Retrovirology

Poster presentation

A High Throughput Quantum Dot-based Fluorescence Assay for Quantitation of HTLV-1 Binding and Attachment

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Quantum dots (Qdots) are fluorescent semiconductor nanocrystals comprised of CdSe core with a semiconductor shell of zinc sulfide coated with a polymer shell allowing particles to be conjugated to biological molecules while retaining the optical properties of the particle. We have used this unique property of Qdots to develop a high throughput binding assay to study the attachment of HTLV-1 to host cells. To this end, we have biotinylated cell-free HTLV-1 (biot-HTLV-1) to facilitate viral detection using streptavidin-coated Qdots. B cells (BTHP-1 and Ramos) were exposed to biot-HTLV-1 with increasing concentrations of DEAE-dextran, a reagent known to enhance binding of other retroviruses. Unbound virus was removed by washing and cells were added with strep-Qdots and fluorescence readings were obtained at 605 nm. HTLV-1 bound efficiently to BTHP-1 and Ramos cells and this binding was significantly increased (3-fold) by DEAE-dextran. To confirm the specificity of viral binding, a competitive inhibition assay was performed wherein increasing amounts of non-biotinylated HTLV-1 was added to the binding assay along with a fixed amount of biot-HTLV-1. A dose-dependent inhibition in biot-HTLV-1 binding was observed in the presence of native virus. These results suggest that the Qdot-based assay may be useful in studying virus attachement to host cells, and the screening of inhibitors for viral binding and entry.