



## Exercise Biochemistry Review

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### Impact of PM2.5 Exposures and Pre-exercise on Pulmonary Function and Leukocyte Count in Aged Rats

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**Objective** Exposure of PM2.5 has been associated with adverse respiratory and the risk of inflammation. While regular physical activity (PA) reduces the risk of many adverse health effects. This study aimed to examine the protection of pre-exercise on adverse health effects of Pulmonary Function and inflammatory induced by PM2.5 exposures in aged rats.

**Methods** 24 male wistar rats, aged 16 months, were randomly divided into 4 groups: Sedentary (S), Exercise (E), Sedentary+ PM2.5 exposures (S+PM), and Exercise+ PM2.5 exposures (E+PM). The rats in all E-related groups went through an aerobic treadmill exercise protocol (15m/min, 30 min) at every other day. The PM-related groups of aged rats were exposed to concentrated ambient particles of less than 2.5  $\mu\text{m}$  (PM2.5) or filtered air (FA) in Beijing, for 4 hours per day, 7 days per week for a total of 2 weeks. After 2-week PM Exposure, blood was taken to measure the count of white blood cell (WC), neutrophil (NE), lymphocytes (LY), monocyte (MO), eosinophils (EO) and basophil (BA), and pulmonary function examined by whole body plethysmography.

**Results** After 2-week PM exposure, compared with E group, S+PM group's percentage of NE decreased significantly ( $p < 0.05$ ), while the decline of NE% in E+PM group was small. Meanwhile, the obviously rise of BA% occurred in S+PM and E+PM group compared with sedentary group ( $p < 0.05$ ). 2) Compared with E group, the Index of constriction (Penh and PAU) were increased evidently in S+PM group after PM exposure ( $p < 0.05$ ), while the value of Penh were significantly improved in E+PM group ( $p < 0.05$ ). 3) Compared with E group, the rejection index (RinX) ( $p < 0.01$ ) and duration of pause before inspiration (TP) ( $p < 0.05$ ) were appeared a clearly inclined in S+PM group, as well as several up-regulated of RinX and TP showed in E+PM group.

**Conclusions** 2-week PM2.5 exposures led to an increased susceptibility of infections, index of constriction and susceptibility of pulmonary function in aged rats. Moderate pre-exercise has beneficial effects on pulmonary function and immune function.