

**Brian Matthew Freed, PhD, FACHI**

**Professor of Medicine and Immunology**

**University of Colorado School of Medicine**

**Executive Director, *ClinImmune Cell and Gene Therapy***

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## EDUCATION AND BOARD CERTIFICATION

Granville High School, Granville, New York (1967-1972)

Colegio Ibitiruna, Governador Valadares, Brazil (1970-71)

B.A. Biology, State University of New York at Plattsburgh (1976)

M.A. Virology, State University of New York at Plattsburgh (1978)

M.S. Immunology, Albany Medical College, Albany, New York (1990)

Ph.D. Immunology, Albany Medical College, Albany, New York (1990)

Diplomate, *American Board of Histocompatibility and Immunogenetics* (1999)

AABB Accredited Director, Umbilical Cord Blood Banking, (2006)

FACT Accredited Director, Stem Cell Processing, *Foundation for Accreditation of Cellular Therapy* (2008)

Director, FDA-licensed public umbilical cord blood banks (FDA Licenses #1855 and #1873)

Fellow, *American College of Histocompatibility and Immunogenetics* (2020)

**PROFESSIONAL ACTIVITIES**

1978-1981 Research Assistant, Department of Medicine, Rhode Island Hospital

1981-1991 Supervisor, Transplantation Immunology Laboratory, Albany Medical College

1984-1990 Assistant Instructor, Department of Surgery, Albany Medical College

1990-1996 Assistant Professor of Surgery, Albany Medical College

1991-1996 Assistant Professor of Immunology and Molecular Genetics, Albany Medical College

1992-1997 Director, Transplantation Immunology Laboratory, Albany Medical College

1992-1997 Assistant Professor of Pharmacology, Albany Medical College

1996-1997 Adjunct Associate Professor of Environmental Health and Toxicology, University at Albany, Albany, New York

1996-1997 Associate Professor of Surgery and Associate Professor of Pathology and Laboratory Medicine, Albany Medical College

1997-2001 Director, Univ Colorado Clinical Immunology and Histocompatibility Lab, Denver, CO

1997-2003 Associate Professor of Medicine and Immunology, University of Colorado School of Medicine, Denver, Colorado

1999-2003 Consulting Director, Kunming Medical College HLA Laboratory, Kunming, P.R. China

2001-present Executive Director, *ClinImmune Cell and Gene Therapy*, University of Colorado Anschutz Medical Campus, Aurora, Colorado

2003-2007 Consultant, Immunological Devices Panel, *US Food and Drug Administration (FDA)*

2003-present Professor of Medicine and Immunology, University of Colorado School of Medicine, Aurora, Colorado

2004-2006 Interim Head, Division of Allergy and Clinical Immunology, University of Colorado School of Medicine, Denver, Colorado

2008-present Member, Immunological Devices Panel, *US Food and Drug Administration (FDA)*

2013-2016 Regional Histocompatibility Representative, *United Network for Organ Sharing*

**PROFESSIONAL AFFILIATIONS**

Sigma Xi Research Honor Society (1976)

American Society for Histocompatibility and Immunogenetics (1983-present)

Adjunct Professor, Miner Institute for Cell Biology and Biotechnology, Chazy, NY (1984-91)

The Transplantation Society (1986-1996)

New York Academy of Science (1987-1997)

The American Society of Transplantation (1993-present)

Credentials Committee, *American Board of Histocompatibility and Immunogenetics* (1993-2003)

Special Reviewer, National Institutes of Health Toxicology Study Section (1994-1995)

The Society of Toxicology (1995-2007)

New York State Certificate of Qualification in HLA and Cellular Immunology (1994-1997)

NIH Special Emphasis Panel, *Hematopoietic Stem Cell Transplantation for Autoimmune Diseases* (1999)

Reviewer for *Journal of Immunology, Transplantation, Journal of Allergy and Clinical Immunology, Toxicological Sciences* and *Toxicology and Applied Pharmacology, Clinical Experimental Immunology*

 NIH Special Emphasis Panel, *NIAID Statistical and Clinical Coordinating Center* (2001)

 NIEHS Special Emphasis Panel, *Training Grant Review* (November 2002)

 Education Committee, *American Society of Histocompatibility and Immunogenetics* (2003-2010)

 Editorial Board, *Journal of Immunotoxicology* (2003-2010)

Member, *American Society for Blood and Marrow Transplantation* (2000-present)

 Member, HRSA/NMDP *Stem Cell Transplant Outcomes Database* Committee (2006-present)

 Member, Cord Blood Committee, *National Marrow Donor Program*

 NCI Special Emphasis Panel, *Inflammation and Lung Cancer* (2007)

 Editorial Board, *Journal of Biological Chemistry* (2008-2013)

 Member, *Systemic Injury by Environmental Exposure NIH Study Section* (2008-2009)

 Associate Editor, *Frontiers in Immunology* (2022-present)

**HONORS, AWARDS AND ACTIVITIES**

Rotary International Exchange Student Scholarship to Brazil (1970-1971)

Graduate Teaching Fellowship, State University of New York Plattsburgh (1976-1978)

Albany Medical College Trustee Scholarship (1986-1990)

Albany Medical College Dean's Award for Excellence in Research (1988)

Albany Medical College Leonard Procita Prize for Most Outstanding Research (1988)

Mayor, *Village of Delanson, New York* (1989-1991)

Diabetes Education Advisory Board, Albany Medical Center (1992-1994)

Board of Directors, *National Kidney Foundation of Northeast New York* (1992-1996)

Secretary, *National Kidney Foundation of Northeast New York* (1993-1994)

Vice President, *National Kidney Foundation of Northeast New York* (1994-1996)

Member, *Duanesburg Central School Board of Education* (1993-1997)

Member, *Admissions Committee of Albany Medical College* (1993-1996)

President, *Duanesburg Central School Board of Education* (1995-1997)

Member, New York State Department of Health HLA Review Commission (1997)

Chairman, 1999 *ASHI Western Regional Meeting*, Keystone, Colorado

Board of Directors, *Donor Awareness Council* (1999-2000)

Member, Medical Advisory Council, *The Donor Alliance* (2000-2004)

Honorary Professor, Kunming Medical College, Kunming, Yunnan Province, China (2001)

University of Colorado Department of Medicine Ph.D. Research and Teaching Award (2007)

**PUBLICATIONS**

1. Freed BM, Patrovic L, Nadon N, Hauser L, Graziadei WD. Role of cytotoxicity and antiviral state in the regulation of interferon synthesis. *Microbiologica* 2:75, 1979.
2. Simon JD, Freed BM, Davignon D, Albala MM. Identification and charac­terization of a soluble suppressor factor in the serum of mice bearing lymphocytic leukemia. *Cell Immunology* 82:163, 1983.
3. Freed BM, Walsh A, Pietrocola D, Laffin R, Lempert N. Early detection of renal allograft rejection by serial monitoring of serum C-reactive protein. *Transplanta­tion* 37:215, 1984.
4. Lempert N, Freed BM, Godlewski J Laffin R, Pietrocola D, Haisch C, Cerilli J. C-reactive protein: an indicator of rejection episode severity in renal allograft recipients pretreated with donor specific transfusions. *Transplant Proc* 17:662, 1985.
5. Rosano TG, Freed BM, Lempert N. Effect of metabolites on therapeu­tic monitoring of cyclosporine by radioimmunoassay versus liquid chromatography. *Clinical Chemistry* 31:936, 1985.
6. Rosano TG, Freed BM, Cerilli J, Lempert N. Immunosuppressive metabolites of cyclosporine in the blood of renal allograft recipients. *Transplantation*42:262, 1986.
7. Freed BM, Mozayeni B, Lawrence DA, Wallach F, Lempert N. N-ethyl­maleimide delays the in vitro human T cell response to mitogens and alloantigens. *Cell Immunology* 101:189, 1986.
8. Freed BM, Rosano TG, Lempert N. In vitro immunosuppressive proper­ties of cyclosporine metabolites. *Transplantation* 43:122, 1986.
9. Rosano TG, Freed BM, Pell MA, Lempert N. Cyclosporine metabolites in human blood and renal tissue. *Transplant Proc* 18:35, 1986.
10. Freed BM, Rapoport R, Lempert N. Inhibition of human T lymphocyte responses by hydrogen peroxide. *Arch Surgery* 122:99, 1987.
11. Rosano TG, Freed BM, Pell MA, Dybas MT, Lempert N. Involvement of cyclo­sporine metabolites in therapeutic monitoring and immunosup­pres­sion. *Transplant Proc* 19:1699, 1987.
12. Freed BM, Rosano TG, Quick C, Lempert N. Effect of cyclosporine metabolites M17 and M18 on proliferation and IL-2 production in the mixed lymphocyte culture. *Transplant Proc* 19:1223, 1987.
13. Lempert N, Laffin RJ, Fitzgerald K, Freed BM. Elevation of serum C-reactive protein levels during graft rejection. *Transplant Proc*19: 1683, 1987.
14. Patterson DA, Rapoport R, Patterson MAK, Freed BM, Lempert N. Hydrogen peroxide mediated inhibition of T-cell response to mitogens is a result of direct action on T cells. *Arch Surgery* 123:300, 1988.
15. Freed BM, Stevens C, Zhang G, Rosano TG, Lempert N. A comparison of the effects of cyclosporine and steroids on human T-lymphocyte responses. *Transplant Proc* 20(suppl 2):233, 1988.
16. Rosano TG, Pell MA, Freed BM, Dybas MT, Lempert N. Cyclosporine and metabolites in blood from renal allograft recipients with nephro­toxicity, rejection, or good renal function. *Transplant Proc* 20:330, 1988.
17. Pell MA, Rosano TG, Brayman KL, Freed BM, Shaw LM, Lempert N. Predomi­nance of native cyclosporine over metabolites in rat blood and tissue. *Transplant Proc* 20 (suppl 2):674, 1988.
18. Freed BM, Patterson DA, Rapoport R, Lawrence DA, Lempert N. Inhibi­tion of human T cell responses by hydrogen peroxide. *Pharmacol Therapeutics*39:267, 1988.
19. Freed BM, Lempert N, Lawrence DA. The inhibitory effects of N-ethylmal­eimide, colchicine, and cytochala­sins on human T cell functions. *Intl J Immunopharmacol­ogy* 11:459, 1989.
20. Rosano TG, Brooks CA, Dybas MT, Cramer SM, Stevens C, Freed BM. Selection of an optimal assay method for monitoring cyclosporine therapy. *Transplant Proc* 22:1125, 1990.
21. Stevens C, Lempert N, Freed BM. The effects of immunosuppressive agents on in vitro production of human immunoglobulins. *Transplan­tation* 51:1240, 1991.
22. Freed BM, Stevens C, Brooks C, Cramer S, Lempert N, Rosano TG. Assessment of the biological activity of cyclosporine metabolites using the human Jurkat T cell line. *Transplant Proc* 23:980, 1991.
23. Freed BM, Lempert N, Lawrence DA. Inhibition of interleukin-2 produc­tion in the human T cell line Jurkat by non-polar maleimides. *Toxicol Appl Pharmacology* 107:173, 1991.
24. Freed BM, Bennett JA, Rosano TG, Brooks C, Cramer SA, Lempert N. Assessment of the in vivo immunosuppressive activity of the major cyclosporine metabolite by leukemia allograft rejection. *Transplan­ta­tion*52:456, 1992.
25. Aubrey MT, Conti DJ, Lempert N, Freed BM. Rapid assessment of islet cell growth and function in vitro by ELISA. *Transplant Proc* 24: 2792, 1992.
26. Conti DJ, Aubrey MT, Lempert N, Freed BM. Human fibroblasts inhibit production of insulin by the HIT-T15 cell line. *Transplant Proc* 24: 2913, 1992.
27. Conti DJ, Freed BM, Lempert N. Prophylactic immunoglobulin therapy improves the outcome of renal transplantation in recipients at risk for primary cytomegalovi­rus disease. *Transplant Proc*25:1421, 1993.
28. Conti DJ, Freed BM, Gruber SA, Lempert N. Prophylaxis of primary cytomegalovirus disease in renal transplant recipients. Arch Surgery129:443, 1994.
29. Aubrey MT, Gallichio M, Amjad I, Dasika U, Conti D, Lempert N, Gruber S, Freed BM. Fibroblasts diminish the insulin secretory response of HIT-T15 cells to glucose. *Transplant Proc* 26:3447, 1994.
30. Gallichio MH, Conti DJ, Lempert N, Gruber SA, Geiselhart L, Freed BM. Calcium-mediated induction of anergy in the Jurkat T cell line. *Transplant Proc* 26:3458, 1994.
31. Conti DJ, Singh TP, Gruber S, Constantino D, Freed BM, Lempert N. Impact of retransplant status on delayed graft function: an analysis of paired kidneys. *Transplant Proc* 27:1070, 1995.
32. Singh TP, Gruber S, Lempert N, Freed B, Conti DJ. Efficacy of cytomegalovirus prophylaxis in renal retransplantation. *Transplant Proc* 27:964, 1995.
33. Conti DJ, Freed BM, Singh TP, Gallichio M, Gruber SA, Lempert N. Preemptive ganciclovir therapy in cytomegalovirus-seropositive renal transplant recipients. *Arch Surgery* 130: 1217, 1995.
34. Gruber SA, Gallichio M, Rosano TG, Hughes SE, Singh TP, Lempert N, Conti DJ, Hasselbarth J, Freed BM, Drusano G. Comparative pharmacokinetics of cyclosporine A and cyclosporine G in renal allograft recipients. *Transplant Proc* 28:892, 1996.
35. Hughes SE, Xiao S, Perera S, Fluno C, Hasselbarth J, Jayasankar V, Singh J, Del Rosario A, Freed BM, Singh TP, Lempert N, Conti DJ, Gruber SA. Local immunosuppression of canine renal allografts with 15-deoxyspergualin. *Transplant Proc* 28:2054, 1996.
36. Gieselhart L, Conti DJ, Freed BM. Ro31-8220, a novel PKC inhibitor, inhibits early and late T cell activation events.  *Transplantation* 61:1637, 1996.
37. Li Q, Geiselhart L, Mittler J, Mudzinski S, Lawrence DA, Freed BM. Inhibition of human T lymphoblast proliferation by hydroquinone. *Tox Appl Pharmacol* 139:317, 1996.
38. Geiselhart LA, Christian T, Minnear F, Freed BM. The cigarette tar component p-benzoquinone blocks T lymphocyte activation by inhibiting interleukin-2 production, but not CD25, ICAM-1 or LFA-1 expression. *Tox Appl Pharmacol* 143:30, 1997.
39. Conti DJ, Shen G, Singh T, Isenberg A, Freed BM. Ganciclovir prophylaxis of cytomegalovirus disease. *Transplant Proc* 29:804, 1997.
40. Li Q, Aubrey MT, Christian T, Freed BM. Differential inhibition of DNA synthesis in human T cells by the cigarette tar components hydroquinone and catechol. *Fund Appl Toxicol*  38:158, 1997.
41. Kasten-Jolly J, Aubrey MT, Conti DJ, Rosano TG, Ross JS, Freed BM. Reversal of hyperglycemia in diabetic NOD mice by human proinsulin gene therapy. *Transplant Proc* 29:2216, 1997.
42. Freed BM, Geiselhart L. Regulation of Transcription by Immunotoxicants. In *Comprehensive Toxicology,* volume 5 (D. A. Lawrence, Ed.), Pergamon, New York, pp.293-303, 1997.
43. Li Q, Kasten-Jolly J, Yen Y, Freed BM. Reversal of hydroquinone-mediated suppression of T cell proliferation by transfection of the M2 subunit of ribonucleotide reductase. *Tox Appl Pharmacol* 150:154, 1998.
44. Isenberg A, Singh TP, Shen GK, Freed BM, Conti DJ. Selective CellCept therapy in high-risk renal transplant recipients. *Transplant Proc* 30:1188, 1998.
45. Yu L, Brewer KW, Gates S, Wu A, Wang T, Babu SR, Gottlieb PA, Freed BM, Noble J, Erlich HA, Rewers MJ, Eisenbarth GS. DRB1\*04 and DQ alleles: expression of 21-hydroxylase antibodies and risk of progression to Addison’s disease. *J Clin Endocrinol Metab* 83:328, 1999.
46. Cohen MD, Schook LB, Oppenheim JJ, Freed BM, Rodgers KE. Alterations in cytokine receptors by xenobiotics. *Toxicol Sciences* 48:163, 1999.
47. Fontenot AP, Falta MT, Freed BM, Newman LS, Kotzin BL. Identification of pathogenic T cells in patients with beryllium-induced lung disease. *J Immunol* 163:1019, 1999.
48. Ouyang Y, Virasch N, Hao P, Aubrey MT, Mukerjee N, Bierer BE, Freed BM. Suppression of human IL‑1β, IL-2, IFN-γ and TNF-α by cigarette smoke extracts. *J Allergy Clin Immunology* 106:280, 2000.
49. Redondo MJ, Kawasaki E, Mulgrew CL, Noble J, Erlich H, Freed BM, Lie BA, Thorsby E, Eisenbarth GS, Undlien DE, Ronningen KS. DR and DQ associated protection from Type I diabetes: comparison of DRB1\*1401 and DQA1\*0102-DQB1\*0602. *J Clin Endocrinol Metab* 85: 3793, 2000.
50. McCue JM, Link KL, Eaton SS, Freed BM. Exposure to cigarette tar inhibits ribonucleotide reductase and blocks lymphocyte proliferation. *J Immunol* 165:6771, 2000.
51. Freed BM, Ouyang Y, McCue JM. Mechanisms of altered transcription by cigarette smoke. *Toxicol Sciences* 59:1, 2001.
52. Supon P, Constantino D, Hao P, Cagle L, Hahn A, Conti DJ, Freed BM. Prevalence of donor-specific anti-HLA antibodies during episodes of renal allograft rejection. *Transplantation* 71:577, 2001.
53. Shpall EJ, Quinones R, Giller R, Zeng C, Barón AE, Jones RB, Bearman SI, Nieto Y, Freed B, Madinger N, Hogan CJ, Slat-Vasquez V, Russell P, Blunk B, Schissel D, Hild E, Malcom J, Ward W, McNiece IK. Transplantation of ex vivo expanded cord blood. *Biol Blood Marrow Transplant* 8:368, 2002.
54. Stringer KA, McCue J, Freed B. Modulation of neutrophil reactive oxygen species production by cigarette smoke extract. *Free Rad Biol Med* 33(suppl 2):S346, 2002.
55. McCue JM, Lazis S, Modiano J, Freed BM. Hydroquinone and catechol interfere with T cell cycle entry and progression through the G1 phase. *Mol Immunol* 39:995, 2003.
56. Aubrey MT, Warnell S, Wedermyer G, Maurer D, Freed BM. HLA-B\*4404: a rare allele with a strong association and unique serology. *Human Immunol* 64:S153, 2003.
57. Cagle LR, Miller SN, Warnell S, Bryan C, Colombe B, Tolleris C, Ting A, Freed B. Analysis of HLA discrepancies in the UNOS/OPTN registry 1995-2001. *Human Immunol* 64:S37, 2003.
58. Stringer KA, Freed BM, Dunn JS, Ayers S, Gustafson DL, Flores SC. Particulate phase cigarette smoke increases MnSOD, NQO1 and Cinc-1 in rat lungs. *Free Rad Biol Med* 37:1527, 2004.
59. McCue J, Freed BM. Measuring lymphocyte transcription factor activity by ELISA. *Current Prot Toxicology* 18:5.1, 2005.
60. Dunn JS, Freed BM, Gustafson DL, Stringer KA. Inhibition of human neutrophil reactive oxygen species production and p67*phox* translocation by cigarette smoke extract. *Atherosclerosis*179:261, 2005.
61. Lambert C, McCue J, Portas M, Ouyang Y, Li J, Rosano TG, Lazis A, Freed BM. Acrolein in cigarette smoke inhibits T cell activation. *J Allergy Clin Immunology* 116:916, 2005.
62. Bill JR, Mack DG, Falta MT, Maier LA, Sullivan AK, Joslin FG, Martin AK, Freed BM, Kotzin BL, Fontenot AP. Beryllium presentation to CD4+ T cells is dependent on a single amino acid residue of the MHC class II β chain. *J Immunology* 175:7029, 2005.
63. Yang Y, Aubrey M, Zhang G, Ji Y, Freed BM. HLA-B\*1586 is a novel hybrid HLA-H15/B22 allele with unique serology and haplotypic associations. *Tissue Antigens* 67:176, 2006.
64. Meyer MA, Dwyer-NieldLD, Hurteau G, Keith RL, Ouyang Y, Freed BM, Kisley LR, Geraci MW, Bonventre JV, Nemenoff RA, MalkinsonAM. Attenuation of the inflammatory response following butylated hydroxytoluene treatment of cytosolic phospholipase A2 null mice. *Am J Physiol Lung Cell Mol Physiol* 290:2160, 2006.
65. Gibney EM, Cagle L, Freed B, Warnell SE, Chan L, Wiseman AC. Detection of donor-specific antibodies using HLA-coated microspheres: another tool for kidney transplant risk stratification.Nephrol Dialysis Transplant 21:2625, 2006.
66. Frazer-Abel A, McCue J, Lazis S, Portas M, Lambert C, Freed BM. Cigarette tar phenols impede T cell cycle progression by inhibiting cyclin-dependent kinases. *Mol Immunol* 44:488, 2007.
67. Lambert C, Li J, Jonscher K, Quintana M, Harvey JA, Freed BM. Acrolein inhibits cytokine gene expression by alkylating cysteine and arginine residues in the NF-κB1 DNA-binding domain. *J Biol Chem* 282:19666, 2007.
68. Mack CL, Falta ML, Sullivan AK, Karrer F, Sokol RJ, Freed BM, Fontenot AP. Oligoclonal expansions of CD4+ and CD8+ T cells in the target organ of patients with biliary atresia. *Gastroenterology* 133:278, 2007.
69. Mustafa S, Aubrey M, Schlichting DG, Atkins F, Leo H, Song B, Talwar H, Freed B, Dreskin SC. Lack of association between HLA Class II alleles and peanut allergy. *J Allergy Clin Immunol* 123: S245, 2009.
70. Dreskin SC, Tripputi MT, Aubrey MT, Mustafa SS, Atkins D, Leo HL, Song B, Schlichting DG, Talwar H, Wang Q, Freed BM. Peanut-allergic subjects and their peanut-tolerant siblings have large differences in peanut-specific IgG that are independent of HLA class II. *Clin Immunology* 137:366-373, 2010.
71. Shang S, Henao-Tamayo M, Bai X, Oberley-Deegan R, Shanley C, Orme IM, Minor M, Lambert C, Freed BM, Iseman MD, Martin RJ, Basaraba RJ, Ordway D, Chan ED. Cigarette smoke exposure increases susceptibility to tuberculosis-evidence from *in vivo* and *in vitro* infection models. *J Infect Disease* 203:1240, 2011.
72. Lang J, Weiss N, Freed BM, Torres RM, Pelanda R. Generation of hematopoietic humanized mice in the newborn Balb/c *Rag2nullIL2rγnull* mouse model: a multivariable optimization approach. *Cell Immunology* 140:102, 2011.
73. Gutman JA, Miller S, Kuenne S, Oppenheim J, Quinones R, Freed BM, Zarlengo G. Cord blood collection after cesarean section improves banking efficiency. *Transfusion* 51:2050, 2011.
74. Freed BM, Schuyler RP, Aubrey MT. Association of the HLA-DRB1 epitope LA67,74 with rheumatoid arthritis and citrullinated vimentin binding. *Arthritis Rheum* 63:3733, 2011.
75. Kamani NR, Walters MC, Carter S, Aquino V, Brochstein JA, Chaudhury S, Eapen M, Freed BM, Grimley M, Levine JE, Logan B, Moore T, Panepinto J, Parikh S, Pulsipher MA, Sande J, Schultz KR, Spellman S, Shenoy S. Unrelated donor cord blood transplantation for children with severe sickle cell disease: results of one cohort from the phase II study from the Blood and Marrow Transplant clinical trials network. *Biol Blood Marrow Transplant* 18:1265, 2012.
76. Menezes CA, Sullivan AK, Falta MT, Freed BM, Rocha MO, Gollub KJ, Fontenot AP, Dutra WO.

Highly conserved CDR3 region in circulating CD4(+)Vβ5(+) T cells may be associated with cytotoxic activity in Chagas disease. *Clin Exp Immunol* 169:109, 2012.

1. Rocha V Spellman S, Zhang MJ, Ruggeri A, Purtill D, Brady C, Altamuro D, Baxter-Lowe L, Beaudoux E, Beddard RL, Bergamaschi P, Chow R, Freed B, Koegler G, Kurtzberg J, Larghero J, Lecchi L, Mrowiec Z, Nagler A, Navarette C, Prasad V, Prasath A, Price T, Pouthier F, Ratanatharathorn V, Sanders J, Sender L, van Rood JJ, Horowitz MM, Gluckman E, Eapen M. Effect of HLA-matching recipients to donor non-inherited maternal antigens on outcomes after mismatched umbilical cord blood transplantation for hematologic malignancies. *Biol Blood Marrow Transplant* 18:1890, 2012.
2. Lyu DM, Grazia TJ, Benson AB, Cagle LR, Freed BM, Zamora MR. Pretransplant presence of antibodies to MICA and HLA Class I or II are associated with an earlier onset of bronchiolitis obliterans syndrome in lung transplant recipients. *Clinical Transplantation* 237, 2012.
3. Lang J, Kelly M, Freed BM, McCarter MD, Kedl RM, Torres RM, Pelanda R. Studies of lymphocyte reconstitution in a humanized mouse model reveal a requirement of T cells for human B cell maturation. *J Immunol* 190:2090, 2013.
4. Mack C, Anderson KJ, Aubrey MT, Rosenthal P, Sokol RJ, Freed BM. Lack of HLA predominance and HLA shared epitopes in biliary atresia. *SpringerPlus* 2:42, 2013.
5. Choudhary R, Baturin D, Fosmire S, Freed B, Porter CC. Knockdown of HPRT for selection of genetically modified human progenitor cells. *PLoS One* 8(3):e59594, 2013.
6. Andersen NJ, Mondal TK, [Preissler MT](http://www.ncbi.nlm.nih.gov/pubmed?term=Preissler%20MT%5BAuthor%5D&cauthor=true&cauthor_uid=24333851), [Freed BM](http://www.ncbi.nlm.nih.gov/pubmed?term=Freed%20BM%5BAuthor%5D&cauthor=true&cauthor_uid=24333851), [Stockinger S](http://www.ncbi.nlm.nih.gov/pubmed?term=Stockinger%20S%5BAuthor%5D&cauthor=true&cauthor_uid=24333851), [Bell E](http://www.ncbi.nlm.nih.gov/pubmed?term=Bell%20E%5BAuthor%5D&cauthor=true&cauthor_uid=24333851), [Druschel C](http://www.ncbi.nlm.nih.gov/pubmed?term=Druschel%20C%5BAuthor%5D&cauthor=true&cauthor_uid=24333851), [Buck Louis GM](http://www.ncbi.nlm.nih.gov/pubmed?term=Buck%20Louis%20GM%5BAuthor%5D&cauthor=true&cauthor_uid=24333851), [Lawrence DA](http://www.ncbi.nlm.nih.gov/pubmed?term=Lawrence%20DA%5BAuthor%5D&cauthor=true&cauthor_uid=24333851). Detection of immunoglobulin isotypes from dried blood spots. *J Immunol Methods* <http://dx.doi.org/10.1016/j.jim.2013.12.001>, 2013.
7. Roark CL, Anderson KM, Simon LJ, Schuyler RP, Aubrey MT, Freed BM. Multiple HLA epitopes contribute to Type I diabetes susceptibility. *Diabetes* 63:323, 2014.
8. Lang J, Ota T, Kelly M, Strauch P, Freed BM, Torres RM, Nemazee D, Pelanda R. Receptor editing and genetic variability in human autoreactive B cells. *J Exp Med* 213: 93, 2016.
9. ­Anderson KM, Roark CL, Portas M, Aubrey MT, Rosloniec EF, Freed BM. A molecular analysis of the shared epitope hypothesis. Binding of arthritogenic peptides to DRβ1\*04 alleles. *Arthritis Rheum* 68:1627, 2016.
10. Fingerlin TE, Zhang W, Yang IV, Ainsworth HC, Russell PH, Blumhagen RZ, Schwarz MI, Brown KK, Steele MP, Loyd JE, Cosgrove GP, Lynch D, Groshong S, Collard HR, Wolters PJ, Bradford WZ, Kossen K, Seiwert SD, du Bois RM, Garcia CM, Devine MS, Gudmundsson G, Isaksson HJ, Kaminski N, Zhang Y, Gibson KF, Lancaster LH, Maher TM, Molyneaux PL, Wells AU, Moffatt MF, Selman M, Pardo A, Kim DS, Crapo JD, Make BJ, Regan EA, Walek DS, Daniel DJ, Kamatani Y, Zelenika D, Murphy E, Smith K, McKean D, Pedersen BS, Talbert J, Powers J, Markin CR, Beckman KB, Lathrop M, Freed BM, Langefeld VD, Schwartz DA. Genome-wide imputation study identifies novel HLA locus for pulmonary fibrosis and potential role for autoimmunity in idiopathic interstitial pneumonia. *BMC Genetics* 17:74, 2016.
11. Anderson KM, Stastny T, Freed BM. Binding of carbamylated collagen258-272 to HLA-DR alleles associated with susceptibility and resistance to RA. *Arthritis Rheum* 68:2051, 2016.
12. Roark CL, Anderson KM, Aubrey MT, Rosloniec EF, Freed BM. Arthritogenic peptide binding to DRβ1\*01 alleles correlates with susceptibility to rheumatoid arthritis. *J Autoimmunity* 72:25, 2016.
13. Adebiyi OO, Gralla J, Klem P, Freed BM, Wiseman A, Cooper JE. Clinical significance of pretransplant donor specific antibodies in the setting of negative cell-based flow cytometry crossmatching in kidney transplant recipients. *Am J Transplant* 16:3458, 2016.
14. Brady C, Armitage S, Freed BM, Duffy M, Gass A, Spellman S, Kurtzberg J, Regan D. How transplants centers deal with the Dextran shortage: Recommendations for comparing alternatives. *Transfusion* 56:2657, 2016.
15. Schade H, Sen S, Neff CP, Freed BM, Gutman JG, Palmer BE. PD-1 expression on CD4+ T cells predicts mortality following allogenic stem cell transplantation. *Biol Blood Marrow Transplant* 22:2172, 2016.
16. Lang J, Zhang B, Kelly M, Peterson JN, Barbee J, Freed BM, Matsuda J, Torres R, Pelanda R. Expression of human BAFF increases human B cell numbers but does not promote B cell maturation in a hematopoietic humanized mouse model. *Blood* *Advances* 1:2741, 2017.
17. Davis S, Gralla J, Klem P, Tong S, Wedermyer G, Freed B, Wiseman A, Cooper JE. Lower Tacrolimus exposure and time in therapeutic range increase the risk of de novo donor-specific antibodies in the first year of kidney transplantation. *Am J Transplant* 18:907, 2018.
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***An Adirondack Life,* AuthorHouse 2014**

“Grand in scope but intimate in its execution. A powerful, quintessentially American work from a debut writer whose skills extend far beyond his experience.” **-*Kirkus Reviews,* July 2014.**

“A stunning debut novel.” ***–Pacific Book Review,* 2014**

***Kirkus Reviews* 2014 Top Ten Summer Reading List**

***Kirkus Reviews* September 2014 Books to Discover**

***Kirkus Reviews* Best Books of 2014**

**INVITED LECTURES (Since 2010)**

*The Business of Cord Blood Banking:* *Financial Barriers to Success.* America’s Blood Centers, Denver, January 2010.

*Smoking and Immunity.* University of Rochester School of Medicine May 2010.

*Umbilical Cord Blood Banking:* *A National Mandate*. St. Joseph Medical Center Obstetrics and Gynecology Grand Rounds, Phoenix, Arizona, December 2010

*Umbilical Cord Blood Banking.* Arizona Department of Health, December 2011.

*Why is Cord Blood So Expensive?* 10th Annual Cord Blood Symposium, San Francisco, June 2012.

*HLA Epitopes in Autoimmunity.* Department of Medicine, University of Colorado Anschutz Medical Campus, January 2013.

*The Future of Stem Cell Banking.* Cell*Tech* Deployment of Stem Cells for Cancer, San Diego January 2013.

*Facility Perspective in Preparing for Cord Blood pre-BLA Inspection.* FDA and the Changing Paradigm for HCT/P Regulation*,* Bethesda, MD, March 2013.

*HLA Epitopes in Autoimmunity.*  24th Annual Meeting of the *Egyptian Society of Laboratory Medicine,* Cairo, April 2013.

*HLA Antibodies in Solid Organ and Bone Marrow Transplantation.* 24th Annual Meeting of the *Egyptian Society of Laboratory Medicine,* Cairo, April 2013.

*Progress in Umbilical Cord Blood Banking and Transplantation.* Tucson Medical Center, August 2014.

*Umbilical Cord Blood Banking and Transplantation.* Leukemia and Lymphoma Society of Upstate New York, October 2014.

*Changing Landscape of Stem Cell Banking and Cellular Therapies.* World Cord Blood Congress, London, May 2015.

*Changing Landscape of Cord Blood Banking.* International Cord Blood Symposium, San Francisco, June 2015.

*The Future of Cord Blood Banking.* Texas Health Presbyterian Hospital, Dallas, Texas, October 2015

*Changing the Model of Cord Blood Banking.* Providence Tarzana Hospital, California, October 2015.

*Impact of BLA/IND Requirements on Public Cord Blood Banks.* International Cord Blood Symposium, San Francisco, June 2016.

*Advances in Cellular Therapy Using Umbilical Cord Blood and Tissue.* National University of Singapore, October 2016.

*Treatment of Chronic Diabetic Wounds with Umbilical Cord Mesenchymal Stem Cells,* Hyatt Regency, Kuala Lumpur, Malaysia, October 2016.

*Novel Clinical Approaches to the Use of Expanded Hematopoietic and Mesenchymal Stem Cells.* Terumo BCT, Lakewood, Colorado, November 2016.

*HLA and Autoimmunity:* *Personalized Gene Editing and Molecular Medicine.* Medical University of South Carolina, January 2017.

*Mesenchymal Stem Cells and Wound Healing.* Singapore National University, December, 2017.

*Challenges to the Sustainability of the U.S. Public Cord Blood System.* Third Annual Arizona Cord Blood Conference, April 2018.

*The Role of Cord Blood Banks in the Development of New Cell Therapies.* 16th Annual International Cord Blood Symposium, San Diego, June 2018.

*New Horizons-Gene Editing of Hematopoietic Stem Cell Transplants.* Fourth Annual Arizona Cord Blood Conference, Tempe, Arizona, April 2019.

*Cord Blood Derived Mesenchymal Stem Cells in the Treatment of Diabetic Foot Ulcers.* The International Congress for Cord Blood and Perinatal Tissue Research, Miami Beach, September 2019.

*Introduction to Regulatory Medicine: From the Laboratory to the Clinic.* Institute of Cell and Molecular Biology, Singapore, 2019.

*Genetically-Induced Tolerance in Autoimmunity.* Human Immunology and Immunotherapy Initiative, University of Colorado School of Medicine, November 2021.

*CorliCyte® Mesenchymal Stem Cells for Treatment of Diabetic Foot Ulcers. DFCon 2022,* Los Angeles, October 2022

**HISTORY OF GRANT SUPPORT**

1. *The Physician-Investigator Development Program*, The Pew Memorial Trust, 1984-1987; Brian M. Freed (PI), $25,000.

2. *Mechanisms of Immune Suppression in the Severely Burned Patient*, Atlantic Richfield Foundation, 1986-1989; Brian M. Freed (PI), $25,000.

3. *Cyclosporine Metabolism in Renal Allograft Recipients*, Sandoz Research Institute, 1986-1988; Neil Lempert, Thomas G. Rosano, and Brian M. Freed (Co-PI), $100,000.

4. *Role of Cyclosporine Metabolism in Transplantation*, NIH RO1-AI25551, 1988-1991; Neil Lempert, Thomas G. Rosano and Brian M. Freed (Co-PI), $376,018.

5. *CsA Metabolites in Immunosuppression and Nephrotoxicity*, NIH RO1-AI26484, 1988-1991; Neil Lempert, Thomas G. Rosano and Brian M. Freed (Co-PI), $520,816

6. *HLA Alleles in Kidney Transplantation,* National Kidney Foundation of Northeast­ern New York, 1989-1990, Brian M. Freed (PI), $3,000.

7. *In Vitro Propagation of Human Pancreatic Cells*, NIH Biomedical Research Support Grant, 1991; Brian M. Freed (PI), $6,500.

1. *Immunotoxicology of Benzene Metabolites*, NIH/NIEHS­ RO1-ES05673, 1993-1997, Brian M. Freed (PI), $263,197.
2. *Oxidation of Phenolic Components of Cigarette Tar,* NIH/NHLBI RO3-HL60538, 1997-1999, Brian M. Freed (PI), $60,856.
3. *Immunotoxicology of Benzene Derivatives,* NIH/NIEHS RO1-ES05673, 1999-2002; Brian M. Freed (PI), $533,809.
4. *Inhibition of T Cell Activation by Thiol-Reactive Aldehydes.* Philip Morris Inc., 2002-2005, Brian M. Freed (PI), $881,023.
5. *Immunotoxicology of Cigarette Smoke,* NIH/NIEHS R01-ES05673, 2002-2007; Brian M. Freed (PI), $1,534,000.
6. *Inhibition of T Cell Activation by Thiol-Reactive Aldehydes.* Philip Morris Inc., 2005-2008, Brian M. Freed (PI), $907,259.
7. *Peanut Allergy: HLA and Environment.* Food Allergy and Anaphylaxis Network, 2006-2008, Stephen Dreskin (PI) and Brian M. Freed (co-investigator), $150,000.
8. *Defining the Beryllium Antigen Complex in Berylliosis.* NIH R21-HL081293, 2007-2009, Lee Newman (PI) and Brian M. Freed (Co-PI), $423,000.
9. *National Cord Blood Bank Program,* Health Research and Service Administration, HHS, 2006-2018, Brian M. Freed, Ph.D (PI), $3,200,000.
10. *National Cord Blood Bank Disaster Response Program,* National Marrow Donor Program, 2007, Brian M. Freed (PI), $8,000.
11. *Demonstration Project for Minority Cord Blood Recruitment at Inner City Prenatal Clinics*, National Marrow Donor Program, 2007, Brian Freed (PI), $79,000.
12. *Detection of HLA Predominance and Novel HLA Shared Epitopes in Biliary Atresia.* NIH/NIDDKD 1R56DK087691-01, 2010-2012, Cara Mack, MD (PI), Brian M Freed, PhD (Co-PI), $229,220.
13. *In Space Expansion of Hematopoietic Stem Cells for Clinical Application,* $3,318,354 (ClinImmune sub-contract $570,000), NASA NNJ13ZBG001N

## CLINICAL SERVICES

Executive Director of *ClinImmune Cell and Gene Therapy* (1997-present). *ClinImmune* is an affiliate of the *University of Colorado Anschutz Medical Campus.* *ClinImmune* occupies 25,000 square feet of state-of-the-art laboratory and office space in the new (August 2015) Bioscience II Building on the Anschutz Medical Campus. The *Histocompatibility Lab* is accredited by the *American Society for Histocompatibility and Immunogenetics*, the *College of American Pathologists*, the *United Network for Organ Sharing* and performs high complexity HLA testing for solid organ and bone marrow transplant programs at five hospitals in Colorado, Georgia and South Carolina. The *Flow Cytometry Lab* is accredited by the *College of American Pathologists* and performs a variety of tests in support of clinical trials. *The University of Colorado and St. Louis Cord Blood Banks* are licensed by the FDA and accredited by *AABB* to store umbilical cord blood for human hematopoietic stem cell transplants. The cord blood banks have cryopreserved >37,000 units and shipped >4000 of them to 130 transplant centers in 25 countries. The cord blood bank is a member of the HRSA *National Cord Blood Inventory* program funded by the *Stem Cell Research and Therapeutic Act of 2010*, and is a member bank of the *National Marrow Donor Program.* The *Stem Cell Laboratory* is accredited bythe *College of American Pathologists* *(CAP)* and *The Foundation for the Accreditation of Cellular Therapy (FACT)* and processes human peripheral blood, bone marrow and mesenchymal stem cells for human transplantation.

**CLINICAL TRIAL EXPERIENCE**

* IND #11084 for human islet transplantation at the *University of Colorado* (2003-2004).
* IND 10-CBA (sponsored by National Marrow Donor Program) for umbilical cord blood transplantation (2005-present).
* BLA #1855 for HPC Cord Blood at *ClinImmune Labs* (May 2012-present).
* BLA #1873 for AlloCord (HPC Cord Blood) for *St. Louis Cord Blood Bank* (2018-present).
* IDE CD34 Isolation from Haploidentical Donors for Cord Blood Transplantation (2018-2022).
* IND #18416 Phase I Open Label Safety Study of Umbilical Cord Lining Mesenchymal Stem Cells (CorliCyte®) to Close Chronic Diabetic Wounds (2019-2022).

**PATENTS**

* U.S. Provisional Patent Application Serial Number 62/655,198**: *A Method of Transporting Mesenchymal Stem Cells by Means of a Transporting Solution and a Method of Administering Stem Cells to Wounds,*** filed on April 9, 2018.
* U.S. Patent PCT/US2018/029302; ***Methods of Treating Rheumatoid Arthritis Using RNA-Guided Genome Editing of HLA Gene***, International filing April 25, 2018.
* U.S. Patent PCT/US2022/028645; ***Pocket Engineering of HLA Alleles for Treating Autoimmunity,*** filed May 10, 2022.