

HOW ULTRAFINE PARTICLES MAY INTERACT WITH PULMONARY CELLS

P. Gehr, B. Rothen, S. Schürch*, N.
Kapp, M. Geiser,

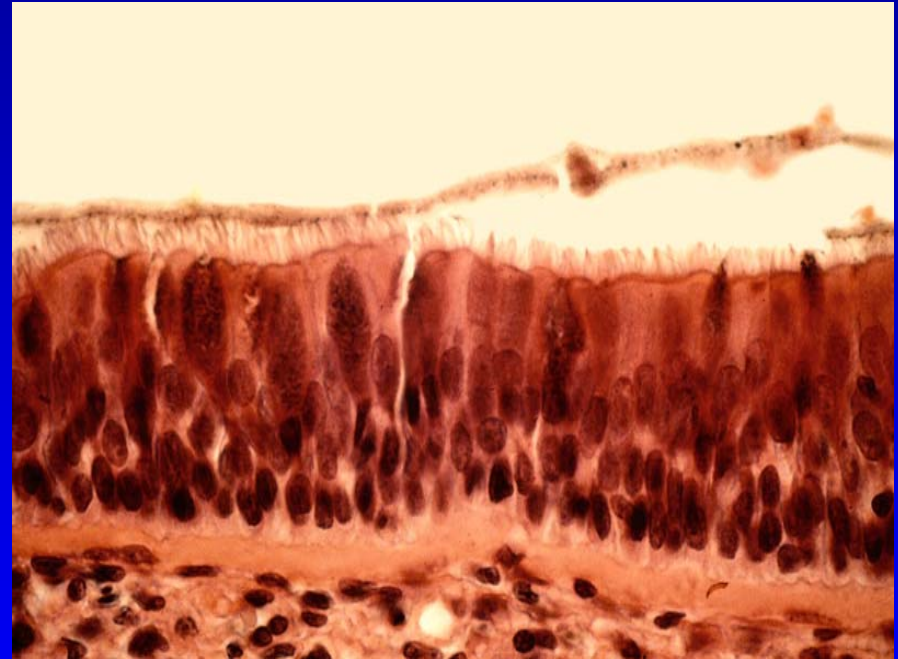
Institute of Anatomy, University of Bern, Bern,
Switzerland

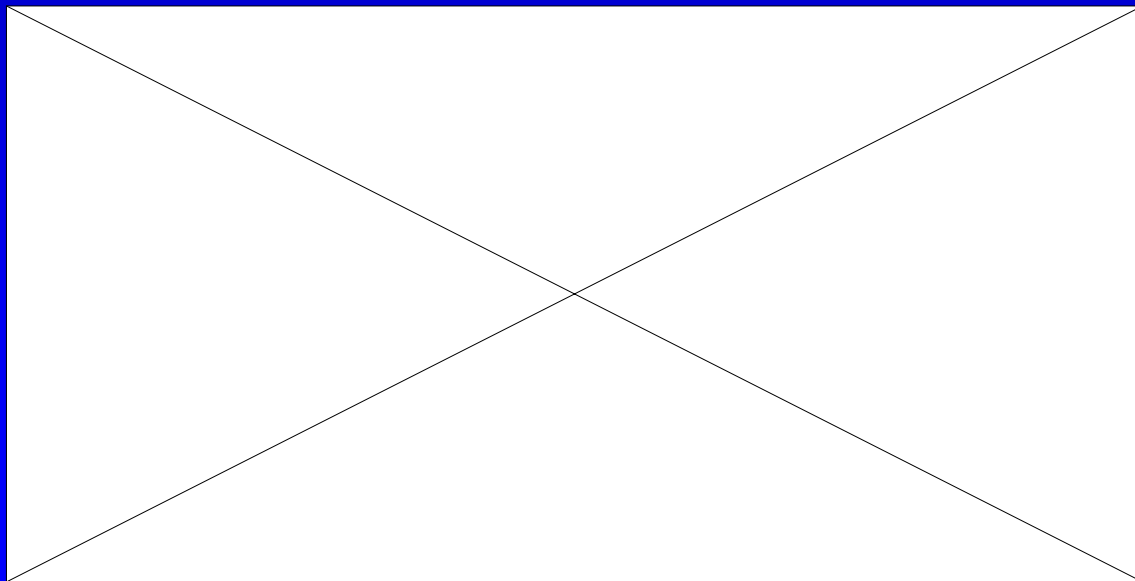
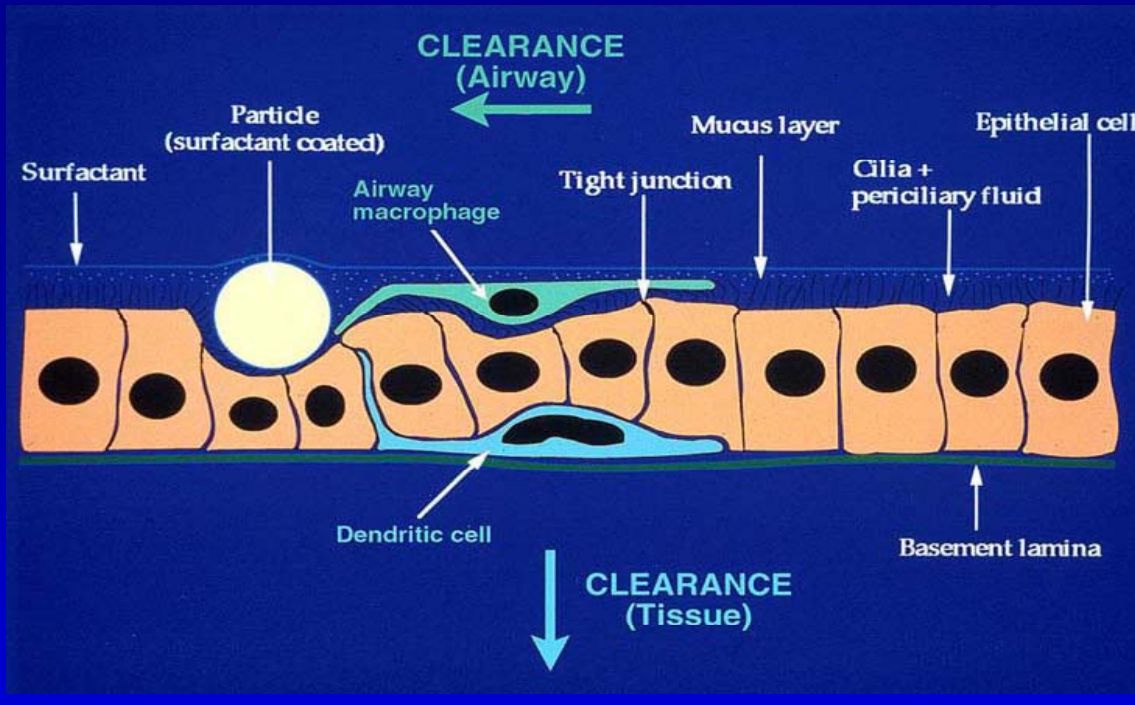
*Health Sciences Center, University of Calgary,
Calgary, Alberta, Canada

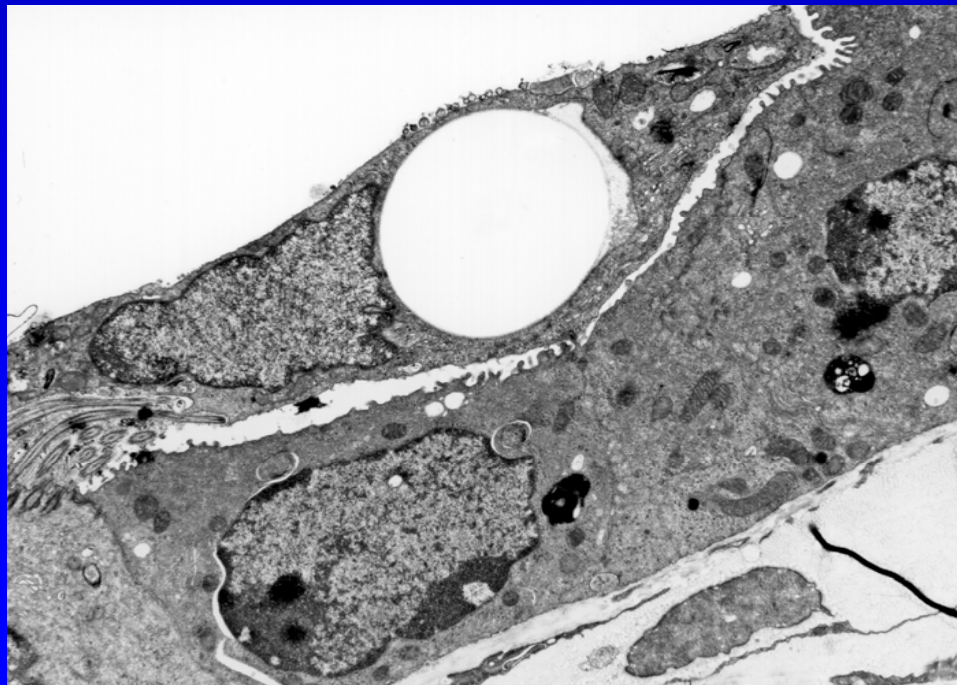
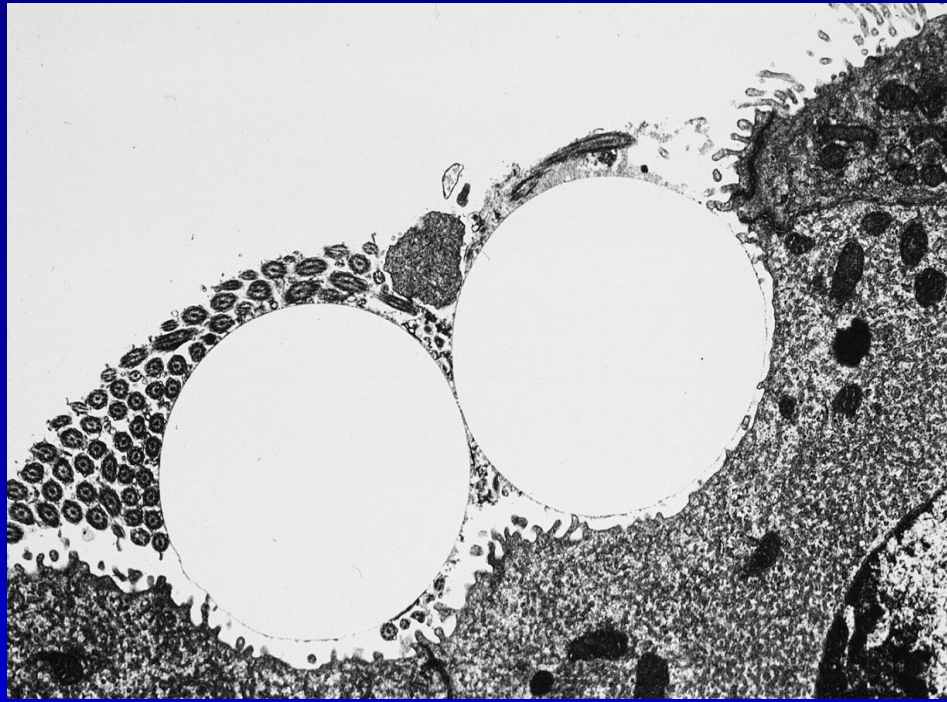
Trachea



Airway epithelium

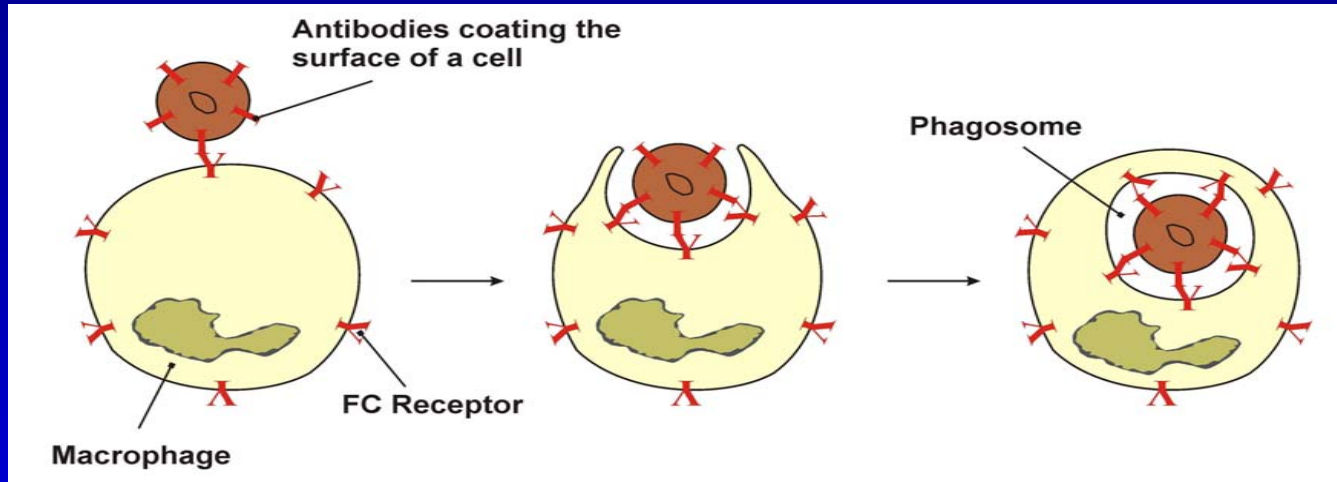






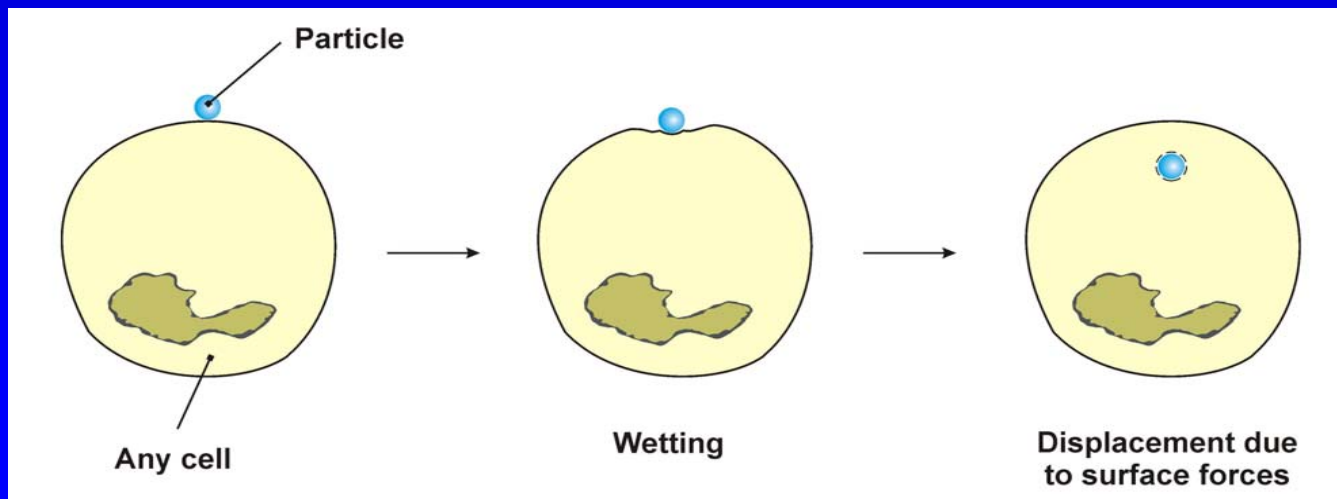
Phagocytosis:

- professional phagocytes: macrophages
- professional antigen-presenting cells: dendritic cells



Non-specific uptake:

- macrophages, dendritic cells, epithelial cells etc.



Models

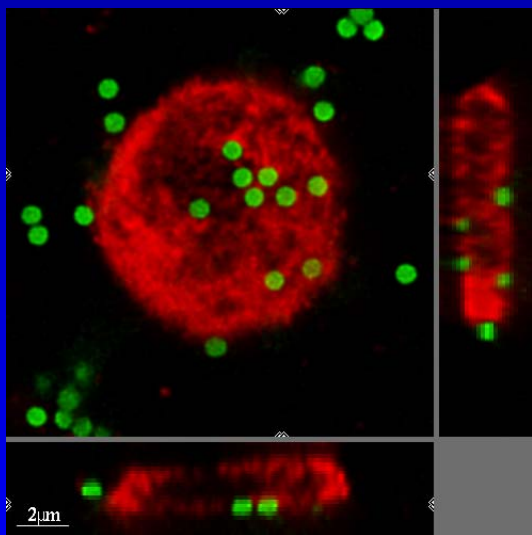
- phagocytic cells: macrophages
- non-phagocytic cells: red blood cells

Incubation with FITC labeled polystyrene particles of different sizes

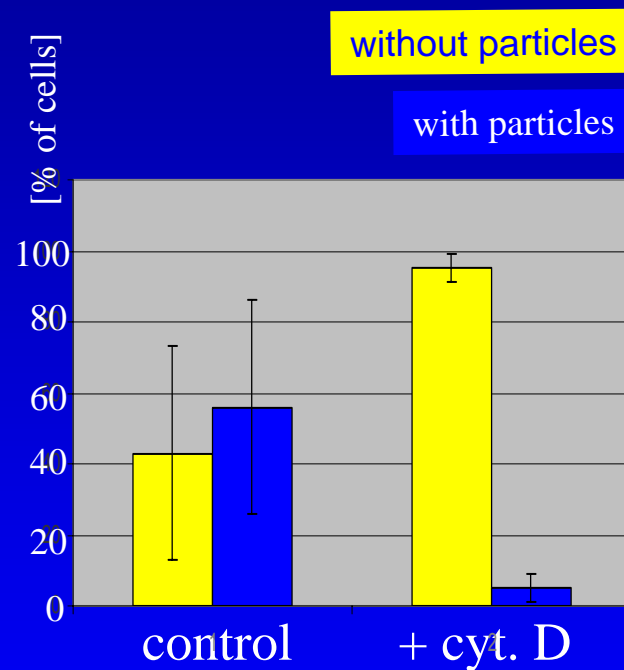
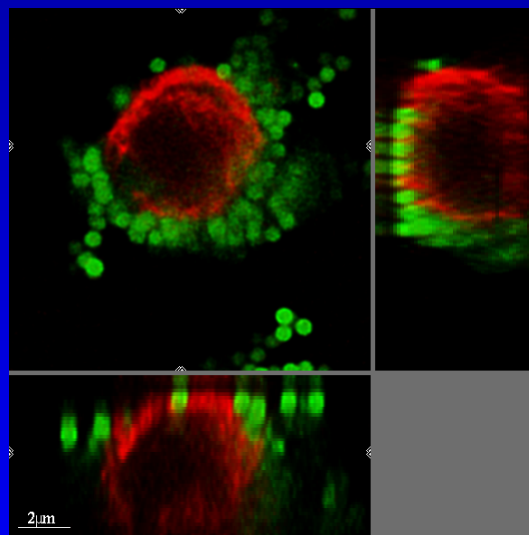
Preparation for confocal laser scanning microscopy

■ F-Actin ■ 1- μ m particles

control

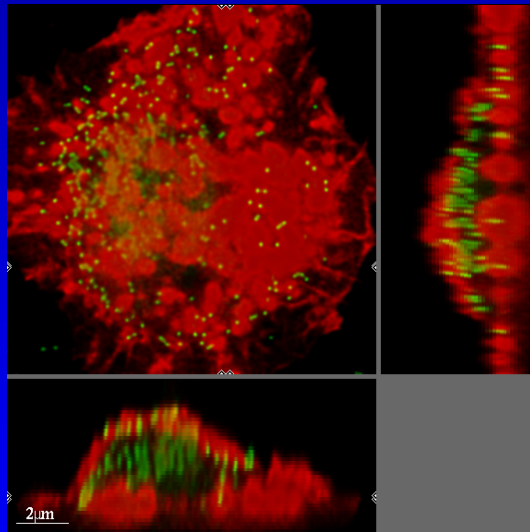


+ cytochalasin D

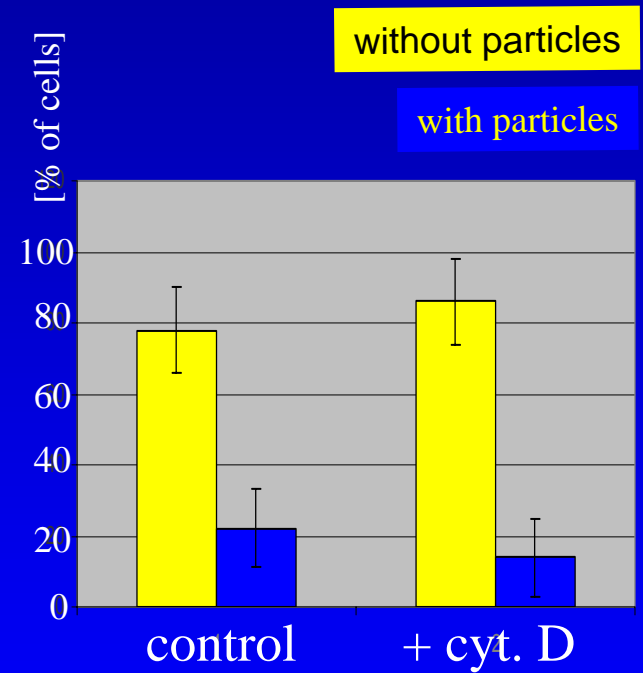
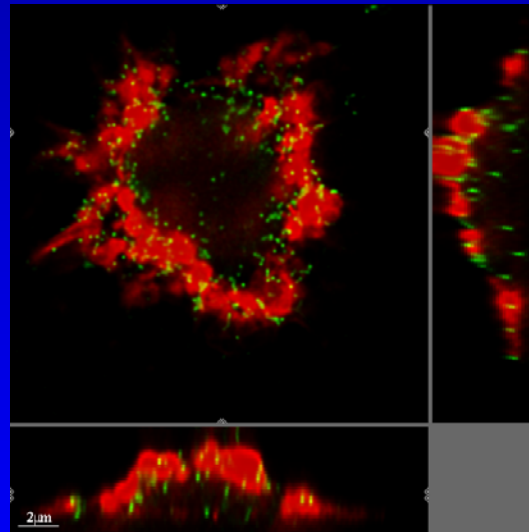


■ F-Actin ■ 0.2- μ m particles (neutral)

control

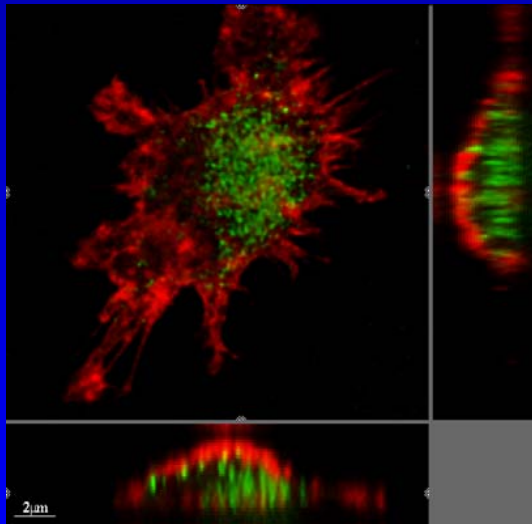


+ cytochalasin D

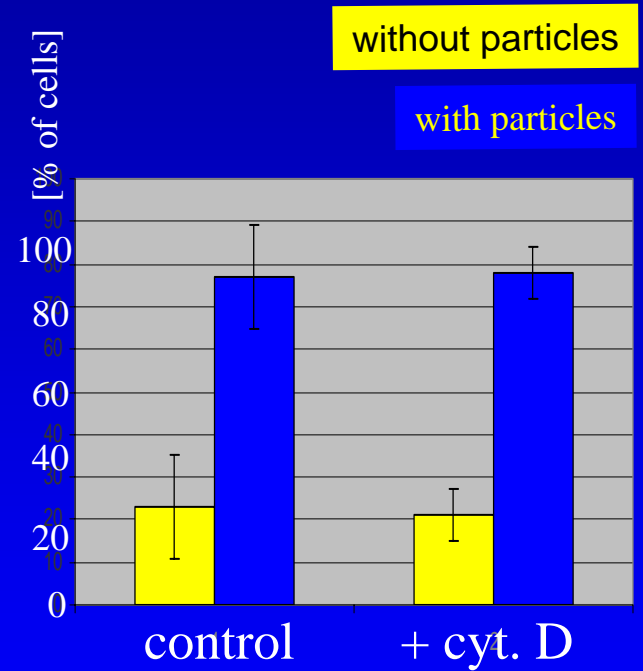
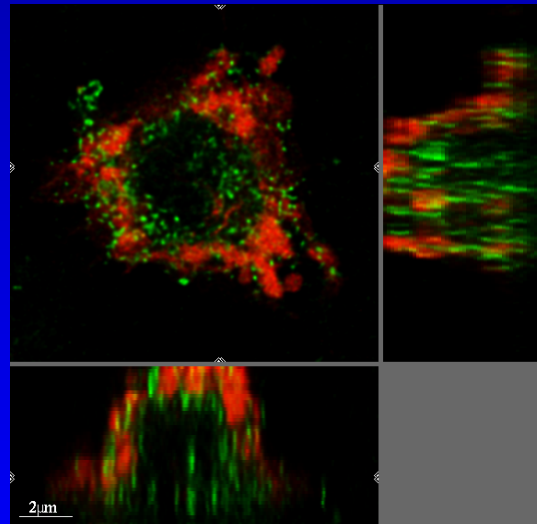


■ F-Actin ■ 78-nm particles (neutral)

control



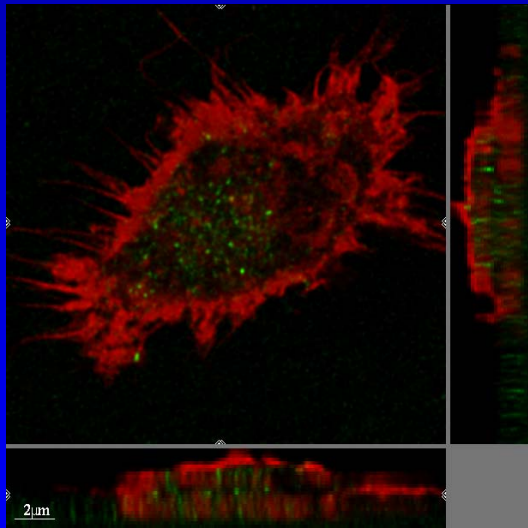
+ cytochalasin D



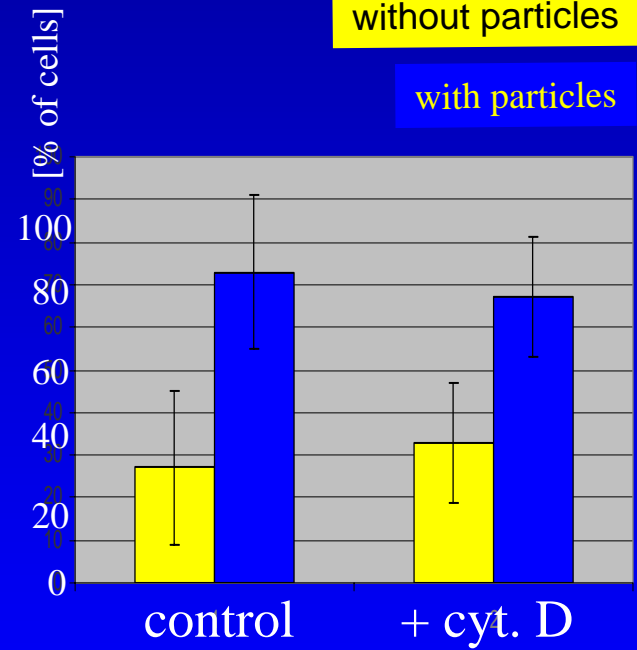
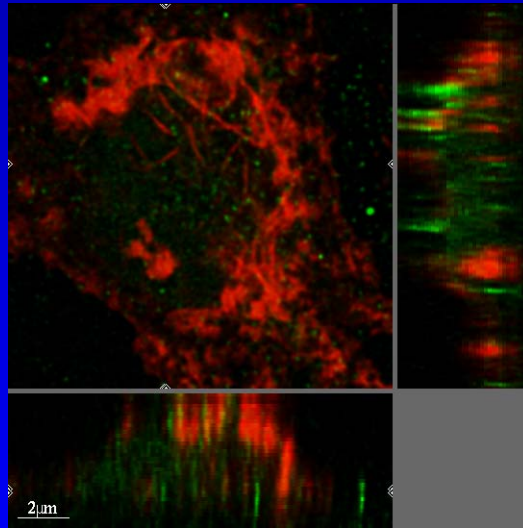
■ F-Actin

■ 20-nm particles (negatively charged)

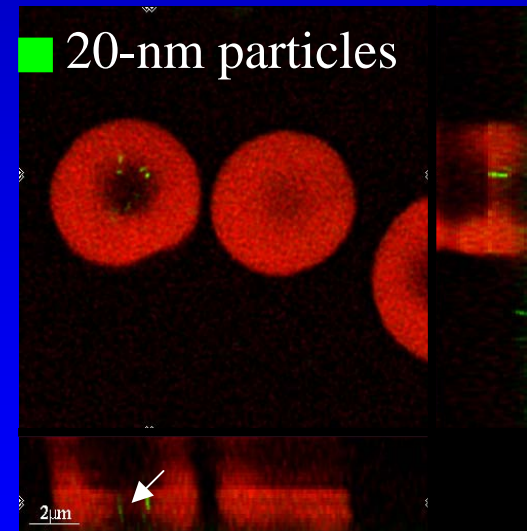
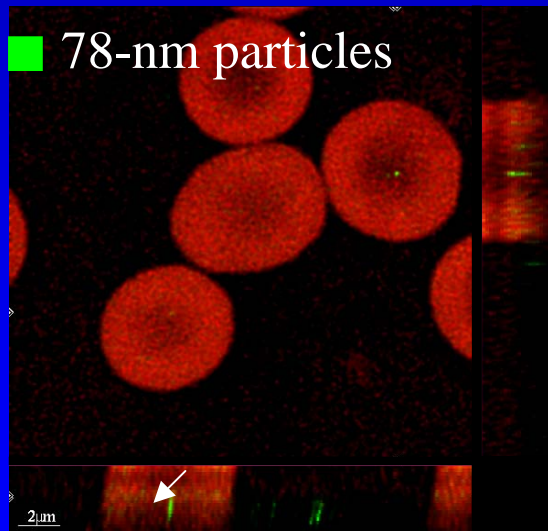
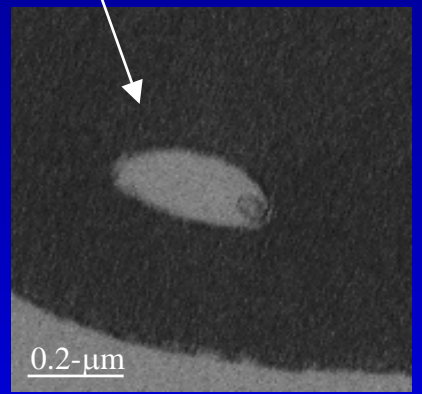
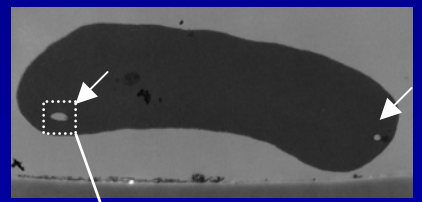
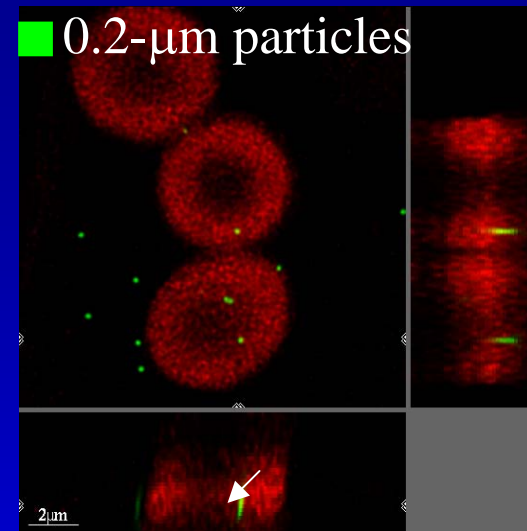
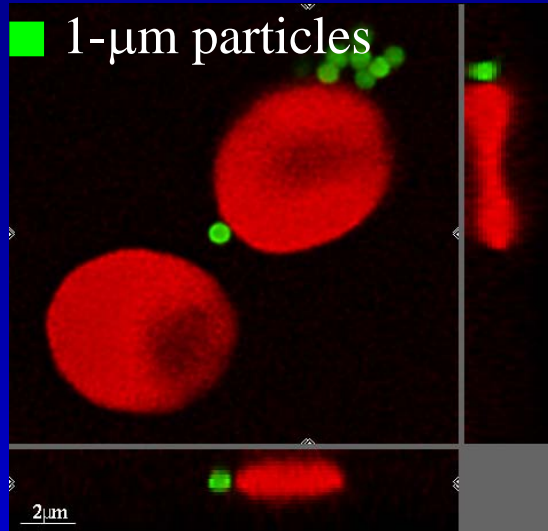
control



+ cytochalasin D



Autofluorescence



Summary

1- μm particles

- taken up by phagocytosis
- no uptake by red blood cells

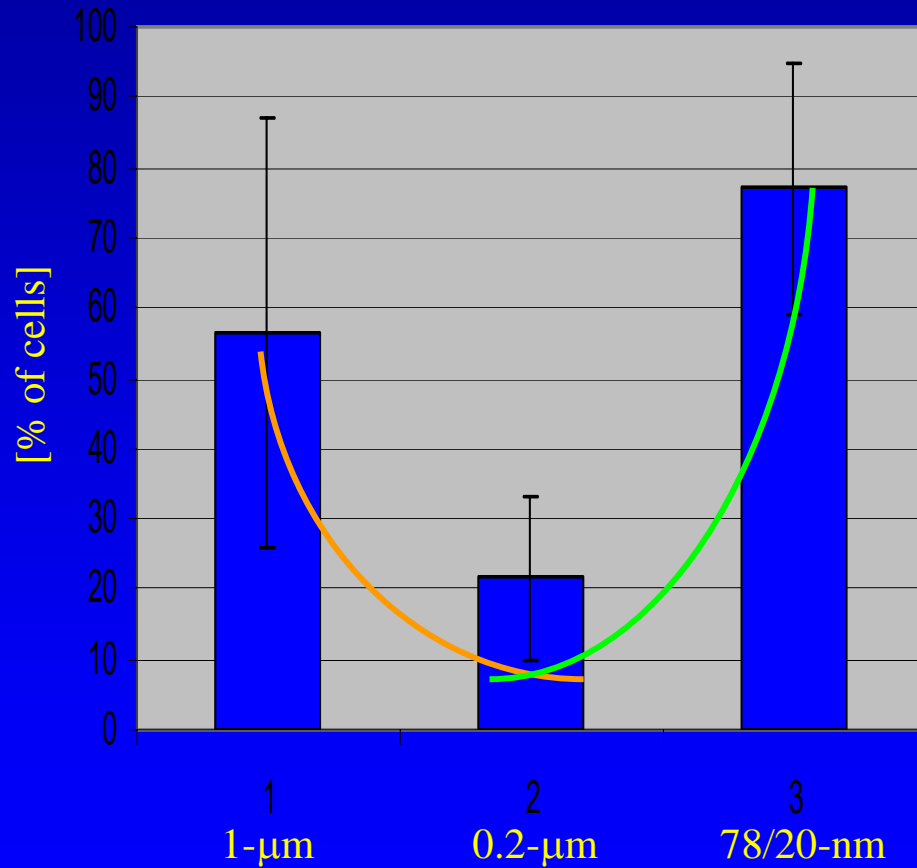
0.2- μm particles

- reduced uptake, mechanism not clear
- uptake by red blood cells

78-nm and 20-nm particles

- increased uptake by adhesive interaction
- uptake by red blood cells

with particles



Phagocytosis

non-specific uptake

Acknowledgements

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