NEUROMYELITIS OPTICA (NMO) SPECTRUM DISORDERS
INCREASED SENSITIVITY & SPECIFICITY WITH AQUAPORIN-4-IgG FACS LIVE CELL-BINDING ASSAYS
WHAT IS NEUROMYELITIS OPTICA (NMO)?

Neuromyelitis optica (NMO) is an inflammatory, demyelinating disease of the central nervous system. NMO is characterized by severe relapsing attacks of optic neuritis and transverse myelitis. Unlike the attacks associated with multiple sclerosis (MS), NMO attacks commonly spare the brain in the early stages.

The spectrum of NMO was traditionally restricted to the optic nerves and the spinal cord. However, Mayo Clinic physician Vanda Lennon, M.D., Ph.D., discovered an antibody that targets aquaporin-4, the water channel on astrocytes and is a sensitive and specific biomarker for NMO. Since that discovery, a much broader category called “NMO spectrum disorders” (NMOSD) has evolved.

WHY TEST FOR NMO & NMOSD?

TO DIFFERENTIATE BETWEEN NMO AND MULTIPLE SCLEROSIS.
- Although NMO spectrum disorders have very similar clinical and radiologic characteristics to MS, the diseases are treated very differently.
- A majority of NMO patients, typically women, are initially misdiagnosed with MS.
- While NMO is treated by immunosuppressant therapy, MS is treated by immunomodulation therapy, which may worsen NMO.

BECAUSE AN EARLY DIAGNOSIS CAN STOP THE DISABILITY.
- Unlike MS, the neurological disability caused by NMO spectrum disorders is based on the number of attacks rather than a progressive phase of the illness.
- Initiating therapy early in the course to eliminate recurrence of attacks will minimize patient disability.
- If not treated appropriately, within 5 years, 50% of NMO patients lose functional vision in at least 1 eye or are unable to walk.

WHAT IS NMOSD?

NMOSD includes patients who are seropositive for aquaporin-4-IgG but have more diverse neurological manifestations.

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<thead>
<tr>
<th>NEUROLOGICAL MANIFESTATION</th>
<th>FREQUENCY IN NMOSD</th>
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<tbody>
<tr>
<td>RECURRENT LONGITUDINALLY EXTENSIVE TRANSVERSE MYELITIS (LETM)</td>
<td>60–80%</td>
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<tr>
<td>SINGLE OCCURRENCE LETM</td>
<td>40%</td>
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<tr>
<td>RECURRENT OPTIC NEURITIS</td>
<td>20%</td>
</tr>
<tr>
<td>SINGLE OCCURRENCE OF OPTIC NEURITIS</td>
<td>&lt;5%</td>
</tr>
<tr>
<td>INTRACTABLE VOMITING</td>
<td>&lt;5%</td>
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<td>ACUTE DISSEMINATED ENCEPHALOMYELITIS (ADEM), POSTERIOR REVERSIBLE ENCEPHALOPATHY SYNDROME (PRES)</td>
<td>&lt;5%</td>
</tr>
<tr>
<td>ENCEPHALOPATHY, SLEEP DISORDER, SIAD</td>
<td>&lt;5%</td>
</tr>
<tr>
<td>HEARING LOSS</td>
<td>&lt;5%</td>
</tr>
<tr>
<td>ATAXIA, DIPLOPIA</td>
<td>&lt;5%</td>
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WHICH TESTS SHOULD I ORDER?

- Neuromyelitis Optica (NMO)/Aquaporin-4-IgG Fluorescence-Activated Cell Sorting (FACS) Assay, Serum*
  (Mayo ID: NMOFS)
  TAT: 4 days
* Serum is generally more sensitive than CSF for detection of NMO/Aquaporin-4-IgG

- Neuromyelitis Optica (NMO)/Aquaporin-4-IgG Fluorescence-Activated Cell Sorting (FACS) Assay, Spinal Fluid
  (Mayo ID: NMOFC)
  TAT: 3 days

FACS LIVE CELL-BINDING ASSAY

<table>
<thead>
<tr>
<th>SENSITIVITY</th>
<th>&gt;80%</th>
<th>60–65%</th>
<th>50–55%</th>
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<tbody>
<tr>
<td>SPECIFICITY</td>
<td>&gt;99%</td>
<td>99%</td>
<td>&gt;99%</td>
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5x THE LIKELIHOOD OF HAVING A FALSE-POSITIVE RESULT WITH ELISA METHODOLOGY IS AT LEAST 5X GREATER WHEN COMPARED WITH THE MAYO CLINIC CELL-BINDING ASSAY.

WHEN SHOULD I ORDER AQP4-IgG LIVE CELL-BINDING ASSAY?

NERVE OR SPINAL CORD INVOLVEMENT

DEFINITELY ORDER
- Long spinal cord lesion
- Multiple episodes of optic neuritis
- Single episode of optic neuritis

CONSIDER ORDERING
- Short spinal cord lesion

SYMPTOMS OUTSIDE OPTIC NERVE OR SPINAL CORD

DEFINITELY ORDER
- When any of the symptoms below are present in combination with either a single episode of optic neuritis or short spinal cord lesions

CONSIDER ORDERING
- Area postrema syndrome: episode of otherwise unexplained hiccups or nausea and vomiting
- Acute brainstem syndrome
- Symptomatic narcolepsy or acute diencephalic clinical syndrome with NMOSD-typical diencephalic MRI lesions
- Symptomatic cerebral syndrome with NMOSD-typical brain lesions

The Mayo Clinic Neuroimmunology Laboratory was the first to introduce comprehensive serological evaluations to aid the diagnosis of neurological autoimmunity. The laboratory continues to discover and clinically validate novel autoantibody profiles that inform neurological decision-making and guide the search for cancer.

The clinical and research activities of the Mayo Clinic Neuroimmunology Laboratory focus on autoimmunity affecting the brain, optic nerve, retina, spinal cord, and autonomic and somatic nerves and muscle. The Neuroimmunology Laboratory complements Mayo Clinic’s Autoimmune Neurology Clinic.

FOR MORE INFORMATION ABOUT AUTOIMMUNE NEUROLOGY TESTING
MayoMedicalLaboratories.com/NMO