

CURRICULUM VITAE

NAME: William Robert Jacobs, Jr.

ADDRESS: Howard Hughes Medical Institute
Albert Einstein College of Medicine
1300 Morris Park Avenue
Bronx, NY 10461

EDUCATIONAL DEGREES:

Ph.D.	Molecular Cell Biology University of Alabama at Birmingham Birmingham, Alabama, June, 1985
B.A.	Mathematics Edinboro State University Edinboro, Pennsylvania, May, 1977

POST-GRADUATE TRAINING:

June 1985 - Nov. 1986	Postdoctoral Fellow in the laboratory of Barry R. Bloom, Dept. of Microbiology and Immunology Albert Einstein College of Medicine
Sept. 1979 - June 1985	Predocctoral Fellow in the laboratory of Drs. Roy Curtiss III and Josephine E. Clark-Curtiss, University of Alabama at Birmingham, and Dept. of Biology, Washington University
Oct. 1978 - July 1979	Instructor of Calculus and Physics, Triangle Tech, Erie, PA

PROFESSIONAL EMPLOYMENT AND APPOINTMENTS:

October 1997 - Present	Investigator Howard Hughes Medical Institute Albert Einstein College of Medicine
May 1993 - Oct. 1997	Associate Investigator Howard Hughes Medical Institute Albert Einstein College of Medicine
July 1996 – Present	Professor Depts. Of Microbiology and Immunology and Molecular Genetics Albert Einstein College of Medicine
July 1992 - July 1996	Associate Professor

Oct. 1990 - June 1992	Depts. of Microbiology and Immunology and Molecular Genetics Albert Einstein College of Medicine Assistant Professor Dept. of Molecular Genetics, Albert Einstein College of Medicine
May 1990 - May 1993	Assistant Investigator Howard Hughes Medical Institute Albert Einstein College of Medicine
Sept. 1987 - June 1992	Assistant Professor Dept. of Microbiology and Immunology Albert Einstein College of Medicine
Nov. 1986 - Aug. 1987	Associate Scientist, Dept. of Microbiology and Immunology Albert Einstein College of Medicine

AECOM RESPONSIBILITIES:

1992 - 1993	Co-Chairman of the Divisional Qualifying Exam Committee
1993 - 1994	Chairman, Divisional Qualifying Exam Committee
1988 - Present	Division Qualifying Exam Committee
1991 - Present	Biohazard Committee
2002 – Present	Gene Therapy Core Committee

TEACHING RESPONSIBILITIES:

1989 - Present	Lecturer in Molecular Genetics Course
1989 - Present	Lecturer in Infectious Disease Course
1996 – Present	Lecturer in the Pathogenesis Course
2003	Lecturer in the Waksman Foundation for Microbiology Lectures Program

PROFESSIONAL SOCIETY MEMBERSHIP:

Jan. 1991 - Present	Member of the editorial board of Infection and Immunity
June 1990 - Present	Ad hoc Member of the Molecular Biology of Mycobacteria Subcommittee of IMMLEP (Immunology of Leprosy) Steering Committee, World Health Organization
June 1987 - May 1990	Member of THELEP (Chemotherapy of Leprosy) Steering Committee, World Health Organization

AWARDS AND HONORS:

May 2003	Gardner Middlebrook Life-Time Achievement Award
April 2003	Fellow, American Academy of Microbiology
October 2001	Ellison Medical Foundation Senior Scholar Award in Global Infectious Disease
July 2000	Burroughs Wellcome Fund Award
January 1998	K.F. Myers Memorial Lecture; Tuberculosis Control: Finding Gold in Soil and Cow Dung. University of California, San Francisco
October 1997	Mellini Award
May 1996	American Society of Microbiology Annual Meeting, Division U Honorary Lecture, New Orleans, LA A View from a Geneticist: A 1914-D Penny. Lotto, Tuberculosis Control, and Beyond.
Sept. 1993	Special Grant Award for Drug Discovery Burroughs Wellcome Fund
May 1993	Distinguished Alumni Award Dept. of Microbiology and Immunology University of Alabama at Birmingham
June 1991	Distinguished Alumni Award Edinboro State University, PA
March 1985	Raymond W. Sarber Fellowship Award American Society for Microbiology

OTHER PROFESSIONAL ACTIVITIES:

Nov. 1999-Oct. 2003	Member, National Advisory Allergy and Infectious Diseases Council of the National Institutes of Health
July 1999	Part of DHHS BTEP TB Team to Russia
1990 - Present	Ad hoc reviewer for Science, Nature, PNAS (USA), J. Bacteriol., Molec. Microbiol., J. Clin. Microbiol., Antimicrobial Agent and Chemo., Gene, and J. Gen. Microbiol.
1990 - 1993	Ad hoc reviewer for RFAs for "Opportunistic Infections in AIDS Patients", Bacterial and Mycology Infections Study Section (BM1), and Food and Drug Administration's Program on Mycobacterial Research

PEER-REVIEWED MANUSCRIPTS:

1. **Sweeney, K., Dee, D.N., Hsu, T., Ramachandra, L., Henao-Tamayo, M., Ordway, D., Jain, P., Chen, B., Chen, M., Kim, J., Harding, C.V., Orme, I., Chan, J., Porcelli, S.A., Jacobs, W.R., Jr.,** (2009) A Recombinant *Mycobacterium smegmatis* that Elicits Bactericidal Immunity Against *M. tuberculosis*. **submitted.**
2. **Larsen, M.H., Jacobs, W.R.;; Porcelli, S.A, Kim, J., Ranganathan, U.D., Fennelly G. J.** (2010) Balancing safety and immunogenicity in live-attenuated mycobacterial vaccines for use in humans at risk for HIV: response to misleading comments in Ranganathan et al. "recombinant pro-apoptotic Mycobacterium tuberculosis generates CD8+ T Cell responses against human immunodeficiency virus type 1 Env and *M. tuberculosis* in neonatal mice:. *Vaccine*. **28(21):** 3633-3634. PMID PMC (in process).
3. **Vilcheze, C., Weinrick, B., Wong, K.W., Chen, B., Jacobs, W.R., Jr.** (2010) NAD (+) Auxotrophy is Bacteriocidal for the Tubercle Bacilli. *Mol. Microbiol.* (in press).
4. **Gratraud, P., Huws, E., Falkard, B., Adjalley, S., Fidock, D.A., Jacobs, W.r., Jr., Baird, M.S., Vial, H., Kremer, L.** (2009) Oleic Acid Biosynthesis in *Plasmodium falciparum*: characterization of the Stearoyl-CoA Desaturase and Validation as a Therapeutic Target. *PLoS One*. (4) 9:e6889. PMID PMC 2731242.
5. **Kalscheuer, R., Syson, K., Veeraraghavan, U., Weinrick, B., Biermann, K.E., Liu, Z., Sacchettini, J.C., Besra, G., Bornemann, S., Jacobs, W.R., Jr.** (2010) Self-poisoning of *Mycobacterium tuberculosis* by inhibition of GlgE reveals a new class of drug target. *Nature Chem Bio*. **6(5):**376-84. PMID PMC(in process).
6. **Kinhikar,A.G., Verma, I., Chandra, D., Singh, K.K., Weldingh, K., Andersen, P., Hsu, T., Jacobs, W.R., Jr., Laal, S.** (2010) Potential role for ESAT6 in dissemination of *M. tuberculosis* via human lung epithelial cells. *Mol. Microbiol.* **(75)1:**92-106. PMID PMC 2846543.
7. **Ranganathan, U.D., Larsen,M.H., Kim, J., Porcelli, S.A., Jacobs, W.R.,Jr., Fennelly, G.J.** (2009) recombinant pro-apoptotic Mycobacterium tuberculosis generates CD8(+) T cell responses against human immunodeficiency virus type 1 Env and *M. tuberculosis* in neonatal mice. *Vaccine*. **10;28(1):**152-161. PMID PMC in process.
8. **Capyk, J.K., Kalscheuer,R., Stewart,G.R., Liu,J., Kwon,H., Zhao,R., Okamoto,S., Jacobs,W.R.,Jr., Eltis,L.D., Mohn,W.W.** (2009) Mycobacterial cytochrome P450 125 (Cyp125) catalyzes the terminal hydroxylation of C27-steroids. *J. Biol. Chem.* [epub ahead of print].
9. **Nascimento, I.P., Dias,W.O., Quintilio,W., Hsu,T., Jacobs, W.R.,Jr., Leite, L.C.** (2009) Construction of an unmarked recombinant BCG expressing a pertussis antigen by auxotrophic complementation: Protection against Bordetella pertussis challenge in neonates. *Vaccine* [epub ahead of print].

10. **Chen, J., Kriakov, J., Singh, A., Jacobs, W.R., Besra, G.S., Bhatt, A.,** (2009) Defects in glycopeptidolipid biosynthesis confer phage 13 resistance in *Mycobacterium smegmatis*. *Microbiology* [epub ahead of print].
11. **Ioerger, T.R., Koo, S., No, E.G., Chen, X., Larsen, M.H., Jacobs, W.R., Jr., Pillay, M., Sturm, A.W., Sacchettini, J.C.** (2009) Genome analysis of multi- and extensively drug-resistant tuberculosis from KwaZulu-Natal, South Africa. *PLoS One* **4**:(11)e778. PMID: PMC2767505.
12. **Baughn, A., Garforth, S., Vilcheze, C., Jacobs, W.R., Jr.** (2009) An Anaerobic-Type α -Ketoglutarate Ferredoxin Oxidoreductase Completes the Oxidative Tricarboxylic Acid Cycle of *Mycobacterium tuberculosis*. *PLoS Path* **5**:(11)e1000662. PMID: PMC in process
13. **Waters, W.R., Palmer, M.V., Nonnecke, B.J., Thacker, T.C., Estes, D.M., Larsen, M.H., Jacobs, W.R., Jr., Andersen, P., McNair, Minion, F.C., Lyashchenko, K.P., Hewinson, R.G., Vordermeier, H.M., Sacco, R.E.,** (2009) Signal regulatory protein alpha (SIRPalpha) cells in the adaptive response to ESAT -6 CFP-10 protein of tuberculous mycobacteria. *PLoS One* **4**:(7) e6414. PMID: PMC2714177.
14. **Venkataswamy, M.M., Beana, A., Goldberg, M.F., Bricard, G., Im, J.S., Chan, J., Reddington, F., Besra, G.S., Jacobs, W.R., Jr., Porcelli, S.A.** (2009) Incorporation of NKT cell-activating glycolipids enhances immunogenicity and vaccine efficacy of *Mycobacterium bovis* bacillus Calmette-Guérin. *J Immunol* **183**: (3) 1644-56. PMID: PMC2719834.
15. **Banaei, N., Kincaid, E.Z., Lin, S.Y., Desmond, E., Jacobs, W.R., Jr., Ernst, J.D.** (2009) Lipoprotein processing is essential for resistance of *Mycobacterium tuberculosis* to malachite green. *Antimicrob Agents Chemother (Epub)*. PMID: PMC in process.
16. **Capinos Scherer, C.F., Endsley, J.J., deAguiar, J.B., Jacobs, W.R., Jr., Larsen, M.H., Palmer, M.V., Nonnecke, B.J., Waters, R.W., Estes, M.D.** (2009) Evaluation of Granulysin and Perforin as Candidate Biomarkers for Protection Following Vaccination with *Mycobacterium bovis* BCG or *M. bovis* Δ RD1. *Transbound Emerg Dis* **56**: (6-7) 228-39. PMID: PMC in process.
17. **Larsen, M., Biermann, K., Chen, B., Hsu, T., Sambandamurthy, V., Lackner, a., Ay, P.P., Didier, P. Huang, D., Shao, L., Huiyong, W., Letvin, N., Frothingham, R., Haynes, B., Chen, Z., Jacobs, W.R., Jr.** (2009) Efficacy and Safety of Live Attenuated Persistent and Rapidly Cleared *Mycobacterium tuberculosis* Vaccine Candidates in Non-Human Primates. *Vaccine* **34**:4709-4717 [Epub]. PMID: PMC in process.
18. **Colangeli, R., Haq, A., Arcus, V.L., Summers, E., Magliozzo, R.S., McBride, A., Mitra, A.K., Radjainia, M., Khajo, a., Jacobs, W.R., Jr., Salgame, P., Alland, D.** (2009) The Multifunctional Histone-Like Protein Lsr2 Protects *Mycobacteria* Against Reactive Oxygen Intermediates. *PNAS* [early edition]. PMID: PMC2657463.

19. **Zimmerman, D.M., Waters, W.R., Lyashcenko, K.P., Nonnecke, B.J., Armstrong, D.L., Jacobs, W.R., Jr., Larsen, M.H., Egan, E., Dean, G.A.** (2009) Safety and immunogenicity of *Mycobacterium tuberculosis* Δ lysA Δ panCD Vaccine in Domestic Cats Infected with Feline Immunodeficiency Virus. *Clin Vaccine Immunol* **16**: (3) 427-429 [Epub]. PMID: PMC2650874.
20. **Parra, M., Yang, A.L., Lim, J., Kolibab, K., Kerrick, S., Cadieux, N., Perera, L.P., Jacobs, W.R., Brennan, M., Morris, S.L.** (2009) The development of a Murine Mycobacterial Growth Inhibition assay for Evaluating Vaccines Against *Mycobacterium tuberculosis*. *Clin Vaccine Immunol* [Epub ahead of print]. PMID: PMC2708400.
21. **Chen, C.Y., Huang, D., Wang, R.C., Shen, L., Zeng, G., Yao, S., Shen, Y., Halliday, L., Fortman, J., McAllister, M., Estep, J., Hunt, R., Vasconcelos, D., Du, G., Porcelli, S.A., Larsen, M.H., Jacobs, W. J., Jr., Haynes, B. F., Letvin, N.L., Chen Z.W.** (2009) A critical role of CD8 T cells in a nonhuman primate model of tuberculosis. *PLoS Pathog.* **5** (4):e1000392 [Epub]. PMID: PMC2663842.
22. **Cirillo, S.L., Subbian, S., Chen, B., Weisbrod, T.R., Cirillo, J.D.** (2009) Protection of *Mycobacterium tuberculosis* from reactive oxygen species conferred by the mel2 locus impacts persistence and dissemination. *Infect Immunol* **77**: (6) 2557-2567. PMID: PMC2687327.
23. **Gopalaswamy, R., Narayanan, S., Chen, B., Jacobs, W.R., Av-Gay, Y.** (2009) The serine/threonine protein kinase PknI controls the growth of *Mycobacterium tuberculosis* upon infection. *FEMS Microbiol Lett* **295** (1): 23-29. PMID: PMC in process.
24. **Piuri, M., Jacobs, W.R. Jr., Hatfull, G. F.** (2009) Fluoromycobacteriophages for rapid, specific, and sensitive antibiotic susceptibility testing of *Mycobacterium tuberculosis*. *PLoS ONE* **4** (3) e-4870. PMID: PMC2654538.
25. **Yam, K.C., D'Angelo, I., Kalscheuer, R., Zhu, H., Wang, J.X., Snieckusk, V., Ly, L.H., Converse, P. J., Jacobs, W.R., Jr., Strynadka, N., Eltis, L.D.** (2009) Studies of a ring-cleaving dioxygenase illuminate the role of cholesterol metabolism in the pathogenesis of *Mycobacterium tuberculosis*. *PLoS Pathog.* **5** (3):e1000344 [Epub]. PMID: PMC2652662.
26. **Cayabyab, M.J., Koriath-Schmitz B., Sun, Y., Carville, A., Balachandran, H., Miura, A., Carlson, K.R., Buzby, A.P., Haynes, B.F., Jacobs, W.R., Letvin, N.L.** (2009) Recombinant *Mycobacterium bovis* BCG prime-recombinant adenovirus boost vaccination in rhesus monkeys elicits robust polyfunctional simian immunodeficiency virus-specific T-cell responses. *J Virol.* **83** (11):5505-5513 [Epub]. PMID: PMC2681969.
27. **Waters WR, Palmer MV, Nonnecke BJ, Thacker TC, Scherer CFC, Estes DM,**

- Hewinson RG, Vordermeier HM, Barnes SW, Federe GC, Walker JR, Glynn RJ, Hsu T, Weinrick B, Biermann K, Larsen MH, Jacobs WR, Jr. (2009) Efficacy and immunogenicity of *Mycobacterium bovis* $\Delta RD1$ against aerosol *M. bovis* infection in neonatal calves. *Vaccine* **27**:1201-1209. PMID: PMC in process.
28. **Freundlich, J.S., Wang, F., Vilcheze, C., Gulten, G., Langley, R., Schiehser, G.A., Jacobus, D.P., Jacobs, W.R., Jr., Sacchettini, J.** (2009) Tricolosan Derivatives: Towards Potent Inhibitors of Drug-Sensitive and Drug Resistant *M. tuberculosis*. *Chem Med Chem* **4**:241-248. PMID: PMC in process.
29. **Bueno, S.M., Gonzalez, P.A., Cautivo, K.M., Mora, J.E., Leiva, E.D., Tobar, H.E., Fennelly, G.J., Eugenin, E.A., Jacobs, W.R., Jr., Riedel, C.A., Kalergis, A.M.** (2008) Protective T Cell Immunity Against Respiratory Syncytial Virus is Efficiently Induced by Recombinant BCG. *PNAS* **105**:20822-20827. PMID: PMC2634951.
30. **Yu, M., Kumar, T.R., Nkrumah, L.J., Coppi, A., Retzlaff, s., Li, C.D., Kelly, B.J., Moura, P.A., Lakshmanan, Freundlich, J.s., Valderramos, J.C., Vilcheze, C., Siedner, M., Tsai, J.H., Falkard, B., Sidhu, A.B., Purcell, L.A., Gradtraud, P, Kremer, L, Waters, A.P., Schiehser, G., Jacobus, D.P., Janse, C.J., Ager, A., Jacobs, W.R., Jr., Sacchettini, J.C., Heussler, V., Sinnis, PI, Fidock, D.A.** (2008) The Fatty Acid Biosynthesis Enzyme FabI Plays a Key Role in the Development of Liver-Stage Malarial Parasites. *Cell Host Microbe* **4**:567-578. PMID: PMC2646117.
31. **Lee, W.L., Gold, B., Darby, C., Brot, N., Jiang, X, de Carvalho, L.P., Wellner, D., John, G., Jacobs, W.R., Jr., Nathan, C.** (2009) *Mycobacterium tuberculosis* Expresses Methionine Sulfoxide Reductases A and B that Protect from Killing by Nitrite and Hypochlorite. *Mol Microbiol* **71**:583-593. PMID: PMC in process.
32. **Lim, J., Derrick, S.C., Kolibab, K., Yang, A.L., Porcelli, S., Jacobs, W.R., Morris, S.L.** (2009) Early Pulmonary Cytokine and Chemokine Responses in Mice Immunized with Three Different Vaccines Against *Mycobacterium tuberculosis* Determined by PCR Array. *Clin Vaccine Immunol* **16**:122-126. PMID: PMC2620659.
33. **Endsley, J.J., Waters, W.R., Palmer, M.V., Nonnecke, B.J., Thacker, T.C., Jacobs, W.R., Jr., Larsen, M.H., Hogg, A., Shell, E., McAlauy, M., Scherer, C.F., Coffey, T., Howard, C.J., Villareal-Ramos, B., Estes, D.M.** (2009) The Calf Model of Immunity for Development of a Vaccine Against Tuberculosis. *Vet Immunol Immunopathol* **128**(1-3):199-204. PMID: PMC in process.
34. **Qiu, L., Huang, D., Chen, C.Y., Wang, R., Shen, L., Shen, Y., Hunt, R., Estep, J., Haynes, B.F., Jacobs, W.R., Jr., Letvin, N., Du, G., Chen, Z.** (2008) Severe Tuberculosis Induces Unbalanced Up-Regulation of Gene Networks and Overexpression of IL-22, MIP-1alpha, CCL27, IP-10, CCR4, CCR5, CXCR3, PD1, PDL2, IL-3 IFN-beta, TIM1, and TLR2 But Low Antigen-Specific Cellular Responses. *J. Infec Dis* **198**:1514-1519. PMID: PMC in process
35. **Vilcheze, C., Av-Gay, Y., Attarian, R., Liu, Z., Hazbon, M.H., Colangeli, R.,**

- Chen, B., Liu, W., Alland, D., Sacchettini, J.C., Jacobs, Jr., W.R.** (2008) Mycothiol biosynthesis is essential for ethionamide susceptibility in *Mycobacterium tuberculosis*. *Mol Microbiol.* **69**:1316-29. PMID: PMC2628429.
36. **Arai, M., Sobou, M., Vilcheze, C., Baughn, A. Hashizume, H., Pruksakorn, P., Ishida, S., Matsumoto, Ma., Jacobs, W.R. Jr., Kobayashi, M.** (2008) Halicyclamine A, a marine spongean alkaloid as a lead for anti-tuberculosis agent. *Bioorg. Med. Chem.* **16**:6732-6. PMID: PMC in process.
37. **Lázár-Molár, E., Chen, B., Liu, W., Porcelli, S.A., Almo, S.C., Nathenson, S.G. Jacobs, W.R., Jr.** (2008) Programmed Death-1 (PD-1) Deficient Mice are Extraordinarily Sensitive to Tuberculosis. *Infect Immun* **submitted**.
38. **Kumar, V., Loganathan, P., Sivaramakrishnan, G., Kriakov, J., Dusthakeer, A., Subramanyam, B., Chan, J., Jacobs, W.R., Jr., Paranjji, Rama, N.** (2008) Characterization of temperate phage Che12 and construction of a new tool for diagnosis of tuberculosis. *Tuberculosis* **[Epub ahead of print]**. PMID: PMC 2678029.
39. **Mohamemohaideen, N.N., Palaninathan, S.K., Morin, P.M., Williams, B.J., Braunstein, M., Tichy, S.E., Locker, J., Russell, D.H., Jacobs, W.R., Jr., Sacchettini, J.C.** (2008) Structure and Function of the Virulence-Associated High-Temperature Requirement A of *Mycobacterium tuberculosis*. *Biochemistry* **[Epub ahead of print]** PMID: PMC in process.
40. **Jayakumar, D., Jacobs, W.R., Jr., Narayanan, S.** (2008) Protein Kinase E. of *Mycobacterium tuberculosis* Has a Role in the Nitric Oxide Stress Response and Apoptosis in a Human Macrophage Model of Infection. *Cell Microbiol.* **10**:365-74. PMID: PMC in process.
41. **Ojha, A.K., Baughn, A.D., Sambandan, D., Hsu, T., Trivellil, X., Guerardel, Y., Alahari, A., Kremer, L., Jacobs, W.R., Jr., Hatfull, G.F.** (2008) Growth of *Mycobacterium tuberculosis* biofilms containing free mycolic acids and harboring drug tolerant bacteria. *Mol. Microbiol.* **69**:164-74. PMID: PMC2615189.
42. **Dao, D. N., K. Lawrence, T. Hsu, I. P. Nascimento, D. Roshevsky, S. S. Gurcha, G. S. Besra, J. Chan, S. A. Porcelli, and W. R. Jacobs** (2008) Repression of IL-12P40 is Controlled by MmaA4 Mediated Modification of Mycolic Acids Associated with Trehalose 6,6' Dimycolate. *PLoS Pathog.* **4**(6):e1000081;pp. 1-14. PMID: PMC2390761.
43. **Mishra, A.K., Alderwich, L.J., Rittmann, D., Wang, C., Bhatt, A., Jacobs, W.R., Jr., Takayama, K., Eggeling, L., Besra, G.S.,** (2008) Identification of a novel alpha (1-->6) mannopyranosyltransferase MptB from *Corynebacterium glutamicum* by deletion of a conserved gene, NCgl1505, affords a lipomannan- and lipoarabinomannan-deficient mutant. *Mol Microbiol* **68** (6): 1595-613. PMID: PMC2440535.
44. **Im, J.S., Kang, T.J., Lee, S.B., Kim, C.H., Lee, S.H., Venkataswamy, M.M., Serfass, E.R., Chen, B., Illarionov, P.S., Besra, G.S., Jacobs, W.R., Jr., Chae, G.T., Porcelli, S.A.** (2008) Alteration of the Relative Levels of iNKT Cell Subsets

is Associated with Chronic Mycobacterial Infections. *Clin. Immunol* **127**:214-224. PMID: PMC2413133.

45. **Huang, D., Shen, Y., Qiu, L., Chen, C.Y., Shen, L., Estep, J., Hunt, R., Vasconcelos, D., Du, G., Qye, P., Lackner, A.A., Larsen, M.H., Jacobs, W.R., Haynes, B.F., Letvin, N.L., Chen, Z.W.** (2008) Immune distribution and Localization of Phosphoantigen-Specific V γ 2V Δ 2 T Cells in Lymphoid and Nonlymphoid Tissues in *Mycobacterium tuberculosis* Infection. *Infect Immun* **76**:426-436. PMID: PMC2223676.
46. **Gopalaswamy, R., Narayanan, S., Jacobs, W.R., Jr., Av-Gay, Y.** (2008) *Mycobacterium smegmatis* Biofilm Formation and Sliding Motility are Affected by the Serine-Threonine Protein Kinase PknF. *FEMS Microbiol.* **278**:121-127. PMID: PMC in process.
47. **Banaiee, N., January, V., Barthus, C., Lambrick, M., RoDiti, D., Behr, M.A., Jacobs, W.R., Jr., Steyn, L.M.** (2008) Evaluation of a Semi-Automated Reporter Phage Assay for Susceptibility Testing of *Mycobacterium tuberculosis* Isolates in South Africa. *Tuberculosis* **88**:64-68. PMID: PMC in process.
48. **Reddy, M.C.M., Gokulan, K., Jacobs, W.R., Jr., Ioerger, T.R., Sacchettini, J.C.** (2008) Crystal structure of *Mycobacterium tuberculosis* LrpA, a Leucine-Responsive Global Regulator Associated with Starvation Response. *Protein Science* **17**:159-170. PMID: PMC2144582.
49. **Waters, W.R., Palmer, M.V., Nonnecke, B.J., Thacker, T.C., Scherer, C.F., Estes, D.M., Jacobs, W.R., Jr., Glatman-Freeman, A., Larsen, M.H.** (2007) Failure of a *Mycobacterium tuberculosis* Δ RD1 Δ panCD Double Deletion Mutant in a Neonatal Calf Aerosol *M. bovis* Challenge Model: Comparisons to Responses Elicited by *M. bovis* bacilli Calmette Guerin. *Vaccine* **25**:7832-7840. PMID: PMC in process.
50. **Banaiee, N., Jacobs, W.R., Jr., Ernst, J.** (2007) LspA-Independent Action of Globomycin on *Mycobacterium tuberculosis*. *J. Antimicrob. Chemother.* **60**:414-416. PMID: PMC in process.
51. **Al-Sayyed, B., Piperdi, S., Yuan, X., Li, A., Besra, G.S., Jacobs, W.R., Jr., Casadevall, A., Glatman-Freeman, A.** (2007) Monoclonal Antibodies to *Mycobacterium tuberculosis* CDC 1551 Reveal Subcellular Localization of MPT51. *Tuberculosis* **87**:489-97. PMID: PMC2475595.
52. **Velmurugan, K., Chen, B., Miller, J.L., Azogue, S., Gurses, S., Hsu, T., Glickman, M., Jacobs, W.R., Porcelli, S.A., Briken, V.** (2007) *Mycobacterium tuberculosis* nuoG Is A Virulence Gene That Inhibits Apoptosis of Infected Host Cells. *PLoS Pathog.* **3**:e110 [Epub ahead of print] PMID: PMC1924871.
53. **Zimhony, O., Vilcheze, C., Arai, M., Welch, J., Jacobs, W., Jr.** (2007) Pyrazinoic Acid and its *n*-Propyl Ester Inhibit Fatty Acid Synthase I in Replicating Tubercle Bacilli. *Antimicrobiol. Agents Chemother.* **51**:752-754. PMID: PMC1797748.

54. **Ngo, S.C., Zimhony, O., Chung, W.J., Sayahi, H., Jacobs, W., Jr. and Welch, J.T.** (2007) Inhibition of Isolated *Mycobacterium tuberculosis* Fatty Acid Synthase I by Pyrazinamide Analogs. *Antimicrobiol. Agents Chem.* **51**:2430-2435. PMID: PMC1913273.
55. **Hinchey, J., Lee, S., Jeon, B.-Y., Basaraba, R.J., Venkataswamy, M.M., Chen, B., Chan, J., Braunstein, M., Orme, I.M., Derrick, S.C., Morris, S.L., Jacobs, Jr., W.R. and Porcelli, S.A.** (2007) Enhanced Priming of Adaptive Immunity by A Proapoptotic Mutant of *Mycobacterium tuberculosis*. *J Clin Invest.* **117**:2279-2288. PMID: PMC1934588.
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Reductase from Wild-type and Trimethoprim-Resistant *Mycobacterium smegmatis*. *Exp. Parasitol.* **72**:184-190.PMCID: PMC in process.

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216. **Snapper, S.B., Lugosi, L., Jekkel, A., Melton, R., Kieser, T., Bloom, B.R. and Jacobs, W.R., Jr.** (1988) Lysogeny and Transformation of Mycobacteria: Stable Expression of Foreign Genes. *Proc. Natl. Acad. Sci., USA.* **85**:6987-6991. PMCID: PMC282104.
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BOOK CHAPTERS AND REVIEWS:

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2. **Jacobs, W.R., Jr., S.B. Snapper, M. Tuckman, and B.R. Bloom.** (1989) Mycobacteriophage Vector Systems. *Rev. Infect. Dis.* 11(Suppl. 2):404-410.
3. **Mehra, V., R.L. Modlin, T.H. Rea, W.R. Jacobs Jr., S.B. Snapper, J. Convit, and B.R. Bloom.** (1989) Molecular Approaches to Developing a Vaccine for Leprosy. pp. 335-346. In: G.P. Talwar (ed.) *Progress in Vaccinology*. Springer Verlag, New York.
4. **Jacobs, W.R. Jr., S.B. Snapper, L. Lugosi, A. Jekkel, R.E. Melton, T. Kieser, and B.R. Bloom.** (1989) Development of genetic systems for the mycobacteria. *Acta Leprol.* 7(Suppl. 1):203-207. (Review)
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6. **Jacobs, W.R. Jr., S.B. Snapper, L. Lugosi, and B.R. Bloom.** (1990) Development of BCG as a Recombinant Vaccine Vector. *Curr. Top. Microbiol. Immunol.* 155:153-160. (Review)
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8. **Cirillo JD, Stover, C.K., Bloom, B.R., Jacobs, W.R., Jr., Barletta, R.G.** (1995) Bacterial Vaccine Vectors and Bacillus Calmette-Guerin. *Clin. Infect. Dis.* 20:1001-1009. (Review)
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13. **Jacobs, W.R. Jr.** (1992) Advances in Mycobacterial Genetics: New Promises for Old Diseases. *Immunobiology* 184:147-156.
14. **Connell, N., C.K. Stover, and W.R. Jacobs, Jr.** (1992) Old Microbes with New Faces: Molecular Biology and Design of New Vaccines. *Curr. Opinion Immunol.* 4:442-448.
15. **Stover, C.K., de la Cruz, VF, Bansal, G.P., Hanson, M.S., Fuerst, T.R., Jacobs, W.R., Jr., Bloom, B.R.** (1992) Use of Recombinant BCG as a Vaccine Delivery Vehicle. *Adv. Exp. Med. Biol.* 327:175-182. (Review)
16. **Jacobs, W.R. Jr., G.V. Kalpana, J.D. Cirillo, L. Pascopella, R.A. Udani, W.D., Jones, Jr., R.G. Barletta, and B.R. Bloom.** (1991) Genetic Systems for the Mycobacteria. In: Miller, J. (ed.) *Method. Enzymol.*, Vol. 204:537-555.
17. **Jacobs, W.R. Jr.** (1992) Advances in Mycobacterial Genetics: New Promises for Old Diseases. *Immunobiology* 184:147-156.
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22. **Hatfull, G.F. and W.R. Jacobs, Jr.** (1994) Mycobacteriophages: Cornerstones of Mycobacterial Research. In: *Tuberculosis, Pathogenesis, Protection, and Control*. B.R. Bloom (ed.) American Society for Microbiology Press, Washington, D.C. pp. 165-183.
23. **Jacobs, W.R. Jr. and B.R. Bloom.** (1994) Molecular Strategies for Identifying Virulence Determinants of *Mycobacterium tuberculosis*. In: *Tuberculosis, Pathogenesis,*

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25. **Jacobs, W.R. Jr.** (1996) Science for Combating Tuberculosis. *Bulletin of the New York Academy of Medicine.* 73:46-52.
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29. **Miesel, L., Rozwarski, D.A., Sacchettini, J.C. and Jacobs, W.R. Jr.** (1998) Mechanisms for Isoniazid Action and Resistance. In: D.J. Chadwick and G. Cardew (eds.) *Genetics & Tuberculosis.* John Wiley & Sons Ltd., West Sussex England pp. 209-220.
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31. **Riska, P.F., Jacobs, W.R. Jr., and Alland, D.** (2000) Molecular determinants of drug resistance in tuberculosis. *Int. J. Tuberc Lung Dis Feb; 4(2 Suppl 1):S4-10.*
32. **Glickman, M.S. and Jacobs, W.R. Jr.** (2001) Microbial Pathogenesis of Mycobacterium tuberculosis: Dawn of a Discipline. (Review) *Cell* 104:477-485.
33. **Goulding, C.W., Apostol, M., Anderson, D.H., Gill, H.S., Smith, C.V., Kuo, M.R., Yang, J.K., Waldo, G.S., Suh, S.W., Chauhan, R., Kale, A., Bachhawat, N., Mande, S.C., Johnston, J.M., Lott, J.S., Baker, E.N., Arcus, V.L., Leys, D., McLean, K.J., Munro, A.W., Berendzen, J., Sharma, V., Park, M.S. Eisenberg, D., Sacchettini, J., Alber, T., Rupp, B., Jacobs, W., Jr., Terwilliger, T.C.** (2002) The TB Structural Genomics Consortium: Providing a Structural Foundation for Drug Discovery. *Curr. Drug Targets Infect. Disord.* 2:121-141.
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35. **Hingley-Wilson, S.M., Sambandamurthy, V.K. and Jacobs, W.R., Jr.** (2003) Survival Perspectives From the World's Most Successful Pathogen, *Mycobacterium tuberculosis*. *Nat. Immunol.* **4**:949-955.
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37. **Zhand, Y., Vilcheze, C., Jacobs, W.R. Jr.,** (2005) Mechanisms of Drug Resistance in *Mycobacterium tuberculosis*. ASM Press, Washington, DC. 8:115-140.
38. **Vilchèze C and Jacobs WR Jr.** The Mechanism of Isoniazid Killing: Clarity Through the Scope of Genetics. *Annu. Rev. Microbiol.*, 2007, 61:35-50.
39. **Vilchèze C and Jacobs WR Jr.** Isolation and Analysis of *Mycobacterium tuberculosis* Mycolic Acids. *Current Protocols in Microbiology*, 2007, 10A.3.1-11.
40. **Murillo, A.C., Li, H.Y., Albert, T., Baker, E.N., Berger, J.M., Cherney, L.T., Cherny, M.M., Cho, Y.S., Eisenberg, D., Garen, C.R., Goulding, C.W., Hung, L.W., Ioerger, T.R., Jacobs, W.R., James, M.N., Kim, C., Krieger, L., Lott, J.S., Sankaranarayanan, R., Segelke, B.W., Terwilliger, T.c., Wang, F., Sacchettini, J.C.** (2007) High Throughput Crystallography of TB Drug Targets. *Infect Disord Drug Targets* **7**:127-139.
41. **Larsen, M.H., Biermann, K., Tandberg, S., Hsu, T., Jacobs, W.R., Jr.** (2007) Genetic Manipulation of *Mycobacterium tuberculosis*. *Curr protoc microbial* **10**:Unit 10A 2.
42. **Larsen, M.H., Biermann, K., Jacobs, W.R., Jr.** (2007) Laboratory maintenance of *Mycobacterium tuberculosis*. *Curr Protoc Microbiol* **10**:Unit 10A 1.
43. **Larsen, M.H., Biermann, K., Jacobs, W.R., Jr.,** (2007) Analyses of *Mycobacterium tuberculosis* proteins. *Curr Protoc Microbiol* **10**: Unit10A4.
44. **Porcelli, S.A. and Jacobs, W.R., Jr.** (2008) Tuberculosis: Unsealing the Apoptotic Envelope. *Nat Immunol* **9**:1189-1197 Review.

EDITOR:

1. Hatfull, G.F. and Jacobs, W.R. Jr. (editors) *Molecular Genetics of Mycobacteria*. 2000 ASM Press, Washington, D.C.
2. Cole, S.T., Eisenach, K.D., McMurray, D.N. and Jacobs, W.R. Jr. (editors) *Tuberculosis and the Tubercle Bacillus*. 2005 ASM Press, Washington, DC.

PATENTS ISSUED:

Recombinant Mycobacterial Vaccines. B. Bloom, W. Jacobs, Jr., R. Young, R. Davis, R. Husson,. U.S. Patent No. 5,504,005, Issue Date: April 2, 1996.

Antimycobacterial Compounds and Method of Using Same. W. Jacobs, Jr., J. Blanchard, J. Sacchettini. U.S. Patent No. 5,648,392, Issue Date: July 15, 1997.

Identification of Mycobacterium Tuberculosis Complex Species. B. Bloom, S. Jurgensen, M. Little, P. Hamilton, P. Riska, J. Chan. U.S. Patent No. 5,656,424, Issue Date: August 12, 1997.

Recombinant Mycobacterial Expression Vehicles and Uses Thereof. B. Bloom, W. Jacobs, Jr., R. Young, R. Davis, R. Husson. Canadian Patent No. 1,339,526, Issue Date: November 4, 1997.

Vectors and Prokaryotes Which Autocatalytically Delete Antibiotic Resistance. W. Jacobs, Jr., S. Haun, M., Hanson, C., Stover, G. Hatfull. U.S. Patent No. 5,736,367, Issue Date: April 7, 1998.

D29 Shuttle Phasmids and Uses Thereof. W. Jacobs, Jr., G. Hatfull. U.S. Patent No. 5,773,267, Issue Date: June 30, 1998.

Method and Compounds for Inhibiting Lipid Biosynthesis of Bacteria and Plants. W. Jacobs, Jr., J. Blanchard, J. Sacchettini. U.S. Patent No. 5,702,935, Issue Date: December 30, 1997, Issue. U.S. Patent No. 5,837,480, Issue Date: November 17, 1998.

Methods and Compositions for Detecting and Treating Mycobacterial Infections Using an INHA Gene. W. Jacobs, A. Banerjee, D. Collins, W. DeLisle, T. Wilson. U.S. Patent No. 5,686,590, Issue Date: 11/11/97. Australian Patent No. 690121, Issue Date: August 6, 1998.

Antimycobacterial Compounds and Method of Using Same. W. Jacobs, Jr., J. Blanchard, J. Sacchettini, R. Bittman. U.S. Patent No. 5,837,732, Issue Date: November 17, 1998.
Mycobacteriophages and Uses Thereof. B. Bloom, W. Jacobs, Jr., R. Davis, R. Young, R. Husson. U.S. Patent No. 5,854,055, Issue Date: December 29, 1998.

Mycobacteriophages and Uses Thereof. B. Bloom, W. Jacobs, Jr., R. Davis, R. Young, R. Husson. U.S. Patent 5,968,733, Issue Date: October 19, 1999.

TM4 Conditional Shuttle Phasmids and Uses Thereof. W. Jacobs, Jr., S. Bardarov, G. Hatfull. U.S. Patent No. 5,972,700, Issue Date: October 26, 1999.

Vector Constructs for the Selection and Identification of Open Reading Frames. W. Jacobs, Jr., S. Daugelat. U.S. Patent No. 5,981,182, Issue Date: November 9, 1999.

L5 Shuttle Phasmids, W. Jacobs, Jr., G. Hatfull, S. Bardarov, R. McAdam. U.S. Patent No. 5,750,384, Issue Date: May 12, 1998. U.S. Patent No. 5,994,137, Issue Date: November 30, 1999.

An EMBCAB Operon of Mycobacteria and Mutations Thereof. W. Jacobs, Jr., J. Musser, A. Telenti. U.S. Patent No. 6,015,890, Issue Date: January 18, 2000.

Recombinant Mycobacterial Auxotrophic for Diaminopimelate. W. Jacobs, Jr., M. Pavelka. U.S. Patent No.6,221,364, B1. Issue Date: April 24, 2001.

INVITED LECTURES:

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|----------------|--|
| March 1988 | Joint Meeting of World Health Organization & Govt. of India on Leprosy, Karigiri, India |
| September 1988 | Fourth International Colloquium on the Mycobacteria, State of the Art Lecture, Institut Paris, Paris France |
| May 1989 | ASM Meeting, Convener and Speaker, Mycobacterial Genetics, New Orleans, LA |
| May 1989 | TransGene/Institut Merieux, Symposium on Vaccines of the Future, Annecy, France |
| July 1989 | Keystone Symposium on Microbial Pathogenesis, Vail, CO |
| March 1990 | WHO/Germany Meeting on Advances on Novel Vaccine Approaches, Ulm, Germany |
| October 1990 | Frontiers in Mycobacteriology: Immunobiology of Mycobacterial Infections, Vale, CO |
| May 1991 | ASM Meeting, Dallas, TX Convener of Mycobacterial Genetics Symposium |
| February 1992 | Joint Meeting of WHO & Govt. of Spain: Working Towards New and Improved Vaccines, Madrid, Spain |
| September 1992 | Smith-Kline Beecham Anti-Infectives Conference, Tuscon, AZ |
| October 1992 | Infectious Disease Society Meeting, Los Angeles, CA |
| November 1992 | First World Congress on Tuberculosis, Plenary Lecture, Washington, DC |
| February 1993 | Microbial Pathogenesis Club, Boston, MA |
| March 1993 | Microbial Pathogenesis Course, Rockefeller University |
| April 1993 | Meharry Medical College, Recent Advances in the Immunobiology and Biochemistry of Tropical Diseases, Nashville, TN |
| May 1993 | Recombinant Vectors in Vaccine Development, Albany, NY |
| May 1993 | American Thoracic Society's Annual Meeting, Convener and Speaker, Los Angeles, CA |

May 1993 American Society for Microbiology, Convener and Speaker for two Sessions - Multi-Drug Resistant Tuberculosis, Mycobacterial Genetics, Atlanta, GA

May 1993 Symposium dedicating the opening of the Microbiology and Immunology Research Facility, Emerging Pathogens, University of Alabama at Birmingham, Birmingham, AL

June 1993 American Society of Clinical Laboratory Microbiologists, New Haven, CT

July 1993 Second International Conference on Mycobacterial Pathogenesis, Stockholm, Sweden

July 1993 Roussel Round Table Conference on Drug Resistance, Versailles, France

July 1993 Gordon Conference on Microbial Populations and Evolution, Colby Sawyer College

August 1993 Science INNOVATION Conference, Boston, MA

September 1993 Molecular Mechanisms of Drug Resistance, Albany, NY

October 1993 ICAAC Meeting, Convener and Speaker on Session on Multi-Drug-Resistant Tuberculosis, New Orleans, LA

May 1994 American Society of Microbiologists Annual Meeting, Las Vegas, NV, Invited Speaker for two Symposia; Intracellular Growth of Mycobacteria and Uses of Luciferase.

August 1994 Molecular Biology of Phage and Bacteria, Chair and Speaker in Bacterial Surfaces Symposium, Madison, WI

September 1994 Annual Meeting of the Laboratory of Tumor Cell Biology, National Institutes of Health, Spoke on the MDR-TB at the AIDS Conference

October 1994 ICCAC and IDSA, Speaker in Drug Resistance Symposium, Orlando, FL

February 1995 Keystone Meeting - Tuberculosis - Tammarron, CO Symposium speaker on Molecular Genetics of Mycobacteria

May 1995 American Society of Microbiology Annual Meeting, Washington, DC. Convener and Speaker in Symposium on Molecular Analysis of Mycobacterial Pathogenesis and Speaker in Symposium on Uses of Phages in Diverse Bacteria

June 1995 Child Health 2000, World Conference of Pediatricians, Speaker on Symposium on Drug-Resistant Pathogens, Vancouver, Canada

August 1995 Advanced Bacterial Genetics Course, Cold Spring Harbor, Speaker

November 1995	Institute of Medicine and New York Academy of Science Joint Symposium - Inside Urban Health , New York, NY; Science for Combating Tuberculosis
March 1996	Keystone Meeting on Drug Resistance, Mechanisms of Isoniazid Resistance, Vail, CO
May 1996	Herman C. Lichstein Symposium, Cincinnati, Ohio - Speaker on Tuberculosis Control: Beyond Isoniazid and BCG
June 1996	13th International Convocation on Immunology, Buffalo, New York- Speaker on Molecular Strategies for Identifying Genes of M. tuberculosis
July 1996	Microbial Ecology & Infectious Disease Conference, Bethesda, MD
September 1996	Infectious Diseases Society of America, New Orleans, LA
September 1996	World Health Organization, Genetic Systems for Mycobacteria, Geneva, Switzerland
October 1996	New York Biotechnology Association's New Science in NY Symposium; Beyond BCG: The New Tuberculosis Vaccine
October 1996	Vaccines 2000; Challenge for a New Tuberculosis Vaccine
December 1996	Ernst A.H. Friedheim Memorial Lecture; Tuberculosis Control: Beyond Isoniazid & BCG, Rockefeller University, NY
March 1997	Center for Tropical Diseases/WHO Collaborating Center; University of Texas Medical Branch; Tuberculosis Control: Beyond Isoniazid and BCG
April 1997	Uniformed Services University of Health Sciences; Guest Lecturer and Seminar Speaker on Pathogenic Mechanisms
April 1997	Temple University, Philadelphia, PA; 1997 Philadelphia Infection & Immunity Forum; Tuberculosis Control: Beyond Isoniazid and BCG
April 1997	National Institutes of Health; National Cooperative Drug Discovery Groups for Opportunistic Infections Focus on Mycobacteria
May 1997	National Vaccine Advisory Committee "TB Vaccines – Barriers & Opportunities Speaker on Vaccine Options
May 1997	Whitehead Institute/Museum of Science Biomedical Series. "Emerging Plagues: The Evolution of Tomorrow's Epidemics"
July 1997	Chair of American Society of Microbiology-sponsored meeting, "Tuberculosis: Past, Present & Future" held in Copper Mountain, Colorado; July 8-12, 1997
September 1997	Keynote Speaker at Microbial Pathogenesis & Host Response Meeting, Cold Spring Harbor Laboratory, Cold Spring, New York

October 1997	Tuberculosis in Africa - The Promise of Scientific Advances; International Conference on Scientific Advances in Tuberculosis, Kampala, Uganda
December 1997	Freidheim Memorial Lecture; Rockefeller University, NY
January 1998	Hooper Memorial Lecture Seminar, University of California at San Francisco
February 1998	The 19th Annual Darwin Festival; Controlling Multi-Drug Resistant Tuberculosis: Finding Gold in Soil and Cow Dung. Salem State College
March 1998	Keystone Symposium on TB: Molecular Mechanisms and Immunologic Aspects; Keystone, Colorado
March 1998	International Glaxo Wellcome Action TB Conference 1998; Cape Town, South Africa
June 1998	48th Annual Meeting of the Canadian Society of Microbiologists; University of Guelph, Ontario
August 1998	1998 International Symposium On TB Vaccines; San Francisco
October 1998	Life Sciences Symposium; Dartmouth Medical School
November 1998	The University of Texas-Houston Medical School Seminar Series
January 1999	"New and Emerging Therapies: Cancer Vaccine Biology" Speaker at Cancer Center Retreat, Briarcliff, NY
February 1999	"Combating Multi-Drug Resistant Tuberculosis: The New York City Lotto Paradigm" Seminars at Columbia University and Yale University
February 1999	"New Drugs and Vaccines for Tuberculosis: Lessons from Isoniazid" Seminar at Glaxo Wellcome, London
July 1999	"Approaches for Development of New More Efficient Vaccines" – Fourth International Conference on the Pathogenesis of Mycobacterial Infections, Stockholm, Sweden
September 1999	"New Tools to Enhance Expression for Foreign Genes in BCG and How They Might be Used to Develop Vaccines for Diseases such as HIV and Malaria" - Twelfth Meeting of the Steering Committee on New Vaccination Approaches, WHO Headquarters, Geneva, Switzerland
October 1999	"Lipid Metabolism: A Life and Death Struggle for the Tubercle Bacillus" - Discovery Research Meeting sponsored by Wyeth-Lederle Laboratories, Lake George, New York
January 2000	Guest Lecturer, Department of Microbiology and Immunology - "Lipid Metabolism: The Life and Death Struggle of the Tubercle Bacilli,"

Uniformed Services University of the Health Sciences, Bethesda, Maryland.

February 2000 Course Lecturer: Molecular Basis of Microbial Pathogenesis, College of Physicians and Surgeons, Columbia University, New York, NY.

February 2000 Grybowski Lecture - Tuberculosis: Moving from Control to Elimination. Obstacles and Opportunities - A Program of the International Union Against Tuberculosis and Lung Disease, North American Region. Sheraton Wall Centre Hotel, Vancouver, BC

March 2000 Invited Lecturer, New York University Medical Center, New York, NY.

March 2000 Invited Lecturer, The Catholic University, Washington, DC.

May 2000 Invited Speaker and Convener: ASM 100th General Meeting – “Mycobacterium tuberculosis and Its Interaction with Its Environment”, Los Angeles, CA.

June 2000 Advanced Bacterial Genetics Course Lecturer - “The Power of Bacterial Genetics: A 1914-D Penny, Lotto, Tuberculosis Control and Beyond” Cold Spring Harbor Laboratories, Cold Spring Harbor, New York.

August 2000 Third International Conference on Mycobacterium bovis - TB Vaccine Development, St. John’s College, Cambridge, United Kingdom

August 2000 The Nobel Symposium No. 114. - “Prevention and Treatment of Tuberculosis in the Coming Century”, Karolinska Institutet, Stockholm, Sweden.

October 2000 Distinguished Lecture Series - “The Mechanism of Action of Isoniazid in Mycobacterium tuberculosis: Implications for tuberculosis and Malaria,” Harvard School of Public Health, Boston, Massachusetts.

October 2000 Guest Lecturer, Department of Microbiology and Immunology, “Tuberculosis and Its Emergence As A Global Health Emergency” – Uniformed Services University of the Health Sciences, Bethesda, Maryland.

November 2000 Guest Lecturer, Department of Microbiology and Molecular Genetics - “Molecular Genetic Approaches To Control Multi-Drug Resistant Tuberculosis,” University of Medicine and Dentistry of New Jersey, Newark, NJ.

December 2000 Invited Speaker: Workshop on Molecular Approaches to Tuberculosis, “Mycobacterial Genetics and Mycobacteriophages,” Instituto Juan March de Estudios e Investigaciones, Madrid, Spain.

January 2001 Rockefeller University - Infectious Disease Centennial Lecture: “Mycolic Acids of Mycobacterium tuberculosis: An Achilles Heel or a Neutralizing Weapon?” Rockefeller University, New York, NY

- January 2001 Keystone Symposia - Molecular and Cellular Aspects of Tuberculosis in the Post Genome Era. Invited Speaker: "Molecular Approaches to Vaccine Development, and Session Leader: "Vaccine Development and Testing", Taos, New Mexico.
- March 2001 Department of Microbiology, "Mycolic Acids of Mycobacterium tuberculosis: An Achilles Heel or a Neutralizing Weapon?" - University of Illinois at Urbana-Champaign, Illinois.
- March 2001 "Frontiers in Biology" - Sponsored by the Center for Infectious Diseases, Mycolic Acids of Mycobacterium tuberculosis: An Achilles Heel or a Neutralizing Weapon?" - SUNY, Stony Brook, Stony Brook, New York.
- April 2001 Invited Speaker: "Gateway to the Immune System: T Cell Receptor Recognition of Peptide MHC Complexes" - The Trudeau Institute, Saranac Lake, New York
- August 2001 Invited Speaker: "The Streptomyces Influence on Mycobacterial Genetics: Finding Gold in Soil and Zebra Dung" – ISBA Meeting, Vancouver, BC, Canada
- February 2002 Invited Speaker: "TB Vaccines: The Genetic Basis of BCG Attenuation and How to Improve It". Molecular Genetics Seminar Series, Princeton University, Princeton, New Jersey.
- February 2002 Invited Speaker: "Exploiting M. tuberculosis Metabolism: The Mechanism of Bacteriocidal Action of Isoniazid," University of Alabama, Birmingham, Birmingham, Alabama.
- March 2002 Invited Speaker: "TB Vaccines: Understanding the Past to Improve the Future". David Axelrod Institute for Public Health, Albany, New York.
- April 2002 Invited Speaker: "Tuberculosis Vaccines: Understanding BCG and What is Needed to Make a Better TB Vaccine". Committee on Microbiology Seminar Series, University of Chicago, Chicago, Illinois.
- May 2002 Invited Speaker: "Tuberculosis Vaccines," The Anderson Symposium: Plagues of the 21st Century: HIV, Viral Hepatitis, Tuberculosis and Malaria, University of Virginia, Charlottesville, Virginia.
- June 2002 Invited Speaker: "Advances in Molecular Genetics," 4th World Congress on Tuberculosis, Washington, DC.
- July 2002 Invited Speaker: "Unmasking the Lifestyle of the World's Most Effective Pathogen: M. tuberculosis." Yerkes Center at Emory University, Atlanta, Georgia
- November 2002 Invited Speaker: "Unmasking the Lifestyle of the World's Most Effective Pathogen: Mycobacterium tuberculosis." International Symposium in Commemoration of the 159th Birthday of Dr. Shibasaburo Kitasato, 7th

Robert Koch Institute-Kitasato Institute Joint Symposium for Overcoming Infectious Diseases. Kitasato Institute, Tokyo, Japan.

- December 2002 Invited Speaker: "Unmasking the Lifestyle of the World's Most Effective Pathogen: *M. tuberculosis*." University of Pennsylvania, Philadelphia, Pennsylvania.
- February 2003 Invited Speaker: "A 2003 Pathogen Survival Guide: Perspectives from the World's Most Effective Pathogen, *Mycobacterium tuberculosis*." Tufts University, Boston, Massachusetts.
- February 2003 Invited Speaker: "A 2003 Pathogen Survival Guide: Perspectives from the Word's Most Effective Pathogen, *Mycobacterium tuberculosis*." Johns Hopkins, Baltimore, Maryland.
- March 2003 Invited Speaker: "A 2003 Pathogen Survival Guide: Perspectives from the World's Most Effective Pathogen, *Mycobacterium tuberculosis*." University of California at Los Angeles, Los Angeles, California.
- April 2003 Invited Speaker: "A 2003 Pathogen Survival Guide: Perspectives from the World's Most Effective Pathogen, *Mycobacterium tuberculosis*." Cornell University, New York, New York.
- September 2003 Invited Speaker: "Evaluation of a *Mycobacterium tuberculosis* $\Delta leuD/\Delta panCD$ Auxotrophic vaccine candidate," First International Conference on TB Vaccines for the World, Montreal, Canada.
- October 2003 Invited Speaker: "A 2003 Pathogen Survival Guide: Perspectives from the World's Most Effective Pathogen, *Mycobacterium tuberculosis*." Mount Sinai Medical Center, New York, New York.
- November 2003 Invited Speaker: "A 2003 Pathogen Survival Guide: Perspectives from the World's Most Effective Pathogen, *Mycobacterium tuberculosis*." Harvard Medical School, Boston, Massachusetts.
- March 2004 Invited Speaker: The 2004 Pathogens Survival guide: Perspectives from the Worlds Most Successful Pathogen *Mycobacterium tuberculosis* Oklahoma Medical Research Foundation, Oklahoma City, Oklahoma.
- March 2004 Invited Speaker: *Mycobacterium tuberculosis*. Vaccines Symposium In Honor of Professor Ruth S. Nussenzweig on the Occasion of Her Retirement as Chair of Parasitology. New York University School of Medicine, New York, New York.
- March 2004 Invited speaker: The Mechanisms of Bacteriocidal Action of Isoniazid on *Mycobacterium tuberculosis*. Strategic Research Institute. Cherry Hill, New Jersey.
- April 2004 Invited Speaker: Novel Strategies for Vaccine Protection Against *M. tuberculosis*. 2004 Keystone Symposium, Whistler, British Columbia, Canada.

April 2003 Invited Speaker: "A 2003 Pathogen Survival Guide: Perspectives from the World's Most Effective Pathogen, *Mycobacterium tuberculosis*." Cornell University, New York, New York.

March 2004 Invited Speaker: The 2004 Pathogens Survival guide: Perspectives from the Worlds Most Successful Pathogen *Mycobacterium tuberculosis* Oklahoma Medical Research Foundation, Oklahoma City, Oklahoma.

March 2004 Invited Speaker: *Mycobacterium tuberculosis*. Vaccines Symposium In Honor of Professor Ruth S. Nussenzweig on the Occasion of Her Retirement as Chair of Parasitology. New York University School of Medicine, New York, New York.

March 2004 Invited speaker: The Mechanisms of Bacteriocidal Action of Isoniazid on *Mycobacterium tuberculosis*. Strategic Research Institute. Cherry Hill, New Jersey.

April 2004 Invited Speaker: Novel Strategies for Vaccine Protection Against M. tuberculosis. 2004 Keystone Symposium, Whistler, British Columbia, Canada.

April 2004 Invited Speaker: Mycobacterial Vaccines for West Nile Virus and SARS. 10th National Symposium: Basic Aspects of Vaccines, Walter Reed Army Institute of Research, Silver Spring, Maryland.

May 2004 Invited Speaker: Rediscovering Metabolism through the:Drug Isoniazid, ASM Integrating Metabolism and Genomics (IMAGE), Montreal, Quebec.

May 2004 Invited Speaker: The 2004 Pathogens Survival Guide: Perspectives from the World's Most Successful Pathogen, *Mycobacterium tuberculosis*. . University of North Carolina, Chapel Hill, North Carolina.

May 2004 Invited Speaker: 2004 Pathogens Survival Guide: Perspectives from the World's Most Successful Pathogen, *Mycobacterium tuberculosis*. Medicine Grand Rounds, Vanderbilt University, Nashville, TN.

July 2004 Invited Speaker: The 2004 Pathogens Survival Guide: Perspectives from the World's Most Successful Pathogen, *Mycobacterium tuberculosis*. Astrazeneca, Bangalore, India.

July 2004 Invited Speaker: Rediscovering Metabolism: The Mechanism of Action of Isoniazid. Tuberculosis Research Centre, Chennai, India.

September 2004 Invited Speaker: The 2004 Pathogens Survival Guide: Perspectives from the World's Most Successful Pathogen, *Mycobacterium tuberculosis*. University of Notre Dame, Notre Dame, Indiana.

October 2004 Invited Speaker: The 2004 Pathogens Survival Guide: Perspectives from the World's Most Successful Pathogen: *Mycobacterium tuberculosis*.

ASM and Waksman Foundation for Microbiology. Bowling Green, Kentucky.

- November 2004 Invited Speaker: The 2004 Pathogens Survival Guide: Perspectives from the World's Most Successful Pathogen: *Mycobacterium tuberculosis*. 44th Interscience Conference on Antimicrobial Agents and Chemotherapy (ICAAC), Washington, D.C.
- November 2004 Invited Speaker: New Strategies for TB Vaccine Development: Duke University Human Translational Immunology Center Review and Symposium, Durham, North Carolina.
- November 2004 Invited Speaker: The 2004 Pathogens Survival Guide: Perspectives from the World's Most Successful Pathogen: *Mycobacterium tuberculosis*. NYSDOH, Wadsworth Center Division of Genetic Disorders, Albany, NY.
- January 2005 Invited Speaker: The 2005 Pathogens Survival Guide: Perspectives from the World's Most Successful Pathogen: *Mycobacterium tuberculosis*. Grand Rounds, The Children's Hospital at Montefiore, Bronx, NY.
- January 2005 Invited Speaker: The 2005 Pathogens Survival Guide: Perspectives from the World's Most Successful Pathogen: *Mycobacterium tuberculosis*. Tulane National Primate Research Center, Covington, Louisiana.
- January 2005 Invited Speaker: Increasing the Immunogenicity of Recombinant Mycobacterial Vaccines. Vaccine Platforms, Northeast Biodefense Center, Mount Sinai Medical Center, New York City.
- February 2005 Invited Speaker: Strategies to Generate Recombinant Mycobacterial Vaccines for TB, Malaria and HIV. New York Academy of Sciences, New York City.
- February 2005 Invited Speaker: Symposium entitled: The Good, The Bad and the Ugly. AAAS Annual Meeting, Washington, DC.
- February 2005 Invited Speaker: The 2005 Pathogens Survival Guide: Perspectives from the World's Most Successful Pathogen, *Mycobacterium tuberculosis*. North Shore LIJ Institute for Medical Research, Manhasset, NY.
- April 2005 Invited Speaker: The 2005 Pathogens Survival Guide: Perspectives from the World's Most Successful Pathogen, *Mycobacterium tuberculosis*. New York Medical Center, Valhalla, New York.
- June 2005 Invited Speaker: Strategies to Increase Immunogenicity in Live Tuberculosis Vaccines. ASM 105th General Meeting, Atlanta, Georgia.
- June 2005 Invited Speaker: The Exported Weapons Arsenal of *Mycobacterium tuberculosis*. HHMI International Research Scholars Meeting, Merida, Mexico.

- July 2005 Invited Speaker: Isoniazid Mechanism of Action: What We Know and What We Do Not Know. Tuberculosis Drug Development GRC Conference at the University of New England. Biddeford, Maine.
- July 2005 Invited Speaker: Functional Genomics of Mycobacteria. IUMS Meeting. San Francisco, California
- September 2005 Invited Speaker: Viable Vaccines and Vaccine Carriers, Part 1. New Approaches to Vaccine Development. Berlin, Germany.
- September 2005 Invited Speaker: A 2005 Pathogen Survival Guide: Perspective from the World's Most Effective pathogen, *Mycobacterium tuberculosis*. University of Michigan. Ann Harbor, Michigan.
- October 2005 Invited Speaker: From Genetics to the Molecular Mechanism of Action of Isoniazid. Drexel University College of Medicine. Philadelphia, Pennsylvania.
- October 2005 Invited Speaker: Generation of a Safe Live Attenuated *Mycobacterium tuberculosis* Vaccine with Enhanced Immunogenicity. 36th Union World Conference. Paris, France.
- November 2005 Invited Speaker: How Does Mycobacterium tuberculosis Evade Innate and Adaptive Immune Responses? Host Pathogen Interaction and Human Disease Meeting Hosted by *Cell*, Wellcome Trust and MA General Hospital. Cambridgeshire, England.
- January 2006 Invited Speaker: Tuberculosis Drugs, Past, Present, and Future. Vertex Pharmaceuticals. Cambridge, Massachusetts.
- April 2006 Invited Speaker. Tuberculosis: Past, Present and Future. Trinity College, Hartford, Connecticut.
- June 2006 Invited Speaker. The 2006 Pathogen's Survival Guide: Perspectives from the World's Most Successful Pathogen, *Mycobacterium tuberculosis*. Tulane University, Covington, Louisiana.
- June 2006 Invited Speaker. Fulfilling Koch's Corollary for *Mycobacterium tuberculosis*. Cold Spring Harbor Laboratory. Cold Spring Harbor, New York.
- June 2006 Invited Speaker. The five Unassailable Truths of Bacterial Genetics: Elucidating the Mechanism of Action of Isoniazid on Mycobacterium tuberculosis. Cold Spring Harbor Laboratory. Cold Spring Harbor, New York.
- June 2006 Invited Speaker. Mycobacteriophages: The Key to Fulfilling Koch's Corollary for *Mycobacterium tuberculosis*. 2006 NIAID Research Conference. Opatija, Croatia.

July 2006 Invited Speaker. Mycobacteriophages: Their Uses in dispelling the Vampire Hypothesis of Tuberculosis. University of Pittsburgh, Pittsburgh, Pennsylvania.

August 2006 Invited Speaker. Novel technologies for target identification validation in *M. tuberculosis*. San Diego California.

September 2006 Invited Speaker. Pathogenesis of *Mycobacterium Tuberculosis*. Iowa State University "Virulence Mechanisms of Bacterial Pathogens, International Symposium. Ames, Iowa.

September 2006 Invited Speaker. Intelligent design of Tuberculosis Vaccines. Aeras Global TB Vaccine Foundation, Scott J. Thaler Lecture Series. Rockville, Maryland.

November 2006 Invited Speaker. Elucidation of the Immune Evasion functions of *Mycobacterium tuberculosis*. University of Texas Medical branch "The Changing Landscape of vaccine Development: Vaccines for Global Health. Galveston, Texas

January 2007 Invited Speaker. Eradicating Tuberculosis, A War on Two Fronts: Chemotherapy and Immune Evasion Function. Imperial College. South Kensington, London, England.

January 2007 Invited Speaker. Eradicating Tuberculosis: A War on Two Fronts. California State University Program for Education and Research in Biotechnology. Los Angeles, California.

February 2007 Invited Speaker. Eradicating Tuberculosis, A War on Two Fronts: Chemotherapy and Immune Evasion Mechanisms. Arizona State University, Tempe, Arizona.

March 2007 Invited Speaker. TB diagnostics and vaccines. BD Technologies, Research Triangle Park, North Carolina.

March 2007 Invited Speaker. Eradicating Tuberculosis, A War on Two Fronts: Chemotherapy and Immune Evasion Mechanisms. Keystone Symposia. Vancouver, Canada.

April 2007 Invited Speaker. Creating Combined tuberculosis/HIV therapies. Whitehead Institute for Biomedical Research. Cambridge, Massachusetts.

May 2007 Invited Speaker. Tuberculosis genetics and vaccines. Infectious Diseases Meeting. Genomics Institute of Novartis Research Foundation, Siena Italy.

June 2007 Invited Speaker. The next generation of TB vaccines Lessons from Understanding How *M.tuberculosis* Evades the Immune System. University of California Rady Children's Hospital and Health Center, San Diego California.

June 2007	Invited Distinguished Speaker. Eradicating Tuberculosis, A War on Two Fronts: Chemotherapy and Immune Evasion Mechanisms. Humigen, L.L.C., The Institute for Genetic Immunology. Hamilton, New Jersey.
July 2007	Invited Speaker. Killing the Tubercle Bacillus: Strategies to make a better TB Vaccine. Aids in India 2007 a regional workshop-Symposium to enhance HIV/Aids Research. Bangalore, India.
July 2007	Invited Speaker. How Do We Know Anything about Mycobacteria. University of Pittsburgh, Pittsburgh, Pennsylvania.
January 2008	Invited Speaker. Death of Tubercle Bacillus. 2 nd Southeastern Mycobacteria Meeting @ University of Georgia, Athens, Georgia.
January 2008	Invited Speaker. Eradicating tuberculosis, a war on two fronts: chemotherapy & Immune Evasion Mechanisms. Harvard School of Public Health, Boston, Massachusetts.
February 2008	Invited Speaker Targeting mycolic Acid Biosynthesis of Mycobacterium tuberculosis: An Achilles heel of Bacteriocidal Killing and Immune Evasion. University of Princeton, Princeton, New Jersey.
March 2008	Invited Speaker The Death of the Tubercle Bacillus. Case Western Reserve University, Cleveland, Ohio.
April 2008	Invited Speaker The Death of the Tubercle Bacillus. University of Colorado Denver, Denver, Colorado.
April 2008 St. Louis. St.	Invited Speaker Death of the Tubercle Bacillus. Washington University in Louis, Missouri.
June 2008	The Death of the Tubercle Bacillus – There Must Be 50 Ways to Kill the Bug. 2008 Wind River Conference on Prokaryotic Biology. Estes Park and Rocky Mountain National Park.
July 2008	Invited Speaker Sterilizing Immunity Against Tuberculosis. Trudeau Institute, Saranac Lake, New York.
September 2008	Fulfilling Molecular Koch's Postulate: A New Era of Tuberculosis Biology. Congreso Internacional Macobacterias, Bogotá, Columbia.
September 2008	Mycolic Acids: The Signature Molecule of Tubercle Bacilli. Congreso Internacional Macobacterias, Bogotá, Columbia.
October 2008	Recombinant <i>M. smegmatis</i> that Elicits Bacteriocidal Immunity against Virulent <i>M. tuberculosis</i> . Keystone Symposia on Molecular & Cellular Biology. Bangkok, Thailand.

- January 2009 XDR TB – Survival of the fittest. Oregon Health & Science University, Portland, Oregon.
- February 2009 XDR TB – Survival of the fittest. Texas A & M Health Science Center, College of Medicine, College Station, Texas.
- February 2009 Drugs against XDR-TB: Lesson from Isoniazid, Stanford University, Stanford California.
- February 2009 How does Mycobacterium tuberculosis evade killing by Innate and Adaptive Immunity, Stanford University, Stanford, California.
- April 2009 Extremely Drug-Resistant TB – Survival of the Fittest. Western Connecticut State University, Danbury Connecticut.