

Abraham WM, Ahmed A, Serebriakov I, Lauredo IT, Bassuk J, Adams JA, Sackner MA.

Whole-body periodic acceleration modifies experimental asthma in sheep. Am J Respir Crit Care Med. 2006 Oct 1;174(7):743-52. Epub 2006 Jul 20.

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RATIONALE: Nitric oxide is released from vascular endothelium in response to increased pulsatile shear stress. Nitric oxide inhibits mast cell activation and is antiinflammatory and therefore might be protective in asthma. **OBJECTIVES:** We determined if a noninvasive motion platform that imparts periodic sinusoidal inertial forces to the whole body along the spinal axis (pGz) causing release of endothelial nitric oxide modulates experimental asthma in sheep. **METHODS:** Allergic sheep were untreated (control) or were treated with pGz alone or after receiving intravenously the nitric oxide synthase inhibitor N(w)-nitro-L-arginine methyl ester (L-NAME) before aerosol challenge with *Ascaris suum*, and the effect on antigen-induced airway responses was determined. Bronchoalveolar lavage cells obtained 6 h after antigen challenge were analyzed for nuclear factor-kappaB (NF-kappaB) activity in the respective groups. **RESULTS:** pGz treatment for 1 h before antigen challenge reduced the early airway response and blocked the late airway response but did not prevent the antigen-induced airway hyperresponsiveness 24 h after challenge. Administration of L-NAME before pGz completely reversed this protection, whereas L-NAME alone did not affect the antigen-induced responses. NF-kappaB activity was 1.9- and 1.8-fold higher in the control and L-NAME + pGz groups, respectively, compared with pGz-treated animals. Extending the pGz treatment to twice daily for 3 d and then 1 h before antigen challenge blocked the early and late airway responses, the 24-h airway hyperresponsiveness, and the airway inflammatory cell response. **CONCLUSION:** Whole-body pGz modulates allergen-induced airway responses in allergic sheep.