EXCLI Journal 2012;11:176-177 – ISSN 1611-2156
Received: April 23, 2012, published: April 23, 2012

Editorial:

A SPECIAL ISSUE ON NANOTOXICOLOGY

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Recently, our partner journal Archives of Toxicology published a special issue addressing the key questions in nanotoxicology (Weiss and Diabaté, 2011). The number of commercially available nanomaterials is rapidly growing. Thus, one aspect of nanotoxicology is the unintended exposure to nanomaterials. Pharmaceutical nanoproducts have been introduced for diagnostics, drug delivery or cancer treatment, and scientists in the field of toxicology are expected to identify and prevent side effects arising from these uses. To provide our readers with an overview of the latest topics in the field of nanotoxicology, we summarize the key messages of the recent special issue (Table 1).

Table 1: Recent developments in nanotoxicology (from: Bolt et al., 2012)

Key message	Reference
Quantum dots are frequently used to label cells. This article reviews the toxicity and biological behaviour of quantum dots and reports that the capping material rather than the care complex is relevant for toxic effects.	Hoshino et al., 2011
This article reviews possibilities and limitations of in vitro testing in nanotoxicology.	Clift et al., 2011 (Review)
Nanoparticles can activate various signalling pathways including ERK, p38, JNK as well as NFκB and Nrf-2. Interestingly, when these pathways are activated oxidative stress is observed. This article demonstrates that by far not all toxic effects of nanoparticles can be explained by oxidative stress.	Marano et al., 2011
Silver nanoparticles cause oxidative stress and induce bulky DNA adducts in a human lung cancer cell line.	Foldbjerg et al., 2011
Industrially manufactured nanoparticles can be radiolabelled by a cyclotron-based irradiation technique and are suitable for in vitro and in vivo tracing studies.	Gibson et al., 2011
High aspect carbon nanotubes (diameter 10-15 nm, length 10 µm) are more cytotoxic than low aspect nanotubes (diameter 10-15 nm, length 150 nm). However, both high and low aspect nanotubes were negative in the Ames test, in vitro chromosome aberration test and in vivo micronuclei test.	Kim et al., 2011
Depending on the type of functionalization, lead sulphide nanoparticles show different degrees of toxicity to embryonic zebrafish. This may be explained by the different extent of released soluble lead ions.	Truong et al., 2011
DNA strand breaks observed after incubation of colon carcinoma cells with platinum nanoparticles are caused by released platinum ions.	Gehrke et al., 2011

Table 1 (cont.): Recent developments in nanotoxicology (from: Bolt et al., 2012)

Key message	Reference
Silica nanoparticles accumulate in endosomes of HeLa cells. In contrast, they do not accumulate in nuclei or mitochondria.	Al-Rawi et al., 2011
The capacity of titanium dioxide nanoparticles to induce pulmonary irritation and inflammation in mice is low.	Leppänen et al., 2011

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