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## Multi-theranostic nanocapsule encapsulated with multiple drugs and Gd-neutron capture therapy facilitated by stem cell-magneto-based targeting for GBM

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Neutron capture therapy (NCT) had been demonstrated as a non-invasive approach for the selective destruction of cancer cells by radiations emitted from nonradioactive NCT agents upon capturing thermal neutrons. In terms of the chemical agents for NCT, <sup>6</sup>Lithium, <sup>10</sup>Boron, <sup>157</sup>Gadolinium, or <sup>235</sup>Uranium nuclides have showed the ability for NCT. Besides the limited delivery of drugs across the blood brain barrier (BBB), no single compound or molecule of NCT agents will be able to target every tumor cell. Therefore, in order to move the NCT therapy to clinical application, it is mandatory to develop the other non-toxic nano-technological and/or cell-based delivery strategies to enhance the biocompatibility and accuracy of NCT for cancer treatment. Mesenchymal stem cells (MSCs) regarding as a cellular vehicle/vector showed a unique tumor-homing tropism for targeted delivery of anticancer substances to animal models of various tumors, including melanoma, glioblastoma and breast cancer. Glioblastoma multiforme (GBM) is the most common deadly malignancy of the central nervous system. It is crucial to identify the ideal therapeutic protocols to target the tumor tissue while sparing healthy brain. In this report, we develop a MSC-based vehicles terrace that integrate the tumor homing of stem cells (MSC-PVA@Fe-SSZ-Gd) and multi-functionalized core-shell Polyvinyl alcohol-derived nanocapsule strengthened by iron oxide (PVA@Fe), which was equipped with interior Gd-DTPA surrounding by outer chemotherapeutic drug (Sulfasalazine). We report the first platform of GBM treatment using stem cell-oriented chaperon delivery of magnet-targeted multimodality fucoidan-derived nanoparticle incorporating with both GD-DTPA and SSZ for triple MR cancer imaging, Gd-NCT radiotherapy and chemotherapy.

### Biography

Yen-Ho Lai has attended his PhD from National Chiao Tung University in Department of Materials Science and Engineering. He is major in Biomaterial field. He has published 2 papers in reputed journals.

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