

CURRICULUM VITAE

Bruce A. Bunnell, Ph.D.

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ACADEMIC DEGREES:

- 1981-1985 B.S., Purdue University, West Lafayette, Indiana, major in developmental biology.
- 1985-1990 Ph.D., University of Alabama at Birmingham, Birmingham Alabama, major in microbiology (molecular genetics).

PROFESSIONAL EXPERIENCE AND APPOINTMENTS:

- 2002-present Assistant Professor, Center for Gene Therapy, Department of Pharmacology, Tulane University Health Sciences Center.
- 2002-present Director, Center for Gene Therapy, Regional Primate Research Center, Tulane University.
- 2000-2002 Full Member, Comprehensive Cancer Center, The Arthur James Cancer Hospital and Research Institute, The Ohio State University, Columbus, OH.
- 1999-2002 Assistant Professor, Department of Molecular Virology, Immunology, and Molecular Genetics, The Ohio State University, Columbus, OH
- 1999-2002 Assistant Professor, Department of Veterinary Biosciences, College of Veterinary Medicine, The Ohio State University, Columbus, OH
- 1998-2002 Member, Molecular Cellular Developmental Biology Program, The Ohio State University, Columbus, OH.

- 1998-2002 Associate Member, Comprehensive Cancer Center, The Arthur James Cancer Hospital and Research Institute, The Ohio State University, Columbus, OH.
- 1998-2002 Member, RNA Oncogenic Virus Program, Comprehensive Cancer Center, The Arthur James Cancer Hospital and Research Institute, The Ohio State University, Columbus OH.
- 1997-2002 Assistant Professor, Primary Appointment, Division of Molecular Medicine, Children's Research Institute, Department of Pediatrics, College of Medicine and Public Health, The Ohio State University, Columbus, OH.
- 1993-1997 Senior Staff Fellow, Clinical Gene Therapy Branch of the National Human Genome Research Institute, National Institutes of Health, Bethesda, MD.
- 1993-10/1993 Postdoctoral Fellow, Pharmaceutical Research, Parke-Davis/Warner-Lambert, Inc., Ann Arbor, MI.
- 1990-1992 Postdoctoral Fellow, Howard Hughes Medical Institute, University of Michigan Medical Center, Ann Arbor, MI.

PROFESSIONAL SOCIETIES AND HONORS:

American Association for the Advancement of Science
American Society for Hematology
American Society for Gene Therapy
International Society for Experimental Hematology
American Society of Microbiology
Sigma Xi

NIH Excellence in Research Award, 1995
Best Research Award NCHGR, 1994
NIH NRSA Award, 1992
Sigma Xi Graduate Student Research Award, 1990
Bertram Marx Graduate Student Research Award, 1988
UAB Medical School Graduate Fellowship, 1985

PROFESSIONAL ACTIVITIES:

- 2001-present Member, Infectious Disease Committee, American Society of Gene Therapy

2001	Member, Children's Research Institute Brand Awareness Committee
2001	Ad Hoc Member, Molecular Genetics and Oncogenes Study Section, American Cancer Society
2001-2002	Chairman, Institutional Biological and Chemical Safety Committee, CRI
2001-2002	Chairman, Children's Research Institute Retreat Planning Committee
2001	Member, Children's Research Institute Retreat Planning Committee
2000-2002	Member, Graduate Studies Committee, Molecular Virology Immunology and Molecular Genetics, The Ohio State University
2000	Award for Excellence in Retrovirology Planning Committee, Center for Retrovirus Research, The Ohio State University
1999-2000	Member, CRI Seminar Series Planning Committee
1998-2001	Member, Institutional Biological and Chemical Safety Committee, CRI
1995-1997	Member, NIH Gene Therapy Interest Group
1995-1997	Member, Institutional Animal Care and Use Committee, NHGRI, NIH
1995-1997	Member, NCHGR Sequencing Core Advisory Committee
1993	Member, BSL-3 Steering Committee, University of Michigan

AD HOC REVIEWER:

AIDS Research and Human Retroviruses
Journal of Virology
Human Gene Therapy
Gene Therapy
Molecular Therapy
Blood

RESEARCH SUPPORT AWARDED:

Active/Pending	Active
Name of Individual:	Bruce A. Bunnell, Ph.D.
Project Number (Principal Investigator):	R01-AI-47693-01 (Bruce A. Bunnell, Ph.D.)
Source:	National Institutes of Health, NIAID
Title of Project (and/or Subproject):	Intramarrow gene transfer in neonatal rhesus monkeys
Dates of Approved/Proposed Project:	06/01/00 - 3/30/04
Annual Direct Costs / Percent Effort:	287,540 / 20% Effort

Active/Pending
Name of Individual: Bruce A. Bunnell, Ph.D.
Project Number (Principal Investigator): R01-NS-39071-01 (Thomas J. Sferra, M.D.)
Source: National Institutes of Health, NINDS
Title of Project (*and/or Subproject*): Gene therapy for lysosomal storage diseases
Dates of Approved/Proposed Project: 06/01/00 - 03/30/04
Annual Direct Costs / Percent Effort: 250,000 / 20% Effort

Active/Pending
Name of Individual: Bruce A. Bunnell, Ph.D.
Project Number (Principal Investigator): F32 HL10430-01 (John P. O'Rourke, Ph.D.)
Source: National Institutes of Health, NHLBI
Title of Project (*and/or Subproject*): Vectors directing persistent myeloid specific gene expression
Dates of Approved/Proposed Project: 08/01/00 - 07/30/03
Annual Direct Costs / Percent Effort: Sponsor

Active/Pending
Name of Individual: Bruce A. Bunnell, Ph.D.
Project Number (Principal Investigator): SERCA (Garret C. Newbound, D.V.M., Ph.D.)
Source: National Institutes of Health, NCRR
Title of Project (*and/or Subproject*): *In vivo* gene therapy for AIDS
Dates of Approved/Proposed Project: 07/01/99 - 06/30/04
Annual Direct Costs / Percent Effort: Sponsor

Active/Pending
Name of Individual: Bruce A. Bunnell, Ph.D.
Project Number (Principal Investigator): Bruce A. Bunnell, Ph.D.
Source: OSU-CCC
Title of Project (*and/or Subproject*): The development of pseudotyped lentiviral vectors for gene th
Dates of Approved/Proposed Project: 06/01/00 - 06/30/00
Annual Direct Costs / Percent Effort: \$6,200

Active/Pending
Name of Individual: Bruce A. Bunnell, Ph.D.
Project Number (Principal Investigator): Bruce A. Bunnell, Ph.D.
Source: OSU, Seed Grant Program
Title of Project (*and/or Subproject*): Gene Transfer to Hematopoietic Stem Cells *in vivo*
Dates of Approved/Proposed Project: 10/01/98 - 09/30/99
Annual Direct Costs / Percent Effort: \$20,000

MENTORING AND TEACHING ACTIVITIES:

Postdoctoral Fellows:

- 1998-2000: Garret C. Newbound, D.V.M., Ph.D., Primary Postdoctoral Advisor, Division of Molecular Medicine, Department of Pediatrics, The Ohio State University.
Research Scientist Eli Lilly Pharmaceutical Company.
- 1999-present: John O'Rourke, Ph.D., Primary Postdoctoral Advisor, Division of Molecular Medicine, Department of Pediatrics, The Ohio State University.

Graduate Students (Primary Thesis Advisor)

- 2000-present: Amrithraj Nair, Veterinary Biosciences Program, College of Veterinary Medicine, The Ohio State University.
- 2000-present: Hajime Hidaragi, Department of Veterinary Biosciences Program, College of Veterinary Medicine, The Ohio State University.

EDUCATIONAL LECTURES:

Integrated Biomedical Graduate Program 701 (IBGP 701)- Biology of Human Disease 1: Gene Therapy, Fall Quarter (2 hours).

Molecular Virology, Immunology, and Molecular Genetics 600- Evolution of Emerging Viruses, Cell biology of HIV evolution: HIV infection, Immune escape, Molecular pathogenesis, April-May 2001 (8 hours).

Molecular and Cellular Biochemistry 781: Animal Models of Human Diseases-Winter Quarter 2001 (1 hour).

Molecular Virology, Immunology, and Molecular Genetics 814.01, Virology Journal Club, Fall Quarter 2000 (Course Leader).

Cancer Research Summer Research Program- Animals in Biomedical Research, July, 2000.

Molecular Virology, Immunology, and Molecular Genetics 754-Virology- Spring Quarter, 2000 (1 hour).

Molecular Virology, Immunology, and Molecular Genetics 600- Evolution of Emerging Viruses, Cell biology of HIV evolution: HIV infection, Immune escape, Molecular pathogenesis, April-May 2000 (8 hours).

Molecular Virology, Immunology, and Molecular Genetics 814, Virology Journal Club, Fall Quarter 1999 (2 hours).

Molecular Cellular Developmental Biology (MCDB) 800/890 Student Seminar- Faculty Coordinator and Moderator, Fall Quarter, 1999.

Medical Microbiology 600- Evolution of Emerging Viruses, Cell biology of HIV evolution: HIV infection, Immune escape, Molecular pathogenesis, May 1999 (4 hours).

Scientific Judge, 43rd Annual Landacre Day Medical Student Scientific Session, April, 1999.

HIV/AIDS, Science in the Cinema Educational Series, OSU College of Medicine, August 1998

Prospects for Human Gene Therapy, Comprehensive Cancer Center, James Cancer Hospital, Workshop for High School Science Teachers, July 1998.

SERVICE TO PROFESSIONAL SOCIETIES:

2001-present: Member, Infectious Diseases Committee, American Society of Gene Therapy

2001: Member, Abstract Review Committee for the Infectious Diseases and Vaccines, 4th Annual American Society of Gene Therapy Meeting, Seattle, WA, May 2001.

2001: Moderator, Infectious Disease and Vaccine Session, 4th Annual American Society of Gene Therapy Meeting, Seattle, WA, May 2001.

SERVICE ACTIVITIES:

Scientific Judge, Cancer Research Summer Internship Program, Research Symposium, Arthur James Comprehensive Cancer Center, The Ohio State University, August 2000.

Scientific Judge, Governor's Award for Excellence in Biotechnology, State Science Day, Ohio Academy of Sciences, April 2000.

INVITED PRESENTATIONS (Oral Presentations Only):

2002

ABCs of Gene Therapy: Science and Ethics, OSU / High School Cancer Research Partnership Program, Spring Research Symposium, Arthur James Comprehensive Cancer Center, The Ohio State University, January 2002.

The Biology and Applications of Stem Cells. Columbus Metropolitan Club, January 2002.

2001

Stem Cells. Sigma Xi, The Ohio State University College of Medicine and Public Health, November 2001.

Direct *in vivo* gene transfer into hematopoietic progenitor cells of fetal and newborn rhesus macaques. 5th International Meeting on *In Utero* Cell Transplantation and Gene Therapy, Reno, NV, October 28-31, 2001.

The Development of *In Vivo* Gene Therapy for Hematopoietic Stem Cells. Division of Experimental Hematology, Department of Hematology/Oncology, Children's Hospital of Cincinnati, Cincinnati, OH. October 2001.

Stem Cells. Mini-Medical School, The Ohio State University College of Medicine and Public Health, September 2001.

The Development of *In Utero* Gene Therapy Applications. Center for Gene Therapy, Tulane Health Science Center, Tulane University, New Orleans, LA. June 2001.

ABCs of Gene Therapy, High School Teacher Workshop, 4th Annual American Society of Gene Therapy Meeting, Seattle, WA, May 2001.

Comparison of Gene Transfer Efficiency and Gene Expression with HIV-1 and EIAV Derived Lentivirus Vectors. 4th Annual American Society of Gene Therapy Meeting, Seattle, WA, May 2001.

In Vivo Gene Transfer into Fetal, Newborn, and Adult Rhesus Monkey Hematopoietic Cells. 4th Annual American Society of Gene Therapy Meeting, Seattle, WA, May 2001.

In vivo Gene Transfer Efficiency and Biodistribution of Recombinant Retrovirus, Lentivirus, and Adeno-associated Virus (AAV) Vector Systems in Fetal Mice. 4th Annual American Society of Gene Therapy Meeting, Seattle, WA, May 2001.

Lentiviral Vector Gene Transfer Efficiency Using Various Routes of Administration in Fetal Rhesus Monkeys. 4th Annual American Society of Gene Therapy Meeting, Seattle, WA, May 2001.

Human Gene Therapy: Science and Ethics, OSU / High School Cancer Research Partnership Program, Spring Research Symposium, Arthur James Comprehensive Cancer Center, The Ohio State University, May 2001.

In Vivo Gene Transfer into Fetal and Newborn Rhesus Monkey Hematopoietic Cells. Year 2001 Pediatric Academic Societies and American Academy of Pediatrics Joint Meeting, Baltimore, MD, April 29.

The development of *In Utero* Gene Therapy Strategies for the Treatment of Genetic Disorders. Department of Microbiology, Arizona State University, Phoenix, AZ, February 16.

The Analysis of *In Utero* Gene Therapy Strategies for the Treatment of Genetic Disorders. Division of Gene Therapy, Department of Medicine, University of Massachusetts Medical Center, Worcester, MA, February 2.

The Generation of Transgenic Models Using Recombinant Virus Vector Systems. The 3rd annual Comprehensive Cancer Center Meeting. James Cancer Hospital and Solove Research Institute, Dublin, OH, January 24.

2000

The Development And Analysis of *In Utero* Gene Therapy Strategies for the Treatment Of Genetic Disorders. Department of Microbiology and Immunology, State University of New York Health Science Center at Syracuse, Syracuse, NY, November 28.

In Vivo Gene Transfer into Fetal and Newborn Rhesus Monkey Hematopoietic Cells. 4th International Meeting on *In Utero* Cell Transplantation and Gene Therapy, Venice, Italy, October 23-24, 2000.

Fetal Gene Transfer in Rhesus Monkeys: Studies with Viral Vectors using Systemic and Organ-Targeting Approaches. 4th International Meeting on *In Utero* Cell Transplantation and Gene Therapy, Venice, Italy, October 23-24, 2000.

Human gene therapy: science and ethics, OSU / High School Cancer Research Partnership Program, Spring Research Symposium, Arthur James Comprehensive Cancer Center, The Ohio State University.

Transduction Of Neonatal Rhesus Macaque Hematopoietic Progenitor Cells *In Vivo* Using Retrovirus Vectors. Year 2000 Pediatric Academic Societies and American Academy of Pediatrics Joint Meeting, Boston, Massachusetts.

In Utero Gene Transfer To Hematopoietic Progenitor Cells In Fetal Rhesus Macaques Using Retroviral Vector Systems. Year 2000 Pediatric Academic Societies and American Academy of Pediatrics Joint Meeting, Boston, Massachusetts.

1999

In Utero Gene Transfer To Hematopoietic Progenitor Cells In Fetal Rhesus Monkeys Using Retroviral Vectors. 41st Annual Meeting of the American Society of Hematology, New Orleans, LA.

In Vivo Transduction Of Neonatal Rhesus Monkey Hematopoietic Progenitors With Retroviral Vectors. 41st Annual Meeting of the American Society of Hematology, New Orleans, LA.

In Vivo Gene Transfer To Rhesus Macaque Hematopoietic Stem Cells. Human Cancer genetics Division, Arthur James Comprehensive Cancer Center, The Ohio State University.

In Situ Retrovirus-Mediated Gene Transfer To Rhesus Macaque Hematopoietic Stem Cells. Stone Lab Conference. The Ohio State University

Gene therapy for Infectious Diseases, American Society for Gene Therapy 2nd Annual Meeting, Washington, D.C.

The Science of Gene Therapy, High School Research Partnership Symposium, Arthur James Comprehensive Cancer Center, The Ohio State University.

1998

Gene Therapy for HIV Infection, Department of Medical Microbiology and Immunology, The Ohio State University.

Gene Therapy for AIDS, EINSHAC Meeting for Genetics and the Courts, Orleans MA.

Gene Therapy: Promises and Pitfalls, Genome Conference, Circuit Court of Cook County, Chicago, IL.

Inhibition of Simian Immunodeficiency Virus Infection *In Vivo* following Infusion of Autologous Lymphocytes Engineered With Antiviral Genes, 1st Annual Meeting of American Society for Gene Therapy, Seattle WA.

1997

Development of an Animal Model for the Testing of HIV Gene Therapy Strategies, Division of Molecular Medicine, Department of Internal Medicine, University of Michigan Medical Center.

Inhibition of Simian Immunodeficiency Virus Infection *In Vivo* Following Gene Transfer of an Antisense Tat/Rev Retroviral Vector Into Rhesus CD4+ Peripheral Blood Lymphocytes, Department of Veterinary Biosciences, The Ohio State University.

Protection From Simian Immunodeficiency Virus Infection *In Vivo* Following Gene Transfer of an Antisense Tat/Rev Retroviral Vector Into Rhesus CD4+ Peripheral Blood Lymphocytes, 15th Annual Symposium on Nonhuman Primate Models for AIDS, Seattle, WA.

High-Efficiency Gene Transfer Into Non-Human Primate Lymphocytes Permits Testing of Anti-HIV Gene Therapy Strategies *In Vivo*, NCCR Meeting on Non-human Primates as Models Systems for Gene Therapy, New Orleans, LA.

Gene Therapy Prospects and Problems, EINSAC Meeting for Genetics and the Courts, Orleans, MA.

High Efficiency Gene Transfer into Mature Peripheral Blood Lymphocytes: Implications for HIV-1 Gene Therapy, Division Of Molecular Medicine, Department of Pediatrics, The Ohio State University.

High Efficiency Gene Transfer into Mature Peripheral Blood Lymphocytes: Implications for HIV-1 Gene Therapy, Institute for Human Genetics, University of Minnesota.

1996

Transduction and Transplantation of Nonhuman Primate CD34+ Cells Using The Gibbon Ape Leukemia Virus Packaging Cell Line, PG13. Restricted Expression Of The Gibbon Ape Leukemia Virus Receptor To A Subset Of CD34+ Cells That Are Small In Size and Express Both CD38 And Thy-1, 38th Annual Meeting of the American Society of Hematology, Orlando, FL.

In Vivo Protection From Simian Immunodeficiency Virus Infection Following Gene Transfer Of An Antisense Tat/Rev Retroviral Vector Into Rhesus CD4+ Peripheral Blood Lymphocytes, 38th Annual Meeting of the American Society of Hematology, Orlando, FL.

High Efficiency Gene Transfer Into Rhesus CD4+ Peripheral Blood Lymphocytes: A Model For The Evaluation Of HIV-1 Gene Therapies, Gene Therapy Meeting, Cold Spring Harbor Laboratory, September 25-29, 1996, Cold Spring Harbor, NY.

1995

High Efficiency Gene Transfer Into Non-Human Primate Peripheral Blood Lymphocytes, 37th Annual Meeting of the American Society of Hematology, Seattle, WA.

PUBLICATIONS:

1. Humphreys-Beher, M.G., King, F.K., **Bunnell, B.** and Brody, B. (1986). Isolation of biologically active RNA from human autopsy samples for the study of Cystic Fibrosis. *Biotech. and Appl. Biochem.* 8:392-403.
2. Humphreys-Beher, M.G., **Bunnell, B.A.**, Van Tuinen, P., Ledbetter, D.H. and Kidd, V.J. (1986). Molecular cloning and chromosomal localization of human 4 b - galactosyl-transferase. *Proc. Nat'l. Acad. Sci. USA* 83:8918-8922.
3. Kidd, V.J., Fillmore, H., Gregory, P. and **Bunnell, B.A.** (1988). Dominant negative mutation in galactosyltransferase created by over-expression of a truncated cDNA.

- In: Gene Transfer and Gene Therapy. I. Verma, R. Mulligan and A. Beaudet (eds.) pp. 225-234.
4. **Bunnell, B.A.** and Kidd, V.J. (1989). Formation of deletion mutants by polymerase chain reaction. *Technique* 1:103-107.
 5. **Bunnell, B.A.**, Fillmore, H., Gregory, P. and Kidd, V.J. (1989). A dominant negative mutation in two proteins created by ectopic expression of an AU-rich 3' untranslated region. *Somatic Cell and Molec. Genet.* 16:151-162.
 6. **Bunnell, B.A.**, Adams, D.E. and Kidd, V.J. (1990). Transient expression of a p58 protein kinase cDNA enhances mammalian glycosyltransferase activity. *Biochem. and Biophys. Res. Comm.* 171:196-203.
 7. **Bunnell, B.A.**, Heath, L.S., Adams, D.E., Lahti, J.M. and Kidd V.J. (1990). Increased expression of a 58 kDa protein kinase leads to changes in the CHO cell cycle. *Proc. Nat'l. Acad. Sci. USA* 87:7467-7471.
 8. **Bunnell, B.A.**, Askari, F.K. and Wilson. J.M. (1992). Targeted delivery of antisense oligonucleotides into eukaryotic cells. *Som. Cell and Mol. Gen.* 18:559-569.
 9. **Bunnell, B.A.** and Morgan R.A. (1994) Retroviral-mediated Gene Transfer, In: Methods in Molecular Genetics, Molecular Virology Techniques, Part B, (Ed. K.W. Adolph) Academic Press (Orlando, FL).
 10. **Bunnell, B.A.** and Morgan R.A. (1995) AIDS Gene Therapy, In: Drugs of Tomorrow, in press.
 11. **Bunnell, B.A.**, Donahue, R.E. and Morgan, R.A. (1995) High-efficiency gene transfer to human and non-human primate peripheral blood lymphocytes, *Proc. Nat'l. Acad. Sci., U.S.A.*, 92: 7739-7743.
 12. **Bunnell, B. A.** and Morgan, R. A. (1996) Gene therapy for AIDS, *Mol. Cells*, 6: 1-12.
 13. **Bunnell, B. A.** and Morgan, R. A. (1996) Development of retroviral vectors expressing antisense RNA to inhibit replication of the human immunodeficiency virus, In: Antisense Oligodeoxynucleotides and Antisense RNA as Novel Pharmacological and Therapeutic Agents, (Ed. B. Weiss) CRC Press (Boca Raton, FL).
 14. **Bunnell, B. A.**, Metzger, M. E., Byrne, E., Morgan, R. A., and Donahue, R. E. (1996) Efficient in vivo marking of primary CD4+ T lymphocytes in nonhuman primates using a gibbon ape leukemia virus derived retroviral vector. *Blood*, 89: 1987-1995.

15. **Bunnell, B.A.** and Morgan, R.A. (1997) Gene therapy for infectious diseases. *Clin. Micro. Rev.*, 11: 42-56.
16. **Bunnell, B.A.**, Donahue, R., Zink, M.C., Metzger, M.E., Wersto, R., Kirby, M., Unangst, T., Clements, J.E., and Morgan, R.A. (1998) Reduction in SIV replication in rhesus macaques infused with autologous lymphocytes engineered with anti-viral genes. *Nat. Med.*, 4:181-186.
17. Onodera, M., Nelson, D.M., Yachie, A., Jagadeesh, G.Y., **Bunnell, B.A.**, Morgan, R.A., and Blaese, R.M. (1998) Development of improved adenosine deaminase retroviral vectors. *J. Virol.*, 72(3): 1769-1774.
18. Davis, B.R., Bauer, G., **Bunnell, B.A.**, Morgan, R.A., and Schwartz, D.A. (1998) Targeted transduction of CD34+ cells by rev^{TD}-containing retrovirus yields anti-HIV protection of progeny macrophages. *Hum. Gene Ther.* 9: 1197-1207.
19. **Bunnell, B. A.**, Metzger, M. E., Byrne, E., Agricola, B. A., Morgan, R. A., and Donahue, R. E. (1999) *In vivo* gene transfer into non-human primate CD34+ cells using the gibbon ape leukemia virus packaging cell line, PG13. *Gene Ther.* 6: 48-56.
20. **Bunnell, B.A.** (2000) Gene therapy for HIV infection. In: *Introduction to Gene Therapy and Molecular Medicine*. T. Kressina ed., Fitzgerald Science Press, Bethesda, MD.
21. Newbound, G.C., Cooper, J., O'Rourke, J.P., Baskin, C., and **Bunnell, B.A.** (2001) Analysis of safety and gene transfer efficiency of retrovirus producer cell transplantation and readministration for *in situ* gene transfer to rhesus macaque hematopoietic cells. *Exp. Hematol.* 29: 163-173.
22. Tarantal, A.F., O'Rourke, J.P., Case, S.S. Newbound, G.C., Li, J., Lee, C.I., Baskin, C.R., Kohn, D.B. and **Bunnell, B.A.** (2001) Rhesus monkey model for fetal gene transfer: Studies with retroviral-based vector systems. *Mol. Therapy*, 3:128-138.
23. Tarantal, A.F., Lee, C.I., Eckert, J.E., McDonald, R., Plopper C.G., Kohn, D.B., and **B.A. Bunnell.** (2001) Lentiviral vector gene transfer into fetal rhesus monkeys (*Macaca mulatta*): lung-targeting approaches. *Mol. Therapy*, 4:614-621.
24. O'Rourke, J.P., Newbound, G.C., Kohn, D.B., Olsen, J.C., and Bunnell, B.A. (2001) Comparison of gene transfer efficiency and gene expression with HIV-1 and EIAV-derived lentivirus vectors. *J. Virol.*, 76:1510-1515.
25. Morgan, R.A., Walker, R., Carter, C., Natarajan, V., Tavel, J., Bechtel, C., Herpin, B, Muul, L., Zheng, Z., Jagannatha, S., **Bunnell, B.A.**, Fellowes, V., Metcalf, J., Stevens, R., Baseler, M., Leitman, S., Reed, E.J., R. Michael Blaese, R.M., and H.

- Clifford Lane, C.L. (2002) Demonstration of preferential survival of CD4 T-lymphocytes engineered with anti-HIV genes in HIV infected individuals. (Nat. Med., submitted).
26. Baskin, C.R., Newbound, G.C., O'Rourke, J.P., Hilaragi, H., Sferra, T.J., and **Bunnell, B.A.** (2002) Analysis of the *in vivo* gene transfer efficiency of recombinant Moloney murine leukemia virus, HIV-1-based lentivirus, and adeno-associated virus vector systems in fetal mice. (Mol. Therapy, submitted).
27. Tarantal, A.F., Lee, C.I., Li, J., Baskin, C.R., Clark, K.R., Johnson, P.R., and **B.A. Bunnell.** (2002) *In vivo* fetal gene transfer in rhesus monkeys (*Macaca mulatta*) using recombinant adeno-associated virus (rAAV) (in preparation).

HUMAN CLINICAL PROTOCOLS

Co-Investigator, Gene Therapy for AIDS Using Retroviral Mediated Gene Transfer to Deliver HIV-1 Anti-sense TAR and Transdominant Rev Protein to Syngeneic Lymphocytes in HIV-Infected Identical Twins, NHGRI, NIH.