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Synthesis of functional liposomes for targeted chemotherapy and photodynamic therapy in brain tumor

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The aims of the present proposal are the preparation and utilization nanomaterials to develop a new brain tumor theranostic system by taking advantages of nanotechnology to efficiently deliver Temozolomide (TMZ) and photosensitizer (PpIX) into brain parenchyma and to estimate the feasibility in clinical application. In this study, we will develop targeted core/shell liposomes which can cross the blood brain barrier (BBB) or blood tumor barrier (BTB) and deliver TMZ and PpIX into tumor cells. Besides, we also will irradiate the PpIX by Blue Light Emitter to monitor the location of tumor cells that can enhance the accuracy of surgery, and then the residual tumor cells can be inhibited by targeted chemotherapy and photodynamic therapy. To accomplish this goal, the transferrin receptor antibody (anti-TfR) must be conjugated on the surface of liposomes to significantly raise the its efficacy of BBB penetration. Such as synergistic applications of emerging technologies promise to provide more effective methods of tumor treatment and accurate diagnosis, with lower therapeutic doses and potentially fewer side effects.

Keywords: Nanomaterials, core/shell liposomes, photodynamic therapy and imaging, malignant brain tumor, blood-brain barrier

Biography

Chih Wen Lin is a PhD candidate working under the supervision of Dr. Chen-Chi M. Ma at the Department of Chemical Engineering, National Tsing Hua University (2012-present). His main research interests include drug/gene delivery, theranostics, biosensor. His researches focuses on the use of graphene-based nanomaterials to develop the effectiveness strategic for diagnosis and treatment of brain tumor. Lin also cooperates with the Department of Neurosurgery, Chang Gung Memorial Hospital during his graduate study period. Lin has published seven research articles in SCI journals, and several poster/oral presentations at International and local conferences.

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