NanoHealth Enterprise

The NanoHealth Enterprise: Opportunity for Partnerships in Nanoscience Research Communities

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NIH Mission

NIH is the steward of medical and behavioral research for the United States.

Science in pursuit of

- **fundamental knowledge about the nature and behavior of living systems.**
- **application of that knowledge to prevent, detect, diagnose, and treat disease and disability.**

Scope of Research

Prevention Research

Exposure
Routes of Exposure
Biomarkers of Exposure
Fate of Material on Entry

Basic and Clinical Research

Cellular and Molecular Mechanisms
Biomarkers of Disease/Progression
Imaging and Sensor Technology
Therapeutics

Engineered Nanoscale Materials

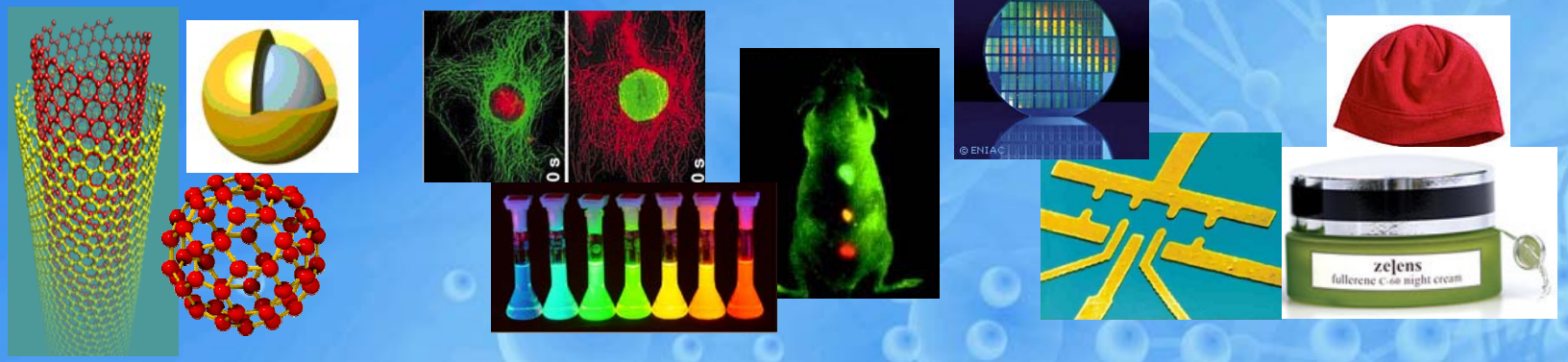
Implications

Applications

Nanotechnology Applications Research

Goal: Design materials, products or devices for a specific purpose or use

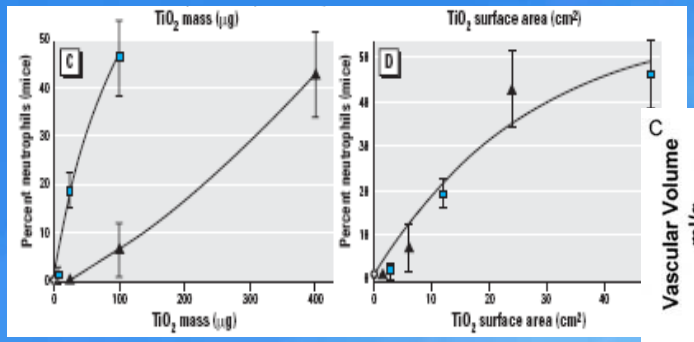
Approach: Manipulate size, shape, and chemistry to achieve desired outcome; maximize benefit and minimize risk

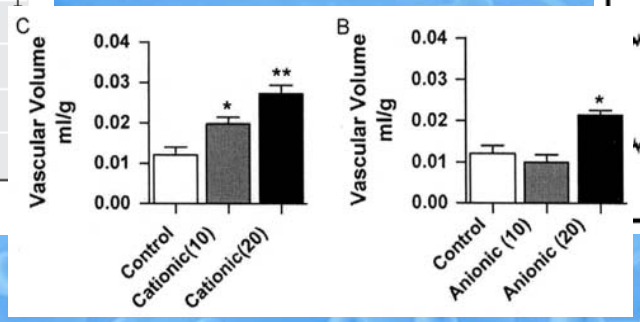


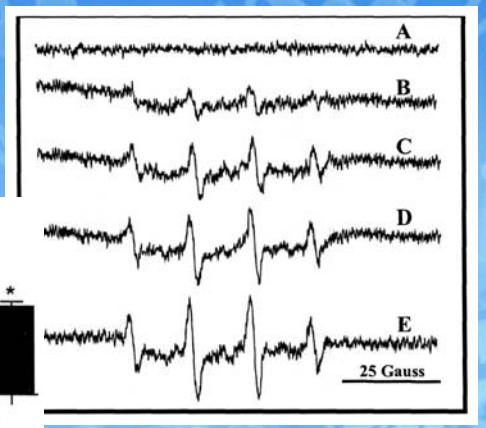
Nanotechnology Implications Research

Goal: Minimize adverse effect on human health and the environment

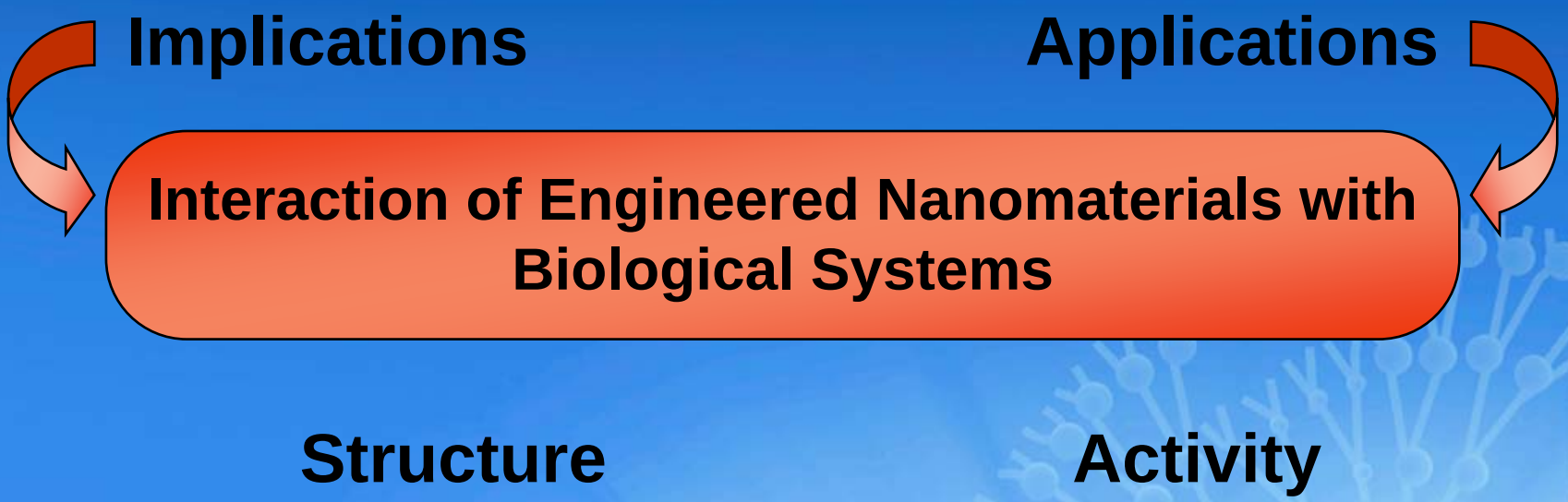
Approach: Understand how materials behave in biological systems







Conceptualizing the Science



Integrating Research Investments through Public-Private Partnerships

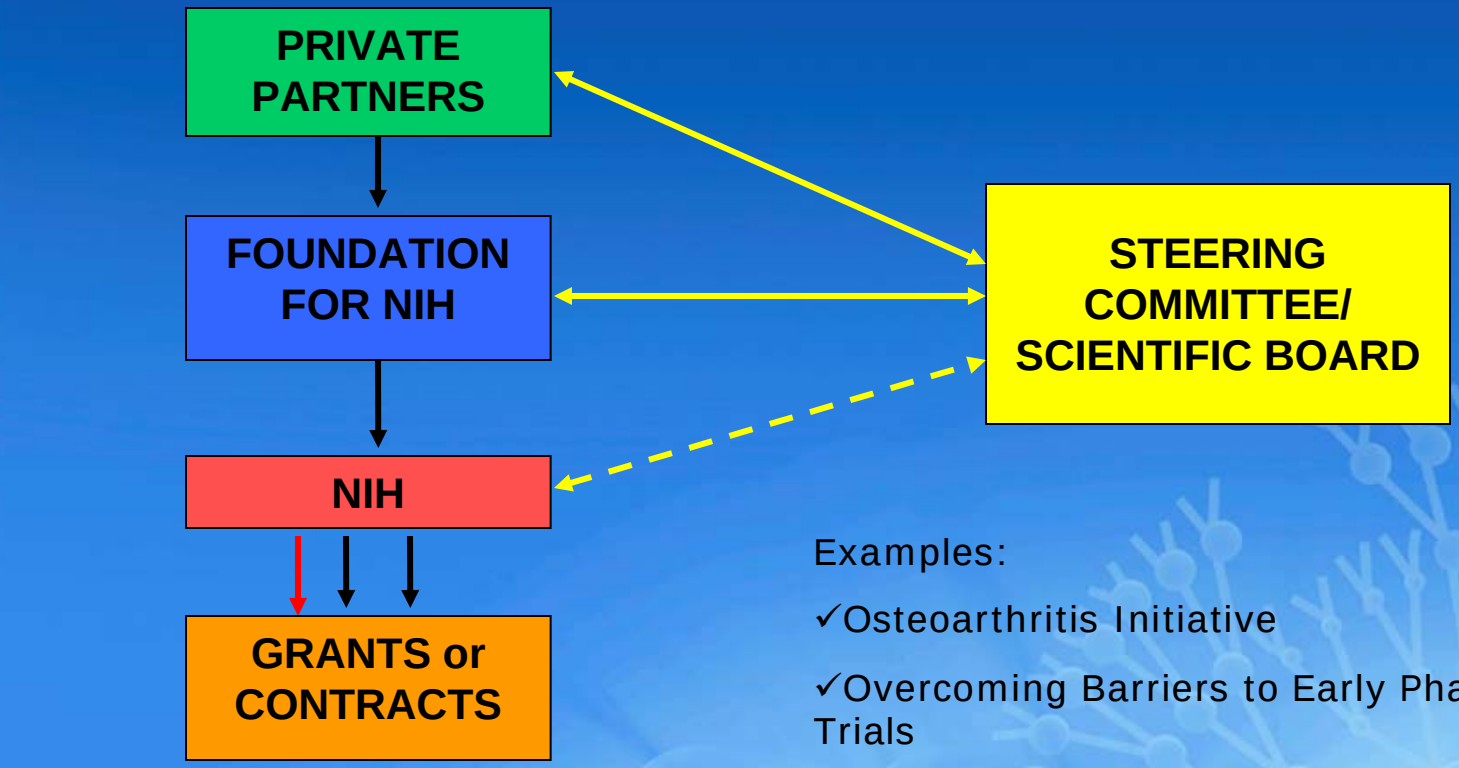
- Bring collaborative, entrepreneurial approach to large and complex problems and programs.
- Promote dialogue and coordinated effort across government, industry, and academia.
- Leverage scientific expertise and investment.
- Accelerate high priority projects by procuring services in new ways.
- Facilitate delivery of technology developed by private entities.

NIH: Organized for Partnership

Four Components for Success

- The Partners: science and resources
- Foundation for NIH: organizational structure
- Public Private Partnership Program: policy issues
- Office of General Council: legal issues

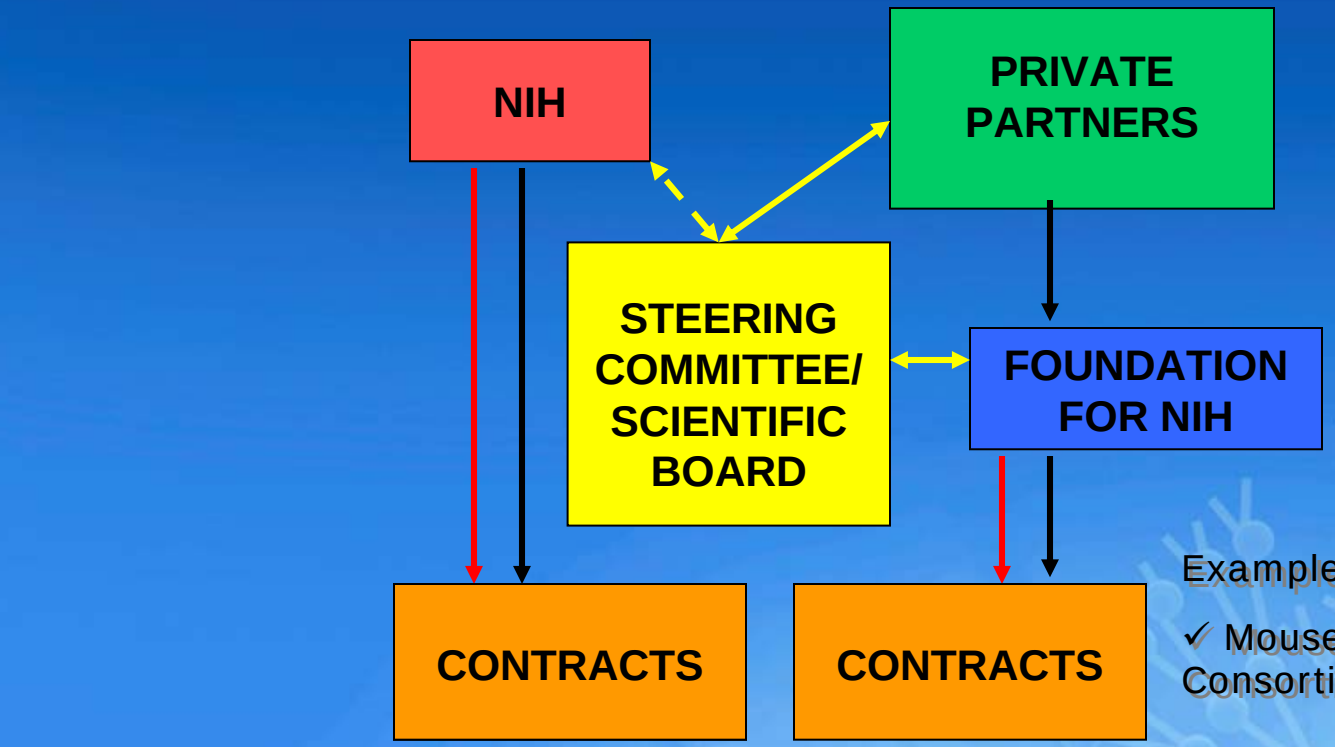
Model 1: Private Funds to FNIH Pooled with NIH Funding



Examples:

- ✓Osteoarthritis Initiative
- ✓Overcoming Barriers to Early Phase Clinical Trials
- ✓Alzheimer's Disease Neuroimaging Initiative
- ✓Imaging Database Resources Initiative

Model 2: Parallel Funding Mechanism, Supplementing NIH's Efforts



Examples:

✓ Mouse Sequencing Consortium

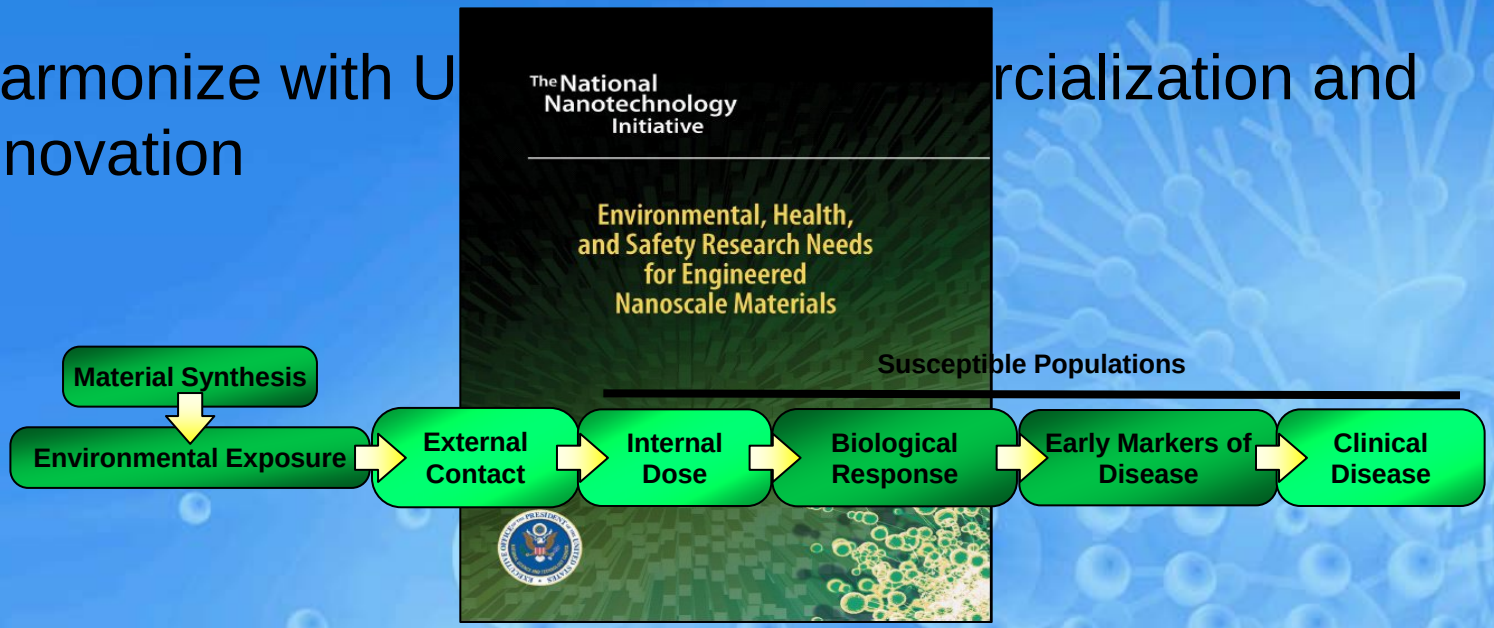
$$ Flow

Information Flow

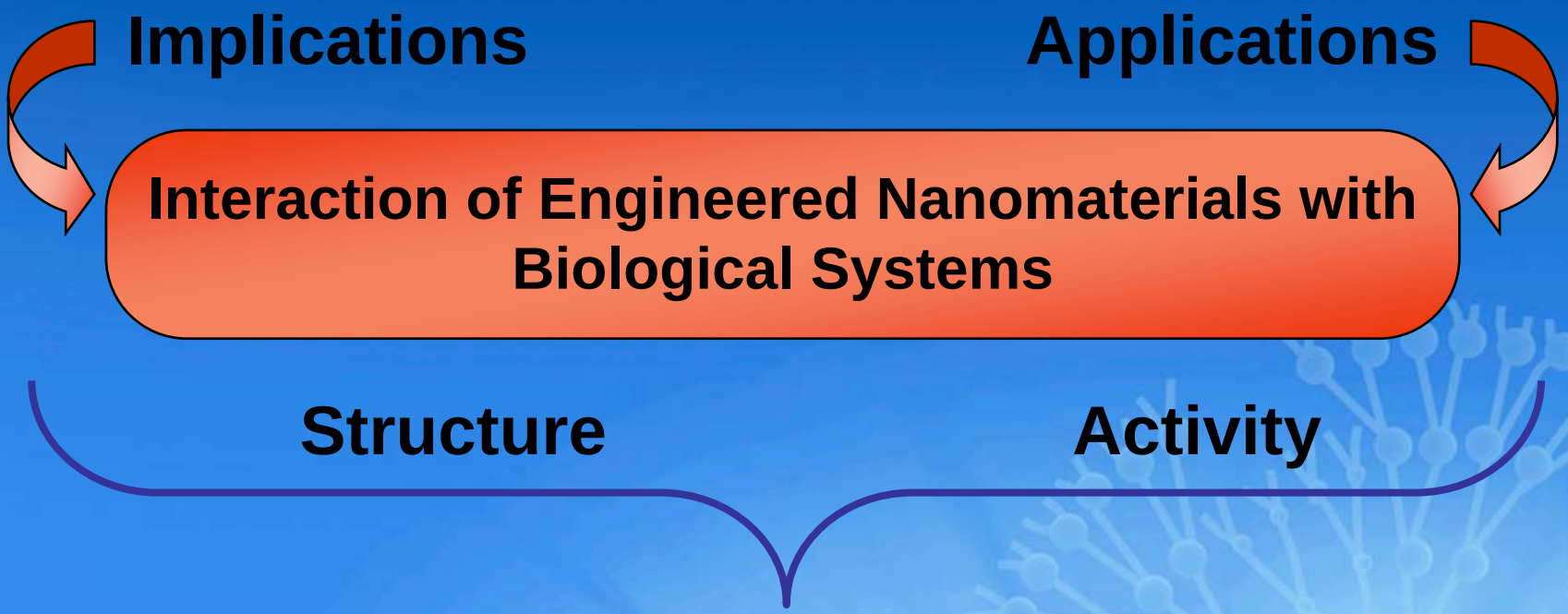
Scientific Direction

Building the NanoHealth Enterprise

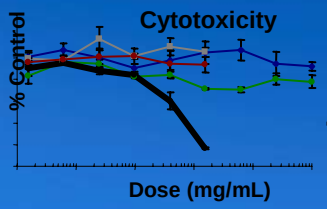
- Build on the NIH investment and expertise
- Invite stakeholder participation
- Target questions within a shared research strategy
- Harmonize with U rcialization and innovation



Conceptualizing Shared Research interests



Trends in NanoBio Interactions



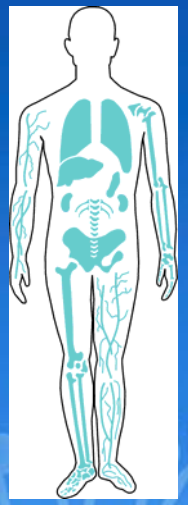
Biocompatibility

(+)

Cytotoxicity
(Surface Reactivity)

Low

RES
Recognition



Zeta Potential

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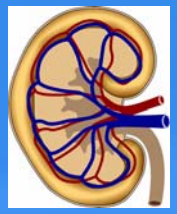
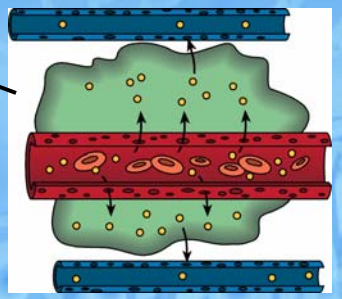
Solubility

Renal Clearance

Biliary Clearance ?

(EPR Effect)





(–)

High

1 nm

220 nm

Size
(Rigid Core)

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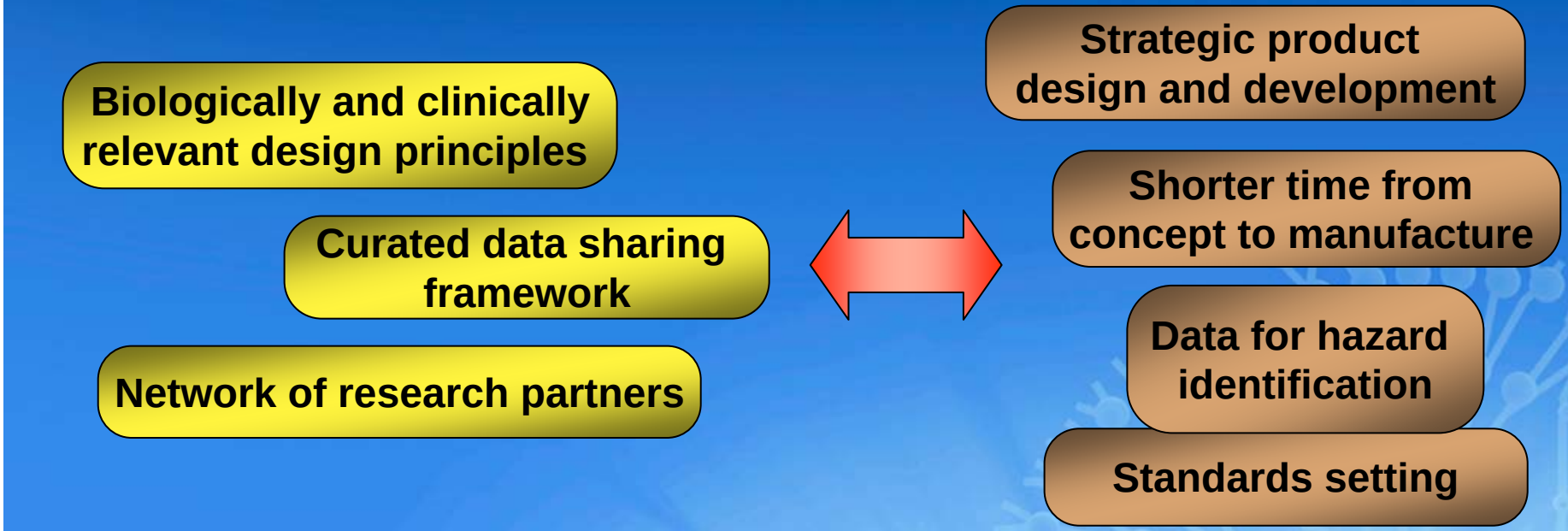
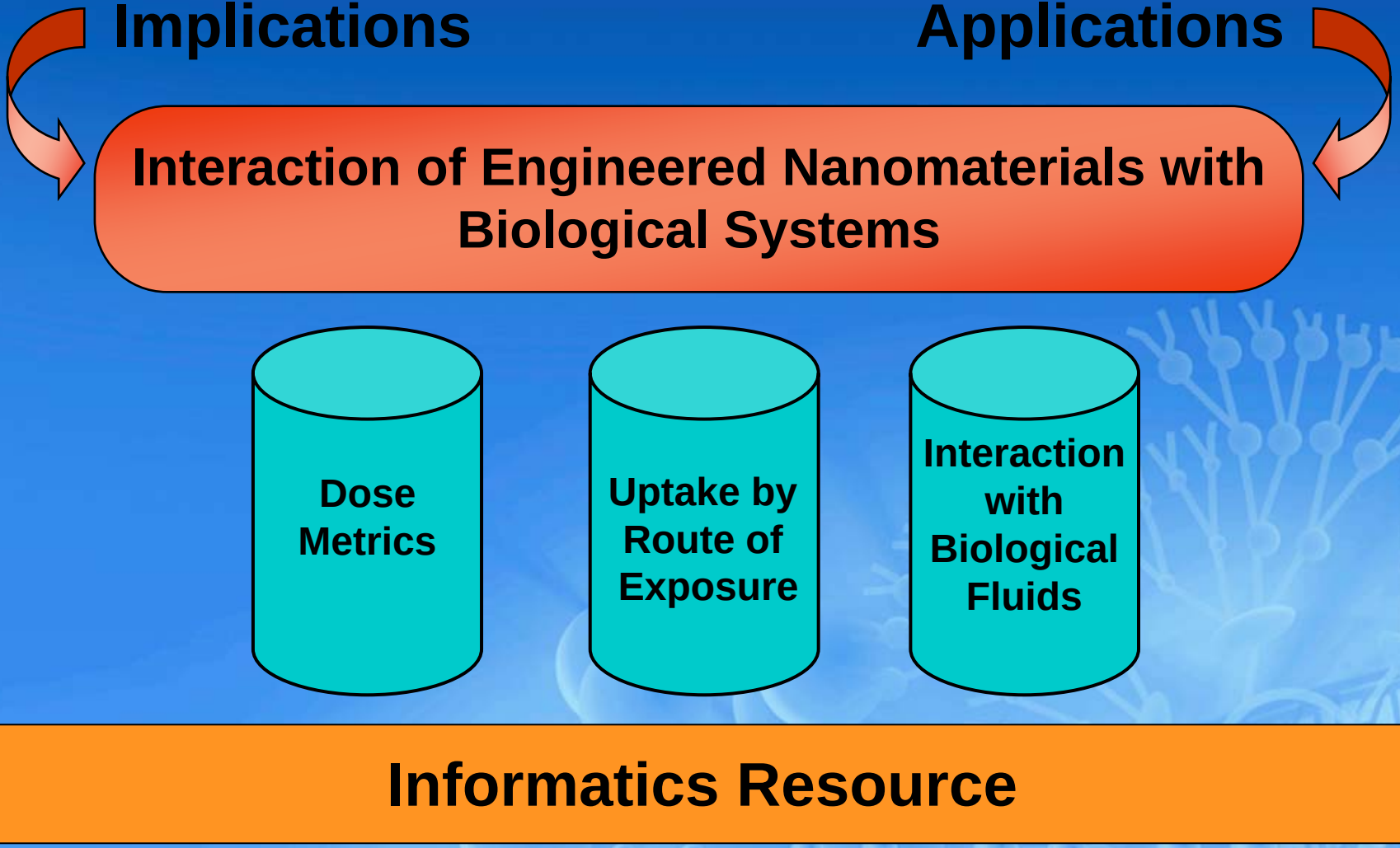
Expanding the Definition of Research Products



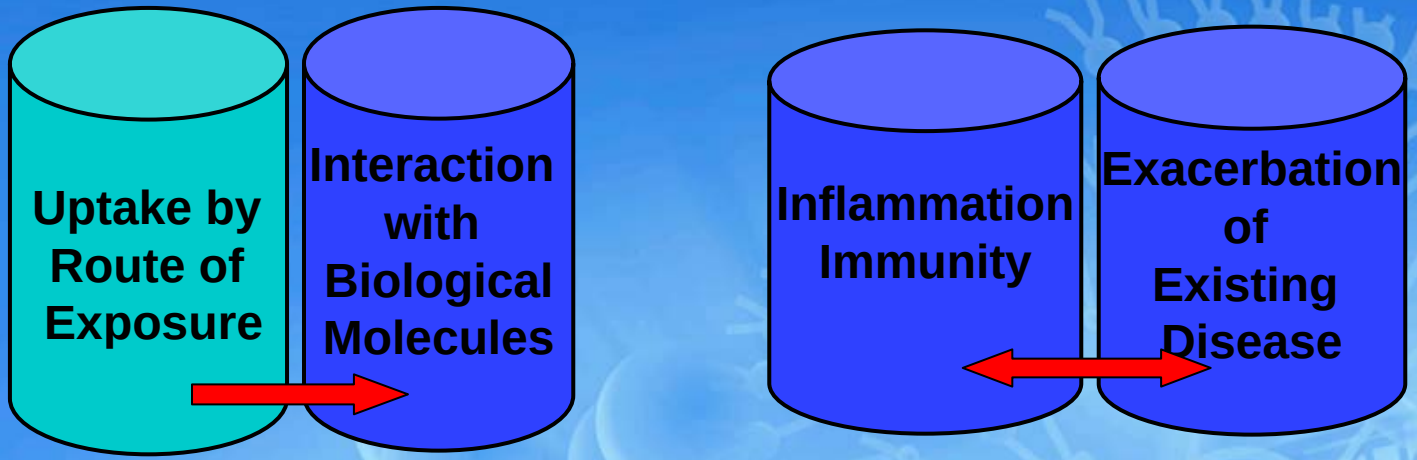
Targeted Research Projects



Exploratory Research Programs

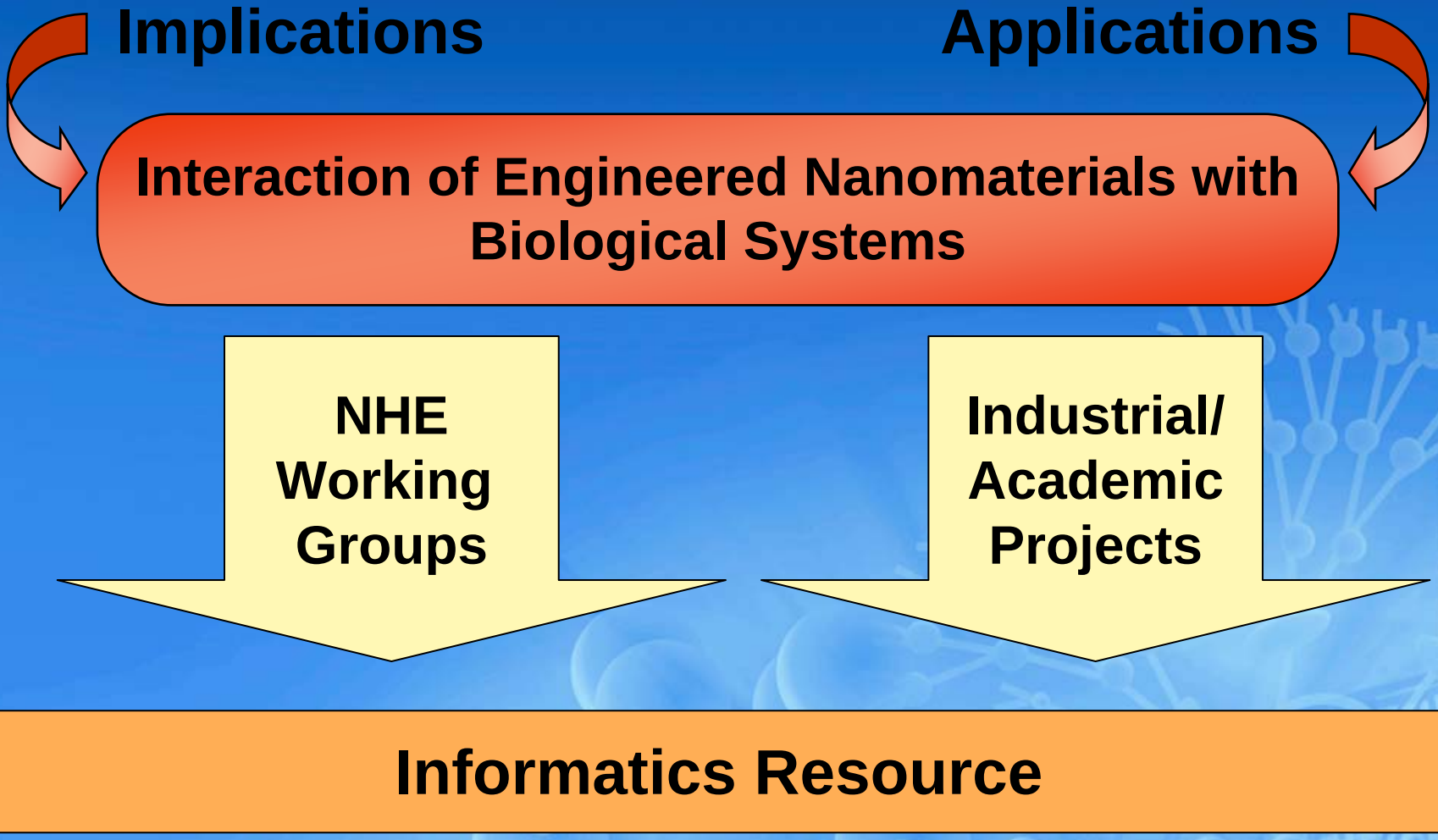
Implications **Applications**

Interaction of Engineered Nanomaterials with Biological Systems

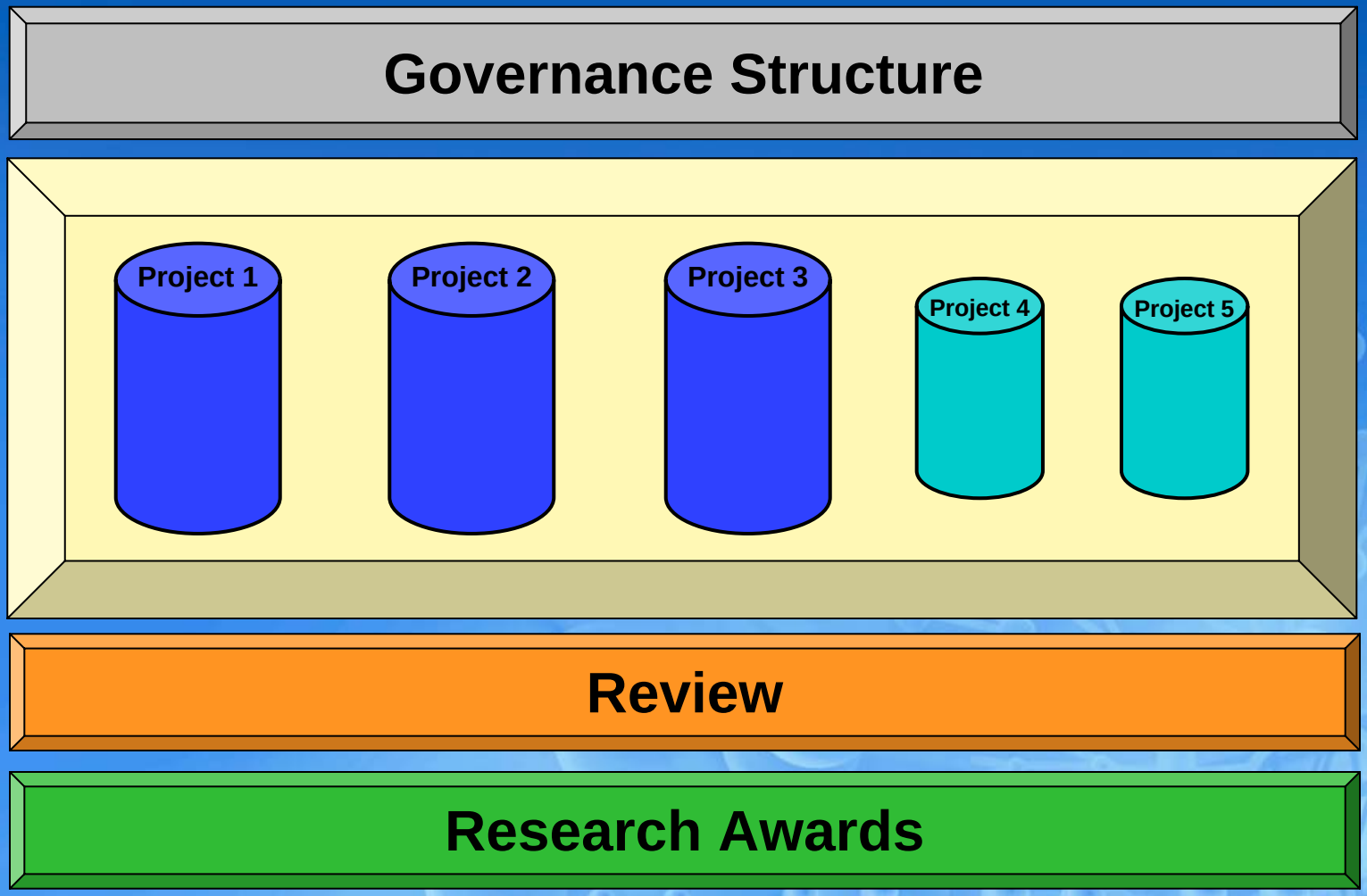


Informatics Resource

Parallel Paths within the NHE



Building the NanoHealth Enterprise



Building the NanoHealth Enterprise

Harness the Power of Nanotechnology

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Enable Discovery

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Principles of Safe Design