, 125.90, 121.69, 121.50, 118.85, 117.82, 115.39. IR (KBr, ν (cm^{-1})): 3093, 3061, 3035 ν(=CH, Ar), 1741 ν(C=O, ester), 1731 ν(C=O, ester), 1633, 1589, 1548, 1483 ν(C=C, Ar), 1380, 1289 ν_{as}(C–*O*–C, ester), 1252, 1192 ν_s(C–*O*–C, ester), 1164, 1143, 1124, 1062, 761, 754, 743 γ(=CH, Ar), 722, 700, 690 γ(C=C, Ar). HRMS (ESI-Q-TOF) *m/z* calcd for $C_{27}H_{19}N_2O_4$ $[M+H]^+$: 435.1339; found: 435.1359.

o-Tolyl 3-phenylimidazo[1,2-a]pyridine-2-carboxylate (**10C^{i}**): Yield: 148 mg (90 %); pale yellow solide material, mp. 114 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.60. δ_H (500 MHz, $CDCl_3$) 8.01 (1H, d, J = 6.9 Hz, 5-*H*), 7.83 (1H, d, J = 9.1 Hz, 8-*H*), 7.60–7.49 (5H, m, Ar), 7.37–7.33 (1H, m, 7-*H*), 7.22–7.19 (2H, m, Ar), 7.14–7.12 (2H, m, Ar), 6.90–6.86 (1H, m, 6-*H*), 2.17 (3H, s, -C*H*$_3$). δ_C (125.7 MHz, $CDCl_3$) 161.49, 149.35, 144.48, 132.02, 130.98, 130.62, 130.36, 129.61, 128.90, 127.72, 126.75, 126.58, 125.90, 124.18, 122.13, 119.15, 113.99, 16.25. IR (KBr, ν (cm^{-1})): 3146, 3108, 3081, 3064, 3023, 2978 ν(=CH, Ar), 2952, 2931 ν(-CH_3), 1742 ν(C=O, ester), 1511, 1492 ν(C=C, Ar), 1387, 1282, 1226, 1180 ν_{as}(C–*O*–C, ester), 1153, 1136 ν_s(C–*O*–C, ester), 882, 761, 753 757 γ(=CH, Ar), 704 γ(C=C, Ar), 606. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{21}H_{17}N_2O_2$ $[M+H]^+$: 329.1285; found: 329.1285.

m-Tolyl 3-phenylimidazo[1,2-a]pyridine-2-carboxylate (**10C^{ii}**): 144 mg (87 %); light yellow solide material, mp. 115 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.64. δ_H (500 MHz, $CDCl_3$) 8.02 (1H, d, J = 7.0 Hz, 5-*H*), 7.82 (1H, d, J = 9.2 Hz, 8-*H*), 7.60–7.50 (5H, m, Ar), 7.36–7.32 (1H, m, 7-*H*), 7.27–7.23 (1H, m, Ar), 7.04–6.99 (3H, m, Ar), 6.89–6.86 (1H, m, 6-*H*), 2.35 (3H, s, -C*H*$_3$). δ_C (125.7 MHz, $CDCl_3$) 161.88, 150.67, 144.51, 139.35, 132.18, 130.58, 130.46, 129.56, 128.95, 128.88, 127.72, 126.52, 126.50, 124.14, 122.39, 119.14, 118.74, 113.94, 21.30. IR (KBr, ν (cm^{-1})): 3114, 3073, 3052, 3023, 2952 ν(=CH, Ar), 2923, 2861 ν(-CH_3), 1740 ν(C=O, ester), 1639, 1613, 1539, 1507, 1489 ν(C=C, Ar), 1390, 1360, 1342, 1287, 1240 ν_{as}(C–*O*–C, ester), 1220, 1166 ν_s(C–*O*–C, ester), 909, 754 γ(=CH, Ar), 740, 707 γ(C=C, Ar), 686. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{21}H_{17}N_2O_2$ $[M+H]^+$: 329.1285; found: 329.1291.

p-Tolyl 3-phenylimidazo[1,2-a]pyridine-2-carboxylate (**10C^{iii}**): Yield: 115 mg (70 %); off white solide material, mp. 177 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.46. δ_H (500 MHz, $CDCl_3$) 8.02 (1H, brd, J = 7.0 Hz, 5-*H*), 7.80 (1H, brd, 9.2 Hz, 8-*H*), 7.60–7.53 (4H, m, Ar), 7.52–7.49 (1H, m, 4-*H*-Ph), 7.35–7.31 (1H, m, 7-*H*), 7.17 (2H, d, J = 8.3 Hz, Ar), 7.08 (2H, d, J = 8.3 Hz, Ar), 6.88–6.85 (1H, m, 6-*H*), 2.34 (3H, s, -C*H*$_3$). δ_C (125.7 MHz, $CDCl_3$) 162.03, 148.49, 144.55, 135.27, 132.27, 130.59, 130.44, 129.75, 129.53, 128.86, 127.75, 126.47, 124.14, 121.47, 119.17, 113.91, 20.85. IR (KBr, ν (cm^{-1})): 3111, 3076, 3055, 3028, 2952, 2920, 2867, 2849 ν(=CH, Ar), 1740 ν(C=O, ester), 1637, 1507, 1447, 1389 ν(C=C, Ar), 1361, 1345, 1282 ν_{as}(C–*O*–C, ester), 1264, 1217, 1198 ν_s(C–*O*–C, ester), 1168, 1151, 1136, 1019, 882, 832, 770, 755, 748 γ(=CH, Ar), 738, 709 γ(C=C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{21}H_{17}N_2O_2$ $[M+H]^+$: 329.1285; found: 329.1291.

3,4-Dimethylphenyl 3-phenylimidazo[1,2-a]pyridine-2-carboxylate (**10D**): Yield: 106 mg (62 %); pale yellow solide material, mp. 74 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.56. δ_H (500 MHz, $CDCl_3$) 8.02 (1H, d, J = 7 Hz, 5-*H*), 7.80 (1H, d, J = 9.1 Hz), 7.60–7.49 (6H, m, Ar), 7.35–7.31 (1H, m, 7-*H*), 7.11 (1H, d, J = 8.1 Hz, Ar) 6.97 (1H, brs, Ar), 6.92 (1H, dd, J = 8.1 Hz, 1.5 Hz), 6.88–6.85 (1H, m, 6-*H*), 2.24 (3H, brs, -C*H*$_3$), 2.23 (3H, s, -C*H*$_3$). δ_C (125.7 MHz, $CDCl_3$) 162.10, 148.63, 144.51, 137.60, 133.94, 130.60, 130.15, 130.10, 129.50, 129.23, 128.84, 127.76, 126.43, 124.13, 122.71, 119.18, 118.85, 113.88, 19.85, 19.14. IR (KBr, ν (cm^{-1})): 3111, 3052, 3014, 2970 ν(=CH, Ar), 2949, 2923, 2855 ν(-CH_3), 1739 ν(C=O, ester), 1634, 1499, 1445 ν(C=C, Ar), 1385, 1279, 1245, 1215 ν_{as}(C–*O*–C, ester), 1191, 1167, 1135 ν_s(C–*O*–C, ester), 889, 834, 768, 750 γ(=CH, Ar), 737, 708 γ(C=C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{22}H_{19}N_2O_2$ $[M+H]^+$: 343.1441; found: 343.1437.

2-Isopropyl-5-methylphenyl 3-phenylimidazo[1,2-a]pyridine-2-carboxylate (**10E**): Yield: 39,7 mg (21 %); pale yellow solide material, mp. 152 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.58. δ_H (500 MHz, $CDCl_3$) 7.99 (1H, d, J = 6.9 Hz, 5-*H*), 7.81 (1H, d, J = 9.1 Hz, 8-*H*), 7.59–7.56 (2H, m, Ar), 7.55–7.52 (2H, m, Ar), 7.50–7.47 (1H, m, 4-*H*-Ph), 7.33 (1H, ddd, J = 9.1 Hz, 6.9 Hz, 1.0 Hz, 7-*H*), 7.18 (1H, d, J = 7.8 Hz), 7.01 (1H, d, J = 7.8 Hz), 6.91 (1H, s), 6.88–6.85 (1H, m, 6-*H*), 2.95 (1H, qq, J = 7.2 Hz, 6.9 Hz, -C*H*(CH_3)$_2$), 2.31 (3H, s, -C*H*$_3$), 1.10 (6H, d, J = 6.9 Hz, –CH(C*H*$_3$)$_2$). δ_C (125.7 MHz, $CDCl_3$) 162.18, 147.79, 144.60, 137.31, 136.33, 132.45, 130.63, 130.11, 129.51, 128.89, 127.96, 127.04, 126.35, 126.26, 124.18, 122.95, 119.21, 113.86, 26.77, 23.15, 20.85. IR (KBr, ν (cm^{-1})): 3114, 3085, 3064, 3040, 2955 ν(=CH, Ar), 2923, 2864 ν(-CH_3, –CH_2-), 1732 ν(C=O, ester), 1507 ν(C=C, Ar), 1381, 1275 ν_{as}(C–*O*–C, ester), 1224, 1154 ν_s(C–*O*–C, ester), 1141, 1121, 1086, 983, 763, 752, 742 γ(=CH, Ar), 701 γ(C=C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{24}H_{23}N_2O_2$ $[M+H]^+$: 371.1754; found: 371.1748.

1,2,3,4-Tetrahydroquinolin-8-yl *3-phenylimidazo[1,2-a]pyridine-2-carboxylate* (**10F**): Yield: 91 mg (49 %); beige solide material, mp. 66 °C; R_f (5 % MeOH, 95 % $CHCl_3$) 0.54. δ_H (500 MHz, DMSO-d_6) 8.97 (1H, brs, -*NH*-), 8.20 (1H, brs, 5-*H*), 7.59–7.57 (1H, m, 8-*H*), 7.53–7.45 (5H, m, Ar), 7.32–7.29 (1H, m, Ar), 6.93 (1H, t, J = 6.4 Hz), 6.87 (1H, t, J = 7.4 Hz), 6.56–6.51 (2H, m, Ar), 3.65 (2H, brs), 2.48 (2H, brs), 1.83 (2H, brs). δ_C (125.7 MHz, DMSO-d_6) 165.12, 150.63, 143.43, 139.00, 135.46, 129.94, 129.31, 128.96, 128.60, 128.09, 126.20, 125.97, 124.50, 124.38, 119.05, 118.21, 114.62, 113.80, 44.60, 26.32, 24.49. IR (KBr, ν (cm^{-1})): 3434 ν(NH), 3142, 3110, 3075, 3050 (=CH, Ar), 2950, 2885 ν(–CH_2–), 1625 ν(C=O, ester), 1586, 1554, 1506, 1472, 1426 ν(C=C, Ar), 1357, 1259 ν_{as}(C–*O*–C, ester), 1173, 1116, 1071 ν_s(C–*O*–C, ester), 1001, 912, 756 γ(=CH, Ar), 700 γ(C=C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{23}H_{20}N_3O_2$ $[M+H]^+$: 370.1550; found: 370.1554.

2-Formyl-6-methoxyphenyl 3-phenylimidazo[1,2-a]pyridine-2-carboxylate (**10G^{i}**): Yield: 92,5 mg (50 %); yellow solide material, mp. 132 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.32. δ_H (500 MHz, $CDCl_3$) 10.17 (1H, s, –CHO), 8.02 (1H, d, J = 7.1 Hz, 5-*H*), 7.79 (1H, d, J = 9.1 Hz, 8-*H*), 7.60–7.58 (2H, m, Ar), 7.53–7.50 (2H, m, Ar), 7.49–7.45 (2H, m, Ar), 7.34–7.31 (1H, m, Ar, 7-*H*), 7.29 (1H, t, J = 8.1 Hz), 7.19 (1H, d, J = 8.1 Hz), 6.88–6.84 (1H, m, 6-*H*), 3.82 (3H, s, -OC*H*$_3$). δ_C (125.7 MHz, $CDCl_3$) 188.62, 160.94, 151.87, 144.65, 142.35, 131.24, 130.93, 130.52, 129.66, 129.42, 128.90, 127.50, 126.66, 126.61, 124.16, 119.85,

119.29, 117.84, 114.07, 56.31. IR (KBr, ν (cm^{-1})): 3085, 3061, 3043, 3020, 2943 ν(=CH, Ar), 2843 ν(-CH_3), 2820, 2725 ν(-C(O)H), 1742 ν(C═O, ester), 1702 ν(C═O, aldehyde), 1579, 1480 ν(C═C, Ar), 1380, 1277 ν_{as}(C–*O*–C, ester), 1226, 1202, 1146, 1133, 1118 ν_s(C–*O*–C, ester), 752 γ(=CH, Ar), 743, 700 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{22}H_{17}N_2O_4$ $[M+H]^+$: 373.1183; found: 373.1183.

4-Formyl-2-methoxyphenyl 3-phenylimidazo[1,2-a]pyridine-2-carboxylate (**10G^{ii}**): Yield: 90,3 mg (49 %); pale yellow solide material, mp. 54 °C; R_f (5 % EtOAc, 95 % $CHCl_3$) 0.80. δ_H (500 MHz, $CDCl_3$) 9.95 (1H, s, -C*H*O), 8.05 (1H, d, *J* = 6.5 Hz, 5-*H*), 7.82 (1H, d, *J* = 9.0 Hz, 8-*H*), 7.61–7.59 (2H, m, Ar), 7.57–7.53 (2H, m, Ar), 7.52–7.47 (3H, m, Ar), 7.37–7.33 (2H, m, Ar), 6.90–6.87 (1H, m, 6-*H*), 3.88 (3H, s, -OC*H*$_3$). δ_C (125.7 MHz, $CDCl_3$) 191.06, 160.58, 152.23, 145.07, 144.56, 135.22, 131.32, 130.87, 130.51, 129.65, 128.89, 127.41, 126.69, 124.60, 124.13, 123.71, 119.26, 114.08, 110.81, 56.07. IR (KBr, ν (cm^{-1})): 3108, 3070, 3055, 2967, 2934 ν(=CH, Ar), 2843 ν(-CH_3), 2728 ν(-C(O)H), 1745 ν(C═O, ester), 1701 ν(C═O, aldehyde), 1687, 1501 ν(C═C, Ar), 1388, 1276 ν_{as}(C–*O*–C, ester), 1147, 1119 ν_s(C–*O*–C, ester), 1031, 754 γ(=CH, Ar), 733, 699 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{22}H_{17}N_2O_4$ $[M+H]^+$: 373.1183; found: 373.1180.

2-Formylphenyl 3-phenylimidazo[1,2-a]pyridine-2-carboxylate (**10G^{iii}**): Yield: 98.9 (58 %); pale yellow solide material, mp. 73 °C; R_f (20 % EtOAc, 80 % $CHCl_3$) 0.51. δ_H (500 MHz, $CDCl_3$) 10.07 (1H, s, -C*H*O), 8.02 (1H, d, *J* = 6.9 Hz, 5-*H*), 7.91 (1H, d, *J* = 7.5 Hz), 7.82 (1H, d, *J* = 9.2 Hz, 8-*H*), 7.63 (1H, t, *J* = 7.8 Hz), 7.60–7.50 (5H, m, Ar), 7.40–7.34 (3H, m, Ar), 6.91–6.87 (1H, m, 6-*H*). δ_C (125.7 MHz, $CDCl_3$) 188.47, 161.49, 152.25, 144.66, 135.14, 131.30, 131.05, 130.51, 129.82, 129.64, 129.00, 128.26, 127.44, 126.79, 126.27, 124.20, 123.59, 119.24, 114.18. IR (KBr, ν (cm^{-1})): 3073, 3052, 3032, 2958, 2923 ν(=CH, Ar), 2855, 2758 ν(-C(O)H), 1739 ν(C═O, ester), 1688, 1603, 1507, 1477, 1454 ν(C═C, Ar), 1383, 1276 ν_{as}(C–*O*–C, ester), 1228, 1206, 1184, 1149, 1134, 1117 ν_s(C–*O*–C, ester), 1010, 980, 755 γ(=CH, Ar), 703 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{21}H_{15}N_2O_3$ $[M+H]^+$: 343.1077; found: 343.1072.

4-Formylphenyl 3-phenylimidazo[1,2-a]pyridine-2-carboxylate (**10G^{iv}**): Yield: 62 mg (36 %); pale yellow solide material, mp. 174 °C; R_f (5 % EtOAc, 95 % $CHCl_3$) 0.80. δ_H (500 MHz, $CDCl_3$) 9.99 (1H, s, -C*H*O), 8.02 (1H, d, *J* = 6.7 Hz, 5-*H*), 7.91 (2H, d, *J* = 8.1 Hz), 7.81 (1H, d, *J* = 9.1 Hz, 8-*H*), 7.58–7.52 (4H, m, Ar), 7.40–7.34 (4H, m, Ar), 6.91–6.88 (1H, m, 6-*H*). δ_C (125.7 MHz, $CDCl_3$) 190.89, 161.04, 155.48, 144.63, 133.97, 131.06, 130.51, 129.81, 128.99, 128.32, 127.50, 126.84, 124.20, 122.58, 119.17, 114.18. IR (KBr, ν (cm^{-1})): 3061, 3029, 2961, 2923, 2846 ν(=CH, Ar), 2790 ν_{as}(-C(O)H), 2734 ν_s(-C(O)H), 1743 ν(C═O, ester), 1701 ν(C═O, ketone), 1595 ν(C═C, Ar), 1383, 1283, 1213 ν_{as}(C–*O*–C, ester), 1157, 1148, 1131 ν_s(C–*O*–C, ester), 886, 750 γ(=CH, Ar), 700 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{21}H_{15}N_2O_3$ $[M+H]^+$: 343.1077; found: 343.1079.

2-Methoxy-4-(methoxycarbonyl)phenyl 3-phenyli-midazo[1,2-a]pyridine-2-carboxylate (**10H^{i}**): Yield: 144 mg (72 %); pale yellow solide material, mp. 155 °C; R_f (20 % EtOAc, 80 % $CHCl_3$) 0.65. δ_H (500 MHz, $CDCl_3$) 8.04 (1H, d, *J* = 7.0 Hz, 5-*H*), 7.80 (1H, d, *J* = 9.1 Hz, 8-*H*), 7.67–7.64 (2H, m, Ar), 7.60–7.58 (2H, m, Ar), 7.55–7.51 (2H, m, Ar), 7.48 (1H, tt, *J* = 7.3 Hz, 1.5 Hz, 4-*H*-Ph), 7.34–7.31 (1H, m, 7-*H*), 7.22 (1H, d, *J* = 8.1 Hz), 6.88–6.85 (1H, m, 6-*H*), 3.91 (3H, s, -OC*H*$_3$), 3.85 (3H, s, -OC*H*$_3$). δ_C (125.7 MHz, $CDCl_3$) 166.44, 160.73, 151.30, 144.54, 143.72, 131.56, 130.70, 130.52, 129.57, 128.85, 128.72, 127.50, 126.55, 124.11, 123.05, 122.46, 119.25, 113.99, 113.40, 56.04, 52.17. IR (KBr, ν (cm^{-1})): 3114, 3079, 3055, 3005, 2967, 2943, 2914 ν(=CH, Ar), 2857, 2837 ν(-CH_3), 1746 ν(C═O, ester), 1723 ν(C═O, ester), 1601, 1506, 1406 ν(C═C, Ar), 1292 ν_{as}(C–*O*–C, ester), 1248, 1202, 1176, 1149, 1126 ν_s(C–*O*–C, ester), 1115 ν_{as}(C–*O*–C, ester), 1027, 886, 752 γ(=CH, Ar), 700 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{23}H_{19}N_2O_5$ $[M+H]^+$: 403.1288; found: 403.1280.

2-(Methoxycarbonyl)phenyl 3-phenylimidazo[1,2-a]pyridine-2-carboxylate (**10H^{ii}**): Yield: 106 mg (57 %); light yellow solide material, mp. 85 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.38. δ_H (500 MHz, $CDCl_3$) 8.07–8.04 (2H, m, Ar), 7.82 (1H, d, *J* = 9.2 Hz, 5-*H*), 7.63–7.61 (2H, m, Ar), 7.59–7.53 (3H, m, Ar), 7.50–748 (1H, m, Ar), 7.35–7.30 (2H, m, Ar), 7.25 (1H, d, *J* = 8.0 Hz), 6.89–6.86 (1H, m, 6-*H*), 3.79 (3H, s, C(O)OC*H*$_3$). δ_C (125.7 MHz, $CDCl_3$) 164.83, 161.89, 150.75, 144.51 133.71, 131.91, 131.68, 130.65, 130.57, 129.52, 128.83, 127.58, 126.46, 125.92, 124.13, 124.10, 123.50, 119.30, 113.93, 52.12. (IR (KBr, ν (cm^{-1})): 3088, 3067, 3052, 2996 ν(=CH, Ar), 2952 ν(-CH_3), 1743 ν(C═O, ester), 1727 ν(C═O, ester), 1604, 1504, 1483, 1456, 1433 ν(C═C, Ar), 1383, 1299, 1276 ν_{as}(C–*O*–C, ester), 1204, 1147, 1120 ν_s(C–*O*–C, ester), 1085, 1006, 979, 754 γ(=CH, Ar), 743, 697 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{22}H_{17}N_2O_4$ $[M+H]^+$: 373.1183; found: 373.1172.

*(E)-2-methoxy-4-(prop-1-en-*1-yl*)phenyl 3-phenyl-imidazo-[1,2-a]pyridine-2-carboxylate* (**10I**): Yield: 125 mg (65 %); off white solide material, mp. 135 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.62. δ_H (500 MHz, $CDCl_3$) 8.05 (1H, d, *J* = 7.04 Hz, 5-*H*), 7.80 (1H, d, *J* = 9.2 Hz, 8-*H*), 7.62–7.59 (2H, m, Ar), 7.55–7.51 (2H, m, Ar), 7.50–7.46 (2H, m, Ar), 7.32 (1H, ddd, *J* = 9.2 Hz, 6.7 Hz, 1.1 Hz, 7-*H*), 7.07 (1H, d, *J* = 8.1 Hz), 6.93 (1H, d, *J* = 1.5 Hz), 6.89 (1H, dd, *J* = 8.2 Hz, 1.5 Hz), 6.85 (1H, ddd, *J* = 7.04 Hz, 6.7 Hz, 1.1 Hz, 6-*H*), 6.37 (1H, dd, *J* = 15.6 Hz, 1.3 Hz), 6.18 (1H, dq, *J* = 15.6 Hz, 6.6 Hz), 3.81 (1H, s, -OC*H*$_3$), 1.88 (3H, dd, *J* = 6.6 Hz, 1.3 Hz, -C*H*$_3$). δ_C (125.7 MHz, $CDCl_3$) 161.42, 151.24, 144.53, 138.66, 136.89, 132.10, 130.60, 130.38, 129.42, 128.79, 127.70, 126.30, 125.78, 124.08, 122.93, 119.30, 118.23, 113.81, 109.61, 55.77, 18.40. IR (KBr, ν (cm^{-1})): 3108, 3064, 3011, 2932 ν(=CH, Ar), 2908, 2846 ν(-CH_3, –CH_2-, =CH_2), 1743 ν(C═O, ester), 1637, 1511 ν(C═C, Ar), 1302, 1267 ν_{as}(C–*O*–C, ester), 1204, 1147 ν_s(C–*O*–C, ester), 1133, 1036, 752 γ(=CH, Ar), 699 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{24}H_{21}N_2O_3$ $[M+H]^+$: 385.1547; found: 385.1538.

2-Acetylphenyl 3-phenylimidazo[1,2-a]pyridine-2-carboxylate (**10J**): Yield: 96.2 mg (54 %); light yellow solide material, mp. 118 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.34. δ_H (500 MHz, $CDCl_3$) 8.04 (1H, d, *J* = 6.8 Hz, 5-*H*), 7.83 (1H, d, *J* = 7.7 Hz), 7.80 (1H, d, *J* = 9.2 Hz, 8-*H*), 7.62–7.59 (2H, m, Ar), 7.55–7.47 (4H, m, Ar), 7.35–7.30 (2H, m, Ar), 7.24 (1H, d, *J* = 8.0 Hz), 6.89–6.85 (1H, m, 6-*H*), 2.55 (3H, s, –C(O)C*H*$_3$). δ_C (125.7 MHz, $CDCl_3$) 197.34, 161.74, 149.30, 144.57, 133.22, 131.76, 131.23, 130.89, 130.56, 130.15, 129.61, 128.90, 127.52, 126.57, 125.99, 124.13, 124.08, 119.29, 114.02, 29.84. IR (KBr, ν (cm^{-1})): 3076, 3052, 3029, 2999, 2973, 2920 ν(=CH, Ar), 2849 ν(-CH_3), 1735 ν(C═O, ester), 1670 ν(C═O, ketone), 1602, 1478, 1452 ν(C═C, Ar), 1377, 1287, 1275 ν_{as}(C–*O*–C, ester), 1218, 1205, 1151 ν_s(C–*O*–C, ester), 1134, 1124, 1007, 978, 752 γ(=CH, Ar), 699 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{22}H_{17}N_2O_3$ $[M+H]^+$: 357.1234; found: 357.1233.

4-Cyanophenyl 3-phenylimidazo[1,2-a]pyridine-2-carboxylate (**10K**): Yield: 149 mg (88 %); pale yellow solide material, mp. 201 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.44. δ_H (500 MHz, $CDCl_3$) 8.02 (1H, d, *J* = 6.9 Hz, 5-*H*), 7.80 (1H, d, *J* = 9.1 Hz, 8-*H*), 7.68 (2H, d, *J* = 8.2 Hz), 7.60–7.53 (5H, m, Ar), 7.39–7.35 (1H, m, 7-*H*), 7.34 (2H, d, *J* = 8.2 Hz), 6.92–6.89 (1H, m, 6-*H*). δ_C (125.7 MHz, $CDCl_3$) 160.95, 154.03, 144.70, 133.54, 131.27, 131.22, 130.47, 129.87, 129.02, 127.43, 126.90, 124.21, 122.98, 119.20, 118.31, 114.24, 109.64. IR (KBr, ν (cm^{-1})): 3117, 3095, 3053, 3031, 2920 ν(=CH, Ar), 2227 ν(C≡N), 1754 ν(C═O, ester), 1607, 1505 ν(C═C, Ar), 1387, 1281, 1263, 1223 ν_{as}(C–*O*–C, ester), 1170, 1122 ν_s(C–*O*–C, ester), 880, 756 γ(=CH, Ar), 704 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{21}H_{14}N_3O_2$ $[M+H]^+$: 340.1081; found: 340.1074.

4-Fluorophenyl 3-phenylimidazo[1,2-a]pyridine-2-carboxylate (**10L**): Yield: 120 mg (72 %); off white solide material, mp. 201 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.60. δ_H (500 MHz, $CDCl_3$) 8.02 (1H, d, *J* = 7.0 Hz, 5-*H*), 7.81 (1H, d, *J* = 9.2 Hz, 8-*H*), 7.59–7.51 (5H, m, Ar), 7.37–7.33 (1H, m, 7-*H*), 7.18–7.15 (2H, m), 7.07–7.03 (2H, m), 6.82 (1H, dt, *J* = 7.0 Hz, 1.1 Hz, 6-*H*). δ_C (125.7 MHz, $CDCl_3$) 161.76, 160.22 (d, $J_{C\text{-}F}$ = 224.1 Hz), 146.51 (d, $J_{C\text{-}F}$ = 2.7 Hz), 144.53, 131.78, 130.70, 130.54, 129.69, 128.93, 127.57, 126.71, 124.17, 123.20 (d, $J_{C\text{-}F}$ = 8.6 Hz), 119.14, 115.88 (d, $J_{C\text{-}F}$ = 23.4 Hz), 114.07. δ_F (470.4 MHz, $CDCl_3$) −117,26. IR (KBr, ν (cm^{-1})): 3114, 3079, 3060 ν(=CH, Ar), 1735

ν(C═O, ester), 1636, 1505, 1479 ν(C═C, Ar), 1389, 1359, 1334, 1283 ν_{as}(C–*O*–C, ester), 1265, 1226, 1215, 1184, 1133 ν_s(C–*O*–C, ester), 1093, 884, 769, 750 γ(=CH, Ar), 739, 706 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{20}H_{14}FN_2O_2$ $[M+H]^+$: 333.1034; found: 333.1037.

4-(Trifluoromethyl)phenyl 3-phenylimidazo[1,2-a]pyridine-2-carboxylate (**10M**): Yield: 71.4 mg (37 %); light yellow solide material, mp. 154 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.67. δ_H (500 MHz, $CDCl_3$) 8.05 (1H, d, *J* = 7.0 Hz, 5-*H*), 7.87 (1H, d, *J* = 9.2 Hz, 8-*H*), 7.66 (2H, d, *J* = 8.5 Hz, Ar), 7.60–7.55 (5H, m, Ar), 7.42–7.39 (1H, m, 7-*H*), 7.35 (2H, d, *J* = 8.5 Hz, Ar), 6.95–6.92 (1H, m, 6-*H*). δ_C (125.7 MHz, $CDCl_3$) 161.17, 153.21, 144.60, 131.43, 131.00, 130.51, 129.81, 128.98, 128.03 (q, $J_{C\text{-}F}$ = 33.0 Hz), 127.45, 126.90, 126.64 (q, $J_{C\text{-}F}$ = 3.6 Hz), 124.21, 123.92 (q, $J_{C\text{-}F}$ = 272.2 Hz), 122, 29, 119.13, 114.20. δ_F (470.4 MHz, $CDCl_3$) −62.24. IR (KBr, ν (cm^{-1})): 3114, 3079, 3063, 3028, 2920 ν(=CH, Ar), 1747 ν(C═O, ester), 1611, 1512 ν(C═C, Ar), 1389, 1331 ν(-CF_3), 1284, 1218 ν_{as}(C–*O*–C, ester), 1172, 1150, 1133 ν_s(C–*O*–C, ester), 1112, 1064, 1016, 888, 748 γ(=CH, Ar), 702 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{21}H_{14}F_3N_2O_2$ $[M+H]^+$: 383.1002; found: 383.1003.

4-Methoxyphenyl 3-phenylimidazo[1,2-a]pyridine-2-carboxylate (**10N**): Yield: 145 mg (84 %); pale yellow solide material, mp. 168 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.58. δ_H (500 MHz, $CDCl_3$) 8.02 (1H, d, *J* = 7.0 Hz, 5-*H*), 7.79 (1H, d, *J* = 9.2 Hz, 8-*H*), 7.61–7.49 (5H, m, Ar), 7.34–7.31 (1H, m, 7-*H*), 7.12 (2H, d, *J* = 8.7 Hz), 6.88 (2H, d, *J* = 8.7 Hz), 6.87–6.85 (1H, m, 6-*H*), 3.79 (3H, s, -O*CH*$_3$). δ_C (125.7 MHz, $CDCl_3$) 162.21, 157.19, 144.55, 144.23, 132.23, 130.58, 130.45, 129.55, 128.87, 127.73, 126.48, 124.14, 122.56, 119.17, 114.32, 113.91, 55.57. IR (KBr, ν (cm^{-1})): 3072, 3047, 3006, 2933 ν(=CH, Ar), 2905, 2832 ν(CH_3), 1737 ν(C═O, ester), 1505 ν(C═C, Ar), 1389, 1282 ν_{as}(C–*O*–C, ester), 1215, 1196 ν_s(C–*O*–C, ester), 1165, 1149, 1134, 771, 755, 738 γ(=CH, Ar), 707 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{21}H_{17}N_2O_3$ $[M+H]^+$: 345.1234; found: 345.1241.

[1,1′-Biphenyl]-4-yl *3-phenylimidazo[1,2-a]pyridine-2-carboxylate* (**10O**): Yield: 156 mg (80 %); off white solide material, mp. 138 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.70. δ_H (500 MHz, $CDCl_3$) 8.04 (1H, d, *J* = 7.0 Hz, 5-*H*), 7.82 (1H, d, *J* = 9.2 Hz, 8-*H*), 7.62–7.52 (9H, m, Ar), 7.46–7.43 (2H, m, Ar), 7.37–7.34 (2H, m, Ar), 7.29–7.27 (2H, m, Ar), 6.90–6.87 (1H, m, 6-*H*). δ_C (125.7 MHz, $CDCl_3$) 161.93, 150.15, 144.62, 140.53, 138.87, 132.12, 130.65, 130.60, 129.63, 128.92, 128.75, 128.03, 127.71, 127.24, 127.12, 126.56, 124.17, 122.09, 119.21, 113.98. IR (KBr, ν (cm^{-1})): 3050, 3028, 2984, 2920 ν(=CH, Ar), 1741 ν(C═O, ester), 1519, 1509, 1485 ν(C═C, Ar), 1385, 1280, 1216 ν_{as}(C–*O*–C, ester), 1170, 1150, 1134 ν_s(C–*O*–C, ester), 882, 762, 752 γ(=CH, Ar), 705, 695 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{26}H_{19}N_2O_2$ $[M+H]^+$: 391.1441; found: 391.1446.

4-(Hydroxymethyl)phenyl 3-phenylimidazo[1,2-a]pyridine-2-carboxylate (**10P**): Yield: 112 mg (65 %); light yellow solide material, mp. 202 °C; R_f (5 % EtOAc, 95 % $CHCl_3$) 0.42. δ_H (500 MHz, $CDCl_3$) 8.03 (1H, d, *J* = 6.7 Hz, 5-*H*), 7.83 (1H, d, *J* = 9.0 Hz, 8-*H*), 7.60–7.51 (5H, m, Ar), 7.39–7.34 (3H, m, Ar), 7.20 (2H, d, *J* = 8.1 Hz), 6.91–6.88 (1H, m, 6-*H*), 4.69 (2H, s, -*CH*$_2$-OH). δ_C (125.7 MHz, $CDCl_3$) 161.71, 150.12, 144.50, 138.45, 131.92, 130.57, 129.64, 128.90, 127.92, 127.60, 126.69, 124.17, 121.90, 119.12, 114.04, 64.80 (-*CH*$_2$-OH). IR (KBr, ν (cm^{-1})): 3372, 3104, 3086, 3063, 3044, 2915 ν(=CH, Ar), 2902, 2861 ν(–CH_2–), 1739 ν(C═O, ester), 1505 ν(C═C, Ar), 1390, 1287 ν_{as}(C–*O*–C, ester), 1216, 1201, 1167 ν_s(C–*O*–C, ester), 1152, 1136, 1052, 761, 748, 747 γ(=CH, Ar), 696 γ(C═C, Ar). HRMS (ESI-Q-TOF) *m/z* calculated for $C_{21}H_{17}N_2O_3$ $[M+H]^+$: 345.1234; found: 345.1235.

Naphthalen-1-yl *3-phenylimidazo[1,2-a]pyridine-2-carboxylate* (**10Q**): Yield: 148 mg (81 %); off white solide material, mp. 131 °C; R_f (10 % EtOAc, 90 % $CHCl_3$) 0.56. δ_H (500 MHz, $CDCl_3$) 8.04 (1H, d, *J* = 6.7 Hz, 5-*H*), 7.89–7.28 (3H, m), 7.73 (1H, d, *J* = 8.1 Hz, 8-*H*), 7.63 (2H, d, *J* = 7.4 Hz), 7.55–7.52 (2H, m), 7.50–7.45 (3H, m), 7.43–7.35 (3H, m), 6.91–6.88 (1H, m, 6-*H*). δ_C (125.7 MHz, $CDCl_3$) 161.77, 146.66, 144.57, 134.62, 131.90, 130.65, 129.70, 128.97, 127.76, 127.61, 126.96, 126.77, 126.28, 126.21, 125.88, 125.33, 124.24, 121.68, 119.15, 118.30, 114.11. IR (KBr, ν (cm^{-1})): 3090, 3075, 3049, 2952, 2923, 2849 ν(=CH, Ar), 1742 ν(C═O, ester), 1633, 1595, 1506, 1441 ν(C═C, Ar), 1381, 1279, 1220 ν_{as}(C–*O*–C, ester), 1146 ν_s(C–*O*–C, ester), 1131, 798, 767, 753 γ(=CH, Ar), 737, 706 γ(C═C, Ar), 668. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{24}H_{17}N_2O_2$ $[M+H]^+$: 365.1285; found: 365.1285.

4-Methyl-2-oxo-2H-chromen-7-yl *3-phenylimidazo[1,2-a]pyridine-2-carboxylate* (**10R**): Yield: 173 mg (87 %); off white solide material, mp. 201 °C; R_f (20 % EtOAc, 80 % $CHCl_3$) 0.30. δ_H (500 MHz, $CDCl_3$) 8.03 (1H, d, *J* = 7.0 Hz, 5-*H*), 7.80 (1H, d, *J* = 9.1 Hz, 8-*H*), 7.61 (1H, d, *J* = 8.5 Hz, Ar), 7.58–7.52 (5H, m, Ar), 7.36 (1H, ddd, *J* = 9.2 Hz, 6.8 Hz, 1.1 Hz, 7-*H*), 7.22–7.19 (2H, m, Ar), 6.91–6.88 (1H, m, 6-*H*), 6.26 (1H, s), 2.43 (3H, s, *CH*$_3$-). δ_C (125.7 MHz, $CDCl_3$) 161.15, 160.55, 154.12, 153.16, 151.94, 144.69, 131.43, 131.09, 130.50, 129.83, 128.99, 127.47, 126.84, 125.22, 124.21, 119.19, 118.38, 117.78, 114.44, 114.19, 110.65, 18.71 (*CH*$_3$-). IR (KBr, ν (cm^{-1})): 3122, 3105, 3084, 3052, 3026, 2973 ν(=CH, Ar), 2949, 2908 ν(-CH_3), 1730 ν(C═O, ester), 1627, 1617, 1504 ν(C═C, Ar), 1386, 1277, 1263, 1223 ν_{as}(C–*O*–C, ester), 1159, 1152, 1138, 1129, 1119, 1009, 985, 886, 753 γ(=CH, Ar), 699 γ(C═C, Ar), 603. HRMS (ESI-Q-TOF) *m/z* calculated for $C_{24}H_{17}N_2O_4$ $[M+H]^+$: 397.1183; found: 397.1186.

3.7.5. Characterization of the copper-complexes of aminopyridines

Bis(acetato-κO,κO′)bis(3-methyl-2-pyridinamine-κN [1])-copper(II) (**Cu-2**): Yield: 1890 mg (95 %); purple crystals, mp. 151 °C (dec.). IR (KBr, ν (cm^{-1})): 3370, 3340 ν_{as}(-NH_2), 3205 ν_s(-NH_2), 3085, 3015, 2942 ν(=C*H*, Ar), 2917, 2854 ν(-CH_3), 1643, 1610, 1589, 1553 ν_{as}(COO^-), 1476, 1465, 1437, 1410 ν_s(COO^-), 1342, 1201, 800, 793, 684, 622. Anal. Calcd. for $C_{16}H_{22}N_4O_4Cu$: C 48.29; H 5.57; N 14.08. Found: C 48.27; H 5.29; N 14.35.

Bis(acetato-κO,κO′)bis(4-methyl-2-pyridinamine-κN [1])-copper(II) (**Cu-3**): Yield: 1730 mg (87 %); blue crystals, mp. 173 °C (dec.). IR (KBr, ν (cm^{-1})): 3401, 3337 ν_{as}(-NH_2), 3210 ν_s(-NH_2), 3041 ν(=CH, Ar), 2920 ν(-CH_3), 1653, 1635, 1571 ν_{as}(COO^-), 1494, 1465, 1430, 1400 ν_s(COO^-), 1339, 1258, 1008, 798, 690, 678, 668. Anal. Calcd. for $C_{16}H_{22}N_4O_4Cu$: C 48.29; H 5.57; N 14.08. Found: C 48.01; H 5.37; N 14.08.

Bis(acetato-κO,κO′)bis(5-methyl-2-pyridinamine-κN [1])-copper(II) (**Cu-4**): Yield: 1750 mg (88 %); green crystals, mp. 172 °C (dec.). IR (KBr, ν (cm^{-1})): 3373, 3355 ν_{as}(-NH_2), 3213 ν_s(-NH_2), 3079, 3025 ν(=CH, Ar), 2968, 2924 ν(-CH_3), 1661, 1650, 1635, 1577 ν_{as}(COO^-), 1560, 1516, 1442, 1408 ν_s(COO^-), 1341, 1147, 1036, 859, 831, 813, 689, 679. Anal. Calcd. for $C_{16}H_{22}N_4O_4Cu$: C 48.29; H 5.57; N 14.08. Found: C 48.35; H 5.51; N 14.23.

Bis(acetato-κO,κO′)bis(6-methyl-2-pyridinamine-κN [1])-copper(II) [20] (**Cu-5**): Yield: 1790 mg (90 %); light pink crystals, mp. 172 °C (dec.). IR (KBr, ν (cm^{-1})): 3333 ν_{as}(-NH_2), 3191 ν_s(-NH_2), 3000, 2981 ν(=CH, Ar), 2933, 2848, 2775 ν(-CH_3), 1643, 1616, 1559 ν_{as}(COO^-), 1475, 1415 ν_s(COO^-), 1342, 1169, 1039, 1016, 800, 683, 621, 476. Anal. Calcd. for $C_{16}H_{22}N_4O_4Cu$: C 48.29; H 5.57; N 14.08. Found: C 48.37; H 5.35; N 14.23.

Tetrakis[μ-(acetato-κO:κO′)]bis(2-pyridinamine-κN [1])di-copper(II) [21] (**(Cu-1)$_2$**): Yield: 1304 mg (95 %); deep green crystals, mp. 178 °C (dec.). IR (KBr, ν (cm^{-1})): 3353 ν_{as}(-NH_2), 3323 ν_s(-NH_2), 3198 ν(-NH_2), 3098, 3034, 2990 ν(=CH, Ar), 2930, 2800, 2720 ν(-CH_3), 1668, 1650, 1622 ν_{as}(COO^-), 1580, 1570, 1552, 1496, 1453 ν_s(COO^-), 1390, 1340, 1330, 1271, 1162, 1010, 790, 766, 682, 454. Anal. Calcd. for $C_{18}H_{24}N_4O_8Cu_2$: C 39.20; H 4.39; N 10.16. Found: C 39.25; H 4.38; N 10.09.

Tetrakis[μ-(acetato-κO:κO′)]bis(5-iodo-2-pyridinamine-κN [1])di-copper(II) (**(Cu-6)$_2$**): Yield: 924 mg (46 %); green crystals, mp. 213 °C (dec.). IR (KBr, ν (cm^{-1})): 3473 ν_{as}(-NH_2), 3321 ν_s(-NH_2), 3237, 3212, 3095, 3063, 2962 ν (=CH, Ar), 2927 ν(-CH_3), 1632, 1616 ν_{as}(COO^-), 1592, 1552, 1487, 1434 ν_s(COO^-), 1395, 1318, 1263, 1151, 1009, 825, 681, 623, 513, 449. Anal. Calcd. for $C_{18}H_{22}N_4O_8I_2Cu_2$: C 26.91; H 2.76; N 6.97. Found: C 26.93; H 2.72; N 6.94.

4. Conclusion

A great variety of imidazopyridine-based carboxamides and esters were synthesised in a two-step synthesis involving copper-catalysed cyclization and palladium-catalysed carbonylations. Highly selective amino- and aryloxycarbonylations were carried out by using primary/secondary amines and phenols of various structures, respectively, ranging from simple model compounds to *N*- and *O*-nucleophiles of biological importance. In this way, even those carboxamides and esters can be synthesised in yields of synthetic importance, which are hardly available by conventional synthetic means.

CRediT authorship contribution statement

Péter Szuroczki: Investigation, Conceptualization. **Laura Barbara Jenei:** Methodology, Investigation. **Viktor Sándor:** Formal analysis, Data curation. **Attila Bényei:** Investigation, Data curation, Conceptualization. **László Kollár:** Writing – original draft, Funding acquisition, Conceptualization.

Availability of X-ray crystallographic data and NMR spectra

The X-ray crystallographic data had been deposited at the Cambridge Crystallographic Data Centre with deposition numbers 2393887 for **Cu-2**, 2393888 for **Cu-3**, 2393889 for **Cu-4**, 2393890 for **Cu-5**, 2393891 for **(Cu-1)$_2$** and 2393892 for **(Cu-6)$_2$.** These data can be obtained free of charge via https://www.ccdc.cam.ac.uk/structures/. Further crystallographic data supporting the finding detailed in this study are available within the article and its Supplementary Material, as well as from the authors upon reasonable request.

Similarly, ^{1}H-, ^{13}C and ^{19}F NMR spectra of all isolated compounds are available as Supplementary Material.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.tet.2025.134489.

Data availability

Data will be made available on request.

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