University of Zurich[UZH]

Zurich Center for Integrative Human Physiology (ZIHP)

ZIHP Special Seminar

Friday, November 2, 2018, 16:15 h
Animal hospital, main building
Seminar room TFA 01.23

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Extracellular Vesicles in β-Thalassemia: Characteristics and Biological Relevance

Beta Thalassemia Major (βT) is a hereditary hemolytic anemia; patients receive blood transfusion and chelation therapy for life, and they often develop main organs dysfunctions. Shortening of erythroid cell life span and iron excess are the main pathogenic features in βT; however, these factors cannot explain all the disease-related complications.
Extracellular vesicles (EVs) are membrane-enclosed vesicles secreted by cells into biological fluids via membrane "shedding" and secretion. EVs can stem from nearly every type of cell and contain bioactive molecules, such as proteins, phospholipids and nucleic acids, which characterize the cell from which they originate. EVs have specific characteristics and pathophysiological roles in several diseases.
We used several methods to characterize the circulating EVs in βT patients including EV count, cellular origin, membrane antigens, protein content, miRNA profile and EVs effects on cell models. We also investigate the influence of hypersplenism and splenectomy on EV features, and explore the association of circulating EVs with ineffective erythropoiesis and iron overload.
Overall, important differences in EV signatures and miRNA profile were found between patients and healthy controls and between different patient groups. Together with spleen status, the EV differences revealed the spleen's importance in EV physiology and clearance. Circulating EVs in βT patients contained high levels of Heat-shock protein 70, correlated with hematological disease severity and ineffective erythropoiesis markers. In addition, patient EVs increased apoptosis and reduced viability of cultured cells, suggesting a novel mechanism of organ damage in βT.

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