COMPARISON OF PROTEASE ACTIVITY IN THE LYMPH NODE AND SPLEEN OF BALB/c AND C57BL/6 MICE INFECTED WITH MURINE LEUKEMIA VIRUS

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It is estimated by the UNAIDS/WHO 2006 AIDS Epidemic Update, that 39.5 million people are living with HIV.¹ There were 4.3 million new infections in 2006 with 2.8 million (65%) of these occurring in sub-Saharan Africa and important increases in Eastern Europe and Central Asia, where there are some indications that infection rates have risen by more than 50% since 2004.¹ In 2006, 2.9 million people died of AIDS-related illnesses.¹ This disease is predominately in young adults causing large holes in the economic and social structure of many communities, especially those in Sub-Saharan Africa. The world’s need for an effective treatment to this disease is becoming more dire by the day.

Non-primate approaches to HIV research use murine leukemia virus (MuLV) in a mouse model (MAIDS). There are two strains of mice that are used for this study, BALB/c and C57BL/6. Both strains of mice will be infected with the virus, but the BALB/c mice recover while the BL/6 mice become immunocompromised. Previous DNA microarray work comparing the two strains has shown that certain serine proteases are up regulated in the BALB/c mice lymph nodes and spleen shortly after infection². Proteases are enzymes that cleave proteins and other enzymes, causing their activation or degradation. Lymphatic remolding and cell activation are consequences of protease activity, and I hypothesize that the up regulation of these proteases in the BALB/c mouse strain may be important for its recovery. This can be due to the protease activation causing an increase in size of the lymphatic vessels allowing for an increase in immune cell circulation, activation, and control of the infection.

Using immunofluorescence and in situ zymography, visualization and quantification of protease activity in the lymph node of each strain was studied. This allowed for the fluorescent visualization of proteases within serial sections of the organ. In situ zymography uses a fluorescently quenched substrate that will only fluoresce once it is cleaved by a protease. This substrate is suspended in agar and placed on top of tissue sections that allowed for protease activity localization and quantification. Also, serial sections were stained for lymphatic (LYVE-1) and vascular (CD31) structures using primary and fluorescently-labeled secondary antibodies. This assisted in revealing overall lymphatic morphology in conjunction with the protease location.