THE OHIO STATE UNIVERSITY

Medical Scientist Training Program

WEXNER MEDICAL CENTER

October 2017

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A Time of Transition...And Opportunity By: Larry Kirschner

As I write these words in mid-August, 2017, I cannot help but be struck by how much has changed since my prior column for the MSTP newsletter, a mere 2 years ago. There is a lot for us to be proud of in the program, but still so many ways to grow.

One of my favorite parts of writing this is to send a shout-out to our nolonger-incoming students, those who by now are well established as first years here in the program. I say it every year, and it still rings true: this is our best, most interesting, and most diverse class yet. Welcome to Kylie Zane, Zheng Tan, Steven Sher, Megan Pino, Daniela Jimenez-Harrison, Sydney Fobare, Rachel Brown, Daniel Brook, Ariunaa Bayanjargal, and Christopher Ayoub. These excellent students are joining us from locations both familiar (Ohio) and exotic (Mongolia), from high (Chicago) and low (Arkansas), from east (New York) and west (Arizona), but share with all of us the love of science and its use to improve human health. This new group of students follows on our 6 graduates from last year, whom we sent outwards to locations all around the country to join our growing OSU MSTP alumni network.

Next, let me talk a little about our leadership. It is difficult for me to say that we will no longer be known as the program run by "2 Larrys from New Jersey." Those of you who have been in the program for a while (or are alumni) will clearly recognize that change is a continual feature of academic medicine, and we wish Larry S the best in his new role leading the Texas Biomedical Research Institute. This change will provide me personally with an opportunity to grow as the Director of the MSTP, and I do not plan to disappoint. Because of the growth of our program, I will be looking to bring on-board at least 1-2 additional faculty members to help me lead the program, and I look forward to partnering with you in finding these individuals to help us continue moving forward. There are many outstanding faculty at OSU and some of them will have the opportunity to step up and add their talents and energy to our program! *Continued on next page...*



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A Time of Transition...

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I also wanted to touch briefly on some new things that are going on. Most of you have heard me talk about our M3-M4 advanced competency, which will teach you the process for clinical research and help fill in some of the gaps for your futures. Working with the MSSO leaders, we are also in the process of re-vamping MSSO to make it more interesting, more interactive, and overall more valuable for everyone. Of course, this comes at the 'price' that I will be expecting to see everyone there most of the time. This change will help to re-establish the strong peer-to-peer connection which has been a hallmark of our program over the years. I am excited that we now have 2 MSTPers who will be getting their PhDs from Public Health-maybe sometime soon we will have engagement with other programs across the campus.

With all these changes going on, some might be tempted to worry, and to even think that Winter is Coming. Me? I'm an optimist and an opportunist. It seems more like Spring, a time to savor all the great new things going on now and in the future at the OSU MSTP.

- Larry Kirschner

MD/PHD Student Annual Conference By Dan Brook

I first became introduced to the collegial atmosphere of the National MD/PhD Student Conference in Keystone, Colorado on the van ride from the Denver airport to Keystone. The initially quiet trip turned into an excited discussion about the upcoming conference from all members once we realized that everyone was going to the same event. There were new and old MD/PhD program members as well as two Physician Scientist Training Program directors.

At the conference, we had fantastic keynote speakers, a diverse array of poster presentation topics, unique student presentations, and beneficial workshops. As I left before the final keynote speakers, I couldn't catch every bit of learning, but from what Donald Ingber, MD, PhD, Kim Orth, PhD and Douglas Lowy, MD presented, I came away with a new realization of potential output from a research career. Each keynote was impressive, with Kim Orth's new antibiotic, Donald Ingber's microchip organs and Douglas Lowy's developments in HPV research being the greatest takeaways outside of their successful journey in translational science. The student poster sessions and presentations were also notable; I found that during these portions of the conference it became easier for me to locate other students interested in my field of research, Epidemiology, that is not common among MD/PhD students.

What I found to be of most use to me personally were the workshops where I learned more about F30 grant applications, and I worked through research ethics problems.

On the final morning, I joined the hike up Quandary Peak and headed home. Overall the conference was a great learning opportunity, and I hope to return in the future as both a presenting student and physician-scientist.



The Ohio State University



Quais Hassan: Can you tell me about yourself (i.e. where you grew up, college, etc.) and what brought you to OSU?

Hui-Zi Chen, MD, PhD: I spent my childhood traveling and living around the world. Born and raised in China until the age of 10; subsequently moved to Lund, Sweden where I lived for 2 years. Then we moved again to Shreveport, Louisiana, where we stayed for 2 years. Finally settled in Columbus, OH where I completed middle and high school. I went to Cornell University College of Arts & Sciences for my undergraduate studies. I came back to OSU in Columbus for MSTP in part because of my family (we are very close) and also because of the potential for growth that was evident when I was interviewing, especially with regards to the cancer center. After spending time all over the world, I guess I turned out to be a Midwestern girl at heart. I really enjoy the friendliness and warmth of the people here. The city of Columbus has seen tremendous growth in the last decade and is surprisingly diverse in its culture and people.

QH: What are you doing now, career-wise?

Dr. C: This past July I just started my last year of fellowship. Currently knee-deep in genomics research. Always learning.

QH: Can you describe your typical work-week?

Dr. C: Though less hectic than clinical training, the typical work week is still demanding. I spend half a day in the clinic on Tuesday mornings starting at 8AM and ending at about 3PM. Then there are clinic notes to finish and items to follow up on from clinic. So each day of the week I spend a part of my day doing things directly related to patient-care.

The remainder of M-F are spent in the lab, and occasionally on the weekends. Average work hours per week range 50-60 (including working from home). When writing reviews, manuscripts, grant applications, the number of hours increase significantly. Bottom line: there's a range and diversity week to week.

QH: Do you have any advice for MSTP students who are just starting?

Dr. C: Yes, slow and steady. Be persistent and cultivate patience. This is the beginning of a real long journey. You will undoubtedly encounter numerous hardships and frustrations (both personal and professional). The key is to make sure you maintain your relationships and friendships, because these people will be the ones to see you through the difficult times.

QH: How about advice for our graduating students who are joining the real world?

Dr. C: If by real world, you mean restarting medical school or joining residency...I would say learn to be a team player and be humble. Navigating medical school can be like going to high school all over again, but it's important to learn to respect all of your peers. Residency, especially intern year, can be tough both physically and emotionally. Your first day as a "real doctor" may be overwhelming but you may find that you get used to it pretty quickly. And of course, you will always work hard. No shortcuts.

QH: Can you touch on the importance of business knowledge when running a lab?

Dr. C: I think it's important to understand the basics, but you certainly don't need an MBA to run a lab. One of the most important aspects is to be organized and be on time. Respect deadlines and most importantly other people's time, be punctual.



Hui-Zi Chen MD, PhD Fellow Department of Hematology & Oncology Graduate of OSU MSTP Class of 2013

QH: What is your advice for maintaining work/life balance?

Dr. C: I think it is extremely important to have work/life balance, and it's important to find an advisor who will respect your need and desire to have a life outside of the lab. Not everyone may agree, and of course each is entitled to his/her opinion. Over time I have discovered that I put the most pressure on myself to get things done. In retrospect (looking back over the past 12 years I have been in training), I was much happier at work when I was able to take time off to do things that I enjoy outside of work.

QH: What is your favorite part of being a physician-scientist?

Dr. C: The fact that I get to take care of patients and study their cancer at the same time.

QH: Looking back at your experiences, what advice would you give to current MD-PhD students?

Dr. C: Be persistent. Be efficient and work hard at the same time. Efficiency at work will allow you to have time for your friends and family outside of work. It is a long and difficult journey but ultimately highly rewarding. Along the way, you find that you will laugh, cry, have some sleepless nights, travel, make new friends or perhaps even meet your soul mate... You end up discovering yourself!



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It is a time-honored tradition at OSU that incoming medical students are welcomed into the medical community by receiving their White Coat. The College of Medicine solicits donations from alumni to provide each student with a coat, and the MSTP invites alumni to donate a coat specifically to an incoming MD/PhD student. We hope that receiving this coat from an MSTP alumnus will provide an early connection to our training community. Upon receiving his or her white coat, the student writes a note or makes a phone call to say thank you, and we hope this enables Ohio State MD/PhDs to connect with one another and initiate a mentorship relationship.

To ensure your donation matches a coat to an MSTP student please contact mdphd@osumc.edu to ensure your coat matches to an MSTP student. In addition to the White Coat Sponsorship Program, the MSTP offers several other options for support for many of its programs.

This year, OSU MSTP alumni Chadwick Wright, MD, PhD and Richard Wardrop, MD, PhD have once again generously donated funds to sponsor white coats for the entire MSTP entering class. Thank you, Drs. Wright and Wardrop!



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WELCOME CLASS OF 2017!



Christopher Ayuob

Although I was born in Houston, Texas, I often say I am a pretty bad Texan. I cannot get excited about football, I am definitely not a conservative, and I keep trying to leave Texas. In fact, this is the fourth time I have left! We will see if it sticks. But the truth is I am also a pretty good Texan. I am a major country music fan, I love barbecue and soul food, and I get cold a little too easily. And I would also point out the purpling of Texas, which was closer to blue this past election than ever. So I am not the only liberal Texan, and while I am excited for my vote to count, I am also a little sad I will not get to be a part of flipping Texas. That would merit some Texas pride. One of the places I cultivated my seemingly un-Texan liberal tendencies was Oberlin College. There I also cultivated a Bachelor of Arts in Biology and Anthropology. And there I also began my biology research career in a C. elegans genetics lab, which I supplemented with summers at UT Health and Washington University in St. Louis, in a circadian lab and a bone remodeling lab, respectively. Since graduating in 2015, I returned to Texas to work as a research technician in a C. elegans microbiome lab. What finally brought me back to Ohio was the opportunity to pursue science and medicine in a complimentary fashion. Here I hope to continue to cultivate both of my undergraduate interests, with anthropology informing me on the medical side in how I approach diverse patients to understand their realities and what is at stake for them, and with biology arming me with the creativity and humility of the scientific method to imagine new models of human health. With that, I look forward to my newest adventure up North.

Favorite Disney/Pixar Movie: Mulan

Ariunaa Bayanjargal



I was born and raised in a small mining town in Mongolia. When I was a teenager, mv mother and I moved to the capital city, Ulaanbaatar, where I started taking science courses and was totally smitten by DNA. During high school, I became interested in a career in medicine leading to my enrollment in the Health Sciences University of Mongolia majoring in Dentistry. When I was eighteen, I had an opportunity to travel to the U.S. for a summer to learn English and American culture. During that time, I quickly realized the educational opportunities I would have in the U.S. and decided to settle in Chicago, Illinois for good. At first, I attended ESL classes, then started at Oakton Community College to receive my Associate degree in Arts. I transferred to the University of Illinois at Chicago (UIC) to complete my bachelor degree. I chose UIC due to its extensive undergraduate research opportunities since I always had the inkling to learn about research from the time I read about DNA. While at UIC, I worked in a neuroscience lab and an endocrine lab in addition to my summer internships in SUCCESS at the Ohio State University (OSU) and ICRC at the National Cancer Institute (NCI). Throughout these experiences, I explored different biomedical fields and I was able to narrow down my research interest to cancer genetics and genomics. With this interest, I joined Dr. Prokunina-Olsson's lab at NCI as a postbac fellow after completing my B.S degree in Biological Sciences. In her lab, I worked on molecular characterization of a novel bladder cancer associated region (by genome-wide association study) on chromosome 20 as well as other projects involving Burkitt lymphoma and APOBEC signature mutations in cancers. I chose OSU MSTP because I had an excellent summer as a SUCCESS participant as well as the variety of cancer research offered at OSU. Besides research, some of my hobbies include listening to podcasts, reading books, attending live performances, exercising (currently I am training for my first halfmarathon), volunteering in the community, watching Netflix, and attending sports events.

Favorite Disney/Pixar Movie: Hercules



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Daniel Brook

I grew up in Cincinnati, Ohio and graduated from Sycamore High School in 2011. For a short time while in high school, I worked in the Bernstein Allergy Group lab. I then attended Ohio State where I graduated with a bachelor's degree in Biomedical Science. While in undergrad, I raced Triathlons and was a member of the OSU Mountaineers and Yoga Club. I also worked in the Caligiuri Lab from freshman through senior year studying the role of MLL-PTD in AML. As a member of the Caligiuri Lab, I participated in Pelotonia as a rider and a fellow and defended an honors thesis. In undergrad, I also spent a summer in the Jaeger Lab in Heidelberg Germany at the National Center for Tumor Diseases characterizing the role of NY-BR1 in breast cancer as a DAAD RISE intern. I graduated undergrad in 2015 and immediately transitioned into Med School at OSU. I initially only pursued MD programs, but I guickly learned that I wanted to a research career and needed more formal training. I applied for the MSTP after my first year of med school. During my first summer of med school, I conducted research on the acute care opioid prescribing guidelines in Ohio. I'm currently interested in Social and Computational Epidemiology in the Epidemiology program in the College of Public Health. Outside of school I still love participating in endurance and adventure sports and have begun to take up the guitar.

Favorite Disney/Pixar movie: WALL-E

Rachel Brown



I grew up in Liberty Township, Ohio, which is about 25 minutes north of Cincinnati. I was homeschooled and attended a public high school part-time. For college, I went to Morehead State University (MSU) in Kentucky and majored in biomedical science with a Spanish minor. Throughout undergrad I happily became an even bigger science nerd and discovered my calling for research and medicine. I first studied local Lepidoptera (an order that includes butterflies and moths) biodiversity, and I later developed a project to use environmental DNA to examine E. coli levels and antibiotic resistance genes in our local watershed. Molecular and cell biology entered my repertoire through summer programs at UPenn and UIowa that explored IRF1 epigenetic regulation by p300 and neutrophil nuclear hypersegmentation, respectively. Becoming a physician never crossed my mind until I spontaneously shadowed one of my UPenn mentors, who happened to be a rheumatology physicianscientist. After graduating from MSU in December of 2016, I worked in a rheumatology research lab at Cincinnati Children's Hospital Medical Center, where I studied neutrophils in systemic juvenile idiopathic arthritis. I am ecstatic to synergistically combine basic research with practicing medicine as a physician-scientist. My current dream is to stay in rheumatology, but I look forward to exploring other fields too. When not sciencing or studying, I am an avid reader and enjoy being outdoors and playing sports, especially soccer. My other hobbies include piano, zumba, jogging, choir, fishing, and volunteering. I love traveling and have been to Spain, Costa Rica, Puerto Rico, and about half of the US states. I am also a crazy cat lady. A native Ohioan, I grew up hearing about OSU and am thrilled to be a Buckeye.

Favorite Disney/Pixar movie: The Aristocats



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Sydney Fobare

I was born in Orlando, Florida, but I have lived in Atlanta, Georgia, and Cleveland, Ohio before settling in Nashville, Tennessee. I attended Hendrix College, a small liberal arts college in Conway, Arkansas. At Hendrix College, I obtained a Bachelor of Arts in Chemistry with a minor in Biology. During my undergraduate career, I worked on two different research projects. During the school year, I participated in research regarding oxidative damage in the mitochondria of the liver at Hendrix College. Over the past two summers, I researched how the inhibition of the epigenetic modifier EZH2 affects acute myeloid leukemia here at The Ohio State University. I joined the MSTP program at Ohio State because of the collaborative and cutting-edge cancer research as well as the innovative medical school curriculum. Outside of research, I enjoy playing soccer, piano, running, and reading. I am excited about the opportunities here at Ohio State and look forward to joining the Buckeye Nation!

Favorite Disney/Pixar Movie: Cinderella



Daniela Jimenez-Harrison

I grew up on Long Island in New York and went to undergrad at SUNY Binghamton in "upstate" New York. I went through 3 majors (originally starting out as a computer science and bioengineering major) before settling on studying neuroscience. I explored several career options, but found my love for research while interning at Columbia studying Alzheimer's Disease. During my senior year I worked in a lab that studied dyslexia using EEG. I worked as a research assistant for three years at the Feinstein Institute (which is associate with Northwell Health) on Long Island studying glucocorticoid expression in an animal model of sepsis. During my gap years I had a lot more exposure to medical practice and its close relationship with research. I couldn't choose between becoming a doctor or becoming a researcher so I decided to pursue an MD/PhD. My current research interests lay in neuroscience but are pretty broad overall. In my spare time, I enjoy playing video games, reading, playing with my dog, Arya, travelling, and attempting to learn new languages. Growing up with all of Manhattan at my disposal has also taught me to enjoy all types of food and I consider myself a professional foodie. I've never been this far away from the Big Apple for an extended period of time, so moving to Columbus is going to be one of the biggest adventures of my life. I'm looking forward to exploring all Ohio has to offer, especially the food.

Favorite Disney/Pixar Movie: Wall-E



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Megan Pino



I am a Florida girl, hailing from the coastal city of Jupiter, FL. I enrolled in a Health Sciences Academy in high school, where I first recognized my passion for the human body. I decided to continue my pre-medical studies at Johns Hopkins University, where I majored in Biomedical Engineering with a concentration in Systems Biology and a minor in the Psychological and Brain Sciences. I became involved with laboratory research during my sophomore year, and as a result of my experiences, I began to view science and medicine as not only complementary, but mutually dependent. After graduating in 2015, I moved back to Florida to research the functional organization and development of neural circuits in the cerebral cortex at the Max Planck Florida Institute for Neuroscience. During the two years I worked there, I also investigated the cellular mechanisms mediating the vestibulo-ocular reflex pathway and studied how experience and learning modify neuronal activity in this motor reflex. Now, my research interests lie in the fields of spinal cord injury and neuroimmunology. Outside of lab, I love to knit, cook, and travel - especially to any place with a great hike! Though my thirst for comprehension was present from a young age, I did not always know that I wanted to be a physician-scientist; rather, the decision was one that I made after many years of working in both the clinical and laboratory settings. Now, I can't imagine a more fulfilling and devoted career, and I wouldn't be happy doing anything else. I'm incredibly excited to be embarking on this new journey of becoming a physician-scientist, and I am so proud to be a part of the great Buckeye Nation!

Favorite Disney/Pixar Movie: Toy Story



Steven Sher

I was born in Philadelphia, Pennsylvania but quickly moved to Scottsdale, Arizona. I grew up in Arizona where I attended grade school through high school. After high school I went to New York University for one year pursuing a degree in Chemistry. I entered college in pursuit of eventually going to medical school; however, when I came to NYU I joined my first research lab where I fell in love with scientific inquiry. During my year at NYU I worked on the development of self-assembling DNA nanocrystals. After my freshman year I transferred to Arizona State University where I changed majors to Biochemistry and changed research paths to synthesis of xenonucleic acids. My foray into undergraduate research concluded with a year and a half of work in the development of biosensors for use in a single-molecule cancer test. During these years of heavy research I found my passion in the natural sciences, but I still retained the desire to engage in patient care. For these reasons I saw myself pursuing an MD/PhD and The Ohio State University was my first choice! I look forward to this journey towards becoming a physician scientist and all it has in store.

Favorite Disney/Pixar Movie: Ratatouille



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Zheng Hong Tan

I was born and raised in Singapore and was happy in that tropical island. But everything changed when the fire nation attacked. I moved to Cleveland, Ohio and completed a dual degree in Biomedical Engineering and Neuroscience at The Ohio State University. My interest for the sciences was sparked at a pretty young age where I distinctly remembered wanting to have a theory named after me (so that I have one less thing to remember during exams, of course). I was sold to a career in sciences when I found out that doctorates in Finland have a top hat and sword during their graduation. In all seriousness, my research interests lie in neuroengineering or more specifically, neuroregeneration or growing an artificial brain (what got me interested in BME in the first place) and the tumour microenvironment. For my undergrad thesis, I worked on a hydrogel based blood brain barrier model to study breast-brain metastases. My interest for medicine originated from tagging along in my dad's clinic and solidified after being injured in the Singapore Air force. I wanted to directly impact people's lives by being their friend and advocate during trying times, just like how my doctors counselled and supported me throughout my recovery when I was injured. The next logical step is then to combine my research and medical interests in a MD/PhD (sadly, without the sword). In my free time, I like eating, sleeping, reading and practicing Taichi. I am honoured to be part of OSU's MSTP and would be looking forward to continuing my buckeye journey!

Favorite Disney/Pixar Movie: UP

Kylie Zane



I was born in Chicago and raised in Seattle before returning to the midwest for my undergraduate degree at University of Chicago. At Chicago, I majored in biology with a specialization in endocrinology, and also enjoyed courses in philosophy, history, and anthropology. In my time there, I conducted research with Dr. Joe Sachleben in the Biomedical NMR Core Facilities and later spent two years as a researcher in the Juan de Pablo Group at the Institute of Molecular Engineering, where I developed a biomimetic bone graft scaffold material in collaboration with Dr. Nader Qazvini. My current interests lie in virology and microbial metagenomics. Like many others, I was drawn to medicine through personal loss, and with my MD/PhD degree, I would like to both improve the field of medicine and learn techniques to heal suffering bodies. Outside of medicine, I enjoy the outdoors and hope to visit Cuyahoga National Park, Great Smoky Mountains, and Allegheny National Forest before I graduate. I also enjoy reading critical theory in a variety of areas, and most recently have been reading history and philosophy leading up to and in light of the events of Paris, May 1968.

Favorite Disney/Pixar Movie: Minions



Student Awards and Achievements

- Sankalp Malhotra won first place for his oral presentation at Hayes Graduate Forum. He also presented at 16th International Conference on Pseudomonas in Liverpool, UK and was awarded third place for his oral presentation at the American Academy of Pediatrics
- Kavin Fatehchand was awarded am NIH F30
- Kevin Blum awarded Academic Excellence and Achievement in Pathology Award
- Nat Murphy and David Clever won 2017 Research Day Award
- Jillian Liu has been awarded the Histochemcial Society's Vector Award for her presentation at EB2017
- Luxi Chen is the Pelotonia Graduate Fellowship Award Winner
- Kelly Regan has been awarded AMIA Translation Bioinformatics Student Paper award
- Ellen Lubbers was awarded an NIH F30
- Brian Hansen was awarded at Hearth Rhythm Society AND has been selected as a trainee fellow
- Nat Murphy was awarded an NIH F30
- Brian Hansen presented research at WexMed Live with Dr. Kent and Dr. Mohler at the Rock and Roll Hall of Fame!

Recent Student Publications

Concise Review: An (Im)Penetrable Shield: How the Tumor Microenvironementa Protects Cancer Stem CellsGnyawali S, **Relation T**, **Dominici M, Horwitz EM** Stem Cells. 2017 Feb 16

Mouse models of acute and chronic hepacivirus infection Billerbeck E, Wolfisberg R, Fahnoe U, Xiao JW, Quirk C, Luna JM, Cullen JM, **Hartlage AS**, Chiriboga L, Ghoshal K, Lipkin WI, Bukh J, Scheel TKH, Kapoor A, Rice CM Science 2017 July 14

Identification of NRAS isoform 2 overexpression as a mechanism facilitating BRAF inhibitor resistance in malignant melanoma Duggan MC, Stiff AR, Bainazar M, Regan K, Olaverria Salavaggione GN, Maharr S, Blachly JS, Krischak M, Walker CJ, Latchana N, Tridandapani S, de la Chapelle A, Eisfeld AK, Carson WE 3rd Proc Natl Acad Sci USA 2017 Aug 21

Viral persistence, liver disease and host response in Hepatitis Clike virus rat model Trivedi S, Murthy S, Sharma H, Hartlage AS, Kumar A, Gadi S, Simmonds P, Chauhan LV, Scheel TLK, Billerbeck E, Burbelo PD, Rice CM, Lipkin WI, Vandergrift K, Cullen JM, Kapoor A Hepatology 2017 Aug 31

Role for the EWS domain of EWS/FLI in binding GGAAmicrosatellies required for Ewing sarcoma anchorage independent growth. Johnson KM, Mahler NR, Saund RS, Theisen ER, Taslim C, Callender NW, Crow JC, Miller KR, Lessnick SLJ Proc Natl Acad Sci USA 2017 Sep 12

IL-18 Drives ILC3 Proliferation and Promotes IL-22 Production via NF-KB

Victor AR, Nalin AP, Dong W, McClory, S, Wei M, Mao C, Kladney RD, Youssef Y, Chan WK, Briercheck EL, Hugs T, Scoville SD, Pitarresi JR, Chen C, Manz S, Wu LC, Zhang J, Ostrowski MC, Freud AH, Leone GW, Caligiuri MA, Yu J. J Immunology 2017 OCT 1

Upcoming Events

November 13th- 15th, 2017- MSTP Recruitment Session

January 16th- 18^h, 2018 - MSTP Recruitment Session

February 6th - 8th, 2018- MSTP Recruitment Session

April 12, 2018 - Annual OSUWMC Trainee Research Day



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