Storing for the future – the H3 Africa Biorepositories

Clinical Laboratory Services (CLS) South Africa: PI: Elizabeth Mayne

Integrated Biorepository of H3Africa in Uganda (IBRH3AU) PI: Moses Joloba

Institute of Human Virology-Nigeria H3Africa Biorepository (I-HAB) PI: Alash’le Abimiku
Regional Distribution of Project to the Three H3A Biorepositories

**Western Africa**
Institute of Human Virology Nigeria H3Africa Biorepository (I-HAB)

**Southern Africa**
Clinical Laboratory Services, South Africa (CLS)

**Eastern Africa**
Integrated Biorepository of H3Africa in Uganda (IBRH3AU)
H3Africa Biorepository Resources

http://h3africa.org/consortium/documents

Guidelines
- Guidelines on specimen processing, storage, and shipment
- Guidelines and Data and Biospecimen Access Policy documents

Standard Operating Procedure (SOPs)
- Nine SOPs on sample collection
- Twelve SOPs on sample processing
- Five SOPs on sample quality control
- Four SOPs on shipment of biospecimens

Standardized Forms
- Biospecimen deposit
- Biospecimen shipment notification
- Shipment manifest
- Receipt confirmation
- Shipment checklist
H3A Biospecimen Ethics & MTA Regulations

- All biospecimens are collected with specific informed consent

- Informed consent documentation shall be submitted together with the biospecimens to guide future use

- An H3A MTA is available to enable biospecimen submission and distribution

- H3A biospecimen distribution & use shall be regulated by the DBAC

H3Africa Biorepository
Biological Deposit Material Transfer Agreement (BDMTA)

The purpose of this agreement is to provide a record of the transfer of original biological materials (biospecimens) from H3AFRICA (H3A) PRINCIPAL INVESTIGATORS (PROVIDERS) to the HOST H3A BIOREPOSITORY, and to memorialize the agreement between the PROVIDER INSTITUTION and the H3A HOST BIOREPOSITORY to abide in future transfers by all terms and conditions of this Agreement. The BDMTA also covers transfer of minimum essential data associated with the biospecimens, as described in the H3AFRICA Biospecimen Submission Policy and Procedures [insert link to website].

The PROVIDER, HOST H3A BIOREPOSITORY PRINCIPAL INVESTIGATORS, and the official authorized to make legal commitments on behalf of both institutions (SIGNING OFFICIAL) should sign the BDMTA and maintain original and/or electronic copies, according to local requirements. Upon receipt of the fully signed agreement, the H3A PROVIDER will forward the biospecimens to the HOST H3A BIOREPOSITORY.

1. DESCRIPTION OF BIOSPECIMENS AND ASSOCIATED DATA

Type (DNA, cell line, serum, etc.)

Origin (human, animal species)

Diagnosis (controls, disease phenotypes, etc.)

Please insert below or attach a complete list of the essential data variables associated with the biospecimens (Sample ID, etc.)

Termination Date of Agreement (OPTIONAL)

IBRAU

global cultural heritage

H3 Africa Biorepository

NATIONAL INSTITUTES OF HEALTH
Technical Updates

• Integrating pilot study results into biospecimen submissions
  – Shipping temperature monitoring
  – DNA Quality Control
  – External quality assurance

• Shipping cost estimates
Pilot study observations and opportunities

- Identification of appropriate point person
- Identification of correct forms and documentation
- Optimisation of shipping including temperature monitoring
- Appropriate quality control and storage
- Data transfer

Identification of appropriate quality control and storage
Pilot Study Observations & Opportunities

- Incorporation of document and process review into scheduled meetings enhanced specimen transfer and understanding of phase II processes
- Use of temperature monitoring devices provided transit readings that were critical during shipments to determine lapses
- Use of CSV file enhanced data transfer and import into the LIMS
- Hands on training enhanced skills on biospecimen collection & QC, storage and transportation, thereby ensuring that high quality samples are deposited for genomic studies
- Gels proved useful in resolving discrepancies in DNA QC due to visual differences in concentration and integrity
- Identification of point person(s) by PIs significantly improved communications and progress
## Shipment Cost Estimates Across Biorepositories

<table>
<thead>
<tr>
<th>Temperatures</th>
<th>Weight / 9x9 boxes</th>
<th>#</th>
<th>DHL</th>
<th>World Courier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient</td>
<td>12kg/1</td>
<td></td>
<td>$434.68</td>
<td>$1,816.00</td>
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<tr>
<td>Refrigerated</td>
<td>12kg/1</td>
<td></td>
<td>$434.68</td>
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<tr>
<td><em>Frozen</em></td>
<td>25kg/1</td>
<td></td>
<td>$5,091.72</td>
<td>$4,551.72</td>
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</tbody>
</table>

*Note: Full capacity of M3 box used for frozen shipment is 10, 9x9 boxes (810 vials).*

1. Turn around time is about 3-4 days
2. Controlled ambient is cheapest and adequate for DNA shipment
3. Credo shipper have proved to be an affordable and reliable means of shipment at varied temperatures (4°C, -20, -50) as it holds the appropriate temperature for up to 5 days.
Shipping temperature monitoring

- Temperature fluctuated outside the acceptable limits in xxxx% of pilot samples shipped.
- This included xx% of samples shipped at ambient temperature.
- This fluctuation was attributed to ….

Proposed solutions:

- Temperature monitor:
  - Reusable for 1 year
  - Quantitative monitoring
  - Cost - $180 per device, $180 for software and $100 for USB interface.
  - [www.sensitech.com](http://www.sensitech.com)

- Temperature indicator:
  - Single use (disposable)
  - Cost - $1.50 each.
  - [www.telatemp.com](http://www.telatemp.com)
Established Quality Control For DNA Samples

1. NanoDrop and gel electrophoresis give reasonable concentrations of DNA and an indication of purity.

2. Qubit discriminates between double-stranded DNA from other forms that absorb at 260nm and is ideal for estimating sample concentration for experiments that require accurate concentrations of double stranded DNA.
DNA and RNA gel electrophoresis

DNA & RNA:
Electrophoresis

1 2 3 4 5 6
Nanodrop machine and Qubit
QA/QC of Submitted Samples

– QC Phase One (Yr 1)
  • QC required for minimally 10% of samples
  • QC samples clearly labeled and/or indicated on accompanying paperwork such as Biospecimen Submission Form
  • Inconsistencies/indicators of poor quality to be flagged and reported to sites

– QC Phase Two (Yr 2)
  • Depending on QC performance sites move to a minimum of 1% QC
  • Can be reviewed depending on performance
External Quality Assurance

Examples of Proficiency certification by Integrated BioBank of Luxembourg (IBBL) and International Society for Biological and Environmental Repositories (ISBER)

Certificate of Participation
in the DNA Extraction from Whole Blood
This is to certify that Institute Of Human Virology H3Africa Biorepository Nigeria (Participant code: L560) has participated in the Biorepository Proficiency Testing Program 2015 DNA Extraction from Whole Blood Round 1. This participant has been evaluated against the performance target set by the ISBER Proficiency Testing Advisory Group, which is comprised of representatives from multiple countries. The results of this evaluation were provided to the participant in February 2016. (Report reference: DNA052015_Report01).
Results were very satisfactory.

Fay Betou, PhD, HDR
IBBL Proficiency Testing Program Coordinator

Certificate of Participation
in the RNA Quantification and Purity
This is to certify that ibrh3au (Participant code: L123) has participated in the Biorepository Proficiency Testing Program 2015 RNA Quantification and Purity Round 1. This participant has been evaluated against the performance target set by the ISBER Proficiency Testing Advisory Group, which is comprised of representatives from multiple countries. The results of this evaluation were provided to the participant in February 2016. (Report reference: RNAQ15BL_Report01).
Results were very satisfactory.

Fay Betou, PhD, HDR
IBBL Proficiency Testing Program Coordinator
Project Updates

- I-HAB: Abuja, Nigeria
- IBRH3AU: Kampala, Uganda
- CLS: Johannesburg, South Africa
## I-HAB Specific Update: Project Interactions

<table>
<thead>
<tr>
<th>Projects</th>
<th>Achievements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1 - Initiation:</strong></td>
<td>• Initiate emails to review phase II activities</td>
</tr>
<tr>
<td></td>
<td><strong>Steps completed</strong></td>
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<tr>
<td>Stroke Network (SIREN):</td>
<td>Mayowa Steps 1-5 Pilot shipment, Planned training for April. 2016</td>
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<tr>
<td>KDRN: Ojo/Dwomoa</td>
<td>Steps 1-4 Pilot Shipment</td>
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<tr>
<td>-ACCME: Adebamowo</td>
<td>Steps 1-2; Document review</td>
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<tr>
<td>RAFAgene: Dissou</td>
<td></td>
</tr>
<tr>
<td>Febrile illness: Happi</td>
<td>Step 1 in progress</td>
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<tr>
<td>Neurological disorders:</td>
<td></td>
</tr>
<tr>
<td>Landoure</td>
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</table>

<table>
<thead>
<tr>
<th>Projects</th>
<th>Achievements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2 - Review:</td>
<td>• Review and work through the H3A documents</td>
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<tr>
<td></td>
<td><strong>Steps completed</strong></td>
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<tr>
<td></td>
<td><strong>Steps completed</strong></td>
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<tr>
<td>Step 3 - Define workflow:</td>
<td>• Define workflow and plans for transport logistics</td>
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<tr>
<td></td>
<td><strong>Steps completed</strong></td>
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<tr>
<td>Step 4 - Pilot:</td>
<td>• Execute shipment pilot and process samples and data</td>
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<tr>
<td></td>
<td><strong>Steps completed</strong></td>
</tr>
<tr>
<td>Step 5 - Analysis:</td>
<td>• Analyze results and document lessons learned</td>
</tr>
<tr>
<td></td>
<td><strong>Steps completed</strong></td>
</tr>
</tbody>
</table>
IBRH₃AU Specific Updates

- H3Africa biorepository program website was completed and launched
- Two staff completed training with a Certificate in Principles in Biobanking of University of Luxembourg
- Participated in the 2015/16 ISBER-endorsed IBBL QMS/EQA scheme with Satisfactory Results
- Procurement of data management systems completed and software installed
- Ethics, legal and regulatory issues – All staff completed an annual refresher training in GCLP as recommended by the IRB
IBRH₃AU Specific Updates

- Performed a site visit to Ethiopia to assess the requirements for the research team for the biorepository services
- Preparations for the MTA are advanced for the utilization of the biorepository
- More site visits are planned with other research sites within the region
- Members are represented on the Biorepository PI WG manuscript groups
- Renewed membership to international standards bodies – ISBER & ESBB
Pilot study observations and opportunities

POINT PERSON: Mark Nicol group
FEBRUARY 2016

Regular teleconferences established
ONGOING

Issuing of correct forms and documentation to Nicol site
ONGOING

Sign off workflow and shipping documents by both parties

Set up dedicated secure file transfer protocol (location and credentials)

Test workflow and documentation by setting up a data and specimen pilot project
CLS Specific Updates: Receipt of Specimens from Sydney Brenner Institute for Molecular Biology

- First specimens received from SBIMB submission site on the 16th February 2016
- H3Africa shipping and manifest document customized to submission site workflow to enable seamless specimen and data transfer
- Quality control performed on 5% of received DNA specimens
- Banked specimen count at 1235
- As per agreement with submission site 2 - 4 96 well plates with extracted DNA to be shipped weekly to the Biorepository
Sustainability, education and engagement

• Continue working with mapped genomics projects to build biorepository collections
• Adapt the current forms and shipping procedures for release of biospecimens to future authorized users
• Refine publication and presentation plans to ensure that the H3 biorepositories continue to contribute to capacity building in Africa
• Look at engaging with strategic partners to ensure sustainability of the H3 biorepositories into the future
**Next Steps**

- Continue working with mapped genomics projects to build biorepository collections
- Adapt the current forms and shipping procedures for release of biospecimens to future authorized users
- Disseminate pilot study findings, policies and procedures in international biobanking journals and conferences.
H3Africa Biorepository Resources

http://h3africa.org/consortium/documents

- Guidelines
- SOPs
- Forms
KEEP CALM AND STORE DNA