

# RESIDENTIAL EXPOSURE TO PARTICULATE MATTER AND MONOCLONAL GAMMOPATHY OF UNDETERMINED SIGNIFICANCE

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**on behalf of the Heinz Nixdorf Recall Investigative Group.**

**Background and Aims:** Monoclonal gammopathy of undetermined significance (MGUS) is a precursor condition leading to hematological malignancies. An association of MGUS with inflammatory disorders was reported. As particulate matter (PM) can induce chronic inflammation, we asked whether there is an association of PM exposure and MGUS.

**Methods:** We screened baseline and 5-year follow-up serum samples of the Heinz Nixdorf Recall Study, an ongoing cohort study of 4,814 participants aged 45-75 years in Germany. Serum electrophoresis and immunofixation (Hydragel 12 IF, Penta-Kit, Sebia, Fulda, Germany) was used to detect MGUS. The individual one-year average  $PM_{2.5}$  and  $PM_{10}$  exposure prior to baseline was assessed using a dispersion and chemistry transport model (EURAD). We calculated distance from participants' home addresses to highly trafficked roads. PM values were categorized in quartiles. Poisson regression was used to model incident MGUS adjusting for sex and age. Logistic regression was used to calculate odds ratios (OR) for prevalent MGUS at follow-up adjusted for distance, age, sex, BMI, education, smoking status, and physical activity.

**Results:** At baseline 165 MGUS cases were identified among 4,702 screened participants (prevalence 3.5%, 95%-CI 3.0-4.1). Among 3,862 participants free of disease at baseline, 50 (1.3%) new MGUS were identified. Median one-year  $PM_{2.5}$  and  $PM_{10}$  concentrations were  $16.6\mu g/m^3$  (IQR 2.4) and  $20.7\mu g/m^3$  (IQR 4.0), respectively. Age- and sex-adjusted relative risk of incident MGUS in increasing quartiles of  $PM_{2.5}$  exposure was 2.78 (95%-CI 1.09-7.11), 1.58 (0.56-4.44), and 3.33 (1.33-8.34), respectively. Fully adjusted ORs for prevalence of MGUS at follow-up in increasing quartiles of  $PM_{2.5}$  were 1.02 (0.65-1.62), 0.98 (0.62-1.56), and 1.54 (1.02-2.34). Effect estimates for  $PM_{10}$  showed a positive trend.

**Conclusions:**

We provide first data suggesting that residential exposure to particulate matter may increase risk of MGUS and thus linking chronic particle exposure with cells of the adaptive immune system.

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