

## 6 Literatur

- Ahrens, E.R., Gossain, V.V. & Rovner, D.R. Human insulin. Its development and clinical use. *Postgrad. Med.* **80**, 181-184 (1986)
- An, K., Gillock, E.T., Sweat, J.A., Reeves, W.M. & Consigli, R.A. Use of the baculovirus system to assemble polyomavirus capsid-like particles with different polyomavirus structural proteins: analysis of the recombinant assembled capsid-like particles. *J. Gen. Virol.* **80**, 1009-1016 (1999).
- An, K., Lovgren, T.R., Tilley, M.B. & Consigli, R.A. Use of the confocal microscope to determine polyomavirus recombinant capsid-like particle entry into mouse 3T6 cells. *J. Virol. Methods* **84**, 153-159 (2000).
- Anderson, F.W. Human gene therapy. *Nature* **392** Suppl., 25-30 (1998).
- Anderson, H.A., Chen, Y. & Norkin, L.C. Bound simian virus 40 translocates to caveolin-enriched membrane domains and its entry is inhibited by drugs that selectively disrupt caveolae. *Mol. Biol. Cell* **7**, 1826-1834 (1996).
- Anderson, H.A., Czhen, Y. & Norkin, L.C. MHC class I molecules are enriched in caveolae but do not enter with simian virus 40. *J. Gen. Virol.* **79**, 1469-1477 (1998).
- Anderson, W.F. Prospects for human gene therapy. *Science* **226**, 401-409 (1984).
- Andersson, S., Davis, D.L., Dahlbäck, H., Jörnvall, H. & Russel, D.W. Cloning, structure, and expression of the mitochondrial cytochrome P-450 sterol 26-hydroxylase, a bile acid biosynthetic enzyme. *J. Biol. Chem.* **264**, 8222-8229 (1989).
- Bachman, B.J. Linkage map of Escherichia coli K-12, Ed. 7. *Microbiol. Rev.* **47**, 180-230 (1983).
- Bachmann, A.S., Surovoy, A. Jung, G. & Moelling, K. Integrin receptor-targeted transfer of peptides for efficient delivery of antisense oligodesoxynucleotides. *J. Mol. Med.* **76**, 126-132 (1998).
- Bai, M., Harfe, B. & Freimuth, P. Mutations that alter an Arg-Gly-Asp (RGD) sequence in the adenovirus type 2 penton base protein abolish its cell-rounding activity and delay virus reproduction in flat cells. *J. Virol.* **67**, 5198-5205 (1993).
- Baron, M., Reynes, J.P., Stassi, D. & Tiraby, G. A selectable bifunctional  $\beta$ -galactosidase: Phleomycin-resistance fusion protein as a potential marker for eukaryotic cells. *Gene* **114**, 239-243 (1992).
- Barouch, D.H. & Harrison, S.C. Interactions among the major and minor coat proteins of polyomavirus. *J. Virol.* **68**, 3982-3989 (1994).
- Bartlett, J.S. & Samulski, R.J. Fluorescent viral vectors: A new technique for the pharmacological analysis of gene therapy. *Nature Med.* **4**, 635-637 (1998).
- Bauer, P.H., Bronson, R.T., Fung, S.C., Freund, R., Stehle, T., Harrison, S.C. & Benjamin, L.T. Genetic and structural analysis of a virulence determinant in polyoma VP1. *J. Virol.* **69**, 7925-7931 (1995).
- Bauer, P.H., Cui, C., Stehle, T., Harrison, S.C., DeCaprio, J.A. & Benjamin, T.L. Discrimination between sialic acid-containing receptors and pseudoreceptors regulates polyomavirus spread in the mouse. *J. Virol.* **73**, 2826-5832 (1999).

- Bedford, M.T., Chan, D.C. & Leder, P. FBP WW domains and the Abl SH3 domain bind a specific class of proline-rich ligands. *EMBO J.* **16**, 2376-2383 (1997).
- Bedford, M.T., Reed, R. & Leder, P. WW domain-mediated interactions reveal a spliceosome-associated protein that binds a third class of proline-rich motif: the proline glycine and methionine-rich motif. *Proc. Natl. Acad. Sci. USA* **95**, 10602-10607 (1998).
- Begley, C.G. Haemopoietic growth factors--from discovery to clinical application. *Med. J. Malaysia* **48**, 3-8 (1993).
- Berger, H. & Wintersberger, E. Polyomavirus small T-antigen enhances replication of viral genomes in 3T6 mouse fibroblasts. *J. Virol.* **60**, 768-770 (1986).
- Berlin, R.D. & Oliver, J.M. Surface functions during mitosis. II. Quantitation of pinocytosis and kinetic characterization of the mitotic cycle with a new fluorescence technique. *J. Cell Biol.* **85**, 660-671 (1980).
- Bertling, W.M., Gareis, M., Paspaleeva, V., Zimmer, A., Kreuter, J., Nurnberg, E. & Harrer, P. Use of liposomes, viral capsids, and nanoparticles as DNA carriers. *Biotechnol. Appl. Biochem.* **13**, 390-405 (1991).
- BIAapplications Handbook, Pharmacia Biosensor AB (1994).
- BIAtechnology Handbook, Pharmacia Biosensor AB (1994).
- Bielecki, J., Youngman, P., Connelly, P. & Portnoy, D.A. *Bacillus subtilis* expressing a haemolysin gene from *Listeria monocytogenes* can grow in mammalian cells. *Nature* **345**, 175-176 (1990).
- Blaese, R.M., Culver, K.W., Miller, A.D., Carter, C.S., Fleisher, T., Clerici, M., Shearer, G., Chang, L., Chiang, Y. & Tolstoshev, P. T-Lymphocyte-directed gene therapy for ADA-SCID: initial trial results after 4 years. *Science* **270**, 475-480 (1995).
- Böhm, G. & Schmidt, U., Methode zur Charakterisierung und Auftrennung molekularer Assoziante. Deutsche Patentanmeldung #199 52 955.8 (1999).
- Böhm, G., Muhr, R. & Jaenicke, R. Quantitative analysis of protein far UV circular dichroism spectra by neural networks. *Prot. Eng.* **5**, 191-195 (1992).
- Böhm, G., Schmidt, U., Esser, D. & Rudolph, R. Produktion und Anwendung modular aufgebauter Träger für molekulare Substanzen. Deutsche Patentanmeldung #199 52 957.4. (1999).
- Bolen, J.B., Anders, D.G., Trempy, J. & Consigli, R.A. Differences in the subpopulations of the structural proteins of polyoma virions and capsids: biological functions of the multiple VP1 species. *J. Virol.* **37**, 80-91 (1981).
- Bolen, J.B., Fisher, S.E., Chowdhury, K., Shan, C., Williams, J.E., Dawe, C.J. & Israel, M.A. A determinant of polyomavirus virulence enhances growth in cells of renal origin. *J. Virol.* **53**, 335-339 (1985).
- Bork, P. & Sudol, M. The WW domain: A signalling site in dystrophin ? *Trends Biochem. Sci.* **19**, 531-533 (1994).
- Boshart, M., Weber, F., Jahn, G., Dorsch-Häsler, K., Fleckenstein, B. & Schaffner, W. A very strong enhancer is located upstream of an immediate early gene of human cytomegalovirus. *Cell* **41**, 521-530 (1985).
- Boussif, O., Lezoualc'h, F., Zanta, M.A., Mergny, M.D., Scherman, D., Demeneix, B., Behr, J.P. A versatile vector for gene and oligonucleotide transfer into cells in culture and in vivo: polyethylenimine. *Proc. Natl. Acad. Sci. USA* **92**, 7297-7301 (1995).

- Bowen, J.H., Chlumecky, D., D'Obrenan, P. & Colter, J.S. Evidence that polyoma polypeptide VP1 is a serine protease. *Virology* **135**, 551-554 (1984).
- Brady, J.N., Winston, V.D. & Consigli, R.A. Characterization of a DNA-protein complex and capsomere subunits derived from polyomavirus by treatment with ethyleneglycol-bis-N,N'-tetraacetic acid and dithiothreitol. *J. Virol.* **27**, 193-204 (1978).
- Brady, J.N., Winston, V.D. & Consigli, R.A. Dissociation of polyomavirus by the chelation of calcium ions found associated with purified virions. *J. Virol.* **23**, 717-724 (1977).
- Brady, R.O., Murray, G.J. & Barton, N.W. Modifying exogenous glucocerebrosidase for effective replacement therapy of Gaucher disease. *J. Inherit. Metab. Dis.* **17**, 510-519 (1994).
- Brahms, S. & Brahms, J. Determination of protein secondary structure in solution by vacuum ultraviolet circular dichroism. *J. Mol. Biol.* **138**, 149-178 (1980).
- Branden, L.J., Mohamed, A.J. & Smith, C.I. A peptide nucleic acid-nuclear localization signal fusion that mediates nuclear transport of DNA. *Nat. Biotechnol.* **17**, 784-787 (1999).
- Braun, H., Boller, K., Löwer, J., Bertling, W.M. & Zimmer, A. Oligonucleotide and plasmid DNA packaging into polyoma VP1 virus-like particles expressed in *Escherichia coli*. *Biotechnol. Appl. Biochem.* **29**, 31-43 (1999).
- Breau, W.C., Atwood, W.J. & Norkin, L.C. Class I major histocompatibility proteins are an essential component of the simian virus 40 receptor. *J. Virol.* **66**, 2037-2045 (1992).
- Brinkley, M. A brief survey of methods for preparing protein conjugates with dyes, haptens, and cross-linking reagents. *Bioconj. Chem.* **3**, 2-13 (1992).
- Bryan, J.K. Molecular weights of protein multimers from polyacrylamide gel electrophoresis. *Anal. Biochem.* **78**, 513-519 (1977).
- Burdach, S. Molecular regulation of hematopoietic cytokines: implications and indications for clinical use in pediatric oncology. *Med. Pediatr. Oncol.* **2** Suppl., 10-17 (1992).
- Burton, K.S. & Consigli, R.A. Methylation of the polyomavirus major capsid protein VP1. *Virus Res.* **40**, 141-147 (1996).
- Cahan, L.D. & Paulson, J.C. Polyomavirus recognizes specific sialyloligosaccharide receptors on erythrocytes. *Virology* **103**, 505-509 (1980).
- Cahan, L.D., Singh, R. & Paulson, J.C. Sialyloligosaccharide receptors of binding variants of polyomavirus. *Virology* **130**, 281-289 (1983).
- Campbell S. & Vogt V.M. Self-assembly in vitro of purified CA-NC proteins from Rous sarcoma virus and human immunodeficiency virus type 1. *J. Virol.* **69**, 6487-6497 (1995).
- Cappai, R. & White, A.R. Amyloid beta. *Int. J. Biochem. Cell Biol.* **31**, 885-889. (1999).
- Carter, N.P. & Meyer, E.W. Introduction to the principles of flow cytometry. Ormerod, M.G. ed., *Flow Cytometry*, 2<sup>nd</sup> ed. IRL Press, Oxford (1994).

- Cayla, X., Ballmer-Hofer, K., Merlevede, W. & Goris, J. Phosphatase 2A associated with polyomavirus small-T or middle-T antigen is an okadaic acid-sensitive tyrosyl phosphatase. *Eur. J. Biochem.* **214**, 281-286 (1993).
- Chalfie, M., Tu, Y., Euskirchen, G., Ward, W. W. & Prasher, D. C. Green fluorescent protein as a marker for gene expression. *Science* **263**, 802-805 (1994).
- Chan, D.C., Bedford, M.T. & Leder, P. Formin binding proteins bear WWP/WW domains that bind proline-rich peptides and functionally resemble SH3 domains. *EMBO J.* **15**, 1045-1054 (1996).
- Chang, D., Cai, X. & Consigli, R.A. Characterization of the DNA binding properties of polyomavirions capsid proteins. *J. Virol.* **67**, 6327-6331 (1993).
- Chang, D., Haynes, J.I. 2nd, Brady, J.N. & Consigli, R.A. The use of additive and subtractive approaches to examine the nuclear localization sequence of the polyomavirus major capsid protein VP1. *Virology* **189**, 821-827 (1992a).
- Chang, D., Haynes, J.I., Brady, J.N. & Consigli, R.A. Identification of a nuclear localization sequence in the polyomavirus capsid protein VP2. *Virology* **191**, 978-983 (1992b).
- Chen, C. & Okayama, H. Calcium phosphate-mediated gene transfer: A highly efficient system for stably transforming cells with plasmid DNA. *BioTechniques* **6**, 632-638 (1988).
- Chen, C. & Okayama, H. High efficiency transformation of mammalian cells with plasmid DNA. *Mol. Cell. Biol.* **7**, 2745-2752 (1987).
- Chen, M.H. & Benjamin, T.L. Roles of N-glycans with  $\alpha$ 2,6 as well as  $\alpha$ 2,3 linked sialic acid in infection by polyomavirus. *Virology* **233**, 440-442 (1997).
- Chen, X.S., Stehle, T. & Harrison, S.C. Interaction of polyomavirus internal protein VP2 with the major capsid protein VP1 and implications for participation of VP2 in viral entry. *EMBO J.* **17**, 3233-3240 (1998).
- Chong, S. & Xu, M.-Q. Protein splicing of the *Saccharomyces cerevisiae* VMA intein without the endonuclease motifs. *J. Biol. Chem.* **272**, 15587-15590 (1997).
- Chong, S., Mersha, F.B., Comb, D.G., Scott, M.E., Landry, D., Vence, L.M., Perler, F.B., Benner, J., Kucera, R.B., Hirvonen, C.A., Pelletier, J.J., Paulus, H. & Xu, M.-Q. Single-column purification of free recombinant proteins using a self-cleavable affinity tag derived from a protein splicing element. *Gene* **192**, 271-281 (1997).
- Chong, S., Williams, K.S., Wotkowicz, C. & Xu, M.-Q. Modulation of protein splicing of the *Saccharomyces cerevisiae* vacuolar membrane ATPase intein. *J. Biol. Chem.* **273**, 10567-10577 (1998).
- Chong, S., Yang, S., Paulus, H., Benner, J., Perler, F.B. & Xu, M.-Q. Protein splicing involving the *Saccharomyces cerevisiae* VMA intein. The steps in the splicing pathway, side reactions leading to protein cleavage, and establishment of an *in vitro* splicing system. *J. Biol. Chem.* **271**, 22159-22168 (1996).
- Chow, M., Newman, J.F.E., Filman, D., Hogle, J.m., Rowlands, B.J. & Brown F. Myristylation of picornavirus capsid protein VP4 and its structural significance. *Nature* **327**, 482-486 (1987).
- Christiansen, G., Landers, T., Griffith, J. & Berg, P. Characterization of components released by alkali disruption of simian virus 40. *J. Virol.* **21**, 1079-1084 (1977).

- Clark, B. & Desselberger, U. Myristylation of rotavirus proteins. *J. Gen. Virol.* **69**, 2681-2686 (1988).
- Clever, J., Yamada, M. & Kasamatsu, H. Import of simian virus 40 virions through nuclear pore complexes. *Proc. Natl. Acad. Sci. USA* **88**, 7333-7337 (1991).
- Cody, C. W., Prasher, D. C., Westler, W. M., Prendergast, F. G. & Ward, W. W. Chemical structure of the hexapeptide chromophore of Aequorea green-fluorescent protein. *Biochemistry* **32**, 1212-1218 (1993).
- Coligan, J.E., Dunn, B.M., Ploegh, H.L., Speicher, D.W., & Wingfield, P.T. Current protocols in protein science. Wiley & Sons (1995).
- Conte, M.P., Petrone, G., Longhi, C., Valenti, P., Morelli, R., Superti, F. & Seganti, L. The effects of inhibitors of vacuolar acidification on the release of *Listeria monocytogenes* from phagosomes of Caco-2 cells. *J. Med. Microbiol.* **44**, 418-424 (1996).
- Cress, W.D. & Nevins, J.R. Use of the E2F transcription factor by DNA tumor viruses regulatory proteins. *Curr. Top. Microbiol. Immunol.* **208**, 63-78 (1996).
- Dalyot-Herman, N., Ben-nun-Shaul, O., Gordon-Shaag, A. & Oppenheim, A. The simian virus 40 packaging signal ses is composed of redundant DNA elements which are partly interchangeable. *J. Mol. Biol.* **259**, 69-80 (1996).
- Dangoria, N.S., Breau, W.C., Anderson, H.A., Cishek, D.M. & Norkin, L.C. Extracellular simian virus 40 induces an ERK/MAP kinase-dependent pathway that activates primary response genes and promotes virus entry. *J. Gen. Virol.* **77**, 2173-2182 (1996).
- Dawe, C.J., Freund, R., Mandel, G., Ballmer-Hofer, K., Talmage, D.T. & Benjamin, T.L. Variations in polyomavirus genotype in relation to tumor induction in mice: characterization of wildtype strains and with widely differing tumor profiles. *Am. J. Pathol.* **127**, 243-261 (1987).
- Dickinson, C.D., Gay, D.A., Parello, J., Ruoslahti, E. & Ely, K.R. Crystals of the cell-binding module of fibronectin obtained from a series of recombinant fragments differing in length. *J. Mol. Biol.* **237**, 123-127 (1994).
- Dilber, M.S., Phelan, A., Aints, A., Mohamed, A.J., Elliot, G., Edvard Smith, C.I. & O'Hare, P. Intercellular delivery of thymidine kinaseprodrug activating enzyme by the herpes simplex protein, VP22. *Gene Ther.* **6**, 12-21 (1999).
- Dilworth, S.M. Polyomavirus middle T-antigen: meddler or mimic ? *Trends Microbiol.* **3**, 31-35 (1995).
- Ding, L., Lu, S. & Munshi, N.C. *In vitro* packaging of an infectious recombinant adeno-associated virus 2. *Gene Ther.* **4**, 1167-1172 (1997).
- Diwu, Z., Chen, C.S., Zhang, C., Klaubert, D.H. & Haugland, R.P. A novel acidotropic pH Indicator and its potential application in labeling acidic organelles of live cells. *Chem. Biol.* **6**, 411-418 (1999).
- Drocourt, D., Calmels, T.P.G., Reynes, J.P., Baron, M. & Tiraby, G. Cassettes of the *Streptoalloteichus hidustanus ble* gene for transformation of lower and higher eukaryotes to phleomycin resistance. *Nucleic Acids Res.* **18**, 4009 (1990).
- Dubensky, T.W., Freund, R., Dawe, C.J. & Benjamin, T.L. Polyomavirus replication in mice: Influences of VP1-Type and route of inoculation. *J. Virol.* **65**, 342-349 (1991).

- Dunant, N. & Ballmer-Hofer, K. Signalling by Src family kinases: lessons learnt from DNA tumor viruses. *Cell. Signal.* **9**, 385-393 (1997).
- Dunn, K.W., Mayor, S., Myers, J.N. & Maxfield, F.R. Applications of ratio fluorescence microscopy in the study of cell physiology. *FASEB J.* **8**, 573-582 (1994).
- Eckhart, W. Polyomaviridae and their replication, p. 727-741. In Fields, B.N. and Knipe, D.M. eds., *Fundamental Virology* 2nd ed. 1991, Raven Press, New York (1991).
- Eigen, M. Prionics or the kinetic basis of prion diseases. *Biophys. Chem.* **63**, A1-A18 (1996).
- Elliot, G. & O'Hare, P. Intercellular trafficking and protein delivery by a herpesvirus structural protein. *Cell* **88**, 223-233 (1997).
- Ermekova, K.S., Zambrano, N., Linn, H., Minopoli, G., Gertler, F., Russo, T. & Sudol, M. The WW domain of neural protein FE65 interacts with proline-rich motifs in Mena, the mammalian homolog of *Drosophila* enabled. *J. Biol. Chem.* **272**, 32869-32877 (1997).
- Esser, D., Böhm, G. & Schmidt, U. Methode für einen gerichteten Einschluss molekularer Substanzen in Proteinhüllen. Deutsche Patentanmeldung #199 52 982.5 (1999).
- Fasbender, A., Zabner, J., Zeiher, B.G. & Welsh, M.J. A low rate of cell proliferation and reduced DNA uptake limit cationic lipid-mediated gene transfer to primary cultures of ciliated human airway epithelia. *Gene Ther.* **4**, 1173-1180 (1997).
- Federico, M. Lentiviruses as gene delivery vectors. *Curr. Opinion Biotechnol.* **10**, 448-453 (1999).
- Feldherr, C.M. & Akin, D. The permeability of the nuclear envelope in dividing and non-dividing cells. *J. Cell Biol.* **111**, 1-8 (1990).
- Felgner, P.L. et al. Lipofection: a highly efficient, lipid-mediated DNA-transfection procedure. *Proc. Natl. Acad. Sci. USA* **84**, 7413-7417 (1987).
- Feng, F., Broder, C.C., Kennedy, P.E. & Berger, E.A. HIV-1-entry cofactor: functional cDNA cloning of a seven-transmembrane, G protein-coupled receptor. *Science* **272**, 872-877 (1996).
- Ferguson, K.A. *Metabolism* **13**, 985 (1964).
- Forstova, J., Krauzevicz, N., Sandig, V., Elliot, J., Palkova, Z., Strauss, M. & Griffin, B.E. Polyoma virus pseudocapsids as efficient carriers of heterologous DNA into mammalian cells. *Hum. Gene Ther.* **6**, 297-306 (1995).
- Fowler, S.J. Use of monoclonal antibodies for western blotting with enhanced chemiluminescent detection. *Methods Mol. Biol.* **45**, 115-127 (1995).
- Freund, R., Calderone, A., Dawe, C.J. & Benjamin, T.L. Polyomavirus tumor induction in mice: effects of polymorphisms of VP1 and large T-antigen. *J. Virol.* **65**, 335-341 (1990).
- Freund, R., Garcea, R.L., Sahli, R. & Benjamin, T.L. A single-aminoacid substitution in polyomavirus VP1 correlates with plaque size and hemagglutination behaviour. *J. Virol.* **65**, 350-355 (1991).
- Freund, R., Mandel, G., Carmichael, G.G., Barncastle, J., Dawe, C.J. & Benjamin, T.L. Polyomavirus tumor induction in mice: influences of viral coding and non-coding sequences on tumor profiles. *J. Virol.* **61**, 2232-2239 (1987).

- Fried, H., Cahan, L.D. & Paulson, J.C. Polyomavirus recognizes specific sialyloligosaccharide receptors on the host cells. *Virology* **109**, 188-192 (1981).
- Fynan, E.F., Webster, R.G., Fuller, D.H., Haynes, J.R., Santoro, J.C., Robinson, H.L. DNA-vaccines: protective immunizations by parenteral, mucosal and gene gun inoculations. *Proc. Natl. Acad. Sci. USA* **90**, 11478-11482 (1993).
- Gage, F.H. Cell therapy. *Nature* **392** Suppl., 18-24 (1998).
- Gaillard, J.L., Berche, P., Mounier, J., Richard, S. & Sansonetti, P.J. *In vitro* model of penetration and intracellular growth of *Listeria monocytogenes* in the human enterocyte-like cell line Caco-2. *Infect. Immunity* **55**, 2822-2829 (1987).
- Galla, H.J. Spektroskopische Methoden in der Biochemie. Thieme, Stuttgart (1988).
- Garcea, R.L. & Benjamin, T.L. Host range transforming gene of polyomavirus plays a role in virus assembly. *Proc. Natl. Acad. Sci. USA* **80**, 3613-3617 (1983).
- Garcea, R.L., Ballmer-Hofer, K. & Benjamin, T.L. Virion assembly defect in polyomavirus hr-t mutants: underphosphorylation of major capsid protein VP1 before DNA encapsidation. *J. Virol.* **54**, 311-316 (1985).
- Garcea, R.L., Salunke, D.M. & Caspar, D.L.D. Site-directed mutation affecting polyomavirus capsid self-assembly in vitro. *Nature* **329**, 86-87 (1987).
- Garcea, R.L., Talmage, D.A., Harmatz, A., Freund, R. & Benjamin, T.L. Separation of host range from transformation functions of the hr-t gene of polyoma virus. *Virology* **168**, 312-319 (1989).
- Gavva, N.R., Gavva, R., Ermekova, K., Sudol, M. & Shen, C.J. Interaction of WW domains with hematopoietic transcription factor p45/NF-E2 and RNA polymerase II. *J. Biol. Chem.* **272**, 24105-24108 (1997).
- Gharakhanian, E. & Kasamatsu, H. Two independent signals, a nuclear localization signal and a VP1 interactive signal, reside within the carboxy-35 amino acids of SV40 VP3. *Virology* **178**, 62-71 (1990).
- Gharakhanian, E., Takahashi, J., Clever, J. & Kasamatsu, H. *In vitro* assay for protein-protein interaction: Carboxyl terminal 40 residues of simian virus 40 structural protein VP3 contain a determinant for interaction with VP1. *Proc. Natl. Acad. Sci. USA* **85**, 6607-6611 (1988).
- Girod, A., Ried, M., Wobus, C., Lahm, H., Leike, K., Kleinschmidt, J., Deleage, G. & Hallek, M. Genetic capsid modifications allow efficient re-targeting of adeno-associated virus type 2. *Nat. Med.* **5**, 1052-1056 (1999).
- Gleiter, S., Stubenrauch, K. & Lilie, H. Changing the surface of a virus shell fusion of an enzyme to polyoma VP1. *Protein Sci.* **8**, 2562-2569 (1999).
- Glenn, G.J. & Eckhart, W. Transcriptional regulation of early response genes during polyomavirus infection. *J. Virol.* **64**, 2193-2201 (1990).
- Godbey, W., Wu, K., Hirasaki, G. & Mikos, A. Improved packing of poly(ethylenimine)/DNA complexes increases transfection efficiency. *Gene Ther.* **6**, 1380-1388 (1999).
- Goldman, E. & Benjamin, T.L. Analysis of host range of non-transforming polyomavirus mutants. *Virology* **66**, 372-384 (1975).
- Gossen, M. & Bujard, H. Tight control of gene expression in mammalian cells by tetracycline-responsive promoters. *Proc. Natl. Acad. Sci. USA* **89**, 5547-5551 (1992).

- Gottifredi, V., Peschiaroli, A., Fimia, G.M. & Maione, R. p53-independent apoptosis induced by muscle differentiation stimuli in polyomavirus large T-expressing myoblasts. *J. Cell Sci.* **112**, 2397-2407 (1999).
- Grabowski, G.A., Barton, N.W., Pastores, G., Dambrosia, J.M., Banerjee, T.K., McKee, M.A., Parker, C., Schiffmann, R., Hill, S.C. & Brady, R.O. Enzyme therapy in type 1 Gaucher disease: comparative efficacy of manose-terminated glucocerebrosidase from natural and recombinant sources. *Ann. Intern. Med.* **122**, 33-39 (1995).
- Graham, F.L. & Eb, A.J.V.D. A new technique for the assay of infectivity of human adenovirus 5 DNA. *Virology* **52**, 456-467 (1973).
- Greber, U.F., Willetts, M., Webster, P. & Helenius, A. Stepwise dismantling of adenovirus 2 during entry into cells. *Cell* **75**, 477-486 (1993).
- Griffith, G.R. & Consigli, R.A. Cross-linking of a polyomavirus attachment protein to its mouse kidney cell receptor. *J. Virol.* **58**, 773-781 (1986).
- Griffith, G.R., Marriott, S.J., Rintoul, D.A. & Consigli, R.A. Early events in polyomavirus infection: fusion of monopinocytotic vesicles containing virions with mouse kidney cell nuclei. *Virus Res.* **10**, 41-51 (1988).
- Griffiths, G., Hoflack, B., Simons, K., Mellman, I. & Kornfeld, S. The mannose 6-phosphate receptor and the biogenesis of lysosomes. *Cell* **52**, 329-341 (1988).
- Gültekin, H. & Heermann, K.H. The use of PVDF-membranes as a general blotting matrix. *Anal. Biochem.* **172**, 320-329 (1988).
- Günther, C. Herstellung und Charakterisierung eines *Delivery*-Systems für Peptide und Proteine. Diplomarbeit, Universität Halle (2000).
- Guy, J., Drabek, D. & Antoniou, M. Delivery of DNA into mammalian cells by receptor-mediated endocytosis and gene therapy. *Mol. Biotechnol.* **3**, 237-248 (1995).
- Hart, S. Use of adhesion molecules for gene delivery. *Exp. Nephrol.* **7**, 193-199 (1999).
- Hedin, U., Sjolund, M., Hultgardh-Nilsson, A. & Thyberg J. Changes in expression and organization of smooth-muscle-specific alpha-actin during fibronectin-mediated modulation of arterial smooth muscle cell phenotype. *Differentiation* **44**, 222-231 (1990).
- Herrmann, M., von der Lieth, C.W., Stehling, P., Reutter, W. & Pawlita, M. Consequences of a subtle sialic acid modification on the murine polyomavirus receptor. *J. Virol.* **8**, 5922-5931 (1997).
- Hillen, W. & Berens, C. Mechanisms underlying expression of Tn10 encoded tetracyclin resistance. *Annu. Rev. Microbiol.* **48**, 345-369 (1994).
- Hillen, W., Gatz, C., Altschmied, L., Schollmeier, K. & Meier, I. Control of expression of the Tn10-encoded tetracycline resistance genes: Equilibrium and kinetic investigations of the regulatory reactions. *J. Mol. Biol.* **169**, 707-721 (1983).
- Holldack, J., Burdach, S., Eisberg, A., Frisch, J. & Schulz, G. Biology and pharmacology of hematopoietic growth factors. *Med. Pediatr. Oncol.* **2** Suppl., 2-9 (1992).
- Holmes, A.R., Dohrman, A.F., Ellison, A.R., Goncz, K.K. & Gruenert, D.C. Intracellular compartmentalization of DNA fragments in cultures airway epithelial cells mediated by cationic lipids. *Pharm. Res.* **16**, 1020-1025 (1999).
- Holtzhauer, M. Methoden in der Proteinanalytik. Springer, Heidelberg (1996).



- Huang, S., Endo, R.I. & Nemerow, G.R. Upregulation of integrins  $\alpha_v\beta_3$  and  $\alpha_v\beta_5$  on human monocytes and T-lymphocytes facilitates adenovirus-mediated gene delivery. *J. Virol.* **69**, 2257-2263 (1995).
- Hutchinson, M.A., Hunter, T. & Eckhart, W. Characterization of T antigens in polyoma-infected and transformed cells. *Cell* **15**, 65-77 (1978).
- Izumi, M., Miyazawa, H., Kamakura, T., Yamaguchi, I., Endo, T. & Hanaoka, F. Blastocidin S-resistance gene (*bsr*): A novel selectable marker for mammalian cells. *Exp. Cell Res.* **197**, 229-233 (1991).
- Jäger, C. Herstellung und Faltung von Varianten des humanen T-Zellrezeptors CD4. Diplomarbeit, Universität Halle (1999).
- Johnson, W.C. Jr. Protein secondary structure and circular dichroism: A practical guide. *Proteins* **7**, 205-214 (1990).
- Kaplan, M.J., Armentano, D., Sparer, T.E., Wynn, S.G., Peterson, P.A., Wadsworth, S.C., Couture, K.K., Pennington, S.E., St George, J.A., Gooding, L.R., Smith, A.E. Characterization of factors involved in modulating persistence of transgene expression from recombinant adenovirus in the mouse lung. *Hum. Gene Ther.* **8**, 45-56 (1997).
- Kartenbeck, J., Stukenbrok, H. & Helenius, A. Endocytosis of simian virus 40 into the endoplasmic reticulum. *J. Cell Biol.* **109**, 2721-2729 (1989).
- Kasamatsu, H. & Nakanishi, A. How do animal DNA viruses get to the nucleus? *Annu. Rev. Microbiol.* **52**, 627-686 (1998).
- Kern, F.G. & Basilico, C. Transcription from the polyoma late promoter in cells stably transformed by chimeric plasmids. *Mol. Cell Biol.* **5**, 797-807 (1985).
- Kern, F.G., Pellegrini, S., Cowie, A. & Basilico, C. Regulation of polyomavirus late promoter activity by viral early proteins. *J. Virol.* **60**, 275-285 (1986).
- Kimura, M., Takatsuki, A. & Yamaguchi, I. Blastocidin S deaminase gene from *Aspergillus terreus* (*BSD*): A new drug resistance gene for transfection of mammalian cells. *Biochim. Biophys. Acta* **1219**, 653-659 (1994).
- Kricka, L.J. Chemiluminescent and bioluminescent techniques. *Clin. Chem.* **37**, 1472-1481 (1991).
- Krishnan, B.R., Blakesley, R. & Berg, D.E. Linear amplification DNA sequencing directly from single phage plaques and bacterial colonies. *Nucleic Acids Res.* **19**, 1153 (1991).
- Kukowska-Latallo, J.F., Bielinska, A.U., Johnson, J., Spindler, R., Tomalia, D.A., Baker, J.R. Jr. Efficient transfer of genetic material into mammalian cells using Starburst polyamidoamine dendrimers. *Proc. Natl. Acad. Sci. USA* **93**, 4897-4902 (1996).
- Kwong, P.D., Wyatt, R., Robinson, J., Sweet, R.W., Sodroski, J. & Hendrickson, W.A. Structure of an HIV gp120 envelope glycoprotein in complex with the CD4 receptor and a neutralizing human antibody. *Nature* **393**, 648-659 (1998).
- Lachmund, A. & Sachse, G. Das Prinzip der Polymerase-Kettenreaktion und ihre Anwendungsbereiche. In Gassen, H.G., Sachse, G.E. & Schulte, A, eds. PCR-Grundlagen und Anwendungen der Polymerase-Kettenreaktion, p. 1-14, Gustav Fischer Verlag, Stuttgart (1994).

- Laemmli, U.K. Cleavage of structural proteins during the assembly of head of bacteriophage T4. *Nature* **227**, 680-685 (1970).
- Lea, S., Abu-Ghazaleh, R., Blakemore, W., Curry, S., Fry, E., Jackson, T., King, A., Logan, D., Newman, J. & Stuart, D. Structural comparison of two strains of foot-and-mouth disease virus subtype 01 and a laboratory antigenic variant G67. *Structure* **3**, 571-580 (1995).
- Leavitt, A.D., Roberts, T.M. & Garcea, R.L. Polyomavirus major capsid protein VP1: purification after high level expression in *Escherichia coli*. *J. Biol. Chem.* **23**, 12803-12809 (1985).
- Lee, R.J. & Huang, L. Lipidic vector systems for gene transfer. *Crit. Rev. Ther. Drug Carrier Syst.* **14**, 173-206 (1997).
- Leopold, P.L., Ferris, B., Grinberg, I., Worgall, S., Hackett, N.R. & Crystal, R.G. Fluorescent virions: Dynamic tracking of the pathway of adenoviral gene transfer vectors in living cells. *Hum. Gene Ther.* **9**, 367-378 (1998).
- Li, M., Beard, P., Estes, P.A., Lyon, M.K. & Garcea, R.L. Intercapsomeric disulfide bonds in papillomavirus assembly and disassembly. *J. Virol.* **72**, 2160-2167 (1998).
- Li, X., Zhang, G., Ngo, N., Zhao, X., Kain, S. R. & Huang, C.-C. Deletions of the *Aequorea victoria* green fluorescent protein define the minimal domain required for fluorescence. *J. Biol. Chem.* **272**, 28545-28549 (1997).
- Liddington, R.C., Yan, Y., Moulai, J., Sahli, R., Benjamin, T.L. & Harrison, S.C. Structure of simian virus 40 at 3.8 Å resolution. *Nature* **354**, 278-284 (1991).
- Lu, P., Zhou, X.Z., Shen, M. & Lu, K.P. Function of WW domains as phosphoserine- or phosphothreonine-binding modules. *Science* **283**, 1325-1328 (1999).
- Ludlow, J.W. & Consigli, R.A. Differences in biological activity and structural protein VP1 phosphorylation of polyomavirus progeny resulting from infection of primary mouse kidney and primary mouse embryo cell cultures. *J. Virol.* **61**, 509-515 (1987a).
- Ludlow, J.W. & Consigli, R.A. Polyomavirus major capsid protein VP1 is modified by tyrosine sulfuration. *J. Virol.* **61**, 1708-1711 (1987b).
- Luo, D. & Saltzman, W.M. Synthetic DNA delivery systems. *Nat. Biotechnol.* **18**, 33-37 (2000).
- Macias, M.J., Hyvönen, M., Baraldi, E., Schultz, J., Sudol, M., Saraste, M. & Oschkinat, H. Structure of a WW domain of a kinase-associated protein complex with a proline-rich peptide. *Nature* **382**, 646-649 (1996).
- MacKay, R. & Consigli, R.A. Early events in polyomavirus infection: attachment, penetration and nuclear entry. *J. Virol.* **19**, 620-636 (1976).
- Mahato, R.I., Takakura, Y & Hashida, M. Nonviral vectors for in vivo gene therapy: physicochemical and pharmacokinetic considerations. *Crit. Rev. Drug Carrier Syst.* **14**, 133-172 (1997).
- Main, A.L., Harvey, T.S., Baron, M., Boyd, J. & Campbell, I.D. The three-dimensional structure of the tenth type III module of fibronectin: an insight into RGD-mediated interactions. *Cell* **71**, 671-678 (1992).
- Main, J.H. & Dawe, C.J. Tumor induction in transplanted tooth buds infected with polyomavirus. *J. Natl. Cancer Inst.* **36**, 1121-1136 (1966).

- Marin, M., Noel, D., Valsesia-Wittman, S., Brockly, F., Etienne-Julan, M., Russell, S., Cosset, F.L. & Piechaczyk, M. Targeted infection of human cells via major histocompatibility complex class I molecules by Moloney murine leukemia virus-derived viruses displaying single-chain antibody fragment-envelope fusion proteins. *J. Virol.* **70**, 2957-2962 (1996).
- Marriot, S.J., Griffith, G.R. & Consigli, R.A. Octyl- $\beta$ -D-glucopyranoside extracts polyomavirusreceptor moieties from the surfaces of mouse kidney cells. *J. Virol.* **61**, 375-382 (1987a).
- Marriot, S.J., Roeder, D.J. & Consigli, R.A. Anti-idiotypic antibodies to a polyomavirus monoclonal antibody recognize cell surface components of mouse kidney cells and prevent polyomavirus infection. *J. Virol.* **61**, 2747-2753 (1987b).
- Matsui, H. Johnson, L.G., Randell, S.H. & Boucher, R.C. Loss of binding and entry of liposome-DNA complexes decreases transfection efficiency in differentiated airway epithelial cells. *J. Biol. Chem.* **272**, 1117-1126 (1997).
- Matusumoto, B. Cell biological applications of confocal microscopy. *Methods in cell biology*, Vol. 38, Academic Press (1993).
- Matz, M.V., Fradkov, A.F., Labas, Y.A., Savitsky, A.P., Zaraisky, A.G., Markelov, M.L. & Lukyanov, S.A. Fluorescent proteins from nonbioluminescent Anthozoa species. *Nat. Biotechnol.* **17**, 969-973 (1999).
- Messerschmidt, A., Disela, C., Dilworth, S., Marti, A.G. & Ballmer-Hofer, K. Polyomavirus middle T-antigen lacking a membrane anchor sequence accumulates in the nucleus. *J. Gen. Virol.* **77**, 17-26 (1996).
- Metcalf, D. The colony stimulating factors. Discovery, development, and clinical applications. *Cancer* **65**, 2185-2195 (1990).
- Modrow, S. & Falke, D. Molekulare Virologie, p. 358-391, Spektrum Akademischer Verlag, Heidelberg (1997).
- Montecucco, C., Papini, E. & Schiavo, G. Bacterial protein toxins penetrate cells via a four-step mechanism. *FEBS Let.* **346**, 92-98 (1994).
- Moore, J.P. Coreceptors: implications for HIV pathogenesis and therapy. *Science* **276**, 51-52 (1997).
- Moreland, R.B. & Garcea, R.L. Characterization of a nuclear localization sequence in the polyomavirus capsid protein VP1. *Virology* **18**, 513-518 (1991).
- Morikawa Y., Goto T. & Sano K. *In vitro* assembly of human immunodeficiency virus type 1 Gag protein. *J. Biol. Chem.* **274**, 27997-28002 (1999).
- Mullis, K.B., Falcoona, F., Scharf, S.J., Saiki, R.K., Horn, G.T. & Ehrlich, H.A. Specific enzymatic amplification of DNA *in vitro*: The polymerase chain reaction. *Cold Spring Harbor Symp. Quant. Biol.* **51**, 263-273 (1986).
- Mulsant, P., Tiraby, G., Kallerhoff, J. & Perret, J. Phleomycin resistance as a dominant selectable marker in CHO cells. *Somat. Cell Mol. Genet.* **14**, 243-252 (1988).
- Murphy, F.A. & Kingsbury, D.W. Virus taxonomy, p. 9-33. In Fields, B.N. and Knipe, D.M. eds., *Fundamental Virology* 2nd ed. 1991, Raven Press, New York (1991).
- Murphy, M.J., Zhou, S., Giese, K., Williams, L.T., Escobedo, J.A. & Dwarki, V.J. Long-term correction of obesity and diabetes in genetically obese mice by a single

intramuscular injection of recombinant adeno-associated virus encoding mouse leptin. *Proc. Natl. Acad. Sci. USA* **94**, 13921-13926 (1997).

Naldini, L., Blömer, U., Gage, F.H., Trono, D. & Verma, M.I. Efficient transfer, integration, and sustained long-term expression of the transgene in adult rat brains injected with a lentiviral vector. *Proc. Natl. Acad. Sci. USA* **93**, 11382-11388 (1996).

Nelson, J.A., Reynolds-Kohler, C. & Smith, B.A. Negative and positive regulation by a short segment in the 5'-flanking region of the human cytomegalovirus major immediate-early gene. *Mol. Cell Biol.* **7**, 4125-4129 (1987).

Nibert, M.L., Schiff, L.A. & Fields, B.N. Mammalian reoviruses contain a myristylated structural protein. *J. Virol.* **65**, 2372-2380 (1991).

Niederau, C., von Dahl, S. & Haussinger, D. First long-term results of imiglucerase therapy of type 1 Gaucher disease. *Eur. J. Med. Res.* **3**, 25-30 (1998).

Norkin, L.C. & Anderson, H.A. Multiple stages of virus-receptor interactions as shown by simian virus 40. p. 159-167. In Kahane, I. & Ofek, I., eds., *Toward anti-adhesion therapy for microbial diseases*. Plenum, New York (1996).

Ohkuma, S. & Poole, B. Fluorescence probe measurement of the intralysosomal pH in living cells and the perturbation of pH by various agents. *Proc. Natl. Acad. Sci. USA* **75**, 3327-3331 (1978).

Ohno, K., Sawei, K., Iijima, Y., Levin, B. & Meruelo, D. Cell-specific targeting of Sindbis virus vectors displaying IgG-binding domains of protein A. *Nat. Biotechnol.* **15**, 763-767 (1997).

Oppenheim, A., Sandalon, Z., Peleg, A., Shaul, O., Nicolis, S. & Ottolenghi, S. A cis-acting DNA signal for Encapsidation of simian virus 40. *J. Virol.* **66**, 5320-5328 (1992).

Oppenheim, A., Siani, M., Sandalon, Z. & Mengeritsky, G. Dynamics of the nucleoprotein structure of simian virus 40 regulatory region during viral development. *J. Mol. Biol.* **238**, 501-513 (1994).

Ormerod, M.G. An introduction to fluorescence technology. Ormerod, M.G. ed., *Flow Cytometry*, 2<sup>nd</sup> ed. IRL Press, Oxford (1994).

Ormö, M., Cubitt, A. B., Kallio, K., Gross, L. A., Tsien, R. Y. & Remington, S. J. Crystal structure of the *Aequorea victoria* green fluorescent protein. *Science* **273**, 1392-1395 (1996).

Orth, G., Jablonska, S., Breitburd, F., Favre, M. & Croissant, O. The human papillomaviruses. *Bull. Cancer (Paris)* **65**, 151-164 (1978).

Pace, C.N., Shirley, B.A. & Thomson, J.A. How to measure and predict the molar absorption coefficient of a protein. *Protein Science* **4**, 2411-2423 (1995).

Paganelli, G., Grana, C., Chinol, M., Cremonesi, M., De Cicco, C., De Braud, F., Robertson, C., Zurrida, S., Casadio, C., Zoboli, S., Siccaldi, A.G. & Veronesi, U. Antibody-guided three-step therapy for high grade glioma with yttrium-90 biotin. *Eur. J. Nucl. Med.* **26**, 348-357 (1999).

Pallas, D.C., Shahrik, L.K., Martin, B.L., Jaspers, S., Miller, T.B., Brautigan, T.L. & Roberts, T.M. Polyoma small and middle T-antigens and SV40 small T-antigen form stable complexes with protein phosphatase 2A. *Cell* **60**, 167-176 (1990).

- Park, E., Starzyk, R.M., McGrath, J.P., Lee, T., George, J., Schutz, A.J., Lynch, P. & Putney, S.D. Production and characterization of fusion proteins containing transferrin and nerve growth factor. *J. Drug target.* **6**, 53-64 (1998).
- Parthier, C. Untersuchungen an der murinen Muskelzelllinie C2C12 mittels Serial Analysis of Gene Expression (SAGE), Diplomarbeit, Universität Halle (1998).
- Parton, R.G. & Lindsay, M. Exploitation of major histocompatibility complex class I molecules and caveolae by simian virus 40. *Immunol. Rev.* **168**, 23-31 (1999).
- Pasqualini, R., Koivunen, E. & Ruoslahti, E. Alpha v integrins as receptors for tumor targeting by circulating ligands. *Nat. Biotechnol.* **15**, 542-546 (1997).
- Paul, R.W., Weisser, K.E., Loomis, A., Sloane, D.L., LaFoe, D., Atkinson, E.M., Overell, R.W. Gene transfer using a novel fusion protein, GAL4/Invasin. *Hum. Gene Ther.* **8**, 1253-1262 (1997).
- Pawson, T. & Scott, J.D. Signaling through scaffold, anchoring, and adaptor proteins. *Science* **278**, 2075-2080 (1997).
- Peng, K.W. & Russel, S.J. Viral vector targeting. *Curr. Opinion Biotechnol.* **10**, 454-457 (1999).
- Perez, P., Tiraby, G., Kallerhoff, J. & Perret, J. Phleomycin resistance as a dominant selectable marker for plant cell transformation. *Plant Mol. Biol.* **13**, 365-373 (1989).
- Perler, F.B., Davis, E.O., Dean, G.E., Gimble, F.S., Jack, W.E., Neff, N., Noren, C.J., Thorner, J. & Belfort, M. Protein splicing elements: inteins and exteins - a definition of terms and recommended nomenclature. *Nucleic Acids Res.* **22**, 1125-1127 (1994).
- Perler, F.B., Olsen, G.J. & Adam, E. Compilation and analysis of intein sequences. *Nucl. Acids Res.* **25**, 1087-1093 (1997).
- Petsko, G.A. For medical purposes. *Nature* **384** Suppl., 7-9 (1996).
- Petterson, E., Lünig, B., Mickos, H. & Heinegård, D. Synthesis, NMR and function of an O-phosphorylated peptide, comprising the RGD-adhesion sequence of osteopontin. *Acta Chem. Scand.* **45**, 604-608 (1991).
- Pfeffer, S.R. Targeting of proteins to the lysosome. *Curr. Top. Microbiol. Immunol.* **170**, 43-63 (1991).
- Phelan, A., Elliott, G. & O'Hare, P. Intercellular delivery of functional p53 by the herpesvirus protein VP22. *Nat. Biotechnol.* **16**, 440-443 (1998).
- Philipson, L., Lonberg-Holm, K. & Pettersson, U. Virus-receptor interaction in an adenovirus system. *J. Virol.* **2**, 1064-1075 (1968).
- Pho, M.T., Ashok, A. & Atwood, W.J. JC virus enters human glial cells by clathrin-dependent receptor-mediated endocytosis. *J. Virol.* **74**, 2288-2292 (2000).
- Pierschbacher, M.D. & Ruoslahti, E. The cell attachment activity of fibronectin can be duplicated by small fragments of the molecule. *Nature* **309**, 30-33 (1984).
- Plank, C., Oberhauser, B., Mechtler, K., Koch, C. & Wagner, E. The influence of endosome disruptive peptides on gene transfer using synthetic virus-like gene transfer systems. *J. Biol. Chem.* **269**, 12918-12924 (1994).
- Ponder, B.A.J., Robbins, A.K. & Crawford, L.V. Phosphorylation of polyoma and SV40 virus proteins. *J. Gen. Virol.* **37**, 75-83 (1977).

- Pouton, C.W. & Seymour, L.W. Key issues in non-viral gene delivery. *Adv. Drug Del. Rev.* **34**, 3-19 (1998).
- Qiu, P., Ziegelhoffer, P., Sun, J. & Yang, N.S. Gene gun delivery of mRNA in situ results in efficient transgene expression and genetic immunization. *Gene Ther.* **3**, 262-268 (1996).
- Rabinowitz, J.E. & Samulski, J. Adeno-associated virus expression systems for gene transfer. *Curr. Opinion Biotechnol.* **9**, 470-475 (1998).
- Rassoulzadegan, M., Cowie, A., Carr, A., Glaichenhaus, N., Kamen, R. & Cuzin, F. The roles of individual polyomavirus early proteins in oncogenic transformation. *Nature* **300**, 713-718 (1982).
- Rasty, S., Dhruva, B.R., Schiltz, R.L., Shih, D.S., Issel, C.J. & Montelaro, R.C. Proviral DNA integration and transcriptional patterns of equine anemia virus during persistent and cytopathic infections. *J. Virol.* **64**, 86-95 (1990).
- Ren, R., Mayer, B.J., Cichetti, P. & Baltimore, D. Identification of a ten-aminoacid proline-rich SH3 binding site. *Science* **259**, 1157-1161 (1993).
- Reynolds, J.A. & Tanford, C. Binding of dodecyl sulfate to proteins at high binding ratios. Possible implications for the state of proteins in biological membranes. *Proc. Natl. Acad. Sci. USA* **66**, 1002-1007 (1970).
- Reynolds, P.N., Dimitriev, I. & Curiel, D.T. Insertion of an RGD motif into the HI loop of adenovirus fiber protein alters the distribution of transgene expression of the systemically administered vector. *Gene Ther.* **6**, 1336-1339 (1999).
- Roivainen, M., Piirainen, L., Hovi, T., Virtanen, I., Riikonen, T., Heino, J. & Hyypia T. Entry of coxsackie virus A9 into host-cells: specific interactions with  $\alpha_v\beta_3$  integrin, the vitronectin receptor. *Virology* **203**, 357-365 (1994).
- Rolland, A.P. From genes to gene medicines: recent advances in nonviral gene delivery. *Crit. Rev. Ther. Drug Carrier Syst.* **15**, 143-198 (1998).
- Ross, G.F., Bruno, M.D., Uyeda, M., Suzuki, K., Nagao, K., Whitsett, J.A., Korfhagen, T.R. Enhanced reporter gene expression in cells transfected in the presence of DMI-2, an acidic nuclease inhibitor. *Gene Ther.* **5**, 1244-1250 (1998).
- Rossjohn, J., Feil, S.C., McKinstry, W.J., Tweten, R.K. & Parker, M.W. Structure of a cholesterol-binding, thiol-activated cytolysin and a model of its membrane form. *Cell* **89**, 685-692 (1997).
- Rothenberger, S., Iacopetta, B.J. & Kühn, L.C. Endocytosis of the transferrin receptor requires the cytoplasmic domain but not its phosphorylation site. *Cell* **49**, 423-431 (1987).
- Rowe, W.P., Hartley, J.W., Estes, J.D. & Huebner, R.J. Studies of mouse polyomavirus infection. Procedures for detection and quantitation of virus. *J. Exp. Med.* **109**, 379-391 (1959).
- Ruoslahti, E. RGD and other recognition sequences for integrins. *Annu. Rev. Cell Dev. Biol.* **12**, 697-715 (1996).
- Russel, C.S. & Clarke, L.A. Recombinant proteins for genetic disease. *Clin. Genet.* **55**, 389-394 (1999).

- Sahli, R., Freund, R., Dubensky, T., Garcea, R., Bronson, R. & Benjamin, T.L. Defect in entry and altered pathogenicity of a polyomavirus mutant blocked in VP2 myristylation. *Virology* **192**, 142-153 (1993).
- Saiki, R.K., Gelfand, D.H., Stoffel, S., Scharf, S.J., Higuchi, R., Horn, G.T., Mullis, K.B. & Ehrlich, H.A. Primer-directed enzymatic amplification of DNA with a thermostable DNA polymerase. *Science* **239**, 487-491 (1988).
- Salunke, D.M., Caspar, D.L. & Garcea, R.L. Polymorphism in the assembly of polyomavirus capsid protein VP1. *Biophys J.* **56**, 887-900 (1989).
- Salunke, D.M., Caspar, D.L.D. & Garcea, R.L. Self-assembly of purified polyomavirus capsid protein VP1. *Cell* **46**, 895-904 (1986).
- Sandalon, Z. & Oppenheim, A. Self-assembly and protein-protein interactions between the SV40 capsid proteins produced in insect cells. *Virology* **237**, 414-421 (1997).
- Sandalon, Z., Dalyot-Herman, N., Oppenheim, A.B. & Oppenheim, A. *In vitro* assembly of SV40 virions and pseudovirions: vector development for gene therapy. *Hum. Gene Ther.* **8**, 843-849 (1997).
- Sanger, F., Nickler, F. & Coulson, A.R. DNA sequencing with chain-terminating inhibitors. *Proc. Natl. Acad. Sci. USA* **74**, 5463-5467 (1977).
- Schafer, W., Stroh, A., Berghofer, S., Seiler, J., Vey, M., Kruse, M.L., Kern, H.F., Klenk, H.D. & Grten, W. Two independent targeting signals in the cytoplasmic domain determine trans-Golgi network localization and endosomal trafficking of the proprotein convertase furin. *EMBO J.* **14**, 2424-2435 (1995).
- Schaffer, D.V. & Lauffenburger, D.A. Optimization of cell surface binding enhances efficiency and specificity of molecular conjugate gene delivery. *J. Biol. Chem.* **273**, 28004-28009 (1998).
- Schaffer, D.V., Fidelman, N.A., Dan, N. & Lauffenburger, D.A. Vector unpacking as a potential barrier for receptor-mediated polyplex gene delivery. *Biotechnol Bioeng.* **67**, 598-606. (2000).
- Schmid, F.X. Spectral methods of characterizing protein conformation and conformational changes. In Creighton, T.E., ed. Protein structure, a practical approach. Oxford University Press (1989).
- Schmidt, U., Günther, C., Parthier, C. & Böhm, G. Methode zur Verbindung molekularer Substanzen. Deutsche Patentanmeldung #199 52 956.6. (1999b).
- Schmidt, U., Kenklies, J., Rudolph, R. & Böhm, G. Site-specific fluorescence labelling of recombinant polyomavirus-like particles. *Biol. Chem.* **380**, 3397-401 (1999).
- Schmidt, U., Rudolph, R. & Böhm, G. Mechanism of assembly of recombinant murine polyomavirus-like particles. *J. Virol.* **74**, 1658-1662 (2000).
- Schulte, A. PCR mit RNA. In Gassen, H.G., Sachse, G.E. & Schulte, A, eds. PCR-Grundlagen und Anwendungen der Polymerase-Kettenreaktion, p. 35-68, Gustav Fischer Verlag, Stuttgart (1994).
- Schwarze, S.R., Ho, A., Vocero-Akbani, A. & Dowdy, S.F. *In vivo* protein transduction: delivery of a biologically active protein into the mouse. *Science* **285**, 1569-1572 (1999).
- Sclimenti, C.R. & Calos, M.P. Epstein-Barr virus vectors for gene expression and transfer. *Curr. Opin Biotechnol.* **9**, 476-479 (1998).

- Sells, M.A., Li, J. & Chernoff, J. Delivery of protein into cells using polycationic liposomes. *Biotechniques* **19**, 72-76 (1995).
- Slilaty, S.N. & Aposhian, H.V. Gene transfer by polyomavirus-like particles assembled in a cell free system. *Science* **22**, 725-727 (1983).
- Slilaty, S.N., Berns, K.I. & Aposhian, H.V. Polyoma-like particle: Characterization of DNA encapsidated in vitro by polyoma empty capsids. *J. Biol. Chem.* **257**, 6571-6575 (1982).
- Soeda, E., Arrand, J.R. & Griffin, B.E. Polyoma virus. The early region and its T-antigens. *Nucleic Acids Res.* **7**, 839-857 (1979).
- Soeda, E., Arrand, J.R. Smolar, N. & Griffin, B.E. Sequence from early region of polyomavirus DNA containing viral replication origin and encoding small, middle and (part of) large T-antigens. *Cell* **17**, 357-370 (1979).
- Soeda, E., Arrand, J.R., Smolar, N., Walsh, J.E. & Griffin, B.E. Coding potential and regulatory signals of the polyomavirus genome. *Nature* **283**, 445-453 (1980).
- Staub, O., Dho, S., Henry, P., Correa, UJ., Ishikawa, T., McGlade, J. & Rotin, D. WW domains of Nedd4 bind to the proline-rich PY motifs in the epithelial Na<sup>+</sup> channel deleted in Liddle's syndrome. *EMBO J.* **15**, 2371-2380 (1996).
- Stehle, T. & Harrison, S.C. Crystal structures of murine polyomavirus in complex with straight-chain and branched-chain sialyloligosaccharide receptor fragments. *Structure* **4**, 183-194 (1996).
- Stehle, T. & Harrison, S.C. High-resolution structure of a polyomavirus VP1-oligosaccharide complex: implications for assembly and receptor binding. *EMBO J.* **16**, 5139-5148 (1997).
- Stehle, T., Gamblin, S.J., Yan, Y. & Harrison, S.C. The structure of simian virus 40 refined at 3.1 Å resolution. *Structure* **4**, 165-182 (1996).
- Stehle, T., Yan, Y., Benjamin, T.L. & Harrison, S.C. Structure of murine polyomavirus complexed with an oligosaccharide receptor fragment. *Nature* **369**, 160-163 (1994).
- Strayer, D.S. Gene therapy using SV40-derived vectors: what does the future hold? *J. Cell Physiol.* **181**, 375-384 (1999).
- Strayer, D.S. SV40 as an effective gene transfer vector in vivo. *J. Biol. Chem.* **271**, 24741-24746 (1996).
- Streuli, C.H. & Griffin, B. Myristic acid is coupled to a structural protein of polyomavirus and SV40. *Nature* **326**, 619-622 (1987).
- Stubenrauch, K., Bachmann, A., Rudolph, R. & Lilie, H. Purification of a viral coat protein by an engineered polyionic sequence. *J. Chromatogr. B. Biomed. Sci. App.* **737**, 77-84 (2000).
- Stubenrauch, K. Reinigung und Charakterisierung des rekombinanten Polyomahüllproteins VP1. Diplomarbeit, Universität Halle (1996).
- Studier, F.W., Rosenberg, A.H., Dunn, J.J. & Dubendorff, J.W. Use of T7 RNA polymerase to direct expression of cloned genes. *Methods Enzymol.* **185**, 60-89 (1990).
- Sudol, M., Bork, P., Einbond, A., Kastury, K., Druck, T., Negrini, M., Huebner, K. & Lehman, D. Characterization of the mammalian YAP (Yes-associated protein) gene and its role in defining a novel protein module, the WW domain. *J. Biol. Chem.* **270**, 14733-14741 (1995).



- Taichman, L.B., Breitburd, F., Croissant, O. & Orth, G. The search for a culture system for papillomavirus. *J. Invest. Dermatol.* **83** Suppl., 2-6 (1984).
- Takeuchi, S., Hirayama, k., Ueda, K., Sakai, H. & Yonehara, H. Blastidicin S, a new antibiotic. *J. Antibiotics* **11** series A, 1-5 (1958).
- Tang, M.X., Redemann, C.T. & Szoka, Jr F.C. In vitro gene delivery by degraded polyamidoamine dendrimers. *Bioconjugate Chem.* **7**, 703-714 (1996).
- Templeton, N.S. & Lasic, D.D. New directions in liposome gene delivery. *Mol. Biotechnol.* **11**, 175-180 (1999).
- Thorstensen, K. & Romslo, I. Uptake of iron from transferrin by isolated rat hepatocytes. *J. Biol. Chem.* **263**, 8844-8850 (1988).
- Tilney, L.G. & Portnoy, D.A. Actin filaments and the growth, movement, and spread of the intracellular bacterial parasite, *Listeria monocytogenes*. *J. Cell Biol.* **109**, 1597-1608 (1989).
- Toone, E.J. Structure and energetics of of protein-carbohydrate complexes. *Curr. Opin. Struct. Biol.* **4**, 719-728 (1994).
- Urcroft, P. Simian virus 40 infection is not mediated by lysosomal activation. *J. Gen. Virol.* **68**, 2477-2480 (1987).
- Vaheri, A. & Pagano, J.S. Infectious poliovirus RNA: a sensitive method of assay. *Virology* **27**, 434-436 (1965).
- Verma, M.I. & Somia, N. Gene therapy-promises, problems and prospects. *Nature* **389**, 239-242 (1997).
- Vigne, E., Mahfouz, I., Dedieu, J.F., Brie, A., Perricaudet, M. & Yeh, P. RGD inclusion in the hexon monomer provides adenovirus type 5-based vectors with a fiber knob-independent pathway for infection. *J. Virol.* **73**, 5156-5161 (1999).
- Villas, B.H. Flow cytometry: an overview. *Cell Vis.* **5**, 56-61 (1998).
- Wadman, M. NIH panel to limit secrecy on gene therapy. *Nature* **402**, 6 (1999).
- Wagner, E., Plank, C., Zatloukal, K., Cotten, M. & Birnstiel, M.L. Influenzavirus hemagglutinin HA-2 N-terminal fusigenic peptides augment gene transfer by transferrin-polylysine-DNA-complexes: toward a synthetic virus-like gene-transfer vehicle. *Proc. Natl. Acad. Sci. USA* **89**, 7934-7938 (1992).
- Waldmann, L. Spektroskopische Charakterisierung von Proteinen. Diplomarbeit, Universität Halle (1998).
- Walter, G., Ruediger, R., Slaughter, C. & Mumby, M. Association of protein phosphatase 2A with polyomavirus medium tumor antigen. *Proc. Natl. Acad. Sci. USA* **87**, 2521-2525 (1990).
- Wang, M., Doyle, M.V. & Mark, D.F. Quantitation of mRNA by the polymerase chain reaction. *Proc. Natl. Acad. Sci. USA* **86**, 9717-9721 (1989).
- Watowich, S.J., Skehel, J.J. & Wiley, D.C. Crystal structures of influenza virus hemagglutinin in complex with high-affinity receptor analogs. *Structure* **2**, 719-731 (1994).
- Weis, W.I. & Drickamer, K. Structural basis of lectin-carbohydrate recognition. *Annu. Rev. Biochem.* **65**, 441-473 (1996).

- Wharton, S.A., Martin, S.R., Ruigrok, R.W.H., Skehel, J.J. & Wiley, D.C. Membrane fusion by peptide analogues of influenza virus haemagglutinin. *J. Gen. Virol.* **69**, 1847-1857 (1988).
- Wickham, T.J. Short-order Sindbis vector targeting. *Nat. Biotechnol.* **15**, 717 (1997).
- Wickham, T.J., Filardo, E.J., Cheresh, D.A. & Nemerow, G.R. Integrin  $\alpha_v\beta_5$  selectively promotes adenovirus mediated cell membrane permeabilization. *J. Cell Biol.* **127**, 257-264 (1994).
- Wickham, T.J., Roelvink, P.W., Brough, D.E. & Kovesdi, I. Adenovirus targeted to heparan-containing receptors increases its gene delivery efficiency to multiple cell types. *Nat. Biotechnol.* **14**, 1570-1573 (1996).
- Wickham, T.J., Segal, D.M., Roelvink, P.W., Carrion, M.E., Lizonova, A., Lee, G.M. & Kovesdi, I. Targeted adenovirus gene transfer to endothelial and smooth muscle cells by using bispecific antibodies. *J. Virol.* **70**, 6831-6838 (1996b).
- Wickham, T.J., Tzeng, E., Shears II, L.L., Roelvink, P.W., Li, Y., Lee, G.M., Brough, D.E., Lizonova, A. & Kovesdi, I. Increased *in vitro* and *in vivo* gene transfer by adenovirus vectors containing chimeric fiber proteins. *J. Virol.* **71**, 8221-8229 (1997).
- Wiley, D.C. & Skehel, J.J. The structure and function of the hemagglutinin membrane glycoprotein of influenza virus. *Annu. Rev. Biochem.* **56**, 365-394 (1987).
- Yaffe, D. & Saxel, O. Serial passaging and differentiation of myogenic cells isolated from dystrophic mouse muscle. *Nature* **270**, 725-727 (1977).
- Yamaguchi, H., Yamamoto, C. & Tanaka, N. Inhibition of protein synthesis by Blastocidin S. First studies with cell-free systems from bacterial and mammalian cells. *J. Biochem. (Tokyo)* **57**, 667-677 (1965).
- Yamashiro, D.J., Tycko, B., Fluss, S.R. & Maxfield, F.R. Segregation of transferrin to a mildly acidic (pH 6.5) para-golgi compartment in the recycling pathway. *Cell* **37**, 789-800 (1984).
- Yan, X., Grace, W.K., Yoshida, T.M., Habbersett, R.C., Velappan, N., Jett, J.H., Keller, R.A. & Marrone, B.L. Staining dyes for DNA fragment sizing by flow cytometry. *Anal. Chem.* **71**, 5470-5480 (1999).
- Yao, C.C., Ziober, B.L., Sutherland, A.E., Mendrick, D.L. & Kramer, R.H. Laminins promote the locomotion of skeletal myoblasts via the  $\alpha_7$  integrin receptor. *J. Cell Sci.* **109**, 3139-3150 (1996).
- Yao, F., Svensjö, T., Winkler, T., Lu, M., Eriksson, C. & Eriksson, E. Tetracycline repressor, tetR, rather than the tetR-mammalian cell transcription factor fusion derivatives, regulates inducible gene expression in mammalian cells. *Hum. Gene Ther.* **9**, 1939-1950 (1998).
- Zauner, W., Ogris, M. & Wagner, E. Polylysine-based transfection systems using receptor-mediated delivery. *Adv. Drug Del. Rev.* **30**, 97-113 (1998).
- Zhang W., Carmichael J., Ferguson J., Inglis S., Ashrafian H. & Stanley M. Expression of human papillomavirus type 16 L1 protein in *Escherichia coli*: denaturation, renaturation, and self-assembly of virus-like particles *in vitro*. *Virology* **243**, 423-431 (1998).
- Zhou J., Stenzel D.J., Sun X.Y. & Frazer I.H. Synthesis and assembly of infectious bovine papillomavirus particles *in vitro*. *J. Gen. Virol.* **74**, 763-768 (1993).

Zhou, Z. & Muzycka, N. In vitro packaging of adeno-associated virus DNA. *J. Virol.* **72**, 3241-3247 (1998).

Zullo, J., Stiles, C.D. & Garcea, R.L. Regulation of *c-myc* and *c-fos* mRNA levels by polyomavirus: distinct roles for the capsid protein VP1 and the viral early proteins. *Proc. Natl. Acad. Sci. USA* **84**, 1210-1214 (1987).