

## 6. Literaturverzeichnis

1. Burmester G-R PA. Taschenatlas der Immunologie. Stuttgart, Thieme-Verlag 1998.
2. Jiang S, Lechler RI, He XS, Huang JF. Regulatory T cells and transplantation tolerance. *Hum Immunol* 2006;67(10):765-76.
3. Jin X, Bauer DE, Tuttleton SE, Lewin S, Gettie A, Blanchard J, et al. Dramatic rise in plasma viremia after CD8(+) T cell depletion in simian immunodeficiency virus-infected macaques. *J Exp Med* 1999;189(6):991-8.
4. Schmitz JE, Kuroda MJ, Santra S, Sasseville VG, Simon MA, Lifton MA, et al. Control of viremia in simian immunodeficiency virus infection by CD8+ lymphocytes. *Science* 1999;283(5403):857-60.
5. Zinkernagel RM, Hengartner H. Antiviral immunity. *Immunol Today* 1997;18(6):258-60.
6. Kyburz D, Speiser DE, Aebischer T, Hengartner H, Zinkernagel RM. Virus-specific cytotoxic T cell-mediated lysis of lymphocytes in vitro and in vivo. *J Immunol* 1993;150(11):5051-8.
7. Gyulai Z, Endresz V, Burian K, Pincus S, Toldy J, Cox WI, et al. Cytotoxic T lymphocyte (CTL) responses to human cytomegalovirus pp65, IE1-Exon4, gB, pp150, and pp28 in healthy individuals: reevaluation of prevalence of IE1-specific CTLs. *J Infect Dis* 2000;181(5):1537-46.
8. Hopkins JI, Fiander AN, Evans AS, Delchambre M, Gheysen D, Borysiewicz LK. Cytotoxic T cell immunity to human cytomegalovirus glycoprotein B. *J Med Virol* 1996;49(2):124-31.
9. von Boehmer H. Mechanisms of suppression by suppressor T cells. *Nat Immunol* 2005;6(4):338-44.
10. Maecker HT, Ghanekar SA, Suni MA, He XS, Picker LJ, Maino VC. Factors affecting the efficiency of CD8+ T cell cross-priming with exogenous antigens. *J Immunol* 2001;166(12):7268-75.
11. Bass EB, Powe NR, Goodman SN, Graziano SL, Griffiths RI, Kickler TS, et al. Efficacy of immune globulin in preventing complications of bone marrow transplantation: a meta-analysis. *Bone Marrow Transplant* 1993;12(3):273-82.
12. Snyderman DR, Werner BG, Heinze-Lacey B, Berardi VP, Tilney NL, Kirkman RL, et al. Use of cytomegalovirus immune globulin to prevent cytomegalovirus disease in renal-transplant recipients. *N Engl J Med* 1987;317(17):1049-54.
13. Guglielmo BJ, Wong-Beringer A, Linker CA. Immune globulin therapy in allogeneic bone marrow transplant: a critical review. *Bone Marrow Transplant* 1994;13(5):499-510.
14. Carr WH, Little AM, Mocarski E, Parham P. NK cell-mediated lysis of autologous HCMV-infected skin fibroblasts is highly variable among NK cell clones and polyclonal NK cell lines. *Clin Immunol* 2002;105(2):126-40.
15. Cerboni C, Mousavi-Jazi M, Linde A, Soderstrom K, Brytting M, Wahren B, et al. Human cytomegalovirus strain-dependent changes in NK cell recognition of infected fibroblasts. *J Immunol* 2000;164(9):4775-82.
16. Kern F, Faulhaber N, Frommel C, Khatamzas E, Prosch S, Schonemann C, et al. Analysis of CD8 T cell reactivity to cytomegalovirus using protein-spanning pools of overlapping pentadecapeptides. *Eur J Immunol* 2000;30(6):1676-82.
17. Chambers J, Angulo A, Amaratunga D, Guo H, Jiang Y, Wan JS, et al. DNA microarrays of the complex human cytomegalovirus genome: profiling kinetic class with drug sensitivity of viral gene expression. *J Virol* 1999;73(7):5757-66.

18. de la Hoz RE, Stephens G, Sherlock C. Diagnosis and treatment approaches of CMV infections in adult patients. *J Clin Virol* 2002;25 Suppl 2:S1-12.
19. Mocarski ES, Prichard MN, Tan CS, Brown JM. Reassessing the organization of the UL42-UL43 region of the human cytomegalovirus strain AD169 genome. *Virology* 1997;239(1):169-75.
20. Larsson S, Soderberg-Naucler C, Moller E. Productive cytomegalovirus (CMV) infection exclusively in CD13-positive peripheral blood mononuclear cells from CMV-infected individuals: implications for prevention of CMV transmission. *Transplantation* 1998;65(3):411-5.
21. Movassagh M, Gozlan J, Senechal B, Baillou C, Petit JC, Lemoine FM. Direct infection of CD34+ progenitor cells by human cytomegalovirus: evidence for inhibition of hematopoiesis and viral replication. *Blood* 1996;88(4):1277-83.
22. Taylor-Wiedeman J, Sissons JG, Borysiewicz LK, Sinclair JH. Monocytes are a major site of persistence of human cytomegalovirus in peripheral blood mononuclear cells. *J Gen Virol* 1991;72 (Pt 9):2059-64.
23. Zhuravskaya T, Maciejewski JP, Netski DM, Bruening E, Mackintosh FR, St Jeor S. Spread of human cytomegalovirus (HCMV) after infection of human hematopoietic progenitor cells: model of HCMV latency. *Blood* 1997;90(6):2482-91.
24. Reinke P, Prosch S, Kern F, Volk HD. Mechanisms of human cytomegalovirus (HCMV) (re)activation and its impact on organ transplant patients. *Transpl Infect Dis* 1999;1(3):157-64.
25. Scholz M, Doerr HW, Cinatl J. Human cytomegalovirus retinitis: pathogenicity, immune evasion and persistence. *Trends Microbiol* 2003;11(4):171-8.
26. Numazaki K, Chiba S. Current aspects of diagnosis and treatment of cytomegalovirus infections in infants. *Clin Diagn Virol* 1997;8(3):169-81.
27. Dannenmaier B, Alle W, Hoferer EW, Lorenz D, Oertel PJ, Doerr HW. Incidences of antibodies to hepatitis B, herpes simplex and cytomegalovirus in prostitutes. *Zentralbl Bakteriol Mikrobiol Hyg [A]* 1985;259(2):275-83.
28. Sissons JG, Bain M, Wills MR. Latency and reactivation of human cytomegalovirus. *J Infect* 2002;44(2):73-7.
29. Jonjic S, Mutter W, Weiland F, Reddehase MJ, Koszinowski UH. Site-restricted persistent cytomegalovirus infection after selective long-term depletion of CD4+ T lymphocytes. *J Exp Med* 1989;169(4):1199-212.
30. Matloubian M, Concepcion RJ, Ahmed R. CD4+ T cells are required to sustain CD8+ cytotoxic T-cell responses during chronic viral infection. *J Virol* 1994;68(12):8056-63.
31. Zajac AJ, Blattman JN, Murali-Krishna K, Sourdive DJ, Suresh M, Altman JD, et al. Viral immune evasion due to persistence of activated T cells without effector function. *J Exp Med* 1998;188(12):2205-13.
32. Khan N, Shariff N, Cobbold M, Bruton R, Ainsworth JA, Sinclair AJ, et al. Cytomegalovirus seropositivity drives the CD8 T cell repertoire toward greater clonality in healthy elderly individuals. *J Immunol* 2002;169(4):1984-92.
33. Sylwester AW, Mitchell BL, Edgar JB, Taormina C, Pelte C, Ruchti F, et al. Broadly targeted human cytomegalovirus-specific CD4+ and CD8+ T cells dominate the memory compartments of exposed subjects. *J Exp Med* 2005;202(5):673-85.
34. Kern F, Surel IP, Brock C, Freistedt B, Radtke H, Scheffold A, et al. T-cell epitope mapping by flow cytometry. *Nat Med* 1998;4(8):975-8.
35. Kern F, Surel IP, Faulhaber N, Frommel C, Schneider-Mergener J, Schonemann C, et al. Target structures of the CD8(+)-T-cell response to human cytomegalovirus: the 72-kilodalton major immediate-early protein revisited. *J Virol* 1999;73(10):8179-84.

36. McLaughlin-Taylor E, Pande H, Forman SJ, Tanamachi B, Li CR, Zaia JA, et al. Identification of the major late human cytomegalovirus matrix protein pp65 as a target antigen for CD8<sup>+</sup> virus-specific cytotoxic T lymphocytes. *J Med Virol* 1994;43(1):103-10.
37. Wang EC, Moss PA, Frodsham P, Lehner PJ, Bell JI, Borysiewicz LK. CD8<sup>high</sup>CD57<sup>+</sup> T lymphocytes in normal, healthy individuals are oligoclonal and respond to human cytomegalovirus. *J Immunol* 1995;155(10):5046-56.
38. Weekes MP, Wills MR, Mynard K, Hicks R, Sissons JG, Carmichael AJ. Large clonal expansions of human virus-specific memory cytotoxic T lymphocytes within the CD57<sup>+</sup> CD28<sup>-</sup> CD8<sup>+</sup> T-cell population. *Immunology* 1999;98(3):443-9.
39. Bitmansour AD, Waldrop SL, Pitcher CJ, Khatamzas E, Kern F, Maino VC, et al. Clonotypic structure of the human CD4<sup>+</sup> memory T cell response to cytomegalovirus. *J Immunol* 2001;167(3):1151-63.
40. Harari A, Rizzardi GP, Ellefsen K, Ciuffreda D, Champagne P, Bart PA, et al. Analysis of HIV-1- and CMV-specific memory CD4 T-cell responses during primary and chronic infection. *Blood* 2002;100(4):1381-7.
41. Gamadia LE, Rentenaar RJ, van Lier RA, ten Berge IJ. Properties of CD4(+) T cells in human cytomegalovirus infection. *Hum Immunol* 2004;65(5):486-92.
42. Harari A, Petitpierre S, Vallelian F, Pantaleo G. Skewed representation of functionally distinct populations of virus-specific CD4 T cells in HIV-1-infected subjects with progressive disease: changes after antiretroviral therapy. *Blood* 2004;103(3):966-72.
43. Kondo E, Akatsuka Y, Kuzushima K, Tsujimura K, Asakura S, Tajima K, et al. Identification of novel CTL epitopes of CMV-pp65 presented by a variety of HLA alleles. *Blood* 2004;103(2):630-8.
44. Moutaftsi M, Mehl AM, Borysiewicz LK, Tabi Z. Human cytomegalovirus inhibits maturation and impairs function of monocyte-derived dendritic cells. *Blood* 2002;99(8):2913-21.
45. Raftery MJ, Schwab M, Eibert SM, Samstag Y, Walczak H, Schonrich G. Targeting the function of mature dendritic cells by human cytomegalovirus: a multilayered viral defense strategy. *Immunity* 2001;15(6):997-1009.
46. Hengel H, Koopmann JO, Flohr T, Muranyi W, Goulmy E, Hammerling GJ, et al. A viral ER-resident glycoprotein inactivates the MHC-encoded peptide transporter. *Immunity* 1997;6(5):623-32.
47. Wiertz EJ, Tortorella D, Bogyo M, Yu J, Mothes W, Jones TR, et al. Sec61-mediated transfer of a membrane protein from the endoplasmic reticulum to the proteasome for destruction. *Nature* 1996;384(6608):432-8.
48. Gilbert MJ, Riddell SR, Plachter B, Greenberg PD. Cytomegalovirus selectively blocks antigen processing and presentation of its immediate-early gene product. *Nature* 1996;383(6602):720-2.
49. Mocarski ES, Jr. Immunomodulation by cytomegaloviruses: manipulative strategies beyond evasion. *Trends Microbiol* 2002;10(7):332-9.
50. Dahle AJ, Fowler KB, Wright JD, Boppana SB, Britt WJ, Pass RF. Longitudinal investigation of hearing disorders in children with congenital cytomegalovirus. *J Am Acad Audiol* 2000;11(5):283-90.
51. Noyola DE, Demmler GJ, Nelson CT, Griesser C, Williamson WD, Atkins JT, et al. Early predictors of neurodevelopmental outcome in symptomatic congenital cytomegalovirus infection. *J Pediatr* 2001;138(3):325-31.
52. Kutza AS, Muhl E, Hackstein H, Kirchner H, Bein G. High incidence of active cytomegalovirus infection among septic patients. *Clin Infect Dis* 1998;26(5):1076-82.
53. Smith MA, Brennessel DJ. Cytomegalovirus. *Infect Dis Clin North Am* 1994;8(2):427-38.

54. Bowen EF, Wilson P, Cope A, Sabin C, Griffiths P, Davey C, et al. Cytomegalovirus retinitis in AIDS patients: influence of cytomegaloviral load on response to ganciclovir, time to recurrence and survival. *Aids* 1996;10(13):1515-20.
55. Razonable RR, Rivero A, Rodriguez A, Wilson J, Daniels J, Jenkins G, et al. Allograft rejection predicts the occurrence of late-onset cytomegalovirus (CMV) disease among CMV-mismatched solid organ transplant patients receiving prophylaxis with oral ganciclovir. *J Infect Dis* 2001;184(11):1461-4.
56. Speich R, van der Bij W. Epidemiology and management of infections after lung transplantation. *Clin Infect Dis* 2001;33 Suppl 1:S58-65.
57. Gandhi MK, Wills MR, Sissons JG, Carmichael AJ. Human cytomegalovirus-specific immunity following haemopoietic stem cell transplantation. *Blood Rev* 2003;17(4):259-64.
58. Bronsther O, Makowka L, Jaffe R, Demetris AJ, Breinig MK, Ho M, et al. Occurrence of cytomegalovirus hepatitis in liver transplant patients. *J Med Virol* 1988;24(4):423-34.
59. Rubin RH. Prevention and treatment of cytomegalovirus disease in heart transplant patients. *J Heart Lung Transplant* 2000;19(8):731-5.
60. Zhou YF, Leon MB, Waclawiw MA, Popma JJ, Yu ZX, Finkel T, et al. Association between prior cytomegalovirus infection and the risk of restenosis after coronary atherectomy. *N Engl J Med* 1996;335(9):624-30.
61. Cainelli F, Vento S. Infections and solid organ transplant rejection: a cause-and-effect relationship? *Lancet Infect Dis* 2002;2(9):539-49.
62. Boeckh M, Nichols WG. The impact of cytomegalovirus serostatus of donor and recipient before hematopoietic stem cell transplantation in the era of antiviral prophylaxis and preemptive therapy. *Blood* 2004;103(6):2003-8.
63. Nichols WG, Corey L, Gooley T, Davis C, Boeckh M. High risk of death due to bacterial and fungal infection among cytomegalovirus (CMV)-seronegative recipients of stem cell transplants from seropositive donors: evidence for indirect effects of primary CMV infection. *J Infect Dis* 2002;185(3):273-82.
64. Rubin RH. The indirect effects of cytomegalovirus infection on the outcome of organ transplantation. *Jama* 1989;261(24):3607-9.
65. Cope AV, Sabin C, Burroughs A, Rolles K, Griffiths PD, Emery VC. Interrelationships among quantity of human cytomegalovirus (HCMV) DNA in blood, donor-recipient serostatus, and administration of methylprednisolone as risk factors for HCMV disease following liver transplantation. *J Infect Dis* 1997;176(6):1484-90.
66. Hassan-Walker AF, Kidd IM, Sabin C, Sweny P, Griffiths PD, Emery VC. Quantity of human cytomegalovirus (CMV) DNAemia as a risk factor for CMV disease in renal allograft recipients: relationship with donor/recipient CMV serostatus, receipt of augmented methylprednisolone and antithymocyte globulin (ATG). *J Med Virol* 1999;58(2):182-7.
67. Sissons JG, Carmichael AJ. Clinical aspects and management of cytomegalovirus infection. *J Infect* 2002;44(2):78-83.
68. Soderberg-Naucler C, Fish KN, Nelson JA. Reactivation of latent human cytomegalovirus by allogeneic stimulation of blood cells from healthy donors. *Cell* 1997;91(1):119-26.
69. Hakki M, Riddell SR, Storek J, Carter RA, Stevens-Ayers T, Sudour P, et al. Immune reconstitution to cytomegalovirus after allogeneic hematopoietic stem cell transplantation: impact of host factors, drug therapy, and subclinical reactivation. *Blood* 2003;102(8):3060-7.
70. Quinnan GV, Jr., Kirmani N, Rook AH, Manischewitz JF, Jackson L, Moreschi G, et al. Cytotoxic t cells in cytomegalovirus infection: HLA-restricted T-lymphocyte and

- non-T-lymphocyte cytotoxic responses correlate with recovery from cytomegalovirus infection in bone-marrow-transplant recipients. *N Engl J Med* 1982;307(1):7-13.
71. Reusser P, Riddell SR, Meyers JD, Greenberg PD. Cytotoxic T-lymphocyte response to cytomegalovirus after human allogeneic bone marrow transplantation: pattern of recovery and correlation with cytomegalovirus infection and disease. *Blood* 1991;78(5):1373-80.
  72. Cwynarski K, Ainsworth J, Cobbold M, Wagner S, Mahendra P, Apperley J, et al. Direct visualization of cytomegalovirus-specific T-cell reconstitution after allogeneic stem cell transplantation. *Blood* 2001;97(5):1232-40.
  73. Gratama JW, van Esser JW, Lamers CH, Tournay C, Lowenberg B, Bolhuis RL, et al. Tetramer-based quantification of cytomegalovirus (CMV)-specific CD8+ T lymphocytes in T-cell-depleted stem cell grafts and after transplantation may identify patients at risk for progressive CMV infection. *Blood* 2001;98(5):1358-64.
  74. Hassan-Walker AF, Vargas Cuero AL, Mattes FM, Klenerman P, Lechner F, Burroughs AK, et al. CD8+ cytotoxic lymphocyte responses against cytomegalovirus after liver transplantation: correlation with time from transplant to receipt of tacrolimus. *J Infect Dis* 2001;183(6):835-43.
  75. Singhal S, Shaw JC, Ainsworth J, Hathaway M, Gillespie GM, Paris H, et al. Direct visualization and quantitation of cytomegalovirus-specific CD8+ cytotoxic T-lymphocytes in liver transplant patients. *Transplantation* 2000;69(11):2251-9.
  76. Engstrand M, Lidehall AK, Totterman TH, Herrman B, Eriksson BM, Korsgren O. Cellular responses to cytomegalovirus in immunosuppressed patients: circulating CD8+ T cells recognizing CMVpp65 are present but display functional impairment. *Clin Exp Immunol* 2003;132(1):96-104.
  77. Trautmann L, Rimbart M, Echasserieu K, Saulquin X, Neveu B, Dechanet J, et al. Selection of T cell clones expressing high-affinity public TCRs within Human cytomegalovirus-specific CD8 T cell responses. *J Immunol* 2005;175(9):6123-32.
  78. Chrisp P, Clissold SP. Foscarnet. A review of its antiviral activity, pharmacokinetic properties and therapeutic use in immunocompromised patients with cytomegalovirus retinitis. *Drugs* 1991;41(1):104-29.
  79. Crumpacker CS. Ganciclovir. *N Engl J Med* 1996;335(10):721-9.
  80. Lalezari JP, Stagg RJ, Kuppermann BD, Holland GN, Kramer F, Ives DV, et al. Intravenous cidofovir for peripheral cytomegalovirus retinitis in patients with AIDS. A randomized, controlled trial. *Ann Intern Med* 1997;126(4):257-63.
  81. Couchoud C, Cucherat M, Haugh M, Pouteil-Noble C. Cytomegalovirus prophylaxis with antiviral agents in solid organ transplantation: a meta-analysis. *Transplantation* 1998;65(5):641-7.
  82. Merigan TC, Renlund DG, Keay S, Bristow MR, Starnes V, O'Connell JB, et al. A controlled trial of ganciclovir to prevent cytomegalovirus disease after heart transplantation. *N Engl J Med* 1992;326(18):1182-6.
  83. Li CR, Greenberg PD, Gilbert MJ, Goodrich JM, Riddell SR. Recovery of HLA-restricted cytomegalovirus (CMV)-specific T-cell responses after allogeneic bone marrow transplant: correlation with CMV disease and effect of ganciclovir prophylaxis. *Blood* 1994;83(7):1971-9.
  84. Limaye AP, Raghu G, Koelle DM, Ferrenberg J, Huang ML, Boeckh M. High incidence of ganciclovir-resistant cytomegalovirus infection among lung transplant recipients receiving preemptive therapy. *J Infect Dis* 2002;185(1):20-7.
  85. Abecassis MM, Koffron AJ, Kaplan B, Buckingham M, Muldoon JP, Cribbins AJ, et al. The role of PCR in the diagnosis and management of CMV in solid organ recipients: what is the predictive value for the development of disease and should PCR be used to guide antiviral therapy? *Transplantation* 1997;63(2):275-9.

86. Emery VC, Sabin CA, Cope AV, Gor D, Hassan-Walker AF, Griffiths PD. Application of viral-load kinetics to identify patients who develop cytomegalovirus disease after transplantation. *Lancet* 2000;355(9220):2032-6.
87. Paya C, Humar A, Dominguez E, Washburn K, Blumberg E, Alexander B, et al. Efficacy and safety of valganciclovir vs. oral ganciclovir for prevention of cytomegalovirus disease in solid organ transplant recipients. *Am J Transplant* 2004;4(4):611-20.
88. Erice A. Resistance of human cytomegalovirus to antiviral drugs. *Clin Microbiol Rev* 1999;12(2):286-97.
89. Limaye AP, Corey L, Koelle DM, Davis CL, Boeckh M. Emergence of ganciclovir-resistant cytomegalovirus disease among recipients of solid-organ transplants. *Lancet* 2000;356(9230):645-9.
90. Addo MM, Rosenberg ES. Cellular immune responses in transplantation-associated chronic viral infections. *Transpl Infect Dis* 2002;4(1):31-40.
91. Schleiss M. Progress in cytomegalovirus vaccine development. *Herpes* 2005;12(3):66-75.
92. Neff BJ, Weibel RE, Buynak EB, McLean AA, Hilleman MR. Clinical and laboratory studies of live cytomegalovirus vaccine Ad-169. *Proc Soc Exp Biol Med* 1979;160(1):32-7.
93. Plotkin SA, Starr SE, Friedman HM, Gonczol E, Weibel RE. Protective effects of Towne cytomegalovirus vaccine against low-passage cytomegalovirus administered as a challenge. *J Infect Dis* 1989;159(5):860-5.
94. Collins RH, Jr., Shpilberg O, Drobyski WR, Porter DL, Giralt S, Champlin R, et al. Donor leukocyte infusions in 140 patients with relapsed malignancy after allogeneic bone marrow transplantation. *J Clin Oncol* 1997;15(2):433-44.
95. Fong L, Engleman EG. Dendritic cells in cancer immunotherapy. *Annu Rev Immunol* 2000;18:245-73.
96. Kolb HJ, Schattenberg A, Goldman JM, Hertenstein B, Jacobsen N, Arcese W, et al. Graft-versus-leukemia effect of donor lymphocyte transfusions in marrow grafted patients. *Blood* 1995;86(5):2041-50.
97. Yee C, Thompson JA, Byrd D, Riddell SR, Roche P, Celis E, et al. Adoptive T cell therapy using antigen-specific CD8+ T cell clones for the treatment of patients with metastatic melanoma: in vivo persistence, migration, and antitumor effect of transferred T cells. *Proc Natl Acad Sci U S A* 2002;99(25):16168-73.
98. Molldrem JJ, Lee PP, Kant S, Wieder E, Jiang W, Lu S, et al. Chronic myelogenous leukemia shapes host immunity by selective deletion of high-avidity leukemia-specific T cells. *J Clin Invest* 2003;111(5):639-47.
99. Lucin P, Pavic I, Polic B, Jonjic S, Koszinowski UH. Gamma interferon-dependent clearance of cytomegalovirus infection in salivary glands. *J Virol* 1992;66(4):1977-84.
100. Reddehase MJ, Mutter W, Munch K, Buhning HJ, Koszinowski UH. CD8-positive T lymphocytes specific for murine cytomegalovirus immediate-early antigens mediate protective immunity. *J Virol* 1987;61(10):3102-8.
101. Walter EA, Greenberg PD, Gilbert MJ, Finch RJ, Watanabe KS, Thomas ED, et al. Reconstitution of cellular immunity against cytomegalovirus in recipients of allogeneic bone marrow by transfer of T-cell clones from the donor. *N Engl J Med* 1995;333(16):1038-44.
102. Einsele H, Roosnek E, Rufer N, Sinzger C, Riegler S, Loffler J, et al. Infusion of cytomegalovirus (CMV)-specific T cells for the treatment of CMV infection not responding to antiviral chemotherapy. *Blood* 2002;99(11):3916-22.

103. Peggs KS, Verfuërth S, Pizzey A, Khan N, Guiver M, Moss PA, et al. Adoptive cellular therapy for early cytomegalovirus infection after allogeneic stem-cell transplantation with virus-specific T-cell lines. *Lancet* 2003;362(9393):1375-7.
104. Brodie SJ, Lewinsohn DA, Patterson BK, Jiyamapa D, Krieger J, Corey L, et al. In vivo migration and function of transferred HIV-1-specific cytotoxic T cells. *Nat Med* 1999;5(1):34-41.
105. Feuchtinger T, Matthes-Martin S, Richard C, Lion T, Fuhrer M, Hamprecht K, et al. Safe adoptive transfer of virus-specific T-cell immunity for the treatment of systemic adenovirus infection after allogeneic stem cell transplantation. *Br J Haematol* 2006;134(1):64-76.
106. Rooney CM, Smith CA, Ng CY, Loftin SK, Sixbey JW, Gan Y, et al. Infusion of cytotoxic T cells for the prevention and treatment of Epstein-Barr virus-induced lymphoma in allogeneic transplant recipients. *Blood* 1998;92(5):1549-55.
107. Bonini C, Lee SP, Riddell SR, Greenberg PD. Targeting antigen in mature dendritic cells for simultaneous stimulation of CD4+ and CD8+ T cells. *J Immunol* 2001;166(8):5250-7.
108. Keever-Taylor CA, Margolis D, Konings S, Sandford GR, Nicolette CA, Lawendowski C, et al. Cytomegalovirus-specific cytolytic T-cell lines and clones generated against adenovirus-pp65-infected dendritic cells. *Biol Blood Marrow Transplant* 2001;7(5):247-56.
109. Moosmann A, Khan N, Cobbold M, Zentz C, Delecluse HJ, Hollweck G, et al. B cells immortalized by a mini-Epstein-Barr virus encoding a foreign antigen efficiently reactivate specific cytotoxic T cells. *Blood* 2002;100(5):1755-64.
110. Riddell SR, Watanabe KS, Goodrich JM, Li CR, Agha ME, Greenberg PD. Restoration of viral immunity in immunodeficient humans by the adoptive transfer of T cell clones. *Science* 1992;257(5067):238-41.
111. Peggs K, Verfuërth S, Pizzey A, Ainsworth J, Moss P, Mackinnon S. Characterization of human cytomegalovirus peptide-specific CD8(+) T-cell repertoire diversity following in vitro restimulation by antigen-pulsed dendritic cells. *Blood* 2002;99(1):213-23.
112. Vaz-Santiago J, Lule J, Rohrlich P, Jacquier C, Gibert N, Le Roy E, et al. Ex vivo stimulation and expansion of both CD4(+) and CD8(+) T cells from peripheral blood mononuclear cells of human cytomegalovirus-seropositive blood donors by using a soluble recombinant chimeric protein, IE1-pp65. *J Virol* 2001;75(17):7840-7.
113. Kleihauer A, Grigoleit U, Hebart H, Moris A, Brossart P, Muhm A, et al. Ex vivo generation of human cytomegalovirus-specific cytotoxic T cells by peptide-pulsed dendritic cells. *Br J Haematol* 2001;113(1):231-9.
114. Li Pira G, Bottone L, Ivaldi F, Tagliamacco A, Fiordoro S, Ricciardi A, et al. Generation of cytomegalovirus (CMV)-specific CD4 T cell lines devoid of alloreactivity, by use of a mixture of CMV-phosphoprotein 65 peptides for reconstitution of the T helper repertoire. *J Infect Dis* 2005;191(2):215-26.
115. Savoldo B, Goss J, Liu Z, Huls MH, Doster S, Gee AP, et al. Generation of autologous Epstein-Barr virus-specific cytotoxic T cells for adoptive immunotherapy in solid organ transplant recipients. *Transplantation* 2001;72(6):1078-86.
116. Cobbold M, Khan N, Pourgheysari B, Tauro S, McDonald D, Osman H, et al. Adoptive transfer of cytomegalovirus-specific CTL to stem cell transplant patients after selection by HLA-peptide tetramers. *J Exp Med* 2005;202(3):379-86.
117. Keenan RD, Ainsworth J, Khan N, Bruton R, Cobbold M, Assenmacher M, et al. Purification of cytomegalovirus-specific CD8 T cells from peripheral blood using HLA-peptide tetramers. *Br J Haematol* 2001;115(2):428-34.

118. Oelke M, Kurokawa T, Hentrich I, Behringer D, Cerundolo V, Lindemann A, et al. Functional characterization of CD8(+) antigen-specific cytotoxic T lymphocytes after enrichment based on cytokine secretion: comparison with the MHC-tetramer technology. *Scand J Immunol* 2000;52(6):544-9.
119. Hammer MH, Meyer S, Brestrich G, Moosmann A, Kern F, Tesfa L, et al. HLA type-independent generation of antigen-specific T cells for adoptive immunotherapy. *Eur J Immunol* 2005;35(7):2250-8.
120. Frentsch M, Arbach O, Kirchoff D, Moewes B, Worm M, Rothe M, et al. Direct access to CD4+ T cells specific for defined antigens according to CD154 expression. *Nat Med* 2005;11(10):1118-24.
121. Riddell SR, Greenberg PD. The use of anti-CD3 and anti-CD28 monoclonal antibodies to clone and expand human antigen-specific T cells. *J Immunol Methods* 1990;128(2):189-201.
122. Suntharalingam G, Perry MR, Ward S, Brett SJ, Castello-Cortes A, Brunner MD, et al. Cytokine storm in a phase 1 trial of the anti-CD28 monoclonal antibody TGN1412. *N Engl J Med* 2006;355(10):1018-28.
123. Sili U, Huls MH, Davis AR, Gottschalk S, Brenner MK, Heslop HE, et al. Large-scale expansion of dendritic cell-primed polyclonal human cytotoxic T-lymphocyte lines using lymphoblastoid cell lines for adoptive immunotherapy. *J Immunother* 2003;26(3):241-56.
124. Grabstein KH, Eisenman J, Shanebeck K, Rauch C, Srinivasan S, Fung V, et al. Cloning of a T cell growth factor that interacts with the beta chain of the interleukin-2 receptor. *Science* 1994;264(5161):965-8.
125. Refaeli Y, Van Parijs L, London CA, Tschopp J, Abbas AK. Biochemical mechanisms of IL-2-regulated Fas-mediated T cell apoptosis. *Immunity* 1998;8(5):615-23.
126. Van Parijs L, Refaeli Y, Lord JD, Nelson BH, Abbas AK, Baltimore D. Uncoupling IL-2 signals that regulate T cell proliferation, survival, and Fas-mediated activation-induced cell death. *Immunity* 1999;11(3):281-8.
127. Judge AD, Zhang X, Fujii H, Surh CD, Sprent J. Interleukin 15 controls both proliferation and survival of a subset of memory-phenotype CD8(+) T cells. *J Exp Med* 2002;196(7):935-46.
128. Liu S, Riley J, Rosenberg S, Parkhurst M. Comparison of common gamma-chain cytokines, interleukin-2, interleukin-7, and interleukin-15 for the in vitro generation of human tumor-reactive T lymphocytes for adoptive cell transfer therapy. *J Immunother* 2006;29(3):284-93.
129. Bonini C, Ferrari G, Verzeletti S, Servida P, Zappone E, Ruggieri L, et al. HSV-TK gene transfer into donor lymphocytes for control of allogeneic graft-versus-leukemia. *Science* 1997;276(5319):1719-24.
130. Riddell SR, Elliott M, Lewinsohn DA, Gilbert MJ, Wilson L, Manley SA, et al. T-cell mediated rejection of gene-modified HIV-specific cytotoxic T lymphocytes in HIV-infected patients. *Nat Med* 1996;2(2):216-23.
131. Cooper LJ, Kalos M, Lewinsohn DA, Riddell SR, Greenberg PD. Transfer of specificity for human immunodeficiency virus type 1 into primary human T lymphocytes by introduction of T-cell receptor genes. *J Virol* 2000;74(17):8207-12.
132. Kessels HW, van Den Boom MD, Spits H, Hooijberg E, Schumacher TN. Changing T cell specificity by retroviral T cell receptor display. *Proc Natl Acad Sci U S A* 2000;97(26):14578-83.
133. Haque T, Taylor C, Wilkie GM, Murad P, Amlot PL, Beath S, et al. Complete regression of posttransplant lymphoproliferative disease using partially HLA-matched Epstein Barr virus-specific cytotoxic T cells. *Transplantation* 2001;72(8):1399-402.



134. Heslop HE, Rooney CM. Adoptive cellular immunotherapy for EBV lymphoproliferative disease. *Immunol Rev* 1997;157:217-22.
135. Papadopoulos EB, Ladanyi M, Emanuel D, Mackinnon S, Boulad F, Carabasi MH, et al. Infusions of donor leukocytes to treat Epstein-Barr virus-associated lymphoproliferative disorders after allogeneic bone marrow transplantation. *N Engl J Med* 1994;330(17):1185-91.
136. Moss P, Khan N. CD8(+) T-cell immunity to cytomegalovirus. *Hum Immunol* 2004;65(5):456-64.
137. Gottschalk S, Ng CY, Perez M, Smith CA, Sample C, Brenner MK, et al. An Epstein-Barr virus deletion mutant associated with fatal lymphoproliferative disease unresponsive to therapy with virus-specific CTLs. *Blood* 2001;97(4):835-43.
138. Ho WY, Yee C, Greenberg PD. Adoptive therapy with CD8(+) T cells: it may get by with a little help from its friends. *J Clin Invest* 2002;110(10):1415-7.
139. Trampisch HW, J.; Ehle, B. *Medizinische Statistik: Springer-Lehrbuch*; 2000.
140. Singh N. Antiviral drugs for cytomegalovirus in transplant recipients: advantages of preemptive therapy. *Rev Med Virol* 2006;16(5):281-7.
141. Harari A, Zimmerli SC, Pantaleo G. Cytomegalovirus (CMV)-specific cellular immune responses. *Hum Immunol* 2004;65(5):500-6.
142. Esser MT, Krishnamurthy B, Braciale VL. Distinct T cell receptor signaling requirements for perforin- or FasL-mediated cytotoxicity. *J Exp Med* 1996;183(4):1697-706.
143. Gamadia LE, Rentenaar RJ, Baars PA, Remmerswaal EB, Surachno S, Weel JF, et al. Differentiation of cytomegalovirus-specific CD8(+) T cells in healthy and immunosuppressed virus carriers. *Blood* 2001;98(3):754-61.
144. Xu D, Fu J, Jin L, Zhang H, Zhou C, Zou Z, et al. Circulating and liver resident CD4+CD25+ regulatory T cells actively influence the antiviral immune response and disease progression in patients with hepatitis B. *J Immunol* 2006;177(1):739-47.
145. Sun Q, Pollok KE, Burton RL, Dai LJ, Britt W, Emanuel DJ, et al. Simultaneous ex vivo expansion of cytomegalovirus and Epstein-Barr virus-specific cytotoxic T lymphocytes using B-lymphoblastoid cell lines expressing cytomegalovirus pp65. *Blood* 1999;94(9):3242-50.
146. Grakoui A, Shoukry NH, Woollard DJ, Han JH, Hanson HL, Ghayeb J, et al. HCV persistence and immune evasion in the absence of memory T cell help. *Science* 2003;302(5645):659-62.
147. Rentenaar RJ, Gamadia LE, van DerHoek N, van Diepen FN, Boom R, Weel JF, et al. Development of virus-specific CD4(+) T cells during primary cytomegalovirus infection. *J Clin Invest* 2000;105(4):541-8.
148. Prod'homme V, Retiere C, Valtcheva R, Bonneville M, Hallet MM. Cross-reactivity of HLA-B\*1801-restricted T-lymphocyte clones with target cells expressing variants of the human cytomegalovirus 72kDa-IE1 protein. *J Virol* 2003;77(12):7139-42.
149. Elkington R, Walker S, Crough T, Menzies M, Tellam J, Bharadwaj M, et al. Ex vivo profiling of CD8+-T-cell responses to human cytomegalovirus reveals broad and multispecific reactivities in healthy virus carriers. *J Virol* 2003;77(9):5226-40.
150. Khong HT, Wang QJ, Rosenberg SA. Identification of multiple antigens recognized by tumor-infiltrating lymphocytes from a single patient: tumor escape by antigen loss and loss of MHC expression. *J Immunother* 2004;27(3):184-90.
151. Alexander-Miller MA, Leggatt GR, Sarin A, Berzofsky JA. Role of antigen, CD8, and cytotoxic T lymphocyte (CTL) avidity in high dose antigen induction of apoptosis of effector CTL. *J Exp Med* 1996;184(2):485-92.

152. Fletcher JM, Vukmanovic-Stejic M, Dunne PJ, Birch KE, Cook JE, Jackson SE, et al. Cytomegalovirus-specific CD4+ T cells in healthy carriers are continuously driven to replicative exhaustion. *J Immunol* 2005;175(12):8218-25.
153. Ouyang Q, Wagner WM, Wikby A, Walter S, Aubert G, Dodi AI, et al. Large numbers of dysfunctional CD8+ T lymphocytes bearing receptors for a single dominant CMV epitope in the very old. *J Clin Immunol* 2003;23(4):247-57.
154. Pawelec G, Gouttefangeas C. T-cell dysregulation caused by chronic antigenic stress: the role of CMV in immunosenescence? *Aging Clin Exp Res* 2006;18(2):171-3.
155. Appay V, Dunbar PR, Callan M, Klenerman P, Gillespie GM, Papagno L, et al. Memory CD8+ T cells vary in differentiation phenotype in different persistent virus infections. *Nat Med* 2002;8(4):379-85.
156. Sallusto F, Geginat J, Lanzavecchia A. Central memory and effector memory T cell subsets: function, generation, and maintenance. *Annu Rev Immunol* 2004;22:745-63.
157. Wills MR, Carmichael AJ, Mynard K, Jin X, Weekes MP, Plachter B, et al. The human cytotoxic T-lymphocyte (CTL) response to cytomegalovirus is dominated by structural protein pp65: frequency, specificity, and T-cell receptor usage of pp65-specific CTL. *J Virol* 1996;70(11):7569-79.
158. Bunde T, Kirchner A, Hoffmeister B, Habedank D, Hetzer R, Cherepnev G, et al. Protection from cytomegalovirus after transplantation is correlated with immediate early 1-specific CD8 T cells. *J Exp Med* 2005;201(7):1031-6.
159. Campbell JD, Piechaczek C, Winkels G, Schwamborn E, Micheli D, Hennemann S, et al. Isolation and generation of clinical-grade dendritic cells using the CliniMACS system. *Methods Mol Med* 2005;109:55-70.
160. Chou T, Sano M, Ogura M, Morishima Y, Itagaki H, Tokuda Y. Isolation and transplantation of highly purified autologous peripheral CD34+progenitor cells: purging efficacy, hematopoietic reconstitution following high dose chemotherapy in patients with breast cancer: results of a feasibility study in Japan. *Breast Cancer* 2005;12(3):178-88.
161. Passweg JR, Stern M, Koehl U, Uharek L, Tichelli A. Use of natural killer cells in hematopoietic stem cell transplantation. *Bone Marrow Transplant* 2005;35(7):637-43.
162. Szmania S, Galloway A, Bruorton M, Musk P, Aubert G, Arthur A, et al. Isolation and expansion of cytomegalovirus-specific cytotoxic T lymphocytes to clinical scale from a single blood draw using dendritic cells and HLA-tetramers. *Blood* 2001;98(3):505-12.
163. Dudley ME, Wunderlich JR, Robbins PF, Yang JC, Hwu P, Schwartzentruber DJ, et al. Cancer regression and autoimmunity in patients after clonal repopulation with antitumor lymphocytes. *Science* 2002;298(5594):850-4.
164. Kitchens WH, Uehara S, Chase CM, Colvin RB, Russell PS, Madsen JC. The changing role of natural killer cells in solid organ rejection and tolerance. *Transplantation* 2006;81(6):811-7.
165. Huber S. T cells in coxsackievirus-induced myocarditis. *Viral Immunol* 2004;17(2):152-64.
166. Janeway CT, P; Walport,M; Shlomchik,M. Immunobiology: The immune System in health and disease 6th Edition. 2005.
167. Savoldo B, Cubbage ML, Durett AG, Goss J, Huls MH, Liu Z, et al. Generation of EBV-specific CD4+ cytotoxic T cells from virus naive individuals. *J Immunol* 2002;168(2):909-18.
168. Ho WY, Nguyen HN, Wolf M, Kuball J, Greenberg PD. In vitro methods for generating CD8+ T-cell clones for immunotherapy from the naive repertoire. *J Immunol Methods* 2006;310(1-2):40-52.

169. Leonard WJ, Spolski R. Interleukin-21: a modulator of lymphoid proliferation, apoptosis and differentiation. *Nat Rev Immunol* 2005;5(9):688-98.
170. Wilson CC, Olson WC, Tuting T, Rinaldo CR, Lotze MT, Storkus WJ. HIV-1-specific CTL responses primed in vitro by blood-derived dendritic cells and Th1-biasing cytokines. *J Immunol* 1999;162(5):3070-8.
171. Schiller JT, Lowy DR. Prospects for cervical cancer prevention by human papillomavirus vaccination. *Cancer Res* 2006;66(21):10229-32.
172. Stern PL. Immune control of human papillomavirus (HPV) associated anogenital disease and potential for vaccination. *J Clin Virol* 2005;32 Suppl 1:S72-81.