

Thesis Title:           Studies on the Thalassemic Red Cell  
                              Membrane

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#### ABSTRACT

Increased destruction of erythrocytes by the spleen is the major cause of anemia and severity of beta-thalassemia/hemoglobin E disease. This is believed to result from the phospholipid asymmetry loss in erythrocyte membrane bilayer in these patients.

Thalassemic erythrocyte density analysis showed that erythrocytes from splenectomized patients contained larger amount of low density erythrocytes than those from non-splenectomized patients.

Dye removal assay of merocyanine 540 dye bound on fractionated erythrocytes which maybe used as the indicator of phospholipid asymmetry loss showed that low density thalassemic erythrocytes from splenectomized patients absorb higher amount of dye than normal erythrocytes whereas high

density thalassemic erythrocytes absorb similar amount of dye as normal erythrocytes. Low density thalassemic erythrocytes from non-splenectomized patients were not measured for bound dye whereas high density thalassemic erythrocytes absorb higher amount of dye than normal erythrocytes.

Flow cytometric analysis of dye bound on both normal and thalassemic erythrocytes confirmed the results from dye removal assay. In addition, low density thalassemic erythrocytes from non-splenectomized patients absorb high amount of dye than normal erythrocytes. Dye binding indices showed no correlation with phagocytosis indices in both non-splenectomized and splenectomized patients.

Direct determination of phospholipid asymmetry change by phospholipase A<sub>2</sub> of unfractionated thalassemic erythrocytes showed that there were increased digestion of phospholipid in both non-splenectomized and splenectomized patients. Percent digestion of each type of phospholipids showed no correlation with phagocytosis indices.

It is concluded that change of phospholipid asymmetry may have occurred in thalassemic erythrocyte membrane and which may be responsible for rapid clearance of the low density erythrocytes by spleen.