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## Glucocorticoid receptor knockdown and adult hippocampal neurogenesis

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## **REFERENCE LIST**

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## Reference List

1. McEwen BS, Sapolsky RM. Stress and cognitive function. *Curr Opin Neurobiol* 1995; 5: 205-216
2. McEwen BS. Stress and hippocampal plasticity. *Annu Rev Neurosci* 1999; 22: 105-122
3. De Kloet ER, Joels M, Holsboer F. Stress and the brain: from adaptation to disease. *Nat Rev Neurosci* 2005; 6: 463-475
4. Holsboer F, Barden N. Antidepressants and hypothalamic-pituitary-adrenocortical regulation. *Endocr Rev* 1996; 17: 187-205
5. Joels M. Role of corticosteroid hormones in the dentate gyrus. *Prog Brain Res* 2007; 163: 355-370
6. Sapolsky RM. Stress hormones: good and bad. *Neurobiol Dis* 2000; 7: 540-542
7. McEwen BS. Central effects of stress hormones in health and disease: Understanding the protective and damaging effects of stress and stress mediators. *Eur J Pharmacol* 2008; 583: 174-185
8. Furay AR, Bruestle AE, Herman JP. The Role of the Forebrain Glucocorticoid Receptor in Acute and Chronic Stress. *Endocrinology* 2008;
9. Herman JP, Cullinan WE. Neurocircuitry of stress: central control of the hypothalamo-pituitary-adrenocortical axis. *Trends Neurosci* 1997; 20: 78-84
10. Lightman SL. The neuroendocrinology of stress: a never ending story. *J Neuroendocrinol* 2008; 20: 880-884
11. De Kloet ER, Vreugdenhil E, Oitzl MS, Joels M. Brain corticosteroid receptor balance in health and disease. *Endocr Rev* 1998; 19: 269-301
12. Lightman SL, Wiles CC, Atkinson HC et al. The significance of glucocorticoid pulsatility. *Eur J Pharmacol* 2008; 583: 255-262
13. Nemeroff CB. The corticotropin-releasing factor (CRF) hypothesis of depression: new findings and new directions. *Mol Psychiatry* 1996; 1: 336-342
14. Reul JM, De Kloet ER. Two receptor systems for corticosterone in rat brain: microdistribution and differential occupation. *Endocrinology* 1985; 117: 2505-2511
15. McEwen BS, De Kloet ER, Rostene W. Adrenal steroid receptors and actions in the nervous system. *Physiol Rev* 1986; 66: 1121-1188
16. Hollenberg SM, Evans RM. Multiple and cooperative trans-activation domains of the human glucocorticoid receptor. *Cell* 1988; 55: 899-906
17. Tao Y, Williams-Skipp C, Scheinman RI. Mapping of glucocorticoid receptor DNA binding domain surfaces contributing to transrepression of NF-kappa B and induction of apoptosis. *J Biol Chem* 2001; 276: 2329-2332
18. Tissing WJ, Meijerink JP, den Boer ML, Pieters R. Molecular determinants of glucocorticoid sensitivity and resistance in acute lymphoblastic leukemia. *Leukemia* 2003; 17: 17-25
19. Kawata M, Nishi M, Matsuda K et al. Steroid receptor signalling in the brain--lessons learned from molecular imaging. *J Neuroendocrinol* 2008; 20: 673-676

20. Chrousos GP, Kino T. Intracellular glucocorticoid signaling: a formerly simple system turns stochastic. *Sci STKE* 2005; 2005: e48
21. De Kloet ER. About stress hormones and resilience to psychopathology. *J Neuroendocrinol* 2008; 20: 885-892
22. Morsink MC, Steenbergen PJ, Vos JB *et al.* Acute activation of hippocampal glucocorticoid receptors results in different waves of gene expression throughout time. *J Neuroendocrinol* 2006; 18: 239-252
23. Urani A, Chourbaji S, Gass P. Mutant mouse models of depression: candidate genes and current mouse lines. *Neurosci Biobehav Rev* 2005; 29: 805-828
24. Reichardt HM, Schutz G. Glucocorticoid signalling--multiple variations of a common theme. *Mol Cell Endocrinol* 1998; 146: 1-6
25. Oitzl MS, Reichardt HM, Joels M, De Kloet ER. Point mutation in the mouse glucocorticoid receptor preventing DNA binding impairs spatial memory. *Proc Natl Acad Sci U S A* 2001; 98: 12790-12795
26. Heck S, Kullmann M, Gast A *et al.* A distinct modulating domain in glucocorticoid receptor monomers in the repression of activity of the transcription factor AP-1. *EMBO J* 1994; 13: 4087-4095
27. Di S, Malcher-Lopes R, Halmos KC, Tasker JG. Nongenomic glucocorticoid inhibition via endocannabinoid release in the hypothalamus: a fast feedback mechanism. *J Neurosci* 2003; 23: 4850-4857
28. Di S, Maxson MM, Franco A, Tasker JG. Glucocorticoids regulate glutamate and GABA synapse-specific retrograde transmission via divergent nongenomic signaling pathways. *J Neurosci* 2009; 29: 393-401
29. Tasker JG, Di S, Malcher-Lopes R. Minireview: rapid glucocorticoid signaling via membrane-associated receptors. *Endocrinology* 2006; 147: 5549-5556
30. Olijslagers JE, De Kloet ER, Elgersma Y, van Woerden GM, Joels M, Karst H. Rapid changes in hippocampal CA1 pyramidal cell function via pre- as well as postsynaptic membrane mineralocorticoid receptors. *Eur J Neurosci* 2008; 27: 2542-2550
31. Joels M, Karst H, DeRijk R, De Kloet ER. The coming out of the brain mineralocorticoid receptor. *Trends Neurosci* 2008; 31: 1-7
32. Karst H, Berger S, Turiault M, Tronche F, Schutz G, Joels M. Mineralocorticoid receptors are indispensable for nongenomic modulation of hippocampal glutamate transmission by corticosterone. *Proc Natl Acad Sci U S A* 2005; 102: 19204-19207
33. Dallman MF, Pecoraro NC, La Fleur SE *et al.* Glucocorticoids, chronic stress, and obesity. *Prog Brain Res* 2006; 153: 75-105
34. Buckingham JC, John CD, Solito E *et al.* Annexin 1, glucocorticoids, and the neuroendocrine-immune interface. *Ann N Y Acad Sci* 2006; 1088: 396-409
35. Gross KL, Cidlowski JA. Tissue-specific glucocorticoid action: a family affair. *Trends Endocrinol Metab* 2008;
36. So AY, Chaivorapol C, Bolton EC, Li H, Yamamoto KR. Determinants of cell- and gene-specific transcriptional regulation by the glucocorticoid receptor. *PLoS Genet* 2007; 3: e94
37. Breuner CW, Orchinik M. Plasma binding proteins as mediators of corticosteroid action in vertebrates. *J Endocrinol* 2002; 175: 99-112

38. Seckl JR. 11beta-Hydroxysteroid dehydrogenase in the brain: a novel regulator of glucocorticoid action? *Front Neuroendocrinol* 1997; 18: 49-99
39. De Kloet ER, Sutanto W, Rots N *et al.* Plasticity and function of brain corticosteroid receptors during aging. *Acta Endocrinol (Copenh)* 1991; 125 Suppl 1: 65-72
40. Datson NA, van der PJ, De Kloet ER, Vreugdenhil E. Identification of corticosteroid-responsive genes in rat hippocampus using serial analysis of gene expression. *Eur J Neurosci* 2001; 14: 675-689
41. De Kloet ER, Reul JM. Feedback action and tonic influence of corticosteroids on brain function: a concept arising from the heterogeneity of brain receptor systems. *Psychoneuroendocrinology* 1987; 12: 83-105
42. Dallman MF, Akana SF, Jacobson L, Levin N, Cascio CS, Shinsako J. Characterization of corticosterone feedback regulation of ACTH secretion. *Ann N Y Acad Sci* 1987; 512: 402-414
43. Reul JM, Gesing A, Droste S *et al.* The brain mineralocorticoid receptor: greedy for ligand, mysterious in function. *Eur J Pharmacol* 2000; 405: 235-249
44. Joels M. Corticosteroid effects in the brain: U-shape it. *Trends Pharmacol Sci* 2006; 27: 244-250
45. Conway-Campbell BL, McKenna MA, Wiles CC, Atkinson HC, De Kloet ER, Lightman SL. Proteasome-dependent down-regulation of activated nuclear hippocampal glucocorticoid receptors determines dynamic responses to corticosterone. *Endocrinology* 2007; 148: 5470-5477
46. De Kloet ER, Sarabdjitsingh RA. Everything has rhythm: focus on glucocorticoid pulsatility. *Endocrinology* 2008; 149: 3241-3243
47. Droste SK, Gesing A, Ulbricht S, Muller MB, Linthorst AC, Reul JM. Effects of long-term voluntary exercise on the mouse hypothalamic-pituitary-adrenocortical axis. *Endocrinology* 2003; 144: 3012-3023
48. Meijer OC. Coregulator proteins and corticosteroid action in the brain. *J Neuroendocrinol* 2002; 14: 499-505
49. Geng CD, Pedersen KB, Nunez BS, Vedeckis WV. Human glucocorticoid receptor alpha transcript splice variants with exon 2 deletions: evidence for tissue- and cell type-specific functions. *Biochemistry* 2005; 44: 7395-7405
50. Zhou J, Cidlowski JA. The human glucocorticoid receptor: one gene, multiple proteins and diverse responses. *Steroids* 2005; 70: 407-417
51. Herman JP, Adams D, Prewitt C. Regulatory changes in neuroendocrine stress-integrative circuitry produced by a variable stress paradigm. *Neuroendocrinology* 1995; 61: 180-190
52. Paskitti ME, McCreary BJ, Herman JP. Stress regulation of adrenocorticosteroid receptor gene transcription and mRNA expression in rat hippocampus: time-course analysis. *Brain Res Mol Brain Res* 2000; 80: 142-152
53. McGowan PO, Sasaki A, D'Alessio AC *et al.* Epigenetic regulation of the glucocorticoid receptor in human brain associates with childhood abuse. *Nat Neurosci* 2009; 12: 342-348

54. Van Eekelen JA, Jiang W, De Kloet ER, Bohn MC. Distribution of the mineralocorticoid and the glucocorticoid receptor mRNAs in the rat hippocampus. *J Neurosci Res* 1988; 21: 88-94
55. Han F, Ozawa H, Matsuda K, Nishi M, Kawata M. Colocalization of mineralocorticoid receptor and glucocorticoid receptor in the hippocampus and hypothalamus. *Neurosci Res* 2005; 51: 371-381
56. Boku S, Nakagawa S, Masuda T et al. Glucocorticoids and lithium reciprocally regulate the proliferation of adult dentate gyrus-derived neural precursor cells through GSK-3beta and beta-catenin/TCF pathway. *Neuropsychopharmacology* 2009; 34: 805-815
57. Garcia A, Steiner B, Kronenberg G, Bick-Sander A, Kempermann G. Age-dependent expression of glucocorticoid- and mineralocorticoid receptors on neural precursor cell populations in the adult murine hippocampus. *Aging Cell* 2004; 3: 363-371
58. Turner JD, Muller CP. Structure of the glucocorticoid receptor (NR3C1) gene 5' untranslated region: identification, and tissue distribution of multiple new human exon 1. *J Mol Endocrinol* 2005; 35: 283-292
59. Vreugdenhil E, Verissimo CS, Mariman R et al. MicroRNAs miR-18 and miR-124a Downregulate the Glucocorticoid Receptor: Implications for Glucocorticoid Responsiveness in the Brain. *Endocrinology* 2009;
60. Makeyev EV, Zhang J, Carrasco MA, Maniatis T. The MicroRNA miR-124 promotes neuronal differentiation by triggering brain-specific alternative pre-mRNA splicing. *Mol Cell* 2007; 27: 435-448
61. Cheng LC, Pastrana E, Tavazoie M, Doetsch F. miR-124 regulates adult neurogenesis in the subventricular zone stem cell niche. *Nat Neurosci* 2009; 12: 399-408
62. Kempermann G, Jessberger S, Steiner B, Kronenberg G. Milestones of neuronal development in the adult hippocampus. *Trends Neurosci* 2004; 27: 447-452
63. Brandt MD, Jessberger S, Steiner B et al. Transient calretinin expression defines early postmitotic step of neuronal differentiation in adult hippocampal neurogenesis of mice. *Mol Cell Neurosci* 2003; 24: 603-613
64. Zhao C, Deng W, Gage FH. Mechanisms and functional implications of adult neurogenesis. *Cell* 2008; 132: 645-660
65. van der Laan S, Lachize SB, Schouten TG, Vreugdenhil E, De Kloet ER, Meijer OC. Neuroanatomical distribution and colocalisation of nuclear receptor corepressor (N-CoR) and silencing mediator of retinoid and thyroid receptors (SMRT) in rat brain. *Brain Res* 2005; 1059: 113-121
66. Szapary D, Huang Y, Simons SS, Jr. Opposing effects of corepressor and coactivators in determining the dose-response curve of agonists, and residual agonist activity of antagonists, for glucocorticoid receptor-regulated gene expression. *Mol Endocrinol* 1999; 13: 2108-2121
67. Fitzsimons CP, Ahmed S, Wittevrongel CF et al. The microtubule-associated protein doublecortin-like regulates the transport of the glucocorticoid receptor in neuronal progenitor cells. *Mol Endocrinol* 2008; 22: 248-262
68. Getzenberg RH. Nuclear matrix and the regulation of gene expression: tissue specificity. *J Cell Biochem* 1994; 55: 22-31
69. De Kloet ER, Ratka A, Reul JM, Sutanto W, Van Eekelen JA. Corticosteroid receptor types in brain: regulation and putative function. *Ann N Y Acad Sci* 1987; 512: 351-361

70. Amaral DG, Scharfman HE, Lavenex P. The dentate gyrus: fundamental neuroanatomical organization (dentate gyrus for dummies). *Prog Brain Res* 2007; 163: 3-22
71. Kim JJ, Diamond DM. The stressed hippocampus, synaptic plasticity and lost memories. *Nat Rev Neurosci* 2002; 3: 453-462
72. Amaral DG, Ishizuka N, Claiborne B. Neurons, numbers and the hippocampal network. *Prog Brain Res* 1990; 83: 1-11
73. Treves A, Tashiro A, Witter ME, Moser EI. What is the mammalian dentate gyrus good for? *Neuroscience* 2008; 154: 1155-1172
74. Claiborne BJ, Amaral DG, Cowan WM. Quantitative, three-dimensional analysis of granule cell dendrites in the rat dentate gyrus. *J Comp Neurol* 1990; 302: 206-219
75. Desmond NL, Levy WB. Granule cell dendritic spine density in the rat hippocampus varies with spine shape and location. *Neurosci Lett* 1985; 54: 219-224
76. Kempermann G, Gast D, Kronenberg G, Yamaguchi M, Gage FH. Early determination and long-term persistence of adult-generated new neurons in the hippocampus of mice. *Development* 2003; 130: 391-399
77. Altman J, Das GD. Autoradiographic and histological evidence of postnatal hippocampal neurogenesis in rats. *J Comp Neurol* 1965; 124: 319-335
78. Altman J, Das GD. Post-natal origin of microneurones in the rat brain. *Nature* 1965; 207: 953-956
79. Kaplan MS, Hinds JW. Neurogenesis in the adult rat: electron microscopic analysis of light radioautographs. *Science* 1977; 197: 1092-1094
80. Ming GL, Song H. Adult neurogenesis in the mammalian central nervous system. *Annu Rev Neurosci* 2005; 28: 223-250
81. Encinas JM, Enikolopov G. Identifying and quantitating neural stem and progenitor cells in the adult brain. *Methods Cell Biol* 2008; 85: 243-272
82. Gould E, Cameron HA, Daniels DC, Woolley CS, McEwen BS. Adrenal hormones suppress cell division in the adult rat dentate gyrus. *J Neurosci* 1992; 12: 3642-3650
83. Cameron HA, Woolley CS, Gould E. Adrenal steroid receptor immunoreactivity in cells born in the adult rat dentate gyrus. *Brain Res* 1993; 611: 342-346
84. Gould E, Reeves AJ, Fallah M, Tanapat P, Gross CG, Fuchs E. Hippocampal neurogenesis in adult Old World primates. *Proc Natl Acad Sci U S A* 1999; 96: 5263-5267
85. Eriksson PS, Perfilieva E, Bjork-Eriksson T et al. Neurogenesis in the adult human hippocampus. *Nat Med* 1998; 4: 1313-1317
86. Gross CG. Neurogenesis in the adult brain: death of a dogma. *Nat Rev Neurosci* 2000; 1: 67-73
87. Curtis MA, Eriksson PS, Faull RL. Progenitor cells and adult neurogenesis in neurodegenerative diseases and injuries of the basal ganglia. *Clin Exp Pharmacol Physiol* 2007; 34: 528-532
88. Clelland CD, Choi M, Romberg C et al. A functional role for adult hippocampal neurogenesis in spatial pattern separation. *Science* 2009; 325: 210-213
89. Mirescu C, Gould E. Stress and adult neurogenesis. *Hippocampus* 2006; 16: 233-238
90. McEwen BS. Glucocorticoids, depression, and mood disorders: structural remodeling in the brain. *Metabolism* 2005; 54: 20-23

91. Nemeroff CB, Vale WW. The neurobiology of depression: inroads to treatment and new drug discovery. *J Clin Psychiatry* 2005; 66 Suppl 7: 5-13
92. Balu DT, Lucki I. Adult hippocampal neurogenesis: Regulation, functional implications, and contribution to disease pathology. *Neurosci Biobehav Rev* 2008;
93. Duman RS, Malberg J, Nakagawa S. Regulation of adult neurogenesis by psychotropic drugs and stress. *J Pharmacol Exp Ther* 2001; 299: 401-407
94. Esposito MS, Piatti VC, Laplagne DA et al. Neuronal differentiation in the adult hippocampus recapitulates embryonic development. *J Neurosci* 2005; 25: 10074-10086
95. Zhao C, Teng EM, Summers RG, Jr., Ming GL, Gage FH. Distinct morphological stages of dentate granule neuron maturation in the adult mouse hippocampus. *J Neurosci* 2006; 26: 3-11
96. Ge S, Goh EL, Sailor KA, Kitabatake Y, Ming GL, Song H. GABA regulates synaptic integration of newly generated neurons in the adult brain. *Nature* 2006; 439: 589-593
97. Overstreet WL, Bromberg DA, Bensen AL, Westbrook GL. GABAergic signaling to newborn neurons in dentate gyrus. *J Neurophysiol* 2005; 94: 4528-4532
98. Dupret D, Fabre A, Dobrossy MD et al. Spatial learning depends on both the addition and removal of new hippocampal neurons. *PLoS Biol* 2007; 5: e214
99. Cameron HA, McKay RD. Adult neurogenesis produces a large pool of new granule cells in the dentate gyrus. *J Comp Neurol* 2001; 435: 406-417
100. Rao MS, Shetty AK. Efficacy of doublecortin as a marker to analyse the absolute number and dendritic growth of newly generated neurons in the adult dentate gyrus. *Eur J Neurosci* 2004; 19: 234-246
101. Kaplan MS, Bell DH. Mitotic neuroblasts in the 9-day-old and 11-month-old rodent hippocampus. *J Neurosci* 1984; 4: 1429-1441
102. Toni N, Laplagne DA, Zhao C et al. Neurons born in the adult dentate gyrus form functional synapses with target cells. *Nat Neurosci* 2008; 11: 901-907
103. van Praag H, Schinder AF, Christie BR, Toni N, Palmer TD, Gage FH. Functional neurogenesis in the adult hippocampus. *Nature* 2002; 415: 1030-1034
104. Ge S, Yang CH, Hsu KS, Ming GL, Song H. A critical period for enhanced synaptic plasticity in newly generated neurons of the adult brain. *Neuron* 2007; 54: 559-566
105. Hastings NB, Gould E. Rapid extension of axons into the CA3 region by adult-generated granule cells. *J Comp Neurol* 1999; 413: 146-154
106. Stanfield BB, Trice JE. Evidence that granule cells generated in the dentate gyrus of adult rats extend axonal projections. *Exp Brain Res* 1988; 72: 399-406
107. Schmidt-Hieber C, Jonas P, Bischofberger J. Enhanced synaptic plasticity in newly generated granule cells of the adult hippocampus. *Nature* 2004; 429: 184-187
108. Wang JW, David DJ, Monckton JE, Battaglia F, Hen R. Chronic fluoxetine stimulates maturation and synaptic plasticity of adult-born hippocampal granule cells. *J Neurosci* 2008; 28: 1374-1384
109. Fitzsimons CP, van Hooijdonk LW, Morrow JA et al. Antiglucocorticoids, neurogenesis and depression. *Mini Rev Med Chem* 2009; 9: 249-264
110. Bruel-Jungerman E, Davis S, Laroche S. Brain plasticity mechanisms and memory: a party of four. *Neuroscientist* 2007; 13: 492-505

111. McEwen BS. Plasticity of the hippocampus: adaptation to chronic stress and allostatic load. *Ann N Y Acad Sci* 2001; 933: 265-277
112. Avital A, Segal M, Richter-Levin G. Contrasting roles of corticosteroid receptors in hippocampal plasticity. *J Neurosci* 2006; 26: 9130-9134
113. Kolber BJ, Wieczorek L, Muglia LJ. Hypothalamic-pituitary-adrenal axis dysregulation and behavioral analysis of mouse mutants with altered glucocorticoid or mineralocorticoid receptor function. *Stress* 2008; 11: 1-10
114. Sousa N, Cerqueira JJ, Almeida OF. Corticosteroid receptors and neuroplasticity. *Brain Res Rev* 2008; 57: 561-570
115. Sousa N, Almeida OF. Corticosteroids: sculptors of the hippocampal formation. *Rev Neurosci* 2002; 13: 59-84
116. Krugers HJ, van der LS, van OE et al. Dissociation between apoptosis, neurogenesis, and synaptic potentiation in the dentate gyrus of adrenalectomized rats. *Synapse* 2007; 61: 221-230
117. Stienstra CM, Van Der GF, Bosma A, Karten YJ, Hesen W, Joels M. Synaptic transmission in the rat dentate gyrus after adrenalectomy. *Neuroscience* 1998; 85: 1061-1071
118. Wossink J, Karst H, Mayboroda O, Joels M. Morphological and functional properties of rat dentate granule cells after adrenalectomy. *Neuroscience* 2001; 108: 263-272
119. Sloviter RS, Dean E, Neubort S. Electron microscopic analysis of adrenalectomy-induced hippocampal granule cell degeneration in the rat: apoptosis in the adult central nervous system. *J Comp Neurol* 1993; 330: 337-351
120. Hassan AH, von RP, Patchev VK, Holsboer F, Almeida OF. Exacerbation of apoptosis in the dentate gyrus of the aged rat by dexamethasone and the protective role of corticosterone. *Exp Neurol* 1996; 140: 43-52
121. Heine VM, Maslana S, Joels M, Lucassen PJ. Prominent decline of newborn cell proliferation, differentiation, and apoptosis in the aging dentate gyrus, in absence of an age-related hypothalamus-pituitary-adrenal axis activation. *Neurobiol Aging* 2004; 25: 361-375
122. Wong EY, Herbert J. The corticoid environment: a determining factor for neural progenitors' survival in the adult hippocampus. *Eur J Neurosci* 2004; 20: 2491-2498
123. Wong EY, Herbert J. Raised circulating corticosterone inhibits neuronal differentiation of progenitor cells in the adult hippocampus. *Neuroscience* 2006; 137: 83-92
124. Palmer TD, Willhoite AR, Gage FH. Vascular niche for adult hippocampal neurogenesis. *J Comp Neurol* 2000; 425: 479-494
125. Schaaf MJ, De Kloet ER, Vreugdenhil E. Corticosterone effects on BDNF expression in the hippocampus. Implications for memory formation. *Stress* 2000; 3: 201-208
126. Kuhn HG, Winkler J, Kempermann G, Thal LJ, Gage FH. Epidermal growth factor and fibroblast growth factor-2 have different effects on neural progenitors in the adult rat brain. *J Neurosci* 1997; 17: 5820-5829
127. Aberg MA, Aberg ND, Hedbäcker H, Oscarsson J, Eriksson PS. Peripheral infusion of IGF-I selectively induces neurogenesis in the adult rat hippocampus. *J Neurosci* 2000; 20: 2896-2903

128. Sairanen M, Lucas G, Ernfors P, Castren M, Castren E. Brain-derived neurotrophic factor and antidepressant drugs have different but coordinated effects on neuronal turnover, proliferation, and survival in the adult dentate gyrus. *J Neurosci* 2005; 25: 1089-1094
129. Heine VM, Maslam S, Joels M, Lucassen PJ. Increased P27KIP1 protein expression in the dentate gyrus of chronically stressed rats indicates G1 arrest involvement. *Neuroscience* 2004; 129: 593-601
130. Jiang W, Zhu Z, Bhatia N, Agarwal R, Thompson HJ. Mechanisms of energy restriction: effects of corticosterone on cell growth, cell cycle machinery, and apoptosis. *Cancer Res* 2002; 62: 5280-5287
131. Lowy MT, Gault L, Yamamoto BK. Adrenalectomy attenuates stress-induced elevations in extracellular glutamate concentrations in the hippocampus. *J Neurochem* 1993; 61: 1957-1960
132. Abraham I, Juhasz G, Kekesi KA, Kovacs KJ. Corticosterone peak is responsible for stress-induced elevation of glutamate in the hippocampus. *Stress* 1998; 2: 171-181
133. Cameron HA, McEwen BS, Gould E. Regulation of adult neurogenesis by excitatory input and NMDA receptor activation in the dentate gyrus. *J Neurosci* 1995; 15: 4687-4692
134. Cameron HA, Tanapat P, Gould E. Adrenal steroids and N-methyl-D-aspartate receptor activation regulate neurogenesis in the dentate gyrus of adult rats through a common pathway. *Neuroscience* 1998; 82: 349-354
135. Nacher J, onso-Llosa G, Rosell DR, McEwen BS. NMDA receptor antagonist treatment increases the production of new neurons in the aged rat hippocampus. *Neurobiol Aging* 2003; 24: 273-284
136. Okuyama N, Takagi N, Kawai T, Miyake-Takagi K, Takeo S. Phosphorylation of extracellular-regulating kinase in NMDA receptor antagonist-induced newly generated neurons in the adult rat dentate gyrus. *J Neurochem* 2004; 88: 717-725
137. Cameron HA, Gould E. Adult neurogenesis is regulated by adrenal steroids in the dentate gyrus. *Neuroscience* 1994; 61: 203-209
138. Cameron HA, McKay RD. Restoring production of hippocampal neurons in old age. *Nat Neurosci* 1999; 2: 894-897
139. Mirescu C, Peters JD, Gould E. Early life experience alters response of adult neurogenesis to stress. *Nat Neurosci* 2004; 7: 841-846
140. Tanapat P, Hastings NB, Rydel TA, Galea LA, Gould E. Exposure to fox odor inhibits cell proliferation in the hippocampus of adult rats via an adrenal hormone-dependent mechanism. *J Comp Neurol* 2001; 437: 496-504
141. Alonso R, Griebel G, Pavone G, Stummelin J, Le FG, Soubrie P. Blockade of CRF(1) or V(1b) receptors reverses stress-induced suppression of neurogenesis in a mouse model of depression. *Mol Psychiatry* 2004; 9: 278-86, 224
142. Gould E, Tanapat P. Stress and hippocampal neurogenesis. *Biol Psychiatry* 1999; 46: 1472-1479
143. Fuchs E, Gould E. Mini-review: in vivo neurogenesis in the adult brain: regulation and functional implications. *Eur J Neurosci* 2000; 12: 2211-2214
144. Gould E, Woolley CS, McEwen BS. Adrenal steroids regulate postnatal development of the rat dentate gyrus: I. Effects of glucocorticoids on cell death. *J Comp Neurol* 1991; 313: 479-485

145. Karten YJ, Stienstra CM, Joels M. Corticosteroid effects on serotonin responses in granule cells of the rat dentate gyrus. *J Neuroendocrinol* 2001; 13: 233-238
146. Kim JB, Ju JY, Kim JH et al. Dexamethasone inhibits proliferation of adult hippocampal neurogenesis in vivo and in vitro. *Brain Res* 2004; 1027: 1-10
147. McEwen BS. Effects of adverse experiences for brain structure and function. *Biol Psychiatry* 2000; 48: 721-731
148. Revsin Y, Rekers NV, Louwe MC et al. Glucocorticoid Receptor Blockade Normalizes Hippocampal Alterations and Cognitive Impairment in Streptozotocin-Induced Type 1 Diabetes Mice. *Neuropharmacology* 2008;
149. De Kloet ER, de J, I, Oitzl MS. Neuropharmacology of glucocorticoids: focus on emotion, cognition and cocaine. *Eur J Pharmacol* 2008; 585: 473-482
150. Oomen CA, Mayer JL, De Kloet ER, Joels M, Lucassen PJ. Brief treatment with the glucocorticoid receptor antagonist mifepristone normalizes the reduction in neurogenesis after chronic stress. *Eur J Neurosci* 2007; 26: 3395-3401
151. Mayer JL, Klumpers L, Maslam S, De Kloet ER, Joels M, Lucassen PJ. Brief treatment with the glucocorticoid receptor antagonist mifepristone normalises the corticosterone-induced reduction of adult hippocampal neurogenesis. *J Neuroendocrinol* 2006; 18: 629-631
152. Malberg JE, Duman RS. Cell proliferation in adult hippocampus is decreased by inescapable stress: reversal by fluoxetine treatment. *Neuropharmacology* 2003; 28: 1562-1571
153. Pham K, Nacher J, Hof PR, McEwen BS. Repeated restraint stress suppresses neurogenesis and induces biphasic PSA-NCAM expression in the adult rat dentate gyrus. *Eur J Neurosci* 2003; 17: 879-886
154. Strekalova T, Spanagel R, Bartsch D, Henn FA, Gass P. Stress-induced anhedonia in mice is associated with deficits in forced swimming and exploration. *Neuropharmacology* 2004; 29: 2007-2017
155. Willner P. Chronic mild stress (CMS) revisited: consistency and behavioural-neurobiological concordance in the effects of CMS. *Neuropsychobiology* 2005; 52: 90-110
156. Mineur YS, Belzung C, Crusio WE. Effects of unpredictable chronic mild stress on anxiety and depression-like behavior in mice. *Behav Brain Res* 2006; 175: 43-50
157. Lemaire V, Koehl M, Le MM, Abrous DN. Prenatal stress produces learning deficits associated with an inhibition of neurogenesis in the hippocampus. *Proc Natl Acad Sci U S A* 2000; 97: 11032-11037
158. Tanapat P, Galea LA, Gould E. Stress inhibits the proliferation of granule cell precursors in the developing dentate gyrus. *Int J Dev Neurosci* 1998; 16: 235-239
159. Zhang LX, Levine S, Dent G et al. Maternal deprivation increases cell death in the infant rat brain. *Brain Res Dev Brain Res* 2002; 133: 1-11
160. Leuner B, Mendolia-Loffredo S, Kozorovitskiy Y, Samburg D, Gould E, Shors TJ. Learning enhances the survival of new neurons beyond the time when the hippocampus is required for memory. *J Neurosci* 2004; 24: 7477-7481

161. aroya-Milshtein N, Hollander N, Apter A et al. Environmental enrichment in mice decreases anxiety, attenuates stress responses and enhances natural killer cell activity. *Eur J Neurosci* 2004; 20: 1341-1347
162. Moncek F, Duncko R, Johansson BB, Jezova D. Effect of environmental enrichment on stress related systems in rats. *J Neuroendocrinol* 2004; 16: 423-431
163. Brown J, Cooper-Kuhn CM, Kempermann G et al. Enriched environment and physical activity stimulate hippocampal but not olfactory bulb neurogenesis. *Eur J Neurosci* 2003; 17: 2042-2046
164. Fabel K, Fabel K, Tam B et al. VEGF is necessary for exercise-induced adult hippocampal neurogenesis. *Eur J Neurosci* 2003; 18: 2803-2812
165. Farmer J, Zhao X, van PH, Wodtke K, Gage FH, Christie BR. Effects of voluntary exercise on synaptic plasticity and gene expression in the dentate gyrus of adult male Sprague-Dawley rats *in vivo*. *Neuroscience* 2004; 124: 71-79
166. van Praag H, Christie BR, Sejnowski TJ, Gage FH. Running enhances neurogenesis, learning, and long-term potentiation in mice. *Proc Natl Acad Sci U S A* 1999; 96: 13427-13431
167. van Praag H, Kempermann G, Gage FH. Running increases cell proliferation and neurogenesis in the adult mouse dentate gyrus. *Nat Neurosci* 1999; 2: 266-270
168. Kempermann G, Kuhn HG, Gage FH. More hippocampal neurons in adult mice living in an enriched environment. *Nature* 1997; 386: 493-495
169. Leuner B, Gould E, Shors TJ. Is there a link between adult neurogenesis and learning? *Hippocampus* 2006; 16: 216-224
170. Nilsson M, Perfilieva E, Johansson U, Orwar O, Eriksson PS. Enriched environment increases neurogenesis in the adult rat dentate gyrus and improves spatial memory. *J Neurobiol* 1999; 39: 569-578
171. Westenbroek C, Den Boer JA, Veenhuis M, Ter Horst GJ. Chronic stress and social housing differentially affect neurogenesis in male and female rats. *Brain Res Bull* 2004; 64: 303-308
172. Stranahan AM, Khalil D, Gould E. Social isolation delays the positive effects of running on adult neurogenesis. *Nat Neurosci* 2006; 9: 526-533
173. Patel NV, Finch CE. The glucocorticoid paradox of caloric restriction in slowing brain aging. *Neurobiol Aging* 2002; 23: 707-717
174. Prince CR, Anisman H. Situation specific effects of stressor controllability on plasma corticosterone changes in mice. *Pharmacol Biochem Behav* 1990; 37: 613-621
175. Araujo AP, DeLucia R, Scavone C, Planeta CS. Repeated predictable or unpredictable stress: effects on cocaine-induced locomotion and cyclic AMP-dependent protein kinase activity. *Behav Brain Res* 2003; 139: 75-81
176. Kant GJ, Bauman RA, Anderson SM, Mougey EH. Effects of controllable vs. uncontrollable chronic stress on stress-responsive plasma hormones. *Physiol Behav* 1992; 51: 1285-1288
177. Shors TJ, Seib TB, Levine S, Thompson RF. Inescapable versus escapable shock modulates long-term potentiation in the rat hippocampus. *Science* 1989; 244: 224-226

178. Tsuda A, Tanaka M. Differential changes in noradrenaline turnover in specific regions of rat brain produced by controllable and uncontrollable shocks. *Behav Neurosci* 1985; 99: 802-817
179. Teppema LJ, Veening JG, Kranenburg A, Dahan A, Berkenbosch A, Olievier C. Expression of c-fos in the rat brainstem after exposure to hypoxia and to normoxic and hyperoxic hypercapnia. *J Comp Neurol* 1997; 388: 169-190
180. SCOVILLE WB, MILNER B. Loss of recent memory after bilateral hippocampal lesions. *J Neurol Neurosurg Psychiatry* 1957; 20: 11-21
181. Morris RG, Garrud P, Rawlins JN, O'Keefe J. Place navigation impaired in rats with hippocampal lesions. *Nature* 1982; 297: 681-683
182. Maguire EA, Frackowiak RS, Frith CD. Recalling routes around london: activation of the right hippocampus in taxi drivers. *J Neurosci* 1997; 17: 7103-7110
183. Roozendaal B. Systems mediating acute glucocorticoid effects on memory consolidation and retrieval. *Prog Neuropsychopharmacol Biol Psychiatry* 2003; 27: 1213-1223
184. Poirier GL, Amin E, Aggleton JP. Qualitatively different hippocampal subfield engagement emerges with mastery of a spatial memory task by rats. *J Neurosci* 2008; 28: 1034-1045
185. Rolls ET, Kesner RP. A computational theory of hippocampal function, and empirical tests of the theory. *Prog Neurobiol* 2006; 79: 1-48
186. Rogers JL, Hunsaker MR, Kesner RP. Effects of ventral and dorsal CA1 subregional lesions on trace fear conditioning. *Neurobiol Learn Mem* 2006; 86: 72-81
187. Leutgeb JK, Leutgeb S, Moser MB, Moser EI. Pattern separation in the dentate gyrus and CA3 of the hippocampus. *Science* 2007; 315: 961-966
188. Lee I, Kesner RP. Differential contributions of dorsal hippocampal subregions to memory acquisition and retrieval in contextual fear-conditioning. *Hippocampus* 2004; 14: 301-310
189. Gulyas AI, Acsady L, Freund TF. Structural basis of the cholinergic and serotonergic modulation of GABAergic neurons in the hippocampus. *Neurochem Int* 1999; 34: 359-372
190. Wiegert O, Joels M, Krugers HJ. Corticosteroid hormones, synaptic strength and emotional memories: corticosteroid modulation of memory -- a cellular and molecular perspective. *Prog Brain Res* 2008; 167: 269-271
191. Corcoran KA, Desmond TJ, Frey KA, Maren S. Hippocampal inactivation disrupts the acquisition and contextual encoding of fear extinction. *J Neurosci* 2005; 25: 8978-8987
192. Donley MP, Schulkin J, Rosen JB. Glucocorticoid receptor antagonism in the basolateral amygdala and ventral hippocampus interferes with long-term memory of contextual fear. *Behav Brain Res* 2005; 164: 197-205
193. Roozendaal B, McGaugh JL. The memory-modulatory effects of glucocorticoids depend on an intact stria terminalis. *Brain Res* 1996; 709: 243-250
194. Brinks V, De Kloet ER, Oitzl MS. Strain specific fear behaviour and glucocorticoid response to aversive events: modelling PTSD in mice. *Prog Brain Res* 2008; 167: 257-261
195. Oitzl MS, De Kloet ER. Selective corticosteroid antagonists modulate specific aspects of spatial orientation learning. *Behav Neurosci* 1992; 106: 62-71

196. Oitzl MS, Fluttert M, De Kloet ER. The effect of corticosterone on reactivity to spatial novelty is mediated by central mineralocorticosteroid receptors. *Eur J Neurosci* 1994; 6: 1072-1079
197. Conrad CD, Roy EJ. Selective loss of hippocampal granule cells following adrenalectomy: implications for spatial memory. *J Neurosci* 1993; 13: 2582-2590
198. Oitzl MS, De Kloet ER. Selective corticosteroid antagonists modulate specific aspects of spatial orientation learning. *Behav Neurosci* 1992; 106: 62-71
199. Pugh CR, Tremblay D, Fleshner M, Rudy JW. A selective role for corticosterone in contextual-fear conditioning. *Behav Neurosci* 1997; 111: 503-511
200. Kohda K, Harada K, Kato K et al. Glucocorticoid receptor activation is involved in producing abnormal phenotypes of single-prolonged stress rats: a putative post-traumatic stress disorder model. *Neuroscience* 2007; 148: 22-33
201. McCormick CM, McNamara M, Mukhopadhyay S, Kelsey JE. Acute corticosterone replacement reinstates performance on spatial and nonspatial memory tasks 3 months after adrenalectomy despite degeneration in the dentate gyrus. *Behav Neurosci* 1997; 111: 518-531
202. Spanswick SC, Epp JR, Keith JR, Sutherland RJ. Adrenalectomy-induced granule cell degeneration in the hippocampus causes spatial memory deficits that are not reversed by chronic treatment with corticosterone or fluoxetine. *Hippocampus* 2007; 17: 137-146
203. Oitzl MS, De Kloet ER, Joels M, Schmid W, Cole TJ. Spatial learning deficits in mice with a targeted glucocorticoid receptor gene disruption. *Eur J Neurosci* 1997; 9: 2284-2296
204. Oitzl MS, Reichardt HM, Joels M, De Kloet ER. Point mutation in the mouse glucocorticoid receptor preventing DNA binding impairs spatial memory. *Proc Natl Acad Sci U S A* 2001; 98: 12790-12795
205. Oitzl MS, De Kloet ER. Selective corticosteroid antagonists modulate specific aspects of spatial orientation learning. *Behav Neurosci* 1992; 106: 62-71
206. Rousse I, Beaulieu S, Rowe W, Meaney MJ, Barden N, Rochford J. Spatial memory in transgenic mice with impaired glucocorticoid receptor function. *Neuroreport* 1997; 8: 841-845
207. Sandi C, Loscertales M, Guaza C. Experience-dependent facilitating effect of corticosterone on spatial memory formation in the water maze. *Eur J Neurosci* 1997; 9: 637-642
208. Nicholas A, Munhoz CD, Ferguson D, Campbell L, Sapolsky R. Enhancing cognition after stress with gene therapy. *J Neurosci* 2006; 26: 11637-11643
209. Sandi C, Merino JJ, Cordero MI, Touyariot K, Venero C. Effects of chronic stress on contextual fear conditioning and the hippocampal expression of the neural cell adhesion molecule, its polysialylation, and L1. *Neuroscience* 2001; 102: 329-339
210. McLaughlin KJ, Gomez JL, Baran SE, Conrad CD. The effects of chronic stress on hippocampal morphology and function: an evaluation of chronic restraint paradigms. *Brain Res* 2007; 1161: 56-64
211. Lupien SJ, Wilkinson CW, Briere S, Ng Ying Kin NM, Meaney MJ, Nair NP. Acute modulation of aged human memory by pharmacological manipulation of glucocorticoids. *J Clin Endocrinol Metab* 2002; 87: 3798-3807

212. Oitzl MS, Fluttert M, Sutanto W, De Kloet ER. Continuous blockade of brain glucocorticoid receptors facilitates spatial learning and memory in rats. *Eur J Neurosci* 1998; 10: 3759-3766
213. Young AH, Gallagher P, Watson S, Del-Estal D, Owen BM, Ferrier IN. Improvements in neurocognitive function and mood following adjunctive treatment with mifepristone (RU-486) in bipolar disorder. *Neuropsychopharmacology* 2004; 29: 1538-1545
214. DeBattista C, Belanoff J, Glass S *et al.* Mifepristone versus placebo in the treatment of psychosis in patients with psychotic major depression. *Biol Psychiatry* 2006; 60: 1343-1349
215. Grootendorst J, Oitzl MS, Dalm S *et al.* Stress alleviates reduced expression of cell adhesion molecules (NCAM, L1), and deficits in learning and corticosterone regulation of apolipoprotein E knockout mice. *Eur J Neurosci* 2001; 14: 1505-1514
216. Donley MP, Schulkin J, Rosen JB. Glucocorticoid receptor antagonism in the basolateral amygdala and ventral hippocampus interferes with long-term memory of contextual fear. *Behav Brain Res* 2005; 164: 197-205
217. Cai WH, Blundell J, Han J, Greene RW, Powell CM. Postreactivation glucocorticoids impair recall of established fear memory. *J Neurosci* 2006; 26: 9560-9566
218. De Kloet ER, Oitzl MS, Joels M. Stress and cognition: are corticosteroids good or bad guys? *Trends Neurosci* 1999; 22: 422-426
219. De Kloet ER, Grootendorst J, Karssen AM, Oitzl MS. Gene x environment interaction and cognitive performance: animal studies on the role of corticosterone. *Neurobiol Learn Mem* 2002; 78: 570-577
220. De Kloet ER, De KS, Schild V, Veldhuis HD. Antiglucocorticoid RU 38486 attenuates retention of a behaviour and disinhibits the hypothalamic-pituitary adrenal axis at different brain sites. *Neuroendocrinology* 1988; 47: 109-115
221. Oitzl MS, De Kloet ER. Selective corticosteroid antagonists modulate specific aspects of spatial orientation learning. *Behav Neurosci* 1992; 106: 62-71
222. Champagne DL, Bagot RC, van HF *et al.* Maternal care and hippocampal plasticity: evidence for experience-dependent structural plasticity, altered synaptic functioning, and differential responsiveness to glucocorticoids and stress. *J Neurosci* 2008; 28: 6037-6045
223. Oitzl MS, Reichardt HM, Joels M, De Kloet ER. Point mutation in the mouse glucocorticoid receptor preventing DNA binding impairs spatial memory. *Proc Natl Acad Sci U S A* 2001; 98: 12790-12795
224. Oitzl MS, De Kloet ER. Selective corticosteroid antagonists modulate specific aspects of spatial orientation learning. *Behav Neurosci* 1992; 106: 62-71
225. Joels M, Pu Z, Wiegert O, Oitzl MS, Krugers HJ. Learning under stress: how does it work? *Trends Cogn Sci* 2006; 10: 152-158
226. Herman JP, Spencer R. Regulation of hippocampal glucocorticoid receptor gene transcription and protein expression in vivo. *J Neurosci* 1998; 18: 7462-7473
227. Mueller NK, Dolgas CM, Herman JP. Stressor-selective role of the ventral subiculum in regulation of neuroendocrine stress responses. *Endocrinology* 2004; 145: 3763-3768
228. Campbell S, Macqueen G. The role of the hippocampus in the pathophysiology of major depression. *J Psychiatry Neurosci* 2004; 29: 417-426

229. Videbech P, Ravnkilde B. Hippocampal volume and depression: a meta-analysis of MRI studies. *Am J Psychiatry* 2004; 161: 1957-1966
230. Holsboer F. The corticosteroid receptor hypothesis of depression. *Neuropsychopharmacology* 2000; 23: 477-501
231. Karten YJ, Nair SM, van EL, Sibug R, Joels M. Long-term exposure to high corticosterone levels attenuates serotonin responses in rat hippocampal CA1 neurons. *Proc Natl Acad Sci U S A* 1999; 96: 13456-13461
232. Nestler EJ, Gould E, Manji H et al. Preclinical models: status of basic research in depression. *Biol Psychiatry* 2002; 52: 503-528
233. Pariante CM. Glucocorticoid receptor function in vitro in patients with major depression. *Stress* 2004; 7: 209-219
234. MacQueen GM, Campbell S, McEwen BS et al. Course of illness, hippocampal function, and hippocampal volume in major depression. *Proc Natl Acad Sci U S A* 2003; 100: 1387-1392
235. Sheline YI, Gado MH, Kraemer HC. Untreated depression and hippocampal volume loss. *Am J Psychiatry* 2003; 160: 1516-1518
236. Sotiropoulos I, Cerqueira JJ, Catania C, Takashima A, Sousa N, Almeida OF. Stress and glucocorticoid footprints in the brain-the path from depression to Alzheimer's disease. *Neurosci Biobehav Rev* 2008; 32: 1161-1173
237. Joels M, De Kloet ER. Control of neuronal excitability by corticosteroid hormones. *Trends Neurosci* 1992; 15: 25-30
238. Caspi A, Sugden K, Moffitt TE et al. Influence of life stress on depression: moderation by a polymorphism in the 5-HTT gene. *Science* 2003; 301: 386-389
239. Fava M, Kendler KS. Major depressive disorder. *Neuron* 2000; 28: 335-341
240. Gold PW, Chrousos GP. Organization of the stress system and its dysregulation in melancholic and atypical depression: high vs low CRH/NE states. *Mol Psychiatry* 2002; 7: 254-275
241. Kessler RC, Berglund P, Demler O et al. The epidemiology of major depressive disorder: results from the National Comorbidity Survey Replication (NCS-R). *JAMA* 2003; 289: 3095-3105
242. Warner-Schmidt JL, Duman RS. Hippocampal neurogenesis: opposing effects of stress and antidepressant treatment. *Hippocampus* 2006; 16: 239-249
243. McEwen BS. Protective and damaging effects of stress mediators: central role of the brain. *Prog Brain Res* 2000; 122: 25-34
244. Sahay A, Drew MR, Hen R. Dentate gyrus neurogenesis and depression. *Prog Brain Res* 2007; 163: 697-722
245. Sahay A, Hen R. Adult hippocampal neurogenesis in depression. *Nat Neurosci* 2007; 10: 1110-1115
246. Drevets WC. Neuroimaging and neuropathological studies of depression: implications for the cognitive-emotional features of mood disorders. *Curr Opin Neurobiol* 2001; 11: 240-249
247. McEwen BS. Mood disorders and allostatic load. *Biol Psychiatry* 2003; 54: 200-207

248. Willner P. Validity, reliability and utility of the chronic mild stress model of depression: a 10-year review and evaluation. *Psychopharmacology (Berl)* 1997; 134: 319-329
249. Modell S, Lauer CJ, Schreiber W, Huber J, Krieg JC, Holsboer F. Hormonal response pattern in the combined DEX-CRH test is stable over time in subjects at high familial risk for affective disorders. *Neuropsychopharmacology* 1998; 18: 253-262
250. Linkowski P. [Circadian rhythm in depressive disorders]. *Arch Belg* 1986; 44: 353-356
251. Sachar EJ, Hellman L, Roffwarg HP, Halpern FS, Fukushima DK, Gallagher TF. Disrupted 24-hour patterns of cortisol secretion in psychotic depression. *Arch Gen Psychiatry* 1973; 28: 19-24
252. Mortola JF, Liu JH, Gillin JC, Rasmussen DD, Yen SS. Pulsatile rhythms of adrenocorticotropin (ACTH) and cortisol in women with endogenous depression: evidence for increased ACTH pulse frequency. *J Clin Endocrinol Metab* 1987; 65: 962-968
253. Carroll BJ, Martin FI, Davies B. Pituitary-adrenal function in depression. *Lancet* 1968; 1: 1373-1374
254. Bachmann CG, Linthorst AC, Holsboer F, Reul JM. Effect of chronic administration of selective glucocorticoid receptor antagonists on the rat hypothalamic-pituitary-adrenocortical axis. *Neuropsychopharmacology* 2003; 28: 1056-1067
255. DeBattista C, Belanoff J. The use of mifepristone in the treatment of neuropsychiatric disorders. *Trends Endocrinol Metab* 2006; 17: 117-121
256. Keller J, Flores B, Gomez RG et al. Cortisol circadian rhythm alterations in psychotic major depression. *Biol Psychiatry* 2006; 60: 275-281
257. Ansell BM. Psyche and rheuma. *J Int Med Res* 1976; 4: 50-53
258. Wolkowitz OM. Prospective controlled studies of the behavioral and biological effects of exogenous corticosteroids. *Psychoneuroendocrinology* 1994; 19: 233-255
259. Jeffcoate WJ, Silverstone JT, Edwards CR, Besser GM. Psychiatric manifestations of Cushing's syndrome: response to lowering of plasma cortisol. *Q J Med* 1979; 48: 465-472
260. Reus VI, Wolkowitz OM. Antiglucocorticoid drugs in the treatment of depression. *Expert Opin Investig Drugs* 2001; 10: 1789-1796
261. Pariante CM, Miller AH. Glucocorticoid receptors in major depression: relevance to pathophysiology and treatment. *Biol Psychiatry* 2001; 49: 391-404
262. Lu X, Sharkey L, Bartfai T. The brain galanin receptors: targets for novel antidepressant drugs. *CNS Neurol Disord Drug Targets* 2007; 6: 183-192
263. Tortorella C, Neri G, Nussdorfer GG. Galanin in the regulation of the hypothalamic-pituitary-adrenal axis (Review). *Int J Mol Med* 2007; 19: 639-647
264. Landfield PW, Waymire JC, Lynch G. Hippocampal aging and adrenocorticoids: quantitative correlations. *Science* 1978; 202: 1098-1102
265. Sapolsky RM, Krey LC, McEwen BS. The neuroendocrinology of stress and aging: the glucocorticoid cascade hypothesis. *Endocr Rev* 1986; 7: 284-301
266. Urani A, Gass P. Corticosteroid receptor transgenic mice: models for depression? *Ann NY Acad Sci* 2003; 1007: 379-393

267. Yehuda R, Halligan SL, Grossman R, Golier JA, Wong C. The cortisol and glucocorticoid receptor response to low dose dexamethasone administration in aging combat veterans and holocaust survivors with and without posttraumatic stress disorder. *Biol Psychiatry* 2002; 52: 393-403
268. Joels M, Karst H, Krugers HJ, Lucassen PJ. Chronic stress: implications for neuronal morphology, function and neurogenesis. *Front Neuroendocrinol* 2007; 28: 72-96
269. De Kloet ER. Stress in the brain. *Eur J Pharmacol* 2000; 405: 187-198
270. van Rossum EF, Roks PH, de Jong FH *et al.* Characterization of a promoter polymorphism in the glucocorticoid receptor gene and its relationship to three other polymorphisms. *Clin Endocrinol (Oxf)* 2004; 61: 573-581
271. Kuningas M, de Rijk RH, Westendorp RG, Jolles J, Slagboom PE, van HD. Mental performance in old age dependent on cortisol and genetic variance in the mineralocorticoid and glucocorticoid receptors. *Neuropsychopharmacology* 2007; 32: 1295-1301
272. Weaver IC, Meaney MJ, Szyf M. Maternal care effects on the hippocampal transcriptome and anxiety-mediated behaviors in the offspring that are reversible in adulthood. *Proc Natl Acad Sci U S A* 2006; 103: 3480-3485
273. Weaver IC, Cervoni N, Champagne FA *et al.* Epigenetic programming by maternal behavior. *Nat Neurosci* 2004; 7: 847-854
274. Moriceau S, Sullivan RM. Maternal presence serves as a switch between learning fear and attraction in infancy. *Nat Neurosci* 2006; 9: 1004-1006
275. Joels M. The concept of allostasis and allostatic load. *Eur J Pharmacol* 2008; 583: 173
276. Duman RS, Malberg J, Nakagawa S, D'Sa C. Neuronal plasticity and survival in mood disorders. *Biol Psychiatry* 2000; 48: 732-739
277. Jacobs BL, Praag H, Gage FH. Adult brain neurogenesis and psychiatry: a novel theory of depression. *Mol Psychiatry* 2000; 5: 262-269
278. Kempermann G, Kronenberg G. Depressed new neurons--adult hippocampal neurogenesis and a cellular plasticity hypothesis of major depression. *Biol Psychiatry* 2003; 54: 499-503
279. Malberg JE, Schechter LE. Increasing hippocampal neurogenesis: a novel mechanism for antidepressant drugs. *Curr Pharm Des* 2005; 11: 145-155
280. Santarelli L, Saxe M, Gross C *et al.* Requirement of hippocampal neurogenesis for the behavioral effects of antidepressants. *Science* 2003; 301: 805-809
281. Lawrence JJ, McBain CJ. Interneuron diversity series: containing the detonation--feedforward inhibition in the CA3 hippocampus. *Trends Neurosci* 2003; 26: 631-640
282. Kempermann G. Regulation of adult hippocampal neurogenesis - implications for novel theories of major depression. *Bipolar Disord* 2002; 4: 17-33
283. Wong ML, Licinio J. Research and treatment approaches to depression. *Nat Rev Neurosci* 2001; 2: 343-351
284. Dranovsky A, Hen R. Hippocampal neurogenesis: regulation by stress and antidepressants. *Biol Psychiatry* 2006; 59: 1136-1143
285. Malberg JE, Eisch AJ, Nestler EJ, Duman RS. Chronic antidepressant treatment increases neurogenesis in adult rat hippocampus. *J Neurosci* 2000; 20: 9104-9110

286. Alfonso J, Aguero F, Sanchez DO *et al.* Gene expression analysis in the hippocampal formation of tree shrews chronically treated with cortisol. *J Neurosci Res* 2004; 78: 702-710
287. Ibi D, Takuma K, Koike H *et al.* Social isolation rearing-induced impairment of the hippocampal neurogenesis is associated with deficits in spatial memory and emotion-related behaviors in juvenile mice. *J Neurochem* 2008; 105: 921-932
288. Yalcin I, Aksu F, Belzung C. Effects of desipramine and tramadol in a chronic mild stress model in mice are altered by yohimbine but not by pindolol. *Eur J Pharmacol* 2005; 514: 165-174
289. Nakagawa S, Kim JE, Lee R *et al.* Localization of phosphorylated cAMP response element-binding protein in immature neurons of adult hippocampus. *J Neurosci* 2002; 22: 9868-9876
290. Airan RD, Meltzer LA, Roy M, Gong Y, Chen H, Deisseroth K. High-speed imaging reveals neurophysiological links to behavior in an animal model of depression. *Science* 2007; 317: 819-823
291. Jiang W, Zhang Y, Xiao L *et al.* Cannabinoids promote embryonic and adult hippocampus neurogenesis and produce anxiolytic- and antidepressant-like effects. *J Clin Invest* 2005; 115: 3104-3116
292. Meltzer LJ, Mindell JA. Impact of a child's chronic illness on maternal sleep and daytime functioning. *Arch Intern Med* 2006; 166: 1749-1755
293. Holick KA, Lee DC, Hen R, Dulawa SC. Behavioral effects of chronic fluoxetine in BALB/cJ mice do not require adult hippocampal neurogenesis or the serotonin 1A receptor. *Neuropsychopharmacology* 2008; 33: 406-417
294. Meshi D, Drew MR, Saxe M *et al.* Hippocampal neurogenesis is not required for behavioral effects of environmental enrichment. *Nat Neurosci* 2006; 9: 729-731
295. Encinas JM, Vaahtokari A, Enikolopov G. Fluoxetine targets early progenitor cells in the adult brain. *Proc Natl Acad Sci U S A* 2006; 103: 8233-8238
296. Warner-Schmidt JL, Madsen TM, Duman RS. Electroconvulsive seizure restores neurogenesis and hippocampus-dependent fear memory after disruption by irradiation. *Eur J Neurosci* 2008; 27: 1485-1493
297. Jayatissa MN, Bisgaard C, Tingstrom A, Papp M, Wiborg O. Hippocampal cytogenesis correlates to escitalopram-mediated recovery in a chronic mild stress rat model of depression. *Neuropsychopharmacology* 2006; 31: 2395-2404
298. Huang GJ, Herbert J. Serotonin modulates the suppressive effects of corticosterone on proliferating progenitor cells in the dentate gyrus of the hippocampus in the adult rat. *Neuropsychopharmacology* 2005; 30: 231-241
299. Cryan JF, Markou A, Lucki I. Assessing antidepressant activity in rodents: recent developments and future needs. *Trends Pharmacol Sci* 2002; 23: 238-245
300. Czeh B, Michaelis T, Watanabe T *et al.* Stress-induced changes in cerebral metabolites, hippocampal volume, and cell proliferation are prevented by antidepressant treatment with tianeptine. *Proc Natl Acad Sci U S A* 2001; 98: 12796-12801
301. McEwen BS, Chattarji S. Molecular mechanisms of neuroplasticity and pharmacological implications: the example of tianeptine. *Eur Neuropsychopharmacol* 2004; 14 Suppl 5: S497-S502

302. Sapolsky RM. Stress, Glucocorticoids, and Damage to the Nervous System: The Current State of Confusion. *Stress* 1996; 1: 1-19
303. Stockmeier CA, Mahajan GJ, Konick LC *et al.* Cellular changes in the postmortem hippocampus in major depression. *Biol Psychiatry* 2004; 56: 640-650
304. Chourbaji S, Vogt MA, Gass P. Mice that under- or overexpress glucocorticoid receptors as models for depression or posttraumatic stress disorder. *Prog Brain Res* 2008; 167: 65-77
305. Chourbaji S, Gass P. Glucocorticoid receptor transgenic mice as models for depression. *Brain Res Rev* 2008; 57: 554-560
306. Kobayakawa K, Kobayakawa R, Matsumoto H *et al.* Innate versus learned odour processing in the mouse olfactory bulb. *Nature* 2007; 450: 503-508
307. Uchida S, Nishida A, Hara K *et al.* Characterization of the vulnerability to repeated stress in Fischer 344 rats: possible involvement of microRNA-mediated down-regulation of the glucocorticoid receptor. *Eur J Neurosci* 2008; 27: 2250-2261
308. Brinks V, van der Mark MH, De Kloet ER, Oitzl MS. Differential MR/GR activation in mice results in emotional states beneficial or impairing for cognition. *Neural Plast* 2007; 2007: 90163
309. van Haarst AD, Oitzl MS, Workel JO, De Kloet ER. Chronic brain glucocorticoid receptor blockade enhances the rise in circadian and stress-induced pituitary-adrenal activity. *Endocrinology* 1996; 137: 4935-4943
310. Erdmann G, Berger S, Schutz G. Genetic dissection of glucocorticoid receptor function in the mouse brain. *J Neuroendocrinol* 2008; 20: 655-659
311. Kellendonk C, Gass P, Kretz O, Schutz G, Tronche F. Corticosteroid receptors in the brain: gene targeting studies. *Brain Res Bull* 2002; 57: 73-83
312. Pepin MC, Barden N. Decreased glucocorticoid receptor activity following glucocorticoid receptor antisense RNA gene fragment transfection. *Mol Cell Biol* 1991; 11: 1647-1653
313. Pepin MC, Pothier F, Barden N. Impaired type II glucocorticoid-receptor function in mice bearing antisense RNA transgene. *Nature* 1992; 355: 725-728
314. Pepin MC, Pothier F, Barden N. Antidepressant drug action in a transgenic mouse model of the endocrine changes seen in depression. *Mol Pharmacol* 1992; 42: 991-995
315. Montkowski A, Barden N, Wotjak C *et al.* Long-term antidepressant treatment reduces behavioural deficits in transgenic mice with impaired glucocorticoid receptor function. *J Neuroendocrinol* 1995; 7: 841-845
316. Barden N. Modulation of glucocorticoid receptor gene expression by antidepressant drugs. *Pharmacopsychiatry* 1996; 29: 12-22
317. Cole TJ, Blendy JA, Monaghan AP *et al.* Targeted disruption of the glucocorticoid receptor gene blocks adrenergic chromaffin cell development and severely retards lung maturation. *Genes Dev* 1995; 9: 1608-1621
318. Ridder S, Chourbaji S, Hellweg R *et al.* Mice with genetically altered glucocorticoid receptor expression show altered sensitivity for stress-induced depressive reactions. *J Neurosci* 2005; 25: 6243-6250
319. Tronche F, Kellendonk C, Kretz O *et al.* Disruption of the glucocorticoid receptor gene in the nervous system results in reduced anxiety. *Nat Genet* 1999; 23: 99-103

320. Cole TJ, Myles K, Purton JF *et al.* GRKO mice express an aberrant dexamethasone-binding glucocorticoid receptor, but are profoundly glucocorticoid resistant. *Mol Cell Endocrinol* 2001; 173: 193-202
321. Tronche F, Kellendonk C, Reichardt HM, Schutz G. Genetic dissection of glucocorticoid receptor function in mice. *Curr Opin Genet Dev* 1998; 8: 532-538
322. Hesen W, Karst H, Meijer O *et al.* Hippocampal cell responses in mice with a targeted glucocorticoid receptor gene disruption. *J Neurosci* 1996; 16: 6766-6774
323. Reichardt HM, Kaestner KH, Tuckermann J *et al.* DNA binding of the glucocorticoid receptor is not essential for survival. *Cell* 1998; 93: 531-541
324. Reichardt HM, Kaestner KH, Wessely O, Gass P, Schmid W, Schutz G. Analysis of glucocorticoid signalling by gene targeting. *J Steroid Biochem Mol Biol* 1998; 65: 111-115
325. Oitzl MS, Reichardt HM, Joels M, De Kloet ER. Point mutation in the mouse glucocorticoid receptor preventing DNA binding impairs spatial memory. *Proc Natl Acad Sci U S A* 2001; 98: 12790-12795
326. Reichardt HM, Tuckermann JP, Bauer A, Schutz G. Molecular genetic dissection of glucocorticoid receptor function in vivo. *Z Rheumatol* 2000; 59 Suppl 2: II/1-II/5
327. Xu D, Buehner A, Xu J *et al.* A polymorphic glucocorticoid receptor in a mouse population may explain inherited altered stress response and increased anxiety-type behaviors. *FASEB J* 2006; 20: 2414-2416
328. Erdmann G, Schutz G, Berger S. Inducible gene inactivation in neurons of the adult mouse forebrain. *BMC Neurosci* 2007; 8: 63
329. Revest JM, Di BF, Kitchener P *et al.* The MAPK pathway and Egr-1 mediate stress-related behavioral effects of glucocorticoids. *Nat Neurosci* 2005; 8: 664-672
330. Gass P, Reichardt HM, Strekalova T, Henn F, Tronche F. Mice with targeted mutations of glucocorticoid and mineralocorticoid receptors: models for depression and anxiety? *Physiol Behav* 2001; 73: 811-825
331. Boyle MP, Brewer JA, Funatsu M *et al.* Acquired deficit of forebrain glucocorticoid receptor produces depression-like changes in adrenal axis regulation and behavior. *Proc Natl Acad Sci U S A* 2005; 102: 473-478
332. Boyle MP, Kolber BJ, Vogt SK, Wozniak DF, Muglia LJ. Forebrain glucocorticoid receptors modulate anxiety-associated locomotor activation and adrenal responsiveness. *J Neurosci* 2006; 26: 1971-1978
333. Brewer JA, Bethin KE, Schaefer ML *et al.* Dissecting adrenal and behavioral responses to stress by targeted gene inactivation in mice. *Stress* 2003; 6: 121-125
334. Wei Q, Lu XY, Liu L *et al.* Glucocorticoid receptor overexpression in forebrain: a mouse model of increased emotional lability. *Proc Natl Acad Sci U S A* 2004; 101: 11851-11856
335. Balsalobre A, Brown SA, Marcacci L *et al.* Resetting of circadian time in peripheral tissues by glucocorticoid signaling. *Science* 2000; 289: 2344-2347
336. Hannon GJ. RNA interference. *Nature* 2002; 418: 244-251
337. van der Krol AR, Mur LA, Beld M, Mol JN, Stuitje AR. Flavonoid genes in petunia: addition of a limited number of gene copies may lead to a suppression of gene expression. *Plant Cell* 1990; 2: 291-299

338. Fire A, Xu S, Montgomery MK, Kostas SA, Driver SE, Mello CC. Potent and specific genetic interference by double-stranded RNA in *Caenorhabditis elegans*. *Nature* 1998; 391: 806-811
339. Elbashir SM, Harborth J, Lendeckel W, Yalcin A, Weber K, Tuschl T. Duplexes of 21-nucleotide RNAs mediate RNA interference in cultured mammalian cells. *Nature* 2001; 411: 494-498
340. Dillon CP, Sandy P, Nencioni A, Kissler S, Rubinson DA, Van PL. Rnai as an experimental and therapeutic tool to study and regulate physiological and disease processes. *Annu Rev Physiol* 2005; 67: 147-173
341. Davidson BL, Boudreau RL. RNA interference: a tool for querying nervous system function and an emerging therapy. *Neuron* 2007; 53: 781-788
342. Fountaine TM, Wood MJ, Wade-Martins R. Delivering RNA interference to the mammalian brain. *Curr Gene Ther* 2005; 5: 399-410
343. Lieberman J, Song E, Lee SK, Shankar P. Interfering with disease: opportunities and roadblocks to harnessing RNA interference. *Trends Mol Med* 2003; 9: 397-403
344. Thakker DR, Natt F, Husken D et al. siRNA-mediated knockdown of the serotonin transporter in the adult mouse brain. *Mol Psychiatry* 2005; 10: 782-9, 714
345. Tan FL, Yin JQ. Application of RNAi to cancer research and therapy. *Front Biosci* 2005; 10: 1946-1960
346. Tan FL, Yin JQ. RNAi, a new therapeutic strategy against viral infection. *Cell Res* 2004; 14: 460-466
347. White MD, Farmer M, Mirabile I, Brandner S, Collinge J, Mallucci GR. Single treatment with RNAi against prion protein rescues early neuronal dysfunction and prolongs survival in mice with prion disease. *Proc Natl Acad Sci U S A* 2008; 105: 10238-10243
348. Golding MC, Long CR, Carmell MA, Hannon GJ, Westhusin ME. Suppression of prion protein in livestock by RNA interference. *Proc Natl Acad Sci U S A* 2006; 103: 5285-5290
349. Pfeifer A, Eigenbrod S, Al-Khadra S et al. Lentivector-mediated RNAi efficiently suppresses prion protein and prolongs survival of scrapie-infected mice. *J Clin Invest* 2006; 116: 3204-3210
350. Thakker DR, Hoyer D, Cryan JF. Interfering with the brain: use of RNA interference for understanding the pathophysiology of psychiatric and neurological disorders. *Pharmacol Ther* 2006; 109: 413-438
351. Miller VM, Paulson HL, Gonzalez-Alegre P. RNA interference in neuroscience: progress and challenges. *Cell Mol Neurobiol* 2005; 25: 1195-1207
352. Rodriguez-Lebron E, Paulson HL. Allele-specific RNA interference for neurological disease. *Gene Ther* 2006; 13: 576-581
353. Geraerts M, Eggemont K, Hernandez-Acosta P, Garcia-Verdugo JM, Baekelandt V, Debyser Z. Lentiviral vectors mediate efficient and stable gene transfer in adult neural stem cells in vivo. *Hum Gene Ther* 2006; 17: 635-650
354. Thakker DR, Natt F, Husken D et al. Neurochemical and behavioral consequences of widespread gene knockdown in the adult mouse brain by using nonviral RNA interference. *Proc Natl Acad Sci U S A* 2004; 101: 17270-17275

355. Van den Haute C, Eggermont K, Nuttin B, Debysen Z, Baekelandt V. Lentiviral vector-mediated delivery of short hairpin RNA results in persistent knockdown of gene expression in mouse brain. *Hum Gene Ther* 2003; 14: 1799-1807
356. Raoul C, bbas-Terki T, Bensadoun JC *et al.* Lentiviral-mediated silencing of SOD1 through RNA interference retards disease onset and progression in a mouse model of ALS. *Nat Med* 2005; 11: 423-428
357. Singer O, Marr RA, Rockenstein E *et al.* Targeting BACE1 with siRNAs ameliorates Alzheimer disease neuropathology in a transgenic model. *Nat Neurosci* 2005; 8: 1343-1349
358. Xia H, Mao Q, Paulson HL, Davidson BL. siRNA-mediated gene silencing in vitro and in vivo. *Nat Biotechnol* 2002; 20: 1006-1010
359. Harper SQ, Staber PD, He X *et al.* RNA interference improves motor and neuropathological abnormalities in a Huntington's disease mouse model. *Proc Natl Acad Sci U S A* 2005; 102: 5820-5825
360. Hommel JD, Sears RM, Georgescu D, Simmons DL, DiLeone RJ. Local gene knockdown in the brain using viral-mediated RNA interference. *Nat Med* 2003; 9: 1539-1544
361. Ralph GS, Mazarakis ND, Azzouz M. Therapeutic gene silencing in neurological disorders, using interfering RNA. *J Mol Med* 2005; 83: 413-419
362. Xia H, Mao Q, Elias SL *et al.* RNAi suppresses polyglutamine-induced neurodegeneration in a model of spinocerebellar ataxia. *Nat Med* 2004; 10: 816-820
363. Chhatwal JP, Hammack SE, Jasnow AM, Rainnie DG, Ressler KJ. Identification of cell-type-specific promoters within the brain using lentiviral vectors. *Gene Ther* 2007; 14: 575-583
364. Hermens WT, Verhaagen J. Viral vectors, tools for gene transfer in the nervous system. *Prog Neurobiol* 1998; 55: 399-432
365. Saxe MD, Malleret G, Vronskaya S *et al.* Paradoxical influence of hippocampal neurogenesis on working memory. *Proc Natl Acad Sci U S A* 2007; 104: 4642-4646
366. Saxe MD, Battaglia F, Wang JW *et al.* Ablation of hippocampal neurogenesis impairs contextual fear conditioning and synaptic plasticity in the dentate gyrus. *Proc Natl Acad Sci U S A* 2006; 103: 17501-17506
367. Tashiro A, Zhao C, Gage FH. Retrovirus-mediated single-cell gene knockout technique in adult newborn neurons in vivo. *Nat Protoc* 2006; 1: 3049-3055
368. Duan X, Chang JH, Ge S *et al.* Disrupted-In-Schizophrenia 1 regulates integration of newly generated neurons in the adult brain. *Cell* 2007; 130: 1146-1158
369. Ahmed BY, Chakravarthy S, Eggers R *et al.* Efficient delivery of Cre-recombinase to neurons in vivo and stable transduction of neurons using adeno-associated and lentiviral vectors. *BMC Neurosci* 2004; 5: 4
370. Janas J, Skowronski J, Van AL. Lentiviral delivery of RNAi in hippocampal neurons. *Methods Enzymol* 2006; 406: 593-605
371. Joels M. Functional actions of corticosteroids in the hippocampus. *Eur J Pharmacol* 2008; 583: 312-321
372. Elbashir SM, Lendeckel W, Tuschl T. RNA interference is mediated by 21- and 22-nucleotide RNAs. *Genes Dev* 2001; 15: 188-200

373. Ui-Tei K, Naito Y, Takahashi F *et al.* Guidelines for the selection of highly effective siRNA sequences for mammalian and chick RNA interference. *Nucleic Acids Res* 2004; 32: 936-948
374. Reynolds A, Leake D, Boese Q, Scaringe S, Marshall WS, Khvorova A. Rational siRNA design for RNA interference. *Nat Biotechnol* 2004; 22: 326-330
375. Brummelkamp TR, Bernards R, Agami R. A system for stable expression of short interfering RNAs in mammalian cells. *Science* 2002; 296: 550-553
376. Du Q, Thonberg H, Wang J, Wahlestedt C, Liang Z. A systematic analysis of the silencing effects of an active siRNA at all single-nucleotide mismatched target sites. *Nucleic Acids Res* 2005; 33: 1671-1677
377. Theriault A, Boyd E, Harrap SB, Hollenberg SM, Connor JM. Regional chromosomal assignment of the human glucocorticoid receptor gene to 5q31. *Hum Genet* 1989; 83: 289-291
378. Ding Y, Chan CY, Lawrence CE. Sfold web server for statistical folding and rational design of nucleic acids. *Nucleic Acids Res* 2004; 32: W135-W141
379. Aigner A. Gene silencing through RNA interference (RNAi) in vivo: strategies based on the direct application of siRNAs. *J Biotechnol* 2006; 124: 12-25
380. Morsink MC, Joels M, Sarabdjitsingh RA, Meijer OC, De Kloet ER, Datson NA. The dynamic pattern of glucocorticoid receptor-mediated transcriptional responses in neuronal PC12 cells. *J Neurochem* 2006; 99: 1282-1298
381. Vreugdenhil E, Kolk SM, Boekhoorn K *et al.* Doublecortin-like, a microtubule-associated protein expressed in radial glia, is crucial for neuronal precursor division and radial process stability. *Eur J Neurosci* 2007; 25: 635-648
382. Vellinga J, Uil TG, de VJ, Rabelink MJ, Lindholm L, Hoeben RC. A system for efficient generation of adenovirus protein IX-producing helper cell lines. *J Gene Med* 2006; 8: 147-154
383. Dittgen T, Nimmerjahn A, Komai S *et al.* Lentivirus-based genetic manipulations of cortical neurons and their optical and electrophysiological monitoring in vivo. *Proc Natl Acad Sci U S A* 2004; 101: 18206-18211
384. Cronin J, Zhang XY, Reiser J. Altering the tropism of lentiviral vectors through pseudotyping. *Curr Gene Ther* 2005; 5: 387-398
385. McCaffrey AP, Nakai H, Pandey K *et al.* Inhibition of hepatitis B virus in mice by RNA interference. *Nat Biotechnol* 2003; 21: 639-644
386. Webster JC, Oakley RH, Jewell CM, Cidlowski JA. Proinflammatory cytokines regulate human glucocorticoid receptor gene expression and lead to the accumulation of the dominant negative beta isoform: a mechanism for the generation of glucocorticoid resistance. *Proc Natl Acad Sci U S A* 2001; 98: 6865-6870
387. Lu NZ, Cidlowski JA. Translational regulatory mechanisms generate N-terminal glucocorticoid receptor isoforms with unique transcriptional target genes. *Mol Cell* 2005; 18: 331-342
388. Jones SW, Souza PM, Lindsay MA. siRNA for gene silencing: a route to drug target discovery. *Curr Opin Pharmacol* 2004; 4: 522-527
389. Fish RJ, Kruithof EK. Short-term cytotoxic effects and long-term instability of RNAi delivered using lentiviral vectors. *BMC Mol Biol* 2004; 5: 9

390. Ding Q, Grammer JR, Nelson MA, Guan JL, Stewart JE, Jr., Gladson CL. p27Kip1 and cyclin D1 are necessary for focal adhesion kinase regulation of cell cycle progression in glioblastoma cells propagated in vitro and in vivo in the scid mouse brain. *J Biol Chem* 2005; 280: 6802-6815
391. Shishkina GT, Kalinina TS, Dygalo NN. Attenuation of alpha2A-adrenergic receptor expression in neonatal rat brain by RNA interference or antisense oligonucleotide reduced anxiety in adulthood. *Neuroscience* 2004; 129: 521-528
392. Omi K, Tokunaga K, Hohjoh H. Long-lasting RNAi activity in mammalian neurons. *FEBS Lett* 2004; 558: 89-95
393. Ralph GS, Radcliffe PA, Day DM *et al.* Silencing mutant SOD1 using RNAi protects against neurodegeneration and extends survival in an ALS model. *Nat Med* 2005; 11: 429-433
394. Lewis DL, Hagstrom JE, Loomis AG, Wolff JA, Herweijer H. Efficient delivery of siRNA for inhibition of gene expression in postnatal mice. *Nat Genet* 2002; 32: 107-108
395. Hassani Z, Lemkine GF, Erbacher P *et al.* Lipid-mediated siRNA delivery down-regulates exogenous gene expression in the mouse brain at picomolar levels. *J Gene Med* 2005; 7: 198-207
396. Dorsett Y, Tuschl T. siRNAs: applications in functional genomics and potential as therapeutics. *Nat Rev Drug Discov* 2004; 3: 318-329
397. Rossi JJ. Expression strategies for short hairpin RNA interference triggers. *Hum Gene Ther* 2008; 19: 313-317
398. Jackson AL, Bartz SR, Schelter J *et al.* Expression profiling reveals off-target gene regulation by RNAi. *Nat Biotechnol* 2003; 21: 635-637
399. Sioud M. Innate sensing of self and non-self RNAs by Toll-like receptors. *Trends Mol Med* 2006; 12: 167-176
400. Bridge AJ, Pebernard S, Ducraux A, Nicoulaz AL, Iggo R. Induction of an interferon response by RNAi vectors in mammalian cells. *Nat Genet* 2003; 34: 263-264
401. Paroo Z, Corey DR. Challenges for RNAi in vivo. *Trends Biotechnol* 2004; 22: 390-394
402. Seress L, Pokorny J. Structure of the granular layer of the rat dentate gyrus. A light microscopic and Golgi study. *J Anat* 1981; 133: 181-195
403. Becker S, Wojtowicz JM. A model of hippocampal neurogenesis in memory and mood disorders. *Trends Cogn Sci* 2007; 11: 70-76
404. Aimone JB, Wiles J, Gage FH. Potential role for adult neurogenesis in the encoding of time in new memories. *Nat Neurosci* 2006; 9: 723-727
405. Suslov ON, Kukekov VG, Ignatova TN, Steindler DA. Neural stem cell heterogeneity demonstrated by molecular phenotyping of clonal neurospheres. *Proc Natl Acad Sci U S A* 2002; 99: 14506-14511
406. Zhang CL, Zou Y, He W, Gage FH, Evans RM. A role for adult TLX-positive neural stem cells in learning and behaviour. *Nature* 2008; 451: 1004-1007
407. Baekelandt V, Claeys A, Eggermont K *et al.* Characterization of lentiviral vector-mediated gene transfer in adult mouse brain. *Hum Gene Ther* 2002; 13: 841-853
408. Marr RA, Rockenstein E, Mukherjee A *et al.* Neprilysin gene transfer reduces human amyloid pathology in transgenic mice. *J Neurosci* 2003; 23: 1992-1996

409. Heldt SA, Stanek L, Chhatwal JP, Ressler KJ. Hippocampus-specific deletion of BDNF in adult mice impairs spatial memory and extinction of aversive memories. *Mol Psychiatry* 2007; 12: 656-670
410. Kuroda H, Kutner RH, Bazan NG, Reiser J. A comparative analysis of constitutive and cell-specific promoters in the adult mouse hippocampus using lentivirus vector-mediated gene transfer. *J Gene Med* 2008; 10: 1163-1175
411. Suh H, Consiglio A, Ray J, Sawai T, D'Amour KA, Gage FH. In Vivo Fate Analysis Reveals the Multipotent and Self-Renewal Capacities of Sox2(+) Neural Stem Cells in the Adult Hippocampus. *Cell Stem Cell* 2007; 1: 515-528
412. Bonci D, Cittadini A, Latronico MV *et al.* 'Advanced' generation lentiviruses as efficient vectors for cardiomyocyte gene transduction in vitro and in vivo. *Gene Ther* 2003; 10: 630-636
413. Schaefer-Wiemers N, Gerfin-Moser A. A single protocol to detect transcripts of various types and expression levels in neural tissue and cultured cells: *in situ* hybridization using digoxigenin-labelled cRNA probes. *Histochemistry* 1993; 100: 431-440
414. Carpenter AE, Jones TR, Lamprecht MR *et al.* CellProfiler: image analysis software for identifying and quantifying cell phenotypes. *Genome Biol* 2006; 7: R100
415. West MJ, Slomianka L, Gundersen HJ. Unbiased stereological estimation of the total number of neurons in the subdivisions of the rat hippocampus using the optical fractionator. *Anat Rec* 1991; 231: 482-497
416. Green EJ, Juraska JM. The dendritic morphology of hippocampal dentate granule cells varies with their position in the granule cell layer: a quantitative Golgi study. *Exp Brain Res* 1985; 59: 582-586
417. Verbeek FJ. Theory & Practice of 3D-reconstructions from serial sections. (Image processing, a practical approach), 153-195. 1999. Oxford: Oxford University Press. Ref Type: Generic
418. Verbeek FJ, Huijsmans DP, Baeten RJ, Schouten NJ, Lamers WH. Design and implementation of a database and program for 3D reconstruction from serial sections: a data-driven approach. *Microsc Res Tech* 1995; 30: 496-512
419. Watson DJ, Kobinger GP, Passini MA, Wilson JM, Wolfe JH. Targeted transduction patterns in the mouse brain by lentivirus vectors pseudotyped with VSV, Ebola, Mokola, LCMV, or MuLV envelope proteins. *Mol Ther* 2002; 5: 528-537
420. Naldini L, Blomer U, Gallay P *et al.* In vivo gene delivery and stable transduction of nondividing cells by a lentiviral vector. *Science* 1996; 272: 263-267
421. Bode M, Irmler M, Friedenberger M *et al.* Interlocking transcriptomics, proteomics and topomics technologies for brain tissue analysis in murine hippocampus. *Proteomics* 2008; 8: 1170-1178
422. Akaneya Y, Jiang B, Tsumoto T. RNAi-induced gene silencing by local electroporation in targeting brain region. *J Neurophysiol* 2005; 93: 594-602
423. Cardoso AL, Simoes S, de Almeida LP *et al.* Tf-lipoplexes for neuronal siRNA delivery: A promising system to mediate gene silencing in the CNS. *J Control Release* 2008;
424. Namba T, Mochizuki H, Onodera M, Mizuno Y, Namiki H, Seki T. The fate of neural progenitor cells expressing astrocytic and radial glial markers in the postnatal rat dentate gyrus. *Eur J Neurosci* 2005; 22: 1928-1941

425. Ehrengruber MU, Hennou S, Bueler H, Naim HY, Deglon N, Lundstrom K. Gene transfer into neurons from hippocampal slices: comparison of recombinant Semliki Forest Virus, adenovirus, adeno-associated virus, lentivirus, and measles virus. *Mol Cell Neurosci* 2001; 17: 855-871
426. Faulkner RL, Jang MH, Liu XB *et al.* Development of hippocampal mossy fiber synaptic outputs by new neurons in the adult brain. *Proc Natl Acad Sci U S A* 2008; 105: 14157-14162
427. Toni N, Teng EM, Bushong EA *et al.* Synapse formation on neurons born in the adult hippocampus. *Nat Neurosci* 2007; 10: 727-734
428. Martin LA, Tan SS, Goldowitz D. Clonal architecture of the mouse hippocampus. *J Neurosci* 2002; 22: 3520-3530
429. Angevine JB, Jr. Time of neuron origin in the hippocampal region. An autoradiographic study in the mouse. *Exp Neurol Suppl* 1965; Suppl-70
430. Altman J, Bayer SA. Migration and distribution of two populations of hippocampal granule cell precursors during the perinatal and postnatal periods. *J Comp Neurol* 1990; 301: 365-381
431. Altman J, Bayer SA. Mosaic organization of the hippocampal neuroepithelium and the multiple germinal sources of dentate granule cells. *J Comp Neurol* 1990; 301: 325-342
432. Wang S, Scott BW, Wojtowicz JM. Heterogenous properties of dentate granule neurons in the adult rat. *J Neurobiol* 2000; 42: 248-257
433. Redila VA, Christie BR. Exercise-induced changes in dendritic structure and complexity in the adult hippocampal dentate gyrus. *Neuroscience* 2006; 137: 1299-1307
434. Choi VW, McCarty DM, Samulski RJ. AAV hybrid serotypes: improved vectors for gene delivery. *Curr Gene Ther* 2005; 5: 299-310
435. Stein CS, Martins I, Davidson BL. The lymphocytic choriomeningitis virus envelope glycoprotein targets lentiviral gene transfer vector to neural progenitors in the murine brain. *Mol Ther* 2005; 11: 382-389
436. Plumpe T, Ehninger D, Steiner B *et al.* Variability of doublecortin-associated dendrite maturation in adult hippocampal neurogenesis is independent of the regulation of precursor cell proliferation. *BMC Neurosci* 2006; 7: 77
437. Consiglio A, Gritti A, Dolcetta D *et al.* Robust in vivo gene transfer into adult mammalian neural stem cells by lentiviral vectors. *Proc Natl Acad Sci U S A* 2004; 101: 14835-14840
438. Scholzen T, Gerdes J. The Ki-67 protein: from the known and the unknown. *J Cell Physiol* 2000; 182: 311-322
439. Markakis EA, Gage FH. Adult-generated neurons in the dentate gyrus send axonal projections to field CA3 and are surrounded by synaptic vesicles. *J Comp Neurol* 1999; 406: 449-460
440. Fritschy JM, Brandner S, Aguzzi A, Koedood M, Lüscher B, Mitchell PJ. Brain cell type specificity and gliosis-induced activation of the human cytomegalovirus immediate-early promoter in transgenic mice. *J Neurosci* 1996; 16: 2275-2282
441. Leander JJ, Dago L, Tornoe J, Rosenblad C, Kusk P. A new versatile and compact lentiviral vector. *Mol Biotechnol* 2005; 29: 47-56

442. Vroemen M, Weidner N, Blesch A. Loss of gene expression in lentivirus- and retrovirus-transduced neural progenitor cells is correlated to migration and differentiation in the adult spinal cord. *Exp Neurol* 2005; 195: 127-139
443. Jakobsson J, Ericson C, Jansson M, Bjork E, Lundberg C. Targeted transgene expression in rat brain using lentiviral vectors. *J Neurosci Res* 2003; 73: 876-885
444. Naldini L, Blomer U, Gage FH, Trono D, Verma IM. Efficient transfer, integration, and sustained long-term expression of the transgene in adult rat brains injected with a lentiviral vector. *Proc Natl Acad Sci U S A* 1996; 93: 11382-11388
445. Park F, Ohashi K, Chiu W, Naldini L, Kay MA. Efficient lentiviral transduction of liver requires cell cycling in vivo. *Nat Genet* 2000; 24: 49-52
446. Barrette S, Douglas JL, Seidel NE, Bodine DM. Lentivirus-based vectors transduce mouse hematopoietic stem cells with similar efficiency to moloney murine leukemia virus-based vectors. *Blood* 2000; 96: 3385-3391
447. Schmetsdorf S, Gartner U, Arendt T. Expression of cell cycle-related proteins in developing and adult mouse hippocampus. *Int J Dev Neurosci* 2005; 23: 101-112
448. Shors TJ, Miesegaes G, Beylin A, Zhao M, Rydel T, Gould E. Neurogenesis in the adult is involved in the formation of trace memories. *Nature* 2001; 410: 372-376
449. Imayoshi I, Sakamoto M, Ohtsuka T et al. Roles of continuous neurogenesis in the structural and functional integrity of the adult forebrain. *Nat Neurosci* 2008; 11: 1153-1161
450. Heine VM, Zareno J, Maslam S, Joels M, Lucassen PJ. Chronic stress in the adult dentate gyrus reduces cell proliferation near the vasculature and VEGF and Flk-1 protein expression. *Eur J Neurosci* 2005; 21: 1304-1314
451. van Hooijdonk LW, Ichwan M, Dijkmans TF et al. Lentivirus-mediated transgene delivery to the hippocampus reveals sub-field specific differences in expression. *BMC Neurosci* 2009; 10: 2
452. Karst H, Joels M. Corticosterone slowly enhances miniature excitatory postsynaptic current amplitude in mice CA1 hippocampal cells. *J Neurophysiol* 2005; 94: 3479-3486
453. Rodriguez A, Ehlenberger DB, Dickstein DL, Hof PR, Wearne SL. Automated three-dimensional detection and shape classification of dendritic spines from fluorescence microscopy images. *PLoS One* 2008; 3: e1997
454. Sundberg M, Savola S, Hienola A, Korhonen L, Lindholm D. Glucocorticoid hormones decrease proliferation of embryonic neural stem cells through ubiquitin-mediated degradation of cyclin D1. *J Neurosci* 2006; 26: 5402-5410
455. Zhao CS, Overstreet-Wadiche L. Integration of adult generated neurons during epileptogenesis. *Epilepsia* 2008; 49 Suppl 5: 3-12
456. Schaaf MJ, de JJ, De Kloet ER, Vreugdenhil E. Downregulation of BDNF mRNA and protein in the rat hippocampus by corticosterone. *Brain Res* 1998; 813: 112-120
457. Schratt GM, Tuebing F, Nigh EA et al. A brain-specific microRNA regulates dendritic spine development. *Nature* 2006; 439: 283-289
458. Meng Y, Zhang Y, Tregoubov V et al. Abnormal spine morphology and enhanced LTP in LIMK-1 knockout mice. *Neuron* 2002; 35: 121-133
459. Morgenstern NA, Lombardi G, Schinder AF. Newborn granule cells in the ageing dentate gyrus. *J Physiol* 2008; 586: 3751-3757

460. Bourne JN, Harris KM. Balancing structure and function at hippocampal dendritic spines. *Annu Rev Neurosci* 2008; 31: 47-67
461. Jones EG, Powell TP. Morphological variations in the dendritic spines of the neocortex. *J Cell Sci* 1969; 5: 509-529
462. Nimchinsky EA, Sabatini BL, Svoboda K. Structure and function of dendritic spines. *Annu Rev Physiol* 2002; 64: 313-353
463. Berger S, Wolfer DP, Selbach O *et al.* Loss of the limbic mineralocorticoid receptor impairs behavioral plasticity. *Proc Natl Acad Sci U S A* 2006; 103: 195-200
464. Magarinos AM, Verdugo JM, McEwen BS. Chronic stress alters synaptic terminal structure in hippocampus. *Proc Natl Acad Sci U S A* 1997; 94: 14002-14008
465. Fukumoto K, Morita T, Mayanagi T *et al.* Detrimental effects of glucocorticoids on neuronal migration during brain development. *Mol Psychiatry* 2009;
466. Wong EY, Herbert J. Roles of mineralocorticoid and glucocorticoid receptors in the regulation of progenitor proliferation in the adult hippocampus. *Eur J Neurosci* 2005; 22: 785-792
467. Millar JK, Wilson-Annan JC, Anderson S *et al.* Disruption of two novel genes by a translocation co-segregating with schizophrenia. *Hum Mol Genet* 2000; 9: 1415-1423
468. Mao Y, Ge X, Frank CL *et al.* Disrupted in schizophrenia 1 regulates neuronal progenitor proliferation via modulation of GSK3beta/beta-catenin signaling. *Cell* 2009; 136: 1017-1031
469. Matsuzaki M, Ellis-Davies GC, Nemoto T, Miyashita Y, Iino M, Kasai H. Dendritic spine geometry is critical for AMPA receptor expression in hippocampal CA1 pyramidal neurons. *Nat Neurosci* 2001; 4: 1086-1092
470. Groc L, Choquet D, Chaouloff F. The stress hormone corticosterone conditions AMPAR surface trafficking and synaptic potentiation. *Nat Neurosci* 2008; 11: 868-870
471. Martin S, Henley JM, Holman D *et al.* Corticosterone alters AMPAR mobility and facilitates bidirectional synaptic plasticity. *PLoS One* 2009; 4: e4714
472. Chen ZY, Jing D, Bath KG *et al.* Genetic variant BDNF (Val66Met) polymorphism alters anxiety-related behavior. *Science* 2006; 314: 140-143
473. Deisseroth K, Singla S, Toda H, Monje M, Palmer TD, Malenka RC. Excitation-neurogenesis coupling in adult neural stem/progenitor cells. *Neuron* 2004; 42: 535-552
474. Fujioka T, Fujioka A, Duman RS. Activation of cAMP signaling facilitates the morphological maturation of newborn neurons in adult hippocampus. *J Neurosci* 2004; 24: 319-328
475. Nacher J, McEwen BS. The role of N-methyl-D-aspartate receptors in neurogenesis. *Hippocampus* 2006; 16: 267-270
476. Kempermann G. The neurogenic reserve hypothesis: what is adult hippocampal neurogenesis good for? *Trends Neurosci* 2008; 31: 163-169
477. Smith MA, Makino S, Kvetnansky R, Post RM. Stress and glucocorticoids affect the expression of brain-derived neurotrophic factor and neurotrophin-3 mRNAs in the hippocampus. *J Neurosci* 1995; 15: 1768-1777
478. King BR, Smith R, Nicholson RC. Novel glucocorticoid and cAMP interactions on the CRH gene promoter. *Mol Cell Endocrinol* 2002; 194: 19-28

479. Legradi G, Holzer D, Kapcala LP, Lechan RM. Glucocorticoids inhibit stress-induced phosphorylation of CREB in corticotropin-releasing hormone neurons of the hypothalamic paraventricular nucleus. *Neuroendocrinology* 1997; 66: 86-97
480. Lucibello FC, Slater EP, Jooss KU, Beato M, Muller R. Mutual transrepression of Fos and the glucocorticoid receptor: involvement of a functional domain in Fos which is absent in FosB. *EMBO J* 1990; 9: 2827-2834
481. Mizoguchi K, Ishige A, Aburada M, Tabira T. Chronic stress attenuates glucocorticoid negative feedback: involvement of the prefrontal cortex and hippocampus. *Neuroscience* 2003; 119: 887-897
482. Mizoguchi K, Ikeda R, Shoji H, Tanaka Y, Maruyama W, Tabira T. Aging attenuates glucocorticoid negative feedback in rat brain. *Neuroscience* 2009; 159: 259-270
483. McHugh TJ, Jones MW, Quinn JJ et al. Dentate gyrus NMDA receptors mediate rapid pattern separation in the hippocampal network. *Science* 2007; 317: 94-99
484. Brinks V, de Kloet ER, Oitzl MS. Strain specific fear behaviour and glucocorticoid response to aversive events: modelling PTSD in mice. *Progress in Brain Research* 167, 241-248. 2008.  
Ref Type: In Press
485. Shors TJ. From stem cells to grandmother cells: how neurogenesis relates to learning and memory. *Cell Stem Cell* 2008; 3: 253-258
486. Winocur G, Wojtowicz JM, Sekeres M, Snyder JS, Wang S. Inhibition of neurogenesis interferes with hippocampus-dependent memory function. *Hippocampus* 2006; 16: 296-304
487. Farioli-Vecchioli S, Saraulli D, Costanzi M et al. The timing of differentiation of adult hippocampal neurons is crucial for spatial memory. *PLoS Biol* 2008; 6: e246
488. Mineur YS, Belzung C, Crusio WE. Functional implications of decreases in neurogenesis following chronic mild stress in mice. *Neuroscience* 2007; 150: 251-259
489. Brinks V, De Kloet ER, Oitzl MS. Corticosterone facilitates extinction of fear memory in BALB/c mice but strengthens cue related fear in C57BL/6 mice. *Exp Neurol* 2009; 216: 375-382
490. Donley MP, Schuklin J, Rosen JB. Glucocorticoid receptor antagonism in the basolateral amygdala and ventral hippocampus interferes with long-term memory of contextual fear. *Behav Brain Res* 2005; 164: 197-205
491. Dalm S, Enthoven L, Meijer OC et al. Age-related changes in hypothalamic-pituitary-adrenal axis activity of male C57BL/6J mice. *Neuroendocrinology* 2005; 81: 372-380
492. de HL, Moser EI, Morris RG. Spatial learning with unilateral and bilateral hippocampal networks. *Eur J Neurosci* 2005; 22: 745-754
493. Groticke I, Hoffmann K, Loscher W. Behavioral alterations in a mouse model of temporal lobe epilepsy induced by intrahippocampal injection of kainate. *Exp Neurol* 2008; 213: 71-83
494. Batchelor S, Thompson EO, Miller LA. Retrograde memory after unilateral stroke. *Cortex* 2008; 44: 170-178
495. Kellendonk C, Tronche F, Reichardt HM et al. Analysis of glucocorticoid receptor function in the mouse by gene targeting. *Ernst Schering Res Found Workshop* 2002; 305-318

496. LeDoux JE, Cicchetti P, Xagoraris A, Romanski LM. The lateral amygdaloid nucleus: sensory interface of the amygdala in fear conditioning. *J Neurosci* 1990; 10: 1062-1069
497. Daumas S, Halley H, Frances B, Lassalle JM. Encoding, consolidation, and retrieval of contextual memory: differential involvement of dorsal CA3 and CA1 hippocampal subregions. *Learn Mem* 2005; 12: 375-382
498. Phillips RG, LeDoux JE. Differential contribution of amygdala and hippocampus to cued and contextual fear conditioning. *Behav Neurosci* 1992; 106: 274-285
499. Anagnostaras SG, Gale GD, Fanselow MS. Hippocampus and contextual fear conditioning: recent controversies and advances. *Hippocampus* 2001; 11: 8-17
500. Quirk GJ, Mueller D. Neural mechanisms of extinction learning and retrieval. *Neuropsychopharmacology* 2008; 33: 56-72
501. Pugh CR, Fleshner M, Rudy JW. Type II glucocorticoid receptor antagonists impair contextual but not auditory-cue fear conditioning in juvenile rats. *Neurobiol Learn Mem* 1997; 67: 75-79
502. Fleshner M, Pugh CR, Tremblay D, Rudy JW. DHEA-S selectively impairs contextual-fear conditioning: support for the antiglucocorticoid hypothesis. *Behav Neurosci* 1997; 111: 512-517
503. Cordero MI, Sandi C. A role for brain glucocorticoid receptors in contextual fear conditioning: dependence upon training intensity. *Brain Res* 1998; 786: 11-17
504. Cordero MI, Kruyt ND, Merino JJ, Sandi C. Glucocorticoid involvement in memory formation in a rat model for traumatic memory. *Stress* 2002; 5: 73-79
505. Donley MP, Schulkin J, Rosen JB. Glucocorticoid receptor antagonism in the basolateral amygdala and ventral hippocampus interferes with long-term memory of contextual fear. *Behav Brain Res* 2005; 164: 197-205
506. de Quervain DJ, Aerni A, Schelling G, Roozendaal B. Glucocorticoids and the regulation of memory in health and disease. *Front Neuroendocrinol* 2009; 30: 358-370
507. Oitzl MS, Reichardt HM, Joels M, de Kloet ER. Point mutation in the mouse glucocorticoid receptor preventing DNA binding impairs spatial memory. *Proc Natl Acad Sci U S A* 2001; 98: 12790-12795
508. Gilbert PE, Kesner RP, Lee I. Dissociating hippocampal subregions: double dissociation between dentate gyrus and CA1. *Hippocampus* 2001; 11: 626-636
509. Donley MP, Schulkin J, Rosen JB. Glucocorticoid receptor antagonism in the basolateral amygdala and ventral hippocampus interferes with long-term memory of contextual fear. *Behav Brain Res* 2005; 164: 197-205
510. Wojtowicz JM, Askew ML, Winocur G. The effects of running and of inhibiting adult neurogenesis on learning and memory in rats. *Eur J Neurosci* 2008; 27: 1494-1502
511. McGaugh JL, Roozendaal B. Role of adrenal stress hormones in forming lasting memories in the brain. *Curr Opin Neurobiol* 2002; 12: 205-210
512. Oitzl MS, de Kloet ER. Selective corticosteroid antagonists modulate specific aspects of spatial orientation learning. *Behav Neurosci* 1992; 106: 62-71
513. Oitzl MS, Reichardt HM, Joels M, de Kloet ER. Point mutation in the mouse glucocorticoid receptor preventing DNA binding impairs spatial memory. *Proc Natl Acad Sci U S A* 2001; 98: 12790-12795

514. Donley MP, Schulkin J, Rosen JB. Glucocorticoid receptor antagonism in the basolateral amygdala and ventral hippocampus interferes with long-term memory of contextual fear. *Behav Brain Res* 2005; 164: 197-205
515. Madsen TM, Kristjansen PE, Bolwig TG, Wortwein G. Arrested neuronal proliferation and impaired hippocampal function following fractionated brain irradiation in the adult rat. *Neuroscience* 2003; 119: 635-642
516. Jessberger S, Zhao C, Toni N, Clemenson GD, Jr., Li Y, Gage FH. Seizure-associated, aberrant neurogenesis in adult rats characterized with retrovirus-mediated cell labeling. *J Neurosci* 2007; 27: 9400-9407
517. Kandel ER. The molecular biology of memory storage: a dialogue between genes and synapses. *Science* 2001; 294: 1030-1038
518. Hugueny-Flores ME, Steimer T, Aubert ML, Schulz P. Mineralo- and glucocorticoid receptor mRNAs are differently regulated by corticosterone in the rat hippocampus and anterior pituitary. *Neuroendocrinology* 2004; 79: 174-184
519. Wilber AA, Southwood CJ, Wellman CL. Brief neonatal maternal separation alters extinction of conditioned fear and corticolimbic glucocorticoid and NMDA receptor expression in adult rats. *Dev Neurobiol* 2009; 69: 73-87
520. Sapolsky RM, Krey LC, McEwen BS. Stress down-regulates corticosterone receptors in a site-specific manner in the brain. *Endocrinology* 1984; 114: 287-292
521. Barnea A, Nottebohm F. Seasonal recruitment of hippocampal neurons in adult free-ranging black-capped chickadees. *Proc Natl Acad Sci U S A* 1994; 91: 11217-11221
522. Snyder JS, Hong NS, McDonald RJ, Wojtowicz JM. A role for adult neurogenesis in spatial long-term memory. *Neuroscience* 2005; 130: 843-852
523. Shors TJ, Townsend DA, Zhao M, Kozorovitskiy Y, Gould E. Neurogenesis may relate to some but not all types of hippocampal-dependent learning. *Hippocampus* 2002; 12: 578-584
524. Hernandez-Rabaza V, Llorens-Martin M, Velazquez-Sanchez C et al. Inhibition of adult hippocampal neurogenesis disrupts contextual learning but spares spatial working memory, long-term conditional rule retention and spatial reversal. *Neuroscience* 2009; 159: 59-68
525. Ge S, Sailor KA, Ming GL, Song H. Synaptic integration and plasticity of new neurons in the adult hippocampus. *J Physiol* 2008; 586: 3759-3765
526. Overstreet-Wadiche LS, Bromberg DA, Bensen AL, Westbrook GL. Seizures accelerate functional integration of adult-generated granule cells. *J Neurosci* 2006; 26: 4095-4103
527. Kee N, Teixeira CM, Wang AH, Frankland PW. Preferential incorporation of adult-generated granule cells into spatial memory networks in the dentate gyrus. *Nat Neurosci* 2007; 10: 355-362
528. Jessberger S, Nakashima K, Clemenson GD, Jr. et al. Epigenetic modulation of seizure-induced neurogenesis and cognitive decline. *J Neurosci* 2007; 27: 5967-5975
529. Bannerman DM, Rawlins JN, McHugh SB et al. Regional dissociations within the hippocampus--memory and anxiety. *Neurosci Biobehav Rev* 2004; 28: 273-283
530. Varela-Buylla A, Lim DA. For the long run: maintaining germinal niches in the adult brain. *Neuron* 2004; 41: 683-686

531. Goldin M, Segal M, Avignone E. Functional plasticity triggers formation and pruning of dendritic spines in cultured hippocampal networks. *J Neurosci* 2001; 21: 186-193
532. Houser CR. Granule cell dispersion in the dentate gyrus of humans with temporal lobe epilepsy. *Brain Res* 1990; 535: 195-204
533. Parent JM, Elliott RC, Pleasure SJ, Barbaro NM, Lowenstein DH. Aberrant seizure-induced neurogenesis in experimental temporal lobe epilepsy. *Ann Neurol* 2006; 59: 81-91
534. Gong C, Wang TW, Huang HS, Parent JM. Reelin regulates neuronal progenitor migration in intact and epileptic hippocampus. *J Neurosci* 2007; 27: 1803-1811
535. Scharfman HE, Goodman JH, Sollas AL. Granule-like neurons at the hilar/CA3 border after status epilepticus and their synchrony with area CA3 pyramidal cells: functional implications of seizure-induced neurogenesis. *J Neurosci* 2000; 20: 6144-6158
536. Dashtipour K, Tran PH, Okazaki MM, Nadler JV, Ribak CE. Ultrastructural features and synaptic connections of hilar ectopic granule cells in the rat dentate gyrus are different from those of granule cells in the granule cell layer. *Brain Res* 2001; 890: 261-271
537. Miller KB, Nelson JC. Does the dexamethasone suppression test relate to subtypes, factors, symptoms, or severity? *Arch Gen Psychiatry* 1987; 44: 769-774
538. Wodarz N, Rupprecht R, Kornhuber J *et al.* Normal lymphocyte responsiveness to lectins but impaired sensitivity to in vitro glucocorticoids in major depression. *J Affect Disord* 1991; 22: 241-248
539. Sapolsky RM. Is impaired neurogenesis relevant to the affective symptoms of depression? *Biol Psychiatry* 2004; 56: 137-139
540. Korte SM. Corticosteroids in relation to fear, anxiety and psychopathology. *Neurosci Biobehav Rev* 2001; 25: 117-142
541. McEwen BS, Magarinos AM, Reagan LP. Studies of hormone action in the hippocampal formation: possible relevance to depression and diabetes. *J Psychosom Res* 2002; 53: 883-890
542. Herbert J. Fortnightly review. Stress, the brain, and mental illness. *BMJ* 1997; 315: 530-535
543. Egeland J, Lund A, Landro NI *et al.* Cortisol level predicts executive and memory function in depression, symptom level predicts psychomotor speed. *Acta Psychiatr Scand* 2005; 112: 434-441
544. Belanoff JK, Rothschild AJ, Cassidy F *et al.* An open label trial of C-1073 (mifepristone) for psychotic major depression. *Biol Psychiatry* 2002; 52: 386-392
545. Belanoff JK, Flores BH, Kalezhan M, Sund B, Schatzberg AF. Rapid reversal of psychotic depression using mifepristone. *J Clin Psychopharmacol* 2001; 21: 516-521
546. Flores BH, Kenna H, Keller J, Solvason HB, Schatzberg AF. Clinical and biological effects of mifepristone treatment for psychotic depression. *Neuropsychopharmacology* 2006; 31: 628-636