Exposure to Diesel exhausts Nano-particles: behavioral alteration, Neuroinflammation and oxidative stress on adult male mice

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Abstract

Exposure to nanoscale diesel engines exhausted particles (DEPs) is a well-recognized risk factor for respiratory and cardiovascular diseases. Rodents as commonly used models for urban air pollution in health effect studies demonstrate constant stimulation of inflammatory responses in the main areas of the brain. Nevertheless, the primary effect of diesel exhaust particulate matter on some of the brain regions and relation by behavioral alterations still remains untouched. We evaluated the brain regional inflammatory responses to a nanosized subfraction of diesel engines exhaust particulate matter in an adult male mice brain. Adult male mice were exposed to DEPs for 3, 6, and 8 h per day, 12 weeks and five days per week. Degree of anxiety and the depression by elevated plus maze and Forced Swimming Test respectively (FST) did measurement. After behavior tests, the plasma and some of the brain regions such as olfactory bulb (OB) and hippocampus (HI) were analyzed for oxidative stress and inflammatory responses. Our findings indicate that, the inflammation and oxidative stress changes in OB and HI, markedly coincides with the results of behavioral alterations. These responses corresponded with rapid induction of MDA and nitrite oxide (NO) in brain regions and neuronal nitric oxide synthase (nNOS) mRNA followed by IL6, IL1α, and TNFα in OB and HI. The different times of DEPs exposure, leads to oxidative stress and inflammatory in plasma and brain regions. We conclude that this cumulative transport of inhaled nanoscale DEPs into the brain and creating to inflammation responses of brain regions may cause problems of brain function and anxiety and depression.

Keywords: *Air Pollution, Diesel exhaust particles, Oxidative stress, Neuroinflammation, Neurotoxicology, Anxiety, Depression.*

Professional Biography

Dr. Mojtaba Ehsanifar has completed his PhD from Iran University of medical Sciences and now he continues his research on Air pollution and Health effects Such as effect of the Nano particular matter, PM, using in-vivo models (mouse) and health effects and focused on the molecular mechanisms involved in neurodegenerative diseases, lung diseases, and reproductive system in Kashan University of Medical Sciences. He has published more than 35 papers in reputed journals and presented in congresses. Also he has Cooperation as reviewer with reputed journals.



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