

7 Literaturverzeichnis

- Abe, K., Niihara, Y., and Misawa, M. (2004). GABA_A receptor-mediated inhibition by ethanol of long-term potentiation in the basolateral amygdala-dentate gyrus pathway in vivo. *Neuroscience* 125, 113-117.
- Abraham, W.C. and Bear, M.F. (1996). Metaplasticity: the plasticity of synaptic plasticity. *Trends Neurosci.* 19, 126-130.
- Abraham, W.C. and Tate, W.P. (1997). Metaplasticity: a new vista across the field of synaptic plasticity. *Prog. Neurobiol.* 52, 303-323.
- Abraham, W.C. (1999). Metaplasticity: Key Element in Memory and Learning? *News Physiol Sci.* 14, 85.
- Abraham, W.C. and Williams, J.M. (2003). Properties and mechanisms of LTP maintenance. *Neuroscientist.* 9, 463-474.
- Adamec, R.E. (1990). Amygdala kindling and anxiety in the rat. *Neuroreport* 1, 255-258.
- Adamec, R.E. and McKay, D. (1993). Amygdala kindling, anxiety, and corticotrophin releasing factor (CRF). *Physiol Behav.* 54, 423-431.
- Adamec, R.E. and Morgan, H.D. (1994). The effect of kindling of different nuclei in the left and right amygdala on anxiety in the rat. *Physiol Behav.* 55, 1-12.
- Adamec, R.E. (1994). Modelling anxiety disorders following chemical exposures. *Toxicol. Ind. Health* 10, 391-420.
- Adamec, R.E. (1997). Transmitter systems involved in neural plasticity underlying increased anxiety and defense--implications for understanding anxiety following traumatic stress. *Neurosci. Biobehav. Rev.* 21, 755-765.
- Adamec, R.E. (1999). Evidence that limbic neural plasticity in the right hemisphere mediates partial kindling induced lasting increases in anxiety-like behavior: effects of low frequency stimulation (quenching?) on long term potentiation of amygdala efferents and behavior following kindling. *Brain Res.* 839, 133-152.
- Adamec, R.E. and Shallow, T. (2000a). Effects of baseline anxiety on response to kindling of the right medial amygdala. *Physiol Behav.* 70, 67-80.
- Adamec, R.E. and Shallow, T. (2000b). Rodent anxiety and kindling of the central amygdala and nucleus basalis. *Physiol Behav.* 70, 177-187.

- Adamec,R.E. and Young,B. (2000). Neuroplasticity in specific limbic system circuits may mediate specific kindling induced changes in animal affect-implications for understanding anxiety associated with epilepsy. *Neurosci. Biobehav. Rev.* 24, 705-723.
- Adamec,R.E., Blundell,J., and Burton,P. (2004). Anxiolytic effects of kindling role of anatomical location of the kindling electrode in response to kindling of the right basolateral amygdala. *Brain Res.* 1024, 44-58.
- Adolphs,R. (2001). The neurobiology of social cognition. *Curr. Opin. Neurobiol.* 11, 231-239.
- Adolphs,R. (2002). Neural systems for recognizing emotion. *Curr. Opin. Neurobiol.* 12, 169-177.
- Akbar,M.T., Rattray,M., Powell,J.F., and Meldrum,B.S. (1996). Altered expression of group I metabotropic glutamate receptors in the hippocampus of amygdala-kindled rats. *Brain Res. Mol. Brain Res.* 43, 105-116.
- Akopian,G. and Walsh,J.P. (2002). Corticostriatal paired-pulse potentiation produced by voltage-dependent activation of NMDA receptors and L-type Ca(2+) channels. *J. Neurophysiol.* 87, 157-165.
- Albrecht,D., Drephal,C., and Kaschel,T. (2002). Intraamygdaloid-induced long-term potentiation and long-term depression in the lateral nucleus of the amygdala is NMDA-dependent. *Neurosci. Soc.* 648. 15.
- Albrecht,D., Hellner,K., Walther,T., and von Bohlen und Halbach,O. (2003). Angiotensin II and the amygdala. *Ann. N. Y. Acad. Sci.* 985, 498-500.
- Allison,C. and Pratt,J.A. (2003). Neuroadaptive processes in GABAergic and glutamatergic systems in benzodiazepine dependence. *Pharmacol. Ther.* 98, 171-195.
- Amorapanth,P., LeDoux,J.E., and Nader,K. (2000). Different lateral amygdala outputs mediate reactions and actions elicited by a fear-arousing stimulus. *Nat. Neurosci.* 3, 74-79.
- Andersen,S.L. and Teicher,M.H. (1999). Serotonin laterality in amygdala predicts performance in the elevated plus maze in rats. *Neuroreport* 10, 3497-3500.
- Anwyl,R., Walshe,J., and Rowan,M. (1987). Electroconvulsive treatment reduces long-term potentiation in rat hippocampus. *Brain Res.* 435, 377-379.
- Arato,M., Frecska,E., Tekes,K., and MacCrimmon,D.J. (1991). Serotonergic interhemispheric asymmetry: gender difference in the orbital cortex. *Acta Psychiatr. Scand.* 84, 110-111.

- Aroniadou-Anderjaska, V., Post, R.M., Rogawski, M.A., and Li, H. (2001). Input-specific LTP and depotentiation in the basolateral amygdala. *Neuroreport* 12, 635-640.
- Asprodini, E.K., Rainnie, D.G., Anderson, A.C., and Shinnick-Gallagher, P. (1992). In vivo kindling does not alter afterhyperpolarizations (AHPs) following action potential firing in vitro in basolateral amygdala neurons. *Brain Res.* 588, 329-334.
- Baas, D., Aleman, A., and Kahn, R.S. (2004). Lateralization of amygdala activation: a systematic review of functional neuroimaging studies. *Brain Res. Brain Res. Rev.* 45, 96-103.
- Baudry, M. (1986). Long-term potentiation and kindling: similar biochemical mechanisms? *Adv. Neurol.* 44, 401-410.
- Bauer, E.P., LeDoux, J.E., and Nader, K. (2001). Fear conditioning and LTP in the lateral amygdala are sensitive to the same stimulus contingencies. *Nat. Neurosci.* 4, 687-688.
- Bauer, E.P., Schafe, G.E., and LeDoux, J.E. (2002). NMDA receptors and L-type voltage-gated calcium channels contribute to long-term potentiation and different components of fear memory formation in the lateral amygdala. *J. Neurosci.* 22, 5239-5249.
- Bauer, E.P. and LeDoux, J.E. (2004). Heterosynaptic long-term potentiation of inhibitory interneurons in the lateral amygdala. *J. Neurosci.* 24, 9507-9512.
- Bear, M.F. and Malenka, R.C. (1994). Synaptic plasticity: LTP and LTD. *Curr. Opin. Neurobiol.* 4, 389-399.
- Beck, H., Goussakov, I.V., Lie, A., Helmstaedter, C., and Elger, C.E. (2000). Synaptic plasticity in the human dentate gyrus. *J. Neurosci.* 20, 7080-7086.
- Ben Attia, M., N'Gouemo, P., Belaidi, M., Rondouin, G., and Chicheportiche, R. (1992). Kindling and electrode effects on the benzodiazepine receptors density of olfactory bulb and hippocampus after olfactory bulb kindling. *Neurosci. Lett.* 143, 74-78.
- Bettler, B., Boulter, J., Hermans-Borgmeyer, I., O'Shea-Greenfield, A., Deneris, E.S., Moll, C., Borgmeyer, U., Hollmann, M., and Heinemann, S. (1990). Cloning of a novel glutamate receptor subunit, GluR5: expression in the nervous system during development. *Neuron* 5, 583-595.
- Bienenstock, E.L., Cooper, L.N., and Munro, P.W. (1982). Theory for the development of neuron selectivity: orientation specificity and binocular interaction in visual cortex. *J. Neurosci.* 2, 32-48.

- Blair, H.T., Schafe, G.E., Bauer, E.P., Rodrigues, S.M., and LeDoux, J.E. (2001). Synaptic plasticity in the lateral amygdala: a cellular hypothesis of fear conditioning. *Learn. Mem.* 8, 229-242.
- Bleakman, D. and Lodge, D. (1998). Neuropharmacology of AMPA and kainate receptors. *Neuropharmacology* 37, 1187-1204.
- Bleakman, D. (1999). Kainate receptor pharmacology and physiology. *Cell Mol. Life Sci.* 56, 558-566.
- Bliss, T.V. and Gardner-Medwin, A.R. (1973). Long-lasting potentiation of synaptic transmission in the dentate area of the unanaesthetized rabbit following stimulation of the perforant path. *J. Physiol* 232, 357-374.
- Bliss, T.V. and Lomo, T. (1973). Long-lasting potentiation of synaptic transmission in the dentate area of the anaesthetized rabbit following stimulation of the perforant path. *J. Physiol* 232, 331-356.
- Bliss, T.V. and Collingridge, G.L. (1993). A synaptic model of memory: long-term potentiation in the hippocampus. *Nature* 361, 31-39.
- Bortolotto, Z.A., Clarke, V.R., Delany, C.M., Parry, M.C., Smolders, I., Vignes, M., Ho, K.H., Miu, P., Brinton, B.T., Fantaske, R., Ogden, A., Gates, M., Ornstein, P.L., Lodge, D., Bleakman, D., and Collingridge, G.L. (1999). Kainate receptors are involved in synaptic plasticity. *Nature* 402, 297-301.
- Braga, M.F., Aroniadou-Anderjaska, V., Xie, J., and Li, H. (2003). Bidirectional modulation of GABA release by presynaptic glutamate receptor 5 kainate receptors in the basolateral amygdala. *J. Neurosci.* 23, 442-452.
- Brocher, S., Artola, A., and Singer, W. (1992). Agonists of cholinergic and noradrenergic receptors facilitate synergistically the induction of long-term potentiation in slices of rat visual cortex. *Brain Res.* 573, 27-36.
- Brown, G.P., Blitzer, R.D., Connor, J.H., Wong, T., Shenolikar, S., Iyengar, R., and Landau, E.M. (2000). Long-term potentiation induced by theta frequency stimulation is regulated by a protein phosphatase-1-operated gate. *J. Neurosci.* 20, 7880-7887.
- Cavalheiro, E.A., Leite, J.P., Bortolotto, Z.A., Turski, W.A., Ikonomidou, C., and Turski, L. (1991). Long-term effects of pilocarpine in rats: structural damage of the brain triggers kindling and spontaneous recurrent seizures. *Epilepsia* 32, 778-782.
- Chapman, P.F., Kairiss, E.W., Keenan, C.L., and Brown, T.H. (1990). Long-term synaptic potentiation in the amygdala. *Synapse* 6, 271-278.

- Chapman,P.F. and Bellavance,L.L. (1992). Induction of long-term potentiation in the basolateral amygdala does not depend on NMDA receptor activation. *Synapse* 11, 310-318.
- Cincotta,M., Young,N.A., and Beart,P.M. (1991). Unilateral up-regulation of glutamate receptors in limbic regions of amygdaloid-kindled rats. *Exp. Brain Res.* 85, 650-658.
- Clarke,V.R., Ballyk,B.A., Hoo,K.H., Mandelzys,A., Pellizzari,A., Bath,C.P., Thomas,J., Sharpe,E.F., Davies,C.H., Ornstein,P.L., Schoepp,D.D., Kamboj,R.K., Collingridge,G.L., Lodge,D., and Bleakman,D. (1997). A hippocampal GluR5 kainate receptor regulating inhibitory synaptic transmission. *Nature* 389, 599-603.
- Clarke,V.R. and Collingridge,G.L. (2002). Characterisation of the effects of ATPA, a GLU(K5) receptor selective agonist, on excitatory synaptic transmission in area CA1 of rat hippocampal slices. *Neuropharmacology* 42, 889-902.
- Clugnet,M.C. and LeDoux,J.E. (1990). Synaptic plasticity in fear conditioning circuits: induction of LTP in the lateral nucleus of the amygdala by stimulation of the medial geniculate body. *J. Neurosci.* 10, 2818-2824.
- Commins,S., Gigg,J., Anderson,M., and O'Mara,S.M. (1998). Interaction between paired-pulse facilitation and long-term potentiation in the projection from hippocampal area CA1 to the subiculum. *Neuroreport* 9, 4109-4113.
- Contractor,A., Swanson,G.T., Sailer,A., O'Gorman,S., and Heinemann,S.F. (2000). Identification of the kainate receptor subunits underlying modulation of excitatory synaptic transmission in the CA3 region of the hippocampus. *J. Neurosci.* 20, 8269-8278.
- Contractor,A., Swanson,G., and Heinemann,S.F. (2001). Kainate receptors are involved in short- and long-term plasticity at mossy fiber synapses in the hippocampus. *Neuron* 29, 209-216.
- Cousens,G. and Otto,T.A. (1998). Induction and transient suppression of long-term potentiation in the peri- and postrhinal cortices following theta-related stimulation of hippocampal field CA1. *Brain Res.* 780, 95-101.
- Dahchour,A., Quertemont,E., and De Witte,P. (1996). Taurine increases in the nucleus accumbens microdialysate after acute ethanol administration to naive and chronically alcoholised rats. *Brain Res.* 735, 9-19.
- Davis,M. and Shi,C. (2000). The amygdala. *Curr. Biol.* 10, R131.
- Davis,M., Walker,D.L., and Myers,K.M. (2003). Role of the amygdala in fear extinction measured with potentiated startle. *Ann. N. Y. Acad. Sci.* 985, 218-232.

- De Witte,P., Pinto,E., Anseau,M., and Verbanck,P. (2003). Alcohol and withdrawal: from animal research to clinical issues. *Neurosci. Biobehav. Rev.* 27, 189-197.
- Deckel,A.W. and Fuqua,L. (1998). Effects of serotonergic drugs on lateralized aggression and aggressive displays in *Anolis carolinensis*. *Behav. Brain Res.* 95, 227-232.
- dos Santos,N.F., Arida,R.M., Filho,E.M., Priel,M.R., and Cavalheiro,E.A. (2000). Epileptogenesis in immature rats following recurrent status epilepticus. *Brain Res. Rev.* 32, 269-276.
- Doyere,V., Schafe,G.E., Sigurdsson,T., and LeDoux,J.E. (2003). Long-term potentiation in freely moving rats reveals asymmetries in thalamic and cortical inputs to the lateral amygdala. *Eur. J. Neurosci.* 17, 2703-2715.
- Drephal,C. and Albrecht,D. (2003). Long-term potentiation (LTP) in the lateral amygdala. *Proc. of the 5th Meeting of the German Neuroscience Society, 29th Göttingen Neurobiology Conference.* N. Elsner and H. Zimmermann (eds.), Georg-Thieme Verlag, Stuttgart, New York, p. 672.
- Drephal, C. (2005). Langzeitpotenzierung in der lateralen Amygdala der Ratte. Dissertation, Medizinische Fakultät der Charité, Berlin.
- Eskazan,E., Onat,F.Y., Aker,R., Oner,G., and Onat,F.Y. (2002). Resistance to propagation of amygdaloid kindling seizures in rats with genetic absence epilepsy. *Epilepsia* 43, 1115-1119.
- Esteban,S., Moranta,D., Sastre-Coll,A., Miralles,A., and Garcia-Sevilla,J.A. (2002). Withdrawal from chronic ethanol increases the sensitivity of presynaptic 5-HT(1A) receptors modulating serotonin and dopamine synthesis in rat brain in vivo. *Neurosci. Lett.* 326, 121-124.
- Everitt,B.J. and Robbins,T.W. (2000). Second-order schedules of drug reinforcement in rats and monkeys: measurement of reinforcing efficacy and drug-seeking behaviour. *Psychopharmacology (Berl)* 153, 17-30.
- Faber,E.S., Callister,R.J., and Sah,P. (2001). Morphological and electrophysiological properties of principal neurons in the rat lateral amygdala in vitro. *J. Neurophysiol.* 85, 714-723.
- Fanselow,M.S. and Gale,G.D. (2003). The amygdala, fear, and memory. *Ann. N. Y. Acad. Sci.* 985, 125-134.
- Fendt,M. and Fanselow,M.S. (1999). The neuroanatomical and neurochemical basis of conditioned fear. *Neurosci. Biobehav. Rev.* 23, 743-760.

- Friedl, M., Clusmann, H., Kral, T., Dietrich, D., and Schramm, J. (1999). Analysing metabotropic glutamate group III receptor mediated modulation of synaptic transmission in the amygdala-kindled dentate gyrus of the rat. *Brain Res.* 821, 117-123.
- Gean, P.W. and Chang, F.C. (1992). Pharmacological characterization of excitatory synaptic potentials in rat basolateral amygdaloid neurons. *Synapse* 11, 1-9.
- Gean, P.W., Chang, F.C., Huang, C.C., Lin, J.H., and Way, L.J. (1993). Long-term enhancement of EPSP and NMDA receptor-mediated synaptic transmission in the amygdala. *Brain Res. Bull.* 31, 7-11.
- Gemmell, C. and O'Mara, S.M. (2002). Plasticity in the projection from the anterior thalamic nuclei to the anterior cingulate cortex in the rat in vivo: paired-pulse facilitation, long-term potentiation and short-term depression. *Neuroscience* 109, 401-406.
- Gernert, M., Thompson, K.W., Loscher, W., and Tobin, A.J. (2002). Genetically engineered GABA-producing cells demonstrate anticonvulsant effects and long-term transgene expression when transplanted into the central piriform cortex of rats. *Exp. Neurol.* 176, 183-192.
- Gilbert, M.E. and Mack, C.M. (1990). The NMDA antagonist, MK-801, suppresses long-term potentiation, kindling, and kindling-induced potentiation in the perforant path of the unanesthetized rat. *Brain Res.* 519, 89-96.
- Goddard, G.V., McIntyre, D.C., and Leech, C.K. (1969). A permanent change in brain function resulting from daily electrical stimulation. *Exp. Neurol.* 25, 295-330.
- Grant, K.A., Valverius, P., Hudspith, M., and Tabakoff, B. (1990). Ethanol withdrawal seizures and the NMDA receptor complex. *Eur. J. Pharmacol.* 176, 289-296.
- Gu, Q. and Singer, W. (1995). Involvement of serotonin in developmental plasticity of kitten visual cortex. *Eur. J. Neurosci.* 7, 1146-1153.
- Halonen, T., Nissinen, J., Pitkow, L.J., and Pitkänen, A. (2001). Chronic elevation of brain GABA levels beginning two days after status epilepticus does not prevent epileptogenesis in rats. *Neuropharmacology* 40, 536-550.
- Harris, E.W. and Cotman, C.W. (1985). Effects of synaptic antagonists on perforant path paired-pulse plasticity: differentiation of pre- and postsynaptic antagonism. *Brain Res.* 334, 348-353.
- Heaulme, M., Chambon, J.P., Leyris, R., Molimard, J.C., Wermuth, C.G., and Biziere, K. (1986). Biochemical characterization of the interaction of three pyridazinyl-GABA derivatives with the GABA_A receptor site. *Brain Res.* 384, 224-231.

- Heinböckel, T. and Pape, H.C. (2000). Input-specific long-term depression in the lateral amygdala evoked by theta frequency stimulation. *J. Neurosci.* 20, RC68.
- Helfer, V., Deransart, C., Marescaux, C., and Depaulis, A. (1996). Amygdala kindling in the rat: anxiogenic-like consequences. *Neuroscience* 73, 971-978.
- Hikiji, M., Tomita, H., Ono, M., Fujiwara, Y., and Akiyama, K. (1993). Increase of kainate receptor mRNA in the hippocampal CA3 of amygdala-kindled rats detected by in situ hybridization. *Life Sci.* 53, 857-864.
- Holland, P.C., Han, J.S., and Gallagher, M. (2000). Lesions of the amygdala central nucleus alter performance on a selective attention task. *J. Neurosci.* 20, 6701-6706.
- Hollmann, M. and Heinemann, S. (1994). Cloned glutamate receptors. *Annu. Rev. Neurosci.* 17, 31-108.
- Holmes, K.H., Keele, N.B., and Shinnick-Gallagher, P. (1996). Loss of mGluR-mediated hyperpolarizations and increase in mGluR depolarizations in basolateral amygdala neurons in kindling-induced epilepsy. *J. Neurophysiol.* 76, 2808-2812.
- Hölscher, C. (2001). Long-term potentiation as a model for memory mechanisms: The story so far. In *neural mechanisms of memory formation*, Cambridge, University-Press, pp. 1-34.
- Huang, Y.Y. and Kandel, E.R. (1998). Postsynaptic induction and PKA-dependent expression of LTP in the lateral amygdala. *Neuron* 21, 169-178.
- Jiang, L., Xu, J., Nedergaard, M., and Kang, J. (2001). A kainate receptor increases the efficacy of GABAergic synapses. *Neuron* 30, 503-513.
- Jones, M.V., Sahara, Y., Dzubay, J.A., and Westbrook, G.L. (1998). Defining affinity with the GABAA receptor. *J. Neurosci.* 18, 8590-8604.
- Kalynchuk, L.E., Davis, A.C., Gregus, A., Taggart, J., Chris, D.C., Wintink, A.J., and Marchant, E.G. (2001). Hippocampal involvement in the expression of kindling-induced fear in rats. *Neurosci. Biobehav. Rev.* 25, 687-696.
- Kalynchuk, L.E., Pinel, J.P., and Treit, D. (1998a). Long-term kindling and interictal emotionality in rats: effect of stimulation site. *Brain Res.* 779, 149-157.
- Kalynchuk, L.E., Pinel, J.P., Treit, D., Barnes, S.J., McEachern, J.C., and Kippin, T.E. (1998b). Persistence of the interictal emotionality produced by long-term amygdala kindling in rats. *Neuroscience* 85, 1311-1319.

- Kalynchuk,L.E., Pinel,J.P., Treit,D., and Kippin,T.E. (1997). Changes in emotional behavior produced by long-term amygdala kindling in rats. *Biol. Psychiatry* 41, 438-451.
- Kalynchuk,L.E. and Meaney,M.J. (2003). Amygdala kindling increases fear responses and decreases glucocorticoid receptor mRNA expression in hippocampal regions. *Prog. Neuropsychopharmacol. Biol. Psychiatry* 27, 1225-1234.
- Kandel,E.R. (1997). Genes, synapses, and long-term memory. *J. Cell Physiol* 173, 124-125.
- Kaschel,T., Schubert,M., and Albrecht,D. (2004). Long-term depression in horizontal slices of the rat lateral amygdala. *Synapse* 53, 141-150.
- Katz,B. and Miledi,R. (1968). The role of calcium in neuromuscular facilitation. *J. Physiol* 195, 481-492.
- Kawakami,R., Shinohara,Y., Kato,Y., Sugiyama,H., Shigemoto,R., and Ito,I. (2003). Asymmetrical allocation of NMDA receptor epsilon2 subunits in hippocampal circuitry. *Science* 300, 990-994.
- Keinanen,K., Wisden,W., Sommer,B., Werner,P., Herb,A., Verdoorn,T.A., Sakmann,B., and Seeburg,P.H. (1990). A family of AMPA-selective glutamate receptors. *Science* 249, 556-560.
- Kirkwood,A. and Bear,M.F. (1994). Hebbian synapses in visual cortex. *J. Neurosci.* 14, 1634-1645.
- Klueva,J., Munsch,T., Albrecht,D., and Pape,H.C. (2003). Synaptic and non-synaptic mechanisms of amygdala recruitment into temporolimbic epileptiform activities. *Eur. J. Neurosci.* 18, 2779-2791.
- Kullmann,D.M., Erdemli,G., and Asztely,F. (1996). LTP of AMPA and NMDA receptor-mediated signals: evidence for presynaptic expression and extrasynaptic glutamate spill-over. *Neuron* 17, 461-474.
- Lauri,S.E., Bortolotto,Z.A., Bleakman,D., Ornstein,P.L., Lodge,D., Isaac,J.T., and Collingridge,G.L. (2001). A critical role of a facilitatory presynaptic kainate receptor in mossy fiber LTP. *Neuron* 32, 697-709.
- LeDoux,J.E. and Muller,J. (1997). Emotional memory and psychopathology. *Philos. Trans. R. Soc. Lond B Biol. Sci.* 352, 1719-1726.
- LeDoux,J.E. (2000). Emotion circuits in the brain. *Annu. Rev. Neurosci.* 23, 155-184.

- Lee, O., Lee, C.J., and Choi, S. (2002). Induction mechanisms for L-LTP at thalamic input synapses to the lateral amygdala: requirement of mGluR5 activation. *Neuroreport* 13, 685-691.
- Lee, S., Miskovsky, J., Williamson, J., Howells, R., Devinsky, O., Lothman, E., and Christakos, S. (1994). Changes in glutamate receptor and proenkephalin gene expression after kindled seizures. *Mol. Brain Res.* 24, 34-42.
- Leite, J.P., Nakamura, E.M., Lemos, T., Masur, J., and Cavalheiro, E.A. (1990). Learning impairment in chronic epileptic rats following pilocarpine-induced status epilepticus. *Braz. J. Med. Biol. Res.* 23, 681-683.
- Leite, J.P., Garcia-Cairasco, N., and Cavalheiro, E.A. (2002). New insights from the use of pilocarpine and kainate models. *Epilepsy Res.* 50, 93-103.
- Lerma, J. (1997). Kainate reveals its targets. *Neuron* 19, 1155-1158.
- Letty, S., Lerner-Natoli, M., and Rondouin, G. (1995). Differential impairments of spatial memory and social behavior in two models of limbic epilepsy. *Epilepsia* 36, 973-982.
- Leung, L.S. and Wu, C. (2003). Kindling suppresses primed-burst-induced long-term potentiation in hippocampal CA1. *Neuroreport* 14, 211-214.
- Li, H. and Rogawski, M.A. (1998). GluR5 kainate receptor mediated synaptic transmission in rat basolateral amygdala in vitro. *Neuropharmacology* 37, 1279-1286.
- Li, H., Weiss, S.R., Chuang, D.M., Post, R.M., and Rogawski, M.A. (1998). Bidirectional synaptic plasticity in the rat basolateral amygdala: characterization of an activity-dependent switch sensitive to the presynaptic metabotropic glutamate receptor antagonist 2S-alpha-ethylglutamic acid. *J. Neurosci.* 18, 1662-1670.
- Li, H., Chen, A., Xing, G., Wei, M.L., and Rogawski, M.A. (2001). Kainate receptor-mediated heterosynaptic facilitation in the amygdala. *Nat. Neurosci.* 4, 612-620.
- Li, R., Nishijo, H., Ono, T., Ohtani, Y., and Ohtani, O. (2002). Synapses on GABAergic neurons in the basolateral nucleus of the rat amygdala: double-labeling immunoelectron microscopy. *Synapse* 43, 42-50.
- Li, S., Anwyl, R., and Rowan, M.J. (2000). A persistent reduction in short-term facilitation accompanies long-term potentiation in the CA1 area in the intact hippocampus. *Neuroscience* 100, 213-220.
- Li, X.F., Stutzmann, G.E., and LeDoux, J.E. (1996). Convergent but temporally separated inputs to lateral amygdala neurons from the auditory thalamus and auditory cortex use different postsynaptic receptors: in vivo intracellular and extracellular recordings in fear conditioning pathways. *Learn. Mem.* 3, 229-242.

- Linke,R., de Lima,A.D., Schwegler,H., and Pape,H.C. (1999). Direct synaptic connections of axons from superior colliculus with identified thalamo-amygdaloid projection neurons in the rat: possible substrates of a subcortical visual pathway to the amygdala. *J. Comp Neurol.* 403, 158-170.
- Löscher,W. and Schwark,W.S. (1987). Further evidence for abnormal GABAergic circuits in amygdala-kindled rats. *Brain Res.* 420, 385-390.
- Löscher,W., Wahnschaffe,U., Honack,D., and Rundfeldt,C. (1995). Does prolonged implantation of depth electrodes predispose the brain to kindling? *Brain Res.* 697, 197-204.
- Löscher,W. and Ebert,U. (1996). The role of the piriform cortex in kindling. *Prog. Neurobiol.* 50, 427-481.
- Löscher,W., Honack,D., and Gramer,M. (1999). Effect of depth electrode implantation with or without subsequent kindling on GABA turnover in various rat brain regions. *Epilepsy Res.* 37, 95-108.
- Malva,J.O., Silva,A.P., and Cunha,R.A. (2003). Presynaptic modulation controlling neuronal excitability and epileptogenesis: role of kainate, adenosine and neuropeptide Y receptors. *Neurochem. Res.* 28, 1501-1515.
- Mangan,P.S., Scott,C.A., Williamson,J.M., and Bertram,E.H. (2000). Aberrant neuronal physiology in the basal nucleus of the amygdala in a model of chronic limbic epilepsy. *Neuroscience* 101, 377-391.
- Maren,S. and Fanselow,M.S. (1995). Synaptic plasticity in the basolateral amygdala induced by hippocampal formation stimulation in vivo. *J. Neurosci.* 15, 7548-7564.
- Maren,S. (1996). Synaptic transmission and plasticity in the amygdala. An emerging physiology of fear conditioning circuits. *Mol. Neurobiol.* 13, 1-22.
- Maren,S. (1999). Long-term potentiation in the amygdala: a mechanism for emotional learning and memory. *Trends Neurosci.* 22, 561-567.
- Maren,S. (2003). The amygdala, synaptic plasticity, and fear memory. *Ann. N. Y. Acad. Sci.* 985, 106-113.
- Maru,E. (2001). [Neuronal plasticity associated with learning and epileptic seizures: LTP and KIP]. *Seishin Shinkeigaku Zasshi* 103, 866-881.
- McDonald,A.J. and Augustine,J.R. (1993). Localization of GABA-like immunoreactivity in the monkey amygdala. *Neuroscience* 52, 281-294.
- McGaugh,J.L. (2000). Memory--a century of consolidation. *Science* 287, 248-251.

- McGaugh, J.L. (2002). Memory consolidation and the amygdala: a systems perspective. *Trends Neurosci.* 25, 456.
- McIntyre, D.C., Poulter, M.O., and Gilby, K. (2002). Kindling: some old and some new. *Epilepsy Res.* 50, 79-92.
- McKernan, M.G. and Shinnick-Gallagher, P. (1997). Fear conditioning induces a lasting potentiation of synaptic currents in vitro. *Nature* 390, 607-611.
- Meldrum, B., Millan, M., Patel, S., and De Sarro, G. (1988). Anti-epileptic effects of focal micro-injection of excitatory amino acid antagonists. *J. Neural Transm.* 72, 191-200.
- Mello, L.E., Cavalheiro, E.A., Tan, A.M., Kupfer, W.R., Pretorius, J.K., Babb, T.L., and Finch, D.M. (1993). Circuit mechanisms of seizures in the pilocarpine model of chronic epilepsy: cell loss and mossy fiber sprouting. *Epilepsia* 34, 985-995.
- Mello, L.E. and Covolan, L. (1996). Spontaneous seizures preferentially injure interneurons in the pilocarpine model of chronic spontaneous seizures. *Epilepsy Res.* 26, 123-129.
- Miserendino, M.J., Sananes, C.B., Melia, K.R., and Davis, M. (1990). Blocking of acquisition but not expression of conditioned fear-potentiated startle by NMDA antagonists in the amygdala. *Nature* 345, 716-718.
- Mockett, B., Coussens, C., and Abraham, W.C. (2002). NMDA receptor-mediated metaplasticity during the induction of long-term depression by low-frequency stimulation. *Eur. J. Neurosci.* 15, 1819-1826.
- Moore, C.I., Browning, M.D., and Rose, G.M. (1993). Hippocampal plasticity induced by primed burst, but not long-term potentiation, stimulation is impaired in area CA1 of aged Fischer 344 rats. *Hippocampus* 3, 57-66.
- Morimoto, K. (1989). Seizure-triggering mechanisms in the kindling model of epilepsy: collapse of GABA-mediated inhibition and activation of NMDA receptors. *Neurosci. Biobehav. Rev.* 13, 253-260.
- Morimoto, K., Fahnestock, M., and Racine, R.J. (2004). Kindling and status epilepticus models of epilepsy: rewiring the brain. *Prog. Neurobiol.* 73, 1-60.
- Morris, R.G., Anderson, E., Lynch, G.S., and Baudry, M. (1986). Selective impairment of learning and blockade of long-term potentiation by an N-methyl-D-aspartate receptor antagonist, AP5. *Nature* 319, 774-776.
- Nagaraja, R.Y., Grecksch, G., Reymann, K.G., Schroeder, H., and Becker, A. (2004). Group I metabotropic glutamate receptors interfere in different ways with pentylenetetrazole seizures, kindling, and kindling-related learning deficits. *Naunyn Schmiedeberg's Arch. Pharmacol.* 370, 26-34.

- Neugebauer, V., Keele, N.B., and Shinnick-Gallagher, P. (1997a). Epileptogenesis in vivo enhances the sensitivity of inhibitory presynaptic metabotropic glutamate receptors in basolateral amygdala neurons in vitro. *J. Neurosci.* 17, 983-995.
- Neugebauer, V., Keele, N.B., and Shinnick-Gallagher, P. (1997b). Loss of long-lasting potentiation mediated by group III mGluRs in amygdala neurons in kindling-induced epileptogenesis. *J. Neurophysiol.* 78, 3475-3478.
- Neugebauer, V., Zinebi, F., Russell, R., Gallagher, J.P., and Shinnick-Gallagher, P. (2000). Cocaine and kindling alter the sensitivity of group II and III metabotropic glutamate receptors in the central amygdala. *J. Neurophysiol.* 84, 759-770.
- Nicoll, R.A. and Malenka, R.C. (1995). Contrasting properties of two forms of long-term potentiation in the hippocampus. *Nature* 377, 115-118.
- Nieminen, S.A., Sirvio, J., Teittinen, K., Pitkänen, A., Airaksinen, M.M., and Riekkinen, P. (1992). Amygdala kindling increased fear-response, but did not impair spatial memory in rats. *Physiol Behav.* 51, 845-849.
- Olive, M.F., Koenig, H.N., Nannini, M.A., and Hodge, C.W. (2002). Elevated extracellular CRF levels in the bed nucleus of the stria terminalis during ethanol withdrawal and reduction by subsequent ethanol intake. *Pharmacol. Biochem. Behav.* 72, 213-220.
- Paladini, C.A. and Tepper, J.M. (1999). GABA(A) and GABA(B) antagonists differentially affect the firing pattern of substantia nigra dopaminergic neurons in vivo. *Synapse* 32, 165-176.
- Pare, D. and Collins, D.R. (2000). Neuronal correlates of fear in the lateral amygdala: multiple extracellular recordings in conscious cats. *J. Neurosci.* 20, 2701-2710.
- Paxinos, G. and Watson, C. (1986). *The rat brain in stereotaxic coordinates*. San Diego, New York, Boston, London, Sydney, Tokyo, Toronto: Academic Press.
- Pena, F., Bargas, J., and Tapia, R. (2002). Paired pulse facilitation is turned into paired pulse depression in hippocampal slices after epilepsy induced by 4-aminopyridine in vivo. *Neuropharmacology* 42, 807-812.
- Peris, J., Anderson, K.J., Vickroy, T.W., King, M.A., and Walker, D.W. (1997a). Neurochemical basis of disruption of hippocampal long term potentiation by chronic alcohol exposure. *Front Biosci.* 2, d309-d316.
- Peris, J., Eppler, B., Hu, M., Walker, D.W., Hunter, B.E., Mason, K., and Anderson, K.J. (1997b). Effects of chronic ethanol exposure on GABA receptors and GABAB receptor modulation of 3H-GABA release in the hippocampus. *Alcohol Clin. Exp. Res.* 21, 1047-1052.

- Perry,R.J., Rosen,H.R., Kramer,J.H., Beer,J.S., Levenson,R.L., and Miller,B.L. (2001). Hemispheric dominance for emotions, empathy and social behaviour: evidence from right and left handers with frontotemporal dementia. *Neurocase*. 7, 145-160.
- Persinger,M.A., Bureau,Y.R., Kostakos,M., Peredery,O., and Falter,H. (1993). Behaviors of rats with insidious, multifocal brain damage induced by seizures following single peripheral injections of lithium and pilocarpine. *Physiol Behav*. 53, 849-866.
- Pitkänen,A., Savander,V., and LeDoux,J.E. (1997). Organization of intra-amygdaloid circuitries in the rat: an emerging framework for understanding functions of the amygdala. *Trends Neurosci*. 20, 517-523.
- Pitkänen,A., Tuunanen,J., Kalviainen,R., Partanen,K., and Salmenpera,T. (1998). Amygdala damage in experimental and human temporal lobe epilepsy. *Epilepsy Res*. 32, 233-253.
- Pitkänen,A. (1998). [Amygdala]. *Duodecim* 114, 2451-2459.
- Pitkänen,A., Jolkkonen,E., and Kemppainen,S. (2000a). Anatomic heterogeneity of the rat amygdaloid complex. *Folia Morphol. (Warsz.)* 59, 1-23.
- Pitkänen,A., Pikkarainen,M., Nurminen,N., and Ylinen,A. (2000b). Reciprocal connections between the amygdala and the hippocampal formation, perirhinal cortex, and postrhinal cortex in rat. A review. *Ann. N. Y. Acad. Sci.* 911, 369-391.
- Pitkänen,A., Kelly,J.L., and Amaral,D.G. (2002). Projections from the lateral, basal, and accessory basal nuclei of the amygdala to the entorhinal cortex in the macaque monkey. *Hippocampus* 12, 186-205.
- Poldrugo,F. and Snead,O.C., III (1984). Electroencephalographic and behavioral correlates in rats during repeated ethanol withdrawal syndromes. *Psychopharmacology (Berl)* 83, 140-146.
- Pollandt,S., Drephal,C., and Albrecht,D. (2003). 8-OH-DPAT suppresses the induction of LTP in brain slices of the rat lateral amygdala. *Neuroreport* 14, 895-897.
- Prendergast,M.A., Harris,B.R., Mullholland,P.J., Blanchard,J.A., Gibson,D.A., Holley,R.C., and Littleton,J.M. (2004). Hippocampal CA1 region neurodegeneration produced by ethanol withdrawal requires activation of intrinsic polysynaptic hippocampal pathways and function of N-methyl-D-aspartate receptors. *Neuroscience* 124, 869-877.
- Price,J.L. (2003). Comparative aspects of amygdala connectivity. *Ann. N. Y. Acad. Sci.* 985, 50-58.

- Pyapali,G.K., Turner,D.A., Wilson,W.A., and Swartzwelder,H.S. (1999). Age and dose-dependent effects of ethanol on the induction of hippocampal long-term potentiation. *Alcohol* 19, 107-111.
- Quirk,G.J., Repa,C., and LeDoux,J.E. (1995). Fear conditioning enhances short-latency auditory responses of lateral amygdala neurons: parallel recordings in the freely behaving rat. *Neuron* 15, 1029-1039.
- Quirk,G.J. and Gehlert,D.R. (2003). Inhibition of the amygdala: key to pathological states? *Ann. N. Y. Acad. Sci.* 985, 263-272.
- Racine,R.J., Okujava,V., and Chipashvili,S. (1972). Modification of seizure activity by electrical stimulation. 3. Mechanisms. *Electroencephalogr. Clin. Neurophysiol.* 32, 295-299.
- Racine,R.J. (1972). Modification of seizure activity by electrical stimulation. II. Motor seizure. *Electroencephalogr. Clin. Neurophysiol.* 32, 281-294.
- Racine,R.J., Milgram,N.W., and Hafner,S. (1983). Long-term potentiation phenomena in the rat limbic forebrain. *Brain Res.* 260, 217-231.
- Rainnie,D.G., Asprodini,E.K., and Shinnick-Gallagher,P. (1991a). Excitatory transmission in the basolateral amygdala. *J. Neurophysiol.* 66, 986-998.
- Rainnie,D.G., Asprodini,E.K., and Shinnick-Gallagher,P. (1991b). Inhibitory transmission in the basolateral amygdala. *J. Neurophysiol.* 66, 999-1009.
- Rainnie,D.G., Asprodini,E.K., and Shinnick-Gallagher,P. (1992). Kindling-induced long-lasting changes in synaptic transmission in the basolateral amygdala. *J. Neurophysiol.* 67, 443-454.
- . Rainnie,D.G., Asprodini,E.K., and Shinnick-Gallagher,P. (1993). Intracellular recordings from morphologically identified neurons of the basolateral amygdala. *J. Neurophysiol.* 69, 1350-1362.
- Rammes,G., Steckler,T., Kresse,A., Schutz,G., Zieglgänsberger,W., and Lutz,B. (2000). Synaptic plasticity in the basolateral amygdala in transgenic mice expressing dominant-negative cAMP response element-binding protein (CREB) in forebrain. *Eur. J. Neurosci.* 12, 2534-2546.
- Ripley,T.L., Dunworth,S.J., and Stephens,D.N. (2002a). Effect of CGP39551 administration on the kindling of ethanol-withdrawal seizures. *Psychopharmacology (Berl)* 163, 157-165.
- Ripley,T.L., Dunworth,S.J., and Stephens,D.N. (2002b). Consequences of amygdala kindling and repeated withdrawal from ethanol on amphetamine-induced behaviours. *Eur. J. Neurosci.* 16, 1129-1138.

- Ripley, T.L., O'Shea, M., and Stephens, D.N. (2003). Repeated withdrawal from ethanol impairs acquisition but not expression of conditioned fear. *Eur. J. Neurosci.* *18*, 441-448.
- Ripley, T.L., Borlikova, G., Lyons, S., and Stephens, D.N. (2004). Selective deficits in appetitive conditioning as a consequence of ethanol withdrawal. *Eur. J. Neurosci.* *19*, 415-425.
- Roberto, M., Nelson, T.E., Ur, C.L., and Gruol, D.L. (2002). Long-term potentiation in the rat hippocampus is reversibly depressed by chronic intermittent ethanol exposure. *J. Neurophysiol.* *87*, 2385-2397.
- Roberto, M., Madamba, S.G., Moore, S.D., Tallent, M.K., and Siggins, G.R. (2003). Ethanol increases GABAergic transmission at both pre- and postsynaptic sites in rat central amygdala neurons. *Proc. Natl. Acad. Sci. U. S. A.* *100*, 2053-2058.
- Rogan, M.T. and LeDoux, J.E. (1996). Emotion: systems, cells, synaptic plasticity. *Cell* *85*, 469-475.
- Rogan, M.T., Staubli, U.V., and LeDoux, J.E. (1997). Fear conditioning induces associative long-term potentiation in the amygdala. *Nature* *390*, 604-607.
- Rogawski, M.A., Kurzman, P.S., Yamaguchi, S.I., and Li, H. (2001). Role of AMPA and GluR5 kainate receptors in the development and expression of amygdala kindling in the mouse. *Neuropharmacology* *40*, 28-35.
- Rogawski, M.A., Gryder, D., Castaneda, D., Yonekawa, W., Banks, M.K., and Lia, H. (2003). GluR5 kainate receptors, seizures, and the amygdala. *Ann. N. Y. Acad. Sci.* *985*, 150-162.
- Rossetti, Z.L. and Carboni, S. (1995). Ethanol withdrawal is associated with increased extracellular glutamate in the rat striatum. *Eur. J. Pharmacol.* *283*, 177-183.
- Royer, S. and Pare, D. (2002). Bidirectional synaptic plasticity in intercalated amygdala neurons and the extinction of conditioned fear responses. *Neuroscience* *115*, 455-462.
- Ruiz, A., Fabian-Fine, R., Scott, R., Walker, M.C., Rusakov, D.A., and Kullmann, D.M. (2003). GABAA receptors at hippocampal mossy fibers. *Neuron* *39*, 961-973.
- Sajdyk, T.J. and Shekhar, A. (2000). Sodium lactate elicits anxiety in rats after repeated GABA receptor blockade in the basolateral amygdala. *Eur. J. Pharmacol.* *394*, 265-273.
- Samson, R.D., Dumont, E.C., and Pare, D. (2003). Feedback inhibition defines transverse processing modules in the lateral amygdala. *J. Neurosci.* *23*, 1966-1973.

- Sander, T., Hildmann, T., Kretz, R., Furst, R., Sailer, U., Bauer, G., Schmitz, B., Beck-Mannagetta, G., Wienker, T.F., and Janz, D. (1997). Allelic association of juvenile absence epilepsy with a GluR5 kainate receptor gene (GRIK1) polymorphism. *Am. J. Med. Genet.* 74, 416-421.
- Sanders, S.K., Morzorati, S.L., and Shekhar, A. (1995). Priming of experimental anxiety by repeated subthreshold GABA blockade in the rat amygdala. *Brain Res.* 699, 250-259.
- Sanders, S.K. and Shekhar, A. (1995). Regulation of anxiety by GABA_A receptors in the rat amygdala. *Pharmacol. Biochem. Behav.* 52, 701-706.
- Sanna, E., Mostallino, M.C., Busonero, F., Talani, G., Tranquilli, S., Mameli, M., Spiga, S., Follesa, P., and Biggio, G. (2003). Changes in GABA(A) receptor gene expression associated with selective alterations in receptor function and pharmacology after ethanol withdrawal. *J. Neurosci.* 23, 11711-11724.
- Sato, T., Yamada, N., Morimoto, K., Uemura, S., and Kuroda, S. (1998). A behavioral and immunohistochemical study on the development of perirhinal cortical kindling: a comparison with other types of limbic kindling. *Brain Res.* 811, 122-132.
- Savage, D.D. and Reyes, E. (1985). Prenatal exposure to ethanol retards the development of kindling in adult rats. *Exp. Neurol.* 89, 583-591.
- Schafe, G.E., Nader, K., Blair, H.T., and LeDoux, J.E. (2001). Memory consolidation of Pavlovian fear conditioning: a cellular and molecular perspective. *Trends Neurosci.* 24, 540-546.
- Schmidt, R. (1999). *Physiologie kompakt*. Heidelberg, Springer Verlag.
- Schubert, M. and Albrecht, D. (2003). Influence of amygdala kindling on LTP in the lateral amygdala and the hippocampus. *Society Neuroscience Abstracts*. E65 477. 9.
- Schulz, P.E. and Fitzgibbons, J.C. (1997). Differing mechanisms of expression for short- and long-term potentiation. *J. Neurophysiol.* 78, 321-334.
- Scott, B.W., Wang, S., Burnham, W.M., De Boni, U., and Wojtowicz, J.M. (1998). Kindling-induced neurogenesis in the dentate gyrus of the rat. *Neurosci. Lett.* 248, 73-76.
- Scuvee-Moreau, J., Liegeois, J.F., Massotte, L., and Seutin, V. (2002). Methyl-laudanosine: a new pharmacological tool to investigate the function of small-conductance Ca(2+)-activated K(+) channels. *J. Pharmacol. Exp. Ther.* 302, 1176-1183.
- Shekhar, A., Sajdyk, T.J., Gehlert, D.R., and Rainnie, D.G. (2003). The amygdala, panic disorder, and cardiovascular responses. *Ann. N. Y. Acad. Sci.* 985, 308-325.

- Shi,C. and Davis,M. (2001). Visual pathways involved in fear conditioning measured with fear-potentiated startle: behavioral and anatomic studies. *J. Neurosci.* 21, 9844-9855.
- Shinnick-Gallagher,P., McKernan,M.G., Xie,J., and Zinebi,F. (2003). L-type voltage-gated calcium channels are involved in the in vivo and in vitro expression of fear conditioning. *Ann. N. Y. Acad. Sci.* 985, 135-149.
- Shoji,Y., Tanaka,E., Yamamoto,S., Maeda,H., and Higashi,H. (1998). Mechanisms underlying the enhancement of excitatory synaptic transmission in basolateral amygdala neurons of the kindling rat. *J. Neurophysiol.* 80, 638-646.
- Smolders,I., Bortolotto,Z.A., Clarke,V.R., Warre,R., Khan,G.M., O'Neill,M.J., Ornstein,P.L., Bleakman,D., Ogden,A., Weiss,B., Stables,J.P., Ho,K.H., Ebinger,G., Collingridge,G.L., Lodge,D., and Michotte,Y. (2002). Antagonists of GLU(K5)-containing kainate receptors prevent pilocarpine-induced limbic seizures. *Nat. Neurosci.* 5, 796-804.
- Sommer,B., Burnashev,N., Verdoorn,T.A., Keinanen,K., Sakmann,B., and Seeburg,P.H. (1992). A glutamate receptor channel with high affinity for domoate and kainate. *EMBO J.* 11, 1651-1656.
- Son,H. and Carpenter,D.O. (1996). Interactions among paired-pulse facilitation and post-tetanic and long-term potentiation in the mossy fiber-CA3 pathway in rat hippocampus. *Synapse* 23, 302-311.
- Squire,L.R. and Kandel,E.R. (1999). Priming, Wahrnehmungslernen und emotionales Lernen. In *Gedächtnis. Die Natur des Erinnerns*, Spektrum Akademischer Verlag Heidelberg, Berlin., pp. 169-186.
- Stanford,I.M., Wheal,H.V., and Chad,J.E. (1995). Bicuculline enhances the late GABAB receptor-mediated paired-pulse inhibition observed in rat hippocampal slices. *Eur. J. Pharmacol.* 277, 229-234.
- Stein,C., Davidowa,H., and Albrecht,D. (2000). 5-HT(1A) receptor-mediated inhibition and 5-HT(2) as well as 5-HT(3) receptor-mediated excitation in different subdivisions of the rat amygdala. *Synapse* 38, 328-337.
- Stephens,D.N., Brown,G., Duka,T., and Ripley,T.L. (2001). Impaired fear conditioning but enhanced seizure sensitivity in rats given repeated experience of withdrawal from alcohol. *Eur. J. Neurosci.* 14, 2023-2031.
- Stephens,D.N., Ripley,T.L., Borlikova,G., Duka,T., Schubert,M., and Albrecht,D. (2004). The effects of alcohol dependence and withdrawal on aversive conditioning. *Alcohol Clin. Exp. Res.* -in press.

- Stoop,R. and Pralong,E. (2000). Functional connections and epileptic spread between hippocampus, entorhinal cortex and amygdala in a modified horizontal slice preparation of the rat brain. *Eur. J. Neurosci.* 12, 3651-3663.
- Stutzmann,G.E. and LeDoux,J.E. (1999). GABAergic antagonists block the inhibitory effects of serotonin in the lateral amygdala: a mechanism for modulation of sensory inputs related to fear conditioning. *J. Neurosci.* 19, RC8.
- Szinyei,C., Heinböckel,T., Montagne,J., and Pape,H.C. (2000). Putative cortical and thalamic inputs elicit convergent excitation in a population of GABAergic interneurons of the lateral amygdala. *J. Neurosci.* 20, 8909-8915.
- Thiel,C.M. and Schwarting,R.K. (2001). Dopaminergic lateralisation in the forebrain: relations to behavioural asymmetries and anxiety in male Wistar rats. *Neuropsychobiology* 43, 192-199.
- Ticku,M.K., Lowrimore,P., and Lehoullier,P. (1986). Ethanol enhances GABA-induced ³⁶Cl-influx in primary spinal cord cultured neurons. *Brain Res. Bull.* 17, 123-126.
- Tremwel,M.F., Hunter,B.E., and Peris,J. (1994). Chronic ethanol exposure enhances [³H]GABA release and does not affect GABAA receptor mediated ³⁶Cl uptake. *Synapse* 17, 149-154.
- Tsvetkov,E., Carlezon,W.A., Benes,F.M., Kandel,E.R., and Bolshakov,V.Y. (2002). Fear conditioning occludes LTP-induced presynaptic enhancement of synaptic transmission in the cortical pathway to the lateral amygdala. *Neuron* 34, 289-300.
- Tsvetkov,E., Shin,R.M., and Bolshakov,V.Y. (2004). Glutamate uptake determines pathway specificity of long-term potentiation in the neural circuitry of fear conditioning. *Neuron* 41, 139-151.
- Turski,W.A., Cavalheiro,E.A., Schwarz,M., Czuczwar,S.J., Kleinrok,Z., and Turski,L. (1983). Limbic seizures produced by pilocarpine in rats: behavioural, electroencephalographic and neuropathological study. *Behav. Brain Res.* 9, 315-335.
- Tuunanen,J., Halonen,T., and Pitkänen,A. (1997). Decrease in somatostatin-immunoreactive neurons in the rat amygdaloid complex in a kindling model of temporal lobe epilepsy. *Epilepsy Res.* 26, 315-327.
- Tuunanen,J. and Pitkänen,A. (2000). Do seizures cause neuronal damage in rat amygdala kindling? *Epilepsy Res.* 39, 171-176.
- Ulrichsen,J., Haugbol,S., Brandt,C.F., Allerup,P., and Hemmingsen,R. (1998a). Irreversibility of kindled alcohol-withdrawal behaviour in rats. *Alcohol* 33, 230-243.

- Ulrichsen, J., Woldbye, D.P., Madsen, T.M., Clemmesen, L., Haugbol, S., Olsen, C.H., Laursen, H., Bolwig, T.G., and Hemmingsen, R. (1998b). Electrical amygdala kindling in alcohol-withdrawal kindled rats. *Alcohol* 33, 244-254.
- Uno, M. and Ozawa, N. (1991). Long-term potentiation of the amygdalo-striatal synaptic transmission in the course of development of amygdaloid kindling in cats. *Neurosci. Res.* 12, 251-262.
- Velisek, L., Veliskova, J., and Stanton, P.K. (2002). Low-frequency stimulation of the kindling focus delays basolateral amygdala kindling in immature rats. *Neurosci. Lett.* 326, 61-63.
- Verstynen, T., Tierney, R., Urbanski, T., and Tang, A. (2001). Neonatal novelty exposure modulates hippocampal volumetric asymmetry in the rat. *Neuroreport* 12, 3019-3022.
- Vignes, M., Clarke, V.R., Parry, M.J., Bleakman, D., Lodge, D., Ornstein, P.L., and Collingridge, G.L. (1998). The GluR5 subtype of kainate receptor regulates excitatory synaptic transmission in areas CA1 and CA3 of the rat hippocampus. *Neuropharmacology* 37, 1269-1277.
- von Bohlen und Halbach, O. and Albrecht, D. (1998a). Angiotensin II inhibits long-term potentiation within the lateral nucleus of the amygdala through AT1 receptors. *Peptides* 19, 1031-1036.
- von Bohlen und Halbach, O. and Albrecht, D. (1998b). Tracing of axonal connectivities in a combined slice preparation of rat brains--a study by rhodamine-dextran-amine-application in the lateral nucleus of the amygdala. *J. Neurosci. Methods* 81, 169-175.
- von Bohlen und Halbach, O. and Albrecht, D. (2002). Reciprocal connections of the hippocampal area CA1, the lateral nucleus of the amygdala and cortical areas in a combined horizontal slice preparation. *Neurosci. Res.* 44, 91-100.
- von Bohlen und Halbach, O., Schulze, K., and Albrecht, D. (2004). Amygdala-kindling induces alterations in neuronal density and in density of degenerated fibers. *Hippocampus* 14, 311-318.
- Walker, D.L. and Davis, M. (2002). The role of amygdala glutamate receptors in fear learning, fear-potentiated startle, and extinction. *Pharmacol. Biochem. Behav.* 71, 379-392.
- Wall, C.J., Kendall, E.J., and Obenaus, A. (2000). Rapid alterations in diffusion-weighted images with anatomic correlates in a rodent model of status epilepticus. *AJNR Am. J. Neuroradiol.* 21, 1841-1852.
- Wang, S.J. and Gean, P.W. (1999). Long-term depression of excitatory synaptic transmission in the rat amygdala. *J. Neurosci.* 19, 10656-10663.

- Washburn, M.S. and Moises, H.C. (1992). Electrophysiological and morphological properties of rat basolateral amygdaloid neurons in vitro. *J. Neurosci.* *12*, 4066-4079.
- Wasterlain, C.G., Farber, D.B., and Fairchild, M.D. (1986). Synaptic mechanisms in the kindled epileptic focus: a speculative synthesis. *Adv. Neurol.* *44*, 411-433.
- Watanabe, Y., Ikegaya, Y., Saito, H., and Abe, K. (1995). Roles of GABAA, NMDA and muscarinic receptors in induction of long-term potentiation in the medial and lateral amygdala in vitro. *Neurosci. Res.* *21*, 317-322.
- Watkins, J.C. and Evans, R.H. (1981). Excitatory amino acid transmitters. *Annu. Rev. Pharmacol. Toxicol.* *21*, 165-204.
- Weiss, S.R., Li, X.L., Rosen, J.B., Li, H., Heynen, T., and Post, R.M. (1995). Quenching: inhibition of development and expression of amygdala kindled seizures with low frequency stimulation. *Neuroreport* *6*, 2171-2176.
- Weisskopf, M.G., Bauer, E.P., and LeDoux, J.E. (1999). L-type voltage-gated calcium channels mediate NMDA-independent associative long-term potentiation at thalamic input synapses to the amygdala. *J. Neurosci.* *19*, 10512-10519.
- Weisskopf, M.G., Anderson, H.A., Foldy, S., Hanrahan, L.P., Blair, K., Torok, T.J., and Rumm, P.D. (2002). Heat wave morbidity and mortality, Milwaukee, Wis, 1999 vs 1995: an improved response? *Am. J. Public Health* *92*, 830-833.
- Weitlauf, C., Egli, R.E., Grueter, B.A., and Winder, D.G. (2004). High-frequency stimulation induces ethanol-sensitive long-term potentiation at glutamatergic synapses in the dorsolateral bed nucleus of the stria terminalis. *J. Neurosci.* *24*, 5741-5747.
- Wintink, A.J., Young, N.A., Davis, A.C., Gregus, A., and Kalynchuk, L.E. (2003). Kindling-induced emotional behavior in male and female rats. *Behav. Neurosci.* *117*, 632-640.
- www.bris.ac.uk/synaptic/info/glutamate.html. 2003. Internet Communication
- Yaniv, D., Schafe, G.E., LeDoux, J.E., and Richter-Levin, G. (2001). A gradient of plasticity in the amygdala revealed by cortical and subcortical stimulation, in vivo. *Neuroscience* *106*, 613-620.
- Yasuda, H. and Tsumoto, T. (1996). Long-term depression in rat visual cortex is associated with a lower rise of postsynaptic calcium than long-term potentiation. *Neurosci. Res.* *24*, 265-274.
- Zald, D.H. (2003). The human amygdala and the emotional evaluation of sensory stimuli. *Brain Res. Rev.* *41*, 88-123.

- Zimmermann,L.N., Schneider,H.H., and Stephens,D.N. (1989). Partial GABA agonist activity of SR 95531 on the binding of [35S]TBPS, [3H]DMCM and [3H]lormetazepam to rat brain membranes. *Biochem. Pharmacol.* 38, 2889-2893.
- Zinebi,F., Russell,R.T., McKernan,M., and Shinnick-Gallagher,P. (2001). Comparison of paired-pulse facilitation of AMPA and NMDA synaptic currents in the lateral amygdala. *Synapse* 42, 115-127.
- Zinebi,F., McKernan,M., and Shinnick-Gallagher,P. (2002). Expression of fear-conditioning is accompanied by increased paired-pulse depression within the amygdala. *Pharmacol. Biochem. Behav.* 71, 393-400.
- Zirlinger,M., Kreiman,G., and Anderson,D.J. (2001). Amygdala-enriched genes identified by microarray technology are restricted to specific amygdaloid subnuclei. *Proc. Natl. Acad. Sci. U. S. A* 98, 5270-5275.
- Zucker,R.S. (1989). Short-term synaptic plasticity. *Annu. Rev. Neurosci.* 12, 13-31.