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SYMPOSIUM

Single-Walled Carbon Nanotube-Based Near-Infrared Optical Glucose Sensors toward *In Vivo* Continuous Glucose Monitoring

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Abstract

This article reviews research efforts on developing single-walled carbon nanotube (SWNT)-based near-infrared (NIR) optical glucose sensors toward long-term *in vivo* continuous glucose monitoring (CGM). We first discuss the unique optical properties of SWNTs and compare SWNTs with traditional organic and nanoparticle fluorophores regarding *in vivo* glucose-sensing applications. We then present our development of SWNT-based glucose sensors that use glucose-binding proteins and boronic acids as a high-affinity molecular receptor for glucose and transduce binding events on the receptors to modulate SWNT fluorescence. Finally, we discuss opportunities and challenges in translating the emerging technology of SWNT-based NIR optical glucose sensors into *in vivo* CGM for practical clinical use.

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Abbreviations: (BA) boronic acid, (CGM) continuous glucose monitoring, (CPBA) carboxyphenylboronic acid, (DX) dexamethasone, (ICG) indocyanine green, (GBP) glucose-binding protein, (MWNT) multiwalled carbon nanotube, (NIR) near-infrared, (PPEG8) polyethylene glycol, eight-member, branched polymer, (PVA) polyvinyl alcohol, (SC) sodium cholate, (SWNT) single-walled carbon nanotube, (VEGF) vascular endothelial growth factor

Keywords: continuous glucose monitoring, glucose, near-infrared fluorescence, single-walled carbon nanotube

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