

National Nanotechnology Initiative Workshop: Nanomaterials and Human Health & Instrumentation, Metrology, Analytical Methods

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The Planning Team Welcomes You

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Industry



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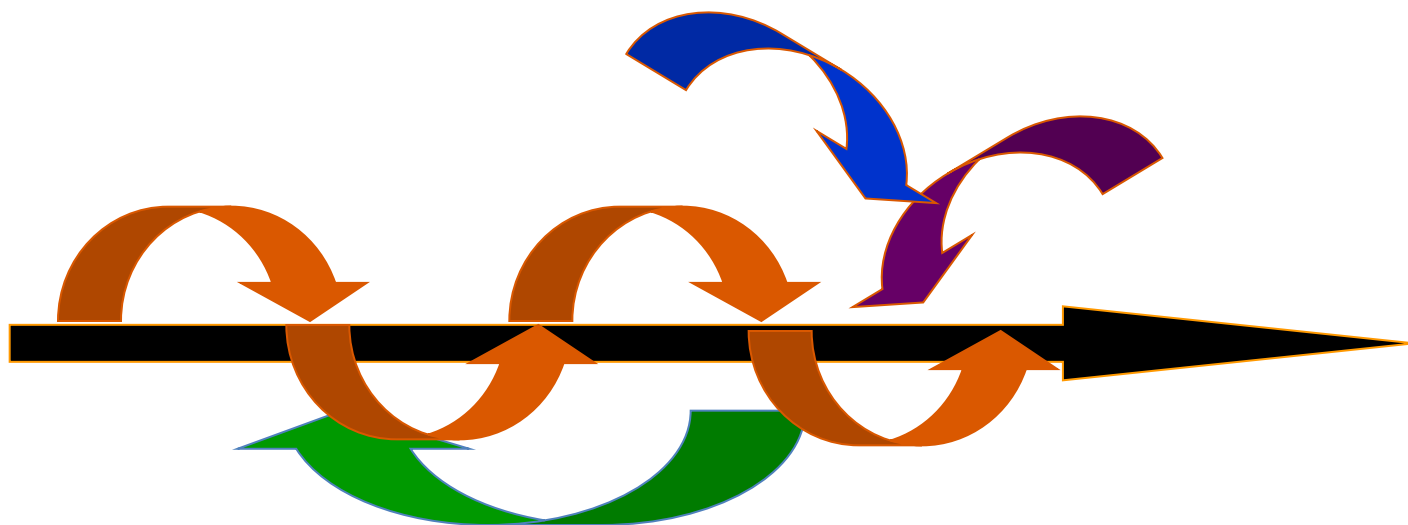
Diane
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Why Are We Here?

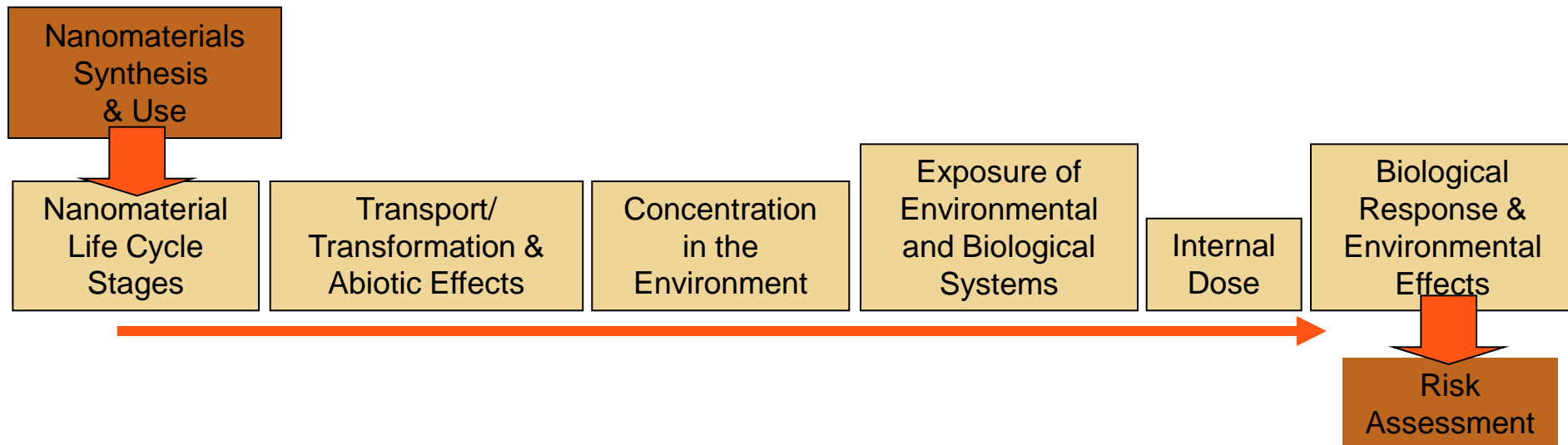
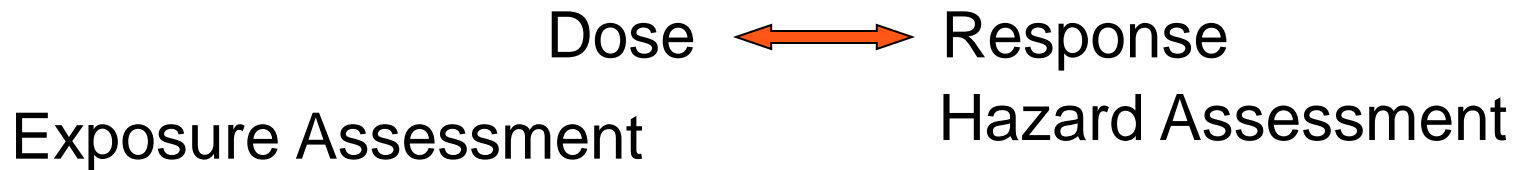


Research

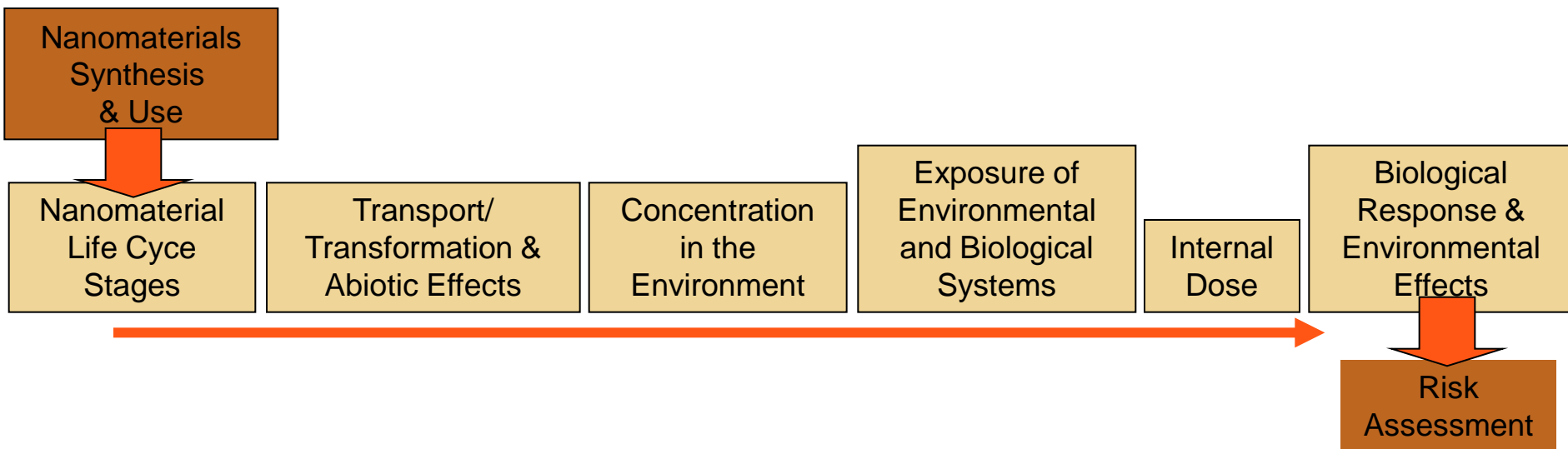


How Did We Get Here?

Developed a Risk Research Framework for Environment, Health, and Safety Research



Identified Research Needed in each Component of the Framework



Research Categories:

- Instrumentation and Metrology
- Human Health
- Environment
- Exposure Assessment
- Risk Management

Organized Research Into a Framework

Research Categories:

- Instrumentation and Metrology
- Human Health
- Environment
- Exposure Assessment
- Risk Management



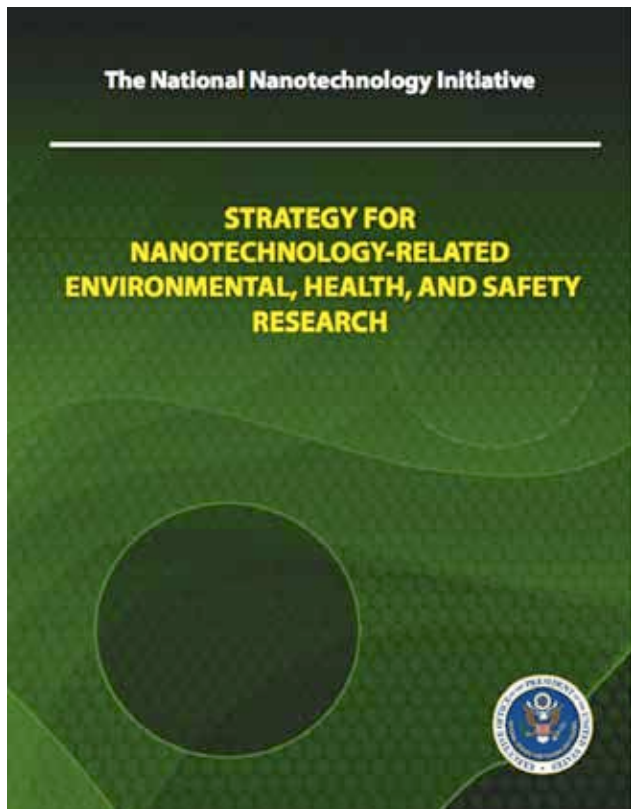
Nanomaterials&Human Health	Near-Term Research 0-5 yrs	Mid-Term Research 5-10 yrs	Long-Term Research >10 yrs
Research Need: Understand the absorption and transport of nanomaterials throughout the human body • Interaction of nanomaterials with exposure organ, including relationship of exposure to uptake • Sequestration of materials in the exposure organ • Metabolism or biological transformation of materials • Translocation out of the exposure organ • Mechanisms of transport through the body • Sequestration of materials in secondary organs • Excretion routes	High focus	Medium focus	Low focus
Research Need: Develop methods to quantify and characterize exposure to nanomaterials and characterize nanomaterials in biological matrices • Determine relevant measurement parameters for each class of nanomaterials in simple exposure matrix and in simple biological matrix • Determine appropriate parameters for sampling and analysis • Establish methods for quantification and characterization • Determine relevant measurement parameters for each class of nanomaterials in complex exposure matrices and in complex biological matrices • Validate methods for each exposure route • Develop biomarkers for exposure	High focus	Medium focus	Low focus
Research Need: Identify or develop appropriate in vitro and in vivo assays/models to predict in vivo human responses to nanomaterials exposure. • Validate existing in vitro and in vivo test methods • Determine appropriate methods to suspend and administer nanomaterials • Develop methods to visualize nanomaterials in biological matrices • Develop methods to assess the nanoscale physical and chemical properties in biological systems • Develop methods as testing gaps emerge • Develop high throughput screening technologies • Evaluate the degree to which in vitro and in vivo models predict human response • Translate research data into computational models that predict toxicity in silico	High focus	Medium focus	Low focus
Research Need: Understand the relationship between the properties of nanomaterials and uptake via the respiratory or digestive tracts or through the eyes or skin, and assess body burden • Characterize the physical and chemical properties of the major classes of nanomaterials by exposure route • Determine the relationship of acute exposure/uptake to body burden by class of nanomaterials • Determine the relationship of chronic exposure/ uptake to body burden by class of nanomaterials	High focus	Medium focus	Low focus
Research Need: Determine the mechanisms of interaction between nanomaterials and the body at the molecular, cellular, and tissular levels • Identify mechanisms through which nanomaterials interact with fundamental, protective biological response pathways • Identify mechanisms by which nanomaterials disrupt protective pathways and cause adverse health effects • Determine the relationship of dose, physical and chemical properties to protective vs adverse responses • Validate in vitro biological response in animal models • Determine the relationship of biological response in animal models to human response	High focus	Medium focus	Low focus

LEGEND

 MORE FOCUS | LESS FOCUS

For this category, the diagram depicts the recommended relative emphasis as a function of time that should be given for the priority research needs and their respective research topics over the course of implementing the NNI EHS Research Strategy.

How Is This Strategy Used By Federal Agencies?



- Common framework for ongoing dialogue, collaboration, and co-funding.
- Foundation from which agencies can build or modify their implementation plans.
- Near to long term perspective with an internal adaptive management process.

Adaptively Managing the NNI EHS Research Strategy

NNI member agencies planning series of workshops as outlined in the *EHS Strategy*

- Human and Environmental Exposure Assessment (Feb 2009)
- Environment and Instrumentation, Metrology & Analytical Methods (Oct 6-7, 2009)
- **Human Health and Instrumentation, Metrology & Analytical Methods (Nov 17-18, 2009)**
- Science for Decision Making: Managing the Impact of Nanotechnology (Mar 30-31, 2010).

Workshop Goals

- **Provide an open forum** at which stakeholders will
 - discuss the state of the science
 - identify gaps and barriers to advancing the science
 - Identify emerging trends that will modify the current research strategy
 - build dialogue and facilitate collaborations to achieve these research goals
- **Produce a Workshop Report** that will
 - reflect the comments and ideas put forth during the workshop
 - inform the next iteration of the NNI EHS Research Strategy

Who Are the Workshop Participants?

- Academics- 42
 - Industry- 43
 - Public Health Advocates- 14
 - General Public- 5
 - Media- 3
 - State and Local Government- 1
 - Trade Representative- 1
 - Federal Government- 130
-
- Webcast- 70

Workshop Overview for Today

This morning

- Welcoming Remarks and Framing the Workshop Goals
- Plenary Session on Characterization, In Vitro Research, In Vivo Research
- Lunch on your own

This afternoon

- Breakout Session 1: Examining the HH/IMA Research Needs
- White House Perspective on Nano EHS
- Reception

Workshop Overview for Wednesday

Morning Session

- Report Out: Breakout Session 1
- Case Studies on Exposure Measurements, Characterization, IANH
- Breakout Session 2: Developing a Strategy to Accomplish the Research

Working Lunch: Data-enabled Predictive Modeling for nano EHS

Afternoon Session

- Public Comment Period (Comment Box)
- Report Out: Breakout Session 2
- Congressional Remarks on nano EHS
- Next Steps