Early Detection Research Network

Alliance of Glycobiologists for Detection of Cancer

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Cancer Biomarkers Research Group

National Institutes of Health

National Cancer Institute

Goal: Establish a Comprehensive Approach to Biomarker Development

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- **Discover, develop and validate biomarkers for cancer detection, diagnosis and risk assessment**
- **Conduct correlative studies/trials to validate biomarkers as indicators of early cancer, pre-invasive cancer, risk, or as surrogate endpoints**
- **Develop quality assurance programs for biomarker testing and evaluation**
- **Forge public-private partnerships**

INVESTIGATOR-DRIVEN CONSORTIUM

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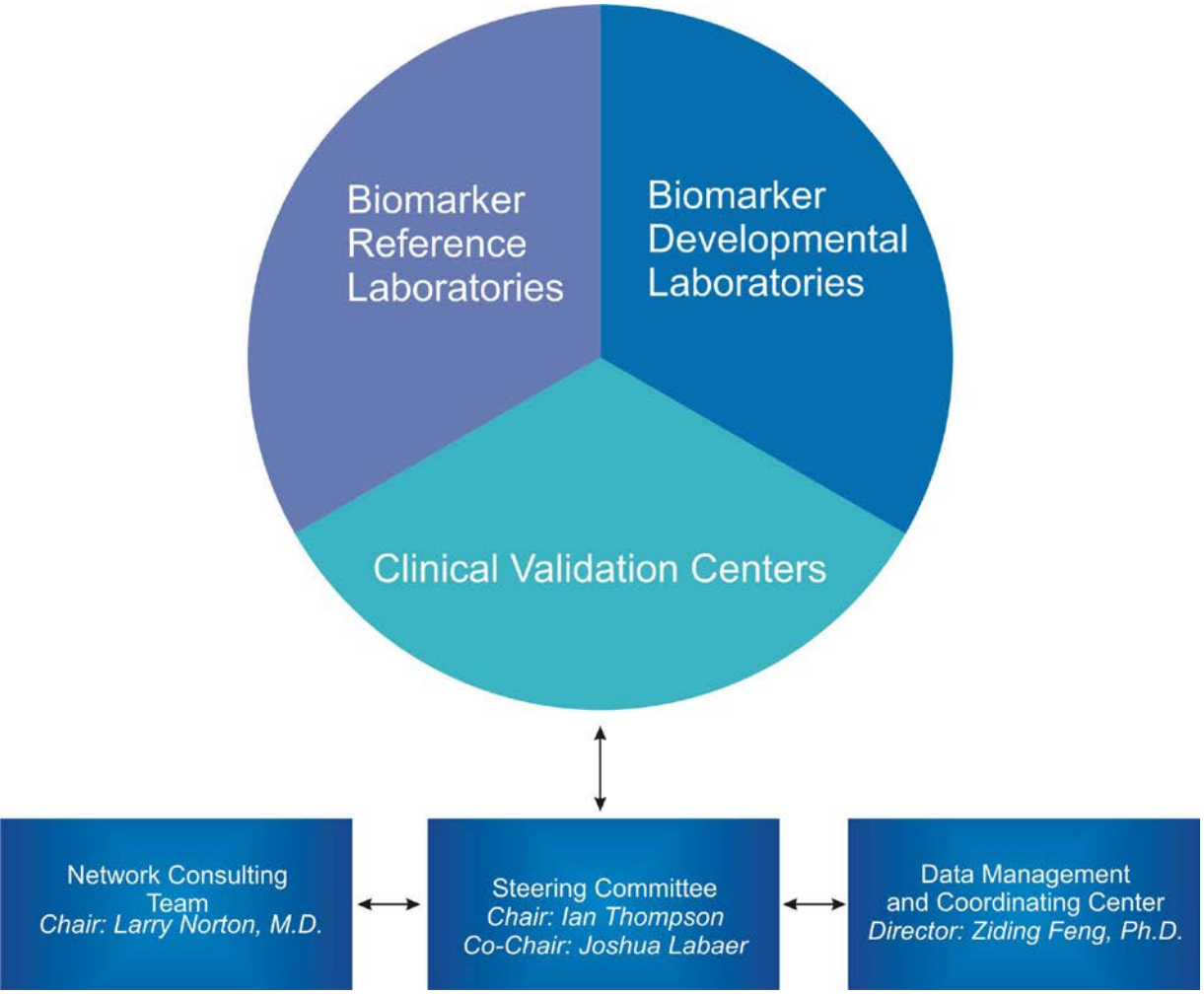

An "infrastructure" for supporting collaborative research on molecular, genetic and other biomarkers in human cancer detection and risk assessment.

PARTNERING WITH FEDERAL AGENCIES

Early Detection Research Network

- National Institute of Standards and Technology as a Reference Laboratory
- NASA's Jet Propulsion Laboratory (JPL) as an Informatics Center
- Centers for Disease Control and Prevention as a Clinical Epidemiology and Validation Center
- DOE's Pacific Northwest National Laboratory as a Reference Laboratory for Antibody and MS

MANAGEMENT STRUCTURE

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Prioritization

Technology Sharing

Collaboration

Communication and Workshop

Data sharing and Informatics

MANAGEMENT OVERSIGHT

Early Detection Research Network

NCI Staff: The Partner

EDRN Executive Committee: Subgroup of the Steering Committee that meets monthly to consider routine EDRN issues.

Steering Committee: The "Housekeeper" Main governing body of the Network that meets three times annually. Subcommittees develop EDRN management policies.

Network Consulting Team: The "Spell Checker" provides independent scientific oversight team.

Systematic Approach To Biomarker Discovery: An Engineering Approach

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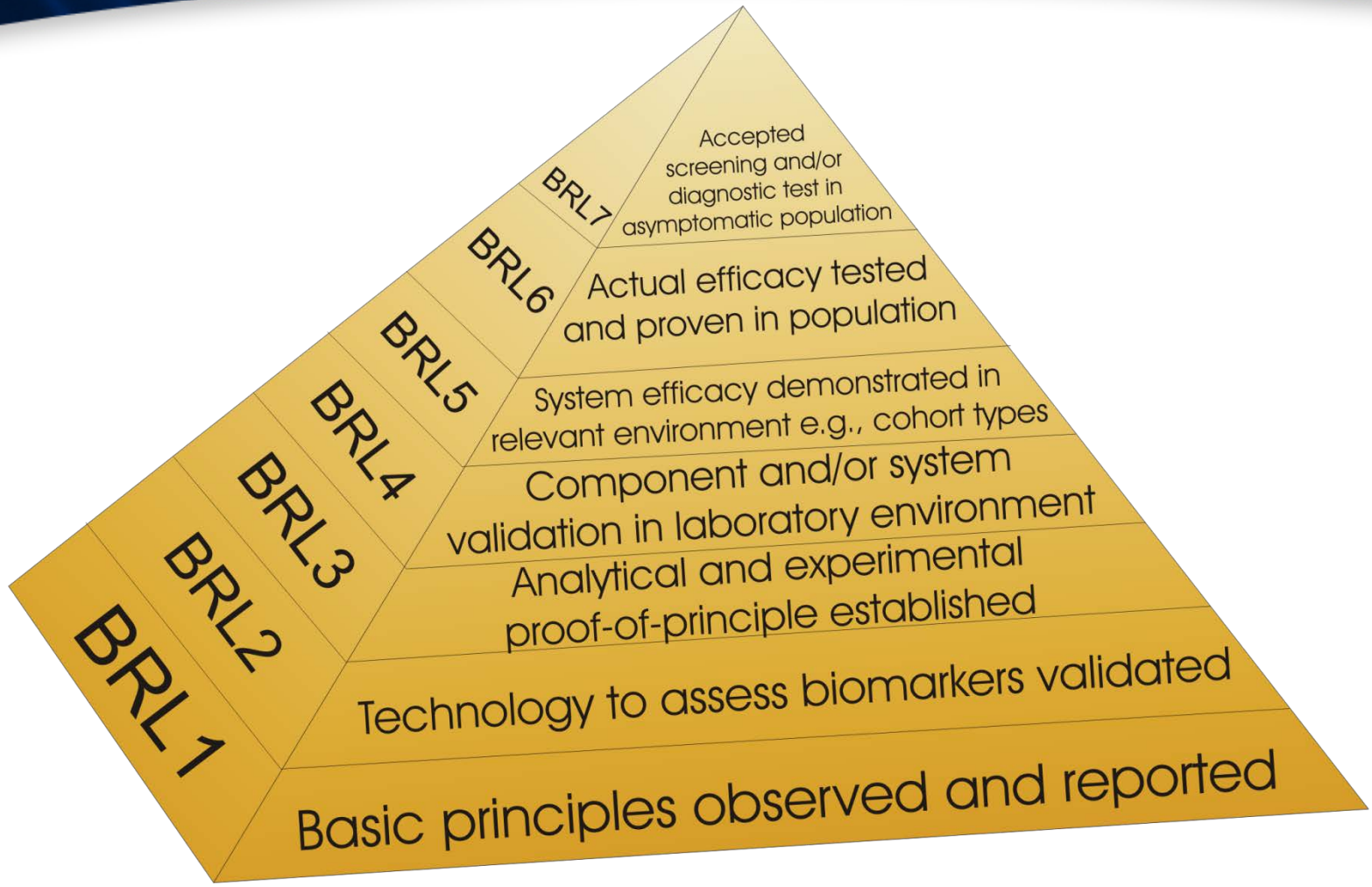

BRL: Biomarkers Readiness Level

Source: JPL/NASA

Sample Reference Libraries

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Reference Libraries are sets of samples with cases and controls statistically powered to allow rapid assessment of technologies and biomarkers discovered through a wide variety of technology platforms.

First-ever concept originated and implemented within EDRN for rapid evaluation of technologies and biomarkers

Example: Sample Reference Libraries

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	Reference Set A	Reference Set B
Clinical context	**Diagnosis of lung cancer**	**Early diagnosis of lung cancer**
Study design	**Case-control study**	**Case-control study**
Study population	**All suspicious lung lesions on CXR or on CT**	**CT screening**
Cases	**Lung cancers, ≥50% Stage I**	**Detected by CT- lung cancer >0.5cm and <3cm**
Controls	**Clinically free of lung cancer at 1year after enrollment 75 patients with other cancers (25 breast, 25 colon,25 prostate)**	**Detected by CT with a lung nodule >0.5cm and <3cm Detected by CT without a lung nodule All free of disease at the 1 year F/U CT 75 patients with other cancers (25 breast, 25 colon, 25 prostate)**
Matching criteria	**Age, sex, smoking status, PKYs**	**Age, sex, smoking status, PKYs**
Sample size Rapid pre-validation (1) Combined pre-validation (2)	**(1) 50 cases 100 controls, 25 other cancer controls (2) 475 (200 cases and 200 controls, 75 other cancer controls)**	**(1) 50 cases 100 controls, 25 other cancer controls (2) 675 (200 cases, 400 controls, 75 other cancer controls)**
Pulmonary diseases	**Enriched across whole population**	**Enriched in controls with CT detected lung nodules**
Institution provider candidates	**Pittsburgh, Vanderbilt, MDACC, Moffitt, NYU, UCLA, Mayo, Lovelace**	**Pittsburgh, Moffitt, NYU, UCLA, Mayo**

Alliance of Glycobiologists for Detection of Cancer

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- **Adds rigor to existing approaches in genomics and proteomics**
- **Consistent with the NCI comprehensive approaches to augment pre-emption, prediction, and prevention (3Ps)**
- **Consistent with the NIH Roadmap on Trans-Institutes Collaboration to accelerate discovery and clinical application**

DIVERSIFYING SEARCH FOR BIOMARKERS

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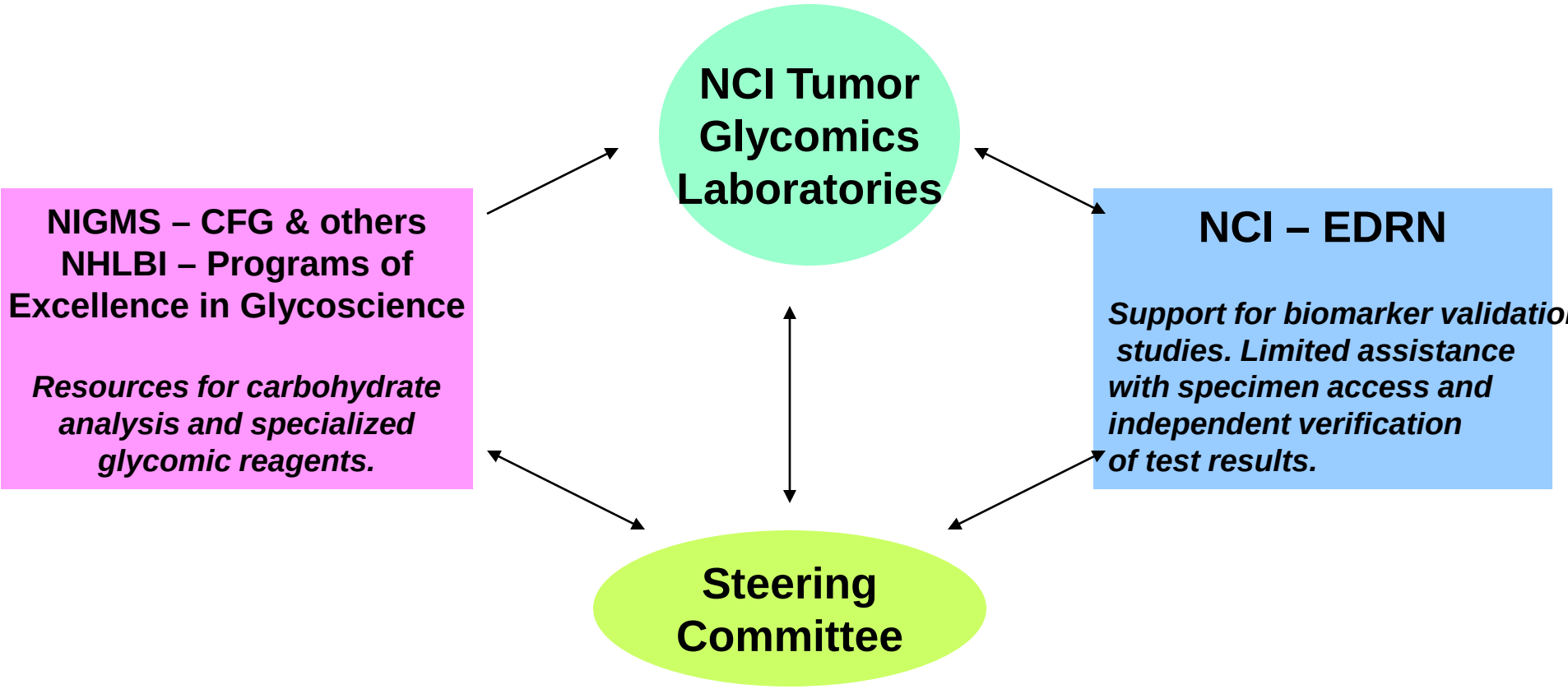
- **Cancer is a heterogeneous disease, actually a disease of diseases**
- **Single marker-based detection approach is not succeeding**
- **Multi-markers approach is gaining scientific validity and is desirable**
- **Integrated approach for 'Omics' markers are needed:**

Genomics
Epigenomics
Proteomics
Epitomics
Metabolomics
Glycomics

STRUCTURE OF THE ALLIANCE



Leveraging the Glycomics Programs From Other Institutes and EDRN

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- **Unique resource open for collaboration with NCI**
- **Developed glycomics technologies necessary to undertake cancer biomarker studies**
- **NCI , NIGMS, and NHLBI and can mutually benefit from a collaborative research effort in tumor glycomics.**
  - **NCI – capitalize on NIGMS resources, clinical validation of new biomarkers, novel therapeutic strategies**
  - **NIGMS & NHLBI – development of new tools and reagents pertinent to glycomic research, assimilation of additional glycan structures into their databases**

Team Science

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“The most successful and efficient research about molecular markers will require effective interdisciplinary communication and collaboration involving fields of molecular biology, observational epidemiology and biostatistics.”

Ransohoff, Nature Rev Cancer 2004; 4:309-314