APPENDIX 2 (13.4.2015)

PROGRAMME AND ABSTRACTS

SENN2015

12–15 APRIL 2015, HELSINKI, FINLAND

Abstract of Parallel satellite workshop A: Toxicology

A: Toxicology - Risk of Altered Immune Function Associated with Expanding Production and Use of Novel Nanomaterials

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Unique chemical and physical properties of novel nanomaterials may inimitably modulate innate and adaptive immune responses. Recognition of engineered nanomaterials (EN) by the immune system, our primary defense outpost against foreign invasion, is a critical point. Because recent evidence suggests that immune-competent cells may respond to nanoparticles in a similar manner as to viruses/bacteria, there are complex relationships between the infection process and inflammatory responses to nanoparticles resulting in potent effects of nanoparticles on pulmonary clearance of bacteria. Among the cross-talks triggered by ENs and bacterial pathogens is the activation of oxidative stress and its relationships with inflammatory response. Recognition of ENs with characteristic surface features by immune cells and the subsequent effects of thus activated oxidative burst on subsequent stages of inflammation may act as essential determinants of the early onset of the fibrosis in response to carbonaceous nanomaterials. Another aspect is a recently reported involvement of autophagy as an important defensive mechanism of eukaryotic cells against microbes. Elucidation of how EN impact recognition, and/or phagocytosis promises to be a fruitful area for better understanding of interactions of nanoparticles with the cells of innate immune system, particularly macrophages. However, with the burgeoning capabilities to manipulate structures at the nano-scale, employing this cellular machinery for predicting safety of nanoproducts is not fully explored. Use of computational and structural modeling approaches can be used to identify essential patterns in the nanoparticle-biomolecule interactions to predict immunomodulation, which could be used to develop novel strategies and tools to safe nanotechnology.