

### Research Goals

- Understanding SIV/ HIV/ SHIV pathogenesis under suppressive cART
- Role of Integrins in modulating disease pathogenesis
- Mucosal Barrier Vaccines and Biology
- HIV Env glycosylation in mucosal transmission
- Neuro AIDS/Substance Abuse Research
- Clinical Translational Studies

### Past and Current Funding

#### List studies currently ongoing

- 1R01AI113883: Role of HIV Env glycosylation in mucosal transmission
- R01DA043164-01: The brain as a SIV reservoir under suppressive cART potentiation by drugs of abuse
- R01DA041751-01: The combinatorial effects of Opiates and the emerging promoter-variant strains of HIV-1 subtype C on HIV neuropathogenesis and latency.
- Nebraska Food for Health Seed Grant: Interaction between Diet and Gut Microbiome using Non-human Primate Models
- Nebraska Neuroscience Alliance Endowed fund: Molecular mechanisms underlying Zika virus mediated neuropathogenesis

#### Completed Research

- Evaluation of bio-marker signature expression patterns in Schistosoma/ HIV co-infection
- Vaccination against intrapartum HIV Clade C transmission
- Vaccine induced broadly neutralizing antibodies
- Role of NK cells in modulating HIV disease pathogenesis

### My Area of Study

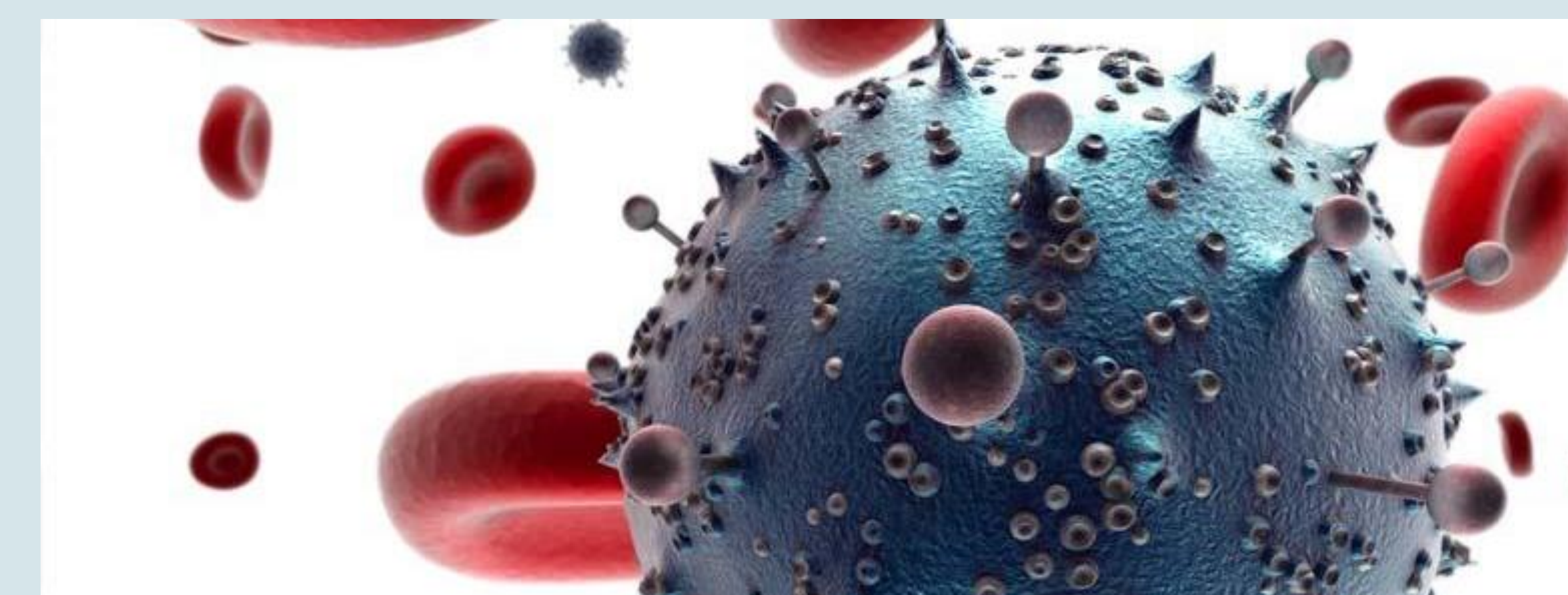
#### • HIV Vaccine/Cure studies

HIV infection continues to afflict a large number of people worldwide. Even with the development of potent antiretroviral drugs, HIV cannot be eliminated from tissues. Therefore it is important to develop novel therapeutic targets that can be exploited to lead to the ultimate goal of curing HIV infection. We are interested to modify immune cell targeting to reduce the accumulation of infected cells in both the gut and CNS using NHP as models

- We plan to investigate and compare glycosylation patterns between linked transmission and founder HIV and test whether they play a role in mucosal transmission
- We are investigating the involvement of combinatorial effects of Opiates and the emerging promoter-variant strains of HIV-1 subtype C on HIV neuropathogenesis and latency and testing this hypothesis in a primate model
- We plan to explore the therapeutic potential of a combined Interleukin (IL)-21 and anti- $\alpha 4\beta 7$  Ab intervention to reduce gut damage and immune activation, improve antiviral responses, and limit the size of the reservoir in ART-treated, SIV-infected rhesus macaques

#### • Zika Virus Pathogenesis

The Zika virus (ZIKV) is a newly emerging virus that has resulted in a worldwide epidemic. We are interested in understanding ZIKV entry into specific cell types such as epidermal keratinocytes, fibroblasts, immature dendritic cells (iDCs), and stem-cell-derived human neural progenitor etc. These studies will help to understand host-pathogen interactions and to develop therapeutics.



### Collaborative Needs

We are mainly seeking clinical collaborators and researchers with cutting edge technologies to answer fundamental questions. We would like to translate our basic research findings to a clinical set up and understand the mechanisms behind clinical observations

List of specific needs we are looking from future collaborators, including and not limited to

- Obtaining clinical samples from drugs abusers with and without HIV infection
- Zika infected clinical samples
- Statistical help to perform Meta-analysis
- CRISPAR technology
- Genomics and proteomics analysis
- Controlled cohorts of various infectious disease such as HIV, TB, Flaviviruses

