Skills for Engineering (MAE4008-B)

Medical & Healthcare Technology Stage one - Project 1

TASK 4

Cell Viability / Population Double Time (PDT)

4.1 Cell viability analysis

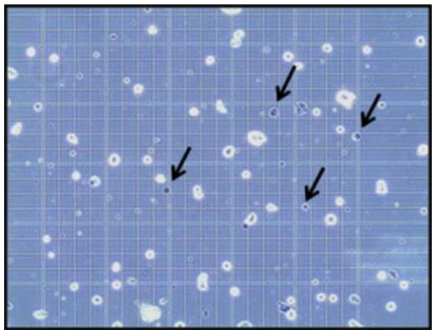
Cell viability is a determination of living (capable of growth) or dead cells, based on a total cell sample. The measurement of cell viability plays a fundamental role in all forms of cell culture. Sometimes it is the main purpose of the experiment, such as in toxicity assays and autologous cell transplantation (ACT).

There are wide arrays of cell viability methods which range from the most routine trypan blue dye exclusion assay to highly complex analysis of individual cells.

Trypan blue dye

Cell viability is determined by staining the cells with trypan blue.

- Trypan blue dye is permeable to non-viable cells or death cells whereas it is impermeable to this dye
- Stain the cells with trypan dye and load to haemocytometer and calculate % of viable cells



Dead cells stained by Trypan blue (arrows)

Percentage of viable cells:

$$\% \text{ of viable cells} = \frac{\text{Number of unstained cells}}{\text{Total number of cells}} \text{ x } 100$$

4.2 Population doubling time (PDT)

One of the most important parameter of cell culture is determination of the population doubling time (PDT) which is a two-fold increase in the total number of cells in a culture. Population doubling time (PDT) is determined using the equation below.

$$PDT = T \frac{\ln 2}{\ln\left(\frac{Xe}{Xb}\right)}$$

T = the incubation time in any units.

Xb = the cell number at the beginning of the incubation time.

Xe = the cell number at the end of the incubation time.