P-999 - MATERNAL EXPOSURE TO NANOPARTICLES ENHANCES THE RISK OF MENTAL NEUROLOGICAL DISORDERS IN OFFSPRING

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Aims: Various nanoparticles are produced with development of nanotechnology; however, the safety is not confirmed precisely at present. Influence on brain of offspring that exposed to various nanoparticles (titanium dioxide; TiO_2, carbon black, carbon nanotube, fullerene; C_{60} and nanoparticles from diesel engine; DEP) in fetal period was examined pathologically.
Methods: Brains from ICR mice born from each nanoparticle-exposed and normal mothers were examined under light and electron microscope. To detect apoptosis, immunohistochemical staining for caspase-3 was performed, and to detect metal particle (TiO_2) transferred from mother to the fetus, brains of offspring were observed by energy-dispersive X-ray spectroscopy (EDS). The storage of abnormal structures (amyloid β and phosphorylayed tau), which are characteristic of neurodegenerative diseases, was detected with immunohistochemical staining.
Results: All mice with nanoparticles exposure showed swelling of astrocytes' endfoot, apoptosis of endothelial cells. In brain of TiO_2-exposed groups, EDS detected TiO_2. Many apoptosis and storage of abnormal structures were showed in characteristic parts of brain. Some capillaries were stenosis and the neighboring parenchyma had degenerative changes.
Conclusions: These findings indicate that nanoparticles transferred from pregnant mice has a severe impact on fetal brain, carries the multiple infarctions and atrophy, a great risk of dementia in offspring. Moreover, appearance of apoptosis and abnormal structures may relate to some mental neurological disorders. Our result should be a grave warning that nonparticles exposure is one of risk factors on neurological diseases, in which various psychic symptoms occur.

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