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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

STUDY REVEALS MOLECULAR MECHANISM OF CARBON NANOTUBES' ROLE IN ARTERIAL THROMBOSIS

Blood platelets are the structural and chemical foundation of blood clotting (hemostasis) and they play a vital role in minor injuries when coagulation prevents the loss of blood at the injury site. If the proper function of these platelets gets disturbed, blood clotting can lead to thrombosis – clots in the blood that obstruct the flow of blood through the circulatory system – which is a leading cause of death and disability in the developed world.

"In view of the rapid development of nanotechnology, the impact of the newly engineered nanomaterials as an additional thrombosis risk factor is not yet known but should not be underestimated," Jan Simak, a Senior Staff fellow at the U.S. Food and Drug Administration's Center for Biologics Evaluation and Research (CBER), says. "In fact, it has been reported that carbon nanotubes induce platelet aggregation and potentiate arterial thrombosis in animal model. However, a mechanism of thrombogenic effects of carbon nanotubes was not known." (see:"Nanoparticle-induced platelet aggregation and vascular thrombosis").

In a recent paper in *ACS Nano* ("Carbon Nanotubes Activate Store-Operated Calcium Entry in Human Blood Platelets"), Simak and a team of researchers from the FDA, the National Institute of Standards and Technology (NIST,the National Institutes of Health (NIH), and Charles University in Prague, show the molecular mechanism of carbon nanotubes' (CNTs) induced platelets activation.

In previous work ("Carbon Nanotubes Activate Blood Platelets by Inducing Extracellular Ca^{2+} Influx Sensitive to Calcium Entry Inhibitors"), the team has already shown that multiwalled CNTs activate blood platelets by inducing extracellular Ca^{2+} influx.

Given that CNTs are under discussion for a variety of applications in biomedicine – diagnostic biosensors, drug delivery nanosystems, imaging nanoprobes for intravascular use and other devices that come in contact with blood – the assessment of the effect of CNTs in blood is a critical safety issue.

In their new work, the team elucidates the mechanism involved in activation of blood platelets by carbon nanotubes.

Silvia H. De Paoli Lacerda, a researcher at CBER and the paper's first author, explains that, in contrast to fullerene nC_{60}, which does not activate platelets, CNTs act as 'nanoneedles' – they perforate platelets and cause injuries to the platelet dense tubular systems (DTS).

"The DTS serves as an intracellular Ca^{2+} store in blood platelets and upon interaction with CNTs, Ca^{2+} is released to the cytosol," she says. "Depletion of Ca^{2+} from DTS leads to the extracellular Ca^{2+} influx via store-operated calcium entry (SOCE). The SOCE activation is triggered by clustering of a Ca^{2+} sensing protein STIM1 co-localized with Orai1."

The researchers have now demonstrated that CNTs activate SOCE – which ultimately leads to the platelet activation and aggregation. At the same time, they also showed that some Ca^{2+} channel blockers inhibit platelet activating activity of CNTs.

According to Simak, this finding opens a possibility of pharmacological modulation of the thrombogenic activity of CNTs. "

Also, the structure of nanomaterial agglomerates play an important role on their effect on platelet function: CNT agglomerates with a hedgehog like surface activate platelets while nC_{60} agglomerates with a smooth surface do not" he says. "Thus, structural studies on the shape of nanomaterials may

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Towards Responsible Nanotextiles And Coatings: A New Risk Approach

A new study has developed risk assessment criteria for engineered nanomaterials (ENMs) to help inform innovation and policy decisions ("Environmental and health effects of nanomaterials in nanotextiles and façade coatings"). It illustrates that product design can influence the unintended release of ENMs and that combining knowledge about the product life cycle with a systematic assessment of the potential hazards may enable responsible choices for future product developments to be made.

Human and environmental health may be harmed by the unintended release of ENMs used in products, such as textiles and façade coatings for buildings. ENMs are finely-tuned to harness unique physical, chemical and mechanical properties that exist at very small scales, up to one ten-thousandth of a millimeter in size. They are of considerable value in the construction, medical and transport sectors for their self-cleaning, UV-resistant, flame retardant, scratch-proof and dirt-resistant properties.

Few Conclusions Yet About ENM Exposure

As yet, very little can be confidently concluded about exposure to ENMs and their potential hazards, but because decisions have to be made today about their development, the study, partly conducted under the EU-funded NanoHouse project, offers assessment criteria to help ensure that development is as sustainable and safe as possible, ahead of a regulatory review of nanotechnology due later this year.

The researchers assessed what is currently understood about the potential risks posed by ENMs used in nanotextiles and façade coatings with an extensive review of previous scientific studies and using new mathematical modeling of ENM behavior and human toxicology. From this, they identified assessment criteria for the environment and human health, which included: Environmental effects; Solubility in water; Sedimentation; Stability during incineration; Impact on wastewater facilities; Human toxicity; DNA impairment; Crossing and damage of tissue barriers; Translocation effects in skin, the gastrointestinal or respiratory tracts.

Some previous research has suggested that around 90 per cent of nanosilver and most other ENMs can be removed during wastewater treatment, posing a reduced hazard to the environment; but the behavior of nano zinc oxide has not yet been extensively investigated. Almost all types of ENM particles are likely to group together to form "agglomerates", which sink down into the sediment with potential exposure to sediment-dwelling organism. One general conclusion from the study is that nanosilver and nano zinc oxide could pose risks to the environment, but nano titanium dioxide should also be further investigated.

Depending on the product design, a fraction of ENMs is released directly into the air, probably embedded in larger sized particles. Nano titanium dioxide is among a range of ENMs that have been linked to varying degrees of disruption to cellular functions in the brain, lungs and other vital organs. ENMs can also act as carriers for other toxic substances. The most important entry point of free nanoparticles is the lungs. Some tests have shown that ENMs can potentially lead to damage of lung tissues. However, it is important to remember that few studies have investigated the chronic toxicity of ENMs and clear conclusions cannot be drawn yet.

Exact Risk Assessment Still Difficult

The precise risk to human health is difficult to quantify at present and large uncertainties still exist, say the researchers. Furthermore, there are still no reliable methods or tools for assessing levels of exposure. In tests, exposure of healthy skin to different types of ENMs has not provoked any acute effects and no translocation of ENMs has been observed. The size, purity and chemical form of ENMs can also vary widely. Exposure depends heavily on the way the products are designed, used, transported, stored and recycled. It is also likely that some ENMs change over time or under particular conditions, possibly altering their toxicity.

The researchers recommend dedicated investigations of specific ENMs products, using their risk assessment criteria, to evaluate and minimize potential risks. This is particularly urgent in the building sector, as it is thought that 15 to 30 per cent of façade coatings will be based on nanomaterials by 2015.

EPA Proposes Policy On Nanomaterials In Pesticide Products

The U.S. Environmental Protection Agency (EPA) announced that it plans to obtain information on nanoscale materials in pesticide products. Under the requirements of the law, EPA will gather information on what nanoscale materials are present in pesticide products to determine whether the registration of a pesticide may cause unreasonable adverse effects on the environment and human health. The proposed policy will be open for public comment.

"We want to obtain timely and accurate information on what nanoscale materials may be in pesticide products, "said Steve Owens assistant administrator for EPA's Office of Chemical Safety and Pollution Prevention. "This information is needed for EPA to meet its requirement under the law to protect public health and the environment."

The new proposed policy options will be published in the Federal Register shortly. The notice will also propose a new approach for how EPA will determine whether a nanoscale ingredient is a "new" active or inert ingredient for purposes of scientific evaluation under the pesticide laws, when an identical, non-nanoscale form of the nanoscale ingredient is already registered under FIFRA. This approach will help ensure that EPA is informed about the presence of nanoscale ingredients in pesticide products and allows a more thorough review of the potential risks.

The notice will be available at www.regulations.gov in docket number EPA–HQ–OPP–2010-0197.

More information or to read the proposed notice: http://www.epa.gov/pesticides/regulating/nanotechnology.html

CARBON NANOTUBES' ROLE IN ARTERIAL THROMBOSIS …

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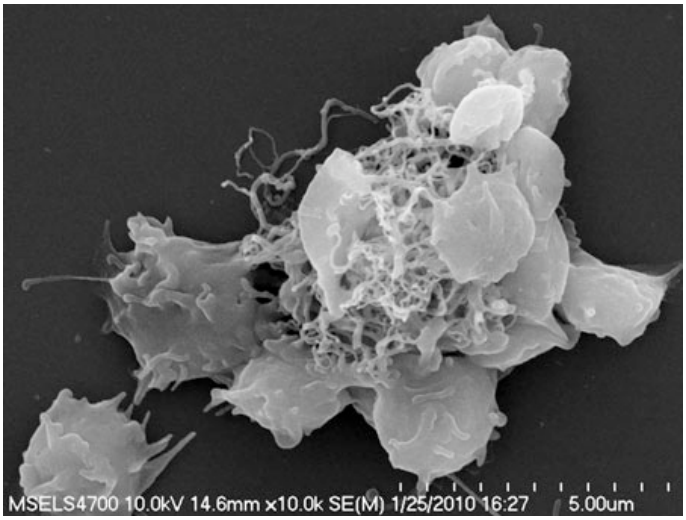
lead to optimization of their biocompatibility in blood."



Scanning electron microscopy image shows platelet activation by multiwallled CNTs (M60). Platelets were incubated with 100 µg/mL of M60 at 37°C for 15 minutes under gentle agitation. The images are representative of at least three individual experiments with platelets from different donors. (Image: Jan Simak, FDA)

Understanding the nature of the interaction of CNTs with platelets will ultimately advance the development of general concepts for designing and testing carbon nanomaterials for optimal biocompatibility in blood. In particular, researchers need to understand how CNTs interact with other blood components and with vessel wall.

The next step for the team is to investigate how surface modifications of CNTs modulate their blood and vascular biocompatibility.

Simak points out that one great challenge in these studies is the lack of standard protocols for characterization of nanomaterials and analysis of impurities in published reports.

"For nanomaterials insoluble in aqueous solutions, it is critical how the nanomaterial suspensions in buffer are prepared and how the nanomaterial agglomeration is controlled and monitored during *in vitro* or *in vivo* biological experiments," he says. "Standardization of such protocols would allow interlaboratory comparison of results of biocompatibility and toxicity studies."

Disclaimer: The findings and conclusions in this article have not been formally disseminated by the Food and Drug Administration and should not be construed to represent any Agency determination or policy.

CADMIUM SELENIDE QUANTUM DOTS DEGRADE IN SOIL, RELEASING THEIR TOXIC GUTS

Quantum dots made from cadmium and selenium degrade in soil, unleashing toxic cadmium and selenium ions into their surroundings, a study has found. The research ("Differences in Soil Mobility and Degradability between Water-Dispersible CdSe and CdSe/ZnS Quantum Dots") demonstrates the importance of learning more about how quantum dots − and other nanomaterials − interact with the environment after disposal, said Diana Aga, the chemistry professor who led the study.

"We can conclude from our research that there is potential for some negative impacts, since the quantum dots biodegrade. But there is also a possibility to modify the chemistry, the surface of the nanomaterials, to prevent degradation in the future," she said.

Aga's research into the afterlife of quantum dots is funded by a $400,000 Environmental Protection Agency grant to investigate the environmental transport, biodegradation and bioaccumulation of quantum dots and oxide nanoparticles.

Working in the laboratory, the team tested two kinds of quantum dots: Cadmium selenide quantum dots, and cadmium-selenide quantum dots with a protective, zinc-sulfide shell. Though the shelled quantum dots are known in scientific literature to be more stable, Aga's team found that both varieties of quantum dot leaked toxic elements within 15 days of entering soil.

In a related experiment designed to predict the likelihood that discarded quantum dots would leach into groundwater, the scientists placed a sample of each type of quantum dot at the top of a narrow soil column. The researchers then added calcium chloride solution to mimic rain. What they observed: Almost all the cadmium and selenium detected in each of the two columns − more than 90 percent of that in the column holding unshelled quantum dots, and more than 70 percent of that in the column holding shelled quantum dots − remained in the top 1.5 centimeters of the soil.

But how the nanomaterials moved depended on what else was in the soil. When the team added ethylenediaminetetraacetic acid (EDTA) to test columns instead of calcium chloride, the quantum dots traveled through the soil more quickly. EDTA is a chelating agent, similar to the citric acid often found in soaps and laundry detergents.

The data suggest that under normal circumstances, quantum dots resting in top soil are unlikely to burrow their way down into underground water tables, unless chelating agents such as EDTA are introduced on purpose, or naturally-occurring organic acids (such as plant exudates) are present.

Aga said that even if the quantum dots remain in top soil, without contaminating underground aquifers, the particles' degradation still poses a risk to the environment.

In a separate study submitted for publication in a different journal, she and her colleagues tested the reaction of Arabidopsis plants to quantum dots with zinc sulfide shells. The team found that while the plants did not absorb the nanocrystals into their root systems, the plants still displayed a typical phytotoxic reaction upon coming into contact with the foreign matter; in other words, the plants treated the quantum dots as a poison.

Safety Of Nanoparticles In Food Crops Is Still Unclear

With the curtain about to rise on a much-anticipated new era of "nanoagriculture" — using nanotechnology to boost the productivity of plants for food, fuel, and other uses — scientists are reporting a huge gap in knowledge about the effects of nanoparticles on corn, tomatoes, rice and other food crops. Their article appears in ACS' *Journal of Agricultural and Food Chemistry* ("Interaction of Nanoparticles with Edible Plants and Their Possible Implications in the Food Chain").

Jorge Gardea-Torresdey and colleagues at The University of Texas at El Paso, a co- investigator for the NSF/EPA University of California Center for Environmental Implications of Nanotechnology, note that nanoparticles, which are 1/50,000th the width of a human hair, are used in products ranging from medicines to cosmetics. The particles also could end up in the environment, settling in the soil, especially as fertilizers, growth enhancers and other nanoagricultural products hit the market. Some plants can take-up and accumulate nanoparticles. But it is unclear whether this poses a problem for plants or for the animals (like humans) that eat them. So, the researchers sorted through the scientific literature looking for evidence to settle the safety question.

In the article, the scientists analyzed nearly 100 scientific articles on the effects of different types of nanoparticles on edible plants. They found that the uptake and build-up of nanoparticles varies, and these factors largely depend on the type of plant and the size and chemical composition of the nanoparticles. "This literature review has confirmed that knowledge on plant toxicity of [nanomaterials] is at the foundation stage," the article states, noting that the emerging field of nanoecotoxicology is starting to tackle this topic.

Nanotechnology Governance: How Should The EU Implement Nanomaterial Traceability?

This Policy Brief (Nano governance: how should the EU implement nanomaterial traceability?) from the European Trade Union Institute (ETUI) addresses the need for a governance response from the European bodies to establish a registry of nanomaterial-containing articles.

Better comprehensive data is urgently needed to improve knowledge of what is on the market, who is exposed and what should be regulated. Member States welcome such inventories and have developed their own initiatives but it is crucial to harmonise them in order to achieve proper protection of human and environmental health.

Background

A wide range of nanomaterial-containing products have been commercialized and are in daily use by consumers worldwide. Sectors identified as having products that incorporate nanomaterials are motor manufacturing; defence and aerospace; electronics and computers; energy and environment; food and agriculture; housing and construction; medical and pharmaceutical; personal care, cosmetics, sports and other consumer products.

The use of engineered nanomaterials in a wide range of goods is spreading rapidly because although only atom-sized, these materials have specific physicochemical properties like high surface area, reactivity, electric conductivity, and surface energy which are more useful and quite different from the macroscopic versions of the same material.

But societal concerns about the life-cycle and possible risks of nanomaterials, and the lack of knowledge about them, call for more information to be disclosed and a proper regulatory framework.

As yet, it is unclear exactly how many articles on the market contain nanomaterials. For instance, production workers have no idea whether they are handling nanomaterials, in what quantities, and whether or not they pose a danger.

The debate on the regulatory framework for nanotechnologies has been rolling for nigh-on a decade; it is on the political agenda because stakeholder discussions with the regulatory bodies on the supply of information on nanomaterials are basically deadlocked.

The EU's REACH regulation on the registration, evaluation, authorization and restriction of chemicals requires most manufacturers and importers to register their chemical substances as proof that they can be used safely.

However, the regulation contains no specific provisions on nanomaterials, and the European Parliament has called on the Commission to evaluate the need to review REACH to ensure that the "no data, no market" principle applies to nanomaterials (European Parliament, 2009).

One key issue in the debate on whether the current regulatory framework is appropriate for nanomaterials is the need for a registry of nanomaterial-containing products. This is firstly because, while most Member States have favoured traceability systems for nanomaterials, some form of coordination is essential because each country has developed its own approach and this makes European harmonization more difficult.

This paper provides an overview of the proposals by those Member States like France, Italy, the Netherlands and Belgium who have actively developed such systems. Secondly, it is doubtful whether voluntary measures will provide enough information, and they are not followed by all industries.

The proposal is to establish a mandatory registry to achieve a transparent regulatory framework for nanomaterials, which would require joint efforts by national authorities and the Commission.

Responsible Realization Of Nanotechnology's Potential

The ability to image, measure, model, and manipulate matter on the nanoscale is leading to new materials, technologies, and applications across many fields including medicine, information technology, aerospace, energy, and transportation. Advances in nanotechnology are already driving economic growth and addressing a broad range of national challenges.

The realization of nanotechnology's full potential will require continued research and flexible, science-based approaches to regulation that protect public health and the environment while promoting economic growth, innovation, competitiveness, exports, and job creation.

In furtherance of those goals, the White House Emerging Technologies Interagency Policy Coordination Committee (ETIPC) has developed a set of principles (pdf) specific to the regulation and oversight of applications of nanotechnology, to guide the development and implementation of policies at the agency level.

These principles reinforce a set of overarching principles (pdf) for the regulation and oversight of emerging technologies released on March 11, 2011. They also reflect recommendations from a report on nanotechnology (pdf) by the President's Council of Advisors on Science and Technology. The report encourages Federal support for the commercialization of nanotech products and calls for the development of rational, science- and risk-based regulatory approaches that would be based on the full array of a material's properties and their plausible risks and not simply on the basis of size alone.

The goals of all of these documents are to achieve consistent approaches across different emerging technologies and to ensure the protection of public health and the environment while avoiding unjustifiably inhibiting innovation, stigmatizing new technologies, or creating trade barriers.

FDA Takes First Step Toward Greater Regulatory Certainty Around Nanotechnology

The U.S. Food and Drug Administration has released draft guidance to provide regulated industries with greater certainty about the use of nanotechnology, which generally involves materials made up of particles that are at least one billionth of a meter in size. The guidance outlines the agency's view on whether regulated products contain nanomaterials or involve the application of nanotechnology.

Nanotechnology, the science involving manipulation of materials on an atomic or molecular scale, is an emerging technology with a broad range of potential applications, such as increasing bioavailability of a drug, improving food packaging and in cosmetics.

Draft Guidance

The draft guidance, "Considering Whether an FDA-Regulated Product Involves the Application of Nanotechnology", is available online and open for public comment. It represents the first step toward providing regulatory clarity on the FDA's approach to nanotechnology.

Specifically, the agency named certain characteristics – such as the size of nanomaterials used and the exhibited properties of those materials – that may be considered when attempting to identify applications of nanotechnology in regulated products.

"With this guidance, we are not announcing a regulatory definition of nanotechnology," said Margaret A. Hamburg, MD, Commissioner of Food and Drugs. "However, as a first step, we want to narrow the discussion to these points and work with industry to determine if this focus is an appropriate starting place."

Premarket Review

For products subject to premarket review, the FDA intends to apply the points contained in the draft guidance, when finalized, to better understand the properties and behavior of engineered nanomaterials.

For products not subject to premarket review, the FDA will urge manufacturers to consult with the agency early in the product development process so questions related to the regulatory status, safety, effectiveness or public health impact of these products can be adequately addressed.

In 2006, the FDA formed the *Nanotechnology Task Force*, charged with identifying and addressing ways to better enable the agency to evaluate possible adverse health effects from FDA-regulated nanotechnology products.

The agency issued a report by the task force in 2007 that recommended that the FDA issue additional guidance and take steps to address the potential risks and benefits of drugs, medical devices and other FDA-regulated products using nanotechnology.

FDA will develop additional guidance documents related to specific products or product categories in the future, as needed.

It is critical for FDA to understand how changes in physical, chemical or biological properties seen in nanomaterials affect the safety, effectiveness, performance or quality of a product that contains such materials.

The FDA has a robust regulatory science agenda to develop the tools, methods and expertise necessary to evaluate products that contain nanomaterials or otherwise involve the use of nanotechnology.

The FDA's regulatory science portfolio focuses on generating data needed to ensure the safety and effectiveness of products using nanomaterials, with an emphasis on products the use of which could present the greatest potential risk to public health.

FDA is releasing its document in coordination with the "Policy Principles for the U.S. Decision-Making Concerning Regulation and Oversight of Applications of Nanotechnology and Nanomaterials" (pdf), jointly by the Office of Science and Technology Policy, Office of Management and Budget, and the United States Trade Representative.

European Commission Proposes 2012 Research Priorities For Nanotechnologies

The European Commission has published an orientation paper with proposed NMP (Nanosciences, Nanotechnologies, Materials) research priorities for 2012. The priorities will increase the attention on sustainability and societal challenges.

The NMP Theme covers the entire range of industrial research activities. Sustainability and societal challenges have always been implicit in NMP strategies, but are receiving increased attention. The NMP Theme focuses on smart and sustainable growth, for a greener industry, its three constituent activities being the tools rather than ends in themselves.

"Although there is an increasing emphasis on applications, longer-term, research in key enabling technologies is seen as a crucial driver of innovation in the areas of nanotechnology, materials and advanced manufacturing, and is also supported, mainly through small and medium collaborative projects. The guiding policy in this area is the Strategy for Key Enabling Technologies, which includes nanotechnology, materials and manufacturing, and sets the basis of the future of European industry. "With regard to specific challenges, the following issues are addressed:

Energy and Energy efficiency: These activities are in tune with the Strategic Energy Technology (SET) Plan. They include topics in support of the 'European energy-efficient buildings' PPP initiative.

Environmental issues and sustainable development: These topics complement activities of the Environment and the Food, Agriculture and Fisheries, and Biotechnology (FAFB) Themes.

Raw Materials: In support of the Commission's Raw Materials Initiative, research is supported on the extraction and processing of raw materials; reduction of waste and recycling. Health and safety: This covers research based on nanomedicine and materials for health, complementing the Health Theme. It also includes research necessary to ensure the safe use of nanotechnologies, building on an extensive body of previous work under the NMP Theme.

Factories of the Future: The objective of this PPP initiative is to help EU manufacturers across sectors, in particular SMEs, to adapt to global competitive pressures by increasing the technological base of EU manufacturing through the development and integration the enabling technologies of the future, such as engineering technologies for adaptable machines and industrial processes, ICT, and advanced materials. Demonstration-targeted activities include high-performance manufacturing technologies (covering efficiency, robustness and accuracy); and technologies for casting, material removing and forming processes.

European energy-efficient buildings: This PPP initiative promotes green technologies and aims at the development of energy-efficient systems and materials in new and renovated buildings with a view to reducing radically their energy consumption and CO_2 emissions. These activities are in tune with the Strategic Energy Technology (SET) Plan.

Green Cars: This PPP supports research on a broad range of technologies and smart energy infrastructures, essential to achieve a breakthrough in the use of renewable and non-polluting energy sources, safety and traffic fluidity.

Upcoming Events
Looking At The Risky Side Of Nano

Nanotechnology - Occupational and Environmental Health
August 9-12, 2011, Boston, MA (USA)
This symposium will provide a high quality of professional presentations to scientists and engineers who wish to promote and communicate the interaction between technical advances and societal, occupational and environmental impacts in the field of nanotechnology research.

Biological Responses to Nanoscale Particles
September 11-15, 2011, Essen (Germany)
The current status of the fundamental aspects of nano-toxicology will be discussed at this international conference on "Bio-Nano Responses".

Environmental Effects of Nanoparticles and Nanomaterials
September 19-21, 2011, London (UK)
Second generation nanomaterials are now emerging, and environmental effects of these materials need to be established. This meeting is the sixth international meeting on this topic.

Size Matters
September 21-22, 2011, Saarbrücken (Germany)
Does high-tech bring about human enhancement? The second round of the NanoBioNet Conference on the ethical challenges of nanotechnology.

Nanomaterials in the Aquatic and Terrestrial Environment : Fate and Effect Assessment
September 28-30, 2011, Leiden (The Netherlands)
The aim of the workshop is to gain experience in risk assessment of manufactured nanomaterials. The main goal is to get acquainted with nano-specific issues regarding fate and effect assessment of nanomaterials, taking the specific physico-chemical properties of the test media into account.

NanoImpactNet Training School on the Impact Assessment of Nanomaterials: In vivo and in vitro testing strategies
October 12-14, 2011, Bratislava (Slovakia)
This training school will provide the participants with the necessary knowledge and skills to assess the impact of manufactured nanomaterials on human health and the environment.

Governance and Ethics of Nanosciences and Nano-technologies
October 20-21, 2011, Warsaw (Poland)
The conference will focus on the EC Code of Conduct for responsible nano-sciences and nanotech-nologies research, and activities of Member States concerning implementation of the Code will be presented and discussed. Stakeholders opinions will be heard as well.

IN SHORT – PAPERS, INITIATIVES & UPDATES

PROCEEDINGS: 'INRS Nano 2011' conference proceedings now available as free download

In April 2011, in Nancy, INRS organized a scientific conference devoted to the risks associated with nanomaterials and nanoparticles. The proceedings of that conference are now available as free download.

PRESENTATIONS: Challenges of regulation and risk assessment of nanomaterials

Twenty-eight presentations delivered at the Joint JRC Nano event and 2nd ENPRA Stakeholders Workshop are now available on-line: ENPRA Workshop 2011 - Programme with Presentations. The workshop was organized on 10-12 May 2011 in Somma Lombardo (Varese) by the IHCP Nanobiosciences unit with the support of the JRC Enlargement and Integration program, in collaboration with the FP7 project ENPRA (Engineered NanoParticle Risk Assessment).

INITIATIVE: New nanotechnology knowledge transfer network "SafeNano Norway"

SINTEF researcher and environmental chemist Andy Booth has initiated a new nanotechnology knowledge transfer network called SafeNano Norway, linked to health, safety and environmental issues. The creation of an independent network linking the industries that manufacture, use or sell products containing nanoparticles with the research community is an important goal of the project. Booth hopes that this work will also enhance the general public's confidence in practical nanoproducts.

PAPER: Nano-titanium-dioxide: challenges for human health risk assessment

This paper, co-authored by scientists from the European Commission Joint Research Centre, Institute for Health and Consumer Protection (JRC-IHCP), investigates feasibility and challenges associated with conducting a human health risk assessment for nano-titanium-dioxide (nano-TiO_2) based on the open literature by following an approach similar to a classical regulatory risk assessment. According to the authors, gaps in the available data sets, both in relation to exposures and hazard, do not allow reaching definite conclusions that could be used for regulatory decision-making.
doi: 10.3109/17435390.2010.504899

INITIATIVE: EU project tackles engineered nanomaterials risk

EU-funded scientists have developed risk assessment criteria for engineered nanomaterials (ENMs) that will help support experts in making innovation and policy decisions. An outcome of the NANOHOUSE ('Life cycle of nanoparticle-based products used in house coating') project, which is backed with EUR 2.4 million under the 'Nanosciences, nanotechnologies, materials and new production technologies' (NMP) Theme of the EU's Seventh Framework Programme (FP7), findings reveal that product design can affect the unintentional release of ENMs.

REPORTS: National Nanotechnology Initiative releases 4 workshop reports from the nanoEHS Series

The National Nanotechnology Initiative's (NNI) released four reports that are the result of a series of workshops focusing on various issues in the nanotechnology environmental, health, and safety (EHS) arena. The "nanoEHS" workshop series was a part of an ongoing strategy to coordinate nanotechnology-related EHS research by convening experts from industry, academia, and the Federal Government to share the latest information and newest developments, to discuss the current state-of-the-science, and to identify research gaps in the nanotechnology-related EHS field. Through four separate workshops, experts examined the following areas:

- Nanomaterials and Human Health & Instrumentation, Metrology, and Analytics
- Nanomaterials and the Environment & Instrumentation, Metrology, and Analytics
- Human and Environmental Exposure Assessment
- Risk Management Methods & Ethical, Legal, and Societal Implications of Nanotechnology

PAPER: Carbon nanotubes could pose health risk to production line staff

Certain types of carbon nanotubes - cylindrical molecules about one-thousandth of the width of a human hair - could cause cancer in the lining of the lung, University of Edinburgh research shows. The study in mice found short carbon nanotubes appear relatively harmless if they entered lung cavities. However, longer nanotubes were more likely to get stuck there and ultimately cause a type of cancer known as mesothelioma. doi: 10.1016/j.ajpath.2011.02.040

PRESENTATIONS: Presentations from EU event 'Towards a regulatory framework for nanomaterials'

The Council of the European Union organized a high level event, bringing together representatives of various associations (consumers, environmental protection, workers, industrial federations), scientists, regulatory experts as well as national and European regulatory bodies, in order to review the legislative initiatives in progress with regard to nanomaterials and to establish an operational framework for the management of incidents in the short term and to achieve improved risk management in the long term. Workshop "Towards a regulatory framework for the traceability of nanomaterials" - programs and presentations (zipped PDF).

PAPER: Smart nanotoxicity testing for biodiversity conservation

A new study suggests that an approach based on ecological traits - measurable morphological and physiological characteristics and ecological attributes of species - could be extremely helpful for interpreting nanoparticle toxicity test results and efficiently extrapolating them to living ecosystems. Examples include the following: organism surface area, target site distribution, dispersal mode, respiratory mode, and reproduction mode. doi: 10.1021/es202094w

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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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