

Wood dust-induced pulmonary inflammation in mice

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Background

- Occupational exposure to wood dust is related to several respiratory diseases, such as **chronic bronchitis** and **asthma**
- Only a little is known about mechanisms behind wood dust-induced pulmonary inflammation

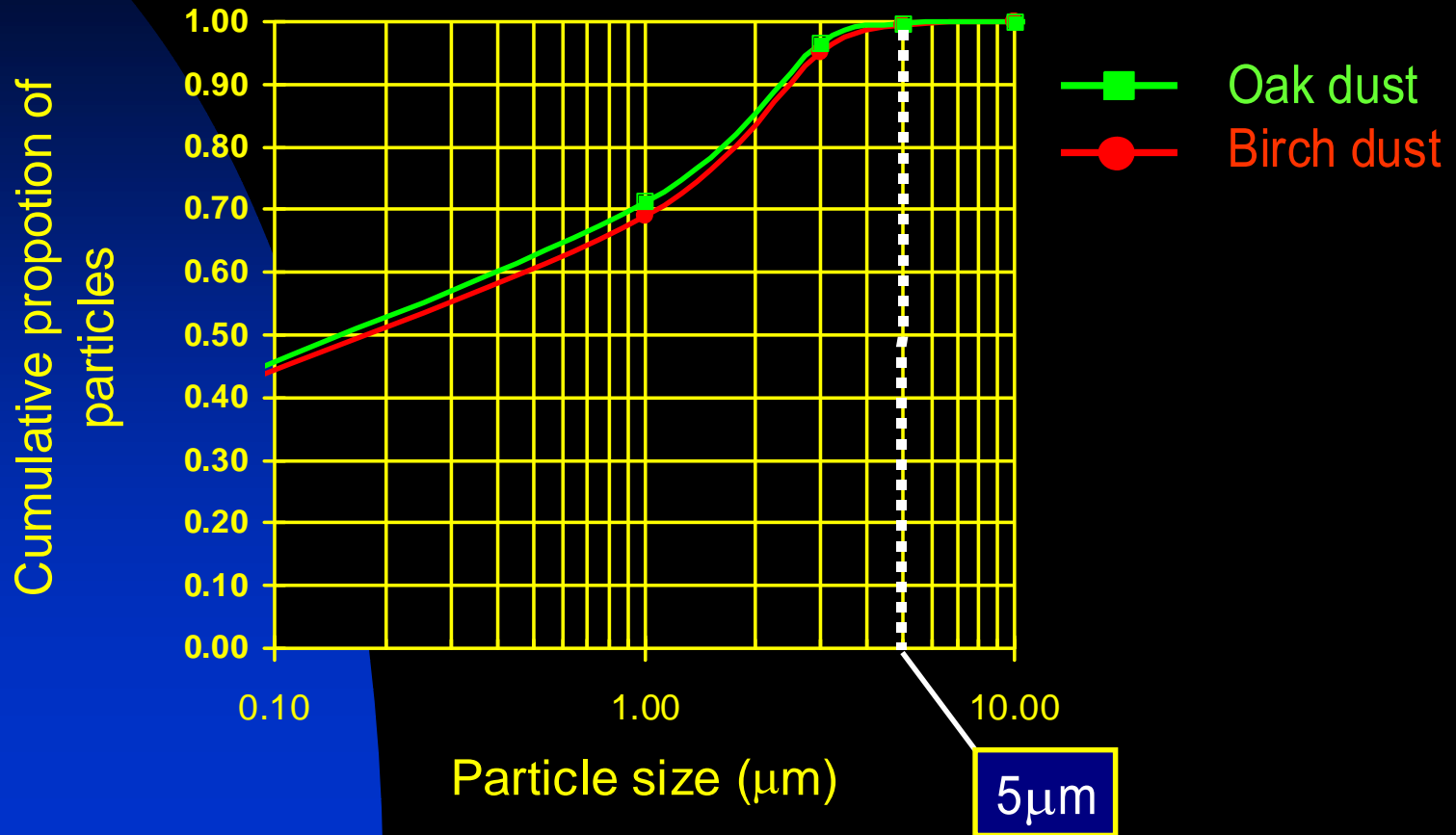
Aim of the study

- To elucidate the effects of **birch dust and oak dust exposure** on lung inflammation in mice

Characteristics of wood dust used in mice experiments

- **Birch dust:** >99% of the particles are $\leq 5 \mu\text{m}$ (optical particle monitor)
- **Oak dust:** >99% of the particles are $\leq 5 \mu\text{m}$ (optical particle monitor)

Size distribution of wood dusts by optical particle monitoring



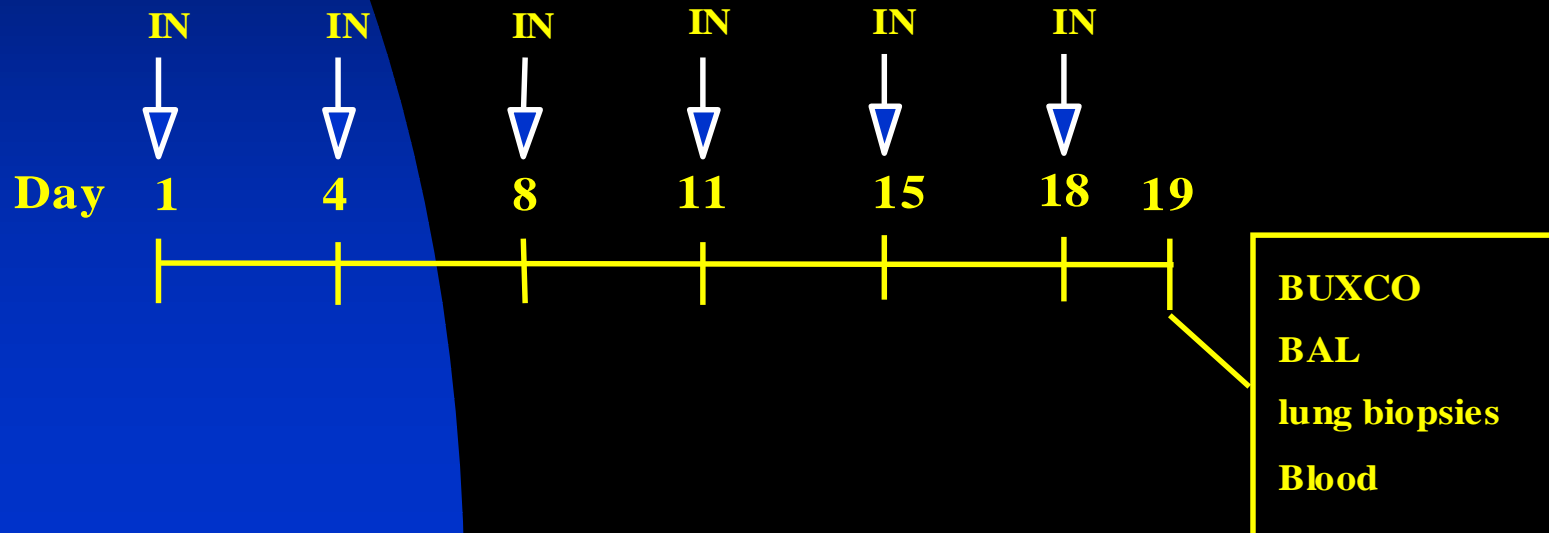
Schedule of sensitization

Exposure agents:

- Birch dust (50 μ g and 5 μ g / 50 μ l)
- Oak dust (50 μ g and 5 μ g / 50 μ l)
- TiO₂ (50 μ g and 5 μ g / 50 μ l)

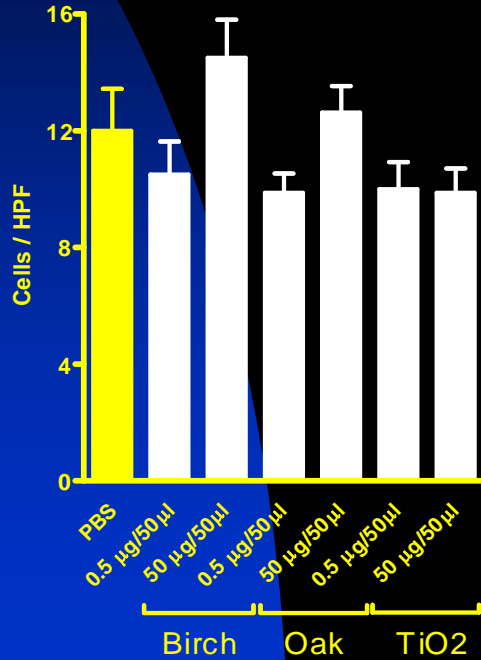
Mice:

- BALB/c
- female; 6-8 weeks old
- 8 mice per group

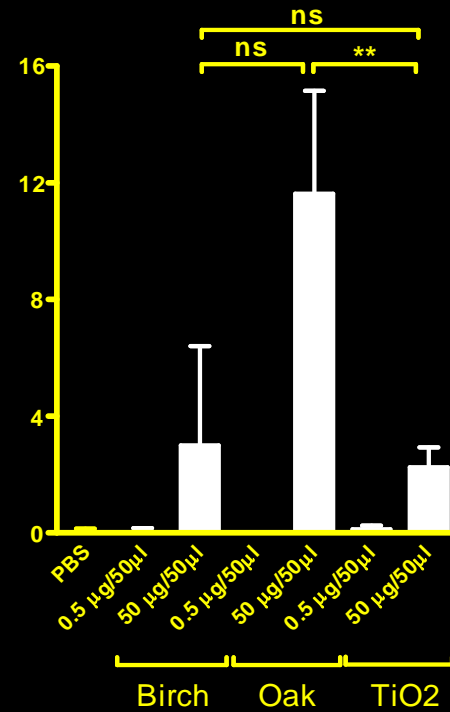


Cells in BAL

Macrophages

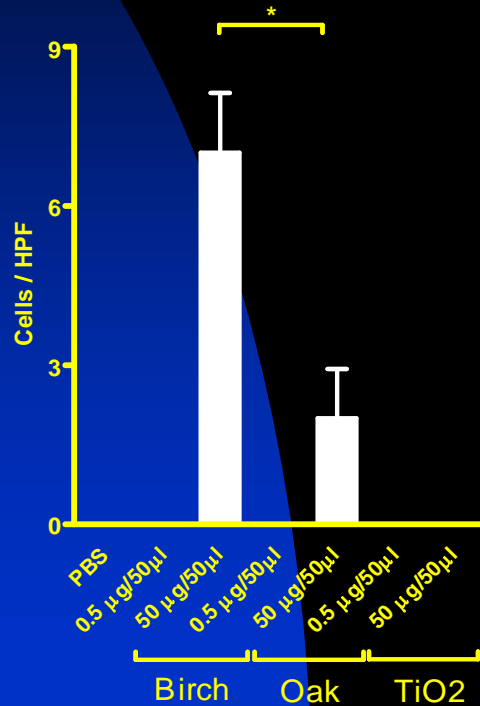


Neutrophils

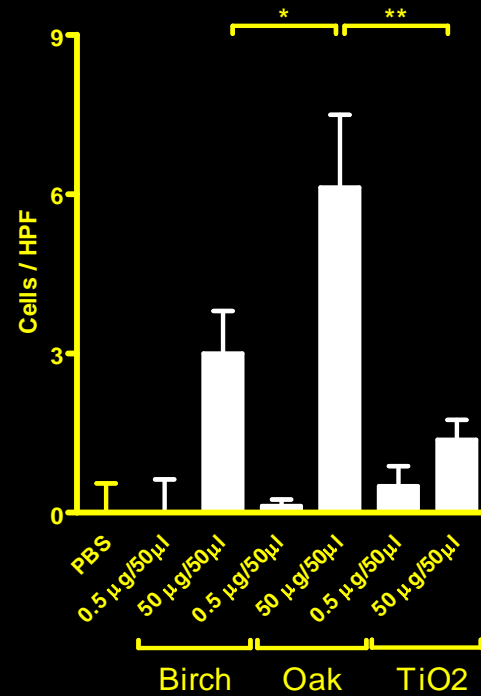


Cells in BAL

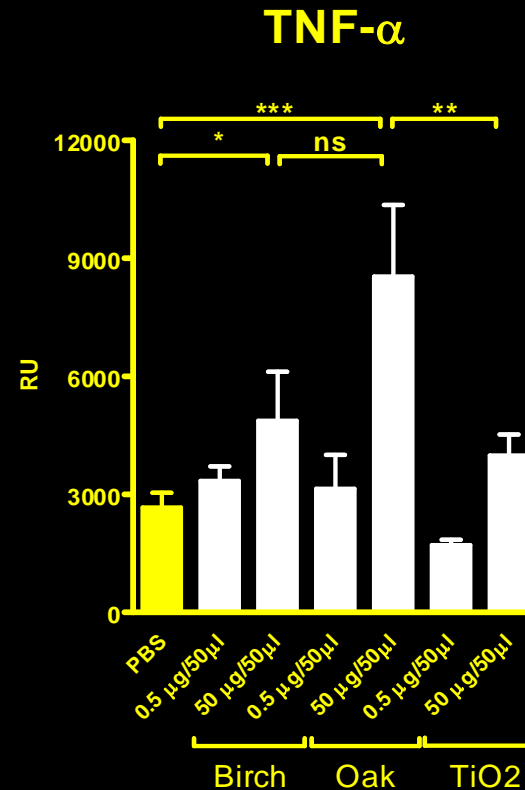
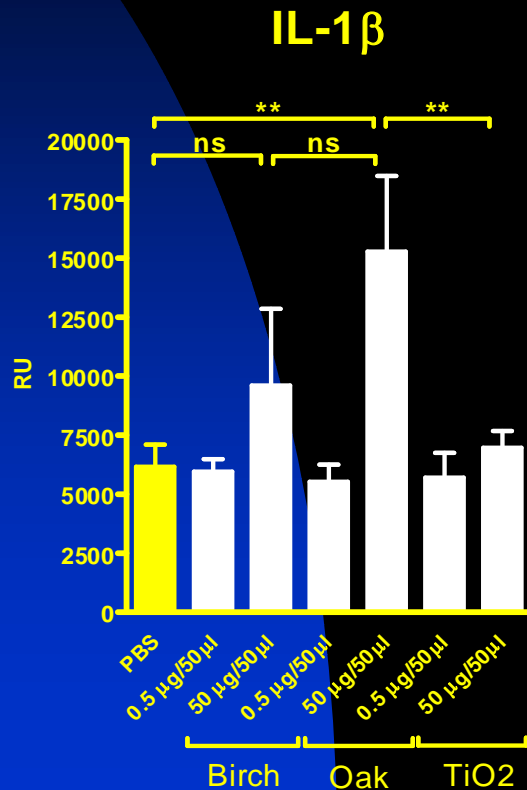
Eosinophils



Lymphocytes



Proinflammatory cytokine mRNA expression in lungs

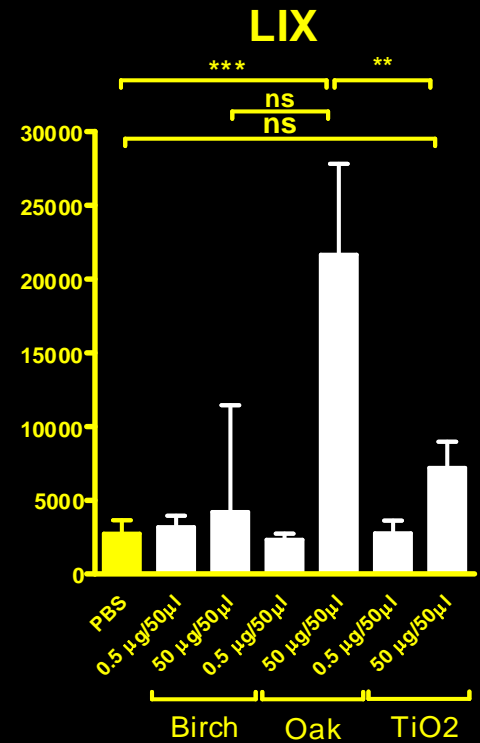
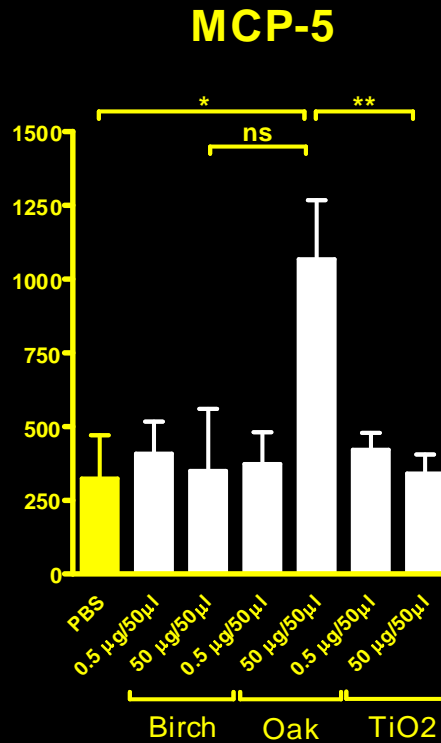
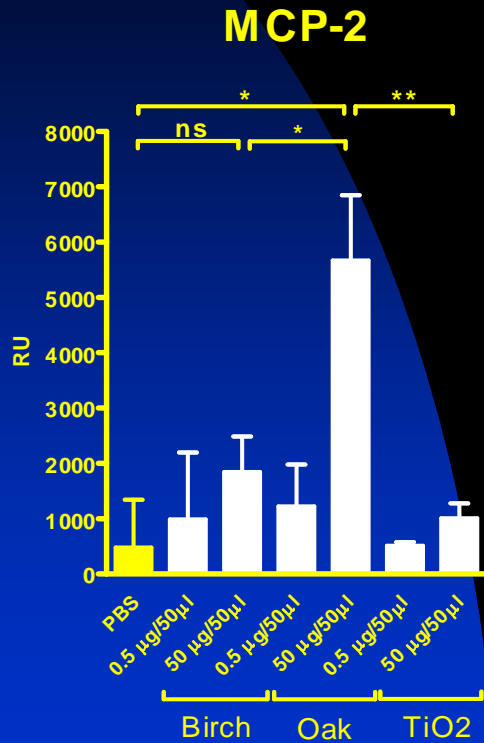


Other cytokines

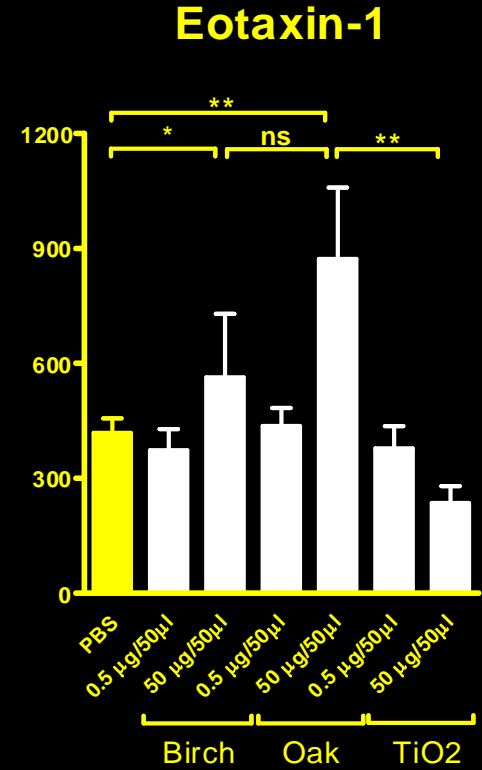
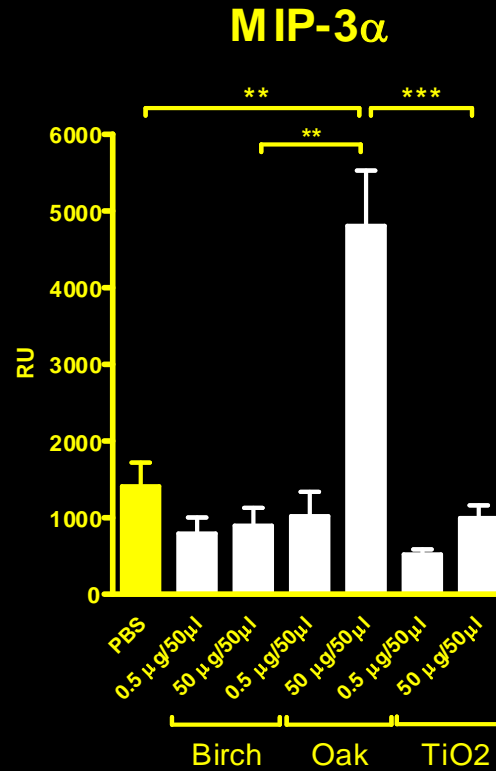
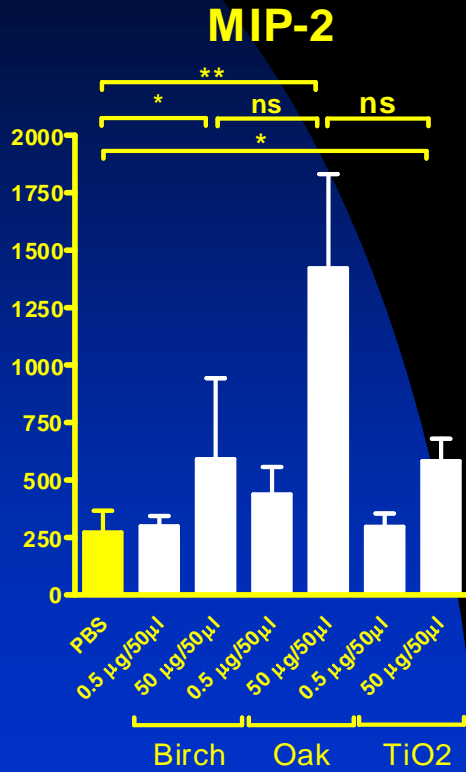
There was no significant increase in expression of major:

- **Th1 cytokines** (IL-12, IL-18)
- **Th2 cytokines** (IL-4, IL-5, IL-13)
- **Regulatory cytokines** (IL-10, TGF- β)

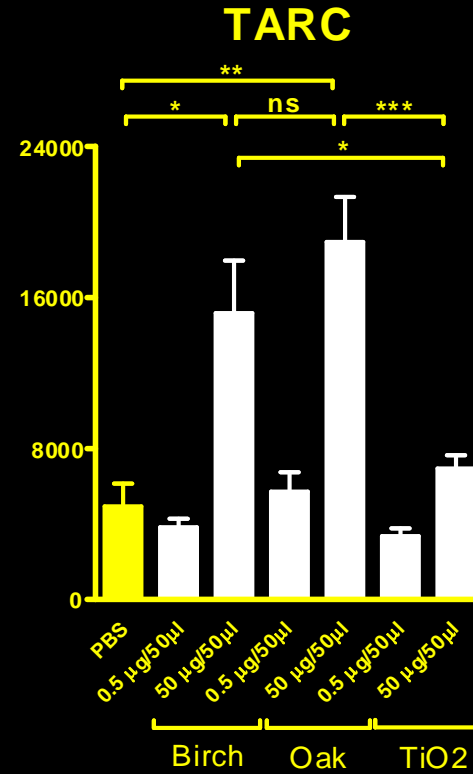
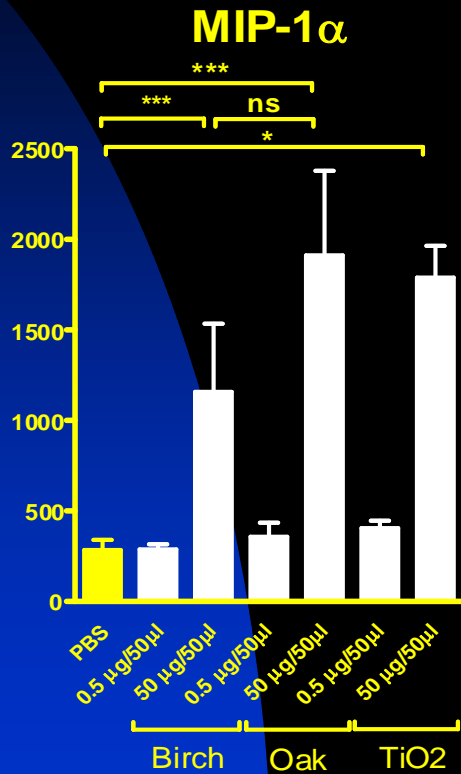
Chemokine mRNA expression in lungs



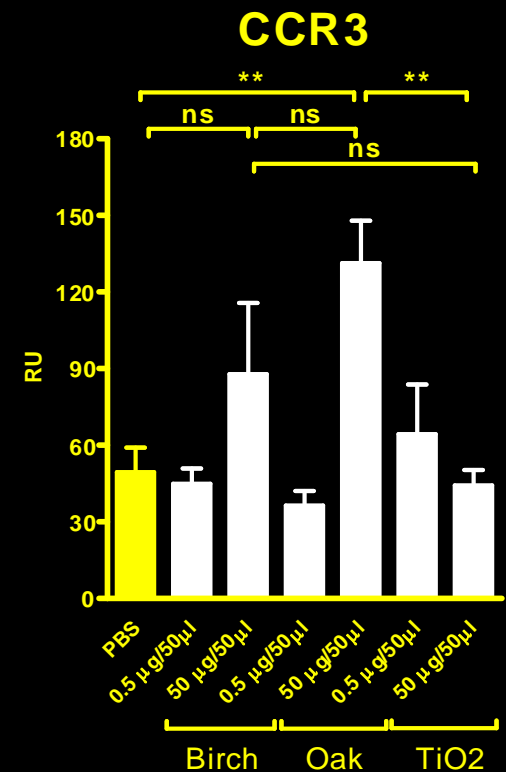
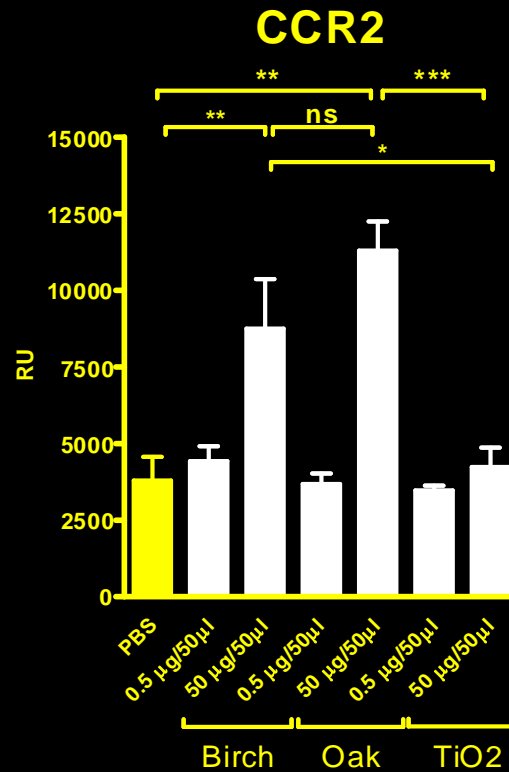
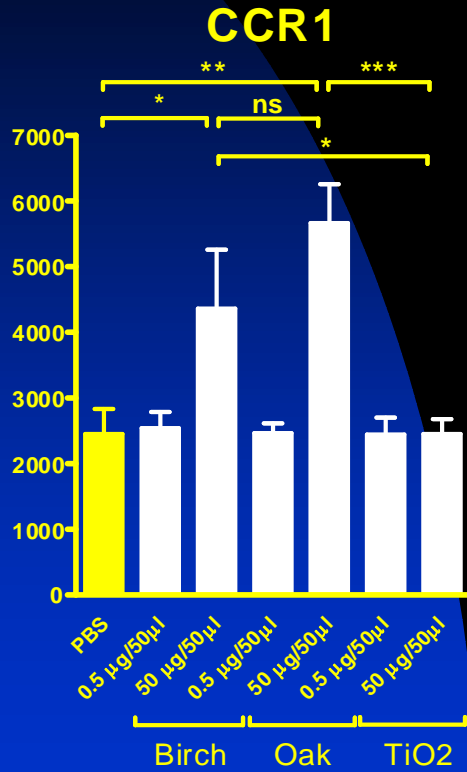
Chemokine mRNA expression in lungs



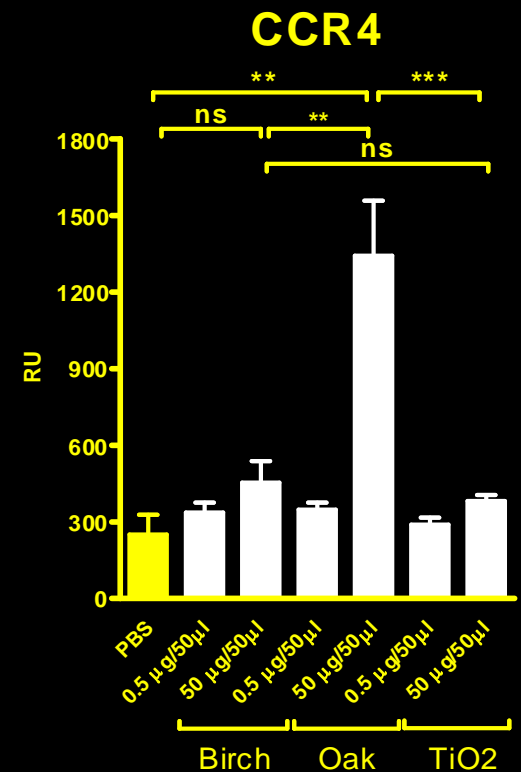
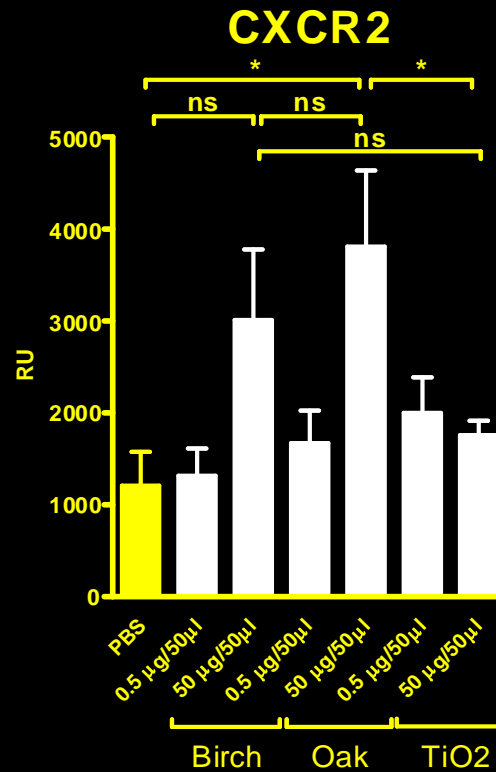
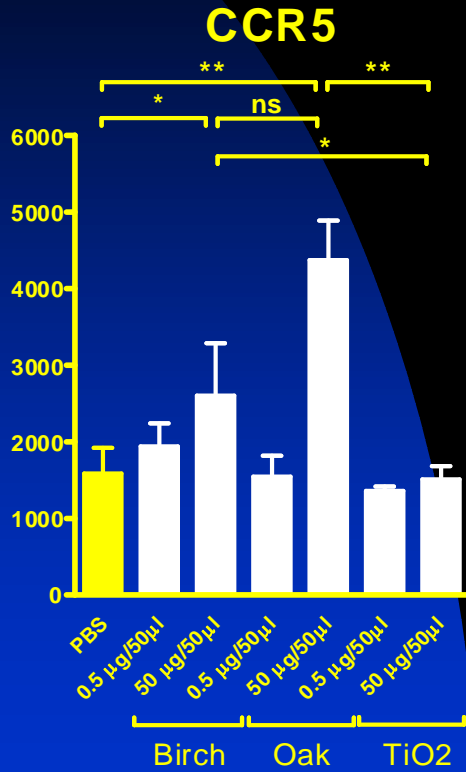
Chemokine mRNA expression in lungs



Chemokine receptor mRNA expression in lungs



Chemokine receptor mRNA expression in lungs



Summary 1.

Intra nasal exposure to wood dusts elicits in mice:

- influx of **inflammatory cells** to the lungs
 - **neutrophils and lymphocytes** dominated after **oak dust** exposure
 - **eosinophil infiltration** was higher after **birch dust** exposure

Summary 2.

Intra nasal exposure to wood dusts elicits in mice:

- induction of **proinflammatory cytokines, chemokines and chemokine receptors** in lung tissue
- exposure to **oak dust** induced higher levels of cytokines and chemokines

Conclusion

- These findings suggest that exposure to wood dust may significantly influence to development of inflammatory process in the airways by modulating the expression of proinflammatory cytokines and chemokines

Acknowledgements

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