

Curriculum Vitae

Ralph S. Baric

I. CONTACT INFORMATION:

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II. EDUCATION:

- A. North Carolina State University, Raleigh, North Carolina, B.S., Zoology, 1977
- B. North Carolina State University, Raleigh, North Carolina, Ph.D., Microbiology, 1983
- C. University of Southern California, School of Medicine, Department of Microbiology and Neurology, Post-doctoral Fellow, 1982-1986

III. PROFESSIONAL EXPERIENCE:

- A. Assistant Professor, Department of Parasitology and Laboratory Practice, University of North Carolina at Chapel Hill, March 1986-June 1990
- B. Assistant Professor, Department of Epidemiology, University of North Carolina at Chapel Hill, July 1990-June 1993.
- C. Associate Professor, Department of Epidemiology, University of North Carolina at Chapel Hill, July 1993-2001.
- D. Associate Professor, Department of Microbiology and Immunology, University of North Carolina at Chapel Hill, July 1993-2001
- E. Professor, Department of Epidemiology, Department of Microbiology and Immunology, University of North Carolina at Chapel Hill, July 2002-current

IV. HONORS AND AWARDS:

- A. Full Athletic Scholarship, Swimming, North Carolina State University, 1973-1976
- B. Atlantic Coast Conference Champion and record holder: 500 yard Freestyle, 1000 yard Freestyle, 1650 yard Freestyle, 400 yard Individual Medley, 800 yard Freestyle Relay
- C. Teaching Assistantship, North Carolina State University, 1977-1978
- D. Agricultural Foundation Pre-doctoral Research Assistantship, 1978-1981
- E. Teaching Assistantship, North Carolina State University, 1981-1982
- F. NIH Postdoctoral Fellowship, Neurology Training Grant, 1982-1984
- G. Harvey Weaver Scholar, National Multiple Sclerosis Society Fellowship, 1984-86
- H. Outstanding Young Man of America, 1987
- I. Established Investigator, American Heart Association, 1989-1994
- J. Delta Omega Honor Society, 1990
- K. Editorial Board, Journal of Virology 2004
- L. Nominated World Technology Award Finalist-2004;
- M. World Technology Award Finalist and Member, 2004
- N. Permanent Member, Virology B Study Section; Oct 2005-2009.
- O. Editorial Board, Journal of Virology, 2004-2006, 2007-2011
- P. Editorial Board, Plos Pathogen, 2007-

- Q. Senior Editor-Plos Pathogens 2008-
- R. Member-Biological Sciences Expert Group (BSEG)-
- S. Internal Advisory Board, Pacific Northwest Regional Center for Excellence, 2009-present.
- T. National Academy Sciences: Working Group: Gene Sequence Methods for Classification of Select Agents
- U. Fellow, American Academy of Microbiology, 2010

V. SCIENTIFIC SOCIETIES:

- A. American Society for Microbiology
- B. American Society for Virology

VI. UNIVERSITY AFFILIATIONS:

- A. Lineberger Cancer Center
- B. Biotechnology Center
- C. Curriculum in Genetics
- D. Center for Infectious Diseases
- E. Carolina Vaccine Institute

VII. CONTRACTS AND GRANTS

A. Current Funding

1. **National Institute of Health, Allergy and Infectious Diseases. RO1 AI056351-06. Susceptibility and Protective Immunity to Noroviruses.** 02/01/2009 - 01/31/2014. RS Baric, PI; 20% effort; Total direct cost: \$2,854,241.

- a. Administrative Supplement - 07/01/2009-06/30/2011
Total Direct Cost: \$359,407

This application seeks to study the function of susceptibility alleles in human Norovirus infection. Using a human challenge model, we will determine if individuals initially infected with Norwalk virus develop long-term resistance that protects against subsequent challenge. We will also determine if other Noroviruses use ABH antigens as receptors for docking and entry.

2. **National Institute of Health, Allergy and Infectious Diseases. R01AI075297 SARS-CoV Pathogenic Mechanisms in Senescent Mice.** 4/1/08-3/31/13. Baric, R.S. (PI); 10% effort; Total direct costs: \$1,966,516

The proposal seeks to unravel the host and virological factors present in zoonotic and epidemic strains of the SARS-CoV that contribute to increased morbidity and mortality in the senescent mouse model. We will use reverse genetics to identify genetic determinants in the zoonotic S glycoprotein and replicase that contribute to increased pathogenesis and mortality in senescent mice and identify host factors which are differentially regulated in young and senescent mice that contribute to pathogenesis. The role of select pathways in disease progression will be evaluated with null animals.

- 3. National Institutes of Health, Allergy and Infectious Diseases. RO1. HL080621-01A1. Macaque Model and Gene Expression Profiling of SARS** Michael Katze, PI (University of Washington); RS Baric Subcontract PI. 5% effort. Total direct costs: \$375,000 direct costs/year. 01/01/06-12/30/10.

The proposal seeks to study the pathophysiological consequences of SARS-CoV pathogenesis in the macaque model developed by Ab Osterhaus. Our role on the proposal is to use reverse genetics to a) reconstruct a molecular clone of strain (HKU-39849) and compare the pathogenesis of this recombinant virus to recombinant Urbani. The proposal studies the pathogenesis of these isolates in the macaque model and performs array analysis to identify alterations in gene expression profiles during infection in airway cultures derived from macaques.

- 4. NIAID/NHLB, R21 AI079521-02 Targeted Gene Expression from NL63 Vaccine Vectors (Sims-PI; Baric Co-Investigator, 5% effort)** Total Direct costs: \$275,000. 07/01/08-06/30/11

Dr. Sims develops attenuated, coronavirus vaccine vectors that express influenza hemagglutinin antigens and that protect from lethal influenza virus challenge.

- 5. National Institutes of Health, Allergy and Infectious Diseases. R21/R33 AI 076159-03 Human Coronaviruses as Multigene Mucosal Vaccine Vectors for HIV (Sims-PI; Baric Co-Investigator); Total Direct costs: \$286,661. 04/01/08 - 03/31/13**

This project will provide the first critical evaluation of the potential use of common cold human coronaviruses as live mucosal vaccine vectors for HIV.

- 6. Univ Wash/NIH-Subcontract, R01 HL080621 A Systems biology Approach to Emerging Respiratory Viral Diseases**, PI: M. Katze(UWash) \$16,954,607 (total contract); Baric SubProject: Systems Biology of Lethal and Attenuated SARS-CoV Infection (~\$300,000/yr direct costs). 9/15/08 - 9/14/13.

This project uses a systems genomic and proteomic approach to elucidate the host signaling networks that regulate highly pathogenic respiratory virus induced severe and end-stage lung disease.

- 7. SERCEB U54 AI057157-08 (Sparling, PI; Denison, Project PI; Vanderbilt; Baric, R-Co-PI) 3/1/09 – 2/28/14 Project 1.1. Platforms for the Synthesis and Testing of Emerging Zoonotic Viruses**

The project will use emerging group 1 Bat-CoV, coupled with synthetic genome and gene design, to define conserved determinants of host species movement, adaptation, and pathogenesis in a senescent mouse model.

- 8. SERCEB U54 AI057157-08 (Sparling, PI; De Silva, Project PI; Baric, R-Co-PI). Project 3.2. “Antibody in Protective and Pathogenic Immunity to Dengue Type 3” 3/1/09 – 2/28/14**

9. **PNWRCE U54AI080680-02 (Baric-CoPI) 4/21/09 – 2/28/14**

Project 3.1 Pathogenomics of Severe Respiratory Virus Infection. PI, RS Baric.
Annual total direct costs: \$430,000.

The project uses a systems genetic approach and novel mouse genetic resources, the collaborative cross, to map susceptibility loci regulating SARS-CoV and influenza virus pathogenesis in young mice.

B. Completed

1. **Harvey Weaver Scholar, National Multiple Sclerosis Society.** 7/1/84-5/1/86. Total: \$44,000. Postdoctoral fellow research fellow support. PI: RS Baric
2. **National Institutes of Health, Allergy and Infectious Diseases (AI 23946 years 1-3)**
Studies into the mechanism of MHV transcription. 7/1/86-3/31/90. \$324,000 Direct costs. PI: RS Baric, 40% effort.
3. **National American Heart Association Grant in Aid.** Coronavirus-induced myocarditis in rabbits. July 1987-June 1990. \$29,609 first year; total for three years: \$94,227 (direct costs), PI: RS Baric 10% effort.
4. **Career Development Award from the National American Heart Association, Established Investigator Award "Coronavirus-Induced Rabbit Cardiomyopathy".** Established Investigator-American Heart Association. Direct costs: \$175,000. 7/1/89 - 6/30/94. PI: RS Baric
5. **School of Public Health, BRSB.** Coronavirus-induced myocarditis in rabbits. 1986-1987. \$7,150 Direct costs. PI: RS Baric
6. **School of Public Health, BRSB.** Incidence of the enteric rotaviruses, adenoviruses, and coronaviruses among migrant farm workers. 1987-88. Direct costs \$7,150. PI: RS Baric
7. **School of Public Health, BRSB** Small Instrument Program. Direct costs \$7,477.80. PI: RS Baric. 1989
8. **National American Heart Association Grant in Aid.** "Coronavirus-induced myocarditis and dilated cardiomyopathy. 7/1/90 - 6/30/93. Direct costs \$108,000. PI: RS Baric, 10% effort.
9. **School of Public Health, BRSB.** Development of PCR techniques for detection of HAV and other enteroviruses. 1989 - 1990. Direct costs \$3,200. PI: RS Baric
10. **School of Public Health, BRSB.** Small Instrument Program. \$7,200. (1987), PI: RS Baric
11. **School of Public Health, BRSB.** Small Instrument Program \$6,200. (1988), PI: RS Baric

12. **American Water Works Association.** "Gene probes to analyze for waterborne microorganisms and virus". 10/1/90 - 9/30/92. Direct costs \$150,000/yr (Co-PI with Mark Sobsey ENVR).
13. **National Shellfish Indicator Study.** Detection of human and nonhuman fecal indicators in shellfish and environmental samples. 11/1/90 - 10/30/92. Direct costs \$205,000 (Co-PI with Mark Sobsey, ENVR).
14. **Environmental Protection Agency.** Development of ultra-sensitive gene probes for the detection of HAV and other enteroviruses in environmental samples. Direct costs \$315,000 (Co-PI with Mark Sobsey, ENVR). 6/5/91 - 6/4/93
15. **National Institutes of Health, Allergy and Infectious Diseases.** "Studies into the Mechanism of MHV Replication". 1/1/92 - 12/31/96. Total costs: ~\$895,000. PI: RS Baric, 40% effort. Years 4-8.
16. **North Carolina Biotechnology Center.** Studies into the mechanism for mefloquine resistance in plasmodium falciparum in vitro. 7/1/92 - 12/31/93 \$40,000 direct costs. PI: RS Baric, 5% effort.
17. **World Health Organization.** Molecular screening strategies for antimalarial drugs. 1994-1996, \$75,000 Direct Costs. PI: RS Baric, 10% effort.
18. **North Carolina Biotechnology Center.** "Molecular Methods to detect and control human calicivirus infections" 7/1/2000-12/21/01. \$55,000 total costs. RS Baric, PI 5% effort.
19. **National Institutes of Health, Allergy and Infectious Diseases.** "Studies into the Mechanism of MHV Replication". 7/1/97-6/30/02. Total costs: 1,000,000. PI: RS Baric, 40% effort. Years 9-13.
20. **American Water Works Association Research Foundation.** "Development of a Molecular Method to Detect Infective Viruses." T. Cromeans and M.Sobsey, PI; RS Baric, co-investigator 5% effort. \$250,000 total costs, 1/1/2000-12/31/03.
21. **Environmental Protection Agency.** "Research to Assess the Potential for the Use of Noninvasive Assays to Measure Infections Caused by Exposure to Viral Pathogens in Drinking and Recreational Waters." PI: C.Moe, subproject: to RS Baric. 10/1/01-9/31/03. \$400,000 total costs, 5% effort.
22. **National Institute of Health, Allergy and Infectious diseases.** "Reverse Genetics with a Coronavirus Infectious cDNA Construct." 4/1/2001-3/31/005 \$1.0 million total costs/yr. RS Baric, PI 25% effort. GM 63228
23. **National Institutes of Health, Allergy and Infectious Diseases.** R01. **Remodeling the SARS Coronavirus Genome Regulatory Network.** RS Baric, PI 10% effort. 7/1/04-6/30/09. \$2.1 million.

24. **NIH Southeastern Regional Center for Excellence.** Marburg virus reverse genetics and pathogenesis 12/1/04-11/30/06. \$200,000 total costs. RS Baric, PI 2% effort.
25. **National Institute of Health, Allergy and Infectious Diseases: "Studies into the Mechanism of MHV Replication".** 4/1/03-3/30/08, ~2,000,000 total costs. RS Baric, PI-30% effort. (years 14-19) AI23946, 1 year no cost extension in progress.

This project focuses on identifying the important virus-receptor interactions which mediate Mouse hepatitis virus cross species transmissibility during persistence and in mixed cell cultures in vitro.

26. **NIH AID Supplement 1 and 2: SARS Reverse Genetics.** AI23946-14A1 \$250,000 direct costs. Supplements to develop a full length cDNA of the SARS-CoV and equip a BSL3 laboratory in the School of Public Health, Room 3221D McGaveran Greenberg Hall. RS Baric, 5% effort, PI. 9/1/03-8/30/04.
27. **National Institute of Health, Allergy and Infectious Diseases. Susceptibility and Protective Immunity to Noroviruses.** 7/1/03-6/30/08. RS Baric, PI; 20% effort; 2.3 million total costs. **RO1 AI056351-01.**
28. **National Institutes of Health, Allergy and Infectious Diseases. SARS Reverse Genetics. AI059136-01.** \$1.7 million total costs, RS Baric, PI. 10% effort. 4/1/04-3/31/09.

The project develops a SARS-CoV full length infectious cDNA, the development of SARS-CoV replicon particles expressing heterologous genes, and seeks to adapt SARS-CoV to mice, producing a pathogenic mouse model for SARS-CoV infection.

29. **GC11714-130654 (Engle, PI; Baric, Co-PI) NIH Univ VA-Subcontract** 6/1/08 - 5/31/09. Yeast Based Assays for Chemical Screens Against SARS-CoV Targets

Specific Aims: The ultimate goal of this proposal is to develop a rationale, high throughput yeast-based antiviral screen that identifies small molecule inhibitors that target novel viral genes.

30. **Gillings Foundation. UNC GIL 200710.0017. "Vaccines for Global Health".** Baric, RS PI. Total Direct Costs: \$528,371. 09/01/2008-08/31/2010.
31. **National Institutes of Health, Allergy and Infectious Diseases. P01 AI059443-05. Developing vaccine candidates for the SARS Coronavirus.** RS Baric, PI 30% effort. Total direct costs: \$9,025,984; 5/1/05-1/31/11.

The program project grant enlists Dr. Robert E. Johnston, Dr. Mark Heise, Dr. Nancy Davis from the University of North Carolina at Chapel Hill, Dr. Mark Denison from Vanderbilt University and Dr. Peter Palese from Mt. Sinai School of Medicine to develop vaccine candidates for the SARS-CoV using a combination of molecular genetic approaches to develop live attenuated vaccines and vaccine platforms based on alphaviruses and new castle disease virus. Vaccine efficacy is tested following SARS-CoV infection in mice and ferrets as models.

C. Career Development Awards (Also listed in previous support)

1. **Harvey Weaver Scholar, National Multiple Sclerosis Society.** 7/1/84-5/1/86. \$44,000. Postdoctoral fellow research fellow support. **PI: RS Baric**
2. **Career Development Award from the National American Heart Association, Established Investigator Award "Coronavirus-Induced Rabbit Cardiomyopathy"..** Direct costs \$175,000. 7/1/89 - 6/30/94. PI: RS Baric

D. Mentor: Student/Postdoc Fellowship Awards

1. Lorraine K. Alexander. Rabbit Coronavirus induced myocarditis and dilated cardiomyopathy. \$60,000, Bird Dunn Awardee.(Postdoctoral Fellowship-North Carolina Chapter from the American Heart Association, RS Baric, Mentor
2. Wan Chen. Persistence and evolution mechanisms of Mouse Hepatitis Virus. Pathogenesis Training Grant. Postdoctoral Fellowship Support \$36,000 direct costs. RS Baric, Mentor
3. Kris Curtis, Virology Training Grant 9/1/01-8/30/02. Coronavirus reverse genetics, \$18,000 direct costs, RS Baric, Mentor
4. Patrick Harrington, Virology Training grant 9/1/02-8/30/03. Norovirus capsid-ABH antigen interactions. \$18,000 Direct Costs, RS Baric, Mentor.
5. Will McRoy, Virology Training Grant 9/1/03-8/30/04. Coronavirus Host Shifting Mechanisms. ~\$18,000 Direct Costs. RS Baric, Mentor
6. R.J. Cleveland, Department of Defense, Breast Cancer Research Program. Insulin-like-growth factor 1-gene polymorphisms in breast cancer. Predoctoral fellowship award 4/1/01-3/31/04; \$65,858 total costs. Mentor: M. Gamon, RS Baric and B. Millikan, co investigators.
7. Amy Sims, Postdoctoral Fellowship Award; Pathogenesis Training Grant. 6/1/02-5/30/04. \$75,000/total costs. RS Baric, Mentor
8. Matt Frieman, NIH Postdoctoral Fellowship Award, "SARS-CoV mediated Modulation of Innate Immunity". \$120,000 total costs; Oct 1, 2005-Sept 31, 2008. RS Baric, Mentor
9. Rachael Graham, NIH Postdoctoral Fellowship Award. Rewiring the SARS-CoV Genome. \$120,000 total costs; Oct 2008-2010. RS Baric, Mentor

E. Training Grant Participation at UNC

1. Virology Training Grant (Department of Microbiology, Ronald Swanstrom, Director) 1993-present.

2. Pathogenesis Training Grant (Department of Microbiology and Division of Infectious Diseases; Mike Cohen, Director) 1992-Present.
3. Nutritional Biochemistry and Epidemiology of Cancer (Epidemiology Department; Lenore Kohlmeier, Director). 1997-Present.
4. Environmental and Molecular Epidemiology Training Grant (David Savitz, Director) 1997-present.

VIII. PUBLISHED MANUSCRIPTS:

A. Manuscripts

1. **Baric, R.S.**, Moore, D.B., and Johnston, R.E., 1980. *In vitro* selection of an attenuated variant of Sindbis virus. **Mol. Cell Biol.** 18:685-694.
2. **Baric, R.S.**, Trent, D.W., and Johnston, R.E., 1981. A Sindbis virus variant with a cell determined latent period. **Virology** 110(1):237-242. PMID: 7210508
3. **Baric, R.S.**, Carlin, L.J., and Johnston, R.E., 1983. Requirement for host transcription in the replication of Sindbis virus. **J. Virol.** 45(1):200-205. PMCID: PMC256402
4. **Baric, R.S.**, Lineberger, D.W., and Johnston, R.W., 1983. Reduced synthesis of Sindbis virus negative strand RNA in cultures treated with inhibitors of host transcription. **J. Virol.** 47(1):46-54. PMCID: PMC255196
5. **Baric, R.S.**, Stohlman, S.A., and Lai, M.M.C., 1983. Characterization of replicative intermediate RNA of mouse hepatitis virus: Presence of leader RNA sequences on the nascent chains. **J. Virol.** 48(3):633-640. PMCID: PMC255394
6. Lai, M.M.C., Patton, C.D., **Baric, R.S.**, and Stohlman, S.A., 1983. Presence of leader sequences in mRNA of mouse hepatitis virus. **J. Virol.** 46(3):1027-1033. PMCID: PMC256579
7. Lai, M.M.C., **Baric, R.S.**, Brayton PR and Stohlman, R.A. 1984. Characterization of leader RNA sequences on the virion and mRNAs of mouse hepatitis virus, a cytoplasmic RNA virus. **PNAS** 81(12):3626-3630. PMCID: PMC345271
8. Lai MM, **Baric RS**, Brayton PR, Stohlman SA.1984. Studies on the mechanism of RNA synthesis of a murine coronavirus. **Adv Exp Med Biol.** 1984;173:187-200. PMID: 6331110
9. Olmstead, R.A., **Baric, R.S.**, Sawyer BA and Johnston, R.E., 1984. Sindbis virus mutants selected for rapid growth in cell culture display attenuated virulence in animals. **Science** 225(4660):424-426. PMID: 6204381
10. **Baric, R.S.**, Stohlman, S.A., Razavi, M.K., and Lai, M.M.C., 1985. Characterization of leader-related small RNAs in coronavirus-infected cells: further evidence for leader-primed mechanism of transcription. **Virus Research** 3(1):19-33. PMID: 2992183

11. Lai, M.M.C., **Baric, R.S.**, Makino, S., Keck, J.G., Egbert, J.E., Leibowitz, J., and Stohlman, S.A., 1986. Recombination between non-segmented RNA genomes of murine coronaviruses. **J. Virol.** 56(2):449-456. PMCID: PMC252599
12. **Baric, R.S.**, Shieh, C.K., Stohlman, S.A., and Lai, M.M.C., 1987. Studies into the mechanism of MHV transcription. **Adv Exp Med Virol** 218,137-149. PMID: 2829521
13. **Baric, R.S.**, Shieh, C.K., Stohlman, S.A., and Lai, M.M.C., 1987. Analysis of intracellular small RNAs of mouse hepatitis virus: Evidence for discontinuous transcription. **Virology** 156(2):342-354. PMID: 3027983
14. Lai, M.M.C., Makino, S., **Baric, R.S.**, Soe, L., Shieh, C.K., Keck, J.G., and Stohlman, S.A., 1987. **ICN-UCLA Symp. Mol. Cell Bio. Positive strand RNA viruses.** Vol 54: 285-299.
15. **Baric, R.S.**, Nelson, G., Fleming, J., Deans, R., Keck, J.G., Casteel, N., and Stohlman, S.A., 1988. Interactions between the coronavirus nucleocapsid protein and viral RNAs: Implications in viral transcription. **J. Virol.** 62(11):4280-4287. PMCID: PMC253862
16. Stohlman, S.A., **Baric, R.S.**, Nelson, G., Soe, L., and Deans, B., 1988. Specific Interaction between the coronavirus leader RNA sequences and the nucleocapsid protein. **J. Virol.** 62(11):4288-4295. PMCID: PMC253863
17. **Baric, R.S.**, Edwards, S., Small J.D., 1990. Rabbit cardiomyopathy. **Adv. Exp. Med. Biol.** 276:511-518.
18. **Baric, R.S.**, Fu, K., Schaad, M.C., and Stohlman, S.A., 1990. Establishing a genetic recombination map for murine coronavirus strain A59 complementation groups. **Virology** 177(2):646-656.
19. **Baric RS**, Schaad MC, Wei T, Fu KS, Lum K, Shieh C, Stohlman SA. 1990. Murine coronavirus temperature sensitive mutants. **Adv. Exp. Med. Biol.** 276:349-356. PMID: 1966422
20. Deleon, R., Y.S. Shieh, **R.S. Baric**, and M.D. Sobsey. 1990. Detection of enteroviruses and hepatitis A virus in environmental samples by gene probes and polymerase chain reaction. **J. Am. Water Works Assoc.** 18, 833-853.
21. Schaad, M.C., Stohlman, S.A., Egbert, J., Lum, K., Fu, K. and **Baric, R.S.** 1990. Genetics of MHV transcription: Identification of cistrons required for MHV positive and negative strand RNA synthesis. **Virology** 177(2):634-645. PMID 2164727
22. Shieh, C., **Baric, R.S.**, Sobsey, M., DeLong, R., Ticehurst, J., and Walter, R., 1991. Detection of hepatitis A virus and other enteroviruses in environmental samples using gene probe methods. **J. Virol Methods** 31(19):119-136. PMID:1849914
23. Alexander, L.K., Small, J.D., Edwards, S.W. and **R. S. Baric.** 1992. An experimental model for dilated cardiomyopathy following rabbit coronavirus infection. **Journal Infectious Diseases** 166(5):978-85. PMID:1328411

24. De Leon, R., Sobsey, M.D., Matsui, S.M., **Baric, R.S.**, Herrmann, J.E., Blacklow, N.R., and Greenberg, H.B., 1992. Detection of Norwalk virus in stool specimens by reverse transcriptase-polymerase chain reaction and non-radioactive oligo probes (RT-PCR-OP). **J. Clin. Microbiol.** 30(12):3151-3157. PMID: PMC270605
25. Edwards, W., Small, J.D., Geratz, D., Alexander, L.K. and **Baric, R.S.**, 1992. A model for Virus-induced myocarditis and congestive heart failure in Rabbits. **J. Infectious Diseases** 165(1):134-140. PMID:1309370
26. Fu, K. and **Baric, R.S.** 1992. Evidence for variable rates of recombination in the MHV genome. **Virology** 189(1):88-102. PMID:1318616
27. Baker, S.C, Gao-HQ and **Baric, R.S.** 1993. Altered proteolytic processing of the polymerase polyprotein in RNA(-) TS mutants of mouse hepatitis virus. **Adv. Exp. Med. Biol.** 342:215-9. PMID:8209733
28. Alexander, L.K., Keene, B., Small, J.D. and Yount, B Jr, **Baric, R.S.** 1993. Electrocardiographic changes associated with rabbit coronavirus induced myocarditis and dilated cardiomyopathy. **Adv. Exp. Med. Biol.** 342:365-370. PMID: 8209755
29. Fletcher, L.D., Berger, L.C., Peel, S.A., **Baric, R.S.**, Tidwell, R.R., Dykstra, C.C. 1993. Isolation and identification of three *Pneumocystis carinii* genes utilizing codon bias. **Gene** 129(2):167-174. PMID: 8325503
30. Hughes, S.A., Dension, M.R., Vonilla P., Leibowitz, J.L., **Baric, R.S.**, and Weiss, R.S. 1993. A newly identified MHV-A59 ORf Ia polypeptide P65 is temperature sensitive in two RNA-mutants. **Adv. Exp. Med. Biol** 342:221-6. PMID:8209734
31. Peel, S.A., Merritt, S.C., Handy J., and **R.S. Baric**. 1993. Derivation of highly mefloquine resistant lines from plasmodium falciparum in vitro. **Am J Trop Med Hyg.** 48(3):385-397. PMID: 8470776
32. Schaad, M.C. and **Baric, R.S.** 1993. Evidence for new transcriptional units encoded at the 3' end of the mouse hepatitis virus genome. **Virology** 196(1):190-198. PMID: 8395114
33. Schaad, M.C., Chen, W., Peel, S.A. and **Baric R.S.** 1993. Studies into the mechanism for MHV transcription. **Adv. Exp. Med. Biol.** 342:85-90. PMID: 8209776
34. Fu, K and **Baric R.S.** 1994. Map locations of MHV temperature sensitive mutants: Evidence for variable rates of recombination. **J. Virol.** 68(11):7458-7466. PMID: PMC237188
35. Peel, S.A., Bright, P., Handy, J. and **Baric, R.S.** 1994. Amplification, over expression and mutation in pfmdr1 is critical for Mefloquine, and Halofantrin resistance in *P. falciparum* in vitro. **Am J Trop Med and Hygiene** 51(5):648-658. PMID: 7985758
36. Schaad MC and **Baric RS.** 1994. Genetics of mouse hepatitis virus transcription: Evidence that subgenomic minus strands are functional templates. **J Virol.** 68(12):7458-7466. PMID: PMC237282

37. Chen, W. and **Baric, R.S.** 1995. Function of a 5' end mutation that evolves during persistent MHV infection in vitro. **J. Virol.** 69(12):7529-7540. PMID: PMC189691
38. Alexander, L.K., Keene, B., and Baric, R.S. 1995. Echocardiographic changes following rabbit coronavirus infection. **Adv. Exp. Med. Biol.** 380:113-115. PMID: 8830464
39. Baric, R.S., Fu, K, Chen, W., Yount, B. 1995. High RNA recombination and mutation rates in MHV suggest that coronaviruses may be potentially important emerging viruses. **Adv. Exp. Med. Biol.** 380:571-576.
40. Chen, W. and **Baric, R.S.** 1996. Molecular anatomy of mouse hepatitis virus persistence: coevolution of resistant host cells and more virulent viruses. **J. Virol.** 70(6):3947-3960. PMID: PMC190273
41. **Baric, R.S.** and Schaad, M.C. 1996. Evidence that mouse hepatitis virus subgenomic negative strands are functional templates. **Adv. Exp. Med. Biol.** 380:491-497.
42. Chen, W. and **Baric, R.S.** 1996. Evolution and persistence mechanisms in mouse hepatitis virus. **Adv. Exp. Med. Biol.** 380:63-71.
43. **Baric, R.S.**, Yount, B, Hensley, L, Peel, SA, and W. Chen. 1997. Episodic Evolution Mediates Interspecies Transfer of A Murine Coronavirus. **J. Virol.** 71(3):1946-1955. PMID: PMC191277.
44. Chen, W., V.J. Madden, C.R. Bagnell, Jr. and **R.S. Baric.** 1997. Host-derived intracellular immunization against mouse hepatitis virus infection. **Virology** 228(2):318-332.
45. Shieh, C.Y.S, **R. S. Baric**, and M.D. Sobsey. 1997. Detection of low levels of enteric viruses in metropolitan and airplane sewage. **Applied and Environmental Microbiology** 63(11):4401-4407. PMID: PMC168760
46. Chen, W., B Yount, L Hensley, and **RS Baric.** 1998. Receptor homologue scanning functions in the maintenance of MHV persistence in vitro. **Adv.Exp.Med.Biol.** 440:743-750.
47. Alexander, L.K., Keene, B., Yount, B.L, Geratz, J.D., Small, J.D., **Baric, R.S.** 1998. Electrocardiographic and pathologic changes associated with rabbit coronavirus interaction. **J. Electrocardiol** 32(1):21-32.
48. Hensley, LE and **RS Baric.** 1998. Human biliary glycoproteins function as receptors for interspecies transfer of mouse hepatitis virus. **Adv.Exp.Med.Biol.** 440:43-52.
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152. Wahala WM, Donaldson EF, de Alwis R, Accavitti-Loper MA, **Baric RS**, de Silva AM. 2010. Natural strain variation and antibody neutralization of dengue serotype 3 viruses. **PLoS Pathog.** Mar; 6(3):e1000821. PMID: PMC2841629
153. Xinxia Peng, Lisa Gralinski, Christopher D. Armour, Martin T. Ferris, Matthew J. Thomas, Sean Proll, Birgit G. Bradel-Tretheway, Marcus J. Korth, John C. Castle, Matthew C. Biery, Heather K. Bouzek, David R. Haynor, Matthew B. Frieman, Mark Heise, Christopher K. Raymond, **Ralph S. Baric**, and Michael G. Katze. 2010. Unique Signatures of Long Noncoding RNA Expression in Response to Virus Infection and Altered Innate Immune Signaling. **mBio.** Nov–Dec; 1(5): e00206-10. PMID: PMC2962437
154. Tian P, Yang D, Jiang X, Zhong W, Cannon JL, Burkhardt Iii W, Woods JW, Hartman G, Lindesmith L, **Baric RS**, Mandrell R. 2010. Specificity and kinetics of norovirus binding to magnetic bead-conjugated histo-blood group antigens. **J Appl Microbiol.** Nov;109(5):1753-1762. PMID: 21040268
155. Zornetzer GA, Frieman MB, Rosenzweig E, Korth MJ, Page C, **Baric RS**, Katze MG. 2010. Transcriptomic analysis reveals a mechanism for a profibrotic phenotype in STAT1 knockout mice during severe acute respiratory syndrome coronavirus infection. **J Virol.** 2010 Nov;84(21):11297-309. Epub 2010 Aug 11. PMID: 20702617 [PubMed - in process]
156. LoBue AD, Lindesmith LC, **Baric RS**. 2010. Identification of cross-reactive norovirus CD4+ T cell epitopes. **J Virol.** 2010 Sep;84(17):8530-8. Epub 2010 Jun 23. PMID: 20573810 [PubMed - indexed for MEDLINE]

157. te Velthuis AJ, van den Worm SH, Sims AC, **Baric RS**, Snijder EJ, van Hemert MJ. 2010. Zn(2+) inhibits coronavirus and arterivirus RNA polymerase activity in vitro and zinc ionophores block the replication of these viruses in cell culture. PLoS Pathog. 2010 Nov 4;6(11):e1001176. PMID: 21079686 PMCID: PMC2973827
158. Lindesmith LC, Donaldson EF, **Baric RS**. 2011. Norovirus GII.4 strain antigenic variation. J Virol. 2011 Jan;85(1):231-42. Epub 2010 Oct 27. PMID: 20980508 PMCID: PMC3014165
159. Sheahan T, Whitmore A, Long K, Ferris M, Rockx B, Funkhouser W, Donaldson E, Gralinski L, Collier M, Heise M, Davis N, Johnston R, **Baric RS**. 2011. Successful vaccination strategies that protect aged mice from lethal challenge from influenza virus and heterologous severe acute respiratory syndrome coronavirus. J Virol. 2011 Jan;85(1):217-30. Epub 2010 Oct 27. PMID: 20980507 PMCID: PMC3014161
160. Pirc K, Sims AC, Dijkman R, Jebbink M, Long C, Deming D, Donaldson E, Vabret A, **Baric R**, van der Hoek L, Pickles R. 2010. Culturing the unculturable: human coronavirus HKU1 infects, replicates, and produces progeny virions in human ciliated airway epithelial cell cultures. J Virol. Nov;84(21):11255-63. PMCID: PMC2953148

B. Book Chapters/Invited Comments

1. Lai, M.M.C., **Baric, R.S.**, Brayton, P.R., and Stohlman, S.A., 1984. Studies on the mechanism of RNA synthesis of a murine coronavirus. In: Coronaviruses: Molecular Biology and Pathogenesis. P. Rottier, B. van der Zeijst, W. Spaan, and M. Horzinek, Eds. Plenum, New York.
2. Sobsey, M.D., Shieh, V.S., and **Baric, R.S.**, 1990. Deletion of hepatitis A virus and other enteroviruses in environmental samples using gene probe methods. In: Biotechnology and Food Safety. (Shain-dou Kung, Bills, D.D. and Quantrano, R., Eds.)
3. Schwab, K.J., De Leon, R., **Baric, R.S.** and Sobsey, M.D. (1992). Detection of rotavirus, enteroviruses and HAV by reverse transcriptase-polymerase chain reaction. AWWA WOTC Proceedings, Orlando, FL.
4. Vine, MF, Moe, CL, Hulka, BS, **Baric, RS** and R. Millikan. 1995. On the teaching of Molecular Epidemiology. Epi.Monitor, Aug/Sept.

A. Published Abstracts/Presentations (Selected)

1. Baric, R.S., and Johnston, R.E., 1979. Characterization of a Sindbis virus variant with a host determined latent period. North Carolina Society for Microbiology.
2. Baric, R.S., and Johnson, R.E., 1979. Sindbis virus variant with a cell determined latent period. American Society for Microbiology Annual Meeting, Los Angeles, CA.
3. Baric, R.S. and Johnston, R.E., 1980. In vitro selection of an attenuated variant of Sindbis virus. J. Supramol. Struc. Supplement 4, p.248.

4. Baric, R.S., Carlin, L.J., Lineberger, D.W., Klinger, J.K., and Johnston, R.E., 1980. Inhibitors of host transcription block Sindbis virus replication. North Carolina Society for Microbiology.
5. Baric, R.S., Carlin, L.J., Lineberger, D.W., and Johnston, R.E., 1981. Inhibitors of host transcription block Sindbis virus replication. Annual meeting of the American Society for Microbiology, p.245.
6. Baric, R.S., Carlin, L.J., Lineberger, D.W., and Johnston, R.E., 1981. Inhibitors of host transcription block Sindbis virus replication. Fifth International Congress on Virology, p.383.
7. Baric, R.S., Carlin, L.J., Lineberger, D.W., and Johnston, R.E., 1982. Requirement for host transcription in the replication of Sindbis virus RNA. American Society for Virology.
8. Baric, R.S., Stohlman, S.A., and Lai, M.M.C., 1983. Characterization of replicative intermediate and replicative form RNA of mouse hepatitis virus: Presence of free leader RNA sequences on nascent chains. American Society for Virology.
9. Baric, R.S., Stohlman, S.A., Razavi, M.K., and Lai, M.M.C., 1984. Presence of free leader RNA in MHV infected cell. American Society for Virology.
10. Keck, J.G., Baric, R.S., Stohlman, S.A., and Lai, M.M.C., 1985. Isolation and characterization of MHV RNA recombinants. American Society for Virology, Albuquerque, NM.
11. Lai, M.M.C., Makino, S., Baric, R.S., Soe, L., Shieh, C.K., Keck, J.g., and Stohlman, S.A., 1987. RNA positive strand viruses. ICN-UCLA Symposium, Keystone, CO.
12. Baric R.S., Soe, L., Shieh, C.K., Stohlman, S.A., and Lai, M.M.C., 1986. Studies into the mechanism of MHV transcription. ICN-UCLA Symp. Positive-stranded RNA Viruses Meetings, Keystone, CO
13. Baric, R.S., Soe, L., Shieh, C.K., Stohlman, S.A., and Lai, M.M.C., 1986. Studies into the mechanism of MHV transcription. Third International Coronavirus Symposium.
14. Small, J.D., Soukup, J., Woods, R.D., Gambling, R.M., and Baric, R.S., 1987. Coronavirus-induced cardiomyopathy in rabbits. Seventh International Congress of Virology, Edmonton, Canada.
15. Small, J.D., Soukup, J., Woods, R.D., Gambling, T.M., and Baric, R.S., 1987. Coronavirus-induced cardiomyopathy in rabbits. American Society for Virology, Chapel Hill, NC.
16. Stohlman, S.A., Deans, R., Baric, R.S., Nelson, G., and Lai, M.M.C., 1988. Specific Interactions between the coronavirus nucleocapsid protein and the MHV leader RNA sequences. J. Cell Biochem. Supp. 12C.
17. Small, J.D., Woods, R.D., Soukup, J., Gambling, T.M., and Baric, R.S., 1988. Coronavirus-induced cardiomyopathy in rabbits. International Symposium on Inflammatory Heart Disease. Snowmass, CO.

18. Baric, R.S., Edwards, S., and Small, J.D., 1989. Rabbit Cardiomyopathy. 4th International Coronavirus Symposium, England.
19. Baric, R.S., Egbert, J., Lum, K., and Stohlman, S.A., 1989. Coronavirus temperature sensitive mutants. 4th International coronavirus Symposium, England.
20. Shieh, Y.D.C., Baric, R.S., and Sobsey, M.D., 1989. Development and evaluation of a Hepatitis A virus RNA probe for environmental samples. American Society of Microbiology, New Orleans, LA.
21. Peel, S.A., Merritt, S.C., Bowdre, J.H., and R.S. Baric. Mefloquine resistance in plasmodium falciparum. Southeastern Parasitology Meeting. April 1990.
22. De Leon, R., Shieh, Y.D.C., Baric, R.S. and M.D. Sobsey. Detection of enteroviruses and hepatitis A virus in environmental samples by gene probes and polymerase chain reaction. Nov. 1990, Water Quality Technology Conference, San Diego.
23. De Leon, R., Baric, R.S. and Sobsey, M.D. Detection of enteroviruses, hepatitis A virus and rotavirus by reverse transcriptase-polymerase chain reaction (RT-PCR) and non-radioactive oligoprobes. American Society of Microbiology, Dallas, 1991.
24. Peel, S.A., Bowdre, J.H. and R.S. Baric. 1992. Mutation and amplification in the pfmdr1 gene of P.falciparum is associated with mefloquine and halofantrine resistance. Molecular Parasitology Meetings, Woods Hole, Ma.
25. Fu, K. and R.S. Baric. Variable rates of recombination in the MHV genome. Amer. Society of Virology, Colorado 1992.
26. Alexander, K. and R.S. Baric. Myocarditis and dilated cardiomyopathy following rabbit coronavirus infection. Amer. Soc. Virol., Colorado, 1992.
27. Peel, S.A., Yount, B., and R.S. Baric. A strong association between mutation and amplification in pfmdr1 and mefloquine resistance in P.falciparum. Molecular/Biochemic. Parasitology Meetings, Woods Hole, MA 1993.
28. Baric, R.S. and Schaad, M.A. 1995. Evidence that subgenomic negative stranded RNAs function in MHV transcription. International Positive strand RNA Virus Meetings, The Netherlands.
29. Baric, R.S., Yount, B., Chen, W. and Peel, S.A. 1995. Interspecies transfer of a murine coronavirus. International Positive Strand RNA Virus Meeting, The Netherlands.
30. Baric, R.S., Yount, B., L. Hensley, and S.A. Peel. Interspecies transfer and remodeling the MHV glycoproteins. 1996. Keystone Symposium: Cell Biology of Virus Entry, Santa Fe, New Mexico.
31. Chen, W. and R.S. Baric. 1996. Mechanism of MHV Persistence: Coevolution of increasing host resistance and virus virulence. Keystone Symposium: Cell Biology of Virus Entry, Santa Fe, New Mexico.

32. Gibson, C., D.Rhodes, H.Sum, R.Baric, R.Guerrant, and C.Moe. Human caliciviruses and pediatric gastroenteritis: genetic diversity of small round structured viruses in an urban Brazilian slum. ASV, Montana, 1997.
33. Baric, R.S. and Schaad, M.C. (1996). Evidence that mouse hepatitis virus subgenomic negative strands are functional templates (Quebec, Canada, International Coronavirus Symposium).
34. Baric, R.S., Chen, W., Yount, B., and Fu, K. (1996). High RNA recombination and mutation rates in MHV suggest that coronaviruses may be potentially important emerging viruses. (Quebec, Canada. International Coronavirus Symposium).
35. Alexander, L.K., Keene, B., Yount, B., and Baric, R.S. (1996). Echocardiographic changes following rabbit coronavirus infection. (Quebec, Canada. International Coronavirus Symposium).
36. Chen, W. and Baric, R.S. Evolution and persistence mechanisms in mouse hepatitis virus. (1997). (Quebec, Canada. International Coronavirus Symposium).
37. Hensley, L. and R.S. Baric. 1997. Human Biliary glycoprotein functions as receptors for Interspecies transfer of mouse hepatitis virus. (Madrid, Spain; International Coronavirus Symposium).
38. Hensley, L.E. and R.S. Baric. 1997. Virus receptor interactions and cross species transfer of mouse hepatitis virus. (Madrid, Spain; International Coronavirus Symposium).
39. Chen, W. and R.S. Baric. 1997. Receptor Homologue Scanning Functions in the Maintenance of Mouse Hepatitis Virus Persistence. (Madrid, Spain; International Coronavirus Symposium).
40. Shieh, C.Y.S, R. S. Baric, and M.D. Sobsey. 1998. Detection of low levels of enteric viruses in metropolitan and airplane sewage. American Society for Microbiology.
41. Baric, R.S. 1998. Molecular and Evolutionary Mechanisms of Virus Cross species Transmission. (July 1998, NIH Bethesda--Cross Species Infectivity Meeting)
42. Shieh, Y.-S. C, S.S. Monroe, R.L. Frankhauser, G.W. Langlois, W. Burkhardt, and RS Baric. 1999. Detection of Norwalk-like viruses in shellfish implicated in illness. International Calicivirus Symposium, Atlanta Ga.
43. Shieh, Y.-S, and Baric, RS. 2000. Detection of Norwalk-like viruses in shellfish. American Society for Virology, Colorado, USA.
44. Baric, RS, Harrington, P., Tseng, F., and Moe, C. 2000. Production of Norwalk like viruses from Venezuelan equine encephalitis virus replicon RNAs. American Society for Virology, Colorado, USA.
45. Baric, RS, Curtis, K. and Yount, B. 2000. Development of Coronavirus Infectious cDNAs. International Nidovirus Symposium, New York, USA.
46. Baric, RS and Yount, B. 2000. Subgenomic negative strand function during MHV infection. International Nidovirus Symposium, New York, USA.
47. Baric, RS and Yount, B. 2000. Mechanisms of MHV Persistence. International Nidovirus Symposium, New York, USA.

48. Harrington, P., Moe, C. and Baric, RS. 2001. Mucosal, systemic and cross immunity against Norwalk like viruses. American Society for Virology, Madison, Wis.
49. Baric, RS and Yount, B. 2001. Coronavirus Heterologous Expression Vectors. American Society for Virology, Madison, Wis.
50. Lindesmith, L., Baric, RS and Moe, CL. 2001. Evidence of a protective immune response against Norwalk like viruses. American Society for Virology, Madison, Wis.
51. Curtis, C., Yount, B. and Baric, RS. 2001. Heterologous gene expression from transmissible gastroenteritis virus replicon particles. International Symposium on Positive Strand RNA Viruses, Paris, Fr.
52. Baric, RS, Curtis, K. and Yount, B. 2001. Coronavirus heterologous gene expression vectors. International Symposium on Positive Strand RNA viruses. Paris, Fr.
53. Harrington, P., Moe, C. and Baric, RS. 2001. Systemic, mucosal and heterotypic protection against Norwalk like viruses using Venezuelan equine encephalitis virus replicons. International symposium on positive strand RNA viruses. Paris, Fr.
54. Harrington, P and Baric, RS. NLV Vaccines. Southeastern Virology Meetings, Atlanta GA, April, 2002.
55. Mcroy, W and Baric, RS. Mechanisms of MHV Cross species Transmission. Southeastern Virology Meeting, Atlanta GA, 2002.
56. McRoy, W and Baric, RS. Molecular Mechanisms of MHV Cross Species Transmission, American Society for Virology, Lexington, Ky. July, 2002.
57. Curtis, K, Yount, B and Baric, RS. Development of TGEV Replicon Particles. American Society for Virology, Lexington, Ky. July 2002.
58. Executive decision to stop listing abstracts, but on average we are providing abstracts at a rate of 4-8/yr.

IX. SERVICE

A. Professional Development/Invited Presentations

Selected Invited Presentations:

1. Studies into the Mechanism of MHV Transcription. N.C. State University, November 19, 1987.
2. Studies into the mechanism for MHV transcription, May 1988, Virology Triangle Meeting.
3. Rabbit cardiomyopathy. Glaxo, Research Triangle Park, December 13, 1988.
4. AIDS, SPH Alumni Conference, April 1988.
5. AIDS, AHEC Fayetteville, NC, March 1989.

6. Modern approaches for health risk assessment, SPH Alumni Conference, May 2-3, 1990.
7. Studies into the Mechanisms of MHV Transcription and RNA Recombination. Loyola University, Department of Microbiology, Chicago, Illinois, February 6, 1991.
8. Genetics of MHV transcription. University of Pennsylvania, School of Medicine, Department of Microbiology and Immunology, Philadelphia, Pa. October 1992.
9. Transcription and Recombination Mechanisms of Mouse Hepatitis Virus, Uniformed Services, Department of Microbiology, Bethesda, MD, November 1993.
10. Convener and presenter: Coronavirus RNA transcription and Recombination, International Coronavirus Symposium, Quebec, Canada 1994.
11. Invited Speaker: International Symposium on Positive Strand RNA Viruses. Genetics of Mouse Hepatitis Virus Transcription. The Netherlands, May 26 - June 1, 1995. Audience of 600+
12. Evolutionary Mechanisms of virus persistence and interspecies spread. Univ. Colorado Health Sciences Center, Dept. of Microbiology, Denver, Co. Feb. 1996.
13. Evolutionary Mechanisms of Mouse Hepatitis virus Persistence and interspecies spread. Research Triangle Park, Triangle Virology, NC, April 1996.
14. Molecular Mechanisms of Virus Persistence and Interspecies Traffic. Vanderbilt University, Department of Microbiology, Nashville, Tn. Jan 7, 1997.
15. Invited Speaker: Molecular and Evolutionary mechanisms of virus cross species transmission. Meeting on the Pathogenesis and Cross species Transmission of Viruses. National Institutes of Health. July 1997. Audience of 400+. Part of USDA hearings on the Public Health Concerns of Xenotransplantation and virus cross species transmission. (Bethesda, Md)
16. Molecular Mechanisms of Virus Cross Species Transmission. North Carolina State University, Department of Microbiology, Oct. 1998
17. Coronavirus reverse genetics. Baylor School of Medicine, Department of Microbiology, Houston Tx. April, 2001
18. Coronavirus reverse genetics. Department of Microbiology, University of Tennessee, Knoxville, Tn. April, 2001
19. Invited Speaker: Consequences of gene order rearrangements on coronavirus replication. International Symposium on Positive Strand RNA Viruses. Paris, France. May 27-June 2, 2001. 500 in attendance.
20. Coronavirus vaccine vectors. Department of Microbiology, North Carolina State University, Sept. 2001
21. Coronavirus reverse genetics. Department of Microbiology, East Carolina University, Oct. 2001
22. Combination vaccines against swine nidoviruses. Department of Microbiology and Immunology, School of Veterinary Medicine, Univ. of Minn., Dec. 2001
23. Coronavirus Heterologous gene expression vectors. Department of Microbiology, University of Iowa, Dec. 2001.

24. Coronavirus Heterologous Gene Expression Vectors. Department of Pathobiology, Microbiology and Immunology, Univ. of Texas, Austin. Mar 2002.
25. Invited speaker, Seventh Southeastern Regional Virology Conference, Georgia State University, Atlanta Ga. April 12-14, 2002. ~150 participants
26. Coronavirus Reverse Genetics. Baylor University, Houston Texas. Department of Microbiology and Immunology. April 9, 2001.
27. Coronavirus Reverse Genetics. University of Tennessee, Department of Microbiology and Immunology, Nashville, TN. April 24, 2001.
28. Invited speaker: International Symposium on RNA Positive Strand Viruses, Paris France. May 27th-June 2nd 2001.
29. Coronavirus Reverse Genetics. East Carolina University, Department of Microbiology, Oct 3, 2001.
30. Coronavirus Reverse Genetics. University of Iowa, Department of Microbiology, Nov, 2001.
31. Coronavirus Reverse Genetics. University of Minn. Dec, Department of Path biology, School of Veterinary Medicine. 2002.
32. Coronavirus Reverse Genetics. University of Texas at College Station, Department of Pathology, March 2002.
33. Reverse Genetics using Coronavirus Infectious cDNAs. University of Texas at Galveston, Department of Microbiology and Immunology, Oct 2002.
34. Coronavirus Reverse Genetics. University of Minn, Department of Path biology, School of Veterinary Medicine. December 2002.
35. Coronavirus Reverse Genetics. University of Texas at College Station, Department of Pathology, March 2002.
36. Reverse Genetics using Coronavirus Infectious cDNAs. University of Texas at Galveston, Department of Microbiology and Immunology, Oct 2002.
37. Coronavirus Reverse Genetics. Loyola University School of Medicine, March 2003.
38. Invited Speaker: Engineering the Genomes of Microorganisms. DARPA Meeting on "Synthetic Biology", Menlo Park, California. March 2003.
39. Invited Speaker: Coronavirus Vaccines. NIAID. SARS: Developing a Research Response, May 30, 2003.
40. Invited Speaker: Susceptibility to Norovirus Infections. International Glycoviropology Meeting, Sweden. June 2003.
41. Coronavirus Reverse Genetics. Mount Siani School of Medicine, New York. Sept 9, 2003.
42. University of Colorado, Health Sciences Center. Sept. 2003. SARS Reverse Genetics.
43. Focus Technology: Expert Consultant: Norovirus Pathogenesis and SARS-CoV Pathogenesis, Sept. 2003.
44. World Health Organization: SARS: Oct 29-Nov1, 2003. Geneva Switzerland. Invited Speaker.

45. SARS CoV Pathogenesis and Reverse Genetics. Jan 6-11th, 2004. Keystone Colorado. Invited speaker: Bioterrorism and Emerging Infectious Diseases: antimicrobials, therapeutics and immune modulators.
46. SARS CoV Reverse Genetics. Emory University, Jan 15th, 2004.
47. Cruising with Noroviruses. Southeastern Virology Conference, Atlanta Ga. March 26th-28th, 2004. Keynote Address.
48. SARS-CoV Genome Organization and Replication. American Society for Virology. Invited Speaker, May 24-27th, 2004. New Orleans
49. Cruising with Noroviruses. International RNA Positive Strand RNA Virus Meeting. May 27-30th, 2004. Invited Speaker. San Francisco, Calif.
50. SARS-CoV Reverse Genetics, Beijing, China. July 2004.
51. Invited Seminar Speaker, Sept 29, 2004. University of Virginia. Title: TBA.
52. SARS-CoV Genetics and Pathogenesis, Madrid Spain, Oct 2004.
53. SARS Pathogenesis, Regional Center for Excellence, Durham, NC (Invited speaker). Nov 2004.
54. SARS-CoV Pathogenesis. The US-Japan Cooperative Medical Science Program 40th Anniversary Meeting Kyoto, Japan December 7-10, 2004 (Invited speaker)
55. SARS-CoV Replication and Genetics. Department of Microbiology, University of Utah, Mar, 2005.
56. Coronavirus Reverse Genetics and Pathogenesis, University of Washington, Seattle, WA. April, 2005. (Invited speaker)
57. Synthetic Coronaviruses. Biohacking: Biological Warfare Enabling Technologies, June 2005. Washington, DC. DARPA/MITRE sponsored event. Invited Speaker
58. SARS-CoV Genetics and Pathogenesis. American Society for Virology, College Park, Penn State University. June 2005. "State of the Art Lecturer"
59. SARS-CoV Genetics and Vaccine Development. International Nidovirales Conference, Colorado, June 2005. Invited keynote speaker.
60. Coronavirus Cross Species Transmission Mechanisms. NIH Workshop, Sept 2005. Emergence of new epidemic viruses through host switching. (Invited Speaker).
61. Human Coronavirus Pathogenesis and Genetics. Charles Gould Easton Seminar series, Department of Immunology, University of Toronto. Sept. 2005. (Invited Speaker)
62. SARS-CoV Pathogenesis. Department of Microbiology, UCLA. Sept 2005. (Invited speaker).
63. SARS-CoV Pathogenesis and Replication, University of Pittsburg, 2006.
64. American Society for Virology, Keynote Speaker, July 2006.
65. Synthetic Genomics. March 27-28. Washington, DC. 2006
66. SARS-CoV Pathogenesis. University of Washington, March 7, 2006.
67. Genetics of SARS-CoV Pathogenesis. Vanderbilt University. May 9, 2006.

68. Biosafety and SARS-CoV. American Society for Microbiology, National Meeting Orlando Florida. May 22, 2006.
69. Synthetic biology Workshop. Synthetic Reconstruction of Viral Genomes. June 1, 2006; Washington DC.
70. Plenary Address, American Society for Virology. Madison Wisconsin, July 2006. SARS-CoV Pathogenesis
71. Synthetic Virology. NSAAB Meeting, Washington DC, July 2006
72. SARS-CoV Pathogenesis, University of Kentucky, Sept. 2006.
73. Genetics of SARS-CoV Pathogenesis. SARS Workshop, Paris, Fr. Oct, 2007
74. SARS-CoV Pathogenesis, North Carolina State University, Feb, 2007.
75. Norovirus Pathogenesis, UNC Chapel Hill, Friday Morning ID Seminar, March 2007
76. SARS-CoV Innate Immunity, University of Florida, April, 2007.
77. Norovirus Pathogenesis, Loyola University, Chicago, May 2007.
78. Norovirus Vaccine Design, NIH Food and Waterborne Disease Network Vaccine Development Meeting. Baltimore, Md. May 2007.
79. Synthetic Virology, American Society for Microbiology, Toronto, Ca. May 2007.
80. Rewiring Coronavirus Genomes, Positive Strand RNA Virus Meeting, Washington, DC, May 2007.
81. Genetics of SARS-CoV Pathogenesis and Norovirus Evolution and Pathogenic Mechanisms, University of Madrid, Spain. June 2007.
82. Norovirus Pathogenesis and Vaccine Design. Atlanta GA. SERCEB Planning Meeting. June 2007.
83. Genetics of SARS-CoV Pathogenesis, University of Amsterdam, The Netherlands, June 2007
84. SARS-CoV Pathogenesis, Vaccine Design and Therapeutics, NIH Advisory Meeting and Planning Committee, Oct 1-2, 2007.
85. Norovirus Evolution and Persistence in Human Populations, Invited Speaker, International Calicivirus Meeting, Cancun Mexico, Nov 2007.
86. SARS-CoV Antagonism of Host Innate Immunity, University of Penn, Department of Microbiology, April 2008.
87. Norovirus Evolution and Persistence, Invited Speaker, American Society for Microbiology, Boston, MA June 2008
88. Mechanisms of Coronavirus Cross Species Transmission. American Society for Virology, medical virology working group, July 2008.
89. Norovirus Pathogenic Mechanisms, Louisiana State University, Baton Rouge, Oct 2008.
90. Synthetic Virology, Invited Speaker, Synthetic Biology 4.0, Hong Kong, China. Oct 2009.

91. Synthetic Virology and Biodefense, American Society for Microbiology and Biodefense Meeting, Baltimore Feb 2009. Invited speaker.
92. SARS Pathogenesis Seminar-University of Arkansas-April 2010
93. Synthetic Genomics National RCE meeting. Las Vegas, NV. Invited Speaker. April 2010.
94. Systems Virology Meeting. Madison, WI Invited Speaker. May 2010.
95. Positive Strand Meeting. Atlanta, GA. Invited Speaker. May 2010.
96. System Biology and Immune Response. Veyrier du Lac France. Invited Speaker. June 2010.
97. American Society for Virology. Bozeman Montana. Session Host, 14 presentations. July 2010.
98. NIAID Workshop on Dengue Virus Infection & Immunity. Portland, OR. Invited Speaker. August 2010.
99. PNWRCE Meeting. Invited Speaker. September 2010.
100. SERCEB Meeting. Presenter. October 2010.
101. International Calici Virus Meeting. Santiago, Chile. Keynote address. October 2010.
102. University of Texas, Austin, TX Invited Seminar. October 2010.
103. St. Louis, MO. Invited Seminar November 2010
104. Systems Virology Meeting. Boston, MA. Invited Speaker. November 2010.
105. University of TX. Galveston. Invited Seminar. November 2010.
106. Arterivirus Meeting. Chicago, IL Keynote Speaker. December 2010
107. University of Iowa. Invited Seminar. December 2010.

X. UNC Patent/Invention Reports

- A. US. Patent No. 6,593,111. 2003. Ralph S. Baric, Boyd Yount. Directional Assembly of Large Viral Genomes and Chromosomes.
- B. US Patent No. 7,279,327, 2007. Ralph S. Baric, Boyd Yount, Kristopher Curtis. Methods for Producing Recombinant Coronavirus
- C. Patent Pending. Ralph S. Baric, Kristopher Curtis, Rhonda Roberts, Boyd Yount. Methods and Compositions for Infectious cDNA of SARS Coronavirus.

XI. Grant Review

A. Grant Review-pre1998

1. USDA, Molecular Biology/Gene Animal Structure, 1988-2002
2. NIH AID Ad Hoc reviewer 1992 (1 proposal)
3. Veterans Administration 1992, 1996 (1 proposal each)
4. NIH Evolution of Infectious Diseases, Special ad hoc committee. July 1997

5. Programme de Recherche Fondamentale en Microbiologie et Maladies Infectieuses et Parasitaires French Government 1998 (1 proposal).

A2. Grant Review 1999:

1. NIH MBRS Score: primary reviewer 7 grant applications from University of Puerto Rico MBRS-SCORE PROGRAM, Decide which proposals are submitted to NIH for review
2. Ad hoc reviewer United States Department of Agriculture-Animal Health and well-being
3. Ad hoc reviewer, National Institutes of Health, Experimental Virology Study Section, 1 grant, conference call

A3. Grant Review 2000-2001

1. National Institutes of Health, Genetics Study Section, Feb 2000. Ad hoc
2. National Institutes of Health, Genetics Study Section June 2000. Ad hoc National Institutes of Health, AIDS Vaccines Study Section, Sept. 2000. Conference call
3. National Institutes of Health, Genetics Study Section, Feb 2001. Ad hoc National Institutes of Health, 3. Genetics Study Section June 2001. Ad hoc.
4. Veterans Administration, Virology (March, 2001). Ad hoc.
5. Experimental Virology Study Section. Ad hoc reviewer with 6 grants to review. Oct 15-17, 2001.

A4. Grant Review 2002

1. National Institutes of Health, Genetics Study Section, Feb 2002. Ad hoc
2. AD hoc reviewer, The Wellcome Trust. March, 2002

A5. Grant Review 2003

1. Genetics study section Feb and Oct, 2003. Ad hoc.
2. Experimental Virology, February, 2003. Ad hoc
3. NIH ad hoc review, Poxvirus vaccine program project. Sept 2003.

A6. Grant Review 2004

1. National Institutes of health, Experimental Virology Study Section, Feb 2004. Ad hoc member
2. National Institutes of health, Experimental Virology Study Section, Oct 2004. Ad hoc reviewer
3. National Institutes of health, Experimental Virology Study Section, Mar, 2005. Ad hoc reviewer

A7. Grant Review, 2005-09

1. Permanent Member, Virology B Study Section, Oct 2005-2009. Three Meetings/year in Oct, Feb and June. Average 6-9 grants to review per session.

XII. Other Professional Development

1. NIH MBRS External Review Committee (1999-2010) National Institutes of Health, MBRS SCORE Proposal for the University of Puerto Rico at San Juan. Visit yearly and review the UPR MRBS SCORE NIH PROGRAM PROJECT GRANT (a compilation of 17 NIH grants to a minority institution), recommended and reviewed new grants for submission to NIH as part of MBRS SCORE (5 projects), reviewed individual PI progress (5 funded applications), reviewed UPR research infrastructure and made recommendations to the Chancellor and Dean of the Medical School for enhancing basic and clinical research on campus.
2. Task force on Veterinary Virology-American Society for Virology
3. Veterinary Virology Finance Committee-American Society for Virology
4. Manuscript Review/Editorial Boards:
 - a. Editorial Board, Journal of Virology 2004-2006.
 - b. Editorial board, Journal of Virology, 2007-2010.
 - c. Associate Editor, Plos Pathogen 2007-.
 - d. Senior Editor, Plos Pathogens 2008-
5. University and Department Committees:
 - a. UNC-School of Public Health Shop Committee, 1987-89
 - b. Departmental (Parasitology and Lab Practice) Curriculum Committee, 1987-1990
 - c. Co-Chair, Parasitology Departmental Space Committee, 1987, 1988
 - d. Infectious Disease Program Task Force, 1988
 - e. UNC-School of Public Health Safety Committee, 1988-1989
 - f. Epidemiology Doctoral Program Committee, 1990-95
 - g. Infectious Disease Program Committee, 1990-present
 - h. Epidemiology Laboratory Committee, 1991-present, Chair
 - i. University Recombinant DNA Committee (1996-2001)
 - j. Space Committee (School of Public Health) 1998-2009

XIII. Student and Postdoc Training

A. Current Students-Dissertation Advisor

1. Allison Totura
2. Meagan Bolles
3. Kari Debbink

B. Current Postdoctoral Fellows

1. Dr. Lisa Gralinski, 2008- present
2. Dr. Rachael Graham, 2007- present
3. Dr. Sudhakar Agnihothram, 2009- present
4. Dr. William Messer, 2008-present
5. Dr. Alexandra Schaefer, 2010-present
6. Dr. Vineet Menachery, 2010-present

C. Staff Supported by Baric Laboratory

1. Boyd Yount-1990-present
2. Lisa Lindesmith 1999-present
3. Lisa Phelps 2005-present
4. Jeremy Huynh 2009-present
5. Trevor Scobey 2009-present

D. Dissertation Committee Member

1. John Meschke (ENVR)
2. Fu-Chih Hsu (ENVR)
3. Jin Haw Chou, (EPID)
4. Julie Smith (ENVR)
5. Rebecca Cleveland (EPID)
6. Nicole Gregoricus (ENVR)
7. Amy Pickard (Epid), graduated Spring 2004
8. Jennifer Konnapka (Micro), graduated Spring 2007
9. Cindy Ma (Epid), graduated Spring 2007
10. Jason Simons (M&I) graduated Spring 2010
11. Catherine Cruz (M&I) graduated Spring 2010

E. Former Postdocs

1. Sheila Peel, Senior Researcher, Walter Reed Medical Institute
2. Lorraine Alexander, Research Assistant Professor, Dept. of Epidemiology, UNC Chapel Hill
3. Carol Shieh, Research Scientist, Food and Drug Administration
4. Kirk Prutzman, Food and Drug Administration
5. Damon Deming, Food and Drug Administration,
6. Matthew Friedman, Assistant Professor, Univ. of Maryland
7. Barry Rockx, University of Texas, Galveston
8. Amy Sims, Research Assistant Professor, UNC
9. Dr. Eric Donaldson, Research Assistant Professor, UNC

F. Former Doctoral Students

1. Kristopher Curtis, graduate Fall 2003, Senior Scientist, INDEXX.
2. Patrick Harrington, graduated Fall 2003, FDA
3. Will McRoy (Micro) graduated fall 2006, Assistant Professor
4. Damon Deming (Micro), graduated Spring 2007
5. Lisa Hensley, (Epid) spring 1999, Senior Scientist USAMRIID
6. Mary Schaad (Epid), 1994 Senior Scientist Ambion
7. Kaisong Fu (Epid), 1995 Senior Scientist, RTP,
8. Sheila Peel (Epid), 1995 Research Scientist, Walter Reed Medical Center
9. Anna LoBue (Micro) PhD 2008
10. Eric Donaldson (Micro) PhD 2008
11. Timothy Sheehan (Micro) PhD 2008