BIOGRAPHICAL SKETCH

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NAME	POSITION TITLE
Michael Wan Cho	
eRA COMMONS USER NAME michaelcho	Assistant Professor of Medicine

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Whitman College	B.A.	1987	Biology, Chemistry
University of Utah	Ph.D.	1993	Cell., Viral, & Mol. Biol.

A. Positions and Honors:

Positions and Employment:

1994-1999 Post-Doctoral Res. Assoc./Senior Staff Fellow, NIH, NIAID, Laboratory of Mol. Microbiol.
1999-2001 Staff Scientist. NIH, NIAID, LMM.
2001-Pres. Assistant Professor. Depts. of Medicine and Biochemistry School of Medicine, CWRU.
2004-Pres. Assistant Professor. Department of Molecular Biology and Microbiology. CWRU.
2004-2006. Director, Molecular Virology and Gene Expression Core, CWRU Center for AIDS Research.
2006-Pres. Associate Director, Microbial Pathogenesis Core, CWRU Center for AIDS Research.

Honors and Awards:

1983-1987 Whitman College Scholarship.
1986-1987 Research Fellowship Award. The Northwest College and University Association for Science.
1991-1992 National Research Service Award. DHHS. NIH Genetics Pre-doctoral Training Grant.
1992 Graduate Student Fellowship Award. NATO Advanced Study Institute and EEC.
1993 Graduate Student Fellowship Award. American Society for Virology.
1994-1998 Post-Doctoral Intramural Research Training Award. National Institutes of Health.
2002 Plenary Lecture. Korean Society of Infectious Diseases.
2004 NIH New Investigator Travel Fellowship (Keystone Symposia).

Professional Services:

1. *Ad hoc* grant reviewer for Aids Fonds, Netherlands (2002).
2. NIH Study Section: SEP on Pop. Genetics Analysis Program: Immunity to Vaccine/Infections (2004).
3. NIH Study Section: SEP on Integrated Preclinical/Clinical AIDS Vaccine Development Program (2005)
4. NIH Study Section: SEP on NIAID Centers of Excellence for Influenza Res. and Surveillance (2006).
5. NIH Study Section: SEP on NIAID B cell Immunology and HIV-1 Nab Projects (2007).
6. NIH Study Section: SEP on Integrated Preclinical/Clinical AIDS Vaccine Development Program (2007)
7. Austrian Science Fund (FWF): Grant reviewer for Erwin Schroedinger Program (2008).
8. *Ad hoc* reviewer for *Journal of Immunol. Methods* (2003, 2004); *Expert Review of Vaccines* (2004).
9. *Ad hoc* reviewer for *Virology* (2003-2005, 07-08); *Vaccine* (2005); *Journal of Medical Virology* (2004).
10. *Ad hoc* reviewer for *Applied and Environmental Microbiology* (2007); Cellular Microbiology (2007).
11. *Ad hoc* reviewer for *Journal of Virology* (2006); *AIDS Research and Therapy* (2005).
12. *Ad hoc* reviewer for *Expert Opinion on Therapeutic Patents* (2006).
13. Gerson Lehrman Group's Council of Healthcare Advisors (2003-present).
14. CWRU Cell and Gene Therapy Facility Quality Assurance Committee (2004-present).
15. Session Chair. Conf. on Immune Mechanisms and HIV Disease Pathogenesis (Cleveland, 2004).
16. CWRU Medical Scientist Training Program (MSTP) Steering Committee (2004-2007).
17. Group Leader: Vaccine Working Group, CWRU Center for AIDS Research (2008-present).

B. Publications (Corresponding author is underlined):

1. McCusker, K., B. Braaten, **M. W. Cho** and D. Low (1991). *Legionella pneumophila* Inhibits Protein Synthesis in Chinese Hamster Ovary Cells. *Infection and Immunity* **59**: 240-246.
2. **Cho, M. W.** and E. Ehrenfeld. (1991). Rapid Completion of the Replication Cycle of Hepatitis A Virus Subsequent to Reversal of Guanidine Inhibition. *Virology* **180**: 770-780.
3. **Cho, M. W.,** O. Richards, T. Dmitrieva, V. Agol and E. Ehrenfeld (1993). RNA Duplex Unwinding Activity of Poliovirus RNA-Dependent RNA polymerase, $3D^{pol}$. *Journal of Virology* **67**: 3010-3018.
4. **Cho, M. W.,** N. Teterina, D. Egger, K. Bienz and E. Ehrenfeld (1994). Membrane Rearrangement and Vesicle Induction by Recomb. Poliovirus 2C and 2BC in Human Cells. *Virology* **202**: 129-145.
5. Teterina, N., W. Zhou, **M. W. Cho** and E. Ehrenfeld (1995). Inefficient Complementation Activity of Poliovirus 2C and 3D Proteins for Rescue of Lethal Mutations. *Journal of Virology* **69**: 4245-4254.
6. Shibata, R., C. Siemon, **M. W. Cho**, L. O. Arthur, S. M. Nigida Jr., T. Matthews, L. A. Sawyer, A. Schultz, K.K. Murthy, Z. Israel, A. Javadian, P. Frost, R. C. Kennedy, H. C. Lane, and M. A. Martin. (1996). Resistance of Previously Infected Chimpanzees to Successive Challenges with a Heterologous Intraclade B Strain of HIV-1. *J. Virol.* **70**: 4361-4369.
7. Kashanchi, F., S. Khleif, J. Duvall, R. Sadaie, M. Radonovich, **M. W. Cho**, M. Martin, S. Chen, R. Weinmann and J. Brady. (1996). Interaction of HIV Type 1 Tat with a Unique Site of TFIID Inhibits Negative Cofactor Dr1 and Stabilizes the TFIID-TFIIA Complex. *J. Virol.* **70**: 5503-5510.
8. Willey, R.L, R. Shibata, E. O. Freed, **M. W. Cho** and M. A. Martin. (1996). Differential Glycosylation, Virion-Incorporation and Sensitivity to Neutralizing Antibodies of HIV-1 Envelope Produced from Infected Primary T-Lymphocyte and Macrophage Cultures. *J. Virol.* **70**: 6431-6436.
9. **Cho, M. W.,** R. Shibata and M. A. Martin. (1996). Infection of Chimpanzee PBMC by HIV-1 Requires Cooperative Interaction Between Multiple Variable Regions of gp120. *J. Virol.* **70**: 7318-7321.
10. **Cho, M. W.,** M. K. Lee, M. C. Carney, J. F. Berson, R. W. Doms and M. A. Martin. (1998). Identification of gp120 determinants on a dual tropic human immunodeficiency virus type 1 that confers usage of CXCR4. *J. Virol.* **72**: 2509-2515.
11. Huang, M., R. Zensen, **M. W. Cho** and M. A. Martin. (1998). Construction and characterization of a temperature sensitive HIV type 1 reverse transcriptase mutant. *J. Virol.* **72**: 2047-2054.
12. Shibata, R., T. Igarashi, N. Haigwood, A. Buckler-White, R. Ogert, W. Ross, R. Willey, **M. W. Cho**, M. A. Martin (1999). Neutralizing antibody directed against the HIV-1 envelope glycoprotein can completely block HIV-1/SIV chimeric virus infections of macaque monkeys. *Nature Med.* **5**: 204-210.
13. Lee, M. K., J. Heaton, and **M. W. Cho** (1999). Identification of determinants of interaction between CXCR4 and gp120 of a dual-tropic $HIV\text{-}1_{DH12}$ isolate. Virology **257**: 290-296.
14. Lee, M. K., M. A. Martin, and **M. W. Cho** (2000). Higher Western blot immunoreactivity of gp120 from R5 HIV-1 isolates compared to X4 or X4R5 isolates. *AIDS Res. and Human Retrovir*. **16**: 765-775.
15. Tsunetsugu-Yokota, Y., T. Kato, S. Yasuda, Z. Matsuda, Y. Suzuki, Y. Koyanagi, N. Yamamoto, K. Akagawa, **M. W. Cho**, and T. Takemori. (2000). Transcriptional regulation of HIV-1 LTR during antigen-dependent activation of primary T cells by dendritic cells. *J. Leukoc. Biol*. **67:**432-40.
16. **Cho, M. W.** (2000). Assessment of HIV vaccine development: Past, present, and future. P. 263-313. In K.-T. Jeang (ed.), *Advanced Pharmacology*, vol. 49. Molecular biology and pathogenesis: clinical application. Academic Press, New York. (**Review**).
17. **Cho, M. W.,** M. K. Lee, C. H. Chen, T. Matthews, and M. A. Martin. (2000). Identification of gp120 regions targeted by a highly potent neutralizing antiserum elicited in a chimpanzee inoculated with a primary human immunodeficiency virus type 1 isolate. *J. Virol.* **74:**9749-9754.
18. Hu, Y-C., J. Kaufman, **M. W. Cho**, H. Golding, and J. Shiloach (2000). Production of HIV-1 gp120 in packed-bed bioreactor using the vaccinia virus/T7 expression system. *Biotechnology Progress*. **16**: 744-750.
19. **Cho, M. W.**, Y. B. Kim, M. K. Lee, K. C. Gupta, *et al.* (2001). Polyvalent envelope glycoprotein vaccine elicits a broader neutralizing antibody response but is unable to provide sterilizing protection against heterologous SIV/HIV infection in pigtailed macaques. *J. Virol.* **75:** 2224-2234.

20. Ogert, R. A., M. K. Lee, W. Ross, A. Buckler-White, M. A. Martin, **M. W. Cho** (2001). N-linked glycosylation sites adjacent to and within the V1/V2 and the V3 loops of dualtropic HIV type 1 isolate DH12 gp120 affect coreceptors usage and cellular tropism. *J. Virol.* **75:** 5998-6006.
21. Kim, Y. B., M. K. Lee, D. P. Han, and **M. W. Cho** (2001). Development of a safe and rapid neutralization assay using murine leukemia virus pseudotyped with HIV type 1 envelope glycoprotein lacking the cytoplasmic domain. *AIDS Res. Human Retroviruses.* **17**: 1715-1724.
22. Kim, Y. B., D. P. Han, C. Cao, **M.W. Cho** (2003). Immunogenicity and ability of variable loop-deleted HIV type 1 envelope glycoproteins to elicit neutralizing antibodies. *Virology* **305**: 124-137
23. Willey R. L., R. Byrum, M. Piatak, Y. B. Kim, **M. W. Cho**, J. L. Rossio, J. Bess, T. Igarashi, Y. Endo, L. O. Arthur, J. D. Lifson, M. A. Martin (2003). Control of viremia and prevention of simian-human immunodeficiency virus-induced disease in rhesus macaques immunized with recombinant vaccinia viruses plus inactivated SIV and HIV type 1 particles. *J. Virol* **77**:1163-1174.
24. **Cho, M. W.** (2003). Subunit protein vaccines: Theoretical and practical considerations for HIV-1. *Curr. Mol. Med.* 3:243-263. **(Review**).
25. Han, D. P., H. G. Kim, Y. B. Kim, L. L. M. Poon, **M. W. Cho** (2004). Development of a safe neutralization assay for SARS-CoV and Characterization of S glycoprotein. *Virology*. **326**: 140-149.
26. Lee, J-S., H. Poo, D. P. Han, S-P. Hong, K. Kim, **M. W. Cho**, E. Kim, M-H. Sung and C-J. Kim (2006). Mucosal immunization with surface-displayed SARS coronavirus spike protein on *Lactobacillus casei* induces neutralizing antibodies in mice. *J. Virol.* **80**: 4079-4087.
27. Han, D. P., A. Penn-Nicholson and **M. W. Cho** (2006). Identification of critical determinants on ACE2 for SARS-CoV entry and development of a potent entry inhibitor. *Virology* **350**: 15-25. (**Cover Art)**
28. Lederman, M. M., A. Penn-Nicholson, **M. W. Cho**, and D. Mosier (2006). Biology of CCR5 and its role in HIV infection and treatment. *Jama* **296**:815-26.
29. Han, D. P., M. Lohani and **M. W. Cho** (2007). Specific asparagine-linked glycosylation sites are critical for DC-SIGN- and L-SIGN-mediated SARS-CoV entry. *J. Virol.* **81**:12029-12039.
30. Penn-Nicholson, A., D. P. Han, S. J. Kim, H. Park, R. Ansari, D. C. Montefiori, and **M. W. Cho** (2008). Assessment of antibody responses against gp41 in HIV-1-infected patients using soluble gp41 fusion proteins and peptides derived from M group consensus envelope. *Virology*. **372**: 442-56.

C. Research Support:

Ongoing Research Support:

1. AI-036219 (PI: Lederman) **4/01/04 – 3/31/09**
NIH/NIAID
Center for AIDS Research (CFAR).
Promote increased collaboration between basic and clinical researchers through a central administrative structure, development of appropriate forums for sharing and exchange of ideas and pilot funding for interdisciplinary research. Also to enhance the depth and breadth of AIDS research by coordinated development of core activities and recruitment of new investigators.
Role: Microbial Pathogenesis Core Co-Director.

2. R21 GM-073222 (PI: Cho) **9/01/05 – 08/31/07**
NIH/NIGMS **9/01/07 – 8/31/08 (No-cost extension)**
A novel approach of generating combinatorial libraries.
The major goals of this project are to optimize and evaluate full potential of a novel approach of generating combinatorial libraries of complex polypeptides.
Role: P.I.

3. **P01 AI-074286-01 (PI: Cho)** **5/1/08-4/30/13**
   NIH/NIAID
   Characterization of immunogenic and structural properties of HIV-1 envelope.
   The major goal of this program project (2 Projects and 1 Administrative Core) is to develop a subunit envelope vaccine that can elicit broadly neutralizing antibodies. The studies include antigen design, characterization of structural properties of antigens, and evaluation of antigen immunogenicity in small animals.
   Role: P.I. and Project 1 Leader.

4. **R21/R33 AI-076083-01 (PI: Cho)** **5/1/08-4/30/10 (R21)**
   NIH/NIAID **5/1/10-4/30/13 (R33)**
   Targeting gp41 to elicit neutralizing antibodies against HIV-1.
   The major goal of this project is to elicit mucosal humoral immunity against gp41 using novel lactic acid bacteria that display gp41 membrane-proximal region on the cell surface.
   Role: P.I.

Recently Completed Research Support:

1. **R21 AI-55340 (PI: Cho)** **9/01/03 – 8/31/05**
   NIH/NIAID **9/01/05 – 8/31/06 (No-cost extension)**
   Developing HIV-1 vaccine using parainfluenza virus.
   The major goals of this project are to generate recombinant parainfluenza viruses that express HIV-1 and SIV proteins.
   Role: P.I.

2. **R21 AI-059217 (PI: Cho)** **9/01/04 – 8/31/06**
   NIH/NIAID **9/01/06 – 8/31/07 (No-cost extension)**
   Development of a vaccine against SARS-CoV.
   The major goals of this project are to understand the mechanism of virus entry and to develop SARS vaccine candidates.
   Role: P.I.

3. **R21 AI-060503 (PI: Cho)** **3/01/05 – 2/28/07**
   NIH/NIAID **3/01/07 – 2/28/08 (No-cost extension)**
   HIV-1 vaccine using variable loop-modified envelopes.
   The major objective of this project is to evaluate immunogenicity of a large library of HIV-1 envelope proteins with antigenically diverse variable loops.
   Role: P.I.