

Anxiety and depression following diesel exhaust nano-particles exposure in male and female mice

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Abstract

Anxiety and depressive are fundamental psychic disorder and are considered one of the most severe mental health problems globally. There is much evidence that air pollution exposure is significantly related to symptoms of anxiety and depression. Air pollution exposures in addition to increased morbidity and mortality caused by cardiovascular and respiratory diseases, may cause neuroinflammation and oxidative stress and contribute to the escalating prevalence of central nervous system (CNS) diseases. Diesel exhaust particles (DEPs), is one of the most important components of air pollution. Diesel exhaust (DE) contains more than 40 toxic air pollutants and is a major constituent of ambient particulate matter (PM), particularly of ultra fine-PM. We hypothesized that females may be less susceptible than males to DEPs exposure neurotoxicity, anxiety, and depression. So adult male and female NMRI mice were exposed to DEPs (350–400 µg/m³ for 6 h per day, five days per week and 8 weeks). The degree of depression by Forced Swimming Test (FST) and anxiety by elevated plus-maze test, showed an increase in male and female mice. But the observed effects were less pronounced in male than in female mice in a number of cases. Findings indicate that sub-chronic exposure to DEPs causes anxiety and depression, and suggest that gender may play important roles in modulating susceptibility to anxiety and depression-related DEPs neurotoxicity.

Air contamination is a blend contained different segments, including gases, particulate issue (PM), metals and natural mixes. Traffic-related air contamination is a significant wellspring of natural contamination. It is assessed that 20 to 70 percent of natural contaminations are ignition determined particles of traffic, coming about because of the burning of traffic, and 85% of PM in urban zones is identified with traffic. Today relationship between air contamination introduction and dismalness and mortality brought about via cardiovascular and respiratory illnesses is settled, while new proof recommends that air contamination may likewise add to focal sensory system (CNS) infections and contrarily influence the CNS. Epidemiological examinations express that expanded air contamination presentation is identified with hear-able and olfactory deficiencies, diminished intellectual capacities, additionally expanded the rate of neurodegenerative illness pathologies and burdensome symptoms. PM is accepted to be the most significant danger between air contamination segments and has been vigorously ensnared in infection.

One of the significant explanations behind worldwide air contamination is traffic-related air contamination and the most significant segment is diesel fumes (DE). DE is an intricate mix of gases, hydrocarbons, sulfur, substantial metals and particulates created inside the burning of diesel fuel. Diesel fumes gas particles (DEPs) are one of the primary segments of ecological particles. Most diesel fumes gas particles have a distance across of under 1 micron. DE presentation is regularly the marker of appearing of traffic-related air contamination. DE is a significant wellspring of encompassing PM, that contains in excess of 40 harmful air contaminations and especially of UFPM. Some examination to DE controlled presentation have analyzed on people; for instance, it has been appeared to initiate EEG changes in people following intense introduction to DEPs (300 µg/m³). DEPs incorporate numerous blends that have conceivably harmful impacts on the insusceptible framework and cerebrum development. In 2013, the International Agency for Research on Cancer (IARC) distinguished DEPs as a human cancer-causing bunch dependent on proof of introduction to particulate and lung cancer¹. Other human frameworks that are influenced by diesel fumes cancer-causing agents contain the CNS

Burdensome is a major mystic issue and is viewed as one of the most serious emotional wellness issues internationally. Nervousness and Depression are not just connected with diminished personal satisfaction, diminished work efficiency, and physical sicknesses, for example, cardiovascular issues yet in addition expands the self destruction rate and mortality. Tension and melancholy are basic mental ailments with particular relational contrasts in indications, where a few people react completely and others show just a minor reaction. In any case, singular contrasts because of stress are still intensely explored however the sex and hereditary wellsprings of these distinctions accordingly generally stay a secret. Moreover, late examinations uphold the inclusion of irritation in the mind in the pathogenesis of emotional issues and impeded insight. For instance, tension and sorrow in the grown-up male mice and learning and memory issue are related with sub-cessless DEPs presentation. DE presentation in mice has been accounted for to adjust spatial memory and learning and locomotor movement. For the most part, the accessible proof recommends that DEPs presentation, with essential components identified with neuroinflammation and to enlistment of oxidative pressure, is related with harmful CNS impacts. Age, sex, and hereditary qualities are among the elements that can be the most pertinent impact of neurotoxic results [36-38]. The fundamental point of

this investigation was to overview whether sexual orientation contrasts in tension and melancholy after DEPs introduction. Accordingly, we accepted that presentation to DEPs would initiate nervousness and despondency in male and female mice. We utilized sub-cessless introduction to DEPs to assess how broadened DEPs presentation may affect tension and melancholy. Consequently, 40 NMRI male and female mice in discrete pens were presented to 350-400 $\mu\text{g}/\text{m}^3$ of nanoscale.

Biography:

Dr. Mojtaba Ehsanifar has completed his PhD from Iran University of medical Sciences and now he continues his research on Airpollution 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 50 papers in reputed journals and presented in congresses. Also he has Cooperation as reviewer with reputed journals.

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