Allergic Sensitization at School Age is a Systemic Low-grade Inflammatory Disorder

Background
Systemic low-grade inflammation has been demonstrated in a range of the frequent noncommunicable diseases (NCDs) proposing a shared mechanism, but is largely unexplored in relation to allergic sensitization. We therefore aimed to investigate the possible association with childhood allergic sensitization.

Methods
High-sensitivity C-reactive protein (hs-CRP), interleukin-1β (IL-1β), IL-6, tumor necrosis factor-α (TNF-α), and chemokine (C-X-C motif) ligand 8 (CXCL8) were measured in plasma at age 6 months (N = 214) and 7 years (N = 277) in children from the Copenhagen Prospective Studies on Asthma in Childhood2000 (COPSAC2000) birth cohort. Allergic sensitization against common inhalant and food allergens was determined longitudinally at ages ½, 1½, 4 and 6 years by specific IgE assessments and skin prick tests. Associations between inflammatory biomarkers and sensitization phenotypes were tested with logistic regression and principal component analyses (PCAs).

Results
Adjusted for gender, recent infections, and a CRP genetic risk score, hs-CRP at 7 years was associated with concurrent elevated specific IgE against any allergen [adjusted OR (aOR) = 1.40; 95% CI, 1.14–1.72; P = 0.001], aeroallergens (aOR, 1.43; 1.15–1.77; P = 0.001), food allergens (aOR, 1.31; 95% CI, 1.02–1.67; P = 0.04), sensitization without any clinical allergy symptoms (aOR = 1.40; 1.06–1.85; P = 0.02), and with similar findings for skin prick tests. The other inflammatory markers were not univariately associated with sensitization, but multiparametric PCA suggested a specific inflammatory response among sensitized children. Inflammatory markers at age 6 months were not associated with subsequent development of sensitization phenotypes.

Conclusions
Elevated hs-CRP is associated with allergic sensitization in school-aged children suggesting systemic low-grade inflammation as a phenotypic characteristic of this early-onset NCD.

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