Title: Blood neutrophil pattern is associated with poor asthma control in adults from the EGEA study

Rachel Nadif, rachel.nadif@inserm.fr1,2, Valerie Siroux, valerie.siroux@ujf-grenoble.fr3,4,5, Anne Boudier, anne.boudier@ujf-grenoble.fr3,4,5, Nicole Le Moual, nicole.lemoual@inserm.fr1,2, Jocelyne Just, jocelyne.just@trs.ap-hop-paris.fr, MD6, Frederic Gormand, frederic.gormand@chu-lyon.fr, MD7, Christophe Pison, CPison@chu-grenoble.fr, MD5,8,9, Regis Matran, regis.matran@univ-lille2.fr, MD10 and Isabelle Pin, IPin@chu-grenoble.fr, MD3,4,5. 1INSERM U1168 Aging and chronic diseases. Epidemiological and Public Health Approches (VIMA). 2UMR-S 1168, Univ Versailles St-Quentin en Yvelines, Versailles, France; 3INSERM. Team of Environmental Epidemiology applied to Reproduction and Respiratory Health, Institut Albert Bonniot., Grenoble, France; 4Univ Grenoble Alpes, Univ Grenoble Alpes, Grenoble, France; 5IAB. Team of Environmental Epidemiology applied to Reproduction and Respiratory Health, CHU de Grenoble, Grenoble, France; 6Centre de l'asthme et des allergies, APHP, Hopital Trousseau, UPMC Paris 6, Paris, France; 7Pneumology Department, CHU de Lyon, Lyon, France; 8Clinique universitaire de Pneumologie, Pôle Thorax et Vaisseaux, CHU Grenoble, Grenoble, France; 9INSERM, U1055, Grenoble, France and 10Univ Lille Nord de France, CHU de Lille, Lille, France.

Body: Introduction. Blood neutrophilia and eosinophilia are features of asthma. Data are limited on their stability over time and how they are associated with asthma control in adults.

Aim. To study whether and how blood inflammatory patterns were associated with asthma symptom control and exacerbations.

Methods. Analyses were conducted in 474 adults with asthma (38.2 yrs, 48% women) participating in the 2nd survey of the Epidemiological Study on the Genetics and Environment of Asthma (EGEA2), including 242 adults followed-up from the 1st survey (EGEA1). At EGEA2, asthma symptom control was assessed in 3 classes (GINA 2014) and exacerbations by use of urgent care or oral corticosteroids in the last year. Four blood inflammatory patterns were defined at EGEA 1 and 2: ≥250 eosinophils/mm³: EOSlo/EOShi, ≥5000 neutrophils/mm³: NEUlo/NEUhi. Estimates were adjusted for age, sex, and smoking.

Results. At EGEA2, both NEUhi and EOShi patterns were associated with poor asthma control (OR[95%CI]=2.94[1.85-4.67] and 1.61[1.11-2.34] respectively). NEUhi pattern was also associated with exacerbations (2.61[1.48-4.63]), and EOShi pattern with poor lung function (FEV1: 93.2 vs. 97.3 % pred., p=0.02). NEUhi and EOShi patterns were stable over time in almost 50% of the 242 adults. Persistent NEUhi (at EGEA1 and 2) was associated with poor asthma control at EGEA2 (3.09[1.18-7.05]), whereas NEUhi at EGEA1 was not. Both EOShi at EGEA1 and persistent EOShi were associated with poor lung function at EGEA2 (FEV1: 90.5 vs. 95.3%, and 88.6 vs. 96.0 % pred., p=0.05).

Conclusion. Blood inflammatory patterns were differently associated with asthma control in adults, suggesting specific role for each one.