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Platelet storage solution improves the in vitro function of preserved platelet concentrate.

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BACKGROUND AND OBJECTIVES: Stored platelets develop biochemical lesions, manifest as depressed haemostatic function, clot retraction and wound healing. ViaCyte trade mark, a proprietary experimental preservative solution (comprising D-ribose, D-glucose, Hanks solution, Hepes solution, bovine serum albumin, tic anticoagulant peptide and sterile water), was tested in comparison with the presently accepted storage solution, citrate-dextrose-phosphate-plasma (CDP-P), to evaluate its ability to preserve platelet function during storage.

MATERIALS AND METHODS: Platelets stored in ViaCyte and platelets suspended in CDP-P were transferred to polypropylene tubes with PL732 covers and analysed for adenine nucleotide levels (ATP molecules), in vitro agonist-mediated P-selectin expression and aggregation.

RESULTS: After 5 days of storage at room temperature, 12.2% of platelets stored in ViaCyte exhibited P-selectin expression at rest, and 64.2% exhibited P-selectin expression upon activation with thrombin challenge, an increase of 52%. Platelets stored in CDP-P exhibited 44.4% P-selectin expression at rest, suggesting significant activation during storage, and thrombin stimulation resulted in P-selectin expression of 47.9%, an increase of only 2.5% ($P < \text{or} = 0.002$, untreated vs. treated). ViaCyte also maintained ATP levels throughout the storage period, while these levels became depressed in platelets stored in CDP-P ($P < \text{or} = 0.02$, untreated vs. treated). Storing platelets in the experimental preservative solution maintained their ability to aggregate, while control platelets lost their ability to aggregate in response to agonist.

CONCLUSIONS: ViaCyte appears to protect platelets during storage, reflected by a low level of induced lesions. Platelets stored in ViaCyte maintain energy levels at their resting state, which preserves their ability to aggregate and secrete granule contents, and ensures the availability of additional platelets for activation upon in vitro challenge.

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