

## Erythrophagocytic Role of Mast Cells in vitro and in vivo during Oxidative Stress

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**Abstract :** Anemia develops when blood lacks enough healthy erythrocytes. Past studies indicated that anemia, inflammatory process, and oxidative stress are interconnected. Erythrocytes are continuously exposed to reactive oxygen species (ROS) during circulation, due to normal aerobic cellular metabolism and also pathology of inflammatory diseases. Systemic mastocytosis and genetic depletion of mast cells have been shown to affect anaemia. In the present study, we attempted to reveal whether mast cells have a direct role in clearance or erythrophagocytosis of normal or oxidatively damaged erythrocytes. Murine erythrocytes were treated with tert-butyl hydroperoxidase (t-BHP), an agent that induces oxidative damage and mimics in vivo oxidative stress. Normal and oxidatively damaged erythrocytes were labeled with carboxyfluorescein succinimidyl ester (CFSE) to track erythrophagocytosis. We show, for the first time, direct erythrophagocytosis of oxidatively damaged erythrocytes in vitro by RBL-2H3 mast cells as well as in vivo by murine peritoneal mast cells. Also, activated mast cells, as may be present in inflammatory conditions, showed a significant increase in the uptake of oxidatively damaged erythrocytes than resting mast cells. This suggests the involvement of mast cells in erythrocyte clearance during oxidative stress or inflammatory disorders. Partial inhibition of phagocytosis by various inhibitors indicated that this process may be controlled by several pathways. Hence, our study provides important evidence for involvement of mast cells in severe anemia due to inflammation and oxidative stress and might be helpful to circumvent the adverse anemic disorders.

**Keywords :** mast cells, anemia, erythrophagocytosis, oxidatively damaged erythrocytes

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