

Postdoctoral Positions at Cleveland Clinic Lerner Research Institute

Jae Jung Laboratory: Jung will relocate to Cleveland Clinic Lerner Research Institute in 2020 summer to be Betsy DeWindt Professor, Cancer Biology Department Chair, and Global and Emerging Pathogen Research Center Director. Jung is currently Fletcher Jones Professor, Microbiology and Immunology Department Chair and Emerging Pathogens and Immune Diseases Institute Director at University of Southern California. Prior to this post, he was a Professor at Microbiology and Molecular Genetics Department, and Tumor Virology Division chair at the New England Primate Research Center, Harvard Medical School.

Jung laboratory currently has 25 people and plans to expand to 30 people. Lab research (<http://uscmmi.com/jaejunglab/>) is divided into four areas: (1) virus-induced cancer (gamma-2 herpesvirus and hepatitis B virus), (2) inflammation and immunity (host-pathogen standoff, programmed cell death, and lung/brain inflammation) (3) emerging pathogens (Flavivirus, Dengue virus and Zika virus; Bunyavirus, Severe Fever with Thrombocytopenia virus and Heartland virus; and Coronavirus, Severe acute respiratory syndrome coronavirus 2) and (4) viral vector and vaccine stabilization. Our research uses cutting-edge genomics, biochemistry, structural biology, immunology and bioinformatics for basic and translational researches.

Position Description: As lab research interest is broad, any clinically relevant exciting topics are welcome. We will have extensive collaborations with two new research centers,

Global and Emerging Pathogen Research Center:

<https://newsroom.clevelandclinic.org/2020/04/22/cleveland-clinic-establishes-center-for-global-and-emerging-pathogens-research/>

Immunotherapy and Precision immunology Oncology Center:

<https://www.lerner.ccf.org/news/details/?Cleveland+Clinic+Names+Director+of+Center+for+Immunotherapy+and+Precision+Immunology&0827df005fdc3565f277a48cd78f85c18b2ab83b&7d29e9000254e20352431b5c42a70b065c6b05c6>.

Qualifications: Candidates should have a Ph.D., M.D., or equivalent degree, and expertise in any area of biology.

To Apply: Applicants should send their *curriculum vitae* to Jae Jung, jungj@ccf.org or jaeujung@med.usc.edu

Jae Jung's Laboratory and Research Interests

My laboratory (<http://uscmmi.com/jaejunglab/>) studies **Virus-induced Cancer, Emerging Pathogen and Inflammation/Immunity**.

1. Virus-Induced Cancer

Gamma-2 herpesviruses (KSHV) include Kaposi's sarcoma associated herpesvirus (KSHV) and murine herpesvirus 68 (MHV68). KSHV is an etiologic agent of Kaposi's sarcoma that is the most common tumor in patients with AIDS and MHV68, the murine counterpart of KSHV, can be used in a small animal model to study viral persistent infection. Using viral genetics and primate/mouse models, we investigate viral gene expression, epigenetics/genomics/single cell transcriptome, persistence, pathogenesis, and vaccine development.

Hepatitis B virus (HBV): HBV infection is the most common chronic viral infection in the world and there is currently no cure. The virus itself is not cytopathic, but inflammation driven by chronic HBV infection significantly elevates the risk for developing liver cirrhosis and carcinoma. The goal of our study is to establish a 3D culture model (mini-liver organoid) for productive HBV infection as a platform to dissect the roles of host factors in HBV replication and pathogenesis.

2. Emerging viruses: Emerging virus includes misquote-borne virus, tick-borne virus and respiratory zoonotic coronavirus. Dengue virus (DENV) is a single positive-stranded RNA virus of the Flavivirus family and causes a spectrum of diseases. Zika virus (ZIKV) is closely related to DENV and transmitted by *Aedes* mosquitoes. ZIKV infection is a key risk factor for microcephaly and neurological diseases. Severe Fever with Thrombocytopenia virus (SFTSV) is an emerging tick-borne infectious agent that has a fatality rate of 15-30% by causing multiple organ failure, thrombocytopenia, and leukopenia. Heartland virus (HRTV) has been identified in the Midwestern and southern United States and causes symptom and fatality similar to those of SFTSV. SFTSV and HRTV are a three-segmented negative-stranded RNA virus of the Bunyavirus family. Coronaviruses (CoV) are a large family of viruses that cause respiratory and intestinal infections in animals and humans. The recent massive outbreak of newly emerged severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has been rapidly spread worldwide, leading to a serious public health concern and global health emergency. Understanding how DENV, ZIKV, SFTSV, HRTV and SARS-CoV-2 evade host immune system and cause diseases in *in vitro* culture and animal models, and how therapeutics and vaccine can be developed against these emerging viruses is the main topics of interest.

3. Inflammation and Immunity

Host-Pathogen Standoff: The first step to mounting a protective immune response is the recognition of pathogens by pattern recognition receptors (PRRs). After recognizing specific pathogen-associated molecular patterns, PRRs activate intracellular signaling pathways to induce anti-viral immunity. To avoid host immune responses, viruses have evolved elaborate mechanisms to target and modulate various aspects of the host's immune system. Our study is focused on understanding anti-microbial responses of intracellular PRRs including RIG-I/MDA5, cGAS, TRIMs, IFITMs, IRFs, and NLRP1/3/12 and discovering various immune evasion tactics of cancer-causing viruses and emerging viruses.

Programmed Cell Death: Upon viral infection, infected cells can go through a programmed cell death (PCD). Apoptosis has been a primary PCD mechanism for the body to respond to viral infection by sacrificing infected cells. Autophagy is an innate immune pathway wherein invading pathogens are swept up and degraded by tiny "vacuum cleaners". "Pyroptosis" and "Necroptosis" are an inflammatory form of cell death characterized by massive leakage of cytosolic contents to magnify inflammatory response. These PCDs are important innate safeguard to induce inflammation and protect the organism against harmful viruses or tumor cells. Viruses, in turn, have evolved elaborate mechanisms to subvert these PCD processes. We study how the host initiates PCD and inflammatory responses upon viral infection and how the virus escapes host intracellular PCD-mediated innate immune controls to establish persistence and pathogenesis.

Traumatic brain injury (TBI) and neuroinflammation: Tripartite motif 9 (TRIM9) E3 ligase is a brain-specific innate immune effector to develop balanced host immune responses against brain injury and viral infection. Specifically, TRIM9 KO mice develops serious brain injury and encephalitis upon traumatic stress, stroke or West Nile virus (WNV) infection. Using mouse TBI models, we study blood brain barrier permeability, neuronal and astrocyte proliferation and death, NF- κ B-mediated brain inflammation, and WNV infection-induced encephalitis.

Lung inflammation: Mast cell-expressed membrane protein 1 (MCEMP1) highly expresses on lung-resident mast cells, macrophages and neutrophils in several inflammatory conditions such as Chronic obstructive pulmonary disease (COPD), idiopathic pulmonary fibrosis (IPF), asthma, and smoking. As MCEMP1 plays a critical role in the activation of mast cells and macrophages for lung inflammation, our goal is to develop MCEMP1 as a therapeutic target to treat chronic pulmonary inflammation including COPD and IPF.

Nonalcoholic fatty liver disease (NAFLD): NAFLD is a condition in which excess fat is stored in liver. Non-alcoholic steatohepatitis (NASH) is a form of NAFLD that has inflammation and cell damage in addition to fat in liver. As inflammation and liver cell damage can cause fibrosis, or scarring, of the liver, NASH may lead to cirrhosis or liver cancer. We have developed a novel NAFLD mouse model. Using this mouse model, we study the development of obesity, fatty liver disease and liver cancer.

4. Viral vector, oncolytic virus and vaccine stabilization: Instability of viral vector, oncolytic virus and vaccine often emerges as a key challenge during clinical development as well as commercial distribution. To yield stable, efficacious viral vector, oncolytic virus and vaccine for human use, successful formulation strategies must address a combination of interrelated topics including stabilization of biological activity and antigens, selection of appropriate delivery and adjuvants, and development of stability-indicating analytical methods. Our goal is to develop thermostable viral vector and oncolytic virus for clinical usages and thermostable vaccine for distribution in developing countries without the need of a cold-chain transport.

B. Representative Publications among 270:

Kim et al. Infection and Rapid Transmission of the 2019 Novel Coronavirus in Ferrets. 2020 **Cell Host & Microbe** 27:704.

Chang et al. Critical role of *OASL* in DAI/RIPK3/MLKL axis-driven necroptosis against viral infection. 2020 **Cell Host & Microbe** in review.

Park et al. Global epigenomic analysis of KSHV-infected primary effusion lymphoma identifies functional MYC super-enhancers and enhancer RNAs. 2020 **Proc Natl Acad Sci U S A**. In Press

Choi et al. Oncogenic human herpesvirus hijacks proline metabolism for tumorigenesis. 2020 **Proc Natl Acad Sci U S A**. 117:8083.

Chen W et al. Zika virus NS3 protease induces fetal brain calcification. 2020 **Nature Microbiology** revision.

Kwak et al. Development of a DNA vaccine for SFTSV that confers complete protection against lethal infection in ferrets. 2019 **Nature Comm** 10:3836.

Chen ST et al. NLRP12 regulates anti-viral RIG-I activation via interaction with TRIM25. 2019 **Cell Host & Microbe** 25:602-616.

Choi YJ et al. SerpinB1-mediated checkpoint of inflammatory caspase activation. 2019 **Nature Immunology** 20(3):276-287.

Srikanth S. et al. STIM1 regulates type I interferon response by retaining STING at the endoplasmic reticulum. 2019 **Nature Immunology** 20(2):152-162.

Choi YH et al. Severe fever with thrombocytopenia syndrome phlebovirus nonstructural protein activates TPL2 signalling pathway for viral immunopathogenesis. 2019 **Nature Microbiology** 4(3):429-437.

Park SJ et al. Ferret model of severe fever with thrombocytopenia syndrome virus infection that recapitulates human clinical manifestations. 2019 **Nature Microbiology** 4(3):438-446.

Eoh H, Jung JU. Bacterial protein reshapes host defense toward antiviral responses. 2018. **Mol Cell**

71:483.

Choi YJ et al. A Talented Duo: IFIT1 and IFIT3 Patrol Viral RNA Caps. 2018 **Immunity** 48:474

Seo et al. TRIM56-mediated monoubiquitination of cGAS for cytosolic DNA sensing. 2018 **Nature Comm.** 9:613.

Choi et al. Double-edged sword of autophagy for viral replication and pathogenesis. 2018 **Nature Rev Microbiol.**

Foo et al. Differential immunomodulatory responses of CD14⁺ blood monocytes upon infection with different lineages of Zika virus. 2017 **Nature Microbiology** 2:1558-1570.

Chen W, Choi YJ, Jung JU. Unexpected alliance of WHIP-TRIM14-PPP6C to Combat Viruses. 2017 **Mol Cell** 19: 259-261.

Choi et al. Double the trouble When two herpesviruses join hands. 2017 **Cell Host & Microbe** 22:5-6.

Kwak et al. Identification and structure of the substrate-recognition module in the Dot/Icm type IV coupling protein complex of *L. pneumophila*. 2017. **Nature Microbiology** 2:1-13.

Chen et al. Hepatitis C virus has a genetically determined lymphotropism through co-receptor B7.2. 2017 **Nature Comm.** 9:13882.

Liang et al. Zika Virus NS4A-NS4B inhibition of Akt-mTOR pathway contributes to neurogenesis defect and autophagy induction of human fetal neural stem cells. 2016 **Cell Stem Cell** 19:663.

Lee et al. Transformation of glutamyl-prolyl tRNA synthetase into an antiviral molecule via infection-specific modification. 2016 **Nature Immunol.** 7:1252.

Seo et al. No Trifling matter on STING. 2016 **Cell Host & Microbe.** 20: 277.

Toth et al. LANA-mediated recruitment of host Polycomb Repressive Complexes onto the KSHV genome during *de novo* infection. 2016 **PLoS Pathogen** 12(9):e1005878.

Zhu et al. An oncogenic virus promotes cell survival and cellular transformation by suppressing glycolysis. 2016 **PLoS Pathogens.** 12(5):e1005648.

Yoo et al. The mitochondrial E3 ubiquitin ligase MARCH5 negatively regulates the MAVS-mediated innate immune response. 2015 **Nature Comm** 6:7910.

Zhang Jet al. Herpesviral G protein-coupled receptors activate NFAT to induce tumor formation via inhibiting the SERCA calcium ATPase. 2015 **PLoS Pathogen** 11(3):e1004768.

Chen et al. Harnessing negative B cell selection to overcome drug-resistance in *Ph*⁺ acute lymphoblastic leukemia. 2015 **Nature** 521:357.

He et al. Herpesviral Pseudo-enzymes Induce RIG-I Deamination and Ligand-independent Activation. 2015 **Mol Cell** 58:134.

Liang et al. Novel functions of viral anti-apoptotic factors. 2015 **Nat Rev Microbiol.** 13:7.

Lee et al. Exploitation of Complement System by Oncogenic Kaposi's Sarcoma-Associated Herpesvirus for Cell Survival and Persistent Infection. 2014 **PLoS Pathogens** 10:e1004412

Shi et al. Negative regulation of NF- κ B activity by brain-specific TRIPartite Motif protein 9. 2014 **Nature Comm** 5:4820.

Fan et al. USP21 negatively regulates antiviral response by acting as a RIG-I deubiquitinase. 2014 **Journal of Experimental Medicine.** 211:313.

Rodgers et al. Ubiquitination-mediated activation of NLRP3-inflammasome activity. 2014 **Journal of Experimental Medicine** 211:1333.

Full et al. Kaposi's sarcoma associated herpesvirus tegument protein ORF75 is essential for viral lytic replication and plays a critical role in the antagonization of ND10-instituted intrinsic immunity. 2014 **PLoS Pathogen** 10:e1003863.

Liang Q et al. cGAS and Beclin-1 interaction shapes innate immune responses by regulating cGAMP production and autophagy pathway. 2014 **Cell Host & Microbe** 15: 228.

Toth Z et al. Biphasic euchromatin-to-heterochromatin transition on the KSHV genome following *de novo* infection. 2013 **PLoS Pathogen** 9(12):e1003813.

Amini-Bavil-Olyae S, et al. A novel mechanism of IFITM-mediated anti-viral activity. 2013 **Cell Host Microbe** 13:452.

Yang CS et al. Rubicon autophagic protein is a feedback inhibitor of CARD9-mediated host innate immunity. 2012 **Cell Host & Microbe** 11:277.

Yang CS et al. Rubicon autophagic protein is a positive regulator of the reactive oxygen species generating NADPH oxidase complex. 2012 **Cell Host & Microbe** 11:262.

Lee HR et al. Viral peptide inhibitors of HAUSP to induce apoptosis. 2011 **Nature Structural & Molecular Biology** 18:1336.

Inn KS et al. Linear Ubiquitin Assembly Complex Negatively Regulates RIG-I- and TRIM25-Mediated Type I Interferon Induction. 2011 **Mol Cell**. 41:354.

Toth et al. Epigenetic regulation of latency and reactivation of Kaposi's sarcoma-associated herpesvirus. 2010 **PLoS Pathogen** 6(7):e10013

Chang et al. Nonhuman primate model for KSHV persistent infection. 2009 **PLoS Pathogen** 5(10):e1000606.

E X et al. Viral Bcl-2- mediated evasion of autophagy aids chronic infection of gherpesvirus 68. 2009 **PLoS Pathogen** 5(10):e1000609.

Gack et al. Inhibition of TRIM25-mediated RIG-I anti-viral activity by Influenza A virus. 2009 **Cell Host & Microbes** 5(5):439.

Myong et al. Cytosolic viral sensor RIG-I is a 5'-triphosphate dependent translocase on double stranded RNA. 2009 **Science** 323:1070.

Lee et al. FLIP-mediated cell death control. 2009 **Nature Cell Biology** 11:1355.

Min CK et al. The role of membrane-proximal amphipathic helix of Tip in membrane deformation and TCR downregulation. 2008 **PLoS Pathogen** 4(11):e1000209.

Ku et al. Structural and biochemical bases for the inhibition of autophagy and apoptosis by viral BCL-2 of murine gamma-herpesvirus 68. **PLOS Pathogen**. 2008 4(2):e25

Gack et al. Roles of RIG-I N-terminal tandem CARD and splice variant in TRIM25-mediated antiviral signal transduction **Proc Natl Acad Sci U S A**. 2008 105(43): 16743.

Liang et al. Beclin1-binding UVRAG targets the class C Vps complex to coordinate autophagosome maturation and endocytic trafficking. **Nature Cell Biology** 2008 Jul;10(7):776.

Feng et al. A novel inhibitory mechanism of mitochondrion-dependent apoptosis by a herpesviral protein. **PLoS Pathog**. 2007 Dec;3(12):e174.

Takahashi et al. Bif-1 interacts with Beclin 1 through UVRAG and regulates autophagy and tumorigenesis. **Nature Cell Biology**. 2007 Oct;9(10):1142.

Gack et al. TRIM25 RING-finger E3 ubiquitin ligase is essential for RIG-I-mediated antiviral activity. **Nature**. 2007 Apr 19;446(7138):916.

Liang et al. Autophagic and tumour suppressor activity of a novel Beclin1-binding protein UVRAG. **Nature Cell Biology**. 2006 Jul;8(7):688.

Cho et al. Inhibition of T cell receptor signal transduction by tyrosine kinase-interacting protein of Herpesvirus saimiri. **J Exp Med**. 2004 Sep 6;200(5):681.

Park et al. Herpesviral protein targets a cellular WD repeat endosomal protein to downregulate T lymphocyte receptor expression. **Immunity**. 2002 Aug;17(2):221.

Ishido et al. Inhibition of natural killer cell-mediated cytotoxicity by Kaposi's sarcoma-associated herpesvirus K5 protein. **Immunity**. 2000 Sep;13(3):365.

Lee et al. Inhibition of intracellular transport of B cell antigen receptor complexes by Kaposi's sarcoma-associated herpesvirus K1. **J Exp Med**. 2000 Jul 3;192(1):11.

Lee et al. Deregulation of cell growth by the K1 gene of KSHV. 1998. **Nature Medicine**. 4:435.

Yoon et al. Tap; a novel cellular protein that interacts with tip of herpesvirus saimiri and induces lymphocyte aggregation. **Immunity** 1997; 6:571.

Duboise et al. Use of virion DNA as a cloning vector for the construction of mutant and recombinant herpesviruses. **Proc. Natl. Acad. Sci**. 1996; 93:11389.

Du et al. Identification of a nef allele that causes lymphocyte activation and acute disease in macaque monkeys. **Cell** 1995; 82:665.

Jung et al. Identification of transforming genes of subgroup A and C strains of Herpesvirus saimiri. **Proc. Natl. Acad. Sci. USA** 1991; 88:7051.

C. Funding Information

ACTIVE

1. KSHV Epigenetic Regulation

Principal Investigator: Jae Jung Agency: NIDCR
Type: R01 DE023926 Period: 9/1/2013-11/30/2024
\$495,315 total cost per year

The major goal of this project is to investigate epigenetic regulation of KSHV gene expression in endothelial and oral epithelial cells.

2. TRIM9-mediated anti-viral immune pathway

Principal Investigator: Jae Jung Agency: NIAID
Type: R01 AI116585 Period: 4/1/2015-3/31/2021
\$412,500 total cost per year

The major goal of this project is to investigate brain-specific TRIM9 E3 ligase for anti-viral and anti-inflammatory response upon viral infection.

3. NCI Outstanding Investigator Award (OIA): Molecular Basis of KSHV oncogenesis

Principal Investigator: Jae Jung Agency: NIH/NCI
Type: R35 CA200422 Period: 03/01/2016-02/29/2023
\$943,324 total cost per year

The major goal of this project is to provide biologically relevant settings for the study of in vivo KSHV persistence and pathogenesis: understanding the viral evasion of host immunity and the viral strategy of cell growth transformation and developing infectious KSHV BAC clone and the humanized mouse and primate models.

4. Vaccine stabilization

Principal Investigator: Jae Jung Agency: Integrity Biotech
Type: Collaboration grant Period: 2016-open
\$100,000 total cost per year

The major goal of this project is to develop thermostable vaccines for distribution in developing countries without the need of a cold-chain transport.

6. Genetic evolution, pathogenesis and immune responses in mother to child transmission of ZIKV

Multi-PI (Nielsen, Jung, Cheng) Agency: NIH/NIAID
Type: R01AI140718 Period: 07/01/2018-06/30/2023
\$776,7040 total cost per year

This ZIKV-themed project is centered on viral evolution, pathogenesis, and immune responses following maternal and infant ZIKV infection.

7. SFTSV NSs-mediated immunopathogenesis

Principal Investigator: Jae Jung Agency: NIH/NIAID
Type: R01 AI140705 Period: 07/01/2018-06/30/2023
\$ 634,081 total cost per year

The major goal of this project is to investigate how SFTSV NSs modulate host immunity to contribute to viral pathogenesis.

8. Regulation of lymphangiogenesis by KSHV vIRF3

Principal Investigator: Jae Jung Agency: NIH/NIDCR
Type: R21DE027888 Period: 09/01/2018-08/31/2020

The major goal of this project is to investigate how KSHV vIRF4 activates host lymphangiogenesis.
\$205,000 total cost per year

9. KSHV-mediated regulation of proline metabolism

Principal Investigator: Jae Jung Agency: NIH/NIDCR
Type: R01DE028521 Period: 01/01/2018-12/31/2024
\$546,120 total cost per year

The major aim of this study is to investigate the KSHV-mediated regulation of proline metabolism for virus-induced cancers.

10. Development of dirty mouse model for cancer and infection

Principal Investigator: Jae Jung
Type: Pilot Program Period: 07/01/2019-06/30/2021
\$100,000 direct cost per year

The major aim of this study is to co-house SPF laboratory mice with wild mice for re-wilding their immunity for cancer and infection study.

11. Collaborative research for emerging and re-emerging viruses

Principal Investigator: Jae Jung
Type: Collaborative Program Period: 01/01/2020-12/31/2030
\$275,000 direct cost per year

The major aim of this study is to develop the basic research programs for emerging and re-emerging viruses.

12. Alzheimer's-focused administrative supplements

Principal Investigator: Jae Jung Agency: NIH/NIAID
Type: R01 AI116585S Period: 02/28/2019-01/31/2021
\$247,500 total cost per year

The major goal of this project is to investigate brain-specific TRIM9 E3 ligase function for neuroinflammatory response upon in Alzheimer conditions.

13. vGPCR-Mediated Paracrine Transformation for Kaposi Sarcoma

Co-PI: Jae Jung Agency: NIH/NCI
Type: R01 CA251275 Period: 4/1/2020-3/30/2025

The major goal of this project is to investigate vGPCR-mediated paracrine transformation for Kaposi Sarcoma in transgenic mouse model.

14. Structural analysis and therapeutic nanobody development of KSHV vGPCR

Principal Investigator: Jae Jung Agency: NIH/NCI
Type: R01 CA250052 Period: 4/1/2020-3/30/2025
\$492,000 total cost per year

The major goal of this project is to investigate the structural analysis and therapeutic nanobody development of KSHV vGPCR.

15. Tickborne SFTS Virus Vaccine Development

Principal Investigator: Jae Jung Agency: NIH/NIAID
Type: R01 AI152190 Period: 7/1/2020-6/30/2025
\$607,500 total cost per year

The major goal of this project is to develop and compare four different types of vaccines against SFTSV in mouse and ferret models.

16. Infection and Rapid Transmission of SARS-CoV-2 in Ferrets

Principal Investigator: Jae Jung Agency: NIH/NIAID
Type: R01 AI140705S Period: 7/1/2020-6/30/2022
\$558,000 total cost per year

The major goal of this project is to develop ferret animal model for SARS-CoV-2 infection, transmission and vaccine.

PENDING

Clinical outcomes, viral shedding and development of immune responses in mother-infant pairs affected by COVID-19

Multi-PI (Nielsen, Jung) Agency: NIH/NIAID
Type: R01AI140718S Period: 07/01/2020-06/30/2022
\$706,784 total cost per year

KSHV Persistence and Pathogenesis (Impact Score 20)

Principal Investigator: Jae Jung Agency: NIH/NCI
Type: PPG P01 CA180779 Period: 12/01/2018-11/30/2023
\$1,619,435 total cost per year

Viral RNA processing as a target therapeutic drug development of SFTSV

Multi-PI (Amarasinghe, Webb, Jung) Agency: NIH/NIAID
Type: R01AI147643 Period: 2019-2024
\$790,834 total cost per year

Zika virus-induced brain calcification and craniosynostosis

Principal Investigator: Jae Jung Agency: NIH/NINDS
Type: R01 NS117037 Period: 4/1/2020-3/30/2025
\$574,000 total cost per year

Pathogenesis and animal model development of SFTSV (awarded as alternative)

Principal Investigator: Jae Jung Agency: DoD
Type: TB190049 Period: 2020-2023
\$492,000 total cost per year

Pentameric Subunit Vaccine Candidates to Elicit Potent Humoral and Cellular Immune Responses Against KSHV Infection

Co-PI: Jae Jung Agency: NIH/NIAID
Type: R01 AI151013 Period: 4/1/2020-3/30/2025

D. Research Meeting:

My laboratory has two types of weekly meetings. (1) Weekly Subgroup Meeting. The Sponsor's lab members are split into three subgroups (6-7 people) based on research topics described above and each subgroup meets on Tuesday, Thursday, and Saturday to discuss individual's weekly progress. This meeting particularly emphasizes creative thinking, critical design/interpretation, and concise data organization. (2) Weekly Group Meeting. All the members in Sponsor's lab are also required to participate in weekly group meeting on Friday morning to present their research progresses and to discuss recently published papers. Speakers from other laboratories or universities with different disciplines are often invited to this meeting to broaden research interest and identify additional research opportunity and collaboration. Each speaker is required to prepare well-organized presentation. This meeting provides an opportunity for critical thinking and improves the presentation and communication skills of the lab members. (3) Scientific Meeting. All members are recommended to attend one national/international scientific meeting yearly and various local scientific meetings of neighboring institutes, UCLA, Caltech, and City of Hope. Abstract submission and presentation are strongly recommended. Besides research meetings, our biannual international food festival, hiking, seasonal party, and weekly "after-group-meeting-wet" party enrich lab members' interactions.

E. Advisory and Supervisory Activities:

Advisory and Supervisory Activities (Visiting scholars, Postdoctoral fellow and graduate student

only included)

Harvard Medical School (1994-2007)

Period	Name	Current position
1994 - 1997	Monroe Duboise, Ph.D.	Professor University of Southern Maine
1995 - 1996	Chungjoong Kim, DVM.	Professor Chungnam University
1995 - 1998	Jie Guo, M.D.	Scientist Pfizer Pharmaceuticals
1995 - 1997	Duk-Won Yoon. DVM.	Private practice, CA
1996 - 1998	Heuiran Lee, Ph.D.	Professor Ulsan College of Medicine
1996 - 2001	Mengtao Li, M.D./Ph.D.	Associate Professor UCLA
1998 - 2000	Blossom Damania, Ph.D.	Professor/Vice Dean University of North Carolina Chapel Hill
1998 - 2001	Satoshi Ishido, M.D./Ph.D.	Professor Kobe Medical School
1998 - 2000	Sung Shim, MS/MBA	Bristol-Myers Squibb Syracuse University
2000 - 2001	Jihyun Cho, MD/Ph.D.	Professor Wonkwang University
1997 - 2003	Joong-Kook Choi, Ph.D.	Professor Chungbuk Medical School
1998 - 2004	Bok-Soo Lee, Ph.D.	Assistant Professor Samsung Research Institute
1999 - 2003	Hiroyuki Nakamura, MD/PhD	Professor NCRI, Japan
1999- 2002	Chunyang Wang, MD	Neurosurgeon Temple Medical School
2000 - 2004	Young-Hwa Chung, Ph.D.	Professor Pusan University, Korea
2000 - 2004	Robert Means, Ph.D.	Associate Professor Yale Medical School
2001 - 2002	Junsoo Park, Ph.D.	Professor Yonsei University
2002 - 2004	Nam-Hyuk Cho, Ph.D.	Professor Seoul National Medical School
2001 - 2007	Sun-Hwa Lee, Ph.D.	Assistant Professor Seoul National Medical School
2001 - 2006	Pinghui Feng, Ph.D.	Professor USC Medical School
2001 - 2004	Yousang Gwack, Ph.D.	Professor University of California-Los Angeles
2002 - 2005	Xiaozhen Liang, Ph.D.	Assistant Professor Institute of Pasteur-Shanghai
2002 - 2007	Ines Garcia, Ph.D.	Scientist FDA
2003 - 2003	Vivian Kouri, MD.	Professor Instituto de Medicina, Cuba
2003 - 2007	Young Shin, Ph.D.	Scientist Brammer Bio

2003 - 2008	Heesoon Chang, Ph.D.	Managing Director Cdmogen
2004 - 2007	Dior Kingston, Ph.D.	Graduate student HMS Computer scientist
2004 - 2007	Qing-Lin Li, Ph.D.	Assistant Professor Indiana University School of Medicine
2005 - 2006	Chul Hyun Joo, MD/PhD	Professor Ulsan Medical School
2005 - 2009	Chengyu Liang, PhD	Professor Wistar Institute
2005 - 2006	Taegun Seo, PhD	Professor Dongkuk University
2005 - 2009	Michaela Geck, PhD	Professor University of Chicago
2006 - 2007	Liguo Wu, PhD	Postdoctoral fellow Harvard Medical School
2006 - 2007	Xiaofei E, PhD	Instructor Uni of Massachusetts Medical School
2006 - 2010	Jong-Soo Lee, DVM/PhD	Professor Chungnam University
2006 - 2007	Alexander Lagadinos, BS	Graduate student UMass Medical School

University of Southern Medical School (2008-present)

Period	Name	Current position
2007 - 2012	Kyung-Soo Inn, PhD	Associate Professor Kyunghee University
2007 - 2015	LaiYee Wong, PhD	Scientist Life Technologies
2008 - 2012	Joseph Jeong, PhD	Assistant Professor Wisconsin Medical College
2008 - 2012	HeeJin Kim, PhD	Patent Lawyer
2008 - 2015	Mude Shi, PhD	Assistant Professor Sun-Yatsen University
2008 - 2011	June-Yong Lee, MS	Postdoctoral Fellow New York University
2009 - 2010	Dongwook Lee, PhD	Postdoctoral fellow USC Medical School
2009 - 2012	Sunhwa Lee, PhD	Principal Researcher Medical Innovation Foundation
2009 - 2011	Soohwan Oh, PhD	Postdoctoral fellow UCSD
2009 - 2015	Samad Amini-Bavil-Olyaei, PhD	Scientist Amgen
2009 - 2011	Chul-Su Yang, PhD	Associate Professor Hanyang University
2009 - 2011	Chan-Ki Min, MS	Postdoctoral fellow LSU
2009 - 2010	Ayesha Bhatia, BS	Graduate Student USC Medical School
2009 - 2014	Kevin Brulois, BS	Postdoctoral fellow Stanford Medical School
2010 - 2014	Mary Rogers, PhD	Scientist

2010 -2012	Lindsey Silva, PhD	Abbott Scientist Genentech
2010 - 2011	Cheol-Hee Yeon, PhD	Postdoctoral fellow
2011 - 2013	Nicole Orazio, PhD	Field Scientist Bio-Rad
2011 - 2011	Hye Won Lee, MD	Clinician Samsung Hospital
2011 - 2011	So-Shin Ahn, PhD	Postdoctoral fellow
2011 - 2012	Jun Han Lee, DVM/PhD	Postdoctoral fellow Wisconsin Med College
2013 - 2014	Chiao-Wen Yang, PhD	Scientist Genentech
2013 - 2014	Hyelim Cho, PhD	Scientist Novartis
2008 - 2016	Zsolt Toth, PhD	Assistant Professor University of Florida-Gainesville
2012 - 2016	Priyanka Sivadas, PhD	Postdoctoral fellow USC Medical School
2015 - 2016	Betti Papp, PhD	Assistant Professor University of Florida-Gainesville
2006 - 2016	Hye-Ra Lee, PhD	Associate Professor Korea University
2012 - 2016	Qiming Liang, PhD	Assistant Professor Shanghai Immunology Institute
2012 - 2017	Jianning Ge, PhD	Scientist Immunotherapy, China
2015 - 2016	Jonas Lanfer, BS	Medical Student Uni-Nurnberg, Germany
2016 - 2017	Ella Sklan, PhD	Assistant Professor Tel-Aviv Uni, Israel
2016 - 2017	Ahrim Lee/Gilok Shin/Seung Lee	Pharmacy students Ewha Women's Uni, Korea
2018 -2018	HeiSun Hwang/Youn Ju Jung, BS	Pharmacy students Ewha Women's Uni, Korea
2017 -2018	Alison Yu, BS	MD Student USC Medical School
2018 -2019	Mohammed Selman, PhD	GSK Biopharmaceuticals
2017-2018	Joyce Wai Suet Lee, BS	Graduate Student Griffith University
2015-2019	Ji Seung Yoo, PhD	Assistant Professor Hokkaido University
2019-2019	Sery Park/HeeJin Kam, BS	Pharmacy students Ewha Women's Uni, Korea
2016-2019	Huan Yan, PhD	Assistant Professor Wuhan University
2013-2019	James Bowman, BS	Postdoctoral fellow Harvard Medical School
2019-2019	Su-Jin Park, PhD	Visiting Scholar USC Medical School
2015-2019	Jianxiong Zeng, PhD	Postdoctoral fellow USC Medical School
2018-2020	Eunjin Hong, BS	Graduate Student USC Medical School

2014-2019	Lin-Chun Chang, PhD	Postdoctoral fellow USC Medical School
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CURRENT TRAINEES

Period	Name	Current position
2012	Youn Jung Choi, PhD	Postdoctoral fellow USC Medical School
2013	Gil Ju Seo, PhD	Postdoctoral fellow USC Medical School
2013	Younho Choi, PhD	Postdoctoral fellow USC Medical School
2015	Un Yung Choi, PhD	Postdoctoral fellow USC Medical School
2015	Angela Park, BS	Graduate student USC Medical School
2016	Javier Chen, PhD	Postdoctoral fellow USC Medical School
2016	Jolin Foo, PhD	Postdoctoral fellow USC Medical School
2016	Woo-Jin Shin, PhD	Postdoctoral fellow USC Medical School
2016	Grace Lee, BS	Graduate Student USC Medical School
2017	Stephanie Kim, BS	Graduate Student USC Medical School
2017	Kyle Jung, BS	Graduate Student USC Medical School
2018	Leo Kim, BS	Graduate Student USC Medical School
2018	Zhongyi Jiang, BS	Master Student USC Medical School
2019	Yu Xiong, BS	Master Student USC Medical School
2019	David Seo, PhD	Postdoctoral fellow USC Medical School
2020	Jonathan Lai, PhD	Postdoctoral fellow USC Medical School
2020	Xin Wu, PhD	Postdoctoral fellow USC Medical School
2020	Tian Xia, PhD	Postdoctoral fellow USC Medical School
2020	Wooram Jung, PhD	Postdoctoral fellow USC Medical School
2020	Mi-Jeong Kwak, PhD	Postdoctoral fellow USC Medical School
2020	Seokmin Kang, PhD	Postdoctoral fellow USC Medical School

Summary of Training Achievement: Dr. Jung has trained approximately 55 postdoctoral fellows during his 15 years at Harvard Medical School and 12 years at USC Keck School of Medicine. Among his former trainees, 32 have gone on to become academic faculty members, carrying the torch for the education of next generation.