

Claims

1. A method for the isolation and/or analysis of nucleic acid molecules on a solid phase device comprising
 - (i) incubating a nucleic acid sample with Dimethyl adipimidate (DMA) under conditions that allow formation of a complex of the nucleic acid with the DMA;
 - (ii) contacting the complex of (i) with an aminated surface of the solid phase device; and
 - (iii) isolating and/or analyzing the nucleic acid of the complex.
2. The method according to claim 1, wherein the nucleic acid sample is extracted with a protease, preferably proteinase K.
3. The method according to claim 1 or 2, wherein the nucleic acid comprises methylated DNA.
4. The method according to any one of claims 1-3, wherein the solid phase device is a micro fluidic device.
5. The method according to any one of claims 1-3, wherein the solid phase device is a ring resonator.
6. The method according to claim 5, further comprising
 - (i) determining an output light intensity measured by a detector of an optical sensing system;
 - (ii) determining a change in an effective refractive index of a resonator of the optical sensing system, during the incubation.
7. The method according to any one of claims 1 to 6 further comprising eluting the complex.
8. The method according to claim 5, wherein said ring resonator comprises a waveguide structure.
9. The method according to any one of claims 1-8 wherein the complex is modified at non-methylated cytosine residues.
10. The method according to any one of claims 1-9 wherein the complex or the modified complex is amplified.
11. The method according to any one of claims 1-10 wherein the complex or the modified complex is detected.
12. A system for isolating a nucleic acid molecule of interest in a nucleic acid sample comprising:

(i) a Dimethyl adipimidate (DMA) compound for directly binding the nucleic acid molecule to form a complex between the nucleic acid molecule and the DMA compound; and

(ii) an aminated solid surface for the interaction of the nucleic acid molecule and the DMA compound to form the complex thereon, wherein

(A) the aminated solid surface is on a ring resonator being an optical detection sensor wherein said detection sensor has an altered reading when said nucleic acid molecule is bound to said DMA such that said sensor is configured to sense the complex formed between the nucleic acid molecule and the DMA compound; and/or

(B) the system does not contain a DMA cross-linked protein intermediary for binding the nucleic acid molecule.

13. The system according to claim 12, wherein the solid surface is on a micro fluidic device.

14. The system according to claim 12 wherein the optical detection sensor is configured to resonate at a resonant wavelength.

15. The system according to claim 14 further comprising a tunable laser capable of providing light at said resonant wavelength for the optical sensor.

16. The system of any one of Claims 12-15, wherein the optical sensor or ring resonator comprises a waveguide structure.

17. The system of any one of Claims 12-16, wherein said resonator has a resonant wavelength that shifts when said nucleic acid molecule is bound to said DMA, forming said complex.