Quantifying cells within the tissue culture hood by simple light emitting diode(LED) technology

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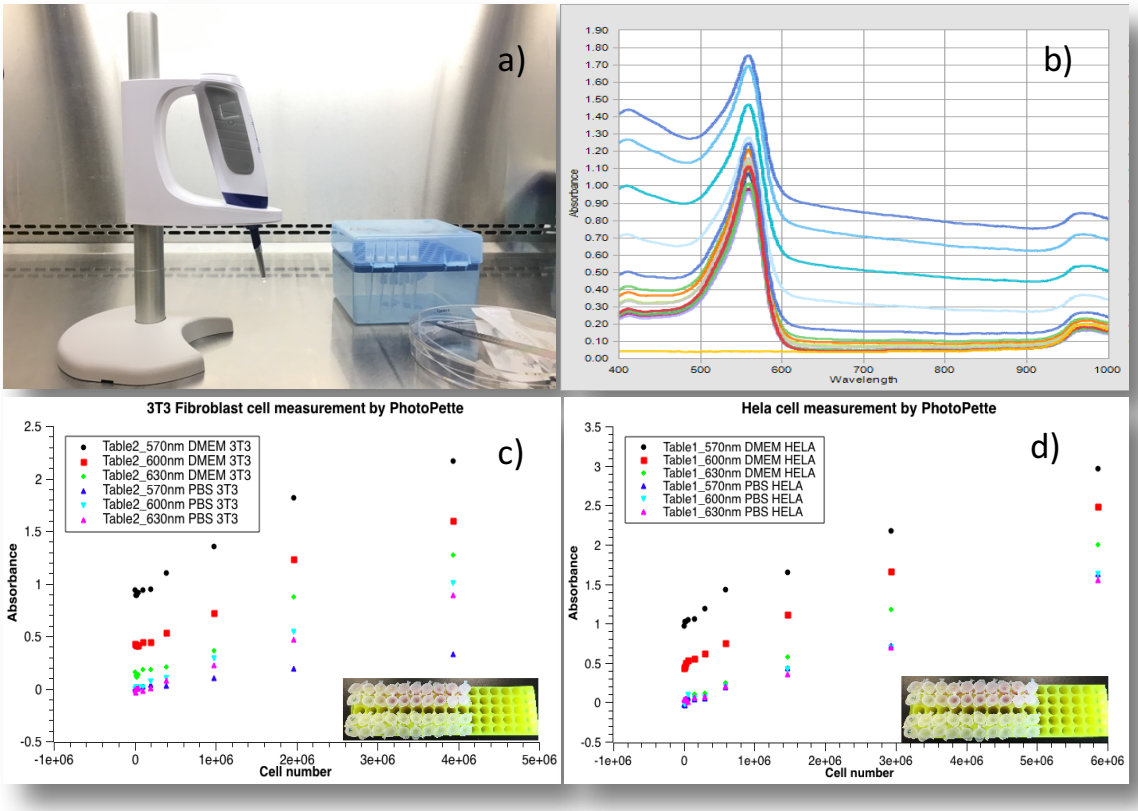
Abstract:

We have developed a photometry system for cell number in suspensions of tissue culture cells. Cell suspensions are turbid and absorb and scatter the light. The higher the cell concentration, the higher the turbidity. Although spectrophotometers can measure intensity of light very accurately, this method is not widely used because of its large volume of sample requirement and bulky system. By using a led emitting diode as light source and photodiode as detector, we minimized the device to handheld size which can measure the optical density of cell suspension within the tissue culture hood. An optical measurement tip was designed, which only requires less than 50 µl. A standard curve of absorbance vs. cell density is used to estimate cell number with accuracy and reproducibility could compete with hemocytometer counting and with speed and ease surpassing use of a Coulter counter. The limit of detection of our system can reach 10,000 cell/mL. The device should be readily extended to assays of cell number directly within microplate culture wells. The photometry assay described here is of significant use in all experiments requiring rapid, measurements of cell number, including determinations of cell doubling time and equal plating of parallel cultures.



a)Our optical device PhotoPette b)spectrum analyze of different cell density samples to determine the certain wavelength light source c)3T3 fibroblast cell measured with PhotoPette in DMEM and PBS buffer in different wavelengths d)Hela cell measured with PhotoPette in DMEM and PBS buffer in different wavelengths