Pulmonary intravascular macrophages: Prime suspects as cellular triggers of porcine CARPA

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CARPA
Complement Activation-related Pseudoallergy
TYPE I hypersensitivity reaction without IgE
Caused by wide range of agents
Reactions from mild and reversible to lethal
CLINICAL and REGULATORY SIGNIFICANCE

IS THERE A CELLULAR CONTRIBUTOR OF CARPA IN THE CARDIOPULMONARY TRACT?

PULMONARY INTRAVASCULAR MACROPHAGES (PIMs)

1. Morphology
Porcine PIMs
• PIMs reaching out with pseudopods attached to the surface of plastic coverslip after incubation (sizebar 2 μm);
• PIMs showing rounded shape, ruffled membrane after incubation on the pulmonary artery endothelium ex vivo, (sizebar 5 μm).

2. Adherence and Phagocytosis
PIM of a sheep, anchored to the pulmonary capillary endothelium via junction-like intercellular adhesion plaques (ICAPs).
Characteristic features include indented nucleus and a unique glycocalyx membrane. This surface plays a key role in receptor-mediated clearance of phagocytosis.

3. Secretion and Mediators
Time correlation between the rise of blood TxB2 and pulmonary arterial pressure during (zymosan-induced) CARPA in a pig.
They also express pattern-recognising and anaphylatoxin receptors on their surface, this way C activation can trigger these cells.

4. Methodology
Porcine PIM cells adhered to plastic surface.
The dense, larger cells (marked by arrows) show ruffled membrane structures and multiple vacuoles. Cells were washed out from the capillaries by collagenase and let to adhere to gelatin surface, 40 ×. Strong adherence of PIM cells enables their in vitro separation.

Human appearance and effect of PIMs?
• In hepatopulmonary syndrome macrophage accumulation in the intravascular space of the lung is present
• Certain healthy people may have PIMs

Conclusions:
Ex vivo examinations, the details of the role of PIMs, and the possibility of selective depletion may present a potential therapeutic target preventing CARPA.