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Editorial:

IN VITRO TEST SYSTEMS IN TOXICOLOGY

J.D. Stewart

Leibniz Research Centre for Working Environment and Human Factors (IfADo), Ardeystrasse 67, 44139 Dortmund, Germany

E-mail: stewart@ifado.de, Telephone: +49 231-1084-406, Fax: +49 231-1084-403

In vitro test systems are becoming increasingly important within EU funding policy (Vanhaecke et al., 2009). In the context of the new European Chemicals Legislation (REACH) it will be particularly important to establish improved and rapid *in vitro* toxicology assays (Lilienblum et al., 2008). However it is currently impossible to predict NOAELS (no observable adverse effect levels) only by *in vitro* tests. Therefore, a premature replacement of *in vivo* studies may lead to a loss of information required for adequate protection of human health. To give our readers an overview over this controversial topic we summarize key messages of recent publications on *in vitro* toxicity test systems (Table 1A), studies on endocrine disruption and developmental toxicity (Table 1B) as well as nanoparticle and fibre research (Table 1C).

Table 1A: Recent studies in ***in vitro*** toxicity test systems

Key message	Reference
An optimized 3D in vitro system with rat hepatocytes was established that shows similar gene expression alterations in response to methapyrilene compared to the in vivo situation in rat liver.	Schug et al., 2008
Despite important advances in the field of in vitro systems one of the major limitations is that still no techniques are available allowing determination of NOAELs in vitro.	Bolt and Hengstler, 2008
Thresholds for genotoxic carcinogens is still a controversially discussed topic. Nevertheless, under certain circumstances „practical thresholds“ may be defined.	Bolt, 2008
This review gives a comprehensive overview over the available in vitro tests and discusses if and to which degree they can replace animal experiments.	Lilienblum et al., 2008
Ethanol may cause artefacts in cell culture. The amounts of ethanol used for disinfection that contaminates cell culture media may be underestimated.	Pontes et al., 2008
Human gingival and pulpal fibroblast in vitro systems are applicable for toxicity evaluation of dental restorative materials.	Reichl et al., 2008

Table 1B: Recent studies on **endocrine disruption** and developmental toxicity

Key message	Reference
Diesel exhaust may compromise spermatogenesis in mouse offspring.	Ono et al., 2008
Methoxychlor, an organochlorine pesticide, transiently inhibits testicular steroidogenesis in rats.	Vaithinathan et al., 2008
Low doses of (137) caesium modify testicular and adrenal steroidogenic metabolism.	Grignard et al., 2008
Perinatal coexposure to methylmercury and polychlorinated biphenyls produces no synergistic effects on neurobehavioral development in mice.	Sugawara et al., 2008
NOELS for 4,4'-butylidenebis(2-tert-butyl-5-methylphenol) and 3-(dibutylamino)phenol were derived in the uterotrophic assay in rats.	Yamasaki et al., 2008
In utero and postnatal exposure of rats to a phytoestrogen-enriched diet did not protect but enhanced the extent of inflammation.	Seibel et al., 2008

Table 1C: Nanoparticle and fibre research

Key message	Reference
Eicosane, a component of nanoparticles in diesel exhaust may be related to dysfunction of surfactant.	Kanno et al., 2008
An in vitro system for the analysis of mineral fiber biopersistence was established.	Dika Nguea et al., 2008a
Alterations in gene expression patterns during mineral fiber degradation by monozytes are presented.	Dika Nguea et al., 2008b
Intravenous administration of low doses (5 mg/kg body weight) of titanium dioxide nanoparticles did not induce toxic effects in rats.	Fabian et al., 2008

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