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## **Birch pollen rupture and the release of aerosols of respirable allergens.**

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### **Author information**

### **Abstract**

#### **BACKGROUND:**

Birch pollen allergens have been implicated as asthma triggers; however, pollen grains are too large to reach the lower airways where asthmatic reactions occur. Respirable-sized particles containing birch pollen allergens have been detected in air filters, especially after rainfall but the source of these particles has remained speculative.

#### **OBJECTIVE:**

To determine the processes by which birch pollen allergens become airborne particles of respirable size with the potential to contribute to airways inflammation.

#### **METHODS:**

Branches with attached male catkins were harvested and placed in a controlled emission chamber. Filtered dry air was passed through the chamber until the anthers opened, then they were humidified for 5 h and air-dried again. Flowers were disturbed by wind generated from a small electric fan. Released particles were counted, measured and collected for immuno-labelling and high-resolution microscopy.

#### **RESULTS:**

Birch pollen remains on the dehiscent anther and can rupture in high humidity and moisture. Fresh pollen takes as long as 3 h to rupture in water. Drying winds released an aerosol of particles from catkins. These were fragments of pollen cytoplasm that ranged in size from 30 nm to 4 microm and contained Bet v 1 allergens.

#### **CONCLUSION:**

When highly allergenic birch trees are flowering and exposed to moisture followed by drying winds they can produce particulate aerosols containing pollen allergens. These particles are small enough to deposit in the peripheral airways and have the potential to induce an inflammatory response.