

7 Literaturverzeichnis

- Abbas, A. K., K. M. Murphy, and A. Sher. 1996. Functional diversity of helper T lymphocytes. *Nature* 383: 787-93.
- Anderson, G., E. J. Jenkinson, N. C. Moore, and J. J. Owen. 1993. MHC class II-positive epithelium and mesenchyme cells are both required for T-cell development in the thymus. *Nature* 362: 70-3.
- Anderson, N. L., and N. G. Anderson. 1998. Proteome and proteomics: new technologies, new concepts, and new words. *Electrophoresis* 19: 1853-61.
- Andreaskos, E. T., B. M. Foxwell, F. M. Brennan, R. N. Maini, and M. Feldmann. 2002. Cytokines and anti-cytokine biologicals in autoimmunity: present and future. *Cytokine Growth Factor Rev* 13: 299-313.
- Anselmo, A. N., R. Bumeister, J. M. Thomas, and M. A. White. 2002. Critical contribution of linker proteins to Raf kinase activation. *J Biol Chem* 277: 5940-3.
- Armitage, R. J. 1994. Tumor necrosis factor receptor superfamily members and their ligands. *Curr Opin Immunol* 6: 407-13.
- Arribas, J., M. Luz Rodriguez, R. Alvarez-Do Forno, and J. G. Castano. 1991. Autoantibodies against the multicatalytic proteinase in patients with systemic lupus erythematosus. *J Exp Med* 173: 423-7.
- Ashton-Rickardt, P. G., L. Van Kaer, T. N. Schumacher, H. L. Ploegh, and S. Tonegawa. 1993. Peptide contributes to the specificity of positive selection of CD8+ T cells in the thymus. *Cell* 73: 1041-9.
- Atta, M. S., K. L. Lim, D. A. Ala'deen, R. J. Powell, and I. Todd. 1995. Investigation of the prevalence and clinical associations of antibodies to human fibronectin in systemic lupus erythematosus. *Ann Rheum Dis* 54: 117-24.
- Avraham, S., H. Avraham, K. F. Austen, and R. L. Stevens. 1992. Negative and positive cis-acting elements in the promoter of the mouse gene that encodes the serine/glycine-rich peptide core of secretory granule proteoglycans. *J Biol Chem* 267: 610-7.

- Battista, S., F. Pentimalli, G. Baldassarre, M. Fedele, V. Fidanza, C. M. Croce, and A. Fusco. 2003. Loss of Hmg1 gene function affects embryonic stem cell lympho-hematopoietic differentiation. *Faseb J* 17: 1496-8.
- Bedell, M. A., N. A. Jenkins, and N. G. Copeland. 1997a. Mouse models of human disease. Part I: techniques and resources for genetic analysis in mice. *Genes Dev* 11: 1-10.
- Bedell, M. A., D. A. Largaespada, N. A. Jenkins, and N. G. Copeland. 1997b. Mouse models of human disease. Part II: recent progress and future directions. *Genes Dev* 11: 11-43.
- Birchfield, P. C. 2001. Osteoarthritis overview. *Geriatr Nurs* 22: 124-30; quiz 130-1.
- Bläß, S., A. Union, J. Raymackers, F. Schumann, U. Ungethum, S. Muller-Steinbach, F. De Keyser, J. M. Engel, and G. R. Burmester. 2001. The stress protein BiP is overexpressed and is a major B and T cell target in rheumatoid arthritis. *Arthritis Rheum* 44: 761-71.
- Blohm, D. H., and A. Guiseppi-Elie. 2001. New developments in microarray technology. *Curr Opin Biotechnol* 12: 41-7.
- Bockenstedt, L. K., R. J. Gee, and M. J. Mamula. 1995. Self-peptides in the initiation of lupus autoimmunity. *J Immunol* 154: 3516-24.
- Boettner, M., B. Prinz, C. Holz, U. Stahl, and C. Lang. 2002. High-throughput screening for expression of heterologous proteins in the yeast *Pichia pastoris*. *J Biotechnol* 99: 51-62.
- Bonagura, V. R., N. Agostino, M. Borretzen, K. M. Thompson, J. B. Natvig, and S. L. Morrison. 1998. Mapping IgG epitopes bound by rheumatoid factors from immunized controls identifies disease-specific rheumatoid factors produced by patients with rheumatoid arthritis. *J Immunol* 160: 2496-505.
- Bonagura, V. R., S. E. Artandi, A. Davidson, I. Randen, N. Agostino, K. Thompson, J. B. Natvig, and S. L. Morrison. 1993. Mapping studies reveal unique epitopes on IgG recognized by rheumatoid arthritis-derived monoclonal rheumatoid factors. *J Immunol* 151: 3840-52.
- Breedveld, F. C. 1998. New insights in the pathogenesis of rheumatoid arthritis. *J Rheumatol Suppl* 53: 3-7.

- Bringuier, J. P., C. M. Veysseyre, C. Martin, T. Raffin, and J. C. Monier. 1984. Binding capacity of sera from systemic lupus erythematosus (SLE) and rheumatoid arthritis (RA) to C3c. Evaluation by enzyme linked immunosorbent assay (ELISA). *Pathol Biol (Paris)* 32: 1029-32.
- Bubb, M. R. 2003. Thymosin beta 4 interactions. *Vitam Horm* 66: 297-316.
- Büssow, K., D. Cahill, W. Nietfeld, D. Bancroft, E. Scherzinger, H. Lehrach, and G. Walter. 1998. A method for global protein expression and antibody screening on high-density filters of an arrayed cDNA library. *Nucleic Acids Res* 26: 5007-8.
- Büssow, K., E. Nordhoff, C. Lubbert, H. Lehrach, and G. Walter. 2000. A human cDNA library for high-throughput protein expression screening. *Genomics* 65: 1-8.
- Cahill, D. 2000. Protein arrays: a high-throughput solution for proteomics research? *Proteomics: A Trends Guide* : 47-51.
- Cahill, D. J. 2001. Protein and antibody arrays and their medical applications. *J Immunol Methods* 250: 81-91.
- Cantrell, D. A. 1996. T cell antigen receptor signal transduction pathways. *Cancer Surv* 27: 165-75.
- Caponi, L., D. Chimenti, F. Pratesi, and P. Migliorini. 2002. Anti-ribosomal antibodies from lupus patients bind DNA. *Clin Exp Immunol* 130: 541-7.
- Carson, D. A., J. L. Pasquali, C. D. Tsoukas, S. Fong, S. F. Slovin, S. K. Lawrance, L. Slaughter, and J. H. Vaughan. 1981. Physiology and pathology of rheumatoid factors. *Springer Semin Immunopathol* 4: 161-79.
- Cereghino, J. L., and J. M. Cregg. 2000. Heterologous protein expression in the methylotrophic yeast *Pichia pastoris*. *FEMS Microbiol Rev* 24: 45-66.
- Cherwinski, H. M., J. H. Schumacher, K. D. Brown, and T. R. Mosmann. 1987. Two types of mouse helper T cell clone. III. Further differences in lymphokine synthesis between Th1 and Th2 clones revealed by RNA hybridization, functionally monospecific bioassays, and monoclonal antibodies. *J Exp Med* 166: 1229-44.
- Chiller, J. M., G. S. Habicht, and W. O. Weigle. 1971. Kinetic differences in unresponsiveness of thymus and bone marrow cells. *Science* 171: 813-5.

- Chu, C. Q., M. Field, M. Feldmann, and R. N. Maini. 1991. Localization of tumor necrosis factor alpha in synovial tissues and at the cartilage-pannus junction in patients with rheumatoid arthritis. *Arthritis Rheum* 34: 1125-32.
- Clark, M. D., G. D. Panopoulou, D. J. Cahill, K. Bussow, and H. Lehrach. 1999. Construction and analysis of arrayed cDNA libraries. *Methods Enzymol* 303: 205-33.
- Constant, S. L., and K. Bottomly. 1997. Induction of Th1 and Th2 CD4+ T cell responses: the alternative approaches. *Annu Rev Immunol* 15: 297-322.
- Corthals, G. L., V. C. Wasinger, D. F. Hochstrasser, and J. C. Sanchez. 2000. The dynamic range of protein expression: a challenge for proteomic research. *Electrophoresis* 21: 1104-15.
- Coutinho, A., M. D. Kazatchkine, and S. Avrameas. 1995. Natural autoantibodies. *Curr Opin Immunol* 7: 812-8.
- Cumberbatch, M., and I. Kimber. 1995. Tumour necrosis factor-alpha is required for accumulation of dendritic cells in draining lymph nodes and for optimal contact sensitization. *Immunology* 84: 31-5.
- Cush, J. J., and P. E. Lipsky. 1988. Phenotypic analysis of synovial tissue and peripheral blood lymphocytes isolated from patients with rheumatoid arthritis. *Arthritis Rheum* 31: 1230-8.
- Cutler, P. 2003. Protein arrays: The current state-of-the-art. *Proteomics* 3: 3-18.
- Cwirla, S. E., E. A. Peters, R. W. Barrett, and W. J. Dower. 1990. Peptides on phage: a vast library of peptides for identifying ligands. *Proc Natl Acad Sci U S A* 87: 6378-82.
- Davies, D. R., and G. H. Cohen. 1996. Interactions of protein antigens with antibodies. *Proc Natl Acad Sci U S A* 93: 7-12.
- Davis, C. A., and S. Benzer. 1997. Generation of cDNA expression libraries enriched for in-frame sequences. *Proc Natl Acad Sci U S A* 94: 2128-32.
- DeFranco, A. L. 1995. Transmembrane signaling by antigen receptors of B and T lymphocytes. *Curr Opin Cell Biol* 7: 163-75.
- de Vos, W. M. 1999. Gene expression systems for lactic acid bacteria. *Curr Opin Microbiol* 2: 289-95.
- de Wildt, R. M., C. R. Mundy, B. D. Gorick, and I. M. Tomlinson. 2000. Antibody arrays for high-throughput screening of antibody-antigen interactions. *Nat Biotechnol* 18: 989-94.

- Del Prete, G. F., M. De Carli, C. Mastromauro, R. Biagiotti, D. Macchia, P. Falagiani, M. Ricci, and S. Romagnani. 1991. Purified protein derivative of *Mycobacterium tuberculosis* and excretory-secretory antigen(s) of *Toxocara canis* expand in vitro human T cells with stable and opposite (type 1 T helper or type 2 T helper) profile of cytokine production. *J Clin Invest* 88: 346-50.
- Delves, P. J., and I. M. Roitt. 2000a. The immune system. First of two parts. *N Engl J Med* 343: 37-49.
- Delves, P. J., and I. M. Roitt. 2000b. The immune system. Second of two parts. *N Engl J Med* 343: 108-17.
- Desbos, A., P. Gonzalo, J. C. Monier, J. Tebib, J. P. Reboud, H. Perrier, J. Bienvenu, and N. Fabien. 2002. Autoantibodies directed against ribosomal proteins in systemic lupus erythematosus and rheumatoid arthritis: a comparative study. *Autoimmunity* 35: 427-34.
- Despres, N., G. Boire, F. J. Lopez-Longo, and H. A. Menard. 1994. The Sa system: a novel antigen-antibody system specific for rheumatoid arthritis. *J Rheumatol* 21: 1027-33.
- Despres, N., G. Talbot, B. Plouffe, G. Boire, and H. A. Menard. 1995. Detection and expression of a cDNA clone that encodes a polypeptide containing two inhibitory domains of human calpastatin and its recognition by rheumatoid arthritis sera. *J Clin Invest* 95: 1891-6.
- Devlin, J. J., L. C. Panganiban, and P. E. Devlin. 1990. Random peptide libraries: a source of specific protein binding molecules. *Science* 249: 404-6.
- Dresser, D. W. 1961. Effectiveness of lipid and lipidophilic substances as adjuvants. *Nature* 191: 1169-71.
- Dudley, E. C., H. T. Petrie, L. M. Shah, M. J. Owen, and A. C. Hayday. 1994. T cell receptor beta chain gene rearrangement and selection during thymocyte development in adult mice. *Immunity* 1: 83-93.
- Edelman, G. 1973. Antibody structure and molecular immunology. *Science* 180: 830-840.
- Egerer, K., U. Kuckelkorn, P. E. Rudolph, J. C. Ruckert, T. Dorner, G. R. Burmester, P. M. Kloetzel, and E. Feist. 2002. Circulating proteasomes are markers of cell damage and immunologic activity in autoimmune diseases. *J Rheumatol* 29: 2045-52.
- Ellmeier, W., S. Sawada, and D. R. Littman. 1999. The regulation of CD4 and CD8 coreceptor gene expression during T cell development. *Annu Rev Immunol* 17: 523-54.

- Emlen, W., J. Niebur, and R. Kadera. 1994. Accelerated in vitro apoptosis of lymphocytes from patients with systemic lupus erythematosus. *J Immunol* 152: 3685-92.
- Evan, G. I., G. K. Lewis, G. Ramsay, and J. M. Bishop. 1985. Isolation of monoclonal antibodies specific for human c-myc proto-oncogene product. *Mol Cell Biol* 5: 3610-6.
- Fares, M. A., and K. H. Wolfe. 2003. Positive Selection and Subfunctionalization of Duplicated CCT Chaperonin Subunits. *Mol Biol Evol* 20: 1588-97.
- Farrar, M. A., and R. D. Schreiber. 1993. The molecular cell biology of interferon-gamma and its receptor. *Annu Rev Immunol* 11: 571-611.
- Feist, E., T. Dorner, U. Kuckelkorn, G. Schmidtke, B. Micheel, F. Hiepe, G. R. Burmester, and P. M. Kloetzel. 1996. Proteasome alpha-type subunit C9 is a primary target of autoantibodies in sera of patients with myositis and systemic lupus erythematosus. *J Exp Med* 184: 1313-8.
- Felici, F., A. Luzzago, P. Monaci, A. Nicosia, M. Sollazzo, and C. Traboni. 1995. Peptide and protein display on the surface of filamentous bacteriophage. *Biotechnol Annu Rev* 1: 149-83.
- Fernsten, P. D., J. K. Czyzyk, T. Mimura, and J. B. Winfield. 1994. Carbohydrate specificity of IgM autoantibodies to CD45 in systemic lupus erythematosus. *Mol Biol Rep* 20: 85-95.
- Fiorentino, D. F., M. W. Bond, and T. R. Mosmann. 1989. Two types of mouse T helper cell. IV. Th2 clones secrete a factor that inhibits cytokine production by Th1 clones. *J Exp Med* 170: 2081-95.
- Foy, T. M., A. Aruffo, J. Bajorath, J. E. Buhlmann, and R. J. Noelle. 1996. Immune regulation by CD40 and its ligand GP39. *Annu Rev Immunol* 14: 591-617.
- Futcher, B., G. I. Latter, P. Monardo, C. S. McLaughlin, and J. I. Garrels. 1999. A sampling of the yeast proteome. *Mol Cell Biol* 19: 7357-68.
- Gabriel, S. E. 2001. The epidemiology of rheumatoid arthritis. *Rheum Dis Clin North Am* 27: 269-81.
- Garcia, K., L. Teyton, and I. Wilson. 1999. Structural basis of T cell recognition. *Annu Rev Immunol* 17: 369-97.
- Gatenby, P. A., and M. Irvine. 1994. The bcl-2 proto-oncogene is overexpressed in systemic lupus erythematosus. *J Autoimmun* 7: 623-31.

- George, K. M., M. W. Leonard, M. E. Roth, K. H. Lieu, D. Kioussis, F. Grosveld, and J. D. Engel. 1994. Embryonic expression and cloning of the murine GATA-3 gene. *Development* 120: 2673-86.
- Girdlestone, J., and M. Wing. 1996. Autocrine activation by interferon-gamma of STAT factors following T cell activation. *Eur J Immunol* 26: 704-9.
- Gravallese, E. M., J. M. Darling, A. L. Ladd, J. N. Katz, and L. H. Glimcher. 1991. In situ hybridization studies of stromelysin and collagenase messenger RNA expression in rheumatoid synovium. *Arthritis Rheum* 34: 1076-84.
- Gray, M. R., G. P. Mazzara, P. Reddy, and M. Rosbash. 1987. Searching for clones with open reading frames. *Methods Enzymol* 154: 129-56.
- Gregersen, P. K., J. Silver, and R. J. Winchester. 1988. Genetic susceptibility to rheumatoid arthritis and human leukocyte antigen class II polymorphism. The role of shared conformational determinants. *Am J Med* 85: 17-9.
- Gregoire, J. M., and P. H. Romeo. 1999. T-cell expression of the human GATA-3 gene is regulated by a non-lineage-specific silencer. *J Biol Chem* 274: 6567-78.
- Grewal, I. S., J. Xu, and R. A. Flavell. 1995. Impairment of antigen-specific T-cell priming in mice lacking CD40 ligand. *Nature* 378: 617-20.
- Groux, H., A. O'Garra, M. Bigler, M. Rouleau, S. Antonenko, J. E. de Vries, and M. G. Roncarolo. 1997. A CD4+ T-cell subset inhibits antigen-specific T-cell responses and prevents colitis. *Nature* 389: 737-42.
- Guilbert, B., G. Dighiero, and S. Avrameas. 1982. Naturally occurring antibodies against nine common antigens in human sera. I. Detection, isolation and characterization. *J Immunol* 128: 2779-87.
- Haab, B. B., M. J. Dunham, and P. O. Brown. 2001. Protein microarrays for highly parallel detection and quantitation of specific proteins and antibodies in complex solutions. *Genome Biol* 2: RESEARCH0004.
- Hannig, G., and S. C. Makrides. 1998. Strategies for optimizing heterologous protein expression in *Escherichia coli*. *Trends Biotechnol* 16: 54-60.
- Harashima, S. 1994. Heterologous protein production by yeast host-vector systems. *Bioprocess Technol* 19: 137-58.

- Harney, S. M., J. L. Newton, and B. P. Wordsworth. 2003. Molecular genetics of rheumatoid arthritis. *Curr Opin Pharmacol* 3: 280-285.
- Hassfeld, W., G. Steiner, W. Graninger, G. Witzmann, H. Schweitzer, and J. S. Smolen. 1993. Autoantibody to the nuclear antigen RA33: a marker for early rheumatoid arthritis. *Br J Rheumatol* 32: 199-203.
- Hassfeld, W., G. Steiner, K. Hartmuth, G. Kolarz, O. Scherak, W. Graninger, N. Thumb, and J. S. Smolen. 1989. Demonstration of a new antinuclear antibody (anti-RA33) that is highly specific for rheumatoid arthritis. *Arthritis Rheum* 32: 1515-20.
- Hayem, G., P. Chazerain, B. Combe, A. Elias, T. Haim, P. Nicaise, K. Benali, J. F. Eliaou, M. F. Kahn, J. Sany, and O. Meyer. 1999. Anti-Sa antibody is an accurate diagnostic and prognostic marker in adult rheumatoid arthritis. *J Rheumatol* 26: 7-13.
- Higashi, K., Y. Inagaki, K. Fujimori, A. Nakao, H. Kaneko, and I. Nakatsuka. 2003. Interferon-gamma interferes with transforming growth factor-beta signaling through direct interaction of YB-1 with Smad3. *J Biol Chem* 278: 43470-9.
- Hochberg, M. C. 1990. Systemic lupus erythematosus. *Rheum Dis Clin North Am* 16: 617-39.
- Hochuli, E., H. Dobeli, and A. Schacher. 1987. New metal chelate adsorbent selective for proteins and peptides containing neighbouring histidine residues. *J Chromatogr* 411: 177-84.
- Hogquist, K. A., M. A. Gavin, and M. J. Bevan. 1993. Positive selection of CD8+ T cells induced by major histocompatibility complex binding peptides in fetal thymic organ culture. *J Exp Med* 177: 1469-73.
- Holz, C., O. Hesse, N. Bolotina, U. Stahl, and C. Lang. 2002. A micro-scale process for high-throughput expression of cDNAs in the yeast *Saccharomyces cerevisiae*. *Protein Expr Purif* 25: 372-8.
- Holz, C., A. Lueking, L. Bovekamp, C. Gutjahr, N. Bolotina, H. Lehrach, and D. J. Cahill. 2001. A human cDNA expression library in yeast enriched for open reading frames. *Genome Res* 11: 1730-5.
- Holzinger, A., K. S. Phillips, and T. E. Weaver. 1996. Single-step purification/solubilization of recombinant proteins: application to surfactant protein B. *Biotechniques* 20: 804-6, 808.

- Huang, E. Y., A. M. Gallegos, S. M. Richards, S. M. Lehar, and M. J. Bevan. 2003. Surface expression of Notch1 on thymocytes: correlation with the double-negative to double-positive transition. *J Immunol* 171: 2296-304.
- Huang, R. P., R. Huang, Y. Fan, and Y. Lin. 2001. Simultaneous detection of multiple cytokines from conditioned media and patient's sera by an antibody-based protein array system. *Anal Biochem* 294: 55-62.
- Huang, R. P. 2001. Detection of multiple proteins in an antibody-based protein microarray system. *J Immunol Methods* 255: 1-13.
- Ihle, J. N., B. A. Witthuhn, F. W. Quelle, K. Yamamoto, and O. Silvennoinen. 1995. Signaling through the hematopoietic cytokine receptors. *Annu Rev Immunol* 13: 369-98.
- Jacobi, A. M., M. Odendahl, K. Reiter, A. Bruns, G. R. Burmester, A. Radbruch, G. Valet, P. E. Lipsky, and T. Dorner. 2003. Correlation between circulating CD27^{high} plasma cells and disease activity in patients with systemic lupus erythematosus. *Arthritis Rheum* 48: 1332-42.
- Jain, J., C. Loh, and A. Rao. 1995. Transcriptional regulation of the IL-2 gene. *Curr Opin Immunol* 7: 333-42.
- Jain, K. K. 2001. Cambridge Healthtech Institute's Third Annual Conference on Lab-on-a-Chip and Microarrays. 22-24 January 2001, Zurich, Switzerland. *Pharmacogenomics* 2: 73-7.
- Janeway, C. A., Jr. 1992. The T cell receptor as a multicomponent signalling machine: CD4/CD8 coreceptors and CD45 in T cell activation. *Annu Rev Immunol* 10: 645-74.
- Janeway, C. A., Jr., and R. Medzhitov. 2002. Innate immune recognition. *Annu Rev Immunol* 20: 197-216.
- Janeway, C. A., Jr, and P. Travers. 1997. *Immunologie*. Spektrum Akademischer Verlag GmbH Heidelberg-Berlin-Oxford.
- Janossy, G., G. Panayi, O. Duke, M. Bofill, L. W. Poulter, and G. Goldstein. 1981. Rheumatoid arthritis: a disease of T-lymphocyte/macrophage immunoregulation. *Lancet* 2: 839-42.
- Jenkins, R. N., A. Nikaein, A. Zimmermann, K. Meek, and P. E. Lipsky. 1993. T cell receptor V beta gene bias in rheumatoid arthritis. *J Clin Invest* 92: 2688-701.

- Joos, T. O., M. Schrenk, P. Hopfl, K. Kroger, U. Chowdhury, D. Stoll, D. Schorner, M. Durr, K. Herick, S. Rupp, K. Sohn, and H. Hammerle. 2000. A microarray enzyme-linked immunosorbent assay for autoimmune diagnostics. *Electrophoresis* 21: 2641-50.
- Jüsten, H. P., E. Grunewald, G. Totzke, I. Gouni-Berthold, A. Sachinidis, D. Wessinghage, H. Vetter, K. Schulze-Osthoff, and Y. Ko. 2000. Differential gene expression in synovium of rheumatoid arthritis and osteoarthritis. *Mol Cell Biol Res Commun* 3: 165-72.
- June, C. H., J. A. Bluestone, L. M. Nadler, and C. B. Thompson. 1994. The B7 and CD28 receptor families. *Immunol Today* 15: 321-31.
- Kappler, J. W., N. Roehm, and P. Marrack. 1987. T cell tolerance by clonal elimination in the thymus. *Cell* 49: 273-80.
- Kapust, R. B., and D. S. Waugh. 1999. Escherichia coli maltose-binding protein is uncommonly effective at promoting the solubility of polypeptides to which it is fused. *Protein Sci* 8: 1668-74.
- Karnitz, L. M., and R. T. Abraham. 1995. Cytokine receptor signaling mechanisms. *Curr Opin Immunol* 7: 320-6.
- Karsenti, E., B. Guilbert, M. Bornens, and S. Avrameas. 1977. Antibodies to tubulin in normal nonimmunized animals. *Proc Natl Acad Sci U S A* 74: 3997-4001.
- Kaufman, D. L., M. Clare-Salzler, J. Tian, T. Forsthuber, G. S. Ting, P. Robinson, M. A. Atkinson, E. E. Sercarz, A. J. Tobin, and P. V. Lehmann. 1993. Spontaneous loss of T-cell tolerance to glutamic acid decarboxylase in murine insulin-dependent diabetes. *Nature* 366: 69-72.
- Kawaoka, J., and F. A. Gomez. 1998. Use of mobility ratios to estimate binding constants of ligands to proteins in affinity capillary electrophoresis. *J Chromatogr B Biomed Sci Appl* 715: 203-10.
- Khan, J., M. L. Bittner, Y. Chen, P. S. Meltzer, and J. M. Trent. 1999. DNA microarray technology: the anticipated impact on the study of human disease. *Biochim Biophys Acta* 1423: M17-28.
- Koch, A. E., P. G. Robinson, J. A. Radosevich, and R. M. Pope. 1990. Distribution of CD45RA and CD45RO T-lymphocyte subsets in rheumatoid arthritis synovial tissue. *J Clin Immunol* 10: 192-9.

- Kodadek, T. 2001. Protein microarrays: prospects and problems. *Chem Biol* 8: 105-15.
- Kohem, C. L., R. I. Brezinschek, H. Wisbey, C. Tortorella, P. E. Lipsky, and N. Oppenheimer-Marks. 1996. Enrichment of differentiated CD45RBdim,CD27- memory T cells in the peripheral blood, synovial fluid, and synovial tissue of patients with rheumatoid arthritis. *Arthritis Rheum* 39: 844-54.
- Kretz-Rommel, A., and R. L. Rubin. 2000. Disruption of positive selection of thymocytes causes autoimmunity. *Nat Med* 6: 298-305.
- Langenkamp, A., K. Nagata, K. Murphy, L. Wu, A. Lanzavecchia, and F. Sallusto. 2003. Kinetics and expression patterns of chemokine receptors in human CD4+ T lymphocytes primed by myeloid or plasmacytoid dendritic cells. *Eur J Immunol* 33: 474-82.
- Larsen, C. P., R. M. Steinman, M. Witmer-Pack, D. F. Hankins, P. J. Morris, and J. M. Austyn. 1990. Migration and maturation of Langerhans cells in skin transplants and explants. *J Exp Med* 172: 1483-93.
- Lavender, P., D. Cousins, and T. Lee. 2000. Regulation of Th2 cytokine gene transcription. *Chem Immunol* 78: 16-29.
- Lee, D. M., and M. E. Weinblatt. 2001. Rheumatoid arthritis. *Lancet* 358: 903-11.
- Lehmann, P. V., O. S. Targoni, and T. G. Forsthuber. 1998. Shifting T-cell activation thresholds in autoimmunity and determinant spreading. *Immunol Rev* 164: 53-61.
- Le Naour, F., F. Brichory, D. E. Misek, C. Brechot, S. M. Hanash, and L. Beretta. 2002. A distinct repertoire of autoantibodies in hepatocellular carcinoma identified by proteomic analysis. *Mol Cell Proteomics* 1: 197-203.
- Lenschow, D. J., T. L. Walunas, and J. A. Bluestone. 1996. CD28/B7 system of T cell costimulation. *Annu Rev Immunol* 14: 233-58.
- Liblau, R. S., S. M. Singer, and H. O. McDevitt. 1995. Th1 and Th2 CD4+ T cells in the pathogenesis of organ-specific autoimmune diseases. *Immunol Today* 16: 34-8.
- Lind, E. F., S. E. Prockop, H. E. Porritt, and H. T. Petrie. 2001. Mapping precursor movement through the postnatal thymus reveals specific microenvironments supporting defined stages of early lymphoid development. *J Exp Med* 194: 127-34.
- Liu, Y. J., D. E. Joshua, G. T. Williams, C. A. Smith, J. Gordon, and I. C. MacLennan. 1989. Mechanism of antigen-driven selection in germinal centres. *Nature* 342: 929-31.

- Lopez-Hoyos, M., R. Carrio, R. Merino, L. Buelta, S. Izui, G. Nunez, and J. Merino. 1996. Constitutive expression of bcl-2 in B cells causes a lethal form of lupuslike autoimmune disease after induction of neonatal tolerance to H-2b alloantigens. *J Exp Med* 183: 2523-31.
- Lueking, A., C. Holz, C. Gotthold, H. Lehrach, and D. Cahill. 2000. A system for dual protein expression in *Pichia pastoris* and *Escherichia coli*. *Protein Expr Purif* 20: 372-8.
- Lüking, A., M. Horn, H. Eickhoff, K. Bussow, H. Lehrach, and G. Walter. 1999. Protein microarrays for gene expression and antibody screening. *Anal Biochem* 270: 103-11.
- Macatonia, S. E., N. A. Hosken, M. Litton, P. Vieira, C. S. Hsieh, J. A. Culpepper, M. Wyszocka, G. Trinchieri, K. M. Murphy, and A. O'Garra. 1995. Dendritic cells produce IL-12 and direct the development of Th1 cells from naive CD4+ T cells. *J Immunol* 154: 5071-9.
- Macatonia, S. E., S. C. Knight, A. J. Edwards, S. Griffiths, and P. Fryer. 1987. Localization of antigen on lymph node dendritic cells after exposure to the contact sensitizer fluorescein isothiocyanate. Functional and morphological studies. *J Exp Med* 166: 1654-67.
- MacBeath, G. 2002. Protein microarrays and proteomics. *Nat Genet* 32: 526-32.
- MacBeath, G., and S. L. Schreiber. 2000. Printing proteins as microarrays for high-throughput function determination. *Science* 289: 1760-3.
- Mackay, C. R. 1993. Homing of naive, memory and effector lymphocytes. *Curr Opin Immunol* 5: 423-7.
- Mackay, C. R., W. L. Marston, and L. Dudler. 1990. Naive and memory T cells show distinct pathways of lymphocyte recirculation. *J Exp Med* 171: 801-17.
- Mackay, I. R. 2000. Science, medicine, and the future: Tolerance and autoimmunity. *Bmj* 321: 93-6.
- Mackay, V. L., and T. Kelleher. 1996. Methods for Expressing Recombinant Proteins in Yeast. *Protein Engineering and Design* : 105-153.
- Madden, D. R. 1995. The three-dimensional structure of peptide-MHC complexes. *Annu Rev Immunol* 13: 587-622.
- Madoz-Gurpide, J., H. Wang, D. E. Misek, F. Brichory, and S. M. Hanash. 2001. Protein based microarrays: a tool for probing the proteome of cancer cells and tissues. *Proteomics* 1: 1279-87.

- Magram, J., J. Sfarra, S. Connaughton, D. Faherty, R. Warriar, D. Carvajal, C. Y. Wu, C. Stewart, U. Sarmiento, and M. K. Gately. 1996. IL-12-deficient mice are defective but not devoid of type 1 cytokine responses. *Ann N Y Acad Sci* 795: 60-70.
- Malik, P., T. D. Terry, L. R. Gowda, A. Langara, S. A. Petukhov, M. F. Symmons, L. C. Welsh, D. A. Marvin, and R. N. Perham. 1996. Role of capsid structure and membrane protein processing in determining the size and copy number of peptides displayed on the major coat protein of filamentous bacteriophage. *J Mol Biol* 260: 9-21.
- Mamoune, A., A. Saraux, J. L. Delaunay, P. Le Goff, P. Youinou, and R. Le Corre. 1998. Autoantibodies to CD45 in systemic lupus erythematosus. *J Autoimmun* 11: 485-8.
- Mannik, M., F. A. Nardella, and E. H. Sasso. 1988. Rheumatoid factors in immune complexes of patients with rheumatoid arthritis. *Springer Semin Immunopathol* 10: 215-30.
- Martel-Pelletier, J., R. McCollum, N. Fujimoto, K. Obata, J. Cloutier, and J. Pelletier. 1994. Excess of metalloproteases over tissue inhibitor of metalloprotease may contribute to cartilage degradation in osteoarthritis and rheumatoid arthritis. *Lab Invest* 70: 807-15.
- Martin, S. E., and W. J. Martin. 1975a. Interspecies brain antigen detected by naturally occurring mouse anti-brain autoantibody. *Proc Natl Acad Sci U S A* 72: 1036-40.
- Martin, W. J., and S. E. Martin. 1975b. Thymus reactive IgM autoantibodies in normal mouse sera. *Nature* 254: 716-8.
- Matzinger, P. 1994. Tolerance, danger, and the extended family. *Annu Rev Immunol* 12: 991-1045.
- McCachren, S. S., B. F. Haynes, and J. E. Niedel. 1990. Localization of collagenase mRNA in rheumatoid arthritis synovium by in situ hybridization histochemistry. *J Clin Immunol* 10: 19-27.
- Mezzasoma, L., T. Bacarese-Hamilton, M. Di Cristina, R. Rossi, F. Bistoni, and A. Crisanti. 2002. Antigen microarrays for serodiagnosis of infectious diseases. *Clin Chem* 48: 121-30.
- Mikawa, Y. G., I. N. Maruyama, and S. Brenner. 1996. Surface display of proteins on bacteriophage lambda heads. *J Mol Biol* 262: 21-30.
- Mondino, A., A. Khoruts, and M. K. Jenkins. 1996. The anatomy of T-cell activation and tolerance. *Proc Natl Acad Sci U S A* 93: 2245-52.

- Moody, M. D., S. W. Van Arsdell, K. P. Murphy, S. F. Orencole, and C. Burns. 2001. Array-based ELISAs for high-throughput analysis of human cytokines. *Biotechniques* 31: 186-90, 192-4.
- Moore, K. W., A. O'Garra, R. de Waal Malefyt, P. Vieira, and T. R. Mosmann. 1993. Interleukin-10. *Annu Rev Immunol* 11: 165-90.
- Mosmann, T. R., H. Cherwinski, M. W. Bond, M. A. Giedlin, and R. L. Coffman. 1986. Two types of murine helper T cell clone. I. Definition according to profiles of lymphokine activities and secreted proteins. *J Immunol* 136: 2348-57.
- Mosmann, T. R., and S. Sad. 1996. The expanding universe of T-cell subsets: Th1, Th2 and more. *Immunol Today* 17: 138-46.
- Muller-Ladner, U. 1996. Molecular and cellular interactions in rheumatoid synovium. *Curr Opin Rheumatol* 8: 210-20.
- Nalivaeva, N. N., and A. J. Turner. 2001. Post-translational modifications of proteins: acetylcholinesterase as a model system. *Proteomics* 1: 735-47.
- Napirei, M., H. Karsunky, B. Zevnik, H. Stephan, H. G. Mannherz, and T. Moroy. 2000. Features of systemic lupus erythematosus in Dnase1-deficient mice. *Nat Genet* 25: 177-81.
- Nilsson, J., S. Stahl, J. Lundeberg, M. Uhlen, and P. A. Nygren. 1997. Affinity fusion strategies for detection, purification, and immobilization of recombinant proteins. *Protein Expr Purif* 11: 1-16.
- Noelle, R. J., M. Roy, D. M. Shepherd, I. Stamenkovic, J. A. Ledbetter, and A. Aruffo. 1992. A 39-kDa protein on activated helper T cells binds CD40 and transduces the signal for cognate activation of B cells. *Proc Natl Acad Sci U S A* 89: 6550-4.
- Nossal, G. J. 1994. Negative selection of lymphocytes. *Cell* 76: 229-39.
- Nykanen, P., V. Bergroth, P. Raunio, D. Nordstrom, and Y. T. Konttinen. 1986. Phenotypic characterization of 3H-thymidine incorporating cells in rheumatoid arthritis synovial membrane. *Rheumatol Int* 6: 269-71.
- O'Garra, A. 1998. Cytokines induce the development of functionally heterogeneous T helper cell subsets. *Immunity* 8: 275-83.

- O'Garra, A., and N. Arai. 2000. The molecular basis of T helper 1 and T helper 2 cell differentiation. *Trends Cell Biol* 10: 542-50.
- O'Garra, A., L. Steinman, and K. Gijbels. 1997. CD4+ T-cell subsets in autoimmunity. *Curr Opin Immunol* 9: 872-83.
- Oldstone, M. B. 1998. Molecular mimicry and immune-mediated diseases. *Faseb J* 12: 1255-65.
- Ooka, S., T. Matsui, K. Nishioka, and T. Kato. 2003. Autoantibodies to low-density-lipoprotein-receptor-related protein 2 (LRP2) in systemic autoimmune diseases. *Arthritis Res Ther* 5: R174-80.
- Orkin, S. H. 1992. GATA-binding transcription factors in hematopoietic cells. *Blood* 80: 575-81.
- Pandey, A., and M. Mann. 2000. Proteomics to study genes and genomes. *Nature* 405: 837-46.
- Patton, W. F. 1999. Proteome analysis. II. Protein subcellular redistribution: linking physiology to genomics via the proteome and separation technologies involved. *J Chromatogr B Biomed Sci Appl* 722: 203-23.
- Paweletz, C. P., L. Charboneau, V. E. Bichsel, N. L. Simone, T. Chen, J. W. Gillespie, M. R. Emmert-Buck, M. J. Roth, I. E. Petricoin, and L. A. Liotta. 2001. Reverse phase protein microarrays which capture disease progression show activation of pro-survival pathways at the cancer invasion front. *Oncogene* 20: 1981-9.
- Penix, L., W. M. Weaver, Y. Pang, H. A. Young, and C. B. Wilson. 1993. Two essential regulatory elements in the human interferon gamma promoter confer activation specific expression in T cells. *J Exp Med* 178: 1483-96.
- Perkins, A. S. 2002. Functional genomics in the mouse. *Funct Integr Genomics* 2: 81-91.
- Persidis, A. 1999. Autoimmune disease drug discovery. *Nat Biotechnol* 17: 1038.
- Petrie, H. T., P. Hugo, R. Scollay, and K. Shortman. 1990. Lineage relationships and developmental kinetics of immature thymocytes: CD3, CD4, and CD8 acquisition in vivo and in vitro. *J Exp Med* 172: 1583-8.
- Picker, L. J., and E. C. Butcher. 1992. Physiological and molecular mechanisms of lymphocyte homing. *Annu Rev Immunol* 10: 561-91.
- Porter, R. 1973. Structural studies of immunoglobulins. *Science* 180: 713-6.

- Powrie, F., and R. L. Coffman. 1993. Cytokine regulation of T-cell function: potential for therapeutic intervention. *Immunol Today* 14: 270-4.
- Rammensee, H. G. 1995. Chemistry of peptides associated with MHC class I and class II molecules. *Curr Opin Immunol* 7: 85-96.
- Ranheim, E. A., and T. J. Kipps. 1993. Activated T cells induce expression of B7/BB1 on normal or leukemic B cells through a CD40-dependent signal. *J Exp Med* 177: 925-35.
- Rapisarda, A., S. Pastorino, S. Massazza, L. Varesio, and M. C. Bosco. 2002. Antagonistic effect of picolinic acid and interferon-gamma on macrophage inflammatory protein-1alpha/beta production. *Cell Immunol* 220: 70-80.
- Raulet, D. H., D. M. Spencer, Y. H. Hsiang, J. P. Goldman, M. Bix, N. S. Liao, M. Zijstra, R. Jaenisch, and I. Correa. 1991. Control of gamma delta T-cell development. *Immunol Rev* 120: 185-204.
- Rengarajan, J., S. J. Szabo, and L. H. Glimcher. 2000. Transcriptional regulation of Th1/Th2 polarization. *Immunol Today* 21: 479-83.
- Robey, E., and B. J. Fowlkes. 1994. Selective events in T cell development. *Annu Rev Immunol* 12: 675-705.
- Robinson, W. H., L. Steinman, and P. J. Utz. 2002a. Protein and peptide array analysis of autoimmune disease. *Biotechniques* Suppl: 66-9.
- Robinson, W. H., L. Steinman, and P. J. Utz. 2002b. Proteomics technologies for the study of autoimmune disease. *Arthritis Rheum* 46: 885-93.
- Robinson, W. H., C. DiGennaro, W. Hueber, B. B. Haab, M. Kamachi, E. J. Dean, S. Fournel, D. Fong, M. C. Genovese, H. E. de Vegvar, K. Skriver, D. L. Hirschberg, R. I. Morris, S. Muller, G. J. Pruijn, W. J. van Venrooij, J. S. Smolen, P. O. Brown, L. Steinman, and P. J. Utz. 2002a. Autoantigen microarrays for multiplex characterization of autoantibody responses. *Nat Med* 8: 295-301.
- Rönnelid, J., J. Lysholm, A. Engstrom-Laurent, L. Klareskog, and B. Heyman. 1994. Local anti-type II collagen antibody production in rheumatoid arthritis synovial fluid. Evidence for an HLA-DR4-restricted IgG response. *Arthritis Rheum* 37: 1023-9.
- Sadlack, B., H. Merz, H. Schorle, A. Schimpl, A. C. Feller, and I. Horak. 1993. Ulcerative colitis-like disease in mice with a disrupted interleukin-2 gene. *Cell* 75: 253-61.

- Sakaguchi, S. 2000a. Animal models of autoimmunity and their relevance to human diseases. *Curr Opin Immunol* 12: 684-90.
- Sakaguchi, S. 2000b. Regulatory T cells: key controllers of immunologic self-tolerance. *Cell* 101: 455-8.
- Schaller, M., D. R. Burton, and H. J. Ditzel. 2001. Autoantibodies to GPI in rheumatoid arthritis: linkage between an animal model and human disease. *Nat Immunol* 2: 746-53.
- Schatz, P. J. 1993. Use of peptide libraries to map the substrate specificity of a peptide-modifying enzyme: a 13 residue consensus peptide specifies biotinylation in *Escherichia coli*. *Biotechnology (N Y)* 11: 1138-43.
- Schena, M., and R. Davis. 2000. DNA Microarrays. *Oxford University Press* : 1-16.
- Schmidt, F., A. Lueking, E. Nordhoff, J. Gobom, J. Klose, H. Seitz, V. Egelhofer, H. Eickhoff, H. Lehrach, and D. J. Cahill. 2002. Generation of minimal protein identifiers of proteins from two-dimensional gels and recombinant proteins. *Electrophoresis* 23: 621-5.
- Schwab, M. H., A. Bartholomae, B. Heimrich, D. Feldmeyer, S. Druffel-Augustin, S. Goebbels, F. J. Naya, S. Zhao, M. Frotscher, M. J. Tsai, and K. A. Nave. 2000. Neuronal basic helix-loop-helix proteins (NEX and BETA2/Neuro D) regulate terminal granule cell differentiation in the hippocampus. *J Neurosci* 20: 3714-24.
- Schwartz, R. H. 1990. A cell culture model for T lymphocyte clonal anergy. *Science* 248: 1349-56.
- Seabra, M. C., E. H. Mules, and A. N. Hume. 2002. Rab GTPases, intracellular traffic and disease. *Trends Mol Med* 8: 23-30.
- Sebbag, M., M. Simon, C. Vincent, C. Masson-Bessiere, E. Girbal, J. J. Durieux, and G. Serre. 1995. The antiperinuclear factor and the so-called antikeratin antibodies are the same rheumatoid arthritis-specific autoantibodies. *J Clin Invest* 95: 2672-9.
- Sher, A., and R. L. Coffman. 1992. Regulation of immunity to parasites by T cells and T cell-derived cytokines. *Annu Rev Immunol* 10: 385-409.
- Shortman, K., and L. Wu. 1996. Early T lymphocyte progenitors. *Annu Rev Immunol* 14: 29-47.

- Skriner, K., W. H. Sommergruber, V. Tremmel, I. Fischer, A. Barta, J. S. Smolen, and G. Steiner. 1997. Anti-A2/RA33 autoantibodies are directed to the RNA binding region of the A2 protein of the heterogeneous nuclear ribonucleoprotein complex. Differential epitope recognition in rheumatoid arthritis, systemic lupus erythematosus, and mixed connective tissue disease. *J Clin Invest* 100: 127-35.
- Smith, G. P. 1985. Filamentous fusion phage: novel expression vectors that display cloned antigens on the virion surface. *Science* 228: 1315-7.
- Song, R., and C. V. Harding. 1996. Roles of proteasomes, transporter for antigen presentation (TAP), and beta 2-microglobulin in the processing of bacterial or particulate antigens via an alternate class I MHC processing pathway. *J Immunol* 156: 4182-90.
- Sprent, J., and S. R. Webb. 1995. Intrathymic and extrathymic clonal deletion of T cells. *Curr Opin Immunol* 7: 196-205.
- Starling, G. C., G. S. Whitney, A. W. Siadak, M. B. Llewellyn, M. A. Bowen, A. G. Farr, and A. A. Aruffo. 1996. Characterization of mouse CD6 with novel monoclonal antibodies which enhance the allogeneic mixed leukocyte reaction. *Eur J Immunol* 26: 738-46.
- Steinberg, A. D., and D. M. Klinman. 1988. Pathogenesis of systemic lupus erythematosus. *Rheum Dis Clin North Am* 14: 25-41.
- Steiner, G., K. Hartmuth, K. Skriner, I. Maurer-Fogy, A. Sinski, E. Thalmann, W. Hassfeld, A. Barta, and J. S. Smolen. 1992. Purification and partial sequencing of the nuclear autoantigen RA33 shows that it is indistinguishable from the A2 protein of the heterogeneous nuclear ribonucleoprotein complex. *J Clin Invest* 90: 1061-6.
- Steiner, G., K. Skriner, and J. S. Smolen. 1996. Autoantibodies to the A/B proteins of the heterogeneous nuclear ribonucleoprotein complex: novel tools for the diagnosis of rheumatic diseases. *Int Arch Allergy Immunol* 111: 314-9.
- Steinman, L. 1995. Escape from "horror autotoxicus": pathogenesis and treatment of autoimmune disease. *Cell* 80: 7-10.
- Steinman, R. M. 1991. The dendritic cell system and its role in immunogenicity. *Annu Rev Immunol* 9: 271-96.
- Sternberg, N., and R. H. Hoess. 1995. Display of peptides and proteins on the surface of bacteriophage lambda. *Proc Natl Acad Sci U S A* 92: 1609-13.

- Stoll, D., M. F. Templin, M. Schrenk, P. C. Traub, C. F. Vohringer, and T. O. Joos. 2002. Protein microarray technology. *Front Biosci* 7: c13-32.
- Strelow, A., C. Kollwe, and H. Wesche. 2003. Characterization of Pellino2, a substrate of IRAK1 and IRAK4. *FEBS Lett* 547: 157-61.
- Surh, C. D., and J. Sprent. 1994. T-cell apoptosis detected in situ during positive and negative selection in the thymus. *Nature* 372: 100-3.
- Suzuki, H., T. M. Kundig, C. Furlonger, A. Wakeham, E. Timms, T. Matsuyama, R. Schmits, J. J. Simard, P. S. Ohashi, H. Griesser, and et al. 1995. Deregulated T cell activation and autoimmunity in mice lacking interleukin-2 receptor beta. *Science* 268: 1472-6.
- Tan, E. M. 1989. Antinuclear antibodies: diagnostic markers for autoimmune diseases and probes for cell biology. *Adv Immunol* 44: 93-151.
- Thomas, S. Y., R. Hou, J. E. Boyson, T. K. Means, C. Hess, D. P. Olson, J. L. Strominger, M. B. Brenner, J. E. Gumperz, S. B. Wilson, and A. D. Luster. 2003. CD1d-Restricted NKT Cells Express a Chemokine Receptor Profile Indicative of Th1-Type Inflammatory Homing Cells. *J Immunol* 171: 2571-2580.
- Tisch, R., X. D. Yang, S. M. Singer, R. S. Liblau, L. Fugger, and H. O. McDevitt. 1993. Immune response to glutamic acid decarboxylase correlates with insulinitis in non-obese diabetic mice. *Nature* 366: 72-5.
- Tzehoval, E., M. B. Szein, and A. L. Goldstein. 1989. Thymosins alpha 1 and beta 4 potentiate the antigen-presenting capacity of macrophages. *Immunopharmacology* 18: 107-13.
- Uematsu, Y., H. Wege, A. Straus, M. Ott, W. Bannwarth, J. Lanchbury, G. Panayi, and M. Steinmetz. 1991. The T-cell-receptor repertoire in the synovial fluid of a patient with rheumatoid arthritis is polyclonal. *Proc Natl Acad Sci U S A* 88: 8534-8.
- Urban, J. F., Jr., K. B. Madden, A. Svetic, A. Cheever, P. P. Trotta, W. C. Gause, I. M. Katona, and F. D. Finkelman. 1992. The importance of Th2 cytokines in protective immunity to nematodes. *Immunol Rev* 127: 205-20.
- Vaishnav, A. K., E. Toubi, S. Ohsako, J. Drappa, S. Buys, J. Estrada, A. Sitarz, L. Zemel, J. L. Chu, and K. B. Elkon. 1999. The spectrum of apoptotic defects and clinical manifestations, including systemic lupus erythematosus, in humans with CD95 (Fas/APO-1) mutations. *Arthritis Rheum* 42: 1833-42.

- van Boekel, M. A., E. R. Vossenaar, F. H. van den Hoogen, and W. J. van Venrooij. 2002. Autoantibody systems in rheumatoid arthritis: specificity, sensitivity and diagnostic value. *Arthritis Res* 4: 87-93.
- van Essen, D., H. Kikutani, and D. Gray. 1995. CD40 ligand-transduced co-stimulation of T cells in the development of helper function. *Nature* 378: 620-3.
- Van Parijs, L., and A. K. Abbas. 1998. Homeostasis and self-tolerance in the immune system: turning lymphocytes off. *Science* 280: 243-8.
- Varshavsky, A. 1996. The N-end rule: functions, mysteries, uses. *Proc Natl Acad Sci U S A* 93: 12142-9.
- von Boehmer, H. 1990. Developmental biology of T cells in T cell-receptor transgenic mice. *Annu Rev Immunol* 8: 531-56.
- von Muhlen, C. A., and E. M. Tan. 1995. Autoantibodies in the diagnosis of systemic rheumatic diseases. *Semin Arthritis Rheum* 24: 323-58.
- Voss, S., and A. Skerra. 1997. Mutagenesis of a flexible loop in streptavidin leads to higher affinity for the Strep-tag II peptide and improved performance in recombinant protein purification. *Protein Eng* 10: 975-82.
- Wahl, S. M. 1994. Transforming growth factor beta: the good, the bad, and the ugly. *J Exp Med* 180: 1587-90.
- Wallace, D. J. 2002. Systemic lupus erythematosus. *Drugs Today (Barc)* 38: 259-63.
- Walter, G., K. Bussow, A. Lueking, and J. Glokler. 2002. High-throughput protein arrays: prospects for molecular diagnostics. *Trends Mol Med* 8: 250-3.
- Warren, H. S., F. R. Vogel, and L. A. Chedid. 1986. Current status of immunological adjuvants. *Annu Rev Immunol* 4: 369-88.
- West, D. B., O. Iakougova, C. Olsson, D. Ross, J. Ohmen, and A. Chatterjee. 2000. Mouse genetics/genomics: an effective approach for drug target discovery and validation. *Med Res Rev* 20: 216-30.
- Willerford, D. M., J. Chen, J. A. Ferry, L. Davidson, A. Ma, and F. W. Alt. 1995. Interleukin-2 receptor alpha chain regulates the size and content of the peripheral lymphoid compartment. *Immunity* 3: 521-30.

- Wilson, I. A., H. L. Niman, R. A. Houghten, A. R. Cherenon, M. L. Connolly, and R. A. Lerner. 1984. The structure of an antigenic determinant in a protein. *Cell* 37: 767-78.
- Wiltshire, S., S. O'Malley, J. Lambert, K. Kukanskis, D. Edgar, S. F. Kingsmore, and B. Schweitzer. 2000. Detection of multiple allergen-specific IgEs on microarrays by immunoassay with rolling circle amplification. *Clin Chem* 46: 1990-3.
- Winchester, R., E. Dwyer, and S. Rose. 1992. The genetic basis of rheumatoid arthritis. The shared epitope hypothesis. *Rheum Dis Clin North Am* 18: 761-83.
- Wood, N. C., E. Dickens, J. A. Symons, and G. W. Duff. 1992. In situ hybridization of interleukin-1 in CD14-positive cells in rheumatoid arthritis. *Clin Immunol Immunopathol* 62: 295-300.
- Wurster, A. L., T. Tanaka, and M. J. Grusby. 2000. The biology of Stat4 and Stat6. *Oncogene* 19: 2577-84.
- Yang, X. O., R. T. Doty, J. S. Hicks, and D. M. Willerford. 2003. Regulation of T-cell receptor D beta 1 promoter by KLF5 through reiterated GC-rich motifs. *Blood* 101: 4492-9.
- Zal, T., A. Volkman, and B. Stockinger. 1994. Mechanisms of tolerance induction in major histocompatibility complex class II-restricted T cells specific for a blood-borne self-antigen. *J Exp Med* 180: 2089-99.
- Zhu, H., M. Bilgin, R. Bangham, D. Hall, A. Casamayor, P. Bertone, N. Lan, R. Jansen, S. Bidlingmaier, T. Houfek, T. Mitchell, P. Miller, R. A. Dean, M. Gerstein, and M. Snyder. 2001. Global analysis of protein activities using proteome chips. *Science* 293: 2101-5.
- Ziff, M. 1990. Rheumatoid arthritis--its present and future. *J Rheumatol* 17: 127-33.
- Zvaifler, N. J. 1973. The immunopathology of joint inflammation in rheumatoid arthritis. *Adv Immunol* 16: 265-336.