

Researchers awarded \$2.3 million for virus-related malignancies research

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Members of the Flemington Lab team include (from left) Juliet Strauss; Nathan Ungerleider, PhD; Xia Wang; Yi Yu; Claire Roberts; Monica Concha, PhD; Melody Baddoo and Erik Flemington, PhD. (Tulane Cancer Center)

For decades the central tenet of molecular biology has been that DNA (deoxyribonucleic acid) transfers genetic information to RNA (ribonucleic acid) which provides the instructions for the production of proteins. Over time, though, scientists have learned that the cell utilizes a vast array of “non-coding RNAs” that are not involved in protein synthesis but instead carry out biochemical reactions and play direct and complex regulatory roles in cells.

Erik Flemington, PhD, professor of pathology and Zimmerman Professor of Cancer Research, and his team study non-coding RNAs that are a bit peculiar.

"For a long time, RNAs were thought to exist in a simple linear configuration," said Flemington. "The non-coding RNAs that our group studies are actually circular in nature. The first circular RNA was identified more than 30 years ago, and for years occasional circular RNA findings were thought to represent splicing mistakes and were largely ignored. However, a few years ago, cells were found to generate thousands of unique circular RNAs and since this time, the field is learning that they play important roles in regulating cell signaling pathways and in cancer progression."

Last year, Flemington's team reported the first findings of circular RNAs encoded by herpesviruses, and they were recently awarded two National Cancer Institute grants — a five-year, \$1.8 million and a two-year, \$460,000 one — to investigate how these viral circular RNAs contribute to Epstein-Barr herpesvirus (EBV)-associated cancers.

"In most cases, if a virus makes a protein, it is processed and presented on the cell surface, where the immune system can recognize it as foreign and kill the virus-infected cell," he said.

"In EBV-associated cancers, the virus expresses primarily non-coding RNAs, including circular RNAs, that do not produce a protein. Through these non-coding RNAs, the virus contributes to the oncogenic process without eliciting recognition by the immune system."

Flemington says that viral non-coding circular RNAs may serve as tumor-specific therapeutic targets for attacking EBV-associated cancers as their roles in promoting cancer are better understood.