美洲華人生物科學學會

Society of Chinese Bioscientists in America

SCBA DC-Baltimore Chapter 2021 Annual Symposium

8:00 AM- 7:00 PM, December 4th, 2021, via Zoom

https://jhjhm.zoom.us/j/98823259835?pwd=VFVwbEtGa1RKK0pzZzhQT05nWm9YUT09
Meeting ID: 988 2325 9835
Passcode: 491577

Organizers: Jie Xiao, Johns Hopkins University; Hong Xu, NHLBI; Yingxi (Cimo) Chen, NCI

Meeting Highlights:
Keynote speech by distinguished professor Dr. Duojia Pan
Exciting talks on cutting-edge sciences
Best poster and best oral presentation awards for trainees.
Career panel discussions featuring prominent scientists/entrepreneurs.
Job information and networking opportunities.

SinoBiological

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8:00 – 8:20 am	**Speakers Check in**
8:25 – 8:30 am	**Welcome remarks by chapter president**
8:30 – 9:50 am	**Session 1: Genetics and Development** Chairs: Mitchell Ho, Ph.D., NCI; Zhi-ming Mai, Ph.D., NCI
8:30 – 8:50 am	**Xin Chen, Ph.D.,** (陈昕), Professor of Biology, HHMI, Johns Hopkins University *Epigenetic Inheritance in Cell Fate Determination*
8:50 – 9:10 am	**Haiyan He, Ph.D.,** (何海燕), Assistant Professor, Georgetown University *Functional roles of a newly discovered membrane-bound proteasome in regulating neuronal activity in vivo*
9:10 – 9:30 am	**Chuan Wu, Ph.D.,** (吴船), Stadtman Investigator, NCI *Immune-neural transmission regulates gut sensation*
9:30 – 9:50 am	**Lichun Ma, Ph.D.,** (马利春), Postdoctoral Fellow, NCI, NIH Understanding of Tumor Heterogeneity and Tumor Evolution in Liver Cancer
9:50 – 10:10 am	**Break**
10:10 – 11:50 am	**Session 2: Neurobiology** Chairs: Wei Li, Ph.D. NEI; Yingxi Chen, Ph.D., NCI
10:10 – 10:30 am	**Zuhang Sheng**, **Ph.D**., (盛祖杭), Senior Investigator, NINDS, NIH Energy Matters: *Mitochondrial Trafficking and Energy Metabolism in Neuronal Regeneration*
10:30 – 10:50 am	**Yi Gu, Ph.D.**, (谷一), Principal Investigator, NINDS *Neural dynamics of the medial entorhinal cortex during spatial learning*
10:50 – 11:10 am	**Zhaozhu Qiu, Ph.D.,** (邱照铸), Associate Professor of Physiology, Johns Hopkins School of Medicine *From SWELL to PAC: discovery of new chloride channels*
11:10 – 11:30 am	**Yuanyuan Liu, Ph.D.,** (刘元渊), Stadtman Investigator, NIDCR *Deciphering Corticospinal Circuits in Controlling Touch and Tactile Neuropathic Pain Sensitivity*
11:30 – 11:50 am	**Xuewei Wang**, **Ph.D.,** (王学伟), Postdoctoral Fellow, Johns Hopkins University *Epigenetic rejuvenation to enhance CNS axon regeneration*
11:50 – 2:00 pm	**Lunch Break**
12:00 – 1:00 pm	**Concurrent panel discussions**
12:00 – 1:00 pm	**Room 1: Job search in academia** **Fengquan Zhou, Ph.D.,** Professor of Orthopaedic Surgery and Neuroscience, Johns Hopkins University School of Medicine

	Jie Xiao, Ph.D., Professor of Biophysics, Johns Hopkins University School of Medicine **Hong Xu, Ph.D.,** Senior investigator, NHLBI, NIH
12:00 – 1:00 pm	**Room 2: Career opportunities in industry (Moderators: Yingxi (Cimo) Chen and Zhe Han)** **Min Li, Ph.D.** CEO, SciNeuro Pharmaceuticals **Xiaodong Xiao, Ph.D** VP, Innovent Biologics **Julia Luan, Ph.D.** Global Regulatory Affairs Senior Director at AstraZeneca **Qing Li, Ph.D.**, Associate Director, Hansoh Bio.
1:00 – 2:00 pm	**Breakout Room Poster Sessions/flash talks**
2:00 – 3:40 pm	**Session 3: Systems Biology** Chairs: Ling Hao, Ph.D., GWU; Lichun, Ma, Ph.D., NCI
2:00 – 2:20 pm	**Hongkai Ji, Ph.D.,** (计宏凯), Professor of Biostatistics, Johns Hopkins School of Public health *A statistical framework for differential pseudotime analysis with multiple single-cell RNA-seq samples with an application to COVID-19*
2:20 – 2:40 pm	**Yingxi Chen, Ph.D.**, (陈盈汐), Staff Scientist, NCI *Premature mortality and opioid use in the United States*
2:40 – 3:00 pm	**Wanchang Cui, Ph.D.,** (崔万昌), Scientist, Uniformed Service University of the Health Sciences *Gut microbiome and radiation*
3:00 – 3:20 pm	**Zhiming Mai, Ph.D.,** (麦智明), Postdoctoral Fellow, NCI *Solar ultraviolet radiation and variations in systemic immune and inflammation markers*
3:20 – 3:40 pm	**Break**
3:40 – 5:00 pm	**Session 4: Bioimaging and Bioengineering** Chairs: Bin Wu, Ph.D., JHU; Ming Ji, Ph.D., NIEHS-NIH
3:40 – 4:00 pm	**James Z. Liu, Ph.D.,** (刘哲), Group leader, HHMI Janelia Research Campus *Imaging the Accessible Genome at Nanometer Scale*
4:00 – 4:20 pm	**Yun Chen, Ph.D.,** (陳昀), Assistant professor of Mechanical engineering, Johns Hopkins University *Plasma Membrane Ruffling is a Mechanosensor of Fluid Viscosity*
4:20 – 4:40 pm	**Qi Cao, Ph.D.,** Assistant professor, University of Maryland School of Medicine *Molecular imaging quantification of brain cell-subtype neurochemicals*
4:40 – 5:00 pm	**Ye Qiao, Ph.D.,** (乔晔)Associate Professor of Radiology and Radiological Science, Johns Hopkins University School of Medicine *MRI Imaging of Intracranial Arteries*
5:00 – 5:20 pm	**Break**
5:20 – 6:20 pm	**Keynote Address** **DuoJia Pan, Ph.D.,** Professor, The Fouad A. and Val Imm Bashour Distinguished Chair in Physiology, HHMI, UT Southwestern *Hippo signaling in growth control and beyond*
6:20 – 6:30 pm	**Award announcement and closing remarks by president-elect**

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Concurrent Panel Discussions (12:00-1:00pm)
The SCBA 2021 Winter Symposium features an exciting concurrent panel discussion session consisting of two topics (See below). To facilitate the discussions, please use this google form to submit your questions to the panelists when you register for the meeting.
https://forms.gle/T6gLeCasYJH7aaXB6

Panel discussion 1: Seeking a career in academia in the post-pandemic era
Summary: This panel will focus on how to prepare for a successful career in academia. The panelists will share their perspectives from the search committee's stand on what the most important factors are when applying for academic jobs.

Dr. Fengquan Zhou
Professor, JHU

Dr. Jie Xiao
Professor, JHU

Dr. Hong Xu
Senior Investigator, NIH

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Panel discussion 2: Career opportunities in biopharmaceutical industry

Summary: This panel discussion is in the format of a townhall meeting, featuring four prominent scientists/entrepreneurs who are playing key roles in business development, personnel recruiting and training in biopharmaceutical companies in the DC-Baltimore area (see below). They will share their visions on the future of the biopharmaceutical industry in the post-pandemic era and their personal career development experience/advice with fellow trainees. They will also answer any questions regarding career path selection, job search preparation, interview skills, and what to expect when seeking a career in pharmaceutical industry. Our panelists will also share their current employment opportunities with the audience.

Dr. Min Li
CEO, SciNeuroPharmaceuticals

Dr. Min Li has over 30 years of professional experience in both academic and industrial R&D. He is the founder, CEO and director of SciNeuro Pharmaceuticals, a leading CNS biotech company headquartered in Shanghai. He currently serves as Non-Executive Director of Adagene Inc. (ADAG, NASDAQ) and venture partner of Lilly Asia Ventures. Dr. Li was formerly Senior Vice President, Global Head of Neuroscience R&D at GSK from 2013 to 2019. While with GSK from 2014 to 2017, he also served as General Manager of GSK R&D China, an organization of >400 employees. Before moving to industry, Dr. Li was a tenured Professor of Neuroscience at Johns Hopkins University School of Medicine for almost 20 years, where he still holds an adjunct appointment. Previously, Dr. Li served on scientific advisory boards, non-profit and corporate boards that include multinational corporations, disease foundations and government agencies.

Dr. Li received his B.S. degree in biochemistry from Wuhan University in 1984 and his Ph.D. in molecular immunology from Johns Hopkins University in 1990. After being a Helen Hay Whitney Fellow at University of California San Francisco, in 1994 he returned to Johns Hopkins to join the faculty. At Johns Hopkins, he studied how nerve cells communicate each other. He is author and inventor of more than 100 scientific articles and patents. Dr. Li was a recipient of prestigious academic awards including an Esther A & Joseph Klingenstein Neuroscience Fellowship and the

Sloan Neuroscience Award. He was a fellow of American Association for Advancement of Science and an established investigator of American Heart Association.

Dr. Qing Li
Principal Scientist
Group Leader
Hansoh Bio.

Dr. Qing Li is currently an associate director and Group Leader of Hansoh Bio, focusing on the discovery and development of biologics in targeted therapy and immuno-oncology areas. Prior to Hansoh Bio, Dr. Li worked at AstraZeneca for more than 7 years and led multiple programs of antibody discovery and drug delivery including novel platform development and pipeline projects. She received her bachelor's degree at University of Science and Technology of China, Ph.D. in chemistry from University of Minnesota, and completed post-doctoral training at University of Texas, Austin. Dr. Li has co-authored 20+ journal publications and book chapters, and 20+ scientific abstracts and presentations at national and international conferences. She is a board member and Vice President of Chinese Biopharmaceutical Association (CBA-USA).

Dr. Julia Luan
Senior Director
Global Regulatory Affairs
AstraZeneca

Dr. Luan is currently a Global Regulatory Affairs Senior Director in AstraZeneca, leading global drug development, regulatory strategies and regulatory execution for multiple Tier 1 products. Prior to AstraZeneca, Dr. Luan worked at the US FDA for more than 13 years and held various positions of increasing responsibilities, including Statistical Reviewer, Team Leader, and Acting Deputy Division Director. She has extensive experience across a number of therapeutic areas for both new and generic drug development. She received more than ten FDA honor awards, including Excellence in Mentoring Award, Leadership Excellence Award, and Regulatory Science Excellence Award. Dr. Luan initiated several FDA funded research projects, led FDA guidance development, chaired steering committees of international conferences, and gave presentations at meetings, workshops, and forums. Before the FDA, she was a member of the research faculty at Johns Hopkins University and a Statistical Consultant at the University of Kentucky Medical Center. Dr. Luan is a board member and Vice President of Chinese Biopharmaceutical Association (CBA-USA), and a board member and committee co-chair of FDA Alumni Association (FDAAA). She received a bachelor's degree in Statistics from Renmin University of China and a doctor degree in Statistics from University of Kentucky.

Dr. Xiaodong Xiao
VP, Innovent Biolics

Dr. Xiaodong Xiao obtained his B.S. from Fudan University in Genetics and Genetic Engineering, and Ph.D. from The Ohio State University in Molecular Biology and Biochemistry. After a brief postdoc training in NCI, NIH, he was promoted to the position of staff scientist as a permanent federal employee. He then moved on to biotech industry assuming increasing responsibilities first as a senior scientist in MedImmune, the biologics arm of Astrazeneca, and then director of biologics discovery in Bristol-Myers Squibb. He was VP of discovery in Jecho Laboratories before joining Innovent Biologics as VP of discovery and protein engineering. He has conducted extensive basic research in cancer and infectious diseases and led numerous biologics drug discoveries and platform development throughout his career. He has more than 70 peer-reviewed publications, holds 12 issued patents or patent applications, and serves as reviewers for 10 international journals. His innovative work has contributed to close to $ 1 billion direct commercial values for NCI and collaborators, in addition to his regular duties. Among his many achievements, he was the first to report the SARS-CoV spike protein receptor binding domain (RBD) (2003), which serves as the scientific foundation for developing antibody therapeutics and vaccines against SARS-CoV and currently COVID-19.

Abstracts

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Abstract # 1

Competitive coordination of the dual roles of the Hedgehog co-receptor in homophilic adhesion and signal reception

Xiaoyan Zheng, Ph.D.

George Washington University

Hedgehog (Hh) signaling patterns embryonic tissues and contributes to homeostasis in adults. In *Drosophila*, Hh transport and signaling are thought to occur along a specialized class of actin-rich filopodia, termed cytonemes. Here, we report that Interference hedgehog (Ihog) not only forms a Hh receptor complex with Patched to mediate intracellular signaling, but Ihog also engages in *trans*-homophilic binding leading to cytoneme stabilization in a manner independent of its role as the Hh receptor. Both functions of Ihog (*trans*-homophilic binding for cytoneme stabilization and Hh binding for ligand sensing) involve a heparin-binding site on the first fibronectin repeat of the extracellular domain. Thus, the Ihog-Ihog interaction and the Hh-Ihog interaction cannot occur simultaneously for a single Ihog molecule. By combining experimental data and mathematical modeling, we determined that Hh-Ihog heterophilic interaction dominates and Hh can disrupt and displace Ihog molecules involved in *trans*-homophilic binding. Consequently, we proposed that the weaker Ihog-Ihog *trans* interaction promotes and stabilizes direct membrane contacts along cytonemes and that, as the cytoneme encounters secreted Hh ligands, the ligands trigger release of Ihog from *trans* Ihog-Ihog complex enabling transport or internalization of the Hh ligand-Ihog-Patched -receptor complex. Thus, the seemingly incompatible functions of Ihog in homophilic adhesion and ligand binding cooperate to assist Hh transport and reception along the cytonemes.

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Abstract # 2

A novel PD-L1-targeted shark VNAR single domain-based CAR-T strategy for treating breast cancer and liver cancer

Dan Li1, Hejiao English1, Jessica Hong1, Tianyuzhou Liang1, Glenn Merlino2, Chi-Ping Day2, Mitchell Ho1*

1Laboratory of Molecular Biology, Center for Cancer Research, National Cancer Institute, Bethesda, MD
2Laboratory of Cancer Biology and Genetics, Center for Cancer Research, National Cancer Institute, Bethesda, MD

Background: Chimeric antigen receptor (CAR)-T cells therapy shows great potency against hematological malignancies, whereas it is difficult to transfer CAR-T into solid tumors due to lack of appropriate antigenic targets and immunosuppressive tumor microenvironment (TME). Checkpoint molecule PD-L1 is widely overexpressed on multiple tumor types, and PD-1/PD-L1 interaction is a primary mediator of immunosuppression in TME. Here, we generated a PD-L1-specific shark single domain VNAR-based CAR-T cell strategy and explored its anti-tumor efficacy in xenograft mouse models of breast cancer and liver cancer.

Methods: We isolated anti-PD-L1 single domain antibodies from a new semi-synthetic nurse shark VNAR phage library. The binding of isolated VNARs was validated by ELISA, flow cytometry, and Octet. A peptide library based on human PD-L1 was synthesized to predict the epitope of select VNARs. Anti-tumor effect of CAR-T cells was determined via cell luciferase-based cell killing assay as well as xenograft mouse models. Two tumor models, MDA-MB-231 (triple-negative breast cancer) and Hep3B (hepatocellular carcinoma or HCC), were used in the present study.

Results: We successfully constructed an engineered semi-synthetic shark single domain phage library with the titer of 1.2x1010 PFU/ml. Three anti-PD-L1 phage binders, B2, A11, and F5, were isolated from this phage library. All three binders showed cross-reactivity to human, mouse, and canine antigens, whereas only B2 functionally blocked the interaction of human PD-1 to PD-L1. Moreover, CAR (B2) T cells specifically lysed both MDA-MB-231 and Hep3B tumor cells by targeting constitutive and inducible expression of PD-L1 in vitro and in vivo. Importantly, the combination of anti-GPC3 CAR (hYP7) T cells with CAR (B2) T cells regress Hep3B tumors synergistically in mice.

Conclusions: PD-L1-targeted shark VNAR single domain-based CAR T therapy is a novel strategy to treat breast cancer and liver cancer. This provides a rationale for potential use of anti-PD-L1 CAR T cells as a monotherapy or combination with a tumor-specific therapy in clinical studies for solid tumors.

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Abstract # 3

Dietary methionine restriction impairs anti-tumor immunity through gut microbiota

Ming Ji1, Xiaojiang Xu2, Qing Xu1, Xin Xu3, M. Andrea Azcarate-Peril4, Xiaoyue Wu1, Juan Liu5, Jason W. Locasale5, Jian-Liang Li2, Igor Shats1, and Xiaoling Li1

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5 Department of Pharmacology and Cancer Biology, Duke University School of Medicine, Durham, NC 27710

Methionine, a sulfur-containing essential amino acid, is a key component of dietary proteins important for protein synthesis, sulfur metabolism, antioxidant defense, and signaling. However, the role of methionine in cancer progression remains inconclusive. On one hand, dietary methionine restriction is known to repress cancer growth and improve cancer therapy in xenografted tumors. On the other hand, methionine is also critical for T cell activation and differentiation, making it a potential tumor suppression nutrient by enhancing T cell-mediated anti-tumor immunity. To investigate the potential impact of dietary methionine on tumor progression, we fed a genetic intestinal tumor model, Apcmin+/- mice, with either a methionine-restricted diet (MR diet) containing 0.172% DL-methionine or a control diet (CTRL diet) containing 0.86% DL-methionine. We were surprised to find that MR diet feeding reduces T cell activation, exacerbates tumor growth, along with a dramatically shortened symptom-free survival in Apcmin+/- mice. Apcmin+/- mice are immunocompetent in contrast with immunodeficient mice utilized in previous xenograft and PDX studies. To directly test whether the differential immune activities in Apcmin+/- mice and immunodeficient mediate the distinct responses of tumors to MR, we compared the effects of MR diet feeding on the growth of allograft CT26.WT mouse colon carcinoma cells in immunocompetent Balb/c mice and immunocompromised NSG mice. MR diet feeding suppressed the growth of allograft CT26.WT tumors in immunocompromised NSG mice but not in immunocompetent Balb/c mice. In line with these observations, anti-PD1 antibody significantly suppressed the growth of allografted CT26.CL25 cells in control diet-fed but not MR diet-fed Balb/c mice, indicating that MR reduces the efficacy of ICI. Mechanistically, we show that the impact of dietary methionine restriction on tumor growth and anti-tumor immunity is partially dependent on gut microbiota-mediated non-cell autonomous activation of immune cells. Methionine restriction alters composition of gut microbiota and reduces microbial production of hydrogen sulfide. Fecal transplantation from methionine-restricted tumor-free animals is sufficient to suppress T cell activation and enhance tumor growth in tumor-bearing recipient mice. Conversely, dietary supplementation of a hydrogen sulfide donor or methionine stimulates anti-tumor immunity and suppresses tumor progression. In summary, our findings reveal a vital role of gut microbiota in mediating methionine restriction-induced suppression of anti-tumor immunity and suggest that any possible anti-cancer benefits of the methionine restriction require careful considerations of both the microbiota and the immune system.

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Abstract # 4

Engineered, fully human nanobody-based CAR T cells surmount penetration and exhaustion challenges in hepatocellular carcinoma

AARTI KOLLURI, 1,2 DAN LI 1, NAN LI 1, MITCHELL HO 1

1 Laboratory of Molecular Biology, Center for Cancer Research, National Cancer Institute, National Institutes of Health
2 Mayo Clinic Graduate School of Biomedical Sciences, Rochester, MN

For treatment of solid tumors such as hepatocellular carcinoma (HCC), the therapeutic landscape for adoptive T cell therapies, including chimeric antigen receptor (CAR) T cells, displays quite limited efficacy. To date, it remains unknown how to precisely engineer CAR T cells for improved efficacy in solid tumors. In the context of hepatocellular carcinoma, we determined how hinges and transmembrane portions of varying structures and sizes affect CAR T cell function. In a vast compendium of work, HN3, a human GPC3 nanobody (VH) isolated from a phage library, was shown to abrogate HCC tumors and block the distally located Wnt binding domain of GPC3. We generated and compared multiple permutations of GPC3 targeted CAR T cells containing HN3, CD8, CD28, IgG4 and Fc domains. Here, we show that CAR T cell signaling can be improved by two independent, synergistic changes in the hinge and transmembrane domains alone. In vitro, the HN3-IgG4H-CD28TM CAR T cells performed exceptionally well, inducing high specificity and cytotoxic activity. HN3-IgG4H-CD28TM CAR T cells markedly improved HN3 cell killing activity by 30-40% in low (1.6:1) and high (25:1) effector to target ratios. Similarly, in vivo, the identical determinative changes in the hinge region and transmembrane domains led to complete tumor eradication in immunodeficient mice bearing HCC tumors within 7-10 days. Moreover, HN3-IgG4H-CD28TM CAR T cells maintain specific tumor killing and avert exhaustion by producing a clear T cell response signature of enriched cytotoxic-memory (Temra) CD8+ along with a subset of naïve T cells. In summary, nanobody based CAR T cells containing the appropriate hinge and transmembrane domains can lead to determinative T cell signaling capable of inducing swift and durable eradication of HCC tumors. Structural models which quantify disorder in protein-protein interactions validate these findings. Altogether, we show that engineered HN3 CAR T cell therapy demonstrates strong potential for treatment of aggressive HCCs enabled by Wnt dysregulation.

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Abstract # 5

Abnormal triaging of misfolded proteins by adult neuronal ceroid lipofuscinosis-associated CSP? mutants causes lipofuscin accumulation

Juhyung Lee1, Yue Xu1, Layla Saidi1, Miao Xu2, Konrad Zinsmaier3, Yihong Ye1

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2 National Center for Advancing Translational Sciences, National Institutes of Health, Rockville, MD 20850, USA
3 Departments of Neuroscience and Molecular and Cellular Biology, University of Arizona, Tucson, AZ 85721, USA

Mutations in DNAJC5 (encoding the J domain-containing HSP70 co-chaperone CSP?) are associated with adult neuronal ceroid lipofuscinosis (ANCL), a dominant-inherited neurodegenerative disease featuring lysosome-derived autofluorescent storage material (AFSM) termed lipofuscin. Functionally, CSPa has been implicated in chaperoning synaptic proteins and in misfolding-associated protein secretion (MAPS), but how CSPa dysfunction causes lipofuscinosis and neurodegeneration is unclear. Here we report two distinct protein quality control functions of CSPa at endolysosomes and perinuclear vesicles, respectively. We show that the endolysosome-associated CSPa promotes microautophagy of misfolded clients, but is dispensable for MAPS. By contrast, the perinuclear-localized CSPa, regulated by a previously unknown CSPa interactor named CD98hc, is critical for MAPS but unneeded for microautophagy. Importantly, these processes are coupled by CSPa in a J-domain regulated manner. Uncoupling these two processes, as seen in cells lacking CD98hc or expressing ANCL-associated CSPamutants, generates CSPa-containing AFSMs resembling NCL patient-derived lipofuscin, and also induces neurodegeneration in a Drosophila ANCL model. These findings suggest that blocking MAPS while allowing CSPa-mediated microautophagy disrupts lysosome homeostasis, causing CSPaassociated lipofuscinosis and neurodegeneration.

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Abstract # 6

Thiol-Cleavable Biotin for Chemical and Enzymatic Biotinylation and Its Application to Mitochondrial TurboID Proteomics

Haorong Li (1); Ashley M. Frankenfield (1); Ryan Houston (2); Shiori Sekine (2); Ling Hao (1)

1.Department of Chemistry, The George Washington University
2.Aging Institute, Division of Cardiology, Department of Medicine, University of Pittsburgh

Protein biotinylation coupled with streptavidin-based enrichment and on-bead digestion have been widely used in numerous biological applications. However, the remarkable affinity of biotin-streptavidin system causes difficulties to elute the captured biotinylated proteins from the streptavidin-coated beads. The most popular elution method, on-bead digestion, has major challenges such as streptavidin contamination signals and lost information of protein biotinylation sites. Here, we explored thiol-cleavable biotin as an alternative reagent to traditional biotin to address these challenges. We first chemically labeled human proteins with NHS-SS-biotin in comparison with non-cleavable NHS-biotin. Possible biotinylation sites and the negative impact of biotinylation on tryptic digestion efficiency were thoroughly evaluated. Furthermore, we applied thiol-cleavable biotin as a TurboID substrate for proximity labeling to study mitochondrial dynamics.
We first chemically labeled protein standards and human cell lysate with amine-reactive NHS-SS-biotin in comparison with non-cleavable NHS-biotin (Li et al. JASMS 2021). We thoroughly evaluated all possible biotinylation sites. Besides the primary lysine residue, we found that other amino acid residues (e.g., serine, threonine, histidine) can also be biotinylated by NHS reagents. We evaluated the negative impact of biotinylation to tryptic digestion efficiency. As expected, both SS-biotin and biotin labeled peptides showed significantly more miscleavages, higher peptide charges, and larger precursor mass compared to unlabeled peptides. Furthermore, thiol-cleavable biotin was applied as a substrate for proximity labeling in living cells. TurboID biotin ligase was engineered onto SLP-2, a protein localized on inner mitochondrial membrane (IMM) facing the mitochondrial matrix. When compared to the routine on-bead digestion method, thiol-cleavable biotin method provided less nonspecific protein IDs with greatly reduced streptavidin signals. Mitochondrial TurboID proteomics using the thiol-cleavable biotin method demonstrated intraorganellar spatial resolution. Mitochondrial matrix and inner membrane proteins were much highly enriched than other locations of the mitochondria. SLP2 interactors, YME1L and PARL were enriched in our result. This harmonized with recent discoveries where SLP-2 assembles with PARL and YME1L into a large protein complex in IMM and may play a pivotal role in regulating mitochondrial dynamics. However, other endogenous binding partners of SLP-2 remain largely unknown, which hinder further understanding of mitochondrial dynamics. Our future work aims to apply SS-biotin based proximity labeling to discover protein interactions of SLP-2 protein to study mitochondrial dynamics.

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Abstract # 7

FtsN activates septal cell wall synthesis by forming a processive complex with the septum-specific peptidoglycan synthase in E. coli

Zhixin Lyu 1, Atsushi Yahashiri 2, Xinxing Yang 1,3, Joshua W. McCausland 1, Gabriela M. Kaus 2, Ryan McQuillen 1, David S. Weiss 2*, Jie Xiao 1*

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2Department of Microbiology and Immunology, University of Iowa Carver College of Medicine, Iowa City, IA 52242, USA.
3Current address: Hefei National Laboratory for Physical Science at the Microscale, CAS key Laboratory of Innate Immunity and Chronic Disease, School of Basic Medical Sciences, Division of Life Science and Medicine, University of Science and Technology of China, Hefei, China.

The FtsN protein of Escherichia coli and other proteobacteria is an essential and highly conserved bitopic membrane protein that triggers the inward synthesis of septal peptidoglycan (sPG) during cell division. Previous work has shown that the activation of sPG synthesis by FtsN involves a series of interactions of FtsN with other divisome proteins and the cell wall. Precisely how FtsN achieves this role is unclear, but a recent study has shown that FtsN promotes the relocation of the essential sPG synthase FtsWI from an FtsZ-associated track (where FtsWI is inactive) to an sPG-track (where FtsWI engages in sPG synthesis). Whether FtsN works by displacing FtsWI from the Z-track or capturing/retaining FtsWI on the sPG-track is not known. Here we use single-molecule imaging and genetic manipulation to investigate the organization and dynamics of FtsN at the septum and how they are coupled to sPG synthesis activity. We found that FtsN exhibits a spatial organization and dynamics distinct from those of the FtsZ-ring. Single FtsN molecules move processively as a single population with a speed of ~ 9 nm/s, the same as the speed of active FtsWI molecules on the sPG-track, but much slower than the ~ 30 nm/s speed of inactive FtsWI molecules on the FtsZ-track. Furthermore, the processive movement of FtsN is independent of FtsZ's treadmilling dynamics but driven exclusively by active sPG synthesis. Importantly, only the essential domain of FtsN, a three-helix bundle in the periplasm, is required to maintain the processive complex containing both FtsWI and FtsN on the sPG-track. Our findings indicate that FtsN activates sPG synthesis by capturing or retaining FtsWI on the sPG-track, rather than by displacing FtsWI from the FtsZ-track. Moreover, FtsN does not simply trigger synthesis of sPG but remains part of the FtsWI complex to keep it active.

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Abstract # 8

Histone inheritance patterns in mammalian adult stem cells

Binbin Ma, Xin Chen

Johns Hopkins University

A long-standing question in the stem cell field is how distinct cell fates are defined with one stem cell asymmetric division. Histones, a major carrier of epigenetic information, play important roles in regulating differential gene expression and cell fate decisions. Our previous studies have shown asymmetric histone inheritance during asymmetric divisions of Drosophila male germline stem cells and intestinal stem cells. However, it is unclear whether asymmetric histone inheritance is applicable to mammalian stem cells. To address this question, we are using spermatogonial stem cells (SSCs) in mouse testes as a model adult stem cell system to study histone inheritance patterns in vivo. First, we explored the division modes of spermatogonial stem cell populations with published stem cell markers. Intriguingly, we found that ~9% of spermatogonial pairs (GFRa1+/Tex14+) exhibited asymmetric distribution of both Eomes and Id4, key transcription factors in stem cells. A similar percentage (~10%) of spermatogonial pairs (GFRa1+/Tex14+) that derive from spermatogonial stem cell divisions displayed asymmetric histone H4 and H3 distribution. To confirm that the asymmetric histone inheritance patterns correlate with distinct cell fates, we incorporated the Id4-EGFP; H4-mscarlet mice and showed that lower histone H4 cells are the Id4-EGFPhigh daughter cell, which represents the stem daughter cell. Furthermore, using a heat-shock induced regeneration regime in the mouse testes, we found that asymmetrically dividing mSSCs with asymmetric histone H4 patterns significantly increased to 18.36%. These results indicate that the asymmetric histone inheritance likely contributes to establishing distinct cell fates during stem cell asymmetric divisions, which could be important for both tissue homeostasis and regeneration. In the future, we will further explore old versus new histone inheritance patterns and the biological significance of asymmetric histone inheritance in the mouse SSCs system. Together, these results will greatly enhance our understanding of how stem cells redistribute epigenetic information during asymmetric divisions and whether this is a conserved phenomenon across different tissue contexts and species.

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Abstract # 9

HOP homeobox (HOPX) represses activation-induced T cell proliferation

Qian Yang, Michael Patrick, and Nan-ping Weng

Laboratory of Molecular Biology and Immunology, National Institute on Aging, National Institutes of Health

Aging is associated with the decline function of T cells including reduced activation-induced proliferation. HOP homeobox (HOPX) is reported to regulate memory CD4 T cell survival. However, its spliced transcript variants and their role in human T cells have not been fully examined. Here, we found that HOPX mRNA was detectable in human CD4+ and CD8+ T cells and increased via activation with anti-CD3/28 treatment and aging. HOPX level was 1.5-fold higher in T cells from old subjects (70 years or older) than from young subjects (40 years or younger). Human T cells express three different isoforms (a, b, and c) of HOPX, and HOPXb encoding a protein of 73 amino acids was the predominant one. To gain insight into the potential role of HOPX, Jurkat T cells and primary T cells were transduced with a pLVX-HOPXb lentiviral vector. In Jurkat T cells, expression of HOPXb significantly reduced the growth compared to sham viral transduced cells, whereas expression of HOPXb in primary CD4+ and CD8+ T cells also reduced proliferation as measured by dilution of CFSE tracking dye and cell number compared with the sham viral control in vitro. Over-expression of HOPXb did not increase cell death in either Jurkat T cells or primary T cells. Genome-wide transcription analysis between HOPXb over-expressed and control primary T cells revealed alteration of T cell proliferation signature genes. Taken together, HOPXb functions as a repressor in activation-induced human T cell proliferation and may play a role in T cell aging.

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Abstract # 10

HiCHub: A Network-Based Approach to Identify Domains of Differential Interactions from 3D Genome Data

Xiang Li [1], Shuang Yuan [1], Shaoqi Zhu [1], Haihui Xue [2], Weiqun Peng [1]

[1] Department of Physics, George Washington University, Washington DC, 20052
[2] Center for Discovery and Innovation, Hackensack University Medical Center, Nutley, NJ 07110

Chromatin architecture is important for gene regulation. Existing algorithms for identification of genome structure changes focus on either the change of loops between focal loci, or changes of large-scale TAD domains. Here we developed a network-based algorithm to detect chromatin interaction changes at intermediate scales, by identifying spatial clusters of genomic elements that exhibit concordant changes of chromatin interactions. We show evidence that the identified hubs play a significant role in gene regulation.

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Abstract # 11

Mitoxantrone modulates a glycosaminoglycan-spike complex to inhibit SARS-CoV-2 infection

Qi Zhang1,3, Peter Radvak2, Juhyung Lee1, Yue, Xu1, Vivian Cao-Dao1, Miao Xu3, Wei Zheng3, Catherine Z. Chen3, Hang Xie2, and Yihong Ye1

1 Laboratory of Molecular Biology, National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health, Bethesda, MD 20892, USA
2 Laboratory of Pediatric and Respiratory Viral Diseases, Division of Viral Products, Office of Vaccines Research and Review, Center for Biologics Evaluation and Research, United States Food and Drug Administration, Silver Spring, MD 20993, USA.
3 National Center for Advancing Translational Sciences, National Institutes of Health, Rockville, MD 20850, USA

Blocking spike-mediated entry of SARS-CoV-2 into human airway epithelial cells is an attractive therapeutic strategy for COVID-19. We and others reported that the SARS-CoV-2 spike (S) protein recognizes heparan sulfate, a negatively charged glycosaminoglycan (GAG) that is attached to some plasma membrane proteins. This interaction facilitates the engagement of spike with a downstream receptor to promote viral entry. Here, we show that Mitoxantrone, an FDA-approved anti-cancer drug, targets a spike-GAG complex to compromise the function of spike in both viral endocytosis and spike-mediated membrane fusion. As a single agent, Mitoxantrone inhibits the entry of an authentic SARS-CoV-2 strain in a cell-based model and in human lung 3D-EpiAirway organoids. Gene expression profiling supports the plasma membrane as a major target of Mitoxantrone but also underscores a major undesired activity associated with nucleosome dynamics. We propose that Mitoxantrone analogs with a similar GAG-binding activity but a reduced affinity for DNA and topoisomerase may offer a safe and economical therapy to overcome breakthrough infections in the post-vaccine era.

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Abstract # 12, selected for talk

Epigenetic rejuvenation to enhance CNS axon regeneration

Xue-Wei Wang1, Shu-Guang Yang1,4, Ming-Wen Hu3, Rui-Ying Wang1, Chi Zhang1, Anish R. Kosanam1, Jing-Jing Jiang1, Ximei Luo3, Jiang Qian3, Chang-Mei Liu1,4, Feng-Quan Zhou1,2

1Department of Orthopedic Surgery, 2The Solomon H. Snyder Department of Neuroscience, 3Department of Ophthalmology, The Johns Hopkins University School of Medicine, Baltimore, MD 21205, USA. 4State Key Laboratory of Reproductive Biology, Institute of Zoology, Chinese Academy of Sciences, Beijing 100190, China.

Current clinical therapeutics for neural injury and neurodegenerative diseases falls short of success. In mammals, while adult neurons in the central nervous system (CNS) possess poor axon growth ability to maintain circuit stability, young developing neurons are competent in axon growth to establish neural circuit. During maturation, epigenetic regulators play vital roles in regulating the chromatin structure and the transcriptome of neurons to switch from favoring to limiting axon growth. Here we studied the role of Ezh2, an H3K27 methyltransferase, in mammalian axon regeneration, as its levels are significantly elevated in dorsal root ganglion (DRG) neurons after peripheral injury, a situation where the axon growth ability of these neurons can be reactivated. Functionally, Ezh2 loss-of-function in DRG neurons impaired axon regeneration in vitro and in vivo. More importantly, forced expression of Ezh2 in RGCs significantly promoted RGC axon regeneration after optic nerve crush. Intriguingly, the promoting effect only partially depends on Ezh2's role as a methyltransferase, as overexpressing a mutant form of Ezh2 lacking the methylation function also induced optic nerve regeneration, although to a lesser extent. RNA-seq and ATAC-seq of RGCs revealed that Ezh2 overexpression decreased chromatin accessibility and mRNA levels of many genes associated with synaptic transmission. One of the most significantly downregulated genes among them is Slc6a13, which encodes GABA transporter 2. Overexpression of it partially blocked the optic nerve regeneration induced by Ezh2, suggesting Ezh2 promotes axon regeneration by inhibiting genes functioning in mature neurons. Additionally, the multiomics analysis showed that Ezh2 suppressed multiple classes of CNS axon growth inhibitors or their receptors. Overexpression of them, e.g., Omg or Lingo3, almost completely blocked the promoting effect of Ezh2 on optic nerve regeneration. Our findings suggest that Ezh2 is a master suppressor of negative regulators of axon regeneration, and that modulating chromatin accessibility is a promising strategy to promote CNS axon regeneration. Similarly, we demonstrated that loss-of-function of an H3K27 demethylase, Utx, could promote RGC axon regeneration and survival. Notably, Utx is among the few genes on the X chromosome that escape X inactivation, therefore its role in exacerbating RGC apoptisis after optic nerve injury may be an explanation for the high susceptibility of women to angle-closure glaucoma.

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Abstract # 13, Invited Speaker

Epigenetic Inheritance in Cell Fate Determination

Xin Chen, Ph.D.

Johns Hopkins University

Most of the cells within a multicellular organism carry identical DNA sequences but take on a wide variety of fates by differential gene expression. This process is regulated through the epigenome, particularly the post-translational modifications of histones, which inform gene expression in a temporospatially specific manner. Considering that all cells in a multicellular animal originate from a single zygote, one key question is how different epigenomes are established to regulate distinct fates of the daughter cells resulting from divisions of their mother cell.

Our previous and current work has led to the discoveries that during asymmetric division of stem cells, preexisting old histones are selectively retained in the stem cell, whereas newly synthesized histones are enriched in the daughter cell that is committed to differentiation. This process provides an important mechanism that allows the two daughter cells to each inherit different epigenetic information from a single cell division. These intriguing findings urge us to better understand how cells maintain their epigenetic memories or reset their epigenome. In addition, we are exploring how general these mechanisms are used in other stem cell lineages and during development. New results from these studies will be discussed.

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Abstract #14, Invited Speaker

Imaging the Accessible Genome at Nanometer Scale

Zhe Liu, Ph.D.

Howard Hughes Medical Institute, Janelia Research Campus

Using advanced labeling and optical imaging tools, my lab devises new strategies to study how biological systems establish precise spatial and temporal controls at the molecular level. As a long-standing direction in the lab, we analyze gene regulatory mechanisms at the single-cell, single-molecule level to understand how stereotypical gene control during normal development as well as altered states in diseases emerge from seemingly stochastic molecular transactions. Specifically, we aim to decode functional links between genome organization, transcription factor (TF) dynamics and transcription. As an exploratory frontier, we have been developing methods in collaboration with others at Janelia to study subcellular localization, dynamics and cell-type specific function of proteins and metabolites in the brain.

To image active chromatin at nanometer scale in situ, we developed 3D ATAC-PALM that integrates the assay for transposase-accessible chromatin (ATAC), PALM super-resolution imaging and lattice light-sheet microscopy. Multiplexed with oligopaint DNA-FISH, RNA-FISH and protein fluorescence, 3D ATAC-PALM connected microscopy and genomic data, revealing spatially segregated accessible chromatin domains (ACDs) that enclose active chromatin and transcribed genes. Using these methods to analyze genetically perturbed cells, we identify the BET family scaffold protein BRD2 as a key factor responsible for compartmentalization of the accessible genome. Specifically, BRD2 mixes and compacts active compartments in the absence of Cohesin. This activity is independent of transcription but requires BRD2 to recognize acetylated nucleosomes through its double bromodomain. We also show that BRD2 safeguards compartmental boundaries by preventing intermingling between active and inactive chromatin. Notably, genome organization mediated by BRD2 is antagonized on one hand by Cohesin and on the other by the BET homolog protein BRD4, both of which inhibit BRD2 binding to chromatin. Polymer simulation of the data supports a BRD2-Cohesin," tug-of-war" model of nuclear topology, where genome compartmentalization results from a competition between loop extrusion and chromatin state-specific affinity interactions.

Recent Job Openings

Industry jobs

1. Biomarker Scientist at NextCure

NextCure is a clinical-stage biopharmaceutical company committed to discovering and developing novel, first-in-class immune-medicines to treat cancer and other immune-related diseases by restoring normal immune function. We are seeking a highly motivated Scientist, to join our biomarker team. The candidate will be part of a dynamic and committed team developing biomarker strategies to support successful clinical development of novel immunotherapies and providing biomarker data to guide indication/patient selection, inform about drug dosing and interrogate hypothesis formed during both pre-clinical and clinical stages.Prior experience in immunotherapy research, lymphocyte and myeloid cell expertise in relation to cancer and/or drug development experience at a pharmaceutical or biotechnology company isideal.

Responsibilities

- Work both independently and collaboratively with a multidisciplinary team of Scientists andAssociate Scientists to design, execute, analyze, interpret, and communicate studies for multiple projects.
- Develop, optimize and perform a variety of histology-based (immunohistochemistry & multiplex immunofluorescent staining) and cell-based (proliferation, cell signaling, celldeath) assays.
- Ensure optimal usage of samples from clinical trial used by biomarker group, includingstorage and distribution within the group, to service providers and to collaborators.
- Identify novel technologies to be evaluated and implemented by the biomarker group.
- Generate SOPs and study report.

Required Education and Experience

- Ph.D. in appropriate discipline (e.g., immunology, tumor biology, cell biology).
- Minimum of 3-5 years postdoctoral basic or translational research experience in eitheracademic and/or in an industry setting.
- Disease relevant research experience in cancer immunology, autoimmunity, inflammationand/or other immune related studies.
- Track record of ability to independently design, optimize, troubleshoot new experiments.
- Ability to make detailed observations, analyze data, interpret, and deliver timely results.
- Hands on experience in IHC and immunofluorescent staining.
- Experience analyzing large data sets and analytics skills, such as R or other data analysis programming.
- Experience in multi-color flow cytometry from sample staining to acquisition of data.
- Experience with Nanostring's GeoMx Digital Spatial Profiler, nCounter and Rosalindbioinformatics software is a plus.

- Record of high-quality research as demonstrated by journal publications, scientific meetings poster or oral presentations.
- Strong verbal and written communication skills.
- Flexible with the capacity to prioritize workload in a fast-paced environment.
- Independent, self-motivated, committed, and efficient.

NextCure is an Equal Opportunity Employer and offers a competitive salary and benefits package in a scientifically engaged work environment. NextCure is located at 9000 VirginiaManor Road, Beltsville, MD 20705. Qualified candidates should email their resume to info@nextcure.com.

2. Associate Scientist II or III, Translational Research at NextCure

Responsibilities

- Conduct experiments in the laboratory and ensure generation of quality data in a timely manner
- Carry out multi-parameter flow cytometry experiments from start to finish in an efficient and independent manner
- Perform standard immunology techniques such as ELISA, primary T cell assays, migration assaysand other assays as needed
- Culture and maintain cell lines and primary cells with standard methods and sterile technique
- Cell line generation through transduction and transfection methods
- May be required to perform injections (IP, SC, IV, ID) and tissue recovery (blood/serum, spleen, LN, tumor, etc.) from mice for ex vivo analysis
- Ensure good record/note keeping and data organization, basic data analysis may be required
- Work diligently with project leads/teams to advance programs in a fast-paced environment
- Work closely with management and other teams to achieve objectives

Requirements

- Undergraduate or Master's degree in a biology related field; significant experience working in immunology or immune-oncology laboratory will be viewed favorably; industry experience strongly preferred
- Full proficiency in multi-color flow cytometry from sample staining to acquisition of data is required
- *in vivo* research experience with expert hands-on work skills in mouse models including IP, SC, IVand ID injections, tumor measurements, ability to collect blood samples, and knowledge of internalorgans, including immune organs, and the ability to collect and process tissues for *ex vivo* analysis
- Experience in performing ELISA and other related methods for cytokine analyses
- Ability to culture primary immune cells and conduct standard in vitro immunology assays such asMLR-like assays, T cell functionality assays and migration assays
- Basic bench research experience including cell line culture and sterile technique; experience in viral transductions and transfections of cell lines highly preferred
- Skills in RNA/protein isolation, Western blot and qRT-PCR preferred
- Capable of working cross-functionally in a team setting to achieve company objectives
- Strong verbal and written communication skills; ability to learn quickly

NextCure is an Equal Opportunity Employer and offers a competitive salary and benefits package in a scientifically engaged work environment. NextCure is located at 9000 Virginia Manor Road, Beltsville,MD 20705. Qualified candidates should email their resume to info@nextcure.com.

3. Scientist I/ Scientist II, Research at CBMG
Job link: https://www.indeed.com/jobs?q=CBMG&l=Maryland&vjk=e7b81db6e4dd977b
(Please apply through the above link)

Job Summary:
CBMG (https://www.cellbiomedgroup.com/) is seeking a talented Scientist I /Scientist II to join our Immuno-Oncology R&D team in Rockville, MD. The successful candidate will be joining us for discovery and development of T-cell therapies (CAR-T, TCR-T, and TIL) for a variety of cancers.

The candidate will work within our rapidly growing R&D team under the direction of the team leader and/or other senior scientific members of the team. In this role, the candidate will make use of his/her experience in cell biology and immunology to contribute to the advancement of innovative cell therapy products by designing and conducting laboratory experiments, developing methodology, and generating and interpreting scientific data in a highly collaborative environment. As a key member of our team, the candidate will also be responsible for documenting and communicating results to appropriate stakeholders.

Responsibilities and Duties:
- Conduct hands-on primary immune cell culturing, immune functional assays, and other *in vitro* experiments.
- Contribute to experimental planning and design, independent data analysis and interpretation.
- Work collaboratively with team members to ensure the efficient relay of information and forward translation of data.
- Assess and report data, with minimal guidance, in a clear and concise manner, with a clear understanding of its implications.
- Provide technical instructions to the team and share information between distinct projects as needed.

Qualifications and Requirements:
- Strong laboratory and analytical skills; hands-on experience with cell culture, qPCR, ELISA, and flow cytometry; evidence of effective problem-solving / troubleshooting abilities.
- Excellent oral and written communication skills; attention to detail; able to document work clearly, concisely, and understand and describe its importance to others.
- Good organizational and planning skills; ability to manage a portfolio of work, prioritize, and deliver quality results while meeting deadlines.
- Good interpersonal skills – able to work effectively with colleagues/collaborators from diverse backgrounds, levels of seniority, and territories.
- Experience in T cell immunotherapy is a plus.

Scientist I : BS in a relevant discipline (MS preferred) + minimum 2 years of experience

Scientist II: MS in a relevant discipline (PhD preferred) + minimum 3-5 years of experience

For questions, contact Fei.Tang@cellbiomedgroup.com

4. Senior scientist in Molecular Biology/Virology at ARV Technologies Inc.

Description Job Type: Full-time
Pay: Start from $80,000.00 per year

ROLE SUMMARY

We are hiring a Research Scientist in Research and Development in Rockville, Maryland. ARV Technologies is a start-up biotechnology company focused on developing innovative vaccines to address critical unmet medical needs in areas such as infectious diseases and oncology. We are looking for enthusiastic individuals to join our preclinical research group. Depending on work experience, the Scientist's title can be Scientist I, Scientist II or Senior Scientist.

This is a laboratory-based position where she/he will be responsible for developing and optimizing in vitro and in vivo studies of vaccine candidates for a number of prophylactic and therapeutic vaccine applications. The ideal applicant should have experience with RNA viruses (e.g. flavivirus, alphavirus) replication and/or virus as a vector for vaccine development. This position requires a strong "hands-on" role and knowledge of virology/RNA biology.

Job Description:

The scientist will use techniques and knowledge of molecular biology/virology to design, optimize and validate novel vaccine candidates based on viral vectors. The ideal candidate must have hands-on experience in molecular biology, virology, or other closely related fields. Knowledge of RNA virus replication and/or use of viruses as vectors for vaccine development is highly desirable.

Qualifications

- PhD in molecular biology, virology, or other closely related fields with 0-3+ years of relevant experience.
- Practical experience and deep knowledge with RNA viruses such as flaviviruses, alphaviruses and their application as expression vectors (replicon), RNA biology and vaccine development are preferred.
- Experience in molecular biology, including sequence design, gene synthesis, DNA cloning, in vitro transcription and purification, PCR/qPCR, sh/miRNA biology and protein expression.
- Industry experience in vaccine research and development is preferred.
- Support the design and execution of relevant in vitro models and cell-based assays.
- Highly organized, detail-oriented individual
- Optimize downstream process development to improve the purification yield of viral vectors is preferred.

PREFERRED QUALIFICATIONS:

- Knowledge and experience of immunology and in vivo model are preferred, but not required.
- Knowledge and experience of bioinformatics is preferred.

SUPERVISION:

- This position may supervise 1-2 Research Associate.

BENIFITS:

- 401(k)
- Dental insurance
- Health insurance

• Paid time off
• Vision insurance

TECHNICAL/BEHAVIORAL SKILLS/COMPETENCIES:
• Communication/Presentation Skills (spoken, written)
• Integrity/Ethics
• Initiative
• Sense of Urgency
• Teamwork
• Collaboration Skills
• Innovation

OTHER:
This is a full-time position. Days and hours of work are Monday through Friday, 8:30 a.m. to 5 p.m. work location will be in Rockville, Maryland

EEO STATEMENT
ARV Technologies Inc. is an equal opportunity employer that is committed to diversity and inclusion in the workplace. We prohibit discrimination and harassment of any kind based on race, color, sex, religion, sexual orientation, national origin, disability, genetic information, pregnancy, or any other protected characteristic as outlined by federal, state, or local laws.

To apply for this position, please send your resume to rxu@arv-tech.com

5. Scientist I/II/Sr Scientist – Molecular Biology/RNA Biology at ARV Technologies Inc.
Job Type: Full-time
Pay: Start from $80,000.00 per year (3 positions available)

ROLE DESCRIPTION:
This position is responsible for supporting and/or leading a multidisciplinary team in the development and optimization of new vaccines for the prevention/treatment of cancer and infectious diseases in a preclinicalsetting. The ideal candidate must have in-depth and practical expertise in molecular biology and cell biologyto support the generation, optimization, and evaluation of RNA vaccines for the R&D group. The candidatemust be able to work independently and collaboratively in a matrix environment, using sound scientific judgment and strong team skills to design, execute, interpret and communicate oncology studies for one ormore projects. Depending on qualifications and work experience, three to four positions are available withthe title of Scientist I, II or Senior Scientist. She/he will report directly to the Director.

BASIC QUALIFICATIONS
• The successful candidate will have a minimum of 2 years work experience with postdoc in academic setting, or Master degree with at least 6+ years of experience in Molecular Biology, Cell Biology, or related disciplines
• The candidates must have hands-on experience in molecular biology and cell biology.
• Solid scientific knowledge and hands on lab experience for molecular biology and cell biology is required, which includes ELISA, Western Blotting, qPCR, DNA cloning, etc.
• Knowledge and hand-on experience of RNA chemistry (e.g., mRNA synthesis products including nucleotides & modified nucleotides, cap analogs, RNA purification, characterization) is required.

- Knowledge and experience in mRNA therapeutics is beneficial.
- Experience with development, testing and troubleshooting of cellular assays
- Ability to independently design experiments, make detailed observations, analyze data, interpret results and provide results in a timely manner
- Excellent presentation and oral and written communication skills.
- Strong documentation and communication skills
- Ability to prioritize and assist with other tasks as needed in a small company environment
- Strong sense of urgency, initiative, ethics/integrity and innovation required.

PREFERRED QUALIFICATIONS:
- Knowledge of RNA formulation and delivery systems is preferred, but not required.
- Experience with in vivo rodent models preferred.
- Experience in flow cytometry preferred.

SUPERVISION:
- This position may supervise 1-2 Research Associate.

BENIFITS:
- 401(k)
- Dental insurance
- Health insurance
- Paid time off
- Vision insurance

TECHNICAL/BEHAVIORAL SKILLS/COMPETENCIES:

Customer Focus

- Communication/Presentation Skills (spoken, written)
- Integrity/Ethics
- Initiative
- Sense of Urgency
- Teamwork
- Collaboration Skills
- Innovation

WORK ENVIRONMENT:

- This position operates in a professional laboratory and office work environment
- This role requires hands-on laboratory work employing aseptic technique, standard molecular and microbial process with limited exposure to inorganic and organic compounds
- This role routinely uses standard office equipment such as computers, phones, photocopiers,filing cabinets and fax machines.

OTHER:

This is a full-time position. Days and hours of work are Monday through Friday, 8:30 a.m. to 5 p.m. work location will be in Rockville, Maryland

EEO STATEMENT

ARV Technologies Inc. is an equal opportunity employer that is committed to diversity and inclusion in the workplace. We prohibit discrimination and harassment of any kind based on race, color, sex, religion, sexual orientation, national origin, disability, genetic information, pregnancy, or any other protected characteristicas outlined by federal, state, or local laws.

To apply for this position, please send your resume to rxu@arv-tech.com

6. Formulation Senior Scientist at ARV Technologies Inc.

Job Type: Full-time

Pay: Start from $90,000.00 per year

We are recruiting for a Senior Research Scientist for mRNA formulation in Rockville, Maryland.

ARV Technologies is a newly startup biotechnology company focused on developing innovative vaccinesto address important unmet medical needs in areas of infectious diseases and oncology.

We are looking for enthusiastic individuals to join our formulation/delivery group. The Scientist's title can be Scientist I, Scientist II or Senior Scientist depending on the work experiences. She/he will be responsible for developing and optimizing of lipid nanoparticle formulations for in vitro and in vivo studiesfor a number of prophylactic and therapeutic vaccine applications.

Key Responsibilities:

- The ideal candidate will work independently to optimize ARV candidate LNP/ or develop newLNPs to support key proof-of-concept studies for the ARV pipelines.
- Characterization of candidate LNP and determine their stability, safety and efficacy profile in vitro and in vivo.
- The ideal candidate will have experience with formulation optimization, characterization and

downstream assays for a variety of novel payloads.

- Ability to troubleshooting and improving formulation design.
- The Formulation Scientist will work closely with other scientists to test LNP delivery efficacy invitro and in vivo.

Basic Qualifications:

- PhD in Organic Chemistry with 1+ year postdoc or industry experience, or BS.MS degree in Chemistry with over 5+ years relevant industry experience.
- Ability to lead the formulation and optimization of lipid nanoparticle drug products containing nucleic acid payloads of a range of sizes and compositions.
- Hand on experience in the lipid nanoparticle characterization techniques including DLS, NTA,HPLC, stability assays, RNA encapsulation, etc.

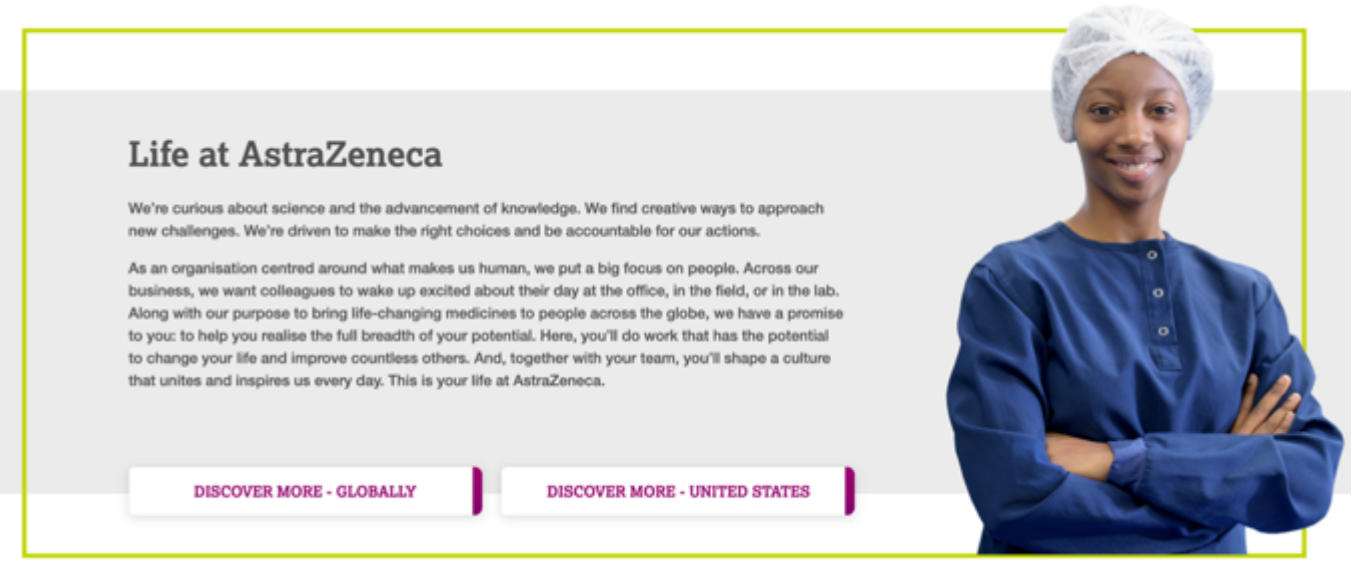
Preferred Qualifications:

- Experience with lipid chemistry and the design of new lipids for delivery applications
- Experience with scale up of LNPs to support large scale preclinical studies.
- HPLC experience
- Familiarity with GLP/GMP requirements
- Familiarity with mRNA and nanoparticle delivery system

To apply for this position, please send your resume to rxu@arv-tech.com

7. **For job opens at AstraZeneca, visit**

https://careers.astrazeneca.com for details



8. Research associate II and senior research associate at HANSOH BIO

A U.S.-based research & development subsidiary of Hansoh Pharma, Hansoh Bio is a biotech devoted to discovering and developing breakthrough therapies that conquer serious diseases and disorders for patients around the world. Hansoh Pharma is a leading biopharmaceutical company in Asia. Founded in 1995, we are committed to discovering and developing life-changing medicines to help patients. Our rapidly growing workforce of 9,000+ employees, and our fully integrated research and development, manufacturing and commercial capabilities have propelled us into leadership positions across a broad range of therapeutic areas, including CNS, oncology, infectious disease, and metabolic disorders. With 1,400 professionals across multiple R&D functions, we rank 2nd in innovation among all Chinese biotech and pharmaceutical companies, based on new molecular entities developed for clinical development. Since an IPO on Hong Kong stock exchange in June 2019, we have raised $1.6B from global top-tier institutional investors; with a current equity value of approximately $27B, Hansoh is the 2nd largest biopharmaceutical companies in China and 6th largest in Asia by market capitalization. For more information, please visit www.hspharm.com.

BIOTHERAPEUTICS – MARYLAND R&D CENTER

At Hansoh, we never rest in the quest of bringing truly life-changing treatments to patients. We are currently seeking a motivated and experienced research associate to join our Biotherapeutics team in Rockville, Maryland. The position offers an exciting opportunity to engage in target discovery, validation and preclinical candidate development of high impact projects.

THE POSITION – RESEARCH ASSOCIATE II / SENIOR RESEARCH ASSOCIATE

We are seeking a candidate who will be responsible for in vitro cell culture, basic molecular biology, immunoassays, protein expression, purification and characterization. The Maryland R&D site are focusing onthe discovery of novel drug candidates for the treatment of cancer, renal, cardiovascular, and immune system diseases. Candidate is expected to maintain good experiment record and participate in lab management. Thesuccessful candidate will work directly with corporate partners, cross-functional teams and project teams to support our pre-clinical programs.

RESPONSIBILITIES

- Design and clone antibody sequence for affinity/activity optimization
- Develop antibody screening assays utilizing ELISA, flow cytometry and Octet-based systems
- Perform *in vitro* cell-based experiments using standard immunological, cellular and molecular biology techniques such as Western Blots, PCR/qPCR, ELISA, Luminex, flow cytometry, spectroscopy, and microscopy
- Expression and purification of various proteins and antibodies from bacterial and mammalian cells using different purification techniques
- Culture and maintain cell lines and prepare reagents by following approved protocols
- Design key scientific experiments together with project teams
- Desire and ability to learn new skills to help contribute to our multi-disciplinary teams
- Provide timely communication and presentations to project team and governance body
- Assist with general lab management and upkeep including maintenance of biological samples, lab supplies, biological and chemical wastes, and calibration of instruments, in accordance with establishedguidelines
- Diligent maintenance of lab records and logs in accordance with the standard practices
- Other related research functions as deemed necessary to support day-to-day functioning of the lab

QUALIFICATIONS

- B.S. or M.S. degree in immunology, cell biology or equivalent scientific discipline from an accredited college or university with 3-4 years (with B.S.) or 1-2 years (with M.S.) of hands-on laboratory experience in an industrial or academic setting.
- PhD. degree in immunology, cell biology or equivalent scientific discipline from an accredited college with 0-2 years of hands-on laboratory experience could be considered.
- Experience with various *in vitro* and cell-based assay, mammalian cell culture, maintenance of cell lines, transfection, cell-based functional assays, flow cytometry, ELISA, Western Blots and PCR/qPCR
- Experience with antibody characterization (LC-MS, HPSEC, Octet, Biacore) highly desired
- Experience with *ÄKTA* purification system and iQue3 preferred
- Familiar with Lasergene DNAStar and GraphPad Prism software
- Experience in cloning of antibody into expression vector, antibody humanization and affinity optimization preferred
- Proficient in computers with excellent record keeping, documentation and good organizational skills
- Professional verbal and written communication and interpersonal skills, including ability to interpret and understand SOPs and laboratory procedures
- Detail-oriented, analytical with excellent trouble shooting skills
- Flexible, forward thinking and motivated with ability to act independently

Company provides competitive compensation with health, dental and vision coverage, as well as amatching401Kretirement plan.

Hansoh Biois an Equal Opportunity Employer. Hansoh does not discriminate on the basis ofrace, religion, color, sex, gender identity, sexual orientation, age, national origin, veteran status, or any other status protected under federal, state, or local law.

Connect with us: admin@hansohbio.com *Date: August 3, 2021*

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Ideal candidates should be familiar with and have rich experiences in academic editing, peer reviews, and professional writing. At least one first-author academic article published in the mainstream academic journal and high responsibility for completion of accepted projects within stipulated time with quality and quantity are required for potential candidates. Experiences in deep/line academic editing, developmental academic editing, personalized rewriting and above are also desired.

Applicants with Ph.D. degrees and academic research experiences in the following research fields with excellent academic manuscript reviewing and editing skills, are encouraged to apply.

Agriculture, Multidisciplinary
Biophysics
Clinical Medicine, Multidisciplinary
Dentistry, Oral Surgery & Medicine
Dermatology
Developmental Biology
Entomology
Environmental Sciences
Food Science & Technology
Forestry
Genetics & Heredity
Hematology
Horticulture
Immunology
Infectious Diseases
Integrative & Complementary Medicine
Microbiology
Neurosciences
Nursing
Nutrition & Dietetics
Obstetrics & Gynecology
Oncology
Ophthalmology
Paleontology
Pediatrics
Pharmacology & Pharmacy
Radiology, Nuclear Medicine & Medical Imaging
Surgery
Toxicology
Veterinary Sciences
Virology
Zoology

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Academic jobs

There are three tenure track faculty positions available at University of Maryland Eastern Shore . Please check the following links for details.
Assistant Professor: Cell/Developmental Biology/Immunology.
https://umes.peopleadmin.com/postings/2872
Assistant or Associate Professor of Biology:
https://umes.peopleadmin.com/postings/2871
Assistant or Associate Professor: Analytical Chemistry:
https://umes.peopleadmin.com/postings/2877

Postdoctoral fellow positions

1. **Gene regulation /Super-resolution imaging/ Electron Microscopy**
   Postdoc Position at Zhe Liu lab, Janelia Research Campus

   https://www.janelia.org/lab/liu-lab

   Job description:
   As a long-standing research direction in the lab, we undertake a quantitative analysis of gene regulatory mechanisms at the single-cell, single-molecule level. Collaborating with pioneer tool builders at Janelia, we aim to develop next generation imaging strategies to decode functional links between genome organization, TF dynamics and transcription in cultured cells as well as in large tissue samples.

2. **Neuroscience/Immunology**
   Position Type: Postdoctoral Position at the NIH
   Position Title: Immunology, Neuroscience
   Position Description:
   A post-doctoral position in neuroscience is available in the lab of Dr. Chuan Wu, Exp. Immunol. Branch, National Cancer Institute in Bethesda, MD. The laboratory's research interest focuses on how neuron-immune interactions regulate mucosal sensation for barrier integrity in health and disease. We seek to study how immune signaling participates in gut sensation and regulates gut-brain axis. We are also exploring new therapeutic approaches for patients with intestinal inflammation and related extraintestinal manifestations. We are utilizing interdisciplinary approaches to elucidate the crosstalk between the nervous system, microbial pathogens and the immune system. Main questions we are investigating include:

- Reciprocal regulations between the host and gut microbiota.
- Neuro-immune crosstalk for the mucosal homeostasis in lungs and gastrointestinal tract.
- Identification of novel targets in the intestinal epithelium for IBD treatment.

   More information on projects in the Wu lab can be found here:
   https://ccr.cancer.gov/Experimental-Immunology-Branch/chuan-wu.

   Qualifications:
   Candidates should have a Ph.D, M.D., or equivalent degree, less than 4 years of post-doctoral experience, and expertise in neuroscience, immunology, cell biology, biochemistry, or molecular biology. The candidate should have excellent writing and communication skills. This position is subject to a background investigation. The NIH is dedicated to building a diverse community in its training and employment programs.
   Employer Name: Chuan Wu
   How to Apply:
   Applicants should send their curriculum vitae, bibliography, and the names and contact information of three references to: Chuan Wu: chuan.wu@nih.gov

   Position Location: Bethesda
   Disclaimers:
   This position is subject to a background investigation.
   The NIH is dedicated to building a diverse community in its training and employment programs.

3. **Postdoctoral position at National Institute of Neurological Disorders and Stroke**

Bethesda, MD and surrounding area

Position Title:

Postdoctoral position - neural mechanisms of spatial navigation and memory

Position Description:

Postdoctoral positions are available in the laboratory of Dr. Yi Gu, the Spatial Navigation and Memory Unit at the National Institute of Neurological Disorders and Stroke (NINDS). The Gu laboratory aims to investigate the neural basis of spatial navigation and memory, with the ultimate goal to uncover the fundamental principle of spatial cognition and the cause of related neurological disorders. Projects in the laboratory mainly use mice as model animals and integrate multifaceted approaches, such as *in vivo* two-photon imaging, virtual reality behavioral paradigm, computational data analysis, and theoretical modeling. For additional information, please refer to the following webpage: https://dir.ninds.nih.gov/ninds/Faculty/Profile/yi-gu.html.

Salary and benefits will be set commensurate with experience and qualifications as well as NIH guidelines for intramural research training awards.

Qualifications:

We are seeking highly motivated postdoctoral candidates with a Ph.D. degree and having strong knowledge background and research training in neuroscience. We prefer, but not limited to, candidates with expertise in the following areas: *in vivo* imaging/recording, rodent surgery, rodent behavior, data analysis (MATLAB skill is preferred), and theoretical modeling. Candidate should have at least one first-author research paper in the area of neuroscience, and good oral and written communication skills in English. Candidates are expected to conduct independent research and cooperatively work with other colleagues.

To apply: The application should include:

(1) Cover letter with a brief description of candidate's interest in the position, research experience and long-term career goals
(2) Curriculum Vitae
(3) A representative first-author research paper
(4) Contact information of three references

Please email all materials as one PDF file to Dr. Yi Gu (yi.gu@nih.gov), Investigator, National Institute of Neurological Disorders and Stroke, Spatial Navigation and Memory Unit, Building 35, Room 1C-1004, 35 Convent Drive, Bethesda, MD 20892.

Review of applications will begin immediately and will continue until the position is filled.

The NIH is dedicated to building a diverse community in its training and employment programs.

4. **Cell Biology, Cancer Biology, CAR-T/NK Cells**

National Cancer Institute, Bethesda, MD

Position Description:

Antibody and cell-based immunotherapy has shown promising efficacy in hematologic tumors. However, this approach has shown limitations in solid tumors including liver cancer and pancreatic cancer. One of the critical factors for treating solid tumors is the identification of cancer-specific targets. The long-term research interests of Dr. Mitchell Ho's laboratory at the National Cancer Institute (NCI) lie primarily in the biology of cell surface receptors including glypicans such as GPC3 and GPC2 for characterizing them as new immunotherapeutic targets. An area of study involves the engineering of therapeutic antibodies including nanobodies and CAR T/NK cells. The candidate should have extensive experience in the area of molecular and cellular biology, biochemistry and evidence of excellent training and productivity.

Detailed information about our research program and publications can be accessed:
https://ccr.cancer.gov/mitchell-ho

Qualifications:

Candidates are expected to have completed, or be completing, a Ph.D. or M.D./Ph.D. with a strong publication record. Highly motivated candidates who are interested in innovative, high-impact basic and translational research are encouraged to apply. A background in molecular biology, cell biology and biochemistry is required. Evidence with protein engineering or CAR-T/NK cell engineering is a plus.

To Apply:

Applications should be sent by e-mail to Dr. Mitchell Ho (homi@mail.nih.gov). Each application should consist of a cover letter describing your research experience and interests, curriculum vitae, bibliography, and contact information of three references.

This position is subject to a background investigation. The NIH is dedicated to building a diverse community in its training and employment programs.

5. **Cell biology/protein trafficking/neurodegenerative diseases**

Position Description:

Postdoctoral fellow positions are available in the Laboratory of Molecular Biology of the National Institute of Diabetes, Digestive, & Kidney diseases (NIDDK) in the National Institutes of Health, USA. The current research is focused on protein quality control mechanisms safeguarding neuronal functions during aging. The fellow is expected to lead an independent research project, dissecting how eukaryotic cells cope with various disease-associated toxic proteins such as tau, Amyloid-beta, and alpha-synuclein using a combination of super-resolution live-cell imaging, genetic screens, genomic tools, structure-based functional assays, and fruit fly models. Examples of recently completed studies include the role of unconventional secretion of misfolded proteins in ceroid lipofuscinosis (*Nat. Cell Biol.* 2016 18(7):765-76; *BioRxiv*, 2021, doi: https://doi.org/10.1101/2021.07.16.452648), the processing of extracellular protein tau and alpha-synuclein aggregates (*PNAS*, 2020 117(20) 10865; *Nature Communications*, 2021 12(1)), and the role of ubiquitin-fold modifier (UFM1) in ribosome-associated quality control at the endoplasmic reticulum (*Cell Research*, 2020 30(1) 5-20).

For more information, see
https://www.niddk.nih.gov/about-niddk/staff-directory/biography/ye-yihong

The NIH offers an outstanding research environment with many opportunities to collaborate. Salary and benefits will be based on experience and qualifications following NIH guidelines for intramural research training awards.

NIH is an Equal Opportunity Employer and is dedicated to building a diverse community in its training and employment programs.

Minimum requirements:

A Ph.D. degree with a strong publication record. A strong background in cell biology, molecular biology, and/or biochemistry is required. Experience in neurobiology and animal studies is a plus but not required.

To apply:

Applicants should send a CV with the names of three references and a Statement of Research Interest in a combined pdf file to Dr. Yihong Ye (yihongy@mail.nih.gov).

6. **Mitochondrial Biology and Metabolic Regulations**
National Institute of Health, Bethesda, Maryland

Position Description:
Postdoctoral fellowships are available at National Institute of Health in Bethesda, the Laboratory of Molecular Genetics, NHLBI (https://www.nhlbi.nih.gov/science/molecular-genetics). We are looking for curious and motivated individuals to join us to explore fundamental questions in mitochondria biology and metabolic regulation. The lab has been at the forefront in studying mitochondrial genetics and inheritance in fruit flies. Current and future projects are to understand the basic principles guiding the transmission of mitochondrial DNA, and to explore potential mito-nuclear communications that control mitochondrial biogenesis and mitochondrial genome maintenance. Beyond studies in Drosophila, we also expanded our horizon into mitochondrial and metabolic regulations in other model organisms including mouse and Dictyostelium.

We locate at NIH Bethesda campus. The NIH intramural research program provides an outstanding research environment, excellent support and ample opportunities for young scientists to launch their own career.

Qualifications:
Applicants should have a PhD. and /or M.D. degree (or anticipate receiving their degree in the near future). Individuals with research experience in model organisms including *fruit flies or mouse* are preferred, but not necessary. Salary and compensation will be commensurate with experience and accomplishments.

To apply:
Please send a cover letter, Curriculum Vitae and the contacts of three referees to Hong Xu (hong.xu@nih.gov).

Disclaimers:
The NIH is dedicated to building a diverse community in its training and employment programs.

Multiple Openings at University of Maryland School of Medicine

1. PI Level:

University of Maryland School of Medicine has a tenure track, open rank (Assistant Professor, Associate Professor or Professor) position with generous startup, brand-new lab space, and great research environment. We are looking for candidates with existing funding or exceptional talents, in the research area of metabolism, endocrinology, diabetes, disease models and mechanism, variant function, and other related area. Interested candidates please contact Dr. Zhe "Zion" Han at zhan@som.umaryland.edu.

2. Non-PI level:

Precision Disease Modeling for Genetic Variant Functional Studies
University of Maryland School of Medicine, Baltimore, Maryland

Position Description:

Postdoc, Research Associate / Instructor, or non-tenure-track Assistant Professor positions are available at the University of Maryland School of Medicine, Baltimore.

We are looking for experienced and motivated researchers to join the newly established Center for Precision Disease Modeling at the University of Maryland School of Medicine https://www.medschool.umaryland.edu/CPDM/. The research area is focused on using model

systems (such as Drosophila, zebrafish, C.elegans, or human cells) to study functions of novel genetic variants identified from patient sequencing. We are located in the newest biomedical research building (HSF3 on the West Baltimore St.) in the area, with great research environment.

Qualifications:
Applicants should have a PhD degree in related field. Individuals with research experience in model systems including Drosophila, zebrafish and C.elegans are
preferred. Salary and compensation will be commensurate with experience and accomplishments.

To apply:
Please contact Dr. Zhe “Zion” Han at zhan@som.umaryland.edu.