

Two-photon in vivo flow cytometry using a fiber probe

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Abstract

We have demonstrated the use of a double-clad fiber probe to conduct two-photon excited flow cytometry in vitro and in vivo. We conducted two-channel detection to measure fluorescence at two distinct wavelengths simultaneously. Because the scattering and absorption problems from whole blood were circumvented by the fiber probe, the detected signal strength from the cells were found to be similar in PBS and in whole blood. We achieved the same detection efficiency of the membrane-binding lipophilic dye DiD labeled cells in PBS and in whole blood. High detection efficiency of green fluorescent protein (GFP)-expressing cells in whole blood was demonstrated. DiD-labeled untransfected and GFP-transfected cells were injected into live mice and the circulation dynamics of the externally injected cells were monitored. The detection efficiency of GFP-expressing cells in vivo was consistent with that observed in whole blood.