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IMMUNOTHERAPY

Platelets to the rescue

One of the main challenges in clinical oncology is the prevention of postsurgical cancer recurrence, which originates from residual microscopic tumour tissue and/or circulating tumour cells (CTCs) that remain after surgery. To address this problem, Zhen Gu and colleagues hypothesized that platelets might be able to deliver immunotherapeutic agents to cancer cells after surgery; results of their study have now been published in *Nature Biomedical Engineering*.

Platelets are anucleated cellular fragments that can migrate to the site of surgical wounds, and have also been described to interact with CTCs. On the methodology used, Gu explains, "we simply conjugated antibodies against PD-L1 (aPDL1) to the surface of platelets (designated P-aPDL1). Unexpectedly, we found that the binding of aPDL1 to nonactivated platelets was highly stable, whereas the release of the antibody was promoted upon platelet activation."

Postsurgical local disease recurrence was studied in mouse models of either melanoma or breast cancer. Upon postsurgical P-aPDL1 injection, aPDL1 enrichment was observed in the surgical wound area and in residual tumours. Tumour recurrence was monitored after surgery and injection of phosphate-buffered saline, platelets, aPDL1, or P-aPDL1. The latter group had the smallest relapsed-tumour volumes and 75% survival at 60 days — in contrast with 0% beyond day 30 in the other groups. P-aPDL1 injection was associated with increased secretion of proinflammatory cytokines and a strong T-cell-mediated immune response.

On the clinical implications of these findings, Gu comments, "patients sometimes require a platelet transfusion after surgery to enhance wound healing. Thus, we want to pursue further studies on the potential clinical translation of our method, which might inspire new measures for prevention of cancer recurrence."

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ORIGINAL ARTICLE Wang, C., *et al. In situ* activation of platelets with checkpoint inhibitors for post-surgical cancer immunotherapy. *Nat. Biomed. Eng.* **1**, 0011 (2017)