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Caveolin proteina potential marker for chronic ozone inhalation mediated cardiac toxicity

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Abstract

A number of unknown factors contribute to the development of cardiovascular disease (CVD). For example, 60,000 deaths each year in the US have been linked to environmental pollutants such as ozone (O_3). Earlier studies from our laboratory have shown myocardial dysfunction subsequent to chronic O_3 exposure in normal adult rats may be associated with a decrease in antioxidant reserve and with an increased activity of inflammatory mediators. The present study tested the hypothesis that O_3 induced cardiac dysfunction in healthy adult rats may be due to changes in caveolin-1 and caveolin-3 levels. Sprague Dawley rats were exposed 8 hrs/day for 28 and 56 days to filtered air or 0.8 ppm O_3. In order to assess the chronic effects to O_3, *in-vivo* cardiac function was assessed by measuring LVDP, 24 hrs after termination of the O_3 exposure. Compared to rats exposed to filtered air, LVDP values significantly decreased in all O_3 exposed animals. This attenuation of cardiac function was associated with increased myocardial TNF-alpha (TNF-□) levels and decreased myocardial activities of superoxidase dismutase (SOD). Progressive increases in the expression of myocardial TNF-□ in 4 and 8 week O_3 exposed animals were followed by decreases in cardiac caveolin-1 levels. On the other hand, differential changes in the expression of caveolin-3 in hearts from 4 and 8 week O_3 exposed animals were independent of intra-cardiac TNF-□□levels. These novel findings suggest the interesting possibility that a balance between caveolin-1 and caveolin-3 may be involved in O_3- mediated cardiac toxicity.

Biography

Rajat Sethi received his Ph.D. from the Department of Medicine, University of Manitoba, Canada. Sethi is currently the Chair of Department of Pharmaceutical and Biomedical Sciences at the California Health Sciences University, Clovis, California. Prior to this he served as the Assistant Dean for Research and Evidence Based Practice at the Texas A&M Health Science Center. He has more than 100 publications in the field of cardiac toxicology, holds 18 patents, has authored 7 books, and serves in the editorial board for many journals. Sethi has received grants from federal and local agencies and from various foundations and has been an invited speaker in many national and international meetings and he is the recipient of numerous awards and honors for his contribution to research and education.