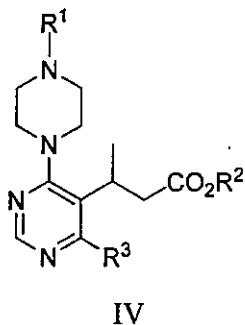


CLAIMS

1. A process, comprising, contacting a compound of formula IV, or a salt thereof:



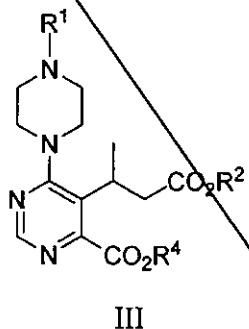
wherein

R^1 is hydrogen or an amino protecting group;

R^2 is hydrogen or optionally substituted C_1 - C_{12} alkyl; and

R^3 is halogen,

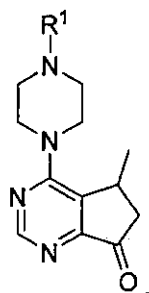
with carbon monoxide, carbonylation catalyst and alcohol of formula R^4OH to form a compound of formula III, or a salt thereof:



wherein

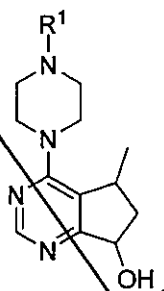
R^4 is C_1 - C_6 alkyl.

2. The process of claim 1, wherein the carbonylation catalyst comprises $Pd(OAc)_2$.
3. The process of claims 1-2, wherein R^1 is Boc group.
4. The process of claims 1-3, wherein R^2 is methyl or benzyl.
5. The process of claims 1-4, wherein R^3 is Cl.
6. The process of claims 1-5, wherein R^4 is isopropyl.
7. The process of claims 1-6, further comprising (i) reacting a compound of formula III, or salt thereof, with base to form an intermediate; and (ii) decarboxylating the intermediate to produce a compound of formula II or salt thereof:



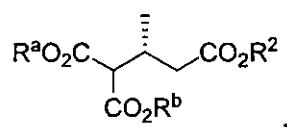
II

8. The process of claims 1-7, wherein the base comprises a potassium *t*-butoxide.
9. The process of claims 1-8, wherein the decarboxylating further comprises a catalyst comprising Pd and hydrogen gas.
10. The process of claims 1-9, comprising reducing a compound of formula II, or a salt thereof, to form a compound of formula I, or salt thereof:



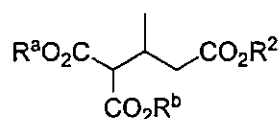
I

11. The process of claims 1-10, wherein the reducing comprises a catalyst comprising ruthenium and hydrogen gas.
12. The process of claims 1-11, further comprising a process of preparing a compound of formula X or a salt thereof



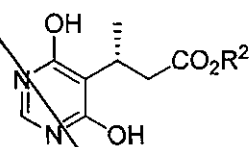
X

wherein R^a and R^b are independently C_{1-12} alkyl, the process comprising contacting a compound of formula XI with a lipase to form the compound of formula X



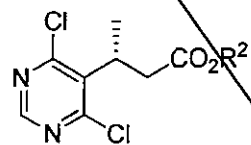
XI.

13. The process of claims 1-12, further comprising reacting a compound of formula X or a salt thereof with formamidine to form a compound of formula XII or a salt thereof,



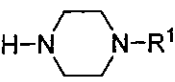
XII

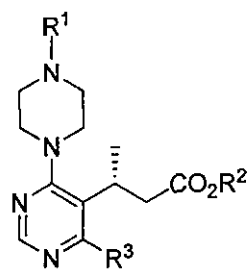
14. The process of claims 1-13, further comprising chlorinating a compound of formula XII or a salt thereof to form a compound of formula XIII or a salt thereof



XIII

15. The process of claims 1-14, further comprising contacting a compound of formula XIII

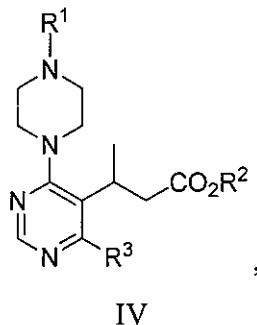
or a salt thereof, with a compound , to form a compound of formula IVa or salt thereof:



IVa

CLAIMS

1. A process, comprising, contacting a compound of formula IV, or a salt thereof:



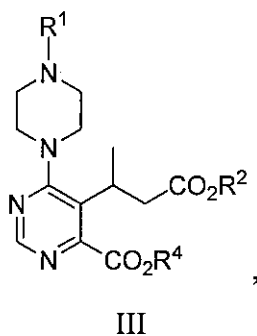
wherein

R^1 is hydrogen or an amino protecting group;

R^2 is hydrogen or optionally substituted C_1 - C_{12} alkyl; and

R^3 is halogen,

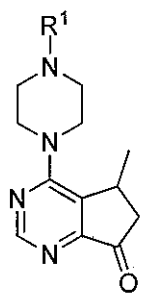
with carbon monoxide, carbonylation catalyst and alcohol of formula R^4OH to form a compound of formula III, or a salt thereof:



wherein

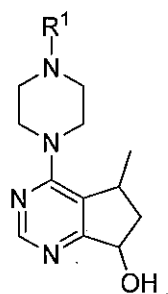
R^4 is C_1 - C_6 alkyl.

2. The process of claim 1, wherein the carbonylation catalyst comprises $Pd(OAc)_2$.
3. The process of claims 1-2, wherein R^1 is Boc group.
4. The process of claims 1-3, wherein R^2 is methyl or benzyl.
5. The process of claims 1-4, wherein R^3 is Cl.
6. The process of claims 1-5, wherein R^4 is isopropyl.
7. The process of claims 1-6, further comprising (i) reacting a compound of formula III, or salt thereof, with base to form an intermediate; and (ii) decarboxylating the intermediate to produce a compound of formula II or salt thereof:



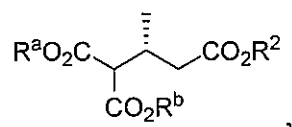
II

8. The process of claims 1-7, wherein the base comprises a potassium *t*-butoxide.
9. The process of claims 1-8, wherein the decarboxylating further comprises a catalyst comprising Pd and hydrogen gas.
10. The process of claims 1-9, further comprising reducing a compound of formula II, or a salt thereof, to form a compound of formula I, or a salt thereof:



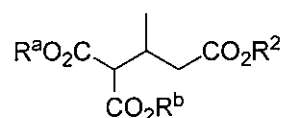
I

11. The process of claims 1-10, wherein the reducing comprises a catalyst comprising ruthenium and hydrogen gas.
12. The process of claims 1-11, further comprising a process of preparing a compound of formula X or a salt thereof



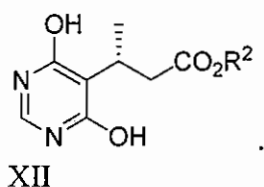
X

wherein R^a and R^b are independently C₁₋₁₂ alkyl, the process comprising contacting a compound of formula XI with a lipase to form the compound of formula X

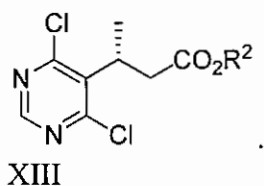


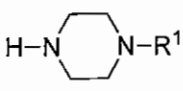
XI.

13. The process of claims 1-12, further comprising reacting a compound of formula X or a salt thereof with formamidine to form a compound of formula XII or a salt thereof,



14. The process of claims 1-13, further comprising chlorinating a compound of formula XII or a salt thereof to form a compound of formula XIII or a salt thereof



15. The process of claims 1-14, further comprising contacting a compound of formula XIII or a salt thereof, with a compound , to form a compound of formula IVa or salt thereof:

