Recirculating Phagocytes are a *Novel Source* of Biomarkers for Brain Injury

Ramesh C. Nayak, Ph.D.*, Timothy Vollmer, M.D.*, Roberto Bomprezzi, M.D.*, Ray Jacolik, B.S.*

*1MSDx, Inc., Tucson, Arizona. 2UC, Denver, Colorado, 3Barrow Neurology Institute, Phoenix, Arizona
• CNS antigens are present in PBMCs of Multiple Sclerosis Subjects

• May be a means of monitoring active neurodegeneration

• Potential to identify resolving versus progressing TBI?
MSDx Pathway
Window into the Brain

Sample Preparation

PBMC → Hypotonic Lysis → Micro centrifuge

Clariﬁed Lysate

Protein Analysis

Pellet (insolubles) → Micro centrifuge
Clarified Lysate ELISA Assay

1. Coat wells with lysate
2. Wash and block
3. Develop Color Reaction
4. Measure and record Optical Density on a Microplate Reader
Selected Antigens

**Tau:**
Neuronal Microfilament Associated Protein. Associated with Alzheimer’s Disease, Parkinson’s, and Multiple Sclerosis.

**Hippocalcin-1 like-1:**
Neuron Specific Protein mediating neuron specific calcium metabolism.

**Potentially Hundreds of Proteins within Phagocytes May be Informative**
Subjects

**Relapsing Remitting Multiple Sclerosis:**
Eighteen sequential patients attending MS Clinic at Barrow Neurological Institute

**Apparentely Healthy Controls:**
Twelve randomly recruited co-worker at Barrow Neurological Institute
Using a cutoff value of 0.35, 7/18 MS samples were positive for Tau and 1/12 healthy control samples was positive for Tau.
## Tau

<table>
<thead>
<tr>
<th>Assay</th>
<th>Controls</th>
<th>MS Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tau</td>
<td>1/12</td>
<td>7/18</td>
</tr>
</tbody>
</table>

Tau 7/18 vs 1/12 not statistically significant
Using a cutoff value of 0.16, 7/18 MS samples were positive for Hippocalcin1like-1 and 1/12 healthy control samples was positive for Hippocalcin1 like-1.
### MSDx Pathway

**Hippocalcin1**

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<tr>
<td>Hippocalcin1</td>
<td>1/12</td>
<td>7/18</td>
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7/18 vs 1/12 not statistically significant
### Statistical Effect of Combining the Biomarker Results

The two-tailed P value equals 0.0235.

<table>
<thead>
<tr>
<th>Tau or Hippocalcin-1</th>
<th>Positive</th>
<th>Negative</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td>Control</td>
<td>1</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>MS</td>
<td>9</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>20</td>
<td>30</td>
</tr>
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