Claims

1. A method of detecting clustering of a Ras protein in a cell, the method comprising: a) culturing the cell on an array comprising a plurality of nanostructures; and b) visualizing the Ras protein using optical microscopy to detect clustering of the Ras protein around the plurality of nanostructures, wherein the Ras is labelled and
   i) wherein an increase in the degree of Ras clustering as compared to a reference indicates that the Ras is a mutant Ras with more than 100% biological activity as compared to wild-type Ras.

2. The method of claim 1, wherein the Ras protein is an endogenous or heterologous Ras protein.

3. The method of claim 1 or 2, wherein the method comprises labelling the Ras protein with a fluorescence tag.

4. The method of any one of claims 1 to 3, wherein the plurality of nanostructures comprises a combination of curved and flat surfaces.

5. The method of any one of claims 1 to 4, wherein a curved surface has an arc width of less than about 1050 nm.

6. The method of any one of claims 1 to 5, wherein the nanostructures are nanobars.

7. The method of any one of claims 1 to 6, wherein an increase in the degree of Ras clustering as compared to a wild-type Ras protein indicates that the Ras protein has a G12V, G13D or Q61pK mutation.

8. The method of any one of claims 1 to 7, wherein the cell is treated with a drug molecule or candidate drug molecule.

9. The method of claim 8, wherein a change in the degree of Ras clustering as compared to a reference provides an indication of the specificity and/or sensitivity of an anti-Ras drug molecule or candidate drug molecule.

10. A method of predicting the biological activity of Ras protein in a cell, the method comprising: a) culturing the cell on an array comprising a plurality of nanostructures; and b) visualizing the Ras protein using optical microscopy to detect clustering of the Ras protein around the plurality of nanostructures, wherein the Ras is labelled and

    wherein an increase in the degree of Ras clustering as compared to a reference predicts the biological activity of Ras in the cell as a oncogenic mutant Ras with more than 100% biological activity as compared to a wild-type Ras, while a decrease in the degree of Ras clustering as compared to a reference predicts the biological activity of Ras in the cell as a mutant Ras with less than 100% biological activity as compared to wild-type Ras.

11. A method of identifying the mutation status of Ras in a cell, the method comprising: a) culturing the cell on an array comprising a plurality of nanostructures; and b) visualizing the Ras protein using optical microscopy to detect clustering of the Ras protein around the plurality of nanostructures, wherein the Ras protein is labelled, and wherein an increase in the degree of Ras clustering as compared to a reference indicates that the Ras is a mutant Ras with more than 100% biological activity as compared to wild-type Ras.

12. A method of identifying a subject suffering or is likely to be suffering from a cancer associated with a Ras mutant, the method comprising: a) culturing a cancer cell from the subject on an array comprising a plurality of nanostructures; and b) visualizing the Ras protein using optical microscopy to detect clustering of the Ras protein around the plurality of nanostructures, wherein the Ras protein is labelled, and wherein an increase in the degree of Ras clustering as compared to a reference identifies the subject as one suffering or is likely to be suffering from a cancer associated with a Ras mutant with more than 100% biological activity as compared to wild-type Ras.

13. A method of screening for a drug compound, the method comprising: a) culturing a cell on an array comprising a plurality of nanostructures; b) contacting the cell with a candidate drug compound, c) visualizing K-Ras protein using optical microscopy to detect a decrease in the degree of clustering of the K-Ras protein around the plurality of nanostructures as compared to a reference, wherein the K-Ras protein is

labelled, wherein the K-Ras is a mutant K-Ras with more than 100% biological activity as compared to wild-type K-Ras.

14. The method of claim 13, wherein the labelled protein is a membrane-associated protein.

15. The method of claim 13 or 14, wherein the drug compound is one that is capable of promoting or inhibiting clustering of the labelled protein.

16. The method of any one of claims 13 to 15, wherein the cell is one that has been obtained from a subject.

17. A method of predicting the efficacy of an anti-Ras drug on a subject, the method comprising: a) culturing a cell that is obtained from the subject on an array comprising a plurality of nanostructures; b) contacting the cell with the anti-Ras drug, c) visualizing K-Ras protein using optical microscopy to detect a decrease in the degree of clustering of the K-Ras protein around the plurality of nanostructures as compared to a reference, wherein the K-Ras protein is labelled, and wherein an decrease in the degree of clustering of the K-Ras protein as compared to a reference predicts the efficacy of the anti-Ras drug on the subject, wherein the K-Ras is a mutant K-Ras with more than 100% biological activity as compared to wild-type K-Ras.