

## Higher ATP Level and Reduced Glucose Consumption of Red Cells Stored in PVC Bags Compared to Glass Bottles

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**Abstract.** Whole blood stored for 21 days at +4 °C in glass bottles showed a decrease in plasma glucose content of 6.6 mM/l, while blood stored in polyvinylchloride bags had a decrease of only 5.3 mM/l. At the same time, red cell ATP was reduced to 69% in bottles compared to 80% in bags (statistically proved differences). The higher red cell ATP level may explain the increased stability of red cells stored in DEHP-plasticized blood bags. The reduction in glucose consumption suggested that the decrease of red cell ATP and plasma glucose content may be a result of some unidentified inhibitory effects of DEHP on biochemical processes.

**Table I.** Comparison of bags to bottles in red cell storage

	CPD whole blood stored for 21 days in	
	glass bottles	PVC bags
ATP content of red cells compared to original values, % <sup>1</sup>	68.74 ± 22.19 (n = 42)	79.93 ± 22.46 (n = 55)
	0.02 < p < 0.01	
Decrease in plasma glucose, mM/l <sup>2</sup>	6.57 ± 0.88 (n = 12)	5.33 ± 1.40 (n = 12)
	0.05 < p < 0.02	

<sup>1</sup> Determined by Boehringer ATP test (Boehringer, FRG).

<sup>2</sup> Determined by Eppendorf ACP 5040 instrument (Eppendorf, Austria).

Horowitz et al. [1] and Rock et al. [2] demonstrated that the plasticizer di(2-ethylhexyl)phthalate (DEHP) has a stabilizing effect on red cells during storage. The improved in vitro stability and the decreased hemolysis of red cells stored in the presence of DEHP has been observed previously [3, 4].

Comparing several characteristics of stored blood, we observed a reduced decrease of red cell ATP and plasma glucose content if whole blood was stored in DEHP-plasticized polyvinylchloride (PVC) bags instead of glass bottles at +4 °C (table I).

Our results regarding ATP values are in accordance with the findings of Sasakawa and Tokunaga [3] on ACD

blood. The higher red cell ATP level may explain the increased stability of red cells in DEHP-plasticized blood bags. The reduced drop of glucose consumption suggests that the reduced decrease of red cell ATP and plasma glucose content may be a result of some unidentified inhibitory effects of DEHP on biochemical processes.

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