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A CONSTRUCTIVE CONTRIBUTION TO THE RESPONSIBLE DEVELOPMENT AND USE OF ENGINEERED NANOMATERIALS

nanoRISK

OPTIMIZING THE BENEFITS OF NANOTECHNOLOGY WHILE MINIMIZING AND CONTROLLING THE RISKS

Insider Report

Regarding nanotechnologies and the consumer, a central paradox is the absence of a regulatory framework while more than 1,000 nano-enabled products are already available on the consumer markets.efforts.

HOW NANOTECHNOLOGIES MIGHT CHALLENGE THE NOTION OF CONSUMER RIGHTS

Consumer products containing, or claiming to contain, nanomaterials are popping up left and right. It's great that we now have better golf balls, antibacterial socks, clear sunscreen and scratch-free Mercedes limousines. Thanks to some marketing geniuses, we also now have nanosilver foam condoms, nanoseal facial creams and nanotea.

When browsing through nanotechnology product directories, it becomes clear very quickly that – apart from the advanced semiconductor structures increasingly found in computers and consumer electronics – today's "nanotechnology" products are quite "primitive" and a far cry from promises of revolutionary products and applications in nanoelectronics and nanomedicine. Not quite the stuff yet that will cure cancer and save the world. Although a lot of exciting and pioneering work is done in laboratories around the world, it will be several years before this groundbreaking work will be commercialized.

Most products today are defined as "nanotechnology product" because they contain nanoparticles in some form or other. For instance, many antimicrobial coatings contain silver in nanoscale form; food products and cosmetics contain nanoparticles; drug formulations are made with nanoscale ingredients; and some products are partially made with composite materials containing nanomaterials (e.g. carbon nanotubes or carbon nanofibers) to mechanically strengthen the material.

Two researchers from the Norwegian National Institute for Consumer Research (SIFO), Harald Throne-Holst and Pål Strandbakken, argue that consumer rights in the nanotechnology age are not self-evident but rather have to be strengthened, partly redefined and certainly revived in order to empower and protect consumers.

"Consumer reactions and reflections on nanoenabled marketed products should be of interest beyond academia" says Throne-Holst. "If one or more of these products fail spectacularly or induce serious health and/or environmental damage, this might severely impact on consumers' trust and support—and hence on the further development of these promising technologies. Financial and political support may dry up if consumers grow wary of products produced with nanotechnologies. As the focus of our study is on marketable products, we considered it relevant to examine the consumer rights in this context: What about the status of consumer rights on such emerging markets where investments are high and the hopes for the future are soaring?"

Writing in the online issue of *Journal of Consumer Policy*, the two Norwegian researchers report on a Norwegian study with data derived from focus groups, a content analysis of advertisements, packaging and labels for cosmetics as well as on a Norwegian consumer survey.

The conceptual starting point of Throne-Holst's and Strandbakken's analysis is the famous set of four basic consumer rights formulated by John F. Kennedy in 1962: the right to safety; the right to be informed; the right to choose and the right to be heard.

"While an analysis of the legal status of these so-called rights should be left to scholars in consumer law, the basic idea of the concept is that these are principles that consumers might refer to rights and that consumers can claim if they are violated," says Throne-Holst. "Even though the rights are not often explicitly stated, they do form the backdrop for most of

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The widespread use of silver nanoparticles in commercial products, especially textiles, will likely result in an unknown spread of silver into the environment.

THE BEHAVIOR OF SILVER NANOTEXTILES DURING WASHING

Nanotechnology has brought a new area of finishing applications to the textile industry. Coating the surface of textiles and clothing with nanoparticles has become a common approach for the production of highly active surfaces to have UV blocking, antimicrobial, flame retardant, water repellant or self-cleaning properties. While antimicrobial properties are exerted by nanosilver, UV blocking, self-cleaning and flame-retardant properties are imparted by coatings containing zinc oxide or titanium oxide nanoparticles.

The potential use of antimicrobial surface coatings ranges from medicine, where medical device infection is associated with significant healthcare costs, to the construction industry and the food packaging industry. Thin films which contain silver have been seen as promising candidate coatings.

Researchers in Switzerland have now examined what happens to these silver nanoparticle-treated textiles during washing. The scientists studied release of nanoparticles in laundry water from nine different textiles, including different brands of commercially available anti-odor socks. Studies like these will help address the question what the chances are of nanoparticles from nanofinished textiles being released into the environment.

"We found that the total released varied considerably from less than 1 to 45 percent of the total nanosilver in the fabric and that most came out during the first wash," says Bernd Nowack, head of the Environmental Risk Assessment and Management Group at the Empa-Swiss Federal Laboratories for Materials Testing and Research. "These results have important implications for the risk assessment of silver textiles and also for environmental fate studies of nanosilver, because they show that under certain conditions relevant to washing, primarily coarse silver-containing particles are released."

Reporting their findings in the online edition of *Environmental Science & Technology* ("The Behavior of Silver Nanotextiles during Washing"), Nowack and his team show that it is the larger silver particles of greater than 450 nm that are most likely the predominant form of silver released into the washing water and subsequently to wastewater.

"An important result of our work is that it shows that it is possible to engineer nanosilver textiles so that only little silver is released during washing" says Nowack. "There are ways that manufacturers and consumers can minimize the release of these particles to the environment, where they potentially could harm fish and other wildlife."

The study shows that the release of the nanoparticles depends on the way the silver is incorporated into the textile fiber. Nowack explains that his team's results demonstrate that little dissolution of silver nanoparticles occurs under conditions relevant to washing (pH 10) with dissolved concentrations 10 times lower than at pH 7. However, bleaching agents such as hydrogen peroxide or peracetic acid can greatly accelerate the dissolution of silver. However, the amount and form of silver released from the fabrics as ionic and particulate silver to a large degree depends on how the silver particles are incorporated into the textile.

Nowack points out that there are ways to apply only small amounts of silver that show hardly any release. "The trick for manufacturers is to use a nanofinishing process that binds silver to the fiber so that some release of dissolved silver occurs – for the antimicrobial effect – but that the nanoparticles are efficiently immobilized and don't get released during washing."

This means that textile companies have options to optimize the use and release of silver nanoparticles, i.e. it is possible to have a nanosilver-treated textile that releases only small amounts of nanoparticles.

"Companies should not only look at the efficacy of their textiles against microbes after extended washing, but also at the amount of released nanosilver," says Nowack.

NANOPARTICLES CAN DAMAGE DNA ACROSS CELLULAR BARRIER

Medically used nanoparticles can damage the DNA of cells without crossing cellular barriers in the body. Published in *Nature Nanotechnology* ("Nanoparticles can cause DNA damage across a cellular barrier"), the study suggests that the indirect effects of nanoparticles on cells should be considered when evaluating their safety.

Nanoparticles are developed for various drug delivery and imaging applications. Their intended targets include a number of organs normally protected by specialized barriers. New research explores nanoparticles' ability to infiltrate past such barriers by comparing the effects of direct and indirect exposure of cells to nanoparticles.

The scientists grew a multilayer of human cells in the lab to mimic a specialized protective barrier. They used this barrier to examine the indirect effects of cobalt–chromium nanoparticles – which are generated from wear and tear of bone implants – on the cells that were lying behind this barrier. The amount of DNA damage in the cells behind the protective barrier was similar to the DNA damage caused by direct exposure to the nanoparticles.

The damage was greater than that caused when there is a porous membrane rather than a cell barrier, suggesting that the barrier itself has an important role in the damaging process. The nanoparticles did not pass through the barrier to cause the DNA damage, but in fact generated signalling molecules within the barrier cells that were then transmitted to the cells behind the barrier.

These findings suggest that direct and indirect effects of nanoparticles on cells are equally crucial when considering the potential risks of their use in nanomedicine.

EPA Funding Opportunity: Improving Data On Fate And Behavior Of Nanomaterials

The U.S. Environmental Protection Agency (EPA), as part of its Science to Achieve Results (STAR) program, the National Science Foundation (NSF), and the National Institute of Food and Agriculture (NIFA) of the U.S. Department of Agriculture (USDA), are seeking applications proposing research to provide data that improves the scientific understanding of fate/transport and behavior of engineered nanomaterials: "Increasing Scientific Data on the Fate, Transport and Behavior of Engineered Nanomaterials in Selected Environmental and Biological Matrices".
Solicitation Opening Date: November 6, 2009
Solicitation Closing Date: February 2, 2010

Funding Opportunity Description

The sponsors of this request for applications (RFA) are interested in supporting fundamental and applied research related to engineered nanomaterials in the following two areas:

1. Evaluation of potential exposures to engineered nanomaterials including an exploration of environmental and biological fate, transport, and transformation of these materials throughout their lifetimes; and
2. Increasing the scientific understanding of engineered nanoscale additives and ingredients intentionally introduced into food matrices for delivery of important micronutrients and modification of sensory attributes. Applications must address one of these two areas. Fostering international research collaboration is one aim of this solicitation and international research collaboration is encouraged.

NIEHS Increases Grants To Explore Health And Safety Issues Of Nanomaterials

The National Institute of Environmental Health Sciences (NIEHS) is increasing its investment in understanding the potential health, safety and environmental issues related to nanoparticles that are used in many everyday products. The NIEHS will award about $13 million over a two-year period to bolster its ongoing research portfolio in the area of engineered nanomaterials (ENMs).

"We currently know very little about nanoscale materials' effect on human health and the environment," said Linda Birnbaum, Ph.D., director of the NIEHS and the National Toxicology Program (NTP). "Nanomaterials come in so many shapes and sizes, with each one having different chemical properties and physical and surface characteristics. They are tricky materials to get a handle on. The same properties that make nanomaterials so potentially beneficial in drug delivery and product development are some of the same reasons we need to be cautious about their presence in the environment."

The NIEHS has awarded 13 new two-year grants to develop better methods to assess exposure and health effects associated with nanomaterials. Ten of the grants were awarded through the NIH Grand Opportunities program announced in March 2009, and three were funded from the NIH Challenge Grants program. All 13 are aimed at developing reliable tools and approaches to determine the impact on biological systems and health outcomes of engineered materials.

The new awards focus on reliable and reproducible methods and models to assess exposure, exposure metrics, and biological response to nanomaterials. This research is also essential for the harmonization of research results and forming a scientifically sound basis for hazard assessment, as well as the safe design and development of ENMs.

"There are inconsistencies in the biological effects of ENMs reported in the scientific literature, and a major reason for this is lack of detailed characterization of the physical and chemical properties of the ENMs used in these studies," said Sri Nadadur, Ph.D., program administrator at the NIEHS. "One of our goals is to identify three or four reliable and reproducible test methods using the same ENMs by investigators across different labs."

To accomplish this, the NIEHS brought 36 investigators together on Oct. 20, 2009 in North Carolina, where the NIEHS is headquartered, to identify ENMs, assays and test systems to be utilized in these investigations in a more coordinated and integrated effort.

The NIEHS is establishing an integrated program that will narrow its focus to identify the best methods to evaluate the health effects of nanomaterials through use of cell cultures and animal systems. After the initial meeting, grantees will meet face-to-face twice a year to share information, evaluate progress and determine next steps.

"Recovery Act funds have allowed us to expand our efforts in this important area," said Sally Tinkle, Ph.D., senior science sdvisor at the NIEHS. "We want to be sure that we come away with some better tools to assess the health and safety of nanomaterials." This NIEHS effort focused on nanomaterials supports the goals identified by the National Nanotechnology Initiative Strategy for Nanotechnology-related Environmental, Health, and Safety Research.

In addition, the NIEHS supports grantees across the country working on issues related to nanotechnology. The NIEHS extramural activities are focused on three main areas:

1) The application of nanotechnologies in environmental health research through use of nanomaterials to improve measurements of exposure to other environmental factors, enabling research into the biological effects of exposures and improving therapeutic strategies to reverse the harmful effects of environmental exposures.

2) Understanding the risks associated with accidental or intentional exposure to nanomaterials.

3) Through the Superfund Research Program, researchers across the country are looking at both the application of nanomaterials for environmental monitoring and remediation, and the health implications associated with their application.

CONSUMER RIGHTS…

Continued from page 1

EU consumer protection policy. Our starting hypothesis is that these four consumer rights, although revolutionary and necessary at the time they were introduced, can be considered almost self-evident and non-disputed in today's Western world. As such we do not expect them to be seriously jeopardized on most consumer markets, even when products resulting from a new set of technologies are introduced. As most consumers do, we assume that the four rights are widely and generally respected."

Based on an empirical study of Norwegian consumers, the objective of the two SIFO researchers was to assess each of these rights as regards markets of nano-enabled products and to evaluate consumers' reflexivity with regard to nanotechnologies. In doing so they covered questions such as: What is the status of the respective consumer right among groups of ordinary citizen-consumers? How are issues that are connected to these rights articulated in public discourse? How are they understood, and how are they brought into the nano discourse?

"Our focus has not been not on individual consumer complaints but on the organized consumer interests' right to influence policy as political actor in a governance model" says Throne-Holst. "Organization of consumer power is clearly relevant in consumer policy on nanotechnology products."

Based on a focus group study and a representative Norwegian consumer survey, Throne-Holst and Strandbakken reached the following conclusions:

With regard to ***the right to safety***, they maintain that the regulatory framework in general, and REACH in particular, do not cover nanotechnologies sufficiently. Moreover, the different national, regional and global initiatives appear to be rather fragmented and not well coordinated. The Working Party on Nanotechnology within the OECD should increase its efforts to coordinate and spur these efforts by combining forces and making markets more transparent.

With regard to ***the right to be informed***, there is much room for better ways of informing and educating consumers. The participants in the focus groups worried about the lack of information available to them. Governments and societal actors should encourage a societal debate over issues related to the use of nanotechnologies in products. Market transparency and continuous dialogue with industry and retailers on the supply side as well as with consumer organizations on the demand side should be promoted. Mandatory labeling requirements are another option.

The latter will also support ***the right to choose***. The focus group participants wanted to have a choice in the market between nano-enabled products and high quality non-nano alternatives. Manufacturers should provide meaningful product information on the products and/or at the point of sale about whether product properties are derived from nanoparticles. For instance, it is not helpful if textiles are labeled to have an "antibacterial agent;" rather, the respective nanoparticle should be mentioned.

Finally, ***the right to be heard*** has to be ensured via appropriate consumer representation – and hence adequate financial support for consumer organizations.

NANOPARTICLES AND GENETIC DAMAGE

Titanium dioxide (TiO2) nanoparticles, found in everything from cosmetics to sunscreen to paint to vitamins, caused systemic genetic damage in mice, according to a new comprehensive study ("Titanium Dioxide Nanoparticles Induce DNA Damage and Genetic Instability *In vivo* in Mice").

The TiO2 nanoparticles induced single- and double-strand DNA breaks and also caused chromosomal damage as well as inflammation, all of which increase the risk for cancer. The UCLA study is the first to show that the nanoparticles had such an effect, said Robert Schiestl, a professor of pathology, radiation oncology and environmental health sciences.

Once in the system, the TiO2 nanoparticles accumulate in different organs because the body has no way to eliminate them. And because they are so small, they can go everywhere in the body, even through cells, and may interfere with sub-cellular mechanisms.

In the past, these TiO2 nanoparticles have been considered non-toxic in that they do not incite a chemical reaction. Instead, it is surface interactions that the nanoparticles have within their environment- in this case inside a mouse - that is causing the genetic damage, Schiestl said. They wander throughout the body causing oxidative stress, which can lead to cell death.

It is a novel mechanism of toxicity, a physicochemical reaction, these particles cause in comparison to regular chemical toxins, which are the usual subjects of toxicological research.

"The novel principle is that titanium by itself is chemically inert. However, when the particles become progressively smaller, their surface, in turn, becomes progressively bigger and in the interaction of this surface with the environment oxidative stress is induced," said Schiestl. "This is the first comprehensive study of titanium dioxide nanoparticle-induced genotoxicity, possibly caused by a secondary mechanism associated with inflammation and/or oxidative stress."

The manufacture of TiO2 nanoparticles is a huge industry, Schiestl said, with production at about two million tons per year. In addition to paint, cosmetics, sunscreen and vitamins, the nanoparticles can be found in toothpaste, food colorants, nutritional supplements and hundreds of other personal care products.

"It could be that a certain portion of spontaneous cancers are due to this exposure," Schiestl said. "And some people could be more sensitive to nanoparticles exposure than others. "I believe the toxicity of these nanoparticles has not been studied enough."

The mice were exposed to the TiO2 nanoparticles in their drinking water and began showing genetic damage on the fifth day. The human equivalent is about 1.6 years of exposure to the nanoparticles in a manufacturing environment. However, Schiestl said, it's not clear if regular, everyday exposure in humans increases exponentially as continued contact with the nanoparticles occurs over time.

"These data suggest that we should be concerned about a potential risk of cancer or genetic disorders especially for people occupationally exposed to high concentrations of titanium dioxide nanoparticles, and that it might be prudent to limit their ingestion through non-essential drug additives, food colors, etc.," the study states.

European Environment Bureau Assesses Critical Nanotechnology Governance Issues

The European Environmental Bureau (EEB), Europe's largest federation of environmental citizens' organisations, launched a report ("Nanotechnologies in the 21st Century - A critical Review of Governance Issues in Europe and Elsewhere") outlining the critical governance structures needed for the safe development and use of nanotechnology.

The publication comes in time to contribute to discussions at a stakeholder conference on nanomaterials organised by the European Commission and the Swedish Presidency taking place on 9th October.

The report reviews the current uncertainties associated with the governance of nanotechnologies where their development and commercialisation is outpacing government oversight, risk management and public debate. It examines regulatory initiatives and responses, voluntary codes and practices and the progress of international cooperation in coordinating nanotechnology governance.

The report also presents NGO initiatives for nano regulation calling for the application of the precautionary principle and pre-market registration of materials. It is the third in a series of publications on nanotechnologies questioning how these can assist in solving 21st century global challenges.

"Efforts to 'nano-proof' existing legislation such as REACH, Novel Foods and Cosmetics have led to fragmented and confusing approaches to nanotechnologies oversight," said Dragomira Raeva, EEB Nanotechnology Policy Officer, "Europe needs an overarching policy and regulatory framework which addresses the various applications of nanotechnologies coherently and comprehensively to ensure better environmental and human health protection in a growing area of innovation."

EEB proposes that the safe and responsible development and application of nanotechnologies in the EU should be done through a dedicated nanotechnologyspecific regulatory framework that includes the following aspects:

- A pre-market registration and approval framework for nanomaterials designed to anticipate future applications before they are put on the market.
- Public consultation on technological innovation, including nanotechnologies and nanomaterials so that public opinion plays a more central role in helping to shape nano's development and to guide research towards only those technologies with true social benefits and improvements.
- Requisite legislation before further market penetration of nanomaterials and not just reviews and fragmented adjustment of existing legislation.

EEB expects that the findings of the report will help to guide the EU effort on the responsible governance of nanotechnologies by putting health, environment protection and democratic decision-making before potentially unsafe or unsustainable technological developments.

All the EEB nanotechnologies reports can be found on the EEB's website here.

Discovery May Help Manage Nanoparticle Waste From Consumer Products

A new understanding about nanoparticle behavior in sewage treatment plants could improve the environmental management of nanoparticle wastes from foods, cosmetics, medicines, cleaning and personal care products.

Experts believe some nanoparticles may have harmful effects on the environment or human health, and research is currently being directed at understanding the issues involved. Scientists from the UK Centre for Ecology and Hydrology (CEH) studied how certain nanoparticles behave in wastewater and have now identified a way to potentially help remove them during primary sewage treatment.

The scientists examined silica nanoparticles, over one million tons of which are used in the manufacture of consumer products each year, with a large proportion of these subsequently washed down drains into sewage systems. This makes sewage treatment plants a major gateway for nanoparticles entering the aquatic environment.

The study ("Fate of Silica Nanoparticles in Simulated Primary Wastewater Treatment") simulated primary sewage treatment to show that coating silica nanoparticles with a detergent-like material made the nanoparticles interact with components of the sewage to form a solid sludge. This sludge can be separated from the wastewater and disposed of. In contrast, uncoated nanoparticles stayed dispersed in the wastewater and were therefore likely to continue through the effluent stream and potentially on into the environment.

Dr Helen Jarvie from CEH, the lead author of the study, said the research proved that the surface chemistry of nanoparticles influenced their likely removal during primary sewage treatment. "By adding a coating which modifies that surface chemistry, it may be possible to re-route their journey through sewage treatment plants," she explained.

The scientists used the ISIS Neutron Source to view the sewage at the nanometer scale. The neutrons easily penetrate the sewage and scatter strongly from the nanoparticles, allowing the aggregation behavior of the nanoparticles to be measured through time.

Dr Steve King from the ISIS Neutron Source said the research showed that primary sewage treatment may not be effective at removing some nanoparticles. "However," he added, "we now know where those nanoparticles may go and how we might deal with them."Further work is now planned to examine the behavior of a wider range of nanoparticles, with different classes of surfactants, in wastewaters.

CNTs Can Affect Lung Linings

Carbon nanotubes are being considered for use in everything from sports equipment to medical applications, but a great deal remains unknown about whether these materials cause respiratory or other health problems. Now a collaborative study from North Carolina State University, The Hamner Institutes for Health Sciences, and the National Institute of Environmental Health Sciences shows that inhaling these nanotubes can affect the outer lining of the lung, though the effects of long-term exposure remain unclear.

Using mice in an animal model study, the researchers set out to determine what happens when multi-walled carbon nanotubes are inhaled. Specifically, researchers wanted to determine whether the nanotubes would be able to reach the pleura, which is the tissue that lines the outside of the lungs and is affected by exposure to certain types of asbestos fibers which cause the cancer mesothelioma. The researchers used inhalation exposure and found that inhaled nanotubes do reach the pleura and cause health effects.

Short-term studies described in the paper do not allow conclusions about long-term responses such as cancer. However, the inhaled nanotubes "clearly reach the target tissue for mesothelioma and cause a unique pathologic reaction on the surface of the pleura, and caused fibrosis," says Dr. James Bonner, associate professor of environmental and molecular toxicology at NC State and senior author of the study. The "unique reaction" began within one day of inhalation of the nanotubes, when clusters of immune cells (lymphocytes and monocytes) began collecting on the surface of the pleura. Localized fibrosis, or scarring on parts of the pleural surface that is also found with asbestos exposure, began two weeks after inhalation.

The study showed the immune response and fibrosis disappeared within three months of exposure. However, this study used only a single exposure to the nanotubes. "It remains unclear whether the pleura could recover from chronic, or repeated, exposures," Bonner says. "More work needs to be done in that area and it is completely unknown at this point whether inhaled carbon nanotubes will prove to be carcinogenic in the lungs or in the pleural lining."

The mice received a single inhalation exposure of six hours as part of the study, and the effects on the pleura were only evident at the highest dose used by the researchers – 30 milligrams per cubic meter (mg/m3). The researchers found no health effects in the mice exposed to the lower dose of one mg/m3.

The study is published in *Nature Nanotechnology* ("Inhaled Carbon Nanotubes Reach the Sub-Pleural Tissue in Mice") and was co-authored by Bonner, Dr. Jessica Ryman-Rasmussen, Dr. Arnold Brody, and Dr. Jeanette Shipley-Phillips of NC State, Dr. Jeffrey Everitt who is an adjunct faculty at NC State, Dr. Mark Cesta of the National Institute of Environmental Health Sciences (NIEHS), Earl Tewksbury, Dr. Owen Moss, Dr. Brian Wong, Dr. Darol Dodd and Dr. Melvin Andersen of The Hamner Institutes for Health Sciences. The study was funded by The Hamner Institutes for Health Sciences, NIEHS and NC State's College of Agriculture and Life Sciences.

Upcoming Events
Looking At The Risky Side Of Nano

A New Governance Framework For Nanotechnologies
December 15, 2009, Brussels (Belgium)
Businesses, researchers, civil society representatives and regulators involved or interested in nanotechnologies are invited to take part in the final International Conference of the FramingNano FP7 project whose primary objective has been the development of a sustainable governance framework for nanotechnologies.

3rd Thailand Nanotechnology Conference 2009: Health, Energy, Environment
December 21-22, 2009, Bangkok (Thailand)
This conference is intended to showcase Nanotechnology activities in Thailand. In particular the study of societal implications, policy and workforce development are part of the mission of the Center of Excellence in Nanotechnology and Nanotec (NSTDA) in Bangkok.

2nd NanoImpactNet Conference
March 9-12, 2010, Lausanne (Switzerland)
The 2nd NanoImpactNet Conference will start with a 1-day training workshop for junior scientists followed by a 3-day conference. This training workshop is aimed at PhD-students, postdocs and early-career scientists and provides training on handling protocols, choices of control materials, dispersion procedures, and hazard evaluation procedures.

8th International Conference And Wokshop On Biological Barriers – In Vitro Tools, Nanotoxicology, And Nanomedicine
March 21 – April 10, 2010, Saarbrücken (Germany)
This conference and workshop is committed to the pressing questions in the triangle of *in vitro* tools, nanotoxicology, and nanomedicine.

Nanotoxicology 2010
June 2-4, 2010, Edinburgh (UK)
The conference will take place over 3 days, and will be divided into sections that allow focus on specific types of nanomaterials. Each section will include talks spanning disciplines including exposure assessment, human toxicology, characterization, ecotoxicology and risk assessment. Such a format will promote interaction between different disciplines and would allow issues specific to certain materials to be addressed.

NanoSafe 2010
November 11-13, 2010, Grenoble (France)
The objectives of the conference will be to make available the major progresses and future trends in the domain of the safe production and use of nanomaterials.

IN SHORT – PAPERS, INITIATIVES & UPDATES

REPORT: Safe Work Australia Releases Two New Reports For Its Nanotechnology Occupational Health And Safety Program

These reports were published as part of the Nanotechnology Occupational Health and Safety (OHS) Program, which is managed by Safe Work Australia for the Department of Innovation, Industry, Science and Research. These reports add significantly to the understanding of the OHS risks of working with nanomaterials and provides scientists with a strong direction for further research. The Royal Melbourne Institute of Technology undertook research for the report titled Engineered Nanomaterials: Evidence on the effectiveness of workplace controls to prevent exposure. This research report explores the effectiveness of workplace controls to prevent exposure to engineered nanomaterials. Toxikos Pty Ltd undertook research for the second report titled Engineered nanomaterials: A review of the toxicology and health hazards. This report analyses scientific literature from 2006 to 2009 and focuses on the toxicity of a number of nanomaterials being researched, manufactured or used in Australia.

INITIATIVE: European Consumer Bodies Launch Nano Consumer Product Inventory

Two European consumer organizations – the European Consumers' Organization (BEUC) and the European consumer voice in standardization (ANEC) – have jointly launched a first stab at a nanotechnology inventory (xls spreadsheet download) to tell consumers which products on the EU market contain nanomaterials. ANEC and BEUC are concerned about the increasing number of products claiming to contain nanomaterials which are currently sold in the EU market without having been subject to a proper safety assessment. With this inventory, the two organizations wish to have a better indication of the potential exposure of consumers to nanomaterials.

INITIATIVE: Testing Finds Nanoparticles In Big Name Cosmetics

The use of nanoparticles in high exposure consumer applications such as cosmetics has attracted increasing controversy as evidence of potential toxicity has grown.. Testing commissioned by Friends of the Earth (pdf download) has found nanoparticles in foundations and concealers sold by big name brands, including Revlon, Clarins, Clinique, Max Factor, the Body Shop, L'Oréal, By Terry and Lancôme Paris.

PAPER: Barrier Capacity Of Human Placenta For Nanosized Materials

A large number of projects have been carried out to assess the consequences of combustion-derived or engineered nano-particle exposure on human health. In recent years there has been a growing concern about the possible health influence of exposure to air pollutants during pregnancy, hence an implicit concern about potential risk for nanoparticle exposure in-utero. Previous work has not addressed the question of whether nanoparticles may cross the placenta. The findings of new research suggest that nanomaterials have the potential for transplacental transfer and underline the need for further nanotoxicological studies on this important organ system.
doi: 10.1289/ehp.0901200

INITIATIVE: UK Nanotechnology Health, Safety, And Environment Directory Launched

The Nanotechnology KTN in its role are a national knowledge broker was tasked with collating and publishing a directory of organizations who are actively involved with the debate around safe and responsible development. The directory (pdf download) includes over 30 institutes, Government departments, networks and commercial service providers who are recognized in some way in contributing to the HSE debate. It is intended that the directory is updated from time to time to keep the information current.

PAPER: Transport Behavior And Effects of Nanosized TiO_2 On Aquatic Microbial Communities

In this research, through experimenting with different TiO2 nanoparticles in stream microcosms, researchers show that microbial membranes were significantly compromised, even under ambient ultraviolet radiation and nano-TiO_2 concentrations predicted for surface waters. Our results suggest adverse effects are not necessarily only attributable to individual particles smaller than 100 nm but also to low concentrations of larger, naturally agglomerating TiO_2 nanoparticles. The findings indicate a high sensitivity of microbial communities to levels of ENP concentration that are to be expected in the environment, with as yet unknown implications for the functioning and health of ecosystems.
doi: 10.1021/es9017046

REPORT: Advisory Committee On Hazardous Waste Urges Further Studies On Nanosilver In Consumer Products

The Advisory Committee on Hazardous Substances to the United Kingdom's Department of Environment, Food and Rural Affairs (Defra), in a "Report on Nanosilver" (pdf download) has recommended to British government agencies that they gather information about products containing nanosilver, saying that the information on both the hazards of and exposure to nanosilver is urgently required. The report recommends: "Further knowledge on both hazard and exposure is urgently required, given the large uncertainties identified in this document. Direct funding and leveraging of other funding sources are suggested as mechanisms to fund immediate priorities: (i) Development of methods to quantify nanosilver in the environment; (ii) Understanding fate and behavior processes (transport and persistence), especially to identify environmental 'hotspots' with high mass or particle number concentration; (iii) Understanding biological effects (bioaccumulation, toxicity) under realistic conditions. Specifically, it is suggested that the relevant government bodies immediately fund a thorough review of this area including the peer-reviewed literature, grey literature and research projects in progress and recently completed. This review should lead up to a workshop which brings together relevant stakeholders. The workshop should focus in knowledge exchange between stakeholders, development of a coherent and integrated research strategy and medium term horizon scanning (developments in the next 5-10 years)."

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OPTIMIZING THE BENEFITS OF NANOTECHNOLOGY WHILE MINIMIZING AND CONTROLLING THE RISKS

The nano*RISK* newsletter is dedicated to providing objective and accurate information about critical issues and developments related to the risks arising from engineered nanomaterials. nano*RISK* appears bi-monthly (ISSN 1931-6941). For a complete list of all published nano*RISK* newsletters please go to www.nanorisk.org.

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