Cancer Nanotechnology
The Opportunity

• Combine power of innovation in nano-materials and cancer biology to develop new solutions in cancer

• Detect Disease *Before* Health Has Deteriorated
  • Sensors
  • Imaging

• Deliver Therapeutics
  • Local delivery
  • Improved efficacy
  • Post-therapy monitoring

• Develop Research Tools to Enhance Understanding of the Disease
NCI Nanotechnology Alliance - Awards

Centers of Cancer Nanotechnology Excellence (8)

- Nanotechnology Platform for Targeting Solid Tumors, The Sidney Kimmel Cancer Center, San Diego, Calif.
- Center for Cancer Nanotechnology Treatment, Understanding, and Monitoring of Cancer, University of California, San Diego, Calif.
- Center for Cancer Nanotechnology Excellence Focused on Therapy Response, Stanford University, Palo Alto, Calif.
- Nanotechnology Platform for Pediatric Brain Cancer Imaging and Therapy, University of Washington, Seattle, Wash.
-近红外荧光纳米颗粒用于靶向光学成像，德克萨斯大学MD安德森癌症中心，休斯顿，德克萨斯州
- DNA-连接的二茂铁纳米颗粒系统用于癌症诊断和治疗，密歇根大学，安娜堡，密歇根州

Cancer Nanotechnology Platform Partnerships (12)

- Near-Infrared Fluorescence Nanoparticles for Targeted Optical Imaging
- Emory-Georgia Tech Nanotechnology Center for Personalized and Predictive Oncology, Atlanta, Ga.
- Photodestruction of Ovarian Cancer: ErbB3 Targeted Aptamer-Nanoparticle Conjugate, Massachusetts General Hospital, Boston, Mass.
- Carolina Center of Cancer Nanotechnology Excellence, University of North Carolina, Chapel Hill, N.C.
- Nanotherapeutic Strategy for Multidrug Resistant Tumors, Northeastern University, Boston, Mass.
- Multifunctional Nanoparticles in Diagnosis and Therapy of Infiltrative Tumor, Virginia Commonwealth University, Richmond, Va.
- The Siteman Center of Cancer Nanotechnology Excellence at Washington University, St. Louis, Mo.
- Hybrid Nanoparticles in Imaging and Therapy of Prostate Cancer, University of Missouri, Columbia, Mo.
- Multifunctional Nanoparticles in Diagnosis and Therapy of Pancreatic Cancer, State University of New York, Buffalo, N.Y.
- DNA-linked Dendrimer Nanoparticle Systems for Cancer Diagnosis and Treatment, University of Michigan, Ann Arbor, Mich.
- Novel Cancer Nanotechnology Platforms for Photodynamic Therapy and Imaging, Roswell Park Cancer Institute, Buffalo, N.Y.
- Metallofullerene Nanoplatform for Imaging and Treating Infiltrative Tumor, Virginia Commonwealth University, Richmond, Va.
- The Siteman Center of Cancer Nanotechnology Excellence at Washington University, St. Louis, Mo.
- Multifunctional Nanoparticles in Diagnosis and Therapy of Pancreatic Cancer, State University of New York, Buffalo, N.Y.
Alliance Score Card

- **Scientific output**: Over 1000 peer-reviewed journal papers published with average impact factor ~7. Strong evidence of establishing joint projects: growing number of publications involving multiple PIs.

- **Clinical Translation**: 8 clinical trials underway; several companies in pre-IND discussions with FDA.

- **Commercialization Efforts**: over 50 companies associated with the Alliance – 10 formed in last one year.

- **Technology**: Over 200 disclosures and patents filed.

- **NCL**: Leader in characterization of nanotechnologies.

- **Leveraged funding**: Significant additional funding to CCNEs (grants, philanthropy, industry, and venture investors).

Unprecedented Teams, Technology - Science Convergence and - Engagement of Cancer Biologists and Oncologists.
Alliance Investigators and Clinical Trials

- **In-vitro assays:**
  - Testing of PSA clinical samples using bio-barcode – *Ch. Mirkin, Sh. Thaxton* - Northwestern University

- **Imaging:**
  - PET agent synthesized in microfluidics – *M. Phelps, C. Radu* - UCLA
  - MRI agent – Kereos and *G. Lanza, S. Wickline* - Washington University
  - MRI agent – *R. Weissleder* - Harvard

- **Therapy:**
  - Adenovirus nanoparticles for immune gene therapy – *T. Kipps* - UCSD
  - Camptothecin on polymeric nanoparticles - Calando Pharm. and *M. Davis* - Caltech
  - siRNA on polymeric nanoparticles - Calando Pharm. and *M. Davis* - Caltech
Achievement:
- More than 165 individual nanoparticles undergoing characterization
  - 50 Active collaborations (MTAs)
  - In 2008, 14 new MTAs, 13 CDAs, 1 CRADA with GE
  - 45 animal studies to date
Nanotechnology Characterization Laboratory (NCL)
NCI Alliance for Nanotechnology in Cancer – Phase II - Organizational Structure

- Centers for Cancer Nanotechnology Excellence (CCNE) U54 Cooperative Agr.
- Cancer Nanotechnology Platform Partnerships U01 Cooperative Agr.
- Multi-disciplinary Training K99/R00 Awards, R25 Awards
- Nanotechnology Characterization Laboratory

- Coordination and Governance Committee
- Industrial Advisory Committee
- Clinical Advisory Committee
- NIH Cancer Nanotechnology Working Group

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