Subject: Dissertation Defense - Sebastian Molnar, PhD Biosciences
Date: Tuesday, May 14, 2024 at 2:40:06 PM Eastern Daylight Time
From: SSB Faculty List on behalf of Diane St. Germain
To: SSB-FACULTY-LIST-L@LISTSERV.GMU.EDU

Dissertation Defense Announcement
To: The George Mason University Community

Candidate: Sebastian Molnar

Program: PhD Biosciences

Date: Wednesday May 29, 2024

Time: 12:00 PM Eastern Time (US and Canada)

Location: In Person, Room 1004, IABR, Science & Tech Campus
And
Via Zoom
Join Zoom Meeting

https://gmu.zoom.us/j/91479763389?pwd=L0swaWwwVHpmckppT0xXQnRNY3dwdz09

Meeting ID: 914 7976 3389

Passcode: 362456

Committee chair: Dr. Fatah Kashanchi
Committee members: Dr. Ramin Hakami, Dr. Lance Liotta, Dr. Victoria Polonis
Title: “Discovery of Novel Small Size Hiv-1 Released From Infected T-Cells and PBMC”

Abstract:

In the current work, we explored the intersecting properties of human immunodeficiency virus type-1 (HIV-1) and small size extracellular particles (sEPs) under 50 nm. We isolated five fractions by sequential differential ultracentrifugation from HIV-1 infected T-cells, where the last fraction contained sEPs. In contrast, the other fractions had EPs greater than 100 nm. The sEPs fraction was enriched in CD63 and HSP70 and contained HIV-1 integrase enclosed in a protective membrane. Surprisingly, our infectivity assay indicated the presence of small infections HIV-1 particles (smHIV-1) in the sEPs fraction, which was blocked by HIV-1 broadly neutralizing monoclonal antibodies and significantly reduced by anti-CD63 immunodepletion. However, treatment of the chronically infected T-cells with NRTIs did not decrease the infectivity of the released smHIV-1, but significantly reduced the infectivity of the virus in the other larger fractions. Furthermore, single particle colocalization analysis for host proteins and viral integrase and the viral envelope glycoproteins further supported that the smHIV-1 in the sEPs fraction is CD63+. Additionally, we confirmed that smHIV-1 was released from peripheral mononuclear cells infected with a primary virus. Collectively, our study indicates the release of distinctly small and large HIV-1 from the same infected T-cells with different biophysical, biochemical, and functional properties. These results could have a potential impact on vaccine and drug development studies not only for HIV, but also for other pathogens.

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