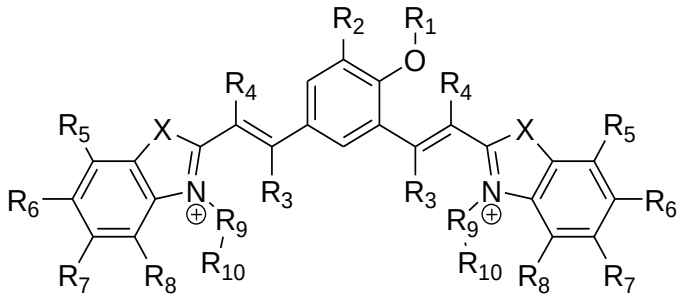
WE CLAIM:

1. A compound of Formula I



Formula I

wherein, 'X' is selected from a group comprising oxygen, sulphur, and selenium;

'R_1' is hydrogen;

'R_2' is selected from a group comprising H, OH, halogen, alkyl and substituted alkyl, and wherein, the halogen is selected from a group comprising bromide, chloride and iodide;

'R_3' and 'R_4' is independently selected from a group comprising H, alkyl, aryl, nitrile, acid and halogen, and wherein the halogen is selected from a group comprising, chloride, fluoride, bromide and iodide;

'R_5', 'R_6', 'R_7' and 'R_8' are independently selected from a group comprising H, OH, alkyl, aryl, halogen, nitro, sulfonates (SO_3^-) and nitrile;

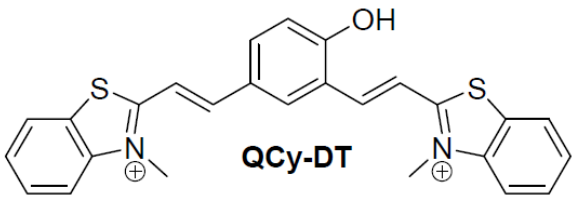
'R_9' is selected from a group comprising H and -$(CH_2)_n$-, wherein 'n' is 1-6;

'R_{10}' is selected from a group comprising hydrogen, -OH, methyl, amine, terminal alkyne, alkene, alkyl acid, amide group and sulfonates (SO_3^-), wherein when R^9 is H, R^{10} is absent;

or its tautomer, polymorph or solvate thereof.

2. The compound as claimed in claim 1, wherein the compound of formula I is a nucleic acid probe and binds to AT rich sequences in the DNA.

3. A compound of Formula I according to claim 1 selected from



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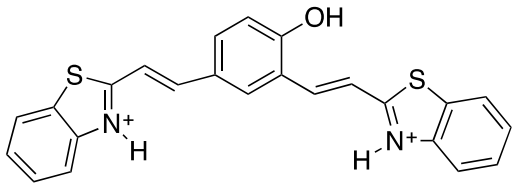

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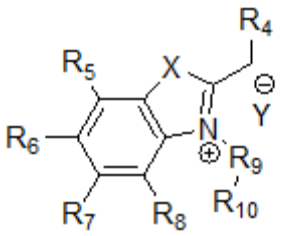
4. A process for preparation of the compound of Formula I as claimed in claim 1:

said process comprising:

a. reacting compound of Formula II with compound of Formula III to obtain compound of Formula IV



Formula IV

wherein,

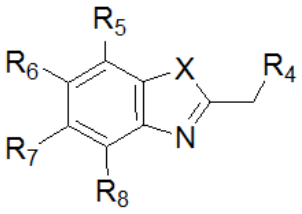
'R_4' is selected from a group comprising H, alkyl, aryl, nitrile, acid and halogen, and wherein the halogen is selected from a group comprising, chloride, fluoride, bromide and iodide;

'R_5', 'R_6', 'R_7' or 'R_8' is selected from a group comprising H, OH, alkyl, aryl, halogen, nitro, sulfonates (SO_3^-) and nitrile group;

'R_9' is selected from a group comprising H and -$(CH_2)_n$-, wherein 'n' is 1-6; and

'R_{10}' is selected from a group comprising hydrogen, -OH, methyl, amine, terminal alkyne, alkene, alkyl acid, amine acid and sulfonates (SO_3^-);

'Y' is either Br or I;

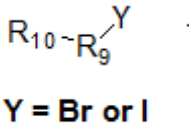


Formula II

wherein,

'R_4' is selected from a group comprising H, alkyl, aryl, nitrile, acid and halogen, and wherein the halogen is selected from a group comprising, chloride, fluoride, bromide and iodide; and

'R_5', 'R_6', 'R_7' or 'R_8' is selected from a group comprising H, OH, alkyl, aryl, halogen, nitro, sulfonates (SO_3^-) and nitrile group;



Formula III

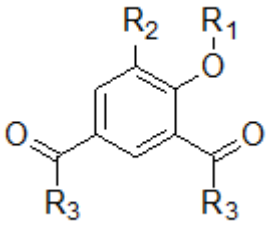
wherein,

'R_9' is selected from a group comprising H and -$(CH_2)_n$-, wherein 'n' is 1-6;

'R_{10}' is selected from a group comprising hydrogen, -OH, methyl, amine, terminal alkyne, alkene, alkyl acid, amine acid and sulfonates (SO_3^-);

and,

b. reacting the compound of Formula IV with compound of Formula V in presence of piperidine and alcohol,



Formula V

wherein,

'R_1' is hydrogen;

'R_2' is selected from a group comprising H, OH, halogen, alkyl and substituted alkyl, and wherein, the halogen is selected from a group comprising bromide, chloride and iodide; and

'R_3'is selected from a group comprising H, alkyl, aryl, nitrile, acid and halogen, and wherein the halogen is selected from a group comprising, chloride, fluoride, bromide and iodide.

5. The process of claim 4, wherein the compound is quinone cyanine–dithiazole, QCy-DT, and the quinone cyanine–dithiazole, QCy-DT is prepared by:

a. reacting 2-methyl benzothiazole with methyl iodide to obtain N-methyl-2-methylbenzothiazole; and

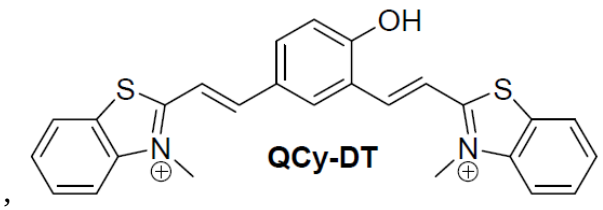
b. reacting the N-methyl-2-methylbenzothiazole with 4-hydroxyisophthalaldehyde in presence of piperidine.

6. The process as claimed in claim 4 or claim 5, wherein said process is carried out at a temperature ranging from about 30 °C to 100°C, and for a time period ranging

from about 2 hours to 24 hours; and wherein said the steps a) and b) further comprise isolation, purification or a combination thereof of the corresponding product; wherein said isolation and purification is carried out by acts selected from a group comprising addition of solvent, washing with solvent, quenching, filtration, extraction, chromatography and combinations thereof.

7. A pharmaceutical composition comprising the compound of Formula I as claimed in claim 1:
optionally along with at least one pharmaceutically acceptable excipient.

8. The pharmaceutical composition of claim 7, wherein the compound is



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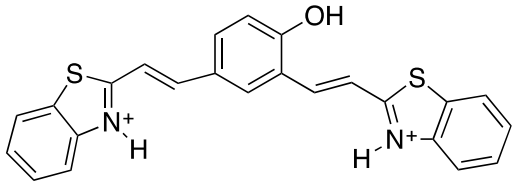

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9. The pharmaceutical composition as claimed in claim 7, wherein the pharmaceutically acceptable excipient is selected from a group comprising adjuvant, diluent, carrier, granulating agents, binding agents, lubricating agents, disintegrating agent, sweetening agents, glidant, anti-adherent, anti-static agent, surfactant, anti-oxidant, gum, coating agent, coloring agent, flavouring agent, coating agent, plasticizer, preservative, suspending agent, emulsifying agent, plant cellulosic material, spheronization agent, other conventionally known pharmaceutically acceptable excipient or any combination of excipients thereof.

10. A method of detection or quantification of AT-rich DNA sequence, said method comprising:

a. contacting the probe of compound of Formula I or its tautomer, polymorph or thereof as claimed in claim 1, or the composition of claim 7 with a DNA sequence so as to allow for hybridization of the probe with the DNA sequence;

b. detecting or quantifying the binding intensity by measuring the change in fluorescence of the probe resulting from the specific interaction or binding of the probe to the DNA, upon hybridization of the probe to the DNA sequence.

11. The method as claimed in claim 10, wherein the DNA sequence is AT rich sequence.

12. The method as claimed in claim 10, wherein the specific interaction or binding is in the minor groove of the DNA sequence, and wherein the compound delocalizes pi electrons between donor acceptor atoms on binding to the DNA minor groove.

13. The method as claimed in claim 10, wherein the specific interaction or binding is by base pairing, covalent or non-covalent interaction, resulting in the fluorescence.

14. The method as claimed in claim 10, wherein the method is for detecting the presence of AT rich DNA sequences in a eukaryotic cell selected from a group comprising cancerous cells, cells infected with microorganisms, unicellular protozoan, parasite and other abnormal cells.

15. Compound of formula I as claimed in claim 1 or the composition as claimed in claim 7 for use in inhibiting growth of a cell.

16. The use as claimed in claim 15, wherein the cell is an eukaryotic cell selected from a group comprising cancerous cells, cells infected with microorganisms, parasite or unicellular protozoan and other abnormal cells, and wherein the parasite is *Plasmodium*.

17. Compound of formula I as claimed in claim 1 or the composition as claimed in claim 7 for use in managing or treating a disease characterized by presence of abnormal levels of AT rich DNA in a cell.

18. The use as claimed in claim 17, wherein the cell is an eukaryotic cell selected from a group comprising cancerous cells, cells infected with parasite or unicellular protozoan.

19. The use as claimed in claim 16, wherein the *Plasmodium* is selected from a group comprising but not limiting to *Plasmodium falciparum, Plasmodium vivax, Plasmodium ovale, Plasmodium malariae* and combinations thereof.

20. Use of the compound of Formula I or tautomeric , polymorph or solvate thereof as claimed in claim 1, or the composition of claim 7 for detecting or quantifying the presence of specific DNA or AT-rich DNA sequence, inhibiting growth of cells or a combination thereof, and for cell imaging.

21. Use of compound of Formula I 1 or tautomer, polymorph or solvate thereof as claimed in claim 1, or the composition of claim 7 in the manufacture of a medicament for treatment of parasitic infection characterized by presence of abnormal levels of AT rich DNA.

22. A method of diagnosing disease characterized by presence of cells comprising abnormal levels of AT rich DNA, the method comprising:

a. contacting the probe of compound of Formula I as claimed in claim 1 with a biological sample comprising DNA to allow for hybridization of the probe with the DNA;

b. removing the unhybridized probe from the mixture; and

c. detecting or quantifying the presence of cells comprising abnormal levels of AT rich DNA, by measuring the change in fluorescence of the probe resulting from the specific interaction or binding of the probe to DNA, upon hybridization of the probe to DNA to diagnose the disease.