



Nanoparticles, Risk & Regulation

Journal of the Royal Society 'Interface' publishes review of the current landscape of nanoparticle risk and regulation

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Nanotechnology continues to be forecast to reap massive global benefits across multiple sectors. Increasing public awareness of nanotechnologies, linked to non-specifically regulated introduction of products containing nanomaterials into the market, and the increasing use of 'Health & Safety' as an easy excuse for the prevention of desirable or beneficial activities by those unable or unwilling to understand them, makes heeding [advice laid out by UK Government in 2005](#) via the Royal Society / Royal Academy of Engineering ever important to their responsible development.

Taking these issues into account, an article published last week within the [Journal of the Royal Society 'Interface'](#), presents an objective review of the current landscape of nanoparticle risk research and regulation. The paper, entitled 'Nanoparticles, Risk & Regulation', is authored by nanotechnology & occupational health expert Professor Anthony Seaton CBE, and co-scientists from the Safety of Nanoparticles Interdisciplinary Research Centre ([SnIRC](#)).

Lessons from History

Beginning with a historical perspective, Seaton et. al. outline some of those risks relating to causation of diseases associated with aerosol and combustion particles, discussing potential analogies with exposure to manufactured NPs. Considering two of the biggest occupational health risks of recent times - asbestos and particulate air pollution – the authors note the differences in how these issues were handled and the knock on effect this had on worker and public health. They conclude *'It is not necessary to understand mechanisms before taking steps to prevent an occupational or environmental disease, and too great a focus on mechanisms alone, though scientifically interesting, may distract from applying preventive measures.'* – or to put it simply "Incomplete knowledge of toxicity should not be used as an argument for delaying pragmatic protective measures in the workplace" Professor Seaton commented.

Nanotoxicology & Exposure – sufficient knowledge for control?

Considering whether there is already sufficient understanding of the risks of nanoparticles to implement control measures forms the body of the review. Outlining and considering key theories in nanotoxicology, including the ultrafine hypothesis, transgression through biological membranes & the role of inflammation; Seaton et. al. relate the base knowledge in this area to that limited research into human exposure to these particles. They conclude that although there is considerable work to be done, in many cases knowledge is sufficient to implement effective controls to minimise exposure and these should be put into place.



Knowledge gaps & the road to regulation

“Consumer protection from theoretical risk relies at present on prudent behaviour by those who would exploit nanotechnology for commercial advantage and an assumption that such particles are unlikely to be toxic” said Seaton. Given this less than ideal situation, much of the latter part of the review is focused on identifying gaps in knowledge relating to the properties of nanoparticles that might determine toxicity and in understanding the most appropriate ways both to measure this in the laboratory and to assess it in the workplace. Discussing the possibilities & pitfalls in developing toxicity testing and exposure control sufficiently robust to progress knowledge to the point at which risk assessment and early steps toward regulation may be implemented, Seaton and his co-authors stress that in order to assist the regulatory process, research should aim at understanding generic issues with respect to determinants of toxicity and at improving methods of measuring exposure.

Anthony Seaton, Lang Tran, Robert Aitken, and Kenneth Donaldson '*Nanoparticles, human health hazard and regulation*' J R Soc Interface 2009: rsif.2009.0252.focusv1-rsif20090252 may be accessed online [here](#).

[ENDS]

Notes to Editors:

This week that the Royal Society / Royal Academy of Engineering are themselves marking the 5th anniversary of their seminal report, 'Nanosciences & Nanotechnologies – Opportunities & Uncertainties'. The review's main author Professor Seaton was one of the working group who authored this report. To mark this anniversary, SAFENANO has provided a feature on the RS/RAEng report 5th Anniversary. To read it, click here [\[http://www.safenano.org/5YearsOn.aspx\]](http://www.safenano.org/5YearsOn.aspx)

About SAFENANO

The SAFENANO initiative is one of the UK Technology Strategy Board's Micro and Nanotechnology Network's Nanotechnology Centres of Excellence. Phase 1 of this initiative was officially launched in August 2007.

SAFENANO Scientific Services represents the latest stage in IOM and SAFENANO's nanotechnology programme which aims to understand, quantify and control risks posed by nanomaterials to the workforce, consumers, the general population and the environment through research, consultancy and service work for industry and government. Access SAFENANO at www.safenano.org

About SnIRC

The Safety of Nano-materials Interdisciplinary Research Centre (SnIRC) is an interdisciplinary research centre to research the toxicity, epidemiology, persistence, exposure pathways and bioaccumulation of manufactured nanoparticles and develop methodologies and instrumentation for monitoring them. It is based on existing collaborations between the Institute of Occupational Medicine in Edinburgh, Napier University, Aberdeen University, Edinburgh University and the US National Institute of Occupational Safety and Health (NIOSH).

The founding SnIRC partners are Dr Rob Aitken and Dr Lang Tran (Institute of Occupational Medicine), Prof. Ken Donaldson (Edinburgh University), Prof Jon Ayres (Aberdeen University), Dr Vicki Stone (Napier University) and Dr Andrew Maynard (NIOSH). The SnIRC collaboration is chaired by Prof Anthony Seaton. Access SnIRC at www.snirc.org

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