

Thesis title : Deformability and malaria infection in
thalassemic and hemoglobinopathic
erythrocytes.

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ABSTRACT

The laser diffractometer was used to measure erythrocyte deformability by subjecting erythrocyte to varying shear stresses and data were analysed from diffraction pattern of the laser light scattering. The study showed that thalassemic and/or hemoglobinopathic erythrocytes had decreased erythrocyte deformability as compared to the normal erythrocyte ($p < 0.001$). Erythrocytes underwent deformability studies were also analysed by the H-1 automatic blood cell counting. The result shows that in thalassemia traits and nondisease homozygotes, the decreased deformability index was correlated with the number of microcytosis and hyperchromic erythrocytes. In contrary the decreased deformability index of erythrocytes in thalassemic diseases (β -thal/HbE, HbH disease, homozygous β -thalassemia, homozygous HbCS) was correlated with the presence of microcytes, macrocytes, hyperchromic erythrocytes and

changes in RDW and HDW. Such changes in deformability index of thalassemic erythrocytes were markedly observed after incubation in isotonic phosphate buffer at 49°C for 1 hour. The thalassemic erythrocytes showed improved cell deformability when they were suspended in hypotonic medium. Decreased deformability of normal and thalassemic erythrocytes was shown with decreased P. falciparum invasion index when the erythrocyte were treated with diamide or glutaraldehyde. On the other hand, improvement of erythrocyte deformability in thalassemic erythrocytes after pentoxifylline treatment was shown to parallel to increased degree of malaria invasion. These findings suggest that erythrocyte deformability plays role in malaria invasion.