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Zika presents hot spots in brains of chicken embryos

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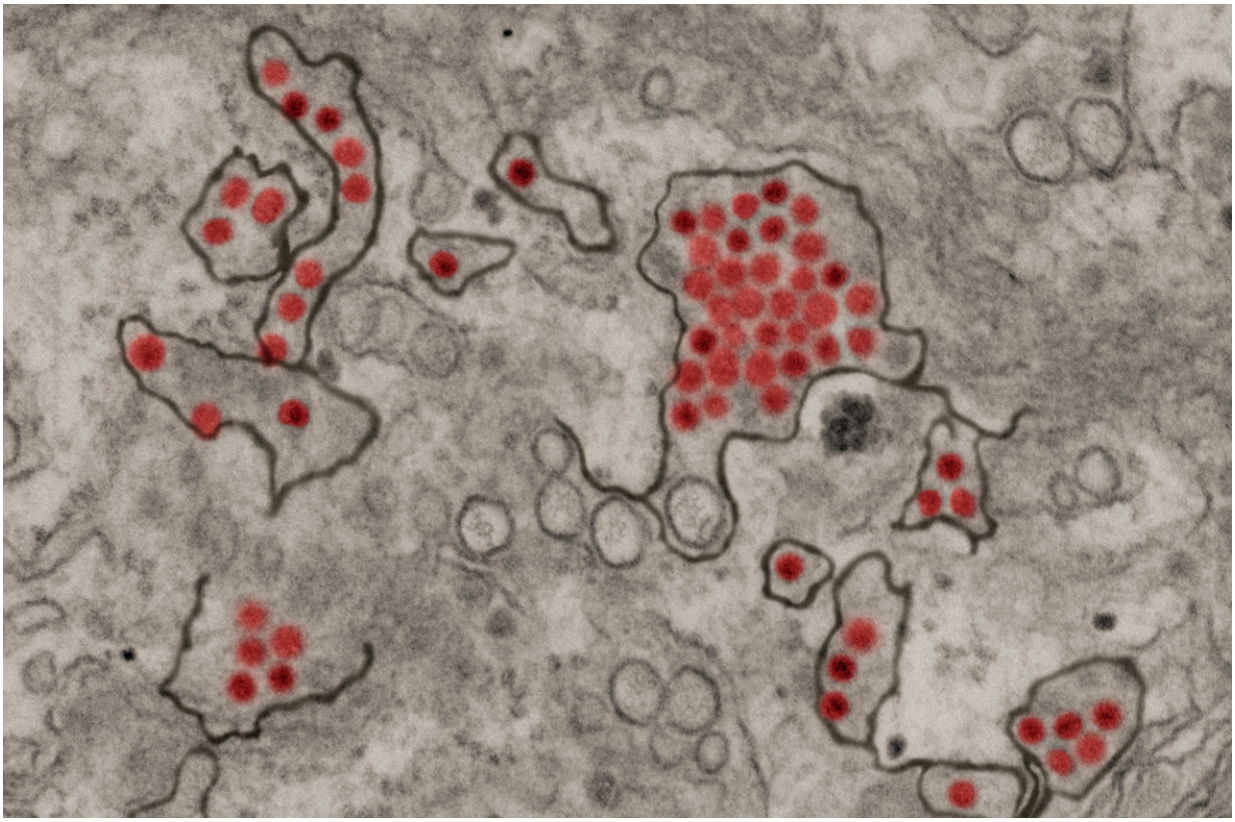

Zika virus particles (red) shown in African green monkey kidney cells. Credit: NIAID

Zika prefers certain "hot spots" in the brains of chicken embryos, offering insight into how brain development is affected by the virus.

If the virus also prefers specific sites in human brains, researchers could look to them for targeted therapies and drug testing.

"When the virus was delivered directly into the middle of the brain, which is the area primarily infected by Zika in the developmental progress of human babies, we didn't see infection evenly throughout the brain," said Donna Fekete, director of Purdue University's Institute for Integrative Neuroscience. "We saw hot spots of infection, and those spots are really important signaling centers in the patterning of the brain."

Zika virus reduces proliferation and kills neural stem cells, causing severe brain defects in human fetuses. In chicken brains, the researchers found three hot spots exhibited reduced expression of substances that regulate brain development, called morphogens, and another site was associated with neural patterning defects.

This means many cells in the brain could be affected by Zika non-directly. Because the cells the virus is preferentially drawn to are key players in development, damage could be widespread without directly affecting many cells.

If there are also hot spots of infection in human brains, this research could help scientitsts find targeted, direct therapeutics for complications associated with Zika virus. It could also make drug testing easier, as they would have to check only a few sites for infection. Those sites could also give researchers a target population to study closer and potentially find out what the receptor for the virus might be.

Zika was injected into the neural tube of two-day-old chicken embryos, which are in a developmental stage comparable to the early fourth week of a human fetus, resulting in infection of hot spots three days later. This is relatively fast compared to other animal models, which have brains

that take weeks or months to form.

More information: Ankita Thawani et al. Zika Virus Can Strongly Infect and Disrupt Secondary Organizers in the Ventricular Zone of the Embryonic Chicken Brain, *Cell Reports* (2018). DOI: 10.1016/j.celrep.2018.03.080

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