

Exercise prior to pregnancy enhances the suppressive function of Tregs in offspring in a mouse model of asthma

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ABSTRACT

Regulatory T cells (Tregs) are a specialized subset of T cells responsible for peripheral tolerance and the mediation of inappropriate immune responses, such as those seen in asthma and allergy. Our lab is interested in the role that exercise plays in Treg responses. Using a mouse model of asthma, we have shown that exercise increases both the number and suppressive function of Tregs. It has been shown that exposing nursing dams to allergens confers protection against airway hyperresponsiveness and inflammation (trademarks of asthma) in pups exposed to the same allergen. In the present study, we wanted to determine if the exercise-induced increase in number and suppressive function of Tregs would be similarly passed from dams to their pups. Male pups from dams that were exercised prior to pregnancy (E) and pups from sedentary dams (S) were OVA-sensitized and challenged beginning at 4wks of age. Mice were sacrificed and tissues were taken for cell analysis. When co-cultured with CD4⁺CD25⁻ responder cells, Tregs from E pups enhanced suppression of responder cells between 8.4-10% when compared to Tregs from S pups. While the number of Tregs from the mediastinal lymph node was not significantly different between E and S pups, there was a significant decrease in the number of CD4⁺ and CD8⁺ T cells in E pups from S pups (51.24% ± 10.2 vs. 33.51% ± 3.3 and 21.42% ± 7.3 vs. 12.94% ± 1.2, respectively), indicating a reduction in cellular infiltration and a muted immune response to allergen. Although not significant, there was a doubling of the number of Tregs in the thymus and bone marrow of E pups compared to S pups. This study indicates that exercise prior to pregnancy may confer some Treg-mediated protection against asthma.