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## Cochlear protein nitration in acquired hearing loss

Samson James Daniel  
Wayne State University, USA

Reactive oxygen species have been implicated as contributing factors to cochlear pathology induced by noise and ototoxic drugs. Nitrosative stress is emerging as an important factor in acquired hearing loss as tyrosine nitration has been detected in inner ear pathologies and is associated with pathways related to the cochlear stress response. We reported that treatment with anti-cancer drug cisplatin increased the expression of nitrated proteins in the cochlear sensory epithelium in rats. More importantly, the dose-dependent increase in cochlear protein nitration correlated with cisplatin-induced hearing loss. In our preliminary studies on rats exposed to loud noise, we detected multiple nitrated cochlear proteins in immunoblots probed with a nitrotyrosine antibody. Time dependent increase of a 75 kDa protein band was observed after exposure to broad band noise (2-20 kHz) at 120 dB SPL for 90 min. Treatment with antioxidants prevented both noise-induced and drug-induced hearing loss. Noise-induced permanent shift in hearing threshold was attenuated by D-methionine treatment, while co-treatment with Trolox, an inhibitor of peroxynitrite, attenuated cisplatin-induced changes in the expression levels of several genes (Irgm, Gadd45a, Gpx2, Mdm2, Ncf2, Sfn) related to nitric oxide signaling, inhibited cisplatin-induced cochlear protein nitration, and attenuated the hearing loss. These findings support our hypothesis that cochlear nitrosative stress is a critical factor that contributes to hearing impairment induced by exposure to noise and cisplatin.

### Biography

Samson James Daniel is an Assistant Professor in the Institute of Environmental Health Sciences at Wayne State University. He completed his PhD in the University of Madras, Chennai, and postdoctoral studies in the State University of New York, Buffalo. He has published more than 18 papers in reputed journals and pursues his research on redox sensitive molecular mechanisms underlying acquired hearing loss.

[sjamesdaniel@wayne.edu](mailto:sjamesdaniel@wayne.edu)