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Dr Daniel is a tenure-track assistant professor at the Depts of Ophthalmology, Anatomy, Biomedical Engineering, Neurobiology Program and Center for Innovation & Precision Eye Health (InVision) at National University of Singapore (NUS). His major research interests span across interdisciplinary technologies for neuroscience and translational therapeutics, such wireless optogenetics and photodynamic therapy (PDT) in neuroscience and ophthalmology. Through his diverse expertise, Dr Daniel is driving forward innovative solutions to address therapeutics gap in vision care, neuroscience and cancer. He was a Japanese Government scholar from 2009-2014 and has been awarded with the Outstanding Research Fellow at Yong Loo Lin School of Medicine in 2021, followed by the Junior Chamber International (Singapore), Ten Outstanding Young Persons (Singaporean) in 2022. In 2024, he co-founded the NUS-spin off "Sirius Therapeutics Pte Ltd" following his wireless PDT technology.

Topic: Wireless Photodynamic Therapy in Orthotopic Glioblastoma Mice Model

Near-infrared (NIR) activatable upconversion nanoparticles (UCNPs) offer a wireless approach to photodynamic therapy (PDT) for deep-seated tumors by converting NIR to visible light. Visible light can then be used to target 5-Aminolevulinic Acid (5-ALA), functioning as a photosensitizer in glioblastoma. However, nanoparticles unsequestered retention hampers clinical translation. To overcome this, biocompatible UCNPs implants with tunable emission spectra are developed, featuring an FDA-approved core for flexibility and optical guidance. These implants, capable of wirelessly transmitting upconverted visible light up to 8 cm, enable untethered and repetitive PDT in orthotopic glioblastoma multiforme (GBM) xenograft mouse model.