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In vitro optical measurements of the interaction between human lung cells and single-wall carbon nanotubes M. L. BECKER, J. A. FAGAN, J. CHUN, B. J. BAUER, E. K. HOBBIE, NIST — The intrinsic band gap fluorescence of individual semiconducting single-wall carbon nanotubes (SWNTs) stabilized with single-stranded DNA and deoxycholate surfactant is exploited to optically measure the interaction between human lung cells and length-fractionated SWNTs. Using near-infrared (NIR) fluorescence microscopy in microfluidic flow platforms, live human lung fibroblasts (IMR-90) are exposed to controlled quantities of length-sorted single wall nanotubes, and the cellular interaction and uptake of the SWNTs is optically monitored in real space-time. Cell mortality is shown to result from the uptake of shorter nanotubes and is correlated with both SWNT length and concentration. The NIR optical measurements are used to identify potential uptake mechanisms and quantify the kinetics of the interaction.

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