NIBIB and Trans-NIH Research Opportunities

National Institute of Biomedical Imaging and Bioengineering

The National Institutes of Health

Much of the biomedical research in the United States is supported by the Federal Government, primarily the National Institutes of Health (NIH)

Biomedical Research at the NIH

- **Multi-disciplinary approaches** – Applying principles and methods from the quantitative sciences and engineering to address problems in biology and medicine.
- **Partnerships and collaboration** – Multi-disciplinary and multi-organizational teams
- **Design- and technology-driven research** in addition to hypothesis-driven
- **Technology transfer** – Discovery-to-patient-to-product (bench-to-bedside-to-practice)

Common Grant Mechanisms

- R01-standard investigator-initiated grant
- R21-exploratory/developmental grant
- R21/R33-phased transition award
- P01-program project grant
- P41-research resource center
- P20-center planning grant
- P50-center grant
- Etc.

SBIR/STTR Program

PHASE I

Feasibility Study

$100K and 6-month (SBIR)

or 12-month (STTR) Award

PHASE II

Full Research/R&D

$750K and 2-year Award

(SBIR/STTR)

PHASE III

Commercialization Stage

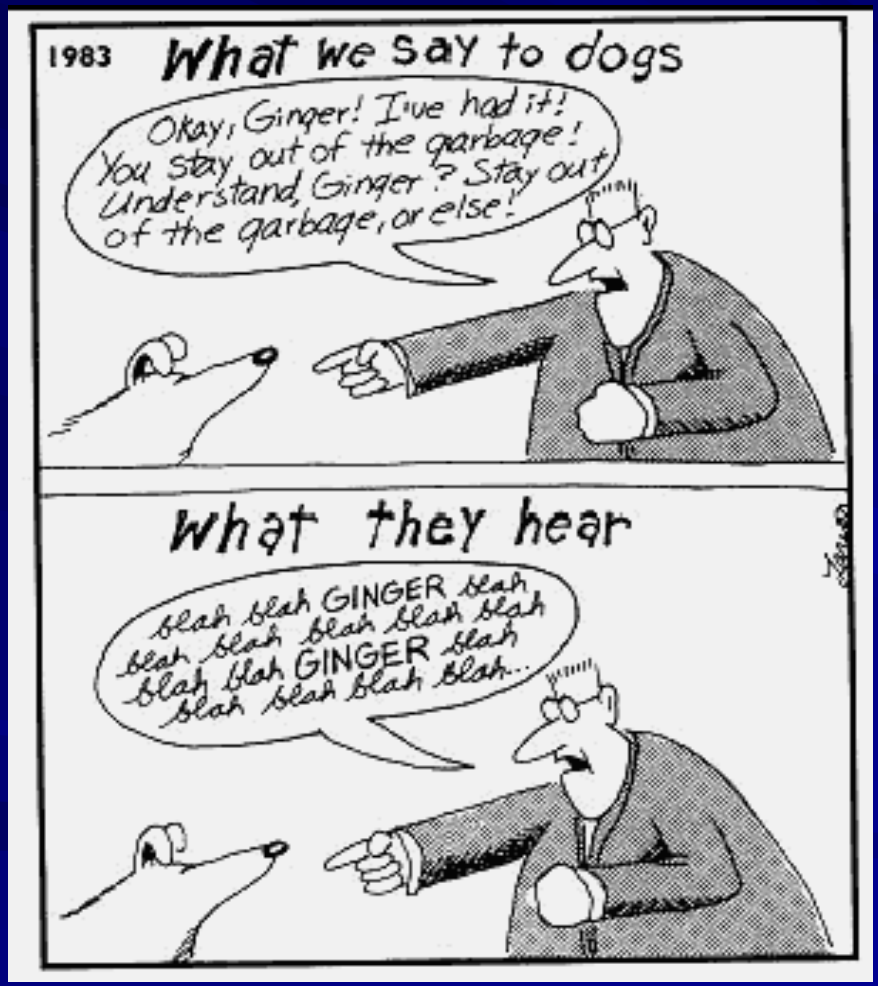
Use of non-SBIR/STTR Funds

NIBIB Mission

Improving human health by leading the development and accelerating the application of biomedical technologies.

The Institute is committed to integrating the physical and engineering sciences with the life sciences to advance basic research and medical care.

A big challenge for the NIBIB is promoting multidisciplinary research



1. Clinicians, biologists and engineers speak in different languages
2. Clinicians and biologists may not know what is technically possible; engineers may not know the biomedical problems.
3. Continued, ongoing collaboration essential

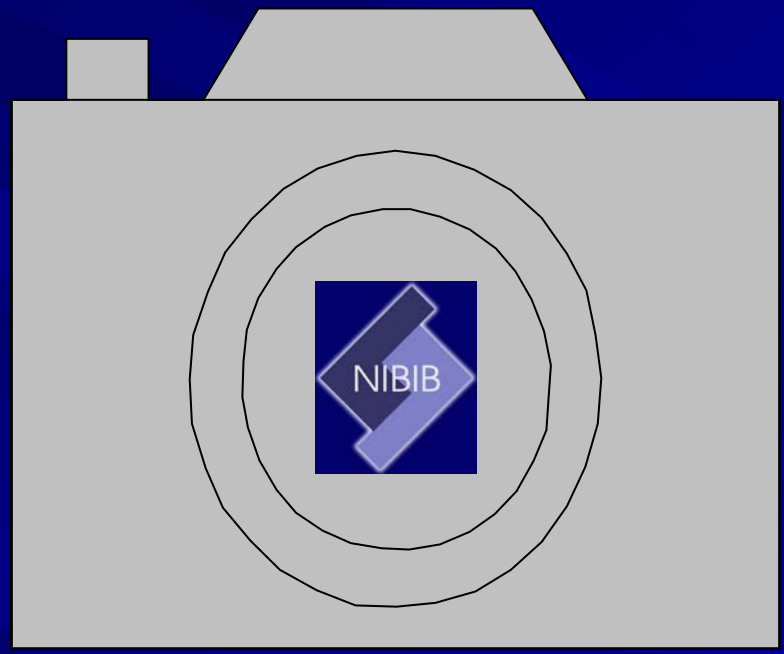
Current NIBIB Grant Portfolio Areas

- Biosensors
- Biomaterials
- Biomechanics
- Bioinformatics
- Computational Biology
- Drug & Gene Delivery
- Medical Devices & Implant Science
- Nanotechnology
- Neuroprothesis & Neuroengineering
- Platform Technologies
- Rehabilitation Engineering
- Surgical Tools & Techniques
- Tissue Engineering

Current NIBIB Grant Portfolio Areas

- Imaging Agents & Molecular Probes
- Image Displays
- Image Guided Therapies & Interventions
- Image Perception
- Image Processing
- Magnetic, Biomagnetic & Bioelectric Devices
- Magnetic Resonance Imaging & Spectroscopy
- Nuclear Medicine
- Optical Imaging & Spectroscopy
- Telemedicine
- Ultrasound and Acoustics
- X ray, Electron & Ion Beam

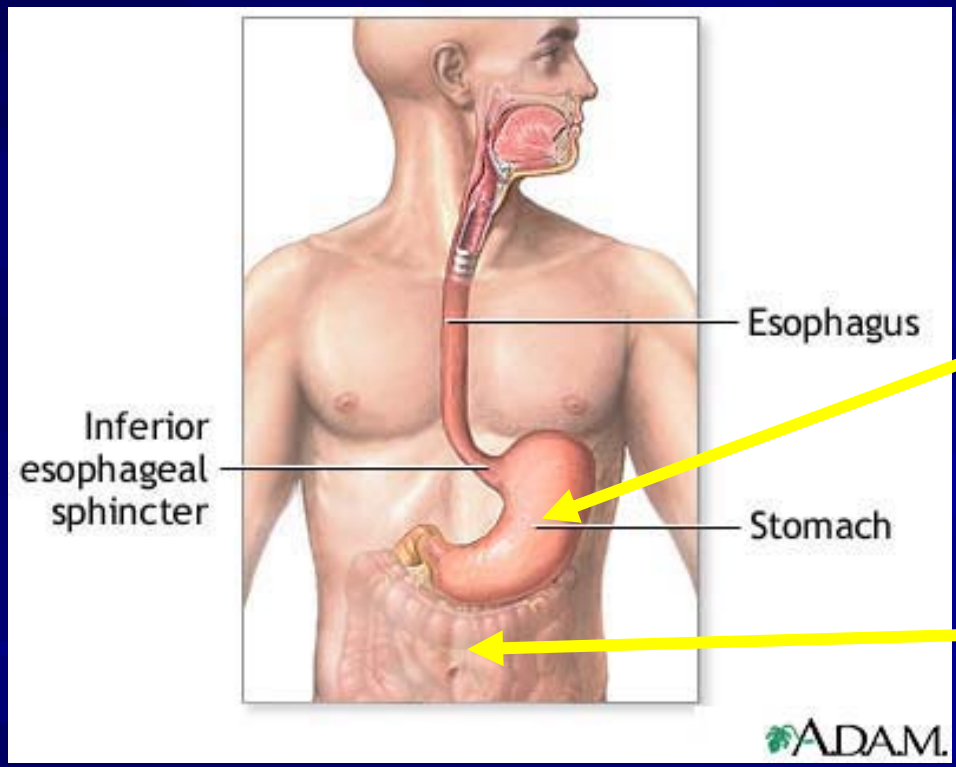
Snapshot of funded NIBIB grants

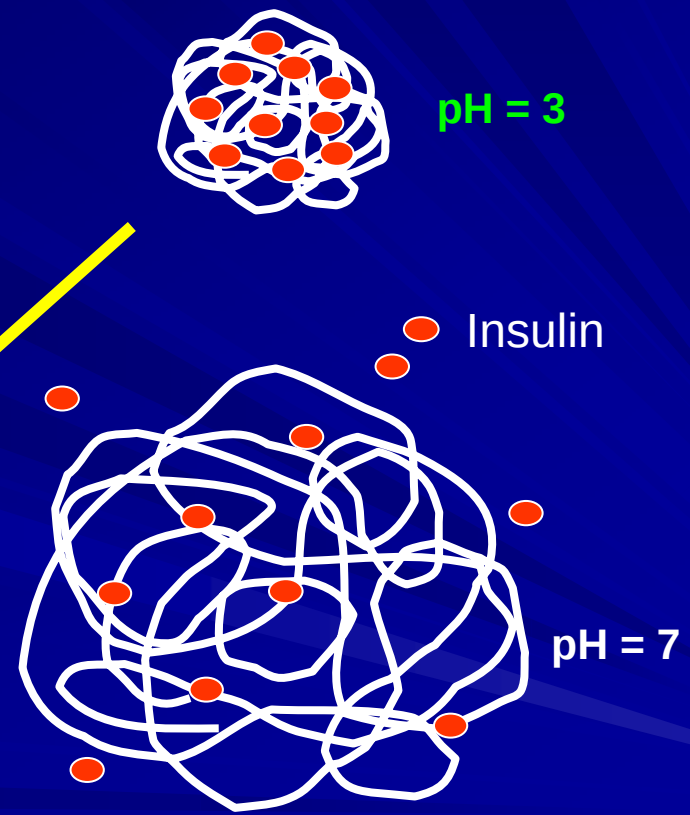


DRUG DELIVERY

Development of a pH Sensitive Complex Hydrogel for Oral Protein (Insulin) Drug Release

Nicholas A. Peppas, Ph.D., UT Austin

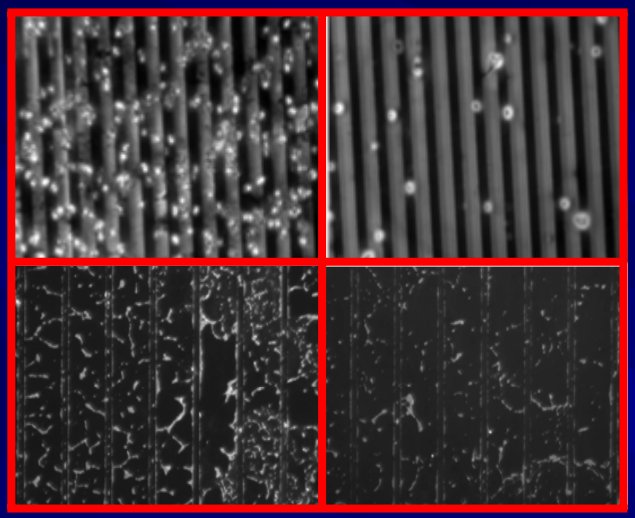




<0.1% of insulin taken orally retains activity by the time it reaches the blood stream. This investigator is developing a pH responsive hydrogel that at low pH is in a collapsed conformation that protects the proteins in passage thru the stomach and as the pH rises in the intestines, the hydrogel swells and rreleases the protein where it can be absorbed into the blood stream.

Improving Biocompatibility of Implanted Medical Devices

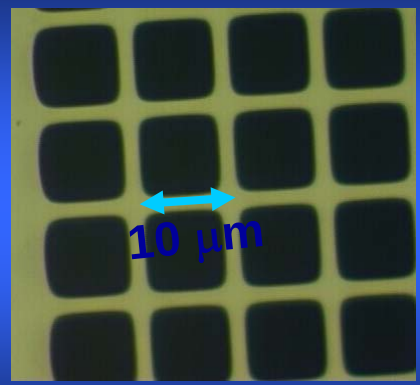
Mark Schoenfisch, R01-EB-708-3, Jose Joseph, R21-EB-1645-2
John Frangos, R01-EB-823-3



protective sol gel grids over sensor
Schoenfisch, UNC Chapel Hill

Porcine platelet adhesion control for glucose sensors

Pseudomonas Aeruginosa biofilm control



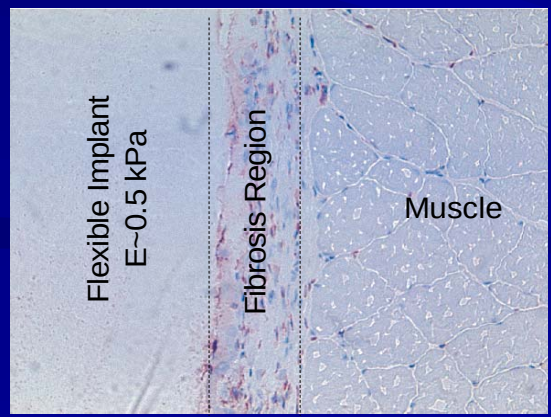
O_2 Electrode

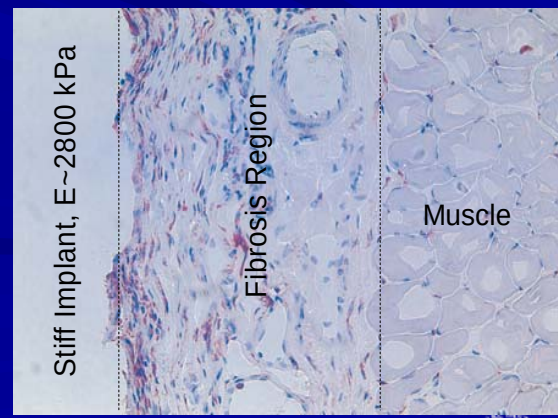
Grid-shaped electrodes are better tolerated by rats than monolithics of same area

Joseph, SRI International

Flexible hydrogel implants cause far less fibrosis and inflammatory response in rat rectus muscle

Frangos, La Jolla Bioengineering Institute



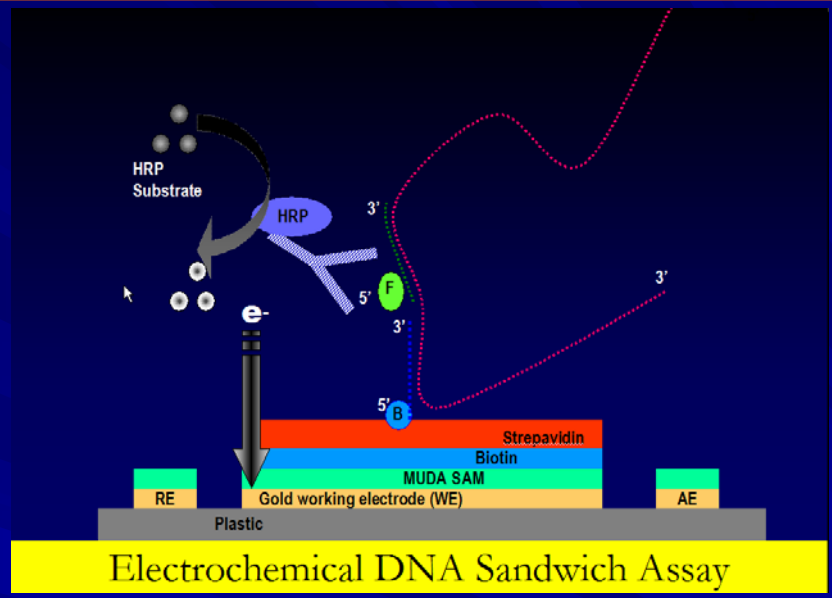


Biosensors

The UCLA Urosensor

Joseph Liao, MD, David Haake, MD, Bernard Churchill, MD (PI)

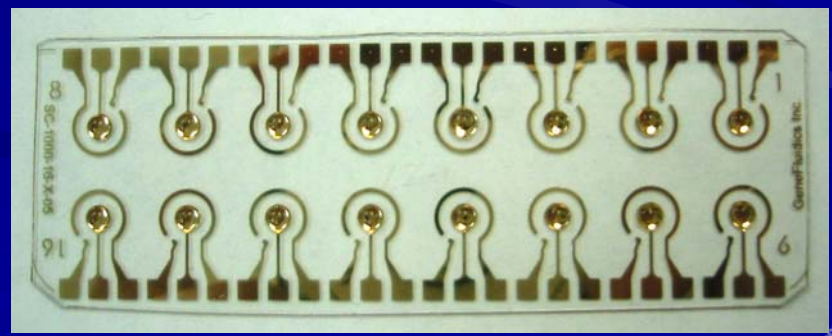
Goal: Development of a microfluidic, point-of-care device for rapid detection of bacteria which cause urinary tract infections. Very prevalent in children with spina bifica



16 sensor array

FEATURES:

- Team of clinicians, engineers and microbiologists.
- Electrochemical-based sensor
- RNA target
- Rapid and sensitive detection (5 min. assay)



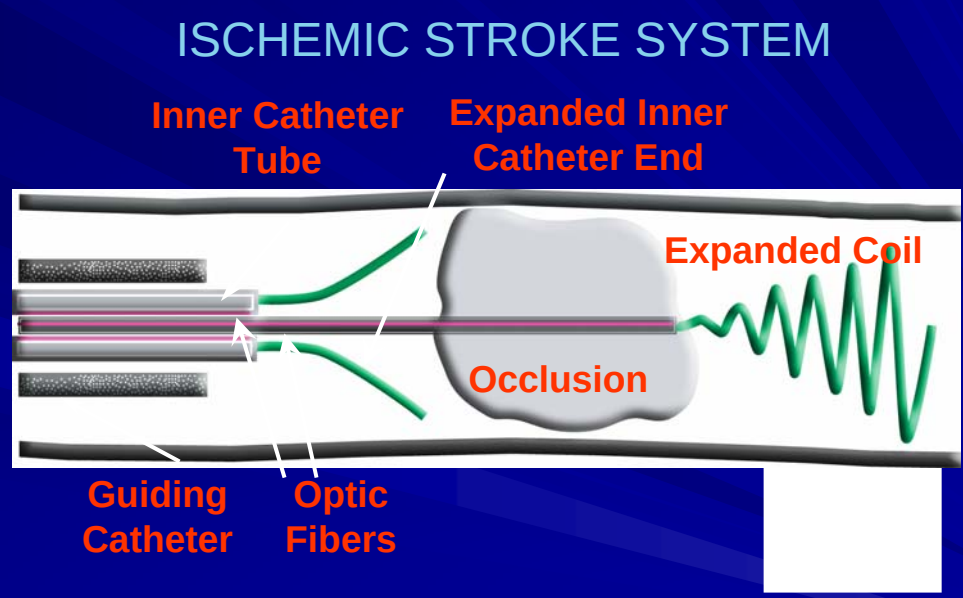
SURGICAL TOOL DEVELOPMENT

Development of a Shape Memory Polymer Device for Treating Stroke

Duncan Maitland, PhD

Lawrence Livermore National Laboratory

- **Mechanical clot extraction catheter with shape memory fiber attached to optical fibers**
- **When laser turned on, polymer transitions from straight shape to coiled shape.**



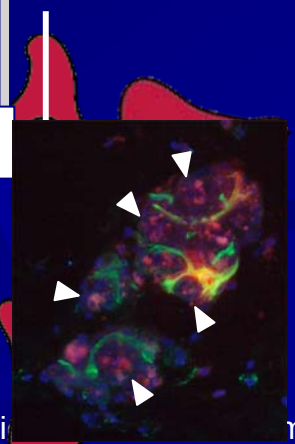
NIBIB Bioengineering Research Partnership

Explanted Vascular Beds as a Scaffold for Complex Tissue Engineering

Geoffrey Gurtner, NYU School of Medicine

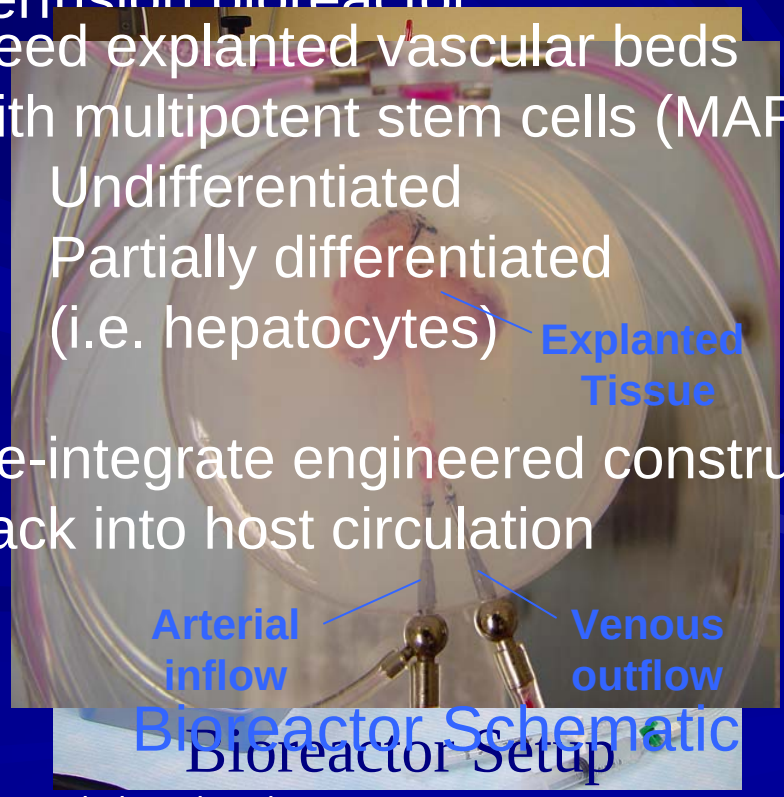
Following 24hr perfusion

4 days following reimplantation



MAPCs (red) in perivascular clusters (vessels in green)

1. Sustain viability of explanted vascular bed (the scaffold) *ex vivo* using a perfusion bioreactor
2. Seed explanted vascular beds with multipotent stem cells (MAPC)
   - Undifferentiated
   - Partially differentiated (i.e. hepatocytes)
3. Re-integrate engineered construct back into host circulation



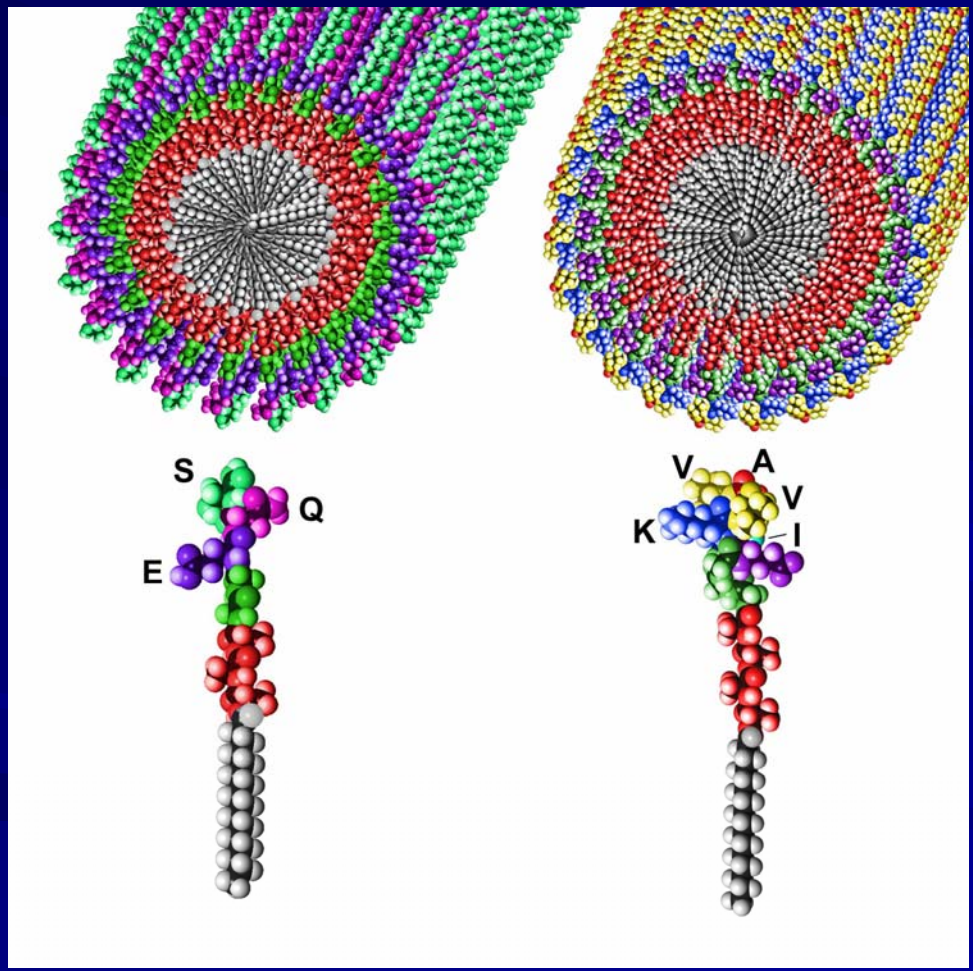
Nanotechnology

Regenerative Scaffold Technologies For CNS & Diabetes

Sam Stupp, PI, Northwestern

Non-bioactive Nanofiber

Bioactive Nanofiber



Nanofibers Customized for Neural Progenitor Cell Differentiation

IKVAV epitope known as a neurite sprouting/guiding epitope, present in the extracellular protein laminin

***Science* 2004**

Telehealth

Development of Multi Sensor Fusion Algorithms for Remote Circulatory Monitoring

H. Harry Asada
Massachusetts Institute of Technology

Andrew Reisner
Massachusetts General Hospital

Wearable Cuff

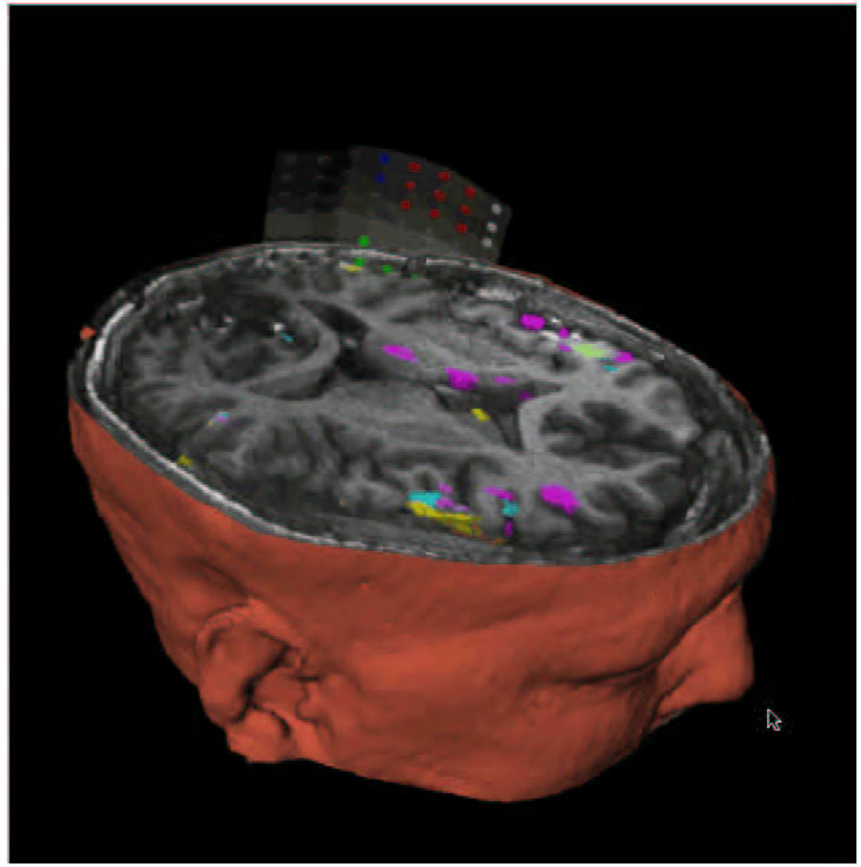
The MIT Ring Sensor

Developing a multi-modality wearable ring sensor system, through the development of novel multi-sensor fusion algorithms, to enable long-term, remote circulatory monitoring. The signals are transmitted locally to a PDA then over the internet to the physicians office.

Image-Guided Intervention in Neocortical Epilepsy

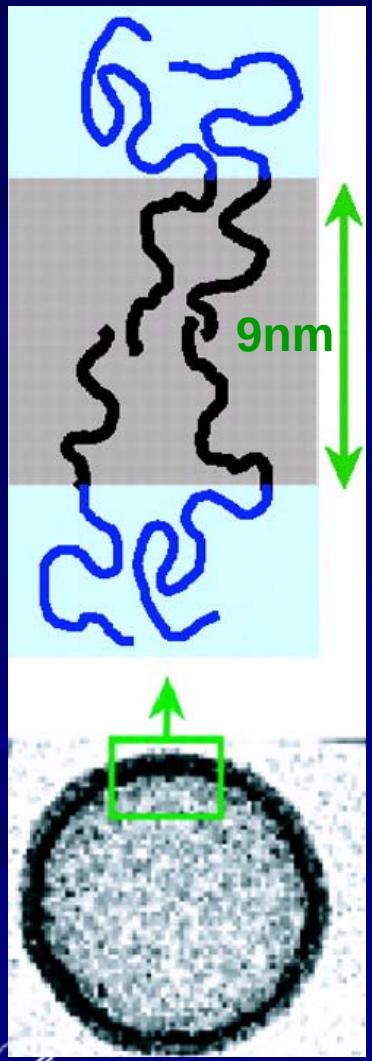
Dr. James Duncan, Yale University, R01 EB000473

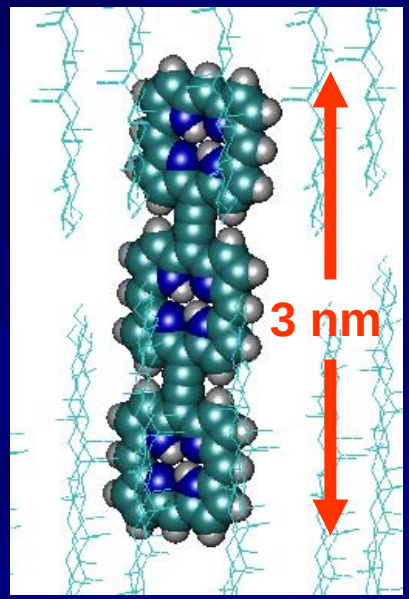
- Dr. Duncan heads a BRP – (Yale, Albert Einstein College of Medicine, the University of Minnesota, and BrainLAB,) a mulitdisciplinary team specializing in image-guided surgery.
- MRI of a patients brain. Overlay shows where the brain is active while performing a language task as quantified by fMRI and EEG.
- The integration of this data into a common space is used to identify the epileptogenic tissue and surrounding regions to plan and guide neurosurgery



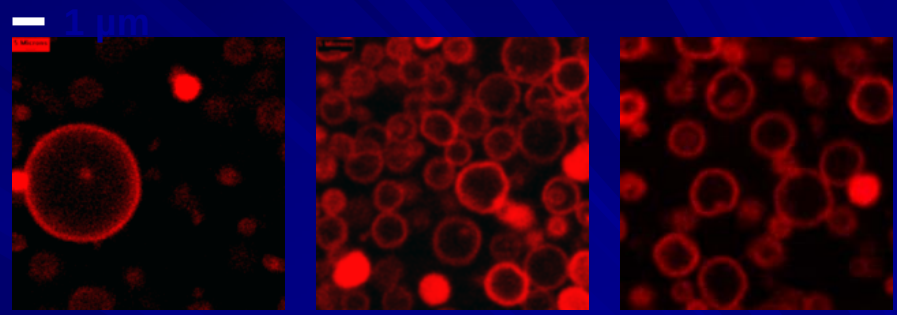
Near-infrared-emissive Polymersomes for In Vivo Optical Imaging

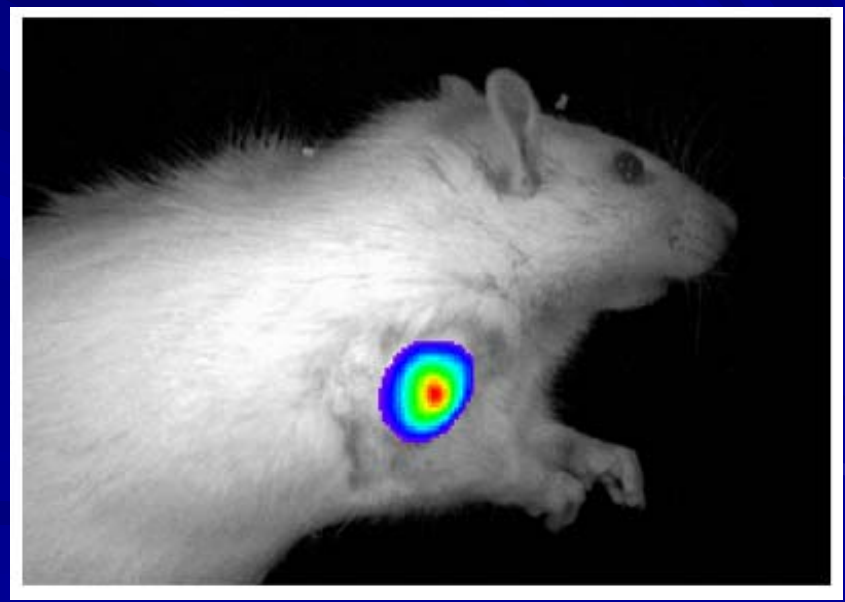
Daniel A. Hammer, Ph.D., U Penn EB003457





Porphyrin Trimer





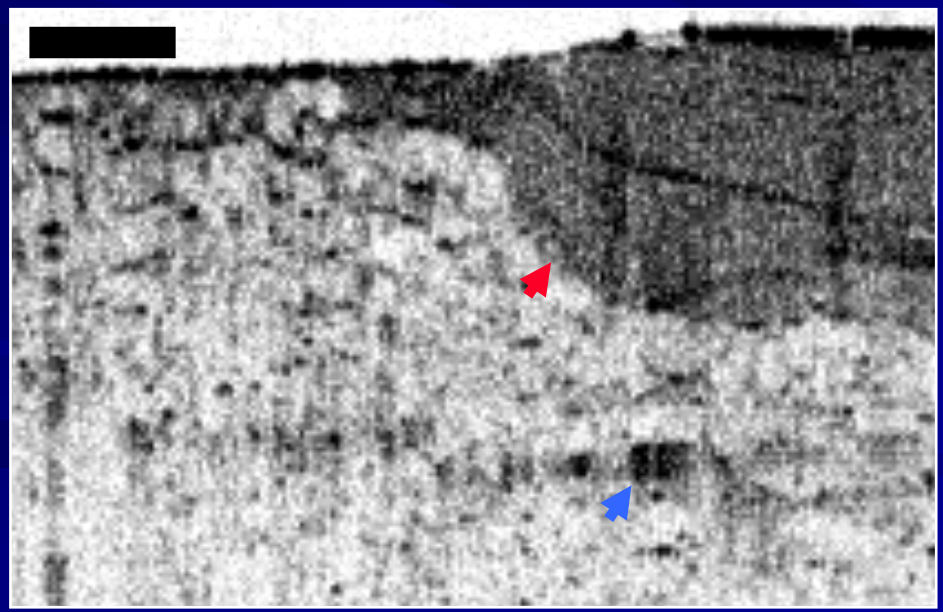
millimeters

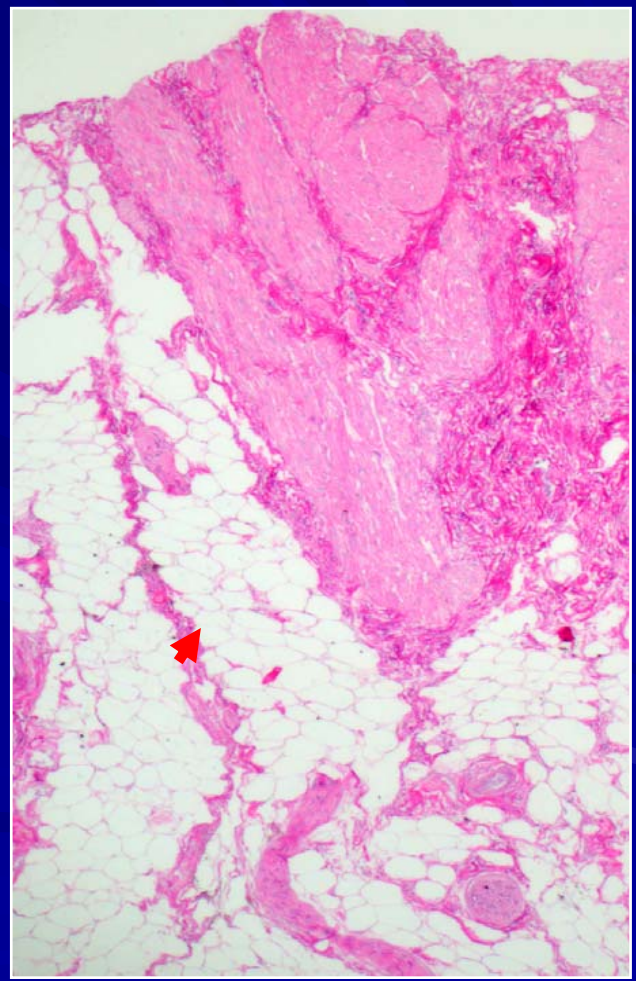
Polymersomes: 5% Membrane Loading with Near Infrared Fluorophore

Optical Coherence Tomography for Microsurgical Guidance

R01 EB000419-03
Principal Investigator: Mark Brezinski
Brigham and Women‘s Hospital, Boston, MA

Potential application in guiding prostate resection





NIBIB and Trans-NIH Funding Opportunities

Research Funding at the NIH

- Information on Web sites – www.nibib.nih.gov and in "NIH Guide" on www.nih.gov
- Targeted solicitations (PA, RFA, etc.) – Public Health Service (PHS) 398 package
- Unsolicited or investigator-initiated applications

Unsolicited Applications

- Also called “Investigator-Initiated”
- Applications that are not in response to specific Program Announcements (PA) or Requests for Applications (RFA)
- Majority of applications received at the NIH are “Investigator-Initiated” or unsolicited
- R01’s are due on February 1, July 1, and October 1
- Contact Scientific Program Staff to ensure that project scope fits mission

Most important are….

investigator-initiated grants

You don’t have to fit into an initiative

….we want to help you get YOUR best ideas funded

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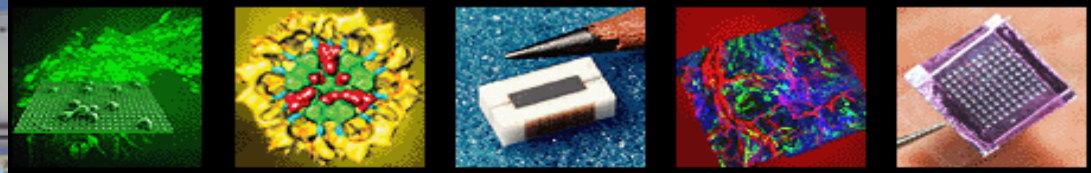
National Institute of Biomedical Imaging and Bioengineering

NATIONAL INSTITUTES OF HEALTH
U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES



NIBIB

Improving health by leading the development and accelerating the application of biomedical technologies

For information on funding opportunities, please visit our website!

www.nibib.nih.gov

- Research
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- Training
- Health & Education
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- About NIBIB

En Español

Pictures & Videos

- Undergraduate/Graduate
- Predoctoral
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- Career-Level
- Special Populations

Health & Education

- Publications and Features
- Health Information
- Science Education

News & Events

- Calendar of Events

Quick Links

- Advisory Council (NACBIB)
- BECON, BISTI
- NIH Neurosciences Blueprint
- NIH Roadmap
- Policies for Researchers

NIH GUIDE for Grants and Contracts

U.S. Department of Health and Human Services

- Announces NIH Scientific Initiatives
- Provides NIH Policy and Administrative Information
- Available on the NIH Web Site : http://grants1.nih.gov/grants/guide/index.html
- Emailed to you each Friday, sign up now!

RO1 Funding Initiatives

- Extension of Bioengineering Research Grant (BRG) Program Announcement (PA-02-011)
  NOT-EB-04-003 - Release Date: October 8, 2004
  Expires: March 1, 2005
- Ancillary Studies to the AD Neuroimaging Initiative
  PA-04-158 - Released September 23, 2004
  Receipt Date(s): October 1, February 1, June 1 annually (a month later for amended applications)
- Addendum to Global Health Research Initiative Program for New Foreign Investigators (PAR-03-118)
  NOT-TW-04-003 - Released September 23, 2004
- Interagency Opportunities in Multi-Scale Modeling in Biomedical, Biological, and Behavioral Systems
  NSF-04-607 - Released August 10, 2004
  Required letters of intent are due: September 22, 2004
  Receipt Date: November 9, 2004
- Novel Approaches to Enhance Animal Stem Cell Research
  PA-04-125 - Released: July 8, 2004
  Receipt Dates: February 1, June 1, and October 1 annually
- Understanding and Promoting Health Literacy
  PAR-04-116 - Released: June 22, 2004
  Receipt Dates: October 13, 2004; October 13, 2005; October 13, 2006
- Characterization, Behavior and Plasticity of Pluripotent Stem Cells
  PA-04-101 - Released: May 4, 2004, Expires: July 2, 2007
  Receipt Dates: February 1, June 1, and October 1 annually
- Novel Approaches to Study Polymicrobial Diseases
  PA-04-093 - Released: April 15, 2004, Expires:July 2, 20007

  Receipt Dates: February 1, June 1, and October 1 annually
- Pathogenesis and Treatment of Lymphedema and Lymphatic Diseases
  PA-04-071 - Released March 5, 2004, Expires: December 31, 2006
  Receipt Dates: February 1, June 1, and October 1 annually
- NIH/NSF Collaborative Research in Computational Neuroscience (CRCNS)
  NSF-04-514 - Released November 3, 2003
  Receipt Dates: January 30, 2004, January 05, 2005, and January 05, 2006
- Neurotechnology Research, Development, and Enhancement
  PA-04-006 - Released October 08, 2003
  Receipt Dates: February 1, June 1, and October 1 annually
- Informatics for Disaster Management
  PA-03-178 - Released September 30, 2003
  Receipt Dates: February 1, June 1, and October 1 annually
- Global Health Research Initiative Program for New Foreign Investigators
  PAR-03-118 - Released May 16, 2003
  Receipt Date: July 25, 2003-2005
- Academic Research Enhancement Award
  PA-03-053 - Released January 8, 2003
  Receipt Dates: January 25, May 25, September 25
  Research on Microbial Biofilms
  PA-03-047 - Released December 20, 2002
  Receipt Dates: April 1, August 1, and December 1 annually
- The Human Brain Project (Neuroinformatics): Phase I - Feasibility; Phase II - Refinements, Maintenance and Integration
  PAR-03-035 - Released December 3, 2002 - NIBIB Participation Notice
  Receipt Dates: January 21, May 21, and September 22, 2003
  January 21, May 21, and September 22, 2004
  January 21, May 20, and September 22, 2005
- Neurotechnology Research, Development, and Enhancement
  PA-02-003 - Released November 5, 2002 - NIBIB Participation Notice
  Receipt Dates: February 1, June 1, and October 1 annually
- Methodology and Measurement in the Behavioral and Social Sciences
  PA-02-072 - Released March 7, 2002
  Receipt Dates: February 1, June 1, and October 1 annually
- Innovation Grants for AIDS Research
  PA-02-046 - Released January 18, 2002
  Receipt Dates: Receipt Dates: January 1, May 1, and September 1 annually
- Neurotechnology Research, Development, and Enhancement
  PA-02-003 - Released October 2, 2001

SBIR/STTR FUNDING INITIATIVES

- Manufacturing Processes of Medical, Dental, and Biological Technologies (SBIR/STTR)
  PA-04-161 - Released October 1, 2004
  Receipt Dates: April 1, August 1, and December 1 annually. Expires October 1, 2007.
- Novel Technologies for In Vivo Imaging (SBIR/STTR)
  PAR-03-125- Released May 19, 2003
  Receipt Dates: July 21, 2003 and November 19, 2003
- Telehealth Technologies Development (SBIR/STTR)
  PA-03-030 - Released November 18, 2002
  Receipt Dates: April 1, August 1, and December 1 annually
- Systems and Methods for Small Animal Imaging (SBIR/STTR)
  PA-03-031 - Released November 18, 2002
  Receipt Dates: April 1, August 1, and December 1 annually
- Knowledge Integration across Distributed Heterogeneous Data Sources (SBIR/STTR)
  PA-03-001 - Released October 1, 2002
  Receipt Dates: April 1, August 1 and December 1 annually
- Innovative Technologies for Enhancing Function for Individuals with Disabilities (SBIR/STTR)
  PA-02-071 - Released March 4, 2002
  Receipt Dates: April 1, August 1 and December 1 annually
- Probes For Microimaging The Nervous System (SBIR Award)
  PA-02-029 - Released December 5, 2001
  Receipt Dates: April 1, August 1 and December 1 annually

NIH Roadmap for Medical Research

ACCELERATING MEDICAL DISCOVERY TO IMPROVE HEALTH

www.nihroadmap.nih.gov

The NIH Roadmap

http://nihroadmap.nih.gov

General Objective: Make the NIH optimally-effective in meeting its mission of improving health and quality of life

Impact: Ten-year plan – 2004 to 2013

$ 128 M in 2004 to >$ 2 B in 2009

Specific Objectives

- Accelerate the pace of discoveries in the life and physical sciences
- Rapidly translate discoveries into practice and application
- Build an integrated system that is far more effective than current approaches

NIH ROADMAP THEMES

New Pathways to Discovery

Research Teams of the Future

Re-engineering the Clinical Research Enterprise

NIH Roadmap Focus Areas

- Molecular Imaging
- Nano-biomedicine
- Computational Biology/Informatics
- Structural Biology
- Building Blocks, Networks, Pathways
- Inter-Disciplinary Research
- Public/Private Partnerships
- Research Communities
- Research Networks
- High-Risk Research

Roadmap Funding Opportunities

Broad Agency Announcements (BAA's)

- RFTOP-RM-169, Inventory and Evaluation of Clinical Research Networks
- Re-Engineering the Clinical Research Enterprise: Feasibility of Integrating and Expanding Clinical Research Networks

Request for Proposals (RFP's)

- Molecular Libraries Small Molecule Repository

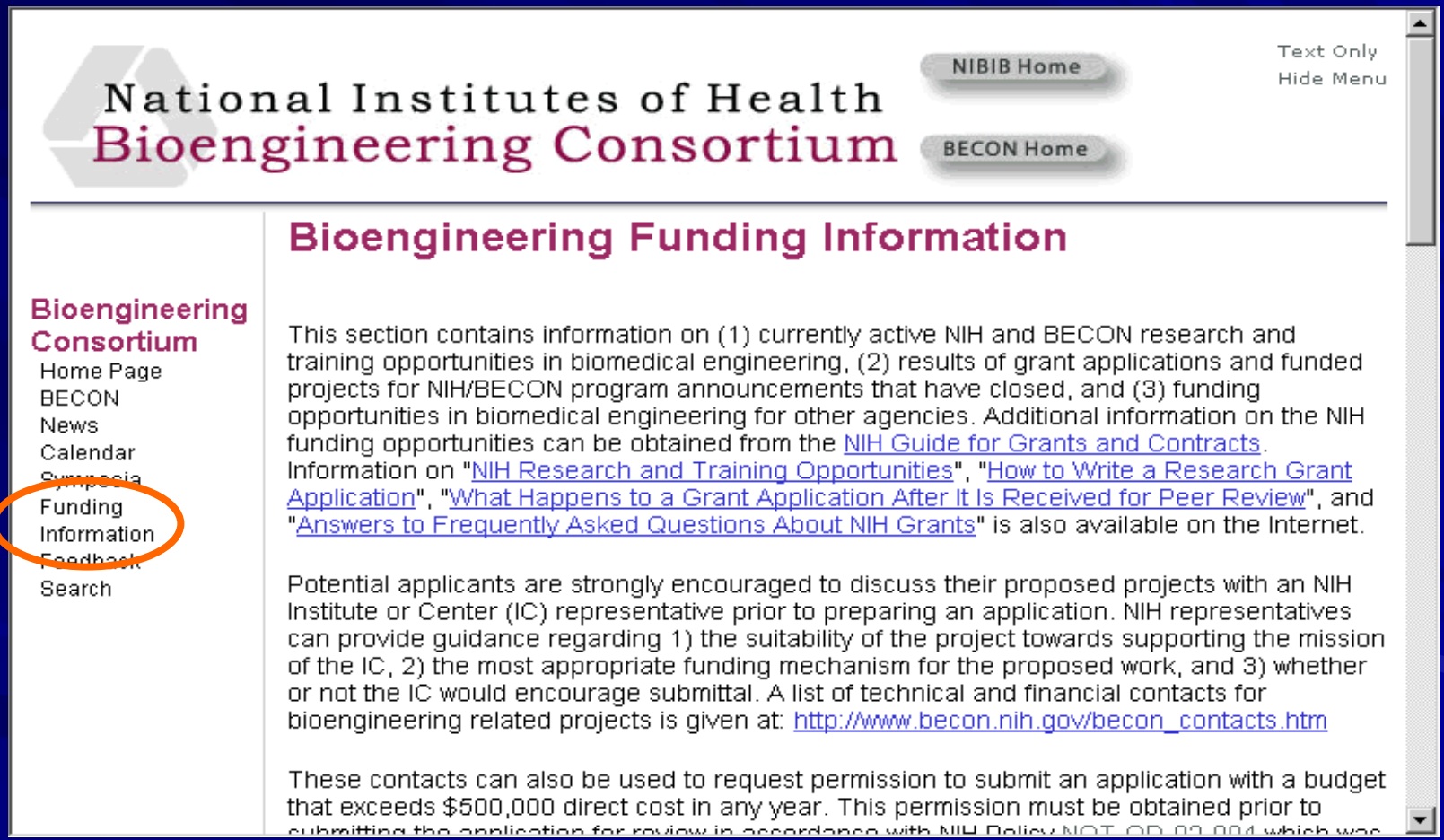
Request for Applications (RFA's)

- High Throughput Molecular Screening Assay Development
- Meetings and Networks for Methodological Development in Interdisciplinary Research
- Training for a New Interdisciplinary Research Workforce
- Supplements for Methodological Innovations in the Behavioral and Social Sciences
- Dynamic Assessment of Patient-Reported Chronic Disease Outcomes
- Interdisciplinary Health Research Training: Behavior, Environment and Biology
- Short Programs for Interdisciplinary Research Training
- Curriculum Development Award in Interdisciplinary Research
- Centers for Innovation in Membrane Protein Production
- Multidisciplinary Clinical Research Career Development Programs
- Development of High Resolution Probes for Cellular Imaging
- Metabolomics Technology Development
- Exploratory Centers (P20) for Interdisciplinary Research
- National Technology Centers for Networks and Pathways
- National Centers for Biomedical Computing

NIH Bioengineering Consortium (BECON)

- Established in February 1997
- Consists of representatives of all NIH Institutes, Centers, and Offices and other Federal agencies (DOE, NSF, NIST)
- Administered by the NIBIB
- Chair: Dan Sullivan (NCI)
- Web site: www.becon.nih.gov

BECON Web Site
www.becon.nih.gov



Trans-NIH Funding Opportunities in Bioengineering Research (BECON)

- **Exploratory/Developmental Bioengineering Research Grants (EBRG, R21)**
- **Bioengineering Research Grants (BRG, R01)**
- **Bioengineering Research Partnerships (BRP, big R01)**
- **Mentored Quantitative Research Career Development Awards (K25)**
- **Nanoscience and Nanotechnology in Biology and Medicine R01 and SBIR/STIR Awards,**

Bioengineering Research Partnerships (PAR-04-032)

- **Requires** a multi-disciplinary and multi-organizational research team to conduct biomedical research and development
- Teams consist of academia, industry, national laboratories, and clinics – 2 to 7 members
- About 150 BRP grants – Trans-NIH
- Average award - $ 880 k per year for 5 years
- Get involved in biomedical R&D and the NIH – partner with a NIH grantee

BISTIC NIH Biomedical Information Science & Technology Initiative Consortium

- Established in April 2000
- Similar structure to the BECON
- Bioinformatics: Application of computer science principles and methods to address problems in biology and medicine
- Administered by the NIGMS
  - Center for Bioinformatics and Computational Biology
    Chair: Eric Jakobsson, PhD (NIGMS)
- Web site: www.bisti.nih.gov

BISTIC Web Site
www.bisti.nih.gov

National Institutes of Health

Biomedical Information Science and Technology Initiative (BISTI)

NIGMS Home

BISTI Home

Hide Graphic
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Bioinformatics Funding Information

This section contains information on (1) active NIH and BISTI Consortium research and training opportunities in bioinformatics and (2) funding opportunities in biomedical computing for other agencies. Additional information on the NIH funding opportunities can be obtained from the NIH Guide for Grants and Contracts. Information on "NIH Research and Training Opportunities", "How to Write a Research Grant Application", "What Happens to a Grant Application After It Is Received for Peer Review", and "Answers to Frequently Asked Questions About NIH Grants" is also available on the Internet.

Potential applicants are strongly encouraged to discuss their proposed projects with an NIH Institute or Center (IC) representative prior to preparing an application. NIH representatives can provide guidance regarding 1) the suitability of the project towards supporting the mission of the IC, 2) the most appropriate funding mechanism for the proposed work, and 3) whether or not the IC would encourage submittal. A list of technical and financial contacts for bioinformatics related projects is given at: http://www.bisti.nih.gov/bistic_contacts.cfm

BISTI Bioinformatics Research Opportunities:

- National Centers for Biomedical Computing - RFA-RM-04-003 (formerly RFA-RR-04-001) - Released September 29, 2003. Click here for an FAQ and detailed information page.
  Mechanism: U54
- Continued Development and Maintenance of Bioinformatics and Computational Biology Software - PA-02-141 - Released July 26, 2002
  Mechanism: R01
- Innovations in Biomedical Information Science and Technology: Phased Innovation Awards (R21/R33) - PAR-03-106 - Released April 17, 2003. Note: Corrected dates listed in NOT-OD-03-044
  Mechanisms: R21/R33, R01
- Innovations in Biomedical Information Science and Technology: SBIR/STTR Initiative - PAR-03-119 - Released May 12, 2003. Note: Corrected dates listed in NOT-OD-03-044
  Mechanisms: R41, R42, R43, R44

Trans-NIH Funding Opportunities in Bioinformatics and Computational Biology Research (BISTIC)

- Innovations in Biomedical Computational Science and Technology SBIR/STTR Initiative
- Innovations in Biomedical Computational Science and Technology R01 and R21/R33 Awards
- Continued Development and Maintenance of Bioinformatics and Computational Biology Software Initiative

BEFORE Preparing your Application

- Contact Scientific Program Staff at the relevant IC (based on mission)
- Describe project to staff and ask if they would encourage submittal
- If not, ask about other opportunities and who might have an interest
- If over $500K direct costs in any year, ask about initial approval requirements

Applications Over $500K

- Policy applies to applications requesting more than $500K in direct costs in any one year
- Must **request** permission to submit application **6 weeks before receipt date**
- Request permission from the scientific program staff from the Institute (IC)
- Request should contain:
  - Brief description of the project & specific aims
  - Draft budget for all years
- NIH-wide policy (NOT-OD-02-004)
- Applications will not be accepted without approval

Foreign Applications

Foreign Applications

- present special opportunities for furthering research programs through the use of unusual talent, resources, populations, or environmental conditions in other countries that are not readily available in the United States or that augment existing U.S. resources.
- have the potential for significantly advancing the health sciences in the United States.

Foreign Collaborations

NIBIB Policy on "New" Investigator Funding

- Investigators **"new" to the NIH** who have scores within 5 percentile points of the pay line will be funded.
- This program will improve the success of new applicants for R01 awards.
- This policy will apply only to Program Announcement and unsolicited R01 applications.

Applications from New Investigators

- **Identify yourself as a New Investigator**
  - **Definition in PHS 398**
  - **Mark box on face page of PHS 398**
- **Reviewers often de-emphasize track record**
- **Special consideration given when making funding decisions**

How to Get Involved with the NIH

- Monitor Web sites and literature
- Participate in workshops and symposia
- Participate in review of grant applications (study sections)
  - Must have recognized expertise in field and must have been peer-reviewed
  - Contact review staff
- Partner with NIH grantee

Take Home Messages

- www.nibib.nih.gov
- Lots of opportunities
- Good time for collaborative research – organizations and disciplines
- Contact Scientific Program Staff
  - Fit with institute mission and priorities
  - Best grant mechanism or program


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We are here to help!
Staff contacts at www.nibib.nih.gov
kelleyc@mail.nih.gov

Visit us or call us at the NIBIB


Thank You for Your Attention
Hope I didn’t make you too sleepy!