THE OHIO STATE UNIVERSITY
BIOMEDICAL SCIENCES
GRADUATE PROGRAM
SPRING, 2016

Steven Davis Scoville
PhD Candidate

“Human Innate Lymphocyte Development”

Friday March 25, 2016
Biomedical Research Tower, Room #105
2:30-4:30pm
VITA

February 13, 1985 . . . . . . . . . . . . . . . . . . . . .Born – Redmond, WA

April 22, 2010 . . . . . . . . . . . . . . . . . . . . . . . . B.A. Biochemistry, 
Brigham Young 
University

June 2010-present . . . . . . . . . . . . . . . . . . . . . . M.D., Ph. D. Candidate, 
The Ohio State 
University

COMMITTEE MEMBERS

Michael A. Caligiuri, M.D., Advisor

Robert A. Baiocchi, M.D., Ph. D.

William E. Carson III, M.D.

Timothy P. Cripe, M.D., Ph. D.

Aharon G. Freud, M.D., Ph. D.
ABSTRACT

Innate lymphoid cells (ILC) were recently discovered as a novel subset of the immune system. While typical adaptive lymphocytes, such as B and T cells, respond in an antigen specific manner, ILCs are distinct in that they lack the gene-rearrangement events necessary to elicit antigen specific responses. Nonetheless, through their unique functional profile ILCs play a vital role in promoting overall health by eliminating certain types of viruses, bacteria, worms, and even cancer cells. ILCs are divided into four distinct populations known as natural killer (NK) cells, ILC1, ILC2 and ILC3, each displaying unique transcriptional and functional effector profiles. However, how and where human ILCs develop is currently not known. We hypothesized that ILCs develop from progenitors found in SLT. Our lab previously showed that a distinct population of CD34(+)CD45RA(+) lymphoid progenitors exists in SLTs. Further dissection of these progenitors revealed a novel progenitor population, identified as CD34(+)CD45RA(+)ID2(+)CD117(+)IL-1R1(+)RORγt(+), that is only found in SLT locations such as human tonsils, lymph nodes, and spleen, but not in non-SLT hematopoietic locations such as peripheral blood, cord blood, thymus, and bone marrow. A hallmark of progenitor differentiation is the distinct loss of multi-lineage potential, thus we performed in vitro differentiation assays to determine the lineage restriction of this novel population. Remarkably, the ID2(+)CD117(+)IL-1R1(+) subset we identified was not capable of developing into T cells or dendritic cells, despite being in conditions that promoted the differentiation of those lineages from other SLT progenitor subsets. However, this population was capable of differentiating into all ILC populations as tested in vitro even at the clonal level. Furthermore, subsequent work has also demonstrated that this cell selectively gives rise only to ILCs in vivo, after injecting these cells into immunodeficient mice. In conclusion, we are the first to identify and characterize a progenitor population in humans that is only capable of ILC development and no other lymphocyte lineage. These findings are now being used to help us understand how cancer cells work to suppress the development and function of ILCs to promote disease progression and more importantly providing new targets that may be helpful in overcoming this effect.
RECENT ABSTRACTS AND PRESENTATION

Oral Presentations:


Abstracts:

Scoville SD, Keller K, Caligiuri MA, Freud AG. An Inexpensive and magnet/column-free method for the enrichment of rare leukocyte populations from human tissues. Abstract for poster presentation, OSUCCC James annual scientific meeting, Columbus, OH. Feb, 2014.


**RECENT PUBLICATIONS**


AWARDS AND HONORS

2011  Medical Scientist Training Program Leadership and Academic Achievement Award, OSU

2011  Outstanding Academic Merit Scholarship (Top 25% of Medical School Class), OSU

2012  Medical Scientist Training Program Leadership and Academic Achievement Award, OSU

2013  University Graduate Fellowship Award, OSU

2014-2016  Pelotonia Graduate Student Fellowship Award, OSU

2014  American Society of Hematology Abstract Achievement Award

2015  ASCI/AAP Joint Meeting Travel Award/AAI Young Investigator Award

2015-2018  F30 Ruth L. Kirschstein National Research Service Fellowship Award, NIH/NCI

2015  Society for Natural Immunity Annual Meeting Travel Award

2015  Induction into Landacre Honors Society OSU

2015  Induction into Sigma Xi Honors Society, OSU

2015  American Society of Hematology Abstract Achievement Award

FUTURE PLANS

My future plans are to continue the clinical portion of my medical school training here at OSU.