

Microvesicles from macrophages as modulators of inflammation

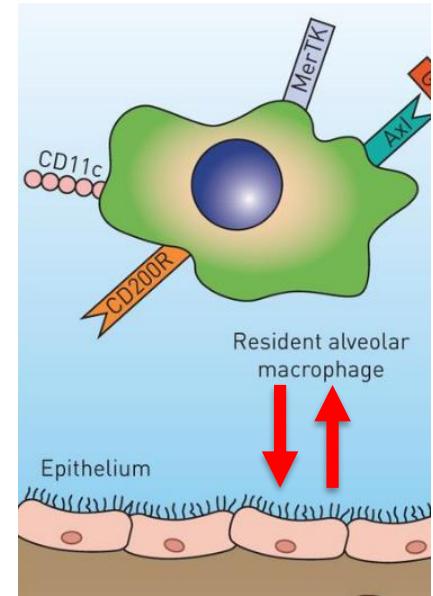
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Cell communication and its influence on inflammation

- Professional phagocytes (e.g. macrophages) and non-professional phagocytes (e.g. epithelial cells) work in concert to clear billions of apoptotic cells and particles on a daily basis
- During apoptotic cell engulfment or in response to inflammation-associated cytokines, macrophages release insulin-like growth factor 1 (IGF-1) and also microvesicles
- **Clinical Problem:**
 - Although professional and non-professional phagocytes reside in proximity in most tissues, it is unknown whether they communicate and how this might impact inflammation

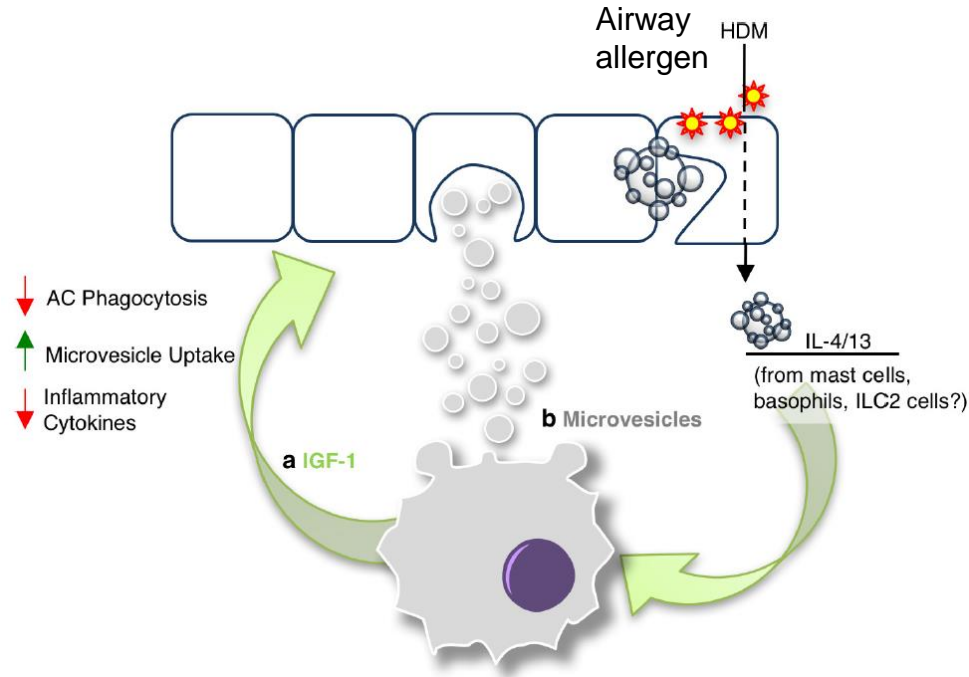


Adapted from Kaur et al Euro Resp Rev 2015

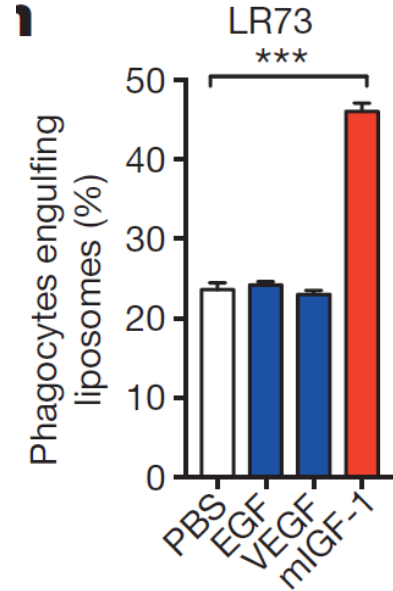
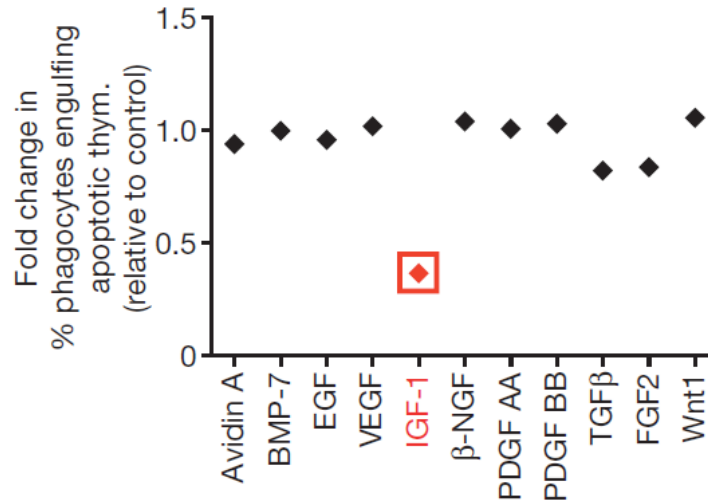
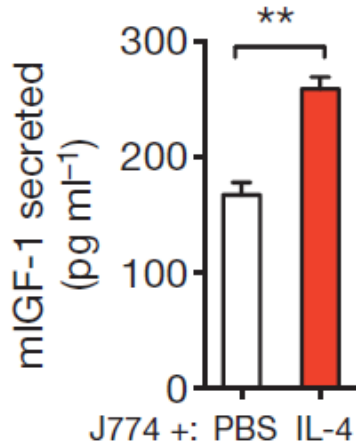
Microvesicles from macrophages modulate inflammation

Solution: Researchers at the University of Virginia have discovered a novel IGF-1 and microvesicle-dependent communication between macrophages and epithelial cells.

- **Delineate macrophage-epithelial cell communication**
- **Can critically influence the magnitude of tissue inflammation**
- **Microvesicles can be used to dampen various inflammatory disorders**



IGF-1 impacts phagocytosis



IGF-1 produced by macrophages can redirect phagocytosis by non-professional phagocytes, suppressing uptake of larger apoptotic cells and enhancing internalization of smaller particles.

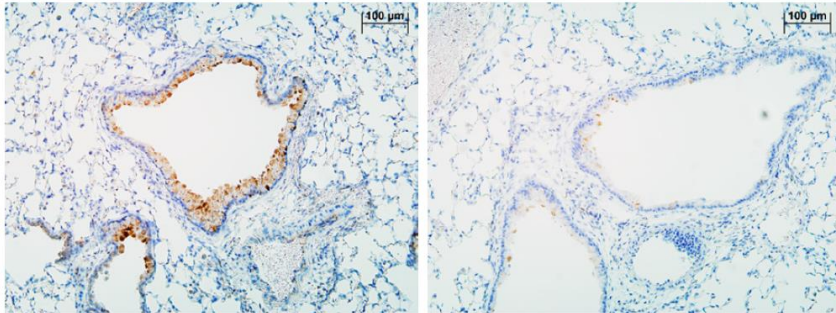
IGF-1/IGF-1R signaling in inflammation

b

IGF-1R expression in airways

CCSP-Cre/*Igf1r*^{+/+}

CCSP-Cre/*Igf1r*^{fl/fl}



c

H&E

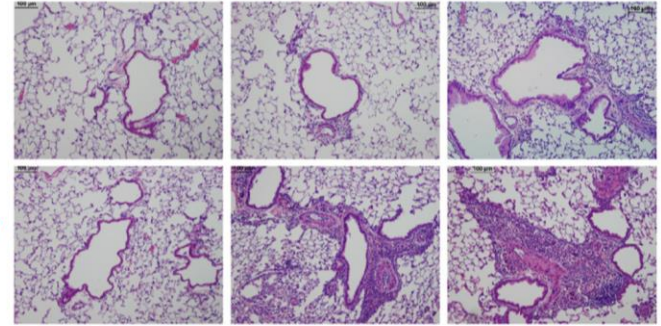
PBS

HDM

HDM

CCSP-Cre/
Igf1r^{+/+}

CCSP-Cre/
Igf1r^{fl/fl}



Control

Mouse 1

Mouse 2

Upon introduction of allergen HDM, mice lacking IGF-1R have exacerbated inflammation in the airway epithelial cells and lungs.

Relevant Publications

- Nature. 2016 Nov 24;539(7630):570-574. doi: 10.1038/nature20141. Epub 2016 Nov 7. **Ravichandran KS**, et al.

Intellectual Property

- UVA Tech ID: RAVI-MICROVE
 - Title: Macrophages redirect phagocytosis by non-professional phagocytes and influence inflammation
 - PCT Patent Application PCT/US2017/59915 filed November 3, 2017