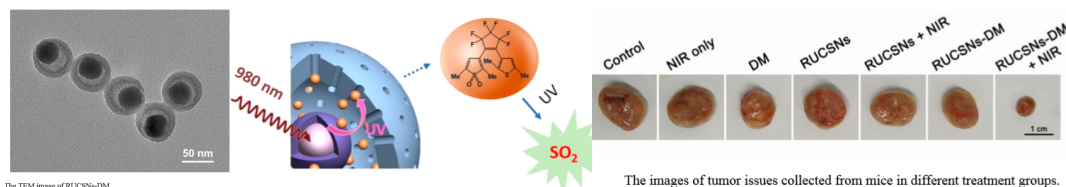


Near-Infrared Light-Triggered Sulfur Dioxide Gas Therapy of Cancer

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Abstract

Gas therapy is widely used in various diseases. However, some uncontrollable factors may limit this method on cancer. The unknown mechanisms between gas molecular and tumor tissues also restrict this method. This article, researching about sulfur dioxide gas therapy of cancer, introduced an efficient method to kill tumor cells and showed some evidences which indicated that this method can't effect normal physical operation during treatment. They used SO_2 , which has been known as a toxic substance, to interact with tumor tissues. To conquer the bad biocompatibility, they use SO_2 prodrug, 1-(2,5-dimethylthien-1,1-dioxide-3-yl)-2-(2,5-dimethylthien-3-yl)-hexafluorocyclopentene (DM), instead of SO_2 molecular. When DM molecular exposes to UV light, SO_2 molecular is then released. However, UV light can't penetrate into deep tissues and it is damage of body. In order to make this method used, they synthesized a rattle-structured upconversion@silica nanoparticles (RUCNPs), which are used as SO_2 prodrug-loaded. This nanoparticle can release UV light when it was excited by near-infrared (NIR) light. It also has an outstanding SO_2 prodrug-loaded ability. In addition, NIR light has the maximum depth of penetration in tissue. Therefore, upon we irradiate NIR light to tumor tissue which was treated with RUCNPs-DM, SO_2 may release on-demand and makes the tumor tissues start to apoptosis.



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