

CLAIMS

1. A method for identifying a status of at least one cell in a cell culture including resorufin in an anaerobic atmosphere, comprising:

while maintaining the cell culture in an anaerobic atmosphere, measuring the extent of reduction of resorufin in the cell culture to dihydrosorufin.

2. The method of claim 1, wherein the measuring comprises measuring the fluorescence of the cell culture.

3. The method of claim 1, wherein the at least one cell is loaded in one or more microwells of a microfabricated chip.

4. The method of claim 1, wherein the at least one cell is loaded in one or more droplets on a droplet-based platform.

5. The method of claim 1, wherein the at least one cell comprises a prokaryotic cell,

6. The method of claim 1, wherein the at least one cell comprises a eukaryotic cell.

7. The method of claim 1, wherein the at least one cell comprises a bacterial cell.

8. The method of claim 1, wherein the measuring is performed for a plurality of times.

9. The method of claim 1, wherein cell culture is prepared by first mixing resorufin with a culture media, and then combining the at least one cell with the resorufin-loaded culture media.

10. The method of claim 1, wherein the status of the at least one cell comprises the metabolic activity of the at least one cell.

11. The method of claim 1, further comprising: determining the presence or absence of at least one biological entity in the cell culture based on the measured extent of reduction of resorufin to dihydroresorufin.

12. A method of using a high density cell cultivation platform comprising a plurality of experimental units, comprising:

loading a sample onto the high density cell cultivation platform such that at least one experimental unit of the plurality of experimental units includes at least one cell, an amount of a nutrient, and resorufin;

culturing a plurality of cells from the at least one cell in the at least one experimental unit in an anaerobic atmosphere; and

measuring fluorescence of the contents of the at least one experimental unit.

13. The method of claim 12, wherein the high density cell cultivation platform is a microfabricated device having a top surface defining an array of microwells as experimental units, the microwells having a surface density of at least 500 microwells per cm^2 or at least 750 microwells per cm^2 .

14. The method of claim 13, wherein the microwells each have a volume of no more than 5 nL.

15. The method of claim 12, further comprising: determining the presence or absence of at least one biological entity in the at least one experimental unit based on the measured fluorescence.

16. The method of claim 12, further comprising: based on the measured fluorescence, determining whether to select and transfer some cells from the plurality of cells to one or more target location.

17. The method of claim 12, wherein the high density cell cultivation platform is a droplet-based platform and the plurality of experimental units each comprise to a droplet on the droplet-based platform.