CURRICULUM VITAE FOR ACADEMIC PROMOTION

The Johns Hopkins University School of Medicine

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Education and Training:

B. S.	1982-1986	National Chung-Hsing Univ.	Entomology
M. S.	1986-1988	National Chung-Hsing Univ.	Entomology
Ph.D.	1991-1996	Univ. of Illinois	Entomology
Postdoct.	1996-1998	Univ. of Pennsylvania	Pharmacology
Postdoct.	1999-2000	Johns Hopkins Univ.	Pathology

Professional Experience:

Research Associate	Department of Pathology at JHMI	2000-2001
Instructor	Department of Pathology at JHMI	2001-2002
Assistant Professor	Department of Pathology at JHMI	2003-2009
Associate Professor	Department of Pathology at JHMI	2009-present

RESEARCH ACTIVITIES

Publications:

Peer-Reviewed Scientific Articles:
*The first two authors contributed equally to this paper.

1) Perng, F. S., **C. F. Hung**, and C. N. Sun. 1988. Teflubenzuron resistance in diamondback moth (Lepidoptera, Plutellidae). J. Econ. Entomol. 81:1277-1282.

2) Yao, M. C., **C. F. Hung**, and C. N. Sun. 1988. Fenvalereate resistance and aldrin epoxidation in larvae of the diamondback moth. Pestic. Biochem. Physiol. 30:272-278.

3) **Hung, C. F.**, and C. N. Sun. 1989. Microsomal monooxygenases in diamondback moth larvae resistant to fenvalerate and piperonyl butoxide. Pestic. Biochem. Physiol. 33:168-165.

4) Kao, C. H., **C. F. Hung**, and C. N. Sun. 1989. Parathion and methyl parathion resistance in diamondback moth (Lepidoptera, Plutellidae) larvae. J. Econ. Entomol. 82:1299-1304.

5) Lin, J. G., **C. F. Hung**, and C. N. Sun. 1989. Teflubenzuron resistance and microsomal monooxygenases in larvae of the diamondback moth. Pestic. Biochem. Physiol. 31:20-25.

6) **Hung, C. F.**, C. H. Kao, C. C. Liu, J. G. Lin, and C. N. Sun. 1990. Detoxifying enzymes of selected insect species with chewing and sucking habits. J. Econ. Entomol. 223:233-245.

7) Wu, H. N., Y. J. Wang, **C. F. Hung**, H. J. Lee, and M. M. Lai. 1992. Sequence and structure of the catalytic RNA of hepatitis delta virus genomic RNA. J Mol Biol 223:233-245.

8) **Hung, C. F.**, H. Harrison, M. R. Berenbaum, and M. A. Schuler. 1995. CYP6B3- A second furanocoumarin-inducible Cytochrome P450 expression in Papilio polyxenes. Insect Mol. Biol. 4:149-160.

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10) **Hung, C. F.**, R. Holzmacher, E. Connolly, M. R. Berenbaum, and M. A. Schuler. 1996. Conserved promoter elements in the CYP6B gene family suggest common ancestry for cytochrome P450 monooxygenases mediating furanocoumarin detoxification. Proc Natl Acad Sci U S A 93:12200-12205.

11) **Hung, C. F.**, M. R. Berenbaum, and M. A. Schuler. 1997. Isolation and characterization of CYP6B4, a furanocoumarin-inducible cytochrome P450 from a polyphagous caterpillar (Lepidoptera: Papilionidae). Insect Biochem. Mol. Biol. 27:377-385.

12) **Hung, C. F.**, and T. M. Penning. 1999. Members of the nuclear factor 1 transcription factor family regulate rat 3alpha-hydroxysteroid/dihydrodiol dehydrogenase (3alpha-

HSD/DD AKR1C9) gene expression: a member of the aldo-keto reductase superfamily. Mol Endocrinol 13:1704-1717.

13) Ji, H., T. L. Wang, C. H. Chen, S. I. Pai, **C. F. Hung**, K. Y. Lin, R. J. Kurman, D. M. Pardoll, and T. C. Wu. 1999. Targeting human papillomavirus type 16 E7 to the endosomal/lysosomal compartment enhances the antitumor immunity of DNA vaccines against murine human papillomavirus type 16 E7-expressing tumors. Hum Gene Ther 10:2727-2740.

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15) Penning, T. M., M. E. Burczynski, **C. F. Hung**, K. D. McCoull, N. T. Palackal, and L. S. Tsuruda. 1999. Dihydrodiol dehydrogenases and polycyclic aromatic hydrocarbon activation: generation of reactive and redox active o-quinones. Chem Res Toxicol 12:1-18.

16) Chen, C. H., T. L. Wang, **C. F. Hung**, D. M. Pardoll, and T. C. Wu. 2000. Boosting with recombinant vaccinia increases HPV-16 E7-specific T cell precursor frequencies of HPV-16 E7-expressing DNA vaccines. Vaccine 18:2015-2022.

17) Chen, C. H., T. L. Wang, **C. F. Hung**, Y. Yang, R. A. Young, D. M. Pardoll, and T. C. Wu. 2000. Enhancement of DNA vaccine potency by linkage of antigen gene to an HSP70 gene. Cancer Res 60:1035-1042.

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20) * Cheng, W. F., **C. F. Hung**, C. Y. Chai, K. F. Hsu, L. He, M. Ling, and T. C. Wu. 2001. Tumor-specific immunity and antiangiogenesis generated by a DNA vaccine encoding calreticulin linked to a tumor antigen. J Clin Invest 108:669-678.

21) * Cheng, W. F., **C. F. Hung**, C. Y. Chai, K. F. Hsu, L. He, C. M. Rice, M. Ling, and T. C. Wu. 2001. Enhancement of Sindbis virus self-replicating RNA vaccine potency by linkage of Mycobacterium tuberculosis heat shock protein 70 gene to an antigen gene. J Immunol 166:6218-6226.

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51) Peng, S., C. Trimble, H. Ji, L. He, Y. C. Tsai, B. Macaes, **C. F. Hung**, and T. C. Wu. 2005. Characterization of HPV-16 E6 DNA vaccines employing intracellular targeting and intercellular spreading strategies. J Biomed Sci 12:689-700.

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56) Mao, C. P., **C. F. Hung**, and T. C. Wu. 2006. Immunotherapeutic strategies employing RNA interference technology for the control of cancers. J Biomed Sci. 14:15-29.

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a strategy to prolong dendritic cell survival enhances DNA vaccine potency. Vaccine 25:7824-7831.

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Editorials, Reviews and Book Chapters:

1) Moniz, M., M. Ling, **C. F. Hung**, and T. C. Wu. 2003. HPV DNA vaccines. Front Biosci 8:d55-68.

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6) Mao, C. P., Y. Y. Lin, **C. F. Hung**, and T. C. Wu. 2007. Immunological research using RNA interference technology. Immunology. 3:295-307

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Inventions, Patents, Copyrights (pending, awarded)

1) Fusion of Calreticulin (CRT) to antigens enhance the potency of DNA vaccine (DM-3661/DM 3693-Sindbis Virus)-US-filed on February 9, 2000, USSN 09/501, 97
USPTO 20080102084. License to Genencor, Cerus, and PowderMed/Pfizer.

2) Molecular vaccine linking an endoplasmic chaperone polypeptide to an antigen. **USPTO 7342002.**

3) Molecular vaccine linking intercellular spreading protein to an antigen.
USPTO 7318928.

4) Molecular vaccines employing nucleic acid encoding anti-apoptotic proteins. **USPTO 20070026076.**

5) Superior molecular vaccine based on self-replicating RNA, suicidal DNA or naked DNA vector that links antigen with polypeptide promotes antigen presentation.
USPTO 20050277605.

6) Mesothelin vaccines and model systems (DM-4083).
USPTO 20050175625. License to Cerus/Anza Therapeutics.

7) Heat shock Protein (HSP) DNA Vaccine (DM-3620-Novel Strategy to Enhance DNA Vaccine Potency)-CIP-filed on February 2, 2000, USSN 09/501, 097.
USPTO 6734173.

8) RNA Interference That Blocks Expression of Pro-Apoptotic Proteins Potentiates Immunity Induced by DNA and Transfected Dendritic Cell Vaccines. **USPTO 20080069840.**

Extramural Sponsorship **percent effort**

ACTIVE

1R21AI109259-01 (Hung) 8/08/14-07/31/16 2.40 calendar
Role: Investigator $125,000
Molecular pathogenesis and host response following persistent E6/E7 expression
The aim of this project is to characterize to characterize whether the animal model resembles persistent anogenital HPV infection and to investigate the molecular pathogenesis and immune responses as persistent infection progresses to precancer and cancer lesions.

NIH (WU) 09/01/2012 – 06/30/2017 0.96 calendar
R01CA114425 . $176,030
Title: Enhancing HVP-16 E6/E7 Specific Antitumor Immunity
The objective of this renewal application is to develop an immunotherapeutic approach to examine the efficacy of HPV pseudovirus vaccine for the treatment of HPV-mediated cervical cancer. Developing a therapeutic strategy to overcome an established infection could have significant impact on the treatment of cervical cancers.

Hookipa Biotech AG 09/01/2014 -08/31/2015
Role: Investigator $105,711 0.6 calendar
Title: Comparative Immunogenicity of and Protection from Tumor Challenge by rLCMV Vectors Expressing E7/E6 Proteins of HPV16 and Various Enhancing Elements Fused to E7/E6
The main goal to test rLCMV E6 and E7 vaccines

The Vax Genetics Vaccine Co, LTD 09/01/2014 – 8/31/2015
Role: Investigator 172,000 0.6 calendar
Title: Characterization of Chimeric Psudomonas Exotoxin A domain 1 and II (PE)-HPV Protein –Based Vaccine The main goal to test TVGV-2 HPV protein based Vaccines

NIH (Wu) 04/01/14 – 03/31/16 0.6 Calendar 1R21
CA178255-01A1 $130,500
Role: Co-Investigator
Upregulation of Nanog as an Innovative Mechanism for Cancer Drug Resistance.
The main goal is to characterize the role of Nanog, a transcription factor involved in the self-renewal of pluripotent stem cells, in the escape of tumors from host immune defenses. This study aims to establish that immune escape and drug resistance in cancer emerge through a central pathway orchestrated by Nanog.

NIH (Wu) R01CA183040 07/01/14 – 06/30/2019 1.5 calendar
Co-leader: Chien-Fu Hung $ 207,500
Ovarian Cancer Gene Therapy Using HPV Pseudovirion
The main goal of the project is to use HPV pseudovirions to facilitate the targeted delivery of an innovative chimeric protein to induce adaptive and innate immune responses respectively to control ovarian tumors.

NIH (Wu) 2P50 CA098252-11 09/24/14 – 08/31/19 1.8 calendar

Co-leader: Project 3 $92,800
Cervical Cancer SPORE
The main goal is to propose the use the Ichor TriGrid Electroporation Device, which has been used in multiple clinical trials, for intramuscular administration of pNGVL4a-hCRTE6E7L2 DNA vaccine at escalating doses in HIV- and HIV+ patients with HPV16-associated high-grade squamous intraepithelial lesions (HSIL) and to examine the safety, virologic and disease outcomes. The systemic and local immune responses will be correlated with these outcomes as well as lesional expression of PD-L1, a pathway associated with immune escape.

1R21CA180953-01A1 (Wu) 12/01/14-11/30/16 1.20 calendar
Co-Investigator: Chien-Fu Hung $125,000
Immune Evasion by Nanog-Mediated Changes to the Tumor Microenvironment
The aim of this project is to characterize impact of the up regulation of nanog on the tumor microenvironment

Papivax, LLC (Hung) 05/01/13-04/30/14
1R43CA174436-01A1 $54,900 (No cost extension)
Therapeutic Vaccination and Oncolysis to Treat HPV-Associated Disease
The goal of this project is to combine clinical grade HPV DNA vaccine and intra-lesional administration of HPV recombinant vacciniatriggers immune clearance using a new model of persistent HPV16 infection in the mouse vagina.

PENDING

1R21CA194896-01 (Hung) 12/01/15-11/30/17 3.60 calendar
PI: Chien-Fu Hung $125,000
Innovative Strategy to Generate Antigen-Specific Cytotoxic Lymphocytes
This project aims to develop a technology that can elicit full activation and expansion of low avidity tumor specific T cells.

R35NIH (WU) 07/01/2016 – 06/30/2023 1.2 calendar
Outstanding Investigator Award $600,000
Role: Co-investigator
Title: Innovative Antigen-Specific Immunotherapy for Cancer
The main goal is to develop innovative antigen-specific immunotherapeutic vaccines against high-grade ovarian serous carcinoma ready for clinical translatation within the next seven years

1R01CA196685-01 (Hung) 7/01/16-06/30/21 2.40 calendar
PI: Chien-Fu Hung $125,000
Title: Cancer Immunotherapy That Bypasses Immune Tolerance
The main goal is to develop a novel fusion protein whcih will specifically deliver this protein to ovarian cancer cells (which over-express mesothelin), enabling the IgG and viral epitope domains to prime the cells for recognition and elimination by the host innate and adaptive immune systems.

1P50CA200515-01 ovarian SPORE (Shih) 4/01/16-03/31/21 1.20 calendar
PI: Chien-Fu Hung $125,000
The main goal is to modulate the ovarian tumor microenvironment with Listeria-based vaccination and use epigenetic therapy to augment immune signaling and sensitize

ovarian cancer to immune checkpoint inhibitors

EDUCATIONAL ACTIVITIES

Educational Publications:

Journal peer review activities:

1. International Journal for Parasitology
2. Journal of Biomedical Science
3. Proc Natl Acad Sci U S A.
4. Clinical Cancer Research
5. Journal of Molecular Medicine
6. Journal of Immunotherapy
7. Journal of Gene Medicine
8. Journal of Immunology
9. Human Gene Therapy
10. Cancer Research
11. Immunotherapy
12. Gene Therapy
13. Vaccine

Teaching

Lecture in Course of Pathology and Disease Mechanisms 2002-present
The titles of lectures: Immunology and HPV vaccines.

Mentoring (pre- and post-doctoral)

Mentoring:

1. Chih-long Chang, M.D., Ph.D. (2006-2007; post-doctoral fellow, currently, an assitant professor at the Department of Obstetrics and Gynecology of the Mackay Memorial Hospital, Taiwan)
2. Youn-Seok Choi, M.D. (2006-2007; post-doctoral fellow, currently, an attending physician at the Catholic University of Daegu School of Medicine in Korea)
3. Chi-Mu Chuang, M.D. (2006-2008; postdoctoral fellow)
4. Dan Lu, Ph.D. (2006- 2008; postdoctoral fellow)
5. Qi Zang, M.D. (2009-2011; postdoctoral fellow)
6. An Jen Chiang (2010-2011; postdoctoral fellow)
7. Hsiao-Hsuan Tsai (2010-2011; postdoctoral fellow)
8. Annie Wu (2007-2011: undergraduate student)
8. Tae Heung Kang (2008-2013; postdoctoral fellow)
9. Xuequn Xu (2015-present, postdoctoral fellow)

Thesis committee

1. Ming Yang (Department of Biomedical Engineering, 2006-2010)
2. Ashley Saint-Fleur (Department of Immunology, 2009-2014)
3. Kihyuck Kwak (Department of Pathology, 2010-2014)
4. Joshua Wang (Department of Pathology, 2011-2015)
5. Rosie Jiang (Department of Pathology, 2012-present)
6. Yi-Hsin Lin (Department of Pathology, 2015-present)
7.

Co-mentoring with Dr. TC Wu

1. Wen-Fang Cheng, M.D. (1999-2001; postdoctoral fellow; currently, an associate professor at the Department of Obstetrics and Gynecology of the National Taiwan University Hospital)
2. Keng-Fu Hsu, M.D. (1999-2000; postdoctoral fellow, currently, an instructor at the Department of Obstetrics and Gynecology of the National Cheng Kung University Hospital)
3. Jung Won Kim, M.D., Ph.D. (2001-2002; postdoctoral fellow; currently, an Assistant Professor in the Department of Internal Medicine at Dankook University Medical center in South Korea)
4. Chia-Jung Hsieh, M.D. (2000-2002; postdoctoral fellow; currently, an attending physician at the Chang-Gung Memorial Hospital in Taiwan)
5. Jeremy Juang (2000-2002)
6. Tae Woo Kim, Ph.D (2001-2004; postdoctoral fellow, currently, an Associated Professor at the Korea University in South Korea)
7. Ken-Yu Lin (1999-2005; B.C.M.B. Graduate Program)
8. Bruce Huang (2002-2008; graduate student pursuing a Ph.D. thesis on the mechanisms of tumor metastasis)
9. Jesse Rowley (2003-2008; graduate student pursuing a Ph.D. thesis on the T cell biology)
10. Shaw-Wei David Tsen (2006-2010; undergraduate student)
11. Chih-Wen Tseng, M.D. (2006-2008; postdoctoral fellow)
12. Dae Jin Kim, M.D., Ph.D. (2005-2008, postdoctoral fellow)
13. Tong Zhang (2008-2011; Ph.D. student)
14. Yuqian Zhang (2008-2009; postdoctoral fellow)
15. Tae-Heung Kang (2008-2013; postdoctoral fellow)
16. Chao-Yi Wu (2010-2013; Ph.D. student)
17. Lihua Yang (2010-2013, postdoctoral fellow)
18. Sung Yong Lee (2010-2013, postdoctoral fellow)
19. Jason Trieu (2011-present; undergraduate student)
20. Nisha Donthi (2011-2013; undergraduate student)
21. Ruey-Shyang Soong (2012-2014, postdoctoral fellow)
22. Yun-Yan Sun (2012-2014 postdoctoral fellow)
23. Liwen Song (2012-2014, postdoctoral fellow)
24. Bianca Gomez (2011-present, postdoctoral fellow)
25. Chih-Ping Mao (2012-present; Ph.D. student)

26. Yi-Hsin Lin (2013-present; Ph.D. student)
27. Jian Miao (2014-2015, postdoctoral fellow)
28. Jin Qin (2014-present, postdoctoral fellow)
29. Lipin Han (2014-present, postdoctoral fellow)
30. Yu-Min Chuang (2015-present, postdoctoral fellow)
31.

ORGANIZATIONAL ACTIVITIES

Professional Societies:

American Association for Cancer Research 1998-present
Society for Immunotherapy of Cancer 2002-present

RECOGNITION

Invited Talks, Panels:

2002 "Improving Vaccine Potency through Enhanced Intercellular Spreading and MHC Class I Presentation of Antigen" invited speaker, Keystone symposia Gene-Based Vaccines, Breckenridge, CO.

2002 "DNA vaccines for cervical cancer" invited speaker, HPV vaccine symposium, National Taiwan University, Taiwan.

2002 "Improving DNA Vaccine Potency via Modification of Professional Antigen Presenting Cells" invited speaker, DNA vaccine symposium, Edinburgh, UK.

2003 "Targeting an Antigen into the Centrosome to Enhance DNA Vaccine Potency" invited speaker, American society for cell biology, San Francisco.

2003 "Enhancing MHC Class I Antigen Presentation by Targeting Antigen to Centrosomes" invited speaker, Annual meeting of the American Society of Gene therapy, Washington, DC.

2004 "Enhancing DNA Vaccine Potency by Combining a Strategy to Prolong Dendritic Cell Life with Intracellular Targeting Strategies" invited speaker, Rational Design of Vaccines and Immunotherapeutics CO.

2004 "Development of HPV Human T cell- Mediated Immunological Assays" invited speaker, 8th International Conference on Malignancies in AIDS and Other Immunodeficiencies (ICMAOI): Basic, Epidemiologic and Clinical Research, Bethesda, MD.

2006 “Identification of Mechanisms for Tumor Immune Evasion” invited speaker, Wayne State University, Detroit, MI.

2006 “Modifying Professional Antigen Presenting Cells to Enhance DNA Vaccine Potency” invited speaker, Society of Chinese Bioscientists in America, Washington, DC.

2006 ‘HPV Immunotherapeutic Vaccines in pre-clinical model and HPV human Immunological Assays” invited speaker, Gynecologic Oncology Group Semi-Annual Symposium 2006, Bethesda, MD.

2007 “HPV vaccines” invited speaker, Mackay Memorial Hospital, Taipei, Taiwan.

2007 “Ovarian cancer vaccine” invited speaker, 19th Federation of Asian and Oceanian Biochemists and Molecular Biologists Conference, Washington, DC.

2008 “Cancer immunotherapy using irradiated tumor cells secreting heat shock protein 70” invited speaker, 2nd International Conference on Ovarian Cancer, Rhodes, Greece.

2009 “Virotherapy and Immunotherapy for Ovarian Cancer” invited speaker, Pathology Grand Rounds, The Johns Hopkins University.

2009 “Chemotherapy and Immunotherapy for Ovarian Cancer” invited speaker, The 14th Taiwan Joint Cancer Conference & 8th Cross-Strait Academic Conference on Oncology.

2009 “Chemotherapy and Immunotherapy for Cervical Cancer” invited speaker, Mackay Memorial Hospital, Taipei, Taiwan.

2009 “Vaccines for Cervical Cancer” invited speaker, Taipei Veteran General Hospital, Taiwan.

2009 “Vaccines for Ovarian Cancer “ 2009 Biennial Meeting of the Johns Hopkins Medical and Surgical Association

2009 “Vaccines for Ovarian Cancer “ 2010 Gyn Cancer SPORE meeting

2009 “Cluster intradermal DNA vaccination rapidly induces E7-specific CD8+ T-cell immune responses leading to therapeutic antitumor effects.“ 2009 NCI Translational Science Meeting

2009 ANCER VACCINES ADJUVANTS &DELIVERY SYSTEMS 2009 Conference, 11-13 November 2009, Dublin, Ireland

2011 “Control of Cervicovaginal HPV-16 E7-Expressing Tumors by the Combination of Therapeutic HPV Vaccination and Vascular Disrupting Agents“ 2011 NCI Translational Science Meeting

2012 “Tumor-targeted delivery of IL-2 by NKG2D leads to accumulation of antigen-specific CD8+ T cells in the tumor loci and enhanced anti-tumor effects” 2012 American Society gene and Cell Therapy Anuual meeting, Philadelphia

2014 Immunology summit 2014 “Mark cancer cells for CTL attack through coating with viral antigenic peptides CTLs kill tumor with viral peptides” Baltimore

2015 International Symposium on Cancer Research in Mackay memorial Hospital. “Novel chemotherapy for ovarian cancer RPN13/ADRM1 inhibitor reverses immunosuppression by myeloid derived suppressor cells”

2015 Taipei medical School Joint Symposium on Cancer “Innovative strategies to control ovarian cancer”

Advisory Committee, Review Group:

1. Grant review for Alliance for Cancer Gene Therapy. 2005
2. NIH Virology Study Section. 2005-2006
3. Grant review for Austrian Science Fund. 2006
4. Grant review for Alliance for Cancer Gene Therapy. 2008
5. NIH Molecular Oncology – Basic, Translational and Clinical Studies P01. 2010
6. NIH SPORE in Gynecologic, Breast and Skin Cancers. 2010
7. NIH Molecular Oncology –Clinical Studies Special Emphasis Panel review meeting NCI P01 2011
8. NIH SPORE in Gynecologic, Breast and Skin Cancers. 2011
9. NIH R03/R21 study section in immunology and immunotherapy, March, 2013
10. NIH R03/R21 study section in immunology, June, 2013
11. NIH R03/R21 study section in immunology, March, 2014
12. NIH R03/R21 study section in immunology, July, 2014
13. NIH R03/R21 study section in immunology, March, 2015
14. NIH SPORE in Gynecologic, Breast and Prostate Cancers, February 2015
15.