Howard University
Center for Sickle Cell Disease
Research Scientist Lab

Sergei Nekhai, Ph.D.
History

• Established in 2001 on NIH/NHLBI “HBCU Research Scientist Program”, Dr. Gordeuk – PI

• 1999-2010: 34 grants, $29,000,000 direct costs and over $9,000,000 indirect costs

• Research opportunities: 14 high school students; 22 undergraduate students, 14 medical students, 7 masters level graduate students, 8 PhD candidates, 10 post-doctoral candidates, 19 residents and fellows, and 22 existing faculty members

• 1999-2000: >150 peer-reviewed publications
Research Scientist Laboratory

SCD Center Director, Victor Gordeuk, M.D.

Tatiana Ammosova, Ph.D.
Assistant Res. Professor

Denitra Breuer, Ph.D. Student

Zufan Debebe, Ph.D. Student

Jamie Rotimi, Res. Assistant

Xiaomei Niu, MD, Research Scientist,

Namita Kumari, Ph.D.

Andrey Ivanov, Ph.D.

Yuri Obukhov, Ph.D. Mass Spectrometry
Current Projects

Sickle Cell Disease and HIV-1
  • HIV-1 Transcription (CDK2, CDK9 and PP1)
  • Induced pluripotent stem cells (iPSC)
  • Iron, ferroportin and hepcidin in HIV-1
  • Hypoxia and HIV-1 transcription

Pulmonary Hypertension and SCD
  • Biomarkers for PHT
  • PHT in Chuvash polycythemia

Proteomics
  • Protein detection by MS, PTM analysis

Small Molecule Inhibitors for HIV-1 and Ebola
  • PP1-targeting inhibitors; novel iron chelators
Current Main Grants

- CDK-2 and HIV-1 transcription, NIGMS, SC-1 Nekhai, 2008-2012
- ARRA, iPSC, NIGMS Nekhai, 2009-2011
- RCMI Proteomics Core, NCRR Taylor, 2009-2014
- Pulmonary hypertension in SCD, NHLBI Gordeuk 2005-2011
- Iron Chelators and HIV-1 Transcription, NHLBI Debebe F31, 2008-2011
- Washington Area BTRP in SCD, Gordeuk 2006-2011
Service

- Analysis of SCD hemoglobin by HPLC, CLIA Certified
- Mass spectrometry analysis (RCMI and CFAR Proteomics Core) for HU and DC D-CFAR users
- FACS Analysis for HU community
- Bioplex analysis for HU community
- Training of high school students (BTRP program), Medical fellows, AHS trainees, grads and undergrads
Future Directions

- SCD and HIV-1: role of hypoxia, hepcidin and heme oxygenase, RO1 planned

- Regulation of HIV-1 transcription by PP1 and CDK2, supported by SC-1 and P20 grants

- Role of ferroportin mutation Q248 on cellular iron collaborative RO1 with iPSC technology planned

- Small molecule inhibitors of Ebola, with UTMB (Bukreyev), RO1 and DOD grants submitted

- Mass Spectrometry for proteomics and small molecules analysis, HU and CFAR
Future Directions – cont.

• **Analysis of the hypoxic response in SCD:** analyze genes upregulated in SCD with PHT (bFGF, VEGF, PDGFbb, ET-1, and EPO) in plasma and serum, and in cultured monocytes and macrophages

• **Analysis of the effect of PP1 inhibition on hydration and sickling of SCD RBCs:** abnormal regulation of KCC (K:Cl) transporters by PP1 in RBC in SCD