

## 5 Literaturverzeichnis

- Agerman, K., Ernfors, P. (2003): Differential influence of BDNF and NT3 on the expression of calcium binding proteins and neuropeptid Y in vivo, NeuroReport 14: 2183 – 2187
- Alderson, R.F., Alterman, A.L., Barde, Y.A., Lindsay, R.M. (1990): Brain-derived neurotrophic factor increases survival and differentiated functions of rat septal cholinergic neurons in culture, Neuron 5: 297 – 306
- Altar C.A., DiStefano, P.S. (1998): Neurotrophin trafficking by anterograde Transport, Trends Neurosci 21(10): 433 - 7
- Altar, C.A., Cai, N., Bliven, T., Juhasz, M., Conner, J.M., Acheson, A.L., Lindsay, R.M., Wiegand, S.J. (1997): Anterograde transport of brain derived neurotrophic factor and its role in the brain, Nature 389: 856 – 860
- Augustine, G.J., Charlton, M.P., Smith, S.J. (1987): Calcium action in synaptic transmitter Release, Annu. Rev. Neurosci. 10: 633 - 693
- Asztely, F., Kokaia, M., Olofsdotter, K., Ortegren, U., Lindvall, O. (2000): Afferent-specific modulation of short-term synaptic plasticity by neurotrophins in dentate gyrus, Eur J Neurosci. 12(2): 662 - 669
- Awapara, J., Landua, A.J., Fuerst, R., Seale, B. (1950): Free  $\gamma$ -aminobutyric acid in brain, J. Biol. Chem. 187, 35 - 39
- Barde, Y.A. (1989): Trophic factors and neuronal survival, Neuron 2(6): 1525 - 1534
- Barde, Y.A., Edgar, D., Thoenen, H. (1982): Purification of a new neurotrophic factor from mammalian brain, EMBO J. 1: 549 - 553
- Barnea, A., Roberts, J. (2001): Induction of functional and morphological expression of neuropeptide Y (NPY) in cortical cultures by brain-derived neurotrophic factor (BDNF): evidence for a requirement for extracellular-regulated kinase (ERK)-dependent and ERK-independent mechanisms, Brain Res. 919: 57 – 69
- Baquet, Z.C., Bickford, P.C., Jones, K.R. (2005): Brain-derived neurotrophic factor is required for the establishment of the proper number of dopaminergic neurons in the substantia nigra pars compacta, J Neurosci. 25(26): 6251 – 6259
- Bedard, A., Gravel, C., Parent, A. (2005): Chemical characterization of newly generated neurons in the striatum of adult primates, Exp Brain Res. 23: 1-12
- Bennett, B.D., Bolam, J.P. (1994): Synaptic input and output of parvalbumin-immunoreactive neurons in the neostriatum of the rat, Neuroscience 62:

707 – 719

- Berghuis, P., Dobszay, M.B., Sousa, K.M., Schulte, G., Mager, P.P., Hartig, W., Gorcs, T.J., Zilberter, Y., Ernfors, P., Harkany, T. (2004): Brain-derived neurotrophic factor controls functional differentiation and microcircuit formation of selectively isolated fast-spiking GABAergic interneurons, *Eur J Neurosci.* 20(5): 1290 - 1306
- Bering, R., Draguhn, A., Diemer, N.H., Johansen, F.F. (1997): Ischemia changes the coexpression of somatostatin and neuropeptide Y in hippocampal interneurons, *Exp. Brain Res.* 115: 423 – 429
- Berkemeier, L.R., Winslow, J.W., Kaplan, D.R., Nikolics, K., Goedel, D.V., Rosenthal, A. (1991): Neurotrophin-5: a novel neurotrophic factor that activates trk and trkb, *Neuron* 7: 857 - 866
- Bibl, M., Barde, Y.A. (2000): Neurotrophins: key regulators of cell fate and cell shape in the vertebrate nervous system, *Genes Dev.* 14: 2919 – 2937
- Brazeau, P., et al. (1973): Hypothalamic polypeptide that inhibits the secretion of immunoreactive pituitary growth hormone, *Science* 179(68): 77 - 79
- Bucker, E.D. (1948): Implantation of tumours in the hind limb field of the embryonic chick and the developmental response of the lumbosacral nervous system, *Anat Rec.* 102: 369 - 389
- Chao, M.V., Rajagopal, R., Lee, F.S. (2006): Neurotrophin signalling in health and disease, *Clin Sci (Lond)*. 110(2): 167 - 173
- Celio, M.R. (1990): Calbindin D-28k and Parvalbumin in the rat nervous system, *Neuroscience* 35: 375 - 475
- Cowan, R.L., Wilson, C.J., Emson, P.C., Heizmann, C.W. (1990): Parvalbumin containing GABAergic interneurons in the rat neostriatum, *J. Comp. Neurol.* 302: 197 – 205
- Croll, S.D., Wiegand, S.J., Anderson, K.D., Lindsay, R.M., Nawa, H. (1994): Regulation of neuropeptides in adult rat forebrain by the neurotrophins BDNF and NGF, *Eur. J. Neurosci.* 6: 1343 – 1353
- Croll, S.D., Chesnutt, C.R., Greene, N.A., Lindsay, R.M., Wiegand, S.J. (1999): Peptide immunoreactivity in aged rat Kortex and hippocampus as a function of memory and BDNF infusion, *Pharmacol. Biochem. Behav.* 64: 625 – 635
- Danzer, S.C., Crooks, K.R., Lo, D.C., McNamara, J.O. (2002): Increased expression

of brain-derived neurotrophic factor induces formation of basal dendrites and axonal branching in dentate granule cells in hippocampal explant cultures, J Neurosci. 22(22): 9754 - 9763

Das, K.P., Chao, S.L., White, L.D., Haines, W.T., Harry, G.J., Tilson, H.A., Barone Jr., S. (2001): Differential patterns of nerve growth factor, brain-derived neurotrophic factor and neurotrophin-3 mRNA and protein levels in developing regions of rat brain, Neuroscience 103: 739 – 61

Davies, A.M. (1996): The neurotrophic hypothesis: where does it stand? Philos Trans R Soc Lond B Biol Sci 351(1338): 389 – 94

Eisch, A.J. (2002): Adult neurogenesis: implications for psychiatry, Prog Brain Res. 138: 315 - 342

Eriksdotter Jonhagen, M., Nordberg, A., Amberla, K., Backman, L., Ebendal, T., Meyerson, B., Olson, L., Shigeta, M., Theodorsson, E., Viitanen, M., Winblad, B., Wahlund, L.O. (1998): Intracerebroventricular infusion of nerve growth factor in three patients with Alzheimers disease, Dementia Geriat. Cogn. Disord. 9: 246 - 257

Ernfors, P., Ibanez, C.F., Ebendal, T., Olson, L., Persson, H. (1990): Molecular cloning and neurotrophic activities of a protein with structural similarities to nerve growth factor: developmental and topographical expression in the brain, Proc Natl Acad Sci 14: 5454 - 5458

Ernfors, P., Lee, K.F., Jaenisch, R.(1994): Mice lacking brain-derived neurotrophic factor develop with sensory deficits, Nature 368(6467): 147 - 150

Fiumelli, H., Kiraly, M., Ambrus, A., Magistretti, P.J., Martin, J.L. (2000): Opposite regulation of calbindin and calretinin expression by brain- derived neurotrophic factor in cortical neurons, J. Neurochem. 74: 1870 – 1877

Fryer, R.H., Kaplan, D.R., Feinstein, S.C., Radeke, M.J., Grayson, D.R., Kromer, L.F. (1996): Developmental and mature expression of full-length and truncated TrkB receptors in the rat forebrain, J. Comp. Neurol. 374: 21 – 40

Ginty, D.D., Segal, R.A. (2002): Retrograde neurotrophin signaling: Trk-ing along the axon, Curr Opin Neurobiol. 12(3): 268 - 274

Götz, R., Schart, I.M. (1994): The conservation of neurotrophic factors during vertebrate evolution, Comp Biochem Physiol Pharmacol Toxicol Endocrinol 108(1): 1 – 10

- Götz, R., Koster, R., Winkler, C., Raulf, F., Lottspeich, F., Schart, I.M., Thoenen, H. (1994): Neurotrophin-6 is a new member of the nerve growth factor family, Nature 372: 266 - 269
- Grimes, M.L., Zhou, J., Beattie, E.C., Yuen, E.C., Hall, D.E., Valletta, J.S., Topp, K.S., Lavail, J.H., Bennett, N.W., Mobley, W.C. (1996): Endocytosis of activated TrkA: evidence that nerve growth factor induces formation of signaling endosomes, J Neurosci 16(24): 7950 - 64
- Große, G., Thiele, T., Heuckendorf, E., Schopp, E., Merder, S., Pickert, G., Ahnert-Hilger, G. (2002): Deltamethrin differentially affects neuronal subtypes in hippocampal primary culture, Neuroscience 112(1): 233 -241
- Große, G., Djalali, S., Deng, D.R., Höltje, M., Hinz, B., Schwartzkopff, K., Cygona, M., Rothe, T., Stroh, T., Hellweg, R., Ahnert-Hilger, G., Hörtogel, H. (2005): Area-specific effects of brain-derived neurotrophic factor (BDNF) genetic ablation on various neuronal subtypes of the mouse brain, Dev. Brain Res. 156 – (2): 111 - 126
- Hallbook, F., Ibanez, C.F., Persson, H. (1991): Evolutionary studies of the nerve growth factor family reveal a novel member abundantly expressed in Xenopus ovary, Neuron 5: 845 - 858
- Hendry, I.A., Stockel, K., Thoenen, H., Iversen, L.L. (1974): The retrograde axonal transport of nerve growth factor, Brain Res 68(1): 103 - 21
- Henneberger, C., Grantyn, R., Rothe, T. (2000): Rapid genotyping of newborn gene mutant mice, J. Neurosci. Methods 100: 123 – 126
- Hohn, A., Leibrock, J., Bailey, K., Barde, Y.A. (1990): Identification and characterization of a novel member of the nerve growth factor / brain derived neurotrophic factor family, Nature 344: 339 - 341
- Holtzman, D.M., Lowenstein, D.H. (1995): Selective inhibition of axon outgrowth by antibodies to NGF in a model of temporal lobe epilepsy, J Neurosci. 15(11): 7062 - 7070
- Huang, E.J., Reichardt, L.F. (2001): Neurotrophins: roles in neuronal development and function, Annu. Rev. Neurosci. 24: 677 – 736
- Huang, E.J., Reichardt, L.F. (2003): Trk receptors: roles in neuronal signal transduction, Annu Rev Biochem. 72: 609 - 642
- Ip, N.Y., Li, Y., Yankopoulus, G.D., Lindsay, R.M. (1993): Cultured hippocampal

- neurons show responses to BDNF, NT-3 and NT-4, but not NGF, J. Neurosci. 13: 3394 – 3405
- Ivkovic, S., Ehrlich, M.E. (1999): Expression of the striatal DARPP-32/ARPP-21 phenotype in GABAergic neurons requires neurotrophins in vivo and in vitro, J. Neurosci. 19: 5409 – 5419
- Johnson, D., Lanahan, A., Buck, C.R., Sehgal, A., Morgan, C., Mercer, E., Bothwell, M., Chao, M. (1986): Expression and structure of the human NGF receptor, Cell 47: 545 – 554
- Jones, K.R., Farinas, I., Backus, C., Reichardt, L.F. (1994): Targeted disruption of the BDNF gene perturbs brain and sensory neuron development but not motor neuron development, Cell 76: 989 – 999
- Kawaguchi, Y., Wilson, C.J., Augood, S.J., Emson, P.C. (1995): Striatal interneurones: chemical, physiological and morphological characterization, Trends Neurosci. 18: 527 – 535
- Knusel, B., Beck, K.D., Winslow, J.W., Rosenthal, A., Burton, L.E., Widmer, H.R., Nikolics, K., Hefti, F. (1992): Brain-derived neurotrophic factor administration protects basal forebrain cholinergic but not nigral dopaminergic neurons from degenerative changes after axotomy in the adult rat brain, J. Neurosci. 12: 4391 – 4402
- Kohler, C., Eriksson, L.G., Davies, S., Chan-Palay, V. (1987): Co-localization of neuropeptide tyrosine and somatostatin immunoreactivity in neurons of individual subfields of the rat hippocampal region, Neurosci. Lett. 78: 1 – 6
- Korschning, S. (1993): The neurotrophic factor concept: a re-examination, J. Neuroscience 13: 2739 - 2748
- Kretsinger, R. H. (1981): Mechanism of selective signaling by calcium, Neurosci. Res. Progr. Bull. 19: 215 - 291
- Kubota, Y., Kawaguchi, Y. (2000): Dependence of GABAergic synaptic areas on the interneuron type and target size, J. Neurosci. 20: 375 – 386
- Lai, K.O., Fu, W.Y., Ip, F.C., Ip, N.Y. (1998): Cloning and expression of a novel neurotrophin, NT-7, from carp, Mol Cell Neurosci. 11(1-2): 64 - 76
- Lapper, S.R., Smith, Y., Sadikot, A.F., Parent, A., Bolam, J.P. (1992): Cortical input to parvalbumin-immunoreactive neurones in the putamen of the squirrel monkey, Brain Res. 580: 215 – 224
- Larsson, E., Lindvall, O., Kokaia, Z. (2001): Stereological assessment of vulnerability

- of immunocytochemically identified striatal and hippocampal neurons after global cerebral ischemia in rats, *Brain Res.* 913: 117 – 132
- Leibrock, J., Lottspeich, F., Hohn, A., Hofer, M., Hengerer, B., Masiakowski, P., Thoenen, H., Barde, Y.A. (1989): Molecular cloning and expression of brain derived neurotrophic factor, *Nature* 341: 149 - 152
- Levi, A., Shechter, Y., Neufeld, E.J., Schlessinger, J. (1980): Mobility, clustering and transport of nerve growth factor in embryonal sensory cells and in a sympathetic neuronal cell line, *Proc Natl Acad Sci U S A* 77(6): 3469 - 73
- Levine, E.S., Dreyfus, C.F., Black, I.B., Plummer, M.R. (1996): Selective role for trkB neurotrophin receptors in rapid modulation of hippocampal synaptic transmission, *Brain Res. Mol. Brain Res.* 38: 300 – 303
- Lewin, G.R., Barde, Y.A. (1996): Physiology of the neurotrophins, *Annu. Rev. Neuroscience* 19: 289 - 317
- Loudes, C., Petit, F., Kordon, C., Faivre-Bauman, A. (2000): Brain-derived neurotrophic factor but not neurotrophin-3 enhances differentiation of somatostatin neurons in hypothalamic cultures, *Neuroendocrinology* 72: 144 – 153
- Lu, B. (2004): Acute and long-term synaptic modulation by Neurotrophins, *Prog Brain Res.* 146: 137 - 150
- Maisonpierre, P.C., Belluscio, L., Friedman, B., Alderson, R.F., Wiegand, S.J., Furth, M.E., Lindsay, R.M., Yancopoulos, G.D. (1990): NT-3, BDNF and NGF in the developing rat nervous system: parallel as well as reciprocal patterns of expression, *Neuron* 5: 501 – 509
- Marty, S., Berninger, B., Carroll, P., Thoenen, H. (1996): GABAergic stimulation regulates the phenotype of hippocampal interneurons through the regulation of brain derived neurotrophic factor, *Neuron* 16: 565 – 570
- Marty, S., da Penha Berzaghi, M., Berninger, B. (1997): Neurotrophins and activity-dependent plasticity of cortical interneurons, *Trends Neurosci.* 20: 198 – 202
- Marty, S., Onténiente, B. (1997): The expression pattern of somatostatin and calretinin by postnatal hippocampal interneurons is regulated by activity-dependent and -independent determinants, *Neuroscience* 80(1): 79 - 88
- Marty, S., Onténiente, B. (1999): BDNF and NT-4 differentiate two pathways in the modulation of neuropeptide protein levels in postnatal hippocampal interneurons, *Eur. J. Neurosci.* 11: 1647 – 1656

- Marty, S., Wehrle, R., Sotelo, C. (2000 a): Neuronal activity and brain-derived neurotrophic factor regulate the density of inhibitory synapses in organotypic slice cultures of postnatal hippocampus, *J. Neurosci.* 20: 8087 – 8095
- Marty, S. (2000 b): Differences in the regulation of neuropeptide Y, somatostatin and parvalbumin levels in hippocampal interneurons by neuronal activity and BDNF, *Prog Brain Res.* 128: 193 - 202
- Masana, Y., Wanaka, A., Kato, H., Asai, T., Tohyama, M. (1993): Localization of trkB mRNA in postnatal brain development, *J. Neurosci. Res.* 35: 468 – 479
- Majdan, M., Miller, F.D. (1999): Neuronal life and death decisions functional antagonism between the Trk and p75 neurotrophin receptors, *Int J Dev Neurosci.* Jun;17(3):153 - 161
- Meakin, S.O., Shooter, E.M. (1992): The nerve growth factor family of receptors, *Trends Neurosci* 15(9): 323 - 31
- Nawa, H., Bessho, Y., Carnahan, J., Nakanishi, S., Mizuno, K. (1993): Regulation of neuropeptide expression in cultured cerebral cortical neurons by brain-derived neurotrophic factor, *J. Neurochem.* 60: 772 - 775.
- Nawa, H., Pelleymounter, M.A., Carnahan, J. (1994): Intraventricular administration of BDNF increases neuropeptide expression in newborn rat brain, *J. Neurosci.* 14: 3751 - 3765
- Nawa, H., Carnahan, J., Gall, C. (1995): BDNF protein measured by a novel enzyme immunoassay in normal brain and after seizure: partial disagreement with mRNA levels, *Eur. J. Neurosci.* 7: 1527 – 1535
- Nitsch, R., Soriano, E., Frotscher, M. (1990): The parvalbumin-containing nonpyramidal neurons in the rat hippocampus, *Anat Embryol (Berl)*. 181(5): 413 - 425
- Nonomura, T., Hatanaka, H. (1992): Neurotrophic effect of brain-derived neurotrophic factor on basal forebrain cholinergic neurons in culture from postnatal rats, *Neurosci. Res.* 14: 226 – 233.
- Olofsdotter, K., Lindvall, O., Asztely, F. (2000): Increased synaptic inhibition in dentate gyrus of mice with reduced levels of endogenous brain-derived neurotrophic factor, *Neuroscience* 101(3): 531 - 539
- Patel, Y.C., et al. (1995): The somatostatin receptor family, *Life Sci.* 57(13): 1249 – 1265
- Poo, M.M. (2001): Neurotrophins as synaptic modulators, *Nat. Rev., Neurosci.* 2:

24 – 32

- Pozzo-Miller, L.D., Gottschalk, W., Zhang, L., McDermott, K., Du, J., Gopalakrishnan, R., Oho, C., Sheng, Z., Lu, B. (1999): Impairments in high-frequency transmission, synaptic vesicle docking, and synaptic protein distribution in the hippocampus of BDNF knockout mice, *J. Neurosci.* 19: 4972 - 4983
- Reibel, S., Vivien-Roels, B., Le, B.T., Larmet, Y., Carnahan, J., Marescaux, C., Depaulis, A. (2000): Overexpression of neuropeptide Y induced by brain-derived neurotrophic factor in the rat hippocampus is long lasting, *Eur J Neurosci.* 12(2): 595 – 605
- Ren-Patterson, R.F., Cochran, L.W., Holmes, A., Sherrill, S., Huang, S.J., Tolliver, T. Lesch, K.P., Lu, B. Murp, D.L. (2005): Loss of brain-derived neurotrophic factor gene allele exacerbates brain monoamine deficiencies and increases stress abnormalities of serotonin transporter knockout mice, *J Neurosci Res.* 79-6: 756 - 71
- Roberts, E., Frankel, S. (1950):  $\gamma$ -aminobutyric acid in brain: its formation from glutamic acid, *J. Biol. Chem* 187, 55 - 63
- Rutherford, L.C., DeWan, A., Lauer, H.M., Turrigiano, G.G. (1997): Brain-derived neurotrophic factor mediates the activity-dependent regulation of inhibition in neocortical cultures, *J. Neurosci.* 17: 4527 – 4535
- Scharfman, H. (1997): Hyperexcitability in combined entorhinal/hippocampal slices of adult rat after exposure to brain-derived neurotrophic factor, *J Neurophysiol.* 78(2): 1082-1095
- Scharfman, H., Goodman, J., Macleod, A., Phani, S., Antonelli, C., Croll, S. (2005): Increased neurogenesis and the ectopic granule cells after intrahippocampal BDNF infusion in adult rats, *Exp Neurol.* 192(2): 348 - 356
- Takahashi, M., Hayashi, S., Kakita, A., Wakabayashi, K., Fukuda, M., Kameyama, S., Tanaka, R., Takahashi, H., Nawa, H. (1999): Patients with temporal lobe epilepsy show an increase in brain-derived neurotrophic factor protein and its correlation with neuropeptide Y, *Brain Res.* 818: 579 - 582
- Takei, N., Sasaoka, K., Higuchi, H., Endo, Y., Hatanaka, H. (1996): BDNF increases the expression of neuropeptide Y mRNA and promotes differentiation/maturation of neuropeptide Y positive cultured cortical neurons from embryonic and postnatal rats, *Mol. Brain Res.* 37: 283 - 289
- Thoenen, H., Barde, Y.A. (1980): Physiology of nerve growth factor, *Physiol Rev*

- 60(4): 1284 - 335
- Thoenen, H., Sendtner, M. (2002): Neurotrophins: from enthusiastic expectations through sobering experiences to rational therapeutic approaches, *Nat Neurosci.* 5 Suppl: 1046 – 1050
- Tohyama, M., Takatsuji, K. (1998): Atlas of Neuroactive Substances and their Receptors in the Rat, 98-103, 260-265, 294-299
- Udenfriend S. (1950): A micro technique for identification of organic compounds using isotopic indicators and paper chromatography, *Fed. Proc.* 9, 240
- Vezzani, A., Ravizza, T., Moneta, D., Conti, M., Borroni, A., Rizzi, M., Samanin, R., Maj, R. (1999): Brain-derived neurotrophic factor immunoreactivity in the limbic system of rats after acute seizures and during spontaneous convulsions: temporal evolution of changes as compared to neuropeptide Y, *Neuroscience* 90: 1445 - 1461
- Villuendas, G., Sanchez-Franco, F., Palacios, N., Fernandez, M., Cacicedo, L. (2001): Involvement of VIP on BDNF-induced somatostatin gene expression in cultured fetal rat cerebral cortical cells, *Brain Res. Mol. Brain Res.* 94: 59 – 66
- Woo, N.H., Lu, B. (2006): Regulation of cortical interneurons by Neurotrophins: from development to cognitive disorders, *Neuroscientist.* 12(1): 43 - 56
- Yamada, M.K., Nakanishi, K., Ohba, S., Nakamura, T., Ikegaya, Y., Nishiyama, N., Matsuki, N. (2002): Brain-derived neurotrophic factor promotes the maturation of GABAergic mechanisms in cultured hippocampal neurons, *J. Neurosci.* 22: 7580 – 7585
- Yuen, E.C., Howe, C.L., Li, Y., Holtzman, D.M., Mobley, W.C. (1996): Nerve growth factor and the neurotrophic factor hypothesis, *Brain Dev* 18(5): 362 - 8
- Yuen, E.C., Mobley, W.C. (1996): Therapeutic potential of neurotrophic factors for neurological disorders, *Ann Neurol* 40(3): 346 – 54
- Zweifel, L.S., Kuruvilla, R., Ginty, D.D. (2005): Functions and mechanisms of retrograde neurotrophin signalling, *Nat Rev Neurosci.* 6(8): 615 - 625

## Abkürzungsverzeichnis

BDNF	brain derived neurotrophic factor
°C	Grad Celsius
CA	Cornu ammonis
DAB	Diaminobenzidin
dH <sub>2</sub> O	destilliertes Wasser
g	Gramm
GABA	Gamma-Amino-Buttersäure
GAD 67	Glutamate-Decarboxylase mit 67 kDa
H <sub>2</sub> O <sub>2</sub>	Wasserstoffperoxid
Hi	Hilus
IE	Internationale Einheit
IgG	Immunglobulin G
kDa	Kilo-Dalton
KGW	Körpergewicht
KCl	Kaliumchlorid
l	Liter
LANR	low-affinity neurotrophin receptor
M	Molar
mm	Millimeter
μ	Mikro
min	Minute
mRNA	messenger- Ribonukleinsäure
n	Nano ( $10^{-9}$ )
NGF	nerve growth factor
NPY	Neuropeptid Y
NT	Neurotrophin
P	Postnataltag
PBS	Phosphat gepufferte Saline
PBS-A	Rinderserum Albumin in PBS
PCR	Polymerase Chain Reaction
pH	negativer dekadischer Logarithmus der Protonenmolarität

PNS	peripheres Nervensystem
sec	Sekunde
SNC	Substancia nigra pars compacta
Sub	Subiculum
TH	Tyrosin Hydroxylase
Tris	Trishydroxymethylaminomethan
Trk	Tyrosinkinase
v/v	volume/volume
w/v	weight/volume
ZNS	zentrales Nervensystem

## **Abbildungsverzeichnis**

Abbildung 1 - Histologie des Hippocampus	10
Abbildung 2 – Neurotrophin Rezeptoren	16
Abbildung 3 - Foto eines BDNF +/+ und -/- Geschwisterpaars	27
Abbildung 4 - Immunzytochemische Darstellung von GAD67	32
Abbildung 5 - Immunzytochemische Darstellung von NPY	34
Abbildung 6 - Anzahl NPY immunreaktiver Nervenzellen	35
Abbildung 7 -Immunzytochemische Darstellung von Somatostatin	37
Abbildung 8 - Anzahl Somatostatin immunreaktiver Nervenzellen	38
Abbildung 9 - Immunzytochemische Darstellung von Parvalbumin	41
Abbildung 10 - Anzahl Parvalbumin immunreaktiver Nervenzellen	42
Abbildung 11 - Immunzytochemische Darstellung von Calretinin	44
Abbildung 12 - Anzahl Calretinin immunreaktiver Nervenzellen	45
Abbildung 13 - Stratum oriens und Stratum radiatum im Hippocampus	46
Abbildung 14 - Immunzytochemische Darstellung von Calbindin	47

## **Tabellenverzeichnis**

Tabelle 1: Mittelwerte der Anzahl NPY positiver Nervenzellen pro definierte Fläche ± der Standardabweichung	33
Tabelle 2: Mittelwerte der Anzahl Somatostatin positiver Nervenzellen pro definierte Fläche ± der Standardabweichung	36
Tabelle 3: Mittelwerte der Anzahl Parvalbumin positiver Nervenzellen pro definierte Fläche ± der Standardabweichung	40
Tabelle 4: Mittelwerte der Anzahl Calretinin positiver Nervenzellen pro definierte Fläche ± der Standardabweichung	43
Tabelle 5: Mittelwerte der Anzahl Calbindin positiver Nervenzellen pro definierte Fläche ± der Standardabweichung	47

## **Publikation**

Große, G., Djalali, S., Deng, D.R., Höltje, M., Hinz, B., Schwartzkopff, K., Cygon, M., Rothe, T., Stroh, T., Hellweg, R., Ahnert-Hilger, G., Hörtnagel, H. (2005): Area-specific effects of brain-derived neurotrophic factor (BDNF) genetic ablation on various neuronal subtypes of the mouse brain, Dev. Brain Res. 156 – (2): 111 - 126

## **Erklärung**

„Ich, Katharina Herrmann-Schwartzkopff, erkläre, dass ich die vorgelegte Dissertationsschrift mit dem Thema: „Vergleichende Studie zur Expression von Neuropeptiden und von Calcium-bindenden Proteinen im Hippocampus von BDNF Knock-out Mäusen und den entsprechenden Wildtyp Geschwistertieren“ selbst verfasst und keine anderen als die angegebenen Quellen und Hilfsmittel benutzt, ohne die (unzulässige) Hilfe Dritter verfasst und auch in Teilen keine Kopien anderer Arbeiten dargestellt habe.“

Frankfurt, den 14. Februar 2007

Katharina Herrmann-Schwartzkopff

## **Lebenslauf**

Mein Lebenslauf wird aus Datenschutzgründen in der elektronischen Version meiner Arbeit nicht mit veröffentlicht.

## Danksagung

Zu dieser Arbeit trugen viele Mitarbeiter der Arbeitsgruppe einen Teil mit bei, sei es durch die wissenschaftlichen Gespräche, Diskussionen und Hinweise, oder einfach ein freundliches Lächeln im Gang. So wurde es mir ermöglicht diese Arbeit an einem gern besuchten Ort anzufertigen.

PD Dr. Gisela Große betreute die Arbeit mit viel Engagement, Flexibilität und Ideen. Ihr gilt mein herzlichster Dank.

Als ich diese Arbeit begonnen habe, hat mir vor allem Falko Radtke mit größter Geduld das technische Wissen beigebracht und stand mir stets mit Rat und Tat zur Seite. Damit hat er mir entscheidend geholfen den Grundstock für dieses Werk zu legen. Sein tragischer Tod hat mich schwer getroffen. Ich vermisse ihn sehr.

Und ebenso unterstützten mich viele andere Mitarbeiter des Instituts, die mich nicht nur während der Doktorarbeit freundlich, offen und helfend in ihre Gruppe aufnahmen, sondern die mich auch in der Freizeit begleiteten und die mir zum Teil zu guten Freunden geworden sind. Aus diesem Grund danke ich Anne, Annett, Birgit, Carola, Markus, Sandra, Sascha, Susann, Thomas, Ursel und Prof. Gudrun Ahnert-Hilger.

Richard schaffte es durch seine engagierte Unterstützung mir den nötigen Druck für den Endspurt zu machen. 1000 Dank dafür!

Weiterhin danke ich Axel für alles, was er tagtäglich für mich tut.

Den größten Dank möchte ich an meine Eltern aussprechen, die sooft es ihnen möglich ist mit liebevoller Unterstützung und großer Hilfe für mich einspringen.

Habt vielen herzlichen Dank!