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A new role for mast cells as scavengers for clearance of erythrocytes damaged due to oxidative stress

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Running Title: Phagocytosis of erythrocytes by mast cells

Highlights

- Mast cells show uptake of opsonized and oxidatively damaged erythrocytes.
- Mast cells do not phagocytose normal erythrocytes.
- Activated mast cells show enhanced phagocytosis of damaged erythrocytes.
- Uptake of erythrocytes by mast cells involves cholesterol and lipid rafts.
- A novel scavenging role for mast cells during oxidative stress is highlighted.

Abstract

Anemia, inflammation, and oxidative stress are interconnected. Erythrocytes are continuously exposed to oxidative stress, normally and during inflammatory diseases. Systemic mastocytosis and genetic depletion of mast cells affect anemia. In the present study, a direct role for mast cells in clearance of erythrocytes was explored. We show, for the first time, direct phagocytosis of opsonized as well as oxidatively damaged erythrocytes *in vitro* by mast cell lines, bone marrow derived mast cells (BMMCs) and *in vivo* by murine peritoneal mast cells. Also, activated mast cells, as may be present in inflammatory conditions, showed a significantly higher uptake of

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