

Biomaterial-Assisted Cancer Immunotherapy

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Despite the great promise of immune checkpoint blockade (ICB) therapy for cancer treatment, the currently available options for ICB treatment pose major clinical challenges, including the risk of severe systemic auto-immune responses. Here, we developed a novel localized delivery platform, immuno-bioglue (imuGlue), which is inspired by the intrinsic underwater adhesion properties of marine mussels and can allow the optimal retention of anti-PD-L1 drugs at tumor sites and the on-demand release of drugs in response to the tumor microenvironment. Using a triple-negative breast cancer and melanoma models, we found that imuGlue could significantly enhance anti-tumor efficacy by eliciting a robust T cell-mediated immune response while reducing systemic toxicity by preventing the rapid diffusion of anti-PD-L1 drugs into the systemic circulation and other tissues. It was also demonstrated that imuGlue could be successfully utilized for combination therapy with other immunomodulatory drugs to enhance the anti-tumor efficacy of ICB-based immunotherapy, demonstrating its versatility as a new treatment option for cancer immunotherapy.