

# Chengxiang Wu

## Curriculum Vitae

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### I. Contact information

Chengxiang Wu, PhD  
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### II. Education and training

Institution and Location	Position	Year	Field of Study
Tulane National Primate Research Center	Research Scientist	2015.3-present	Gene therapy
Oklahoma University Health Sciences Center	Postdoc fellow	2014.5-2015.2	Physiology
University of Hawai'i at Mānoa, Honolulu, Hawaii, USA	Junior Researcher	2013.5-2014.4	Gene therapy
University of Hawai'i at Mānoa, Honolulu, Hawaii, USA	PhD	2013.5	Microbiology

### III. Research interests

I am interested in topics in virology, immunology, gene therapy; adoptive T cell transfer therapy; viral vectors, vaccine development; animal models; toxicology; cell culture; cell sorting; epigenetics; gene expression; RNA interference. More specifically, I am interested in studying Molecular virology and virus-host interaction; Preventive and therapeutic strategies for inherited and acquired diseases; Viral vectors with improved gene transfer efficiency, specificity, and biosafety; Enhanced detection, characterization and monitoring of outbreaks of infectious diseases through molecular, virological, and microbial technologies; Preventive and therapeutic strategies for behavioral and environmental threats to public health; Bioremediation of environmental pollution through select natural or genetic modified microbes and plants.

My past and current research include:

1. Development of a non-invasive method of drug delivery into the brain through genetically modified monocyte/macrophage cells as delivery vehicles. My work toward this goal focused on development of retroviral and lentiviral vector systems for high efficiency transduction of peripheral blood- and bone marrow-derived monocyte/macrophage, and analysis of migration of transduced monocyte/macrophage across the blood-brain barrier (BBB) following tail vein injection.
2. Treatment of HIV infection and AIDS through adoptive transfer of T cells that are genetically engineered to express chimeric antigen receptors (CARs). Besides T cells as cellular vehicles for transfer therapy, other cell types including NK, NKT, monocyte/macrophage is also being tested. CAR constructs that confers enhanced killing activity to targets cells, and novel strategies to generate CAR-T cells that are less susceptible to exhaustion are being tested. T cell transfer therapies are being tested through non-human primate model.
3. Development of CRISPR/Cas9-based strategy for the depletion of HIV reservoir. This is done through disruption of HIV genome by targeted delivery of all-in-one LV vector with Cas9 and gRNAs that target multiple sites of the viral genome.
4. Development of strategies to inhibit SARS-CoV-2, study of mechanism of blood clotting following COVID-19 vaccines, and tests of methods to enhance the safety of covid-19 vaccine.

#### **IV. Peer reviewed journal publications**

1. **Wu C**, Johnson N, Yu S, Lo A, Sahu G, Marx P, Von Laer D, Skowron G, Geleziunas R, Shaw G, Kaur A, Junghans R, and Braun S. Adoptive T Cell Immunotherapy using CMV-Specific T Cells Genetically Modified with  $\alpha$ HIV-CAR Vectors. *Journal of Experimental Medicine*. (submitted)
2. Giorgio Zenere, Cecily Midkiff, Nathan M. Johnson, **Chengxiang Wu**, William C. Wimley, Amitinder Kaur, and Stephen E. Braun. The Fast and The Curious: CAR motifs and hinge length affect surface expression of CAR. *Human gene therapy*. (in revision)
3. Eldesouki RE, **Wu C**, Saleh FM, Mohamed EAM, Younes S, Hassan NELS, Brown TC, Alt EU, Robinson JE, Mohamed FB, Braun SE. Identification and targeting of Thomsen-Friedenreich and IL1RAP antigens on Chronic Myeloid Leukemia stem cells using bi-specific antibodies *Onco Targets Ther*. 2021; 14: 609–621.
4. Chandra PK, Gerlach SL, **Wu C**, Khurana N, Swientoniewski LT, Abdel-Mageed AB, Li J, Braun SE, Mondal D. Mesenchymal stem cells are attracted to latent

- HIV-1-infected cells and enable virus reactivation via a non-canonical PI3K-NFκB signaling pathway. *Sci Rep.* 2018 Oct 2;8(1):14702.
5. **Wu C**, Yu S, Sahu G, Marx P, Skowron G, Junghans R, Kaur A, Braun S, Stimulation, transduction, and expansion of CMV-specific T cells for adoptive immunotherapy in NHP, *Journal of Medical Primatology* (2017), 46, Issue 4, 207-207.
  6. **Wu C**, Yu S, L A, Li H, Sahu G, Marx P, vonLaer D, Skowron G, Shaw G, Kaur A, Junghans R, Braun S, Adoptive T cell immunotherapy using CMV-specific T cells genetically modified with anti HIV-CAR vectors, *Journal of Medical Primatology* (2018), 47, Issue 5, 309-310
  7. Kaljas Y, Liu C, Skaldin M, **Wu C**, Zhou Q, Lu Y, Aksentijevich I, Zavialov AV. Human adenosine deaminases ADA1 and ADA2 bind to different subsets of immune cells. *Cell Mol Life Sci.* 2017 Feb;74(3):555-570.
  8. Varshney R, Ali Q\*, **Wu C\***, Sun Z. Monocrotaline-Induced Pulmonary Hypertension Involves Downregulation of Antiaging Protein Klotho and eNOS Activity. *Hypertension.* 2016 Nov;68(5):1255-1263. (\*: equal contribution)
  9. Chengqian LIU, Yulia Mukienko, **Chengxiang Wu** and Andrey Zavialov. Human adenosine deaminases control the immune cell responses to activation signals by reducing extracellular adenosine concentration. *J Immunol* May 1, 2016, 196 (1 Supplement) 124.63;
  10. **Wu C\***, Liu C\*, Skaldin M\*, Lu Y, Zavialov AV. Application of ADA1 as a new marker enzyme in sandwich ELISA to study the effect of adenosine on activated monocytes. *Sci Rep.* 2016 6:31370. (\*: equal contribution)
  11. Kang W., Marasco WA, Tong HI, Byron MM, **Wu C**, Shi Y, Sun S, Sun Y, Lu Y. Anti-tat Hutat2:Fc mediated protection against tat-induced neurotoxicity and HIV-1 replication in human monocyte-derived macrophages. *J Neuroinflammation.* 2014, 11:195.
  12. Tong J, Buch S, Yao H, **Wu C**, Tong HI, Wang Y, Lu Y. 2014. Monocytes-derived macrophages mediated stable expression of human brain-derived neurotrophic factor, a novel therapeutic strategy for NeuroAIDS. *Plos One* 9(2):e82030;
  13. **Wu C**, Nerurkar VR, and Lu Y. 2013. New insights into the inhibition of human immunodeficiency virus type 1 replication through mutant tRNALys3. *Retrovirology* 10(1):112;
  14. **Wu C** and Y Lu. 2012. HIV treatment: mechanisms of neurotoxicity and implications for targeted therapy. *Neurobehav HIV Med* 4:75-98;
  15. **Wu C**, Cao S, Maggirwar S, Dewhurst S, Lu Y. 2012. Construction and characterization of lentiviral vector-mediated expression of TNFR as a potential protective molecule in human neuronal cells. *J Neuroimmune Pharmacol* 7(Suppl 1):S60;

16. **Wu C,\*** Cao S,\* Yang Y, Sniderhan LF, Maggirwar S, Dewhurst S, and Lu Y. 2011. Lentiviral vector-mediated stable expression of sTNFR-Fc in human macrophage and neuronal cells as a potential therapy for neuroAIDS. *J Neuroinflammation*. 8: 48; (\*: equal contribution)
17. Leng Y, **Wu C**, Liu Z, Friesen TL, Rasmussen JB, Zhong S. 2011. RNA-mediated gene silencing in the cereal fungal pathogen *Cochliobolus sativus*. *Mol Plant Pathol* 12(3): 289-298;
18. **Wu C** and Lu Y. 2010. High-titer retroviral vector system for efficient gene delivery into human and mouse cells of haematopoietic and lymphocytic lineages. *J Gen Virol* 91: 1909-1918;
19. Asahina AY, Lu Y, **Wu C**, Fujioka RS and Loh PC. 2009. Potential biosentinels of human waste in marine coastal waters: Bioaccumulation of human caliciviruses and enteroviruses from sewage polluted waters by indigenous mollusks. *J Virol Methods* 158: 46–50;
20. **Wu C**, Nerurkar VR, Yanagihara R, and Lu Y. 2008. Effective modifications for improved homologous recombination and high-efficiency generation of recombinant adenovirus-based vectors. *J Virol Methods* 153(2):120-128;
21. Yang Y, **Wu C**, Wu J, Nerurkar VR, Yanagihara R, Lu Y. 2008 Inhibition of West Nile Virus replication by retrovirus-delivered small interfering RNA in human neuroblastoma cells. *J Med Virol* 80(5):930-936;
22. **Wu C** and Lu Y. 2007 Inclusion of high molecular weight dextran in calcium phosphate-mediated transfection significantly improves gene transfer efficiency. *Cell Mol Biol (Noisy-le-grand)*. 53(4):67-74;
23. Zeng LB, Yang SM, **Wu C**, Planelles V, Dewhurst S, Ye LB, and Lu Y. 2006. Effective transduction of primary mouse blood-and bone marrow-derived monocytes/macrophages by HIV-1-based defective lentiviral vectors. *J Virol Methods* 134:66-73;
24. **Wu C**, Wan Y, Xu J, Su J, and Fang X. 2002. Establishment of a new rice transformation system by regeneration from embryonic callus induced from scutum of mature embryo. *Chinese Journal of Tropical Crops* 23(3): 88-94; (in Chinese)
25. **Wu C**, Wan Y, Xu J, Su J, and Fang X. 2002. Analysis of matrix attachment region (MAR)-mediated transgene expression in transgenic rice generated by gene bombardment transformation method. *Journal of Agricultural Biotechnology* 10(3): 227-230; (in Chinese)
26. Su J, Zhu R, **Wu C**, Fang X. 2000. Cloning and functional characterization of the chloroplast Glutamine synthetase cDNA from *Pisum Sativum*. *Journal of Agricultural Biotechnology* 4(8): 326-330. (in Chinese)

## V. Conference presentations

1. Johnson, NM., **Wu, C.**, Yu, S., Li, H., Sahu, G., Marx, P., von Laer, D., Skowron, G., Shaw, G., Junghans, RP., Kaur, A., Braun, SE. In Vivo Expansion of CMV-Specific anti-HIV CAR T cells following CMV Superinfection. American Society of Gene and Cell Therapy Conference Abstract. May 2019
2. Johnson, NM., **Wu, C.**, Yu, S., Lo, A., Li, H., Sahu, G., Marx, P., von Laer, D., Skowron, G., Shaw, G., Kaur, A., Junghans, RP., Braun, SE. Modifying CMV-specific T cells with anti-HIV CAR Vectors. National MD/PHD Student Conference Abstract. June 2018
3. Johnson, NM., **Wu, C.**, Yu, S., Lo, A., Li, H., Sahu, G., Marx, P., von Laer, D., Skowron, G., Shaw, G., Junghans, RP., Kaur, A., Braun, SE. Modifying CMV-specific T cells with anti-HIV CAR Vectors. NHP AIDS Conference Abstract. October 2018
4. **Wu C**, Yu S, Lo A, Li H, Sahu GK, Marx PA, von Laer D, Skowron G, Shaw G, Kaur A, Junghans R, Braun SE. Adoptive T cell immunotherapy using CMV - specific T cells genetically modified with  $\alpha$  HIV - CAR vectors. August 2017. Conference: 35th Annual Symposium on Nonhuman Primate Models for AIDS. Wisconsin USA
5. Varshney R, **Wu C**, Ali Q, Sun Z. Secreted klotho augments the therapeutic potential of mesenchymal stem cells for monocrotaline-induced pulmonary arterial hypertension. Experimental Biology 2015. American Physiology Society.
6. **Wu C**, Nerurkar V, Yanagihara R, and Lu Y. New insights into inhibition of human immunodeficiency virus type 1 replication through mutant tRNA<sup>Lys3</sup>. The Biomedical Science Symposium of University of Hawai'i at Mānoa, John A. Burns School of Medicine, April 8, 2013. Honolulu, Hawaii;
7. **Wu C**, Cao S, Maggirwar S, Dewhurst S, and Lu Y. Construction and characterization of lentiviral vector-mediated expression of TNFR as a potential protective molecule in human neuronal cells. The 18<sup>th</sup> SNIP conference, Society on NeuroImmune Pharmacology, April 25-28, 2012. Honolulu, Hawaii;
8. Zavialov A, **Wu C** and Lu Y. Adenosin deaminases as drug candidates for the treatment of HIV infection. The 18<sup>th</sup> Society on NeuroImmune Pharmacology (SNIP) conference, April 25-28, 2012. Honolulu, Hawaii;
9. Zavialov A, **Wu C**, and Lu Y. The structure and function of adenosine deaminase 2, a human member of the adenosine deaminase growth factor (ADGF) family. The Biomedical Science Symposium of University of Hawai'i at Mānoa, John A. Burns School of Medicine, April 18, 2012. Honolulu, Hawaii;
10. Lee JQY, **Wu C**, Lu Y. 2011. Primary cultures of mouse bone marrow cells are effectively transduced with lentiviral vectors for the expression of an anti-TNFR- $\alpha$  effector in vitro. Spring Meeting of Hawaii American Society of Microbiology, April 23, 2011. TreeTop Restaurant, Mānoa, Honolulu, Hawai'i;

11. **Wu C**, Cao S, Maggirwar S, Dewhurst S, and Lu Y. Neuroprotective effect of soluble TNFR expressed from stably transduced cells on HIV-1 Tat and gp120-mediated neurotoxicity. The 29<sup>th</sup> Conference of American Society for Virology, University of Minnesota, July 16-20, 2011. Minneapolis, Minnesota;
12. **Wu C** and Lu Y. Neuron protection through lentiviral vector-mediated expression of a tumor necrosis factor- $\alpha$  antagonist: a potential therapy for neuroAIDS. The Spring Meeting of Hawaii ASM, April 23, 2011. TreeTop Restaurant, Mānoa, Honolulu, Hawaii;
13. Lee J, **Wu C**, and Lu Y. Primary cultures of mouse bone marrow cells are effectively transduced with lentiviral vectors for the expression of an anti-TNF- $\alpha$  effector *in vitro*. The Biomedical Science Symposium of University of Hawai'i at Mānoa, John A. Burns School of Medicine, April 20, 2011. Honolulu, Hawaii;
14. Zavialov A, **Wu C**, Lu Y. The structure and function of adenosine deaminase 2, a human member of the adenosine deaminases growth factor (ADGF) family. The Biomedical Sciences Symposium, John A. Burns School of Medicine, University of Hawai'i at Mānoa, April 20, 2011. Honolulu, Hawaii;
15. **Wu C**, Cao S and Lu Y. Effective protection of neuronal cells through lentiviral vector-mediated expression of a soluble tumor necrosis factor- $\alpha$  receptor: a potential therapy for neuroAIDS. The Biomedical Science Symposium, University of Hawai'i at Mānoa, John A. Burns School of Medicine, April 20, 2011. Honolulu, Hawaii;
16. Lee J, **Wu C** and Lu Y. Lentiviral vector mediated gene transfer into primary mouse monocytes: a novel therapeutic approach for neuroAIDS. The 23<sup>rd</sup> Annual CTAHR and COE Student Research Symposium. April 8, 2011. Honolulu, Hawaii;
17. **Wu C** & Lu Y. High efficiency gene delivery into human and mouse cells of hematopoietic and lymphocytic lineages through an improved MoMLV-based vector system. Spring meeting of American Society of Microbiology, Kapiolani Community College, April 24, 2010. Honolulu, Hawai'i;
18. **Wu C** and Lu Y. Construction of a new retroviral vector for HIV-1/AIDS gene therapy. The 42<sup>nd</sup> APACPH Conference, November 24-27, 2010, Bali, Indonesia;
19. **Wu C** and Lu Y. Construction of a retroviral vector for efficient gene delivery into human and mouse cells of hematopoietic and lymphocytic lineages. The 29<sup>th</sup> Conference of American Society for Virology, Montana State University, July 17-21, 2010, Bozeman, Montana;
20. **Wu C**, and Lu Y. High-titer MOMLV-based retroviral vector system for superior gene delivery into mouse cells of hematopoietic and lymphocytic lineages. The Biomedical Science Symposium, John A. Burns School of Medicine, University of Hawai'i at Mānoa, April 13, 2010. Honolulu, Hawaii;

21. Lu Y, Soderlund M, and **Wu C**. Molecular isolation and biological characterization of a newly identified putative shrimp  $\beta$ -actin promoter from *Litopenaeus vannamei*. Abstract for World Aquaculture 2009 Conference. September 25-29, 2009. Veracruz, Mexico;
22. Yang Y, **Wu C**, Nerurkar VR, Yanagihara R and Lu Y. Inhibition of West Nile Virus Replication by Retrovirus Delivered Small Interfering RNAs in Human Neuroblastoma Cells. The Biomedical Science Symposium, John A. Burns School of Medicine, University of Hawai'i at Mānoa, April 13, 2009. Honolulu, Hawaii;
23. **Wu C**, Nerurkar VR, Yanagihara R, and Lu Y. Multiple modification for improved homologous recombination and high efficiency generation of recombinant adenovirus-based vectors. The Biomedical Science Symposium, John A. Burns School of Medicine, University of Hawai'i at Mānoa, April 13, 2009. Honolulu, Hawaii;
24. **Wu C** and Lu Y. Construction of a high-titer retroviral-vector system for efficient gene delivery into human and mouse cells of hematopoietic and lymphocytic lineages. The Biomedical Science Symposium, John A. Burns School of Medicine, University of Hawai'i at Mānoa, April 13, 2009. Honolulu, Hawaii;
25. Lu Y, Soderlund M, and **Wu C**. Isolation and Identification and Biological Function of a Putative Shrimp  $\beta$ -Actin Promoter from *Litopenaeus vannamei*. Abstract for Aquaculture America 2009. February 15-18, 2009. Seattle, Washington;
26. **Wu C** and Lu Y. Production of High-Titer Retroviral-Vectors for Enhanced Gene Delivery into Human and Mouse Cells of Hematopoietic and Lymphocytic Lineages. The 11th RCMI International Symposium on Health Disparities. December 1-4, 2008. Honolulu, Hawaii;
27. **Wu C**, Nerurkar VR, Yanagihara R, and Lu Y. Molecular-Based Approaches for Enhanced Adenoviral Homologous Recombination and Generation of Recombinant Adenovirus-Based Vectors. The 11th RCMI International Symposium on Health Disparities. December 1-4, 2008. Honolulu, Hawaii;
28. Leng Y, **Wu C**, Rasmussen J and Zhong S. 2008. Development of transformation and RNA-mediated gene silencing systems for functional genomics of *Cochliobolus sativus*. American Phytopathological Society, University of Minnesota, Minneapolis, Minnesota;
29. Asahina AY, Loh PC, Lu Y, **Wu C**, Fujioka RS. Recovery and detection of human norovirus and enteroviruses from sewage and their bioaccumulation by indigenous isogonomon. The Joint Annual Meeting of the NSF/NIEHS OHHC and the NOAA Oceans and Human Health Initiative. April 16-18 2008. Honolulu, Hawaii;
30. Asahina AY, Loh PC, Lu Y, **Wu C**, Fujioka RS. Recovery and identification of human norovirus from an epidemic from a nursing home in Honolulu. The Joint

- Annual Meeting of the NSF/NIEHS OHHC and the NOAA Oceans and Human Health Initiative. April 16-18 2008. Honolulu, Hawaii;
31. Yang Y, **Wu C**, Wu J, Nerurkar VR, Yanagihara R, Lu Y. 2008. Inhibition of west nile virus replication by retrovirus-delivered small interfering RNA in human neuroblastoma cells. The 27<sup>th</sup> Conference of American Society for Virology, Cornell University, Ithaca, New York;
  32. **Wu C**, Nerurkar VR, Yanagihara R, and Lu Y. 2008. Multiple modifications for improved homologous recombination and efficient generation of recombinant adenovirus-based vectors. The 27<sup>th</sup> Conference of American Society for Virology, Cornell University, Ithaca, New York;
  33. **Wu C** and Lu Y. 2007. Novel approaches for efficient generation of recombinant adenovirus-based vector. The Biomedical Science Symposium, John A. Burns School of Medicine, University of Hawai'i at Mānoa, Honolulu, Hawaii;
  34. **Wu C**, Nerurkar VR, Yanagihara R, and Lu Y. 2007. Constitutive expression of mutated tRNA primers for effective inhibition of HIV-1 infection in transduced human T-lymphocytes. The Biomedical Science Symposium, John A. Burns School of Medicine, University of Hawai'i at Mānoa, Honolulu, Hawaii;
  35. **Wu C** and Lu Y. 2007. Production of high-titer retrovirus vectors through viral transcriptional and translational enhancement. The Biomedical Science Symposium, John A. Burns School of Medicine, University of Hawai'i at Mānoa, Honolulu, Hawaii;
  36. **Wu C**, Nerurkar VR, Yanagihara R, and Lu Y. 2007. Improved inhibition of HIV-1 replication using mutant tRNA<sup>Lys3</sup>. The 26<sup>th</sup> Conference of American Society for Virology, Oregon State University, Corvallis, Oregon;
  37. Zeng LB, **Wu C** and Lu Y. 2005. Further characterization of lentiviral vector-mediated genetransduction of human monocytes-derived macrophages. The Biomedical Science Symposium, John A. Burns School of Medicine, University of Hawai'i at Mānoa, Honolulu, Hawaii;
  38. **Wu C** and Lu Y. 2005. Dextran-Mediated Enhancement of calcium phosphate-based DNA transfer *in vitro* cell cultures. The Biomedical Science Symposium, John A. Burns School of Medicine, University of Hawai'i at Mānoa, Honolulu, Hawaii;
  39. **Wu C** and Y Lu. 2004. Inclusion of high molecular weight dextran in calcium phosphate-mediated transfection significantly improves gene transfer efficiency. The 9<sup>th</sup> RCMI symposium of NIH, Baltimore, Maryland;
  40. **Wu C**, Zeng L, and Lu Y. 2004. Inclusion of dextran-500 in calcium-phosphate-mediated DNA transfection substantially increases gene transfection efficiency. The Biomedical Science Symposium, John A. Burns School of Medicine, University of Hawai'i at Mānoa, Honolulu, Hawaii.



## **VI. Professional Societies**

1. World Journal of Neuroscience, editor on board;
2. Journal of Clinical Immunology and Immunotherapy (CIIT), editor on board;
3. Journal of HIV and Retrovirus (JHRV), editor on board;
4. Journal of Managed Care & Specialty Pharmacy (JMCP), reviewer;
5. Member of American Society for Microbiology (ASM), since 2003
6. Member of American Society for gene and cell therapy (ASGCT), since 2014;
7. Member of American Association for Advancement of Sciences (AAAS), since 2005;
8. Member of American Society for Virology (ASV), since 2006.