Knowledge Markets in Biomedical Research Public-Private Partnerships: GAIN and The Biomarkers Consortium

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Foundation for NIH Overview

Mission

- Sole entity authorized by the U.S. Congress to raise private funds in support of NIH’s mission of improving health through scientific discovery and translational research
- Creates innovative public-private biomedical partnerships with NIH and other federal partners, industry, academia, the philanthropic community

Organization

- Independent nonprofit 501(c)(3) public charity founded in 1990; independent Board of Directors with public and private sector representation

Track Record

- Proven expertise in public-private partnership development and management
- Currently supporting 50+ projects; raised over $410M since 1996
- 96 cents of every dollar raised supports programs
Major Public-Private Partnerships

Grand Challenges in Global Health
Partner: Bill & Melinda Gates Foundation
$200M

Collaboration for AIDS Vaccine Discovery (CAVD)
Partners: VRC/NIAID, Bill & Melinda Gates Foundation
$33M

Alzheimer’s Disease Neuroimaging Initiative (ADNI)
Partners: NIA & AstraZeneca, Bristol-Myers Squibb, Eisai, Elan, GE Healthcare, GlaxoSmithKline, Innogenetics, Eli Lilly, Merck, Novartis, Pfizer, Schering-Plough, Synarc, Wyeth Alzheimer’s Association, Institute for the Study of Aging
$27M

Genetic Association Information Network (GAIN)
Partners: NHGRI, NLM & Pfizer, Affymetrix, Broad Institute, Abbott Laboratories
$26M

Osteoarthritis Initiative (OAI)
Partners: NIAMS & Pfizer, Novartis, Merck, GlaxoSmithKline
$18.5M

Avon-NCI Progress for Patients Award Program
Partners: NIAMS & Pfizer, Novartis, Merck, GlaxoSmithKline
$12M

The Biomarkers Consortium
Partners: NIH, FDA, CMS, PhRMA, BIO, pharmaceutical/biotech companies, non-profits
$10.4M*

Schizophrenia Metabolic Initiative
Partners: NIMH & Bristol-Myers Squibb
$8M

* to date
PPPs: The Key Reagents

- True agreement by all parties to a common set of goals
- Clear public benefit
- High-level leadership from all sectors
- Public and private sector balance
- Appropriate governance structure and partnership → using a trusted third party intermediary if possible
- Policies
- Adequate financial and project management resources
- Transparent communication between partners
- Clear recognition of goals and distinct roles and limitations of each partner
- Commitment to move fast
PPP-based knowledge markets present special challenges

- Antitrust
- Government regulations/policies
- Governance
- Privacy/Confidentiality
- Human Subjects Protections
- Intellectual Property
- Data Access:
  - Who gets access, for what purposes, and under what conditions?
- Publication and Communication
- Ownership of Data and Infrastructure
- Data Quality
The Genetic Association Information Network (GAIN)

- Partnership with FNIH, NHGRI, NLM, Pfizer, Abbott, Affymetrix, Perlegen Sciences, The Broad Institute
- Genotyped 18,000 samples from existing case-control studies in 6 common diseases
- Studies chosen via peer review, technical assessment group (TAG), and 21-member Steering Committee final selection
- Resulting genotypes and phenotypes made broadly available to qualified researchers via large-scale database (dbGaP) built at NLM (NCBI)
- Developed extensive set of policies governing use (human subjects, privacy, intellectual property, data access, publication)—basis for policies now used broadly for GWAS studies across NIH
The Guiding Principle of GAIN:

The greatest public benefit will be achieved if results of whole genome association studies are made immediately and broadly available.
Key GAIN Information Policies

- **Data Quality**: Extensive analysis beyond peer review
- **Privacy/Confidentiality**: Home institutions responsible for compliance with HIPAA/regulations; phenotypic data is double-coded
- **Human subjects**: Oversight for initial participation resides at local level; data use restrictions are enforced via Data Use Certification and oversight by an NIH-based Data Use Review Board
- **Intellectual property**: GAIN data is pre-competitive; pre-computed associations and Data Use Certification discourage pre-emptive claims
- **Data access**: No “early look” at data; controlled access to individual genotype and phenotype data via online application process & NIH-based Data Access Committee review
- **Publications**: Contributing investigators get 9-month ‘head start’ on submitting analyses on their data for publication
The Biomarkers Consortium
The Biomarkers Consortium seeks to address key challenges in biomarker development

• There are 1,000s of candidate biomarkers in the literature

• Biomarkers require extensive testing and qualification for practical use

• Biomarkers Qualification:
  – Challenging, expensive, and time-consuming
  – Requires consensus among the scientific community
  – Can be a pre-competitive activity
  – Regulatory pathways still being refined

• Difficult to accomplish these activities through a single entity/sector

Requires partnerships and a strategic approach
The Biomarkers Consortium

Goals:

• Advance the discovery, development, qualification and regulatory acceptance of biomarkers

• Conduct joint research in “pre-competitive” areas with partners that share common interest in advancing human health and improving patient care

• Speed the development of medicines and therapies for detection, prevention, diagnosis and treatment of disease

• Make Consortium project results broadly available to the entire research community
### Contributing Members (55)

#### For-Profit Companies (24)
- Althea Technologies
- AstraZeneca
- Avalon Pharmaceuticals
- BG Medicine
- Boehringer-Ingelheim Pharmaceuticals
- Bristol-Myers Squibb
- Digilab Biovision GmbH
- EMD Serono
- Genstruct
- GlaxoSmithKline
- GVK Biosciences
- Ingenuity Systems
- Johnson & Johnson
- Eli Lilly and Company
- Luminex Corporation
- Lundbeck
- Merck and Co., Inc.
- Novartis
- Novo Nordisk
- Pfizer Inc
- F. Hoffmann-La Roche
- Scout Diagnostics
- Wyeth

#### Nonprofit Organizations (31)
- Academy of Molecular Imaging
- Advanced Medical Technology Association
- Alliance for Aging Research
- Alzheimer’s Association
- American Association for Cancer Research
- American Cancer Society
- American College of Neuropsychopharmacology
- American Health Assistance Foundation
- American Society for Clinical Pharmacology and Therapeutics
- American Society for Therapeutic Radiology and Oncology
- American Society of Clinical Oncology
- Association of Clinical Research Organizations
- Autism Speaks
- Battelle Memorial Institute
- Biotechnology Industry Organization
- Federation of Clinical Immunology Societies
- Hamner Institutes for Health Sciences
- High Q Foundation
- Immune Tolerance Institute
- Polo Ralph Lauren Foundation
- Juvenile Diabetes Research Foundation
- Kidney Cancer Association
- The Leukemia and Lymphoma Society
- Lupus Foundation of America
- Lupus Research Institute
- Michael J. Fox Foundation for Parkinson’s Research
- Pharmaceutical Research and Manufacturers of America
- Radiological Society of North America
- Ryan Licht Sang Bipolar Foundation
- Society of Nuclear Medicine
- Vanderbilt University
The Biomarkers Consortium Governance Structure
The Biomarkers Consortium
Executive Committee

**Chairman**
Charles Sanders, *Foundation for NIH*

**Public Member**
Mary Woolley, *Research!America*

**NIH**
Thomas Insel, *NIMH*
John Niederhuber, *NCI*
Lawrence Tabak, *NIDCR*

**CMS**
Barry Straube

**Industry**
Stephen Eck, *Eli Lilly & Co.*
Garry Neil, *Johnson & Johnson*
Perry Nisen, *GlaxoSmithKline*
Sara Radcliffe, *BIO*

**FDA**
ShaAvhree Buckman,
*Office of Translational Science, Center for Drug Evaluation and Research*
Dan Schultz,
*Center for Devices & Radiological Health*
Janet Woodcock,
*Center for Drug Evaluation and Research*

**Foundation for NIH Board**
Ellen Sigal, *Friends of Cancer Research*
The Biomarkers Consortium
Steering Committee Co-Chairs

Cancer
- Anna Barker, National Cancer Institute
- Barbara Weber, GlaxoSmithKline

Inflammation and Immunity
- Daniel Rotrosen, National Institute of Allergy and Infectious Diseases
- Bruce Littman, Translational Medicine Associates (ex-Pfizer)

Metabolic Disorders
- Björn Carlsson, AstraZeneca
- Myrlene Staten, National Institute of Diabetes and Digestive and Kidney Diseases

Neuroscience
- Huda Akil, University of Michigan
- William Potter, Merck and Co., Inc.
2008 Approach: “High-Impact Biomarkers Opportunities”

**Strategic** focus on high impact areas of biomarker development and validation:

- **Important:** addresses a significant unmet/scientific need
- **Translational:** will result in significant improvement in the development, approval or delivery of care to patients
- **Transformational:** addresses critical gaps
- **Feasible:** end goals can be likely achieved in a specific timeframe
- **Practical:** leverages pre-existing resources wherever possible
- **Fundable:** is capable of generating the required funding/stakeholder support needed
- **Unique:** not already substantially being done elsewhere
- **Collaborative:** would uniquely benefit from the multi-stakeholder composition and approach of The Biomarkers Consortium
Project Development Process

1. EC/SC, RFA/RFP or External Submission
   - Scientific merit
   - Pre-competitive
   - Feasibility
   - Initial funding scan

2. Steering Committee
   - Protocol
   - Resources
   - Intellectual property
   - Data sharing and distribution
   - Timelines and milestones
   - Budget
   - Human subjects
   - Privacy
   - Legal review

3. Approved Project Plan
   - Final QA/QC
   - Funding
   - Contracts

4. Executive Committee (and Funders)

5. Project Team
   - Project management

Steering Committee/Project Team

- Project development process diagram

Steering Committee

- Initial or Conceptual Evaluations

Executive Committee

- Learning and New Project Development
Projects Launched To Date

FDG-PET Imaging in Non-Hodgkin’s Lymphoma to Predict Tumor Response to Treatment (Cancer Steering Committee)

Phase II Study of FDG-PET/CT as a Predictive Marker of Tumor Response and Patient Outcome: Prospective Validation in Non-Small Cell Lung Cancer (Cancer Steering Committee)

The Utility of Adiponectin as a Biomarker of Glycemic Efficiency (Metabolic Disorders Steering Committee)

Carotid MRI Reproducibility Study (Metabolic Disorders Steering Committee)
Launched Projects Example:  
**FDG-PET Lung and Lymphoma Projects**

**Project Goals:**

- Determine the linkage of FDG-PET to the effect of conventional cytotoxic drugs in clinical outcome and survival in lymphoma and lung cancer
- Determine the linkage of FDG-PET to the effect of drugs on clinical response and survival in lymphoma and lung cancer
- Develop standard protocols for acquiring and evaluating FDG-PET data
- Evaluate robustness and clinical feasibility of protocols

**Timeline/Cost:** 5 years / $10.18M (launched in 2007)

- Private sector: $6.43M
  - Amgen, AstraZeneca, BMS, Genentech, GSK, J&J, Merck, Pfizer, Wyeth
- Government: $3.75M
  - National Cancer Institute
Launched Project Example:  
**The Utility of Adiponectin as a Biomarker for Predicting Glycemic Efficacy**

- **Blinded, pooled data (~2000 pts)**
- **De-identified clinical trials data**
- **GSK**
- **Lilly**
- **Merck**
- **Roche**

Is there relationship between adiponectin and:
- glucose
- HbA1C levels?

**Analysis**
- NIDDK
- Quintiles

**Results made public**

**The Biomarkers Consortium Project Team**
Key Principles of The Biomarkers Consortium

- The Biomarkers Consortium supports pre-competitive research
- Intellectual Property:
  - Contributed IP may be protected, remain property of contributing entity
  - Project participants grant the BC licenses for research use within each project
  - IP developed by the Consortium should be placed in public domain as much as possible, with consideration for encouraging downstream development
- Data Sharing:
  - Source/raw data may be protected/kept confidential
  - Results data should be made broadly available as soon as possible after appropriate review
- IP and Data Sharing are specified as part of each BC Project Plan
Key Principles of The Biomarkers Consortium

• **Antitrust:** Competitively sensitive or commercial information should not be shared; FNIH retains antitrust counsel

• **Grants/contracts:** Selection and award of grants/contracts will be conducted to ensure fairness, impartiality and inclusiveness, as well as conformity with all BC policies.

• **Confidentiality:** Consortium participants certify that they will maintain the confidentiality of all confidential information and only use such confidential information in connection with the Consortium

• **Conflicts of Interest:** Funding members and participants must promptly disclose any current or potential conflict of interest; EC or FNIH board decides action

• **Data Quality, Privacy, Human Subjects:** are addressed within each Project Plan
The Biomarkers Consortium Policies

Key governing policies pre-negotiated prior to Consortium launch with principals/legal counsel representing the Foundation for NIH, NIH, FDA, PhRMA and BIO:

- Intellectual property and data sharing
- Antitrust
- Selection and award of grants/contracts
- Confidentiality
- Conflict of interest

All policies and other information available at
www.biomarkersconsortium.org
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