

CURRICULUM VITAE - Emil R. Unanue

ADDRESS AND TELEPHONE NUMBERS:

Office: Department of Pathology and Immunology
Washington University School of Medicine
660 S. Euclid Ave. St. Louis, MO 63110
(314) 362-7440

Home: 25 Wydown Terrace, Clayton, MO 63105
(314) 725-6427

PRESENT POSITION:

Mallinckrodt Professor and Chairman, Department of Pathology and Immunology, Washington University School of Medicine, St. Louis, MO

EDUCATION:

1952 B.S. Institute of Secondary Education, Havana, Cuba

1960 M.D. University of Havana, School of Medicine

POSTDOCTORAL TRAINING:

1961-1962 Intern in Pathology, Presbyterian University Hospital,
Pittsburgh, Pennsylvania

1962-1966 Research Fellow, Department of Experimental Pathology,
Scripps Clinic and Research Foundation, La Jolla,
California

1966-1968 Research Fellow, Immunology Division, National Institute
for Medical Research, London, England

ACADEMIC POSITIONS:

- 1968-1970 Associate, Department of Experimental Pathology, Scripps Clinic and Research Foundation, LaJolla, California
- 1970-1971 Assistant Professor of Pathology, Department of Pathology, Harvard Medical School, Boston, Massachusetts
- 1972-1974 Associate Professor of Pathology, Department of Pathology, Harvard Medical School, Boston, Massachusetts
- 1974-1984 Mallinckrodt Professor of Immunopathology, Department of Pathology, Harvard Medical School, Boston, Massachusetts
- 1985- Mallinckrodt Professor and Chairman, Department of Pathology and Immunology, Washington University School of Medicine, St. Louis, Missouri

HOSPITAL APPOINTMENTS:

- 1977-1984 Consultant in Pathology, Department of Pathology, Brigham and Women's Hospital, Boston, Massachusetts
- 1985- Pathologist-in-Chief, Barnes-Jewish Hospital, St. Louis, MO

MEDICAL LICENSURE:

Certificate of Education Council for Foreign Medical Graduates, U.S.A.
Pennsylvania M.D. license
Massachusetts M.D. license
Missouri M.D. license

HONORS AND AWARDS:

- 1966-1969 Fellow of the Helen Hay Whitney Foundation
- 1968 T. Duckett Jones Award of the Hay Whitney Foundation
- 1969-1970 Senior Fellow of the American Cancer Society, California Division
- 1971 Research Career Development Award, National Institutes of Health
- 1973 Parke Davis Award, American Society for Experimental Pathology
- 1974 Master in Arts (Honorary), Harvard University, Cambridge, Massachusetts

HONORS AND AWARDS (continued)

- 1980-1981 Guggenheim Fellowship, John Simon Guggenheim Memorial Foundation, New York, New York: Biological Laboratories, Harvard University, Cambridge, Massachusetts
- 1985-1988 Councilor, American Association of Pathologists, Inc.
- 1988-1989 President, American Association of Pathologists, Inc.
- 1986 Marie T. Bonazinga Annual Research Award of the Reticuloendothelial Society
- 1987 Member, National Academy of Sciences
- 1988 Member, Alpha Omega Alpha Honorary Medical Society
- 1989 Fellow, American Academy of Arts and Sciences
- 1989 William B. Coley Award, Cancer Research Institute, New York
- 1995 Albert Lasker Basic Medical Research Award, New York (co-recipient)
- 1995 Member, Institute of Medicine, National Academy of Sciences
- 1998 Rous-Whipple Award, American Society for Investigative Pathology
- 1999 Doctor Honoris causa - Universitat di Barcelona
- 2000 Gairdner Foundation International Award (co-recipient)
- 2003 Irvington Institute Scientific Leadership in Immunology Award, New York

EDITORIAL RESPONSIBILITIES:

- 1972-1977 Associate Editor, The Journal of Immunology
- 1972-1989 Associate Editor, Clinical Immunology and Immunopathology
- 1973-1991 Associate Editor, International Archives of Allergy and Applied Immunology
- 1974-1977 Associate Editor, Journal of the Reticuloendothelial Society
- 1975-1990 Associate Editor, Laboratory Investigation
- 1976-1977 Contributing Editor, Vox Sanguinis
- 1977-1983 Head, Cellular Immunology Section, The Journal of Immunology
- 1980-1984 Editorial Board, The Journal of Immunology
- 1980-1984 Editorial Board, Lymphokines
- 1983-1987 Publication Committee, Reticuloendothelial Society
- 1984-1988 Editorial Board, Annual Review of Immunology
- 1984-1985 Editorial Board, Microbiological Reviews
- 1987-1988 Editorial Board, FASEB Journal
- 1988-1997 Editorial Board, Modern Pathology
- 1988-1996 Review Board, Science
- 1992-2003 Transmitting Editor, International Immunology
- 1994-1996 Associate Editor, Immunity
- 1994-1999 Editorial Board, Molecular Medicine

1995 Editorial Advisory Board, Encyclopedia of Immunology, 2nd ed.
1996-2002 Editorial Board, Immunological Reviews

EDITORIAL RESPONSIBILITIES (continued):

1996-2/00	Editor, Immunity
2000-	Associate Editor, Immunity
2003-	Editorial Board, International Immunology
2003-	Editorial Board, Advances in Immunology

MEMBERSHIPS IN PROFESSIONAL SOCIETIES:

1966	American Society of Investigative Pathology
1966	American Association of Immunologists
1976	British Society for Immunology
1977	Reticuloendothelial Society
1981	Venezuelan Society of Allergy and Immunology (Honorary)
1984	American Society for Cell Biology
1986	Association of Pathology Chairmen
1986	U.S. and Canadian Academy of Pathology

MAJOR INVITED PROFESSORSHIPS AND LECTURESHIPS:

1979	Ecker Lecture, Western Reserve University, Cleveland, Ohio
1982	Visiting Professor, Kuwait University School of Medicine, Kuwait (November)
1983	Visiting Professor, Royal Postgraduate Medical School, London, England (November)
1985	Plenary Speaker, FASEB meetings, Anaheim, California
1985	D. Allan Harmon Lecture, Oklahoma Medical Research Foundation, Oklahoma City, Oklahoma
1985	Henry Kunkel Lecture, Johns Hopkins University, Baltimore, Maryland
1986	Gerald Rodnan Lecture, American Rheumatism Association, New Orleans, Louisiana
1988	Albert H. Coons Lecture, Harvard Medical School, Boston, Massachusetts
1991	Gustave Dammin Lecture, Brigham and Womens Hospital, Harvard Medical School, Boston, Massachusetts
1992	Sidney Leskowitz Memorial Lecture, Tufts University School of Medicine, Boston, Massachusetts
1992	Swerling Lecture, Dana-Farber Cancer Center, Boston, Massachusetts
1993	Ninth Shipley Symposium. Department of Microbiology & Molecular Genetics, Harvard Medical School, Boston, MA
1994	Second Annual Baruj Benacerraf Lecture, Harvard Medical School, Boston, Massachusetts
1995	33rd Annual J.S. and H.R. Blumenthal Memorial Lecture,

University of Minnesota, Minneapolis, Minnesota

MAJOR INVITED PROFESSORSHIPS AND LECTURESHIPS (continued):

- 1997 Paulette Shirey Pritchett Endowed Lecture, University of Alabama, Birmingham, Alabama
- 1998 Irving Lepow Memorial Lecture, Case Western Reserve University
- 1998 Michael Heidelberg Memorial Lecture, New York University
- 1999 Kenneth W. Sell Memorial Lecture, Emory University
- 2000 Burroughs Wellcome Visiting Professor in the Basic Medical Sciences, Tulane University
- 2002 Keynote Address at Keystone Symposium on T Lymphocyte Activation, Differentiation and Death, Keystone, Colorado
- 2002 American Association of Immunologists Distinguished Lecture, New Orleans, Louisiana
- 2002 Zoltan Ovary Lecture, New York University

COMMITTEE AND BOARD MEMBERSHIPS:

- 1973-1977 Pathology "A" Study Section, National Institutes of Health
- 1980-1985 Allergy and Immunology Research Committee, National Institutes of Health
- 1985-1986 National Scientific Advisory Council, National Jewish Center for Immunology and Respiratory Medicine, Denver, Colorado
- 1986-1992 Executive Committee, Scientific Advisory Board, Terri Gotthelf Lupus Research Institute
- 1987-1990 American Association of Pathologists, Inc., Representative to the FASEB Board
- 1987-1991 Scientific Advisory Board, Harold C. Simmons Arthritis Research Center
- 1988-1991 Scholars Selection Committee (Immunology), RJR Nabisco
- 1989-1991 Board of Directors, Barnes Hospital
- 1990-1995 Scientific Advisory Board, Howard Hughes Medical Institute
- 1992-1997 Board of Scientific Counselors, National Institute of Allergy and Infectious Diseases, NIH
- 1994-1997 Abbott Laboratories Scientific Advisory Council
- 1994-1998 Pew National Advisory Council
- 1995-1999 Medical Advisory Board, Howard Hughes Medical Institute
- 1996-2000 Scientific Advisory Board, Dana-Farber Cancer Institute
- 1997-2001 National Advisory Allergy and Infectious Diseases Council, NIH
- 1998-2001 Chairman, National Academy of Sciences Section 43 (Microbiology and Immunology)
- 2002- Harvard Medical School - Visiting Committee of the Board of Overseers

ORIGINAL PUBLICATIONS

1. Unanue ER, Dixon FJ: Experimental glomerulonephritis. IV. Participation of complement in nephrotoxic nephritis. *J Exp Med* 1964;119:965.
2. Unanue ER, Dixon FJ: Experimental glomerulonephritis. V. Studies of the interaction of nephrotoxic antibodies with tissues of the rat. *J Exp Med* 1965;121:697.
3. Unanue ER, Dixon FJ: Experimental glomerulonephritis. VI. The autologous phase of nephrotoxic serum nephritis. *J Exp Med* 1965;121:715.
4. Cochrane CG, Unanue ER, Dixon FJ: A role of polymorphonuclear leukocytes and complement in nephrotoxic nephritis. *J Exp Med* 1965;122:99.
5. Unanue ER, Lee S, Dixon FJ, Feldman JD: Experimental glomerulonephritis. VII. The absence of autoimmunity in nephrotoxic nephritis of the rat. *J Exp Med* 1965;122:565.
6. Unanue ER, Dixon FJ, Lee S: Experimental glomerulonephritis. VIII. The in vivo fixation of heterologous nephrotoxic antibodies to, and their exchange among, tissues of the rat. *Int Arch Allergy* 1966;28:140.
7. Feldman JD, Mardiney MR, Unanue ER, Cutting H: The vascular pathology of thrombotic thrombocytopenic purpura. An immunohistochemical and ultrastructural study. *Lab Invest* 1966;15:297.
8. Moran TJ, Westerman MP, Unanue ER: Anemia and hyperlipemia in cortisone-treated rabbits. Characterization of anemia and comparison of serum and erythrocyte lipid levels. *Lab Invest* 1966;10:1050.
9. Unanue ER, Mardiney MR, Dixon FJ: Nephrotoxic serum nephritis in complement-intact and -deficient mice. *J Immunol* 1967;97:609.
10. Unanue ER, Dixon FJ: Experimental allergic glomerulonephritis induced in the rabbit with heterologous renal antigens. *J Exp Med* 1967;125:149.
11. Unanue ER, Dixon FJ, Feldman JD: Experimental allergic glomerulonephritis induced in the rabbit with homologous renal antigens. *J Exp Med* 1966;125:163.

12. Katz DH, Unanue ER, Dixon FJ: Nephritogenic properties of cross-reacting kidney antibodies to heart, spleen, and muscle. *J Immunol* 1967;98:160.
13. Askonas BA, Auzins I, Unanue ER: Role of macrophages in the immune response *Bull Soc Chim Biol* 1968;50:1113.
14. Unanue ER, Askonas BA: Persistence of immunogenicity of antigen after uptake by macrophages. *J Exp Med* 1968;127:915.
15. Unanue ER, Askonas BA: The immune response of mice to antigen in macrophages. *Immunol* 1968;15:287.
16. Unanue ER: Properties and some uses of anti-macrophage antibodies. *Nature (London)*: 1968;36:218.
17. Katz DH, Unanue ER, Dixon FJ: Induction of intravascular coagulation and focal tissue necrosis in rats by administration of anti-connective tissue antibodies. *Am J Pathol* 1968;53:835.
18. Unanue ER, Askonas BA, Allison AC: A role of macrophages in the stimulation of immune responses by adjuvants. *J Immunol* 1969;71:103.
19. Unanue ER: The immune response of mice to keyhole limpet hemocyanin bound to macrophages. *J Immunol* 1969;102:893.
20. Unanue ER, Cerottini J-C, Bedford M: The persistence of antigen on the surface of macrophages. *Nature (London)*: 1969;222:1193.
21. Unanue ER, Cerottini J-C: The immunogenicity of antigen bound to the plasma membrane of macrophages. *J Exp Med* 1970;131:711.
22. Tung KSK, Unanue ER, Dixon FJ: The immunopathology of experimental allergic orchitis. *Am J Pathol* 1970;60:313.
23. Unanue ER: Thymus dependency of the immune response to hemocyanin - an evaluation of the role of macrophages in thymectomized mice. *J Immunol* 1970;105:1339.
24. Cerottini J-C, Unanue ER: Genetic control of the immune response of mice to hemocyanin. I. The role of macrophages. *J Immunol* 1971;106:732.
25. Cruchaud A, Unanue ER: Fate and immunogenicity of antigens endocytosed by macrophages: A study using foreign red cells and immunoglobulin G. *J Immunol* 1971;107:1329.

26. Rabellino E, Colon S, Grey HM, Unanue ER: Immunoglobulins on the surface of lymphocytes. I. Distribution and quantitation. *J Exp Med* 1971;133:156.
27. Unanue ER, Grey HM, Rabellino E, Campbell P, Schmidtke J: Immunoglobulins on the surface of lymphocytes. II. The bone marrow as the main source of lymphocytes with detectable surface-bound immunoglobulin. *J Exp Med* 1971; 133:1188.
28. Tung KSK, Unanue ER, Dixon FJ: Immunological events associated with immunization by sperm in incomplete Freund's adjuvant. *Int Arch Allergy Applied Immunol* 1971;41:565.
29. Tung KSK, Unanue ER, Dixon FJ: Pathogenesis of experimental allergic orchitis. I. Transfer with immune lymph node cells. *J Immunol* 1971; 106:1453.
30. Tung KSK, Unanue ER, Dixon FJ: Pathogenesis of experimental allergic orchitis. II. The role of antibody. *J Immunol* 1971;106:1463.
31. Schmidtke JR, Unanue ER: Interaction between macrophages and lymphocytes with surface immunoglobulin. *Nature (London)*: 1971;233:84.
32. Unanue ER, Feldman JD: Role of macrophages in delayed hypersensitivity. I. Induction with macrophage-bound antigen. *Cell Immunol* 1971;2:369.
33. Feldman JD, Unanue ER: Role of macrophages in delayed hypersensitivity. II. Effects of anti-macrophage antibody. *Cell Immunol* 1971;2:275.
34. Unanue ER: Antigen-binding cells. I. Their identification and role in the immune response. *J Immunol* 1971;107:1168.
35. Schmidtke JR, Unanue ER: Macrophage-antigen interaction: uptake, metabolism, and immunogenicity of foreign albumin. *J Immunol* 1971;107: 331.
36. Unanue ER: Antigen binding cells. II. Effect of highly radioactive antigen on the immunological function of bone marrow cells. *J Immunol* 1971;107:1663.

37. Perkins WD, Karnovsky MJ, Unanue ER: An ultrastructural study of lymphocytes with surface-bound immunoglobulin. *J Exp Med* 1972;135:167.
38. Unanue ER, Perkins WE, Karnovsky MJ: Endocytosis by lymphocytes of complexes of anti-Ig with membrane-bound Ig. *J Immunol* 1972;108:569.
39. Lane FC, Unanue ER: Requirement of T (thymus) lymphocytes for resistance to listeriosis. *J Exp Med* 1972;135:1104.
40. Feldman JD, Tubergen DG, Pollock EM, Unanue ER: Distribution of a macrophage-specific antigen. *Cell Immunol* 1972;5:324.
41. Unanue ER, Perkins WD, Karnovsky MJ: Ligand-induced movement of lymphocyte membrane macromolecules. I. Analysis by immunofluorescence and ultrastructural radioautography. *J Exp Med* 1972;136:885.
42. Karnovsky MJ, Unanue ER, Leventhal M: Ligand-induced movement of lymphocyte membrane macromolecules. II. Mapping of surface moieties. *J Exp Med* 1972; 136:907.
43. Katz DH, Unanue ER: The immune capacity of lymphocytes after cross-linking of surface immunoglobulin receptors by antibody. *J Immunol* 1972;109:1022.
44. Dunham EK, Unanue ER, Benacerraf B: Antigen binding and capping by lymphocytes of genetic nonresponder mice. *J Exp Med* 1972;136:403.
45. Engers HD, Unanue ER: The fate of anti-Ig-surface Ig complexes on B lymphocytes. *J Immunol* 1973;110:465.
46. Lane FC, Unanue ER: Immunological events during *Listeria monocytogenes* infection in mice: adjuvanticity and immunogenicity of macrophage-bound antigens. *J Immunol* 1973;110:829.
47. Unanue ER, Karnovsky MJ, Engers HD: Ligand-induced movement of lymphocyte surface macromolecules. III. Relationship between the formation and fate of anti-Ig-surface Ig complexes and cell metabolism. *J Exp Med* 1973;137:675.
48. Katz DH, Unanue ER: Critical role of determinant presentation in the induction of specific responses in immunocompetent lymphocytes. *J Exp Med* 1973;137:967.

49. Unanue ER, Benacerraf B: Immunological events in experimental hypersensitivity granulomas. *Am J Pathol* 1973;7:349.
50. Engers HD, Unanue ER: Antigen binding thymic lymphocytes: specific binding of soluble antigen molecules and quantitation of surface receptor sites. *J Immunol* 1974;112:293.
51. Ault KA, Karnovsky MJ, Unanue ER: Studies on the distribution of surface immunoglobulin on human B lymphocytes. *J Clin Invest* 1973;53:2507.
52. Unanue, ER, Katz DH: Immunogenicity of macrophage-bound antigens: the requirement for hapten and carrier determinants to be on the same molecule for T and B lymphocyte collaboration. *Eur J Immunol* 1973;3:559.
53. Lane FC, Petit JC, Gordon E, Unanue ER: Increased bacterial activity by non-specific stimulation of lymphoid cells - experiments in vivo with Concanavalin A. *Clin Immunol Immunopathol* 1973;2:74.
54. Calderon J, Unanue ER: The release of antigen molecules from macrophages - characterization of the phenomena. *J Immunol* 1974;112:1804.
55. Unanue ER, Biozzi G, Benacerraf B: Immunocytochemical studies on B lymphocytes from the Biozzi high and low lines of mice selected for their responses to heterologous erythrocytes. *Proc Soc Exp Biol Med* 1974;145:1243.
56. Unanue ER, Ault KA, Karnovsky MJ: Ligand-induced movement of lymphocyte membrane macromolecules. IV. Stimulation of cell movement by anti-Ig and lack of relationship to capping. *J Exp Med* 1974;139:295.
57. Ault KA, Unanue ER: Events following the binding of antigen to lymphocytes: removal and regeneration of antigen receptor. *J Exp Med* 1974;139:1110.
58. Ryan GB, Unanue ER, Karnovsky MJ: Inhibition of surface capping of macromolecules by local anesthetics and tranquilizers. *Nature* 1974;250:56.
59. Petit J-C, Unanue ER: Effects of bacterial products on lymphocytes and macrophages: Their possible role in natural resistance to *Listeria* infection in mice. *J Immunol* 1974;113:984.

60. Ault KA, Unanue ER, Katz DH, Benacerraf B: Failure of lymphocytes to re-express antigen receptors after brief interaction with tolerogenic D amino acid copolymer. *Proc Natl Acad Sci USA* 1974;71:3111.
61. Unanue ER, Karnovsky MJ: Ligand-induced movement of lymphocyte membrane macromolecules. V. Capping, cell movement, and microtubular function in normal and lectin-treated lymphocytes. *J Exp Med* 1974;140:1207.
62. Unanue ER: Cellular events following binding of antigen to lymphocytes (Parke Davis Award Lecture). *Am J Pathol* 1974;77:2.
63. Calderon J, Williams RT, Unanue ER: An inhibitor of cell proliferation released by cultures of macrophages. *Proc Natl Acad Sci USA* 1974;71:4273.
64. Schreiner GF, Unanue ER: The modulation of spontaneous and anti-Ig-stimulated motility of lymphocytes by cyclic nucleotides and adrenergic and cholinergic agents. *J Immunol* 1975;114:802.
65. Unanue ER, Dorf ME, David CS, Benacerraf B: The presence of I-region-associated antigens on B cells in molecules distinct from Ig and H-2K and H-2D. *Proc Natl Acad Sci USA* 1974;71:5014.
66. Moatamed F, Karnovsky MJ, Unanue ER: Early cellular response to mitogens and adjuvants in the mouse spleen. *Lab Invest* 1975;32:302.
67. Schreiner GF, Unanue ER: Anti-Ig-triggered movement of lymphocytes-specificity and lack of evidence for directional migration. *J Immunol* 1975;114:809.
68. Abbas AK, Ault KA, Karnovsky MJ, Unanue ER: Non-random distribution of surface immunoglobulin in B murine lymphocytes. *J Immunol* 1975;114:1197.
69. Calderon J, Unanue ER: Two biological activities regulating cell proliferation found in cultures of peritoneal exudate cells. *Nature (Washington)* 1975;253:359.
70. Sidman CL, Unanue ER: Development of B lymphocytes. I. Cell populations and a critical event during ontogeny. *J Immunol* 1975;114:1730.
71. Kennedy LJ Jr, Dorf ME, Unanue ER, Benacerraf B: Binding of poly (glu 60-ala 30-tyr 10) by thymic lymphocytes from genetic responder and non-

- responder mice: effect of antihistocompatibility serum. *J Immunol* 1975;114:1670.
72. Calderon J, Kiely J-M, Lefko JL, Unanue ER: The modulation of lymphocyte functions by molecules secreted by macrophages. I. Description and partial biochemical analysis. *J Exp Med* 1975;142:151.
 73. Sidman CL, Unanue ER: Receptor-mediated inactivation of early B lymphocytes. *Nature* 1975;257:149.
 74. Abbas AK, Unanue ER: Interrelationship of surface immunoglobulin and Fc receptors on mouse B lymphocytes. *J Immunol* 1975;115:1665.
 75. Abbas AK, Dorf ME, Karnovsky MJ, Unanue ER: The distribution of Ia antigens on the surfaces of lymphocytes. *J Immunol* 1976;116:371.
 76. Schreiner GF, Unanue ER: Calcium-sensitive modulation of Ig capping-evidence supporting a cytoplasmic control of surface-receptor complexes. *J Exp Med* 1976;143:15.
 77. Becker EL, Unanue ER: The requirement for esterase activation in the anti-immunoglobulin-triggered movement of B lymphocytes. *J Immunol* 1976;117:27.
 78. Schreiner GF, Unanue ER: The disruption of immunoglobulin caps by local anesthetics. *Clin Immunol Immunopathol* 1976;6:264.
 79. Unanue ER, Kiely J-M, Calderon J: The modulation of lymphocyte functions by molecules secreted by macrophages. II. Conditions leading to increased secretion. *J Exp Med* 1976;144:155.
 80. Fram RJ, Sidman CL, Unanue ER: Genetic control of ligand-induced events in B lymphocytes. *J Immunol* 1976;117:1456.
 81. Unanue ER, Beller DI, Calderon J, Kiely J-M, Stadecker MJ: Regulation of immunity and inflammation by mediators from macrophages. *Am J Pathol* 1976;85:465.
 82. Sidman CL, Unanue ER: Control of B lymphocyte function. I. Inactivation of mitogenesis by interactions with surface immunoglobulin and Fc-receptor molecules. *J Exp Med* 1976;144:882.
 83. Schreiner GF, Braun J, Unanue ER: Spontaneous redistributions of surface immunoglobulin in the motile B lymphocyte. *J Exp Med* 1976;144:1683.

84. Ault KA, Unanue ER: Comparison of the two types of immunoglobulin-bearing lymphocytes in human blood with regard to capping and motility. *Clin Immunol Immunopathol* 1977;7:394.
85. Camazine SM, Ryan GB, Unanue ER, Karnovsky MJ: Isolation of phagocytic cells from the rat glomerulus. *Lab Invest* 1976;35:315.
86. Beller DI, Unanue ER: Thymocyte maturation *in vitro* by a secretory product from macrophages. *J Immunol* 1977;118:1780.
87. Ault KA, Unanue ER: Failure of B lymphocytes in human blood to regenerate surface Ig after its removal by antibody. *J Immunol* 1977;119:327.
88. Schreiner GF, Fujiwara K, Pollard TD, Unanue ER: Redistribution of myosin accompanying capping of surface Ig. *J Exp Med* 1977;145:1393.
89. Unanue ER, Kiely J-M: Synthesis and secretion of a mitogenic protein by macrophages: description of a superinduction phenomenon. *J Immunol* 1977;119:925.
90. Ward PA, Unanue ER, Goralnick S, Schreiner GF: Chemotaxis of rat lymphocytes. *J Immunol* 1977;119:416.
91. Farr AG, Dorf ME, Unanue ER: Secretion of mediators following T lymphocyte-macrophage interaction is regulated by the major histocompatibility complex. *Proc Natl Acad Sci USA* 1977;74:3542-3546.
92. Stadecker MJ, Calderon J, Karnovsky MJ, Unanue ER: Synthesis and release of thymidine by macrophages. *J Immunol* 1977;119:1738.
93. Polverini PJ, Cotran RS, Gimbrone MA Jr, Unanue ER: Activated macrophages induce vascular proliferation. *Nature* 1977;269:804.
94. Schreiner GF, Unanue ER: Capping and the lymphocyte: Models for membrane reorganization. *J Immunol* 1977;119:1549.
95. Schreiner GF, Cotran RS, Pardo V, Unanue ER: A mononuclear cell component in experimental immunological glomerulonephritis. *J Exp Med* 1978;147:369.
96. Sidman CL, Unanue ER: Control of B lymphocyte function. II. Control of proliferation and differentiation by anti-Ig antibodies and a serum-derived cofactor. *Proc Natl Acad Sci USA* 1978;75:2401.

97. Beller DI, Unanue ER: Thymic macrophages modulate one stage of T cell differentiation *in vitro*. J Immunol 1978;121:186.
98. Braun J, Fujiwara K, Pollard TD, Unanue ER: Two distinct mechanisms for redistribution of lymphocyte surface macromolecules -- relationship to cytoplasmic myosin. J Cell Biol 1978;78:409.
99. Braun J, Fujiwara K, Pollard TD, Unanue ER: Two distinct mechanisms for redistribution of lymphocyte surface macromolecules -- contrasting effects of local anesthetics and a calcium ionophore. J Cell Biol 1978;78:419.
100. Sidman CL, Unanue ER: Proliferative response to anti-IgM antibodies of various B lymphocyte subpopulations isolated by cell sorting. J Immunol 1978;121:2129.
101. Karnovsky MJ, Unanue ER: Cell surface changes in capping studied by correlated fluorescence and scanning electron microscopy. Lab Invest 1978;39:554.
102. Sidman CL, Schultz LD, Unanue ER: The mouse mutant "moth-eaten". I. Development of lymphocyte populations. J Immunol 1978;121:2392.
103. Sidman CL, Schultz LD, Unanue ER: The mouse mutant "moth-eaten". II. Functional studies of the immune system. J Immunol 1978;121:2399
104. Sidman CL, Unanue ER: Requirements for mitogenic stimulation of murine B cells by soluble anti-IgM antibodies. J Immunol 1979;122:406.
105. Farr AG, Kiely J-M, Unanue ER: Macrophage-T cell interactions involving *Listeria monocytogenes* - role of the H-2 gene complex. J Immunol 1979;122:2395-2404.
106. Farr AG, Wechter WJ, Kiely J-M, Unanue ER: Induction of cytotoxic macrophages following *in vitro* interactions between *Listeria*-immune T cells and macrophages -- role of H-2. J Immunol 1979;122:2405-2412.
107. Hauser SL, Weiner H, Ault KA, Unanue ER: Lymphocyte capping in Duchenne muscular dystrophy. New Engl J Med 1979;300:861.
108. Stadecker MJ, Unanue ER: The regulation of thymidine secretion by macrophages. J Immunol 1979;123:568.

109. Braun J, Sha'afi RI, Unanue ER: Crosslinking by ligands to surface immunoglobulin triggers mobilization of intracellular $^{45}\text{Ca}^{2+}$ in B lymphocytes. *J Cell Biol* 1979;82:755.
110. Ziegler K, Unanue ER: The specific binding of Listeria-immune T lymphocytes to macrophages. I. Quantitation, role of H-2 gene products. *J Exp Med* 1979;150:1143.
111. Lu CY, Calamai EG, Unanue ER: A defect in the antigen-presenting functions of macrophages from neonatal mice. *Nature* 1979;282:327.
112. Beller DI, Unanue ER: Evidence that resting thymocytes require at least two distinct signals to proliferate. *J Immunol* 1979;123:2890.
113. Braun J, Rosen FS, Unanue ER: Capping and adenosine metabolism - genetic and pharmacologic studies. *J Exp Med* 1980;151:174.
114. Beller DI, Unanue ER: Ia antigens and antigen-presenting function of thymic macrophages. *J Immunol* 1980;124:1433.
115. Beller DI, Kiely J-M, Unanue ER: Regulation of macrophage populations. I. Preferential induction of Ia-rich peritoneal exudates by immunological stimuli. *J Immunol* 1980;124:1426.
116. Lu CY, Beller DI, Unanue ER: During ontogeny, Ia-bearing accessory cells are found early in the thymus but late in the spleen. *Proc Natl Acad Sci USA* 1980;77:1597.
117. Kammer GM, Unanue ER: Accessory cell requirement in the proliferative response of T lymphocytes to hemocyanin. *Clin Immunol Immunopathol* 1980;15:434.
118. Scher MG, Beller DI, Unanue ER: Demonstration of a soluble mediator that induces exudates rich in Ia-positive macrophages. *J Exp Med* 1980;152:1684-1698.
119. Beller DI, Unanue ER: Regulation of macrophage populations. II. Synthesis and expression of Ia antigens by peritoneal exudate macrophages is a transient event. *J Immunol* 1981;126:263.
120. Weinberg DS, Unanue ER: Antigen-presenting function of alveolar macrophages: uptake and presentation of Listeria monocytogenes. *J Immunol* 1981;126:794.

121. Behbehani K, Pan S, Unanue ER: Marked increase in Ia-bearing macrophages during *Trypanosoma cruzi* infection. Clin Immunol Immunopathol 1981;19:190.
122. Martin BM, Gimbrone MA Jr, Unanue ER, Cotran RS: Stimulation of nonlymphoid mesenchymal cell proliferation by a macrophage-derived growth factor. J Immunol 1981;126:1510.
123. Lu CY, Peters E, Unanue ER: Ia-bearing macrophages in athymic mice: antigen presentation and regulation. J Immunol 1981;126:2496.
124. Schreiner GF, Kiely J-M, Cotran RE, Unanue ER: Characterization of resident glomerular cells expressing Ia determinants and manifesting genetically restricted interactions with lymphocytes. J Clin Invest 1981;68:920.
125. Ziegler K, Unanue ER: Identification of a macrophage antigen-processing event required for I-region-restricted antigen presentation to lymphocytes. J Immunol 1981;127:1869.
126. Unanue ER, Ungewickell E, Branton D: The binding of clathrin triskelions to membranes from coated vesicles. Cell 1981;26:439.
127. Ziegler K, Unanue ER: Decrease in macrophage antigen catabolism by ammonia and chloroquine is associated with inhibition of antigen presentation to T cells. Proc Natl Acad Sci USA 1982;78:175.
128. Scher MG, Unanue ER, Beller DI: Regulation of macrophage populations. III. The immunologic induction of exudates rich in Ia-positive macrophages is a radiosensitive process. J Immunol 1982;138:447.
129. Braun J, Hochman PS, Unanue ER: Ligand-induced association of surface immunoglobulin with the detergent-insoluble cytoskeletal matrix of the B lymphocyte. J Immunol 1982;128:1198.
130. Snyder DS, Lu CY, Unanue ER: Control of macrophage Ia expression in neonatal mice - role of a splenic suppressor cell. J Immunol 1982;128:1458.
131. Lu CY, Unanue ER: Ontogeny of murine macrophages. Infect Immun 1982;36:169.
132. Calamai EG, Beller EI, Unanue ER: Regulation of macrophage populations. IV. Modulation of Ia expression in bone marrow-derived macrophages. J Immunol 1982;128:1692.

133. Lu CY, Unanue ER: Spontaneous T cell lymphocyte production and enhanced macrophage Ia expression and tumoricidal activity in MRL-lpr mice. *Clin Immunol Immunopathol* 1982;25:213.
134. Snyder DS, Beller DI, Unanue ER: Prostaglandins modulate macrophage Ia expression. *Nature* 1982;299:263.
135. Snyder DS, Unanue ER: Corticosteroids inhibit murine macrophage Ia expression and interleukin-1 production. *J Immunol* 1982;129:1803.
136. Amato PA, Unanue ER, Taylor DL: The distribution of actin in spreading macrophages: a comparative study on living and fixed cells. *J Cell Biol* 1983;96:750.
137. Martin BM, Gimbrone MA Jr, Majeau GR, Unanue ER, Cotran RS: Stimulation of human monocyte/macrophage-derived growth factor (MDGF) production by plasma fibronectin. *Am J Pathol* 1983;111:367.
138. Allen PM, Beller DI, Braun J, Unanue ER: The handling of *Listeria monocytogenes* by macrophages - the search for an immunogenic molecule in antigen presentation. *J Immunol* 1983;132:323.
139. Unanue ER, Beller DI, Lu CY, Allen PM: Antigen presentation: Comments on its regulation and mechanisms. *J Immunol* 1984;132:1.
140. Allen PM, Unanue ER: Differential requirements for antigen processing by macrophages for lysozyme-specific T cell hybridoma. *J Immunol* 1984;132:1077.
141. Lu CY, Changelian PS, Unanue ER: Alpha-fetoprotein inhibits macrophage expression of Ia antigen. *J Immunol* 1984;132:1722.
142. Allen PM, Strydom DJ, Unanue ER: Processing of lysozyme by macrophages: identification of the determinant recognized by two T cell hybridomas. *Proc Natl Acad Sci USA* 1984;81:2489.
143. Schreiner GF, Unanue ER: The origin of the rat mesangial phagocyte and its expression of the leukocyte common antigen. *Lab Invest* 1984;51:515.
144. Schreiner GF, Cotran RS, Unanue ER: The modulation of Ia and LC antigen expression in rat glomeruli during the course of glomerulonephritis and aminonucleoside nephrosis. *Lab Invest* 1984;51:524.

145. Virgin HW IV, Unanue ER: Suppression of the immune response to *Listeria monocytogenes*. I. Immune complexes inhibit resistance. *J Immunol* 1984;133:104.
146. Allen PM, Unanue ER: Antigen processing and presentation by macrophages. *Am J Anat* 1984;170:483.
147. Kurt-Jones EA, Beller DI, Mizel SB, Unanue ER: Identification of a membrane-associated interleukin-1 in macrophages. *Proc Natl Acad Sci USA* 1985;82:1204.
148. Behbehani K, Beller DI, Unanue ER: The effects of beryllium and other adjuvants on Ia expression by macrophages. *J Immunol* 1985; 134:2047.
149. Kiely J-M, Braun J, Unanue ER: Autoregulation of B cell growth by an immunoglobulin M autoantibody. *J Immunol* 1985;135(2):1040.
150. Allen PM, Matsueda GR, Haber E, Unanue ER: Specificity of the T cell receptor: Two different determinants are generated by the same peptide and the I-A^k molecule. *J Immunol* 1985;135:368.
151. Kurt-Jones EA, Kiely J-M, Unanue ER: Conditions required for expression of membrane IL-1 on B cells. *J Immunol* 1985;135(3):1548.
152. Babbitt BP, Allen PM, Matsueda G, Haber E, Unanue ER: Binding of immunogenic peptides to Ia histocompatibility molecules. *Nature* 1985;317:359.
153. Virgin HW, Wittenberg GF, Bancroft GJ, Unanue ER: Suppression of immune response to *Listeria monocytogenes*: Mechanism(s) of immune complex suppression. *Infection and Immunity* 1985;50(2):343.
154. Virgin HW, Wittenberg GF, Unanue ER: Immune complex effects on murine macrophages. I. Immune complexes suppress interferon- γ induction of Ia expression. *J Immunol* 1985;135(6):3735-3743.
155. Virgin HW, Kurt-Jones EA, Wittenberg GF, Unanue ER: Immune complex effects on murine macrophages. II. Immune complex effects on activated macrophages cytotoxicity, membrane IL-1, and antigen presentation. *J Immunol* 1985;135(6):3744-3749.
156. Kurt-Jones EA, Virgin HW, Unanue ER: Relationship of macrophage Ia and membrane IL-1 expression to antigen presentation. *J Immunol* 1985;135(6):3652-3654.

157. Sidman CL, Marshall JD, Beamer WG, Nadeau JH, Unanue ER: Two loci affecting B cell responses to B cell maturation factors. *J Exp Med* 1986;163:116-128.
158. Babbitt BP, Matsueda G, Haber E, Unanue ER, Allen PM: Antigenic competition at the level of peptide - Ia binding. *Proc Natl Acad Sci USA* 1986;83:4509-4513.
159. Kurt-Jones EA, Virgin HW, Unanue ER: *In vivo* and *in vitro* expression of macrophage membrane interleukin-1 in response to soluble and particulate stimuli. *J Immunol* 1986;137(1):10-14.
160. Bancroft GJ, Bosma MJ, Bosma GC, Unanue ER: Regulation of macrophage Ia expression in mice with severe combined immunodeficiency: Induction of Ia expression by a T cell independent mechanism. *J Immunol* 1986;137(1):4-9.
161. Wright JR Jr, Lacy PE, Unanue ER, Muszynski C, Hauptfeld V: Interferon-mediated induction of Ia antigen expression on isolated murine whole islets and dispersed islet cells. *Diabetes* 1986;35(10):1174-1177.
162. Tripp CS, Unanue ER, Needleman P: Monocyte migration explains the changes in macrophage arachidonate metabolism during the immune response. *Proc Natl Acad Sci USA* 1986;83:9655-9659.
163. Weaver CT, Unanue ER: T cell induction of membrane IL-1 on macrophages. *J Immunol* 1986;137(12):3868-3873.
164. Tripp CS, Wyche A, Unanue ER, Needleman P: The functional significance of the regulation of macrophage Ia expression by endogenous arachidonate metabolites in vitro. *J Immunol* 1986;127:3915-3920.
165. Tripp CS, Needleman P, Unanue ER: Indomethacin in vivo increases the sensitivity to *Listeria* infection in mice. A possible role for macrophage thromboxane A₂ synthesis. *J Clin Invest* 1987;79:399-403.
166. Fuhlbrigge RC, Chaplin DD, Kiely J-M, Unanue ER: Regulation of interleukin-1 gene expression by adherence and lipopolysaccharide. *J Immunol* 1987;138:3799-3802.
167. Bancroft GJ, Schreiber RD, Bosma GC, Bosma MJ, Unanue ER: A T cell-independent mechanism of macrophage activation by interferon- γ . *J Immunol* 1987;129(4):1104-1107.

168. Wright JR Jr, Lacy PE, Unanue ER, Hauptfeld V: Induction of class II MHC antigens on human and rodent islet parenchymal cells in vitro. *Diabetologia* 1987;30:441.
169. Comens PG, Wolf BA, Unanue ER, Lacy PE, McDaniel ML: Interleukin 1 is potent modulator of insulin secretion from isolated rat islets of Langerhans. *Diabetes* 1987;36(8):963-970.
170. Allen PM, Babbitt BP, Unanue ER: T-cell recognition of lysozyme: the biochemical basis of presentation. *Immunological Reviews* 1987;98:171-187.
171. Allen PM, Matsueda GR, Evans RJ, Dunbar JB Jr, Marshall G, Unanue, ER: Identification of the T-cell and Ia contact residues of a T-cell antigenic epitope. *Nature* 1987;327:713-715.
172. DeSchryver-Kecsckemeti K, Bancroft GJ, Bosma GC, Bosma MJ, Unanue, ER: Pathology of Listeria infection in murine severe combined immunodeficiency. *Lab Inv* 1988;58(6):698-705.
173. Luescher IF, Allen PM, Unanue ER: Binding of photoreactive lysozyme peptides to murine histocompatibility class II molecules. *Proc Natl Acad USA Sci* 1988;85:871-874.
174. Leyva-Cobian F, Unanue ER: Intracellular interference with antigen presentation. *J Immunol* 1988;141:1445-1450.
175. Fuhlbrigge RC, Fine SM, Unanue ER, Chaplin DD: Expression of membrane interleukin 1 by fibroblasts transfected with murine pro-interleukin 1 α cDNA. *Proc Natl Acad Sci USA* 1988;85:5649-5653.
176. Fuhlbrigge RC, Sheehan KCF, Schreiber RD, Chaplin DD, Unanue ER: Monoclonal antibodies to murine IL-1 α . Production, characterization, and inhibition of membrane-associated IL-1 activity. *J Immunol* 1988;141:2643-2650.
177. Weaver CT, Hawrylowicz CM, Unanue ER: T helper cell subsets require the expression of distinct costimulatory signals by antigen-presenting cells. *Proc Natl Acad Sci USA* 1988;85:8181-8185.
178. Hawrylowicz CM, Unanue ER: Regulation of antigen-presentation-I. IFN- γ induces antigen-presenting properties on B cells. *J Immunol* 1988;141:4083-4088.

179. Harding CV, Unanue ER: Antigen processing and intracellular Ia. Possible role of endocytosis and protein synthesis in Ia function. *J Immunol* 1989;142:12-19.
180. Hawrylowicz CM, Duncan LM, Fuhlbrigge RC, Unanue ER: Regulation of antigen presentation-II - Anti-Ig and IL-2 induce IL-1 production by murine splenic B cells. *J Immunol* 1989;142:3361-3368.
181. Weaver CT, Duncan LM, Unanue ER: T cell induction of macrophage IL-1 during antigen presentation. Characterization of a lymphokine mediator and comparison of TH1 and TH2 subsets. *J Immunol* 1989;142:3469-3476.
182. Allen PM, Matsueda GR, Adams S, Freeman J, Roof RW, Lambert LE, Unanue ER: Enhanced immunogenicity of a T cell immunogenic peptide by modifications of its N and C termini. *International Immunol* 1989;1(2):141-150.
183. Harding CV, Roof RW, Unanue ER: Turnover of Ia-peptide complexes is facilitated in viable antigen presenting cells: Biosynthetic turnover of Ia vs. peptide exchange. *Proc Natl Acad Sci USA* 1989;86:4230-4234.
184. Bancroft GJ, Sheehan KCF, Schreiber RD, Unanue, ER: Tumor necrosis factor is involved in the T cell independent pathway of macrophage activation in SCID mice. *J Immunol* 1989;143:127-130.
185. Lambert LE, Unanue ER: Analysis of the interaction of the lysozyme peptide HEL(34-45) with the I-A^k molecule. *J Immunol* 1989;143:802-807.
186. Hawrylowicz CM, Santoro SA, Platt FM, Unanue ER: Activated platelets express IL-1 activity. *J Immunol* 1989;143:4015-4018.
187. Harding CV, Unanue ER: Low-temperature inhibition of antigen processing and iron uptake from transferrin: deficits in endosome functions at 18°C. *Eur J Immunol* 1990;20:323-329.
188. Roof RW, Luescher IF, Unanue ER: Phospholipids enhance the binding of peptides to class II major histocompatibility molecules. *Proc Natl Acad Sci USA* 1990;87:1735-1739.
189. Luescher IF, Crimmins DL, Schwartz BD, Unanue ER: The sites in the I-A^k histocompatibility molecule photoaffinity labeled by an immunogenic lysozyme peptide. *J Biol Chem* 1990;265(19):11177-11184.

190. Williams IF, Unanue ER: Costimulatory requirements of murine Th1 clones. The role of accessory cell-derived signals in responses to anti-CD3 antibody. *J Immunol* 1990;145(1):85-93.
191. Harding CV, Unanue ER, Slot JW, Schwartz AL, Geuze HJ: Functional and ultrastructural evidence for intracellular formation of major histocompatibility complex class II-peptide complexes during antigen processing. *Proc Natl Acad Sci USA* 1990;87:5553-5557.
192. Harding CV, Unanue ER: Quantitation of antigen-presenting cell MHC class II/peptide complexes necessary for T-cell stimulation. *Nature* 1990;346(6284):574-576.
193. Brunt LM, Portnoy DA, Unanue ER: Presentation of *Listeria monocytogenes* to CD8⁺ T cells requires secretion of hemolysin and intracellular bacterial growth. *J Immunol* 1990;145(11):3540-3546.
194. Duncan LM, Meegan LS, Unanue ER: IL-1 gene expression in lymphoid tissues. *J Immunol* 1991;146(2):565-571.
195. Luescher IF, Unanue ER: Purification and photoaffinity labeling of the I-A^k histocompatibility molecule. *J Immunol Methods* 1990;135:233-245.
196. Harding CV, Collins DS, Slot JW, Geuze HJ, Unanue ER: Liposome-encapsulated antigens are processed in lysosomes, recycled, and presented to T cells. *Cell* 1991;64:393-401.
197. Harding CV, Roof RW, Allen PM, Unanue ER: Effects of pH and polysaccharides on peptide binding to class II major histocompatibility complex molecules. *Proc Natl Acad Sci USA* 1991;88:2740-2744.
198. Wherry JC, Schreiber RD, Unanue ER: Regulation of gamma interferon production by natural killer cells in SCID mice: Roles of tumor necrosis factor and bacterial stimuli. *Infect & Immunity* 1991;59(5):1709-1715.
199. Harding CV, Unanue ER: Modulation of antigen presentation and peptide-MHC-specific, LFA-I-dependent T cell-macrophage adhesion. *J Immunol* 1991;147(3):767-773.
200. Hogquist KA, Unanue ER, Chaplin DD: Release of IL-1 from mononuclear phagocytes. *J Immunol* 1991;147(7):2181-2186.
201. Hogquist KA, Nett MA, Unanue ER, Chaplin DD: Interleukin-1 is processed and released during apoptosis. *Proc Natl Acad Sci USA* 1991;88:8485-8489.

202. Harding CV, Collins DS, Kanagawa O, Unanue ER: Liposome-encapsulated antigens engender lysosomal processing for class II MHC presentation and cytosolic processing for class I presentation. *J Immunol* 1991;147(9):2860-2863.
203. Williams IF, Unanue ER: Characterization of accessory cell co-stimulation of Th1 cytokine synthesis. *J Immunol* 1991;147(11):3752-3760.
204. Collins DS, Unanue ER, Harding CV: Reduction of disulphide bonds within lysosomes is a key step in antigen processing. *J Immunol* 1991;147:4054-4059.
205. Rogers HW, Sheehan KCF, Brunt LM, Dower SK, Unanue ER, Schreiber RD: Interleukin-1 participates in the development of anti-Listeria responses in normal and SCID mice. *Proc Natl Acad Sci USA* 1992;89(3):1011-1015.
206. Ulaeto D, Lacy PE, Kipnis DM, Kanagawa O, Unanue ER: A T-cell dormant state in the autoimmune process of nonobese diabetic mice treated with complete Freund's adjuvant. *Proc Natl Acad Sci USA* 1992;89(9):3927-3931.
207. Nelson CA, Roof RW, McCourt DW, Unanue ER: Identification of the naturally processed form of hen egg white lysozyme bound to the murine major histocompatibility complex class II molecule I-A^k. *Proc Natl Acad Sci USA* 1992;89:7380-7383.
208. Nelson CA, Petzold SJ, Unanue ER: Identification of two distinct properties of class II major histocompatibility complex-associated peptides. *Proc Natl Acad Sci USA* 1993;90:1227-1231.
209. Beckerman KP, Rogers HW, Corbett JA, Schreiber RD, McDaniel ML, Unanue ER: Release of nitric oxide during the T cell-independent pathway of macrophage activation. *J Immunol* 1993;150:888-895.
210. Tripp CS, Wolf SF, Unanue ER: Interleukin 12 and tumor necrosis factor α are costimulators of interferon- γ production by natural killer cells in severe combined immunodeficiency mice with listeriosis, and interleukin 10 is a physiologic antagonist. *Proc Natl Acad Sci USA* 1993;90:3725-3729.
211. Shimizu J, Kanagawa O, Unanue ER: Presentation of β -cell antigens to CD4⁺ and CD8⁺ cells of non-obese diabetic mice. *J Immunol* 1993;151:1723-1730.

212. Harding CV, Kihlberg J, Elofsson M, Magnusson G, Unanue ER: Glycopeptides bind MHC molecules and elicit specific T cell responses. *J Immunol* 1993;151:2419-2425.
213. Corbett JA, Mikhael A, Shimizu J, Frederick K, Misko TP, McDaniel, ML, Kanagawa O, Unanue ER: Nitric oxide production in islets from nonobese diabetic mice: Aminoguanidine-sensitive and -resistant stages in the immunological diabetic process. *Proc Natl Acad Sci USA* 1993;90:8992-8995.
214. Nixon-Heiss L, Moser SA, Unanue ER, Goldman WE: Interleukin-1 is linked to the respiratory epithelial cytopathology of pertussis. *Infect & Immun* 1993;61:3123-3128.
215. Rogers HW, Unanue ER: Neutrophils are involved in acute, non-specific resistance to *Listeria monocytogenes* in mice. *Infect & Immun* 1993;61:5090-5096.
216. Tripp CS, Gately MK, Hakimi J, Ling P, Unanue ER: Neutralization of IL-12 decreases resistance to *Listeria* in SCID and C.B-17 mice. Reversal by IFN- γ . *J Immunol* 1994;152:1883-1887.
217. Rogers HW, Tripp CS, Schreiber RD, Unanue ER: Endogenous IL-1 is required for neutrophil recruitment and macrophage activation during murine Listeriosis. *J Immunol* 1994;153:2093-2101.
218. Nelson CA, Petzold SJ, Unanue ER: Peptides determine the lifespan of MHC class II molecules in the antigen-presenting cell. *Nature* 1994;371:250-252.
219. Viner NJ, Nelson CA, Unanue ER: Identification of a major I-E^k-restricted determinant of hen egg lysozyme: Limitations of lymph node proliferation studies in defining immunodominance and crypticity. *Proc Natl Acad Sci USA* 1995;92:2214-2218.
220. Tripp CS, Beckermann KP, Unanue ER: Immune complexes inhibit anti-microbial responses through IL-10 production: Effect in severe combined immunodeficient mice during *Listeria* infection. *J Clin Invest* 1995;95:1628-1634.
221. Deck B, Elofsson M, Kihlberg J, Unanue ER: Specificity of glycopeptide-specific T cells. *J Immunol* 1995;155:1074-1078.

222. Tripp CS, Kanagawa O, Unanue ER: Secondary response to *Listeria* infection requires IFN- γ but is partially independent of IL-12. *J Immunol* 1995;155:3427-3432.
223. Shimizu J, Carrasco-Marin E, Kanagawa O, Unanue ER: Relationship between β cell injury and antigen presentation in NOD mice. *J Immunol* 1995;155:4095-4099.
224. Nelson CA, Viner N, Young S, Petzold S, Benoist C, Mathis D, Unanue ER: Amino acid residues of the I-A^k α -chain required for the binding and stability of two antigenic peptides. *J Immunol* 1996;156:176-182.
225. Carrasco-Marin E, Shimizu J, Kanagawa O, Unanue ER: The class II MHC I-Ag⁷ molecules from non-obese diabetic mice are poor peptide binders. *J Immunol* 1996;156:450-458.
226. Rogers HW, Callery MP, Deck B, Unanue ER: *Listeria monocytogenes* induces apoptosis of infected hepatocytes. *J Immunol* 1996;156:679-684.
227. Viner NJ, Nelson CA, Deck B, Unanue ER: Complexes generated by the binding of free peptides to class II MHC molecules are antigenically diverse compared with those generated by intracellular processing. *J Immunol* 1996;156:2365-2368.
228. Nelson CA, Viner NJ, Young SP, Petzold SJ, Unanue ER: A negatively charged anchor residue promotes high-affinity binding to the MHC molecule I-A^k. *J Immunol* 1996;157:755-762.
229. Dustin ML, Miller JM, Ranganth S, Vignali DAA, Viner NJ, Nelson CA, Unanue ER: TCR-mediated adhesion of T cell hybridomas to planar bilayers containing purified MHC class II/peptide complexes and receptor shedding during detachment. *J Immunol* 1996;157:2014-2021.
230. Lindner R, Unanue ER: Distinct antigen MHC class II complexes generated by separate processing pathways. *EMBO J* 1996;15:6910-6920.
231. Nelson CA, Vidavsky I, Viner NJ, Gross ML, Unanue ER: Amino-terminal trimming of peptides for presentation on major histocompatibility complex class II molecules. *Proc Natl Acad Sci USA* 1997;94:628-633.
232. Parra-Lopez CA, Lindner R, Vidavsky I, Gross M, Unanue ER: Presentation on class II MHC molecules of endogenous lysozyme targeted to the endocytic pathway. *J Immunol* 1997;158:2670-2679.

233. Dustin ML, Bromley SK, Kan Z, Peterson DA, Unanue ER: Antigen receptor engagement delivers a stop signal to migrating T lymphocytes. *Proc Natl Acad Sci USA* 1997;94:3909-3913.
234. Dinauer MC, Deck MB, Unanue ER: Mice lacking NADPH oxidase activity show increased susceptibility to early infection with *Listeria monocytogenes*. *J Immunol* 1997;158:5581-5583.
235. Dadaglio G, Nelson CA, Deck MB, Petzold SJ, Unanue ER: Characterization and quantitation of peptide-MHC complexes produced from hen egg lysozyme using a monoclonal antibody. *Immunity* 1997;6:727-738.
236. Kanagawa O, Shimizu J, Unanue ER: The role of I-Ag⁷ beta chain in peptide binding and antigen recognition by T cells. *International Immunol* 1997;9:1523-1526.
237. Merrick JC, Edelson BT, Bhardwaj V, Swanson PE, Unanue ER: Lymphocyte apoptosis during early phase of *Listeria* infection in mice. *Am J Pathol* 1997;151:785-792.
238. Bhardwaj V, Kanagawa O, Swanson PE, Unanue ER: Chronic *Listeria* infection in SCID mice: Requirements for the carrier state and the dual role of T cells in transferring protection or suppression. *J Immunol* 1998;160:376-384.
239. Kanagawa O, Martin SM, Vaupel BA, Carrasco-Marin E, Unanue ER: Autoreactivity of T cells from nonobese diabetic mice: An I-Ag⁷-dependent reaction. *Proc Natl Acad Sci USA* 1998;95:1721-1724.
240. Fremont DH, Monnaie D, Nelson CA, Hendrickson WA, Unanue ER: Crystal structure of I-A^k in complex with a dominant epitope of lysozyme. *Immunity* 1998;8:305-317.
241. Gugasyan R, Vidavsky I, Nelson CA, Gross ML, Unanue ER: Isolation and quantitation of a minor determinant of hen egg white lysozyme bound to I-A^k by using peptide-specific immunoaffinity. *J Immunol* 1998;161:6074-6083.
242. Kanagawa O, Vaupel BA, Xu G, Unanue ER, Katz J: Thymic positive selection and peripheral activation of islet antigen specific T cells: separation of two diabetogenic steps by an I-Ag⁷ class II beta chain. *J Immunol* 1998;161:4489-4492.

243. Teitelbaum R, Glatman-Freedman A, Chen B, Robbins JB, Unanue E, Casadevall A, Bloom BR: A mAb recognizing a surface antigen of *Mycobacterium tuberculosis* enhances host survival. Proc Natl Acad Sci USA 1998;95:15688-15693.
244. Peterson DA, DiPaolo RJ, Kanagawa O, Unanue ER: Negative selection of immature thymocytes by a few peptide-MHC complexes: Differential sensitivity of immature and mature T cells. J Immunol 1999;162:3117-3120.
245. Deck MB, Sjolín P, Unanue ER, Kihlberg J: MHC-restricted glycopeptide-specific T cells show specificity for both carbohydrate and peptide residues. J Immunol 1999;162:4740-4744.
246. Carrasco-Marin E, Kanagawa O, Unanue ER: The lack of consensus for I-A^{G7}-peptide binding motifs: Is there a requirement for anchor amino acid side chains? Proc Natl Acad Sci USA 1999;96:8621-8626.
247. Edelson BT, Cossart P, Unanue ER: Cutting Edge: Paradigm revisited: antibody provides resistance to *Listeria* infection. J Immunol 1999;163:4087-4090.
248. Carrasco-Marin E, Petzold S, Unanue ER: Two structural states of peptide-class II MHC complexes revealed by photoaffinity labeled peptides. J Biol Chem 1999; 274:31333-31340.
249. Peterson DA, DiPaolo RJ, Kanagawa O, Unanue ER: Quantitative aspects of the T cell repertoire that escapes negative selection. Immunity 1999;11:453-462.
250. Latek RR, Suri A, Petzold SJ, Nelson CA, Kanagawa O, Unanue ER, Fremont DH: Structural basis of peptide binding and presentation by the type 1 diabetes-associated MHC class II molecule of NOD mice. Immunity 2000;12:699-710.
251. Gugasyan R, Velazquez C, Vidavsky I, Deck BM, van der Drift K, Gross ML, Unanue ER: Independent selection by I-A^k molecules of two epitopes found in tandem in an extended polypeptide. J Immunol 2000;165:3206-3213.
252. Latek RR, Petzold S, Unanue ER. Hindering auxiliary anchors are potent modulators of peptide binding and selection by I-A^k class II molecules. Proc Natl Acad Sci USA 2000;97:11460-11465.

253. Edelson BT, Unanue ER: Intracellular antibody neutralizes *Listeria* growth. *Immunity* 2001;14:503-512.
254. Velazquez C, DiPaolo R, Unanue ER: Quantitation of lysozyme peptides bound to class II MHC molecules indicates very large differences in levels of presentation. *J Immunol* 2001;166:5488-5494.
255. Peterson DA, DiPaolo RJ, Kanagawa O, Unanue ER: Cutting edge: A single MHC anchor residue alters the conformation of a peptide-MHC complex inducing T cells that survive negative selection. *J Immunol* 2001;166:5874-5877.
256. Cirrito TP, Pu Z, Deck MB, Unanue ER: Deamidation of asparagine in an MHC-bound peptide affects T cell recognition but does not explain type B reactivity. *J Exp Med* 2001;194:1165-1169.
257. DiPaolo RJ, Unanue ER: The level of peptide-MHC complex determines the susceptibility to autoimmune diabetes: Studies in HEL transgenic mice. *Eur J Immunol* 2001; 31:3453-3459.
258. Suri A, Vidavsky I, van der Drift K, Kanagawa O, Gross ML, Unanue ER: In antigen presenting cells, the autologous peptides selected by the diabetogenic I-A^{g7} molecules are unique and determined by the amino acid changes in the P9 pocket. *J Immunol* 2002; 168:1235-1243.
259. Pu Z, Carrero JA, Unanue ER: Distinct recognition by two subsets of T cells of an MHC class II-peptide complex. *Proc Natl Acad Sci USA* 2002; 99:8844-8849.
260. DiPaolo RJ, Unanue ER: Cutting edge: Chemical dominance does not relate to immunodominance: Studies of the CD4⁺ T cell response to a model antigen. *J Immunol* 2002;169:1-4.
261. Velazquez C, Vidavsky I, van der Drift, K, Gross ML, Unanue ER: Chemical identification of a low abundant lysozyme peptide family bound to I-A^k histocompatibility molecules. *J Biol Chem* 2002; 277:42514-42522.
262. DiPaolo R, Unanue ER: Cutting edge: The relative distribution of T cells responding to chemically dominant or minor epitopes of lysozyme is not affected by CD4-CD40L and B7-CD28-CTLA-4 costimulatory pathways. *J Immunol* 2002;169:2832-2836.
263. Edelson BT, Unanue ER: MyD88-dependent but TLR 2-independent innate immunity to *Listeria*. No role for either in macrophage listericidal activity. *J Immunol* 2002;169:3869-3875.

264. Mandik-Nayak L, Wipke BT, Shih FF, Unanue ER, Allen PM: Despite ubiquitous autoantigen expression, arthritogenic autoantibody responses initiate in the local lymph node. *Proc Natl Acad Sci USA* 2002;99:14368-14373.
265. Lovitch SB, Walters JJ, Gross ML, Unanue ER: Antigen presenting cells present A β^k -derived peptides which are autoantigenic to type B T cells. *J Immunol* 2003;170:4155-4160.
266. Suri A, Walters JJ, Kanagawa O, Gross ML, Unanue ER: Specificity of peptide selection by APCs homozygous or heterozygous for expression of class II MHC molecules - the lack of competition. *Proc Natl Acad Sci USA* 2003;100:5330-5335.
267. Krug A, Veeraswamy R, Pikosz AR, Kanagawa O, Unanue ER, Colonna M, Cella M: Interferon producing cells fail to induce proliferation of naive T cells but can promote expansion and T helper 1 differentiation of antigen-experienced unpolarized cells. *J Exp Med* 2003;197:899-860.
268. Kim JM, Wu H, Green G, Winkler CA, Kopp JB, Miner JH, Unanue ER, Shaw AS: CD2-associated protein haploinsufficiency underlies susceptibility to glomerular disease. *Science* 2003;300:1298-1300.
269. Veeraswamy R, Cella M, Colonna M, Unanue ER: Dendritic cells process and present antigens across a range of maturation states. *J Immunol* 2003;170:5367-5372.
270. Lovitch SB, Petzold SJ, Unanue ER: Cutting Edge: H-2DM is responsible for the large differences in presentation among peptides selected by I-A k during antigen processing. *J Immunol* 2003;171:2183-2186.
271. Mogemark M, Cirrito TP, Sjölin P, Unanue ER, Kihlberg J: Influence of saccharide size on the cellular immune response to glycopeptides. *Org Biomol Chem* 2003;1:2063-2069.
272. Levisetti MG, Suri A, Vidavsky I, Gross ML, Kanagawa O, Unanue ER: Autoantibodies and CD4 T cells target a beta-cell retroviral envelope protein in NOD mice. *Int Immunol* 2003;15:1473-1483.
273. Suri A, Shimizu J, Katz JD, Sakaguchi S, Unanue ER, Kanagawa O: Regulation of autoimmune diabetes by non-islet-specific T cells - A role for the glucocorticoid-induced TNF receptor. *Eur J Immunol* 2004;34:447-454.

274. Carrero JA, Calderon B, Unanue ER: Listeriolysin O from *Listeria monocytogenes* is a lymphocyte apoptogenic molecule. *J Immunol* 2004;172:4866-4874.
275. Pu Z, Lovitch SB, Bikoff EK, Unanue ER: T cells distinguish MHC-peptide complexes formed in separate vesicles and edited by H2-DM. *Immunity* 2004;20:467-476.
276. Carrero JA, Calderon B, Unanue ER: Type I interferon sensitizes lymphocytes to apoptosis and reduces resistance to *Listeria* infection and apoptosis. *J Exp Med* 2004;200:535-540
277. Byersdorfer CA, DiPaolo RJ, Petzold SJ, Unanue ER: Following immunization antigen becomes concentrated in a limited number of antigen presenting cells including B cells. *J Exp Med* 2004;173:6627-6634.
278. Levisetti MG, Suri A, Frederick K, Unanue ER: Absence of lymph nodes in NOD mice treated with lymphotoxin- β receptor immunoglobulin protects from diabetes. *Diabetes* 2004;53:3115-3119.
279. Herzog J, Maekawa Y, Cirrito TP, Illian BS, Unanue ER: Activated antigen presenting cells select and present chemically modified peptides recognized by unique CD4 T cells. *Proc Natl Acad Sci USA* 2005; 102:7928-7933.
280. Suri A, Walters JJ, Gross M, Unanue ER: Natural peptides selected by diabetogenic DQ8 and murine I-A^{g7} molecules show common sequence specificity. *J Clin Invest* 2005;115:2268-2276.
281. Byersdorfer CA, Schweitzer GG, Unanue ER: Diabetes is predicted by the beta cell level of autoantigen. *J Immunol* 2005;in press.

REVIEW ARTICLES

1. Dixon FJ, Unanue ER, Watson JI: Immunopathology of the kidney. In: Grabar P, Miescher PA, eds., Immunopathology. Basel, Switzerland: Schwabe and Company, 1965;363.
2. Unanue ER, Dixon FJ: Experimental glomerulonephritis. Immunologic events and pathogenetic mechanisms. *Adv Immunol* 1967;6:1.
3. Unanue ER, Dixon FJ, Feldman JD: Experimental immunologic diseases of the kidney. In: Miescher PA, Muller-Eberhard HJ, etc, Textbook of Immunopathology, New York, NY: Grune and Stratton, 1968;164.
4. Unanue ER, Lerner RA, Dixon FJ: Experimental autoimmune glomerulonephritis (EAG) induced by antibodies to renal basement membrane. In: Miescher, P.A., Grabar, P., eds., Immunopathology, Basel, Switzerland: Schwabe and Company, 1968;62.
5. Unanue ER, Cerottini, J-C: Fate and immunogenicity of macrophage-associated hemocyanins. In: Symposium on Developmental Aspects of Antibody Formation and Structure, Prague, June 1-7, 1969, Vol. II, p. 521.
6. Unanue ER, Cerottini J-C: The function of macrophages in immune response. *Seminars in Hematology* 1970;7:225.
7. Cruchaud A, Unanue ER: Fate and immunogenicity of antigens endocytosed by macrophages. In: Lindahl-Kiessling, Alm, Hanna, eds., Morphological and Functional Aspects of Immunity, New York, NY, Plenum Press, 1971;187.
8. Unanue ER, Schmidtke J, Cruchaud A, Grey HM: Interactions among antigen, macrophages, and lymphocytes. In: Miescher, PA, ed., Immunopathology, Basel, Switzerland, Schwabe and Company, 1970;35.
9. Perkins WD, Karnovsky MJ, Unanue ER: Ultrastructural identification of membrane-bound immunoglobulin molecules on lymphoid cells. In: Schwarz, M.R., ed., Proceedings of the Sixth Leukocyte Culture Conference. New York, NY, Academic Press, Inc., 1972;423.
10. Unanue ER: The regulatory role of macrophages in antigenic stimulation. *Adv Immunol* 1972;15:95.

11. Unanue ER, Dixon FJ: Tissue injury produced by antibody-antigen reactions. In: Najarian, JS and Simmons, RL, eds., Text on Transplantation, Philadelphia, PA, Lea and Fibiger, 1972;14.
12. Unanue ER, Engers HD, Karnovsky MJ: Antigen receptors on lymphocytes. Fed Proc 1973;32:44.
13. Karnovsky MJ, Unanue ER: Mapping and migration of lymphocyte surface macromolecules. Fed Proc 1973;32:55.
14. Unanue ER, Karnovsky MJ: Redistribution and fate of Ig complexes on surface of B lymphocytes: Functional implications and mechanisms. Transplant Proc 1973;14:184.
15. Unanue ER, Dixon FJ, Feldman JD: Experimental immunologic diseases of the kidney. In: Miescher PA, Muller-Eberhard HJ, eds, Textbook of Immunopathology. New York, NY, Grune and Stratton, Vol. 1, 1976;231.
16. Unanue ER: Introduction of discussion on "Relationship between histocompatibility-linked and allotype-linked immune response genes and antigenspecific receptor T and B cells". In: McDevitt HO, Landy M, eds, Genetic Control of Immune Responses. New York, NY, Academic Press, Inc, 1972;205.
17. Karnovsky MJ, Engers HD, Leventhal M, Perkins WD, Unanue ER: Topography, migration, and endocytosis of lymphocyte surface macromolecules. Acta Histochem Cytochem. 1972;5:275.
18. Unanue ER: The regulation of immune responses by macrophages. In: van Furth R, ed, Mononuclear Phagocytes in Immunity, Infection, and Pathology. Oxford, England, Blackwell Scientific Publications, 1975;721.
19. Unanue ER: Immunological parameters in hypersensitivity granulomas. In: van Furth R, ed, Mononuclear Phagocytes in Immunity, Infection, and Pathology. Oxford, England, Blackwell Scientific Publications, 1975;1029.
20. Unanue ER, Ault KA: Functional relationships in antigen-receptor interaction in B lymphocytes. In: Katz, D.H., Benacerraf, B., eds., Immunologic Tolerance, Mechanisms and Potential Therapeutic Applications. New York, NY, Academic Press, Inc., 1974;301.
21. Calderon J, Unanue ER: An evaluation of the role of macrophages in immune induction. Fed Proc 1975;34:1737.

22. Benacerraf B, Unanue ER: Immunological aspects of delayed hypersensitivity reactions with special emphasis on the pathogenesis of hypersensitivity granuloma. In: *Allergology, Proceedings of the Eighth Congress of the International Association of Allergology*. Amsterdam, Holland, Excerpta Medica 1974;195.
23. Unanue ER, Schreiner GF: The modulation of immunoglobulin in B lymphocytes and its relevance to immune stimulation. In: Rosenthal AS, ed., *Immune Recognition*, New York, NY, Academic Press, Inc, 1975;261.
24. Unanue ER, Calderon J, Kiely J-M: Secretion by macrophages of two molecules modulating cell proliferation. In: Rosenthal AS, ed, *Immune Recognition*. New York, NY, Academic Press. Inc, 1975;555.
25. Unanue ER, Ault KA, Schreiner GF, Sidmall CL: The cycle of ligand-induced changes in B cells -- functional relationship. In: Seligmann, M, Preud'homme, JL, Kourilsky, FM, eds. *Membrane Receptors of Lymphocytes*. Amsterdam, Holland: North-Holland Publishing Company, 1975;363.
26. Unanue ER, Abbas AK: Relationship of the B cell surface of immunoglobulin, Fc receptors, and histocompatibility antigens. In: Seligmann, M., Preud'homme, JL, Kourilsky, FM, eds., *Membrane Receptors of Lymphocytes*. Amsterdam, Holland, North-Holland Publishing Company, 1975;281.
27. Benacerraf B, Unanue ER, Dorf ME, Kenneth LJ Jr: Binding of the terpolymer of L-glutamic acid, L-alanine, L-tyrosine by mouse thymic lymphocytes: inhibition by anti-H-2 alloantisera. In: Seligmann M, Preud'homme JL, Kourilsky FM, eds, *Membrane Receptors of Lymphocytes*. Amsterdam, Holland, North-Holland Publishing Company 1975;127.
28. Abbas AK, Unanue ER, Karnovsky MJ: Current techniques for the detection of surface immunoglobulin on lymphocytes. In: Glick D, Rosenbaum, RR, eds, *Techniques of Biochemical and Biophysical Morphology, Vol 3*, New York, NY, John Wiley and Sons, Inc, 1977;139.
29. Unanue ER: Cytological analysis of histocompatibility molecules. In: Katz DH, Benacerraf B, eds, *The Role of the Products of the Histocompatibility Gene Complex in Immune Response*. New York, NY, Academic Press, Inc, 1976;603.
30. Unanue ER: Secretory function of mononuclear phagocytes. *Am J Pathol* 1976;83:395.

31. Schreiner GF, Unanue ER: Membrane and cytoplasmic changes in B lymphocytes induced by ligand-surface immunoglobulin interaction. *Adv Immunol* 1976;24:37.

32. Unanue ER: Antigen recognition by lymphocytes. In: Schmidtke JR, Ferguson RM eds, *Immunology for the Practicing Physician*. New York, NY, Plenum Press, 1977;11.
33. Ault KA, Unanue ER: Lymphocyte surface immunoglobulin: its disposition on the membrane and its role in B lymphocyte physiology. In: Bell GI, Perelson AS, Pimbley GH Jr, eds, *Theoretical Immunology*, New York, NY, Marcell Dekker, Inc, 1977;145.
34. Unanue ER, Schreiner GF: Structure and function of surface immunoglobulin of lymphocytes. In: Poste G, Nicolson GL, eds, *Dynamic Aspects of Cell Surface Organization*. Cell Surface Reviews, Vol. 3, Amsterdam, Holland, North Holland Publishing 1977;619.
35. Unanue ER : Modulation of immunity by molecules secreted by macrophages. In: Miescher PA, ed, *Immunopathology*, Basel, Switzerland, Schwabe and Company, 1977;35.
36. Dorf ME, Unanue ER: Subpopulations of peritoneal macrophages identified with anti-Ia sera. In: McDevitt HQ, ed, *Ir Genes and Ia Antigens*. Proceedings of the Third Ir Gene workshop. New York, NY, Academic Press, Inc 1978;171.
37. Beller DI, Farr AG, Unanue ER: The regulation of lymphocyte proliferation and differentiation by macrophages. *Fed Proc* 1978;37:1991.
38. Unanue ER: The regulation of lymphocyte functions by the macrophage. *Immunological Rev* 1978;40:227-255.
39. Unanue ER: The response of B lymphocytes to anti-Ig antibodies and antigen. In: Serrov B, Rosenfeld C, eds, *Human Lymphocyte Differentiation: Its Application to Cancer*. INSERM Symposium No. 8, Amsterdam, Holland, Elsevier-North-Holland Biomedical Press 1978;35.
40. Unanue ER: The immune granulomas. In: Samter M, ed, *Immunological Diseases*, Third Edition, Boston, Massachusetts; Little, Brown and Company, 1978;297.
41. Diamanstein T, Handschumacher RE, Oppenheim JJ, Rosenstreich DL, Unanue ER, Waksman BH, Wood DD: Nonspecific "lymphocyte-activating" factors produced by macrophages. *J Immunol* 1979;122:2633.
42. Schultz LD, Sidman CL, Unanue ER: Immunologic dysfunction in moth-eaten mice: immunodeficiency, autoimmunity, and hyperimmunoglobulinemia in a short-lived mutant. In: Gershwin ME, Cooper EL, eds,

Animal Models of Comparative and Developmental Aspects of Immunity and Disease. New York, NY, Pergamon Press 1979;260.

43. Unanue ER: B Cell responses to ligand-surface Ig interactions. In: Cooper MD, Mosier DE, Vitetta E, Sher A, eds, B Lymphocytes in the Immune Responses. New York, NY, Elsevier-North-Holland, 1979;25.
44. Sidman CL, Unanue ER: Function of B lymphocytes at various stages of development. In: Siskind GW, Litwin SD, Weksler ME, eds, New York, NY, Grune and Stratton, 1979;85.
45. Unanue ER: Function of surface immunoglobulin of B lymphocytes. In: Pernis B, Vogel HJ, eds. Cells of Immunoglobulin Synthesis, New York, NY, Academic Press, Inc., 1979;199.
46. Unanue ER: The macrophage as a regulator of lymphocyte function. Hospital Practice 1979;14:61.
47. Unanue ER: Redistribution of surface immunoglobulin in lymphocytes. Mechanisms and functions. In: Milgrom, F, Albini, B, eds. Immunopathology Sixth International Convocation on Immunology. Basel, Switzerland, S Karger, 1979;208.
48. Ault KA, Unanue ER: Mechanisms and functions of capping in lymphocytes. In: Gordon AS, Silber R, LoBue J, eds, Contemporary Hematology/Oncology, Volume 1, New York, NY, Plenum Publishing Corporation, 1980;219.
49. Stadecker MJ, Unanue ER: Macrophage secretion of micromolecules. In: Friedman H, ed, Subcellular Factors in Immunity, New York, NY, Academic Sciences, 1979;550.
50. Unanue ER: T cell-macrophage interaction in infection to the intracellular pathogen *Listeria monocytogenes*. Unanue ER, Rosenthal AS, eds., Macrophage Regulation of Immunity. New York, NY, Academic Press, Inc, 1980;73.
51. Ziegler K, Unanue ER: Quantitation of genetically restricted T cell-macrophage binding. In: Unanue ER, Rosenthal AS, eds, Macrophage Regulation of Immunity. New York, NY, Academic Press, Inc, 1980;245.
52. Beller DI, Unanue ER: Role of macrophages in the regulation of thymocytes proliferation and differentiation. In: Unanue ER, Rosenthal AS, eds. Macrophage Regulation of Immunity. New York, NY, Academic Press, Inc, 1980;361.
53. Beller DI, Unanue ER: Thymocyte response to a growth-promoting activity from macrophages: A dual-signal model. In: deWeck A,

Kristensen F, Landy M, eds, Biochemical Characterization of Lymphokines, New York, NY, Academic Press, Inc., 1980;427.

54. Braun J, Unanue ER: B lymphocyte biology studied with anti-Ig antibodies. *Immunol Rev* 1980;52:58.
55. Unanue ER, Farr AG, Kiely JM: Multiple interactions between Listeria-immune T lymphocytes and macrophages: regulation by the major histocompatibility gene complex. In: van Furth R, ed. *Mononuclear Phagocytes*. The Hague, Holland: Martinus Nijhoff Publishers, 1980;1837.
56. Unanue ER: Cooperation between mononuclear phagocytes and lymphocytes in immunity. *NEJM* 1980;303:977.
57. Braun J, Unanue ER: Biochemical basis for the function of surface immunoglobulin. In: Klinman N, Mosier, DE, Scher, A, Vitetta, E, eds. *B Lymphocytes in the Immune Response: Functional, Developmental, and Interactive Properties*. Amsterdam, Holland: Elsevier-North Holland, 1981;168.
58. Unanue ER: The regulatory role of macrophages in antigenic stimulation. Part Two: Symbiotic relationship between lymphocytes and macrophages. *Adv Immunol* 1981;31:1.
59. Unanue ER, Beller DI: Control of Ia expression by macrophages. In: Forster, O, Landy, M, eds. *Heterogeneity of Mononuclear Phagocytes*. New York, New York: Academic Press, Inc, 1981;214.
60. Schreiner GF, Cotran RS, Unanue ER: Glomerular cell types and immune function. In: Zurukzoglu W, Papadimitriou M, Phypasopoulos M, Sion M, Zamboulis C, eds. *Proceedings of the Eighth International Congress of Nephrology*. Thessaloniki, Greece: University Studio; Basel, Switzerland, S Karger, 1981;858.
61. Ungewickell E, Unanue ER, Branton D: Functional and structural studies on clathrin triskelions and baskets. *XLVI Cold Spring Harbor Symposium on Quantitative Biology*, 1982;723.
62. Beller DI, Unanue ER: Reciprocal regulation of macrophage and T cell function by way of soluble mediators. *Lymphokines* 1982;6:25.
63. Braun J, Unanue ER: Calcium and lymphocyte macromolecules. In: Anghileri LJ, Tuffet-Anghileri AM, eds. *The role of calcium in biological systems*. Vol. 1, 1982;151, CRC Press, Boca Raton, Florida.
64. Gimbrone MA Jr, Martin BM, Baldwin WM, Unanue ER, Cotran, RS: Stimulation of vascular cell growth by macrophage products. In: Nossel

- HL, Vogel HJ, eds, Pathobiology of the Endothelial Cell, New York, NY, Academic Press Inc, 1982;3.
65. Beller DI, Unanue ER: Regulation of the expression of macrophage Ia antigens. In: Mizuno D, Cohn ZA, Takeya K, Ishida N, eds. Self-Defense Mechanisms. Role of Macrophages. Tokyo, Japan, University of Tokyo Press, 1982;167.
 66. Unanue ER: Symbiotic relationships between macrophages and lymphocytes. In: Normal, SJ, Sorkin, E, eds. Macrophages and Natural Killer Cells. Plenum Publishing Co, New York, NY, 1982;49.
 67. Beller DI, Unanue ER: Regulation of macrophage Ia expression *in vivo* and *in vitro*. In: Norman SJ, Sorkin E, eds. Macrophages and Natural Killer Cells, Plenum Publishing Company, New York, NY, 1982;591.
 68. Unanue ER, Schreiner GF, Cotran RS: A role of mononuclear phagocytes in immunologically-induced glomerulonephritis. In: Cummings M, Wilson C, eds., Immune Mechanisms in Renal Disease. Plenum Publishing Co, New York, NY, 1982;443.
 69. Schreiner GF, Cotran RS, Unanue ER: Macrophages and cellular immunity in experimental glomerulonephritis. Springer Seminars in Immunopathol 1982;5:251.
 70. Martin BM, Gimbrone MA Jr, Unanue ER, Cotran RS: Macrophage factors: their role in proliferation of smooth muscle, fibroblasts, and endothelium. In: Bing DH, Rosenbaun RA, eds, Plasma and Cellular Modulatory Proteins, Center for Blood Research, Inc, Boston, Massachusetts, 1982;83.
 71. Braun J, Unanue ER: Surface immunoglobulin and the lymphocyte cytoskeleton. Fed Proc 1983;42:2446.
 72. Braun J, Unanue ER: The lymphocyte cytoskeleton and its control of surface receptor function. Sem Hematol 1983;20:322.
 73. Unanue ER, Beller DI, Lu CY: The function and regulation of macrophages bearing I-region-associated molecules. In: Yamamura Y, Kishimoto T, Hayashi H, Muramatsu M, Honjo T, Osawa T, eds, Humoral Factors in Host Defense, Academic Press, Inc, New York, NY, 1983;268
 74. Lu CY, Unanue ER: The ontogeny of Ia-positive macrophages. In: Parker JW, O'Brien RL, eds, Intracellular Communication in Leukocyte Function, John Wiley and Sons, 1983;271.

75. Unanue ER: Regulatory function of mononuclear phagocytes. *Prog Immunol* 1983;5:973.
76. Unanue ER: Antigen-presenting function of the macrophage. *Ann Rev Immunol* 1984;3:395.
77. Braun J, Kiely J-M, Unanue ER: Propagation of B lymphocytes in vitro. *Curr Top Micro Immunol*, Springer-Verlag, Heidelberg, West Germany 1984;237.
78. Allen PM, Unanue ER: Processing and presentation of hen egg-white lysozyme by macrophages. *Immunobiol* 1984;168:182.
79. Virgin HW, Unanue ER: Immune complexes suppress cellular immunity. *Acquired Immune Deficiency Syndrome*, Vol. 437, *Annals of the New York Academy of Sciences*, 1985;16.
80. Lu CY, Unanue ER: Macrophage ontogeny: Implications for host defense, T-lymphocyte differentiation, and the acquisition of self-tolerance. *Clinics in Immunology and Allergy* 1985;5(2):253.
81. Unanue ER, Allen PM, Kurt-Jones EA: Molecular nature of T cell recognition of antigen. *Immune Regulations*, eds, M Feldmann and NA Mitchison, Humana Press, Inc, 1985;225.
82. Allen PM, Unanue ER: Molecular nature of T-cell recognition of antigen. *Cell Biology of the Major Histocompatibility Complex* 1985;283-287.
83. Kurt-Jones EA, Virgin HW IV, Kiely J-M, Unanue ER: Expression and function of a membrane associated form of interleukin-1 on macrophages. In: *The Physiologic, Metabolic and Immunologic Actions of Interleukin 1*; MJ Kluger, JJ Oppenheim, MC Powanda, eds, AR Liss, NY, 1985;463-472.
84. Schreiner GF, Unanue ER, Cotran RS: Glomerular injury: functional phenotypic characteristics of resident and infiltrating macrophages. In: *Mononuclear Phagocytes. Characteristics, Physiology and Function*; R van Furth, M Nighoff, eds, 1985;785-792.
85. Unanue ER, Allen PM: Biochemistry and biology of antigen presentation by macrophages. *Cellular Immunology* 1986;99:3-6.
86. Allen PM, Babbitt BP, Unanue ER, Matsueda GR, Haber E: Molecular-events in antigen processing and presentation. *Vaccines* 1986;86:109-112.

87. Unanue ER, Allen PM: Comment on the finding of Ia expression in non-lymphoid cells. *Lab Inv* 1986;55(2):123-125.
88. Unanue ER, Braun J: Immunofluorescence methods to study cell surface and cytoplasmic proteins, and their dynamics. *Handbook of Experimental Immunology* Vol. 1, 4th edition, chapter 23, 1986;23.1-23.3.
89. Allen PM, Unanue ER: Implications of the direct binding in an immunogenic peptide to Ia. *Ann Inst Pasteur/Immunol* 1986;137D:297-349.
90. Unanue ER, Allen PM, Babbitt BP, Bancroft GJ, Kiely J-M, Kurt-Jones E, Virgin HW, IV, Weaver C: The regulatory role of macrophages in infection with intracellular pathogens. *Progress Immunol* 1987;VI:752.
91. Unanue ER and Allen PM: The immunoregulatory role of the macrophage. *Hospital Practice* 1987;22:87-104.
92. Unanue ER and Allen PM: The basis for the immunoregulatory role of macrophages and other accessory cells. *Science* 1987;236:551-557.
93. Unanue ER, Weaver CT, Fuhlbrigge RC, Kiely J-M, Chaplin DD: A membrane form of IL-1 - Identification and control of expression. *Molecular Basis of Lymphokine Action*, editors: DR Webb, CW Pierce, S Cohen, The Humana Press, Inc 1987;97-104.
94. Unanue ER: Antigen presentation by macrophages. In: *Processing and Presentation of Antigens*, B Pernis, SC Silverstein & HJ Vogel, eds., Academic Press, 1988;159-165.
95. Unanue ER, Weaver CT, Fuhlbrigge RC, Kiely J-M and Chaplin, DD: Membrane IL-1: A key protein in antigen presentation. *Ann Inst Pasteur/Immunol.* 1987;138:489-492.
96. Unanue ER: The molecular basis of macrophage-lymphocyte interaction. In: *Molecular Biology and Infectious Diseases-Colloque du Centenaire de L'Institut Pasteur.* Eds. M Schwartz, Elsevier, 1988;301.
97. Chaplin DD, Fuhlbrigge RC, Jadidi S, Sheehan KC, Schreiber RD, Gray PW, Unanue ER, D'Eustachio P: Restriction fragment length polymorphisms and linkage of murine IL-1-a and b genes on chromosome 2. In: *Monokines and other non-lymphocytic cytokines.* MC Powanda, JJ Oppenheim, MJ Kluger, CA Dinarello, eds. AR Liss, publisher, 1988;41-46.
98. Harding CV, Leyva-Cobian F, Unanue ER: Mechanisms of antigen processing. *Immunological Reviews* 1988;106:77-92.

99. Unanue ER: Macrophages, antigen presenting cells and the phenomena of antigen handling and presentation. *Fundamental Immunology*, Second edition, WE Paul, ed.
100. Fuhlbrigge RC, Hogquist KA, Unanue ER, Chaplin DD: Molecular biology and genetics of interleukin-1. *The Year in Immunology 1988. Immunoregulatory Cytokines and Cell Growth*. Editors: JM Cruse, RE Lewis, Jr. Publishers: Basel, Karger, 1988;5:21-37.
101. Unanue ER, Harding CV, Luescher IF, Roof RW: Antigen-binding function of class II MHC molecules. *Cold Spring Harbor Symposia on Quantitative Biology*, Volume LIV, 1989;383.
102. Unanue ER, Harding CV, Luescher IF, Roof RW: Further analysis of the role of MHC molecules in antigen presentation. In: *Progress in Immunology VII: 1989*;52-59, F Melchers, ed, Springer-Verlag.
103. Bancroft GJ, Schreiber RD, Unanue ER: T cell-independent macrophage activation in Scid mice. *Current Topics in Microbiology and Immunology* 1989;152:235-242.
104. Unanue ER, Cerottini J-C: Antigen presentation. *The FASEB Journal* 1989;3:2496-2502.
105. Weaver CT, Unanue ER: The co-stimulatory function of antigen-presenting cells. *Immunology Today* 1990;11:49-54.
106. Harding CV, Unanue ER: Cellular mechanisms of antigen processing and and the function of class I and II major histocompatibility complex molecules. *Cell Regulation* 1990;1:499-509.
107. Unanue ER, Cerottini J-C: Antigen recognition - editorial overview. *Curr Opin Immunol* 1991;3:1-2.
108. Unanue ER: Antigen Processing. In: *Encyclopedia of Immunology*. IM Roitt and PJ Delves, eds.-in press, 1992.
109. Unanue ER: Antigen Presentation. In: *Encyclopedia of Immunology*. IM Roitt and PJ Delves, eds.-in press, 1992.
110. Unanue ER: Antigen Presenting Cells. In: *Encyclopedia of Immunology*. IM Roitt and PJ Delves, eds.-in press, 1992.

111. Harding CV, Collins D, Unanue ER: Processing of liposome-encapsulated antigens targetted to specific subcellular compartments. *Res Immunol* 1991;143:188-196.
112. Bancroft GJ, Schreiber RD, Unanue ER: Natural Immunity: A T-cell-independent pathway of macrophage activation, defined in the SCID mouse. *Immunological Reviews* 1991;124:5-24.
113. Unanue ER: Cellular studies on antigen presentation by class II MHC molecules. *Current Opinion in Immunology* 1992;4:63-69.
114. Unanue ER, Braciale TJ: Antigen Recognition. *Current Opinion in Immunology* 1992;4:57-58.
115. Unanue ER: Antigen Processing and Presentation. In: *Immunology*, Upjohn Publ, B. Schwartz, ed, 1991;72-80.
116. Nelson CA, Harding CV, Unanue ER: Biochemical anatomy of antigen presentation. *Cold Spring Harbor Symposia on Quantitative Biol* 1992;LVII:557.
117. Unanue ER: Macrophages, antigen presenting cells and the phenomena of antigen handling and presentation. In: *Fundamental Immunology*, Third Edition, William E. Paul, ed, Chapter 5, Raven Press, Ltd., 1993;111-144,
118. Unanue ER: Antigen processing and presentation. *Clinical Aspects of Immunology*, PJ Lachmann, K Peters, FS Rosen, WJ Walport, eds, Blackwell Scientific, Boston, 1993;661-673.
119. Harding CV, Elofsson M, Kihlberg J, Magnusson G, Unanue ER: A carbohydrate antigen linked to a T-cell immunogenic peptide induces T-cell clones selective for carbohydrate. *Peptides, Proceedings of the 22nd European Peptide Symposium*, CH Schneider, AN Eberle, eds, Escom Science Publishers, 1992;840-841.
120. Unanue ER: Overview with historial perspective of the immune system. *Samter's Immunological Diseases*, 5th edition. MM Frank, KF Austen, HN Claman, ER Unanue, eds. Little, Brown and Co., Boston, 1995;3-16.
121. Unanue ER: Antigen processing and presentation. *Samter's Immunological Diseases*, 5th edition. MM Frank, KF Austen, HN Claman, ER Unanue, eds. Little, Brown and Co., Boston, 1995;87-100.
122. Rock KL and Unanue ER: Antigen recognition - Editorial Overview. *Current Opinion in Immunology* 1995;7:65-68.

123. Rogers HW, Tripp CS, Unanue ER : Different stages in the natural and acquired resistance to an intracellular pathogen. *The Immunologist* 1995;3:152-156.
124. Unanue ER: The concept of antigen processing and presentation. *JAMA* 1995;274(13): 1071-1073.
125. Tripp CS, Unanue ER: Macrophage production of IL12 is a critical link between the innate and specific immune responses to *Listeria*. *Research in Immunology* 1995;146:515-519.
126. Unanue ER: Joseph D. Feldman: Scientist, editor, friend. *J Immunol* 1995;155:5488-5489.
127. Nelson CA, Viner NJ, Unanue ER: Appreciating the complexity of MHC class II peptide binding: Lysozyme peptide and I-A^k. *Immunol Rev* 1996;151:81-105.
128. Unanue ER: Interrelationship among macrophages, NK cells and neutrophils in early stages of *Listeria* resistance. *Curr Opin Immunol* 1997;9:35-43.
129. Unanue ER: Macrophages, NK cells and neutrophils in the cytokine loop of *Listeria* resistance. *Research in Immunol* 1997;147:499-506.
130. Unanue ER: Why Listeriosis? A perspective on cellular immunity to infection. *Immunol Rev* 1997;158:5-9.
131. Unanue ER: Studies in Listeriosis show the strong symbiosis between the innate cellular system and the T cell response. *Immunol Rev* 1997;158:11-25.
132. Carrasco-Marin E, Kanagawa O, Unanue ER: Insights into the chemistry and biology of the I-A^{g7} class II molecule. *Res in Immunol* 1997; 148:291-301.
133. Unanue ER: A review of the immune system. *Immunology of the Nervous System*, RW Keane, WF Hickey eds. Oxford University Press, New York, 1997;69-98.
134. Unanue ER, Nelson CA, Viner NJ: The biochemical and cellular basis of peptide selection during antigen processing. *Alfred Benzon Symposium 40 - HLA and Disease - The Molecular Basis*. A Svejgaard, S Buus, L Fugger, eds. Munksgaard, Copenhagen. 1997;148-157.

135. Unanue ER: Antigen presenting cells, Antigen presentation via MHC class I molecules, Antigen presentation via MHC class II molecules. In: Encyclopedia of Immunology, second edition, PJ Delves, IM Roitt, eds. Academic Press, 1998;(pages 171, 191, 194, respectively).
136. Unanue ER: Chemical features of peptide selection by the class II histocompatibility molecules. Am J Path 1999;154:651-664.
137. Hämmerling GJ, Unanue ER: Antigen presentation in 1998 and at the 10th International Congress of Immunology. The Immunologist 1999;7:16-20.
138. Allen PM, Murphy KM, Schreiber RD, Unanue ER.: Immunity at 2000. Immunity 1999;11:649-651.
139. Latek RR, Unanue ER: Mechanisms of consequences of peptide selection by the I-A^k class II molecule. Immunol Rev 1999;172:209-228.
140. Unanue ER: Interaction of pathogens with the innate and adaptive immune system. In: Cellular Microbiology, P Cossart, P Boquet, S Normark, R Rappuoli, eds. ASM Press 2000; Chapter 16:291-311.
141. Unanue ER: The cellular and biochemical complexity of immunization. Published Universitat de Barcelona 2000;19-26.
142. Unanue ER: A review of the adaptive immune system. In: Chapter 1: Therapeutic Immunology 2001;3-17.
143. Edelson BT, Unanue ER: Immunity to *Listeria* infection. Curr Opinion Immunol 2000;12:425-431.
144. Unanue ER: Antigen processing and presentation. In: Samter's Immunological Diseases, 6th edition. KF Austen, KF Austen, JP Atkinson, H. Cantor, eds. Lippincott, Williams & Wilkins, Philadelphia. 2001;53-64.
145. Unanue ER: Innate immunity in bacterial infections. In: Immunology of Infectious Diseases. SHE Kaufmann, A Sher, R Ahmed, eds. ASM Press, Washington, DC. 2002;93-104.
146. Unanue ER: Perspective on antigen processing and presentation. Immunol Rev 2002; 185:86-102.
147. Unanue ER: Intracellular pathogens and antigen presentation - new challenges with *Legionella Pneumophila*. Immunity 2003;18:722-724.

148. Unanue ER, DeGregorio E: Interactions of pathogens with the innate and adaptive immune system. *Cellular Microbiology*, 2nd ed. Cossart P, Boquet P, Normark S, Rappuoli R, eds. ASM Press, Washington, D.C. 2005;425-451.
149. Unanue ER, Byersdorfer C, Carrero J, Levisetti M, Lovitch S, Pu Z, Suri A: Antigen presentation, autoimmune diabetes and Listeria - What do they have in common? *Immunol Res* 2005; in press.
150. Unanue ER: Some old and some new findings on antigen processing and presentation. In: *Antigen Presenting Cells: From Mechanisms to Drug Development*. H Kropshofer, AB Vogt, eds, Wiley-VCH Verlag, Weinham, Germany. 2005; in press.
151. Unanue ER: Processing and presentation of antigen by the class II histocompatibility system. In: *Topley and Wilson's Microbiology and Microbial Infections*, 10th edition, Immunology volume. 2005; in press.
152. Lovitch SB, Unanue ER: Conformational isomers of a peptide-class II MHC complex. *Immunol Rev* 2005; in press.
153. Suri A, Unanue ER: The murine diabetogenic class II histocompatibility molecule I-A^{g7}: structural and functional properties and specificity of peptide selection. *Adv Immunol* 2005; in press.

BOOKS

1. Benacerraf B, Unanue ER: Textbook of Immunology, Baltimore, Maryland: Williams and Wilkins Company, 1979.
2. Unanue ER, Rosenthal AS: Macrophage Regulation of Immunity. New York, New York: Academic Press, Inc, 1980.
3. Unanue ER, Benacerraf B: Textbook of Immunology, Second Edition. Baltimore, Maryland: Williams and Wilkins Company, 1984.
4. Rosen FS, Steiner L, Unanue ER: Dictionary of Immunology, MacMillan and Company, 1989.
5. Unanue ER: Samter's Immunological Diseases, 5th edition. Co-edited with MM Frank, KF Austen, HN Claman. Little, Brown and Co., Boston, 1995.