

## Label-free differentiation of human immunodeficiency virus-1 infected from uninfected cells using transmission measurement

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### **Abstract:**

Transmission measurement has been perceived as a potential candidate for label-free investigation of biological material. It is a real-time, label-free and non-invasive optical detection technique that has found wide applications in pharmaceutical industry as well as the biological and medical fields. Combining transmission measurement with optical trapping has emerged as a powerful tool allowing stable sample trapping, while also facilitating transmittance data analysis. In this study, a near-infrared laser beam emitting at a wavelength of 1064 nm was used for both optical trapping and transmission measurement investigation of human immunodeficiency virus 1 (HIV-1) infected and uninfected TZM-bl cells. The measurements of the transmittance intensity of individual cells in solution were carried out using a home built optical trapping system combined with laser transmission setup using a single beam gradient trap. Transmittance spectral intensity patterns revealed significant differences between the HIV-1 infected and uninfected cells. This result suggests that the transmittance data analysis technique used in this study has the potential to differentiate between infected and uninfected TZM-bl cells without the use of labels. The results obtained in this study could pave a way into developing an HIV-1 label-free diagnostic tool with possible applications at the point of care.