

7 Literaturverzeichnis

- Agarkova,I. and Perriard,J.C. (2005). The M-band: an elastic web that crosslinks thick filaments in the center of the sarcomere. *Trends Cell Biol.*
- Allard,L., Burkhard,P.R., Lescuyer,P., Burgess,J.A., Walter,N., Hochstrasser,D.F., and Sanchez,J.C. (2005). PARK7 and nucleoside diphosphate kinase A as plasma markers for the early diagnosis of stroke. *Clin. Chem.* *51*, 2043-2051.
- Allen,D.L. and Unterman,T.G. (2006). Regulation of Myostatin Expression and Myoblast Differentiation by FoxO and SMAD Transcription Factors. *Am. J. Physiol Cell Physiol.*
- Antoons,G., Vangheluwe,P., Volders,P.G., Bito,V., Holemans,P., Ceci,M., Wuytack,F., Caroni,P., Mubagwa,K., and Sipido,K.R. (2006). Increased phospholamban phosphorylation limits the force-frequency response in the MLP-/- mouse with heart failure. *J. Mol. Cell Cardiol.* *40*, 350-360.
- Antoons,G., Ver,H.M., Raeymaekers,L., Vangheluwe,P., Wuytack,F., and Sipido,K.R. (2003). Ca²⁺ uptake by the sarcoplasmic reticulum in ventricular myocytes of the SERCA2b/b mouse is impaired at higher Ca²⁺ loads only. *Circ. Res.* *92*, 881-887.
- Arber,S., Hunter,J.J., Ross,J., Jr., Hongo,M., Sansig,G., Borg,J., Perriard,J.C., Chien,K.R., and Caroni,P. (1997). MLP-deficient mice exhibit a disruption of cardiac cytoarchitectural organization, dilated cardiomyopathy, and heart failure. *Cell* *88*, 393-403.
- Arya,R., Kedar,V., Hwang,J.R., McDonough,H., Li,H.H., Taylor,J., and Patterson,C. (2004). Muscle ring finger protein-1 inhibits PKC{epsilon} activation and prevents cardiomyocyte hypertrophy. *J Cell Biol.*
- Ayme-Southgate,A., Southgate,R., Saide,J., Benian,G.M., and Pardue,M.L. (1995). Both synchronous and asynchronous muscle isoforms of projectin (the Drosophila bent locus product) contain functional kinase domains. *J Cell Biol.* *128*, 393-403.
- Bagnato,P., Barone,V., Giacomello,E., Rossi,D., and Sorrentino,V. (2003). Binding of an ankyrin-1 isoform to obscurin suggests a molecular link between the sarcoplasmic reticulum and myofibrils in striated muscles. *J. Cell Biol.* *160*, 245-253.
- Bahler,M., Wallimann,T., and Eppenberger,H.M. (1985). Myofibrillar M-band proteins represent constituents of native thick filaments, frayed filaments and bare zone assemblages. *J. Muscle Res. Cell Motil.* *6*, 783-800.
- Bang,M.L., Centner,T., Fornoff,F., Geach,A.J., Gotthardt,M., McNabb,M., Witt,C.C., Labeit,D., Gregorio,C.C., Granzier,H., and Labeit,S. (2001a). The complete gene sequence of titin, expression of an unusual approximately 700-kDa titin isoform, and its interaction with obscurin identify a novel Z-line to I-band linking system. *Circ Res* *89*, 1065-1072.
- Bang,M.L., Mudry,R.E., McElhinny,A.S., Trombitas,K., Geach,A.J., Yamasaki,R., Sorimachi,H., Granzier,H.L., Gregorio,C.C., and Labeit,S. (2001b). Myopalladin, a novel 145-kilodalton sarcomeric protein with multiple roles in z-disc and i-band protein assemblies. *J Cell Biol* *153*, 413-428.

Literaturverzeichnis

- Barash,I.A., Mathew,L., Lahey,M., Greaser,M.L., and Lieber,R.L. (2005). Muscle LIM protein plays both structural and functional roles in skeletal muscle. *Am. J. Physiol Cell Physiol* **289**, C1312-C1320.
- Baumeister,A., Arber,S., and Caroni,P. (1997). Accumulation of muscle ankyrin repeat protein transcript reveals local activation of primary myotube endcompartments during muscle morphogenesis. *J. Cell Biol.* **139**, 1231-1242.
- Berger,M., Hagg,S.A., Goodman,M.N., and Ruderman,N.B. (1976). Glucose metabolism in perfused skeletal muscle. Effects of starvation, diabetes, fatty acids, acetoacetate, insulin and exercise on glucose uptake and disposition. *Biochem. J.* **158**, 191-202.
- Bernhardt,J., Buttner,K., Scharf,C., and Hecker,M. (1999). Dual channel imaging of two-dimensional electropherograms in *Bacillus subtilis*. *Electrophoresis* **20**, 2225-2240.
- Bloom,S.E. and Goodpasture,C. (1976). An improved technique for selective silver staining of nucleolar organizer regions in human chromosomes. *Hum. Genet.* **34**, 199-206.
- Bodine,S.C., Latres,E., Baumhueter,S., Lai,V.K., Nunez,L., Clarke,B.A., Poueymirou,W.T., Panaro,F.J., Na,E., Dharmarajan,K., Pan,Z.Q., Valenzuela,D.M., DeChiara,T.M., Stitt,T.N., Yancopoulos,G.D., and Glass,D.J. (2001). Identification of ubiquitin ligases required for skeletal muscle atrophy. *Science* **294**, 1704-1708.
- Boelens,W.C., Croes,Y., and de Jong,W.W. (2001). Interaction between alphaB-crystallin and the human 20S proteasomal subunit C8/alpha7. *Biochim. Biophys. Acta* **1544**, 311-319.
- Bogoyevitch,M.A., Parker,P.J., and Sugden,P.H. (1993). Characterization of protein kinase C isotype expression in adult rat heart. Protein kinase C-epsilon is a major isotype present, and it is activated by phorbol esters, epinephrine, and endothelin. *Circ. Res.* **72**, 757-767.
- Bolivar,F. and Backman,K. (1979). Plasmids of *Escherichia coli* as cloning vectors. *Methods Enzymol.* **68**, 245-267.
- Bonifati,V., Rizzu,P., van Baren,M.J., Schaap,O., Breedveld,G.J., Krieger,E., Dekker,M.C., Squitieri,F., Ibanez,P., Joosse,M., van Dongen,J.W., Vanacore,N., van Swieten,J.C., Brice,A., Meco,G., van Duijn,C.M., Oostra,B.A., and Heutink,P. (2003). Mutations in the DJ-1 gene associated with autosomal recessive early-onset parkinsonism. *Science* **299**, 256-259.
- Bonow,R.O. (1996). New insights into the cardiac natriuretic peptides. *Circulation* **93**, 1946-1950.
- Bowie,A. and O'Neill,L.A. (2000). Oxidative stress and nuclear factor-kappaB activation: a reassessment of the evidence in the light of recent discoveries. *Biochem. Pharmacol.* **59**, 13-23.
- Boyer,H.W. and Roulland-Dussoix,D. (1969). A complementation analysis of the restriction and modification of DNA in *Escherichia coli*. *J. Mol. Biol.* **41**, 459-472.
- Brunet,A., Bonni,A., Zigmond,M.J., Lin,M.Z., Juo,P., Hu,L.S., Anderson,M.J., Arden,K.C., Blenis,J., and Greenberg,M.E. (1999). Akt promotes cell survival by phosphorylating and inhibiting a Forkhead transcription factor. *Cell* **96**, 857-868.

- Bullard,B., Ferguson,C., Minajeva,A., Leake,M.C., Gautel,M., Labeit,D., Ding,L., Labeit,S., Horwitz,J., Leonard,K.R., and Linke,W.A. (2004). Association of the chaperone alphaB-crystallin with titin in heart muscle. *J Biol. Chem.* **279**, 7917-7924.
- Capetanaki,Y., Milner,D.J., and Weitzer,G. (1997). Desmin in muscle formation and maintenance: knockouts and consequences. *Cell Struct. Funct.* **22**, 103-116.
- Cazorla,O., Freiburg,A., Helmes,M., Centner,T., McNabb,M., Wu,Y., Trombitas,K., Labeit,S., and Granzier,H.L. (2000). Differential expression of cardiac titin isoforms and modulation of cellular stiffness. *Circ Res* **86**, 59-67.
- Centner,T., Yano,J., Kimura,E., McElhinny,A.S., Pelin,K., Witt,C.C., Bang,M.L., Trombitas,K., Granzier,H., Gregorio,C.C., Sorimachi,H., and Labeit,S. (2001). Identification of Muscle Specific Ring Finger Proteins as Potential Regulators of the Titin Kinase Domain. *J Mol Biol* **306**, 717-726.
- Cheung,B.M. and Kumana,C.R. (1998). Natriuretic peptides--relevance in cardiovascular disease. *JAMA* **280**, 1983-1984.
- Chin,E.R., Olson,E.N., Richardson,J.A., Yang,Q., Humphries,C., Shelton,J.M., Wu,H., Zhu,W., Bassel-Duby,R., and Williams,R.S. (1998). A calcineurin-dependent transcriptional pathway controls skeletal muscle fiber type. *Genes Dev.* **12**, 2499-2509.
- Choi,J., Sullards,M.C., Olzmann,J.A., Rees,H.D., Weintraub,S.T., Bostwick,D.E., Gearing,M., Levey,A.I., Chin,L.S., and Li,L. (2006). Oxidative damage of DJ-1 is linked to sporadic Parkinson and Alzheimer diseases. *J. Biol. Chem.* **281**, 10816-10824.
- Chu,F., Chen,L.H., and O'Brian,C.A. (2004). Cellular protein kinase C isozyme regulation by exogenously delivered physiological disulfides--implications of oxidative protein kinase C regulation to cancer prevention. *Carcinogenesis* **25**, 585-596.
- Clerico,A., Del,R.S., and Giannessi,D. (2000). Measurement of cardiac natriuretic hormones (atrial natriuretic peptide, brain natriuretic peptide, and related peptides) in clinical practice: the need for a new generation of immunoassay methods. *Clin. Chem.* **46**, 1529-1534.
- Clerk,A., Bogoyevitch,M.A., Anderson,M.B., and Sugden,P.H. (1994). Differential activation of protein kinase C isoforms by endothelin-1 and phenylephrine and subsequent stimulation of p42 and p44 mitogen-activated protein kinases in ventricular myocytes cultured from neonatal rat hearts. *J. Biol. Chem.* **269**, 32848-32857.
- Conconi,M., Djavadi-Ohaniance,L., Uerkvitz,W., Hendil,K.B., and Friguet,B. (1999). Conformational changes in the 20S proteasome upon macromolecular ligand binding analyzed with monoclonal antibodies. *Arch. Biochem. Biophys.* **362**, 325-328.
- Crabtree,G.R. and Olson,E.N. (2002). NFAT signaling: choreographing the social lives of cells. *Cell* **109 Suppl**, S67-S79.
- Dai,K.S. and Liew,C.C. (2001). A novel human striated muscle RING zinc finger protein, SMRZ, interacts with SMT3b via its RING domain. *J. Biol. Chem.* **276**, 23992-23999.
- Delling,U., Tureckova,J., Lim,H.W., De Windt,L.J., Rotwein,P., and Molkentin,J.D. (2000). A calcineurin-NFATc3-dependent pathway regulates skeletal muscle differentiation and slow myosin heavy-chain expression. *Mol. Cell Biol.* **20**, 6600-6611.

Literaturverzeichnis

- Deshmukh,P.A., Blunt,B.C., and Hofmann,P.A. (2006). Acute Modulation of Protein Phosphatase 2a (PP2a) and Troponin I Phosphorylation in Ventricular Myocytes: Studies with a Novel PP2a Peptide Inhibitor. *Am. J. Physiol Heart Circ. Physiol.*
- Djabali,K., de,N.B., Landon,F., and Portier,M.M. (1997). AlphaB-crystallin interacts with intermediate filaments in response to stress. *J. Cell Sci. 110 (Pt 21)*, 2759-2769.
- Doppler,H., Storz,P., Li,J., Comb,M.J., and Toker,A. (2005). A phosphorylation state-specific antibody recognizes Hsp27, a novel substrate of protein kinase D. *J. Biol. Chem. 280*, 15013-15019.
- Dulhunty,A., Gage,P., Curtis,S., Chelvanayagam,G., and Board,P. (2001). The glutathione transferase structural family includes a nuclear chloride channel and a ryanodine receptor calcium release channel modulator. *J. Biol. Chem. 276*, 3319-3323.
- Eaton,P., Fuller,W., and Shattock,M.J. (2002). S-thiolation of HSP27 regulates its multimeric aggregate size independently of phosphorylation. *J. Biol. Chem. 277*, 21189-21196.
- Edmondson,R.D., Vondriska,T.M., Biederman,K.J., Zhang,J., Jones,R.C., Zheng,Y., Allen,D.L., Xiu,J.X., Cardwell,E.M., Pisano,M.R., and Ping,P. (2002). Protein kinase C epsilon signaling complexes include metabolism- and transcription/translation-related proteins: complimentary separation techniques with LC/MS/MS. *Mol. Cell Proteomics. 1*, 421-433.
- Edstrom,L., Thornell,L.E., Albo,J., Landin,S., and Samuelsson,M. (1990). Myopathy with respiratory failure and typical myofibrillar lesions. *J. Neurol. Sci. 96*, 211-228.
- Eymann,C., Dreisbach,A., Albrecht,D., Bernhardt,J., Becher,D., Gentner,S., Tam,I.T., Buttner,K., Buurman,G., Scharf,C., Venz,S., Volker,U., and Hecker,M. (2004). A comprehensive proteome map of growing *Bacillus subtilis* cells. *Proteomics. 4*, 2849-2876.
- Flogel,U., Godecke,A., Klotz,L.O., and Schrader,J. (2004). Role of myoglobin in the antioxidant defense of the heart. *FASEB J. 18*, 1156-1158.
- Franco,D., Lamers,W.H., and Moorman,A.F. (1998). Patterns of expression in the developing myocardium: towards a morphologically integrated transcriptional model. *Cardiovasc. Res. 38*, 25-53.
- Freiburg,A. and Gautel,M. (1996). A molecular map of the interactions between titin and myosin-binding protein C. Implications for sarcomeric assembly in familial hypertrophic cardiomyopathy. *Eur J Biochem 235*, 317-323.
- Freiburg,A., Trombitas,K., Hell,W., Cazorla,O., Fougerousse,F., Centner,T., Kolmerer,B., Witt,C., Beckmann,J.S., Gregorio,C.C., Granzier,H., and Labeit,S. (2000). Series of exon-skipping events in the elastic spring region of titin as the structural basis for myofibrillar elastic diversity. *Circ Res 86*, 1114-1121.
- Frey,N., Barrientos,T., Shelton,J.M., Frank,D., Rutten,H., Gehring,D., Kuhn,C., Lutz,M., Rothermel,B., Bassel-Duby,R., Richardson,J.A., Katus,H.A., Hill,J.A., and Olson,E.N. (2004). Mice lacking calsarcin-1 are sensitized to calcineurin signaling and show accelerated cardiomyopathy in response to pathological biomechanical stress. *Nat. Med. 10*, 1336-1343.

- Frey,N. and Olson,E.N. (2002). Calsarcin-3, a novel skeletal muscle-specific member of the calsarcin family, interacts with multiple Z-disc proteins. *J. Biol. Chem.* 277, 13998-14004.
- Frey,N., Richardson,J.A., and Olson,E.N. (2000). Calsarcins, a novel family of sarcomeric calcineurin-binding proteins. *Proc Natl Acad Sci U S A* 97, 14632-14637.
- Furukawa,T., Ono,Y., Tsuchiya,H., Katayama,Y., Bang,M.L., Labeit,D., Labeit,S., Inagaki,N., and Gregorio,C.C. (2001). Specific Interaction of the Potassium Channel beta-subunit minK with the Sarcomeric Protein T-cap Suggests a T-tubule-Myofibril Linking System. *J Mol Biol* 313, 775-784.
- Fyrberg,C.C., Labeit,S., Bullard,B., Leonard,K., and Fyrberg,E. (1992). Drosophila projectin: relatedness to titin and twitchin and correlation with lethal(4) 102 CDa and bent-dominant mutants. *Proc. Biol. Sci.* 249, 33-40.
- Garvey,S.M., Rajan,C., Lerner,A.P., Frankel,W.N., and Cox,G.A. (2002). The Muscular Dystrophy with Myositis (mdm) Mouse Mutation Disrupts a Skeletal Muscle-Specific Domain of Titin. *Genomics* 79, 146-149.
- Gautel,M., Castiglione,M., Pfuhl,M., Motta,A., and Pastore,A. (1995). A calmodulin-binding sequence in the C-terminus of human cardiac titin kinase. *Eur J Biochem* 230, 752-759.
- Gautel,M., Mues,A., and Young,P. (1999). Control of sarcomeric assembly: the flow of information on titin. *Rev. Physiol Biochem. Pharmacol.* 138, 97-137.
- Geers,C. and Gros,G. (2000). Carbon dioxide transport and carbonic anhydrase in blood and muscle. *Physiol Rev.* 80, 681-715.
- Gehmlich,K., Geier,C., Osterziel,K.J., Van,d., V, and Furst,D.O. (2004). Decreased interactions of mutant muscle LIM protein (MLP) with N-RAP and alpha-actinin and their implication for hypertrophic cardiomyopathy. *Cell Tissue Res.* 317, 129-136.
- Gerull,B., Gramlich,M., Atherton,J., McNabb,M., Trombitas,K., Sasse-Klaassen,S., Seidman,J.G., Seidman,C., Granzier,H., Labeit,S., Frenneaux,M., and Thierfelder,L. (2002). Mutations of TTN, encoding the giant muscle filament titin, cause familial dilated cardiomyopathy. *Nat Genet* 30, 201-204.
- Gladden,L.B. (2004). Lactate metabolism: a new paradigm for the third millennium. *J. Physiol* 558, 5-30.
- Golenhofen,N., Arbeiter,A., Koob,R., and Drenckhahn,D. (2002). Ischemia-induced association of the stress protein alpha B-crystallin with I-band portion of cardiac titin. *J Mol Cell Cardiol.* 34, 309-319.
- Golenhofen,N., Htun,P., Ness,W., Koob,R., Schaper,W., and Drenckhahn,D. (1999). Binding of the stress protein alpha B-crystallin to cardiac myofibrils correlates with the degree of myocardial damage during ischemia/reperfusion in vivo. *J. Mol. Cell Cardiol.* 31, 569-580.
- Gotthardt,M., Hammer,R.E., Hubner,N., Monti,J., Witt,C.C., McNabb,M., Richardson,J.A., Granzier,H., Labeit,S., and Herz,J. (2003). Conditional Expression of Mutant M-line Titins Results in Cardiomyopathy with Altered Sarcomere Structure. *J Biol Chem* 278, 6059-6065.

Literaturverzeichnis

- Graham,F.L. and van der Eb,A.J. (1973). A new technique for the assay of infectivity of human adenovirus 5 DNA. *Virology* 52, 456-467.
- Grantham,J.A. and Burnett,J.C., Jr. (1997). BNP: increasing importance in the pathophysiology and diagnosis of congestive heart failure. *Circulation* 96, 388-390.
- Granzier,H.L. and Irving,T.C. (1995). Passive tension in cardiac muscle: contribution of collagen, titin, microtubules, and intermediate filaments. *Biophys J* 68, 1027-1044.
- Granzier,H.L. and Labeit,S. (2004). The giant protein titin: a major player in myocardial mechanics, signaling, and disease. *Circ Res* 94, 284-295.
- Gregorio,C.C., Granzier,H., Sorimachi,H., and Labeit,S. (1999). Muscle assembly: a titanic achievement? *Curr Opin Cell Biol* 11, 18-25.
- Gregorio,C.C., Trombitas,K., Centner,T., Kolmerer,B., Stier,G., Kunke,K., Suzuki,K., Obermayr,F., Herrmann,B., Granzier,H., Sorimachi,H., and Labeit,S. (1998). The NH₂ terminus of titin spans the Z-disc: its interaction with a novel 19-kD ligand (T-cap) is required for sarcomeric integrity. *J Cell Biol* 143, 1013-1027.
- Gusev,N.B., Bogatcheva,N.V., and Marston,S.B. (2002). Structure and properties of small heat shock proteins (sHsp) and their interaction with cytoskeleton proteins. *Biochemistry (Mosc.)* 67, 511-519.
- Hackman,P., Vihola,A., Haravuori,H., Marchand,S., Sarparanta,J., De Seze,J., Labeit,S., Witt,C., Peltonen,L., Richard,I., and Udd,B. (2002). Tibial muscular dystrophy is a titinopathy caused by mutations in TTN, the gene encoding the giant skeletal-muscle protein titin. *Am. J Hum. Genet* 71, 492-500.
- Hahn,H.S., Yussman,M.G., Toyokawa,T., Marreez,Y., Barrett,T.J., Hilty,K.C., Osinska,H., Robbins,J., and Dorn,G.W. (2002). Ischemic protection and myofibrillar cardiomyopathy: dose-dependent effects of in vivo deltaPKC inhibition. *Circ. Res.* 91, 741-748.
- Hanahan,D. (1983). Studies on transformation of Escherichia coli with plasmids. *J. Mol. Biol.* 166, 557-580.
- Harper,J.W., Adami,G.R., Wei,N., Keyomarsi,K., and Elledge,S.J. (1993). The p21 Cdk-interacting protein Cip1 is a potent inhibitor of G1 cyclin-dependent kinases. *Cell* 75, 805-816.
- Hasselgren,P.O. and Fischer,J.E. (2001). Muscle cachexia: current concepts of intracellular mechanisms and molecular regulation. *Ann. Surg.* 233, 9-17.
- Heidkamp,M.C., Bayer,A.L., Martin,J.L., and Samarel,A.M. (2001). Differential activation of mitogen-activated protein kinase cascades and apoptosis by protein kinase C epsilon and delta in neonatal rat ventricular myocytes. *Circ. Res.* 89, 882-890.
- Heineke,J., Ruetten,H., Willenbockel,C., Gross,S.C., Naguib,M., Schaefer,A., Kempf,T., Hilfiker-Kleiner,D., Caroni,P., Kraft,T., Kaiser,R.A., Molkentin,J.D., Drexler,H., and Wollert,K.C. (2005). Attenuation of cardiac remodeling after myocardial infarction by muscle LIM protein-calcineurin signaling at the sarcomeric Z-disc. *Proc. Natl. Acad. Sci. U. S. A* 102, 1655-1660.

- Hochgrafe,F., Mostertz,J., Albrecht,D., and Hecker,M. (2005). Fluorescence thiol modification assay: oxidatively modified proteins in *Bacillus subtilis*. *Mol. Microbiol.* *58*, 409-425.
- Hogan,P.G., Chen,L., Nardone,J., and Rao,A. (2003). Transcriptional regulation by calcium, calcineurin, and NFAT. *Genes Dev.* *17*, 2205-2232.
- Holtzer,H., Hijikata,T., Lin,Z.X., Zhang,Z.Q., Holtzer,S., Protasi,F., Franzini-Armstrong,C., and Sweeney,H.L. (1997). Independent assembly of 1.6 microns long bipolar MHC filaments and I-Z-I bodies. *Cell Struct. Funct.* *22*, 83-93.
- Huebsch,K.A., Kudryashova,E., Wooley,C.M., Sher,R.B., Seburn,K.L., Spencer,M.J., and Cox,G.A. (2005). Mdm muscular dystrophy: interactions with calpain 3 and a novel functional role for titin's N2A domain. *Hum. Mol. Genet.* *14*, 2801-2811.
- Improta,S., Krueger,J.K., Gautel,M., Atkinson,R.A., Lefevre,J.F., Moulton,S., Trehewella,J., and Pastore,A. (1998). The assembly of immunoglobulin-like modules in titin: implications for muscle elasticity. *J. Mol. Biol.* *284*, 761-777.
- Inagaki,K., Chen,L., Ikeno,F., Lee,F.H., Imahashi,K., Bouley,D.M., Rezaee,M., Yock,P.G., Murphy,E., and Mochly-Rosen,D. (2003a). Inhibition of delta-protein kinase C protects against reperfusion injury of the ischemic heart in vivo. *Circulation* *108*, 2304-2307.
- Inagaki,K., Hahn,H.S., Dorn,G.W., and Mochly-Rosen,D. (2003b). Additive protection of the ischemic heart ex vivo by combined treatment with delta-protein kinase C inhibitor and epsilon-protein kinase C activator. *Circulation* *108*, 869-875.
- Isaacs,W.B., Kim,I.S., Struve,A., and Fulton,A.B. (1989). Biosynthesis of titin in cultured skeletal muscle cells. *J. Cell Biol.* *109*, 2189-2195.
- Itoh-Satoh,M., Hayashi,T., Nishi,H., Koga,Y., Arimura,T., Koyanagi,T., Takahashi,M., Hohda,S., Ueda,K., Nouchi,T., Hiroe,M., Marumo,F., Imaizumi,T., Yasunami,M., and Kimura,A. (2002). Titin Mutations as the Molecular Basis for Dilated Cardiomyopathy. *Biochem Biophys Res Commun* *291*, 385-393.
- Jakoby,W.B. (1978). The glutathione S-transferases: a group of multifunctional detoxification proteins. *Adv. Enzymol. Relat Areas Mol. Biol.* *46*, 383-414.
- Jeyaseelan,R., Poizat,C., Baker,R.K., Abdishoo,S., Isterabadi,L.B., Lyons,G.E., and Kedes,L. (1997). A novel cardiac-restricted target for doxorubicin. CARP, a nuclear modulator of gene expression in cardiac progenitor cells and cardiomyocytes. *J. Biol. Chem.* *272*, 22800-22808.
- Jideama,N.M., Crawford,B.H., Hussain,A.K., and Raynor,R.L. (2006). Dephosphorylation specificities of protein phosphatase for cardiac troponin I, troponin T, and sites within troponin T. *Int. J. Biol. Sci.* *2*, 1-9.
- Kang,S.M., Lim,S., Song,H., Chang,W., Lee,S., Bae,S.M., Chung,J.H., Lee,H., Kim,H.G., Yoon,D.H., Kim,T.W., Jang,Y., Sung,J.M., Chung,N.S., and Hwang,K.C. (2006). Allopurinol modulates reactive oxygen species generation and Ca²⁺ overload in ischemia-reperfused heart and hypoxia-reoxygenated cardiomyocytes. *Eur. J. Pharmacol.* *535*, 212-219.

Literaturverzeichnis

- Kemp,T.J., Sadusky,T.J., Saltisi,F., Carey,N., Moss,J., Yang,S.Y., Sassoon,D.A., Goldspink,G., and Coulton,G.R. (2000). Identification of Ankrd2, a novel skeletal muscle gene coding for a stretch-responsive ankyrin-repeat protein. *Genomics* *66*, 229-241.
- Kilts,J.D., Grocott,H.P., and Kwatra,M.M. (2005). G alpha(q)-coupled receptors in human atrium function through protein kinase C epsilon and delta. *J. Mol. Cell Cardiol.* *38*, 267-276.
- Kinbara,K., Sorimachi,H., Ishiura,S., and Suzuki,K. (1997). Muscle-specific calpain, p94, interacts with the extreme C-terminal region of connectin, a unique region flanked by two immunoglobulin C2 motifs. *Arch Biochem Biophys* *342*, 99-107.
- Klein,G., Schaefer,A., Hilfiker-Kleiner,D., Oppermann,D., Shukla,P., Quint,A., Podewski,E., Hilfiker,A., Schroder,F., Leitges,M., and Drexler,H. (2005). Increased collagen deposition and diastolic dysfunction but preserved myocardial hypertrophy after pressure overload in mice lacking PKCepsilon. *Circ. Res.* *96*, 748-755.
- Knoll,R., Hoshijima,M., Hoffman,H.M., Person,V., Lorenzen-Schmidt,I., Bang,M.L., Hayashi,T., Shiga,N., Yasukawa,H., Schaper,W., McKenna,W., Yokoyama,M., Schork,N.J., Omens,J.H., McCulloch,A.D., Kimura,A., Gregorio,C.C., Poller,W., Schaper,J., Schultheiss,H.P., and Chien,K.R. (2002). The Cardiac Mechanical Stretch Sensor Machinery Involves a Z Disc Complex that Is Defective in a Subset of Human Dilated Cardiomyopathy. *Cell* *111*, 943-955.
- Kogler,H., Schott,P., Toischer,K., Milting,H., Van,P.N., Kohlhaas,M., Grebe,C., Kassner,A., Domeier,E., Teucher,N., Seidler,T., Knoll,R., Maier,L.S., El-Banayosy,A., Korfer,R., and Hasenfuss,G. (2006). Relevance of brain natriuretic peptide in preload-dependent regulation of cardiac sarcoplasmic reticulum Ca²⁺ ATPase expression. *Circulation* *113*, 2724-2732.
- Koh,T.J. and Escobedo,J. (2004). Cytoskeletal disruption and small heat shock protein translocation immediately after lengthening contractions. *Am. J. Physiol Cell Physiol* *286*, C713-C722.
- Kong,Y., Flick,M.J., Kudla,A.J., and Konieczny,S.F. (1997). Muscle LIM protein promotes myogenesis by enhancing the activity of MyoD. *Mol. Cell Biol.* *17*, 4750-4760.
- Kong,Y., Shelton,J.M., Rothermel,B., Li,X., Richardson,J.A., Bassel-Duby,R., and Williams,R.S. (2001). Cardiac-specific LIM protein FHL2 modifies the hypertrophic response to beta-adrenergic stimulation. *Circulation* *103*, 2731-2738.
- Kontogianni-Konstantopoulos,A. and Bloch,R.J. (2003). The hydrophilic domain of small ankyrin-1 interacts with the two N-terminal immunoglobulin domains of titin. *J. Biol. Chem.* *278*, 3985-3991.
- Korzeniewski,B. (2006). AMP deamination delays muscle acidification during heavy exercise and hypoxia. *J. Biol. Chem.* *281*, 3057-3066.
- Kramerova,I., Kudryashova,E., Tidball,J.G., and Spencer,M.J. (2004). Null mutation of calpain 3 (p94) in mice causes abnormal sarcomere formation in vivo and in vitro. *Hum. Mol. Genet* *13*, 1373-1388.
- Kuhbandner,S., Brummer,S., Metzger,D., Chambon,P., Hofmann,F., and Feil,R. (2000). Temporally controlled somatic mutagenesis in smooth muscle. *Genesis* *28*, 15-22.

- Labeit,S., Gautel,M., Lakey,A., and Trinick,J. (1992). Towards a molecular understanding of titin. *EMBO J 11*, 1711-1716.
- Labeit,S. and Kolmerer,B. (1995). Titins: giant proteins in charge of muscle ultrastructure and elasticity. *Science 270*, 293-296.
- Lange,S., Auerbach,D., McLoughlin,P., Perriard,E., Schafer,B.W., Perriard,J.C., and Ehler,E. (2002). Subcellular targeting of metabolic enzymes to titin in heart muscle may be mediated by DRAL/FHL-2. *J. Cell Sci. 115*, 4925-4936.
- Lange,S., Xiang,F., Yakovenko,A., Vihola,A., Hackman,P., Rostkova,E., Kristensen,J., Brandmeier,B., Franzen,G., Hedberg,B., Gunnarsson,L.G., Hughes,S.M., Marchand,S., Sejersen,T., Richard,I., Edstrom,L., Ehler,E., Udd,B., and Gautel,M. (2005). The Kinase Domain of Titin Controls Muscle Gene Expression and Protein Turnover. *Science 308*, 1599-1603.
- Langley,B., Thomas,M., Bishop,A., Sharma,M., Gilmour,S., and Kambadur,R. (2002). Myostatin inhibits myoblast differentiation by down-regulating MyoD expression. *J. Biol. Chem. 277*, 49831-49840.
- Launay,N., Goudeau,B., Kato,K., Vicart,P., and Lilienbaum,A. (2006). Cell signaling pathways to alphaB-crystallin following stresses of the cytoskeleton. *Exp. Cell Res. 312*, 3570-3584.
- Liang,P. and MacRae,T.H. (1997). Molecular chaperones and the cytoskeleton. *J. Cell Sci. 110 (Pt 13)*, 1431-1440.
- Lindquist,S. and Craig,E.A. (1988). The heat-shock proteins. *Annu. Rev. Genet. 22*, 631-677.
- Linke,W.A. and Granzier,H. (1998). A spring tale: new facts on titin elasticity. *Biophys J 75*, 2613-2614.
- Liu,H., McPherson,B.C., and Yao,Z. (2001). Preconditioning attenuates apoptosis and necrosis: role of protein kinase C epsilon and -delta isoforms. *Am. J. Physiol Heart Circ. Physiol 281*, H404-H410.
- Liu,Q. and Hofmann,P.A. (2002). Antiadrenergic effects of adenosine A(1) receptor-mediated protein phosphatase 2a activation in the heart. *Am. J. Physiol Heart Circ. Physiol 283*, H1314-H1321.
- Louvet-Vallee,S. (2000). ERM proteins: from cellular architecture to cell signaling. *Biol. Cell 92*, 305-316.
- Lutz,S., Mura,R., Baltus,D., Movsesian,M., Kubler,W., and Niroomand,F. (2001). Increased activity of membrane-associated nucleoside diphosphate kinase and inhibition of cAMP synthesis in failing human myocardium. *Cardiovasc. Res. 49*, 48-55.
- Lyons,G.E., Muhlebach,S., Moser,A., Masood,R., Paterson,B.M., Buckingham,M.E., and Perriard,J.C. (1991). Developmental regulation of creatine kinase gene expression by myogenic factors in embryonic mouse and chick skeletal muscle. *Development 113*, 1017-1029.

Literaturverzeichnis

- MacGowan,G.A., Evans,C., Hu,T.C., Debrah,D., Mullet,S., Chen,H.H., McTiernan,C.F., Stewart,A.F., Koretsky,A.P., and Shroff,S.G. (2004). Troponin I protein kinase C phosphorylation sites and ventricular function. *Cardiovasc. Res.* *63*, 245-255.
- Machado,C. and Andrew,D.J. (2000). D-Titin. A giant protein with dual roles in chromosomes and muscles. *J Cell Biol* *151*, 639-652.
- Maizels,E.T., Peters,C.A., Kline,M., Cutler,R.E., Jr., Shanmugam,M., and Hunzicker-Dunn,M. (1998). Heat-shock protein-25/27 phosphorylation by the delta isoform of protein kinase C. *Biochem. J.* *332* (*Pt 3*), 703-712.
- Majumder,P.K., Mishra,N.C., Sun,X., Bharti,A., Kharbanda,S., Saxena,S., and Kufe,D. (2001). Targeting of protein kinase C delta to mitochondria in the oxidative stress response. *Cell Growth Differ.* *12*, 465-470.
- Makarenko,I., Opitz,C.A., Leake,M.C., Neagoe,C., Kulke,M., Gwathmey,J.K., del,M.F., Hajjar,R.J., and Linke,W.A. (2004). Passive stiffness changes caused by upregulation of compliant titin isoforms in human dilated cardiomyopathy hearts. *Circ. Res.* *95*, 708-716.
- Marchler-Bauer,A., Anderson,J.B., Cherukuri,P.F., Weese-Scott,C., Geer,L.Y., Gwadz,M., He,S., Hurwitz,D.I., Jackson,J.D., Ke,Z., Lanczycki,C.J., Liebert,C.A., Liu,C., Lu,F., Marchler,G.H., Mullokandov,M., Shoemaker,B.A., Simonyan,V., Song,J.S., Thiessen,P.A., Yamashita,R.A., Yin,J.J., Zhang,D., and Bryant,S.H. (2005). CDD: a Conserved Domain Database for protein classification. *Nucleic Acids Res.* *33*, D192-D196.
- Maruyama,K. (1997). Connectin/titin, giant elastic protein of muscle. *FASEB J.* *11*, 341-345.
- Maruyama,K., Murakami,F., and Ohashi,K. (1977). Connectin, an elastic protein of muscle. *Comparative Biochemistry. J Biochem. (Tokyo)* *82*, 339-345.
- May,S.R., Stewart,N.J., Chang,W., and Peterson,A.S. (2004). A Titin mutation defines roles for circulation in endothelial morphogenesis. *Dev Biol* *270*, 31-46.
- Mayans,O., van der Ven,P.F., Wilm,M., Mues,A., Young,P., Fnrst,D.O., Wilmanns,M., and Gautel,M. (1998). Structural basis for activation of the titin kinase domain during myofibrillogenesis. *Nature* *395*, 863-869.
- Mayans,O., Wuerges,J., Canela,S., Gautel,M., and Wilmanns,M. (2001). Structural evidence for a possible role of reversible disulphide bridge formation in the elasticity of the muscle protein titin. *Structure*. *9*, 331-340.
- Mayr,M., Chung,Y.L., Mayr,U., McGregor,E., Troy,H., Baier,G., Leitges,M., Dunn,M.J., Griffiths,J.R., and Xu,Q. (2004). Loss of PKC-delta alters cardiac metabolism. *Am. J. Physiol Heart Circ. Physiol* *287*, H937-H945.
- McCahill,A., Warwicker,J., Bolger,G.B., Houslay,M.D., and Yarwood,S.J. (2002). The RACK1 scaffold protein: a dynamic cog in cell response mechanisms. *Mol. Pharmacol.* *62*, 1261-1273.
- McElhinny,A.S., Kakinuma,K., Sorimachi,H., Labeit,S., and Gregorio,C.C. (2002). Muscle-specific RING finger-1 interacts with titin to regulate sarcomeric M-line and thick filament structure and may have nuclear functions via its interaction with glucocorticoid modulatory element binding protein-1. *J Cell Biol* *157*, 125-136.

- McLaughlin,M.M., Kumar,S., McDonnell,P.C., Van,H.S., Lee,J.C., Livi,G.P., and Young,P.R. (1996). Identification of mitogen-activated protein (MAP) kinase-activated protein kinase-3, a novel substrate of CSBP p38 MAP kinase. *J. Biol. Chem.* *271*, 8488-8492.
- Miller,G., Musa,H., Gautel,M., and Peckham,M. (2003). A targeted deletion of the C-terminal end of titin, including the titin kinase domain, impairs myofibrillogenesis. *J Cell Sci* *116*, 4811-4819.
- Mochly-Rosen,D., Wu,G., Hahn,H., Osinska,H., Liron,T., Lorenz,J.N., Yatani,A., Robbins,J., and Dorn,G.W. (2000). Cardiotoxic effects of protein kinase C epsilon: analysis by in vivo modulation of PKCepsilon translocation. *Circ. Res.* *86*, 1173-1179.
- Moerman,D.G., Benian,G.M., Barstead,R.J., Schriefer,L.A., and Waterston,R.H. (1988). Identification and intracellular localization of the unc-22 gene product of *Caenorhabditis elegans*. *Genes Dev.* *2*, 93-105.
- Molkentin,J.D., Lu,J.R., Antos,C.L., Markham,B., Richardson,J., Robbins,J., Grant,S.R., and Olson,E.N. (1998). A calcineurin-dependent transcriptional pathway for cardiac hypertrophy. *Cell* *93*, 215-228.
- Montel,V., Gardrat,F., Azanza,J.L., and Raymond,J. (1999). 20S proteasome, hsp90, p97 fusion protein, PA28 activator copurifying oligomers and ATPase activities. *Biochem. Mol. Biol. Int.* *47*, 465-472.
- Mues,A., Van,d., V, Young,P., Furst,D.O., and Gautel,M. (1998). Two immunoglobulin-like domains of the Z-disc portion of titin interact in a conformation-dependent way with telethonin. *FEBS Lett.* *428*, 111-114.
- Muhle-Goll,C., Habbeck,M., Cazorla,O., Nilges,M., Labeit,S., and Granzier,H. (2001). Structural and Functional Studies of Titin's fn3 Modules Reveal Conserved Surface Patterns and Binding to Myosin S1 - A Possible Role in the Frank-Starling Mechanism of the Heart. *J Mol Biol* *313*, 431-447.
- Musa,H., Meek,S., Gautel,M., Peddie,D., Smith,A.J., and Peckham,M. (2006). Targeted homozygous deletion of M-band titin in cardiomyocytes prevents sarcomere formation. *J. Cell Sci.* *119*, 4322-4331.
- Nave,R., Furst,D.O., and Weber,K. (1989). Visualization of the polarity of isolated titin molecules: a single globular head on a long thin rod as the M band anchoring domain? *J. Cell Biol.* *109*, 2177-2187.
- New,L., Jiang,Y., Zhao,M., Liu,K., Zhu,W., Flood,L.J., Kato,Y., Parry,G.C., and Han,J. (1998). PRAK, a novel protein kinase regulated by the p38 MAP kinase. *EMBO J.* *17*, 3372-3384.
- Nicholas,G., Thomas,M., Langley,B., Somers,W., Patel,K., Kemp,C.F., Sharma,M., and Kambadur,R. (2002). Titin-cap associates with, and regulates secretion of, Myostatin. *J Cell Physiol* *193*, 120-131.
- Nishizawa,J., Nakai,A., Higashi,T., Tanabe,M., Nomoto,S., Matsuda,K., Ban,T., and Nagata,K. (1996). Reperfusion causes significant activation of heat shock transcription factor 1 in ischemic rat heart. *Circulation* *94*, 2185-2192.

Literaturverzeichnis

Obermann,W.M., Gautel,M., Steiner,F., van der Ven,P.F., Weber,K., and Furst,D.O. (1996). The structure of the sarcomeric M band: localization of defined domains of myomesin, M-protein, and the 250-kD carboxy-terminal region of titin by immunoelectron microscopy. *J Cell Biol* 134, 1441-1453.

Ojima,K., Ono,Y., Hata,S., Koyama,S., Doi,N., and Sorimachi,H. (2005). Possible functions of p94 in connectin-mediated signaling pathways in skeletal muscle cells. *J. Muscle Res. Cell Motil.* 26, 409-417.

Okagaki,T., Weber,F.E., Fischman,D.A., Vaughan,K.T., Mikawa,T., and Reinach,F.C. (1993). The major myosin-binding domain of skeletal muscle MyBP-C (C protein) resides in the COOH-terminal, immunoglobulin C2 motif. *J. Cell Biol.* 123, 619-626.

Ono,S., Minami,N., Abe,H., and Obinata,T. (1994). Characterization of a novel cofilin isoform that is predominantly expressed in mammalian skeletal muscle. *J. Biol. Chem.* 269, 15280-15286.

Ono,Y., Kakinuma,K., Torii,F., Irie,A., Nakagawa,K., Labeit,S., Abe,K., Suzuki,K., and Sorimachi,H. (2004). Possible regulation of the conventional calpain system by skeletal muscle-specific calpain, p94/calpain 3. *J. Biol. Chem.* 279, 2761-2771.

Ordway,G.A. and Garry,D.J. (2004). Myoglobin: an essential hemoprotein in striated muscle. *J. Exp. Biol.* 207, 3441-3446.

Page,S. and Huxley,H.E. (1963). Filament length in striated muscle. *J. Cell Biol.* 19, 369-390.

Pan,J., Singh,U.S., Takahashi,T., Oka,Y., Palm-Leis,A., Herbelin,B.S., and Baker,K.M. (2005). PKC mediates cyclic stretch-induced cardiac hypertrophy through Rho family GTPases and mitogen-activated protein kinases in cardiomyocytes. *J. Cell Physiol* 202, 536-553.

Parcellier,A., Schmitt,E., Gurbuxani,S., Seigneurin-Berny,D., Pance,A., Chantome,A., Plenckette,S., Khochbin,S., Solary,E., and Garrido,C. (2003). HSP27 is a ubiquitin-binding protein involved in I-kappaBalpha proteasomal degradation. *Mol. Cell Biol.* 23, 5790-5802.

Peng, J., Raddatz, K., Molkentin, JD., Wu, Y., Labeit, S., Granzier H., Gotthardt, G. (2007) Cardiac Hypertrophy and Reduced Contractility in Hearts Deficient in the Titin Kinase Region. *Circulation*, 115, 743-751

Perng,M.D., Cairns,L., van,d., I, Prescott,A., Hutcheson,A.M., and Quinlan,R.A. (1999). Intermediate filament interactions can be altered by HSP27 and alphaB-crystallin. *J. Cell Sci.* 112 (Pt 13), 2099-2112.

Pi,Y., Kemnitz,K.R., Zhang,D., Kranias,E.G., and Walker,J.W. (2002). Phosphorylation of troponin I controls cardiac twitch dynamics: evidence from phosphorylation site mutants expressed on a troponin I-null background in mice. *Circ. Res.* 90, 649-656.

Pi,Y., Zhang,D., Kemnitz,K.R., Wang,H., and Walker,J.W. (2003). Protein kinase C and A sites on troponin I regulate myofilament Ca²⁺ sensitivity and ATPase activity in the mouse myocardium. *J. Physiol* 552, 845-857.

- Pizon,V., Iakovenko,A., van der Ven,P.F., Kelly,R., Fatu,C., Furst,D.O., Karsenti,E., and Gautel,M. (2002). Transient association of titin and myosin with microtubules in nascent myofibrils directed by the MURF2 RING-finger protein. *J. Cell Sci.* *115*, 4469-4482.
- Porter,M.J., Heidkamp,M.C., Scully,B.T., Patel,N., Martin,J.L., and Samarel,A.M. (2003). Isoenzyme-selective regulation of SERCA2 gene expression by protein kinase C in neonatal rat ventricular myocytes. *Am. J. Physiol Cell Physiol* *285*, C39-C47.
- Poussard,S., Duvert,M., Balcerzak,D., Ramassamy,S., Brustis,J.J., Cottin,P., and Ducastaing,A. (1996). Evidence for implication of muscle-specific calpain (p94) in myofibrillar integrity. *Cell Growth Differ.* *7*, 1461-1469.
- Rappaport,L. and Samuel,J.L. (1988). Microtubules in cardiac myocytes. *Int. Rev. Cytol.* *113*, 101-143.
- Rayment,I., Rypniewski,W.R., Schmidt-Base,K., Smith,R., Tomchick,D.R., Benning,M.M., Winkelmann,D.A., Wesenberg,G., and Holden,H.M. (1993). Three-dimensional structure of myosin subfragment-1: a molecular motor. *Science* *261*, 50-58.
- Reisz-Porszasz,S., Bhasin,S., Artaza,J.N., Shen,R., Sinha-Hikim,I., Hogue,A., Fielder,T.J., and Gonzalez-Cadavid,N.F. (2003). Lower skeletal muscle mass in male transgenic mice with muscle-specific overexpression of myostatin. *Am. J. Physiol Endocrinol. Metab* *285*, E876-E888.
- Rogalla,T., Ehrnsperger,M., Preville,X., Kotlyarov,A., Lutsch,G., Ducasse,C., Paul,C., Wieske,M., Arrigo,A.P., Buchner,J., and Gaestel,M. (1999). Regulation of Hsp27 oligomerization, chaperone function, and protective activity against oxidative stress/tumor necrosis factor alpha by phosphorylation. *J. Biol. Chem.* *274*, 18947-18956.
- Roman,B.B., Goldspink,P.H., Spaite,E., Urboniene,D., McKinney,R., Geenen,D.L., Solaro,R.J., and Buttrick,P.M. (2004). Inhibition of PKC phosphorylation of cTnI improves cardiac performance in vivo. *Am. J. Physiol Heart Circ. Physiol* *286*, H2089-H2095.
- Rouse,J., Cohen,P., Trigon,S., Morange,M., onso-Llamazares,A., Zamanillo,D., Hunt,T., and Nebreda,A.R. (1994). A novel kinase cascade triggered by stress and heat shock that stimulates MAPKAP kinase-2 and phosphorylation of the small heat shock proteins. *Cell* *78*, 1027-1037.
- Sagnella,G.A. (1998). Measurement and significance of circulating natriuretic peptides in cardiovascular disease. *Clin. Sci. (Lond)* *95*, 519-529.
- Sakamoto,K., Urushidani,T., and Nagao,T. (1998). Translocation of HSP27 to cytoskeleton by repetitive hypoxia-reoxygenation in the rat myoblast cell line, H9c2. *Biochem. Biophys. Res. Commun.* *251*, 576-579.
- Sambrook, J. und Russell, D. W. Molecular Cloning: A Laboratory Manual. Third Edition. 2001. Cold Spring Harbor Laboratory Press.
Ref Type: Serial (Book,Monograph)
- Sanger,J.W. and Sanger,J.M. (2001). Fishing out proteins that bind to titin. *J. Cell Biol.* *154*, 21-24.

Literaturverzeichnis

- Schaffner,W. and Weissmann,C. (1973). A rapid, sensitive, and specific method for the determination of protein in dilute solution. *Anal. Biochem.* *56*, 502-514.
- Seidman,J.G. and Seidman,C. (2001). The genetic basis for cardiomyopathy: from mutation identification to mechanistic paradigms. *Cell* *104*, 557-567.
- Singh,R.B., Chohan,P.K., Dhalla,N.S., and Netticadan,T. (2004). The sarcoplasmic reticulum proteins are targets for calpain action in the ischemic-reperfused heart. *J. Mol. Cell Cardiol.* *37*, 101-110.
- Sohal,D.S., Nghiem,M., Crackower,M.A., Witt,S.A., Kimball,T.R., Tymitz,K.M., Penninger,J.M., and Molkentin,J.D. (2001). Temporally regulated and tissue-specific gene manipulations in the adult and embryonic heart using a tamoxifen-inducible Cre protein. *Circ Res* *89*, 20-25.
- Sorimachi,H., Freiburg,A., Kolmerer,B., Ishiura,S., Stier,G., Gregorio,C.C., Labeit,D., Linke,W.A., Suzuki,K., and Labeit,S. (1997). Tissue-specific expression and alpha-actinin binding properties of the Z-disc titin: implications for the nature of vertebrate Z- discs. *J Mol Biol* *270*, 688-695.
- Sorimachi,H., Kinbara,K., Kimura,S., Takahashi,M., Ishiura,S., Sasagawa,N., Sorimachi,N., Shimada,H., Tagawa,K., and Maruyama,K. (1995). Muscle-specific calpain, p94, responsible for limb girdle muscular dystrophy type 2A, associates with connectin through IS2, a p94-specific sequence. *J Biol Chem* *270*, 31158-31162.
- Spencer,J.A., Eliazer,S., Ilaria,R.L.J., Richardson,J.A., and Olson,E.N. (2000). Regulation of microtubule dynamics and myogenic differentiation by MURF, a striated muscle RING-finger protein. *J Cell Biol* *150*, 771-784.
- Squier,T.C. (2001). Oxidative stress and protein aggregation during biological aging. *Exp Gerontol.* *36*, 1539-1550.
- Stokoe,D., Engel,K., Campbell,D.G., Cohen,P., and Gaestel,M. (1992). Identification of MAPKAP kinase 2 as a major enzyme responsible for the phosphorylation of the small mammalian heat shock proteins. *FEBS Lett.* *313*, 307-313.
- Studier,F.W. and Moffatt,B.A. (1986). Use of bacteriophage T7 RNA polymerase to direct selective high-level expression of cloned genes. *J. Mol. Biol.* *189*, 113-130.
- Sussman,M.A., Welch,S., Gude,N., Khoury,P.R., Daniels,S.R., Kirkpatrick,D., Walsh,R.A., Price,R.L., Lim,H.W., and Molkentin,J.D. (1999). Pathogenesis of dilated cardiomyopathy: molecular, structural, and population analyses in tropomodulin-overexpressing transgenic mice. *Am. J. Pathol.* *155*, 2101-2113.
- Tada,M. and Toyofuku,T. (1996). SR Ca(2+)-ATPase/phospholamban in cardiomyocyte function. *J. Card Fail.* *2*, S77-S85.
- Tagawa,H., Koide,M., Sato,H., Zile,M.R., Carabello,B.A., and Cooper,G. (1998). Cytoskeletal role in the transition from compensated to decompensated hypertrophy during adult canine left ventricular pressure overloading. *Circ. Res.* *82*, 751-761.
- Taira,T., Saito,Y., Niki,T., Iguchi-Ariga,S.M., Takahashi,K., and Ariga,H. (2004). DJ-1 has a role in antioxidative stress to prevent cell death. *EMBO Rep.* *5*, 213-218.

- Takeishi,Y., Ping,P., Bolli,R., Kirkpatrick,D.L., Hoit,B.D., and Walsh,R.A. (2000). Transgenic overexpression of constitutively active protein kinase C epsilon causes concentric cardiac hypertrophy. *Circ. Res.* *86*, 1218-1223.
- Taveau,M., Bourg,N., Sillon,G., Roudaut,C., Bartoli,M., and Richard,I. (2003). Calpain 3 is activated through autolysis within the active site and lyses sarcomeric and sarcolemmal components. *Mol Cell Biol* *23*, 9127-9135.
- Tobias,A.H., Slinker,B.K., Kirkpatrick,R.D., and Campbell,K.B. (1995). Mechanical determinants of left ventricular relaxation in isovolumically beating hearts. *Am. J. Physiol* *268*, H170-H177.
- Tokuyasu,K.T., Dutton,A.H., Geiger,B., and Singer,S.J. (1981). Ultrastructure of chicken cardiac muscle as studied by double immunolabeling in electron microscopy. *Proc. Natl. Acad. Sci. U. S. A* *78*, 7619-7623.
- Trombitas,K., Freiburg,A., Centner,T., Labeit,S., and Granzier,H. (1999). Molecular dissection of N2B cardiac titin's extensibility. *Biophys J* *77*, 3189-3196.
- Tskhovrebova,L. and Trinick,J. (2002). Role of titin in vertebrate striated muscle. *Philos. Trans. R. Soc. Lond B Biol. Sci.* *357*, 199-206.
- Tsuyama,S., Fujita,H., Hijikata,R., Okamoto,H., and Takenaka,S. (1999). Effects of mono-ADP-ribosylation on cytoskeletal actin in chromaffin cells and their release of catecholamine. *Int. J. Biochem. Cell Biol.* *31*, 601-611.
- Udd,B., Kaarianen,H., and Somer,H. (1991). Muscular dystrophy with separate clinical phenotypes in a large family. *Muscle Nerve* *14*, 1050-1058.
- van de Klundert,F.A., Gijsen,M.L., van,d., I, Snoeckx,L.H., and de Jong,W.W. (1998). alpha B-crystallin and hsp25 in neonatal cardiac cells--differences in cellular localization under stress conditions. *Eur. J. Cell Biol.* *75*, 38-45.
- Vangheluwe,P., Tjwa,M., Van Den,B.A., Louch,W.E., Beullens,M., Dode,L., Carmeliet,P., Kranias,E., Herijgers,P., Sipido,K.R., Raeymaekers,L., and Wuytack,F. (2006). A SERCA2 pump with an increased Ca²⁺ affinity can lead to severe cardiac hypertrophy, stress intolerance and reduced life span. *J. Mol. Cell Cardiol.* *41*, 308-317.
- Verboomen,H., Wuytack,F., De,S.H., Himpens,B., and Casteels,R. (1992). Functional difference between SERCA2a and SERCA2b Ca²⁺ pumps and their modulation by phospholamban. *Biochem. J.* *286* (*Pt 2*), 591-595.
- Wang,S.M., Jeng,C.J., and Sun,M.C. (1992). Studies on the interaction between titin and myosin. *Histol. Histopathol.* *7*, 333-337.
- Wang,Z., Kutschke,W., Richardson,K.E., Karimi,M., and Hill,J.A. (2001). Electrical remodeling in pressure-overload cardiac hypertrophy: role of calcineurin. *Circulation* *104*, 1657-1663.
- Warren,C.M., Krzesinski,P.R., and Greaser,M.L. (2003). Vertical agarose gel electrophoresis and electroblotting of high-molecular-weight proteins. *Electrophoresis* *24*, 1695-1702.

Literaturverzeichnis

- Watanabe,K., Nair,P., Labeit,D., Kellermayer,M., Greaser,M., Labeit,S., and Granzier,H. (2002). Molecular mechanics of cardiac titin's PEVK and N2B spring elements. *J Biol Chem.*
- Waterston,R.H., Thomson,J.N., and Brenner,S. (1980). Mutants with altered muscle structure of *Caenorhabditis elegans*. *Dev. Biol.* 77, 271-302.
- Weinert,S., Bergmann,N., Luo,X., Erdmann,B., and Gotthardt,M. (2006). M line-deficient titin causes cardiac lethality through impaired maturation of the sarcomere. *J. Cell Biol.* 173, 559-570.
- Welsh,M.J. and Gaestel,M. (1998). Small heat-shock protein family: function in health and disease. *Ann. N. Y. Acad. Sci.* 851, 28-35.
- Wessel,D. and Flugge,U.I. (1984). A method for the quantitative recovery of protein in dilute solution in the presence of detergents and lipids. *Anal. Biochem.* 138, 141-143.
- Westfall,M.V. and Borton,A.R. (2003). Role of troponin I phosphorylation in protein kinase C-mediated enhanced contractile performance of rat myocytes. *J. Biol. Chem.* 278, 33694-33700.
- White,M.Y., Hambly,B.D., Jeremy,R.W., and Cordwell,S.J. (2006). Ischemia-specific phosphorylation and myofilament translocation of heat shock protein 27 precedes alpha B-crystallin and occurs independently of reactive oxygen species in rabbit myocardium. *J. Mol. Cell Cardiol.* 40, 761-774.
- Wigler,M., Pellicer,A., Silverstein,S., and Axel,R. (1978). Biochemical transfer of single-copy eucaryotic genes using total cellular DNA as donor. *Cell* 14, 725-731.
- Wilding,J.R., Schneider,J.E., Sang,A.E., Davies,K.E., Neubauer,S., and Clarke,K. (2005). Dystrophin- and MLP-deficient mouse hearts: marked differences in morphology and function, but similar accumulation of cytoskeletal proteins. *FASEB J.* 19, 79-81.
- Witt,C.C., Ono,Y., Puschmann,E., McNabb,M., Wu,Y., Gotthardt,M., Witt,S.H., Haak,M., Labeit,D., Gregorio,C.C., Sorimachi,H., Granzier,H., and Labeit,S. (2004). Induction and Myofibrillar Targeting of CARP, and Suppression of the Nkx2.5 Pathway in the MDM Mouse with Impaired Titin-based Signaling. *J Mol Biol* 336, 145-154.
- Witt,S.H., Granzier,H., Witt,C.C., and Labeit,S. (2005). MURF-1 and MURF-2 target a specific subset of myofibrillar proteins redundantly: towards understanding MURF-dependent muscle ubiquitination. *J Mol. Biol.* 350, 713-722.
- Wolff,S., Otto,A., Albrecht,D., Zeng,J.S., Buttner,K., Gluckmann,M., Hecker,M., and Becher,D. (2006). Gel-free and gel-based proteomics in *Bacillus subtilis*: a comparative study. *Mol. Cell Proteomics.* 5, 1183-1192.
- Wroblewski,K., Spalthoff,S., Zimmerman,U.J., Post,R.L., Sanger,J.W., and Forster,R.E. (2005). The role of carbonic anhydrase in the recovery of skeletal muscle from anoxia. *J. Appl. Physiol* 99, 488-498.
- Wu,Y., Cazorla,O., Labeit,D., Labeit,S., and Granzier,H. (2000). Changes in Titin and Collagen Underlie Diastolic Stiffness Diversity of Cardiac Muscle. *J Mol Cell Cardiol* 32, 2151-2162.

- Xu,X., Meiler,S.E., Zhong,T.P., Mohideen,M., Crossley,D.A., Burggren,W.W., and Fishman,M.C. (2002). Cardiomyopathy in zebrafish due to mutation in an alternatively spliced exon of titin. *Nat Genet 30*, 205-209.
- Yamasaki,R., Wu,Y., McNabb,M., Greaser,M., Labeit,S., and Granzier,H. (2002). Protein kinase A phosphorylates titin's cardiac-specific N2B domain and reduces passive tension in rat cardiac myocytes. *Circ Res 90*, 1181-1188.
- Yonehara,M., Minami,Y., Kawata,Y., Nagai,J., and Yahara,I. (1996). Heat-induced chaperone activity of HSP90. *J. Biol. Chem. 271*, 2641-2645.
- Yoshimura,M., Yasue,H., and Ogawa,H. (2001). Pathophysiological significance and clinical application of ANP and BNP in patients with heart failure. *Can. J. Physiol Pharmacol. 79*, 730-735.
- Young,J.C., Moarefi,I., and Hartl,F.U. (2001a). Hsp90: a specialized but essential protein-folding tool. *J. Cell Biol. 154*, 267-273.
- Young,P., Ehler,E., and Gautel,M. (2001b). Obscurin, a giant sarcomeric Rho guanine nucleotide exchange factor protein involved in sarcomere assembly. *J. Cell Biol. 154*, 123-136.
- Zhou,L.Z., Johnson,A.P., and Rando,T.A. (2001). NF kappa B and AP-1 mediate transcriptional responses to oxidative stress in skeletal muscle cells. *Free Radic. Biol. Med. 31*, 1405-1416.