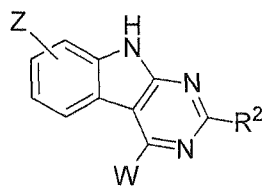
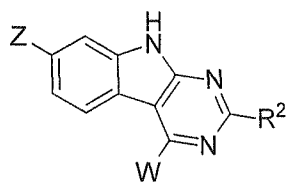


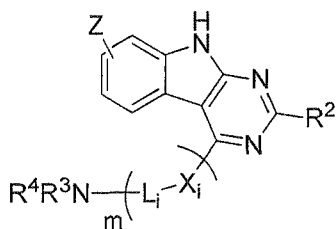
[0020] According to an aspect, the disclosure provides for compounds of the following general formulas I, II, III, IV, V and VI:



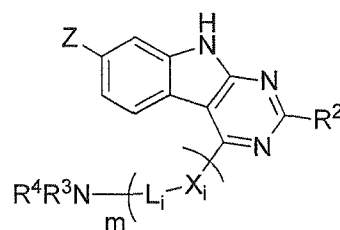
I



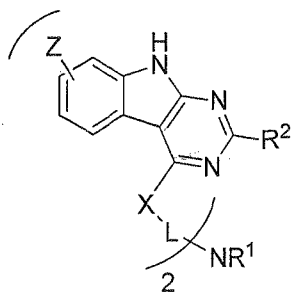
II



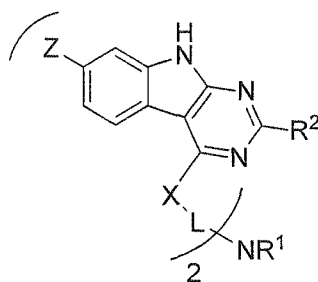
III



IV

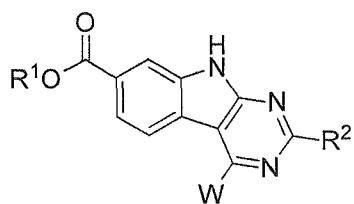


V

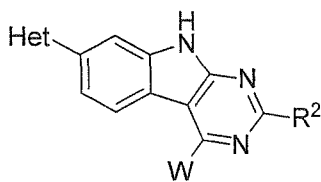


VI

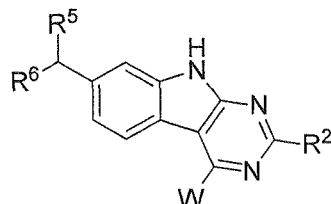
[0020a] According to an aspect, the disclosure provides for a compound of formula IIA, IIB or IIC



IIA



IIB



IIC

or

or a salt thereof;

wherein Het is a 3 to 7-membered heterocycle, optionally substituted with one or more R^1 , and R^5 and R^6 are the same or different and are each independently L, or they join together with C to form a 5 to 7-membered ring which optionally includes one or more heteroatom selected from N, O and S, optionally the ring is substituted with one or more R^1 ; wherein R^1 is -H, - C_{1-6} alkyl, - or - C_{3-7} cycloalkyl;

W is

- 1) $-OR^1$, wherein R^1 is - C_{1-6} alkyl, or - C_{3-7} cycloalkyl, optionally substituted with 1 or 2 R^A substituents,
- 2) $-N(R^1)R^1$
- 3) $-L-N(R^1)R^1$,
- 4) $-O-L-$ heterocyclyl optionally substituted with one or more R^A or R^1 substituents attached on either or both the L and heterocyclyl groups,
- 5) $-(N(R^1)-L)_n - N(R^1)R^1$, wherein n is 1;

wherein when two R^1 substituents are present on the same nitrogen atom, then unless otherwise defined, each R^1 substituent is independently selected from the list of R^1 values described thereafter, and wherein, when (R^1) and R^1 are attached to a nitrogen atom, optionally they join together with the nitrogen atom to form a 3 to 7-membered ring which optionally includes one or more other heteroatom selected from N, O and S, optionally the ring is substituted with one or more R^1 or R^A ;

L is

- 1) - C_{1-6} alkyl,
- 2) - C_{3-7} cycloalkyl, or
- 3) heterocyclyl,

and wherein the alkyl, the cycloalkyl, the heterocyclyl, are each independently optionally substituted with one or two R^A substituent;

R^1 is

- 1) -H,
- 2) - C_{1-6} alkyl,
- 3) - C_{2-6} alkynyl,
- 4) - C_{1-5} perfluorinated,
- 5) -heterocyclyl,
- 6) -aryl,
- 7) or
- 8) 5-[(3aS,4S,6aR)-2-oxohexahydro-1H-thieno[3,4-d]imidazol-4-yl]pentanoyl,

and wherein the alkyl, the alkynyl, the perfluorinated alkyl, the heterocyclyl, and the aryl groups are each independently optionally substituted with 1, 2 or 3 R^A or R^1 substituents;

R^2 is

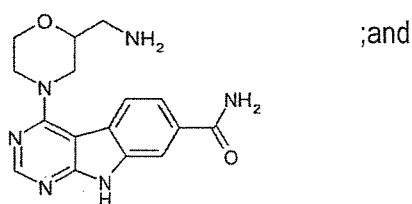
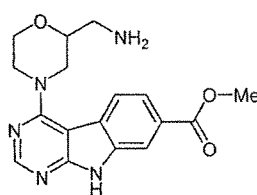
- 1) -H,
- 2) -C₁₋₆ alkyl,
- 3) -C(O) R^1 , wherein R^1 is -aryl, or -heteroaryl,
- 4) -C₁₋₃alkyl-heteroaryl optionally substituted with one or more R^A or R^1 substituents attached on either one or both the -C₁₋₃alkyl and the heteroaryl groups, wherein R^1 is -H, -C₁₋₆ alkyl, -C₂₋₆ alkenyl, -C₂₋₆ alkynyl, or -C₁₋₅ alkyl wherein the hydrogen atoms are all substituted with fluorine atoms,
- 5) -C₁₋₃alkyl-aryl optionally substituted with one or more R^A or R^1 substituents attached on either one or both the -C₁₋₃alkyl and the aryl groups, wherein R^1 is -H, -C₁₋₆ alkyl, -C₂₋₆ alkenyl, -C₂₋₆ alkynyl, or -C₁₋₅ alkyl wherein the hydrogen atoms are all substituted with fluorine atoms,

R^A is

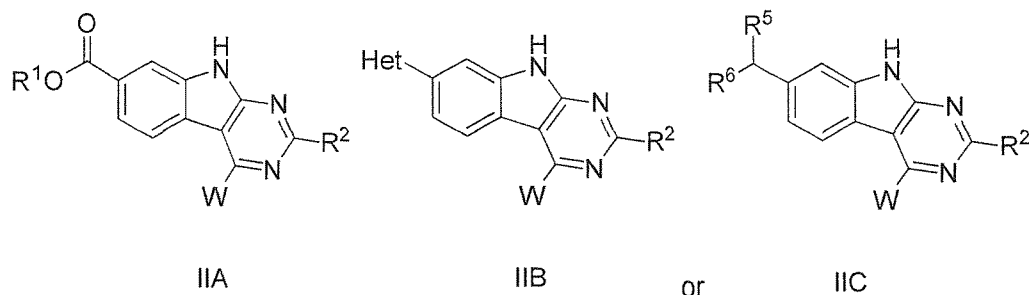
- 1) -halogen,
- 2) -CF₃,
- 3) -OR¹,
-
- 4) -NR¹R¹,
- 5) -L-N R¹R¹,
- 6) -C(O) R^1 ,
- 7) -C(-N=N-)(CF₃),

provided that the compound of Formula (I) is other than

;



[0020b] According to an aspect, the disclosure provides for a method of increasing stem and progenitor cells *in vitro* or *ex vivo*, the method comprising; contacting a starting population in the presence of at least one compound, optionally together with at least one cell expanding factor which is a biologic or another small molecule, wherein said compound is of formula IIA, IIB or IIC



or a salt thereof;

wherein Het is a 3 to 7-membered heterocycle, optionally substituted with one or more R¹, and R⁵ and R⁶ are the same or different and are each independently L, or they join together with C to form a 5 to 7-membered ring which optionally includes one or more heteroatom selected from N, O and S, optionally the ring is substituted with one or more R¹; wherein R¹ is -H, -C₁-₆ alkyl, - or -C₃-₇ cycloalkyl; W is

- 1) -OR¹, wherein R¹ is -C₁-₆ alkyl, or -C₃-₇ cycloalkyl, optionally substituted with 1 or 2 Rᴬ substituents,
- 2) -N(R¹)R¹,
- 3) -L-N(R¹)R¹,
- 4) -O-L- heterocyclyl optionally substituted with one or more Rᴬ or R¹ substituents attached on either or both the L and heterocyclyl groups,
- 5) -(N(R¹)-L)ₙ - N(R¹)R¹, wherein n is 1;

and wherein when two R¹ substituents are present on the same nitrogen atom, then unless otherwise defined, each R¹ substituent is independently selected from the list of R¹ values described thereafter, and wherein, when (R¹) and R¹ are attached to a nitrogen atom, optionally they join together with the nitrogen atom to form a 3 to 7-membered ring which optionally includes one or more other heteroatom selected from N, O and S, optionally the ring is substituted with one or more R¹ or Rᴬ;

L is

- 1) -C₁-₆ alkyl,
- 2) -C₂-₆ alkynyl, or

3) heterocyclyl,

and wherein the alkyl, the cycloalkyl, and the heterocyclyl groups are each independently optionally substituted with one or two R^A substituent;

R^1 is

- 1) -H,
- 2) -C₁₋₆ alkyl,
- 3) -C₂₋₆ alkynyl,
- 4) -C₁₋₅ perfluorinated,
- 5) -heterocyclyl,
- 6) -aryl,
- 7) 5-[(3aS,4S,6aR)-2-oxohexahydro-1H-thieno[3,4-d]imidazol-4-yl]pentanoyl,

and wherein the alkyl, the alkynyl, the perfluorinated alkyl, the heterocyclyl, and the aryl, groups are each independently optionally substituted with 1, 2 or 3 R^A or R^1 substituents;

R^2 is

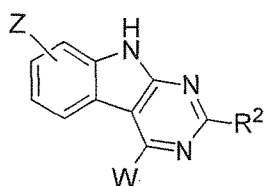
- 1) -H,
- 2) -C₁₋₆ alkyl,
- 3) -C(O) R^1 , wherein R^1 is -aryl, or -heteroaryl,
- 4) -C₁₋₃alkyl -heteroaryl optionally substituted with one or more R^A or R^1 substituents attached on either one or both the -C₁₋₃alkyl and the heteroaryl groups, wherein R^1 is -H, -C₁₋₆ alkyl, -C₂₋₆ alkenyl, -C₂₋₆ alkynyl, or - C₁₋₅ alkyl wherein the hydrogen atoms are all substituted with fluorine atoms,
- 5) - C₁₋₃alkyl -aryl optionally substituted with one or more R^A or R^1 substituents attached on either one or both the -C₁₋₃alkyl and the aryl groups, wherein R^1 is -H, -C₁₋₆ alkyl, -C₂₋₆ alkenyl, -C₂₋₆ alkynyl, or - C₁₋₅ alkyl wherein the hydrogen atoms are all substituted with fluorine atoms

R^A is

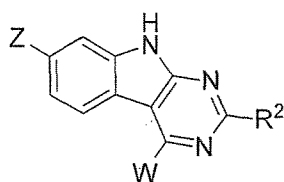
- 1) -halogen,
- 2) -CF₃,

- 3) $-OR^1$,
- 4) $-NR^1R^1$,
- 5) $-L-NR^1R^1$,
- 6) $-C(O)R^1$, or
- 7) $-C(-N=N-)(CF_3)$.

[0020c] According to an aspect, the disclosure provides for a compound of general formula I or II



I



II

or a salt thereof,

wherein:

Z is

- 1) $-P(O)(OR^1)(OR^1)$,
- 2) $-C(O)OR^1$,
- 3) $-C(O)NHR^1$,
- 4) $-C(O)N(R^1)R^1$,
- 5) $-C(O)R^1$,
- 6) $-CN$,
- 7) $-SR^1$,
- 8) $-S(O)_2NH_2$,
- 9) $-S(O)_2NHR^1$,
- 10) $-S(O)_2N(R^1)R^1$,
- 11) $-S(O)R^1$,
- 12) $-S(O)_2R^1$,
- 13) $-L$,
- 14) $-benzyl$ optionally substituted with 1, 2 or 3 R^A or R^1 substituents,
- 15) $-L-heteroaryl$ optionally substituted with one or more R^A or R^1 substituents attached on either or both the L and the heteroaryl groups,
- 16) $-L-heterocyclyl$ optionally substituted with one or more R^A or R^1 substituents attached on either one or both the L and the heterocyclyl groups,

17) -L-aryl optionally substituted with one or more R^A or R^1 substituents attached on either or both the L and the heteroaryl groups,

18) -heteroaryl optionally substituted with one or more R^A or R^1 substituents, or

19) -aryl optionally substituted with one or more R^A or R^1 substituents,

and wherein each substituent is optionally attached to the L group if it is not already present,

and wherein, when (R^1) and R^1 are attached to a nitrogen atom, optionally they join together with the nitrogen atom to form a 3 to 7-membered ring which optionally includes one or more other heteroatom selected from N, O and S, optionally the is substituted with one or more R^1 or R^A ;

W is

1) -OR¹, wherein R¹ is -C₁₋₆ alkyl, -C₂₋₆ alkenyl, -C₂₋₆ alkynyl, -C₃₋₇ cycloalkyl, -C₃₋₇ cycloalkenyl, -C₁₋₅ perfluorinated, -heterocyclyl, -aryl, -heteroaryl, -benzyl, or 5-[(3aS,4S,6aR)-2-oxohexahydro-1H-thieno[3,4-d]imidazol-4-yl]pentanoyl, wherein the alkyl, the alkenyl, the alkynyl, the cycloalkenyl, the perfluorinated alkyl, the heterocyclyl, the aryl, the heteroaryl and the benzyl groups are each independently optionally substituted with 1, 2 or 3 R^A or R^1 substituents;

2) -L-OH,

3) -L-OR¹,

4) -SR¹,

5) -CN,

6) -P(O)(OR¹)(OR¹),

7) -NHR¹,

8) -N(R¹)R¹,

9) -L-NH₂,

10) -L-NHR¹,

11) -L-N(R¹)R¹,

12) -L-SR¹,

13) -L-S(O)R¹,

14) -L-S(O)₂R¹,

15) -L-P(O)(OR¹)(OR¹),

16) -C(O)OR¹,

17) -C(O)NH₂,

18) -C(O)NHR¹,

- 19) $-C(O)N(R^1)R^1$,
- 20) $-NHC(O)R^1$,
- 21) $-NR^1C(O)R^1$,
- 22) $-NHC(O)OR^1$,
- 23) $-NR^1C(O)OR^1$,
- 24) $-OC(O)NH_2$,
- 25) $-OC(O)NHR^1$,
- 26) $-OC(O)N(R^1)R^1$,
- 27) $-OC(O)R^1$,
- 28) $-C(O)R^1$,
- 29) $-NHC(O)NH_2$,
- 30) $-NHC(O)NHR^1$,
- 31) $-NHC(O)N(R^1)R^1$,
- 32) $-NR^1C(O)NH_2$,
- 33) $-NR^1C(O)NHR^1$,
- 34) $-NR^1C(O)N(R^1)R^1$,
- 35) $-NHS(O)_2R^1$,
- 36) $-NR^1S(O)_2R^1$,
- 37) $-S(O)_2NH_2$,
- 38) $-S(O)_2NHR^1$,
- 39) $-S(O)_2N(R^1)R^1$,
- 40) $-S(O)R^1$,
- 41) $-S(O)_2R^1$,
- 42) $-OS(O)_2R^1$,
- 43) $-S(O)_2OR^1$,
- 44) -benzyl optionally substituted with 1, 2 or 3 R^A or R^1 substituents,
- 45) -L-heteroaryl optionally substituted with one or more R^A or R^1 substituents attached on either or both the L and the heteroaryl groups,
- 46) -L-heterocyclyl optionally substituted with one or more R^A or R^1 substituents attached on either or both the L and the heterocyclyl groups,
- 47) -L-aryl optionally substituted with one or more R^A or R^1 substituents attached on either or both the L and aryl groups,

- 48) $-L-NR^1(R^1)$,
- 49) $-(L-)_2 NR^1$,
- 50) $-L-(N(R^1)-L)_n - N(R^1)R^1$,
- 51) $-L-(N(R^1)-L)_n$ – heteroaryl optionally substituted with one or more R^A or R^1 substituents attached on either or both the L and heteroaryl groups,
- 52) $-L-(N(R^1)-L)_n$ – heterocyclyl optionally substituted with one or more R^A or R^1 substituents attached on either or both the L and heterocyclyl groups,
- 53) $-L-(N(R^1)-L)_n$ – aryl optionally substituted with one or more R^A or R^1 substituents attached on either or both the L and aryl groups,
- 54) $-O-L-N(R^1)R^1$,
- 55) $-O-L-$ heteroaryl optionally substituted with one or more R^A or R^1 substituents attached on either or both the L and heteroaryl groups,
- 56) $-O-L-$ heterocyclyl optionally substituted with one or more R^A or R^1 substituents attached on either or both the L and heterocyclyl groups,
- 57) $-O-L-$ aryl optionally substituted with one or more R^A or R^1 substituents attached on either or both the L and aryl groups,
- 58) $-(O-L)_2-NR^1$,
- 59) $-O-L-(N(R^1)-L)_n - N(R^1)R^1$,
- 60) $-O-L-(N(R^1)-L)_n$ – heteroaryl optionally substituted with one or more R^A or R^1 substituents attached on either or both the L and heteroaryl groups,
- 61) $-O-L-(N(R^1)-L)_n$ – heterocyclyl optionally substituted with one or more R^A or R^1 substituents attached on either or both the L and heterocyclyl groups,
- 62) $-O-L-(N(R^1)-L)_n$ – aryl optionally substituted with one or more R^A or R^1 substituents,
- 63) $-S-L-$ heteroaryl optionally substituted with one or more R^A or R^1 substituents,
- 64) $-S-L-$ heterocyclyl optionally substituted with one or more R^A or R^1 substituents,
- 65) $-S-L-$ aryl optionally substituted with one or more R^A or R^1 substituents attached on either or both the L and aryl groups,
- 66) $-(S-L)_2 NR^1$,
- 67) $-S-L-(N(R^1)-L)_n - N(R^1)R^1$,
- 68) $-S-L-(N(R^1)-L)_n$ – heteroaryl optionally substituted with one or more R^A substituents,
- 69) $-S-L-(N(R^1)-L)_n$ – heterocyclyl optionally substituted with one or more R^A substituents,
- 70) $-S-L-(N(R^1)-L)_n$ – aryl optionally substituted with one or more R^A substituents,

- 71) $-NR^1(R^1)$,
- 72) $-(N(R^1)-L)_n - N(R^1)R^1$,
- 73) $-(N(R^1)L)_2 - NR^1$,
- 74) $-(N(R^1)-L)_n - N(R^1)R^A$,
- 75) $-(N(R^1)-L)_n -$ heteroaryl optionally substituted with one or more R^A or R^1 substituents,
- 76) $-(N(R^1)-L)_n -$ heterocyclyl optionally substituted with one or more R^A or R^1 substituents,
- 77) $-(N(R^1)-L)_n -$ aryl optionally substituted with one or more R^A or R^1 substituents,
- 78) -heteroaryl optionally substituted with one or more R^A substituents, or
- 79) -aryl optionally substituted with one or more R^A substituents,

and wherein each substituent is optionally attached to the L group if it is not already present,

and wherein when two R^1 substituents are present on the same nitrogen atom, then each R^1 substituent is independently selected from the list of R^1 values described thereafter,

and wherein n is an integer equal to either 0, 1, 2, 3, 4, or 5,

and wherein, when (R^1) and R^1 are attached to a nitrogen atom, optionally they join together with the nitrogen atom to form a 3 to 7-membered ring which optionally includes one or more other heteroatom selected from N, O and S, optionally the ring is substituted with one or more R^1 or R^A ;

L is

- 1) $-C_{1-6}$ alkyl,
- 2) $-C_{2-6}$ alkenyl,
- 3) $-C_{2-6}$ alkynyl,
- 4) $-C_{3-7}$ cycloalkyl,
- 5) $-C_{3-7}$ cycloalkenyl,
- 6) heterocyclyl,
- 7) $-C_{1-6}$ alkyl- C_{3-7} cycloalkyl,
- 8) $-C_{1-6}$ alkyl-heterocyclyl,
- 9) aryl, or
- 10) heteroaryl,

and wherein the alkyl, the alkenyl, the alkynyl, the cycloalkyl, the cycloalkenyl, the heterocyclyl, the aryl and the heteroaryl groups are each independently optionally substituted with one or two R^A substituent;

R^1 is

- 1) $-H$,
- 2) $-C_{1-6}$ alkyl,

- 3) -C₂₋₆ alkenyl,
- 4) -C₂₋₆ alkynyl,
- 5) -C₃₋₇ cycloalkyl,
- 6) -C₃₋₇ cycloalkenyl,
- 7) -C₁₋₅ perfluorinated,
- 8) -heterocyclyl,
- 9) -aryl,
- 10) -heteroaryl,
- 11) -benzyl, or
- 12) 5-[(3aS,4S,6aR)-2-oxohexahydro-1H-thieno[3,4-d]imidazol-4-yl]pentanoyl,

and wherein the alkyl, the alkenyl, the alkynyl, the cycloalkenyl, the perfluorinated alkyl, the heterocyclyl, the aryl, the heteroaryl and the benzyl groups are each independently optionally substituted with 1, 2 or 3 R^A or R¹ substituents;

R² is

- 1) -H,
- 2) -C₁₋₆ alkyl,
- 3) -SR¹,
- 4) -C(O)R¹,
- 5) -S(O)R¹,
- 6) -S(O)₂R¹,
- 7) -benzyl optionally substituted with 1, 2 or 3 R^A or R¹ substituents,
- 8) -L-heteroaryl optionally substituted with one or more R^A or R¹ substituents attached on either one or both the L and the heteroaryl groups,
- 9) -L-heterocyclyl optionally substituted with one or more R^A or R¹ substituents attached on either one or both the L and the heterocyclyl groups,
- 10) -L-aryl optionally substituted with one or more R^A or R¹ substituents attached on either one or both the L and the aryl groups,
- 11) -heteroaryl optionally substituted with one or more R^A or R¹ substituents, or
- 12) -aryl optionally substituted with one or more R^A or R¹ substituents,

and wherein each substituent is optionally attached to the L group if it is not already present;

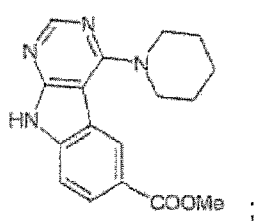
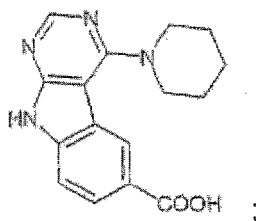
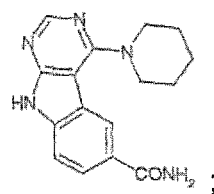
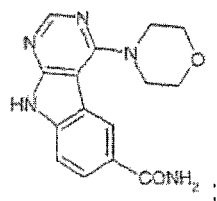
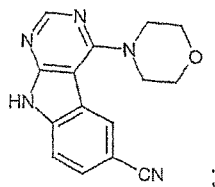
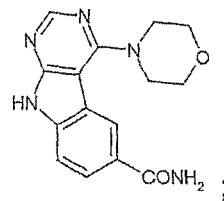
R^A is

- 1) -halogen,

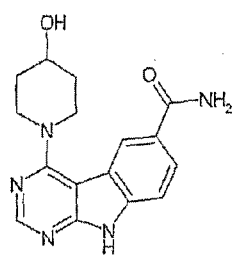
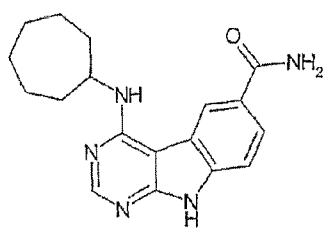
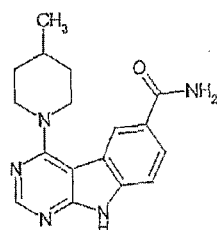
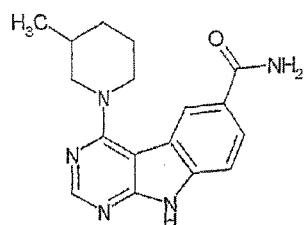
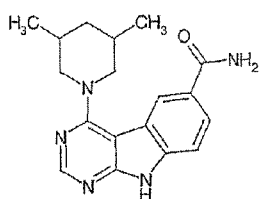
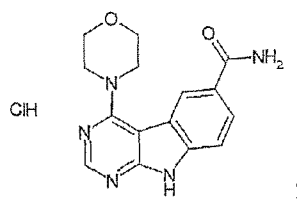
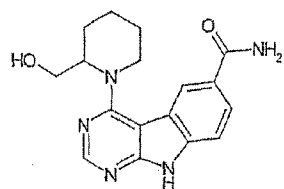
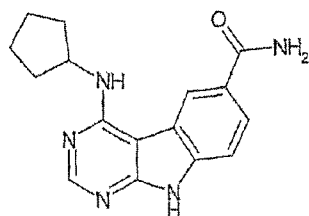
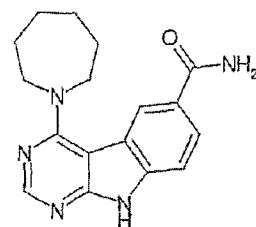
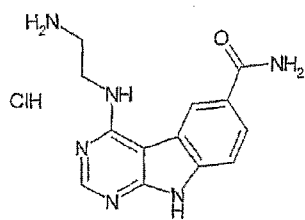
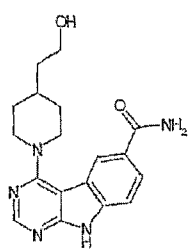
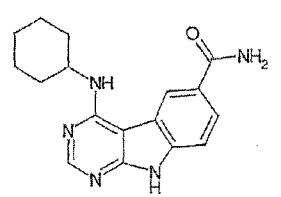
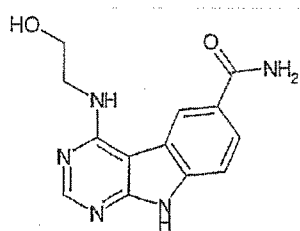
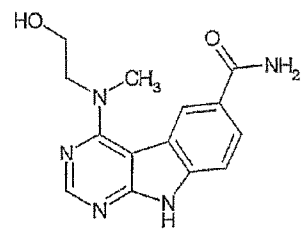
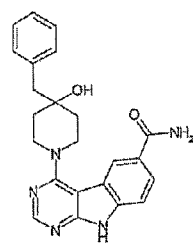
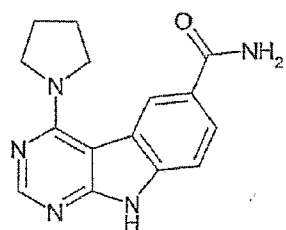
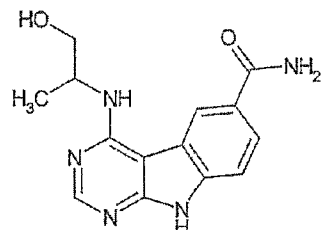
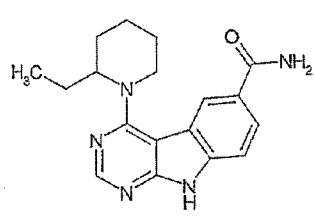
- 2) $-\text{CF}_3$,
- 3) $-\text{OH}$,
- 4) $-\text{OR}^1$,
- 5) $-\text{L-OH}$,
- 6) $-\text{L-OR}^1$,
- 7) $-\text{OCF}_3$,
- 8) $-\text{SH}$,
- 9) $-\text{SR}^1$,
- 10) $-\text{CN}$,
- 11) $-\text{NO}_2$,
- 12) $-\text{NH}_2$,
- 13) $-\text{NHR}^1$,
- 14) $-\text{NR}^1\text{R}^1$,
- 15) $-\text{L-NH}_2$,
- 16) $-\text{L-NHR}^1$,
- 17) $-\text{L-SR}^1$,
- 18) $-\text{L-S(O)R}^1$,
- 19) $-\text{L-S(O)}_2\text{R}^1$,
- 20) $-\text{C(O)OH}$,
- 21) $-\text{C(O)OR}^1$,
- 22) $-\text{C(O)NH}_2$,
- 23) $-\text{C(O)NHR}^1$,
- 24) $-\text{C(O)N(R}^1)\text{R}^1$,
- 25) $-\text{NHC(O)R}^1$,
- 26) $-\text{NR}^1\text{C(O)R}^1$,
- 27) $-\text{NHC(O)OR}^1$,
- 28) $-\text{NR}^1\text{C(O)OR}^1$,
- 29) $-\text{OC(O)NH}_2$,
- 30) $-\text{OC(O)NHR}^1$,
- 31) $-\text{OC(O)N(R}^1)\text{R}^1$,
- 32) $-\text{OC(O)R}^1$,
- 33) $-\text{C(O)R}^1$,

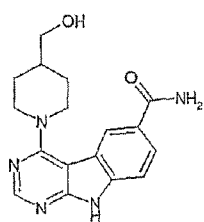
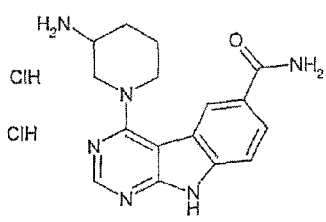
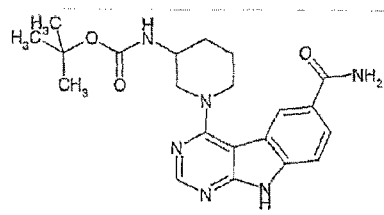
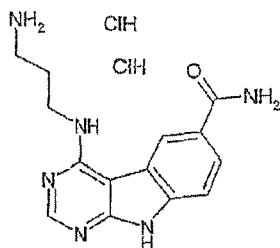
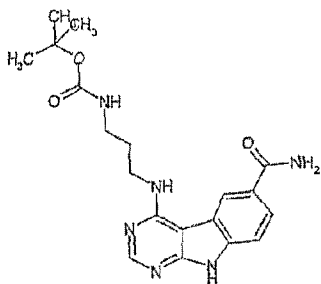
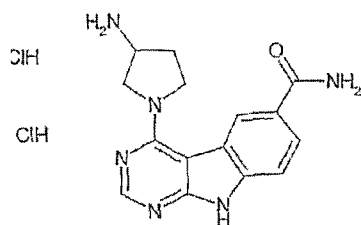
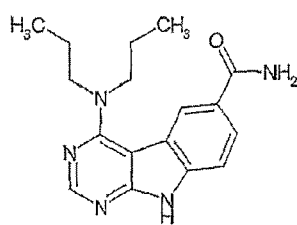
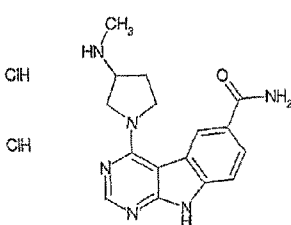
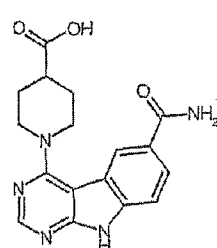
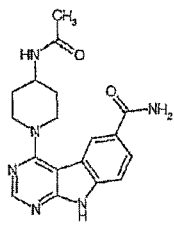
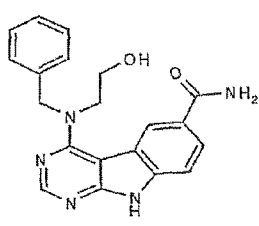
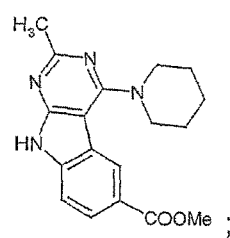
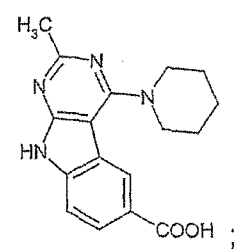
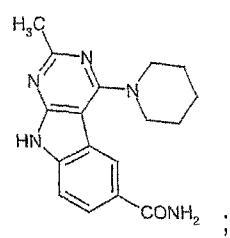
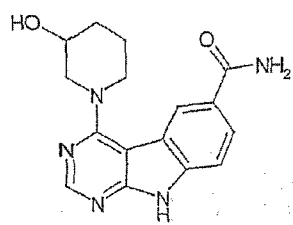
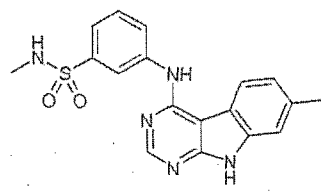
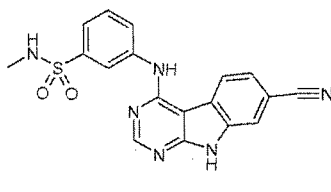
- 34) -NHC(O)NH_2 ,
- 35) -NHC(O)NHR^1 ,
- 36) $\text{-NHC(O)N(R}^1\text{)R}^1$,
- 37) $\text{-NR}^1\text{C(O)NH}_2$,
- 38) $\text{-NR}^1\text{C(O)NHR}^1$,
- 39) $\text{-NR}^1\text{C(O)N(R}^1\text{)R}^1$,
- 40) $\text{-NHS(O)}_2\text{R}^1$,
- 41) $\text{-NR}^1\text{S(O)}_2\text{R}^1$,
- 42) $\text{-S(O)}_2\text{NH}_2$,
- 43) $\text{-S(O)}_2\text{NHR}^1$,
- 44) $\text{-S(O)}_2\text{N(R}^1\text{)R}^1$,
- 45) -S(O)R^1 ,
- 46) $\text{-S(O)}_2\text{R}^1$,
- 47) $\text{-OS(O)}_2\text{R}^1$,
- 48) $\text{-S(O)}_2\text{OR}^1$,
- 49) -benzyl ,
- 50) -N_3 , or
- 51) $\text{-C(-N=N-)(CF}_3\text{)}$,

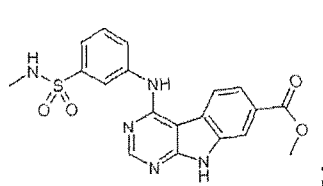
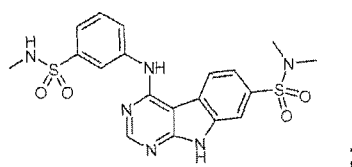
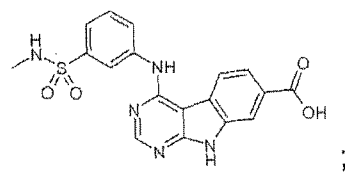
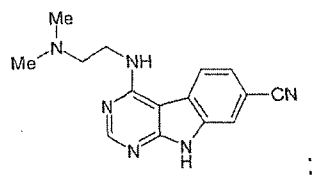
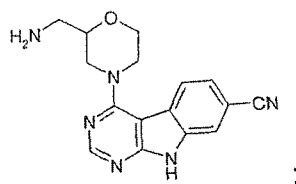
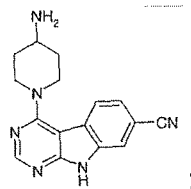
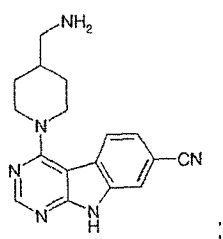
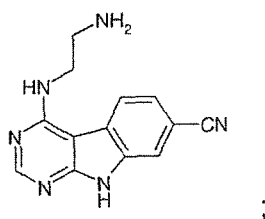
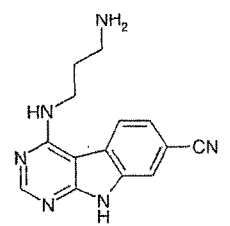
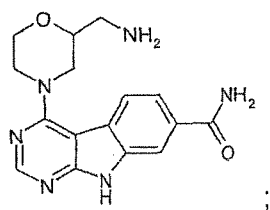
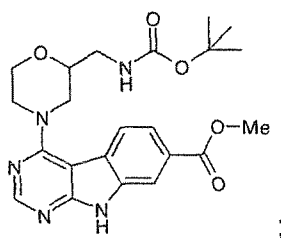
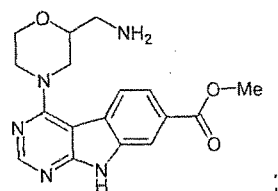
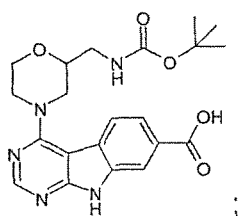
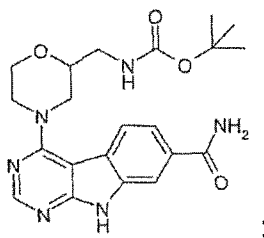
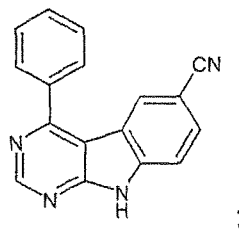
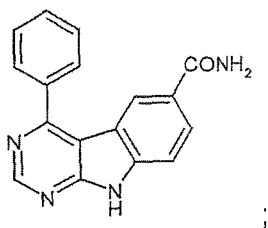
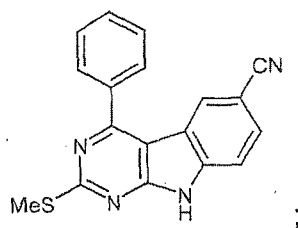
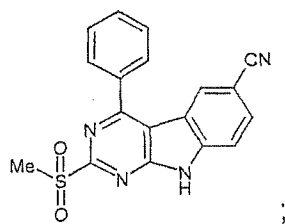
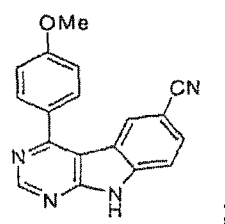
and wherein the benzyl group is optionally substituted with 1, 2 or 3 R^A or R^1 substituents provided that the compound of Formula (I) is other than

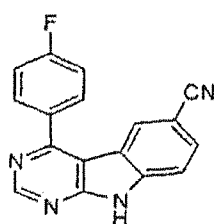


6 m

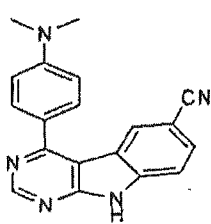




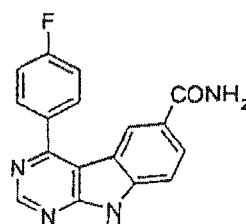




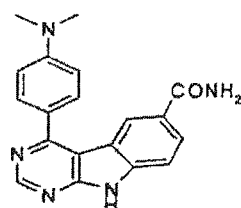
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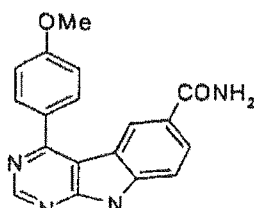
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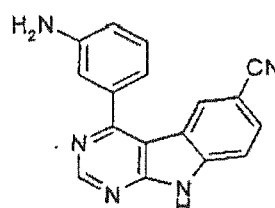
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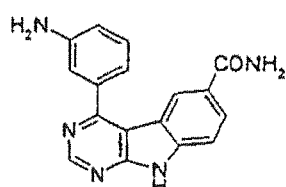
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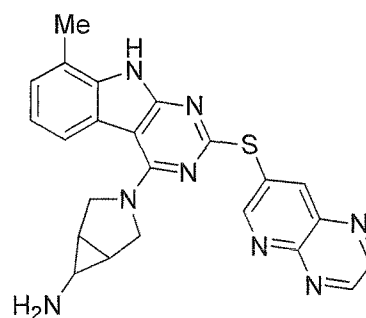
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;



;



and

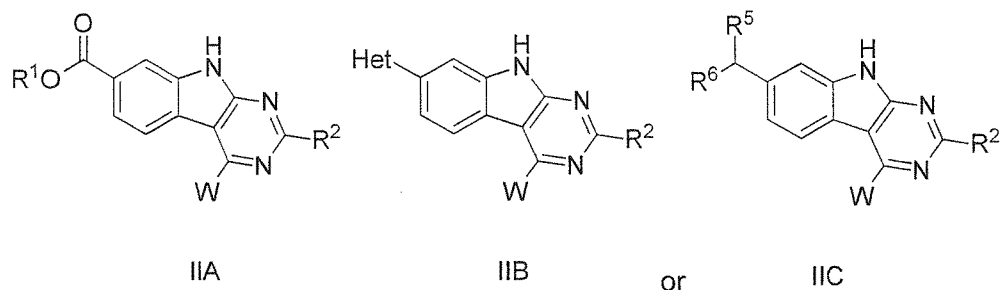
[0021] The substituents in the above general formulas I, II, III, IV, V and VI, namely, Z, W, L, Li, X, Xi, R¹, R², R³, R⁴ and m are as defined herein below.

[0022] According to an aspect, the disclosure provides for pharmaceutical compositions comprising a compound of general formula I, II, III, IV, V or VI.

[0023] According to an aspect, the disclosure provides for use of a compound of general formula I, II, III, IV, V or VI to expand hematopoietic stem cells. In embodiments of the disclosure, the hematopoietic stem cells are human cells.

CLAIMS

1. A compound of formula IIA, IIB or IIC



or a salt thereof;

wherein Het is a 3 to 7-membered heterocycle, optionally substituted with one or more R^1 , and R^5 and R^6 are the same or different and are each independently L, or they join together with C to form a 5 to 7-membered ring which optionally includes one or more heteroatom selected from N, O and S, optionally the ring is substituted with one or more R^1 ; wherein R^1 is -H, -C₁₋₆ alkyl, - or -C₃₋₇ cycloalkyl;

W is

- 1) -OR¹, wherein R¹ is -C₁₋₆ alkyl, or -C₃₋₇ cycloalkyl, optionally substituted with 1 or 2 R^A substituents,
- 2) -N(R¹)R¹,
- 3) -L-N(R¹)R¹,
- 4) -O-L- heterocyclyl optionally substituted with one or more R^A or R¹ substituents attached on either or both the L and heterocyclyl groups,
- 5) -(N(R¹)-L)_n - N(R¹)R¹, wherein n is 1;

wherein when two R¹ substituents are present on the same nitrogen atom, then unless otherwise defined, each R¹ substituent is independently selected from the list of R¹ values described thereafter,

and wherein, when (R¹) and R¹ are attached to a nitrogen atom, optionally they join together with the nitrogen atom to form a 3 to 7-membered ring which optionally includes one or more other heteroatom selected from N, O and S, optionally the ring is substituted with one or more R¹ or R^A;

L is

- 1) -C₁₋₆ alkyl,
- 2) -C₃₋₇ cycloalkyl, or
- 3) heterocyclyl,

and wherein the alkyl, the cycloalkyl, the heterocyclyl, are each independently optionally substituted with one or two R^A substituent;

R^1 is

- 1) -H,
- 2) -C₁₋₆ alkyl,
- 3) -C₂₋₆ alkynyl,
- 4) -C₁₋₅ perfluorinated,
- 5) -heterocyclyl,
- 6) -aryl,
- 7) or
- 8) 5-[(3aS,4S,6aR)-2-oxohexahydro-1H-thieno[3,4-d]imidazol-4-yl]pentanoyl,

and wherein the alkyl, the alkynyl, the perfluorinated alkyl, the heterocyclyl, and the aryl groups are each independently optionally substituted with 1, 2 or 3 R^A or R^1 substituents;

R^2 is

- 1) -H,
- 2) -C₁₋₆ alkyl,
- 3) -C(O) R^1 , wherein R^1 is -aryl, or -heteroaryl,
- 4) -C₁₋₃alkyl-heteroaryl optionally substituted with one or more R^A or R^1 substituents attached on either one or both the -C₁₋₃alkyl and the heteroaryl groups, wherein R^1 is -H, -C₁₋₆ alkyl, -C₂₋₆ alkenyl, -C₂₋₆ alkynyl, or - C₁₋₅ alkyl wherein the hydrogen atoms are all substituted with fluorine atoms,
- 5) -C₁₋₃alkyl-aryl optionally substituted with one or more R^A or R^1 substituents attached on either one or both the -C₁₋₃alkyl and the aryl groups, wherein R^1 is -H, -C₁₋₆ alkyl, - C₂₋₆ alkenyl, -C₂₋₆ alkynyl, or - C₁₋₅ alkyl wherein the hydrogen atoms are all substituted with fluorine atoms,

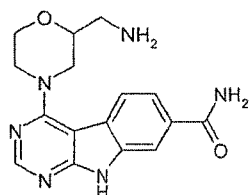
R^A is

- 1) -halogen,
- 2) -CF₃,
- 3) -OR¹,
-
- 4) -NR¹R¹,
- 5) -L-N R¹R¹,
- 6) -C(O)R¹,

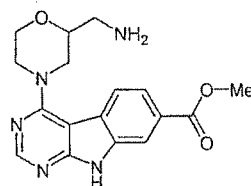
7) $-C(-N=N-)(CF_3)$,

provided that the compound of Formula (I) is other than

;

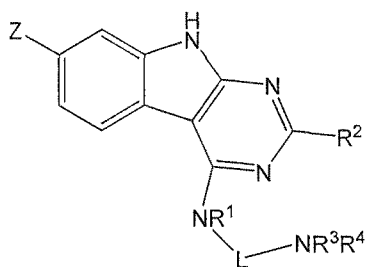


;and



2 A compound according to claim 1, wherein the compound is of formula IIB and the ring of Het is a 5-membered ring, and the heteroatom is N.

3. A compound according to claim 1, wherein the compound is of formula



or a salt thereof,

wherein R^3 and R^4 are the same or different and are each independently H, or R^1 , or R^3 and R^4 join together with N to which they are attached to form a 3 to 7-membered ring which optionally includes one or more other heteroatom selected from N, O and S, optionally the ring is substituted with one or more R^1 or R^A .

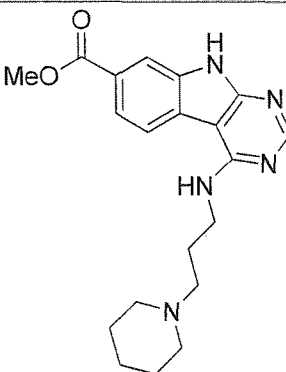
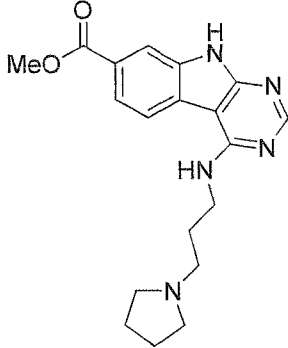
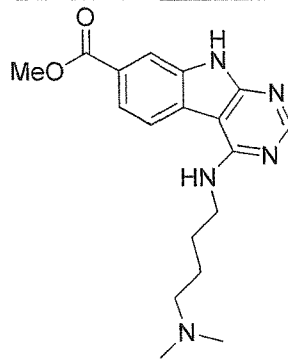
4. A compound according to claim 1, wherein:

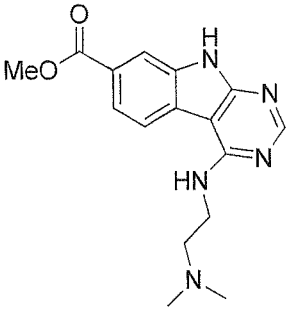
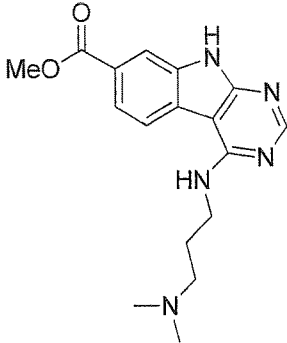
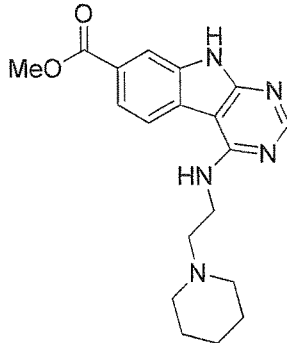
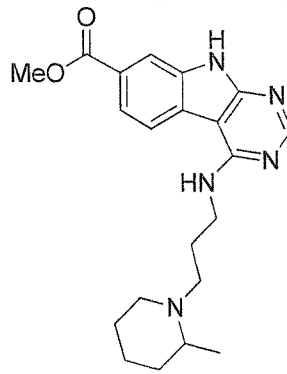
Z is CO_2Me or 2-methyl-2H-tetrazol-5-yl;

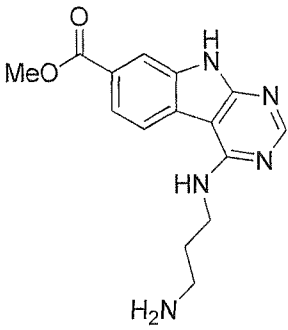
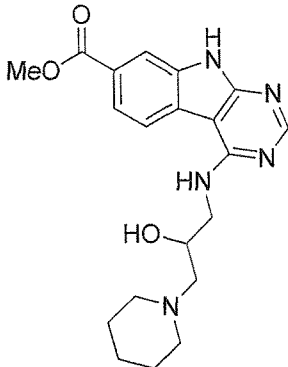
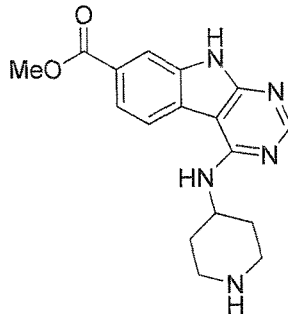
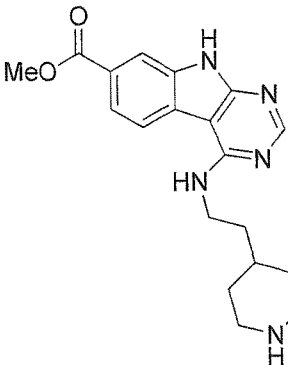
R^2 is benzyl or H; and

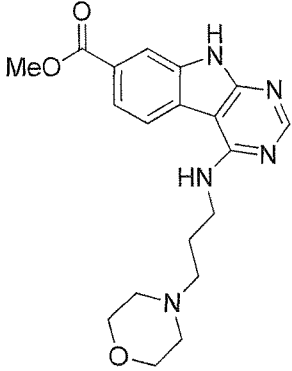
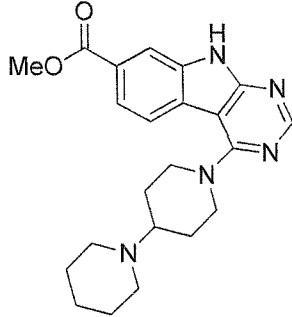
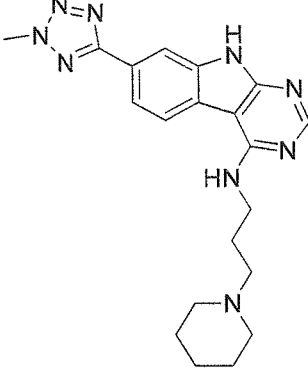
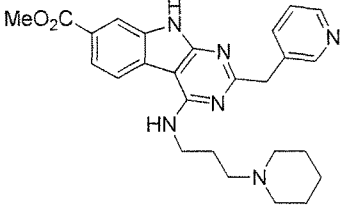
W is $NH-L-N(R^1)R^1$ wherein L is C_{2-4} alkyl or C_{3-7} cycloalkyl and R^1 and $(R1)$ is C_{1-4} alkyl or H; or (R^1) and R^1 join together with the nitrogen atom to which they are attached to form a 3 to 7-membered ring, which optionally includes one or more other heteroatom selected from N, O and S, optionally the ring is substituted with one or more R^1 or R^A .

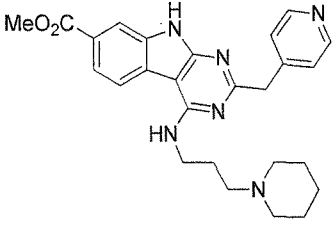
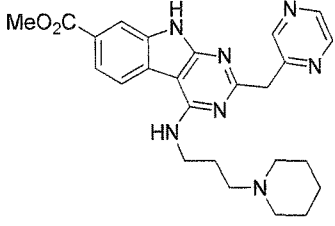
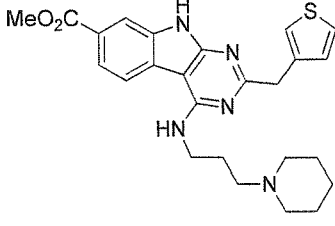
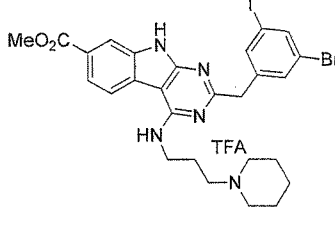
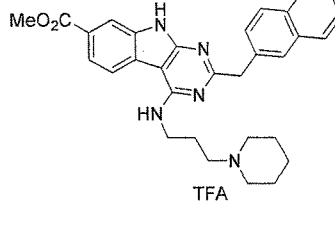
5. A compound according to claim 1 which is:

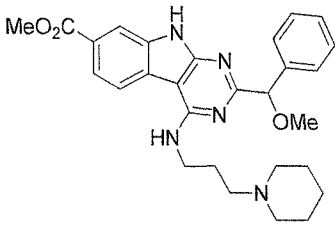
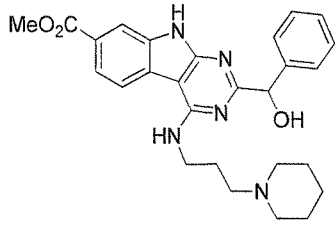
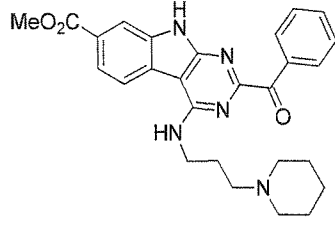
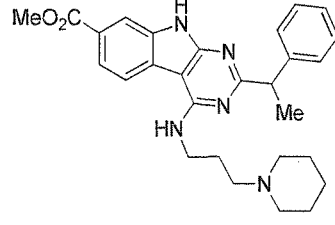
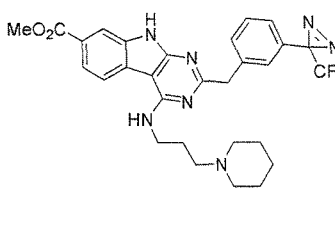
Compound number	Structure
1	
2	
3	

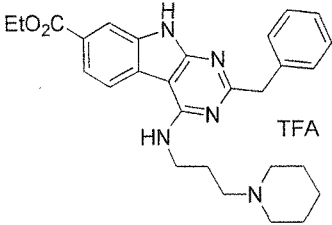
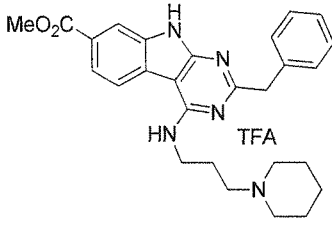
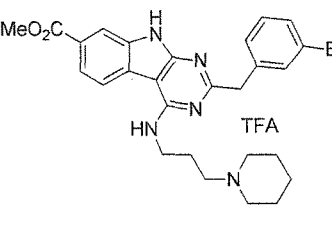
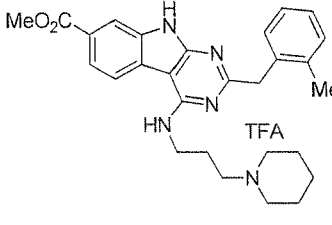
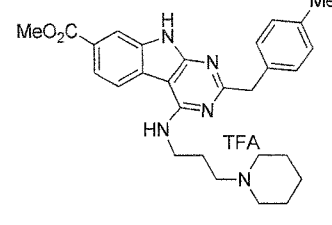
Compound number	Structure
4	 <chem>CN(C)CCNC1=NC=NC2=C1C(=C(C=C2)C(=O)OC)N</chem>
5	 <chem>CN(C)CCCN[C@@H]1C=NC2=C1C(=C(C=C2)C(=O)OC)N</chem>
6	 <chem>C1CCN(CC1)CCNC2=NC=NC3=C2C(=C(C=C3)C(=O)OC)N</chem>
7	 <chem>CC1CCN(CCC1)CNC2=NC=NC3=C2C(=C(C=C3)C(=O)OC)N</chem>

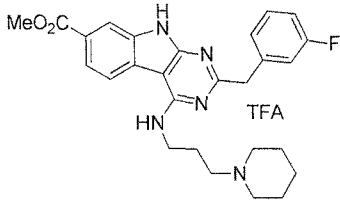
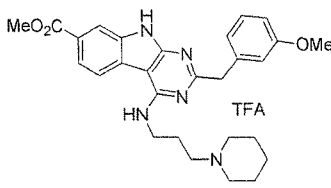
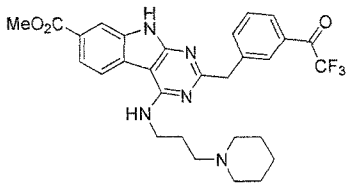
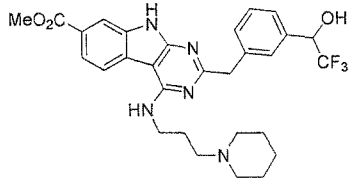
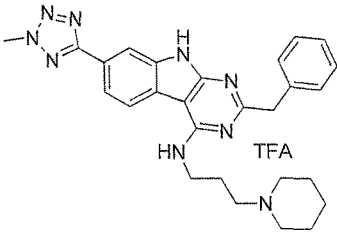
Compound number	Structure
8	 <chem>COC(=O)c1ccc2c(c1)c3c(c2)c4c(c3)nc5c4cnc5NCCCN</chem>
9	 <chem>COC(=O)c1ccc2c(c1)c3c(c2)c4c(c3)nc5c4cnc5NCC(O)CN1CCCCC1</chem>
10	 <chem>COC(=O)c1ccc2c(c1)c3c(c2)c4c(c3)nc5c4cnc5Nc6ccncc6</chem>
11	 <chem>COC(=O)c1ccc2c(c1)c3c(c2)c4c(c3)nc5c4cnc5NCCC6CCNCC6</chem>

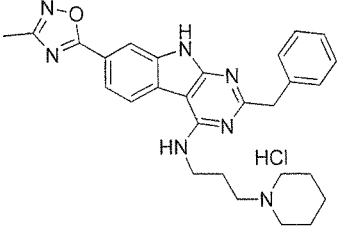
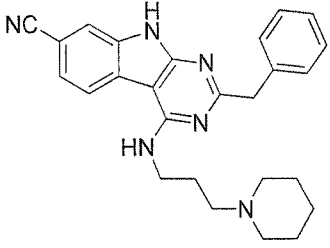
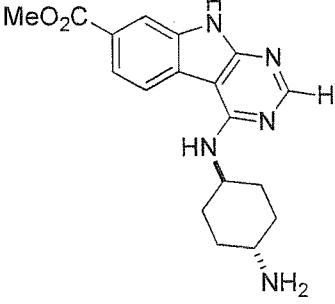
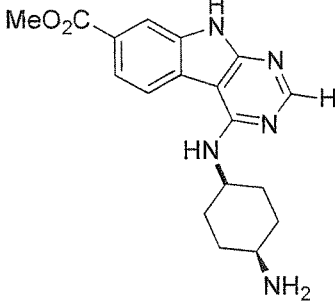
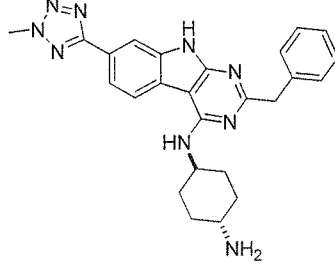
Compound number	Structure
12	 <chem>COC(=O)c1ccc2c(c1)c3ncnc3n2NCCN4CCOCC4</chem>
13	 <chem>COC(=O)c1ccc2c(c1)c3ncnc3n2N(CCCN4CCCCC4)CCN5CCCCC5</chem>
14	 <chem>CN1C=NN=N1c1ccc2c(c1)c3ncnc3n2NCCCCN4CCCCC4</chem>
15	 <chem>COC(=O)c1ccc2c(c1)c3nc(nc3n2)Cc4ccncc4NCCCCN5CCCCC5</chem>

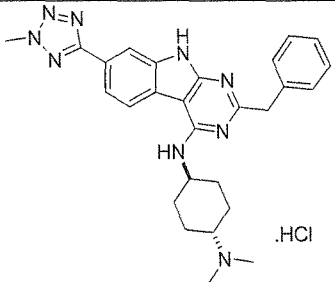
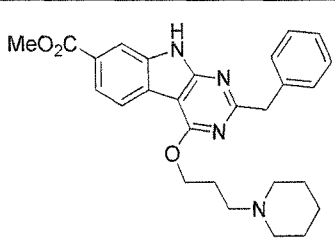
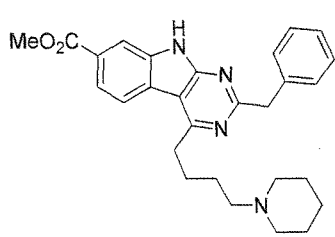
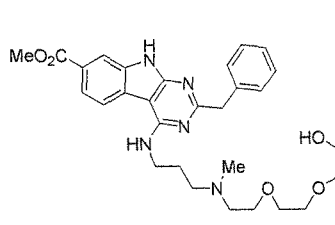
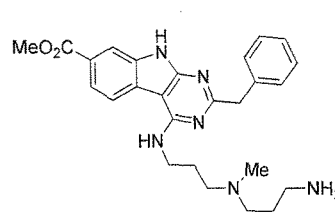
Compound number	Structure
16	 <chem>COC(=O)c1ccc2c(c1)c(c[nH]2)C(=N)NCCCCN3CCCCC3C4=CN=CC=CC4</chem>
17	 <chem>COC(=O)c1ccc2c(c1)c(c[nH]2)C(=N)NCCCCN3CCCCC3C4=NC=NC(=C)N=C4</chem>
18	 <chem>COC(=O)c1ccc2c(c1)c(c[nH]2)C(=N)NCCCCN3CCCCC3C4=CC=CSC4</chem>
19	 <chem>COC(=O)c1ccc2c(c1)c(c[nH]2)C(=N)NCCCCN3CCCCC3C4=CC=C(C=C4Br)I</chem> TFA
20	 <chem>COC(=O)c1ccc2c(c1)c(c[nH]2)C(=N)NCCCCN3CCCCC3C4=CC=CC=C5C(=C4)C=CC=CC5</chem> TFA

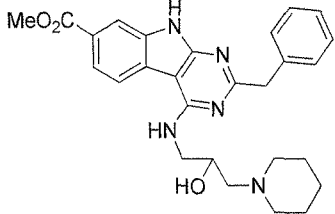
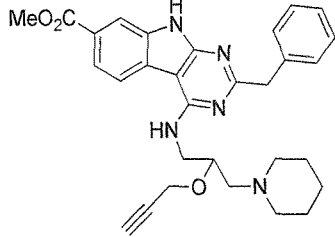
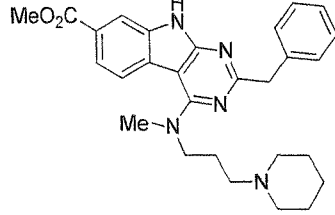
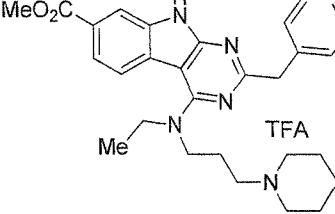
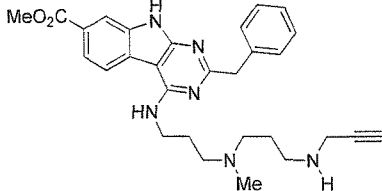
Compound number	Structure
21	 <chem>COC(=O)c1ccc2c(c1)c3c(ncn3C4=CC=C(C=C4)C5=CC(OC)=CC=C5)NCCCN6CCCCN6</chem>
22	 <chem>COC(=O)c1ccc2c(c1)c3c(ncn3C4=CC=C(C=C4)C5=CC(O)=CC=C5)NCCCN6CCCCN6</chem>
23	 <chem>COC(=O)c1ccc2c(c1)c3c(ncn3C4=CC=C(C=C4)C5=CC(=O)C6=CC=CC=C65)NCCCN6CCCCN6</chem>
24	 <chem>COC(=O)c1ccc2c(c1)c3c(ncn3C4=CC=C(C=C4)C5=C(C)C6=CC=CC=C65)NCCCN6CCCCN6</chem>
25	 <chem>COC(=O)c1ccc2c(c1)c3c(ncn3C4=CC=C(C=C4)C5=CC6=CC=CC=C6N5C7=CC=CC=C7C8=NN(C(F)(F)F)N8)NCCCN6CCCCN6</chem>

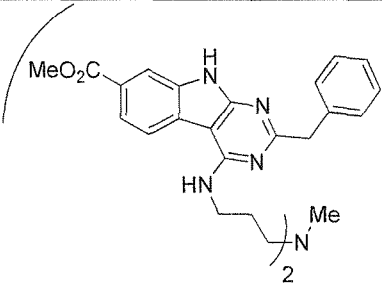
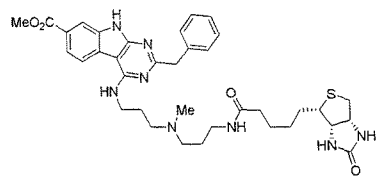
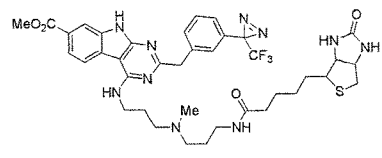
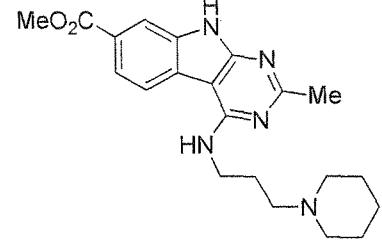
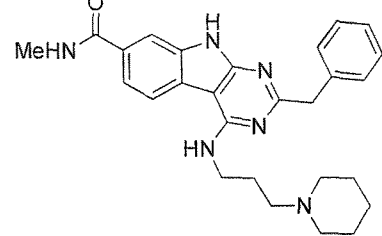
Compound number	Structure
26	
27	
28	
29	
30	

Compound number	Structure
31	 <chem>COC(=O)c1ccc2c(c1)c3c(c2)n(c3)C(CNCCCN4CCCCC4)C(C4=CC=CC=C4F)C5=CC=CC=C5.[TFA]</chem>
32	 <chem>COC(=O)c1ccc2c(c1)c3c(c2)n(c3)C(CNCCCN4CCCCC4)C(C4=CC=C(C=C4)OC)C5=CC=CC=C5.[TFA]</chem>
33	 <chem>COC(=O)c1ccc2c(c1)c3c(c2)n(c3)C(CNCCCN4CCCCC4)C(C4=CC=C(C=C4)C(=O)C(F)(F)F)C5=CC=CC=C5</chem>
34	 <chem>COC(=O)c1ccc2c(c1)c3c(c2)n(c3)C(CNCCCN4CCCCC4)C(C4=CC=C(C=C4)C(O)C(F)(F)F)C5=CC=CC=C5.[TFA]</chem>
35	 <chem>Cc1nn[n+](=N)c1-c2ccc3c(c2)c4c(c3)n(c4)C(CNCCCN5CCCCC5)C(C6=CC=CC=C6)C7=CC=CC=C7.[TFA]</chem>

Compound number	Structure
36	 <chem>Cc1nn(C2=CC=C(C=C2)c3c[nH]c4c3nc(Cc5ccccc5)c4)NCCCN6CCCCN6.[Cl-]</chem>
37	 <chem>N#Cc1ccc2c(c1)c3c[nH]c4c3nc(Cc5ccccc5)c4NCCCN6CCCCN6</chem>
38	 <chem>COC(=O)c1ccc2c(c1)c3c[nH]c4c3nc(C=O)c4N[C@@H]5CCCCC5N</chem>
39	 <chem>COC(=O)c1ccc2c(c1)c3c[nH]c4c3nc(C=O)c4N[C@H]5CCCCC5N</chem>
40	 <chem>Cc1nn(C2=CC=C(C=C2)c3c[nH]c4c3nc(Cc5ccccc5)c4)NCC[C@@H]6CCCCC6N</chem>

Compound number	Structure
41	 <chem>CN1CCCCC1Nc2nc(Cc3ccccc3)c4c2[nH]c5ccc(cc5N=[N+]#N)N1.[Cl-]</chem>
42	 <chem>COC(=O)c1ccc2c(c1)[nH]c3nc(Cc4ccccc4)nc3c2Oc5ccccc5N</chem>
43	 <chem>COC(=O)c1ccc2c(c1)[nH]c3nc(Cc4ccccc4)nc3c2CCCCN5CCCCC5</chem>
44	 <chem>COC(=O)c1ccc2c(c1)[nH]c3nc(Cc4ccccc4)nc3c2NCCCN(C)CCOCCO</chem>
45	 <chem>COC(=O)c1ccc2c(c1)[nH]c3nc(Cc4ccccc4)nc3c2NCCCN(C)CCN</chem>

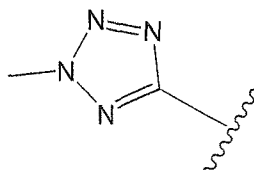
Compound number	Structure
46	
47	
48	
49	
50	

Compound number	Structure
51	
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53	
54	
55	

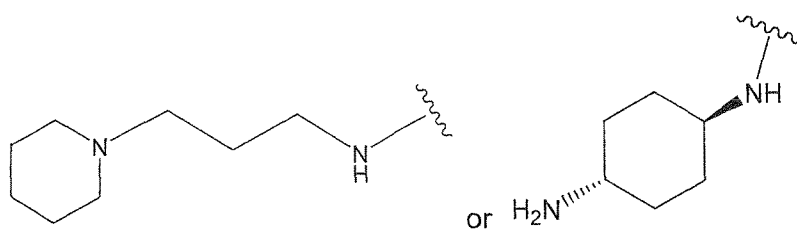
or a salt thereof.

6. A compound according to claim 1, wherein R^2 is benzyl or H.

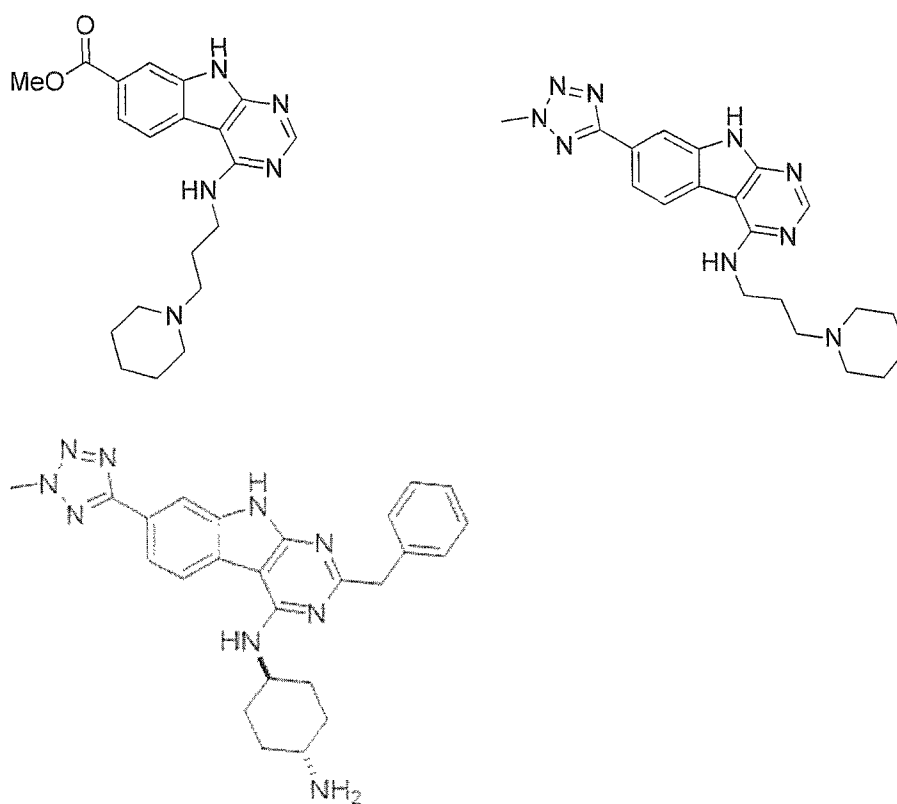
7. A compound according to claim 1, wherein R^5 and R^6 join together with C to form:



8. A compound according to claim 1, wherein W is

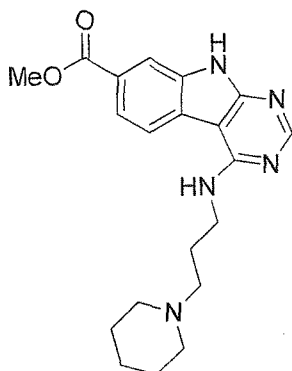


9. The compound according to claim 1, wherein the compound is

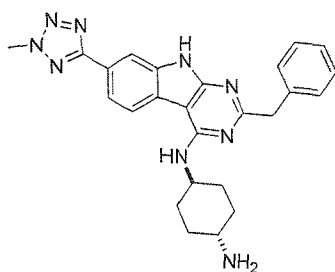


or a pharmaceutically acceptable salt thereof.

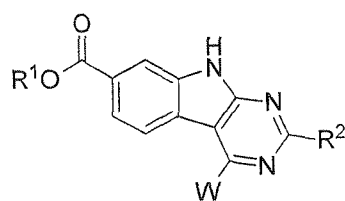
10. The compound of claim 1 which is a hydrochloride salt of



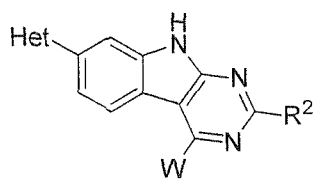
11. The compound of claim 1 which is a hydrobromide salt of



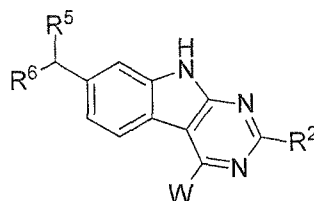
12. A method of increasing stem and progenitor cells *in vitro* or *ex vivo*, the method comprising; contacting a starting population in the presence of at least one compound, optionally together with at least one cell expanding factor which is a biologic or another small molecule, wherein said compound is of formula IIA, IIB or IIC



IIA



IIB



IIC

or

or a salt thereof;

wherein Het is a 3 to 7-membered heterocycle, optionally substituted with one or more R^1 , and R^5 and R^6 are the same or different and are each independently L, or they join together with C to form a 5 to 7-membered ring which optionally includes one or more heteroatom selected from N, O and S, optionally the ring is substituted with one or more R^1 ; wherein R^1 is -H, -C₁₋₆ alkyl, - or -C₃₋₇ cycloalkyl; W is

- 1) -OR¹, wherein R¹ is -C₁₋₆ alkyl, or -C₃₋₇ cycloalkyl, optionally substituted with 1 or 2 R^A substituents,
- 2) -N(R¹)R¹,
- 3) -L-N(R¹)R¹,
- 4) -O-L- heterocyclyl optionally substituted with one or more R^A or R¹ substituents attached on either or both the L and heterocyclyl groups,
- 5) -(N(R¹)-L)_n - N(R¹)R¹, wherein n is 1;

and wherein when two R¹ substituents are present on the same nitrogen atom, then unless otherwise defined, each R¹ substituent is independently selected from the list of R¹ values described thereafter,

and wherein, when (R¹) and R¹ are attached to a nitrogen atom, optionally they join together with the nitrogen atom to form a 3 to 7-membered ring which optionally includes one or more other heteroatom selected from N, O and S, optionally the ring is substituted with one or more R¹ or R^A;

L is

- 1) -C₁₋₆ alkyl,
- 2) -C₂₋₆ alkynyl, or
- 3) heterocyclyl,

and wherein the alkyl, the cycloalkyl, and the heterocyclyl groups are each independently optionally substituted with one or two R^A substituent;

R¹ is

- 1) -H,
- 2) -C₁₋₆ alkyl,
- 3) -C₂₋₆ alkynyl,
- 4) -C₁₋₅ perfluorinated,
- 5) -heterocyclyl,

6) -aryl,

7) 5-[(3aS,4S,6aR)-2-oxohexahydro-1H-thieno[3,4-d]imidazol-4-yl]pentanoyl,

and wherein the alkyl, the alkynyl, the perfluorinated alkyl, the heterocyclyl, and the aryl, groups are each independently optionally substituted with 1, 2 or 3 R^A or R¹ substituents;

R² is

1) -H,

2) -C₁₋₆ alkyl,

3) -C(O)R¹, wherein R¹ is -aryl, or -heteroaryl,

4) -C₁₋₃alkyl -heteroaryl optionally substituted with one or more R^A or R¹ substituents attached on either one or both the -C₁₋₃alkyl and the heteroaryl groups, wherein R¹ is -H, -C₁₋₆ alkyl, -C₂₋₆ alkenyl, -C₂₋₆ alkynyl, or -C₁₋₅ alkyl wherein the hydrogen atoms are all substituted with fluorine atoms,

5) -C₁₋₃alkyl -aryl optionally substituted with one or more R^A or R¹ substituents attached on either one or both the -C₁₋₃alkyl and the aryl groups, wherein R¹ is -H, -C₁₋₆ alkyl, -C₂₋₆ alkenyl, -C₂₋₆ alkynyl, or -C₁₋₅ alkyl wherein the hydrogen atoms are all substituted with fluorine atoms

R^A is

1) -halogen,

2) -CF₃,

3) -OR¹,

4) -NR¹R¹,

5) -L-N R¹R¹,

6) -C(O)R¹, or

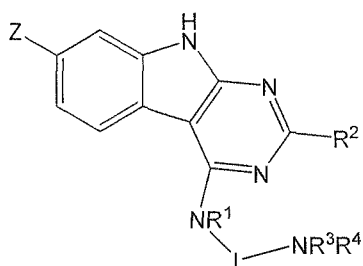
7) -C(-N=N-)(CF₃).

13. The method of claim 12, which is ex vivo.

14. The method of claim 13, comprising contacting the starting population with at least one cell expanding factor which is a biologic.

15. The method of claim 12, wherein the compound is of formula IIB and the ring of Het is a 5-membered ring, and the heteroatom is N.

16. The method of claim 12, wherein the compound is of formula



or a salt thereof,

wherein R^3 and R^4 are the same or different and are each independently H or R^1 , or R^3 and R^4 join together with N to which they are attached to form a 3 to 7-membered ring which optionally includes one or more other heteroatom selected from N, O and S, optionally the ring is substituted with one or more R^1 or R^A .

17. The method of claim 12, wherein:

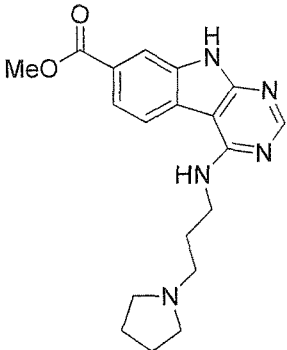
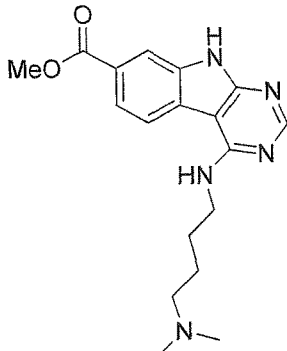
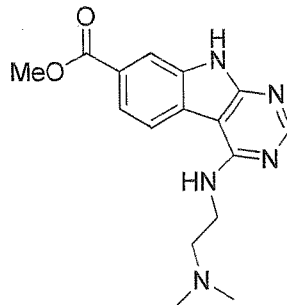
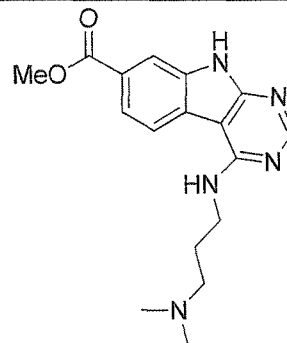
Z is CO_2Me or 2-methyl-2H-tetrazol-5-yl;

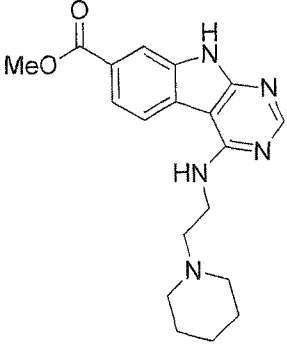
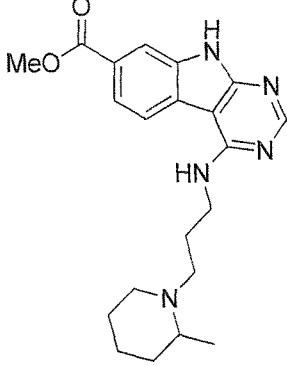
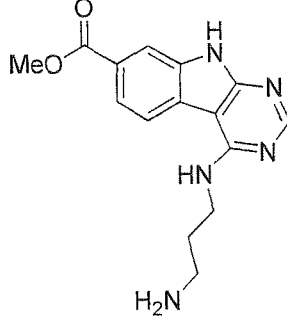
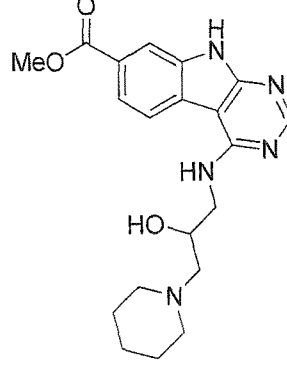
R^2 is benzyl, or H; and

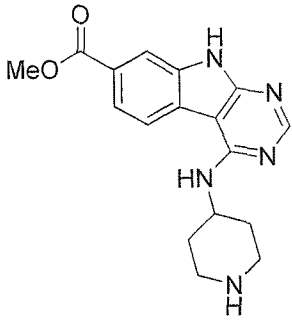
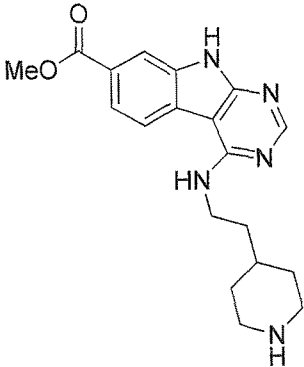
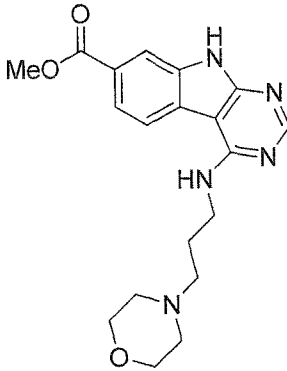
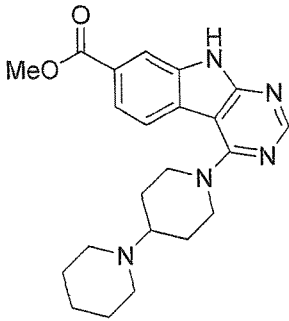
W is $\text{NH-L-N}(R^1)R^1$ wherein L is C_{2-4} alkyl or C_{3-7} cycloalkyl and R^1 and $(R1)$ is C_{1-4} alkyl or H; or (R^1) and R^1 join together with the nitrogen atom to which they are attached to form a 3 to 7-membered ring, which optionally includes one or more other heteroatom selected from N, O and S, optionally the ring is substituted with one or more R^1 or R^A .

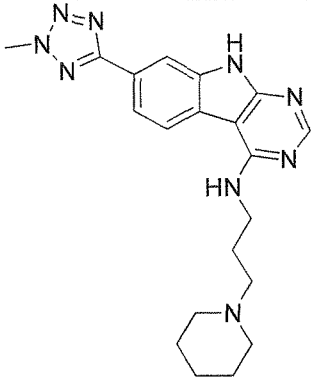
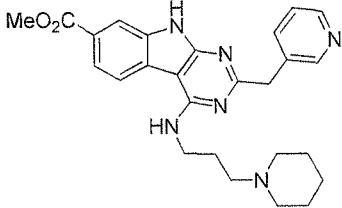
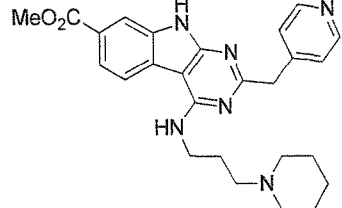
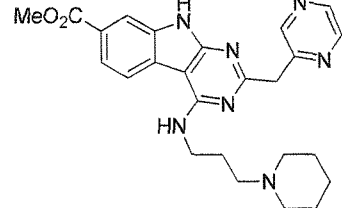
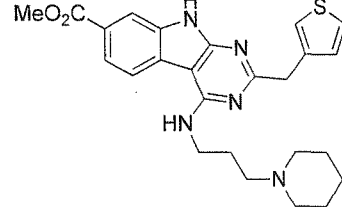
18. The method of claim 12, wherein the compound is:

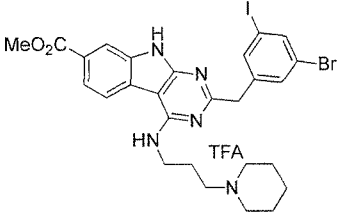
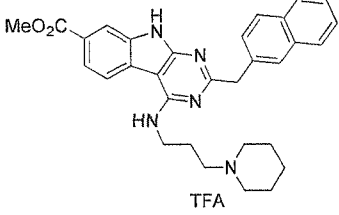
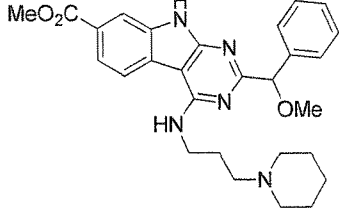
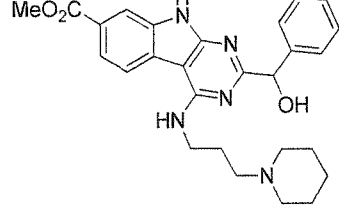
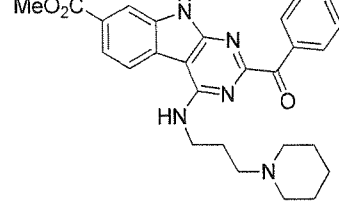
Compound number	Structure
1	

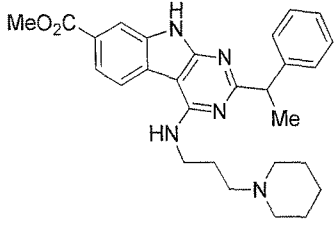
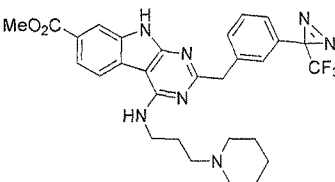
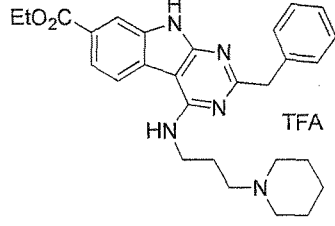
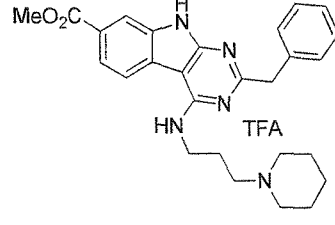
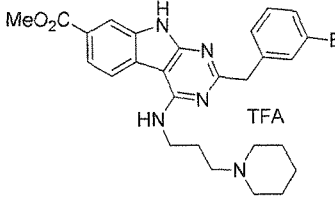
Compound number	Structure
2	 <chem>COC(=O)c1ccc2c(c1)c(c[nH]2)NCNCCN3CCCC3</chem>
3	 <chem>COC(=O)c1ccc2c(c1)c(c[nH]2)NCNCCN(C)C</chem>
4	 <chem>COC(=O)c1ccc2c(c1)c(c[nH]2)NCNCCN(C)C</chem>
5	 <chem>COC(=O)c1ccc2c(c1)c(c[nH]2)NCNCCN(C)C</chem>

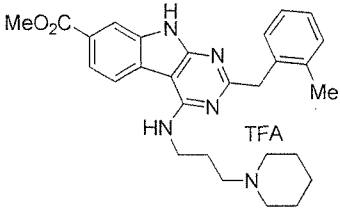
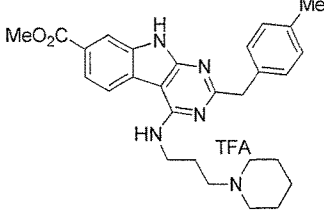
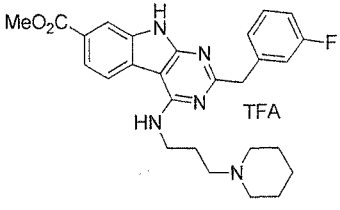
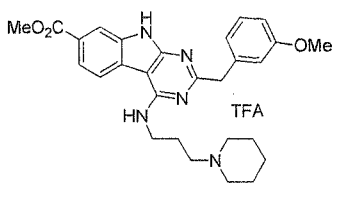
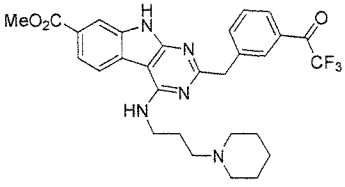
Compound number	Structure
6	 <chem>COC(=O)c1ccc2c(c1)c(c[nH]2)NCNCCN3CCCCC3</chem>
7	 <chem>COC(=O)c1ccc2c(c1)c(c[nH]2)NCNCCCN3CCCCC3C</chem>
8	 <chem>COC(=O)c1ccc2c(c1)c(c[nH]2)NCNCCCNC</chem>
9	 <chem>COC(=O)c1ccc2c(c1)c(c[nH]2)NCNCC(O)CN3CCCCC3</chem>

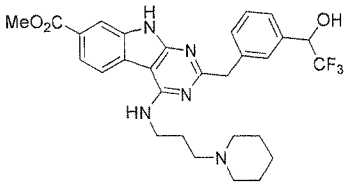
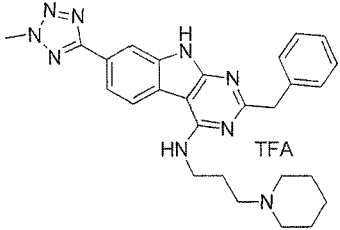
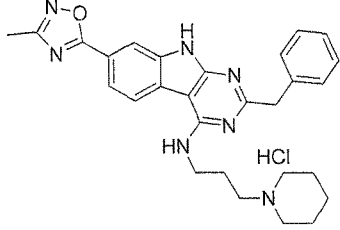
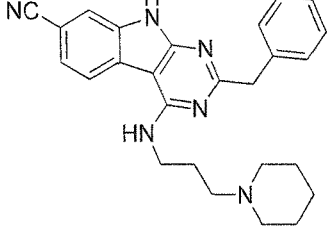
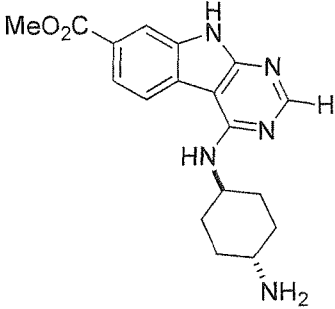
Compound number	Structure
10	 <chem>COC(=O)c1ccc2c(c1)c(c[nH]2)NC3CCNCC3</chem>
11	 <chem>COC(=O)c1ccc2c(c1)c(c[nH]2)NCCC3CCNCC3</chem>
12	 <chem>COC(=O)c1ccc2c(c1)c(c[nH]2)NCCCN3CCOCC3</chem>
13	 <chem>COC(=O)c1ccc2c(c1)c(c[nH]2)N3CCN(C3)CC4CCNCC4</chem>

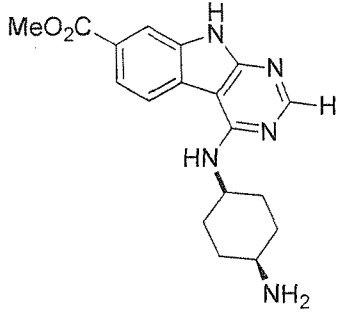
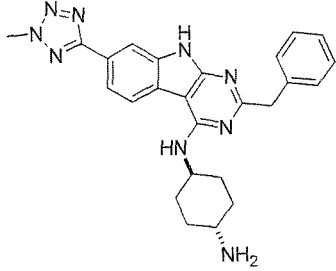
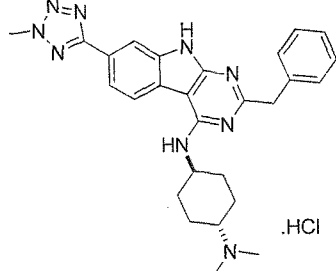
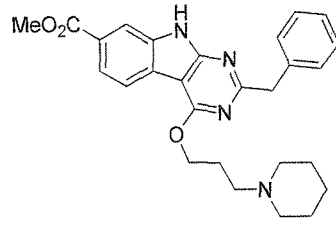
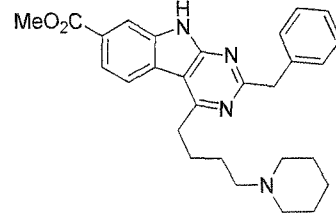
Compound number	Structure
14	 <chem>CN1C=NC2=C(N1)C(=C3C=CC(=C3C=C2C4=CC=CC=C4C5=NN=N5N)N)NCCCN6CCCCC6</chem>
15	 <chem>COC(=O)c1ccc2c(c1)c3c(c2)c4c(c3)nc5c4cnc5C6=CC=CC=C6NCCCN7CCCCC7</chem>
16	 <chem>COC(=O)c1ccc2c(c1)c3c(c2)c4c(c3)nc5c4cnc5C6=CC=CC=C6NCCCN7CCCCC7</chem>
17	 <chem>COC(=O)c1ccc2c(c1)c3c(c2)c4c(c3)nc5c4cnc5C6=CC=CC=C6NCCCN7CCCCC7</chem>
18	 <chem>COC(=O)c1ccc2c(c1)c3c(c2)c4c(c3)nc5c4cnc5C6=CC=CC=C6NCCCN7CCCCC7</chem>

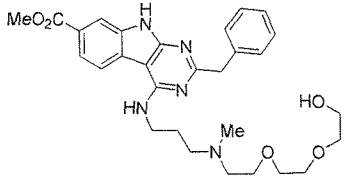
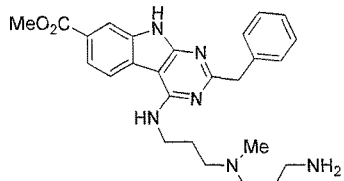
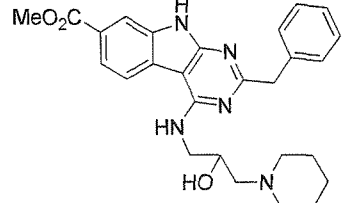
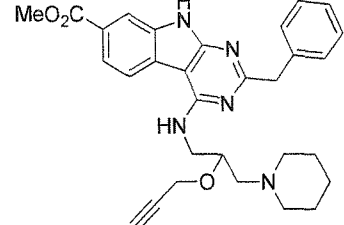
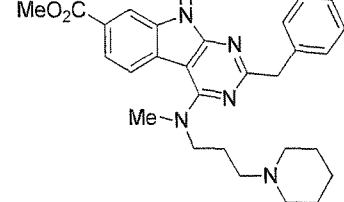
Compound number	Structure
19	 <chem>COC(=O)c1ccc2c(c1)c3c(nc2)nc(Cc4cc(Br)cc(I)c4)nc3NCCCN5CCCCC5.[TFA-]</chem>
20	 <chem>COC(=O)c1ccc2c(c1)c3c(nc2)nc(Cc4c5ccccc5cc4)nc3NCCCN6CCCCC6.[TFA-]</chem>
21	 <chem>COC(=O)c1ccc2c(c1)c3c(nc2)nc(C(C)Oc4ccccc4)nc3NCCCN5CCCCC5</chem>
22	 <chem>COC(=O)c1ccc2c(c1)c3c(nc2)nc(C(C)Oc4ccccc4)nc3NCCCN5CCCCC5</chem>
23	 <chem>COC(=O)c1ccc2c(c1)c3c(nc2)nc(C(=O)c4ccccc4)nc3NCCCN5CCCCC5</chem>

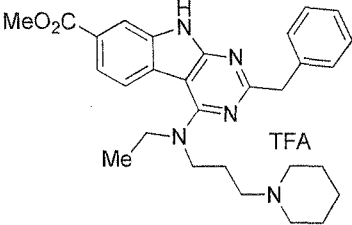
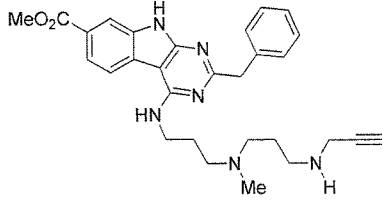
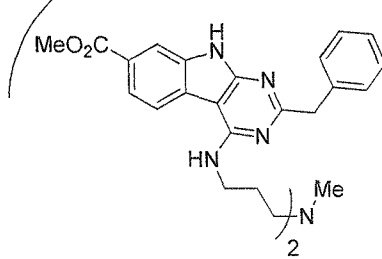
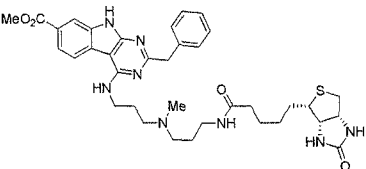
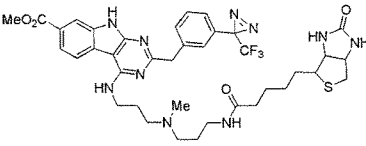
Compound number	Structure
24	
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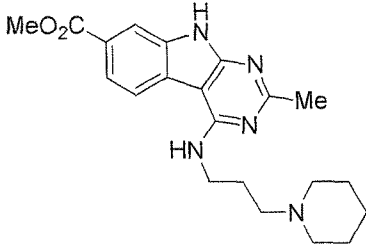
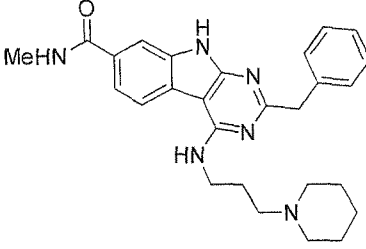
Compound number	Structure
29	
30	
31	
32	
33	

Compound number	Structure
34	
35	
36	
37	
38	

Compound number	Structure
39	 <chem>COC(=O)c1ccc2c(c1)c(c[nH]2)C(=N3C=NC=CC3=O)N[C@@H]4CCCC[C@H]4N</chem>
40	 <chem>C1=CN=C(N1)c2cc(ccc2c3c(c[nH]3)C(=N4C=CC=C4C5=CC=CC=C5)N[C@@H]6CCCC[C@H]6N)N</chem>
41	 <chem>CN(C)[C@@H]1CCCC[C@H]1N[C@@H]2c3c(c[nH]2)C(=N4C=CC=C4C5=CC=CC=C5)N3C6=CC=CC=C6.NCl</chem>
42	 <chem>COC(=O)c1ccc2c(c1)c(c[nH]2)C(=N3C=CC=C3C4=CC=CC=C4)OC5CCCN5</chem>
43	 <chem>COC(=O)c1ccc2c(c1)c(c[nH]2)C(=N3C=CC=C3C4=CC=CC=C4)CCCCN5CCCCC5</chem>

Compound number	Structure
44	 <chem>COC(=O)c1ccc2c(c1)c(c[nH]2)C(=N1C(=CN1)Cc2ccccc2)NCN(C)CCOCCO</chem>
45	 <chem>COC(=O)c1ccc2c(c1)c(c[nH]2)C(=N1C(=CN1)Cc2ccccc2)NCN(C)CCN</chem>
46	 <chem>COC(=O)c1ccc2c(c1)c(c[nH]2)C(=N1C(=CN1)Cc2ccccc2)NCNCCOCCN1CCCCC1</chem>
47	 <chem>COC(=O)c1ccc2c(c1)c(c[nH]2)C(=N1C(=CN1)Cc2ccccc2)NCNCCOC#CCC1CCCCC1</chem>
48	 <chem>COC(=O)c1ccc2c(c1)c(c[nH]2)C(=N1C(=CN1)Cc2ccccc2)N(C)CCN1CCCCC1</chem>

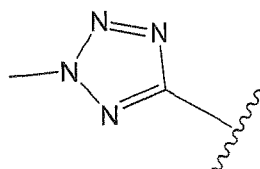
Compound number	Structure
49	
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Compound number	Structure
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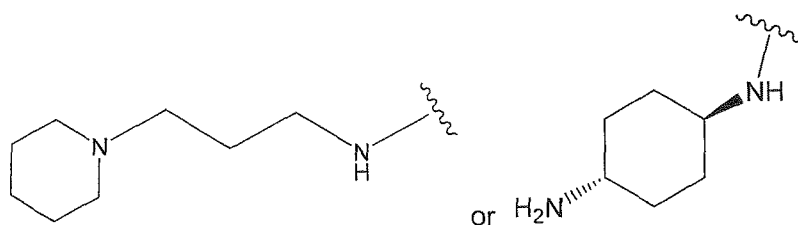
or a salt thereof.

19. The method of claim 12, wherein R^2 is benzyl or H.

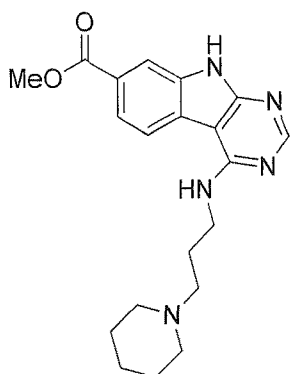
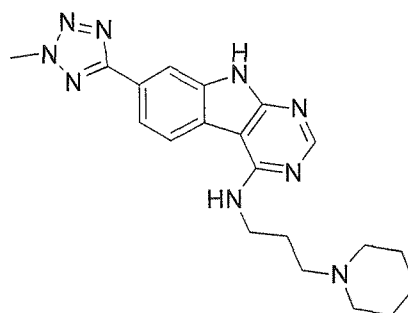
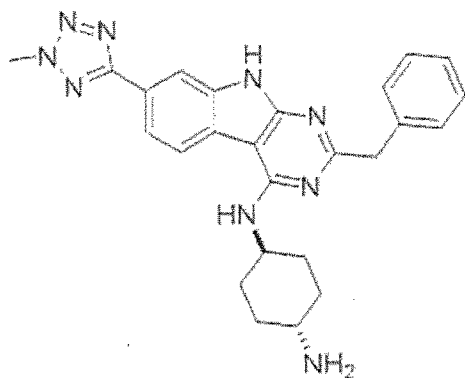
20. The method of claim 12, wherein R^5 and R^6 join together with C to form:



21. The method of claim 12, wherein W is

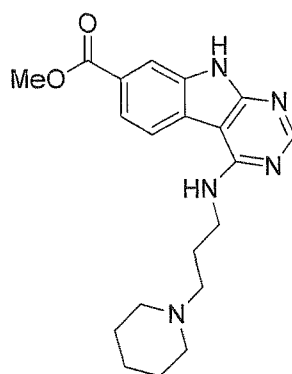


22. The method of claim 12, wherein the compound is

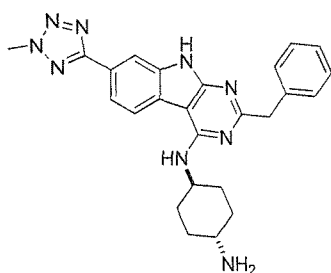


or a pharmaceutically acceptable salt thereof.

23. The method of claim 12, wherein the compound is a hydrochloride salt of



24. The method of claim 12, wherein the compound is a hydrobromide salt of



25. The method according to claim 12, wherein the stem and progenitor cells are human hematopoietic stem and progenitor cells.
26. The method according to claim 12, wherein the starting cell population includes CD34+ cells harvested from mobilized peripheral blood (mPB), bone marrow (BM) or umbilical cord blood (UCB).
27. The method according to claim 26, wherein the starting cell population includes CD34+ cells harvested from umbilical cord blood (UCB).
28. The method according to claim 12, wherein the starting cell population essentially consists of CD34+ cells purified from one or two umbilical cord blood units.
29. The method according to claim 28, comprising culturing the starting cell population in presence of said compound from about 2 days to about 21 days.
30. The method according to claim 28, comprising administering said compound to the starting cell population at a concentration between 1 nM and 3000 nM.
31. The method of claim 14, wherein the biologic comprises Interleukin-3 (IL-3), Granulocyte Macrophage Colony-Stimulating Factor (GM-CSF), Thrombopoietin (TPO), FMS-Like Tyrosine Kinase 3 Ligand (FLT3-L), Stem Cell Factor (SCF), Interleukin-6 (IL-6) or a combination thereof.
32. The method of claim 31, wherein the biologic comprises SCF, FLT3-L, TPO, IL-6 or a combination thereof.
33. The method of claim 12, wherein the other small molecule is StemRegenin 1 (SR1).
34. A cell population as expanded according to a method as defined in claim 12.