

FLUORESCENCE MICROSCOPIC STUDIES ON HEMAL LYMPH NODES IN RATS: A NEW IMMUNOBIOLOGICAL CONCEPT

H.E. Castenholz, A. Castenholz

Humboldt University, Charité Hospital, Berlin, and Department of Human Biology, University of Kassel, Kassel, Germany

ABSTRACT

Hemal lymph nodes are characterized by a high content of blood cells most of them in different stages of erythrophagocytosis. These peculiar structures are not well understood up to now regarding their functional morphology. Above all, their biological relevance, especially to the phenomenon of disintegration of one's own blood cells, has eluded conclusive explanation so far. In the present study, hemal lymph nodes of 45 rats of the perirenal group were investigated by means of confocal laser fluorescence microscopy (CLSM) in combination with three fluorescent markers: latex standard particles, liposomes and autologous erythrocytes. Each marker briefly entered the hemal lymph nodes when injected into the kidney, whereas no notable migration took place after intravenous injection. Besides direct connections between hemal lymph nodes and the homolateral kidney, the study also revealed lymphatic communications with the contralateral kidney. Each marker was ingested by nodal macrophages, most of them surrounded by red blood cells (rosette formation) and laden with the by-products of cellular disintegration (erythrophagocytosis). Intimate contact of lymphocytes with macrophages as an expression of special interaction (emperipolesis) between both types of cells was frequently observed. A new concept is proposed, which ascribes to the hemal lymph nodes an important immunobiological role for the recognition of antigenic properties of one's own red blood cells permanently released by the kidney. The information macrophages obtain from these cells is presented to lymphocytes, which, in turn, initiates suppresser immune reactions. Under normal conditions, this mechanism of cellular identification and surveillance serves to preserve self-tolerance of the defense system against permanent renewal of one's own red blood cell population during a life time. In this way, an auto-aggressive immune anemia is circumvented.