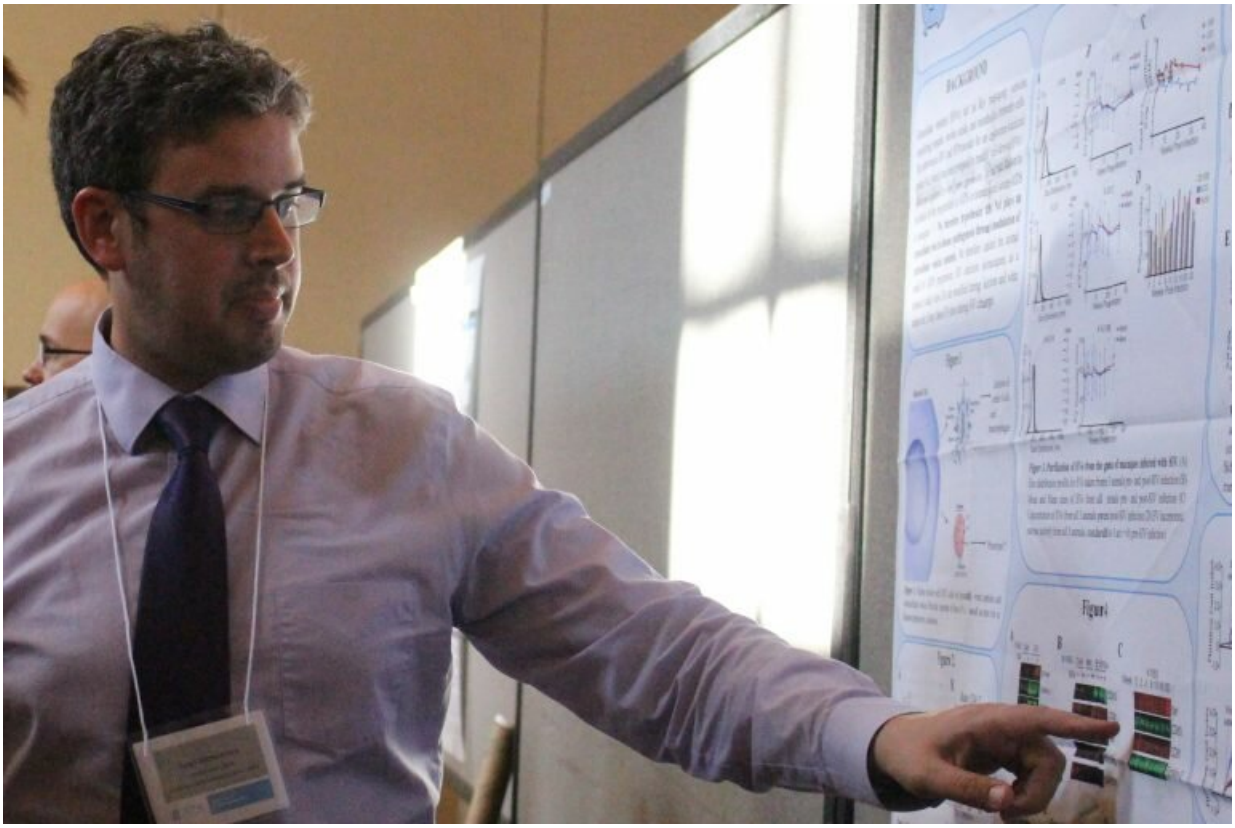
Virus linked to cancer takes over 'cellular mail' to alter tumor environment

February 22 2019



Ryan P. McNamara, PhD, is a postdoctoral research associate at UNC Lineberger. Credit: University of North Carolina at Chapel Hill School of Medicine

A virus linked to cancer can hijack the host's cellular mail and could

help drive changes in the environment around tumors, researchers from the University of North Carolina Lineberger Comprehensive Cancer Center found.

A study published in *PLOS Pathogens* reports the Kaposi sarcoma-associated herpes virus can commandeer a mail system that host cells use to send out "packages" into their surroundings. These packages, known as extracellular vesicles, or exosomes, can contain materials that can cause changes in how neighboring cells send out signals, how they move, and other effects, researchers reported.

"Our study shows that Kaposi sarcoma-associated herpes virus uses extracellular vesicles to re-shape the environment near the tumor," said senior author Dirk Dittmer, Ph.D., professor in the UNC School of Medicine Department of Microbiology & Immunology and co-director of UNC Lineberger's global oncology and virology programs. "The virus is able to do this without infecting new cells; instead, cells within and near the tumor environment are being barraged by these virus-modified vesicles over time. This leads to activation of signaling cascades, cytokine release, and a reprogramming of the cells' gene expression profile."

Kaposi sarcoma is a cancer of cells lining blood vessels or lymph. It is caused by infection with the Kaposi sarcoma-associated herpesvirus, or KSHV. The most common type of Kaposi sarcoma occurs in people with weakened immune systems or who are infected with HIV, the virus that causes AIDS. Infection with KSHV can also cause other cancers, including primary effusion lymphoma, a tumor of antibody-producing B-cells.

For the study, researchers collected extracellular vesicles from primary effusion lymphoma and studied their impact on endothelial cells, which are cells that line blood vessels, in preclinical models. Endothelial cells

can give rise to Kaposi sarcoma after infection with KSHV. Researchers found when they added the pieces of "mail" into their laboratory models, they saw indications that the vesicles from virally-infected lymphoma cells changed the way the genes were expressed in the endothelial cells, increased their movement, and altered their signaling cascades.

"You have cells that are around the tumor that are being exposed to these exosomes," said the study's first author Ryan P. McNamara, Ph.D., postdoctoral research associate at UNC Lineberger. "These cells are neither virus positive, nor part of the tumor itself. But what we are showing is that the exosomes coming from the tumor are actually acting to influence the behavior of these non-infected, non-cancerous cells."

McNamara said they have more work to do to understand what the full impact of these changes are to these cells, which are not cancerous, and also have not been infected by the virus.

"Our study sheds light on a mechanism of disease that was previously unappreciated, and may facilitate future therapeutic strategies to reduce risk of progression or recurrence," he said.

More information: Julio C. Ruiz et al. Kaposi's sarcoma-associated herpesvirus ORF57 protein protects viral transcripts from specific nuclear RNA decay pathways by preventing hMTR4 recruitment, *PLOS Pathogens* (2019). DOI: 10.1371/journal.ppat.1007596

Provided by University of North Carolina at Chapel Hill School of Medicine

Citation: Virus linked to cancer takes over 'cellular mail' to alter tumor environment (2019, February 22) retrieved 28 April 2024 from https://medicalxpress.com/news/2019-02-virus-linked-

cancer-cellular-mail.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.