

Translational Opportunities Joining Imaging with Genetics on the Path to Personalized Medicine: Part 2

**Gary S. Dorfman, M.D.
Vice-Chair for Research
Department of Radiology
Weill Cornell Medical College**

(No Relevant COI Disclosures)

Linking Imaging Phenotypic Data with “omics” Repositories

- **TCGA and NBIA participation by CTSA sites**
 - **Potential utility if submission of tissue and image datasets is “possible” within stated terms / conditions**
 - **Utility would be improved if imaging data were standardized; or varied per specified plan**
 - **Utility would be further improved if tissue-derived data were spatially co-registered to the imaging data**
 - **But – cannot specify conditions for the acquisition parameters of already completed acquisitions**
 - **Tissue – either meets standards or not**
 - **Imaging – either available or not (take it or leave it)**

Linking Imaging Phenotypic Data with “omics” Repositories

- What about heterogeneous imaging and/or tissue-derived data; can sample size truly overcome heterogeneity?
- Alternatives might include:
 - Linkage of image-guided biopsy “omics” with localized imaging phenotypes
 - Limited tissue may demand targeted analyses
 - Co-registration of excised tissue specimens with imaging datasets
 - Orientation of excised tissue with infinite degrees of freedom with imaging data acquired by non-isotropic protocol

Linking Imaging Phenotypic Data with “omics” Repositories

- TCGA / NBIA “alternatives” may be possible (instead of or in addition to)
 - Building on existing, prospective local CTSA biorepository activities
 - Using variants of TCGA and NBIA model
 - Incorporation of highly stipulated imaging protocols
 - CTSA planning / pilot grants to initiate linked imaging-biorepository activities
 - Likely needs specific hypothesis beyond “resource-building”
 - Could incorporate co-registered tissue acquisitions with highly stipulated imaging data

CTSA IWG Support of Linked Imaging-“omics” Repositories

- **First, is this a CTSA IWG priority? If so.....**
- **Educate CTSA members regarding TCGA and NBIA**
- **Catalogue existing local CTSA efforts**
 - **TCGA-like efforts with and/or without imaging**
 - **Determine the single site and multi-site opportunities**
- **Provide Imaging protocols**
 - **Standardized (UPICT)**
 - **Specified variants of UPICT protocols**
 - **To answer questions raised by UPICT and QIBA**
 - **To explore whether varying protocol components improves phenotypic prediction of “omic” signature**

CTSA IWG Support of Linked Imaging-“omics” Repositories

- **IT tools for imaging repositories and co-registration**
 - **Support the development / deployment of IT tools**
 - **Potentially in c/w NBIA, RSNA, industry, etc.**
- **Emerging imaging technologies (in c/w industry)**
- **Developing materials to assist local submissions to successfully compete for planning / pilot awards**
- **Providing an infrastructure to facilitate collaboration among existing and new imaging-biorepository efforts**
- **Work within NCRR / CTSA organizational structure to elevate the priority of such efforts**
- **Etc.**
- **But as stated, first determine is this a CTSA IWG priority?**