A Plan for a Long Term Investigation of Human Exposure to West Nile Virus in Fremont County, Wyoming

Joy Watkins, Kaylan Schilling, Adam Conner, Shanda Barlow, Grant Hosking and Kelvin Kinyatta with Steven McAllister
Division of Health Science and Public Safety
Central Wyoming College
Virus Classification:

- **Discovery:** Uganda, 1937
  Detected in U.S. 1999

- **Family:** *Flaviviridae*
  Other members: Dengue Fever, Tick Borne Encephalitis, Yellow Fever, and Zika Virus

- **Arbovirus** (arthropod borne)
Symptoms:

• Fever
• Malaise
• Skin rash
• Lymphadenopathy

Complications:

• Meningitis
• Encephalitis
• Polio-like paralysis
Humoral Function:

• Ig’s produced by B-cells (after infection)

• Normally 1-3m class switch

• Direct neutralization

• Opsonization

• Agglutination
### Serosurvey Conducted with IgM and IgG Titers

<table>
<thead>
<tr>
<th>Researcher</th>
<th>IgM Persistance</th>
<th>RT-PCR</th>
<th>Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Papa, 2015</td>
<td>3 years post</td>
<td>No</td>
<td>10 of 26</td>
</tr>
<tr>
<td>K Murray, 2013</td>
<td>1, 6, 8 years post</td>
<td>No</td>
<td>42, 34, 23%</td>
</tr>
</tbody>
</table>

### Urine Collection Assessing Viral Presence

<table>
<thead>
<tr>
<th>Researcher</th>
<th>IgM/IgG Positive</th>
<th>RT-PCR</th>
<th>Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>K Murray, 2010</td>
<td>Yes, 6.7 years</td>
<td>Yes, +</td>
<td>5 of 25</td>
</tr>
<tr>
<td>K Gibney, Baty 2010</td>
<td>Yes, 6 years</td>
<td>Yes, -</td>
<td>40</td>
</tr>
</tbody>
</table>
K Murray, 2013, Percentages of participants (N = 163) with detectable IgM or undetectable IgG by year post-infection.
RT-PCR in combination with ELISA

Primers for Protein Genes:
- prM, and M: pre-membrane and membrane proteins
- E: envelope protein
- C: capsid protein

Viral RNA
Lipid Membrane
Capsid Protein
E Protein
prM Protein
CWC Longitudinal Study

- Identify and track subjects infected or previously infected with WNV
- Assess additional subjects expressing high titration of IgM long after exposure
- Increase sample population and testing time frame
- Test individuals for cryptic infection through reverse transcriptase PCR
- Investigate if IgM and IgG are elevated in tandem with virus replication
Acknowledgements:
This project is supported in part by a grant from the National Institute of General Medical Sciences (2P20GM103432) from the National Institutes of Health. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

We thank Dr. Scott Seville and the University of Wyoming INBRE network for their support in this research.
Works Cited


