Enteroviruses are small, very contagious RNA viruses that cause a wide spectrum of diseases in persons of all ages, although infection and illness occur most commonly in infants. They infect an estimated 50 million people each year in the US and possibly a billion or more worldwide. Diagnostic testing allows proper management of enterovirus outbreaks and has a direct impact on patient management and reducing health care costs.

Approximately 75% of enterovirus infections occur in children under 15 years of age and the occurrence rates are highest in children under 1 year of age. Transmission can occur orally either directly or indirectly (contaminated food) and initial infection is typically in the enteric or intestinal tract. Approximately 50-80% of all enterovirus infections are mild or asymptomatic, however they can also develop into severe and life threatening diseases. Serologic studies have distinguished over 70 human enterovirus serotypes which are associated with 26 different syndromes and diseases, including coronary heart disease, type 1 diabetes, hand-foot-and-mouth disease, polio, and meningitis. It is possible for an enteroviral infection to result in a multi-organ illness or a series of illnesses in different organs spanning several years.

Newly identified non-polio enteroviruses are no longer classified into the separate species (e.g. coxsackie or echovirus) due to the large overlaps in their epidemiologic and clinical characteristics. To date the following enteroviruses have been identified: 31 echoviruses serotypes, 23 coxsackie A serotypes, 6 coxsackie B serotypes, 3 poliovirus serotypes and the relatively new enterovirus types 68-71.

Enterovirus outbreaks are common in the summer and fall, though they can cause infections year-round in tropical parts of the world. Several serotypes have been responsible for large outbreaks including:

- **Enterovirus 71:** Hand Foot and Mouth Disease (HFMD) worldwide, especially in children in Asia
- **Echovirus 13, 18, and 30:** several outbreaks of viral meningitis in the United States
- **Enterovirus D68:** infected children in 49 states in 2014 and hospitalized them with severe respiratory illness
- **Coxsackie A16 & A6:** the most common cause of HFMD in the United States
- **Coxsackie A24 and Enterovirus 70:** seasonal worldwide outbreaks of acute hemorrhagic conjunctivitis
- **Poliovirus:** Killed over 500,000 people worldwide each year in the 1940’s and 50’s. Vaccines are now available.

Laboratory diagnosis of enterovirus is important given that they can cause serious infections and their surveillance is required to stop re-occurring outbreaks. Diagnostic methods include virus isolation, nucleic acid testing (NAT), and serological tests, such as ELISA, complement fixation (CF), and neutralization assays. In particular, IgM EIAs have proven very useful due to their high specificity with the benefit of lower cost and a reduced need for experienced personnel and dedicated laboratories.

**MERIDIAN ENTEROVIRUS REAGENTS**

<table>
<thead>
<tr>
<th>Coxsackie Virus</th>
<th>Echovirus</th>
<th>Poliovirus</th>
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</thead>
<tbody>
<tr>
<td>R17160 A16 Native Antigen</td>
<td>R14510 Type 6 Native Antigen</td>
<td>C30510M MAb to Poliovirus 1</td>
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<td>R17900 A9 Native Antigen</td>
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<td>C30027M MAb to Poliovirus 3</td>
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<td>R01517 B1 Recombinant Antigen</td>
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<td>R14400 B1 Native Antigen</td>
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<td>R14430 B5 Native Antigen</td>
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<tr>
<td>R14410 B6 Native Antigen</td>
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<tr>
<td>C01700M MAb to EV Pan-reactive VP3</td>
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<td>C01670M MAb to EV 70</td>
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<tr>
<td>C01699M MAb to EV 71</td>
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APPLICATIONS

IgM Antibody Capture

IgM antibody capture assays have become available for various coxsackie A and B, and echovirus serotypes. Cross-reactivity occurs between the IgM responses to different enteroviruses, including hepatitis A virus, especially in older patients. Enterovirus IgM is typically detectable between 8 - 12 weeks after initial infection, but may persist up to a few years. Approximately 30 - 40% of patients with myocarditis, 60 - 70% of patients with aseptic meningitis, and 30% of patients with postviral fatigue syndrome give positive results for coxsackie B IgM. However, 10% of normal adults will also give a positive result, perhaps having experienced a recent enterovirus infection.

Suggested products which can be paired with any of the Coxsackie and Echovirus antigens:

**C01700M**  MAb to Enterovirus Pan-reactive VP3
Reacts with the VP3 protein of: rhinovirus Type 1a, 2, 14, 16, 17, 27, 42, 70, 80, coxsackie A7, A9, A16, A2, coxsackie B1, B2, B3, B4, B5, B6, echovirus Types 4, 6, 9, 11, 30, 34, EV71 and poliovirus

Use with MLS Anti-human IgM (mu chain specific) products: W01258G or W01259G (low cross reactivity to IgG and IgA)

Indirect Immunofluorescence Assay (IFA)

Several commercial assays are already available for the qualitative identification of enteroviruses in cell cultures by IFA. The simplicity of this technique allows for rapid differentiation between polioviruses and non-polio enterovirus enteroviruses.

**C01670M**  MAb to EV70

**C01699M**  MAb to EV71

**C01700M**  MAb to EV Pan-reactive VP3
Reacts with the VP3 protein of: rhinovirus Type 1a, 2, 14, 16, 17, 27, 42, 70, 80, coxsackie A7, A9, A16, A2, coxsackie B1, B2, B3, B4, B5, B6, echovirus Types 4, 6, 9, 11, 30, 34, EV71 and poliovirus

FOR RESEARCH OR FURTHER MANUFACTURING USE

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