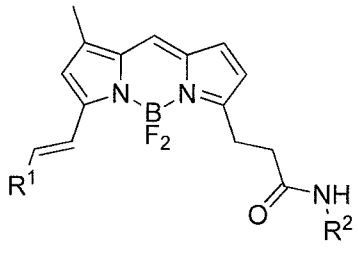
CLAIMS

What is claimed is:

1. A compound having the structure of Formula (I) or a pharmaceutically acceptable salt thereof:



(I);

wherein:

R^1 is $(C_6\text{-}C_{10})$aryl or $(C_3\text{-}C_{12})$heteroaryl, optionally substituted at any position with one or more substituents independently selected from $(C_1\text{-}C_{10})$alkyl, $-O(C_1\text{-}C_6)$alkyl, $(C_2\text{-}C_6)$alkenyl, $(C_6\text{-}C_{10})$aryl, $-O(C_6\text{-}C_{10})$aryl, $-S(C_1\text{-}C_{10})$alkyl, -O(benzyl), $(C_3\text{-}C_8)$heteroaryl, halo, hydroxyl, $-NR^3R^4$, nitro or $-O(C_2\text{-}C_6)$alkenyl;

further wherein each $-O(C_1\text{-}C_6)$alkyl, $(C_2\text{-}C_6)$alkenyl, $-O(C_6\text{-}C_{10})$aryl, –O(benzyl) or $(C_3\text{-}C_8)$heteroaryl is optionally substituted at any position with one or more substituents independently selected from halo, $(C_6\text{-}C_{10})$aryl, $(C_1\text{-}C_{10})$alkyl or $-O(C_1\text{-}C_6)$alkyl;

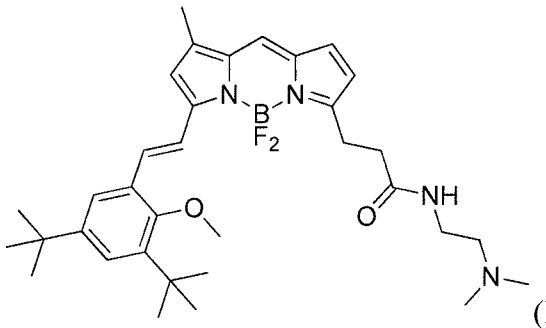
R^2 is $(C_1\text{-}C_6)$alkyl or $(C_3\text{-}C_8)$cycloalkyl, optionally and independently substituted with one or more substituents selected from $-NR^5R^6$, hydroxyl, halo or $-O(C_1\text{-}C_6)$alkyl; and

R^3, R^4, R^5, and R^6, if present, are independently selected from H, $(C_1\text{-}C_6)$alkyl, $(C_6\text{-}C_{10})$aryl, $(C_1\text{-}C_6)$hydroxyalkyl, or are taken together to form a $(C_3\text{-}C_7)$heterocycle.

2. The compound of Claim 1, wherein R^1 is $(C_6\text{-}C_{10})$aryl, optionally substituted at any position with one or more substituents independently selected from $(C_1\text{-}C_{10})$alkyl or $-O(C_1\text{-}C_6)$alkyl; and

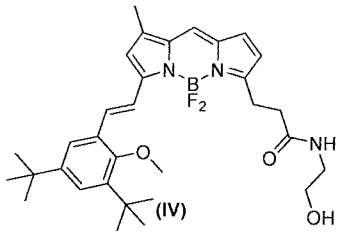
R^2 is $(C_1\text{-}C_6)$alkyl, optionally substituted with one or more substituents independently selected from $-NR^5R^6$ or hydroxyl.

3. The compound of Claim 1, having the structure of Formula (II), or a pharmaceutically acceptable salt thereof:

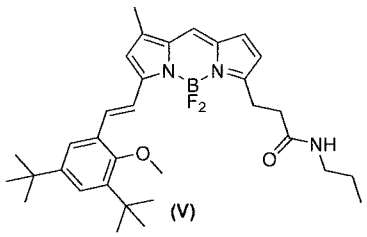


(II).

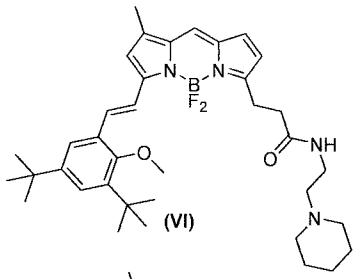
4. The compound of Claim 2, having the structure of any one of Formulae (IV), (V), (VI), (VII), (VIII), (IX), (X), (XI) or (XII), or a pharmaceutically acceptable salt thereof:



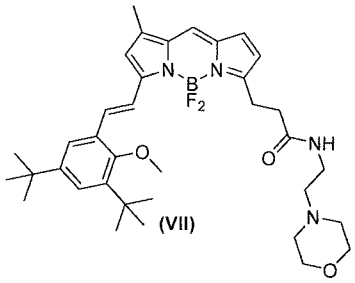
(IV)



(V)



(VI)



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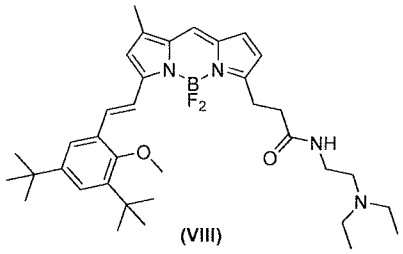
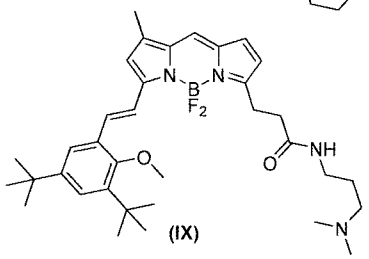


(VIII)



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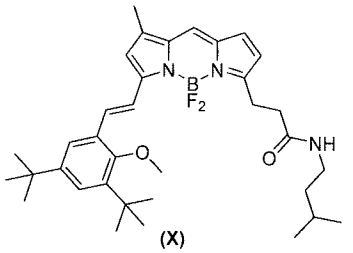
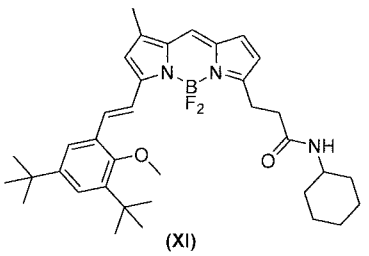
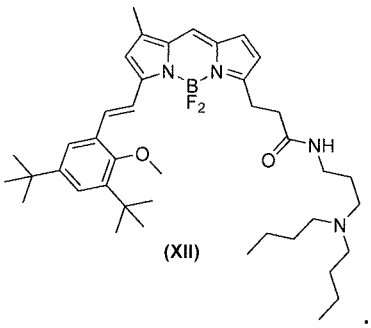


(X)



(XI)



(XII)

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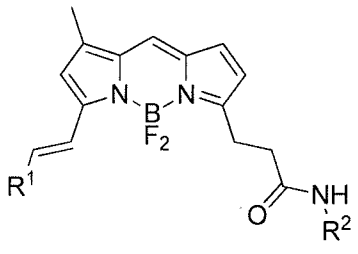
5. A method for the synthesis of a compound of Formula (I) or a pharmaceutically acceptable salt thereof:



(I);

wherein:

R^1 is $(C_6\text{-}C_{10})$aryl or $(C_3\text{-}C_{12})$heteroaryl, optionally substituted at any position with one or more substituents independently selected from $(C_1\text{-}C_{10})$alkyl, $-O(C_1\text{-}C_6)$alkyl, $(C_2\text{-}C_6)$alkenyl, $(C_6\text{-}C_{10})$aryl, $-O(C_6\text{-}C_{10})$aryl, $-S(C_1\text{-}C_{10})$alkyl, -O(benzyl), $(C_3\text{-}C_8)$heteroaryl, halo, hydroxyl, $-NR^3R^4$, nitro or $-O(C_2\text{-}C_6)$alkenyl;

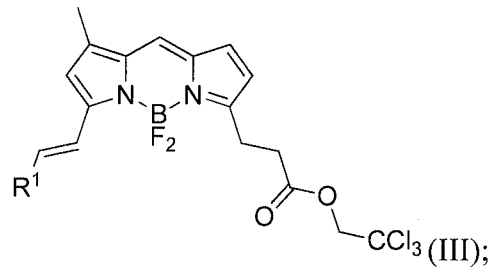
further wherein each $-O(C_1\text{-}C_6)$alkyl, $(C_2\text{-}C_6)$alkenyl, $-O(C_6\text{-}C_{10})$aryl, –O(benzyl) or $(C_3\text{-}C_8)$heteroaryl is optionally substituted at any position with one or more substituents independently selected from halo, $(C_6\text{-}C_{10})$aryl, $(C_1\text{-}C_{10})$alkyl or $-O(C_1\text{-}C_6)$alkyl;

R^2 is $(C_1\text{-}C_6)$alkyl or $(C_3\text{-}C_8)$cycloalkyl, optionally and independently substituted with one or more substituents selected from $-NR^5R^6$, hydroxyl, halo or $-O(C_1\text{-}C_6)$alkyl; and

R^3, R^4, R^5, and R^6, if present, are independently selected from H, $(C_1\text{-}C_6)$alkyl, $(C_6\text{-}C_{10})$aryl, $(C_1\text{-}C_6)$hydroxyalkyl, or are taken together to form a $(C_3\text{-}C_7)$heterocycle;

the method comprising:

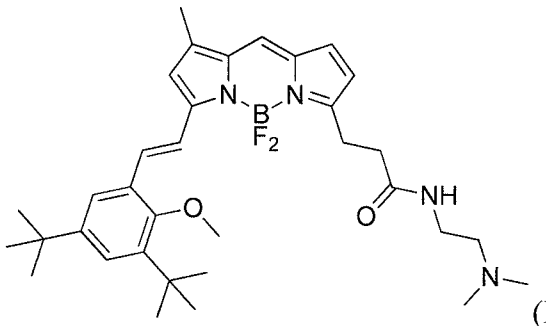
reacting a compound of Formula (III):



(III);

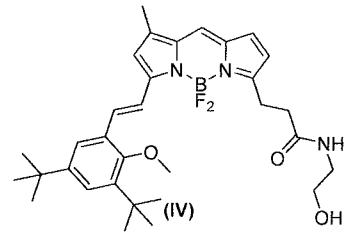
with a compound having the formula R^2NH_2, thereby forming a compound of Formula (I).

6. The method of Claim 5, wherein the compound of Formula (I) has a structure of Formula (II), or a pharmaceutically acceptable salt thereof:

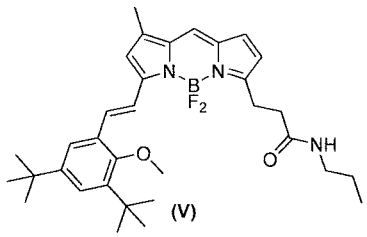


(II).

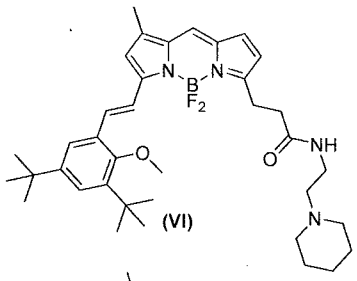
7. The method of Claim 5, wherein the compound of Formula (I) has a structure of any one of Formulae (IV), (V), (VI), (VII), (VIII), (IX), (X), (XI), or (XII) or a pharmaceutically acceptable salt thereof:



(IV)



(V)



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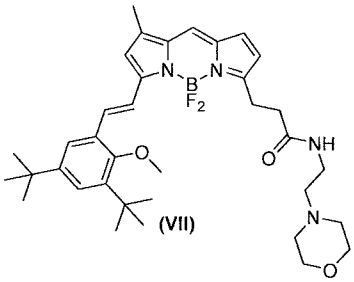

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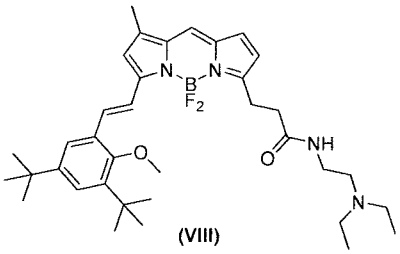
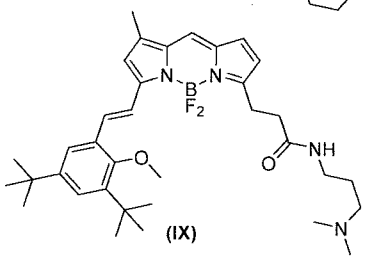
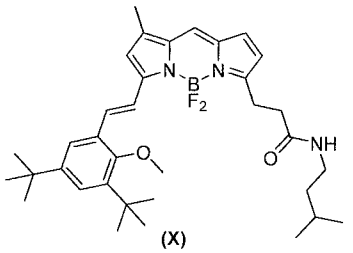


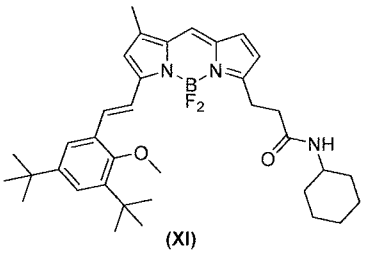
(VIII)



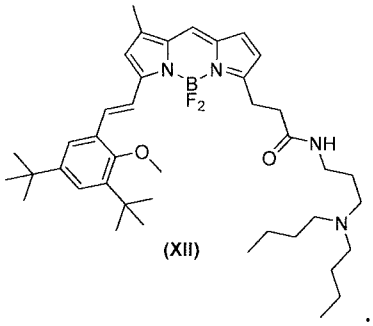
(IX)



(X)



(XI)



(XII)

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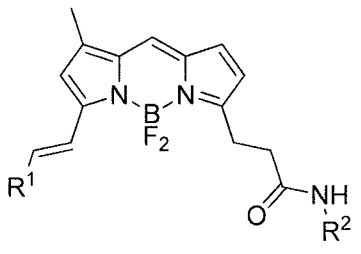
8. A method for assessing the progression of mitosis in a live cell, comprising:

(a) contacting a live cell with a compound of formula (I),



(I);

wherein:

R^1 is $(C_6\text{-}C_{10})$aryl or $(C_3\text{-}C_{12})$heteroaryl, optionally substituted at any position with one or more substituents independently selected from $(C_1\text{-}C_{10})$alkyl, $-O(C_1\text{-}C_6)$alkyl, $(C_2\text{-}C_6)$alkenyl, $(C_6\text{-}C_{10})$aryl, $-O(C_6\text{-}C_{10})$aryl, $-S(C_1\text{-}C_{10})$alkyl, -O(benzyl), $(C_3\text{-}C_8)$heteroaryl, halo, hydroxyl, $-NR^3R^4$, nitro or $-O(C_2\text{-}C_6)$alkenyl;

further wherein each $-O(C_1\text{-}C_6)$alkyl, $(C_2\text{-}C_6)$alkenyl, $-O(C_6\text{-}C_{10})$aryl, –O(benzyl) or $(C_3\text{-}C_8)$heteroaryl is optionally substituted at any position with one or more substituents independently selected from halo, $(C_6\text{-}C_{10})$aryl, $(C_1\text{-}C_{10})$alkyl or $-O(C_1\text{-}C_6)$alkyl;

R^2 is $(C_1\text{-}C_6)$alkyl or $(C_3\text{-}C_8)$cycloalkyl, optionally and independently substituted with one or more substituents selected from $-NR^5R^6$, hydroxyl, halo or $-O(C_1\text{-}C_6)$alkyl; and

R^3, R^4, R^5, and R^6, if present, are independently selected from H, $(C_1\text{-}C_6)$alkyl, $(C_6\text{-}C_{10})$aryl, $(C_1\text{-}C_6)$hydroxyalkyl, or are taken together to form a $(C_3\text{-}C_7)$heterocycle;

or a pharmaceutically acceptable salt thereof;

to form an incubation media;

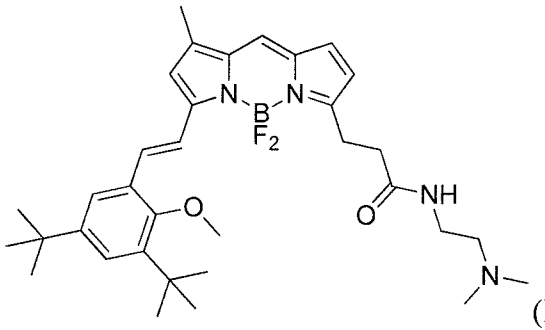
b) incubating the incubation media of step (a) for a period of time to stain the live cell; and

c) imaging the stained cell of step (b) to assess the progression of mitosis in the live cell by fluorescence microscopy.

9. The method of Claim 8, wherein R^1 is $(C_6\text{-}C_{10})$aryl, optionally substituted at any position with one or more substituents independently selected from $(C_1\text{-}C_{10})$alkyl or $-O(C_1\text{-}C_6)$alkyl; and

R^2 is $(C_1\text{-}C_6)$alkyl, optionally substituted with one or more substituents independently selected from $-NR^5R^6$.

10. The method of Claim 9, wherein the compound of Formula (I) has the structure of Formula (II), or a pharmaceutically acceptable salt thereof:



(II).

11. A method for the preferential staining of an M-phase live cell, comprising:

(a) contacting a live cell with a compound of formula (I) of claim 1,

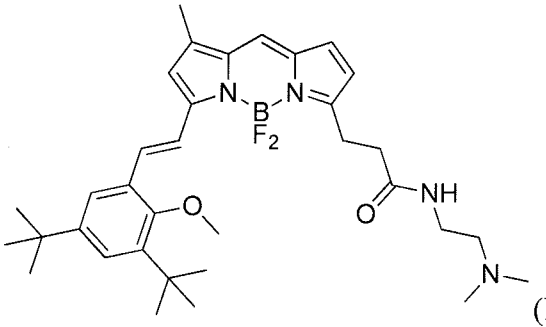
or a pharmaceutically acceptable salt thereof;
to form an incubation media;

b) incubating the incubation media of step (a) for a period of time to stain the M-phase live cell; and

c) visualizing the stained M-phase live cell of step (b) with microscopy, wherein a live cell that exists in the M-phase is stained with higher intensity than a live cell that exists in any other phase of the cell cycle.

12. The method of Claim 11, wherein R^1 is $(C_6\text{-}C_{10})$aryl, optionally substituted at any position with one or more substituents independently selected from $(C_1\text{-}C_{10})$alkyl or $\text{-O}(C_1\text{-}C_6)$alkyl; and
R^2 is $(C_1\text{-}C_6)$alkyl, optionally substituted with one or more substituents independently selected from $\text{–NR}^5\text{R}^6$.

13. The method of Claim 12, wherein the compound of Formula (I) has the structure of Formula (II), or a pharmaceutically acceptable salt thereof:



(II).