

Overcoming drug resistance in cancer through hypoxia-based drug release control

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Hypoxia due to improper supply of oxygen is characteristic of various diseases, including cancer and vascular disease. Hypoxia condition makes cancer tissues resistant to photodynamic therapy and some chemotherapy. Therefore, hypoxia is a problem that we must overcome when using a drug delivery system, and it will also be a useful tool. In this work, we developed HSA-based nanoparticles, RGD-PEG/Ce6-Azo/PTX-HSA nanoparticles (RGD-PEG/Ce6-Azo/PTX-HNPs), in which the chemotherapeutic agent PTX and photosensitizer Ce6 were co-incorporated for targeted chemo-photodynamic combination cancer therapy. Azo bonds break when exposed to a hypoxia environment, releasing Ce6. We confirmed that these nanoparticles release Chlorin e6 effectively in hypoxia condition, and through this, it was confirmed that PDT effect and chemotherapeutic anticancer effect are increased.