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Rapid *in situ* gelation by blue light-irradiation for combination therapy in brain tumor

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About 40,000 people are diagnosed with primary brain tumor in the United States each year, an estimated 15,000 have glioblastoma multiforme (GBM), still associated with poor prognosis with 14.6 months of median survival after surgical resection combined with chemotherapy and radiation. It is a significant clinical challenge that preventing tumor from recurrence after surgical resection because current methods deliver chemotherapeutic agents in a rapid manner and is not effective against the residual tumor cells, such as Gliadel®. To overcome this drawback, we develop a blue light-crosslinking hydrogel which can be rapidly gelled *in situ* and tightly adhere on the tissues for controlled chemotherapy, radiotherapy and enhanced laser interstitial thermal therapy (LITT) to continue the inhibition of residual tumor cells for preventing recurrence after surgical resection. The principle goals are to: (1) Determine the prevailing factors that affect efficient encapsulation of chemotherapeutic drugs (i.e., Epirubicin or Temozolomide) and radio-sensitizer (i.e., Cisplatin) within hydrogels, (2) Demonstrate efficiency of gelation, LITT enhancement, *in vitro* drug release and (3) Evaluate the efficiency in human cancer cells and *in vivo* tumor model. Thus, we used highly biocompatible material derived from collagen, gelatin as hydrogel scaffold to encapsulate small molecule drug (Epirubicin and Cisplatin). Our preliminary results have demonstrated this multi-treatment system can effectively prevent tumor recurrence and significantly prolong the medium survival of gliosarcoma-bearing (MBR 614 or U87) mice to around 50 days compared with the control group (18 days). We believe this synergistic strategy presents a new approach to the development of a local drug delivery system for the prevention of brain tumor recurrence.

Biography

Hung Chun Wang had studied Chemistry in National Sun Yat-sen University. He is currently studying in the Institute of Medical Science and Technology of National Sun Yat-sen University. His research focuses on biomaterial as anticancer drug carrier in multi-treatment therapy.

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