Associations between blood eosinophils and markers of nitric oxide pathway in blood and in exhaled breath condensate in asthmatics from the EGEA study


Increased numbers of eosinophils (EOS) in blood and in airways are a characteristic feature of asthma, and eosinophils are involved in the Nitric Oxide (NO) pathway. Objective was to compare associations between blood EOS count and markers of NO pathway both in blood and in exhaled breath condensate (EBC) in asthmatics from a large epidemiological study.

Exhaled fraction of NO (FeNO) was measured at 50mL/s. EBC was collected using RTube™. In plasma and EBC, NO$_2$-NO$_3$ (converted nitrate plus nitrite) was measured by the Griess reaction, and both NO$_2$-NO$_3$ level and NO$_2$-NO$_3$ level related to protein concentration (ratio) were considered. Analyses with adjustment for age, sex and smoking were performed in 354 adults with current asthma (38.9 years, 172 women, FEV1% pred. 95.7±18.6%, 80.1% with atopy) from the French Epidemiological study on the Genetics and Environment of Asthma.

Blood geometric mean (GM) (95% CI) for NO$_2$-NO$_3$ level, ratio and EOS was 35.2µM (10.2–121), 0.45µmol/g (0.13–1.59) and 210 cells/mm$^3$ (59–749) respectively. EBC GM for NO$_2$-NO$_3$ level, ratio and FeNO was 5.45µM (0.66–44.9), 1.83µmol/µg (0.16–21.4) and 17.5 ppb (3.99–76.7) respectively. EOS was not associated with blood NO$_2$-NO$_3$. EOS was positively and significantly associated with EBC NO$_2$-NO$_3$ ratio ($r=0.21$, $P=0.03$) and with FeNO ($r=0.35$, $P<0.001$). EBC NO$_2$-NO$_3$ and FeNO were not associated ($r=0.05$).

Blood EOS was associated with FeNO and with NO$_2$-NO$_3$ only in EBC, suggesting that systemic and lung NO pathways are differently involved in asthma. Results also suggest that EBC NO$_2$-NO$_3$ and FeNO represent two pieces of NO pathway, making them complementary in the study of asthma.