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BOOK OF ABSTRACT

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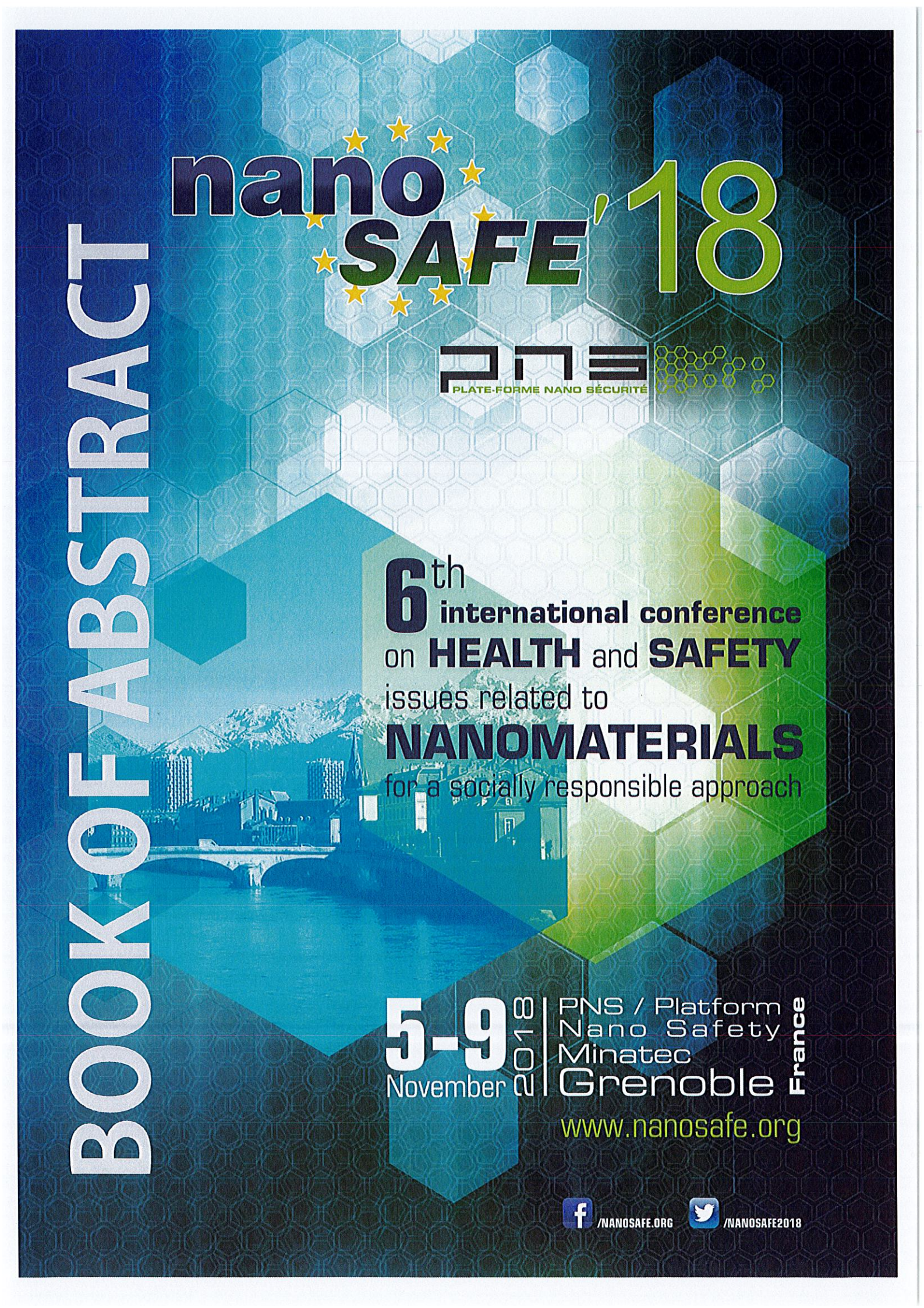

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A DAILY GESTATIONAL EXPOSURE TO DIESEL EXHAUST PARTICLES IMPAIRED THE BRAIN AND OLFACTORY DOPAMINERGIC PATHWAYS OF RABBIT PUPS

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Previous results obtained at gestational day (GD) 28 from rabbit fetuses daily exposed to diesel exhaust (DE) particles from GD3 to GD27 showed the presence of nanosized particles (20-48nm) in the olfactory sensory neurons and the glomerular layer of the olfactory bulb (OB), along with cellular and axonal hypertrophy. Concomitant bulbar monoaminergic homeostasis disturbances, especially affecting the dopaminergic system, were also observed (Bernal Melendez et al., Toxicology Letters, 2016, 259S, S201-S202). However, the neurotransmission pathways potentially affected by this gestational exposure and their long-term consequences have yet to be further explored. To further investigate the effects of DE exposure with a focus on the dopaminergic system, the OB and brain of GD28 (8 controls; 8 exposed) and adult (8 controls; 10 exposed) rabbits were analyzed using histochemistry, immunohistochemistry and chromatography analysis in order to assess the anatomical and functional continuum between the olfactory system and other central structures of the brain at these two states. At GD28, increases in the content of dopamine and the tyrosine hydroxylase (TH) -labeling intensity per cell were observed in OB of exposed fetuses without any increase in the number of dopaminergic neurons. At the adult stage, OB of exposed animals exhibited higher levels of dopamine and its metabolites (DOPAC and HVA). Within the brain of the same rabbits, the cytochrome oxidase activity, a marker of energetic metabolism, and the TH-labeling intensity were increased in the ventral tegmental area, a key area which is implicated in the reward circuitry of the brain, whereas both markers remained unchanged in the dopaminergic pars compacta of the substantia nigra which plays a role in the regulation of the fine motor control. All these findings suggest that the imbalance in the dopaminergic system observed in OB of the exposed fetuses at the end of the gestation seems to persist in adulthood, and is associated to alteration in more central structures. Because of the known anatomical and functional continuum between the olfactory system and the rest of the brain, and the importance of dopamine homeostasis in the plasticity of neural circuits, such alterations could participate to disturbances in higher integrative structures, with possible long-term behavioral consequences.

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Session 5
5.1 Toxicology