A biological bank of liver samples and related information intended for hepatocellular carcinoma research

Osman Zin Al-Abdin

Liver Disease Research center
King Saud University, Riyadh, Saudi Arabia
Objectives

- Liver disease in Saudi Arabia
- Liver Disease Research Center mission and outcomes
- Establishment of a Liver Disease Biobank
- CAISIS Data Management Registry
- Quality Assurance controls of biospecimen collected
Background

- Liver disease is a major medical problem in Saudi Arabia
- 7% of Saudi children have HBsAg (before vaccine program)
- 2% have Hepatitis C
- HCC is the most common cancer in Saudi men
- Nonalcoholic fatty liver disease (NAFLD) is currently the most common form of chronic liver disease
- 20% of Saudis have diabetes
- 25% of Saudis are obese
KSU Liver Disease Research Center

- An effective research infrastructure for liver disease research in Saudi Arabia.
LDRC Objectives

- To engage in high quality basic and clinical research to improve our understanding of the pathology, diagnosis, and management of liver diseases
- To perform basic science research in the field of virology, genetics, and proteomics of liver diseases
- To promote the culture of clinician scientists
- To build a Biobank and a clinical registry
Collaborations

- McGill University, Canada
- University of Calgary, Canada
- National Liver Institute, Egypt
Overall Design

*Biobank Resource Center documentation templates
Blood Processing
Biospecimens

Total Blood
- Clot activator, silicone coated interior
- EDTA

Serum
- 1
- 2
- 3
- 4
- 5

Plasma
- 1
- 2
- 3
- 4
- 5

BFC*
- 1
- 2
- 3

Whatman**
- RNA

PAXgene

Stool
- feces tube

1

*Buffy coat; **Whatman FTA Elute card;
Quality Assurance End Products

- **Traceability**
  - Creation of Worksheet system
  - 15 worksheets that record every step and log the materials used

- W1 Informed consent signature
- W2 Questionnaire administration
- W3 Blood collection
- W4 Blood reception
- W5A Blood processing
- W6 Blood storage
- W7 Urine collection
- W0 Data entry (collection; verification of all worksheets for each specific case)

- W8 Urine processing
- W9 Urine storage
- W10 tissue collection
- W11 tissue reception
- W12 tissue freezing
- W13 Storing tissue
- W14 Stool collection
- W15 Stool storage
PARTICIPANT FILE

W1 - CONSENT FORM SIGNATURE WORKSHEET

Identification

FLS1P00 V0 -CSF1

Information on the administration of the Consent form

Signature Date: ___/___/_____  Signature time: _____:____  □ AM □ PM
   dd / mm / yyyy           (hr) (min)  □ PM

Consent form version: □ English  □ Arabic

Revised date: ___/___/_____  dd / mm / yyyy
               ___/___/_____  dd / mm / yyyy

□ I confirm that the identity of the participant has been verified

Initials

Effective Date: 22/01/2009
Worksheet system v1.4
Confidential
Replace: 29/11/2006
Page 1/18
## Quality Assurance End Products

### PARTICIPANT FILE

#### W4 - BLOOD RECEIPT WORKSHEET

**Receipt**

- **Date:** `___ / ___ / ____`  
- **At:** `_____ : _____`  
  - `[ ] AM`
  - `[ ] PM`

- Serum tubes were kept at room temperature for 1 hour.
- PAXgene tube were kept at room temperature for 2 hours.

<table>
<thead>
<tr>
<th>Type of tube</th>
<th>Time at refrigeration</th>
<th>Number of tubes received</th>
</tr>
</thead>
<tbody>
<tr>
<td>SERUM (Red)</td>
<td><code>___ : ___</code></td>
<td><code>___ ml</code></td>
</tr>
<tr>
<td></td>
<td><code>(hr)</code> <code>(min)</code></td>
<td></td>
</tr>
<tr>
<td>PAXgene (Brown)</td>
<td><code>___ : ___</code></td>
<td><code>___ ml</code></td>
</tr>
<tr>
<td></td>
<td><code>(hr)</code> <code>(min)</code></td>
<td></td>
</tr>
<tr>
<td>EDTA (Lavender)</td>
<td><code>___ : ___</code></td>
<td><code>___ ml</code></td>
</tr>
<tr>
<td></td>
<td><code>(hr)</code> <code>(min)</code></td>
<td></td>
</tr>
</tbody>
</table>
Non-alcoholic fatty liver disease (NAFLD)

1. The Effects of Bariatric Surgery on Non-alcoholic Fatty Liver Diseases

2. Prevalence of Non-Alcoholic Fatty Liver Disease in Patients with Gallstone Disease
# Biospecimen collected from NAFLD

<table>
<thead>
<tr>
<th>SUMMARY</th>
<th>Total Banked Specimens</th>
</tr>
</thead>
<tbody>
<tr>
<td>PARTICIPANTS</td>
<td>403</td>
</tr>
<tr>
<td>BLOOD</td>
<td>325</td>
</tr>
<tr>
<td>PAXgene</td>
<td>145</td>
</tr>
<tr>
<td>LIVER TISSUE</td>
<td>245</td>
</tr>
<tr>
<td>Subcutaneous fat, Visceral fat and Abdominal muscle</td>
<td>79</td>
</tr>
</tbody>
</table>
Tissue Processing
Other Samples

LDRC biobank samples:

- HCV = 949 blood samples, no liver tissue
- HBV = 1904 blood samples, no liver tissue
- HCC = 341 blood samples, 7 primary liver neoplastic tissue
Dear LDRC Biobank,

Please accept this letter as documentation that you have completed all of the requirements of the UBC Office of Biobank Education and Research Biobank Certification Program.
Welcome to CAISIS

Please enter your username and password on the right to begin.

The application will automatically log out after 60 minutes inactivity.

Please update your password on your first login.

If you need assistance, use the help link from anywhere in the application to contact the system administrator.

username: erobles
password: **********

Purpose:  
- Clinical
- Research
- Operations

enter

change your password

forgotten your password?
HOME SCREEN
Data Systems and Records Management Registry
## Data Systems and Records Management Registry

**Manage Storage**

Select a storage level to view its contents. For further information on a level, click the applicable icon.

<table>
<thead>
<tr>
<th>Site</th>
<th>Storage/Shelf</th>
<th>Container/Rack</th>
<th>Box</th>
</tr>
</thead>
<tbody>
<tr>
<td>LORC</td>
<td>Thermocentric Freezer #1</td>
<td>HBV and HCV Rack #1</td>
<td>PLASMA &quot;1&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gallstone Study Rack #1</td>
<td>Biliary Coat &quot;1&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gallstone Study Rack #2</td>
<td></td>
</tr>
</tbody>
</table>

**Add New Site**

<table>
<thead>
<tr>
<th>Add New Storage</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Add New Container</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Add New Box</th>
</tr>
</thead>
</table>
Data Systems and Records Management Registry
### Specimen Accessions for MMW MMW

<table>
<thead>
<tr>
<th>Collection Date</th>
<th>27/08/2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collection Time</td>
<td>14:00</td>
</tr>
<tr>
<td>Received Condition</td>
<td>Fridge</td>
</tr>
<tr>
<td># EDTA Tubes</td>
<td>1</td>
</tr>
<tr>
<td>Date Frozen</td>
<td>29/06/2012 08:00</td>
</tr>
<tr>
<td>Time Frozen</td>
<td>15:20</td>
</tr>
<tr>
<td>Institution</td>
<td>RZH</td>
</tr>
</tbody>
</table>

- **Blood Collection Location**: Thibotony Lab
- **Method of Collection**: 
- **Time Received in Lab**: 15:00
- **RED TOP Capped Tubes**: 3
- **YELLOW TOP Gel Tubes**: 5
- **Other Tube Type**: RUGene
- **# Other Tubes**: 2

#### Specimens (8)

<table>
<thead>
<tr>
<th>Identification</th>
<th>Box : Position</th>
<th>Type</th>
<th>Sub Type</th>
<th>Status</th>
<th>Original Qty</th>
<th>Units</th>
<th>Storage Type</th>
<th>Remaining Qty</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>FL5130045</td>
<td>SER1, Bc</td>
<td>43</td>
<td>Blood</td>
<td>Available</td>
<td>1.0</td>
<td>ml</td>
<td>-80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FL5130046</td>
<td>SER1, Bc</td>
<td>44</td>
<td>Blood</td>
<td>Available</td>
<td>1.0</td>
<td>ml</td>
<td>-80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FL5130045</td>
<td>PLA1 Box</td>
<td>45</td>
<td>Blood</td>
<td>Available</td>
<td>1.8</td>
<td>ml</td>
<td>-80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FL5130045</td>
<td>PLA1 Box</td>
<td>46</td>
<td>Blood</td>
<td>Available</td>
<td>1.8</td>
<td>ml</td>
<td>-80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FL5130045</td>
<td>PLA1 Box</td>
<td>47</td>
<td>Blood</td>
<td>Available</td>
<td>1.2</td>
<td>ml</td>
<td>-80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FL5130045</td>
<td>BRC1, Bc</td>
<td>34</td>
<td>Blood</td>
<td>Available</td>
<td>0.7</td>
<td>ml</td>
<td>-80</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Phase II – Quality Control

- The LDRC Biobank should be confident that it is providing nucleic acids that is suitable for meaningful gene expression data.
Blood RNA: Quality Assessment

- Agilent 2200 TapeStation system

- For RNA quality analysis RIN equivalent (RINe) is indicated (n=16)
Quality of frozen tissue

- A quality score based on “Collection time” is applied to categorize one scale of tissue biospecimen quality
Research Needs

Scientists  Laboratories

Human Samples  Money

“Who ever has the biologic material will drive the discoveries”
Special thanks to our team at the LDRC family!

- Dr. Ayman Abdo
- Dr. Mazen Hassanain
- Dr. Anthoula Lazaris
- Dr. Peter Metrakos
- Dr. Walid AlHamoudi
- Dr. Khaled AlSwat
- Dr. Faisal AlSaif
- Dr. Kinjal Vora
- Dr. Nehad AlAjez
- Esther Robles
Challenges

- To recruit the right people
- To establish successful international collaborations
- To expand the SOLID database
- To effectively run clinical trials
- Interrupted funding

The best is yet to come.