

WELLESLEY COLLEGE
OFFICE OF THE PRESIDENT
H. Kim Bottomly

RESUMÉ AND CURRICULUM VITAE

Education

B.S Zoology, University of Washington, 1969

Ph.D. Biological Structure, University of Washington School of Medicine, 1975

Current Postion

2007-present President, Wellesley College

Previous Administrative, Teaching, and Research Positions

2007-present Professor of Biological Sciences, Wellesley College

2005-2007 Deputy Provost for Science, Technology, and Faculty Development, Yale University. Responsible for shaping and implementing academic, administrative, and budgetary policies in all departments in the natural sciences, as well as anthropology, psychology, statistics and linguistics. Oversaw Yale Engineering, the School of Forestry and Environmental Studies, the Peabody Museum of Natural History, the Yale Institute for Biospheric Studies and the Haskins Laboratory.

2004-2005 Chair (acting) of Immunobiology (2004-2005), Yale University School of Medicine.

2000-2004 Divisional Director of the Biological Sciences (2000-2004), Yale University. Divisional committees are appointed by the President and determine all senior appointments and tenure decisions. The Committee also reviews and serves to advise the Provost and President on new initiatives, graduate programs, departmental reviews, and other activities in the sciences.

1992-2007 Professor of Immunobiology, Yale University School of Medicine, Professor of Molecular, Cellular and Developmental Biology, Yale University

1989-1991 Associate Professor of Immunobiology (with tenure), Yale University School of Medicine

1987-1988 Visiting Scholar, Harvard University

1980 Assistant Professor of Pathology, Yale University School of Medicine

1979-1980 Research Associate, Institute for Cancer research, Fox Chase Cancer Center

1976-1979 Postdoctoral fellow, Laboratory of Immunology, NIAID, National Institutes of Health



Selected Other Administration Yale University

Chair, Biological Science Advisory Committee

Chair, Dean's Strategic Planning Committee for Basic Research

Chair, Dean's Advisory Committee on Student Grievances, Graduate School.

Search committee member for: Dean of the Medical School, Dean of Engineering, Chair of Pathology,
Chair of Internal Medicine, Chair of Surgery, Chair of Comparative Medicine.

Committee to review Epidemiology and Public Health

Committee to review the Yale undergraduate curriculum

Steering Committee and member, Women Faculty Forum

Awards and Recognition

Elected to the American Academy of Arts and Sciences, 2009

University of Washington Wondrous 100 (Top 100 graduates of the past century), 2008

Elected to the Connecticut Academy of Science and Engineering, 2007

Clontech/Fong Award for Distinguished Research and Teaching, 2004

American Association of Immunologists, Distinguished Lecturer, 2004

National Institutes of Health, Merit Award AI26791: Differential activation of T cell subsets, 1998-2008

National Institutes of Health, PHS Postdoctoral Research Award, 1976-1979

Professional and National Service Activities, Honors

2010 Member, Teach for America Champions' Board

2010 Member, National Cancer Advisory Board's ad hoc Working Group to develop a
strategic scientific vision for the National Cancer Program

2009 Member, American Academy of Arts and Sciences committee on Federal Funding
Impact on the American University

2009 Chair, Board of Directors of the Consortium on Financing Higher Education (COFHE)

2008 Member, Franklin W. Olin College of Engineering President's Council

2004-2007 Member, Yale Comprehensive Cancer Center Executive Committee

2003 Member, Expert Panel on Food Allergy, National Institutes of Health

2001 Member, NIH Government Performance and Results Act Research Assessment Committee

1998-2002 Member, Advisory Council, National Institutes of Allergy and Infectious Disease,
National Institutes of Health

1997 Member, Expert Panel on HIV/AIDS, National Institutes of Health

1993-1998 Member, Immunobiology Study Section, Division of Research Grants, NIH

1993-1995 Steering Committee, Boyer Center for Molecular Medicine, Yale University School
of Medicine

- 1993 Dean's Committee, Recruitment & Retention of Senior Women Faculty, Yale University
School of Medicine
- 1992 Yale University, M.A. (honorary)

Industry Advisory / Consultant

- 2005-2007 Medical Advisory Board, Food Allergy Initiative
- 2005 Scientific Advisory Board, La Jolla Institute for Allergy and Immunology
- 2005 Novartis
- 1998-present Panacea/Seer Pharmaceuticals
- 1997-8 Boehringer Ingelheim Pharmaceuticals
- 1996-7 Immunova, LTD.
- 1994-5 Fuji Pharmaceuticals
- 1993 Bristol Myers-Squibb

Editorial Boards

- WGBH Board of Trustees (2007-present)
- SOCIETY, Advisory Editorial Board, (2007-present)
- Immunity, Editor, (2000-2003); Associate Editor (2003-2005)
- Journal of Immunology, Section Editor (1991-1992); Associate Editor (1987-1991)
- Journal of Molecular and Cellular Immunology, Editorial Board (1982-1989)

Recent Invited Presentations

- National Archives' 4th Annual Forum on Women in Leadership panelist (2011), *The Changing Roles of Women in Academic Leadership*.
- Bryn Mawr 125th Anniversary panelist (2020), *The Past, Present, and Future of Women's Education in a Global World*.
- Aspen Ideas Festival, Aspen Colorado (2010), presentations in two sessions. *Women at the Cutting Edge of Science: Why Should We Care?* and *The Purpose of Higher Education in the 21st Century*.
- Asia Society Conference in Hong Kong on Women Leaders of New Asia (2010), presentation in plenary closing session.
- National Organization for Women (NOW) 2010 Conference, plenary speaker.
- National Association of Women Judges District 1 Fall Reception honoring new women judges (2009), presentation on *Education of 21st Century Women as Leaders and Architects of Our Society*.
- American Association for the Advancement of Science New Fellows Induction (2008), Invited Keynote Speaker, *Unchanging Science Education in a Changing World*.

Professional Societies

American Association for the Advancement of Sciences

AAAS Electorate Nominating Committee (elected) (2006-2009)

American Association of Immunologists

Program Committee, (1986-1988)

Program Block Chairman (1986-1988)

Chair, Committee on the Status of Women (1985-1989)

Education Committee (1993-1996)

Public Affairs Committee (1994-1997)

Nominating Committee (elected) (1995-1997)

Awards Committee (elected) (1998-2001)

Federation of American Societies for Experimental Biology

Chairman, Women's Committee (1988-1991)

Major Research Areas:

Immunobiology

Control of effector cell responses by subsets of CD4 T cells

Asthma and allergic diseases

Summary of research work and professional interests:**Research interests:**

My research focuses on the molecular and cellular factors that influence CD4 T cell differentiation. In the mid 1980s, studies in my laboratory, using new technology for generating monoclonal T cells, showed that CD4 T cells were functionally heterogeneous but individually committed to a set of functions. My early studies led to the definition of two major types of CD4 T cell based on both differences in cytokine gene expression and in function. These types, named Th1 and Th2 cells, were shown to be key to our understanding of protective immunity in that the activation of Th1 cells is essential for resistance to intracellularly residing microorganisms, whereas activation of Th2 cells is essential for resistance to large parasites. Since responses to invading microorganisms leads to the selective activation of one of these two types of cells, protective immune responses depend on the early activation of the right type of CD4 T cell. Over the years my laboratory has studied the factors determining which type of CD4 T cell is activated by evaluating gene expression and subsequent cell function in response to microbial stimulation. Using biochemical and genetic approaches, factors influencing early signaling events required for CD4 T cell differentiation were defined. Using these findings, the in vivo role of CD4 T cells was studied in a newly created murine model of asthma, in which Th2 cells were shown to respond to inhaled allergens. This model allowed my laboratory to determine the factors required for the initiation of Th2 responses in vivo and the role of innate

immune receptors in sensitization. Overall, the laboratory is interested in understanding how appropriate effector CD4 T cell responses are generated, responses that lead to effective clearance of invasive microorganisms.

I was a member of the Immunobiology Study Section and served on the editorial boards of *Molecular and Cellular Immunology*, *Journal of Immunology*, *Immunity*, and *SOCIETY*. In 1998, I was appointed to a 5-year term on the Advisory Council for the National Institute of Allergy and Infectious Diseases. Until 2007, I was the principal investigator on five grants from the NIH and a grant from the Philip Morris Research Institute and have over 160 peer-reviewed publications. I received a merit award for one of my grants which had been funded and renewed for 25 years. Recently I have been serving on the National Cancer Advisory Board ad hoc Working Group charged with creating a strategic program and reviewing the National Cancer Institute and an American Academic Arts and Sciences Committee to study the *Federal Funding Impact on the American University*.

PUBLICATIONS

1. Bottomly, K., W.D. Perkins, and M.R. Schwarz. 1975. 3H-uridine incorporation by small lymphocytes of tolerant rats: Relationship to T and B lymphocytes. *J. Immunol.* 115:648.
2. Bottomly, K., B.J. Mathieson, and D.E. Mosier. 1978. Anti-idiotypic induced regulation of helper cell function for the response to phosphorylcholine in adult BALB/c mice. *J. Exp. Med.* 148:1216.
3. Bottomly, K., B.J. Mathieson, H. Cosenza, and D.E. Mosier. 1979. Idiotypic specific regulation of the response to phosphorylcholine by T cells from mice with high and low levels of circulating idiotype. In: *B Lymphocytes in the Immune Response*, Eds. M. Cooper, D.E. Mosier, I. Scher, and E. Vitetta (Elsevier North-Holland, New York) page 323.
4. Mosier, D.E., E. Goldings and K. Bottomly. 1979. Activation requirements for neonatal B lymphocytes in vitro and in vivo. In: *B Lymphocytes in the Immune Response*, Eds. M. Cooper, D.E. Mosier, I. Scher, and E. Vitetta (Elsevier North-Holland, New York) page 91.
5. Bottomly, K. and D.E. Mosier. 1979. Mice whose B cells cannot produce the T15 idiotype also lack an antigen-specific helper T cell required for T15 expression. *J. Exp. Med.* 150:1399.

6. Janeway, Jr., C.A., K. Bottomly, D.L. Bert, E.A. Dzierzak and D.E. Mosier. 1980. Synergizing helper T cell sets and the regulation of antibody quality. In: Regulatory T Lymphocytes. Pernis, B. and Vogel, H., Eds.(Academic Press, New York). page 159
7. Bottomly, K. and D.E. Mosier. 1980. Analogous dual specificity of helper T cells cooperating in the generation of clonally-restricted antibody responses. In: Strategies for Immune Regulation, Eds. E. Sercarz and A. Cunningham, (Academic Press), New York p. 487.
8. Bottomly, K., C.A. Janeway, Jr. and D.E. Mosier. 1980. Absence of an antigen-specific helper T cell required for the expression of the T15 idiotype in mice treated with anti- μ chain antibody. Eur. J. Immunol. 10:159.
9. Mathieson, B.J., S. Sharrow, K. Bottomly and B.J. Fowlkes. 1980. Ly-9: An alloantigenic marker of lymphocyte differentiation. J. Immunol. 125:2127.
10. Bottomly, K. and P.H. Maurer. 1980. Antigen-specific helper T cells required for dominant production of idiotype (ThId) are not under immune response (Ir) gene control. J. Exp. Med. 152:1571.
11. Bottomly, K. and F. Jones III. 1981. Idiotype dominance manifested during a T-dependent anti-phosphorylcholine response requires a distinct helper T cell. In: B Lymphocytes in the Immune Response: Functional, Developmental and Interactive Properties. Eds. N. Klinman, D.E. Mosier, I. Scher, E.S. Vitetta (Elsevier-North Holland, New York) page 415.
12. Bottomly, K. and C.A. Janeway, Jr. 1981. Selected populations of alloreactive T cells contain helper T cells but lack ThId, an antigen-specific helper T cell required for dominant production of the T15 idiotype. Eur. J. Immunol. 11:270.
13. Bottomly, K. 1981. Activation of the idiotypic network: Environmental and regulatory influences. In: Immunoglobulin Idiotypes and their Expression. Eds. C. Janeway, E. Sercarz and H. Wigzell (Academic Press, New York). pp 517.
14. Bottomly, K. and B. Huber. 1981. Cellular regulation of isotype, allotype and idiotype expression. In: B lymphocytes in the Immune Response: Functional Developmental, and Interactive Properties, Eds. N. Klinman, D.E. Mosier, I. Scher and E. Vitetta (Elsevier North Holland, New York) pp 449.

15. Bottomly, K. and D.E. Mosier. 1981. Helper T cells required for dominant production of the T15 idiotype are not MHC restricted. *J. Exp. Med.* 154:411.
16. Jason, J.M., K. Bottomly, J. Murray, R.E. Cone, R.W. Rosenstein, W. Ptak and C.A. Janeway, Jr. 1982. Detection of a novel binding site for T cell derived antigen binding proteins on thymic epithelial cell surfaces. *Behring Insti. Mitteilung* 70:39.
17. Janeway, Jr., C.A., K. Bottomly, B. Jones, P. Jones, E.A. Lerner, L.A. Matis, J.M. McNicholas, D.B. Murphy and R.H. Schwartz. 1982. Helper T cells specific for protein antigens. Role of self major histocompatibility complex and immunoglobulin gene products. In: *Immunobiology of Proteins and Peptides -II.* Ed. M.Z. Atazzi (Plenum Publishing Corp.). pp. 53.
18. Bottomly, K. and E. Dunn. 1983. The role of B cell Ia antigens in T cell dependent B cell activation. Ia antigen density correlates with idiotype expression. In: *Annals of the New York Academy of Sciences.* p. 23.
19. Bottomly, K., B. Jones, J. Kaye and F. Jones III. 1983. Subpopulations of B cells distinguished by cell surface expression of Ia antigens: Correlation of Ia and idiotype during activation by cloned, Ia restricted T cells. *J. Exp. Med.* 158:265.
20. Bottomly, K., J. Kaye, F. Jones III, B. Jones, and C.A. Janeway, Jr. 1983. A cloned antigen-specific Ia-restricted Lyt-1+, 2- T cell with suppressive activity. *J. Mol. Cell Immunology.* 1:42.
21. Bottomly, K. 1983. Biological relevance of helper T cell subsets. *J. Mol. Cell Immunology* 1:63.
22. Bottomly, K. and E. Dunn. 1984. Helper T lymphocyte influences on idiotype bearing B cells. In: *The Biology of Idiotypes.* Eds. M. Greene and A. Nisonoff (Plenum Publishing Corp. N.Y.) pp 365.
23. Bottomly, K. 1984. All idiotypes are equal, but some are more equal than others. *Immunol Rev.* 79:45.
24. Janeway, Jr., C.A., K. Bottomly, J. Babich, P. Conrad, S. Conzen, B. Jones, J. Kaye, M. Katz, L. McVay, D.B. Murphy and J. Tite. 1984. Quantitative variation in Ia antigen expression plays a central role in immune regulation. *Immunology Today* . 5:99.

25. Janeway Jr., C.A., K. Bottomly, B Jones, M. Katz, J. Kaye, G. Su and J. Tite. 1985. Quantitative variation in Ia and non-Ia B cell surface molecules regulates T cell:B cell interactions. In: *Cell Biology of the MHC*. Eds. B. Pernis and A. Vogel, (Academic Press), New York, pp 259-271.
26. Dunn, E. and K. Bottomly. 1985. T15 specific helper T cells: Analysis of idiotypic specificity by competitive inhibition analysis. *Eur. J. Immunol.* 15:728.
27. Kim, J., A. Woods, E. Becker-Dunn and K. Bottomly. 1985. Distinct functional phenotypes of cloned Ia-restricted helper T cells. *J. Exp. Med.* 162:188.
28. Janeway Jr., C.A., K. Bottomly, J. Horowitz, J. Kaye, B. Jones and J. Tite. 1985. Modes of cell: cell communication in the immune system. *J. Immunol.* 135:739.
29. Becker-Dunn, E., J. Kim and K. Bottomly. 1985. Generation of a cloned T cell line which selectively activates idiotypic bearing B cells. In: *ICSU Short Reports-Advances in Gene Technology: Molecular Biology of the Immune System*. (Cambridge University Press) p 109.
30. Janeway, Jr., C.A., J.P. Tite, K. Bottomly and P. Flood. 1985. The role of immunoglobulin and B cells in T cell ontogeny and repertoire formation. *J. Mol. Cell Immunol.* 2: 118.
31. Janeway, Jr., C.A., J.P. Tite, J. Horowitz, P.J. Conrad, J. Kaye, B. Jones and K. Bottomly. 1986. Cell interactions in the immune system: The role of self recognition in the targeting of non-specific effector molecules by helper T cells. *Fundamental Cancer Res.* 38:45.
32. Becker-Dunn, E., J. Kim and K. Bottomly. 1986. A cloned T cell line that selectively augments antibody responses of phosphorylcholine-specific B cells bearing the T15 idiotypic. *J. Mol. Cell. Immunol.* 2:209
33. Janeway, Jr., C.A., B. Broughton, L.A. Smith, T.N. Marion and K. Bottomly. 1987. Direct receptor: receptor interactions between T and B lymphocytes: Idiotypic restriction in the antibody response to a cloned helper T cell receptor. *J. Mol. Cell Immunol.* 3: 83-94.
34. Bottomly K., J.P. Tite, B. Jones, E.B. Dunn, J. Kaye, A. Kupfer and C.A. Janeway, Jr. 1986. Control of B cell activation by helper T cells. In: *The Molecular Basis of B Cell Differentiation and function*. Eds. M. Ferrarini and B. Pernis (Plenum Press, N.Y.), p. 83.

35. Killar, L., G. MacDonald, J. West and K. Bottomly. 1987. Cloned Ia restricted T cells that do not produce interleukin 4 (IL-4)/B cell stimulatory factor 1 (BSF-1) fail to help antigen-specific B cells. *J. Immunol.* 138:1674.
36. Smith, A.L., K. Bottomly and D.F. Winograd. 1987. Altered splenic T cell function of BALB/cBy mice infected with house hepatitis virus or sendai virus. *J. Immunol.* 138:3426.
37. Janeway, Jr., C.A., P. Tite, L. Conrad, W-J Poo, P. Conrad, A. Kupfer, K. Bottomly and B. Jones. 1987. The effector T cell as a lymphokine targeting vehicle. In: *Immune Regulation by Characterized Polypeptides*. Eds. G. Goldstein, J.F. Bach and H. Wigzell (Alan Liss, Inc. N.Y.) p373.
38. Woods, A., J. West, R. Rasmussen and K. Bottomly. 1987. Granulocyte – macrophage colony stimulating factor produced by cloned L3T4a+, Class II –restricted T cells induces HT-2 cells to proliferate. *J. Immunol.* 138:4293.
39. Rasmussen, R., K. Takatsu, N. Harada, T. Takahashi and K. Bottomly. 1988. T cell dependent hapten specific and polyclonal B cell responses require release of interleukin 5. *J. Immunol.* 140:705.
40. Janeway, Jr., C.A., S. Carding, B. Jones, J. Murray, P. Portoles, R. Rasmussen, J. Rojo, K. Saizawa, J. West and K. Bottomly. 1988. CD4+ T Cells: Specificity and function. *Immunol. Rev.* 101:39.
41. Greenbaum, L., J.B. Horowitz, A. Woods, T. Pasqualini and K. Bottomly. 1988. Autocrine growth of CD4+ T cells: differential effects of IL1 on helper and inflammatory T cells. *J. Immunol.* 140:1555.
42. Carding, S.R. and K. Bottomly. 1988. Interleukin 4 (BSF-1) exhibits thymocyte growth factor activity in the presence of IL-2. *J. Immunol.* 140: 1519.
43. Bottomly, K. A functional dichotomy in CD4+ T lymphocytes. 1988. *Immunology Today.* 9:268.
44. Jones, B., J. Horowitz, J. Kaye, L. Killar, K. Bottomly and C.A. Janeway, Jr. 1988. Antigen presenting cell lysis: role in immune responses and effect on quantitative analysis of antigen presentation to T cells. In: *Antigen Presentation and Processing*. Eds. B. Pernis and A. Vogel, (Academic Press, NY). p. 291.
45. Bottomly, K. 1988. Whither the immune response? Factors directing the response to humoral or cell-mediated immunity. In: *The Semiotics of Cellular Communication in the Immune System*. Eds. E. Sercarz, F. Celada, N.A Mitchison and T. Tada (Springer-Verlag, N.Y.) p. 305.

46. Bottomly, K. Idiotypic regulation. 1988. In B Cell Development. Eds. O. Witte, N. Klinman and M. Howard, (Academic Press, New York) p. 117.
47. Bottomly K. 1988. The idiotype-specific repertoire is determined by idiotype prevalence. In: Elicitation and Use of Anti-Idiotype Antibodies and their Biological Applications. Ed. C.A. Bona (CRC Press, Inc.) p.153.
48. Bottomly, K. and C.A. Janeway Jr. 1988. The activation of immune effector cells: Role of helper and inflammatory CD4 T cell subsets. In: The Immune Consequences of Trauma, Ed. E. Faist, (Springer-Verlag, New York)
49. Carding, S.R., A. Woods, J. West and K. Bottomly. 1989. Differential activation of cytokine genes in normal CD4 Bearing T cells is stimulus dependent. Eur. J. Immunol. 19:231-238.
50. Johnson, P., L. Greenbaum, K. Bottomly and I.S. Trowbridge. 1989. Identification of the alternatively spliced exons of murine CD45 (T200) required for reactivity with B220 and other T200 restricted antibodies. J. Exp. Med. 169:1179-1184.
51. Janeway Jr., C.A., J. Yagi, J. Rojo, P. Portoles, S. Carding, M. Luqman and K. Bottomly. 1989 Immune recognition and effector function in subsets of CD4 T cell. In: Proc. of the 19th Princess Takamatsu Cancer Symposium. Ed. T. Hamaoka. pp 193-208.
52. Stout, R.D. and K. Bottomly. 1989. Antigen-specific activation of effector macrophages by interferon-gamma producing (Th1) T cell clones. Failure of IL4-producing (Th2) T cell clones to activate effector function in macrophages. J. Immunol. 142:760-765.
53. Carding, S.R., E. J. Jenkinson, R. Kingston, A.C. Hayday, K. Bottomly and J.J.T. Owen. 1989. Developmental control of lymphokine gene expression in fetal thymocytes during intrathymic development. Proc. Nat. Acad. Sci. USA. 86:3342-3345.
54. Bottomly, K., M. Luqman, L. Greenbaum, S. Carding, J. West, T. Pasqualini and D.B. Murphy. 1989. A monoclonal antibody to murine CD45R distinguishes CD4 T cell populations that produce different lymphokines. Eur. J. Immunol. 19: 617-623.
55. Portoles, P., Rojo, J., A. Golby, L. Greenbaum, S. Gromkowsky, D.B. Murphy C.A. Janeway, Jr. and K. Bottomly. 1989. Monoclonal antibodies to murine CD3e define distinct epitopes, one of which may interact with CD4 during T cell activation. J. Immunol. 142:4169-4175.

56. Bottomly, K. Subsets of CD4 T cells and B cell activation. 1989. *Seminars in Immunology*. 1:21-31.
57. Murray, J., J. Madri, J. Tite, S. Carding and K. Bottomly. 1989. MHC control of CD4+ T cell subset activation. *J. Exp. Med.* 170:2135-2140.
58. Polan, M.L., J. Loukides, P. Nelson, S. Carding, M. Diamond, A. Walsh and K. Bottomly. 1989. Progesterone and estradiol modulate interleukin 1b (IL-1b) messenger ribonucleic acid levels in cultured human peripheral monocytes. *J. Clin. Endoc. Metab.* 89:1200.
59. Bottomly, K, M. Luqman, J. Murray, J. West, A. Woods and S. Carding. 1989. Clonal Expansion and differentiation to effector function in normal CD4 T cell subpopulations. *Progress in Immunology*. 7:593-597.
60. Killar, L.M., C.A. Hatfield, S. Carding, M. Pan, G.E. Winterrowd and K. Bottomly. 1989. In vivo administration of interleukin-1 induces changes in murine lymphocytes. Effects on subset distributions, class II MHC antigen expression, mitogen responses, and cytokine mRNA expression. *Eur. J. Immunol.* 19:2205-2210.
61. Carding, S., J. McNamara, M. Pan and K. Bottomly. 1990. Characterization of g/d T cell clones isolated from human fetal liver and thymus. *Eur. J. Immunol.* 20:1327-1335.
62. Polan, Mary Lake, A. Kuo, J. Loukides and K. Bottomly. 1990. Cultured human luteal peripheral monocytes secrete increased levels of interleukin-1. *J. Clin. Endoc. and Metab.* 70:480-484.
63. Carding, S.R., S. Keys, E.J. Jenkinson, R. Kingston, K. Bottomly, J.J. T. Owen, and A. Hayday. 1990. Developmentally regulated fetal thymic and extra-thymic T cell receptor gd gene expression. *Genes and Development*. 4:1304-1315.
64. Dianzani, U., M. Luqman, J. Rojo, J. Yagi, J. Baron, A. Woods, C. Janeway, Jr. and K. Bottomly. 1990. Molecular associations on the T cell surface correlate with immunological memory. *Eur. J. Immunol.* 20:2249-2257.
65. Ernst, D.N., M.V. Hobbs, B.E. Torbett, A. Glasebrook, M.A. Rehse, K. Bottomly, K. Hayakawa, R.R. Hardy and W.O. Weigle. 1990. Differences in the expression profiles of CD45RB, Pgp-1 and 3G11 membrane antigens and in the patterns of lymphokine secretion by splenic CD4+ T cells from young and aged mice. *J. Immunol.* 145:1295-1302.

66. Carding, S.R., W. Ailan, S. Kyes, A. C. Hayday, K. Bottomly and P.C. Doherty. 1990. Late dominance of the inflammatory process in murine influenza by gd T cells. *J. Exp. Med.* 172:1225-1231.
67. Gao, X-M, F.Y. Liew, K. Bottomly, A. Meager and J.P. Tite. 1990. Clonal analysis of the relationship between class II MHC-restricted cytotoxicity and lymphokine secretion in murine L3T4+ T cells. *Immunology.* 72: 256-260.
68. Ernst, D., M. Hobbs, B. Torbett, A. Glasebrook, M. Rehse, D. McQuitty, K. Bottomly and W.D. Weigle. 1990. Differences in the subset composition of CD4+ T cell populations from young and old mice. *Aging: Immunology and Infectious Disease.* 2:105-109.
69. Janeway Jr., C.A., J. Rojo, P. Portoles, E. Dunn, and K. Bottomly. 1990. Idiotype interactions between B- and T- lymphocyte receptors. In *Idiotype Networks in Biology and Medicine*, A.D.M. E. Osterhaus and F.G.C.M. Uytendaele, editors. pp. 125.
70. Luqman, M., P. Johnson, I.S. Trowbridge and K. Bottomly. 1991. Differential expression of the alternatively spliced exons of murine CD45 in Th1 and Th2 cloned lines. *Eur. J. Immunol.* 21:17-22.
71. McVay, L., S. Carding, K. Bottomly, and A. Hayday. 1991. Regulated expression and structure of T cell receptor α/δ transcripts in human thymic ontogeny. *EMBO J.* 10:83-91.
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73. de Souza, M.S., A. Smith, and K. Bottomly. 1991. Infection of BALB/cByJ Mice with the JHM strain of mouse hepatitis virus alters in vitro splenic T cell proliferation and cytokine production. *Lab Animal Science.* 41:99-105.
74. Carding, S., A. Hayday, and K. Bottomly. 1991. Cytokines in T cell development. *Immunology Today.* 12:239-245.
75. Pfeiffer, C., J. Murray, J. Madri and K. Bottomly. 1991. Selective Activation of Th1 and Th2 like cells in vivo. Response to Human Collagen IV. *Immunol. Rev.* 123:65-84.
76. Eichelberger, M., W. Ailan, S.R. Carding, K. Bottomly, and P.C. Doherty. 1991. Activation status of the CD4-8- gd T cells recovered from mice with influenza pneumonia. *J. Immunol.* 147:2069-2074.

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80. Jenkins, MK, D. Mueller, RH Schwartz, S. Carding, K. Bottomly, MJ Staderker, Urdahl, SD Norton. 1991. Induction and maintenance of anergy in mature T cells. *Adv. Exp. Med. Biol.* 292: 167-76.
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