

Pollen allergen air-concentration and its distribution on the aerosol

Manfred Nachtnebel (1), Bernadette Führer (2), Lilian Kaufmann (2), Gabi Ettenberger (2), and Johannes Rattenberger (1)

(1) ZFE Graz Centre for Electron Microscopy, Graz, Austria (manfred.nachtnebel@felmi-zfe.at), (2) OFI Technology & Innovation GmbH, Vienna, Austria

In the last decades the number of people with allergies against at least one of the major allergens like birch, grass, ragweed pollen or domestic cat epithelia is steadily increasing [1]. There are various investigation methods available with which new insights can be gained regarding the allergy potential, the concentration or position of specific allergens at various sample types. In this study the more sophisticated methods enzyme-linked immunosorbent assay (ELISA) and immunogold electron microscopy (IEM) are combined to reveal information about the concentration and distribution of allergens on aerosols on fine dust filters. ELISA was used to obtain information about the allergen concentration on filters used in Vienna. The additional EIM investigations enable to locate specific proteins, which are responsible for an allergic reaction and reveal information about the presence of those allergens at particles deposited at the filters.

Standard PM2.5 (particulate matter) and PM10 filters, used in fine dust measurement sites in the capital city Vienna, were provided by courtesy of the environmental protection department (MA22) and investigated at the OFI (OFI Technology & Innovation GmbH) by ELISA. The resulting allergen concentration were subsequently compared with the PM2.5 and PM10 concentrations at the same site. Expectably, it was shown that the birch pollen allergen (Bet v1) concentration at the PM2.5 and PM10 filters show the same slope as the pollen concentration at its high seasons at the beginning of April. Same filters were investigated at the ZFE (Graz Centre for Electron Microscopy) to obtain information about the location of the allergens. A sample preparation protocol was found by an iterative sample preparation process, initially for the detection of the grass pollen allergen (Phl p5). It was able to show, that the allergens are present directly on fine dust particles. Further investigations will be performed to obtain statistically evaluable data sets.

[1] N. Ghouri et al., J. R. Soc. Med 101 (2008) 466–472.9