

National Consultation on Nanomaterials and Their Implications for Human Health and Environment

Understanding the State of Science and Research Gaps

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for Nanotechnology



Office of Environmental NanoSafety

State of Science

- ❑ Improved Understanding of working with colloids as toxicants
- ❑ Improved understanding of the physics of “nano” and potential impacts on biological processes
- ❑ Improved methods for separating/understanding free metal or dissolution effects versus “nano” effects



State of Science

- ❑ Improved understanding appropriate assays to use to assess toxicity.
 - reducing sources of error
 - assessment of colloid-induced error in assays
- ❑ Most researchers now working with “environmentally realistic” concentrations
- ❑ Improved understanding of dose and behaviour in solution.



State of Science

- ❑ Harmonization of regulatory efforts well underway (OECD WPN reports, guidance documents on testing methods, sample preparation, *etc.* almost ready)
- ❑ “substantial new use”
 - Understanding of what “nano” means in terms of properties that allow assessment of hazard.



Gaps and Opportunities

- ❑ **Understanding future release scenarios**
 - Large scale use in agriculture, food science, coatings

- ❑ **Novel capping agents, delivery agents and formulations**
 - will change uptake and release scenarios- little predictive confidence at this point.

- ❑ **Detection technologies remain a significant issue**
 - dose cannot be determined accurately and therefore risk cannot be accurately stated



Gaps and Opportunities

- ❑ Understanding future release scenarios
- ❑ Novel and “combination” nano materials, capping agents, delivery agents and formulations will change uptake, release and toxicity scenarios
 - little predictive confidence at this point.
- ❑ Detection technologies remain a significant issue
 - dose cannot be determined accurately and therefore risk cannot be accurately stated



Gaps and Opportunities

- ❑ **Nomenclature- assessment of materials and registration issues**
- ❑ **Light-induced effects only nominally studied despite clear quantum effects of Nano with UV exposure**
 - Lack of infrastructure



Gaps and Opportunities

- ❑ **Lack of co-ordinated Canadian system that will allow researches in all disciplines to interact and learn from International efforts**
 - **Fragmented approach to interacting with European, American, Asian efforts**



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Questions?/Discussion points



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