

## **Leonard D. Shultz, Ph.D.**

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### ***Curriculum Vitae***

#### **EDUCATION**

- 1967 B.A., Biology, Northeastern University, Boston, MA  
1971-1972 Predoctoral Trainee, US Public Health Services, University of Massachusetts, Amherst, MA  
1972 Ph.D., Medical Microbiology, University of Massachusetts, Amherst, MA  
1972-1974 Postdoctoral Fellow, The Jackson Laboratory, Bar Harbor, ME

#### **RESEARCH POSITIONS**

- 1967-1968 Research Assistant, Tufts University School of Medicine, Boston, MA  
1968-1970 Graduate Teaching Assistant, University of Massachusetts, Amherst, MA  
1970-1971 Lecturer, University of Massachusetts, Amherst MA  
1974-1976 Research Associate, The Jackson Laboratory, Bar Harbor, ME  
1976-1979 Assistant Professor, The Jackson Laboratory, Bar Harbor, ME  
1979-1991 Associate Professor, The Jackson Laboratory, Bar Harbor, ME  
1981 Cooperating Professor in Zoology, University of Maine, Orono, ME  
1988-present Graduate Faculty Member, School of Biomedical Sciences and Engineering (GSBSE), University of Maine, Orono, ME  
1991-present Professor, The Jackson Laboratory, Bar Harbor, ME  
1995-present Research Professor, Department of Medicine, School of Medicine, University of Massachusetts Medical School, Worcester, MA  
1998-present Research Professor, Graduate School of Biomedical Sciences, University of Massachusetts Medical School  
2006-2007 Assistant Clinical Professor, Department of Immunology, University of Connecticut, School of Medicine, Farmington, CT  
2008 Adjunct Assistant Professor, Department of Immunology, University of Connecticut, School of Medicine, Farmington, CT

#### **RESEARCH INTERESTS**

Development and regulation of the immune system in normal and pathologic states: immunodeficiency; AIDS; autoimmunity; tumor immunology; Development of humanized mouse models as a preclinical bridge for translational investigations

#### **PROFESSIONAL ACTIVITIES**

##### Board Membership:

- 1990-present In Vivo  
2003-2008 Experimental Biology and Medicine  
2004-present Stem Cell  
2012-present Stem Cell Core External Advisory Committee, Maine Medical Research Center  
2008-2014 Beta Cell Biology Consortium (BCBC), Principal Investigator

##### Institutional Committees:

- 2004-present Genetic Resources  
2004-present RAF Advisory Committee  
2005-2015 Human Subjects IRB, Chair  
2005-present Research Grants Committee  
2006-2007 Cancer Core Grant Committee  
2014-present Radiation & Lab Safety

## PROFESSIONAL SOCIETIES

American Association of Immunologists, American Society for Microbiology, American Diabetes Association, American Association for the Advancement of Science, American Society for Hematology, International Association for Comparative Research on Leukemia and Related Diseases

## EXTRAMURAL RESEARCH SUPPORT – CURRENT

- 2015-2016 Consortium PI, 1R3-01 "Programing Hematopoietic Stem Cells for Long-Term Targeted T Cell Therapy in Patients with Relapsed Ovarian Cancer," New York State Department of Health (10/01/2015-09/30/2016)
- 2015-2016 Principal Investigator, JAX-CCSG-Pilot-LDS-02 "JAXCC Pilot and Feasibility Study," The Jackson Laboratory Cancer Center (01/01/15-12/31/16)
- 2014-2019 Co-Project Leader, 5 P30 CA034196-31 "Cancer Center Support (Core) Grant – Cancer Models Development Resource," NIH/NCI (07/01/14-06/30/19)
- 2014-2019 Consortium PI, 1 UC4 DK104218-01 "Humanized Mouse Avatars for T1D," NIH/NIDDK (09/25/14-06/30/19)
- 2014-2018 Consortium Principal Investigator, 5 R01 AI111809-03 "Boosting Cell-Intrinsic Innate Immune Recognition of HIV-1 by Dendritic Cells," NIH/NIAID (04/15/14-03/31/18)
- 2014-2018 Consortium Principal Investigator, 5 R24 OD018259-03 "Development and Validation of Novel NSG Mouse Models for Human Stem Cell Therapy," NIH/OD (05/15/14-02/28/18)
- 2014-2017 Consortium Principal Investigator, 3-SRA-2014-285-M-R "Advanced Biomaterials and Delivery Systems for Islet encapsulation," Juvenile Diabetes Research Foundation International (07/01/14-06/30/17)
- 2014-2017 Consortium Principal Investigator, 2015PG-T1D057 "In Vivo Reconstruction of Human T1D Disease using Patient-derived Tissues and Induced Pluripotent Stem Cells (iPSCs)," Helmsley Foundation (12/01/14-5/31/17)
- 2014-2016 Principal Investigator, SACKLER-LDS-2014 "The JAX Ileal Carcinoid PDX Project," Sackler Fund for the Arts Sciences (03/10/14-03/09/16)
- 2014-2016 Principal Investigator, MCF LDS-01 "Optimization and Validation of a Preclinical Model for Myelodysplastic Syndrome," Maine Cancer Foundation (07/01/14-06/30/16)
- 2013-2018 Principal Investigator, 5 R25 CA174584-04 "Summer Research Experience in Cancer Biology and Genomics for Undergraduates," NIH/NCI (04/01/13-03/31/18)
- 2013-2018 Consortium Principal Investigator, 5 P01 CA171983-04 "Targeted Sphingolipid Metabolism for Treatment of AML," NIH/NCI (09/10/13-08/31/18)
- 2012-2017 Co-Investigator, 5 UC4 DK097610-05 "Type 1 Diabetes Mouse Resource (T1DR)," NIH/NIDDK (9/15/12-6/30/17)
- 2010-2016 Consortium Principal Investigator, 5 P01 AI046629-14 "EBV and Heterologous Alloimmunity in Humanized Mice," NIH/NIAID (6/1/10-5/31/16)

## PUBLICATIONS

1. **Shultz LD**, Wilder MS. 1971. Cytotoxicity of rabbit blood for *Listeria monocytogenes*. *Infect Immun* 4: 703-708. PMID: PMC416377
2. **Shultz LD**, Wilder MS. 1973. Fate of *Listeria monocytogenes* in normal rabbit serum. *Infect Immun* 7: 289-297. PMID: PMC422672
3. Green MC, **Shultz LD**. 1975. Motheaten, an immunodeficient mutant of the mouse. I. Genetics and pathology. *J Hered* 66: 250-258.
4. Green MC, **Shultz LD**, Nedzi LA. 1975. Abnormal nuclear morphology of leukocytes in the mouse mutant ichthyosis. *Transplantation* 20: 172-175.
5. **Shultz LD**, Bailey DW. 1975. Genetic control of contact sensitivity in mice: Effect of H-2 and non-H-2 loci. *Immunogenetics* 1:570-583.

6. **Shultz LD**, Green MC. 1976. Motheaten, an immunodeficient mutant of the mouse. II. Depressed immune competence and elevated serum immunoglobulins. *J Immunol* 116: 936-943.
7. **Shultz LD**, Heiniger HJ, Eicher EM. 1978. Immunopathology of streaker mice, a remutation to nude in the AKR/J strain. In: *Comparative and Developmental Aspects of Immunity and Disease*, Gershwin ME, Cooper EL (eds). New York, Pergamon Press, pp. 211-222.
8. **Shultz LD**, Sidman CL, Unanue ER. 1978. Immunologic dysfunction in "motheaten" mice: Immunodeficiency, autoimmunity and hyperimmunoglobulinemia in a short-lived mutant. In: *Animal Models of Comparative and Developmental Aspects of Immunity and Disease*, Gershwin ME, Cooper EL (eds). New York, Pergamon Press, pp. 260-269.
9. **Shultz LD**, Zurier RB. 1978. "Motheaten": A single gene model for stem cell dysfunction and early onset autoimmunity. In: *Genetic Control of Autoimmune Disease*, Rose NR, Bigazzi P, Warner N (eds). New York, Elsevier, pp. 229-240.
10. Sidman CL, **Shultz LD**, Unanue ER. 1978. The mouse mutant "motheaten." II. Functional studies of the immune system. *J Immunol* 121: 2399-2404.
11. Sidman CL, **Shultz LD**, Unanue ER. 1978. The mouse mutant "motheaten". I. Development of lymphocyte populations. *J Immunol* 121: 2392-2398.
12. Bedigian HG, **Shultz LD**, Meier H. 1979. Expression of endogenous murine leukaemia viruses in AKR/J streaker mice. *Nature* 279: 434-436.
13. **Shultz LD**. 1979. Mutant mouse genes affecting development of the immune system. In: *Inbred and Genetically Defined Strains of Laboratory Animals*, Altman PL, Katz DD (eds). Baltimore, MD, Federation of American Societies for Experimental Biology, pp. 67-70.
14. Clark EA, **Shultz LD**, Pollack SB. 1981. Mutations in mice that influence natural killer (NK) cell activity. *Immunogenetics* 12: 601-613.
15. Grzanna R, **Shultz LD**. 1982. The contribution of mast cells to the histamine content of the central nervous system: a regional analysis. *Life Sci* 30: 1959-1964.
16. Johnson DA, **Shultz LD**, Bedigian HG. 1982. Immunodeficiency and reticulum cell sarcoma in mice segregating for HRS/J and SJL/J genes. *Leuk Res* 6: 711-720.
17. **Shultz LD**, Bedigian HG, Heiniger HJ, Eicher EM. 1982. The congenitally athymic streaker mouse. In: *Proceedings of the Third International Workshop on Nude Mice*, Reed ND (ed). New York, Fischer Verlag, pp. 33-39.
18. **Shultz LD**, Sweet HO, Davisson MT, Coman DR. 1982. 'Wasted', a new mutant of the mouse with abnormalities characteristic to ataxia telangiectasia. *Nature* 297: 402-404.
19. Leiter EH, Beamer WG, **Shultz LD**. 1983. The effect of immunosuppression on streptozotocin-induced diabetes in C57BL/KsJ mice. *Diabetes* 32: 148-155.
20. **Shultz LD**, Bailey CL, Coman DR. 1983. Hematopoietic stem cell function in motheaten mice. *Exp Hematol* 11: 667-680.
21. **Shultz LD**, Bedigian HG, Carlson GA, Coman DR. 1983. Effect of congenital athymia on expression of preleukemic cells. In: *Leukemia Reviews International, Advances in Comparative Leukemia Research*, Yohn DS (ed). New York, Marcel Dekker, pp. 225-226.
22. Nordeen SK, Schaefer VG, Edgell MH, Hutchison CA, 3rd, **Shultz LD**, Swift M. 1984. Evaluations of wasted mouse fibroblasts and SV-40 transformed human fibroblasts as models of ataxia telangiectasia in vitro. *Mutat Res* 140: 219-222.
23. **Shultz LD**, Bailey CL, Carlson GA, Coman DR, Evans R, Outzen HC. 1984. Potential of "viable motheaten" mice for the growth of tumor xenografts. In: *Immune-Deficient Animals*, Sordat B (ed). Basel, Karger, pp. 224-229.
24. **Shultz LD**, Coman DR, Bailey CL, Beamer WG, Sidman CL. 1984. "Viable motheaten," a new allele at the motheaten locus. I. Pathology. *Am J Pathol* 116: 179-192. PMID: PMC1900532
25. Sidman CL, Marshall JD, Masiello NC, Roths JB, **Shultz LD**. 1984. Novel B-cell maturation factor from spontaneously autoimmune viable motheaten mice. *Proc Natl Acad Sci U S A* 81: 7199-7202. PMID: PMC392105
26. Sidman CL, Marshall JD, **Shultz LD**, Gray PW, Johnson HM. 1984. Gamma-interferon is one of several direct B cell-maturing lymphokines. *Nature* 309: 801-804.

27. Gershwin ME, **Shultz L**. 1985. Mechanisms of genetically determined immune dysfunction. *Immun Today* 6: 36-37.
28. Outzen HC, Corrow D, **Shultz LD**. 1985. Attenuation of exogenous murine mammary tumor virus virulence in the C3H/HeJ mouse substrain bearing the Lps mutation. *J Natl Cancer Inst* 75: 917-923.
29. Sidman CL, **Shultz LD**, Evans R. 1985. A serum-derived molecule from autoimmune viable motheaten mice potentiates the action of a B cell maturation factor. *J Immunol* 135: 870-872.
30. Greiner DL, Goldschneider I, Komschlies KL, Medlock ES, Bollum FJ, **Shultz LD**. 1986. Defective lymphopoiesis in the bone marrow of "motheaten" (me/me) and "viable motheaten" (mev/vev) mutant mice. I. Analysis of the development of prothymocytes, early B lineage cells, and terminal deoxynucleotidyl transferase-positive cells. *J Exp Med* 164:1129-1144.
31. Hagiya M, Davis DD, **Shultz LD**, Sakano H. 1986. Non-germ-line elements (NGE) are present in the T cell receptor beta-chain genes isolated from the mutant mouse, motheaten (me/me). *J Immunol* 136: 2697-2700.
32. Inoue T, Aikawa K, Tezuka H, Kada T, **Shultz LD**. 1986. Effect of DNA-damaging agents on isolated spleen cells and lung fibroblasts from the mouse mutant "wasted," a putative animal model for ataxia-telangiectasia. *Cancer Res* 46: 3979-3982.
33. Inoue T, Tezuka H, Kada T, Aikawa K, **Shultz LD**. 1986. The mouse mutant "wasted": an animal model for ataxia-telangiectasia. *Basic Life Sci* 39: 323-335.
34. Leiter EH, Prochazka M, Coleman DL, Serreze DV, **Shultz LD**. 1986. Genetic factors predisposing to diabetes susceptibility in mice. In: *Immunology in Diabetes*, Mollnar GD, Jaworski MA (eds). New York, Elsevier, pp. 28-38.
35. Sidman CL, **Shultz LD**, Hardy RR, Hayakawa K, Herzenberg LA. 1986. Production of immunoglobulin isotypes by Ly-1+ B cells in viable motheaten and normal mice. *Science* 232: 1423-1425.
36. Tezuka H, Inoue T, Noguti T, Kada T, **Shultz LD**. 1986. Evaluation of the mouse mutant "wasted" as an animal model for ataxia telangiectasia. I. Age-dependent and tissue-specific effects. *Mutat Res* 161: 83-90.
37. Komschlies KL, Greiner DL, **Shultz L**, Goldschneider I. 1987. Defective lymphopoiesis in the bone marrow of motheaten (me/me) and viable motheaten (mev/mev) mutant mice. III. Normal mouse bone marrow cells enable mev/mev prothymocytes to generate thymocytes after intravenous transfer. *J Exp Med* 166: 1162-1167.
38. Leiter EH, Beamer WG, **Shultz LD**, Barker JE, Lane PW. 1987. Mouse models of genetic diseases. *Birth Defects Orig Artic Ser* 23: 221-257.
39. Leiter EH, Prochazka M, **Shultz LD**. 1987. Effect of immunodeficiency on diabetogenesis in genetically diabetic (db/db) mice. *J Immunol* 138: 3224-3229.
40. Medlock ES, Goldschneider I, Greiner DL, **Shultz L**. 1987. Defective lymphopoiesis in the bone marrow of motheaten (me/me) and viable motheaten (mev/mev) mutant mice. II. Description of a microenvironmental defect for the generation of terminal deoxynucleotidyltransferase-positive bone marrow cells in vitro. *J Immunol* 138: 3590-3597.
41. **Shultz LD**. 1987. Pleiotropic mutations causing abnormalities in the murine immune system and the skin. *Curr Probl Dermatol* 17: 236-250.
42. **Shultz LD**, Coman DR, Lyons BL, Sidman CL, Taylor S. 1987. Development of plasmacytoid cells with Russell bodies in autoimmune "viable motheaten" mice. *Am J Pathol* 127: 38-50. PMID: PMC1899601
43. **Shultz LD**, Roths JS. 1987. Euthymic murine models for immunologic dysfunction. In: *Immune Deficient Animals for Biomedical Research*, Rygaard J, Brunner N, Graem N (eds). New York, Karger, pp. 1-14.
44. **Shultz LD**, Sidman CL. 1987. Genetically determined murine models of immunodeficiency. *Annu Rev Immunol* 5: 367-403.
45. Willis EH, Carson DA, **Shultz LD**. 1987. Adenosine deaminase activity in recipients of bone marrow from immunodeficient mice homozygous for the wasted mutation. *Biochem Biophys Res Commun* 145: 581-585.

46. Beamer WG, Tennent BJ, Shultz KL, Nadeau JH, **Shultz LD**, Skow LC. 1988. Gene for ovarian granulosa cell tumor susceptibility, Gct, in SWXJ recombinant inbred strains of mice revealed by dehydroepiandrosterone. *Cancer Res* 48: 5092-5095.
47. Evans R, Duffy TM, **Shultz LD**. 1988. The immunological mouse mutants nude (nu) and rhino (hrrh) generate cytotoxic effector cells following adoptive immunotherapy but fail to reject a transplanted tumor. *Cancer Immunol Immunother* 26: 35-42.
48. Hayashi S, Witte PL, **Shultz LD**, Kincade PW. 1988. Lymphohemopoiesis in culture is prevented by interaction with adherent bone marrow cells from mutant viable motheaten mice. *J Immunol* 140: 2139-2147.
49. McCune JM, Namikawa R, Kaneshima H, **Shultz LD**, Lieberman M, Weissman IL. 1988. The SCID-hu mouse: murine model for the analysis of human hematolymphoid differentiation and function. *Science* 241: 1632-1639.
50. Schweitzer PA, **Shultz LD**. 1988. Characterization of Mott cell hybridomas from autoimmune "viable motheaten" mutant mice. *Curr Top Microbiol Immunol* 137: 223-226.
51. Serreze DV, Leiter EH, Worthen SM, **Shultz LD**. 1988. NOD marrow stem cells adoptively transfer diabetes to resistant (NOD x NON)F1 mice. *Diabetes* 37: 252-255.
52. **Shultz LD**. 1988. Pleiotropic effects of deleterious alleles at the "motheaten" locus. *Curr Top Microbiol Immunol* 137: 216-222.
53. Bosma GC, Davisson MT, Ruetsch NR, Sweet HO, **Shultz LD**, Bosma MJ. 1989. The mouse mutation severe combined immune deficiency (scid) is on chromosome 16. *Immunogenetics* 29: 54-57.
54. Haar JL, Popp JD, **Shultz LD**. 1989. Defective in vitro migratory capacity of bone marrow cells from viable motheaten mice in response to normal thymus culture supernatants. *Exp Hematol* 17: 21-24.
55. Quimby FW, Bosma MJ, Good RA, Hansen CT, Myers DD, Richter CB, Roths JB, Wortis HH, Briles DE, Davisson MT, Fernandes G, Green MC, Guberski DL, Haddada H, Hedrich HJ, Kyogoku M, Lane PW, Lasky JL, Leiter EH, Roderick TH, **Shultz LD**, Thorbecke GJ. 1989. *Immunodeficient Rodents: A Guide to their Immunology, Husbandry, and Use*. National Academy Press.
56. Reed ND, Hall-Stoodley LH, **Shultz LD**. 1989. Mast cell production by scid/scid mice: in vivo and in vitro studies. In: 6th International Workshop on Immune Deficient Animals in Biomedical Research, Wu B-Q, Zheng J (eds). pp. 63-67.
57. **Shultz LD**. 1989. Single gene models of immunodeficiency diseases. In: 6th International Workshop on Immune Deficient Animals in Biomedical Research, Wu B-Q, Zheng J (eds). pp. 19-26.
58. **Shultz LD**, Schweitzer PA, Hall EJ, Sundberg JP, Taylor S, Walzer PD. 1989. Pneumocystis carinii pneumonia in scid/scid mice. *Curr Top Microbiol Immunol* 152: 243-249.
59. Sundberg JP, Burnstein T, **Shultz LD**, Bedigian H. 1989. Identification of Pneumocystis carinii in immunodeficient mice. *Lab Anim Sci* 39: 213-218.
60. Tennent BJ, Beamer WG, **Shultz LD**, Adamson ED. 1989. Epidermal growth factor receptors in spontaneous ovarian granulosa cell tumors of SWR-derived mice. *Int J Cancer* 44: 477-482.
61. Van Zant G, **Shultz L**. 1989. Hematologic abnormalities of the immunodeficient mouse mutant, viable motheaten (mev). *Exp Hematol* 17: 81-87.
62. Walzer PD, Kim CK, Linke MJ, Pogue CL, Huerkamp MJ, Chrisp CE, Lerro AV, Wixson SK, Hall E, **Shultz LD**. 1989. Outbreaks of Pneumocystis carinii pneumonia in colonies of immunodeficient mice. *Infect Immun* 57: 62-70. PMID: PMC313041
63. Willis EH, Carson DA, **Shultz LD**. 1989. Adenosine deaminase activity in recipients of bone marrow from immunodeficient mice homozygous for the wasted mutation. *Adv Exp Med Biol* 253B: 209-212.
64. Croitoru K, Stead RH, Bienenstock J, Fulop G, Harnish DG, **Shultz LD**, Jeffery PK, Ernst PB. 1990. Presence of intestinal intraepithelial lymphocytes in mice with severe combined immunodeficiency disease. *Eur J Immunol* 20: 645-651.
65. Serreze DV, Leiter EH, **Shultz LD**. 1990. Transplantation analysis of B cell destruction in (NOD x CBA)F1 mouse bone marrow chimeras. *Diabetologia* 33: 84-92.
66. Sprecher E, Becker Y, Kraal G, Hall E, Harrison D, **Shultz LD**. 1990. Effect of aging on epidermal dendritic cell populations in C57BL/6J mice. *J Invest Dermatol* 94: 247-253.

67. Sprecher E, Becker Y, Kraal G, Hall E, **Shultz LD**. 1990. Effect of genetically determined immunodeficiency on epidermal dendritic cell populations in C57BL/6J mice. *Arch Dermatol Res* 282: 188-193.
68. Sundberg JP, Beamer WG, **Shultz LD**, Dunstan RW. 1990. Inherited mouse mutations as models of human adnexal, cornification, and papulosquamous dermatoses. *J Invest Dermatol* 95: 62S-63S.
69. Yoshida H, Hayashi S, Kunisada T, Ogawa M, Nishikawa S, Okamura H, Sudo T, **Shultz LD**, Nishikawa S. 1990. The murine mutation osteopetrosis is in the coding region of the macrophage colony stimulating factor gene. *Nature* 345: 442-444.
70. Chakraborty NG, Okino T, Stabach P, Padula S, Yamase Y, Morse E, Shaafi R, Twardzik DR, **Shultz LD**, Mukherji B. 1991. Adoptive transfer of activated autologous macrophages results in regression of transplanted human melanoma cells in SCID mice. *In Vivo* 5:609-614.
71. Croitoru K, Stead RH, Bienenstock J, **Shultz LD**, Ernst PB. 1991. T cell receptor expression is not required for the localization and differentiation of intraepithelial lymphocytes. *Immunol Res* 10: 293-295.
72. Davies TF, Kimura H, Fong P, Kendler D, **Shultz LD**, Thung S, Martin A. 1991. The SCID-hu mouse and thyroid autoimmunity: characterization of human thyroid autoantibody secretion. *Clin Immunol Immunopathol* 60: 319-330.
73. Greiner DL, **Shultz LD**, Rossini AA, Mordes JP, Handler ES, Rajan TV. 1991. Recapitulation of normal and abnormal BB rat immune system development in scid mouse/rat lymphohemopoietic chimeras. *J Clin Invest* 88: 717-719. PMID: PMC295424
74. Kolber DL, **Shultz LD**, Rothstein TL. 1991. Phorbol ester responsiveness of murine Ly-1-lineage B cells from normal and viable motheaten mutant mice. *Eur J Immunol* 21: 721-729.
75. Koo GC, Manyak CL, Dasch J, Ellingsworth L, **Shultz LD**. 1991. Suppressive effects of monocytic cells and transforming growth factor-beta on natural killer cell differentiation in autoimmune viable motheaten mutant mice. *J Immunol* 147: 1194-1200.
76. McCune JM, Kaneshima H, Krowka J, Namikawa R, Outzen H, Peault B, Rabin L, Shih C, Yee E, Lieberman M, Weissman IL, **Shultz LD**. 1991. The SCID-hu mouse: A small animal model for HIV infection and pathogenesis. *Ann Rev Immunol* 9:399-429.
77. Naito M, Hayashi S, Yoshida H, Nishikawa S, **Shultz LD**, Takahashi K. 1991. Abnormal differentiation of tissue macrophage populations in 'osteopetrosis' (op) mice defective in the production of macrophage colony-stimulating factor. *Am J Pathol* 139: 657-667. PMID: PMC1886220
78. Nelson FK, Greiner DL, **Shultz LD**, Rajan TV. 1991. The immunodeficient scid mouse as a model for human lymphatic filariasis. *J Exp Med* 173: 659-663.
79. Schweitzer PA, Taylor SE, **Shultz LD**. 1991. Synthesis of abnormal immunoglobulins by hybridomas from autoimmune "viable motheaten" mutant mice. *J Cell Biol* 114: 35-43.
80. **Shultz LD**. 1991. Hematopoiesis and models of immunodeficiency. *Semin Immunol* 3: 397-408.
81. **Shultz LD**. 1991. Immunological mutants of the mouse. *Am J Anat* 191: 303-311.
82. **Shultz LD**, Lane PW, Coman DR, Taylor S, Hall E, Lyons B, Wood BG, Schlager G. 1991. Hairpatches, a single gene mutation characterized by progressive renal disease and alopecia in the mouse. A potential model for a newly described heritable human disorder. *Lab Invest* 65: 588-600.
83. Sprecher E, **Shultz LD**, Becker Y. 1991. Epidermal dendritic cells in immunodeficient mice. In: *Skin Langerhans (Dendritic) Cells in Virus Infections and AIDS*, Becker Y (ed). Kluwer Academic Publishers, pp. 59-75.
84. Sprecher E, **Shultz LD**, Becker Y. 1991. Epidermal dendritic cells in aged C57BL/6J mice. In: *Skin Langerhans (Dendritic) Cells in Virus Infections and AIDS*, Becker Y (ed). Kluwer Academic Publishers, pp. 99-117.
85. Sundberg JP, **Shultz LD**. 1991. Inherited mouse mutations: Models for the study of alopecia. *J Invest Dermatol* 91:95S-96S.
86. Disney JE, Barth AL, **Shultz LD**. 1992. Defective repair of radiation-induced chromosomal damage in scid/scid mice. *Cytogenet Cell Genet* 59: 39-44.
87. Greiner DL, Rajan TV, **Shultz LD**. 1992. Animal models for immunodeficiency diseases. *Immunol Today* 13: 116-117.

88. Hayes SM, **Shultz LD**, Greiner DL. 1992. Thymic involution in viable motheaten (me(v)) mice is associated with a loss of intrathymic precursor activity. *Dev Immunol* 2: 191-205. PMID: PMC2275861
89. Martin A, Kimura H, Thung S, Fong P, **Shultz LD**, Davies TF. 1992. Characteristics of long-term human thyroid peroxidase autoantibody secretion in scid mice transplanted with lymphocytes from patients with autoimmune thyroiditis. *Int Arch Allergy Immunol* 98: 317-323.
90. Naito M, Honda Y, Umeda S, **Shultz LD**, Takahashi K. 1992. Glucan-induced granuloma formation in the liver of osteopetrosis (op) and nude (nu) mutant mice. *Proceedings of the Sixth International Symposium on Cells of the Hepatic Sinusoid*.
91. Ohara A, Anklesaria P, **Shultz L**, Greenberger JS. 1992. Isolation of permanent clonal bone marrow stromal cell lines derived from "viable moth-eaten" and "severe combined immunodeficiency" mutant mice. *Int J Cell Cloning* 10: 33-46.
92. Prochazka M, Gaskins HR, **Shultz LD**, Leiter EH. 1992. The nonobese diabetic scid mouse: model for spontaneous thymomagenesis associated with immunodeficiency. *Proc Natl Acad Sci U S A* 89: 3290-3294. PMID: PMC48852
93. Rajan TV, Nelson FK, Cupp E, **Shultz LD**, Greiner DL. 1992. Survival of *Onchocerca volvulus* in nodules implanted in immunodeficient rodents. *J Parasitol* 78:160-163.
94. Rajan TV, Nelson FK, **Shultz LD**, Koller BH, Greiner DL. 1992. CD8+ T lymphocytes are not required for murine resistance to human filarial parasites. *J Parasitol* 78: 744-746.
95. Rajan TV, **Shultz LD**, Greiner DL. 1992. Lack of peripherally induced tolerance to established skin allografts in immunologically reconstituted scid mice. *Dev Immunol* 3: 45-50. PMID: PMC2275903
96. Takahashi K, Naito M, **Shultz LD**. 1992. Differentiation of epidermal Langerhans cells in macrophage colony-stimulating-factor-deficient mice homozygous for the osteopetrosis (op) mutation. *J Invest Dermatol* 99: 46S-47S.
97. Takahashi K, Naito M, **Shultz LD**. 1992. Glucan-induced granuloma formation in the liver of osteopetrosis (op) mice lacking macrophage colony-stimulating activity. *Sarcoidosis* 9:293-294.
98. Beamer WG, Shultz KL, Tennent BJ, **Shultz LD**. 1993. Granulosa cell tumorigenesis in genetically hypogonadal-immunodeficient mice grafted with ovaries from tumor-susceptible donors. *Cancer Res* 53: 3741-3746
99. Christianson SW, **Shultz LD**, Leiter EH. 1993. Adoptive transfer of diabetes into immunodeficient NOD-scid/scid mice. Relative contributions of CD4+ and CD8+ T-cells from diabetic versus prediabetic NOD.NON-Thy-1a donors. *Diabetes* 42: 44-55.
100. Kapasi ZF, Burton GF, **Shultz LD**, Tew JG, Szakal AK. 1993. Induction of functional follicular dendritic cell development in severe combined immunodeficiency mice. Influence of B and T cells. *J Immunol* 150: 2648-2658.
101. Kapasi ZF, Burton GF, **Shultz LD**, Tew JG, Szakal AK. 1993. Cellular requirements for functional reconstitution of follicular dendritic cells in SCID mice. *Adv Exp Med Biol* 329: 383-386.
102. Katoh S, Bendig MM, Kanai Y, **Shultz LD**, Hitoshi Y, Takatsu K, Tominaga A. 1993. Maintenance of CD5+ B cells at an early developmental stage by interleukin-5: evidence from immunoglobulin gene usage in interleukin-5 transgenic mice. *DNA Cell Biol* 12: 481-491.
103. Koo GC, Rosen H, Sirotna A, Ma XD, **Shultz LD**. 1993. Anti-CD11b antibody prevents immunopathologic changes in viable moth-eaten bone marrow chimeric mice. *J Immunol* 151: 6733-6741.
104. Martin A, Valentine M, Unger P, Lichtenstein C, Schwartz AE, Friedman EW, **Shultz LD**, Davies TF. 1993. Preservation of functioning human thyroid organoids in the scid mouse: 1. System characterization. *J Clin Endocrinol Metab* 77: 305-310.
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