

Claims:

1. A method of detecting double stranded nucleic acid comprising the steps of;
 - a. making a thiolated probe with complimentary nucleic acid base pairs to a target nucleic acid;
 - b. adding the thiolated probe to a sample suspected of containing the target nucleic acid and a gold nanoparticle wherein a colour change is observed if the sample contains the target nucleic acid,wherein the gold nanoparticle is added after the thiolated probe has been added to the sample suspected of containing the target nucleic acid.
2. The method of claim 1 wherein the double stranded nucleic acid is not amplified.
3. The method of claim 1 wherein the thiolated probe comprises at least 90% contiguous complimentary nucleic acid base pairs to the target nucleic acid
4. The method of claim 1 wherein the incubation is in an ionic solution having an ionic concentration of 400mM or less.
5. The method of claim 1 wherein the incubation is in an ionic solution having an ionic concentration of 250mM or less.
6. The method of claim 1 wherein the gold nanoparticle ranges in size from 1nm to 100 nm
7. The method of claim 1 wherein the gold nanoparticle is about 15 nm
8. The method of claim 1 wherein the sample suspected of containing the target nucleic acid is a bacterium.
9. The method of claim 8 wherein the bacterium is a *Salmonella*.
10. The method of claim 9 wherein the thiolated probe comprises SEQ ID NOS. 1, 2, 3, 4, or 9.
11. The method of claim 8 wherein the bacterium is a *Escherichia Coli*.
12. The method of claim 11 wherein the thiolated probe comprises SEQ ID NOS. 14, or 15.
13. The method of claim 8 wherein the bacterium is a *Bacillus anthracis*.

14. The method of claim 13 wherein the thiolated probe comprises SEQ ID NOS. 12 or 13.
15. The method of claim 8 wherein the bacterium is a *Vibrio cholera*.
16. The method of claim 15 wherein the thiolated probe comprises SEQ ID NOS. 16 or 17.
17. The method of claim 1 further comprising the step of lysing a cell in the sample suspected of containing the target nucleic acid prior to adding the thiolated probe.
18. A nucleic acid detection system for visually detecting double stranded nucleic acid comprising a thiolated probe having complimentary nucleic acid base pairs to a target nucleic acid and which are capable of hybridising to said target nucleic acid in a sample suspected of containing the target nucleic acid; and a gold nanoparticle capable of a colour change if the sample contains the target nucleic acid, wherein said nucleic acid detection system does not require a power source so visual detection of DNA can be carried out at a point of need.
19. The system of claim 18 wherein the double stranded nucleic acid is not amplified.
20. The system of claim 18 wherein the thiolated probe comprises at least 90% contiguous complimentary nucleic acid base pairs to the target nucleic acid.
21. The system of claim 18 further comprising an ionic solution having an ionic concentration of 400mM or less.
22. The system of claim 18 further comprising an ionic solution having an ionic concentration of 250mM or less.
23. The system of claim 18 wherein the gold nanoparticle ranges in size from 1nm to 100 nm
24. The system of claim 19 wherein the gold nanoparticle is about 15 nm
25. The system of claim 18 wherein the double stranded nucleic acid to be detected is from a bacterium.
26. The system of claim 25 wherein the bacterium is a *Salmonella*.
27. The system of claim 25 wherein the bacterium is a *Escherichia Coli*.
28. The system of claim 25 wherein the bacterium is a *Bacillus anthracis*.

29. The system of claim 25 wherein the bacterium is a *Vibrio cholera*.
30. The system of claim 18 or 27 wherein the thiolated probe comprises SEQ ID NOS. 14, or 15.
31. The system of claim 18 or 28 wherein the thiolated probe comprises SEQ ID NOS. 12 or 13.
32. The system of claim 18 or 26 wherein the thiolated probe comprises SEQ ID NOS. 1, 2, 3, 4, or 9.
33. The system of claim 18 or 29 wherein the thiolated probe comprises SEQ ID NOS. 16 or 17.
34. The system of claim 18 further comprising a means of lysing a cell.
- ~~35. A device for visually detecting double stranded nucleic acid comprising~~
~~a first compartment containing a thiolated probe having complimentary~~
~~nucleic acid base pairs to a target nucleic acid;~~
~~a second compartment containing a gold nanoparticle; and~~
~~a set of instructions,~~
~~wherein the compartments can be set in fluid connection and the set of~~
~~instructions comprises the steps of:~~
~~adding a sample suspected of containing the target nucleic acid~~
~~to the second compartment; and~~
~~setting the first and the second compartment in fluid connection,~~
~~wherein a colour change is observed if the sample contains the target~~
~~nucleic acid.~~
- ~~36. A device of claim 35 further comprising a means of adding a sample~~
~~suspected of containing a target nucleic acid to the first compartment~~
~~and a means of moving the nanoparticles from the second~~
~~compartment to the first compartment for visually detecting the double~~
~~stranded nucleic acid.~~
- ~~37. The device of claim 35 further comprising a delivery tube suitable for~~
~~delivering a fluid sample suspected of containing a target nucleic acid;~~
~~and delivering an ionic solution having an ionic concentration of~~
~~400mM or less; such that the gold nanoparticle when combined in the~~
~~compartment containing a thiolated probe is capable of having a visual~~
~~colour change in the presence of the target nucleic acid.~~

- ~~38. The device of claim 35 wherein the thiolated probe comprises at least 90% contiguous complementary nucleic acid base pairs to the target nucleic acid.~~
- ~~39. The device of claim 35 further comprising an ionic solution having an ionic concentration of 400mM or less.~~
- ~~40. The device of claim 35 further comprising an ionic solution having an ionic concentration of 250mM or less.~~
- ~~41. The device of claim 35, wherein the gold nanoparticle ranges in size from 1nm to 100 nm.~~
- ~~42. The device of claim 35 wherein the gold nanoparticle is about 15 nm.~~
- ~~43. The device of claim 35, wherein the thiolated probe comprises SEQ ID NOS. 14, or 15.~~
- ~~44. The device of claim 35, wherein the thiolated probe comprises SEQ ID NOS. 12 or 13.~~
- ~~45. The device of claim 35, wherein the thiolated probe comprises SEQ ID NOS. 1, 2, 3, 4, or 9.~~
- ~~46. The device of claim 35, wherein the thiolated probe comprises SEQ ID NOS. 16 or 17.~~
- ~~47. The device of claim 35 further comprising a means of lysing a cell.~~

Claims:

1. A method of detecting double stranded nucleic acid comprising the steps of;
 - a. making a thiolated probe with complimentary nucleic acid base pairs to a target nucleic acid;
 - b. adding the thiolated probe to a sample suspected of containing the target nucleic acid and a gold nanoparticle wherein a colour change is observed if the sample contains the target nucleic acid,wherein the gold nanoparticle is added after the thiolated probe has been added to the sample suspected of containing the target nucleic acid.
2. The method of claim 1 wherein the double stranded nucleic acid is not amplified.
3. The method of claim 1 wherein the thiolated probe comprises at least 90% contiguous complimentary nucleic acid base pairs to the target nucleic acid
4. The method of claim 1 wherein the incubation is in an ionic solution having an ionic concentration of 400mM or less.
5. The method of claim 1 wherein the incubation is in an ionic solution having an ionic concentration of 250mM or less.
6. The method of claim 1 wherein the gold nanoparticle ranges in size from 1nm to 100 nm
7. The method of claim 1 wherein the gold nanoparticle is about 15 nm
8. The method of claim 1 wherein the sample suspected of containing the target nucleic acid is a bacterium.
9. The method of claim 8 wherein the bacterium is a *Salmonella*.
10. The method of claim 9 wherein the thiolated probe comprises SEQ ID NOS. 1, 2, 3, 4, or 9.
11. The method of claim 8 wherein the bacterium is a *Escherichia Coli*.
12. The method of claim 11 wherein the thiolated probe comprises SEQ ID NOS. 14, or 15.
13. The method of claim 8 wherein the bacterium is a *Bacillus anthracis*.

14. The method of claim 13 wherein the thiolated probe comprises SEQ ID NOS. 12 or 13.
15. The method of claim 8 wherein the bacterium is a *Vibrio cholera*.
16. The method of claim 15 wherein the thiolated probe comprises SEQ ID NOS. 16 or 17.
17. The method of claim 1 further comprising the step of lysing a cell in the sample suspected of containing the target nucleic acid prior to adding the thiolated probe.
18. A nucleic acid detection system for visually detecting double stranded nucleic acid comprising a thiolated probe having complimentary nucleic acid base pairs to a target nucleic acid and which are capable of hybridising to said target nucleic acid in a sample suspected of containing the target nucleic acid; and a gold nanoparticle capable of a colour change if the sample contains the target nucleic acid, wherein said nucleic acid detection system does not require a power source so visual detection of DNA can be carried out at a point of need.
19. The system of claim 18 wherein the double stranded nucleic acid is not amplified.
20. The system of claim 18 wherein the thiolated probe comprises at least 90% contiguous complimentary nucleic acid base pairs to the target nucleic acid.
21. The system of claim 18 further comprising an ionic solution having an ionic concentration of 400mM or less.
22. The system of claim 18 further comprising an ionic solution having an ionic concentration of 250mM or less.
23. The system of claim 18 wherein the gold nanoparticle ranges in size from 1nm to 100 nm
24. The system of claim 19 wherein the gold nanoparticle is about 15 nm
25. The system of claim 18 wherein the double stranded nucleic acid to be detected is from a bacterium.
26. The system of claim 25 wherein the bacterium is a *Salmonella*.
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29. The system of claim 25 wherein the bacterium is a *Vibrio cholera*.
30. The system of claim 18 or 27 wherein the thiolated probe comprises SEQ ID NOS. 14, or 15.
31. The system of claim 18 or 28 wherein the thiolated probe comprises SEQ ID NOS. 12 or 13.
32. The system of claim 18 or 26 wherein the thiolated probe comprises SEQ ID NOS. 1, 2, 3, 4, or 9.
33. The system of claim 18 or 29 wherein the thiolated probe comprises SEQ ID NOS. 16 or 17.
34. The system of claim 18 further comprising a means of lysing a cell.