About OMICS Group

OMICS Group International is an amalgamation of Open Access publications and worldwide international science conferences and events. Established in the year 2007 with the sole aim of making the information on Sciences and technology 'Open Access', OMICS Group publishes 500 online open access scholarly journals in all aspects of Science, Engineering, Management and Technology journals. OMICS Group has been instrumental in taking the knowledge on Science & technology to the doorsteps of ordinary men and women. Research Scholars, Students, Libraries, Educational Institutions, Research centers and the industry are main stakeholders that benefitted greatly from this knowledge dissemination. OMICS International also organizes 500 International conferences annually across the globe, where knowledge transfer takes place through debates, round table discussions, poster presentations, workshops, symposia and exhibitions.

About OMICS International Conferences

OMICS International is a pioneer and leading science event organizer, which publishes around 500 open access journals and conducts over 300 Medical, Clinical, Engineering, Life Sciences, Pharma scientific conferences all over the globe annually with the support of more than 1000 scientific associations and 30,000 editorial board members and 3.5 million followers to its credit.

OMICS International has organized 500 conferences, workshops and national symposiums across the major cities including San Francisco, Las Vegas, San Antonio, Omaha, Orlando, Raleigh, Santa Clara, Chicago, Philadelphia, Baltimore, United Kingdom, Valencia, Dubai, Beijing, Hyderabad, Bengaluru and Mumbai.

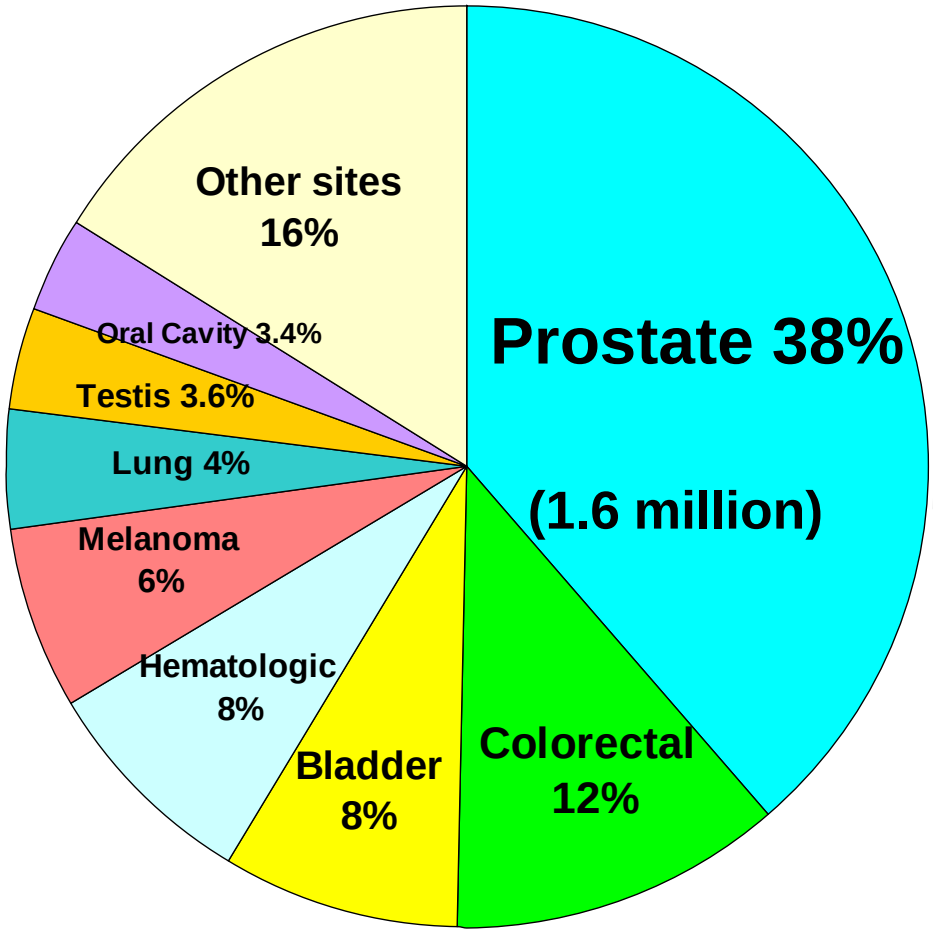
National Cancer Institute

Keynote Address

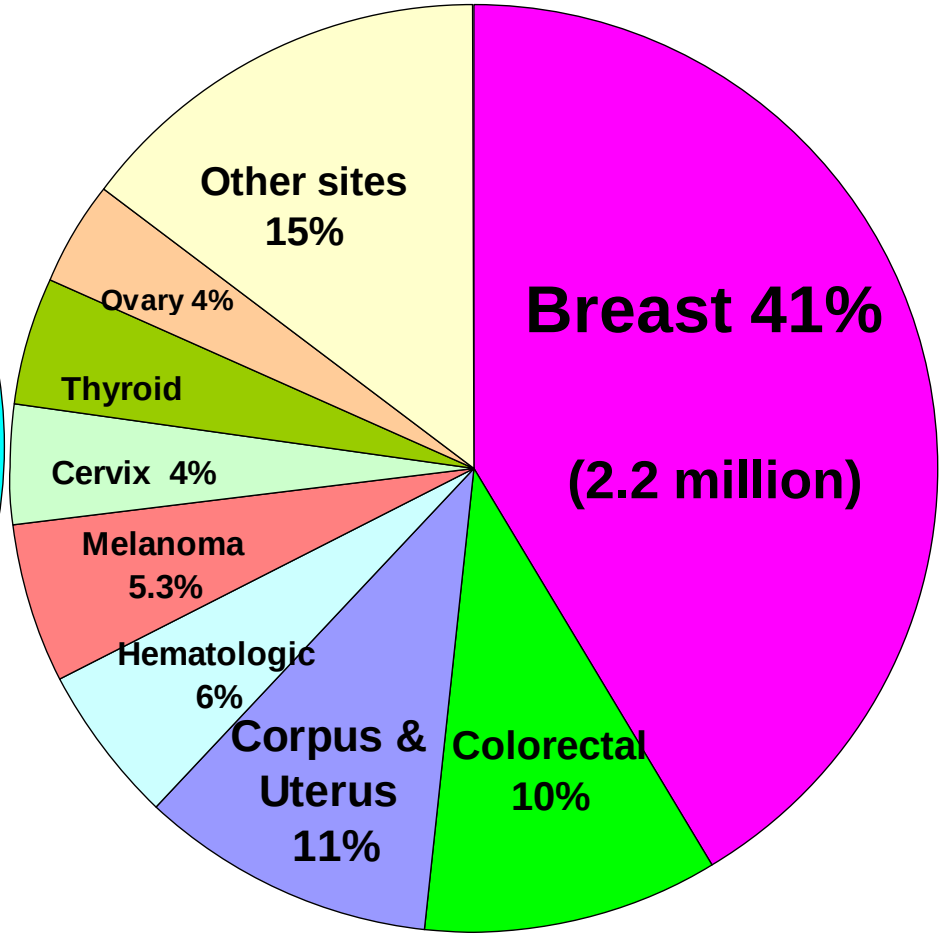
Metabolomics Research at NIH

Mukesh Verma
Chief, Methods and Technologies Branch
Program Director, Epidemiology and Genetics Research Program
Division of Cancer Control and Population Sciences
National Cancer Institute
National Institutes of Health

Estimated Number of Persons Alive in the U.S. Diagnosed with Cancer by Site

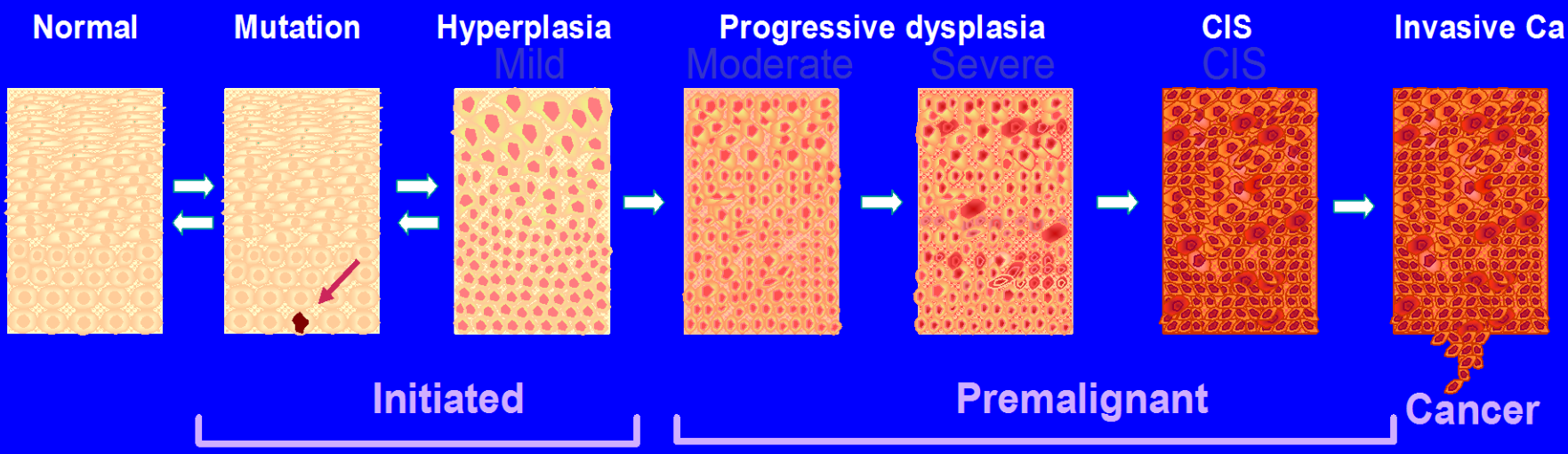


Men (4.24 million)



Women (5.31 million)

Cancer Development is a Multi-step Process



Breast	14-18 yrs	6-10 yrs
Cervix	9-13 yrs	10-20 yrs
Colon	5-20 yrs	5-15 yrs
Prostate	20 yrs	3-15 yrs
Lung	? yrs	Many yrs

The Broad Reach of the NIH

NIH *is* an institution
(Intramural Research)

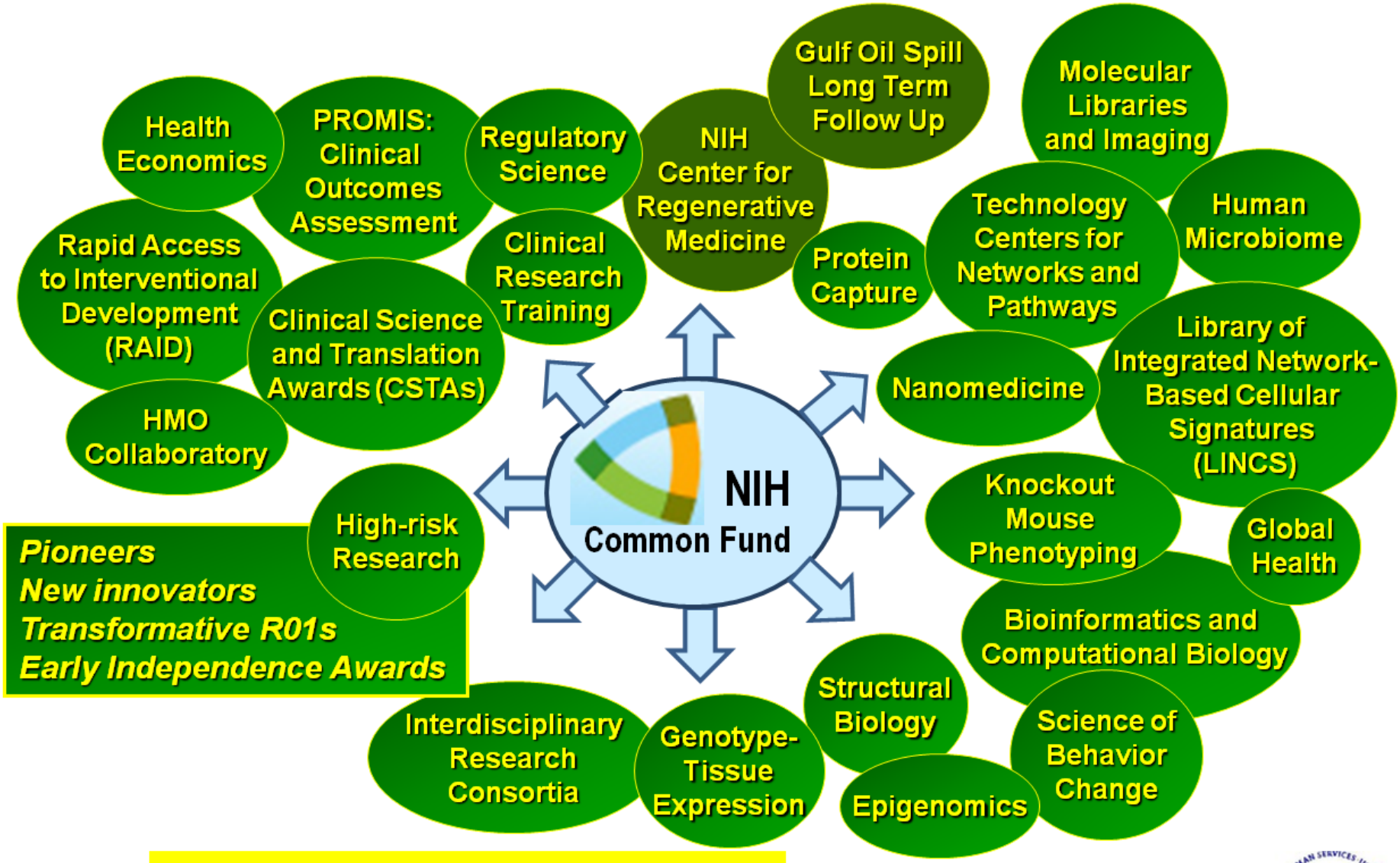
~ 6,000 scientists
~ 10% of NIH budget

NIH *supports* institutions & people
(Extramural Research)

> 4,000 institutions
> 300,000 scientists & research personnel
~ 85% of the NIH budget

There are resources--
FY11 budget: $31B

Cross-Cutting, trans-NIH Programs



http://commonfund.nih.gov/

NIH Common Funds: Metabolomics

Anderson, James (NIH/OD)
Smith, Philip (NIH/NIDDK)
Singer, Dinah (NIH/NCI)
Varmus, Harold (NIH/NCI)
Castle, Arthur (NIH/NIDDK)
Basavappa, Ravi (NIH/OD)
Wilder, Elizabeth (NIH/OD)
Kawazoe, Robin (NIH/OD)
Verma, Mukesh (NIH/NCI)

Potential Focus Area of the New Program (Varmus and Anderson)

1. Standards and protocols for measuring and quantifying most of the human metabolome.

2. Informatics tools to process, store and disseminate metabolomics information.

3. A core understanding of how much and how often individual metabolites vary under normal conditions, especially in clinical samples.

4. Improved tools for measuring sub-cellular localization and changes in metabolite concentrations.

Metabolomics Working Group Members

Balshaw, David (NIEHS)	**Castle, Arthur (NIDDK)**
Dutta, Chhanda (NIA)	Nadler, Laurie (NIMH)
Okita, Richard (NIGMS)	Oversby, Steven (NEI)
Proctor, Lita (NHGRI)	Shaughnessy, Daniel (NIEHS)
Shum, Lillian (NIDCR)	Smith, Philip (NIDDK)
Spalholz, Barbara (NCI)	Srinivas, Pothur R (NHLBI)
Tagle, Danilo (NINDS)	Tigno, Xenia (NINR)
Velazquez, Jose (NIA)	Verma, Mukesh (NCI)
Winer, Karen (NICHD)	Zakhari, Samir (NIAAA)

What is Metabolomics?

- Metabolomics enables simultaneous identification and analysis of multiple metabolites in cells, tissues and body fluids.
- Metabolomics deals with a global analysis of small molecule metabolites and metabolic patterns.
- Metabonomics, another term used in relation to metabolic profiling, refers specifically to metabolic measurements in organisms in response to external stimuli or genetic modifications.

(In the post genomic era, metabolomics has emerged as a field of great significance for both translational and basic biological research)

Additional Information about Metabolomics

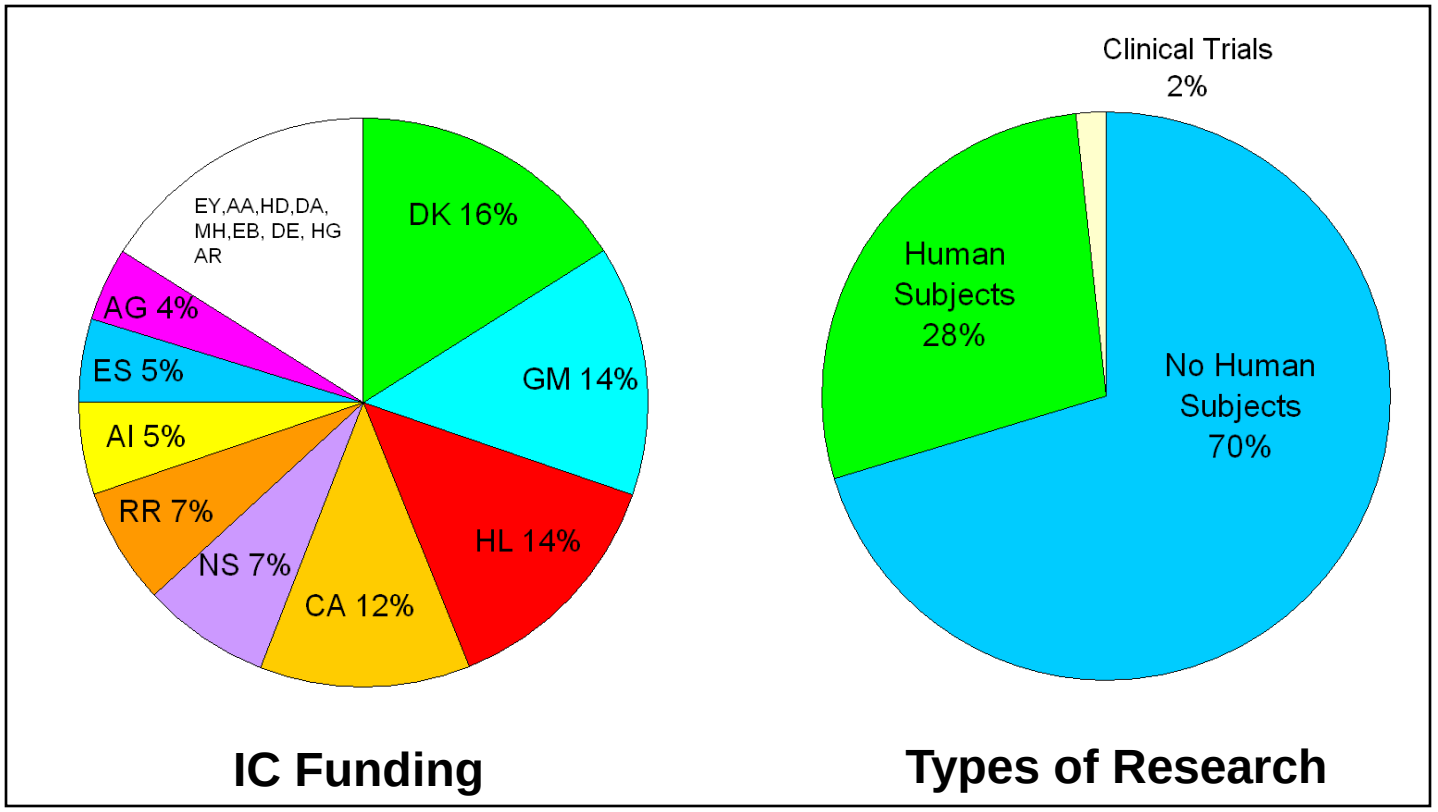
How individuals respond to therapy?

Metabolomics technologies permit integration of biological pathways to understand how living organisms interact with its environment

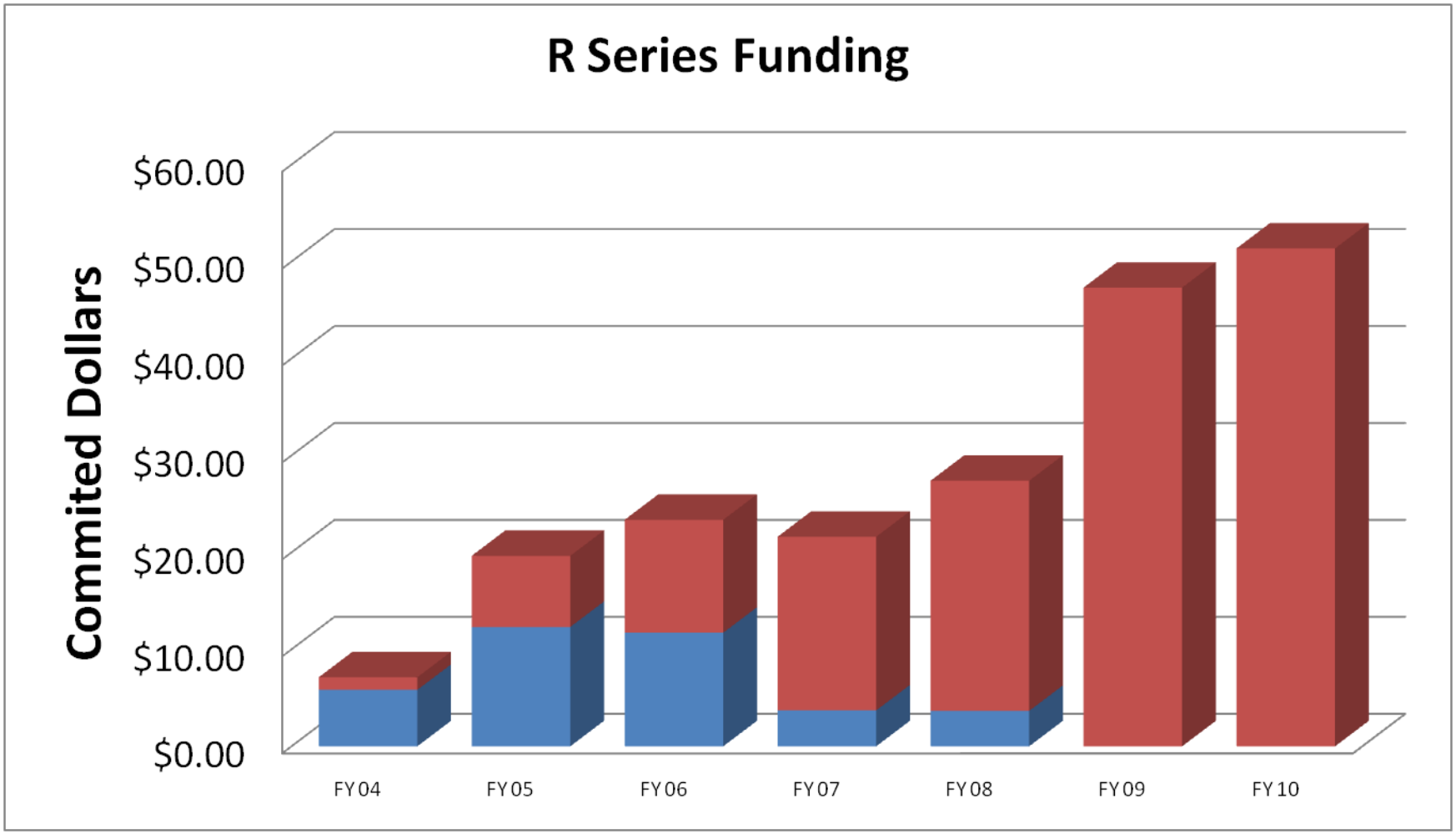
and

produce a metabolic fingerprint or ‘metabolome’, analogous to the genome or the proteome.

Distribution of Awarded Grants in Metabolomics (RPGs)



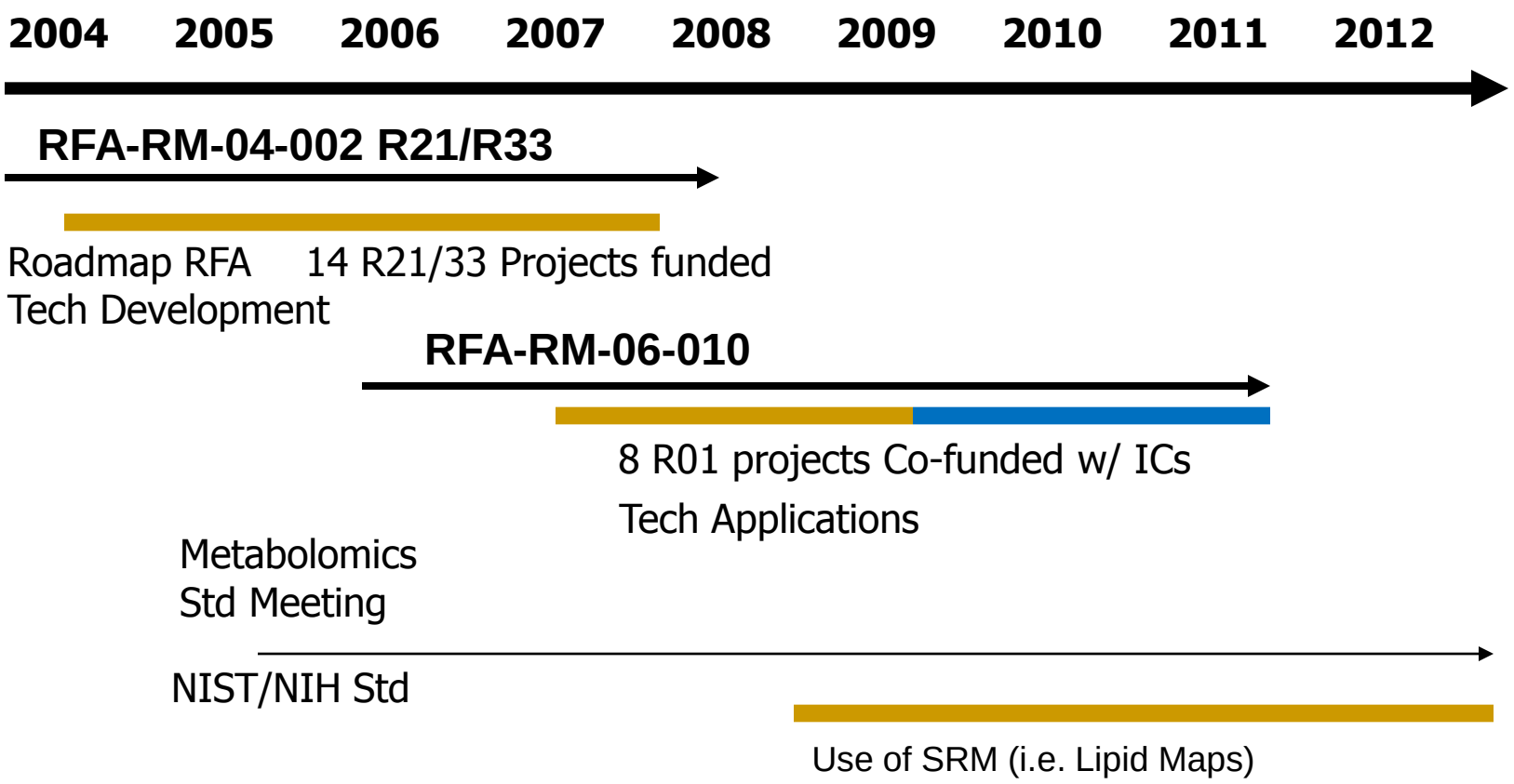
Growth of NIH Metabolomics Funding



Currently Funded Projects

- In 2010, at least 115 R series grants have self identified themselves with metabolomics in at least one specific aim.
- In 2010, 55 P or U series grants and cooperative agreements have at least one core or subproject self identified as metabolomics
- In most of these grants/agreements metabolomics is a minor subcomponent of overall project
- Most are not technology development or clinical/translational research (mostly discovery)

Metabolomics Roadmap Timeline



Awarded Projects (R21/R33)

Wayne R Matson	"Integrating LCEC/LCMS in a Single Metabolomics Platform"
Herbert Hill	"The Potential of Ion Mobility Mass Spectrometry for Metabolic Profiling"
Julian Griffin	"Metabolomics and Metabolic Compartmentation in the Brain"
Truman R Brown	"Metabolic Patterns in 1H NMR Spectra of Biofluids"
Jonathan V Sweedler	"Technologies for Cellular Neurometabolomics"
Michael R Sussman	"Isotope-Assisted Differential Metabolomics"
Fred E Regnier	"Tools for Comparative Metabolomics"
Gerhard Wagner	"An Integrated and Sensitive Metabolomics Platform for Human Disease Prediction, Diagnosis and Treatment"
Norman J Dovichi	"Glycolipid Metabolism in Single Cells"
Ronald Breaker	"Sensing Metabolites with Riboswitches"
John D York	"Biological Oscilloscopes: Spatio-Temporal Metabolomics"
Dr. Alan M Kleinfeld	"Profiling unbound metabolites using fluorescent probes"
Dr. James C Liao	"Automated Chip-Based Metabolomics Analysis"
Dr. Henri Brunengraber	"Dynamic Metabolomics via Isotopomer Analysis"

Awarded Projects (R01)

- Cravatt, Benjamin F (NCI) — Chemical Probes for Metabolic Pathway Discovery in Human Disease
- Freyer, James P (NCI) — Differential metabolic network analysis of tumor progression
- Han, Xianlin (NIA) — Shotgun Lipidomics and Alterations in Sphingolipidomes in Alzheimer's Diseases
- Rabinowitz, Joshua D (NAID) — Metabolomics of the Virus-host Cell Interaction
- Sweedler, Jonathan* (NIDCR) — The Neurometabolome of a Sensory Neuronal Network
- Burant, Charles F (NIDDK) — Using Systems Biology to Understand Islet Adaptation and Failure Diabetes
- Frommer, Wolf B* (NIDDK) — Sugar signaling networks detected by high content fluxomics
- ovichi, Norman J*(NINDS) — Glycolipid metabolism in single cells

Scientific Progress

- NCRR meeting Sept. 17th, 2010
  State of Metabolomics Technologies in Translational Research

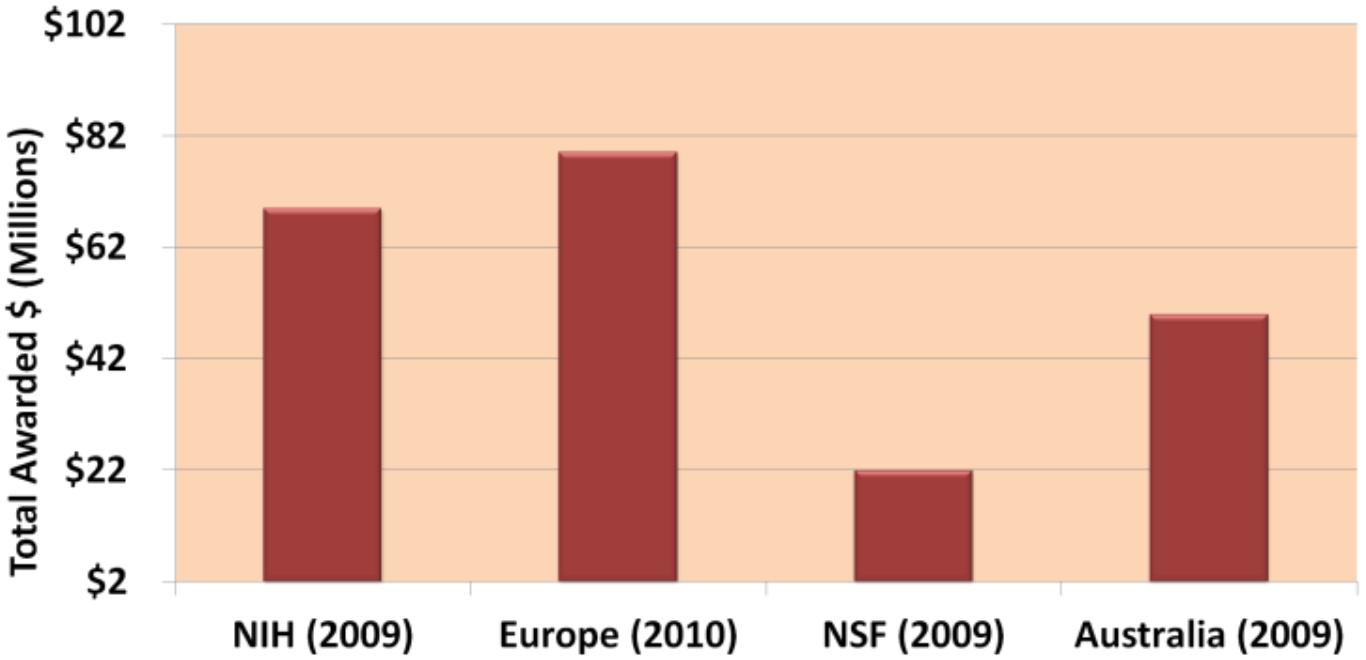
- Application in clinical/epidemiological studies
- Increasing depth, breadth, throughput
- Quantification
- New Tech (i.e. Metabolomics Imaging)

http://videocast.nih.gov/

Note: BPC3 plans to propose metabolomics as the functional aspect of the project in their renewal application

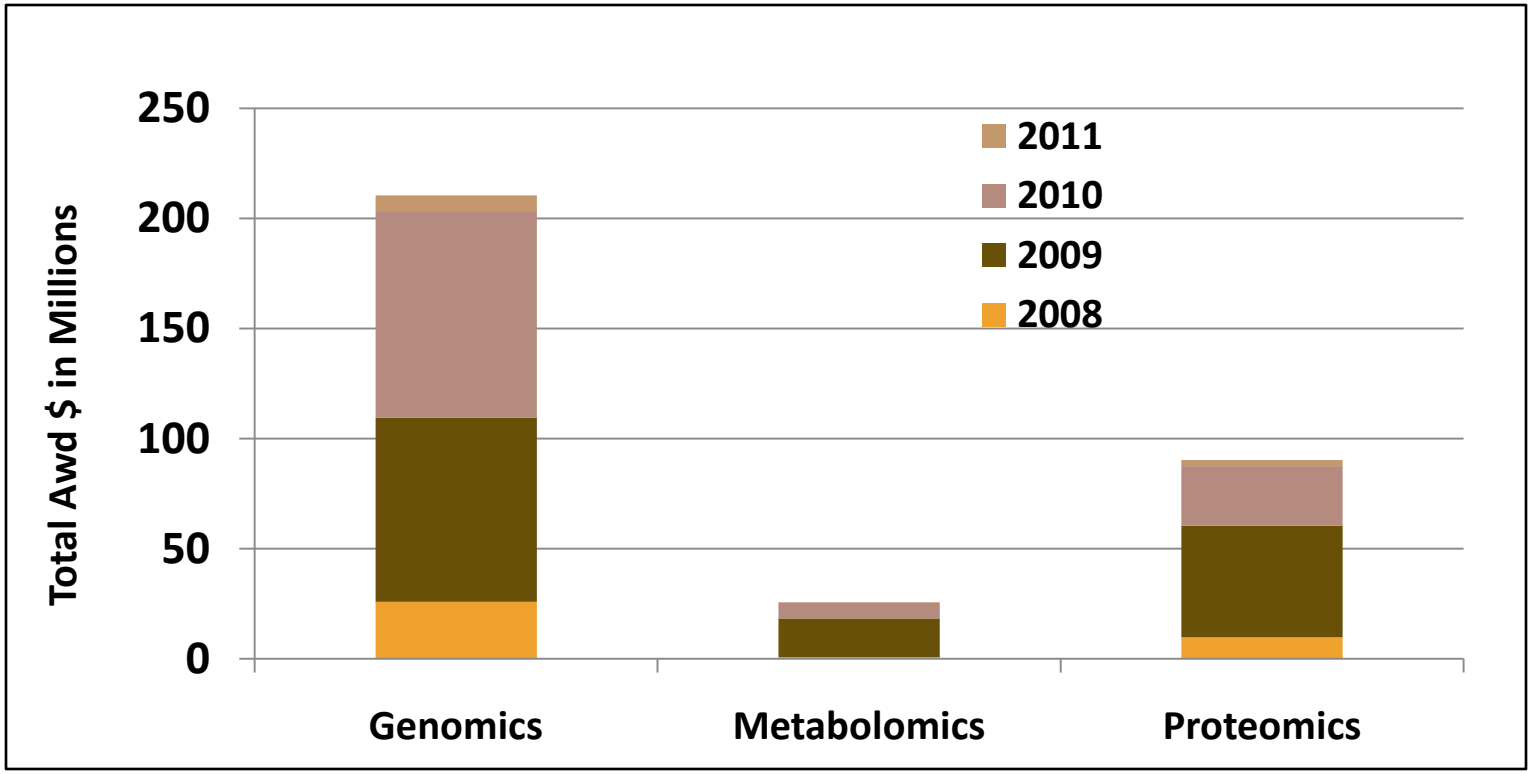
INTERNATIONAL EFFORTS

- Australia Metabolomics Bioplatforms: $208 million
- Netherlands Metabolomics Center: $67 million
- BBSRC, UK Plant and Microbial Metabolomics: $10.4 million
- Canadian Human Metabolome Database: $8.1 million
- Global investment in Metabolomics for FY 2010 is Estimated to be $ 225 million*



* Current trends in the Metabolomics sector within Europe.
http://www.frost.com/prod/servlet/market-insight-top.pag?docid=128394679

Comparing the NIH Investment in Other "Omics" Fields in Translational Research (FY 2008-2011)

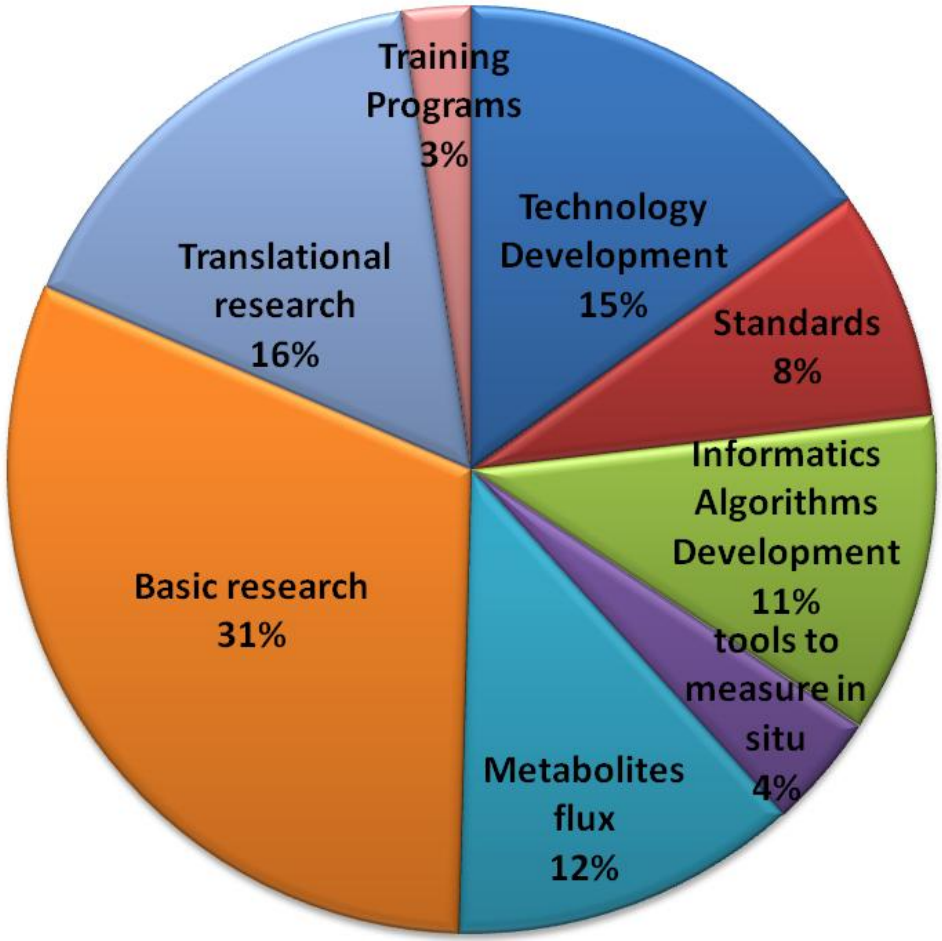


"Omics" Fields	2008	2009	2010	2011	Grand Total
Genomics	$ 25,913,961	$ 83,529,488	$ 93,877,672	$7,137,180	$ 210,458,301
Metabolomics	$ 760,996	$ 17,620,677	$ 7,125,183	$ 149,982	$ 25,656,838
Proteomics	$ 9,671,349	$ 50,798,279	$ 27,025,316	$2,756,224	$ 90,251,168
Grand Total	$ 36,346,306	$151,948,444	$ 128,028,171	$10,043,386	$ 326,366,307

NIH Investment in Metabolomics by Topics

FY 2005 – Present Single Project Mechanisms R, DP, F, K, T

Topic	Total Awarded$	Number of Projects
Technology Development	$ 65,464,257	45
Standards	$ 34,815,891	29
Informatics Algorithms Development	$ 48,303,827	40
tools to measure in situ	$ 17,374,348	12
Metabolites flux	$ 52,587,656	49
Basic research	$ 134,518,374	128
Translational research	$ 69,844,145	68
Training Programs	$ 10,484,773	50



- Majority of the portfolio is Basic Research, with over $ 69 million (16%) invested in Translational Research
- Percentage calculated based on the total amount of $211M awarded for Single projects (Mechanisms R, DP, F, K, T)

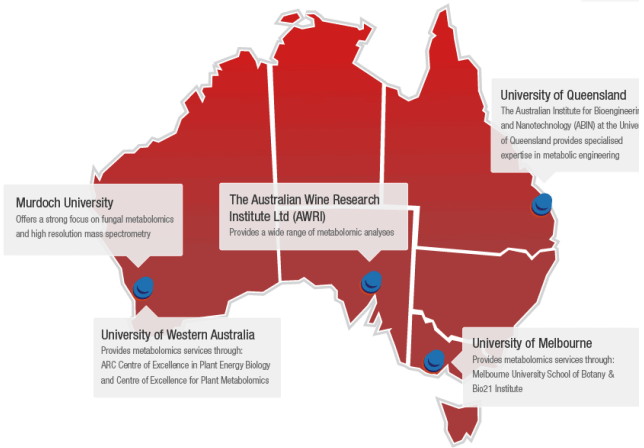
Foreign Efforts

BBSRC, UK Plant and Microbial Metabolomics: $10.4M

Canadian Human Metabolome Database: $8.1M

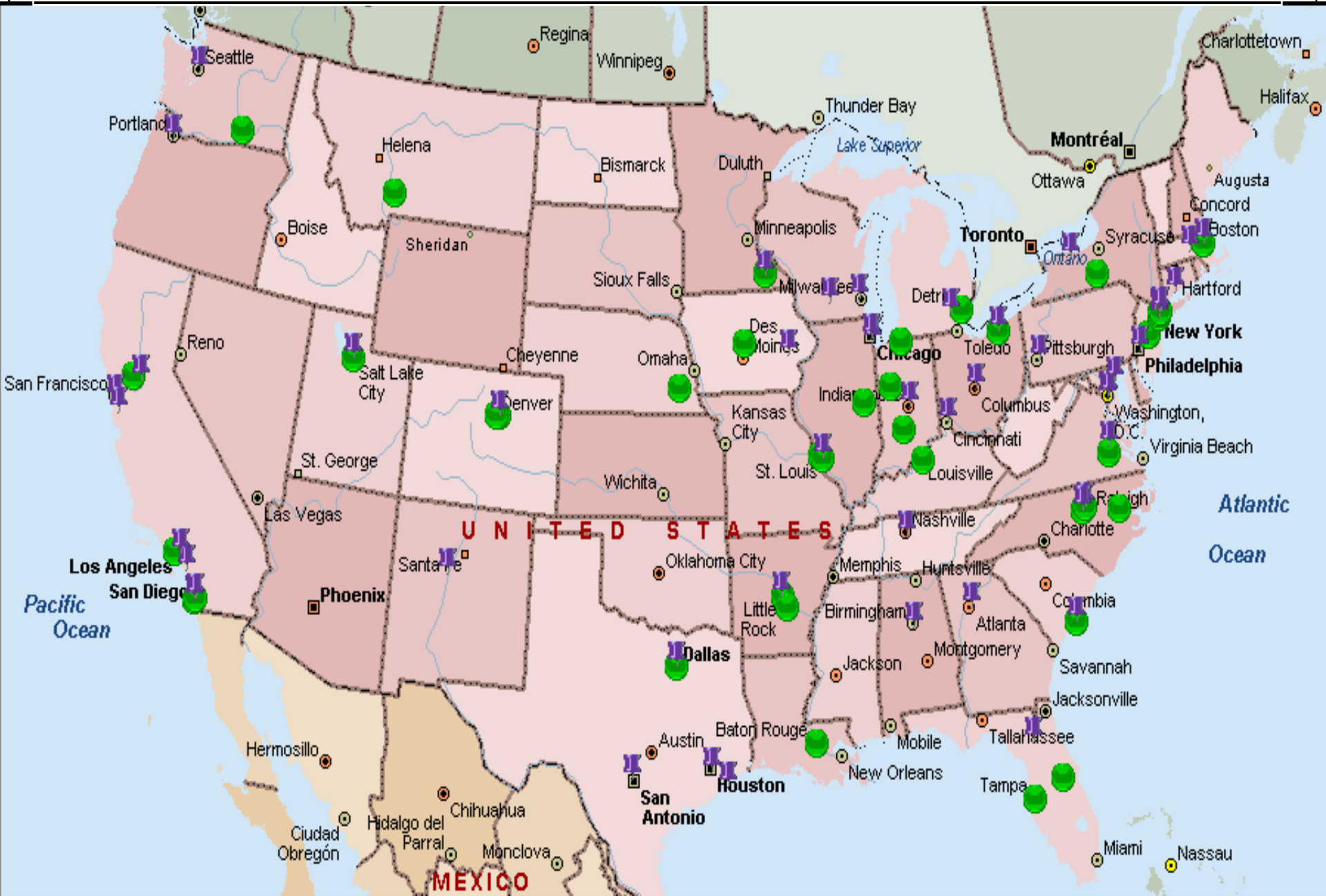
Institute for Advanced Biosciences, Keio University, Japan 100M+

Netherlands Metabolomics Center: $67M



Australia Metabolomics Bioplatforms: $208M

Clinical and Translational CTSA Centers (purple) and Metabolomics –Ready Sites(green) Overlap 62%



Common Funds RFAs ($110 M for 5 years)

RFA-RM-11-016
Regional Comprehensive Metabolomics Resource Cores (RCMRC) (U24)
RFA-RM-11-017
Mentored Research Scientist Award in Metabolomics (K01)
RFA-RM-11-018
Development of Courses or Workshops in Metabolomics (R25)
RFA-RM-11-019
Technology Development to Enable Large Scale Metabolomics Analyses (R01)
RFA-RM-11-020
Metabolomics Data Repository and Coordinating Center (U01)

NOT-RM-11-025
Request for Information on Specific Needs for Metabolomics Reference Standards
NOT-RM-11-024
Notice of Availability for Administrative Supplements for Collaborative Activities to Promote Metabolomics Research

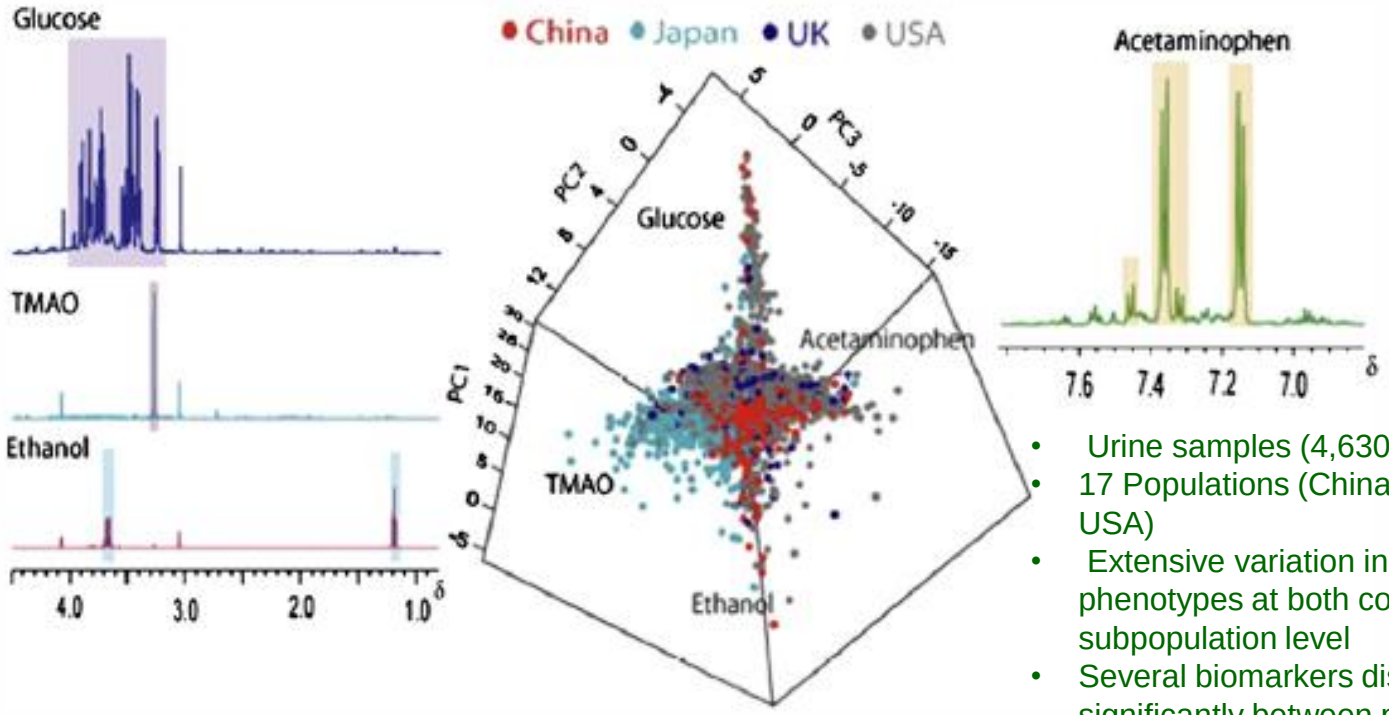
Research Questions (Related to EGRP Mission)

- Can metabolimic profile identify populations at high risk of developing cancer?
- How to integrate information from genomics, epigenomics, proteomics, transcriptomics, microbiome to metabolomics
- Developing metabolomics based mathematical models and algorithms that will be useful for monitoring the progression of cancer and predicting chances for successful treatment
- Probing metabolic pathways of responses to environmental exposures and how these pathways affect individual susceptibility to exposures
- Identifying and validating metabolomics biomarkers (profiles) of biological responses to exposure including compensatory responses and early indicators of cancer
- Develop study design to measure response to environmental changes and disease development by following metabolomic profiles

Research Questions (Related to EGRP Mission)

- Can metabolimic profile identify subtypes of a cancer?
- Can unidentified metabolotes be used for cancer detection and diagnosis (one example in ovarian cancer exists) (common libraries do not have these unidentified metabolites)?
- How can we used metabolomic profiling for personalized medicine?

Large Scale Metabolomic Screening of Human Population



- Urine samples (4,630 people)
- 17 Populations (China, Japan, UK, USA)
- Extensive variation in metabolomic phenotypes at both country and subpopulation level
- Several biomarkers discriminated significantly between populations

Fig. 1. Large-scale metabonomic screening of human populations. Scores plot for a principal component analysis model derived from ^{1}H NMR urine data from INTERMAP (n = 4,630 participants), colored by population sample. The ^{1}H NMR measurement for a given urine specimen is plotted as a single point. The plot shows four outlying phenotypes based on latent information extracted from the spectral data sets, attributable to high urinary glucose, TMAO, ethanol, and acetaminophen. Representative spectra of participants with characteristic spectral profiles for these metabolites are also highlighted. NMR, nuclear magnetic resonance; PC, principal component; TMAO, trimethylamine-*N*-oxide.

http://commonfund.nih.gov/Metabolomics/

Common Fund Initiatives

THEME: NEW PATHWAYS TO DISCOVERY

Building Blocks, Pathways, and Networks Implementation Group

- ***National Technology Centers for Networks and Pathways.*** This network of research Centers will create new tools to describe the dynamics of protein interactions. The Centers will develop instruments, methods, and reagents for quantitative measurements at sub-cellular resolution and very short timescales.
- ***Metabolomics Technology Development.*** This initiative will promote development of novel technologies to study cellular metabolites, such as lipids, carbohydrates, and amino acids. Knowledge gained from these studies will be used to understand more precisely the role of metabolites in the context of cellular pathways and networks.
- ***Standards for Proteomics and Metabolomics/Assessment of Critical Reagents for Proteomics.*** Workshops will be convened to address these two important areas. The "Standards" workshops will engage the scientific community in the establishment of quality and data standards for proteomics and metabolomics. The "Reagents" workshops will seek advice from extramural and intramural scientists and program staff regarding critical reagents required to enhance future research in proteomics.

Molecular Libraries and Imaging Implementation Group

- ***Molecular Libraries Screening Center Network (MLSCN).*** These NIH-funded centers will provide: a public collection of chemically diverse small m and phenotype-based assays; medicinal chemistry to transform hits into chemical probes; implementation of novel technologies, and deposition of screening data into a freely accessible public database.
- ***Cheminformatics.*** A new and comprehensive database of chemical structures and their biological activities is being developed by the National Center for Biotechnology Information at NIH. The database, called PubChem, will house both compound information from the scientific literature as well as screening and probe data from the MLSCN. This initiative will also fund grants to deve screening.
- ***Technology Development.*** Bottlenecks in the development of compounds as basic research tools and drugs will be targeted, including improveme obotics, and prospectiv characterization of chemical compounds' metabolism and toxicology properties.
- ***Development of High Specificity/High Sensitivity Probes to Improve Detection.*** This technology development program seeks to improve probe detection sensitivity 10- to 100-fold within 5 years.

Metabolomics Newsletter

Metabolomics Society

NIH COMMON FUNDS METABOLOMICS: RESEARCH PRIORITIES

1. Support generation of more metabolite standards through coordinated collaborative approach

2. Train more scientists in Metabolomics

3. Increase the capacity in Metabolomics through establishing more centers

4. Support Metabolomics technology development

Percent of NIH Budget

SBIR & STTR

	Set Aside
SBIR: Set-aside program for small business concerns to engage in Federal R&D with the potential for commercialization	2.5%
STTR: Set-aside program to facilitate cooperative R&D between small business concerns and U.S. research institutions with potential for commercialization	0.3%

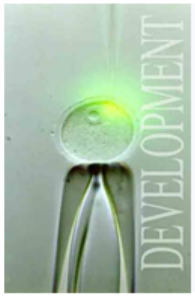
~$110 million annually at the NCI

~$650 million annually at the NIH

Small Business Innovation Research (SBIR) Small Business Technology Transfer (STTR) Programs

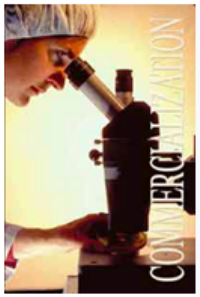
PHASE I – Feasibility Study

- Average award: $170K
- Project period varies, most 6 – 12 months



PHASE II – Full R&D

- Average $850K, 2 years but some longer
- Commercialization plan required

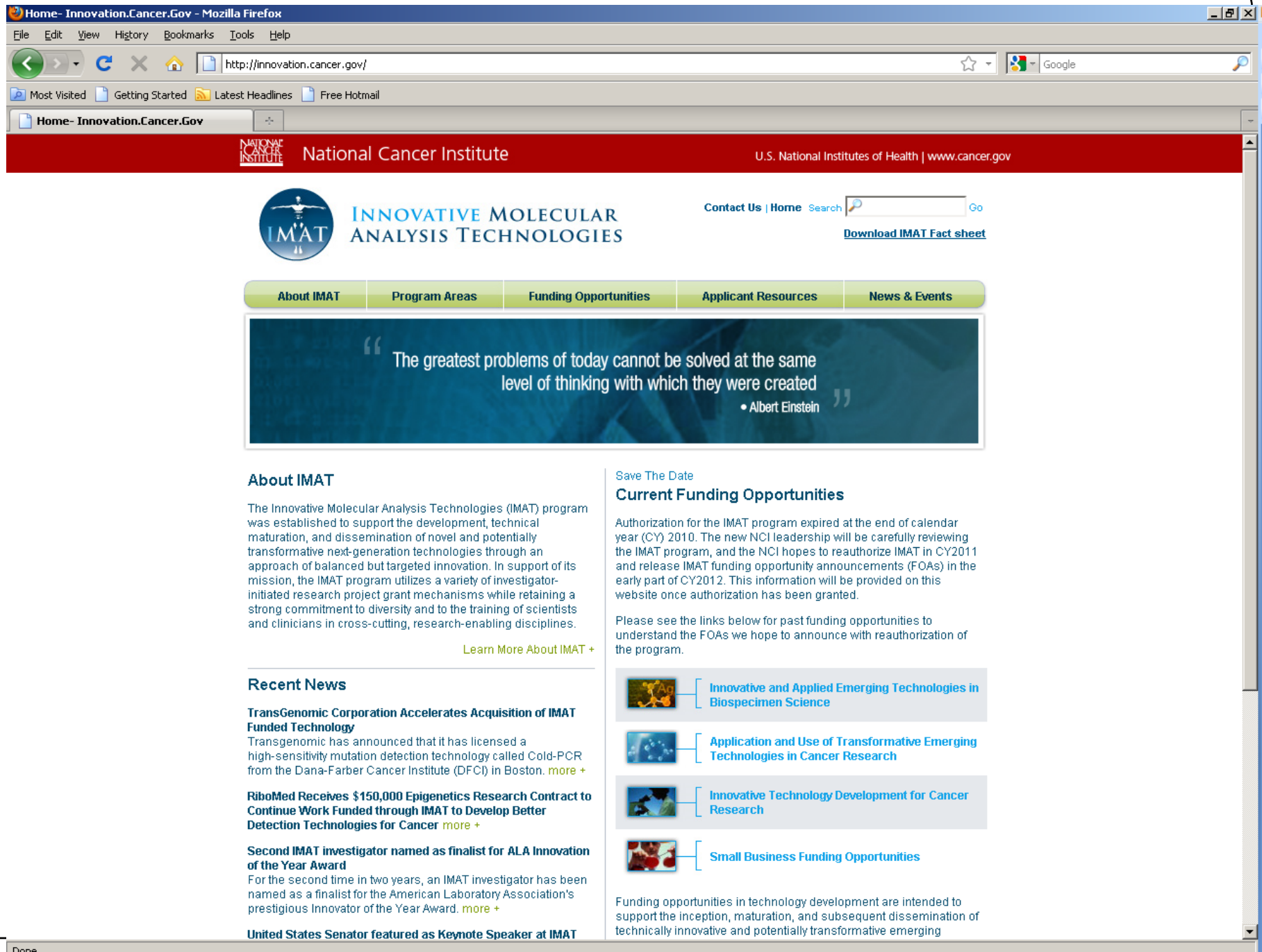


PHASE III – Commercialization

- Use of non-SBIR/STTR Funds
- Consider exit strategy

Issues

- Budgets inadequate for expectations
- Gap between Phases I and II can be almost two years
- Reviewers do not understand challenges of the “D” in “R&D”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"The greatest problems of today cannot be solved at the same level of thinking with which they were created"
• Albert Einstein
About IMAT
The Innovative Molecular Analysis Technologies (IMAT) program was established to support the development, technical maturation, and dissemination of novel and potentially transformative next-generation technologies through an approach of balanced but targeted innovation. In support of its mission, the IMAT program utilizes a variety of investigator-initiated research project grant mechanisms while retaining a strong commitment to diversity and to the training of scientists and clinicians in cross-cutting, research-enabling disciplines.
Learn More About IMAT +
Recent News
TransGenomic Corporation Accelerates Acquisition of IMAT Funded Technology
Transgenomic has announced that it has licensed a high-sensitivity mutation detection technology called Cold-PCR from the Dana-Farber Cancer Institute (DFCI) in Boston. more +
RiboMed Receives $150,000 Epigenetics Research Contract to Continue Work Funded through IMAT to Develop Better Detection Technologies for Cancer more +
Second IMAT investigator named as finalist for ALA Innovation of the Year Award
For the second time in two years, an IMAT investigator has been named as a finalist for the American Laboratory Association's prestigious Innovator of the Year Award. more +
United States Senator featured as Keynote Speaker at IMAT
Save The Date
Current Funding Opportunities
Authorization for the IMAT program expired at the end of calendar year (CY) 2010. The new NCI leadership will be carefully reviewing the IMAT program, and the NCI hopes to reauthorize IMAT in CY2011 and release IMAT funding opportunity announcements (FOAs) in the early part of CY2012. This information will be provided on this website once authorization has been granted.
Please see the links below for past funding opportunities to understand the FOAs we hope to announce with reauthorization of the program.
Innovative and Applied Emerging Technologies in Biospecimen Science
Application and Use of Transformative Emerging Technologies in Cancer Research
Innovative Technology Development for Cancer Research
Small Business Funding Opportunities
Funding opportunities in technology development are intended to support the inception, maturation, and subsequent dissemination of technically innovative and potentially transformative emerging
Done

IMAT Supported Commercial Technologies

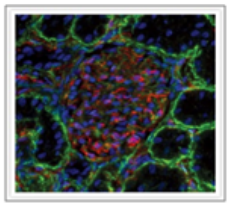
SBIR & STTR

Ambion

IMAT Award: Enzymatic Tools for Degrading Tissue and Preserving RNA *(R43 – 2001,*R44, *2005-2007*)
PI: Gary Latham, Ph.D

Illumina

IMAT Award: Protein Profiling Arrays, Random Arrays for Gene Expression Profiling *(R43 – 1998, R44- 1999)*
PI: Mark Chee, Ph.D



invitrogen

IMAT Award: Sensitive, Multiplexed Analysis of Breast Cancer Markers *(R44 - 1999)*
Quantum Dot Corp, PI: Robert H. Daniels, Ph.D.,

Home - caHUB.Cancer.Gov - Mozilla Firefox

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National Cancer Institute

U.S. National Institutes of Health | www.cancer.gov

caHUB The Cancer Human Biobank

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About caHUB | caHUB Development | Partner With Us | News Center | Resources

What's New

October 15, 2010
ARRA Funding Opportunity: cancer Human Biobank (caHUB) Comprehensive Data Resource

October 7, 2010
caHUB to Lead Biospecimen Accrual for GTEx

September 2, 2010
New ARRA Funding Opportunity: cancer Human Biobank (caHUB) Biospecimen Source Sites

caHUB Long-Term Vision

caHUB will contribute to medical advances through high-quality human biospecimens and data as well as analysis, scientific tools, and services to the cancer research community and product development industries.
Learn More

Sign up for Updates:

Enter your email address to receive caHUB news and updates.

SUBMIT

PARTNER PERSPECTIVES

MOVING FORWARD WITH caHUB

JOIN THE MISSION

Done

Biospecimen Lifecycle: Pre-analytical Factors Affect Molecular Composition and Integrity

OBBR Office of Biorepositories and Biospecimen Research

Specimen is viable and biologically reactive

Molecular composition subject to further alteration/degradation

Factors (examples):

- Antibiotics
- Other drugs
- Type of anesthesia
- Duration of anesthesia
- Arterial clamp time

Time 0

Factors (examples):

- Time at room temperature
- Temperature of room
- Type of fixative
- Time in fixative
- Rate of freezing
- Size of aliquots

Patient | Medical/ Surgical Procedures | Acquisition | Handling / Processing | Storage | Distribution | Scientific Analysis | Restocking Unused Sample

Pre-acquisition

Post-acquisition

Public-Private Partnership Program Examples

PUBLIC-PRIVATE PARTNERSHIP PROGRAM

FNIH
Foundation for the National Institutes of Health

THE biomarkers CONSORTIUM

accelerate identification, development and regulatory qualification of biomarkers for: cancer, inflammation and immunity, metabolic disorders, and neuroscience

Alzheimer's Disease Neuroimaging Initiative
- NIA, NIBIB, FDA -

ADNI DEFINING ALZHEIMER'S DISEASE

OAI osteoarthritis initiative a knee health study

Federal partners: NIAMS, NIA, NIDCR, ORWH, NCCAM, NIMHD
Private partners: Merck, Novartis, Pfizer

Publically available database of gene-gene association studies
-NIH, Pfizer, Affeymetrix, Abbott -

GAIN
GENETIC ASSOCIATION INFORMATION NETWORK

NATIONAL INSTITUTES OF HEALTH

wellcome trust

BILL & MELINDA GATES foundation

CIHR IRSC
Canadian Institutes of Health Research / Instituts de recherche en santé du Canada

Grand Challenges in Global Health

– effective, inexpensive, simple health tools for low resource settings

NIH-FDA Regulatory Science Initiative

- a Common Fund Program

development and use of the scientific knowledge, tools, standards, and approaches necessary for the assessment of medical product safety, efficacy, quality, potency, and performance

- **ACCELERATING DRUG AND DEVICE EVALUTATION THROUGH INNOVATIVE CLINICAL TRIAL DESIGN** (University of Michigan: William Barsan, Roger Lewis, Donald Berry)
- **REPLACEMENT OCCULAR BATTERY (ROBATT)** (MB Research Labs: Daniel Cevern, George DeGeorge)
- **CHARACTERIZATION/BIOINFORMATICS-MODELING OF NANOPARTICLE:COMPLEMENT INTERACTIONS** (University of Washington: Dennis Hourcade)
- **HEART-LUNG MICROMACHINE FOR SAFETY AND EFFICACY TESTING** (Harvard University: Donald Ingber)

NCATS: National Center for Advancing Translational Science

NCATS To Expand Researcher Access to Industry Molecular Compounds - The NIH Record -May 11, 201 - Windows Internet Explorer

http://nihrecord.od.nih.gov/newsletters/2012/05_11_2012/story1.htm

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NCATS To Expand Researcher Access to Industry Molecular Compounds

On the front page...

HHS Secretary Kathleen Sebelius

Therapeutic development is a costly, complex and time-consuming process. In recent years, researchers have succeeded in identifying the causes of more than 4,500 diseases. But it has proven difficult to turn such knowledge into new therapies; effective treatments exist for only about 250 of these conditions.

To help combat the challenges, HHS Secretary Kathleen Sebelius and NIH director Dr. Francis Collins recently unveiled an NIH collaborative program that will match researchers with a selection of pharmaceutical industry molecular compounds to help scientists explore new treatments for patients. NIH's new National Center for Advancing Translational Sciences has partnered initially with Pfizer Inc., AstraZeneca and Eli Lilly and Co., which have agreed to make more than 20 of their compounds available for this initiative."

This initiative is an investment not only in our researchers, but also in our nation," said Sebelius. "When American scientists have the tools and resources to pursue the next great discovery, we all benefit. This makes our nation stronger, healthier and more competitive."

Continued...

This innovative approach will leverage data that already has been collected on these molecular compounds as well as the collective power of researchers across the nation.

"Such visionary thinking is imperative if we want to take bold action to speed up drug development," Collins said.

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Can we identify mutations most critical to maintenance of oncogenic phenotype?

- **What is the relationship between low frequency mutations and "driver" mutations? How to determine which mutations have key roles in tumor development?**
  - ➔ Can we establish methods that will determine which changes are important for tumor development and use these methods to study the functional roles of these mutations?
  - ➔ Appropriate mutation analyses will provide an important set of RNA and protein targets for therapy and yield key insights to cancer etiology

- **Technology opportunity:**
  - ➔ Tools to elucidate the relationship between individual and pathway-related mutations and tumor development
  - ➔ Tools to track order of mutation development and corresponding metastatic potential in models

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Common Fund Initiatives

THEME: NEW PATHWAYS TO DISCOVERY

Building Blocks, Pathways, and Networks Implementation Group

- ***National Technology Centers for Networks and Pathways.*** This network of research Centers will c
quantitative measurements at sub-cellular resolution and very short timescales.
- ***Metabolomics Technology Development.*** This initiative will promote development of novel technolo
understand more precisely the role of metabolites in the context of cellular pathways and networks.
- ***Standards for Proteomics and Metabolomics/Assessment of Critical Reagents for Proteomics.***
establishment of quality and data standards for proteomics and metabolomics. The "Reagents" wor
research in proteomics.

Molecular Libraries and Imaging Implementation Group

- ***Molecular Libraries Screening Center Network (MLSCN).*** These NIH-funded centers will provide: a public collection of chemically diverse small m
phenotype-based assays; medicinal chemistry to transform hits into chemical probes; implementation of novel technologies, and deposition of screening data into a freely accessible public database.
- ***Cheminformatics.*** A new and comprehensive database of chemical structures and their biological activities is being developed by the National Center for Biotechnology Information at NIH. The database, called PubChem, will house both compound information from the scientific literature as well as screening and probe data from the MLSCN. This initiative will also fund grants to deve
screening.
- ***Technology Development.*** Bottlenecks in the development of compounds as basic research tools and drugs will be targeted, including improveme
obotics, and prospectiv
characterization of chemical compounds' metabolism and toxicology properties.
- ***Development of High Specificity/High Sensitivity Probes to Improve Detection.*** This technology development program seeks to improve probe detection sensitivity 10- to 100-fold within 5 years.

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