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Biocompatibility of Carbon Nanotubes in Mammalian Cells: An Imaging Based Approach HOWARD CHEN, Massachusetts General Hospital, Harvard Medical School, JESSICA LUCAS, Simmons College, HANNAH PONEK, CHRISTOPHER EVANS, BRADLY BAER, SARA CHOUNG, MICHELLE CHEN, Point Loma Nazarene University — Carbon nanotubes have been widely researched for ultrasensitive biomolecule detection and drug delivery. However, its impact on cells is yet to be fully characterized, mainly due to the complex biological in vivo environment. We report here a mammalian cell-imaging paradigm to study the cellular response to single-walled carbon nanotubes (SWNTs) at the single-cell level. Chinese Hamster Ovarian cells were exposed to SWNTs resuspended in phosphate buffered saline (PBS) at various concentrations. Upon exposure, we optically imaged the cells (1) to visually quantify the SWNTs' crossing of the cell membrane in real-time; (2) to both qualitatively and quantitatively assess the morphological changes associated with cellular stress in the presence of SWNTs; and (3) to serially quantify cell survival with highly sensitive bioluminescence-based imaging. Consistent with literature reports, high concentration of SWNTs acutely compromised cell division and decreased cell survival. Low concentrations were well tolerated by the cells initially but had similar effects after prolonged exposure. We discuss the inter-relationships among the cell morphology, viability, and intracellular SWNT uptake parameters, as a function of nanotube concentration and exposure time.

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