

Multispectral Imaging of Healthy and Diseased Red Blood Cells using Confocal Microscopy

Laura Rey-Barroso^{a*}, Mónica Roldán^{b,e}, Francisco J. Burgos-Fernández^a, Ignacio Isola^{c,e}, Anna Ruiz-Llobet^d, Susanna Gassiot^{c,d} and Meritxell Vilaseca^a

^aCentre for Sensors, Instruments and Systems Development, Technical University of Catalonia, Spain

^bU. of Confocal Microscopy, Svc. of Path. Anatomy, Pediatric Ins. of Rare Diseases, Hosp. Sant Joan de Déu, Spain

^cLaboratory of Hematology, Svc. of Laboratory Diagnosis, Hosp. Sant Joan de Déu, Spain

^dService of Pediatric Hematology, Hospital Sant Joan de Déu, Spain

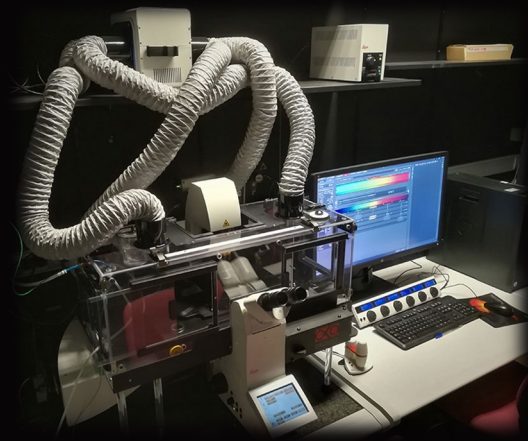
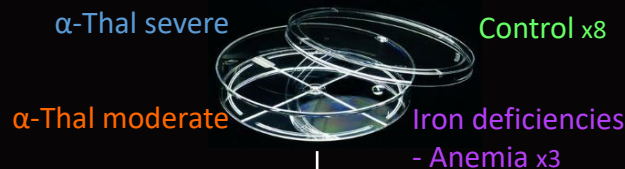
^eInstitute of Pediatric Research, Hospital Sant Joan de Déu, Spain

ABSTRACT

Red blood cells (RBCs) transport oxygen through the body. In thalassemia (Thal) RBCs have a shortened life expectancy: globin chains that form hemoglobin are not properly synthesized.

METHODS

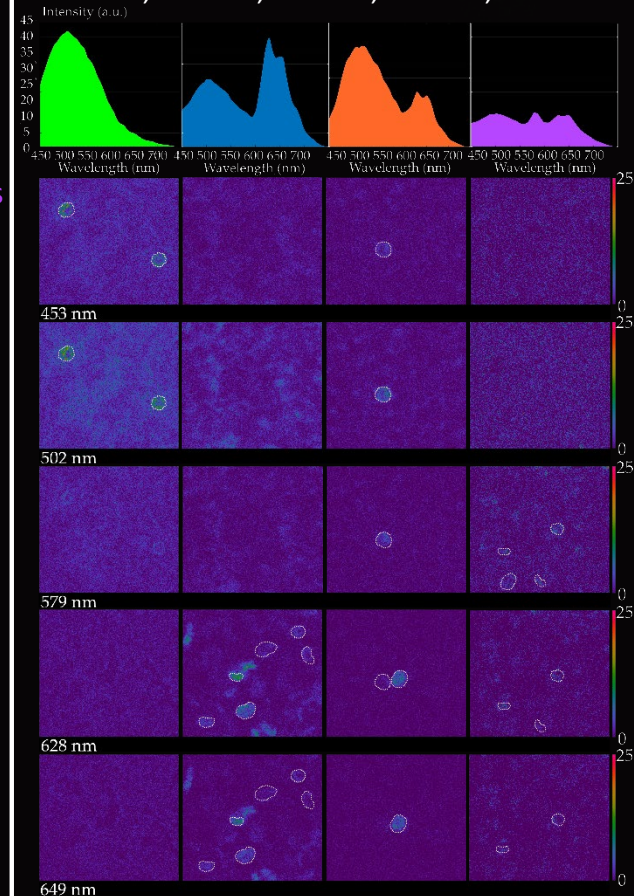
Blood samples +EDTA of 17 pediatric patients (12 ♂ - 5 ♀) were loaded to adherent Petris'



Confocal laser spectral imaging was performed on a Leica TCS SP8 STED 3x. Samples were excited at $\lambda = 405 \text{ nm}$.

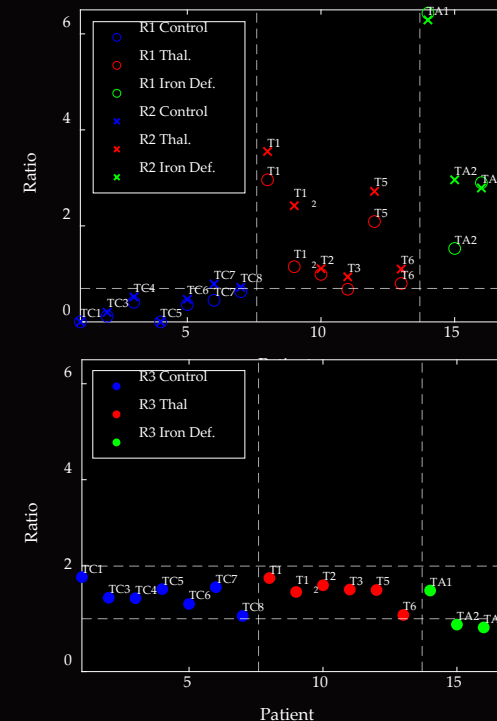
RESULTS

RBCs autofluorescence was collected at $\lambda = 453 \text{ nm}, 502 \text{ nm}, 579 \text{ nm}, 628 \text{ nm}, 649 \text{ nm}$.



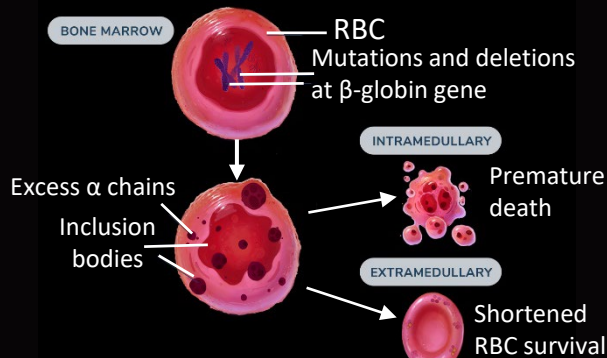
CONCLUSIONS

Intensities at $\lambda = 502 \text{ nm}, 628 \text{ nm}, 649 \text{ nm}$ are different between control and diseased individuals (α -Thal or Iron-deficiency anemia) and between different degrees of severity in α -Thal.



INTRODUCTION

In α -Thal, a defective synthesis of β -globin subunit produces an accumulation of toxic α -globin aggregates.



1.5 million – Men | Women – Mediterranean