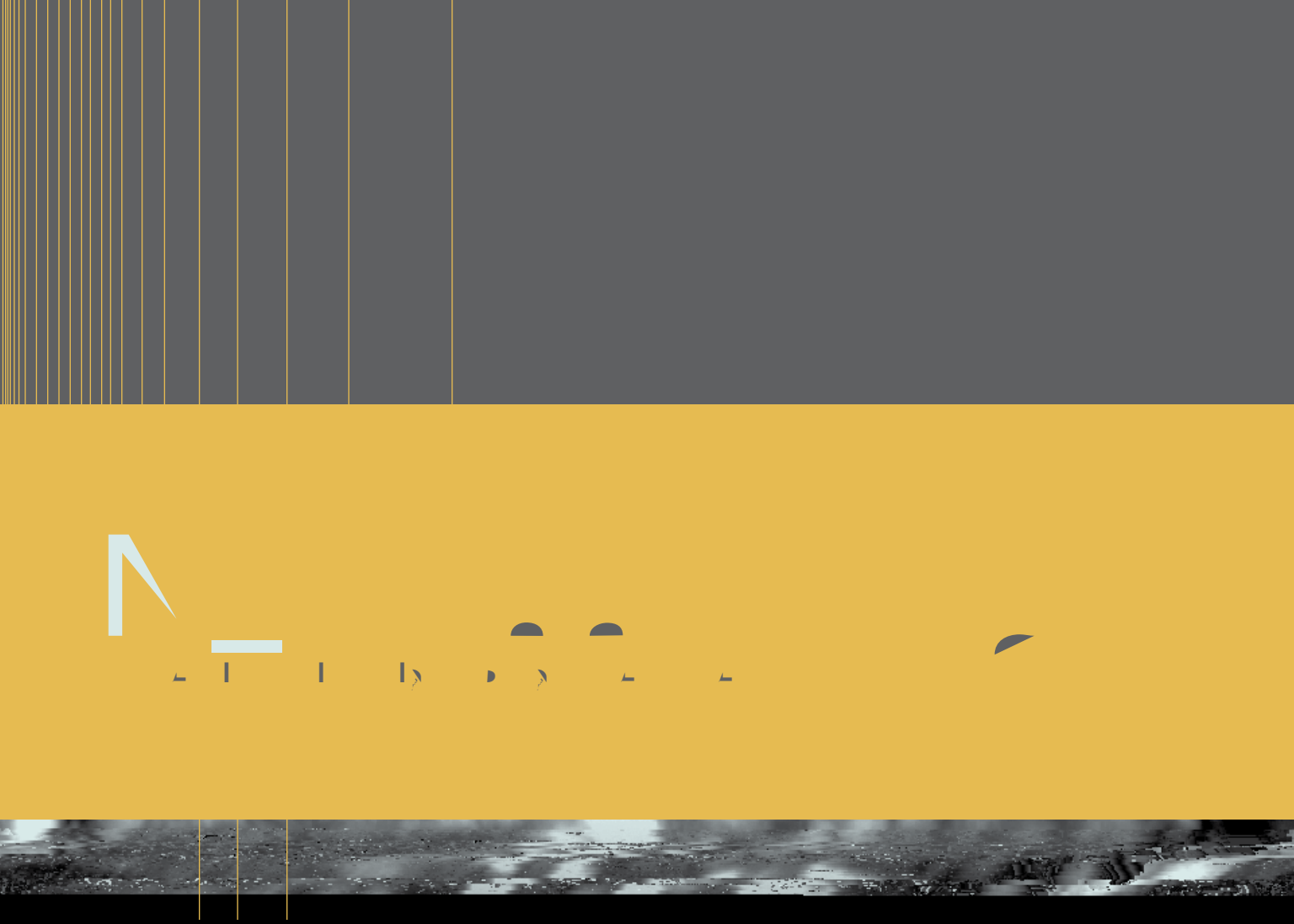

[illegible]

[illegible], [illegible], & [illegible]

Researchers at the Center for Cancer Nanotechnology Excellence focused on □erapeutic Response (CCNE TR) from Stanford University are working on developing rapid diagnostic assays based on detection of magnetic nanoparticle labels. Imaged here is a microfluidic magneto-nano chip with 8 by 8 sensors arrays and 8 microfluidic channels mounted on a chip carrier and an electronic test

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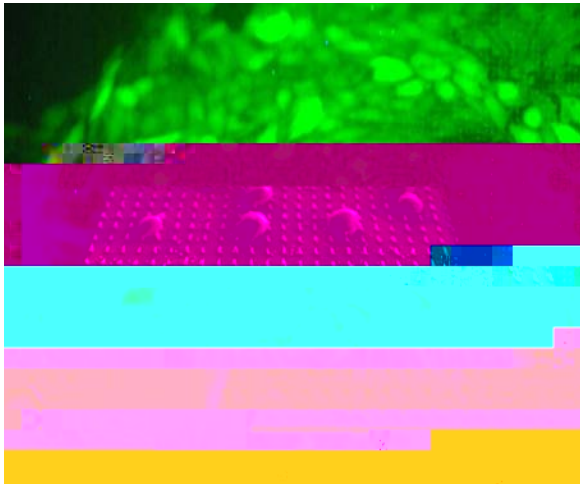
□e NIH is the nation's medical research agency, comprising 27 institutes and centers that fund biomedical research across the United States and around the world to improve human health. For more than 7 years, the NIH has recognized the tremendous potential of nanotechnology as a scientific focus that could t8chnol(i6(fi5o8he7u t8o07

Although the majority of NIH funding in nanotechnology is awarded using investigator-initiated grant mechanisms, three major NIH programs complement those efforts. All NIH institutes and centers participate in supporting a network of Nanomedicine Development Centers that represent a unique approach to translational biomedical research. The centers were challenged to develop a deep understanding of a fundamental biological system and gradually move the research to apply this basic knowledge to improve our understanding, diagnosis, and treatment of one or more diseases. This requires a multidisciplinary effort in which teams of scientists and clinicians are working together to improve health.



Tim McKnight, Oak Ridge National Laboratory, Nanoarrays for real time probing within living cells.

The National Heart, Lung, and Blood Institute supports a unique Program of Excellence in Nanotechnology (PEN). This program brings together bioengineers, materials scientists, biologists, and physicians who also work in interdisciplinary teams. This research is expected to spur the development of novel technologies to diagnose and treat heart, lung, blood, and sleep disorders.

The National Cancer Institute has created the NCI Alliance for Nanotechnology in Cancer. This comprehensive program consists of four major components: Nanotechnology Platform Partnerships focused on developing new technologies and novel products for cancer diagnosis and treatment; Cancer Centers of Nanotechnology Excellence that complement existing cancer research centers to integrate nanotechnology into basic and applied research; a Nanotechnology Characterization Lab to facilitate product safety and regulatory approval; and training opportunities in relevant multidisciplinary sciences.

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e NIH participates in the National Nanotechnology Initiative (NNI), a federal R&D program established to coordinate multi-agency efforts in nanoscale science, engineering, and technology. Twenty-six federal agencies currently participate in the NNI by funding or conducting studies, applying results from federally funded R&D efforts, or through collaborations with other agencies. e NNI is managed within the framework of the National Science and Technology Council (NSTC), the Cabinet-level council by which the U.S. President coordinates science, space, and technology policies across the federal government. e Nanoscale Science Engineering and Technology (NSET) Subcommittee of the NSTC coordinates planning, budgeting, program implementation, and review to ensure a balanced and comprehensive initiative. e NSET Subcommittee is comprised of representatives from each of the agencies participating in the NNI.

Researchers at the Northwestern University Center of Cancer Nanotechnology Excellence (NU CCNE) are using nanotechnology to develop highly sensitive diagnostic systems for cancer. The image above, taken with a transmission electron microscope, shows DNA-functionalized gold nanoparticles that have been assembled into a two-dimensional superlattice. DNA-functionalized gold nanoparticles are being used in a variety of high sensitivity biodiagnostic systems. Image courtesy of Professor Chad A. Mirkin, PhD, and Savka Stoeva, PhD.

[illegible]

Information on major programs and investigator-initiated nanotechnology efforts across the NIH, as well as other federal agencies, can be found at the following websites:

[illegible]
A roster of the representatives from NIH institutes and centers with nanotechnology portfolios

[illegible]

[illegible]
Information on current funding opportunities and links to other NIH sites relevant to nanotechnology

[illegible]

[illegible]
Program descriptions, goals of the initiative, and center contact information

[illegible]

[illegible]
A public-private partnership initiative of government, industry, academia, and other interested sectors to facilitate research on the fundamental interactions of engineered nanomaterials with biological systems

[illegible]

[illegible]
Currently open funding opportunities in nanotechnology at the NIH:

Nanoscience and Nanotechnology in Biology and Medicine (R01)

[illegible]

Nanoscience and Nanotechnology in Biology and Medicine (R21)

[illegible]

Bioengineering Nanotechnology Initiative - SBIR (R43/R44)

[illegible]

Bioengineering Nanotechnology Initiative -STTR (R41/R42)

[illegible]

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Information about Alliance programs, funding opportunities, research highlights, and institute contacts

A guide to NCI nanotechnology programs, areas of research emphasis, and research resources

Preclinical toxicity and efficacy testing is performed at this laboratory, located in Frederick, Maryland.

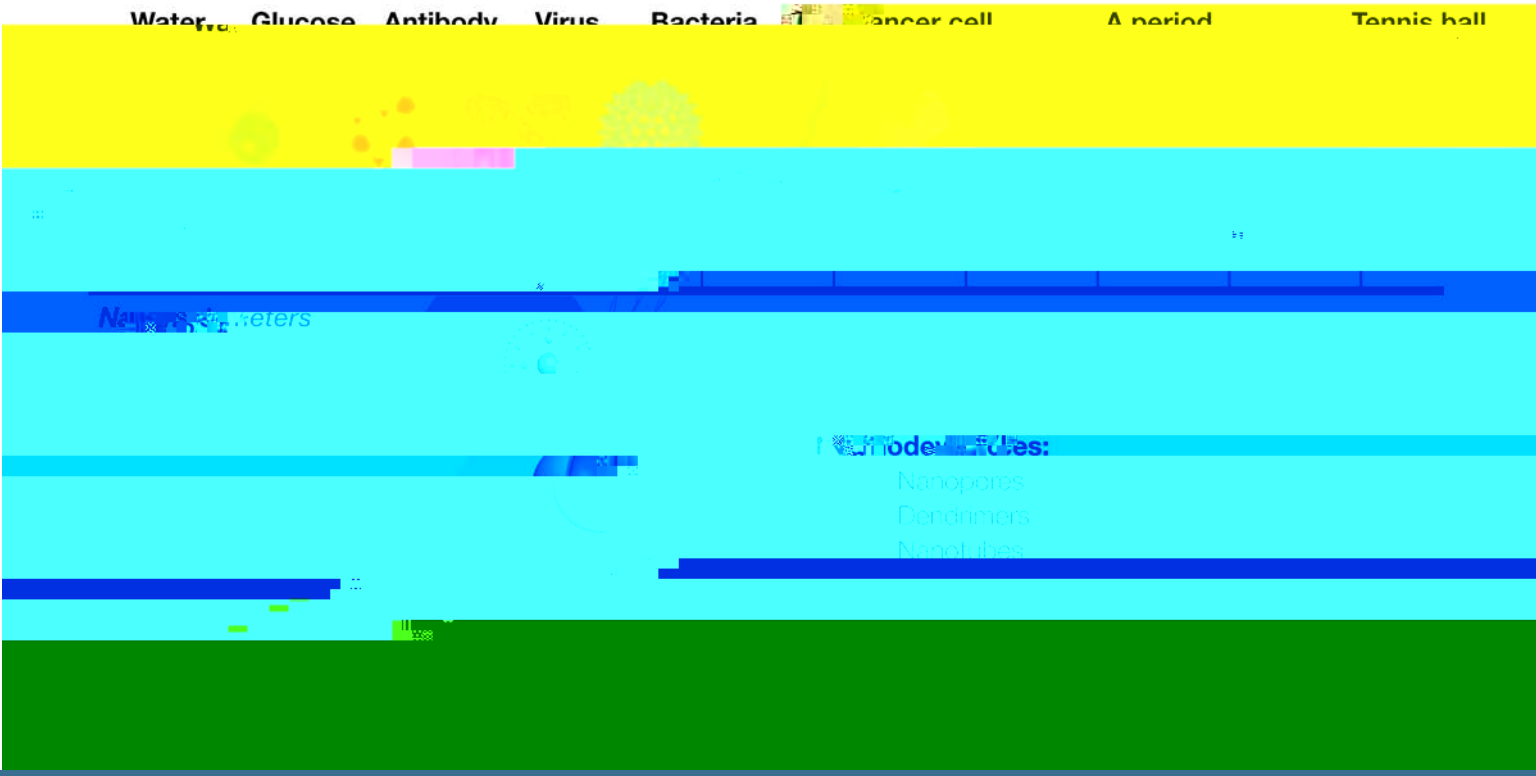
Program information, currently funded centers, and contact information

Program information, contacts, and funding opportunities at NIBIB

Program information, contacts, and funding opportunities at NIGMS

□e National Toxicology Program's Nanotechnology Safety Initiative to address potential health hazards created by the manufacture and use of nanomaterials

□e homepage of the NNI, which coordinates multi-agency federal nanotechnology efforts



Nanoscale devices are one hundred to ten thousand times smaller than human cells. They are similar in size to large biological molecules (“biomolecules”) such as enzymes and receptors. As an example, hemoglobin, the molecule that carries oxygen in red blood cells, is approximately 5 nanometers <http://nano.cancer.gov/resource center/nanotech glossary.asp#nanometer> in diameter. Nanoscale devices smaller than 50 nanometers can easily enter most cells, while those smaller than 20 nanometers can move out of blood vessels as they circulate through the body.

Designed by NIH Medical Arts