Caveolin mediated p38MAPK associated signaling in ozone-induced cardiac toxicity

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Out of 350,000 sudden cardiac deaths each year in the United States, 60,000 deaths have been linked to air pollution, suggesting a detrimental role of environmental pollutants in the development of cardiac toxicity. Although epidemiology studies have associated exposure to particulate matter (PM) with acute mortality and morbidity, only recently have they found associations between ozone and mortality. It has been challenging to disentangle the toxic effects of ozone from those of PM in these studies because the 2 pollutants are often closely correlated temporally and geographically. In studies using rats from controlled ozone (O₃) exposure environment we showed moderate and chronic cardiac dysfunction after 4 and 8 weeks of O₃ inhalation respectively. This stage dependent O₃ mediated progressive decline in cardiac function was associated with increasing levels of inflammatory mediators. Our findings were cited and the results validated in a recent USEPA sponsored human study where exposure to O₃ was shown to modulate the cardiovascular system by increasing the levels inflammatory mediators. Later studies from our laboratory suggest a balance between caveolin-1 and caveolin-3 may play a role in O₃ associated cardiac toxicity. Since interaction of caveolins with p38MAPK is involved in regulating death and survival signaling in the cardiac muscle, our recent findings in O₃ exposed rats suggest a stage dependent involvement of caveolin mediated p38MAPK associated death and survival signaling and that more than one pathways may be involved in the pathology of O₃ mediated cardiac toxicity.

Biography

Rajat Sethi completed his Ph.D in Physiology from University of Manitoba, Canada and is currently the Assistant Dean for Research and Evidence Based Practice at the Texas A&M Health Science Center- College of Nursing. He has published more than 30 peer reviewed papers in cardiac pathology, holds 15 patents, and has authored 5 books and serves in the editorial board for many journals.

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