Comparison of elephant and bovine platelet ultrastructure

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Introduction and Objectives: Absence of open canalicular system in bovine platelets (7)and elephant platelets (3)were respectively reported before. Although The morphology of platelets in some mammals has been extensively reviewed(1,2,4,5,6);this similarity between the platelets of elephants and bovine provides an interest to study the ultrastructure of these two cells comparatively which may provide a new category in this blood cell type in the mammals**.**

Materials &Methods: Six healthy adult Asian Elephants"Elephas Maximus", and two healthy adult cows used for the study. The elephants were bled by venepuncture of a vein on the underside of an ear, and the cows were bled from the external jugular vein**.** After collection, Platelet–rich plasma(PRP) was prepared by centrifuging the whole blood at 170g for 15 min in non-refrigerated Damon centrifuge and removing the upper two thirds of the PRP with a siliconized Pasteur pipette. Platelet-poor plasma (PPP)was obtained by centrifuging the remaining blood at 2500g for 20min at 5°C.To inhibit platelet activation, PGE1 were added to PRP to a final concentration of 1uM, and were centrifuged at 600 g in non-refrigerated Damon centrifuge for 15min.The resulting platelet pellet were resuspent in 0.1 ml of PPP and transferred into disposible wintrobe tube and centrifuged at 1000g for 15min.Two third of upper layer were replaced by 2.5%gluteraldehyde & 2.5%formaldehyde in 0.1M phosphate buffered saline(PBS) at PH=7.2 for 1 hr. Samples were removed into petery dishes and cut into small pieces and were continued the similar fixation for 3hrs.Fixed samples were put into tanic acid 1% (stenberg method)(6) to stain the membranes of the platelets in continuity with the external space and also providing better morphologic definition of the plasma membrane and then postfixed in 2% OSO4 in 0.1 M PBS(PH=7.2) for 1 hr. Samples were routinely processed for transmission electron microscopy. Usual fixation procedures were also used for some of the elephant and bovine samples.

Results &Discussion: The elephant platelets were smaller in size and had fewer but larger alpha granules. Although there was no visible open canalicular system in both cells, and the large granules secreted their products by exocytosis, but their cytoskeletal compartments was differ from each other. Since there was an extensive array of cortical microtubules and dispersed types throughout the cells in bovine platelets, it was rare in elephant platelets ,instead there was lots of thin filaments, was cortically arranged.

References:

1-Gentry,p;(1992):The mammalian blood platelet :its role in haemostasis, inflammation and tissue repair.J.comp.path.vol107,243-270

2-Grouse,l,h;Rao,g,h,r;Weiss,d,j;Perman,v;White,j,g; (1990):Surface-activated bovine platelets do not spread, they unfold.Am.J.Pathol,vol.136,no.2,399-408

3-Rezaian,m;Yamashiro,s;(1994):Ultra structure of platelets in Asian elephants' elephas maximus', proc 52th annual meeting of the electron microscopy society of America, san Francisco press, San Francisco,USA,204-206

4-Smith,c,m;Burris,s,m;Weiss,d,j;White,j,g;(1989): Comparison of bovine and human platelet deformability, using micropipette elastimetry. Am J Vet Res, Vol 50,no 1,34-38

5-Tablin,f;Castro,m,d;(1992):Equine platelets contain an anisotropic array of microtubules which reorganize upon activation.comp haematol international,2,125-132

6-Zucker-Franklin,d;(1981):Endocytosis by human platelets: metabolic and freeze-fracture studies.J cell boil,91:706

7-Zucker-Franklin,d;Benson,k,a;Myers,k,m;(1985): Absence of a surface-connected canalicular system in bovine platelets.Blood,65,1,241-244