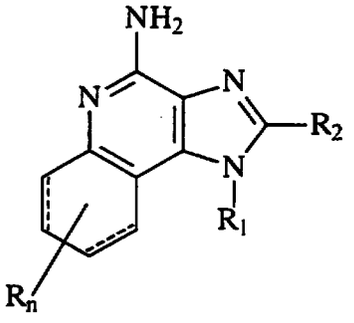
nitrogen is part of a heterocyclic ring. Despite these attempts to identify compounds that are useful as immune response modifiers, there is a continuing need for compounds that have the ability to modulate the immune response, by induction of cytokine biosynthesis or other mechanisms.

Summary of the Invention

We have found a new class of compounds that are useful in inducing cytokine biosynthesis in animals. Accordingly, this invention provides imidazoquinoline-4-amine and tetrahydroimidazoquinoline-4-amine compounds that have an amide containing substituent at the 1-position. The compounds which have been found to be useful inducers of cytokine biosynthesis are defined by Formulae (I), (Ia), and (Ib), which are defined in more detail *infra*. These compounds share the general structural formula (I):



(I)

wherein R_1, R_2, and R are as defined herein for each class of compounds having formulas (I), (Ia), and (Ib). The invention also provides novel compounds of formulas (Ic), (Id), and (Ie) as defined herein, which compounds are also useful as immune response modifiers and which also have the same general structural formula (I) above.

The compounds of Formulae (I), (Ia), (Ib), (Ic), (Id), and (Ie) are useful as immune response modifiers due to their ability to induce cytokine biosynthesis and otherwise modulate the immune response when administered to animals. This makes the compounds

wherein

R_1 is -alkyl-NR_3-CO-R_4 or -alkenyl-NR_3-CO- R_4 wherein R_4 is aryl, heteroaryl, alkyl or alkenyl, each of which may be unsubstituted or substituted by one or more substituents selected from the group consisting of:

-alkyl;

-alkenyl;

-alkynyl;

-$(alkyl)_{0-1}$-aryl;

-$(alkyl)_{0-1}$-(substituted aryl);

-$(alkyl)_{0-1}$-heteroaryl;

-$(alkyl)_{0-1}$-(substituted heteroaryl);

-O-alkyl;

-O-$(alkyl)_{0-1}$-aryl;

-O-$(alkyl)_{0-1}$-(substituted aryl);

-O-$(alkyl)_{0-1}$-heteroaryl;

-O-$(alkyl)_{0-1}$-(substituted heteroaryl);

-CO-aryl;

-CO-(substituted aryl);

-CO-heteroaryl;

-CO-(substituted heteroaryl);

-COOH;

-CO-O-alkyl;

-CO-alkyl;

-$S(O)_{0-2}$-alkyl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-aryl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-(substituted aryl);

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-heteroaryl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-(substituted heteroaryl);

-$P(O)(OR_3)_2$;

-NR_3-CO-O-alkyl;

-N_3;

-CO-O-C_{1-10} alkyl;

-N_3;

-aryl;

-(substituted aryl);

-heteroaryl;

-(substituted heteroaryl);

-heterocyclyl;

-(substituted heterocyclyl);

-CO-aryl; and

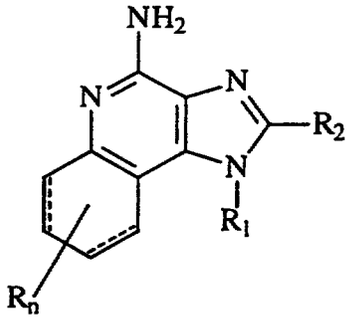
-CO-heteroaryl;

each $\mathbf{R_3}$ is independently selected from the group consisting of hydrogen; C_{1-10} alkyl-heteroaryl; C_{1-10} alkyl-(substituted heteroaryl); C_{1-10} alkyl–aryl; C_{1-10} alkyl–(substituted aryl) and C_{1-10} alkyl;

n is 0 to 4;

and each **R** present is independently selected from the group consisting of C_{1-10} alkyl, C_{1-10} alkoxy, halogen and trifluoromethyl, or a pharmaceutically acceptable salt thereof, in combination with a therapeutically effective carrier.

The invention also provides pharmaceutical compositions comprising a therapeutically effective amount of a compound of Formula (Ia):



(Ia)

-CO-O-C_{1-10} alkyl;

-N_3;

-aryl;

-(substituted aryl);

-heteroaryl;

-(substituted heteroaryl);

-heterocyclyl;

-(substituted heterocyclyl);

-CO-aryl; and

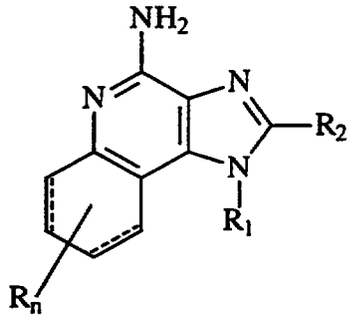
-CO-heteroaryl;

each $\mathbf{R_3}$ is independently selected from the group consisting of hydrogen; C_{1-10} alkyl-heteroaryl; C_{1-10} alkyl-(substituted heteroaryl); C_{1-10} alkyl–aryl; C_{1-10} alkyl–(substituted aryl) and C_{1-10} alkyl;

n is 0 to 4;

and each **R** present is independently selected from the group consisting of C_{1-10} alkyl, C_{1-10} alkoxy, halogen and trifluoromethyl, or a pharmaceutically acceptable salt thereof, in combination with a pharmaceutically acceptable carrier.

The invention further provides pharmaceutical compositions comprising a therapeutically effective amount of a compound of Formula (Ib):



(Ib)

wherein

$\mathbf{R_1}$ is -alkyl-NR_3-CO-R_4 or -alkenyl-NR_3-CO- R_4 wherein $\mathbf{R_4}$ is heterocyclyl which may be unsubstituted or substituted by one or more substituents selected from the group consisting of:

-N_3;

-halogen;

-NO_2;

-CN;

-haloalkyl;

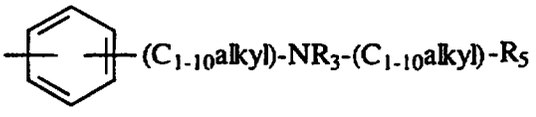
-O-haloalkyl;

-CO-haloalkyl;

-OH;

-SH;

or R_4 is



wherein R_5 is an aryl, (substituted aryl), heteroaryl, (substituted heteroaryl), heterocyclyl or (substituted heterocyclyl) group;

R_2 is selected from the group consisting of:

-hydrogen;

-alkyl;

-alkenyl;

-aryl;

-(substituted aryl);

-heteroaryl;

-(substituted heteroaryl);

-heterocyclyl;

-(substituted heterocyclyl);

-alkyl -O-alkyl;

-alkyl-O-alkenyl; and

-alkyl or alkenyl substituted by one or more substituents selected from the group consisting of:

-OH;

-halogen;

wherein

R_1 is -alkyl-NR_3-CO-R_4 or -alkenyl-NR_3-CO- R_4 wherein R_4 is aryl, heteroaryl, heterocyclyl, alkyl or alkenyl, each of which may be unsubstituted or substituted by one or more substituents selected from the group consisting of:

-alkyl;

-alkenyl;

-alkynyl;

-$(alkyl)_{0-1}$-aryl;

-$(alkyl)_{0-1}$-(substituted aryl);

-$(alkyl)_{0-1}$-heteroaryl;

-$(alkyl)_{0-1}$-(substituted heteroaryl);

-$(alkyl)_{0-1}$-heterocyclyl;

-$(alkyl)_{0-1}$- (substituted heterocyclyl);

-O-alkyl;

-O-$(alkyl)_{0-1}$-aryl;

-O-$(alkyl)_{0-1}$-(substituted aryl);

-O-$(alkyl)_{0-1}$-heteroaryl;

-O-$(alkyl)_{0-1}$-(substituted heteroaryl);

-O-$(alkyl)_{0-1}$-heterocyclyl;

-O-$(alkyl)_{0-1}$-(substituted heterocyclyl);

-CO-aryl;

-CO-(substituted aryl);

-CO-heteroaryl;

-CO-(substituted heteroaryl);

-COOH;

-CO-O-alkyl;

-CO-alkyl;

-$S(O)_{0-2}$-alkyl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-aryl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-(substituted aryl);

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-heteroaryl;

-alkyl or alkenyl substituted by one or more substituents selected from the group consisting of:

-OH;

-halogen;

-$N(R_6)_2$;

-CO-$N(R_6)_2$;

-CO-C_{1-10} alkyl;

-CO-O-C_{1-10} alkyl;

-N_3;

-aryl;

-(substituted aryl);

-heteroaryl;

-(substituted heteroaryl);

-heterocyclyl;

-(substituted heterocyclyl);

-CO-aryl; and

-CO-heteroaryl;

$\mathbf{R_3}$ is selected from the group consisting of C_{1-10} alkyl-heteroaryl; C_{1-10} alkyl-(substituted heteroaryl); C_{1-10} alkyl–aryl; C_{1-10} alkyl–(substituted aryl) and C_{1-10} alkyl;

each $\mathbf{R_6}$ is independently selected from the group consisting of hydrogen; C_{1-10} alkyl-heteroaryl; C_{1-10} alkyl-(substituted heteroaryl); C_{1-10} alkyl–aryl; C_{1-10} alkyl–(substituted aryl) and C_{1-10} alkyl;

n is 0 to 4;

and each **R** present is independently selected from the group consisting of C_{1-10} alkyl, C_{1-10} alkoxy, halogen and trifluoromethyl, or a pharmaceutically acceptable salt thereof.

Another class of compounds provided by the invention is described by Formula (Id):

-CO-(substituted heteroaryl);

-COOH;

-CO-O-alkyl;

-CO-alkyl;

-$S(O)_{0-2}$-alkyl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-aryl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-(substituted aryl);

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-heteroaryl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-(substituted heteroaryl);

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-heterocyclyl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-(substituted heterocyclyl);

-$P(O)(OR_3)_2$;

-NR_3-CO-O-alkyl;

-N_3;

-halogen;

-NO_2;

-CN;

-haloalkyl;

-O-haloalkyl;

-CO-haloalkyl;

-OH; and

-SH;

$\mathbf{R_2}$ is selected from the group consisting of:

-hydrogen;

-alkyl;

-alkenyl;

-aryl;

-(substituted aryl);

-heteroaryl;

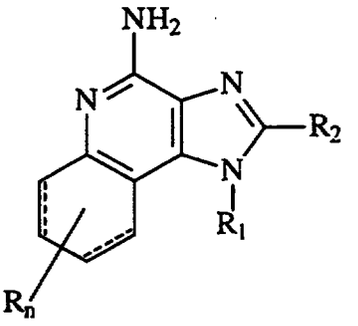
-(substituted heteroaryl);

-heterocyclyl;

-(substituted heterocyclyl);

wherein R_5 is an aryl, (substituted aryl), heteroaryl, (substituted heteroaryl), heterocyclyl or (substituted heterocyclyl) group.

A further class of compounds provided by the invention is described by Formula (Ie):



(Ie)

wherein

R_1 is -alkyl-NR_3-CO-R_4 or -alkenyl-NR_3-CO- R_4 wherein R_4 is an alkyl or alkenyl group that is substituted by one or more substituents selected from the group consisting of:

-alkynyl;

-(substituted aryl) wherein the substituent(s) are independently selected from the group consisting of alkyl, alkoxy, alkylthio, hydroxy, haloalkyl, haloalkylcarbonyl, haloalkoxy, alkylcarbonyl, alkenylcarbonyl, arylcarbonyl, heteroarylcarbonyl, aryl, arylalkyl, heteroaryl, heteroarylalkyl, heterocyclyl, heterocycloalkyl, nitrile, alkoxycarbonyl, alkanoyloxy, and alkanoylthio;

-(substituted aryl);

-heteroaryl;

-(substituted heteroaryl);

-O-alkyl;

-O-$(alkyl)_{0-1}$-(substituted aryl) wherein the substituent(s) are independently selected from the group consisting of alkyl, alkoxy, alkylthio, hydroxy, haloalkyl, haloalkylcarbonyl, haloalkoxy, alkylcarbonyl, alkenylcarbonyl, arylcarbonyl, heteroarylcarbonyl, aryl, arylalkyl, heteroaryl, heteroarylalkyl, heterocyclyl, heterocycloalkyl, nitrile, alkoxycarbonyl, alkanoyloxy, and alkanoylthio;

-O-$(alkyl)_{0-1}$-heteroaryl;

-alkyl -O-alkyl;

-alkyl-O-alkenyl; and

-alkyl or alkenyl substituted by one or more substituents selected from the group consisting of:

-OH;

-halogen;

-$N(R_3)_2$;

-$CO\text{-}N(R_3)_2$;

-$CO\text{-}C_{1\text{-}10}$ alkyl;

-$CO\text{-}O\text{-}C_{1\text{-}10}$ alkyl;

-N_3;

-aryl;

-(substituted aryl);

-heteroaryl;

-(substituted heteroaryl);

-heterocyclyl;

-(substituted heterocyclyl);

-CO-aryl; and

-CO-heteroaryl;

each $\mathbf{R_3}$ is independently selected from the group consisting of hydrogen; $C_{1\text{-}10}$ alkyl-heteroaryl; $C_{1\text{-}10}$ alkyl-(substituted heteroaryl); $C_{1\text{-}10}$ alkyl–aryl; $C_{1\text{-}10}$ alkyl–(substituted aryl) and $C_{1\text{-}10}$ alkyl;

n is 0 to 4;

and each

R present is independently selected from the group consisting of $C_{1\text{-}10}$ alkyl, $C_{1\text{-}10}$ alkoxy, halogen and trifluoromethyl, or a pharmaceutically acceptable salt thereof.

Preparation of the Compounds

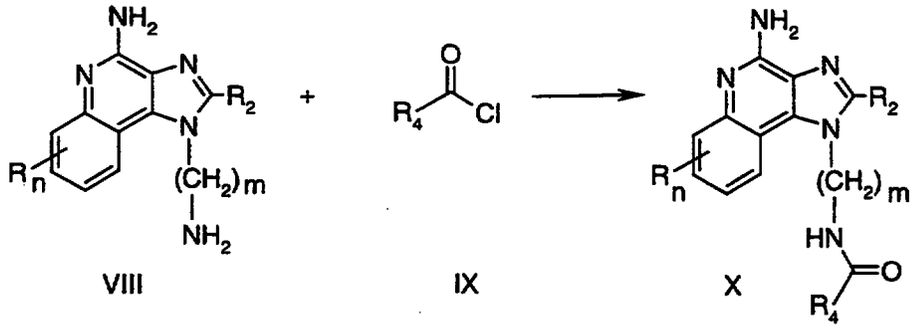
Imidazoquinolines of the invention can be prepared according to Reaction Scheme I where R, R_1, R_2 and n are as defined above.

In step (1) of Reaction Scheme I a 4-chloro-3-nitroquinoline of Formula II is reacted with an amine of Formula R_1NH_2 to provide a 3-nitroquinolin-4-amine of Formula

aminating agents include ammonia (e.g., in the form of ammonium hydroxide) and ammonium salts (e.g., ammonium carbonate, ammonium bicarbonate, ammonium phosphate). Ammonium hydroxide is preferred. The reaction is preferably carried out by dissolving the N-oxide of Formula VI in an inert solvent such as dichloromethane, adding the aminating agent to the solution, and then slowly adding the acylating agent. The product or a pharmaceutically acceptable salt thereof can be isolated using conventional methods.

Alternatively, step (5) may be carried out by (i) reacting an N-oxide of Formula VI with an isocyanate and then (ii) hydrolyzing the resulting product. Part (i) involves reacting the N-oxide with an isocyanate wherein the isocyanato group is bonded to a carbonyl group. Preferred isocyanates include trichloroacetyl isocyanante and aroyl isocyanates such as benzoyl isocyanate. The reaction of the isocyanate with the N-oxide is carried out under substantially anhydrous conditions by adding the isocyanate to a solution of the N-oxide in an inert solvent such as chloroform or dichloromethane. Part (ii) involves hydrolysis of the product from part (i). The hydrolysis can be carried out by conventional methods such as heating in the presence of water or a lower alkanol optionally in the presence of a catalyst such as an alkali metal hydroxide or lower alkoxide.

Reaction Scheme II

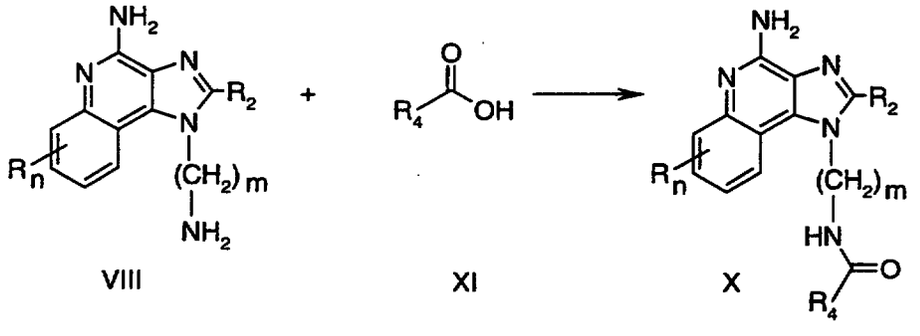


VIII IX X

Compounds of the invention can also be prepared according to Reaction Scheme III where R, R_2, R_4 and n are as defined above and m is 1–20.

In Reaction Scheme III an aminoalkyl substituted 1*H*-imidazo[4,5-*c*]quinolin-4-amine of Formula VIII is reacted with an acid of Formula XI to provide a compound of Formula X which is a subgenus of Formula I. The reaction can be run at ambient temperature in a solvent such as dichloromethane or pyridine using a standard coupling reagent such as 1,3-dicyclohexylcarbodiimide or 1-[3-(dimethylamino)propyl]-3-ethylcarbodiimide. The product or a pharmaceutically acceptable salt thereof can be isolated using conventional methods.

Reaction Scheme III

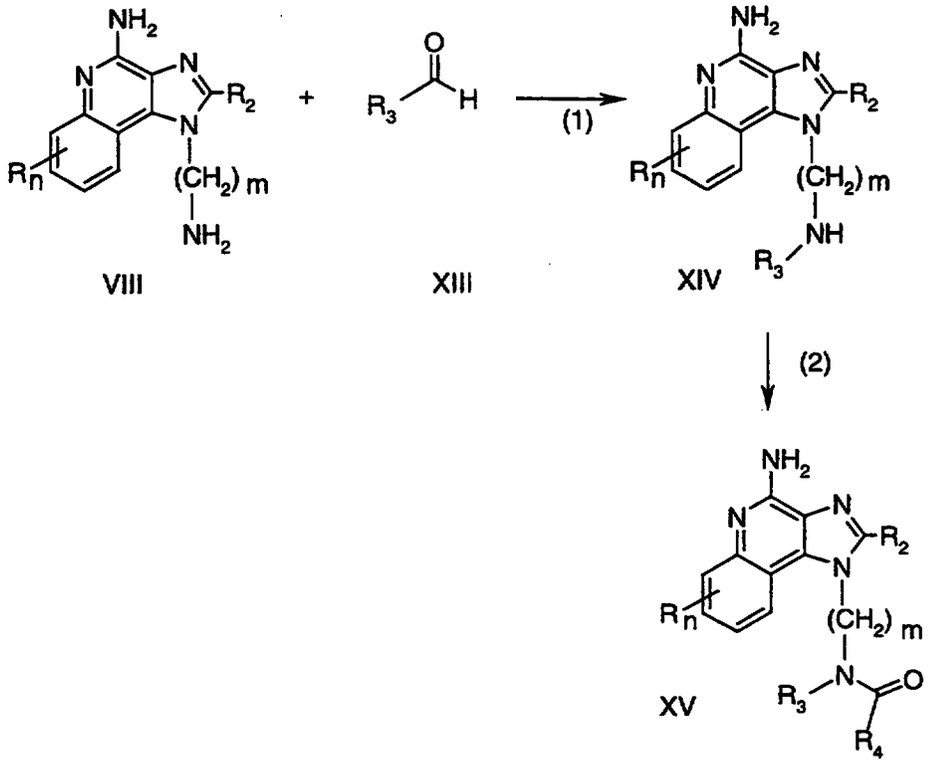


VIII XI X

Compounds of the invention can also be prepared according to Reaction Scheme IV where R, R_2, R_4 and n are as defined above and m is 1-20.

In Reaction Scheme IV an aminoalkyl substituted 1*H*-imidazo[4,5-*c*]quinolin-4-amine of Formula VIII is reacted with an acid anhydride of Formula XII provide a compound of Formula X which is a subgenus of Formula I. The reaction can be run at ambient temperature in an inert solvent such as dichloromethane in the presence of a base such as N,N-diisopropylethylamine or pyridine. Many acid anhydrides of Formula XII are

Reaction Scheme V

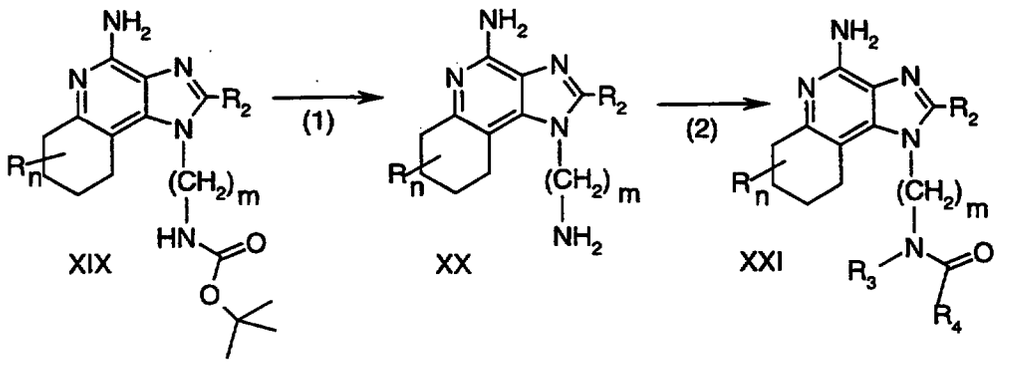


Tetrahydroimidazoquinolines of the invention can be prepared according to Reaction Scheme VI where R_2, R_3 and R_4 are as defined above and m is 1-20.

In step (1) of Reaction Scheme VI an aminoalkyl substituted 1*H*-imidazo[4,5-*c*]quinolin-4-amine of Formula XVI is reduced to provide an aminoalkyl substituted 6,7,8,9-tetrahydro-1*H*-imidazo[4,5-*c*]quinolin-4-amine of Formula XVII. Preferably the reduction is carried out by suspending or dissolving the compound of Formula XVI in trifluoroacetic acid, adding a catalytic amount of platinum (IV) oxide, and then subjecting the mixture to hydrogen pressure. The reaction can conveniently be carried out on a Parr apparatus. The product or a salt thereof can be isolated using conventional methods.

In step (2) of Reaction Scheme VI an aminoalkyl substituted 6,7,8,9-tetrahydro-1*H*-imidazo[4,5-*c*]quinolin-4-amine of Formula XVII is reacted to provide a compound of Formula XVIII which is a subgenus of Formula I. When R_3 is hydrogen, the reaction can be carried out according to the methods described in Reaction Schemes II, III and IV above using a tetrahydroimidazoquinoline of Formula XVII in place of the imidazoquinoline of Formula VIII. When R_3 is other than hydrogen, then the reaction can be carried out using the method described in Reaction Scheme V. The product or a pharmaceutically acceptable salt thereof can be isolated using conventional methods.

Reaction Scheme VII



Some compounds of Formula I can be readily prepared from other compounds of Formula I. For example, compounds wherein the R_4 substituent contains a chloroalkyl group can be reacted with an amine to provide an R_4 substituent substituted by a secondary or teriary amino group; compounds wherein the R_4 substituent contains a nitro group can be reduced to provide a compound wherein the R_4 substituent contains a primary amine.

As used herein, the terms "alkyl", "alkenyl", "alkynyl" and the prefix "-alk" are inclusive of both straight chain and branched chain groups and of cyclic groups, i.e. cycloalkyl and cycloalkenyl. Unless otherwise specified, these groups contain from 1 to 20 carbon atoms, with alkenyl and alkynyl groups containing from 2 to 20 carbon atoms. Preferred groups have a total of up to 10 carbon atoms. Cyclic groups can be monocyclic or polycyclic and preferably have from 3 to 10 ring carbon atoms. Exemplary cyclic groups include cyclopropyl, cyclopentyl, cyclohexyl and adamantyl.

The term "haloalkyl" is inclusive of groups that are substituted by one or more halogen atoms, including groups wherein all of the available hydrogen atoms are replaced by halogen atoms. This is also true of groups that include the prefix "haloalk-". Examples of suitable haloalkyl groups are chloromethyl, trifluoromethyl, and the like.

The term "aryl" as used herein includes carbocyclic aromatic rings or ring systems. Examples of aryl groups include phenyl, naphthyl, biphenyl, fluorenyl and indenyl. The term "heteroaryl" includes aromatic rings or ring systems that contain at least one ring hetero atom (e.g., O, S, N). Suitable heteroaryl groups include furyl, thienyl, pyridyl, quinolinyl, isoquinolinyl, indolyl, isoindolyl, pyrrolyl, tetrazolyl, imidazo, pyrazolo, oxazolo, thiazolo and so on.

compound to the subject. Any of the conventional dosage forms may be used, such as tablets, lozenges, parenteral formulations, syrups, creams, ointments, aerosol formulations, transdermal patches, transmucosal patches and the like.

The compounds of the invention can be administered as the single therapeutic agent in the treatment regimen, or the compounds of the invention may be administered in combination with one another or with other active agents, including additional immune response modifiers, antivirals, antibiotics, etc.

The compounds of the invention have been shown to induce the production of certain cytokines in experiments performed according to the tests set forth below. These results indicate that the compounds are useful as immune response modifiers that can modulate the immune response in a number of different ways, rendering them useful in the treatment of a variety of disorders.

Cytokines whose production may be induced by the administration of compounds according to the invention generally include interferon-α (IFN-α) and/or tumor necrosis factor-α (TNF-α) as well as certain interleukins (IL). Cytokines whose biosynthesis may be induced by compounds of the invention include IFN-α, TNF-α, IL-1, 6, 10 and 12, and a variety of other cytokines. Among other effects, cytokines inhibit virus production and tumor cell growth, making the compounds useful in the treatment of viral diseases and tumors.

In addition to the ability to induce the production of cytokines, the compounds of the invention affect other aspects of the innate immune response. For example, natural killer cell activity may be stimulated, an effect that may be due to cytokine induction. The compounds may also activate macrophages, which in turn stimulates secretion of nitric oxide and the production of additional cytokines. Further, the compounds may cause proliferation and differentiation of B-lymphocytes.

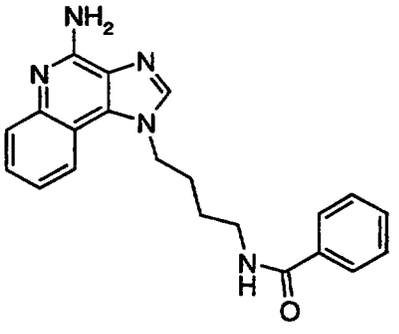
Compounds of the invention also have an effect on the acquired immune response. For example, although there is not believed to be any direct effect on T cells or direct induction of T cell cytokines, the production of the T helper type 1 (Th1) cytokine IFN-γ is induced indirectly and the production of the T helper type 2 cytokines IL-4, IL-5 and IL-13 are inhibited upon administration of the compounds. This activity means that the compounds are useful in the treatment of diseases where upregulation of the Th1 response and/or downregulation of the Th2 response is desired. In view of the ability of compounds

The invention also provides a method of treating a viral infection in an animal and a method of treating a neoplastic disease in an animal comprising administering an effective amount of a compound or composition of the invention to the animal. An amount effective to treat or inhibit a viral infection is an amount that will cause a reduction in one or more of the manifestations of viral infection, such as viral lesions, viral load, rate of virus production, and mortality as compared to untreated control animals. The precise amount will vary according to factors known in the art but is expected to be a dose of about 100ng/kg to about 50mg/kg, preferably about 10µg/kg to about 5mg/kg. An amount of a compound effective to treat a neoplastic condition is an amount that will cause a reduction in tumor size or in the number of tumor foci. Again, the precise amount will vary according to factors known in the art but is expected to be a dose of about 100ng/kg to about 50mg/kg, preferably about 10µg/kg to about 5mg/kg.

The invention is further described by the following examples, which are provided for illustration only and are not intended to be limiting in any way.

Example 1

N^1-[4-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]benzamide

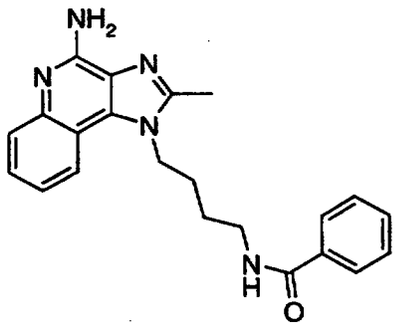


A suspension of 1-(4-aminobutyl)-1*H*-imidazo[4,5-*c*]quinolin-4-amine (2.0 g, 7.8 mmol) in pyridine (1 L) was warmed to 60°C to dissolve the starting material. The solution was cooled to about 30°C and then benzoyl chloride (1.1 g, 7.8 mmol) diluted with pyridine (100 mL) was slowly added. After 1 hour analysis by high performance liquid chromatography (HPLC) indicated that some starting material remained. Additional benzoyl chloride (0.3 g) was added and the reaction was warmed to 50°C overnight. The reaction mixture was concentrated under vacuum. The resulting residue was combined with chloroform (200 mL) and 1% sodium carbonate (200 mL). The organic layer was separated and then concentrated under vacuum. The resulting residue was combined with

Using the general method of Example 1, 1-(4-aminobutyl)-2-propyl-1*H*-imidazo[4,5-*c*]quinolin-4-amine (0.55 g, 1.8 mmol) was reacted with benzoyl chloride (0.26 g, 1.8 mmol) to provide N^1-[4-(4-amino-2-propyl-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]benzamide as a solid, m.p. 173-174°C. ^{1}H NMR (500 MHz, DMSO-d_6) δ 8.80 (broad s, 2H), 8.46 (t, J=6.0 Hz, 1H), 8.20 (d, J=8.0 Hz, 1H), 7.81 (d, J=8.4 Hz, 1H), 7.76 (d, J=7.4 Hz, 2H), 7.67 (t, J=7.4 Hz, 1H), 7.49 (m, 2H), 7.43 (t, J=7.5 Hz, 2H), 4.63 (t, J=7.0 Hz, 2H), 3.34 (m, 2H), 2.97 (t, J=7.0 Hz, 2H), 1.85 (m, 4H), 1.72 (quintet, J=7.0 Hz, 2H), 1.01 (t, J=7.0 Hz, 3H); MS (EI) m/e 401.2210 (401.2216 calcd for $C_{24}H_{27}N_5O$).

Example 4

N^1-[4-(4-Amino-2-methyl-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]benzamide

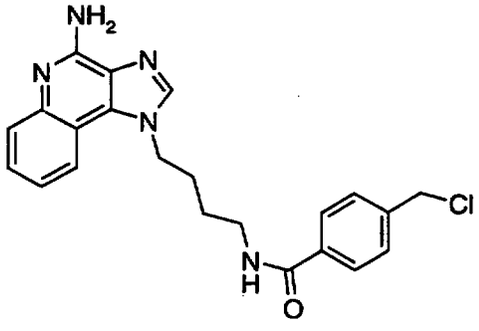


Using the general method of Example 1, 1-(4-aminobutyl)-2-methyl-1*H*-imidazo[4,5-*c*]quinolin-4-amine (0.5 g, 1.8 mmol) was reacted with benzoyl chloride (0.26 g, 1.8 mmol) to provide N^1-[4-(4-amino-2-methyl-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]benzamide as a solid. m.p. 164-170°C. ^{1}H NMR (500 MHz, DMSO-d_6) δ 8.47 (t, J=6.0 Hz, 1H), 8.01 (d, J=8.0 Hz, 1H), 7.78 (d, J=8.0 Hz, 2H), 7.59 (dd, J=8.0, 1.2 Hz, 1H), 7.50 (t, J=8.0 Hz, 1H), 7.43 (t, J=8.0 Hz, 2H), 7.38 (dt, J=8.0, 1.2 Hz, 1H), 7.17 (dt, J=8.0, 1.2 Hz, 1H), 6.48 (broad s, 2H), 4.53 (t, J=7.0 Hz, 2H), 3.31 (q, J=6.0 Hz, 2H), 2.60 (s, 3H), 1.88 (quintet, J=7.0 Hz, 2H), 1.68 (quintet, J=7.0 Hz, 2H); MS (EI) m/e 373.1903 (373.1903 calcd for $C_{22}H_{23}N_5O$).

aqueous sodium bicarbonate. The organic layer was separated and then concentrated under vacuum. The residue was dissolved in dichloromethane and placed on a silica gel column. The column was eluted with 5% methanol in dichloromethane and then with 10% methanol in dichloromethane. The 10% methanol in dichloromethane fractions were combined and concentrated under vacuum to provide N^1-[4-(4-amino-2-butyl-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]benzamide as a solid, m.p. 174-175°C. ^{1}H NMR (500 MHz, DMSO-d_6) δ 8.48 (t, J=6.0 Hz, 1H), 8.00 (d, J=8.0 Hz, 1H), 7.78 (d, J=8.0 Hz, 2H), 7.60 (d, J=8.0 Hz, 1H), 7.50 (t, J=8.0 Hz, 1H), 7.43 (t, J=8.0 Hz, 2H), 7.39 (t, J=8.0 Hz, 1H), 7.18 (t, J=8.0 Hz, 1H), 6.50 (broad s, 2H), 4.54 (t, J=7.0 Hz, 2H), 3.32 (m, 2H), 2.91 (t, J=7.0 Hz, 2H), 1.86 (quintet, J=7.0 Hz, 2H), 1.77 (quintet, J=7.0 Hz, 2H), 1.70 (quintet, J=7.0 Hz, 2H), 1.41 (sextet, J=7.0 Hz, 2H), 0.91 (t, J=7.0 Hz, 3H); MS (CI) m/e 416 (M+H).

Example 7

N^1-[4-(4-Amino -1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-4-(chloromethyl)benzamide



Part A

Oxalyl chloride (4.4 mL of 2M in chloroform, 8.8 mmol) was added to a suspension of 4-(chloromethyl)benzoic acid (1 g, 5.7 mmol) in dichloromethane. N,N-dimethylformamide (4 drops) was added to catalyze the reaction. After 1 hour analysis by HPLC indicated 100% clean conversion. The reaction mixture was concentrated under vacuum to provide 4-(chloromethyl)benzoyl chloride.

Part B

A solution of 4-(chloromethyl)benzoyl chloride (1.06 g, 5.6 mmol) in dichloromethane was added to a suspension of 1-(4-aminobutyl)-1*H*-imidazo[4,5-*c*]quinolin-4-amine (1.0 g, 3.9 mmol) in pyridine (250 mL). After 1 hour HPLC analysis indicated that the reaction was complete. The reaction mixture was concentrated under

ammonium hydroxide. The resulting solid was isolated by filtration, washed with water and then air dried to provide 11.8 g of crude product as a tan powder. This material was recrystallized from ethyl acetate/methanol to provide 4.9 g of 2-pyrrolidino-1*H*-benzimidazole. Analysis: Calculated for $C_{11}H_{13}N_3$: %C, 70.56; %H, 7.00; %N, 22.44; Found: %C, 70.13; %H, 7.05; %N, 22.70.

Part C

Sodium hydride (402 mg, 11 mmol) was added to a suspension of 2-pyrrolidino-1*H*-benzimidazole (1.9 g, 10.1 mmol) in dry N,N-dimethylformamide (30 mL). All solids dissolved. The solution was allowed to stir at ambient temperature for 15 minutes following the cessation of foaming. The solution was cooled to 5°C and a solid formed. Methyl 4-(bromomethyl)benzoate (2.1 g, 01 mol) was added to the suspension and all the solids dissolved. The solution was allowed to stir at ambient temperature and a solid formed. The mixture was stirred at ambient temperature overnight and then it was poured into cold water. A solid was isolated by filtration, washed with water and dried to provide 3.0 g of crude product as an off-white solid. This material was recrystallized from methanol to provide methyl 4-[(2-pyrrolidinyl-1*H*-benzimidazol-1yl)methyl]benzoate. Analysis: Calculated for $C_{20}H_{21}N_3O_2$: %C, 71.62; %H, 6.31; %N, 12.53; Found: %C, 71.44; %H, 6.41; %N, 12.50.

Part D

Methyl 4-[(2-pyrrolidinyl-1*H*-benzimidazol-1yl)methyl]benzoate (2.5 g, 7.5 mmol) was added to a solution of sodium hydroxide (1.8 g, 45 mmol) in water (30 mL) and methanol (10 mL). The mixture was heated on a steam bath until all of the ester dissolved. Heating was continued for an additional 15 minutes and then the solution was diluted with an equal volume of water and neutralized with hydrochloric acid. The resulting precipitate was isolated by filtration, washed with water and dried to provide 1.9 g of crude product. This material was recrystallized from N,N-dimethylformamide to provide 4-[(2-pyrrolidinyl-1*H*-benzimidazol-1yl)methyl]benzoic acid. Analysis: Calculated for $C_{19}H_{19}N_3O_2$: %C, 71.01; %H, 5.96; %N, 13.07; Found: %C, 70.01; %H, 6.14; %N, 13.32.

Part E

Oxalyl chloride (4 mL) was added to a suspension of 4-[(2-pyrrolidinyl-1*H*-benzimidazol-1yl)methyl]benzoic acid (0.28 g, 0.872 mmol) in chloroform (50 mL). The mixture was heated at reflux for 1 hour and then concentrated under vacuum. The residue

Part B

Triethylamine (1 eq.) was added to a suspension of 4-chloro-3-nitroquinoline hydrochloride (13 g, 53 mmol) in chloroform. A suspension of N-(5-aminopentyl)benzamide (11 g, 53 mmol) in chloroform was added and the reaction mixture was heated to reflux. Progress of the reaction was monitored by HPLC. The reaction mixture was concentrated under vacuum. The residue was diluted with toluene, heated to reflux and then filtered while still hot. The filtrate was allowed to cool. The resulting precipitate was isolated by filtration to provide 16.9 g of N^1-{5-[(3-nitroquinolin-4-yl)amino]pentyl}benzamide as a yellow solid, m.p. 130-132°C. ^{1}H NMR (500 MHz, DMSO-d_6) δ 9.07 (s, 1H), 9.02 (broad s, 1H), 8.53 (d, J=8.0 Hz, 1H), 8.43 (t, J=6.0 Hz, 1H), 7.89 (dd, J=8.0, 1.2 Hz, 1H), 7.83 (dt, J=8.0, 1.2 Hz, 1H), 7.80 (d, J=8.0 Hz, 2H), 7.57 (dt, J=8.0, 1.2 Hz, 1H), 7.50 (t, J=8.0 Hz, 1H), 7.43 (t, J=8.0 Hz, 2H), 3.63 (q, J=6.0 Hz, 2H), 3.25 (q, J=6.0 Hz, 2H), 1.77 (quintet, J=7.0 Hz, 2H), 1.55 (quintet, J=7.0 Hz, 2H), 1.39 (quintet, J=7.0 Hz, 2H).

Part C

A catalytic amount of platinum on carbon was added to a suspension of N^1-{5-[(3-nitroquinolin-4-yl)amino]pentyl}benzamide (3.4 g, 9 mmol) in isopropyl alcohol (250 mL). The reaction mixture was placed under a hydrogen atmosphere at 50 psi (3.4 X 10^4 pascals) on a Parr apparatus. After 2 hours the reaction mixture was filtered to remove the catalyst. The filtrate was concentrated under vacuum to provide crude N^1-{5-[(3-aminoquinolin-4-yl)amino]pentyl}benzamide. This material was combined with triethylorthoacetate (1.4 g, 9 mmol) and toluene (200 mL). The reaction mixture was heated overnight on a steam bath with a Vigreux column. The toluene was decanted from the reaction mixture and concentrated under vacuum to provide N^1-[5-(2-methyl-1*H*-imidazo[4,5-*c*]quinolin-1-yl)pentyl]benzamide as an oil.

Part D

3-Chloroperoxybenzoic acid (3 g, 9 mmol) was added to a solution of the oil from Part C in methyl acetate (50 mL). The reaction mixture was stirred at ambient temperature overnight and then diluted with diethyl ether (50 mL). The resulting precipitate was isolated by filtration and then washed with diethyl ether to provide 1.6 g of 1-(5-benzamidopentyl)-2-methyl-1*H*-imidazo[4,5-*c*]quinoline-5N-oxide.

steam bath and then filtered. HPLC analysis indicated that both filtrates contained product so they were combined and concentrated under vacuum to provide crude N^1-{5-[(3-aminoquinolin-4-yl)amino]pentyl}benzamide. This material was combined with toluene (250 mL). Triethylorthoformate (4 g, 26.4 mmol) was added and the reaction mixture was heated at reflux with a Vigreux column for 2 hours. The reaction mixture was allowed to cool to ambient temperature. The resulting precipitate was isolated by filtration to provide 3.4 g of N^1-[5-(1*H*-imidazo[4,5-*c*]quinolin-1-yl)pentyl]benzamide as a solid, m.p. 171.5-172.5°C. ^{1}H NMR (500 MHz, DMSO-d_6) δ 9.22 (s, 1H), 8.43 (t, J=6.0 Hz, 2H), 8.38 (m, 1H), 8.18 (m, 1H), 7.80 (d, J=7.0 Hz, 2H), 7.73 (m, 2H), 7.51 (t, J=7.0 Hz, 1H), 7.45 (t, J=7.0 Hz, 2H), 4.72 (t, J=7.5 Hz, 2H), 3.25 (q, J=6.0 Hz, 2H), 1.94 (quintet, J=7.5 Hz, 2H), 1.58 (quintet, J=7.5 Hz, 2H), 1.40 (quintet, J=8.5 Hz, 2H).

Part B

3-Chloroperoxybenzoic acid (1.9 g, 5.58 mmol) was added to a solution of N^1-[5-(1*H*-imidazo[4,5-*c*]quinolin-1-yl)pentyl]benzamide (2.0 g, 5.58 mmol) in chloroform. After 4 hours HPLC analysis indicated that the reaction was complete. The reaction was washed twice with 1% sodium carbonate (50 mL) and then concentrated under vacuum to provide 1-(5-benzamidopentyl)-1*H*-imidazo[4,5-*c*]quinoline-5N-oxide.

Part C

Ammonium hydroxide was added to a solution of 1-(5-benzamidopentyl)-1*H*-imidazo[4,5-*c*]quinoline-5N-oxide (2.1 g, 5.58 mmol) in dichloromethane. Tosyl chloride (1.06 g, 5.58 mmol) was slowly added with rapid stirring of the reaction mixture. After 1 hour the reaction was diluted with dichloromethane. The organic layer was separated, washed with 1% sodium carbonate and then concentrated under vacuum. The resulting residue was dissolved in isopropyl alcohol (100 mL) and then 6N hydrochloric acid (0.93 mL) was added. The resulting precipitate was suspended in water (150 mL), heated to reflux, treated with charcoal and then filtered. The filtrate was allowed to cool. The resulting precipitate was isolated by filtration and dried to provide 0.9 g of N^1-[5-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)pentyl]benzamide hydrochloride as a white crystalline solid, m.p. 217-219°C. Analysis: Calculated for $C_{22}H_{23}N_5O \cdot HCl \cdot ½H_2O$: %C, 52.85; %H, 6.85; %N, 14.01; Found: %C, 52.62; %H, 6.44%; %N, 13.87. ^{1}H NMR (500 MHz, DMSO-d_6) δ 13.84 (broad s, 1H), 9.24 (broad s, 2H), 8.51 (s, 1H), 8.43 (t, J=6.0 Hz, 1H), 8.22 (d, J=8.0 Hz, 1H), 7.82 (d, J=8.0 Hz, 1H), 7.76 (d, J=8.0 Hz, 2H), 7.70 (t, J=8.0

J=8.0 Hz, 1H), 7.76 (d, J=8.0 Hz, 2H), 7.55 (t, J=8.0 Hz, 1H), 7.50 (t, J=8.0 Hz, 1H), 7.43 (t, J=8.0 Hz, 2H), 3.69 (q, J=6.0 Hz, 2H), 3.35 (q, J=6.0 Hz, 2H), 2.00 (quintet, J=7.0 Hz, 2H).

Part C

A suspension of N^1-{3-[(3-nitroquinolin-4-yl)amino]propyl}benzamide (1.0 g, 2.8 mmol) in isopropyl alcohol (120 mL) was warmed to dissolve some of the material. A catalytic amount of platinum on carbon was added and the reaction mixture was placed under a hydrogen atmosphere at 50 psi (3.4×10^4 pascals) on a Parr apparatus. After 3 hours the reaction mixture was filtered to remove catalyst. The filtrate was concentrated under vacuum to provide crude N^1-{3-[(3-aminoquinolin-4-yl)amino]propyl}benzamide as an oil. Toluene (100 mL) was added to the oil followed by the addition of triethylorthoformate (0.8 g, 5.6 mmol). The reaction mixture was heated on a steam bath overnight. The reaction mixture was allowed to cool to ambient temperature. The resulting precipitate was isolated by filtration to provide 0.53 g of N^1-[3-(1*H*-imidazo[4,5-*c*]quinolin-1-yl)propyl]benzamide as an off white solid, m.p. 188-190°C. ^{1}H NMR (500 MHz, DMSO-d_6) δ 8.67 (t, J=5.5 Hz, 1H), 8.50 (s, 1H), 8.37 (d, J=7.5 Hz, 1H), 8.17 (dd, J=8.0, 1.5 Hz, 1H), 7.87 (d, J=7.0 Hz, 2H), 7.71 (dt, J=7.5, 1.5 Hz, 1H), 7.56 (dt, J=7.5, 1.0 Hz, 1H), 7.54 (d, J=8.0 Hz, 2H), 7.48 (t, J=7.0 Hz, 2H), 4.78 (t, J=7.0 Hz, 2H), 3.38 (q, J=6.0 Hz, 2H), 2.18 (quintet, J=7.0 Hz, 2H).

Part D

3-Chloroperoxybenzoic acid (0.55 g, 1.6 mmol) was slowly added at ambient temperature to a solution of N^1-[3-(1*H*-imidazo[4,5-*c*]quinolin-1-yl)propyl]benzamide (0.53 g, 1.6 mmol) in chloroform (50 mL). After 3 hours the reaction was washed with 1% sodium carbonate (2 X 30 mL) and then concentrated under vacuum to provide 0.32 g of 1-(3-benzamidopropyl)-1*H*-imidazo[4,5-*c*]quinoline-5N-oxide as a solid.

Part E

Ammonium hydroxide (20 mL) was added to a solution of 1-(3-benzamidopropyl)-1*H*-imidazo[4,5-*c*]quinoline-5N-oxide (0.32 g, 0.92 mmol) in dichloromethane (100 mL). Tosyl chloride (0.17 g, 0.92 mmol) was slowly added. The reaction mixture was stirred overnight at ambient temperature and then it was concentrated under vacuum to remove the dichloromethane. The resulting precipitate was isolated by filtration and then washed with water. This material was dissolved in isopropyl alcohol (20 mL/g). Concentrated

solution was allowed to cool to ambient temperature overnight. The resulting precipitate was isolated by filtration, washed with isopropyl alcohol and dried to provide isopropyl 6-morpholinonicotinate. The filtrate was diluted with water. The resulting precipitate was isolated by filtration, washed with water and dried to provide isopropyl 6-morpholinonicotinate. The combined yield was 8.3 g. The isopropyl 6-morpholinonicotinate was combined with 1 N sodium hydroxide (40 mL) and the resulting suspension was stirred at 50-60°C until all of the solid had dissolved. The solution was stirred at ambient temperature overnight during which time a precipitate formed. This material was isolated by filtration and identified as starting material. The filtrate was neutralized with concentrated hydrochloric acid. The resulting precipitate was isolated by filtration, washed with water and dried to provide 3.3 g of crude product. This material was recrystallized from methanol/dichloromethane to provide 6-morpholinonicotinic acid as a solid, m.p. 259-261°C. Analysis: Calculated for $C_{10}H_{12}N_2O_3$: %C, 57.19; %H, 5.81; %N, 13.48; Found: %C, 57.50; %H, 5.71; %N, 13.53.

Part C

N,N-Dimethylformamide (1 mL) was slowly added to a solution of oxalyl chloride (0.13 g, 1 mmol) in chloroform (5 mL). 6-Morpholinonicotinic acid (0.21 g, 1 mmol) was added and the reaction mixture was stirred for 15 minutes. The reaction mixture was concentrated under vacuum, diluted with toluene and then concentrated under vacuum to provide 6-morpholinonicotinoyl chloride. This material was kept under vacuum at ambient temperature overnight and then used in the next step.

Part D

The acid chloride from Part C was dissolved in pyridine (20 mL) and then added all at once to a warm solution of 1-(4-aminobutyl)-1*H*-imidazo[4,5-*c*]quinolin-4-amine (0.25 g, 1 mmol) in pyridine (25 mL). The reaction mixture was concentrated under vacuum at 40°C to remove the pyridine. The resulting residue was combined with water and 1N sodium hydroxide (25 mL). The mixture was extracted with dichloromethane. The extract was concentrated under vacuum. The resulting residue was recrystallized from isopropyl alcohol to provide N^3-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-6-morpholinonicotinamide as a solid, m.p. 160-170°C (dec.). ^{1}H NMR (500 MHz, DMSO-d_6) δ 8.55 (d, J=2.5 Hz, 1H), 8.52 (s, 1H), 8.28 (t, J=6.0 Hz, 1H), 8.22 (d, J=8.0 Hz, 1H), 7.90 (dd, J=8.0, 2.5 Hz, 1H), 7.82 (d, J=8.0 Hz, 1H), 7.69 (t, J=8.0 Hz, 1H), 7.52 (d, J=8.0

(250 mL). The reaction mixture was heated at reflux for 5 hours and then allowed to slowly cool to ambient temperature. The resulting precipitate was isolated by filtration and dried to provide 17.6 g of *tert*-butyl N-[2-(1*H*-imidazo[4,5-*c*]quinolin-1-yl)ethyl]carbamate as a light tan solid, m.p. 154-155°C.

Part D

3-Chloroperoxybenzoic acid (17.4 g, 60.6 mmol) was added in small portions to a solution of *tert*-butyl N-[2-(1*H*-imidazo[4.5-*c*]quinolin-1-yl)ethyl]carbamate (17.2 g, 55.1 mmol) in chloroform (250 mL). The reaction was maintained at ambient temperature overnight and then quenched with 5% sodium carbonate solution. The layers were separated. The organic layer was dried over magnesium sulfate and then concentrated under vacuum to provide 15.0 g of 1-[2-(*tert*-butylcarbamyl)ethyl]- 1*H*-imidazo[4,5-*c*]quinoline-5N-oxide as an off white solid, m.p. 213-215°C.

Part E

Trichloroacetyl isocyanate (9.5 g. 50.2 mmol) was slowly added to a stirred solution of 1-[2-(*tert*-butylcarbamyl)ethyl]- 1*H*-imidazo[4,5-*c*]quinoline-5N-oxide (15.0 g, 45.7 mmol) in chloroform (200 mL). After 2 hours the reaction was quenched with concentrated ammonium hydroxide (100 mL). Water (100 mL) was added and the layers were separated. The aqueous layer was extracted with chloroform. The organic layers were combined, dried over magnesium sulfate and then concentrated under vacuum to provide a white solid. This material was slurried in warm methyl acetate and then filtered to provide 15 g of *tert*-butyl N-[2-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)ethyl]carbamate as a white solid, m.p. 215°C. ^{1}H NMR (500 MHz, DMSO-d_6) δ 8.13 (t, J=8.0 Hz, 1H), 8.03 (s, 1H), 7.61(d, J=8.0 Hz, 1H), 7.44 (t, J=8.0 Hz, 1H), 7.23 (t, J=8.0 Hz, 1H), 7.06 (t, J=6.0 Hz, 1H), 6.56 (broad s, 2H), 4.63 (t, J=7.0 Hz, 2H), 3.43 (q, J=6.0 Hz, 2H), 1.32 (s, 9H); MS (EI) m/e 327.1696 (327.1695 calcd for $C_{17}H_{21}N_5O_2$)

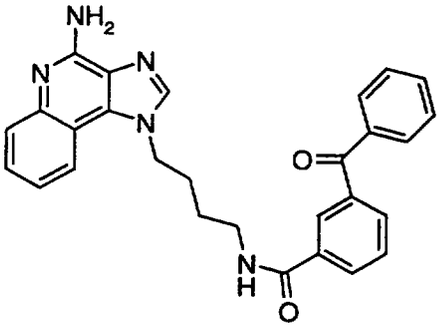
Part F

Tert-butyl N-[2-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)ethyl]carbamate (14.8 g, 45.2 mmol), trifluoroacetic acid (100 mL) and acetonitrile (100 mL) were combined and maintained at ambient temperature overnight. The acetonitrile was removed and the reaction mixture was heated at reflux for 2 hours. The reaction mixture was concentrated under vacuum to provide a tan solid. This material was dissolved in a minimal amount of hot water. The solution was adjusted to pH 14 and allowed to cool. The solution was

with a heat gun to dissolve the solid. The resulting solution was allowed to cool to ambient temperature. A solution of 2-phenoxybenzoyl chloride (0.11 g, 0.47 mmol) in pyridine (5 mL) was added. The reaction mixture was maintained at ambient temperature for 18 hours and then concentrated under vacuum. The resulting solid residue was purified by flash chromatography (silica gel eluting with 9:1 dichloromethane:methanol) to provide 0.12 g of N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-2-phenoxybenzamide as a white solid, m.p. 93-94°C. ^{1}H NMR (500 MHz, DMSO-d_6) δ 8.23 (t, J=6.0 Hz, 1H), 8.14 (s, 1H), 8.00 (d, J=8.0 Hz, 1H), 7.62 (d, J=8.0 Hz, 1H), 7.54 (dd, J=8.0, 1.5 Hz, 1H), 7.43 (dt, J=8.0, 1.5 Hz, 1H), 7.42 (dt, J=8.0, 1.5 Hz, 1H), 7.30 (t, J=8.0 Hz, 2H), 7.22 (t, J=8.0 Hz, 1H), 7.18 (t, J=8.0 Hz, 1H), 7.07 (t, J=8.0 Hz, 1H), 6.89 (m, 3H), 6.59 (broad s, 2H), 4.55 (t, J=7.0 Hz, 2H), 3.23 (q, J=6.0 Hz, 2H), 1.81 (quintet, J=7.0 Hz, 2H), 1.47 (quintet, J=7.0 Hz, 2H); MS (EI) m/e 451.2004 (451.2008 calcd for $C_{27}H_{25}N_5O_2$).

Example 15

N^1-[4-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-3-benzoylbenzamide

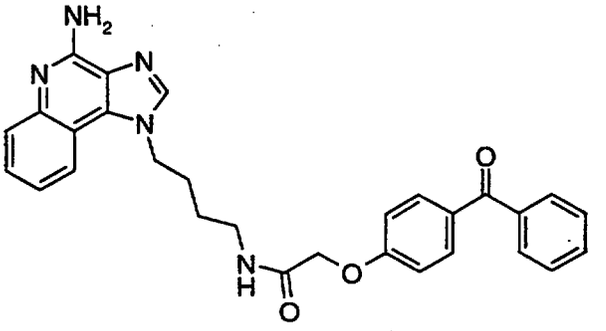


Using the method of Example 14, 1-(4-aminobutyl)-1*H*-imidazo[4,5-*c*]quinolin-4-amine (0.2 g, 0.78 mmol) was reacted with 3-benzoylbenzoyl chloride (0.18 g, 0.73 mmol) to provide 0.19 g of N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-3-benzoylbenzamide as a white crystalline solid, m.p. 103-105°C. ^{1}H NMR (500 MHz, DMSO-d_6) δ 8.70 (t, J=6.0 Hz, 1H), 8.22 (s, 1H), 8.16 (broad s, 1H), 8.08 (d, J=8.0 Hz, 1H), 8.03 (d, J=8.0 Hz, 1H), 7.85 (d, J=8.0 Hz, 1H), 7.73 (d, J=8.0 Hz, 2H), 7.70 (t, J=8.0 Hz, 1H), 7.64 (t, J=8.0 Hz, 1H), 7.61 (d, J=8.0 Hz, 1H), 7.57 (t, J=8.0 Hz, 2H), 7.40 (t, J=8.0 Hz, 1H), 7.19 (t, J=8.0 Hz, 1H), 6.67 (broad s, 2H), 4.63 (t, J=7.0 Hz, 2H), 3.32 (q, J=6.0 Hz, 2H), 1.91 (quintet, J=7.0 Hz, 2H), 1.59 (quintet, J=7.0 Hz, 2H); MS (EI) m/e 463.2022 (463.2008 calcd for $C_{28}H_{25}N_5O_2$).

Hz, 2H), 3.54 (q, J=6.0 Hz, 2H), 2.75 (t, J=7.0 Hz, 2H), 2.31 (t, J=7.0 Hz, 2H); MS (EI) m/e 359.1745 (359.1746 calcd for $C_{21}H_{21}N_5O$).

Example 18

N^1-[4-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-2-(4-benzoylphenoxy)acetamide

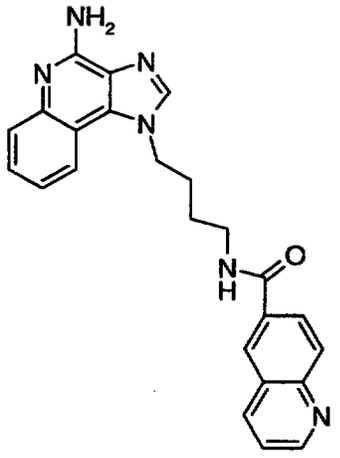


1-(4-Aminobutyl)-1*H*-imidazo[4,5-*c*]quinolin-4-amine (99.6 mg, 0.39 mmol) and 2-(4-benzoylphenoxy)acetic acid (100 mg, 0.39 mmol) were combined in pyridine (10 mL). The mixture was warmed until homogeneous and then allowed to cool. 1-[3-(dimethylamino)propyl]-3-ethylcarbodiimide hydrochloride (82 mg, 0.43 mole) was added. The reaction mixture was maintained at ambient temperature overnight and then concentrated under vacuum. The residue was partitioned between chloroform and saturated potassium carbonate solution. The layers were separated. The aqueous layer was extracted with chloroform. The organic layers were combined, dried over magnesium sulfate and then concentrated under vacuum to provide a gold oil. The oil was purified by column chromatography (silica gel eluting with 10% methanol in dichloromethane) to provide about 70 mg of N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-2-(4-benzoylphenoxy)acetamide as a white solid, m.p. 73-98°C. ^{1}H NMR (500 MHz, DMSO-d_6) δ 8.22 (t, J=6.0 Hz, 1H), 8.18 (s, 1H), 8.03 (d, J=8.3 Hz, 1H), 7.73 (d, J=8.0 Hz, 2H), 7.68 (d, J=8.0 Hz, 2H), 7.65 (t, J=8.0 Hz, 1H), 7.60 (dd, J=8.0, 1.0 Hz, 1H), 7.55 (t, J=8.0 Hz, 2H), 7.42 (dt, J=8.0, 1.0 Hz, 1H), 7.25 (t, J=8.0, 1.0 Hz, 1H), 7.07 (d, J=8.0 Hz, 2H), 6.58 (broad s, 2H), 4.61 (t, J=7.0 Hz, 2H), 4.56 (s, 2H), 3.18 (q, J=6.0 Hz, 2H), 1.86 (quintet, J=7.0 Hz, 2H), 1.50 (quintet, J=7.0 Hz, 2H); MS (EI) m/e 493.2106 (493.2114 calcd for $C_{29}H_{27}N_5O_3$).

mmol) to provide 0.15 g of N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin1-yl)butyl]-4-benzoylbenzamide as a white solid, m.p. 159-161°C. ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.06 (s, 1H), 7.96 (d, J=8.0 Hz, 1H), 7.91 (d, J=8.0 Hz, 1H), 7.85 (d, J=8.0 Hz, 2H), 7.81 (d, J=8.0 Hz, 2H), 7.76 (d, J=8.0 Hz, 2H), 7.60 (m, 2H), 7.49 (t, J=8.0 Hz, 2H), 7.48 (t, J=8.0 Hz, 1H), 7.24 (broad s, 1H), 6.86 (broad s, 1H), 6.60 (t, J=6 Hz, 1H), 4.69 (t, J=7.0 Hz, 2H), 3.62 (q, J=6.0 Hz, 2H), 2.14 (quintet, J=7.0 Hz, 2H), 1.82 (quintet, J=7.0 Hz, 2H); MS (EI) m/e 463.2002 (463.2008 calcd for $C_{28}H_{25}N_5O_2$).

Example 21

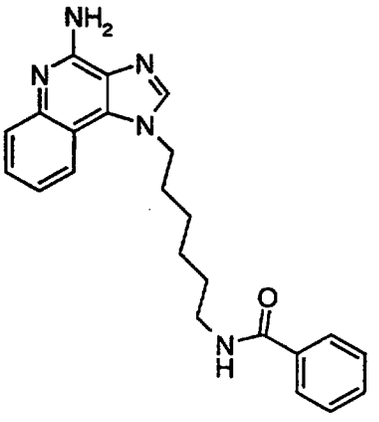
N^6-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-6-quinolinecarboxamide



Using the general method of Example 18, 1-(4-aminobutyl)-1*H*-imidazo[4,5-c]quinolin-4-amine (0.5 g, 1.96 mmol) was coupled with 6-quinolinecarboxylic acid (0.34 g, 1.96 mmol) to provide 0.08 g of N^6-[4-(4-amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-6-quinolinecarboxamide as a tan powder, m.p. 122-127 °C (foaming). ^{1}H NMR (300 MHz, DMSO-d_6) δ 8.98 (m, 1H), 8.73 (t, J=5.4 Hz, 1H), 8.43 (m, 2H), 8.23 (s, 1H), 8.13-8.03 (m, 3H), 7.60 (m, 2H), 7.40 (m, 1H), 7.20 (m, 1H), 6.58 (broad s, 2H), 4.66 (t, J=6.7 Hz, 2H), 3.37 (m, 2H), 1.96 (m, 2H), 1.64 (m, 2H); MS (EI) m/e 410.1847 (410.1855 calcd for $C_{24}H_{22}N_6O$).

Example 23

N^1-[6-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)hexyl]benzamide



Part A

Using the general method of Example 9 Part A, hexamethylenediamine (348.63 g, 3 mol) was reacted with benzamide (121.14 g, 1 mole) to provide 136.5 g of N-(6-aminohexyl)benzamide.

Part B

Using the general method of Example 9 Part B, 4-chloro-3-nitroquinoline hydrochloride (10 g, 41 mmol) was reacted with N-(6-aminohexyl)benzamide to provide 12.85 g of N^1-{6-[(3-nitroquinolin-4-yl)amino]hexyl}benzamide as a yellow crystalline solid.

Part C

Using the general method of Example 9 Part C, 12.3 g of the material from part B was reduced and then reacted with triethylorthoformate (8.94 g, 6 mmol) to provide 6.4 g of N^1-[6-(1*H*-imidazo[4,5-*c*]quinolin-1-yl)hexyl]benzamide as a brown oil.

Part D

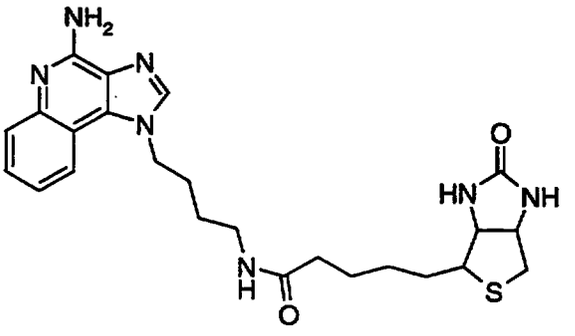
3-Chloroperoxybenzoic acid (5.9 g, 17 mmol) was slowly added to a solution of the material from Part C in chloroform. The solution turned orange. After 2 hours the reaction mixture was washed twice with aqueous sodium carbonate and then concentrated under vacuum to provide 6.0 g of 1-(6-benzamidohexyl)-1*H*-imidazo[4,5-*c*]quinoline-5N-oxide as an orange oil.

Part E

Ammonium hydroxide was added to a solution of the material from Part D in dichloromethane. Tosyl chloride (2.94 g, 15 mmol) was slowly added with vigorous

Example 25

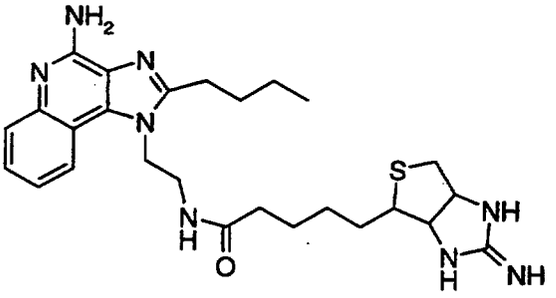
N^1-[4-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-
5-(2-oxoperhydrothieno[3,4-*d*]imidazol-4-yl)pentanamide



A solution of 1-(4-aminobutyl)-1*H*-imidazo[4,5-c]quinolin-4-amine (0.38 g, 1.49 mmol) in pyridine (20 mL) was added to a solution of N-hydroxysuccinimidobiotin (0.51 g, 1.49 mmol) in pyridine (20 mL). The reaction was maintained at ambient temperature overnight and then concentrated to dryness. The residue was partitioned between dichloromethane and aqueous saturated potassium carbonate. The organic layer was dried over magnesium sulfate and then concentrated to provide 0.58 g of N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)-5-(2-oxoperhydrothieno[3,4-*d*]imidazol-4-yl)pentamide as a solid, m.p. 104-106°C. High resolution mass spec: Theoretical mass = 481.2260, Measured mass = 481.2261.

Example 26

N^1-[2-(4-Amino-2-butyl-1*H*-imidazo[4,5-*c*]quinolin-1-yl)ethyl]-
5-(2-iminoperhydrothieno[3,4-*d*]imidazol-4-yl)pentanamide

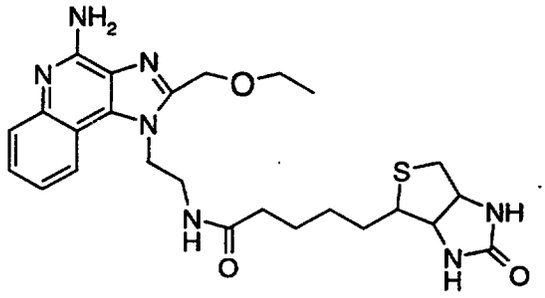


A solution of N-hydroxysuccinimidoiminobiotin (0.74 g, 1.76 mmol) in pyridine (10 mL) was slowly added to a solution of 1-(2-aminoethyl)-2-butyl-1*H*-imidazo[4,5-c]quinolin-4-amine (0.50 g, 1.76 mmol) in pyridine (30 mL). The reaction was maintained at ambient temperature overnight and then concentrated to dryness. The residue was

butyl-1*H*-imidazo[4,5-*c*]quinolin-1-yl)ethyl]-5-(2-oxoperhydrothieno[3,4-*d*]imidazol-4-yl)pentanamide as a white solid, m.p. 124-126°C. High resolution mass spec: Theoretical mass =509.25, Measured mass = 509.2580.

Example 29

N^1-[2-(4-Amino-2-(ethoxymethyl)-1*H*-imidazo[4,5-*c*]quinolin-1-yl)ethyl]-5-(2-oxoperhydrothieno[3,4-*d*]imidazol-4-yl)pentanamide Ditrifluoroacetate

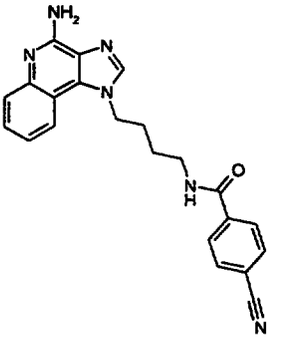


Triethylamine (1.2 g, 11.4 mmol) was added in a single portion to a slurry of 1-(2-aminoethyl)-2-(ethoxymethyl)-1*H*-imidazo[4,5-c]quinolin-4-amine hydrochloride (3.39 g, 10.53 mmol) in chloroform (150 mL). The reaction mixture became clear. N-hydroxysuccinimidobiotin (3.0 g, 8.79 mmol) was then slowly added. After 2 hours the turbid reaction mixture was heated to reflux. The reaction mixture was maintained at reflux overnight and became clear. The reaction mixture was allowed to cool to ambient temperature and then it was quenched with water. The layers were separated. The organic layer was dried over magnesium sulfate and then concentrated to provide an off-white solid. This material was recrystallized from 8:2 ethanol:water to provide a white solid. A portion of this material was purified by prep HPLC eluting with water/acetonitrile/trifluoroacetic acid to provide 0.6 g of N^1-[2-(4-amino-2-(ethoxymethyl)-1*H*-imidazo[4,5-*c*]quinolin-1-yl)ethyl]-5-(2-oxoperhydrothieno[3,4-*d*]imidazol-4-yl)pentanamide as the ditrifluoroacetate salt, m.p. 171-175°C. Analysis: Calculated for: $C_{25}H_{33}N_7O_3S \cdot 2\ C_2HF_3O_2$: %C, 47.09; %H, 4.77; %N, 13.26; Found: %C, 47.06; %H, 5.17; %N, 13.31.

(t, J=5.8 Hz, 1H), 8.22 (s, 1H), 8.09 (d, J=8.0 Hz, 1H), 7.91 (d, J=8.7 Hz, 1H), 7.87-7.84 (m, 1H), 7.64-7.56 (m, 2H), 7.47-7.22 (m, 5H), 6.60 (s, 2H), 4.69 (t, J=7.2 Hz, 2H), 4.09 (q, J=7.2 Hz, 2H), 3.37 (m, 2H), 2.01 (m, 2H), 1.64 (m, 2H), 1.18 (t, J=7.2 Hz, 3H); MS (EI) m/e 453.2157 (453.2165 calcd for $C_{27}H_{27}N_5O_2$).

Example 32

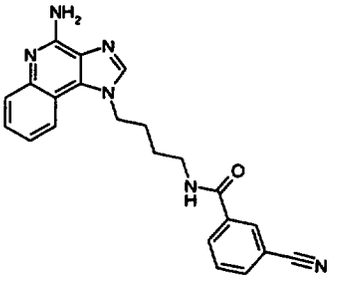
N^1-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-4-cyanobenzamide



According to the general method of Example 14, 1-(4-aminobutyl)-1*H*-imidazo[4,5-c]quinolin-4-amine and 4-cyanobenzoyl chloride were combined to provide N^1-[4-(4-amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-4-cyanobenzamide as a white powder, m.p. 222.8-225.3 °C. ^{1}H NMR (300 MHz, DMSO-d_6) δ 8.73 (t, J=5.7 Hz, 1H), 8.22 (s, 1H), 8.03 (d, J=8.1 Hz, 1H), 7.93 (s, 4H), 7.61 (dd, J=8.4, 1.2 Hz, 1H), 7.43 (dt, J=7.6, 1.5 Hz, 1H), 7.21 (dt, J=7.6, 1.2 Hz, 1H), 6.61 (s, 2H), 4.64 (t, J=7.2 Hz, 2H), 3.33 (m, 2H), 1.96 (quintet, J=7.2 Hz, 2H), 1.58 (quintet, J=7.2 Hz, 2H); IR (KBr) 3441, 3337, 3136, 2945, 2228, 1641, 1545, 1531, 1481, 1396, 1309, 1257, 857, 755 cm^{-1}; MS (EI) m/e 384.1699 (384.1699 calcd for $C_{22}H_{20}N_6O$).

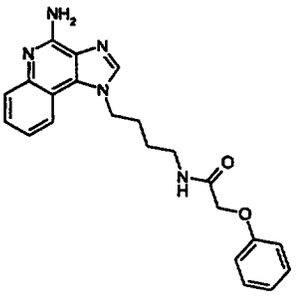
Example 33

N^1-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-3-cyanobenzamide



Example 35

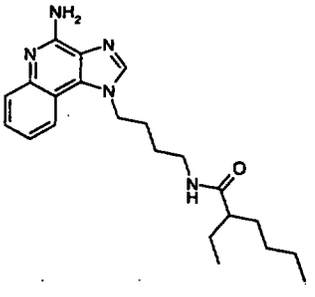
N^1-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-phenoxyacetamide



According to the general method of Example 14, 1-(4-aminobutyl)-1*H*-imidazo[4,5-c]quinolin-4-amine and phenoxyacetyl chloride were combined to provide N^1-[4-(4-amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-phenoxyacetamide as an off white powder, m.p. 61.5 °C (decomposition). ^{1}H NMR (300 MHz, DMSO-d_6) δ 8.19 (s, 1H), 8.12 (t, J=6.0 Hz, 1H), 8.03 (d, J=8.4 Hz, 1H), 7.62 (dd, J=8.4, 1.2 Hz, 1H), 7.44 (dt, J=7.5, 1.2 Hz, 1H), 7.29-7.21 (m, 3H), 6.96-6.88 (m, 3H), 6.62 (s, 2H), 4.60 (t, J=7.2 Hz, 2H), 4.42 (s, 2H), 3.16 (q, J=6.9 Hz, 2H), 1.83 (quintet, J=7.2 Hz, 2H), 1.47 (quintet, J=7.2 Hz, 2H); IR (KBr) 3311, 3180, 2937, 1664, 1618, 1583, 1527, 1493, 1480, 1396, 1244, 755 cm^{-1}; MS (EI) m/e 389.1844 (389.1852 calcd for $C_{22}H_{23}N_5O_2$).

Example 36

N^1-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-ethylhexanamide

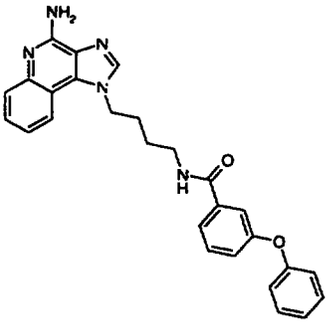


According to the general method of Example 14, 1-(4-aminobutyl)-1*H*-imidazo[4,5-c]quinolin-4-amine and 2-ethylhexanoyl chloride were combined to provide N^1-[4-(4-amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-ethylhexanamide as a tan powder, m.p. 163.0-164.0 °C. ^{1}H NMR (300 MHz, DMSO-d_6) δ 8.19 (s, 1H), 8.03 (d, J=8.1 Hz, 1H), 7.79 (m, 1H), 7.61 (dd, J=8.1, 1.2 Hz 1H), 7.44 (dt, J=7.5, 1.2 Hz, 1H), 7.26 (dt, J=7.5, 1.2 Hz, 1H), 6.63 (s, 2H), 4.61 (t, J=6.9 Hz, 2H), 3.12-3.05 (m, 2H), 1.94-

According to the general method of Example 14, 1-(4-aminobutyl)-1*H*-imidazo[4,5-c]quinolin-4-amine and 1-naphthoyl chloride were combined to provide N^1-[4-(4-amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-1-naphthamide as an off white powder, m.p. 174.5 °C (decomposition). ^{1}H NMR (300 MHz, DMSO-d_6) δ 8.52 (t, J=5.6 Hz, 1H), 8.49 (s, 1H), 8.24 (m, 3H), 8.10 (d, J=8.1 Hz, 1H), 7.97 (m, 2H), 7.80 (d, J=8.2 Hz, 1H), 7.65 (t, J=7.3 Hz, 1H), 7.57-7.41 (m, 5H), 4.75 (t, J=6.9 Hz, 2H), 2.03-1.98 (m, 2H), 1.69-1.64 (m, 2H); MS (EI) m/e 409.1903 (409.1903 calcd for $C_{25}H_{23}N_5O$).

Example 39

N^1-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-3-phenoxybenzamide

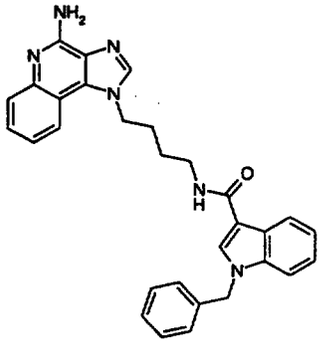


According to the general method of Example 14, 1-(4-aminobutyl)-1*H*-imidazo[4,5-c]quinolin-4-amine and 3-phenoxybenzoyl chloride were combined to provide N^1-[4-(4-amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-3-phenoxybenzamide as a white powder, m.p. 105.0-107.0 °C. ^{1}H NMR (300 MHz, DMSO-d_6) δ 8.54 (t, J=5.4 Hz, 1H), 8.34 (s, 1H), 8.10 (d, J=8.1 Hz, 1H), 7.69 (dd, J=8.1, 1.2 Hz, 1H), 7.58-7.29 (m, 9H), 7.19-7.13 (m, 2H), 7.04-6.99 (m, 2H), 4.65 (t, J=7.2 Hz, 2H), 3.28 (m, 2H), 1.89 (quintet, J=7.2 Hz, 2H), 1.58 (quintet, J=7.2 Hz, 2H); MS (EI) m/e 451.2012 (451.2008 calcd for $C_{27}H_{25}N_5O_2$).

J=6.9 Hz, 2H), 1.76 (quintet, J=7.1 Hz, 2H), 1.43 (quintet, J=7.1 Hz, 2H), 1.33 (d, J=6.6 Hz, 3H); MS (EI) m/e 403.2005 (403.2008 calcd for $C_{23}H_{25}N_5O_2$).

Example 42

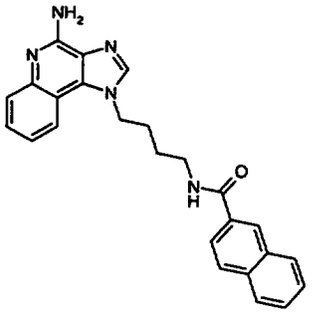
N^3-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-1-benzyl-1*H*-3-indolecarboxamide



According to the general method of Example 14, 1-(4-aminobutyl)-1*H*-imidazo[4,5-c]quinolin-4-amine and 1-benzylindole-3-carbonyl chloride were combined to provide N^3-[4-(4-amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-1-benzyl-1*H*-3-indolecarboxamide as a white powder, m.p. 139.0 °C (decomposition). ^{1}H NMR (300 MHz, DMSO-d_6) δ 8.24 (s, 1H), 8.14 (t, J=7.8 Hz, 1H), 8.04 (m, 2H), 7.93 (m, 1H), 7.62 (d, J=8.4 Hz, 1H), 7.51 (d, J=7.8 Hz, 1H), 7.44-7.09 (m, 9H), 6.63 (s, 2H), 5.44 (s, 2H), 4.66 (t, J=6.6 Hz, 2H), 1.97-1.92 (m, 2H), 1.62-1.57 (m, 2H); MS (EI) m/e 488.2326 (488.2325 calcd for $C_{30}H_{28}N_6O$).

Example 43

N^2-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-naphthamide

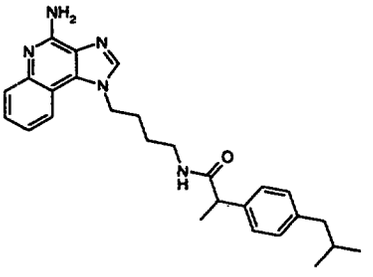


According to the general method of Example 14, 1-(4-aminobutyl)-1*H*-imidazo[4,5-c]quinolin-4-amine and 2-naphthoyl chloride were combined to provide N^2-[4-(4-amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-naphthamide as a white powder,

as a tan powder, m.p. 91.0-93.0 °C. ^{1}H NMR (300 MHz, DMSO-d_6) δ 10.80 (t, J=5.5 Hz, 1H), 8.79 (dd, J=4.3, 1.8 Hz, 1H), 8.55-8.49 (m, 2H), 8.24 (s, 1H), 8.17 (dd, J=8.1, 1.5 Hz, 1H), 8.06 (d, J=7.2 Hz, 1H), 7.73 (t, J=7.8 Hz, 1H), 7.63-7.59 (m, 2H), 7.40 (dt J=7.1, 1.2 Hz, 1H), 7.14 (dt, J=7.1, 1.2 Hz, 1H), 6.57 (broad s, 2H), 4.68 (t, J=7.0 Hz, 2H), 3.51 (m, 2H), 2.02 (m, 2H), 1.69 (m, 2H); MS (EI) m/e 410.1858 (410.1855 calcd for $C_{24}H_{22}N_6O$).

Example 46

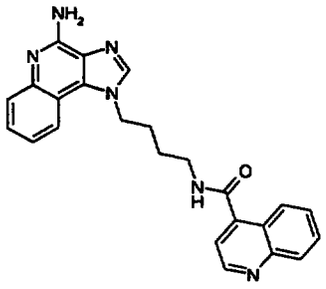
N^1-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-(4-isobutylphenyl)propanamide



According to the general method of Example 14, 1-(4-aminobutyl)-1*H*-imidazo[4,5-c]quinolin-4-amine and 4-isobutyl-α-methylphenylacetyl chloride were combined to provide N^1-[4-(4-amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-(4-isobutylphenyl)propanamide as a white powder, m.p. 172.0-173.0 °C. ^{1}H NMR (300 MHz, DMSO-d_6) δ 8.14 (s, 1H), 8.01 (d, J=7.6 Hz, 1H), 7.90 (t, J=5.6 Hz, 1H), 7.63 (dd, J=8.1, 1.0 Hz, 1H), 7.44 (dt, J=7.0, 1.0 Hz, 1H), 7.25 (dt, J=7.0 Hz, 1H), 7.14 (d, J=8.0 Hz, 2H), 6.97 (d, J=8.0 Hz, 2H), 6.58 (broad s, 2H), 4.55 (t, J=7.0 Hz, 2H), 3.47 (q, J=7.1 Hz, 1H), 3.06 (m, 2H), 2.34 (d, J=7.1 Hz, 2H), 1.80-1.69 (m, 3H), 1.44 (m, 2H), 1.24 (d, J=7.0 Hz, 3H), 0.82 (d, J=6.6 Hz,6H); MS (EI) m/e 443.2687 (443.2685 calcd for $C_{27}H_{33}N_5O$).

Example 49

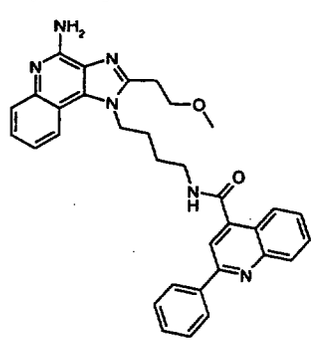
N^4-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-4-quinolinecarboxamide



According to the general method of Example 14, 1-(4-aminobutyl)-1*H*-imidazo[4,5-c]quinolin-4-amine and quinoline-4-carbonyl chloride were combined to provide N^4-[4-(4-amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-4-quinolinecarboxamide as a white crystalline solid, m.p. 214.5-215.2 °C. ^{1}H NMR (300 MHz, DMSO-d_6) δ 8.89 (d, J=4.3 Hz, 1H), 8.76 (t, J=5.6 Hz, 1H), 8.24 (s, 1H), 8.10-8.01 (m, 3H), 7.78 (ddd, J=8.4, 6.9, 1.5 Hz, 1H), 7.64 (dd, J=8.4, 1.1 Hz, 1H), 7.56 (ddd, J=8.3, 6.9, 1.4 Hz, 1H), 7.44 (ddd, J=8.3, 7.0, 1.3 Hz, 1H), 7.34 (d, J=4.3 Hz, 1H), 7.24 (ddd, J=8.3, 7.0, 1.3 Hz, 1H), 6.60 (broad s, 2H), 4.68 (t, J=6.9 Hz, 2H), 3.38 (q, J=7.0 Hz, 2H), 2.00 (m, 2H), 1.63 (m, 2H); MS (EI) m/e 410.1860 (410.1855 calcd for $C_{24}H_{22}N_6O$).

Example 50

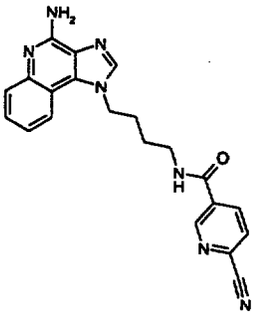
N^4-[4-(4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-phenyl-4-quinolinecarboxamide



1-[3-(Dimethylamino)propyl]-3-ethylcarbodiimide hydrochloride (0.57 g, 3.0 mmol) was added dropwise to a chilled (0 °C) solution of 2-phenyl-4-quinolinecarboxylic acid (0.5 g, 3.7 mmol), 1-hydroxybenzotriazole (0.5 g, 3.7 mmol), pyridine (2.2 ml), and dichloromethane (20 ml). The reaction was maintained for 15 min followed by the

Example 52

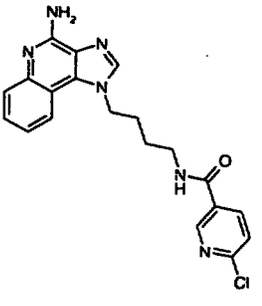
N^3-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-6-cyanonicotinamide



According to the general method of Example 14, 1-(4-aminobutyl)-1*H*-imidazo[4,5-c]quinolin-4-amine and 6-cyanopyridine-3-carbonyl chloride were combined to provide N^3-[4-(4-amino-1*H*-imidazo[4.5-c]quinolin-1-yl)butyl]-6-cyanonicotinamide as an off white powder, m.p. 125.0-129.0 °C. ^{1}H NMR (300 MHz, DMSO-d_6) δ 9.05 (dd, J=2.1, 0.8 Hz, 1H), 8.88 (t, J=5.6 Hz, 1H), 8.31 (dd, J=8.1, 2.1 Hz, 1H), 8.21 (s, 1H), 8.14 (dd, J=8.1, 0.8 Hz, 1H), 8.03 (m, 1H), 7.62 (dd, J=8.3, 1.1 Hz, 1H), 7.42 (m, 1H), 7.20 (m, 1H), 6.59 (broad s, 2H), 4.64 (t, J=6.9 Hz, 2H), 3.30 (m, 2H), 1.93 (m, 2H), 1.59 (m, 2H); MS (EI) m/e 385.1648 (385.1651 calcd for $C_{21}H_{19}N_7O$).

Example 53

N^3-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-6-chloronicotinamide

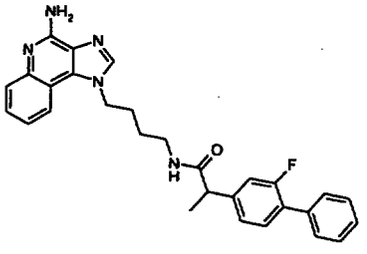


According to the general method of Example 14, 1-(4-aminobutyl)-1*H*-imidazo[4,5-c]quinolin-4-amine and 6-chloropyridine-3-carbonyl chloride were combined to provide N^3-[4-(4-amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-6-chloronicotinamide as an off white crystalline solid, m.p. 144.0-148.0 °C (decomposition). ^{1}H NMR (300 MHz, DMSO-d_6) δ 8.77 (dd, J=2.5, 0.6 Hz, 1H), 8.73 (t, J=5.6 Hz, 1H), 8.22 (s, 1H), 8.16 (dd, J=8.3, 2.5 Hz, 1H), 8.03 (m, 1H), 7.63 (d, J=0.5 Hz, 1H), 7.60 (d, J=0.5 Hz, 1H), 7.45-

According to the general method of Example 14, 1-(4-aminobutyl)-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-4-amine and quinoline-2-carbonyl chloride were combined in dichloromethane and triethylamine (3 equivalents) to provide N^2-{4-[4-amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}-2-quinolinecarboxamide as a white solid, m.p. 78.1-79.9 °C. ^{1}H NMR (300 MHz, DMSO-d_6) δ 9.02 (t, J=6.1 Hz, 1H), 8.55 (d, J=8.5 Hz, 1H), 8.23 (d, J=8.5 Hz, 1H), 8.10 (t, J=7.6 Hz, 1H), 8.02 (d, J=7.6 Hz, 1H), 7.90-7.84 (m, 1H), 7.75-7.70 (m, 1H), 7.58 (dd, J=8.3, 1.0 Hz, 1H), 7.35-7.30 (m, 1H), 7.18-7.13 (m, 2H), 6.48 (broad s, 2H), 4.58 (m, 2H), 3.79 (t, J=6.7 Hz, 2H), 3.44 (m, 2H), 3.22 (m, 5H), 1.91-1.78 (m, 4H); MS (EI) m/e 468.2276 (468.2274 calcd for $C_{27}H_{28}N_6O_2$).

Example 56

N^1-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-(2-fluoro-4-biphenylyl)propanamide

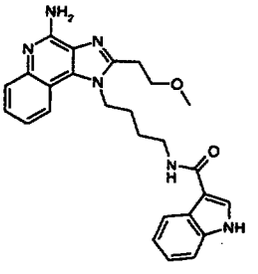


According to the general method of Example 14, 1-(4-aminobutyl)-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-4-amine and 2-(2-fluoro-4-biphenylyl)propionyl chloride were combined to provide N^1-[4-(4-amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-(2-fluoro-4-biphenylyl)propanamide as a white powder, m.p. 76.1-79.9 °C. ^{1}H NMR (300 MHz, DMSO-d_6) δ 8.17 (s, 1H), 8.03 (m, 2H), 7.62 (d, J=8.3 Hz, 1H), 7.49-7.14 (m, 10H), 6.59 (broad s, 2H), 4.58 (t, J=6.9 Hz, 2H), 3.59 (q, J=7.0 Hz, 1H), 3.09 (pentet, J=6.7 Hz, 2H), 1.82 (m, 2H), 1.45 (m, 2H), 1.30 (d, J=7.0 Hz, 3H); MS (EI) m/e 481.2268 (481.2278 calcd for $C_{29}H_{28}FN_5O$).

DMSO-d_6) δ 8.81 (t, J=6.1 Hz, 1H), 8.44 (m, 1H), 7.98 (d, J=7.3 Hz, 1H), 7.94 (dd, J=8.0, 0.7 Hz, 1H), 7.80 (dd, J=8.0, 2.2 Hz, 1H), 7.60 (dd, J=8.3, 1.2 Hz, 1H), 7.39-7.34 (m, 1H), 7.16-7.10 (m, 1H), 6.52 (broad s, 2H), 4.55 (t, J=6.9 Hz, 2H), 3.79 (t, J=6.7 Hz, 2H), 3.23 (s, 3H), 3.18 (t, J=6.7 Hz, 2H), 2.67 (t, J=7.6 Hz, 2H), 1.83-1.72 (m, 4H), 1.63-1.53 (m, 2H), 1.34-1.24 (m, 2H), 0.90 (t, J=7.3 Hz, 3H); MS (EI) m/e 474.2750 (474.2743 calcd for $C_{27}H_{34}N_6O_2$).

Example 59

N^3-{4-[4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}-3-indolecarboxamide

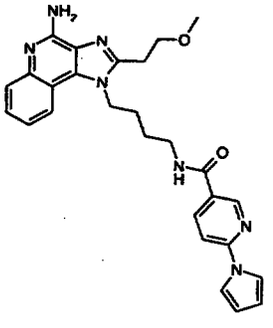


According to the general method of Example 50, 1-(4-aminobutyl)-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-4-amine and indole-3-carboxylic acid were combined to provide N^3-{4-[4-amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}-3-indolecarboxamide as a white powder, m.p. 225.5-227.4 °C. ^{1}H NMR (300 MHz, DMSO-d_6) δ 11.50 (broad s, 1H), 8.13 (d, J=7.9 Hz, 1H), 8.06 (d, J=10.2 Hz, 1H), 7.95-7.89 (m, 2H), 7.61 (d, J=8.3 Hz, 1H), 7.43-7.35 (m, 2H), 7.20-7.05 (m, 3H), 6.48 (broad s, 2H), 4.58 (t, J=7.2 Hz, 2H), 3.80 (t, J=6.6 Hz, 2H), 3.33 (m, 2H), 3.24-3.18 (m, 5H), 1.88 (m, 2H), 1.70 (m, 2H); ^{13}C NMR (75 MHz, DMSO-d_6) δ 165.0, 152.0, 151.0, 145.1, 136.4, 132.6, 127.8, 126.8, 126.6, 126.4, 122.1, 121.5, 121.4, 120.6, 120.3, 115.1, 112.1, 111.0, 70.5, 58.4, 45.1, 38.2, 27.7, 27.5, 27.0; MS (EI) m/e 456.2282 (456.2274 calcd for $C_{26}H_{28}N_6O_2$).

vacuo. The yellow residue was partitioned between dichloromethane and saturated aqueous sodium bicarbonate. The organic fraction was dried ($MgSO_4$), filtered, and concentrated. The crude residue was purified by flash column chromatography (silica gel, gradient elution using dichloromethane to 95:5 dichloromethane\methanol) to provide 0.19 g of N^2-{4-[4-amino-2-(4-methoxybenzyl)-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}-2-quinolinecarboxamide as an off white solid, m.p. 95.1-97.4 °C. ^{1}H NMR (300 MHz, DMSO-d_6) δ 8.97 (t, J=6.0 Hz, 1H), 8.56 (d, J=8.4 Hz, 1H), 8.16-8.07 (m, 3H), 7.96 (d, J=7.7 Hz, 1H), 7.87 (m, 1H), 7.72 (m, 1H). 7.58 (dd, J=8.3, 1.1 Hz, 1H), 7.31 (m, 1H), 7.23 (d, J=8.7 Hz, 2H), 7.08 (m, 1H), 6.82 (d, J=8.7 Hz, 2H), 6.58 (broad s, 2H), 4.50 (m, 2H), 4.33 (s, 2H), 3.63 (s, 3H), 3.34 (m, 2H), 1.65 (m, 4H); MS (EI) m/e 530.2431 (530.2430 calcd for $C_{32}H_{30}N_6O_2$).

Example 62

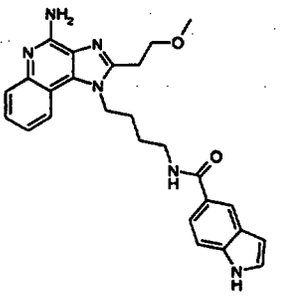
N^3-{4-[4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}-6-(1-pyrrolyl)nicotinamide



According to the general method of Example 50, 1-(4-aminobutyl)-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-4-amine and 2-pyrrolopyridine-5-carboxylic acid were combined to provide N^3-{4-[4-amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}-6-(1-pyrrolyl)nicotinamide as a yellow crystalline solid, m.p. 77.0-80.0 °C. ^{1}H NMR (300 MHz, $CDCl_3$) δ 8.72 (d, J=2.3 Hz, 1H), 8.07 (dd, J=8.4, 2.4 Hz, 1H), 7.92 (d, J=7.3 Hz, 1H), 7.82 (d, J=7.4 Hz, 1H), 7.55 (t, J=2.2 Hz, 2H), 7.49 (m, 1H), 7.37 (m, 2H), 6.39 (d, J=2.2 Hz, 2H), 6.20 (m, 1H), 5.42 (broad s, 2H), 4.59 (t, J=7.5 Hz, 2H), 3.90 (t, J=7.4 Hz, 2H), 3.56 (q, J=6.7 Hz, 2H), 3.36 (s, 3H), 3.20 (t, J=6.4 Hz, 2H), 2.05 (m, 2H), 1.82 (m, 2H); MS (EI) m/e 483.2376 (483.2383 calcd for $C_{27}H_{29}N_7O_2$).

Example 63

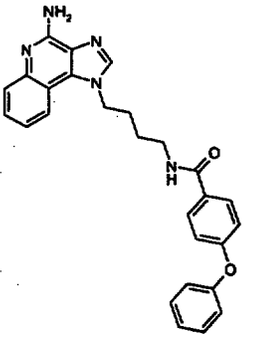
N^5-{4-[4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}-5-indolecarboxamide



According to the general method of Example 50, 1-(4-aminobutyl)-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-4-amine and indole-5-carboxylic acid were combined to provide N^5-{4-[4-amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}-5-indolecarboxamide as an off white solid. ^{1}H NMR (300 MHz, DMSO-d_6) δ 11.31 (s, 1H), 8.34 (t, J=5.5 Hz, 1H), 8.06 (m, 2H), 7.63-7.58 (m, 2H), 7.42-7.38 (m, 3H), 7.22 (t, J=7.1 Hz, 1H), 6.67 (broad s, 2H), 6.50 (s, 1H), 4.58 (m, 2H), 3.81 (t, J=6.6 Hz, 2H), 3.34 (m, 2H), 3.25 (s, 3H), 3.21 (t, J=6.6 Hz, 2H), 1.89 (m, 2H), 1.72 (m,2H); MS (EI) m/e 456.2264 (456.2274 calcd for $C_{26}H_{28}N_6O_2$).

Example 64

N^1-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-4-phenoxybenzamide

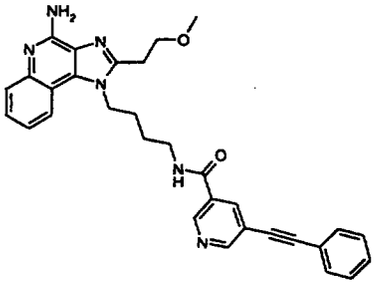


According to the general method of Example 14, 1-(4-aminobutyl)-1*H*-imidazo[4,5-c]quinolin-4-amine and 4-phenoxybenzoyl chloride were combined to provide N^1-[4-(4-amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-4-phenoxybenzamide as a white powder, m.p. 90.5-91.5 °C. ^{1}H NMR (500 MHz, DMSO-d_6) δ 8.42 (t, J=5.7 Hz, 1H), 8.21 (s, 1H), 8.03 (d, J=7.9 Hz, 1H), 7.81 (d, J=8.9 Hz, 2H), 7.62 (d, J=7.9 Hz, 1H),

7.45-7.40 (m, 3H), 7.21 (m, 2H), 7.07 (d, J=7.6 Hz, 2H), 6.99 (d, J=8.9 Hz, 2H), 6.61 (broad s, 2H), 4.63 (t, J=7.0 Hz, 2H), 3.25 (m, 2H), 1.92 (m, 2H), 1.58 (m, 2H); MS (EI) m/e 451.2008 (451.2008 calcd for $C_{27}H_{25}N_5O_2$).

Example 65

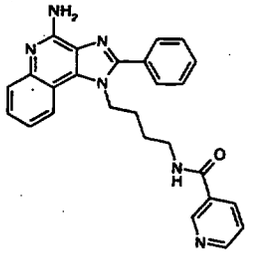
N^5-{4-[4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}-5-(2-phenyl-1-ethynyl)nicotinamide



According to the general method of Example 50, 1-(4-aminobutyl)-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-4-amine and 5-(phenylethynyl)pyridine-3-carboxylic acid were combined to provide N^5-{4-[4-amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}-5-(2-phenyl-1-ethynyl)nicotinamide as a yellow solid, m.p. 76.0-78.0 °C. ^{1}H NMR (300 MHz, DMSO-d_6) δ 8.95 (d, J=2.1 Hz, 1H), 8.87 (d, J=2.0 Hz, 1H), 8.79 (t, J=2.1 Hz, 1H), 8.31 (d, J=2.0 Hz, 1H), 8.02 (d, J=8.1 Hz, 1H), 7.61 (m, 3H), 7.48 (m, 3H), 7.40 (m, 1H), 7.19 (m, 1H), 6.56 (broad s, 2H), 4.57 (t, J=7.4 Hz, 2H), 3.82 (t, J=6.7 Hz, 2H), 3.37 (m, 2H), 3.27 (s, 3H), 3.21 (t, J=6.7 Hz, 2H), 1.89 (m, 2H), 1.72 (m, 2H); MS (CI) m/e 519 (M+H).

Example 66

N^3-[4-(4-Amino-2-phenyl-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]nicotinamide



Part A

A solution of benzoyl chloride (5.3 g, 37.7 mmol) in dichloromethane (100 mL) was slowly added to a solution of *tert*-butyl N-{4-[(3-aminoquinolin-4-

yl)amino]butyl}carbamate (12.5 g, 37.7 mmol) in dichloromethane (250 mL) at ambient temperature. The reaction mixture was maintained at ambient temperature overnight. The resulting precipitate was isolated by filtration and dried to provide 11.0 g of *tert*-butyl N-(4-{[3-(benzoylamino)quinolin-4-yl]amino}butyl)carbamate hydrochloride as a white solid.

Part B

Triethylamine (7.26 g, 71.7 mmol) was added to a solution of the material from Part A in ethanol (200 mL) and heated at reflux for 2 days. The reaction mixture was concentrated to provide an orange syrup. HPLC mass spec analysis showed that the syrup contained the desired product and starting material. The syrup was taken up in dichloromethane (100 mL) and then cooled in an ice bath. Triethylamine (5 mL) and benzoyl chloride (1.9 mL) were added. The reaction mixture was maintained at ambient temperature for 2 days at which time analysis by HPLC indicated that the reaction was not complete. The reaction mixture was concentrated under vacuum. The residue was taken up in isopropyl alcohol (150 mL). Triethylamine (5 mL) was added and the reaction mixture was heated at reflux overnight. The reaction mixture was concentrated under vacuum. The residue was purified by flash chromatography (silica gel; eluting with 10% methanol in dichloromethane). The fractions containing product were combined and concentrated under vacuum. The residue was recrystallized from acetonitrile to provide 6.7 g of *tert*-butyl N-[4-(2-phenyl-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]carbamate as a solid, m.p. 158-159°C.

Part C

3-Chloroperoxybenzoic acid (1.05 eq of 65%) was slowly added in small portions to a solution of *tert*-butyl N-[4-(2-phenyl-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]carbamate (6.56 g, 15.75 mmol) in dichloromethane (120 mL). After 3 hours the reaction was quenched with 1% aqueous sodium bicarbonate (200 mL). The layers were separated. The aqueous layer was extracted with dichloromethane (2 X 50 mL). The organic fractions were combined, dried over magnesium sulfate and then concentrated under vacuum to provide a pale orange syrup. The syrup was triturated with diethyl ether to provide 6.8 g of 1-[4-(*tert*-butylcarbamyl)butyl]-2-phenyl-1*H*-imidazo[4,5-*c*]quinoline-5N-oxide as a pale tan solid, m.p. 178-181°C.

Part D

A solution of 1-[4-(*tert*-butylcarbamyl)butyl]-2-phenyl-1*H*-imidazo[4,5-*c*]quinoline-5N-oxide (6.8 g, 15.75 mmol) in dichloromethane (100 mL) was chilled in an ice bath. Concentrated ammonium hydroxide (30 mL) was added. Tosyl chloride (3.0 g, 15.75 mmol) was added in small portions over a period of 30 minutes. The reaction mixture was allowed to warm to ambient temperature overnight. The reaction was quenched with water (350 mL). The layers were separated. The aqueous layer was extracted with dichloromethane. The organic fractions were combined, dried over magnesium sulfate and then concentrated under vacuum to provide a tan solid. This material was purified by flash chromatography (silica gel eluting with 10% methanol in dichloromethane) to provide 4.8 g of product. The bulk of the material was carried on to the next step. A small portion was recrystallized from toluene to provide *tert*-butyl N-[4-(4-amino-2-phenyl-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]carbamate as a solid, m.p. 182-183°C. Analysis: Calculated for $C_{25}H_{29}N_5O_2$: %C, 69.58; %H, 6.77; %N, 16.22; Found: %C, 69.86; %H, 6.95; %N, 15.80.

Part E

The material from Part D was dissolved in methanol (15 mL) and 1 N hydrochloric acid (100 mL) and then heated at reflux for 2 hours. The reaction mixture was concentrated under vacuum to a volume of about 50 mL. Addition of concentrated ammonium hydroxide to pH 12 did not produce a precipitate. The pH was adjusted to 7 with 1 N hydrochloric acid. The mixture was extracted with dichloromethane and then with ethyl acetate. The aqueous layer was concentrated to dryness. The residue was dissolved in water (50 mL) and then extracted continuously with refluxing chloroform for 36 hours. The chloroform extract was concentrated under vacuum to provide a light tan solid. This material was recrystallized from acetonitrile to provide 2.5 g of 1-(4-aminobutyl)-2-phenyl-1*H*-imidazo[4,5-*c*]quinolin-4-amine as an off white solid, m.p. 175-177°C. Analysis: Calculated for $C_{20}H_{21}N_5$: %C, 72.48; %H, 6.39; %N, 21.13; Found: %C, 72.72; %H, 6.32; %N, 20.71.

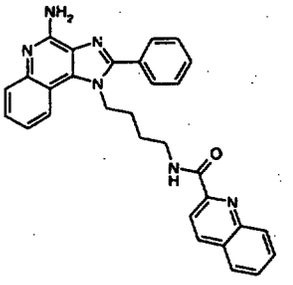
Part F

According to the general method of Example 61, 1-(4-aminobutyl)-2-phenyl-1*H*-imidazo[4,5-c]quinolin-4-amine and nicotinoyl chloride hydrochloride were combined to provide N^3-[4-(4-amino-2-phenyl-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]nicotinamide as a

white crystalline solid, m.p. 84.5-86.1 °C. ^{1}H NMR (300 MHz, DMSO-d_6) δ 8.91 (s, 1H), 8.69 (m, 1H), 8.56 (m, 1H), 8.07 (m, 2H), 7.75-7.41 (m, 8H), 7.21 (m, 1H), 6.72 (broad s, 2H), 4.60 (m, 2H), 3.15 (t, J=6.0 Hz, 2H), 1.86 (m, 2H), 1.40 (m, 2H); MS (CI) m/e 437 (M+H).

Example 67

N^2-[4-(4-Amino-2-phenyl-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-quinolinecarboxamide



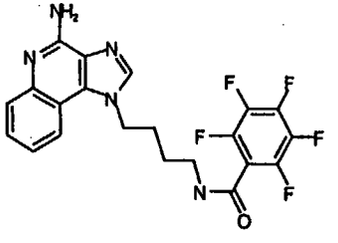
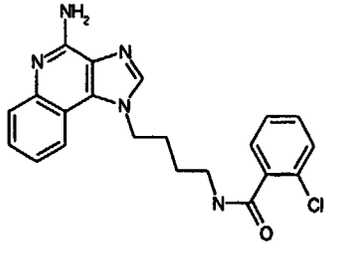
According to the general method of Example 61, 1-(4-aminobutyl)-2-phenyl-1*H*-imidazo[4,5-c]quinolin-4-amine and quinoline-2-carbonyl chloride were combined to provide N^2-[4-(4-amino-2-phenyl-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-quinolinecarboxamide as an off white crystalline solid, m.p. 81.1-83.9 °C. ^{1}H NMR (300 MHz, DMSO-d_6) δ 8.90 (t, J=6.0 Hz, 1H), 8.55 (d, J=8.5 Hz, 1H), 8.12-8.07 (m, 4H), 7.90-7.84 (m, 1H), 7.75-7.54 (m, 7H), 7.36 (t, J=7.5 Hz, 1H), 7.18 (t, J=7.5 Hz, 1H), 6.70 (broad s, 2H), 4.61 (m, 2H), 3.23 (m, 2H), 1.88 (m, 2H), 1.49 (m, 2H); MS (CI) m/e 487 (M+H).

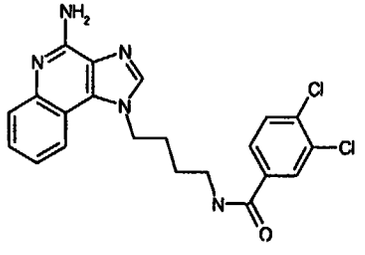
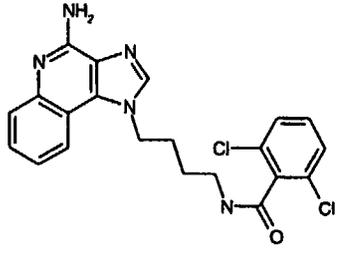
Examples 68 - 102

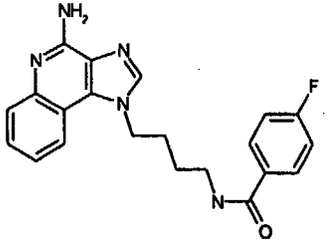
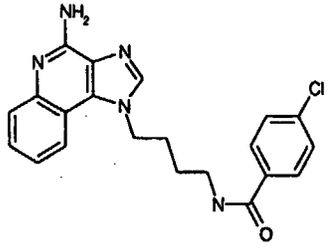
The compounds shown in the table below were prepared using the synthetic method described in Reaction Scheme II above.

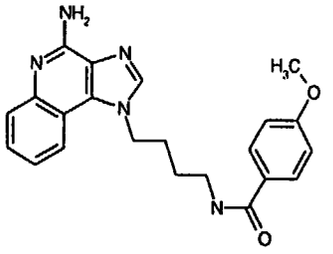
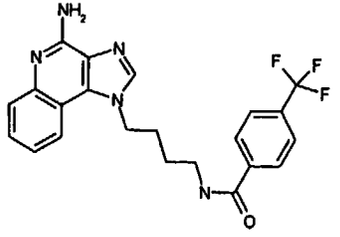
A solution of 1-(4-aminobutyl)-1*H*-imidazo[4,5-*c*]quinolin-4-amine (36 μmol) in 10 mL of dichloromethane in a screw-capped test tube was cooled down to -5°C. The acid chloride (45 μmol) was added as a 0.3 M solution in dichloromethane. Argon was bubbled through the mixture during addition and for an additional 15 seconds, and the mixture was allowed to stand at -5°C overnight. To this mixture was added approximately 90 mg of an aminomethyl polystyrene resin (0.62 meq/g, 100-200 mesh), and the mixture

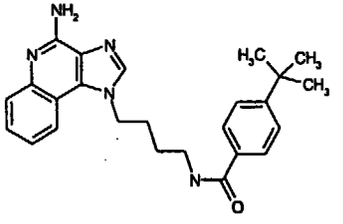
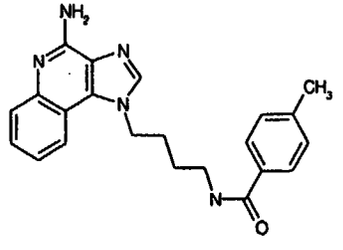
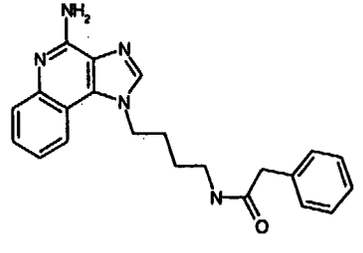
was warmed to reflux and shaken at 600 rpm for 3 hours. The compounds were purified by eluting through a short plug of silica gel with 10:1 dichloromethane-methanol, collecting ca. 1 mL fractions and pooling the product fractions (fractions analyzed by tlc in 9:1 dichloromethane-methanol to identify product). Compounds were analyzed by 500 MHz ^{1}H nmr and APCI-MS (plug injection or an LC/MS protocol).

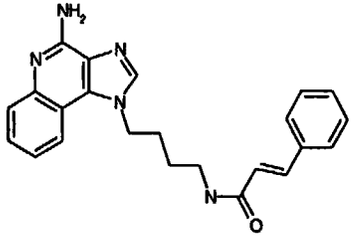
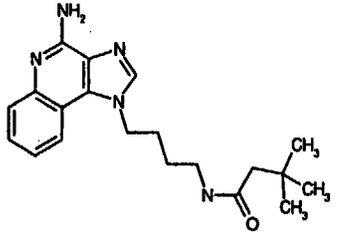
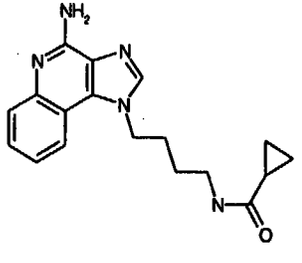
Example No.	Structure	APCI-MS m/e	500 MHz ^{1}H NMR
68		450.10	(DMSO-d_6) δ 8.93 (t,J=5.2Hz,1H), 8.23 (s,1H), 8.06 (d,J=8.2Hz,1H), 7.63 (d,J=8.5Hz,1H), 7.46 (t,J=7.8Hz,1H), 7.27 (t,J=7.6Hz,1H), 6.75 (bs,2H), 4.65 (t,J=7Hz,2H), 3.31 (q,J=6Hz,2H), 1.92 (quintet,J=8Hz,2H), 1.56 (quintet,J=7Hz,2H)
69		394.12	(DMSO-d_6) δ 8.40 (t,J=5.8Hz,1H), 8.23 (s,1H), 8.08 (d,J=8.2Hz,1H), 7.64 (d,J=8.5Hz,1H), 7.47 (t,J=8.2Hz,1H), 7.43 (d,J=7.9Hz,1H), 7.39 (dt,J=1.5Hz, J=7Hz,1H), 7.30 (t,J=6.4Hz,1H), 7.28 (t,J=10.4Hz,1H), 7.23 (dd,J=1.5Hz, J=7.3Hz,1H), 6.75 (bs,2H), 4.65 (t,J=7Hz,2H), 3.26 (q,J=6Hz,2H), 1.95 (quintet,J=8Hz,2H), 1.56 (quintet,J=7.5Hz,2H)

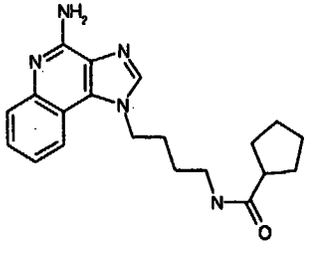
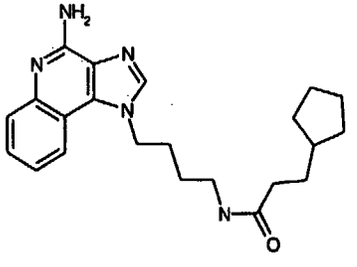
Example No.	Structure	APCI-MS m/e	500 MHz ^{1}H NMR
70		428.07	(DMSO-d_6) δ 8.47 (t,J=5.8Hz,1H), 8.22 (s,1H), 8.07 (d,J=8.2Hz,1H), 7.64 (d,J=8.8Hz,1H), 7.63 (d,J=2.1Hz,1H), 7.47 (t,J=8.2Hz,1H), 7.40 (dd,J=2.1Hz, J=10.4Hz,1H), 7.29 (t,J=7.0Hz,1H), 7.26 (d,J=8.2Hz,1H), 6.75 (bs,2H), 4.65 (t,J=5.5Hz,2H), 3.25 (q,J=6.5Hz,2H), 1.94 (quintet,J=8Hz,2H), 1.54 (quintet,J=7Hz,2H),
71		428.06	(DMSO-d_6) δ 8.65 (t,J=6.1Hz,1H), 8.23 (s,1H), 8.08 (d,J=7.9Hz,1H), 7.64 (d,J=8.2Hz,1H), 7.47 (t,J=7.9Hz,1H), 7.43 (d,J=9Hz,1H), 7.44 (d,J=7Hz,1H), 7.38 (dd,J=9.2Hz,J=7Hz,1H), 7.28 (t,J=7.9Hz,1H), 6.8 (bs,2H), 4.65 (t,J=6.5Hz,2H), 3.28 (m,2H), 1.96 (quintet,J=7.5Hz,2H), 1.57 (quintet,J=8Hz,2H)

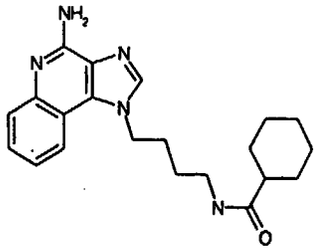
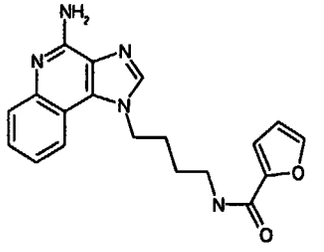
Example No.	Structure	APCI-MS m/e	500 MHz ^{1}H NMR
72		378.11	(DMSO-d_6) δ 8.50 (t,J=5.8Hz,1H), 8.23 (s,1H), 8.04 (d,J=8.2Hz,1H), 7.84 (dd,J=2.1Hz, J=5.8Hz,2H), 7.62 (d,J=7.3Hz,1H), 7.44 (t,J=7Hz,1H), 7.26 (t,J=6.7Hz,2H), 7.22 (t,J=8.2Hz,1H), 6.74 (bs,2H), 4.63 (t,J=7Hz,2H), 3.28 (m,2H), 1.91 (quintet,J=7.5Hz,2H), 1.57 (quintet,J=8Hz,2H)
73		394.07	(DMSO-d_6) δ 8.56 (t,J=5.6Hz,1H), 8.24 (s,1H), 8.05 (d,J=7.9Hz,1H), 7.79 (d,J=8.5Hz,2H), 7.63 (d,J=8.2Hz,1H), 7.50 (d,J=8.9Hz,2H), 7.46 (t,J=7.6Hz,1H), 7.23 (t,J=7.6Hz,1H), 6.8 (bs,2H), 4.64 (t,J=7Hz,2H), 3.29 (q,J=6.5Hz,2H), 1.91 (quintet,J=7.5Hz,2H), 1.57 (quintet,J=7.5Hz,2H)

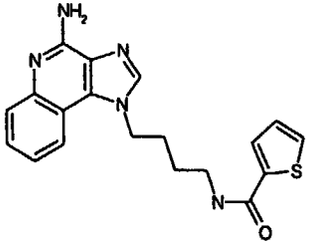
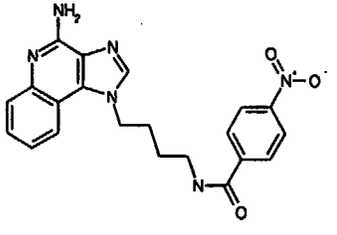
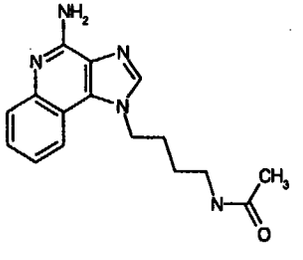
Example No.	Structure	APCI-MS m/e	500 MHz ^{1}H NMR
74		390.13	(DMSO-d_6) δ 8.33 (t,J=5.6Hz,1H), 8.24 (s,1H), 8.05 (d,J=8.2Hz,1H), 7.76 (d,J=8.8Hz,2H), 7.63 (d,J=8.2Hz,1H), 7.45 (t,J=8.2Hz,1H), 7.24 (t,J=7.9Hz,1H), 6.95 (d,J=8.8 Hz,2H), 6.81 (bs,2H), 4.64 (t,J=7Hz,2H), 3.80 (s,3H), 3.28 (quintet,J=5.5Hz,2H), 1.90 (quintet,J=8Hz,2H), 1.57 (quintet,J=8.5Hz,2H)
75		428.10	(DMSO-d_6) δ 8.71 (t,J=5.6Hz,1H), 8.27 (s,1H), 8.06 (d,J=7.9Hz,1H), 7.96 (d,J=8.2Hz,2H), 7.64 (d,J=7.9Hz,2H), 7.64 (d,J=7.9Hz,1H), 7.46 (t,J=7.3Hz,1H), 7.25 (t,J=7Hz,1H), 6.9 (bs,2H), 4.65 (t,J=7Hz,2H), 3.31 (m,2H), 1.92 (quintet,J=8Hz,2H), 1.59 (quintet,J=7.5Hz,2H)

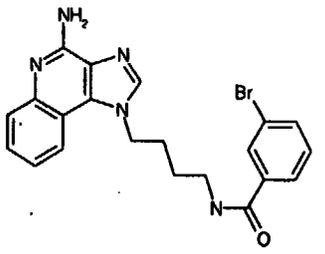
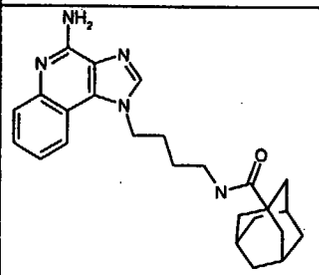
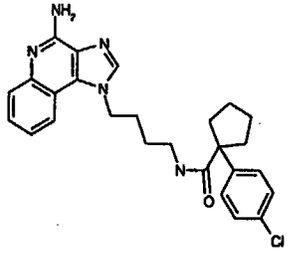
Example No.	Structure	APCI-MS m/e	500 MHz ^{1}H NMR
76		416.22	(DMSO-d_6) δ 8.54 (s,1H), 8.39 (t,J=5.5Hz,1H), 8.22 (d,J=8.2Hz,1H), 7.82 (d,J=8.2Hz,1H), 7.70 (t,J=4Hz,1H), 7.68 (d,J=4.3Hz,2H), 7.52 (t,J=8Hz,1H), 7.43 (d,J=7.8Hz,2H), 4.72 (t,J=7Hz,2H), 3.30 (q,J=6.5Hz,2H), 1.91 (quintet,J=7.5Hz,2H), 1.59 (quintet,J=7.5Hz,2H), 1.29 (s,9H)
77		374.18	(DMSO-d_6) δ 8.54 (s,1H), 8.38 (t,J=5.8Hz,1H), 8.23 (d,J=8.2Hz,1H), 7.82 (d,J=8.6Hz,1H), 7.71 (t,J=8.2Hz,1H), 7.659(d,J=8.2Hz,2H), 7.54 (t,J=8.2Hz,1H), 7.22 (d,J=7.9Hz,2H), 4.71 (t,J=6.5Hz,2H), 3.28 (q,J=6Hz,2H), 2.34 (s,3H), 1.92 (quintet,J=8Hz,2H), 1.60 (quintet,J=7.5Hz,2H)
78		374.18	(DMSO-d_6) δ 8.50 (s,1H), 8.22 (d,J=8.2Hz,1H), 8.06 (t,J=5.8Hz,1H), 7.84 (d,J=8.5Hz,1H), 7.74 (t,J=7Hz,1H), 7.58, (t,J=7.6Hz,1H), 7.21 (m,2H), 7.18 (m,3H), 4.67 (t,J=7Hz,2H), 3.33 (s,2H), 3.09 (q,J=6Hz,2H), 1.84 (quintet,J=8Hz,2H), 1.48 (quintet,J=7.5Hz,2H)

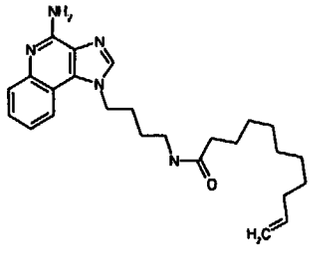
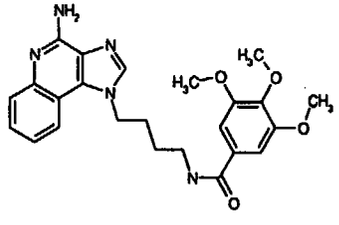
Example No.	Structure	APCI-MS m/e	500 MHz ^{1}H NMR
79		386.15	(DMSO-d_6) δ 8.55 (s,1H), 8.24 (d,J=8.2Hz,1H), 8.16 (t,J=5.8Hz,1H), 7.82 (d,J=8.6Hz,1H), 7.72 (t,J=7.3Hz,1H), 7.58 (t,J=7.3Hz,1H), 7.53 (d,J=6.7Hz,2H), 7.40 (m,4H), 6.57 (d,J=15.9Hz,1H), 4.72 (t,J=7Hz,2H), 3.23 (q,J=6Hz,2H), 1.91 (quintet,J=7.5Hz,2H), 1.55 (quintet,J=7.5Hz,2H)
80		354.19	(DMSO-d_6) δ 8.53 (s,1H), 8.24 (d,J=8.2Hz,1H), 7.83 (d,J=8.2Hz,1H), 7.74 (m,2H), 7.58 (t,J=7.8,1H), 4.70 (t,J=7Hz,2H), 3.06 (q,J=6Hz,2H), 1.86 (s,2H), 1.86 (quintet,J=8.5Hz,2H), 1.44 (quintet,J=7.5Hz,2H), 0.84 (s,9H)
81		324.15	(DMSO-d_6) δ 8.53 (s,1H), 8.23 (d,J=8.5Hz,1H), 8.06 (t,J=5.5Hz,1H), 7.84 (d,J=8.2Hz,1H), 7.74 (t,J=8.2Hz,1H), 7.59 (t,J=8.2Hz,1H), 4.69 (t,J=7Hz,2H), 3.09 (q,J=6Hz,2H), 1.86 (quintet,J=7Hz,2H), 1.47 (m,3H), 0.59 (m,4H)

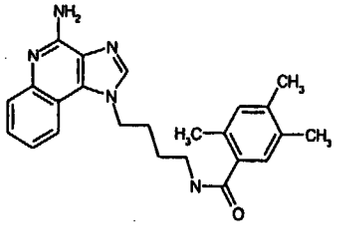
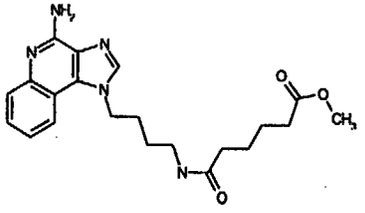
Example No.	Structure	APCI-MS m/e	500 MHz ^{1}H NMR
82		352.16	(DMSO-d_6) δ 8.52 (s,1H), 8.23 (d,J=7.9Hz,1H), 7.83 (d,J=8.2Hz,1H), 7.74 (m,2H), 7.60 (t,J=7.6Hz,1H), 4.69 (t,J=7.5Hz,2H), 3.06 (q,J=6Hz,2H), 2.42 (quintet,J=8Hz,1H), 1.84 (quintet,J=7.5Hz,2H), 1.59 (m,2H), 1.55 (m,2H), 1.48 (m,6H)
83		380.16	(DMSO-d_6) δ 8.52 (s,1H), 8.22 (d,J=8.2Hz,1H), 7.83 (d,J=8.2Hz,1H), 7.77 (t,J=5.8Hz,1H), 7.73 (t,J=8.2Hz,1H), 7.58 (t,J=8.2Hz,1H), 4.68 (t,J=7Hz,2H), 3.06 (q,J=6Hz,2H), 1.98 (t,J=8Hz,2H), 1.84 (quintet,J=7.5Hz,2H), 1.62 (m,3H), 1.48 (m,8H), 0.97 (m,2H)

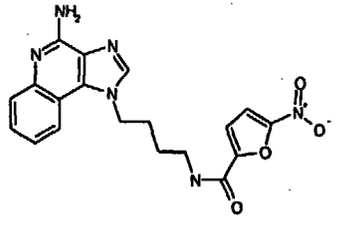
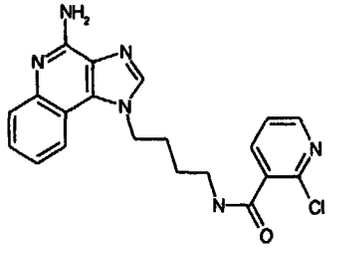
Example No.	Structure	APCI-MS m/e	500 MHz ^{1}H NMR
84		366.15	(DMSO-d_6) δ 9.2 (b,2H), 8.52 (s,1H), 8.22 (d,J=8.2Hz,1H), 7.83 (d,J=8.5Hz,1H), 7.74 (t,J=8.2Hz,1H), 7.65 (t,J=5.8Hz,1H), 7.58 (t,J=7.9Hz,1H), 4.68 (t,J=7Hz,2H), 3.04 (q,J=6.5Hz,2H), 1.95 (m,1H), 1.83 (quintet,J=8Hz,2H), 1.60 (m,3H), 1.50 (m,2H), 1.43 (quintet,J=7.5Hz,2H), 1.14 (m,5H)
85		350.18	(DMSO-d_6) δ 9.0 (bs,2H), 8.54 (s,1H), 8.39 (t,J=5Hz,1H), 8.22 (d,J=5Hz,1H), 7.82 (d,J=10Hz,1H), 7.80 (s,1H), 7.72 (t,J=10Hz,1H), 7.54 (t,J=10Hz,1H), 7.02 (dd,J=1Hz, J=3Hz,1H), 6.60 (dd,J=1.7Hz, J=3.5Hz,1H), 4.70 (t,J=7.5Hz,2H), 3.25 (q,J=6Hz,2H), 1.90 (quintet,J=7.5Hz,2H), 1.58 (quintet,J=7Hz,2H)

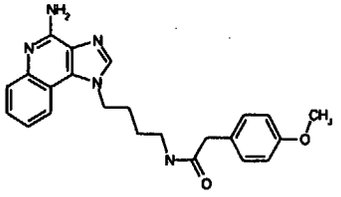
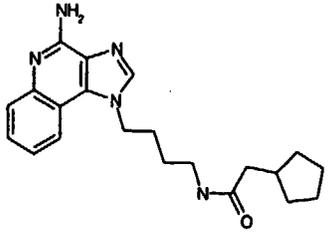
Example No.	Structure	APCI-MS m/e	500 MHz ^{1}H NMR
86		366.25	(DMSO-d_6) δ 8.51 (t,J=5.5Hz,1H), 8.32 (s,1H), 8.10 (d,J=8.6Hz,1H), 7.72 (dd,J=0.9Hz, J=4.9Hz,1H), 7.68 (m,2H), 7.52 (t,J=7.9Hz,1H), 7.34 (bs,2H), 7.31 (t,J=7.9Hz,1H), 7.11 (dd,J=4Hz,J=4.9Hz,1H), 4.66 (t,J=7.5Hz,2H), 3.27 (q,J=6Hz,2H), 1.91 (quintet,J=7.5Hz,2H), 1.58 (quintet,J=8Hz,2H)
87		405.21	(DMSO-d_6) δ 8.80 (t,J=5.8Hz,1H), 8.28 (s,1H), 8.27 (d,J=8.6Hz,2H), 8.07 (d,J=8Hz,1H), 7.98 (d,J=8.9Hz,2H), 7.65 (d,J=8.6Hz,1H), 7.47 (t,J=7.9Hz,1H), 7.27 (t,J=7.9Hz,1H), 7.07 (bs,2H), 4.66 (t,J=7Hz,2H), 1.93 (quintet,J=8Hz,2H), 1.60 (quintet,J=7.5Hz,2H)
88		298.16	(DMSO-d_6) δ 8.33 (s,1H), 8.11 (d,J=8.1Hz,1H), 7.83 (t,J=6Hz,1H), 7.71 (d,J=8.1Hz,1H), 7.56 (t,J=8.1Hz,1H), 7.39 (t,J=7.8Hz,1H), 4.63 (t,J=7Hz,2H), 3.05 (q,J=6.5Hz,2H), 1.85 (quintet,J=7.5Hz,2H), 1.74 (s,3H), 1.44 (quintet,J=7.5Hz,2H)

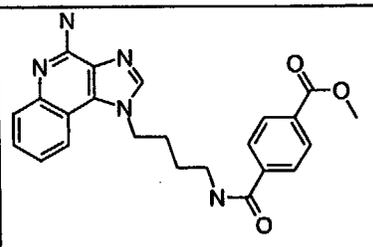
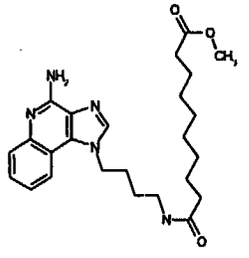
Example No.	Structure	APCI-MS m/e	500 MHz ^{1}H NMR
89		439.30	(DMSO-d_6) δ 8.59 (t,1H), 8.43 (s,1H), 8.16 (d,J=7.6Hz,1H), 7.94 (d,J=1.7Hz,1H), 7.75 (t,J=6.8Hz,2H), 7.71 (d,J=8.1Hz,1H), 7.60 (m,1H), 7.40 (t,J=7.8Hz,2H), 4.68 (t,J=6.5Hz,2H), 3.30 (q,J=6Hz,2H), 1.91 (quintet,J=6Hz,2H), 1.59 (quintet, J=6Hz,2H)
90		418.28	(DMSO-d_6) δ 8.29 (s,1H), 8.08 (d,J=8.5Hz,1H), 7.68 (d,J=7.8Hz,1H), 7.53 (t,J=7.6Hz,1H), 7.36 (t,J=7.3Hz,1H), 7.30 (t,J=5.9Hz,1H), 4.62 (t,J=6.5Hz,2H), 3.05 (q,J=6.5Hz,2H), 1.86 (m,5H), 1.60 (m,12H), 1.41 (quintet,J=7Hz,2H)
91		462.21	(DMSO-d_6) δ 8.25 (s,1H), 8.06 (d,J=8.3Hz,1H), 7.70 (d,J=8.1Hz,1H), 7.55 (t,J=7.8Hz,1H), 7.49 (t,J=5.6Hz,1H), 7.37 (t,J=7.3Hz,1H), 7.24 (s,4H), 4.57 (t,J=7Hz,2H), 3.01 (q,J=6Hz,2H), 2.38 (m,2H), 1.68 (m,4H), 1.49 (m,2H), 1.40 (m,4H)

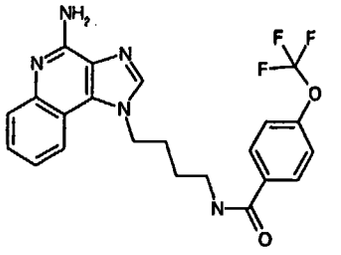
Example No.	Structure	APCI-MS m/e	500 MHz ^{1}H NMR
92		422.28	(DMSO-d_6) δ 8.36 (s,1H), 8.13 (d,J=8.8Hz,1H), 7.86 (b,2H), 7.76 (t,J=6Hz,1H), 7.74 (d,J=8.5Hz,1H), 7.59 (t,J=8.1Hz,1H), 7.43 (t,J=7.5Hz,1H), 5.77 (m,1H), 4.98 (dd,J=2Hz, J=17Hz,1H), 4.92 (dd ,J=1.5Hz, J=10Hz,1H), 4.64 (t,J=7Hz,2H), 3.07 (q,J=5.5Hz,2H), 1.97 (m,J=7.5Hz,4H), 1.84 (quintet,J=7Hz,2H), 1.45 (quintet,J=8Hz,2H), 1.40 (quintet,J=6.5Hz,2H), 1.30 (quintet,J=7Hz,2H), 1.18 (m,8H)
93		450.19	(DMSO-d_6) δ 8.43 (t,J=5.6Hz,1H), 8.31 (s,1H), 8.08 (d,J=7.8Hz,1H), 7.67 (d,J=8.1Hz,1H), 7.50 (t,J=7.3Hz,1H), 7.29 (t,J=7.8Hz,1H), 7.11 (s,2H), 4.67 (t,J=7Hz,2H), 3.78 (s,6H), 3.69 (s,3H), 3.29 (q,J=6Hz,2H), 1.91 (quintet,J=7.5Hz,2H), 1.58 (quintet,J=7.5Hz,2H)

Example No.	Structure	APCI-MS m/e	500 MHz ^{1}H NMR
94		402.25	(DMSO-d_6) δ 8.24 (s,1H), 8.19 (t,J=5.9Hz,1H), 8.08 (d,J=8Hz,1H), 7.65 (d,J=8.3Hz,1H), 7.48 (t,J=8.3Hz,1H), 7.29 (t,J=7.8Hz,1H), 6.87 (bs,2H), 6.77 (s,2H), 4.65 (t,J=6.5Hz,2H), 3.26 (q,J=6.5Hz,2H), 2.19 (s,3H), 2.02 (s,6H), 1.92 (quintet,J=8Hz,2H), 1.54 (quintet,J=8.5Hz,2H)
95		398.21	(DMSO-d_6) δ 8.28 (s,1H), 8.08 (d,J=7.6Hz,1H), 7.79 (t,J=5.9Hz,1H), 7.68 (d,J=7.8Hz,1H), 7.52 (t,J=7.6Hz,1H), 7.35 (t,J=7.1Hz,1H), 7.2 (bs,2H), 4.62 (t,J=7Hz,2H), 3.56 (s,3H), 3.06 (q,J=5.5Hz,2H), 2.24 (m,2H), 1.99 (quintet,J=6.5Hz,2H), 1.84 (quintet,J=8Hz,2H), 1.43 (m,6H)

Example No.	Structure	APCI-MS m/e	500 MHz ^{1}H NMR
96		395.12	(DMSO-d_6) δ 8.88 (t,J=5.6Hz,1H), 8.25 (s,1H), 8.05 (d,J=8.3Hz,1H), 7.72 (d,J=3.9Hz,1H), 7.63 (d,J=8.3Hz,1H), 7.45 (t,J=7.3Hz,1H), 7.32 (d,J=3.9Hz,1H), 7.26 (t,J=7.1Hz,1H), 6.93 (bs,2H), 4.64 (t,J=7Hz,2H), 3.28 (q,J=6Hz,2H), 1.90 (quintet,J=7Hz,2H), 1.56 (quintet,J=8Hz,2H)
97		395.20	(DMSO-d_6) δ 8.57 (t,J=5.6Hz,1H), 8.42 (dd,J=1.9Hz, J=4.6Hz,1H), 8.25 (s,1H), 8.12 (d,J=8.0Hz,1H), 7.70 (dd,J=2Hz, J=7.6Hz,1H), 7.65 (d,J=8.5Hz,1H), 7.49 (t,J=7.6Hz,1H), 7.41 (dd,J=4.9Hz, J=7.6Hz,1H), 7.30 (t,J=7.6Hz,1H), 6.90 (bs,2H), 4.66 (t,J=7Hz,2H), 3.27 (q,J=6.5Hz,2H), 1.96 (quintet,J=8.5Hz,2H), 1.56 (quintet,J=7.5Hz,2H)

Example No.	Structure	APCI-MS m/e	500 MHz ^{1}H NMR
98		404.18	(DMSO-d_6) δ 8.36 (s,1H), 8.14 (d,J=8.3Hz,1H), 7.97 (t,J=5.6Hz,1H), 7.76 (d,J=8.3Hz,1H), 7.62 (t,J=7.8Hz,1H), 7.45 (t,J=7.5Hz,1H), 7.08 (d,J=8.5Hz,2H), 6.76 (d,J=8.8Hz,2H), 4.63 (t,J=7Hz,2H), 3.70 (s,3H), 3.25 (s,2H), 3.08 (q,J=6Hz,2H), 1.83 (quintet,J=7.5Hz,2H), 1.46 (quintet,J=7Hz,2H)
99		366.22	(DMSO-d_6) δ 8.35 (s,1H), 8.2 (bs,1H), 8.13 (d,J=7.8Hz,1H), 7.75 (t,J=5.6Hz,1H), 7.73 (d,J=8.8Hz,1H), 7.59 (t,J=7.6Hz,1H), 7.42 (t,J=7.6Hz,1H), 4.65 (t,J=7Hz,2H), 3.06 (q,J=6Hz,2H), 2.02 (m,J=7.5Hz,1H), 1.96 (d,J=7.5Hz,2H), 1.84 (quintet,J=8Hz,2H), 1.55 (quintet,J=5Hz,2H), 1.46 (m,J=7.5Hz,6H), 1.00 (m,J=12Hz,2H)

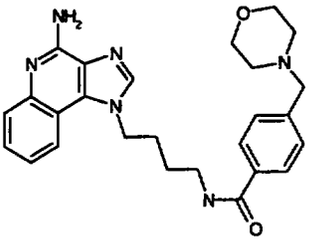
Example No.	Structure	APCI-MS m/e	500 MHz ^{1}H NMR
100		418.11	(DMSO-d_6) δ 9.6-8.5 (b,2H), 8.66 (t,J=5.5 Hz,1H), 8.54 (s,1H), 8.23 (d,J=8.0Hz,1H), 8.00 (d,J=8.0Hz,2H), 7.87 (d,J=8.0Hz,2H), 7.81 (d,J=8Hz,1H), 7.70 (t,J=8.0 Hz,1H), 7.53 (t,J=8.0Hz,1H), 4.72 (t,J=7.0Hz,2H), 3.88 (s,3H), 3.31 (q,J=5.5Hz,2H), 1.93 (quintet,J=7.0,2H), 1.61 (quintet,J=7.0Hz,2H)
101		454.19	(DMSO-d_6) δ 9.6-8.6 (b,2H), 8.51 (s,1H), 8.22 (d,J=8.5Hz,1H), 7.84 (d,J=8.5Hz,1H), 7.78 (t,J=5.5 Hz,1H), 7.73 (t,J=8.5Hz,1H), 7.58 (t,J=8.5Hz,1H), 4.68 (t,J=7.0Hz,2H), 3.57 (s,3H), 3.07 (q,J=5.5Hz,2H), 2.26 (t,J=7.0Hz,2H), 1.84 (quintet,J=7.0Hz,2H), 1.48 (sextet,J=7.0Hz,4H), 1.38 (quintet,J=7.0Hz,2H), 1.71 (m,8H)

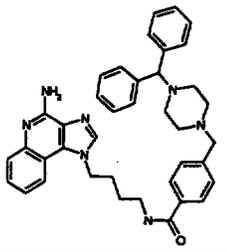
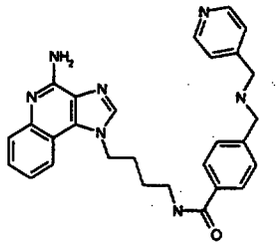
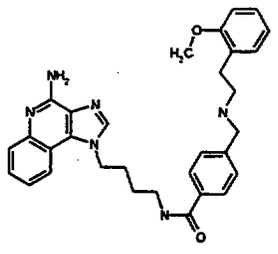
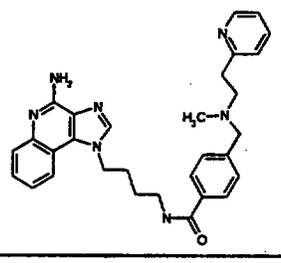
Example No.	Structure	APCI-MS m/e	500 MHz ^{1}H NMR
102		444.11	Compound is trifluoroacetate salt

Examples 103-107

The compounds shown in the Table below were prepared according to the synthetic method described below.

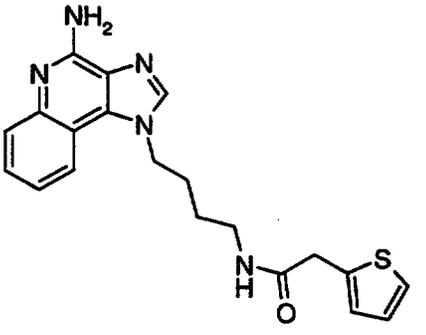
A 10 mg (25 µmol) portion of N^1-[4-(4-amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-4-(chloromethyl)benzamide (example 7) was dissolved in 1 mL of N,N-dimethylformamide in a screw-cap tube, and the appropriate amine (2 eq) was added, along with ca. 70 mg (270 µmol) of N,N-(diisopropyl)aminomethylpolystyrene beads (PS-DIEA, 3.86 meq/g, Argonaut). The mixture was heated to 50°C and was vortexed overnight at 500 rpm. Another 1-2 eq of amine was added and then heating and vortexing was continued for a second night. The product was isolated by injection of the filtered reaction mixture onto a semi-prep HPLC system (Shimadzu LC-6A pumps, Rainin Microsorb C18 column , 21.4 x 250 mm, 8 micron particle size, 60A pore, 9.9 mL/min., gradient elution from 2-95% B in 25 min.. hold at 95% B for 5 min., where A=0.1 % trifluoroacetic acid/water and B=0.1% trifluoroacetic acid/acetonitrile, peak detection at 254 nm, collected 5 mL fractions). The semi-prep hplc fractions were analyzed by reversed-phase hplc and the appropriate fractions were dried in vacuo to provide the compound as a trifluoroacetate salt. The compound was dissolved in ca. 3-5 mL of 2:1 dichloromethane-methanol and shaken with ca. 80 mg (300 µmol) of diisopropylaminomethyl-polystyrene resin (Argonaut PS-DIEA, 3.86 mmol/g) for 1-2 h to liberate the free amine, and then filtered and dried in vacuo to give the compound as an amorphous solid. Each amine product was analyzed by LC/APCI-MS.

Example No.	Structure of the Free Base	APCI-MS m/e
103		459.26

Example No.	Structure of the Free Base	APCI-MS m/e
104		624.51
105		480.34
106		523.31
107		508.32

Example 108

N^1-(4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl)-2-(2-thienyl)acetamide

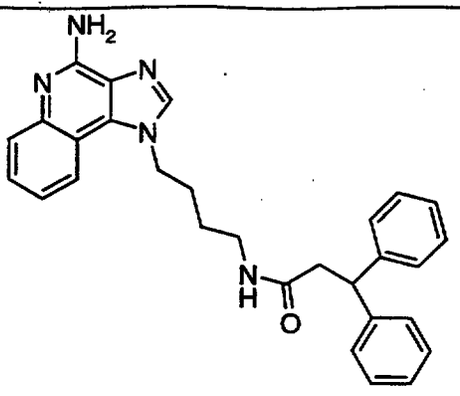
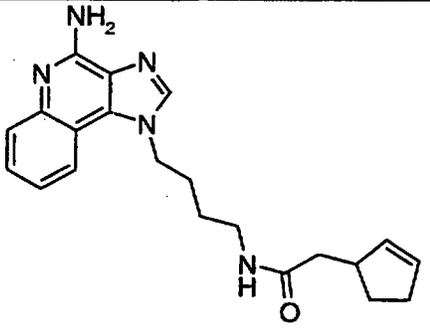
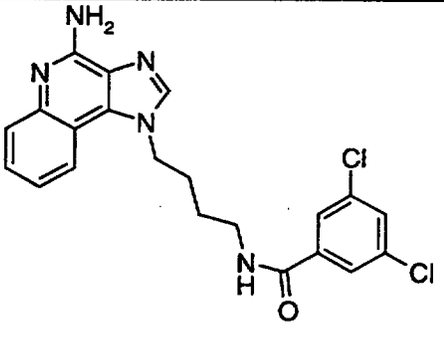
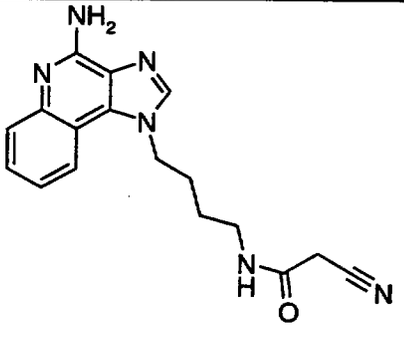


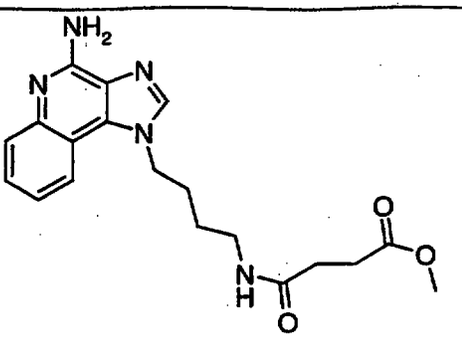
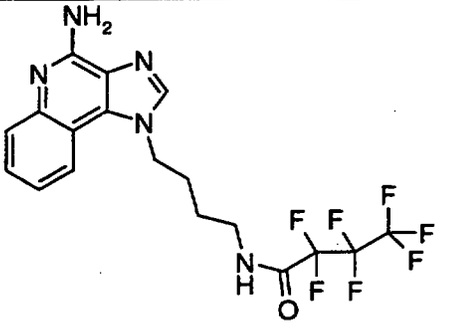
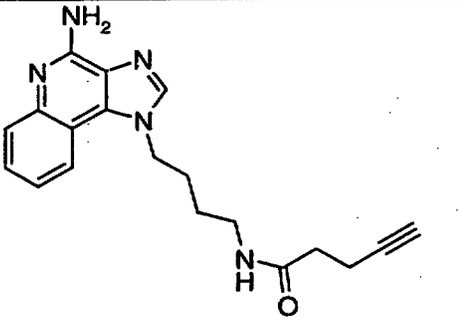
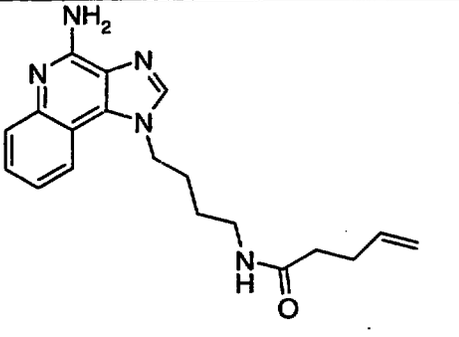
This compound was prepared according to the method of Examples 68 - 102. (DMSO-d_6) δ 8.28 (s,1H), 8.09 (m,2H), 7.70 (d,J=7.9Hz,1H), 7.54 (t,J=7.9Hz,1H), 7.36 (t,J=7.3Hz,1H), 7.28 (dd,J=0.9Hz, J=5.2Hz,1H), 6.88 (dd,J=3.4Hz, J=5.2Hz,1H), 6.82 (d,J=3.1Hz,1H), 4.63 (t,J=7Hz,2H), 3.56 (s,2H), 3.10 (q,J=6.5Hz,2H), 1.85 (quintet,J=7.5Hz,2H), 1.46 (quintet,J=7.5Hz,2H) MS (APCI) m/e 380.22 (M+H).

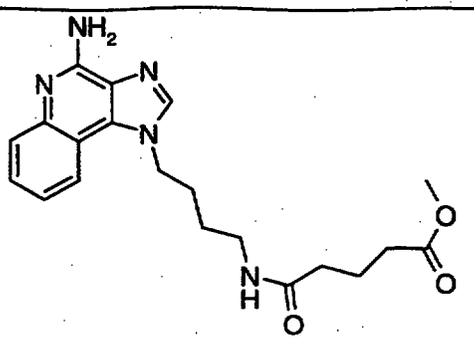
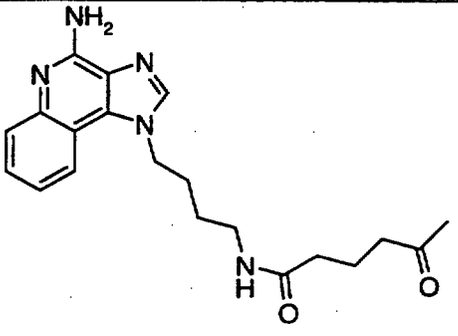
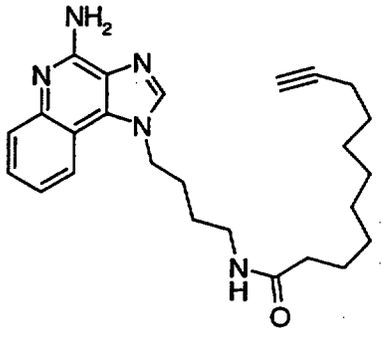
Examples 109 - 119

The examples in the table below were prepared using the synthetic method described in Reaction Scheme III.

1-(4-Aminobutyl)-1*H*-imidazo[4,5-*c*]quinolin-4-amine (10 mg, 0.04 mmol) was suspended in 10 mL of dichloromethane in a threaded test tube. The acid (0.05 mmol) was added and the mixture was briefly vortexed. To the mixture was added 1-[3-(dimethylamino)propyl]-3-ethylcarbodiimide hydrochloride (EDC, 10 mg, 0.05 mmol) and the mixture was shaken overnight at ambient temperature. To the tube was added about 90 mg of aminomethylpolystrene resin (Bachem, ~1 meq/g, 100-200 mesh) and the mixtures were heated to reflux and shaken overnight. The mixture was then filtered to remove the resin, and was purified by semi-preparative reversed-phase HPLC (Rainin Microsorb C18 column, 21.4 x 250 mm, 8 micron particle size, 60A pore, 10 mL/min., gradient elution from 2-95% B in 25 min., hold at 95% B for 5 min., where A=0.1 % trifluoroacetic acid/water and B=0.1% trifluoroacetic acid/acetonitrile, peak detection at 254 nm for triggering fraction collection). The semi-prep HPLC fractions were analyzed by LC-APCI/MS and the appropriate fractions were combined and lyophilized to provide the trifluoroacetate salt of the desired amide. The compounds were analyzed by LC-MS (APCI).

Example Number	Structure of Free Base	Observed Mass
109		464.18
110		364.15
111		427.98, 429.97
112		323.19

Example Number	Structure of Free Base	Observed Mass
113		370.18
114		452.10
115		336.16
116		338.20

Example Number	Structure of Free Base	Observed Mass
117		384.20
118		368.28
119		420.30

Examples 120 - 146

The examples in the table below were prepared using the synthetic method described in Reaction Scheme V above.

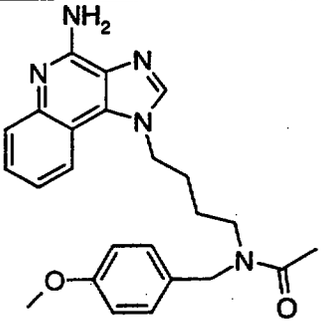
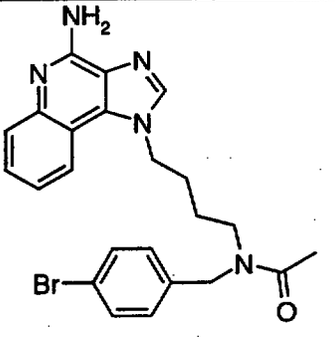
Part A

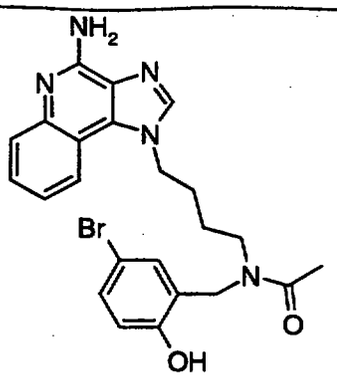
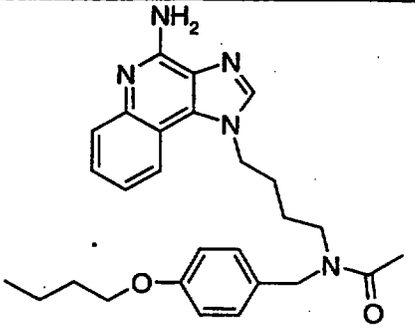
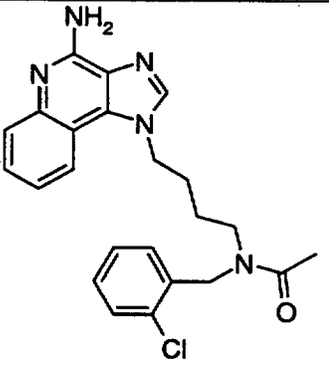
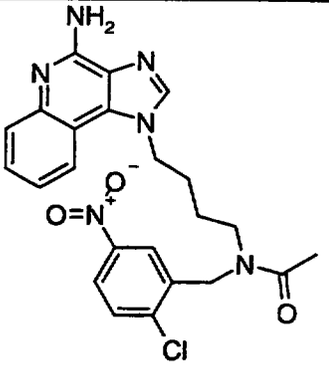
1-(4-Aminobutyl)-1*H*-imidazo[4,5-*c*]quinolin-4-amine (25 mg, 0.1 mmol) was suspended in 5 mL of dichloromethane in a threaded test tube and the aldehyde (about 0.1 mmol) was added. The mixture was heated to reflux and was vortexed at 500 rpm for half an hour. The mixture was allowed to cool for a few minutes and then sodium triacetoxyborohydride (38 mg, 0.18 mmol) was added. The mixture was shaken at ambient temperature for 3 days, then was quenched with 0.5 mL of methanol and

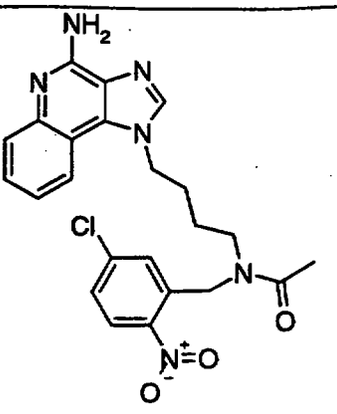
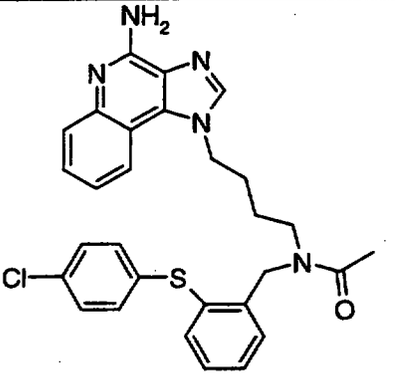
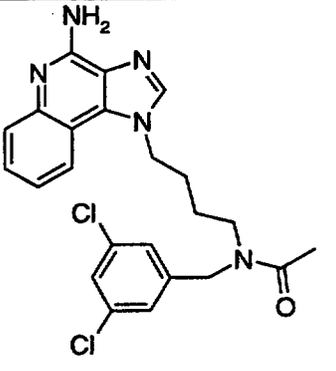
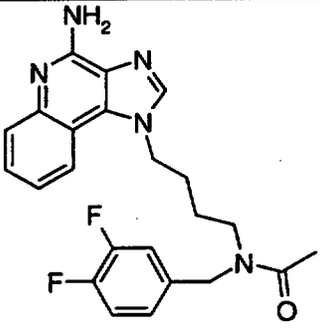
evaporated to dryness. The mixture was purified by semi-preparative reversed-phase HPLC (Rainin Microsorb C18 column, 21.4 x 250 mm, 8 micron particle size, 60A pore, 10 mL/min., gradient elution from 2-95% B in 25 min., hold at 95% B for 5 min., where A=0.1 % trifluoroacetic acid/water and B=0.1% trifluoroacetic acid/acetonitrile, peak detection at 254 nm for triggering fraction collection). The semi-prep HPLC fractions were analyzed by LC-APCI/MS and the appropriate fractions were combined and lyophilized to provide the trifluoroacetate salt of the desired secondary amine. The compounds were analyzed by LC-MS (APCI).

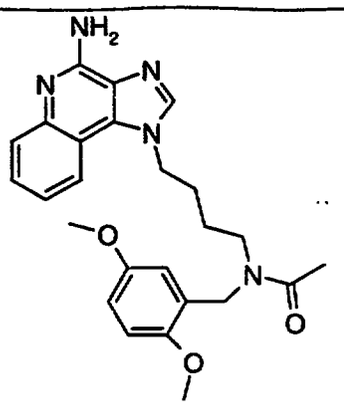
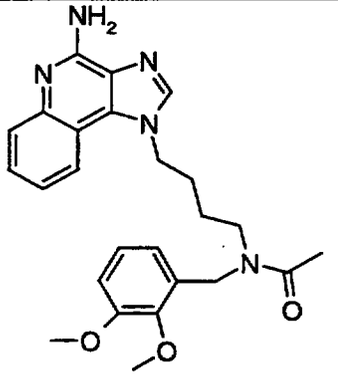
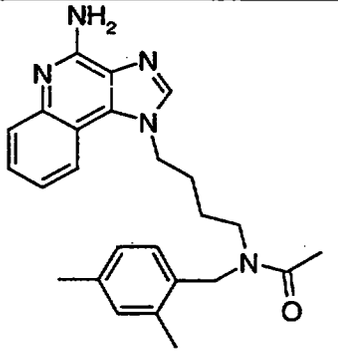
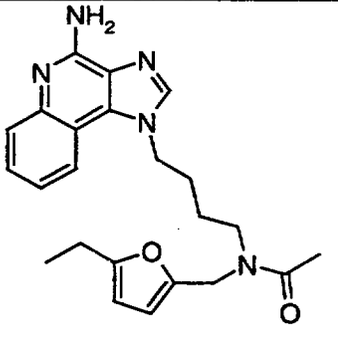
Part B

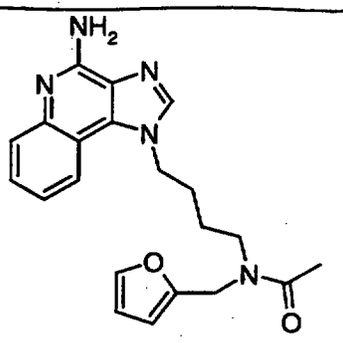
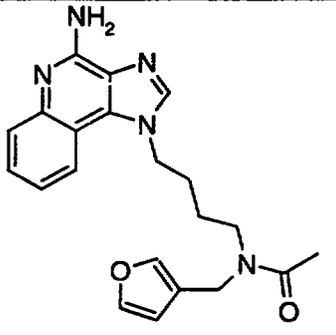
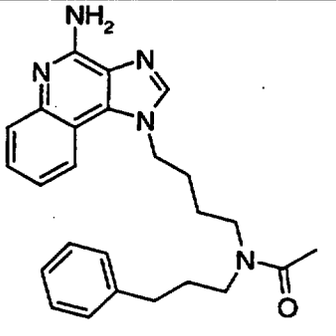
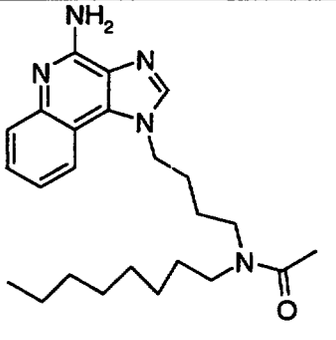
The secondary amines from Part A (about 3-30 µmol as the di-trifluoroacetate salt) were each dissolved in 1 mL of pyridine, and about 10 equivalents of a 0.1 M solution of acetic anhydride in dichloromethane was added. The mixtures were allowed to stand for 1 hour and then 200 µL of methanol was added. The mixtures were evaporated to dryness in a vacuum centrifuge. The mixtures were purified by semi-preparative reversed-phase HPLC as in Part A. The compounds were analyzed by LC-MS (APCI).

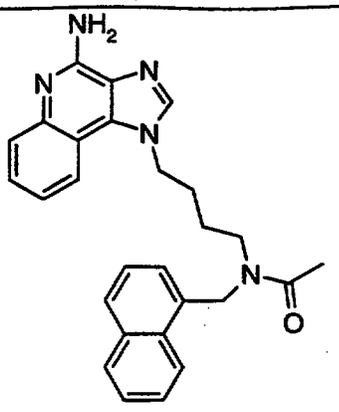
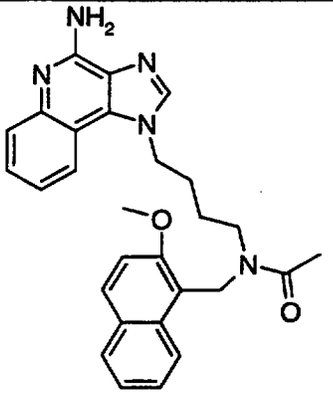
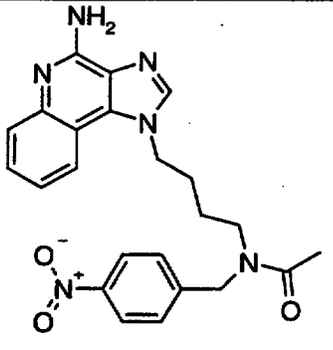
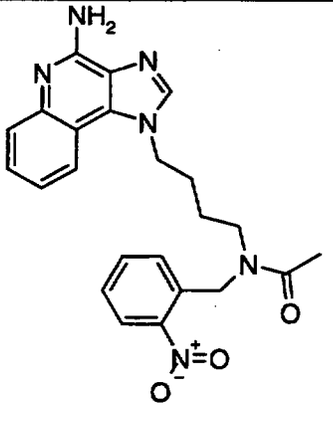
Example Number	Structure of Free Base	Observed Mass
120		418.1
121		466.0,468.0

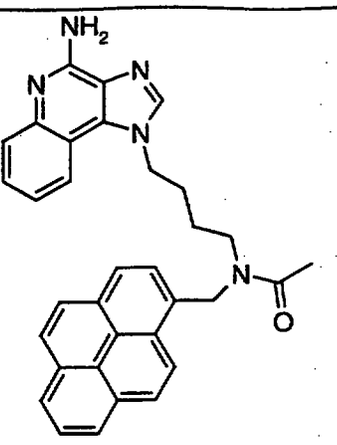
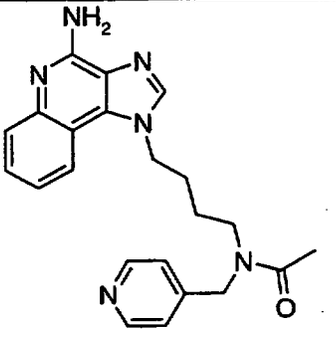
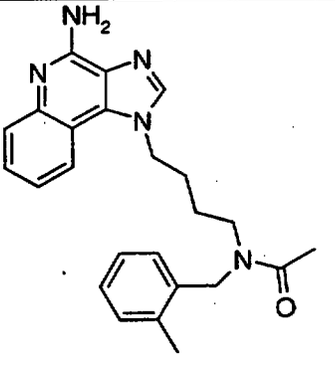
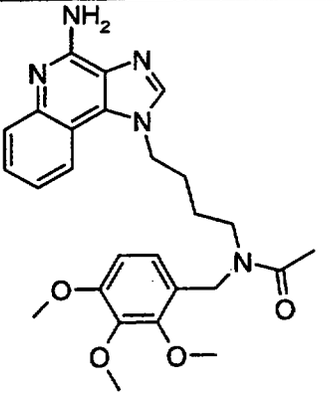
Example Number	Structure of Free Base	Observed Mass
122		482.0,484
123		460.1
124		422.0
125		467.0,469.0

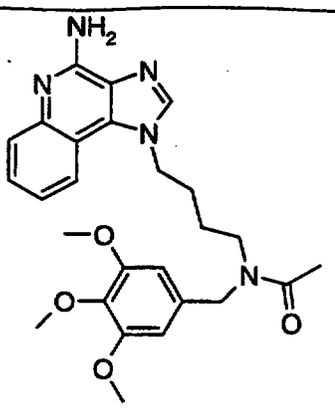
Example Number	Structure of Free Base	Observed Mass
126		467.0,469.0
127		530.0
128		456.0,458.0
129		424.0

Example Number	Structure of Free Base	Observed Mass
130		448.1
131		448.1
132		416.1
133		406.1

Example Number	Structure of Free Base	Observed Mass
134		378.0
135		378.0
136		416.1
137		410.0

Example Number	Structure of Free Base	Observed Mass
138		438.0
139		468.1
140		433.0
141		433.0

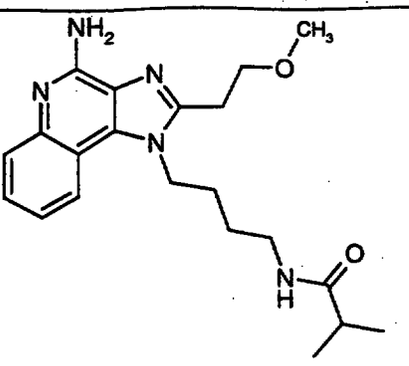
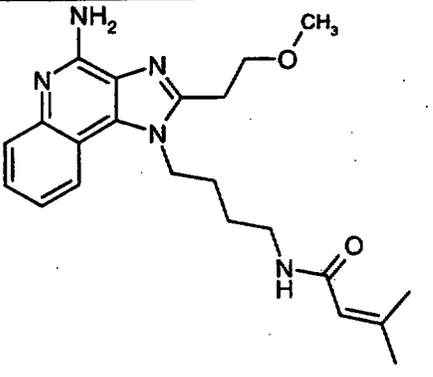
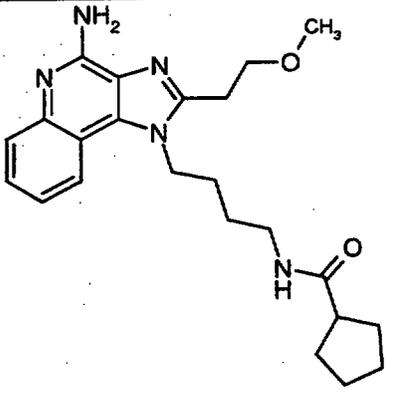
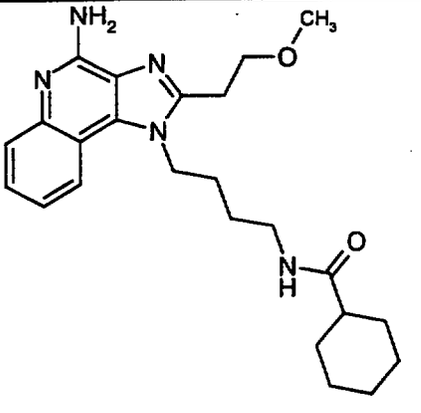
Example Number	Structure of Free Base	Observed Mass
142		512.0
143		389.0
144		402.1
145		478.1

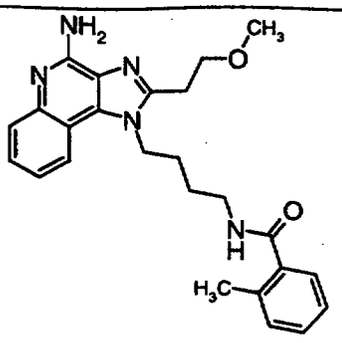
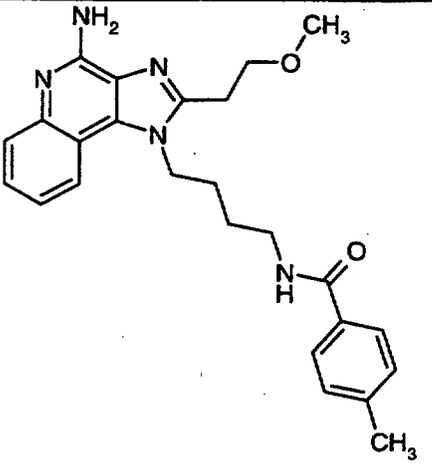
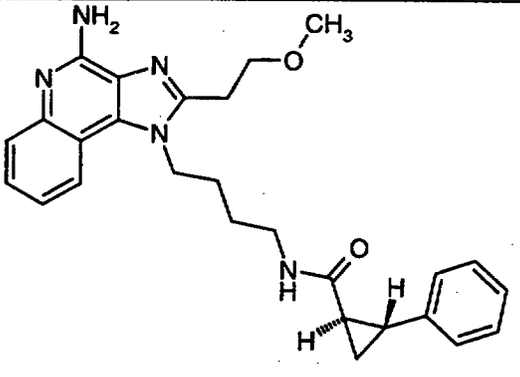
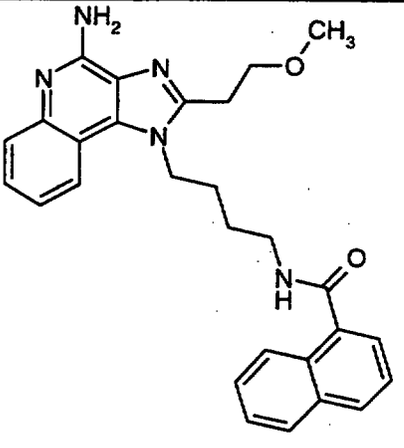
Example Number	Structure of Free Base	Observed Mass
146		478.1

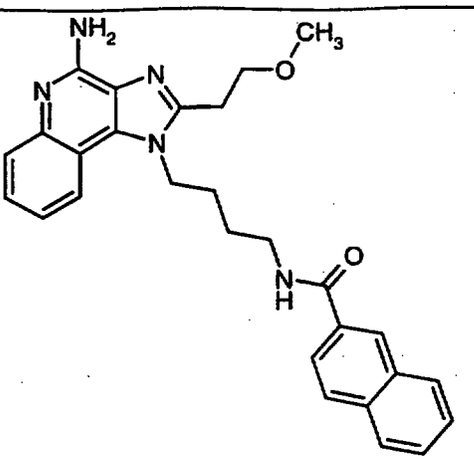
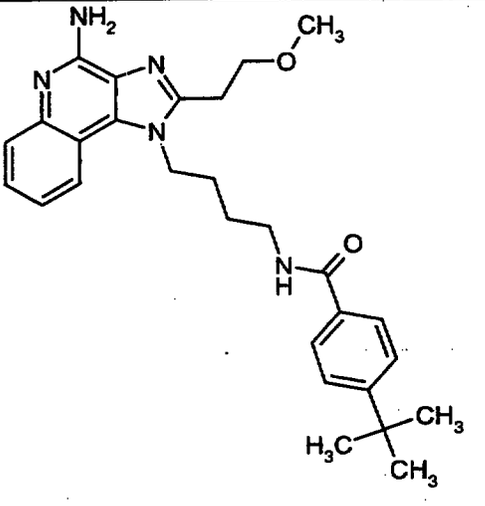
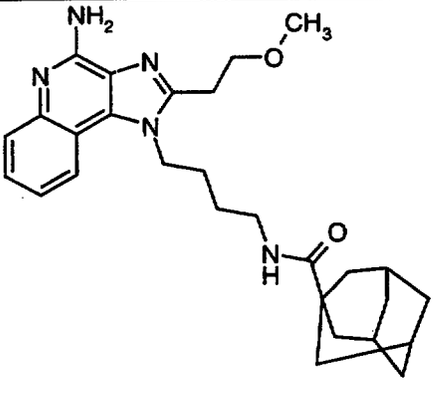
Examples 147 - 159

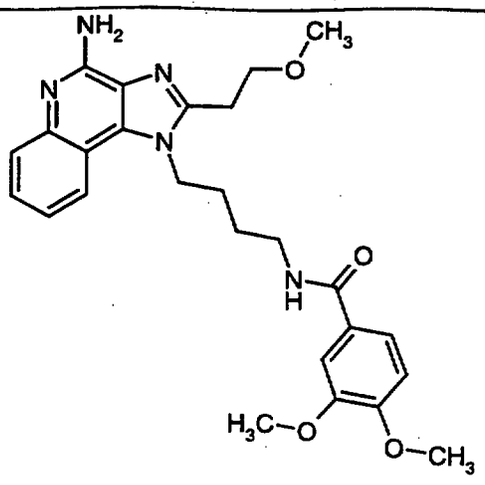
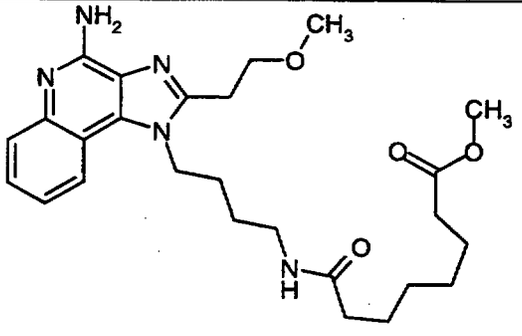
The compounds in the table below were prepared using the synthetic method of Reaction Scheme II above.

1-(4-Aminobutyl)-2-methoxyethyl-1*H*-imidazo[4,5-c]quinolin-4-amine (50 mg) was placed in a 2 dram (7.4 mL) vial. Diisopropylethylamine (1.2 eq)and dichloromethane (1 mL) were added. A solution containing the carboxylic acid chloride (1.1 eq) in dichloromethane (1 mL) was added. The vial was placed on a shaker for about 2 hours at ambient temperature. The reaction mixture was analyzed by LC/MS to confirm the formation of the desired product. The solvent was removed and the residue was purified by semi-preparative HPLC (Capcell PakC18 column, 35 x 20 mm, 5 micron particle size, 20 mL/min., gradient elution from 5-95% B in 10 min., hold at 95% B for 2 min., where A=0.1 % trifluoroacetic acid/water and B=0.1% trifluoroacetic acid/acetonitrile, peak detection at 254 nm for triggering fraction collection). The semi-prep HPLC fractions were analyzed by LC-APCI/MS and the appropriate fractions were combined and lyophilized to provide the trifluoroacetate salt of the desired amide.

Example #	Structure of the Free Base	APCI-MS m/e
147		384.2
148		396.2
149		410.2
150		424.2

Example #	Structure of the Free Base	APCI-MS m/e
151		432.2
152		432.3
153		458.2
154		468.2

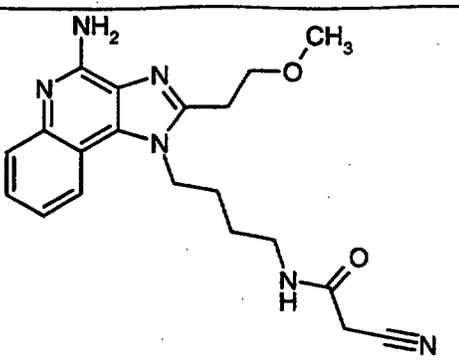
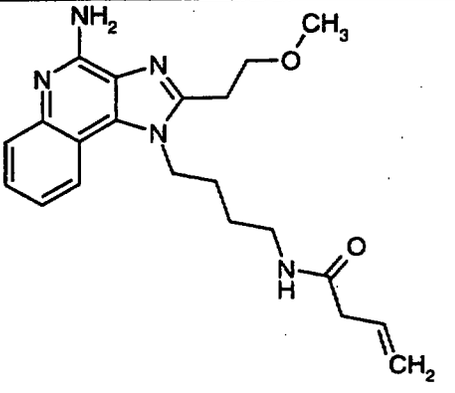
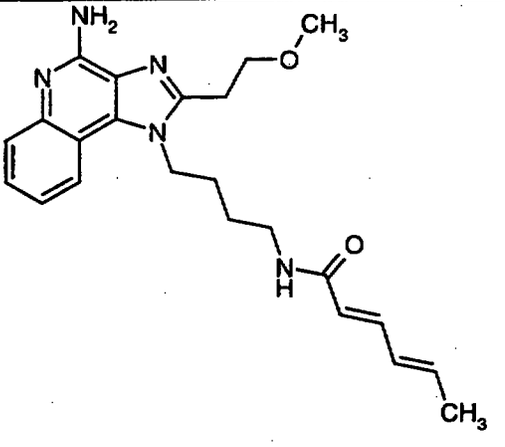
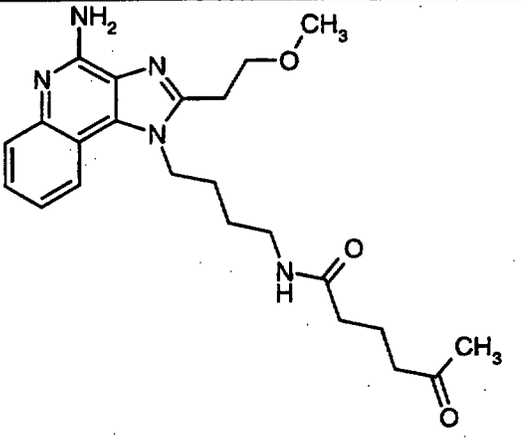
Example #	Structure of the Free Base	APCI-MS m/e
155		468.2
156		474.2
157		476.3

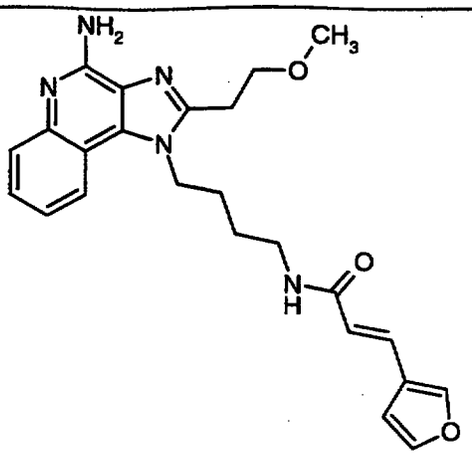
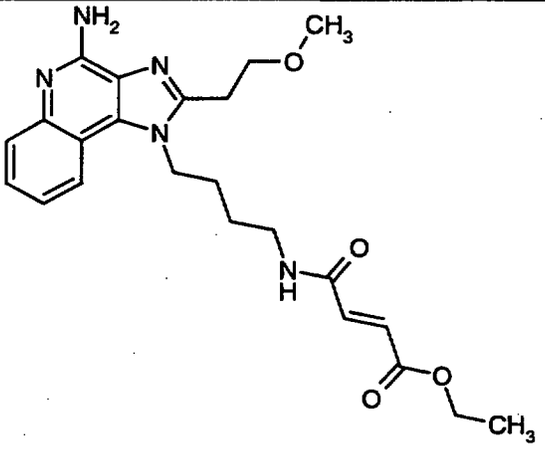
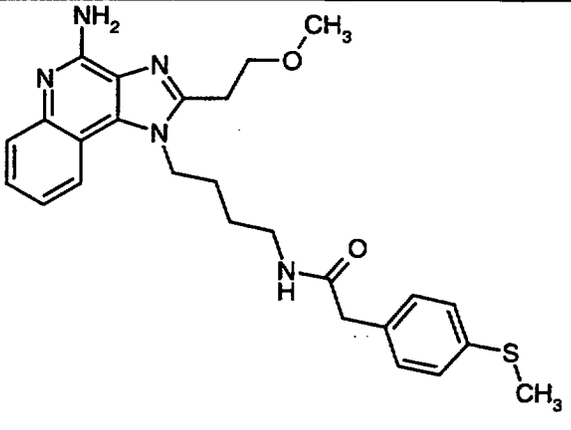
Example #	Structure of the Free Base	APCI-MS m/e
158		478.3
159		484.30

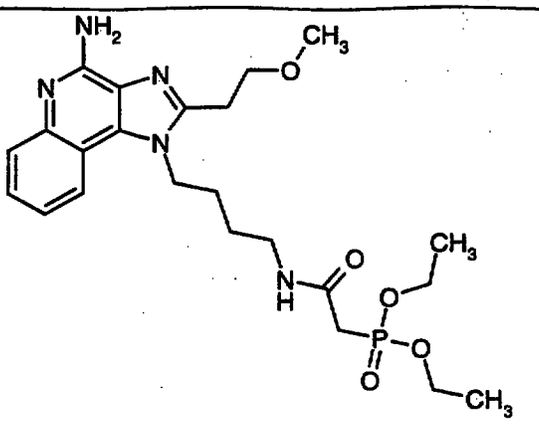
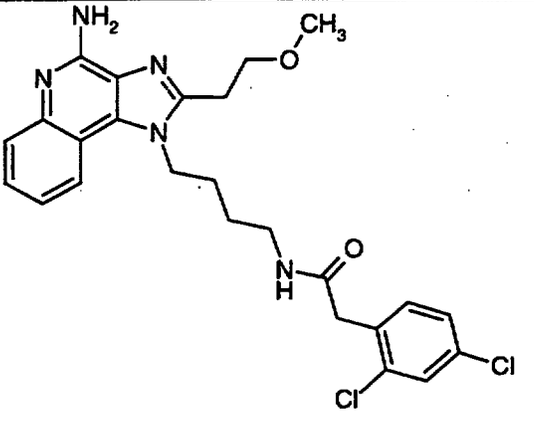
Examples 160 - 168

The compounds in the table below were prepared using the synthetic method of Reaction Scheme III above.

1-(4-Aminobutyl)-2-methoxyethyl-1*H*-imidazo[4,5-c]quinolin-4-amine (50 mg), the carboxylic acid (1.0 eq.) and dichloromethane (3 mL) were placed in a 2 dram (7.4 mL) vial. A solution containing 1-[3-(dimethylamino)propyl]-3-ethylcarbodiimide hydrochloride (1.1 eq) in dichloromethane (1 mL) was added. The vial was placed on a shaker for about 2 hours at ambient temperature. The reaction mixture was analyzed by LC/MS to confirm the formation of the desired product. The solvent was removed and the residue was purified by semi-preparative HPLC (Capcell Pak C18 column, 35 x 20 mm, 5 micron particle size, 20 mL/min., gradient elution from 5-95% B in 10 min., hold at 95% B for 2 min., where A=0.1 % trifluoroacetic acid/water and B=0.1% trifluoroacetic acid/acetonitrile, peak detection at 254 nm for triggering fraction collection). The semi-prep HPLC fractions were analyzed by LC-APCI/MS and the appropriate fractions were combined and lyophilized to provide the trifluoroacetate salt of the desired amide.

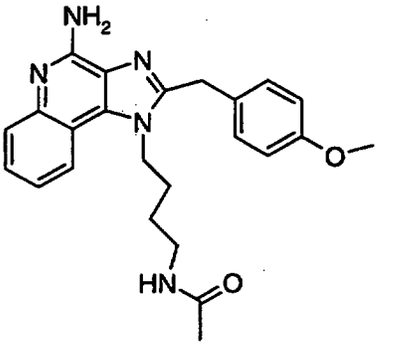
Example #	Structure of Free Base	APCI-MS m/e
160		381.2
161		382.2
162		408.3
163		426.2

Example #	Structure of Free Base	APCI-MS m/e
164		434.2
165		440.2
166		478.2

Example #	Structure of Free Base	APCI-MS m/e
167		492.3
168		500.2, 502.2

Example 169

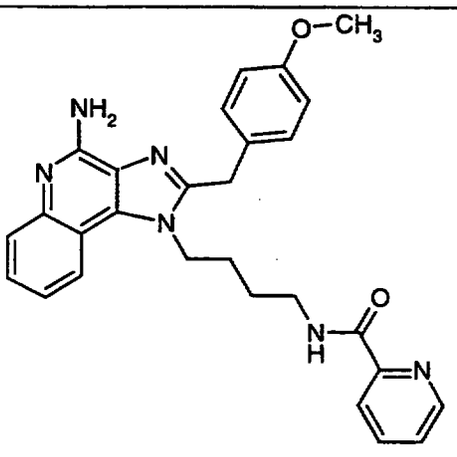
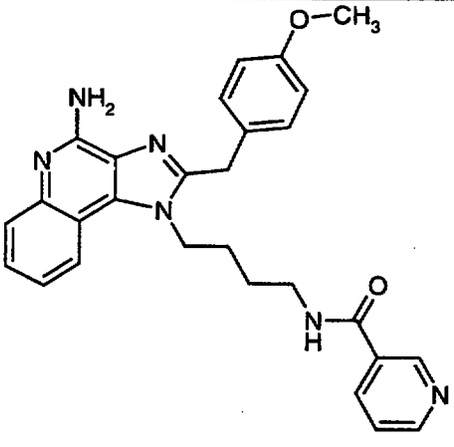
N^1-[4-(4-Amino-2-(4-methoxybenzyl)-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]acetamide Trifluoroacetate



Using the method of Examples 147 - 159 above, 1-(4-aminobutyl)-2-(4-methoxybenzyl)-1*H*-imidazo[4,5-*c*]quinolin-4-amine was reacted with acetyl chloride to provide N^1-[4-(4-amino-2-(4-methoxybenzyl)-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]acetamide Trifluoroacetate. APCI-MS m/e 418.2.

Examples 170 & 171

The examples in the table below were prepared by reacting 1-(4-aminobutyl)-2-(4-methoxybenzyl)-1*H*-imidazo[4,5-*c*]quinolin-4-amine with the appropriate carboxylic acid using the method of Example 160 - 168.

Example #	Structure of the Free Base	APCI-MS m/e
170		481.2
171		481.2

Examples 172 - 174

The examples in the table below were prepared according to the synthetic method described in Reaction Scheme VI above.

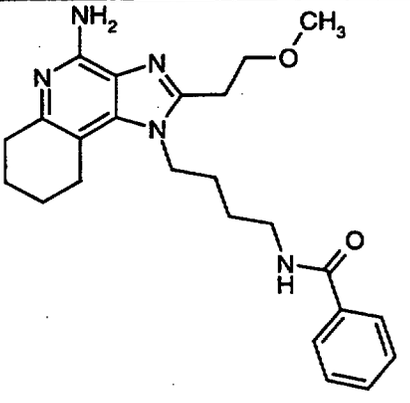
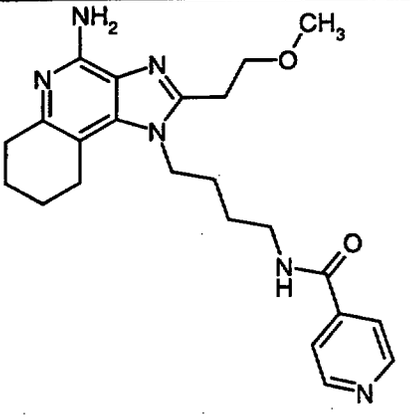
Part A

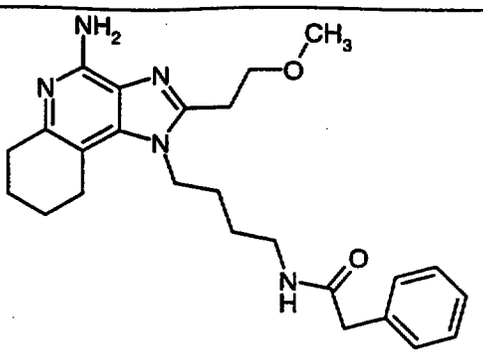
A catalytic amount of platinum (IV) oxide was added to a solution of 1-(4-aminobutyl)-2-methoxyethyl-1*H*-imidazo[4,5-c]quinolin-4-amine (7.7 g, 24.5 mmol) in trifluoroacetic acid (250 mL). The reaction mixture was hydrogenated at 50 psi (3.44 X 10^5 Pa) on a Parr apparatus. The progress of the reaction was monitored by LC/MS.

Additional catalyst was added 7, 11, and 17 days after the start of the reaction. After 25 days the reaction was complete. The reaction mixture was filtered through a layer of Celite® filter aid to remove the catalyst and the filtrate was concentrated under vacuum. The residue was combined with 1 N hydrochloric acid (100 mL) and stirred overnight. The mixture was made basic (pH = 11) with ammonium hydroxide and then extracted with dichloromethane (3 X 300 mL). The extracts were combined and concentrated under vacuum to provide 3.5 g of 1-(4-aminobutyl)-6,7,8,9-tetrahydro-2-methoxyethyl-1*H*-imidazo[4,5-c]quinolin-4-amine as a solid.

Part B

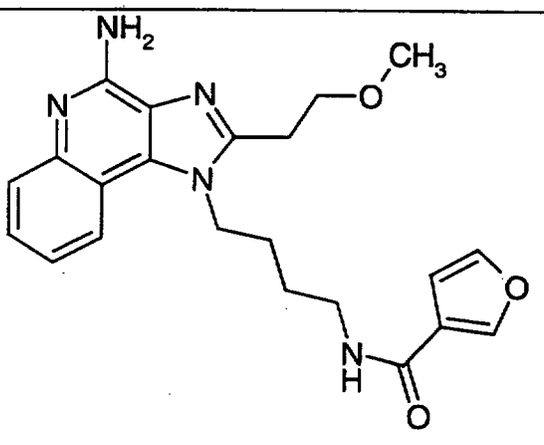
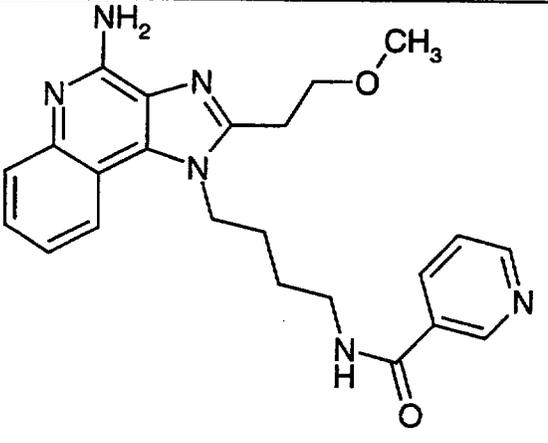
Using the method of Examples DC 147 - 159 above. The material from Part A was reacted with the appropriate acid chloride to give the desired amide.

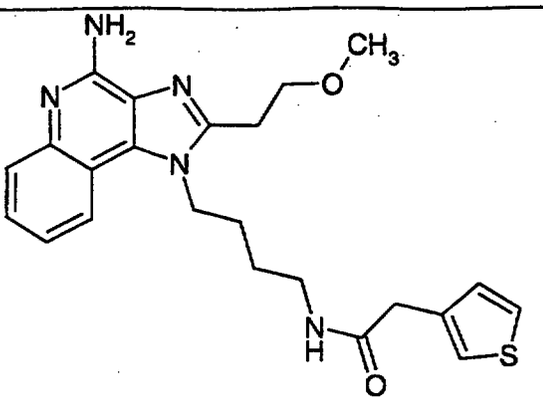
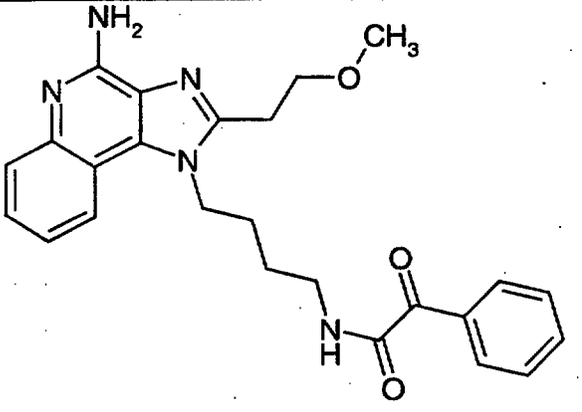
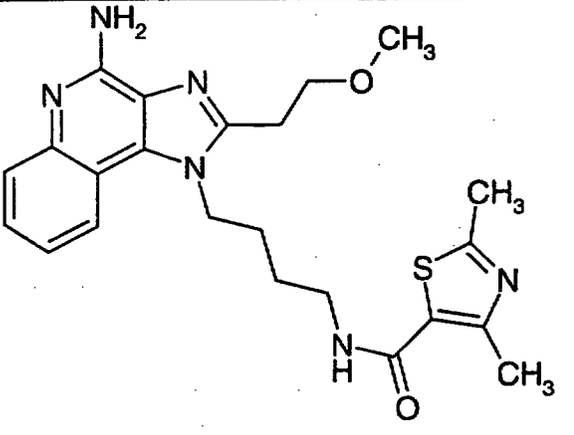
Example #	Structure of the Free Base	APCI-MS m/e
172		422.2
173		423.1

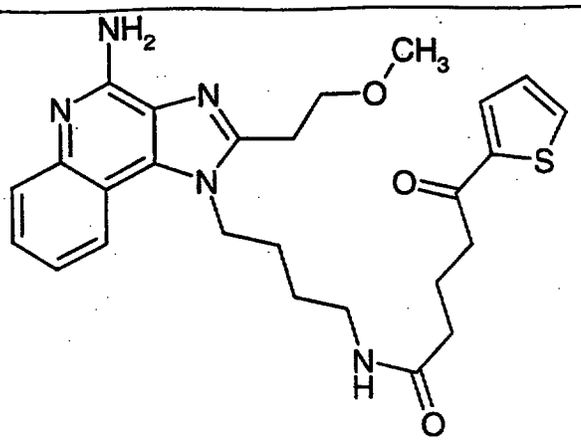
Example #	Structure of the Free Base	APCI-MS m/e
174		436.2

Examples 175 –180

The examples in the table below were prepared according to the synthetic method of Reaction Scheme III above using the general method of Examples 160 – 168.

Example #	Structure of the Free Base	mass
175		408.2
176		419.1

Example #	Structure of the Free Base	mass
177		438.2
178		446.2
179		453.2

Example #	Structure of the Free Base	mass
180		480.2

CYTOKINE INDUCTION IN HUMAN CELLS

An in vitro human blood cell system was used to assess cytokine induction by compounds of the invention. Activity is based on the measurement of interferon and tumor necrosis factor (α) (IFN and TNF, respectively) secreted into culture media as described by Testerman et. al. In "Cytokine Induction by the Immunomodulators Imiquimod and S-27609", Journal of Leukocyte Biology, **58**, 365-372 (September, 1995).

Blood Cell Preparation for Culture

Whole blood is collected by venipuncture into EDTA vacutainer tubes from healthy human donors. Peripheral blood mononuclear cells (PBMCs) are separated from whole blood by density gradient centrifugation using Histopaque®-1077 (Sigma Chemicals, St. Louis, MO). The PBMCs are suspended at 3-4 x 10^6 cells/mL in RPMI 1640 medium containing 10 % fetal bovine serum, 2 mM L-glutamine and 1% penicillin/streptomycin solution (RPMI complete). The PBMC suspension is added to 48 well flat bottom sterile tissue culture plates (Costar, Cambridge, MA or Becton Dickinson Labware, Lincoln Park, NJ) containing an equal volume of RPMI complete media containing test compound.

Compound Preparation

The compounds are solubilized in dimethyl sulfoxide (DMSO). The DMSO concentration should not exceed a final concentration of 1% for addition to the culture wells.

Incubation

The solution of test compound is added at 60 μM to the first well containing RPMI complete and serial (three fold or ten fold) dilutions are made. The PBMC suspension is then added to the wells in an equal volume, bringing the test compound concentrations to the desired range. The final concentration of PBMC suspension is 1.5–2 X 10^6 cells/mL. The plates are covered with sterile plastic lids, mixed gently and then incubated for 18 to 24 hours at 37°C in a 5% carbon dioxide atmosphere.

Separation

Following incubation the plates are centrifuged for 5-10 minutes at 1000 rpm (~200 x g) at 4°C. The cell culture supernatant is removed with a sterile polypropylene pipet and transferred to sterile polypropylene tubes. Samples are maintained at –30 to -70°C until analysis. The samples are analyzed for interferon (α) by either ELISA or bioassay and for tumor necrosis factor (α) by ELISA

Interferon Bioassay Analysis

Interferon is determined by bioassay using A549 human lung carcinoma cells challenged with encephalomyocarditis. The details of the bioassay method have been described by G. L. Brennan and L. H. Kronenberg in "Automated Bioassay of Interferons in Micro-test Plates", Biotechniques, June/July, 78, 1983, incorporated herein by reference. Briefly stated the method is as follows: A549 cells are incubated with dilutions of samples or a standard interferon at 37°C for 24 hours. The incubated cells are then infected with an inoculum of encephalomyocarditis virus. The infected cells are incubated for an additional 24 hours at 37°C before evaluating for viral cytopathic effect. The viral cytopathic effect is quantified by staining with crystal violet followed by visual scoring of the plates. Results are expressed as alpha reference units/mL based on the value obtained for NIH Human Leukocyte IFN standard.

Interferon (α) and Tumor Necrosis Factor (α) Analysis by ELISA

Interferon (α) concentration is determined by ELISA using a Human Multi-Species kit from PBL Biomedical Laboratories, New Brunswick, NJ.

Tumor necrosis factor (α) (TNF)concentration is determined using ELISA kits available from Genzyme, Cambridge, MA; R&D Systems, Minneapolis, MN; or Pharmingen, San Diego, CA.

The table below lists the lowest concentration found to induce interferon and the lowest concentration found to induce tumor necrosis factor for each compound. A "**" indicates that no induction was seen at any of the tested concentrations (0.12, 0.37, 1.11, 3.33, 10 and 30 μM). A "***" indicates that no induction was seen at any of the tested concentrations (0.0001, 0.001, 0.01, 0.1, 1 and 10 μM). Unless otherwise indicated, the interferon biosynthesis was determined by ELISA.

Cytokine Induction in Human Cells		
Example Number	Lowest Effective Concentration (μM)	
	Interferon	Tumor Necrosis Factor
1	0.37	10
3	0.37	1.11
4	0.04	0.37
5	0.04	0.37
6	0.12	1.11
7	1.11	**
8	0.04	**
9	0.37	3.33
10	3.33	**
11	1.11	**
12	3.33	**
13	1.11	3.33
14	3.33	**
15	3.33	**
16	1.11	30
17	3.33	10
18	3.33	**
19	10	**

Cytokine Induction in Human Cells		
Example Number	Lowest Effective Concentration (μM)	
	Interferon	Tumor Necrosis Factor
20	3.33	**
21	0.12	1.11
22	0.37	10
23	1.11	**
24	0.12	3.33
25	3.33	**
26	0.37	10
27	**	**
28	0.12	**
29	0.12	**
31	1.11	**
32	3.33	**
33	0.37	**
34	**	3.33
35	1.11	**
36	1.11	10
37	0.37	**
38	0.12	3.33
39	3.33	**
40	0.37	30
41	1.11	**
42	30	3.33
43	0.12	**
44	1.11	**
45	3.33	**
46	**	10
68*	1.11	10
69*	0.12	1.11

Cytokine Induction in Human Cells		
Example Number	Lowest Effective Concentration (μM)	
	Interferon	Tumor Necrosis Factor
70*	0.37	3.33
71*	0.12	3.33
72*	0.37	10
73*	0.37	10
74*	0.37	10
75*	1.11	**
76*	3.33	**
77*	1.11	10
78*	0.12	10
79*	0.37	**
80*	1.11	10
81*	3.33	30
82*	0.12	10
83*	1.11	**
84*	0.12	10
85	1.11	10
86	1.11	10
87	3.33	30
88	10	**
89	1.11	10
90	3.33	10
91	3.33	**
92	3.33	**
93	1.11	30
94	0.04	3.33
95	3.33	30
96	0.37	10
97	0.12	3.33

Cytokine Induction in Human Cells		
Example Number	Lowest Effective Concentration (μM)	
	Interferon	Tumor Necrosis Factor
98	1.11	10
99	0.37	3.33
100	10	3.33
101	3.33	**
102	3.33	**
103	0.37	10
104	**	**
105	0.12	10
106	3.33	**
107	0.12	10
108	0.12	10
109	**	**
110	1.11	3.33
111	1.11	**
112	10	**
113	3.33	**
114	1.11	10
115	1.11	30
116	0.37	10
117	3.33	**
118	1.11	**
119	**	**
120	0.37	**
121	1.11	**
122	3.33	**
123	3.33	**
124	1.11	3.33
125	1.11	**

Cytokine Induction in Human Cells		
Example Number	Lowest Effective Concentration (μM)	
	Interferon	Tumor Necrosis Factor
126	3.33	**
127	**	**
128	3.33	1.11
129	3.33	**
130	1.11	10
131	3.33	**
132	1.11	3.33
133	3.33	**
134	0.37	**
135	0.12	**
136	1.11	**
137	10	**
138	1.11	**
139	**	**
140	1.11	**
141	0.37	**
142	3.33	**
143	0.12	**
144	1.11	**
145	1.11	**
146	3.33	**
148	0.01	1
149	0.001	1
150	0.001	0.1
151	0.0001	***
153	0.0001	0.1
154	0.0001	***
155	0.0001	1

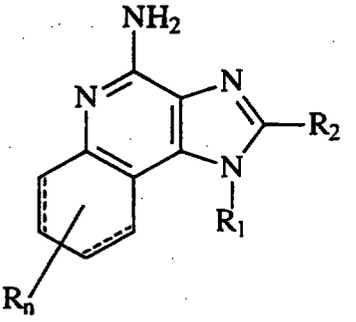
Cytokine Induction in Human Cells		
Example Number	Lowest Effective Concentration (μM)	
	Interferon	Tumor Necrosis Factor
155	0.01	0.1
156	0.001	1
158	0.001	1
159	0.01	1
172	0.0001	1
173	0.001	1
174	0.001	1

*Interferon determined using the bioassay method

The present invention has been described with reference to several embodiments thereof. The foregoing detailed description and examples have been provided for clarity of understanding only, and no unnecessary limitations are to be understood therefrom. It will be apparent to those skilled in the art that many changes can be made to the described embodiments without departing from the spirit and scope of the invention. Thus, the scope of the invention should not be limited to the exact details of the compositions and structures described herein, but rather by the language of the claims that follow.

WHAT IS CLAIMED IS:

1. A pharmaceutical composition comprising a therapeutically effective amount of a compound of the formula (I):



(I)

wherein

R_1 is -alkyl-NR_3-CO-R_4 or -alkenyl-NR_3-CO- R_4 wherein R_4 is aryl, heteroaryl, alkyl or alkenyl, each of which may be unsubstituted or substituted by one or more substituents selected from the group consisting of:

-alkyl;

-alkenyl;

-alkynyl;

-$(alkyl)_{0-1}$-aryl;

-$(alkyl)_{0-1}$-(substituted aryl);

-$(alkyl)_{0-1}$-heteroaryl;

-$(alkyl)_{0-1}$-(substituted heteroaryl);

-O-alkyl;

-O-$(alkyl)_{0-1}$-aryl;

-O-$(alkyl)_{0-1}$-(substituted aryl);

-O-$(alkyl)_{0-1}$-heteroaryl;

-O-$(alkyl)_{0-1}$-(substituted heteroaryl);

-CO-aryl;

-CO-(substituted aryl);

-CO-heteroaryl;

-CO-(substituted heteroaryl);

-COOH;

-CO-O-alkyl;

-CO-alkyl;

-$S(O)_{0-2}$-alkyl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-aryl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-(substituted aryl);

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-heteroaryl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-(substituted heteroaryl);

-$P(O)(OR_3)_2$;

-NR_3-CO-O-alkyl;

-N_3;

-halogen;

-NO_2;

-CN;

-haloalkyl;

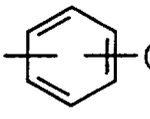
-O-haloalkyl;

-CO-haloalkyl;

-OH;

-SH; and in the case of alkyl, alkenyl, or heterocyclyl, oxo;

or R_4 is



wherein R_5 is an aryl, (substituted aryl), heteroaryl, (substituted heteroaryl), heterocyclyl or (substituted heterocyclyl) group;

R_2 is selected from the group consisting of:

-hydrogen;

-alkyl;

-alkenyl;

-aryl;

-(substituted aryl);



-heteroaryl;

-(substituted heteroaryl);

-heterocyclyl;

-(substituted heterocyclyl);

-alkyl -O-alkyl;

-alkyl-O-alkenyl; and

-alkyl or alkenyl substituted by one or more substituents selected from the group consisting of:

-OH;

-halogen;

-$N(R_3)_2$;

-$CO\text{-}N(R_3)_2$;

-$CO\text{-}C_{1\text{-}10}$ alkyl;

-$CO\text{-}O\text{-}C_{1\text{-}10}$ alkyl;

-N_3;

-aryl;

-(substituted aryl);

-heteroaryl;

-(substituted heteroaryl);

-heterocyclyl;

-(substituted heterocyclyl);

-CO-aryl; and

-CO-heteroaryl;

each $\mathbf{R_3}$ is independently selected from the group consisting of hydrogen; $C_{1\text{-}10}$ alkyl-heteroaryl; $C_{1\text{-}10}$ alkyl-(substituted heteroaryl); $C_{1\text{-}10}$ alkyl–aryl; $C_{1\text{-}10}$ alkyl–(substituted aryl) and $C_{1\text{-}10}$ alkyl;

n is 0 to 4;

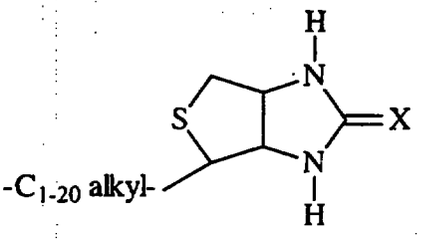
and each **R** present is independently selected from the group consisting of $C_{1\text{-}10}$ alkyl, $C_{1\text{-}10}$ alkoxy, halogen and trifluoromethyl, or a pharmaceutically acceptable salt thereof, in combination with a pharmaceutically acceptable carrier.

2. The composition of claim 1 wherein R_2 is hydrogen.

* C L M S *

3. The composition of claim 1 wherein R_2 is selected from the group consisting of hydrogen; alkyl; alkyl-O-alkyl; $(alkyl)_{0-1}aryl$; and $(alkyl)_{0-1}$ -(substituted aryl).

4. The composition of claim 1 wherein R_4 is



wherein X is O, S, or NH.

5. The composition of claim 1 wherein R_4 is aryl or heteroaryl that may be unsubstituted or substituted by one or more substituents selected from the group consisting of:

-alkyl;
-alkenyl;
-alkynyl;
$-(alkyl)_{0-1}$-aryl;
$-(alkyl)_{0-1}$-(substituted aryl);
$-(alkyl)_{0-1}$-heteroaryl;
$-(alkyl)_{0-1}$-(substituted heteroaryl);
-O-alkyl;
$-O-(alkyl)_{0-1}$-aryl;
$-O-(alkyl)_{0-1}$-(substituted aryl);
$-O-(alkyl)_{0-1}$-heteroaryl;
$-O-(alkyl)_{0-1}$-(substituted heteroaryl);
-CO-aryl;
-CO-(substituted aryl);
-CO-heteroaryl;
-CO-(substituted heteroaryl);
-COOH;

* C L M S *

-CO-O-alkyl;

-CO-alkyl;

-$S(O)_{0-2}$-alkyl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-aryl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-(substituted aryl);

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-heteroaryl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-(substituted heteroaryl);

-NR_3-CO-O-alkyl;

-$P(O)(OR_3)_2$;

-N_3;

-halogen;

-NO_2;

-CN;

-haloalkyl;

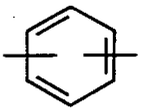
-O-haloalkyl;

-CO-haloalkyl;

-OH; and

-SH.

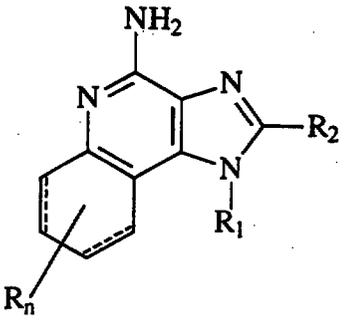
6. The composition of claim 1 wherein R_4 is



$(C_{1-10}alkyl)$-NR_3-$(C_{1-10}alkyl)$-R_5 .

7. The composition of claim 6 wherein R_5 is 4-pyridyl.

8. A pharmaceutical composition comprising a therapeutically effective amount of a compound of the formula (Ia):



(Ia)

wherein

R_1 is -alkyl-NR_3-CO-R_4 or -alkenyl-NR_3-CO- R_4 wherein R_4 is aryl, heteroaryl, alkyl or alkenyl, each of which may be unsubstituted or substituted by one or more substituents selected from the group consisting of:

-heterocyclyl;

-(substituted heterocyclyl);

-$(alkyl)_{0-1}$heterocyclyl;

-$(alkyl)_{0-1}$(substituted heterocyclyl);

-O-$(alkyl)_{0-1}$heterocyclyl;

-O-$(alkyl)_{0-1}$(substituted heterocyclyl);

-$S(O)_{0-2}$–$(alkyl)_{0-1}$heterocyclyl; and

-$S(O)_{0-2}$–$(alkyl)_{0-1}$(substituted heterocyclyl);

R_2 is selected from the group consisting of:

-hydrogen;

-alkyl;

-alkenyl;

-aryl;

-(substituted aryl);

-heteroaryl;

-(substituted heteroaryl);



-heterocyclyl;

-(substituted heterocyclyl);

-alkyl -O-alkyl;

-alkyl-O-alkenyl; and

-alkyl or alkenyl substituted by one or more substituents selected from the group consisting of:

-OH;

-halogen;

-$N(R_3)_2$;

-$CO\text{-}N(R_3)_2$;

-$CO\text{-}C_{1\text{-}10}$ alkyl;

-$CO\text{-}O\text{-}C_{1\text{-}10}$ alkyl;

-N_3;

-aryl;

-(substituted aryl);

-heteroaryl;

-(substituted heteroaryl);

-heterocyclyl;

-(substituted heterocyclyl);

-CO-aryl; and

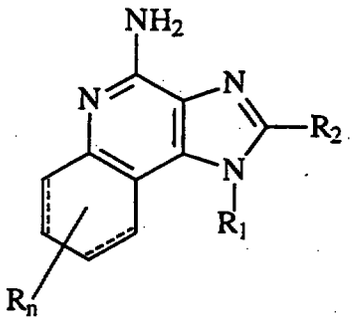
-CO-heteroaryl;

each $\mathbf{R_3}$ is independently selected from the group consisting of hydrogen; $C_{1\text{-}10}$ alkyl-heteroaryl; $C_{1\text{-}10}$ alkyl-(substituted heteroaryl); $C_{1\text{-}10}$ alkyl–aryl; $C_{1\text{-}10}$ alkyl–(substituted aryl) and $C_{1\text{-}10}$ alkyl;

n is 0 to 4;

and each **R** present is independently selected from the group consisting of $C_{1\text{-}10}$ alkyl, $C_{1\text{-}10}$ alkoxy, halogen and trifluoromethyl, or a pharmaceutically acceptable salt thereof, in combination with a pharmaceutically acceptable carrier.

9. A pharmaceutical composition comprising a therapeutically effective amount of a compound of the formula (Ib):



(Ib)

wherein

R_1 is -alkyl-NR_3-CO-R_4 or -alkenyl-NR_3-CO- R_4 wherein R_4 is heterocyclyl which may be unsubstituted or substituted by one or more substituents selected from the group consisting of:

-alkyl;

-alkenyl;

-alkynyl;

-$(alkyl)_{0-1}$-aryl;

-$(alkyl)_{0-1}$-(substituted aryl);

-$(alkyl)_{0-1}$-heterocyclyl;

-$(alkyl)_{0-1}$-(substituted heterocyclyl);

-$(alkyl)_{0-1}$-heteroaryl;

-$(alkyl)_{0-1}$-(substituted heteroaryl);

-O-alkyl;

-O-$(alkyl)_{0-1}$-aryl;

-O-$(alkyl)_{0-1}$-(substituted aryl);

-O-$(alkyl)_{0-1}$-heterocyclyl;

-O-$(alkyl)_{0-1}$-(substituted heterocyclyl);

-O-$(alkyl)_{0-1}$-heteroaryl;

-O-$(alkyl)_{0-1}$-(substituted heteroaryl);

-CO-aryl;

-CO-(substituted aryl);

-CO-heteroaryl;

-CO-(substituted heteroaryl);

-COOH;

-CO-O-alkyl;

-CO-alkyl;

-$S(O)_{0-2}$-alkyl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-aryl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-(substituted aryl);

-$S(O)_{0-2}$-$(alkyl)_{0-1}$-heterocyclyl;

-$S(O)_{0-2}$-$(alkyl)_{0-1}$-(substituted heterocyclyl);

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-heteroaryl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-(substituted heteroaryl);

-$P(O)(OR_3)_2$;

-NR_3-CO-O-alkyl;

-N_3;

oxo;

-halogen;

-NO_2;

-CN;

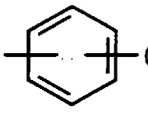
-haloalkyl;

-O-haloalkyl;

-CO-haloalkyl;

-OH; and

-SH; or $\mathbf{R_4}$ is



$(C_{1-10}alkyl)$-NR_3-$(C_{1-10}alkyl)$-R_5

wherein $\mathbf{R_5}$ is an aryl, (substituted aryl), heteroaryl, (substituted heteroaryl), heterocyclyl or (substituted heterocyclyl) group;

$\mathbf{R_2}$ is selected from the group consisting of:

-hydrogen;

-alkyl;

-alkenyl;



-aryl;

-(substituted aryl);

-heteroaryl;

-(substituted heteroaryl);

-heterocyclyl;

-(substituted heterocyclyl);

-alkyl -O-alkyl;

-alkyl-O-alkenyl; and

-alkyl or alkenyl substituted by one or more substituents selected from the group consisting of:

-OH;

-halogen;

-$N(R_3)_2$;

-CO-$N(R_3)_2$;

-CO-C_{1-10} alkyl;

-CO-O-C_{1-10} alkyl;

-N_3;

-aryl;

-(substituted aryl);

-heteroaryl;

-(substituted heteroaryl);

-heterocyclyl;

-(substituted heterocyclyl);

-CO-aryl; and

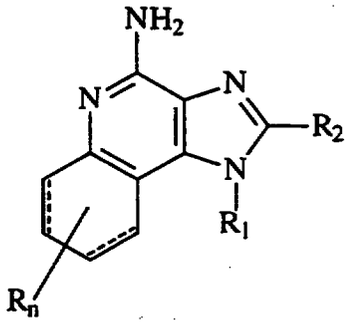
-CO-heteroaryl;

each R_3 is independently selected from the group consisting of hydrogen; C_{1-10} alkyl-heteroaryl; C_{1-10} alkyl-(substituted heteroaryl); C_{1-10} alkyl–aryl; C_{1-10} alkyl–(substituted aryl) and C_{1-10} alkyl;

n is 0 to 4;

and each **R** present is independently selected from the group consisting of C_{1-10} alkyl, C_{1-10} alkoxy, halogen and trifluoromethyl, or a pharmaceutically acceptable salt thereof, in combination with a pharmaceutically acceptable carrier.

10. A compound of the formula (Ic):



(Ic)

wherein

R_1 is -alkyl-NR_3-CO-R_4 or -alkenyl-NR_3-CO- R_4 wherein R_4 is aryl, heteroaryl, heterocyclyl, alkyl or alkenyl, each of which may be unsubstituted or substituted by one or more substituents selected from the group consisting of:

-alkyl;

-alkenyl;

-alkynyl;

-$(alkyl)_{0-1}$-aryl;

-$(alkyl)_{0-1}$-(substituted aryl);

-$(alkyl)_{0-1}$-heteroaryl;

-$(alkyl)_{0-1}$-(substituted heteroaryl);

-$(alkyl)_{0-1}$-heterocyclyl;

-$(alkyl)_{0-1}$- (substituted heterocyclyl);

-O-alkyl;

-O-$(alkyl)_{0-1}$-aryl;

-O-$(alkyl)_{0-1}$-(substituted aryl);

-O-$(alkyl)_{0-1}$-heteroaryl;

-O-$(alkyl)_{0-1}$-(substituted heteroaryl);

-O-$(alkyl)_{0-1}$-heterocyclyl;

-O-$(alkyl)_{0-1}$-(substituted heterocyclyl);



-CO-aryl;

-CO-(substituted aryl);

-CO-heteroaryl;

-CO-(substituted heteroaryl);

-COOH;

-CO-O-alkyl;

-CO-alkyl;

-$S(O)_{0-2}$-alkyl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-aryl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-(substituted aryl);

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-heteroaryl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-(substituted heteroaryl);

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-heterocyclyl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-(substituted heterocyclyl);

-NR_6-CO-O-alkyl;

-$P(O)(OR_3)_2$;

-N_3;

-halogen;

-NO_2;

-CN;

-haloalkyl;

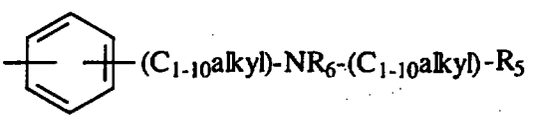
-O-haloalkyl;

-CO-haloalkyl;

-OH;

-SH; and in the case of alkyl, alkenyl, or heterocyclyl, oxo;

or $\mathbf{R_4}$ is



wherein $\mathbf{R_5}$ is an aryl, (substituted aryl), heteroaryl, (substituted heteroaryl), heterocyclyl or (substituted heterocyclyl) group;

$\mathbf{R_2}$ is selected from the group consisting of:

-hydrogen;

-alkyl;

-alkenyl;

-aryl;

-(substituted aryl);

-heteroaryl;

-(substituted heteroaryl);

-heterocyclyl;

-(substituted heterocyclyl);

-alkyl -O-alkyl;

-alkyl-O-alkenyl; and

-alkyl or alkenyl substituted by one or more substituents selected from the group consisting of:

-OH;

-halogen;

-$N(R_6)_2$;

-CO-$N(R_6)_2$;

-CO-C_{1-10} alkyl;

-CO-O-C_{1-10} alkyl;

-N_3;

-aryl;

-(substituted aryl);

-heteroaryl;

-(substituted heteroaryl);

-heterocyclyl;

-(substituted heterocyclyl);

-CO-aryl; and

-CO-heteroaryl;

R_3 is selected from the group consisting of C_{1-10} alkyl-heteroaryl; C_{1-10} alkyl-(substituted heteroaryl); C_{1-10} alkyl–aryl; C_{1-10} alkyl–(substituted aryl) and C_{1-10} alkyl;

each R_6 is independently selected from the group consisting of hydrogen; C_{1-10} alkyl-heteroaryl; C_{1-10} alkyl-(substituted heteroaryl); C_{1-10} alkyl–aryl; C_{1-10} alkyl–(substituted aryl) and C_{1-10} alkyl;

n is 0 to 4;

and each **R** present is independently selected from the group consisting of C_{1-10} alkyl, C_{1-10} alkoxy, halogen and trifluoromethyl, or a pharmaceutically acceptable salt thereof.

11. A compound of claim 10 wherein the dashed bonds are absent.

12. A compound of claim 10 wherein R_3 is selected from the group consisting of C_{1-10} alkyl-heteroaryl; C_{1-10} alkyl-(substituted heteroaryl); C_{1-10} alkyl–aryl; and C_{1-10} alkyl–(substituted aryl).

13. A compound of claim 10 wherein R_3 is selected from the group consisting of C_{1-10} alkyl-heteroaryl; C_{1-10} alkyl-(substituted heteroaryl); C_{1-10} alkyl–aryl; C_{1-10} alkyl–(substituted aryl) and C_{6-10} alkyl.

14. A compound of claim 10 wherein R_3 is selected from the group consisting of 2-methoxybenzyl; 2-furylmethyl; 3-furylmethyl; 2-nitrobenzyl; and 4-pyridylmethyl.

15. A compound of claim 14 wherein R_2 is hydrogen and R_4 is methyl.

16. A compound of claim 10 wherein n is 0.

17. A compound of claim 10 wherein R_2 is selected from the group consisting of hydrogen; alkyl; alkyl-O-alkyl; $(alkyl)_{0-1}$ aryl, $(alkyl)_{0-1}$-(substituted aryl); $(alkyl)_{0-1}$-heteroaryl; and $(alkyl)_{0-1}$-(substituted heteroaryl).

18. A compound of claim 10 wherein R_2 is selected from the group consisting of hydrogen; C_{1-4} alkyl; and C_{1-4}alkyl-O-C_{1-4}alkyl.

19. A compound of claim 10 wherein R_1 is $-(CH_2)_{1-6}-NR_3-CO-R_4-$.

20. A compound of claim 10 wherein R_4 is naphthyl that may be unsubstituted or substituted by one or more substituents selected from the group consisting of:

-alkyl;
-alkenyl;
-alkynyl;
$-(alkyl)_{0-1}$-aryl;
$-(alkyl)_{0-1}$-(substituted aryl);
$-(alkyl)_{0-1}$-heteroaryl;
$-(alkyl)_{0-1}$-(substituted heteroaryl);
-O-alkyl,
$-O-(alkyl)_{0-1}$-aryl;
$-O-(alkyl)_{0-1}$-(substituted aryl);
$-O-(alkyl)_{0-1}$-heteroaryl;
$-O-(alkyl)_{0-1}$-(substituted heteroaryl);
-CO-aryl;
-CO-(substituted aryl);
-CO-heteroaryl;
-CO-(substituted heteroaryl);
-CO-O-alkyl;
-CO-alkyl;
-COOH;
$-S(O)_{0-2}$-alkyl;
$-S(O)_{0-2}-(alkyl)_{0-1}$-aryl;
$-S(O)_{0-2}-(alkyl)_{0-1}$-(substituted aryl);
$-S(O)_{0-2}-(alkyl)_{0-1}$-heteroaryl;
$-S(O)_{0-2}-(alkyl)_{0-1}$-(substituted heteroaryl);
$-NR_3$-CO-O-alkyl;
$-P(O)(OR_3)_2$;
$-N_3$;
oxo;

-halogen;

$-NO_2$;

-CN;

-haloalkyl;

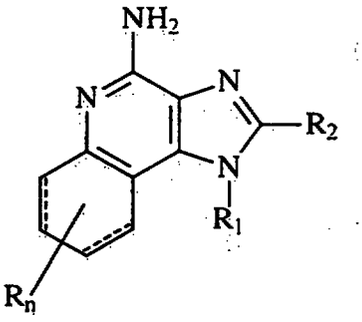
-O-haloalkyl;

-CO-haloalkyl;

-OH; and

-SH.

21. A compound of the formula (Id):



(Id)

wherein

R_1 is -alkyl-NR_3-CO-R_4 or -alkenyl-NR_3-CO- R_4 wherein R_4 is aryl or heteroaryl which may be unsubstituted or substituted by one or more substituents selected from the group consisting of:

-alkyl;

-alkenyl;

-alkynyl;

-$(alkyl)_{0-1}$-aryl;

-$(alkyl)_{0-1}$-(substituted aryl);

-$(alkyl)_{0-1}$-heteroaryl;

-$(alkyl)_{0-1}$-(substituted heteroaryl);

-$(alkyl)_{0-1}$-heterocyclyl;



-$(alkyl)_{0-1}$- (substituted heterocyclyl);

-O-alkyl;

-O-$(alkyl)_{0-1}$-aryl;

-O-$(alkyl)_{0-1}$-(substituted aryl);

-O-$(alkyl)_{0-1}$-heteroaryl;

-O-$(alkyl)_{0-1}$-(substituted heteroaryl);

-O-$(alkyl)_{0-1}$-heterocyclyl;

-O-$(alkyl)_{0-1}$-(substituted heterocyclyl);

-CO-aryl;

-CO-(substituted aryl);

-CO-heteroaryl;

-CO-(substituted heteroaryl);

-CO-O-alkyl;

-COOH;

-CO-alkyl;

-$S(O)_{0-2}$-alkyl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-aryl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-(substituted aryl);

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-heteroaryl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-(substituted heteroaryl);

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-heterocyclyl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-(substituted heterocyclyl);

-NR_3-CO-O-alkyl;

-$P(O)(OR_3)_2$;

-N_3;

-halogen;

-NO_2;

-CN;

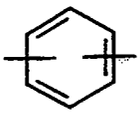
-haloalkyl;

-O-haloalkyl;

-CO-haloalkyl;

-OH; and

-SH; or R_4 is



$-(C_{1-10}alkyl)-NR_6-(C_{1-10}alkyl)-R_5$

wherein R_5 is an aryl, (substituted aryl), heteroaryl, (substituted heteroaryl), heterocyclyl or (substituted heterocyclyl) group;

R_2 is selected from the group consisting of:

-hydrogen;

-alkyl;

-alkenyl;

-aryl;

-(substituted aryl);

-heteroaryl;

-(substituted heteroaryl);

-heterocyclyl;

-(substituted heterocyclyl);

-alkyl -O-alkyl;

-alkyl-O-alkenyl; and

-alkyl or alkenyl substituted by one or more substituents selected from the group consisting of:

-OH;

-halogen;

$-N(R_3)_2$;

$-CO-N(R_3)_2$;

$-CO-C_{1-10}$ alkyl;

$-CO-O-C_{1-10}$ alkyl;

$-N_3$;

-aryl;

-(substituted aryl);

-heteroaryl;

-(substituted heteroaryl);

-heterocyclyl;

-(substituted heterocyclyl);

-CO-aryl; and

-CO-heteroaryl;

each R_3 is independently selected from the group consisting of hydrogen; C_{1-10} alkyl-heteroaryl; C_{1-10} alkyl-(substituted heteroaryl); C_{1-10} alkyl–aryl; C_{1-10} alkyl–(substituted aryl) and C_{1-10} alkyl;

n is 0 to 4;

and each **R** present is independently selected from the group consisting of C_{1-10} alkyl, C_{1-10} alkoxy, halogen and trifluoromethyl, or a pharmaceutically acceptable salt thereof,

with the proviso that R_4 is not an unsubstituted benzene ring, and that when R_4 is a substituted benzene ring the substituents are selected from the group consisting of alkyl, alkoxy, alkylthio, hydroxy, haloalkyl, haloalkylcarbonyl, haloalkoxy, alkylcarbonyl, alkenylcarbonyl, arylcarbonyl, heteroarylcarbonyl, aryl, arylalkyl, heteroaryl, heteroarylalkyl, heterocyclyl, heterocycloalkyl, nitrile, alkoxycarbonyl, alkanoyloxy, alkanoylthio, and $-(C_{1-10}\text{alkyl})\text{-}NR_3\text{-}(C_{1-10}\text{alkyl})\text{-}R_5$, wherein $\mathbf{R_5}$ is an aryl, (substituted aryl), heteroaryl, (substituted heteroaryl), heterocyclyl or (substituted heterocyclyl) group.

22. A compound of claim 21 wherein n is 0.

23. A compound of claim 21 wherein R_2 is selected from the group consisting of hydrogen; alkyl; alkyl-O-alkyl; $(\text{alkyl})_{0-1}\text{aryl}$; and $(\text{alkyl})_{0-1}$ -(substituted aryl).

24. A compound of claim 21 wherein R_2 is selected from the group consisting of hydrogen, C_{1-4} alkyl, and $C_{1-4}\text{alkyl-O-}C_{1-4}\text{alkyl}$.

25. A compound of claim 24 wherein R_2 is hydrogen or methoxyethyl.

26. A compound of claim 21 wherein R_1 is $-(CH_2)_{1-6}\text{-}NR_3\text{-}CO\text{-}R_4\text{-}$.

27. A compound of claim 21 wherein R_3 is hydrogen.



28. A compound of claim 21 wherein R_4 is naphthyl, quinolinyl, isoquinolinyl or pyridyl that may be unsubstituted or substituted by one or more substituents selected from the group consisting of:

-alkyl;

-alkenyl;

-alkynyl;

-$(alkyl)_{0-1}$-aryl;

-$(alkyl)_{0-1}$-(substituted aryl);

-$(alkyl)_{0-1}$-heteroaryl;

-$(alkyl)_{0-1}$-(substituted heteroaryl);

-O-alkyl;

-O-$(alkyl)_{0-1}$-aryl;

-O-$(alkyl)_{0-1}$-(substituted aryl);

-O-$(alkyl)_{0-1}$-heteroaryl;

-O-$(alkyl)_{0-1}$-(substituted heteroaryl);

-CO-aryl;

-CO-(substituted aryl);

-CO-heteroaryl;

-CO-(substituted heteroaryl);

-COOH;

-CO-O-alkyl;

-CO-alkyl;

-$S(O)_{0-2}$-alkyl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-aryl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-(substituted aryl);

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-heteroaryl;

-$S(O)_{0-2}$–$(alkyl)_{0-1}$-(substituted heteroaryl);

-NR_3-CO-O-alkyl;

-$P(O)(OR_3)_2$;

-N_3;

-halogen;

-NO_2;

-CN;

-haloalkyl;

-O-haloalkyl;

-CO-haloalkyl;

-OH; and

-SH.

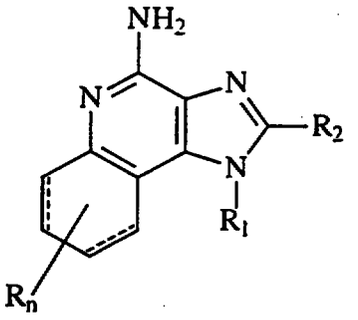
29. A compound of claim 28 wherein:

R_2 is selected from the group consisting of hydrogen; alkyl; alkyl-O-alkyl; $(alkyl)_{0-1}aryl$; and $(alkyl)_{0-1}$ -(substituted aryl);

R_3 is hydrogen; and

n is 0.

30. A compound of the formula (Ie):



(Ie)

wherein

R_1 is -alkyl-NR_3-CO-R_4 or -alkenyl-NR_3-CO- R_4 wherein R_4 is an alkyl or alkenyl group that is substituted by one or more substituents selected from the group consisting of:

-alkynyl;

-(substituted aryl) wherein the substituent(s) is selected from the group consisting of alkyl, alkoxy, alkylthio, hydroxy, haloalkyl, haloalkylcarbonyl, haloalkoxy, alkylcarbonyl, alkenylcarbonyl, arylcarbonyl, heteroarylcarbonyl, aryl, arylalkyl, heteroaryl, heteroarylalkyl, heterocyclyl, heterocycloalkyl, nitrile, alkoxycarbonyl, alkanoyloxy, and alkanoylthio;

-(substituted aryl);



-heteroaryl;

-(substituted heteroaryl);

-O-alkyl;

-O-(alkyl)$_{0-1}$-(substituted aryl) wherein the substituent(s) is selected from the group consisting of alkyl, alkoxy, alkylthio, hydroxy, haloalkyl, haloalkylcarbonyl, haloalkoxy, alkylcarbonyl, alkenylcarbonyl, arylcarbonyl, heteroarylcarbonyl, aryl, arylalkyl, heteroaryl, heteroarylalkyl, heterocyclyl, heterocycloalkyl, nitrile, alkoxycarbonyl, alkanoyloxy, and alkanoylthio;

-O-(alkyl)$_{0-1}$-heteroaryl;

-O-(alkyl)$_{0-1}$-(substituted heteroaryl);

-CO-aryl;

-CO-(substituted aryl);

-CO-heteroaryl;

-CO-(substituted heteroaryl);

-COOH;

-CO-O-alkyl;

-CO-alkyl;

-S(O)$_{0-2}$-alkyl;

-S(O)$_{0-2}$–(alkyl)$_{0-1}$-aryl;

-S(O)$_{0-2}$–(alkyl)$_{0-1}$-(substituted aryl);

-S(O)$_{0-2}$–(alkyl)$_{0-1}$-heteroaryl;

-S(O)$_{0-2}$–(alkyl)$_{0-1}$-(substituted heteroaryl);

-NR$_3$-CO-O-alkyl;

-P(O)(OR$_3$)$_2$;

-N$_3$;

oxo;

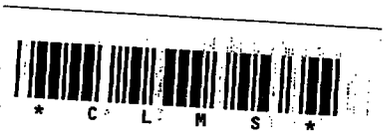
-NO$_2$;

-CN;

-O-haloalkyl;

-CO-haloalkyl;

-OH; and



-SH;

R_2 is selected from the group consisting of:

-hydrogen;

-alkyl;

-alkenyl;

-aryl;

-(substituted aryl);

-heteroaryl;

-(substituted heteroaryl);

-heterocyclyl;

-(substituted heterocyclyl);

-alkyl -O-alkyl;

-alkyl-O-alkenyl; and

-alkyl or alkenyl substituted by one or more substituents selected from the group consisting of:

-OH;

-halogen;

$-N(R_3)_2$;

$-CO-N(R_3)_2$;

$-CO-C_{1-10}$ alkyl;

$-N_3$;

-aryl;

-(substituted aryl);

-heteroaryl;

-(substituted heteroaryl);

-heterocyclyl;

-(substituted heterocyclyl);

-CO-aryl; and

-CO-heteroaryl;

each R_3 is independently selected from the group consisting of hydrogen; C_{1-10} alkyl-heteroaryl; C_{1-10} alkyl-(substituted heteroaryl); C_{1-10} alkyl–aryl; C_{1-10} alkyl–(substituted aryl) and C_{1-10} alkyl;

n is 0 to 4;

and each **R** present is independently selected from the group consisting of C_{1-10} alkyl, C_{1-10} alkoxy, halogen and trifluoromethyl, or a pharmaceutically acceptable salt thereof.

31. A compound of claim 30 wherein n is 0.

32. A compound of claim 30 wherein R_2 is selected from the group consisting of hydrogen, alkyl, alkyl-O-alkyl, $(alkyl)_{0-1}$-aryl, and $(alkyl)_{0-1}$- (substituted aryl).

33. A compound of claim 30 wherein R_2 is selected from the group consisting of hydrogen, C_{1-4} alkyl, and C_{1-4}alkyl-O-C_{1-4}alkyl.

34. A compound of claim 30 wherein R_2 is hydrogen or methoxyethyl.

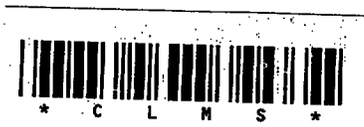
35. A compound of claim 34 wherein n is 0.

36. A compound of claim 34 wherein R_3 is hydrogen and n is 0.

37. A compound of claim 30 wherein R_3 is hydrogen.

38. A pharmaceutical composition comprising a therapeutically effective amount of a compound selected from the group consisting of:

N^1-[4-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]benzamide;
N^1-[4-(4-Amino-2-propyl-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]benzamide;
N^1-[4-(4-Amino-2-methyl-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]benzamide;
N^1-[4-(4-Amino-2-ethyl-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]benzamide;
N^1-[4-(4-Amino-2-butyl-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]benzamide;
N^1-[5-(4-Amino-2-methyl-1*H*-imidazo[4,5-*c*]quinolin-1-yl)pentyl]benzamide;
N^1-[5-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)pentyl]benzamide;
N^1-[3-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)propyl]benzamide;



N^1-[2-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)ethyl]benzamide;

N^1-[3-(4-Amino-2-methyl-1*H*-imidazo[4,5-*c*]quinolin-1-yl)propyl]benzamide;

N^1-[6-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)hexyl]benzamide;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-3-phenylpropanamide;

N^1-[2-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)ethyl]-3-phenylpropanamide;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-phenoxyacetamide;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-ethylhexanamide;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-phenoxypropanamide ;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-2-chlorobenzamide;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-3,4-dichlorobenzamide;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-2,6-dichlorobenzamide;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-4-fluorobenzamide;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-4-chlorobenzamide;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-4-methoxybenzamide;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-4-(trifluoromethyl)benzamide;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-2-phenylacetamide;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-(E)-3-phenyl-2-propenamide;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-3-cyclopentylpropanamide;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-1-cyclopentanecarboxamide;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-1-cyclohexanecarboxamide;

N^1-{4-[4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-*c*]quinolin-1-yl]butyl}-2-methylbenzamide ;

N^1-{4-[4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-*c*]quinolin-1-yl]butyl}-1-cyclopentanecarboxamide;

N^1-{4-[4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-*c*]quinolin-1-yl]butyl}-1-cyclohexanecarboxamide,

N^1-{4-[4-Amino-2-(2-methoxyethyl)-6,7,8,9-tetrahydro-1*H*-imidazo[4,5-

c]quinolin-1-yl]butyl}benzamide;

N^1-{4-[4-Amino-2-(2-methoxyethyl)-6,7,8,9-tetrahydro-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}-2-phenylacetamide;

N^1-[4-(4-Amino-2-(4-methoxybenzyl)-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]acetamide;

N^1-[4-(4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]acetamide;

N^1-[4-(4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-2,2,2-trifluoroacetamide;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-2,2,2-trifluoroacetamide;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-(*trans*)-2-phenylcyclopropane-1-carboxamide; and

N^1-{4-[4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}-(*trans*)-2-phenylcyclopropane-1-carboxamide

in combination with a pharmaceutically acceptable carrier.

39. A compound selected from the group consisting of:

N^6-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-6-quinolinecarboxamide;

N^3-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-3-quinolinecarboxamide;

N^3-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2,6-dimethoxynicotinamide;

N^8-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-8-quinolinecarboxamide;

N^3-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]nicotinamide;

N^4-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]isonicotinamide;

N^4-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-4-quinolinecarboxamide;

N^4-[4-(4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-phenyl-4-quinolinecarboxamide;

N^3-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-(pentylsulfanyl)nicotinamide;

N^3-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-6-cyanonicotinamide;

N^3-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-6-chloronicotinamide;

N^3-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-6-(2,2,2-trifluoroethoxy)nicotinamide;

N^2-{4-[4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}-2-quinolinecarboxamide;

N^1-{4-[4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}-1-isoquinolinecarboxamide;

N^2-{4-[4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}-5-butyl-2-pyridinecarboxamide;

N^3-{4-[4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}-3-indolecarboxamide;

N^2-{4-[4-Amino-2-(4-methoxybenzyl)-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}-2-quinolinecarboxamide;

N^3-{4-[4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}-6-(1-pyrrolyl)nicotinamide;

N^5-{4-[4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}-5-indolecarboxamide;

N^3-{4-[4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}-5-(2-phenyl-1-ethynyl)nicotinamide;

N^3-[4-(4-Amino-2-phenyl-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]nicotinamide;

N^2-[4-(4-Amino-2-phenyl-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-quinolinecarboxamide;

N^3-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-chloronicotinamide;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-(2-thienyl)acetamide;

N^1-[4-(4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-(3-thienyl)acetamide;

N^2-{4-[4-Amino-2-(4-methoxybenzyl)-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}-2-pyridinecarboxamide;

N^3-{4-[4-Amino-2-(4-methoxybenzyl)-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}-nicotinamide;

N^4-{4-[4-Amino-2-(2-methoxyethyl)-6,7,8,9-tetrahydro-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}isonicotinamide ;

N^3-{4-[4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}-3-

furamide;

N^3-{4-[4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}nicotinamide;

N^2-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-furamide;

N^2-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-thiophenecarboxamide; and

N^2-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-5-nitro-2-furamide.

40. A compound selected from the group consisting of:

N^1-[4-(4-Amino-2-butyl-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-5-(2-oxoperhydrothieno[3,4-*d*]imidazol-4-yl)pentanamide;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-5-(2-oxoperhydrothieno[3,4-*d*]imidazol-4-yl)pentanamide;

N^1-[2-(4-Amino-2-butyl-1*H*-imidazo[4,5-*c*]quinolin-1-yl)ethyl]-5-(2-iminoperhydrothieno[3,4-*d*]imidazol-4-yl)pentanamide;

N^1-[2-(4-Amino-2-butyl-1*H*-imidazo[4,5-*c*]quinolin-1-yl)ethyl]-5-(2-oxoperhydrothieno[3,4-*d*]imidazol-4-yl)pentanamide; and

N^1-[2-(4-Amino-2-(ethoxymethyl)-1*H*-imidazo[4,5-*c*]quinolin-1-yl)ethyl]-5-(2-oxoperhydrothieno[3,4-*d*]imidazol-4-yl)pentanamide.

41. A compounds selected from the group consisting of:

N^1-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-4-(morpholinomethyl)benzamide;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-4-{[(4-pyridylmethyl)amino]methyl}benzamide;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-4-{[(2-methoxyphenethyl)amino]methyl}benzamide;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-4-({methyl[2-(2-pyridyl)ethyl]amino}methyl)benzamide;

N^1-{4-[4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}-2-

oxo-2-phenylacetamide;

N^1-[4-(4-Amino -1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-4-[(2-tetrahydro-1*H* –1-pyrrolyl-1*H*-benzo[d]imidazol-1-yl)methyl]benzamide; and

N^3-[4-(4-Amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-6-morpholinonicotinamide.

42. A compound selected from the group consisting of:

N^1-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-ethoxy-1-naphthamide;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-4-cyanobenzamide;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-3-cyanobenzamide;

N^1-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-1-naphthamide;

N^2-[4-(4-Amino-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-naphthamide;

N^1-{4-[4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl]butyl}-4-(1-pyrrolyl)benzamide;

N^1-{4-(4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl}-1-naphthamide;

N^2-{4-(4-Amino-2-(2-methoxyethyl)-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl}-2-naphthamide;

N^1-{4-(4-Amino-2-(4-methoxybenzyl)-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl}-1-naphthamide;

N^2-{4-(4-Amino-2-(4-methoxybenzyl)-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl}-2-naphthamide;

N^1-[4-(4-Amino-2-butyl-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-1-naphthamide;

N^2-[4-(4-Amino-2-butyl-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-naphthamide;

N^1-[4-(4-Amino-6,7,8,9-tetrahydro-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-1-naphthamide; and

N^2-[4-(4-Amino-6,7,8,9-tetrahydro-1*H*-imidazo[4,5-c]quinolin-1-yl)butyl]-2-naphthamide.

43. A compound selected from the group consisting of:

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-(4-methoxybenzyl)acetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-(4-bromobenzyl)acetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-(5-bromo-2-hydroxybenzyl)-acetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-(4-butoxybenzyl)acetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-(2-chlorobenzyl)acetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-(2-chloro-5-nitrobenzyl)acetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-(5-chloro-2-nitrobenzyl)acetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-2-[(4-chlorophenyl)sulfanyl]benzylacetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-(3,5-dichlorobenzyl)acetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-(3,4-difluorobenzyl)acetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-(2,5-dimethoxybenzyl)acetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-(2,3-dimethoxybenzyl)acetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-(2,4-dimethylbenzyl)acetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-[(5-ethyl-2-furyl)methyl]acetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-(2-furylmethyl)acetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-(3-furylmethyl)acetamide;

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N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-(3-phenylpropyl)acetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-octylacetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-(1-naphthylmethyl)acetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-[(2-methoxy-1-naphthylmethyl]acetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-(4-nitrobenzyl)acetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-(2-nitrobenzyl)acetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-(4-pyridylmethyl)acetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-(2-methylbenzyl)acetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-(2,3,4-trimethoxybenzyl)acetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-(3,4,5-trimethoxybenzyl)acetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-cyclopentylacetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-(4-fluorophenyl)acetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-isopropylacetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-[4-(trifluoromethyl)phenyl]acetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-cyclohexylmethylacetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-benzylacetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-methylacetamide;

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-ethylacetamide; and

N^1-[4-(4-amino-1*H*-imidazo[4,5-*c*]quinolin-1-yl)butyl]-N^1-benzyl-2,2,2-trifluoroacetamide.

44. A pharmaceutical composition comprising a therapeutically effective amount of a compound of claim 10 in combination with a pharmaceutically acceptable carrier.

45. A pharmaceutical composition comprising a therapeutically effective amount of a compound of claim 21 in combination with a pharmaceutically acceptable carrier.

46. A pharmaceutical composition comprising a therapeutically effective amount of a compound of claim 30 in combination with a pharmaceutically acceptable carrier.

47. A method of inducing cytokine biosynthesis in an animal comprising administering an effective amount of a composition of claim 1 to the animal.

48. A method of treating a viral disease in an animal comprising administering an effective amount of a composition of claim 1 to the animal.

49. A method of treating a neoplastic disease in an animal comprising administering an effective amount of a composition of claim 1 to the animal.

50. A method of inducing cytokine biosynthesis in an animal comprising administering an effective amount of a composition of claim 8 to the animal.

51. A method of treating a viral disease in an animal comprising administering an effective amount of a composition of claim 8 to the animal.

52. A method of treating a neoplastic disease in an animal comprising administering an effective amount of a composition of claim 8 to the animal.

53. A method of inducing cytokine biosynthesis in an animal comprising administering an effective amount of a composition of claim 9 to the animal.

54. A method of treating a viral disease in an animal comprising administering an effective amount of a composition of claim 9 to the animal.

55. A method of treating a neoplastic disease in an animal comprising administering an effective amount of a composition of claim 9 to the animal.

56. A method of inducing cytokine biosynthesis in an animal comprising administering an effective amount of a compound of claim 10 to the animal.

57. A method of treating a viral disease in an animal comprising administering an effective amount of a compound of claim 10 to the animal.

58. A method of treating a neoplastic disease in an animal comprising administering an effective amount of a compound of claim 10 to the animal.

59. A method of inducing cytokine biosynthesis in an animal comprising administering an effective amount of a compound of claim 21 to the animal.

60. A method of treating a viral disease in an animal comprising administering an effective amount of a compound of claim 21 to the animal.

61. A method of treating a neoplastic disease in an animal comprising administering an effective amount of a compound of claim 21 to the animal.

62. A method of inducing cytokine biosynthesis in an animal comprising administering an effective amount of a compound of claim 30 to the animal.

63. A method of treating a viral disease in an animal comprising administering an effective amount of a compound of claim 30 to the animal.

64. A method of treating a neoplastic disease in an animal comprising administering an effective amount of a compound of claim 30 to the animal.