

Accompanying Collection (Enabling Future Research Alongside Current Research Studies)

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Agenda

- Introduction to STR-NCCS Tissue Bank
- Accompanying Collection alongside current studies
- Devising a solution
- Explaining accompanying collection

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Introduction to STR-NCCS Tissue Bank

Mission/Purpose

- To empower cancer research in NCCS / Singhealth by supporting ongoing research studies

Operational Focus

- To support the use of the additional collected HBM for research that synergize with use of **matched HBM from the same patient** to maximize research value.

2 approaches are:

- 1) **Catalogue** of all tissues held by NCCS researchers (including meta-data of analyses already performed)
- 2) **Accompanying collection**: Enabling future research **alongside** current research studies

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Future* research alongside current research studies

- Cohort studies - study a particular disease
- Clinical Annotation/Event - 2 types of samples

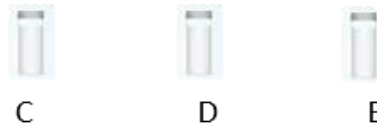
Scheduled collection:



Sample collection

- Samples linked to ongoing/upcoming studies
- Example: Lung, Colorectal, HNSCC, Lymphoma

Unscheduled Collection:



Banked for future research

- Staged Analyses (pending initial results or availability of assay platforms)
- Future Research (pending emerging literature, technologies)
- Future collaborations
- BUILDS UPON initial research Cohort/research findings

“Future”*

pre-planned intent to layer on additional analyses on

but “what” analyses is determined in the future

type of analyses, population subset not yet determined, depends on findings, literature, networks &

“serendipity”/opportunity

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When is an entity considered a TB?

Scenario 1: Where researcher is considered a TB

A researcher **intends to collect 10 ml of blood** – 5 ml of blood would be used for his/her own current HBR **while the other** 5 ml of blood would be stored for **future research studies** (i.e. collection of **additional** blood).

The researcher would be considered to be conducting tissue banking activities not just for his/her own IRB-approved HBR and **would need to be a TB or come under the supervision and control of a TB.**

Scenario 2: Where researcher is not considered a TB

A researcher **intends to collect 10 ml of blood** – the entire 10 ml was intended to be used in his/her own current HBR; however he/she only used 5 ml in the research and the other 5 ml was **leftover**. The researcher decides to use the leftover blood for his/her other own IRB-approved HBR.

The researcher would be considered to be conducting tissue banking activities just for his/her own IRB-approved HBR. Hence the researcher **would not need to be a TB or come under the supervision and control of a TB**, until he/she decides to supply the leftover blood to other researchers.

When to use scheduled, unscheduled and accompanying collection

- Scheduled Collection: collecting HBM for IRB protocol only.
- Unscheduled collection: collecting specimens not linked to any study.
- Accompanying collection: enabling future research alongside current research studies (additional samples for future research analyses that are not yet pre-defined) for patients in current cohorts.

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Two Approaches to synergize research with use of matched HBM from same patient

- 1) A **comprehensive catalogue** of all human tissue held by researchers. (including: HBM availability, clinical information and generated molecular information, generated patient-derived material)
- 2) An **accompanying collection workflow** where tissue samples can incrementally build upon ongoing research, in matched samples in well annotated longitudinal patient cohorts.

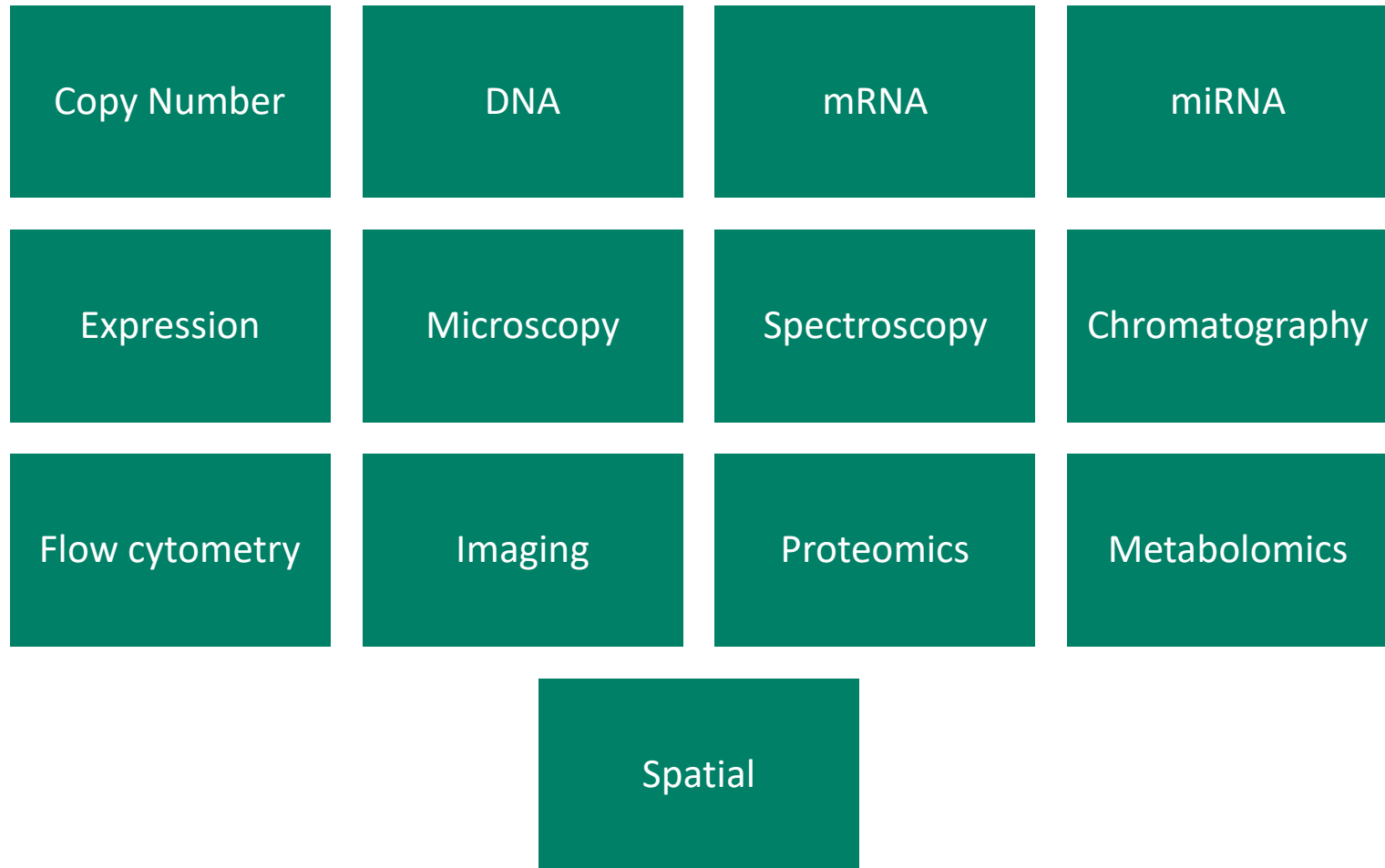
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Catalogue of HBM within NCCCS

- A comprehensive, well-annotated catalogue of all HBM available within NCCCS will allow us to form linkage between HBM used for current research and future research.
- This allows for synergy between current and future research. This allows for future research to build upon current research.

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Categories of Metadata



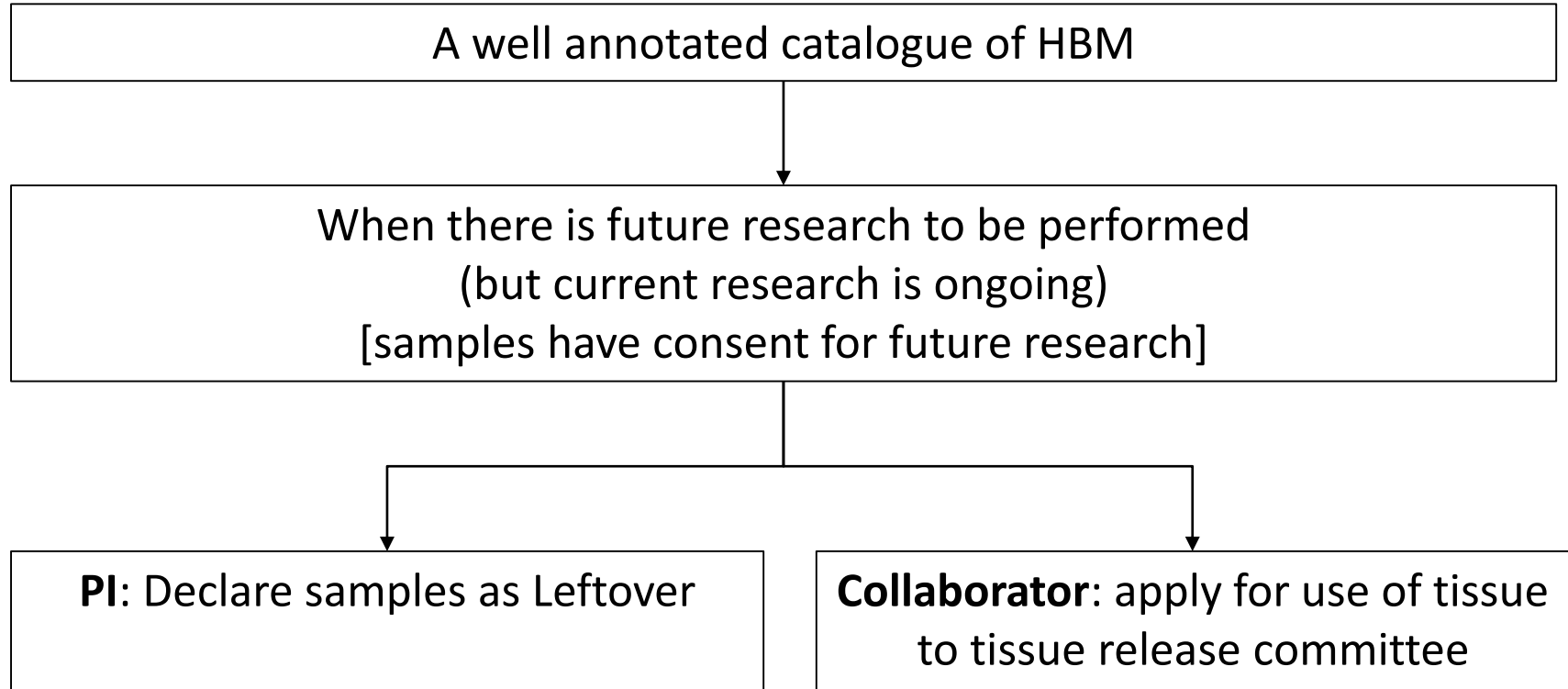
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Categories of Metadata

SNP microarray	Copy Number Microarray	Low-pass DNA sequencing	Whole Exome	Whole Genome	SNP microarray	Sequence trace	mRNA sequencing
total RNA sequencing	Microarray	FISH	M-FISH	MERFISH	miRNA sequencing	Array-based	RNA expression
Promoter expression	Protein expression	Posttranslational modification	Paraffin	Frozen sections	Semithin section	Cell microscopy	UV-Visible
Circular Dichroism	Atomic Absorption	Nuclear magnetic resonance	Infrared	Thin layer	Ion exchange	Affinity	Size Exclusion
HPLC	FACS	Cytometric bead	Coulter counter	X-ray	MRI	Computed tomography	Mammogram
Ultrasound	Positive emission tomography	IHC	mIHC	highly-mIHC	Bulk Mass spectrometry	Cytometry by time of flight, single-cell	Metabolic fingerprinting
	Targeted metabolites panel assay	Untargeted metabolite assay	Stable isotope tracer	Area of interest (AOI)-based	Grid-based	Single-Cell resolution	

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Existing collections (already collected)



* Leftover: tissues deemed best used for another analyses/study

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STR Tissue Release Committee (STR-TRC)

Purpose

To review and approve applications for withdrawal of Human Biological Material (HBM) from STR and her satellite and sub-satellite banks.

Position	Name	Designation
Chairman	A/Prof Iain Tan	Director, STR-NCCS Satellite Bank
Member	A/Prof Kenneth Chang	Director, STR
Member	A/Prof Lim Chwee Ming	Director, STR-SGH Satellite Bank
Member	A/Prof Ng Heng Joo	Director, STR-SGH Sub-satellite Bank (Haematology)
Member	A/Prof Tang Choong Leong	Director, STR-SGH Sub-satellite Bank (Colorectal Surgery)
Member	A/Prof Javed Iqbal	Senior consultant, Department of Anatomical Pathology
Member	A/Prof Benita Tan	Chairman, Division of Surgery, Sengkang Health

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Current/Ongoing studies (to be collected)

PI registers study as a Scheduled Collection and Accompanying Collection
(apply to STR or STR@NCCS)

For tissue collections:
Current Research: PI collects or enlist STR/STR@NCCS for scheduled collection
Accompanying collection: enlist STR/STR@NCCS (Directors/Associate Directors)
for accompanying collection

A well annotated catalogue of HBM

When there is future research to be performed:
Apply to Tissue Release committee

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Associate Directors of Tissue Bank

The key is to synergize the tissue bank activities of NCCS tissue bank Satellite Repository (STR-NCCS) with NCCS's ongoing research.

1. Upper GI - Dr Matthew Ng Chau Hsien
2. HPB - Prof Pierce Chow Kah Hoe
3. Lower GI – A/Prof Iain Tan
4. Haematolymphoid - Prof Lim Soon Thye
5. Paed malignancy - Dr Amos Loh Hong Pheng
6. Gynae - Dr Lim Hsuen Elaine
7. Breast - Dr Veronique Tan Kiak Mien
8. Lung - A/Prof Daniel Tan Shao Weng
9. Head and neck – A/Prof Darren Lim Wan Teck
10. Urogenital - A/Prof Melvin Chua
11. Skin and soft tissue - Dr Johnny Ong
12. Brain - Dr Tham Chee Kian
13. Blood collections across cancers – A/Prof Iain Tan & A/Prof Melvin Chua
14. Other collections - A/Prof Iain Tan & A/Prof Daniel Tan

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New Workflow for STR UnScheduled and Accompanying Collection

(1) Consent taking

- Staff conducting the research protocol and TBA will perform consent taking as per the approved research protocol.
- Consent will be obtained for collection of extra HBM that accompany the research protocol.
- This may either be through the STR broad consent form or existing study consent form incorporating all the 12(2) elements of HBRA.



(2) Tissue harvesting, HBM collection and processing

- Tissue harvesting, collection and processing of HBM will be adapted to existing HBM collected in the study



(3) Coding, labelling and storage of HBM

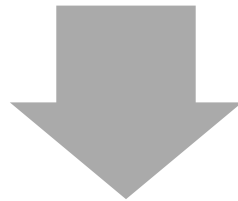
- All banked HBM are de-identified with de-identified study code or TRID number.
- User access control will be implemented, allowing only authorized STR and satellite bank personnel to access the records.

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New Workflow for STR UnScheduled and Accompanying Collection

(4) Quality Assessment

- HBM will be processed and assessed for quality according to each study protocol for maximum research utility.

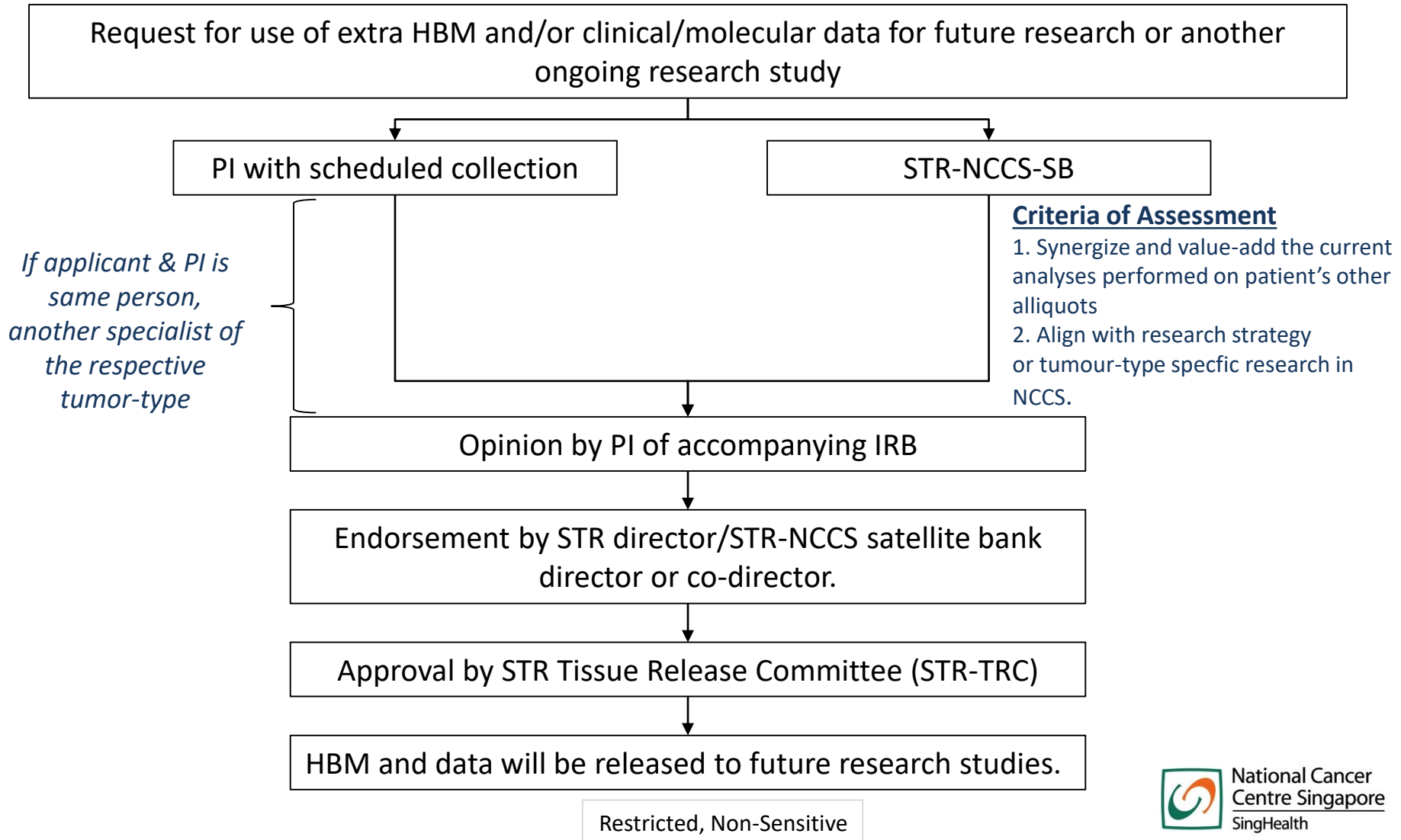


(5) Data Collection and Inventory

- HBM inventory
- Sample information
 - Primary material : time-point, organ site, sample type (frozen, dissociated), #alliquots, location
 - Secondary/derived material: nature, location
- Experimental data (categories) generated from material
 - e.g. exome, RNAseq, Drug Screen
 - Location & owner of data
- Clinical data – "layer 1 clinical data" *in collaboration with PI & DCI*
 - PI will hold layer 2 clinical information

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Accompanying Collection Workflow *(Release of HBM for Future Research)*



Advantages of Accompanying Collection

Discrete/Segregated Accompanying Collection

- Differentiation between types of collection
 - “routine”: no other annotation performed
 - “annotated”: detailed clinical/molecular & generated resources

Protocol specifications

- Processing of samples for future research to fit existing study design
- Collection of additional samples (blood/tissue) based on future clinical procedures/clinical events

Catalogue of generated data and Access to query of detailed data

- Catalogue of generated data & resources **per sample** (base data)
- Access to granular molecular and clinical data (granular data)

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Advantages of Accompanying Collection

Case Selection Mechanism

- Ability to request **superficial** query of types of datasets available **or** generated resources **or** baseline clinical phenotype
- Ability to request **deep** query of subsequent clinical progress **or** molecular findings to select specific cases

Scientific assessment

- Detailed assessment of scientific synergy of future research to **build upon** current research.
- Detailed assessment of alignment with thematic goals of research program
- Appeal Process for review of applications

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THANK YOU!

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