

An Activatable Prodrug for the Treatment of Metastatic Tumors

Authors : Eun-Joong Kim, Sankarprasad Bhuniya, Hyunseung Lee, Hyun Min Kim, Chaejoon Cheong, Su-khendu Maiti, Kwan Soo Hong, Jong Seung Kim

Abstract : Metastatic cancers have historically been difficult to treat. However, metastatic tumors have been found to have high levels of reactive oxygen species such as hydrogen peroxide (H₂O₂), supporting the hypothesis that a prodrug could be activated by intracellular H₂O₂ and lead to a potential anti-metastatic therapy. In this study, prodrug 7 was designed to be activated by H₂O₂-mediated boronate oxidation, resulting in activation of the fluorophore for detection and release of the therapeutic agent, SN-38. Drug release from prodrug 7 was investigated by monitoring fluorescence after addition of H₂O₂ to the cancer cells. Prodrug 7 activated by H₂O₂ selectively inhibited tumor cell growth. Furthermore, intratracheally administered prodrug 7 showed effective anti-tumor activity in a mouse model of metastatic lung disease. Thus, this H₂O₂-responsive prodrug has therapeutic potential as a novel treatment for metastatic cancer via cellular imaging with fluorescence as well as selective release of the anti-cancer drug, SN-38.

Keywords : hydrogen peroxide, prodrug, metastatic tumors, fluorescence

Conference Title : ICBS 2014 : International Conference on Bioimaging and Sensing

Conference Location : Barcelona, Spain

Conference Dates : October 27-28, 2014