Laura Hughes, Biology

University: University of Missouri-Columbia
Year in School: Junior
Hometown: Kansas City, Missouri
Faculty Mentor: Dr. Marc Johnson, Molecular Microbiology & Immunology
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Which retroviral Gag proteins utilize crm1 nuclear export system throughout their lifecycle?

Laura Hughes, Kristen Clary-Beach, and Marc Johnson

The retroviral structural protein, Gag, is required for the assembly of infectious virus particles within a cell. To better understand how the viral assembly process occurs, it is important to understand the cellular pathways followed by the assembling virus. Previous studies have shown that the Rous Sarcoma Virus (RSV) Gag protein post-translationally traffics through the nucleus and is exported back into the cytoplasm via a Crm1 dependent nuclear export signal (Scheifele, Lisa, et. al). The objective of this study was to determine if other retroviruses also utilize a Crm1 dependent nuclear export system. The retroviruses studied were Murine Leukemia Virus (MLV), Human T-cell Leukemia Virus (HTLV), Feline Immunodeficiency Virus (FIV), Mason Pfizer Monkey Virus (MPMV), and Human Immunodeficiency Virus type 1 (HIV-1). The Gag gene from each of these retroviruses was introduced into an expression construct with a C-terminal green fluorescent protein (GFP) tag. Tissue culture cells were transfected with the Gag fusion proteins and the distribution of Gag within the cell was observed by fluorescence microscopy. To determine if each Gag protein utilizes a CRM-1 dependent pathway, the cells were treated with leptomycin B (LMB), a CRM-1 inhibitor, prior to visualization. Our data conclusively shows FIV Gag protein assembly with a nuclear step that is Crm1 dependent. Studies with MLV, HTLV, and HIV-1 are ongoing.