

## Sarah Gad

Microbiology, CBS, 2009

Mentors: Rebecca S. LaRue,  
Reuben S. Harris, BMBB

*Is the role of the lentivirus Vif protein in  
degrading cellular APOBEC3 proteins  
conserved across mammals?*

The human APOBEC3G (apolipoprotein B messenger-RNA-editing enzyme, catalytic polypeptide-like 3G) protein is a single-strand DNA deaminase that has been shown to inhibit the activity of several lentiviruses, such as HIV. APOBEC3 hinders virus infectivity by converting nascent lentiviral cDNA cytosine bases into uracils, which ultimately results in high levels of DNA mutation or degradation. Several studies have indicated that an HIV accessory protein called 'Vif' (viral infectivity factor) helps ensure virus replication by destroying human APOBEC3 proteins. HIV is only one of many lentiviruses that has the capacity to infect a variety of mammals, and the majority of these viruses encode a Vif-like protein. We hypothesize that APOBEC3-destroying activity of Vif is conserved in mammals. This hypothesis will be tested by cloning the Vif gene of representative lentiviruses of cattle (BIV), cats (FIV) and humans (HIV) and determining whether the expressed protein can neutralize the corresponding APOBEC3 protein of each specific host species. The Vif sequence of BIV and FIV were identified, and a comparative sequence analysis was done to identify conserved motifs. The resulting isolated Vif sequences were sub-cloned from available plasmids and site-directed mutagenesis was used to construct derivatives with mutated conserved residues (by analogy to HIV these constructs were anticipated to serve as negative controls). These plasmids were co-expressed with APOBEC3-GFP expression plasmids in cell lines to determine whether the Vif protein destroys APOBEC3 proteins in a species-specific manner. Fluorescent microscopy was used to qualitatively assess the results, and flow cytometry and immunoblotting were used to quantify the data. We anticipate showing either that the APOBEC3 degradation mechanism is conserved among the Vif proteins of representative mammalian lentiviruses or that it is not, with either scenario being very interesting.

Poster Number:      Session:

