

Research Interests --- HIV

Currently, according to the UNAIDS, there are over 33 million living with HIV, with the majority of the infected individuals living in sub-Saharan Africa. There are still millions of deaths and over 2.5 million cases of new infections are occurring each year. In addition, mother-to-child transmission (MTCT) of HIV-1 remains a significant problem in the resource-constrained settings where the implementation of effective preventive and therapeutic strategies is still not widely available. In the absence of antiretroviral treatment, 30-45% of infants born to HIV-positive mothers have become infected. Globally HIV-1 infected children account for 20% of all HIV-1 related deaths and more than 90% of the infected children under the age of 15 are living in sub-Saharan Africa. Because of the genetic variability of the virus, there are many strains or subtypes of HIV which are found in different regions of the world. For example, in Africa, the HIV-1 subtype C is the most prevalent and account for more than 60% of infections. HIV-1 Subtype C is now the most abundant and the most rapidly expanding subtype in the world. Given the high prevalence of HIV-1 subtype C infections, a better understanding of virus transmission is of significant importance, which is a major focus of our laboratory.

The laboratory has a longstanding research and training program in collaboration with the University of Zambia, in Zambia, a central African nation that lies in the heart of the AIDS epidemic. We found that almost all Zambian HIV are of subgroup C and are rapidly spreading in Zambia. Unfortunately, very little is known about the events that affect mother to child transmission of this subgroup of viruses, regarding the host and viral factors that may affect transmission, and the viral biological properties, pathogenesis, and genetic evolution in infected individuals. The laboratory has been identifying and following HIV infected mother infant pairs from birth onwards, characterizing a panel of subtype C HIV isolated from infected infants at various time points after infection. First to determine virological and host factors that may affect transmission, and then determine factors that may affect disease progression and viral pathogenesis, including the natural evolution of these viruses, in order to correlate them to disease progression. The goal of these studies is to better understand the biology of this virus and its transmission so that strategies can be developed to block its transmission.

Studies are also underway to the extent of HIV associated neurological diseases in Zambia and factors that can contribute to these HIV associated diseases. We have found that HIV associated neurocognitive disorders (HAND) were present in 22% of the sample population, and the effect and extent of HAND are currently being investigated. This is being carried out by collecting a bank of HIV infected brain specimens, and analyzing for HIV and other opportunistic infections.