engineered to produce inviable offspring or introducing mosquitoes infected with *Wolbachia* bacteria, which interfere with the capacity of the insects to produce and transmit CHIKV.

Ongoing phase 1 vaccine trials could lead eventually to preventive vaccine campaigns across the region. Infusion of anti-CHIKV immunoglobulins for those at risk to develop severe disease is another potential option, and a clinical trial is under way, according to Marc Lecuit of the Institut Pasteur in Paris, France. Moreover, because type I interferon deficiency is linked to high viremia and severe disease in mice and humans, bolstering this host immune response may also be helpful for some such patients.

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**NEW FROM ASM**

**Chikungunya, Enterovirus D68 Cause Neurologic Symptoms in Children**

**Shannon Weiman**

Recent outbreaks involving the chikungunya virus (CHIKV) and enterovirus D68 in the Americas led to rare but severe neurologic symptoms in infected children that, in some cases, gave rise to long-term neurologic deficits, according to several researchers who spoke during the 2015 International Conference on Antimicrobial Agents and Chemotherapy, in partnership with the International Congress of Chemotherapy and convened in San Diego last September. Researchers continue to probe those rare neurotropisms, for which there are no treatment options, with an aim to develop deficit-sparing interventions.

CHIKV infections are known mainly for causing rheumatic symptoms. However, when transmitted from mother to infant at birth, severe neurologic manifestations afflict 50% of those newborns, while fatalities occur in nearly 17% of such patients, according to Marc Lecuit of the Institut Pasteur in Paris, France, who spoke in the session “Chikungunya: a Global Threat.” With chikungunya’s recent jump to the Americas, and outbreak numbers reaching 1.6 million within two years of its arrival, these severe cases are of growing concern.

“CHIKV infection acquired in the perinatal period can cause lifelong disability,” says Patrick Gerardin of the French National Institute of Health and Medical Research (INSERM). “The neurological outcome of chikungunya encephalopathy ... ranges from mild ocular, behavioral, or postural deficiency to severe cerebral palsy with
Instead it is transmitted from viremic mothers to babies during birth, says Lecuit. CHIKV then infects the brain through the choroid plexus, an epithelial barrier between the blood and cerebrospinal fluid (CSF). These cells are highly susceptible to CHIKV infection when tested in vitro and in mice, whereas endothelial cells along the blood-brain barrier, glial cells, and neurons are not. Within the CNS, CHIKV targets the leptomeninges, which envelop the brain and spinal cord, and cells that line cavities inside the central nervous system, replicating and amplifying virus in the CSF.

Enterovirus D68 (EV-D68), responsible for outbreaks of respiratory illnesses among children across the United States last year, also gives rise to rare polio-like neurologic manifestations, according to Aaron Milstone of Johns Hopkins University in Baltimore, Md., who spoke in the session “Enterovirus D68: What Is It and Where Did It Come From?” When mysterious cases of muscle weakness and paralysis emerged in Colorado and California in 2014, investigators from the Centers for Disease Control and Prevention (CDC) tested specimens suspecting that they would find polio or a similar virus but, instead, found EV-D68. As of July this year, the CDC reports 120 cumulative cases in 34 states.

Enteroviruses typically target the respiratory tract, causing cold-like symptoms, but neurotropic strains also exist. Sequencing of samples from the ongoing outbreak reveals mutations that could confer neurotropism in EV-D68, says Charles Chiu of the University of California, San Francisco. “Clade B1 strains have mutations that distinguish them from other enteroviruses by making them resemble polio virus,” he reports. Chiu suspects a VP1 capsid polymorphism may be important for neuronal targeting. Neuroimaging reveals lesions in CNS grey matter and nerve dysfunction typical of neurotropic enteroviruses that target motor neurons, adds Kevin Messacar of Children’s Hospital Colorado in Aurora.

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Jeffrey L. Fox

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