

## Regulation of $\alpha_7$ -integrin expression in vascular smooth muscle by injury-induced atherosclerosis

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**Chao, Jun-Tzu, Gerald A. Meininger, Jan L. Patterson, Sarah A. L. Jones, Charles R. Partridge, Jessemy D. Neiger, E. Spencer Williams, Stephen J. Kaufman, Kenneth S. Ramos, and Emily Wilson.** Regulation of  $\alpha_7$ -integrin expression in vascular smooth muscle by injury-induced atherosclerosis. *Am J Physiol Heart Circ Physiol* 287: H381–H389, 2004. First published February 26, 2004; 10.1152/ajpheart.00939.2003.—Injury of vascular smooth muscle cells (VSMCs) by allylamine (AAM) leads to phenotypic changes associated with atherogenic progression including increased proliferation, migration, and alterations in cell adhesion. In the present study, the relationship between AAM-induced vascular injury and expression of the  $\alpha_7$ -integrin subunit was investigated. The  $\alpha_7$ -mRNA and protein expression were examined using real-time RT-PCR, fluorescence-activated cell sorting analysis (FACS), immunohistochemistry, and immunoblotting. In cultured VSMCs from aortas of AAM-treated rats (70 mg/kg for 20 days),  $\alpha_7$ -mRNA levels were increased more than twofold compared with control cells. No change was seen in  $\beta_1$ -integrin expression. FACS analysis revealed increased cell surface expression of  $\alpha_7$ -protein ( $25 \pm 9\%$ ;  $*P < 0.05$ ). AAM treatment of naive VSMCs enhanced  $\alpha_7$ -mRNA expression ( $2.4 \pm 0.7$ -fold, mean  $\pm$  SE;  $*P < 0.05$ ). The increased  $\alpha_7$ -mRNA expression was attenuated by the amine oxidase inhibitor semicarbazide and the antioxidant pyrrolidine dithiocarbamate, which confirms a role for oxidative stress in modulating  $\alpha_7$ -expression. In vivo  $\alpha_7$ -mRNA and protein expression were enhanced in the aortas of AAM-treated rats. In addition, increased  $\alpha_7$ -integrin expression facilitated AAM VSMC adhesion to laminin more efficiently compared with control ( $51 \pm 2\%$ ;  $*P < 0.05$ ). Chemical injury induced by AAM significantly enhances  $\alpha_7$ -integrin expression in VSMCs. These findings implicate for the first time the expression of  $\alpha_7$ -integrin during the response of VSMCs to vascular injury.

aorta; cell adhesion; laminin; vascular injury

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