Nemours

Zika Viruses Show Potential as Treatment for High-Risk Childhood Cancer

Researchers at Nemours Children's Health System Investigate the Effects of Zika on Neuroblastoma Cells

ORLANDO (July 25, 2018) – Zika virus, long feared for its severe effects on pregnant mothers and unborn babies, may hold potential as a cancer treatment for neuroblastoma, a rare- but-deadly childhood cancer, according to early findings from basic research published today in PLOS One. This basic research provides the groundwork for future investigations, but more studies are required to determine if it will lead to new treatments.

Neuroblastoma, the second most common childhood tumor, typically develops along the sympathetic nervous system or adrenal glands. While these cancers account for only 6 percent of all childhood cancers, affecting 1 in 7,000 children, they cause a disproportionately high number of childhood cancer deaths (15 percent). Most cases do not respond well to current standard treatments of aggressive chemotherapy and radiation, resulting in high mortality and a desperate need to identify new therapies for high-risk cases.

"The same thing that makes Zika so detrimental to developing infants gives it promise as a cancer treatment. Its attack on developing nerve cells, the same type of cells neuroblastoma is derived, allows the virus to selectively target cancer cells and leave normal cells alone," said Tamarah Westmoreland, MD, PhD, a Pediatric General and Thoracic surgeon at Nemours Children's Hospital.

Researchers at Nemours Children's Hospital in the laboratories of Drs. Tamarah Westmoreland and Kenneth Alexander as well as Dr. Griffith Parks at the University of Central FL College of Medicine examined the impact of Zika viruses on neuroblastoma cells by infecting different types of cultured neuroblastoma cells with Zika and then measuring the impact. Ten days after infection, most neuroblastoma cells were killed. However, most surprising was that one specific neuroblastoma cell line, SK-N-AS, showed resistance to Zika infection. Upon closer examination, these researchers found that this cell line had poorly expressed levels of the protein, CD24, a membrane protein, than any of the other neuroblastoma cell lines. They also determined that CD24 on neuroblastoma cells was required for Zika viral infection, which could be used as a potential cancer treatment.

"While this mosquito-borne illness is not usually something you chose to contract, very few children and adults who are infected with the virus have symptoms and those who do usually experience a mild reaction, such as conjunctivitis, fever, and rash. Given these limited symptoms, the virus' ability to fight cancer could present far fewer side effects than current treatments," said Kenneth Alexander, MD, PhD, Chief of the Division of Infectious Diseases at Nemours Children's Hospital.

The laboratories of Westmoreland, Alexander, and Parks working side by side on this project demonstrates the power of collaboration among basic science, clinical medicine, and clinical surgery. This laboratory research is an early, but important first step in potentially using Zika virus as a cancer therapy. The results of this basic research in cell lines will help direct future research to investigate the possibility of treating neuroblastoma and other cancers that express the CD24 protein with the Zika virus.

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About Nemours Children's Health System

Nemours is an internationally recognized children's health system that owns and operates the Nemours/Alfred I. duPont Hospital for Children in Wilmington, Del., and Nemours Children's Hospital in Orlando, Fla., along with outpatient facilities in six states, delivering pediatric primary, specialty and urgent care. Nemours also powers the world's most-visited website for information on the health of children and teens, KidsHealth.org and offers on-demand, online video patient visits through Nemours CareConnect.

Established as The Nemours Foundation through the legacy and philanthropy of Alfred I. duPont, Nemours provides pediatric clinical care, research, education, advocacy, and prevention programs to families in the communities it serves.

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