

## Cancer Virology Program Quarterly Newsletter

**Published:** September 1, 2022

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### Program Overview

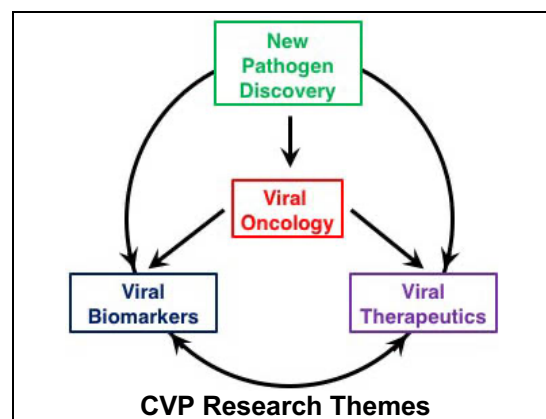
Seven known viruses have been associated with approximately 15% of human cancer. Although significant advancements have been made for the care and prevention of viral cancers over the last few decades, these malignancies continue to cause significant morbidity and mortality. Among the cancer viruses, vaccines are now available for hepatitis B virus (HBV) and human papillomavirus (HPV), which are the most successful vaccines in cancer prevention. However, accessibility to these vaccines and implementation of vaccination programs present challenges in some populations. Furthermore, a significant portion of the general population is chronic HBV and/or HPV carriers and a cure regimen remains unavailable, some of whom have developed the related viral cancers and require urgent medical intervention.

The advent of anti-hepatitis C virus (HCV) drugs has revolutionized the treatment and care of patients with HCV-associated hepatocellular carcinoma. However, the high costs of these medications have become a barrier of treatment for some populations. There are currently no effective anti-viral drugs and vaccines available for other cancer viruses, including Kaposi's sarcoma-associated herpesvirus (KSHV), Epstein-Barr virus (EBV), Merkel cell polyomavirus (MCV) and human T-cell leukemia virus type 1 (HTLV-1). KSHV is associated with Kaposi's sarcoma (KS), while EBV is associated with various portions of *Burkitt's lymphoma* (BL), Hodgkin lymphoma (HL), non-Hodgkin lymphoma (NHL), nasopharyngeal carcinoma (NPC) and gastric cancer (GC).

Both KS and NHL are common in AIDS patients. The incidences of these AIDS-related malignancies (ARM) have decreased since the introduction of anti-retroviral therapy (ART). However, the incidence of these cancers has since stabilized or even slightly increased in the last few years. This is in part due to the increased survival of HIV-infected population undergoing ART, which has evolved into a distinct new epidemiology conundrum.

The goal of the Cancer Virology Program (CVP), which is closely aligned with that of Hillman Cancer Center (HCC), is to prevent and cure viral and nonviral cancer by acquiring new understanding of viral infection. To achieve this goal, CV members carry out research focusing on four integrated specific aims:

- Aim 1:** Identify new cancer pathways targeted by cancer viruses
- Aim 2:** Identify novel therapeutic targets/agents for viral cancer and develop new anticancer virus-based therapeutics
- Aim 3:** Identify novel biomarkers for viral cancers
- Aim 4:** Discover new cancer-causing viruses



CV promotes a productive, highly-collaborative group of investigators devoted to these aims and build an outstanding research program with multiple generations of scientists studying cancer viruses. CV provides fertile ground for fundamental cancer research using cancer viruses and viral cancers as model systems. CV is internationally recognized as a leading center for the discovery and characterization of new human cancer viruses. The program includes 24 members representing 10 departments and 3 schools at the University of Pittsburgh. (Edited by Dr. Shou-Jiang Gao)

## Program Member Highlights



### **Dr. Kathy Shair**

Dr. Shair is a Member of the UPMC Cancer Virology Program and an Assistant Professor in the Department of Microbiology & Molecular Genetics. She obtained a B.Sc. in Biochemistry from the Imperial College of Science & Technology, London, U.K., and a Ph.D. in Virology from the University of Cambridge, U.K. where she studied poxvirus molecular mimicry for her thesis.

Before joining Pitt in 2013, Dr. Shair trained as a postdoc with renowned herpesvirologist Dr. Nancy Raab-Traub at the University of North Carolina at Chapel Hill. As a molecular virologist with 21 publications, her main research interest is Epstein-Barr virus (EBV)-associated cancers with a focus on EBV molecular pathogenesis in nasopharyngeal carcinoma. Her research makes important contributions to the emerging 3-D culture models that can be used to study gamma-herpesvirus infection in the airway and stratified epithelium. She was featured in mSphere of Influence. (Shair KHY\*. 3-D Culture Models Influence Studies on Epstein-Barr Virus Molecular Pathogenesis in the Epithelium. mSphere. 2020;5:e00954-20).

Her laboratory takes an interdisciplinary approach. In collaboration with Dr. Jian-Min Yuan (Dept. of Epidemiology), this year she filed a provisional patent on her biomarker work on EBV in the risk assessment of nasopharyngeal carcinoma. Her PLoS Pathogens paper from 2021 (PMID: 33914843) will soon be featured in an interview on the media outlet "Researcher" scheduled for release in September.

Among other Program in Microbiology (PMI) commitments, she is the founding Course Director for the upper-level Tumor Virology graduate course and serves on the PMI Admissions Committee and the UPSOM Interviewing Committee.

Born in Hong Kong, raised in The Netherlands with college degrees from the U.K., Dr. Shair is a fearless female scientist who is passionate about inclusion and diversity. She is making important contributions to empowering the next generation of budding virologists and has spoken at the UPMC Hillman Cancer Center Women's Task Force and organized the Women's Powerhour at the 2022 Gordon Research Conference on nasopharyngeal carcinoma in Spain.

Her obligation to the broader herpesvirus research community is notable. This year, she served as adhoc reviewer for VIRA on two occasions and is an Associate Editor for the Journal of Medical Virology (journal impact factor 20.69). She also chaired sessions at the International Herpesvirus Workshop (IHW2022) and the Gordon Research Conference on Nasopharyngeal Carcinoma.

## New Faculty Recruits



### **Dr. Yufei Huang**

Dr. Huang is a Professor in the Department of Medicine, School of Medicine and Leader in AI Research at Hillman Cancer Center. He joined the Hillman Cancer Center in July 2021.

Dr. Huang has multi-disciplinary expertise in computational genomics and AI/machine learning. He has extensive experience in developing AI/machine learning tools for the integrative analysis of multi-omics data. His current research focuses on studying the functions of m<sup>6</sup>A mRNA methylation in cancer and cancer viruses and developing artificial intelligence systems for precision oncology. He is working closely with CVP PIs to enable discoveries in basic and translational research of cancer viruses through incorporating computation and state-of-the-art high throughput techniques.

He serves as Vice Chair of the IEEE Biomedical and Health Informatics Technical Committee and Associate Editor for multiple journals including BMC Systems Biology and Frontiers Genetics.



### **Dr. Renfeng Li**

Dr. Li will join the Cancer Virology Program, UPMC Hillman Cancer Center and the Department of Microbiology and Molecular Genetics in October 2022. Before joining Pitt, he was an Associate Professor in the Department of Oral and Craniofacial Molecular Biology, School of Dentistry at Virginia Commonwealth University.

Dr. Li has been working on human gamma-herpesviruses, especially Epstein-Barr virus (EBV), for more than 14 years. He obtained funding from the National Institutes of Health (NIH) and the American Cancer Society (ACS) to investigate host restriction factors (PIAS1 and YTHDF2) against EBV replication. His lab is also exploring novel factors that regulates EBV life cycle, including polycomb repressive complex 1 (PRC1), ASB13 and HNRNPA2B1. He will be working closely with CVP PIs to utilize state-of-the-art technologies to study cancer viruses.

Dr. Li was elected as the next President for Association of Chinese Virologists in America (ACVA) (Jan 2023 - Dec 2024), which include more than 150 Principal Investigators. He serves as Editorial Board member for multiple journals including *Journal of Virology*, and *Viruses*.

## New Lab Members

### **Dr. Suet Kee Loo, Ph.D.**

Dr. Loo joined Dr. SJ Gao's lab in February 1, 2022 as a Postdoctoral Fellow. Dr. Loo obtained her Ph.D. in Cancer Biology from the Universiti Sains Malaysia, Malaysia in 2017. She then joined the University of Pittsburgh as a

Postdoctoral Fellow. She has extensive experiences in Cancer Biology. She will work on cellular factors essential for KSHV-induced cellular transformation and cancer biomarkers.

#### ***Dr. Ning Sun, Ph.D.***

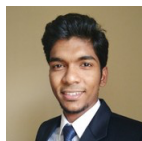
Dr. Sun joined Dr. Haitao Guo's lab on Feb 1, 2022, as a Postdoctoral Fellow. She received her Ph.D. degree in Microbiology from Duquesne University in 2022, her postdoctoral research is to study the structural dynamics of HBV RNA pregenome in translation, encapsidation, and reverse transcription.

#### ***Dr. Marwa Ibrahim, Ph.D.***

Dr. Ibrahim started her postdoctoral research in Dr. Haitao Guo's lab in March 2022 to study cancer epigenetics and develop a novel hepatitis B transgenic mouse model. Dr. Ibrahim obtained her Ph.D. at the University of Texas and has just completed a fellowship study in National Institute of Infectious Diseases, Japan, prior to arriving in Pittsburgh.

#### ***Dr. Cheng-Der Liu, Ph.D.***

Dr. Liu joined Dr. Haitao Guo's lab in April 2022 as a Postdoctoral Fellow. Dr. Liu received his Ph.D. in medical sciences from Tzu Chi University, Taiwan. His current research project is focused on the molecular mechanisms of HBV episome epigenetics.



#### ***Dr. Arun Das, Ph.D.***

Dr. Das joined Dr. Huang's lab on February 1, 2022 as a Postdoctoral Fellow. Dr. Das received his Ph.D. in Electrical Engineering from the University of Texas at San Antonio.

His Ph.D. thesis focuses on developing interpretable AI models to integrate brain imaging data and facial images to study neurological diseases. He is working on developing machine learning/tools for the analysis of single-cell spatial genomics data and using these tools to study the immune responses in cancer and cancer viruses.

#### ***Sumin Jo, M.S.***

Ms. Jo joined Dr. Huang's lab on January 1, 2022. She is a Ph.D. student in the Electrical and Computer Engineering Department. She received her B.S. and M.S. from Ewha Womans University, Seoul, Korea. She is working on studying intrinsic and tissue-specific m<sup>6</sup>A methylation and their deregulation in cancer and cancer viruses by using a multi-omics approach.

#### ***Zhentao Liu, M.S.***

Mr. Liu joined Dr. Huang's lab on January 1, 2022. He is a Ph.D. student in the Electrical and Computer Engineering Department. He obtained his M.S. from the University of Bridgeport and B.S. from Lanzhou University, China. He is working on using causal machine learning and scRNAseq to study regulatory mechanisms of cancer viral infection.

## **Program Activities**

CVP has hosted several visitors this past spring and summer. Each of them presented a seminar either at UPMC Hillman Cancer Center or the Department of Microbiology and Molecular Genetics.



#### ***Guangxiang (George) Luo, M.D.***

Dr. Luo is the Endowed Professor in Infectious Diseases in the Department of Microbiology, University of Alabama at Birmingham School of Medicine. Dr. Luo was invited through CVP and visited us on March 28-29, 2022. He presented a seminar entitled: "Host Factors Determining the Fate of Viral Infections" at UPMC Hillman Cancer Center. (*Host: Dr. Shou-Jiang Gao*)



#### ***Kenneth Kaye, M.D., Ph.D.***

Dr. Kaye is a Professor in the Department of Medicine, Harvard Medical School. Dr. Kaye was invited through the Department of Microbiology and Molecular Genetics and visited us on April 5-6, 2022. He presented a seminar entitled: "Decoding Kaposi's Sarcoma Herpesvirus Persistence" at the Department of Microbiology and Molecular Genetics. (*Host: Dr. Shou-Jiang Gao*)



#### ***Zhiming Zheng, Ph.D.***

Dr. Zheng is a senior Investigator and Chief at the Tumor Virus TNA Biology Section, HIV Dynamics and Replication Program, National Cancer Institute, NIH and visited us on April 19-20, 2022. He presented a seminar entitled: "KSHV inhibits host antiviral RNA granules and innate immunity by a viral early protein ORF57" at the Department of Microbiology and Molecular Genetics. (*Host: Dr. Haitao Guo*)



#### ***Ka-Wei Tang, MD, Ph.D.***

Dr. Kathy Shair is hosting Dr. Ka-Wei Tang, MD, Ph.D. and his Ph.D. student Alan Bäckholm from the University of Gothenburg, Sweden starting on May 1st, 2022 for a period of 1 year. Dr. Tang is a physician scientist and virologist. Dr. Tang will collaborate with Dr. Shair and Dr. Yufei Huang on studies involving single cell RNA-sequencing. Dr. Tang's group focuses on virally-associated cancers. He aims to interact with other CVP members during his year at Pitt. (*Host: Dr. Kathy Shair*)



#### ***Jianxin You, Ph.D.***

Dr. You is an Associate Professor in the Department of Microbiology at the University of Pennsylvania Perelman School of Medicine. Dr. You was invited through UPMC Hillman Cancer Center and visited us on May 17, 2022. She presented a seminar entitled: "Immune response in MCPyV infection and MCC tumorigenesis" at UPMC Hillman Cancer Center. (*Hosts: Drs. Shou-Jiang Gao and Masahiro Shuda*)





### **John Karijolic, Ph.D.**

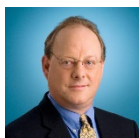
Dr. Karijolic an Associate Professor in the Department of Pathology, Microbiology & Immunology at Vanderbilt University Medical Center. Dr. Karijolic was invited through CVP and visited us on June 28-30, 2022. He presented a seminar entitled: "Structural and Chemical Modifications Regulating the KSHV Lifecycle" at UPMC Hillman Cancer Center. (Host: Dr. Shou-Jiang Gao)



### **Amy Chang, Ph.D.**

Dr. Chang is the Distinguished Professor at the Institute of Microbiology and Immunology, School of Life Science, National Yang Ming Chiao Tung University, Taiwan. Dr. Chang was taking a sabbatical leave as a Guest Scientist at Cleveland Clinics. She was invited through CVP and visited us on August 5, 2022. She presented a seminar entitled: "Uncover the Epigenetic Regulation of Tumorigenesis Using Oncogenic Herpesvirus Model" at the Hillman Cancer Center. (Host: Dr. Shou-Jiang Gao)

## **Newly Funded**



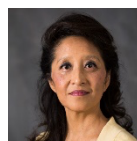
### **Dr. Paul Kinchington Awarded New NIH R01** (1R01AI158510-01A1, 07/01/22-06/30/27, total cost: \$3,395,433) entitled: "VZV vaccine attenuation and the DNA Damage response". The major goals are:

(1) to determine if the high frequency and near fixed mutations found in the Varicella Zoster virus ORF62 gene (encoding the key VZV regulatory IE62 protein) of the vaccine strain are responsible to the virus attenuation seen for the vaccine in human skin models; (2) to determine if the same mutations alter the ability of the ORF62 protein to regulate the pro-viral DNA damage response to facilitate infection in skin, and if this is mediated through the human differentiating skin specific factor cytokeratin15; and (3) To determine if these and other vaccine specific mutations in the IE62 regulatory protein underlie to poor reactivation of VZV from latency, using model reactivatable latent states with cultured Neuron platforms.



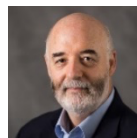
### **Dr. Kathy Shair was awarded a new NIH R01** (R01AI153115, 04/01/22-03/31/2027) entitled: "Epstein-Barr virus Molecular Pathogenesis in the Nasopharynx and the Role of LMP1 in Lytic Infection." In this grant, she will study EBV infection in the nasopharynx and pursue the molecular mechanism by which EBV latent membrane protein 1 (LMP1) facilitates lytic infection. These studies are expected to illuminate how EBV LMP1 sequence variation influences EBV infection in the nasopharynx and generate new hypothesis for how latent infection in nasopharyngeal carcinoma might emerge.

## **Awards & Honors**



### **Dr. Yuan Chang**

Dr. Chang presented the **2022 Wissler-Kumar Lectureship in Pathology** at the **University of Chicago** on May 26, 2022. Her lecture was titled: "Human Cancer Viruses: Nature and Discovery."



### **Dr. Patrick Moore**

Dr. Moore gave the **2022 Henle Herpesvirus: Pathogenesis & Cancer Symposium** keynote at the **University of Pennsylvania Perelman School of Medicine** on June 3, 2022. His presentation was titled: "Invisible Viruses, Latency, and Cancer."



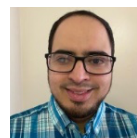
### **Dr. Haitao Guo**

Dr. Guo was elected to the American Academy of Microbiology Fellowship in 2021.



### **Dr. Joseph C. Glorioso, Ph.D.**

Dr. Glorioso received an American Society for Microbiology Award for Applied and Biotechnological Research in 2021.



### **Dr. Joseph Perez Awarded Training Fellowship**

Dr. Perez was appointed to the "Viral Persistence and Pathogenesis training grant (VPP, PI: Neal DeLuca)" T32 training fellowship starting on July 1st, 2022. He will study how a novel tumor suppressor CASTOR1 inhibits mTORC1 to regulate immune cells and affect the proliferation and activation of tumor-specific immune T cells and NK cells required for tumor clearance.

### **Alex Reznik Awarded Two Poster Awards**

Alex Reznik, a Pitt undergraduate honors college student (Class of 2022) in Dr. Shair's lab, presented posters that received the STEM award at the 2022 Pitt Honors College Research Fair, and the undergraduate poster award at the 2022 American Physician Scientists Association Northeast Regional Conference.

### **Benjamin Warner Awarded Training Fellowship**

Dr. Warner was awarded the NIH "Translational Research Training in Cancer Etiology and Prevention" (PI: Dr. Jian-Min Yuan) T32 training fellowship. He will perform profiling EBV serology using a mammalian expression library of EBV proteins in Dr. Shair's lab. His project goal is to discover serological biomarkers for the risk

assessment of EBV-associated cancers and pathologies. In work that he has contributed, a provisional patent application no. 63/336,590 was filed on 4/29/2022 with the U.S. Patent and Trademark Office by the University of Pittsburgh. Title: "Serological Biomarker for the Risk Prediction of Epstein-Barr Virus-Associated Nasopharyngeal Carcinoma."

### **Dr. Wen Meng Received Travel Award**

Dr. Wen Meng, a Postdoctoral Fellow in Dr. Gao's lab was awarded a travel award to attend and present at the 24<sup>th</sup> International Workshop on Kaposi's Sarcoma Associated Herpesvirus (KSHV) and Related Agents, July 10-13, 2022, Aurora, CO.

### **Benjamin Warner & Alex Reznik Received Travel Awards**

Dr. Warner and Alex Reznik received travel awards to attend the Gordon Research Conference on Nasopharyngeal Carcinoma and Virus-Associated Carcinomas, May 8-13, 2022 at Castelldefels, Spain.

### **In the News**



#### **Dr. Kathy Shair**

Dr. Shair led the Women's Powerhour at the 2022 Gordon Research Conference on Nasopharyngeal Carcinoma and Virus-

Associated Carcinomas, May 8-13, 2022 at Castelldefels, Spain.

### **Notable Editorial Service**

Numerous CVP members (Drs. Kathy Shair, Haitao Guo and Shou-Jiang Gao) are currently serving as Editors for the *Journal of Medical Virology* (JMV), a traditional Wiley-Blackwell journal established in 1977. JMV provides rapid publication of original scientific papers on fundamental as well as applied research concerning viruses affecting humans. In the recent annual Journal Citation Reports (Clarivate Analytics), JMV has received an impressive impact factor (IF) of 20.693 and is currently ranked the 1<sup>st</sup> among the pure virology journals. JMV has published a large number of important and significant works, and attracted many high quality submissions in areas related to medical virology in the last few years.

### **Upcoming Events**

We will be hosting more visitors in the coming year. See their info below & mark your calendars!

#### **September 13:**

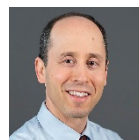


#### **Dr. Javier Gordon Ogembo, Ph.D.**

Associate Professor, Beckman Research Institute of City of Hope

Seminar: "A Historical Perspective of Human Oncogenic Herpesviruses and the Quest for a Protective Vaccine"

#### **September 21:**



#### **Dr. Benjamin Elison Gewurz, M.D., Ph.D.**

Associate Professor, Associate Chair, Harvard Graduate Program in Virology and Founding Member, Center for Integrated Solutions in Infectious Diseases, Harvard Medical School and Broad Institute

#### **October 4:**



#### **Dr. Christopher Sullivan**

Professor, Molecular Biosciences University of Texas at Austin

#### **November 15:**



#### **Dr. Elizabeth White, Ph.D.**

Assistant Professor, Otorhinolaryngology University of Pennsylvania Perelman School of Medicine

#### **December 6:**



#### **Dr. Cary Moody, Ph.D.**

Associate Professor, Microbiology and Immunology, University of North Carolina at Chapel Hill

#### **April 11:**



#### **Dr. David Knipe**

Higgins Professor of Microbiology and Molecular Genetics, Head, Harvard Program in Virology, Harvard Medical School

### **CVP Work-in-Progress Restarts on Sept. 9<sup>th</sup>**

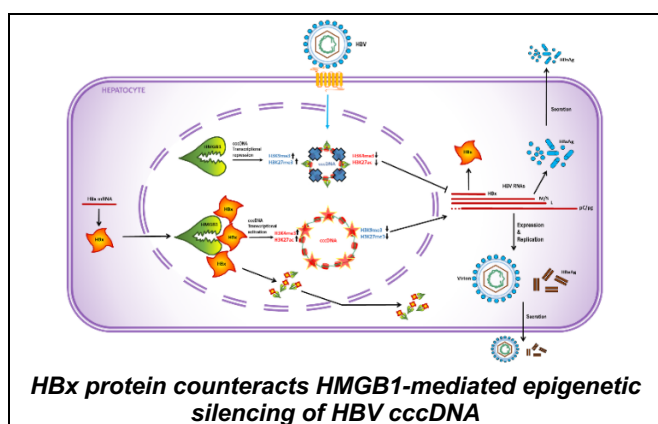
CVP will resume the work-in-progress (WIP) bi-weekly seminar series starting on Friday September 9<sup>th</sup>. Please sign up for a slot to present your exciting work. Contact Dr. Haitao Guo at: [guoh4@upmc.edu](mailto:guoh4@upmc.edu).

### **Exciting Sciences**

#### **Anti-HBV Host Restriction Factor Identified**

Nowadays hepatitis B virus (HBV) prevalence remains a significant burden to the worldwide healthcare. There is no cure for chronic HBV infection so far due to the lack of therapies that enable elimination of an intrahepatic persistent form of HBV DNA genome, namely, the covalently closed circular DNA (cccDNA). Inside the infected liver cells, cccDNA hijacks host structural and regulatory factors to assemble into a minichromosome, but certain intrinsic host factors can counteract cccDNA activity.

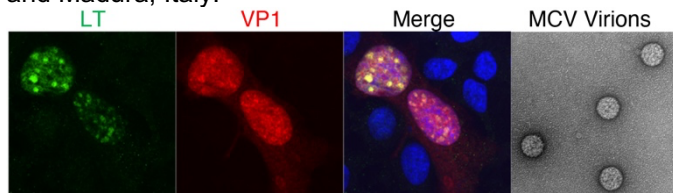
In a recent study published in *PLoS Pathogens* (Kim et al, 2022), Dr. Haitao Guo's lab identified an anti-HBV host restriction factor, specifically the high mobility group box 1 protein (HMGB1), and demonstrated its potential to mediate an epigenetic silencing, i.e. functional inactivation, of the cccDNA. However, the virally encoded accessory protein HBx can antagonize HMGB1 and maintain an active state of cccDNA. This may contribute to a better understanding of virus-host interaction during HBV infection, and to the development of HBV infection epigenetic drugs and re-consideration of cancer therapeutics strategies, where HMGB1 is used as an anti-cancer target.



### First Reporter Polyomavirus

The Chang-Moore laboratory recently described construction of the first reporter polyomavirus allowing direct detection of virus as it replicates in the journal *Viruses*. Merkel cell polyomavirus, causing Merkel cell carcinoma, was discovered by this group in 2008 (together with CVP member Masahiro Shuda) and is notoriously difficult to replicate in the laboratory.

Using a trick in molecular biology, they were able to generate closed, circular DNA from the virus that can be introduced into cells to allow virus replication. By tagging one of the virus' coat proteins with a fluorescent protein, replication of the virus now can be monitored, for the first time, using a microscope. The results were presented by the two lead authors of this paper, Hongzhao Zhou and Bizunesh Abere, at international meetings at Madison, WI and Madura, Italy.



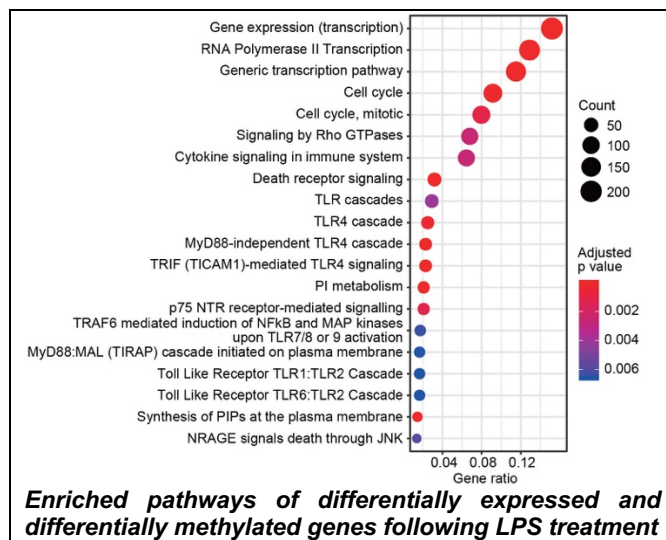
### Innate Immune Response Regulated By Epitranscriptomics

In a paper published in *Cell Death and Diseases*, Dr. Gao's group investigates how RNA modifications and epitranscriptomics regulate innate immune response during viral and bacterial infections. N<sup>6</sup>-methyladenosine

(m<sup>6</sup>A) is a dynamic post-transcriptional RNA modification influencing all aspects of mRNA biology.

The group examined cellular m<sup>6</sup>A epitranscriptomes during infections of *Pseudomonas aeruginosa* and herpes simplex virus type 1 (HSV-1), and lipopolysaccharide (LPS) stimulation to identify m<sup>6</sup>A-regulated innate immune response genes. It was found that a significant portion of cellular genes including many innate immune response genes underwent m<sup>6</sup>A modifications in 5'UTR and 3'UTR.

The investigators identified common and distinct m<sup>6</sup>A-modified genes under different stimulating conditions. Significantly, the expression of a subset of innate immune response genes was positively correlated with m<sup>6</sup>A level. Importantly, the group identified genes that had significant enrichments of m<sup>6</sup>A peaks during *P. aeruginosa* infection following knockdown of m<sup>6</sup>A "eraser" ALKBH5, confirming the regulation of these genes by m<sup>6</sup>A and ALKBH5. Among them, the group confirmed the association of m<sup>6</sup>A modification with gene expression in immune response genes TNFAIP3, IFIT1, IFIT2 and IFIH1. Taken together, the results revealed the vital role of m<sup>6</sup>A in regulating innate immunity against bacterial and viral infections. These works also provided rich resources for the scientific community.



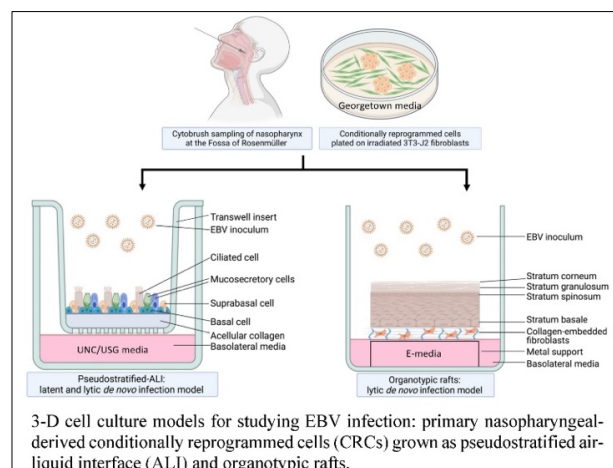
### Three-dimensional Models of the Nasopharynx for the Study of Epstein-Barr Virus Infection

In a Bio-protocol paper accompanying the original publication (Ziegler et al., A primary nasopharyngeal three-dimensional air-liquid interface cell culture model of the pseudostratified epithelium reveals differential donor- and cell type-specific susceptibility to Epstein-Barr virus infection. *PLoS Pathog* 2021;17: e1009041), the Shair lab publishes a step-by-step guide on how to generate primary cell 3-D cell culture models of the nasopharyngeal epithelium. Working with otolaryngologists (Dr. Stella Lee), skull base surgeons (Dr. Eric Wang), the Cystic Fibrosis Research Center (Dr. Mike Myerburg) and the UPMC Histopathology Core (John Moore), they



demonstrate that 3-D cell culture models of the nasopharynx can be used to study EBV de novo infection. Initially this work focused on developing pseudostratified air-liquid interface (pseudo-ALI) cultures to model the respiratory epithelia, akin to the models used for studying acute respiratory pathogens such as SARS-CoV-2, influenza virus, respiratory syncytial virus). This work has provided new opportunities for the in-house generation of primary nasopharyngeal epithelial cultures to study gamma-herpesvirus infection. The primary conditionally reprogrammed cells (CRCs) from which these 3-D cultures are generated are cryobanked and these frozen CRCs biospecimens provide a new resource serving the continued efforts of the PITT “Sinus Fluid and Tissue Bank” and the “Head and Neck Cancer Tissue and Data Repository”.

In the new publication, they extend the culture models to include infection of organotypic rafts to model the stratified keratinocytes in the nasopharyngeal epithelium. This collaborative effort has provided new opportunities for the in-house generation of primary nasopharyngeal epithelial cultures to study gamma-herpesvirus infection.



## Recently Published

### [Dr. Zandrea Ambrose's Lab:](#)

Dwivedi R, Wang Y, Kline C, Fischer DK, **Ambrose Z**. APOBEC3 selects V179I in HIV-1 reverse transcriptase to provide selective advantage for non-nucleoside reverse transcriptase inhibitor-resistant mutants. *Front Virol*. 2022;2:919825.

### [Dr. Moses Bility's Lab:](#)

Biradar S, Agarwal Y, Lotze MT, **Bility MT**, Mailliard RB. The BLT Humanized Mouse Model as a Tool for Studying Human Gamma Delta T Cell-HIV Interactions *In Vivo*. *Front Immunol*. 2022;13:881607.

### [Drs. Yuan Chang and Patrick Moore's Lab:](#)

Abere B, Zhou H, **Shuda M**, Stolz DB, Rapchak K, **Moore PS**, **Chang Y**. Replication Kinetics for a Reporter Merkel Cell Polyomavirus. *Viruses*. 2022;14(3):473.

### [Dr. James Conway's Lab:](#)

Fung HKH, Grimes S, Huet A, Duda RL, Chechik M, Gault J, Robinson CV, Hendrix RW, Jardine PJ, **Conway JF**, Baumann CG, Antson AA. Structural basis of DNA packaging by a ring-type ATPase from an archetypal viral system. *Nucleic Acids Res*. 2022;gkac647.

### [Dr. Neal DeLuca's Lab:](#)

Dremel SE, Sivrich FL, Tucker JM, Glaunsinger BA, **DeLuca NA**. Manipulation of RNA polymerase III by Herpes Simplex Virus-1. *Nat Commun*. 2022;13(1):623.

### [Dr. Terence Dermody's Lab:](#)

Barbeau DJ, Martin JM, Carney E, Dougherty E, Doyle JD, **Dermody TS**, Hoberman A, Williams JV, Michaels MG, Alcorn JF, **Paul Duprex W**, McElroy AK. Comparative analysis of human immune responses following SARS-CoV-2 vaccination with BNT162b2, mRNA-1273, or Ad26.COV2.S. *NPJ Vaccines*. 2022;7(1):77.

Comunale MJ, **Dermody TS**, Peters M, Rudolph JA, Sevco M, Young S. Consumer-centric approach to enhance access to pediatric specialty care. *Am J Manag Care*. 2022;28(6):e228-e231.

**Dermody TS**, Ettinger A, Savage Friedman F, Chavis V, Miller E. The Pittsburgh Study: Learning with Communities About Child Health and Thriving. *Health Equity*. 2022;6(1):338-344.

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