Award ID:
RP140223

Project Title:
Viral MicroRNAs in Ovarian Cancer Growth and Metastasis

Award Mechanism:
High Impact/High Risk

Principal Investigator:
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Entity:
Baylor College of Medicine

Lay Summary:

Nearly 15% of all human cancers are caused by viral infections. Examples of viruses and the cancers they cause include the human papilloma virus (cervical, nasopharyngeal and anal cancers), Epstein-Barr virus (nasopharyngeal cancers and lymphomas), and hepatitis C virus (liver cancer). Viral infections are not currently thought to play any significant role in most other human cancers. Recently, we discovered that specific microRNAs encoded by Epstein-Barr virus (EBV) and cytomegalovirus (HCMV) are robustly associated with ovarian cancer outcomes. MicroRNAs (miRNAs) are evolutionarily conserved, small RNA transcripts 22-24 nucleotides in length. In humans and other mammals, miRNAs play a critical role in both normal development and abnormal cell growth by targeting essential regulatory pathways, oncogenes and tumor suppressor genes. Investigators have recently found that DNA viruses, such as EBV and HCMV, also encode miRNAs and that viral miRNAs can directly target and regulate human gene expression. Thus, our observation that levels of viral miRNA expression affect ovarian cancer outcome have led us to hypothesize that these transcripts directly regulate the expression of human genes important for growth and metastasis. We propose to test this novel and exciting hypothesis by assessing the degree to which ovarian cancers and other normal human tissues, including ovary and fallopian tube, express the EBV and HCMV miRNAs we have identified and confirming the clinical relevance of our initial observations. We also intend to define the function of the viral miRNAs implicated in ovarian cancer using model systems to dissect the mechanisms by which they potentially impact this disease. We believe that the insights generated by this work will lead to new and unanticipated treatments for ovarian cancer and shed light on previously undiscovered mechanisms by which common viral infections can promote ovarian and other human cancers.