Burkitt Lymphoma Research in East Africa: Lessons from the EMBLEM Study

**Background and Etiology**

Burkitt lymphoma (BL) is an aggressive non-Hodgkin B-cell lymphoma first described by Denis Burkitt in 1958 in African children. It manifests as the following subtypes.

- **Endemic** — occurs worldwide, but 10-100 times more frequent in equatorial Africa, involving 2 rural lake-shore or riverine areas. Regional risk factors include exposure to malaria, Vector, immune suppression (HIV, HTLV-1), and EBV infection.
- **Immunodeficiency-related** — occurs in persons with HIV, EBV infection, but the role of malaria and EBV in BL etiology is unknown.
- **Sporadic** — occurs in persons without HIV, EBV infection, and malaria. Rare regions include the United States, Europe, and Australia.
- **Immunodeficiency not due to HIV** — occurs in persons with HIV, EBV infection, and malaria.

**Case Definition:**

Cases are newly diagnosed, untreated BL residing in defined geographic regions.

**Methods:**

In 2010, the National Cancer Institute (NCI) launched a population-based case-control study. The study design is a population-based case-control study with controls matched to cases by age, gender, and residence.

**Current and Future Plans:**

EMBLEM has also: initiated preliminary studies of malaria biomarkers, documented historical BL experience in East Africa, and obtained ethical approval in all three countries and from local Health Ministry officials.

**Current Status:**

Biospecimen Collection

<table>
<thead>
<tr>
<th>Specimen Type</th>
<th>Uganda</th>
<th>Tanzania</th>
<th>Kenya</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frozen tissues</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Tissue blocks</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Slides</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Saliva</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Buffy coats</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>RBCs</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Plasma samples</td>
<td>3,981</td>
<td>143</td>
<td>208</td>
<td>4,332</td>
</tr>
</tbody>
</table>

**Biopsies/Specimens:**

Additional tasks include: DNA extraction and genetic testing using GWAS, tumor genome sequencing, and implementing a registry.

**Financial Support:**

The study is supported by NCI and the National Institutes of Health (NIH). The study is also supported by the Uganda Virus Research Institute, the Kenya Medical Research Institute (KEMRI), and the Uganda Cancer Institute.

**Acknowledgments:**

The study team would like to acknowledge the contributions of all study participants, their families, and the local communities in East Africa. The team would also like to thank the National Cancer Institute (NCI) and the National Institutes of Health (NIH) for their support.

**References:**

