

optical trap, under the stretching force of the filament, and attaching the particle the chamber surface at such position.

7. The method of claim 6, wherein the filament is fluorescent-labeled, and the filament is examined in its extended condition by fluorescence-light illumination.

8. The method of claim 6, wherein the filament is labeled with a fluorescent DNA-intercalating dye, and the concentration of the dye in the filament is selectively reduced by addition to the solution of polymer particles effective to binding to the dye.

9. A method of nucleic acid filament sample preparation, for examining a filament in an extended condition within a chamber, comprising

coupling one end of the filament to a particle, with the particle and attached filament suspended in a thin film of aqueous medium, and the opposite end of the filament anchored in a chamber, capturing the particle in an optical beam trap, manipulating the position of the particle relative to the other end of the filament, to place the filament in the film in an extended condition, and fixing the filament in an extended condition.

10. The method of claim 9, wherein said fixing includes attaching the particle to the chamber positioning the particle against a surface of said chamber and holding the particle at a substantially stationary position in the optical trap for a period sufficient to fuse the particle to the chamber surface.

11. The method of claim 10, which further comprises adjusting the power of the divergent beam source, to

produce a trapping force equal to a selected stretching force of the filament manipulating the particle to a position at which the particle can just escape from the optical trap, under the stretching force of the filament, and attaching the particle to the chamber surface at such position.

12. The method of claim 9, which further includes binding to the filament, a binding agent (i) effective to bind specifically to a selected sequence, and (ii) having a detectable reporter moiety, and determining the position of the reporter moiety along the filament in its extended position.

13. The method of claim 12, wherein said binding includes binding a second sequence-specific probe to the filament, where the two probes are homologous in sequence to the selected base sequences of interest, and determining the distance between the probes with the filament in its extended condition.

14. The method of claim 12, which further includes binding to the filament, such protein having a detectable reporter moiety, and determining the position of the reporter moiety along the filament in its extended position.

15. The method of claim 14, which further includes measuring the distance between the filament ends.

16. The method of claim 14, which further includes contacting a polymerase labeled with a fluorescence reporter with the extended filament, under reaction conditions which promote polymerase activity when the enzyme is bound to the filament as a substrate.

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