Afr. J. Med. med. Sci. (2010) **39**, 97-102

The influence of storage period on the antioxidants level of red blood cells and the plasma before transfusion.

PS Ogunro[1, 3], TO Ogungbamigbe[2, 3]† and MA Muhibi[4],
Departments of Chemical Pathology[1], Pharmacology and Therapeutics[2], Malaria Research Clinic and Laboratory[3], College of Health Sciences, Ladoke Akintola University of Technology and Department of Haematolgy and Blood Transfusion[4], LAUTECH Teaching Hospital Osogbo, Nigeria.

Summary
Stored blood is used for transfusion in humans but peroxidative processes occur in stored blood before transfusion. The aim of this study was to evaluate the influence of the length of storage on plasma antioxidant levels and RBCs antioxidant enzyme activity. Blood collected from 15 donors and preserved with anticoagulant (citerate phosphate, dextrose adenine (CPDA-1) were examined. The concentration of total antioxidant status (TAS), malondialdehyde (MDA) and potassium (K+) in the plasma as well as glutathione peroxidise (GSH – Px), glutathione superoxide dismutase (SOD) and catalase (CAT) activities in erythrocytes were determined on days 1,5,10,15,20,25,30,35 and 40 of storage. Day 1 of the study is the day of donation.A 24.8% increase in plasma concentration of MDA and 15.8% increase in the concentration K+ on day 15 were recorded ($p<0.05$). A 27% decrease in the plasma concentration of TAS was observed on day 20 compared with day 1 ($p<0.05$). Similarly GSH-Px activity is stored RBC decreased by 17.1%, on day 15 ($p<0.05$). SOD activities reduced by 17.1% on day 20, CAT activities reduced by 12.6% on day 15 (in each case $p<0.05$). In this study blood stored in CPDA-1 shows that those glutathione-dependent antioxidant enzymes systems in erythrocytes and antioxidant defence in plasma were depleting gradually depending on the day of storage. We concluded based on our finding that 10 days period can be considered a safe storage limits for transfusion in relation to oxidative stress the RBCs were subjected in the storage medium.

Keywords: *RBCs, CPDA-1, plasma antioxidants, erythrocyte antioxidant enzyme*

Résumé
Le sang préservé est utilisé pour les transfusions humaines mais les processus peroxidatifs s'effectuent dans ce sang avant la transfusion. Le but principal de cette étude était d'évaluer l'influence de la durée du stockage sur les taux d'antioxydant dans le plasma et l'activité d'enzymes des hématies antioxydants. Le sang collectés des 15 donneurs et préservés avec d'anticoagulants (citrate de phosphate, dextrose adénine (CPDA-1) étaient examines. La concentration totale du statut total d'antioxydant (TAS), malondialdehyde (MDA) et potassium (K+) dans le plasma comme le glutathionne peroxidase (GSH – Px), glutathionne superoxide dismutase (SOD) et catalase (CAT) sur es activités des hématies étaient déterminés pendant les jours 1, 5, 10, 15, 20, 25, 30, 35 et 40 de stockage. Le jour du don e sang est le jour 1 de l'étude. 24.8% augmentation en concentration de la concentration du plasma de MDA et 15.8% en K+ au jour 15 étaient enregistres ($p<0.05$). 27% de réduction en concentration du plasma en TAS était observe au jour 20 compare au jour 1 ($p<0.05$). Semblablement l'activité du GSH-Px accumulée dans les hématies

Correspondence: Dr. P.S. Ogunro,Department of Chemical Pathology, College of Health Sciences. Ladoke Akintola University of Technology, Osogbo, Nigeria. E-mail: ogunrops@yahoo.com