

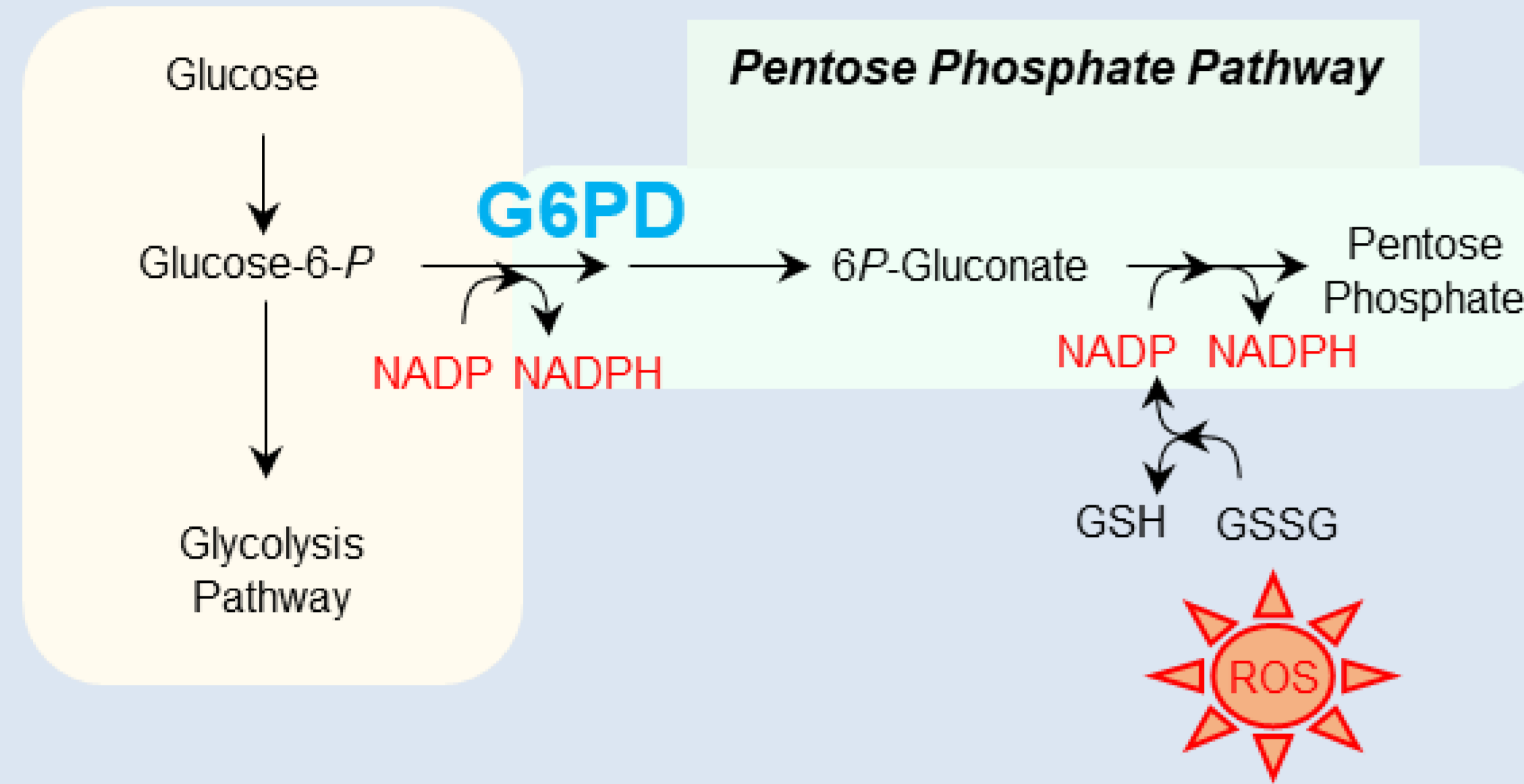
The Effect of Glucose-6-Phosphate Dehydrogenase Inhibition in Platelet Storage

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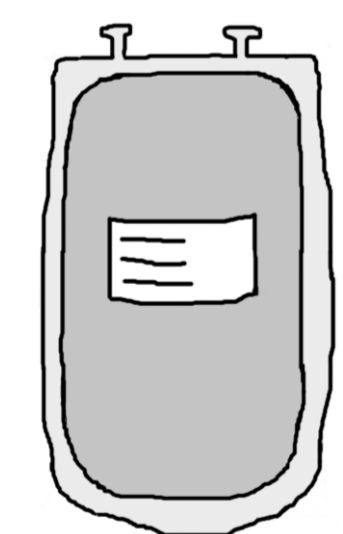
- Both room-temperature stored platelets (RPs) and cold-stored platelets (CPs) experience oxidative stress during storage
- The glucose-6-phosphate dehydrogenase (G6PD) is a key enzyme of the pentose phosphate pathway that can neutralize reactive oxygen species (ROS)



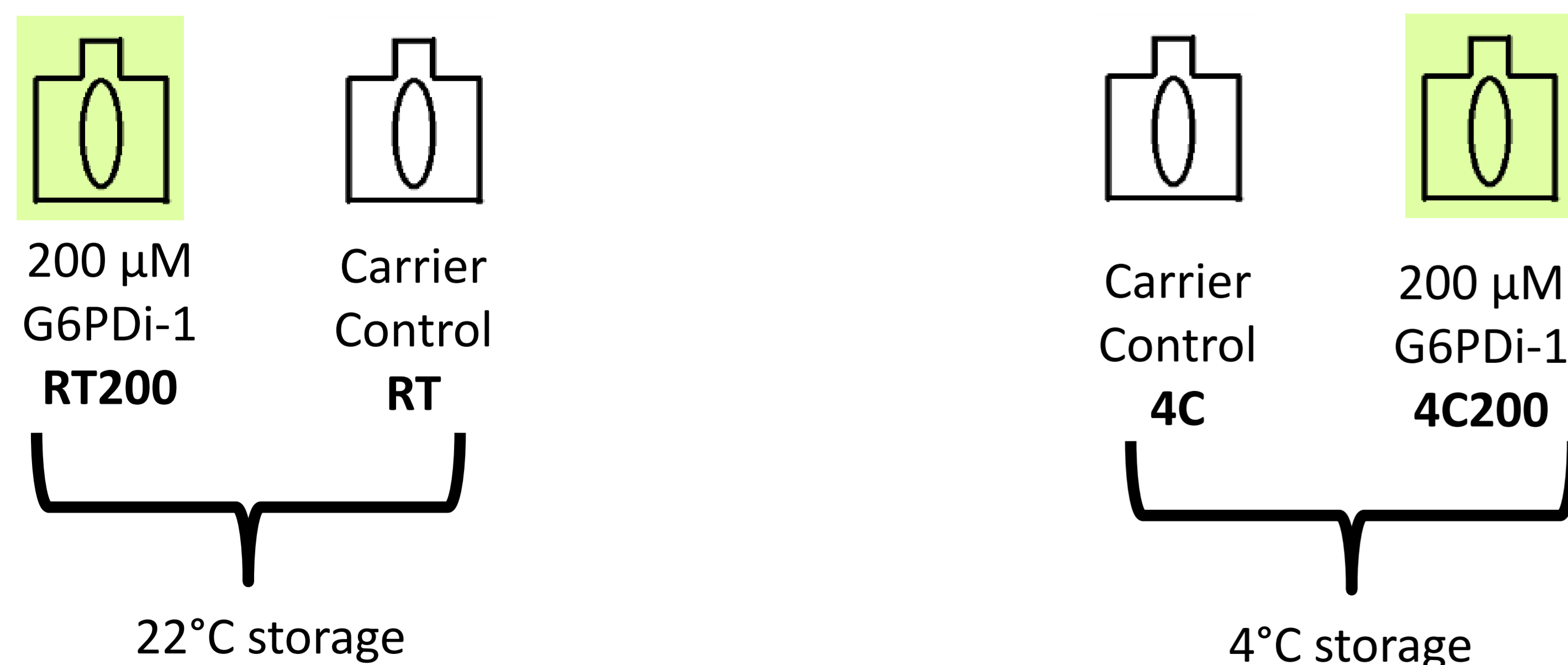
Hypothesis/Objective

By inhibiting the activity of G6PD using the specific inhibitor:G6PDi-1, we investigate the role of the pentose phosphate pathway in both room temperature and cold storage of platelets.

Methods



A standard buffy coat derived platelet unit is used to fill 4 small test containers (12 mL of platelet each)



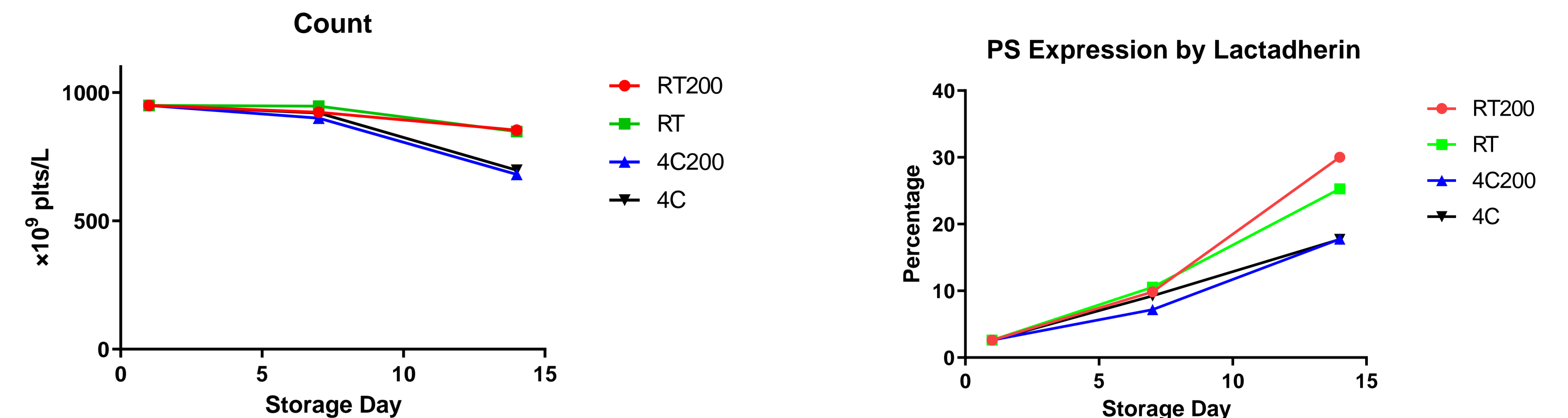
In vitro analysis sampling days

Day 1 Day 7 Day 14

Results and Discussion

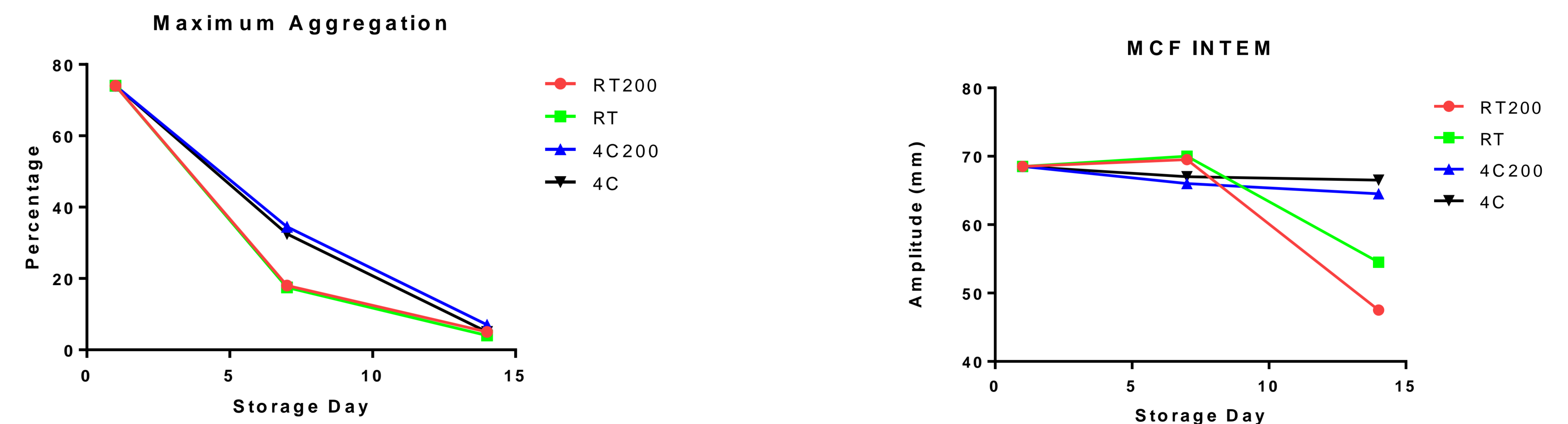
Results are shown as the mean of 2 independent experiments. The graphs were generated using GraphPad Prism 8

Platelet storage characteristics with G6PD inhibitor



The addition of G6PDi-1 did not seem to result in a change of platelet count during storage. The difference in platelet count on day 14 of storage appears to be due to the different storage temperatures (22°C versus 4°C). In RPs stored with G6PDi-1 (RT200), there seems to be higher phosphatidylserine (PS) expression when compared to RPs without the inhibitor.

Platelet functions with G6PD inhibitor



The platelets' abilities to aggregate in response to 20 μM of ADP were assessed by light transmission aggregometry. The addition of the G6PDi-1 did not result in significant differences in the maximum aggregation of both RPs and CPs. Platelets' clot dynamics were also assessed by rotational thromboelastometry. When platelets were activated with INTEM coagulation activator (ellagic acid), RPs incubated with G6PDi-1 (RT200) had lower maximum clot firmness (MCF)

Conclusions

Inhibiting G6PD using inhibitor during platelet storage seems to impact both platelet storage characteristics and platelet function. Specifically, RPs are more affected by the inhibition. These data suggest that the pentose phosphate pathway may play a significant role in maintaining platelet quality by neutralizing platelet oxidative stress during storage.

Acknowledgments

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The views expressed herein do not necessarily represent the view of the federal government of Canada.