

XVI. References

A. Textbooks

1. Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K. & Walter, P. (2002) *Molecular Biology of the Cell*, 4th edition. Garland Science, New York, USA
2. Gilbert, S. F. (1994) *Developmental Biology*, 4th edition. Sinauer Associates, Sunderland, USA
3. Marieb, E. N. (1995) *Human Anatomy and Physiology*, 3rd edition. The Benjamin/Cummings Publishing Company, Redwood City, USA
4. Stent, G. S. & Calendar, R. (1978) *Molecular Genetics. An introductory narrative*, 2nd edition. W. H. Freeman and Company, San Francisco, USA
5. Strachan, T. & Read, A. P. (2004) *Human Molecular Genetics*, 3rd edition. Garland Science, London, UK
6. Voet, D. & Voet, J. G. (1995) *Biochemistry*, 2nd edition. John Wiley & Sons, New York, USA

B. Primary literature, reviews & book chapters

1. Jensen, F. C., Girardi, A. J., Gilden, R. V. & Koprowski, H. (1964). Infection of Human and Simian Tissue Cultures with Rous Sarcoma Virus. *Proc Natl Acad Sci U S A* 52, 53-9.
2. Opitz, J. M. & Kaveggia, E. G. (1974). Studies of malformation syndromes of man 33: the FG syndrome. An X-linked recessive syndrome of multiple congenital anomalies and mental retardation. *Z Kinderheilkd* 117, 1-18.
3. Bertani, G. (2004). Lysogeny at mid-twentieth century: P1, P2, and other experimental systems. *J Bacteriol* 186, 595-600.
4. Rost, B. & Sander, C. (1993). Prediction of protein secondary structure at better than 70% accuracy. *J Mol Biol* 232, 584-99.
5. Hanahan, D. (1983). Studies on transformation of *Escherichia coli* with plasmids. *J Mol Biol* 166, 557-80.
6. World Health Organisation (2001). The World Health Report 2001. Mental Health: New Understanding, New Hope.
7. Polder, J. J., Meering, W. J., Bonneux, L. & van der Maas, P. J. (2002). Healthcare costs of intellectual disability in the Netherlands: a cost-of-illness perspective. *J Intellect Disabil Res* 46, 168-78.
8. Meering, W. J., Bonneux, L., Polder, J. J., Koopmanschap, M. A. & van der Maas, P. J. (1998). Demographic and epidemiological determinants of healthcare costs in Netherlands: cost of illness study. *BMJ* 317, 111-5.
9. Simonoff, E., Bolton, P. & Rutter, M. (1996). Mental retardation: genetic findings, clinical implications and research agenda. *J Child Psychol Psychiatry* 37, 259-80.
10. Broman, S., Nichols, P. L., Shaughnessy, P. & Kennedy, W. (1987) Retardation in young children: a developmental study of cognitive deficit, Erlbaum, Hillsdale, USA
11. Stevenson, R. E., Procopio-Allen, A. M., Schroer, R. J. & Collins, J. S. (2003). Genetic syndromes among individuals with mental retardation. *Am J Med Genet* 123A, 29-32.
12. Plomin, R. & Spinath, F. M. (2004). Intelligence: genetics, genes, and genomics. *J Pers Soc Psychol* 86, 112-29.
13. Richardson, S. & Koller, H. (1985) Epidemiology. In: *Mental deficiency: the changing outlook* (Clarke, A. M., Clarke, A. D. B. and Berg, J. M., Eds.) Methuen, London, UK.
14. Yeargin-Allsopp, M., Murphy, C. C., Cordero, J. F., Decoufle, P. & Hollowell, J. G. (1997). Reported biomedical causes and associated medical conditions for mental retardation among 10-year-old children, metropolitan Atlanta, 1985 to 1987. *Dev Med Child Neurol* 39, 142-9.
15. Kirby, R. S., Brewster, M. A., Canino, C. U. & Pavin, M. (1995). Early childhood surveillance of developmental disorders by a birth defects surveillance system: methods, prevalence comparisons, and mortality patterns. *J Dev Behav Pediatr* 16, 318-26.
16. Decouflé, P., Boyle, C. A., Paulozzi, L. J. & Lary, J. M. (2001). Increased risk for developmental disabilities in children who have major birth defects: a population-based study. *Pediatrics* 108, 728-34.
17. Costeff, H., Cohen, B. E., Weller, L. & Kleckner, H. (1981). Pathogenic factors in idiopathic mental retardation. *Dev Med Child Neurol* 23, 484-93.
18. Ross, M. T., Grafham, D. V., Coffey, A. J., Scherer, S., McLay, K. *et al.* (2005). The DNA sequence of the human X chromosome. *Nature* 434, 325-37.
19. International Human Genome Sequencing Consortium (2004). Finishing the euchromatic sequence of the human genome. *Nature* 431, 931-45.
20. Venter, J. C., Adams, M. D., Myers, E. W., Li, P. W., Mural, R. J. *et al.* (2001). The sequence of the human genome. *Science* 291, 1304-51.
21. Lander, E. S., Linton, L. M., Birren, B., Nusbaum, C., Zody, M. C. *et al.* (2001). Initial sequencing and analysis of the human genome. *Nature* 409, 860-921.
22. Sachidanandam, R., Weissman, D., Schmidt, S. C., Kakol, J. M., Stein, L. D. *et al.* (2001). A map of human genome sequence variation containing 1.42 million single nucleotide polymorphisms. *Nature* 409, 928-33.
23. Bohossian, H. B., Skaletsky, H. & Page, D. C. (2000). Unexpectedly similar rates of nucleotide substitution found in male and female hominids. *Nature* 406, 622-5.
24. Carrel, L. & Willard, H. F. (2005). X-inactivation profile reveals extensive variability in X-linked gene expression in females. *Nature* 434, 400-4.
25. Barr, M. L. & Bertram, E. G. (1949). A morphological distinction between neurones of the male and female, and the behaviour of the nucleolar satellite during accelerated nucleoprotein synthesis. *Nature* 163, 676-7.
26. Ohno, S. & Hauschka, T. S. (1960). Allocyclcy of the X-chromosome in tumors and normal tissues. *Cancer Res* 20, 541-5.

27. Lyon, M. F. (1961). Gene action in the X-chromosome of the mouse (*Mus musculus* L.). *Naturwissenschaften* 190, 372-3.
28. Lyon, M. F. (1962). Sex chromatin and gene action in the mammalian X-chromosome. *Am J Hum Genet* 14, 135-48.
29. Miller, O. J., Breg, W. R., Schmickel, R. D. & Tretter, W. (1961). A family with an XXXXY male, a leukaemic male, and two 21-trisomic mongoloid females. *Lancet* 2, 78-9.
30. Ferguson-Smith, M. A., Johnston, A. W. & Handmaker, S. D. (1960). Primary amentia and micro-orchidism associated with an XXXY sex-chromosome constitution. *Lancet* 2, 184-7.
31. Fraccaro, M., Kaijser, K. & Lindsten, J. (1960). A child with 49 chromosomes. *Lancet* 2, 899-902.
32. Russell, L. B. (1963). Mammalian X-chromosome action: inactivation limited in spread and region of origin. *Science* 140, 976-8.
33. Duthie, S. M., Nesterova, T. B., Formstone, E. J., Keohane, A. M., Turner, B. M., Zakian, S. M. & Brockdorff, N. (1999). Xist RNA exhibits a banded localization on the inactive X chromosome and is excluded from autosomal material in cis. *Hum Mol Genet* 8, 195-204.
34. Therman, E. & Patau, K. (1974). Abnormal X chromosomes in man: origin, behavior and effects. *Humangenetik* 25, 1-16.
35. Schmidt, M. & Du Sart, D. (1992). Functional disomies of the X chromosome influence the cell selection and hence the X inactivation pattern in females with balanced X-autosome translocations: a review of 122 cases. *Am J Med Genet* 42, 161-9.
36. Gartler, S. M. & Riggs, A. D. (1983). Mammalian X-chromosome inactivation. *Annu Rev Genet* 17, 155-90.
37. Lyon, M. F. (2003). The Lyon and the LINE hypothesis. *Semin Cell Dev Biol* 14, 313-8.
38. White, W. M., Willard, H. F., Van Dyke, D. L. & Wolff, D. J. (1998). The spreading of X inactivation into autosomal material of an x;autosome translocation: evidence for a difference between autosomal and X-chromosomal DNA. *Am J Hum Genet* 63, 20-8.
39. Keohane, A. M., Barlow, A. L., Waters, J., Bourn, D. & Turner, B. M. (1999). H4 acetylation, XIST RNA and replication timing are coincident and define x;autosome boundaries in two abnormal X chromosomes. *Hum Mol Genet* 8, 377-83.
40. Hall, L. L., Clemson, C. M., Byron, M., Wydner, K. & Lawrence, J. B. (2002). Unbalanced X;autosome translocations provide evidence for sequence specificity in the association of XIST RNA with chromatin. *Hum Mol Genet* 11, 3157-65.
41. Sharp, A. J., Spotswood, H. T., Robinson, D. O., Turner, B. M. & Jacobs, P. A. (2002). Molecular and cytogenetic analysis of the spreading of X inactivation in X;autosome translocations. *Hum Mol Genet* 11, 3145-56.
42. Johnson, G. E. (1897). Contribution to the psychology and pedagogy of feeble-minded children. *J Psycho-Asthenics* 2, 26-32.
43. Laxova, R. (1998). Lionel Sharples Penrose, 1898-1972: A personal memoir in celebration of the centenary of his birth. *Genetics* 150, 1333-40.
44. Penrose, L. S. (1938) The Colchester survey: A clinical and genetic study of 1,280 cases of mental defect, H.M. Stationary Office, Privy Council of Medical Research Council, London, UK
45. Martin, J. P. & Bell, J. (1943). A pedigree of mental defect showing sex-linkage. *J Neurol Psychiat* 6, 154-57.
46. Lehrke, R. (1972). A Theory of X-linkage of major intellectual traits. *Am J Ment Defic* 76, 611-9.
47. Terman, L. M. (1925) Genetic studies of genius, Stanford University Press, California, USA
48. Wechsler, D. (1958) The measurement and appraisal of adult intelligence, 4th edition. Williams and Wilkins, Baltimore, USA
49. Clark, W. W. (1958) Research findings on mental sex differences and their implications for education: An analysis of sex differences found in mental ability and achievement test results. In: the Convention of the American Association of School Administrators, Cleveland, USA.
50. Schull, W. J. & Neel, J. V. (1965) The effects of inbreeding on Japanese children, Harper and Row, New York, USA
51. Reed, E. W. & Reed, S. C. (1965) Mental retardation: A family study., W. B. Saunders, Philadelphia, USA
52. Wright, S. W., Tarjan, G. & Eyer, L. (1959). Investigation of families with two or more mentally defective siblings; clinical observations. *AMA J Dis Child* 97, 445-63.
53. Verkerk, A. J., Pieretti, M., Sutcliffe, J. S., Fu, Y. H., Kuhl, D. P. *et al.* (1991). Identification of a gene (FMR-1) containing a CGG repeat coincident with a breakpoint cluster region exhibiting length variation in fragile X syndrome. *Cell* 65, 905-14.
54. Richards, B. W., Sylvester, P. E. & Brooker, C. (1981). Fragile X-linked mental retardation: the Martin-Bell syndrome. *J Ment Defic Res* 25 Pt 4, 253-6.
55. Stevenson, R. E., Bennett, C. W., Abidi, F., Kleefstra, T., Porteous, M., Simensen, R. J., Lubs, H. A., Hamel, B. C. & Schwartz, C. E. (2005). Renpenning syndrome comes into focus. *Am J Med Genet A* 134, 415-21.
56. Renpenning, H., Gerrard, J. W., Zaleski, W. A. & Tabata, T. (1962). Familial sex-linked mental retardation. *Can Med Assoc J* 87, 954-6.
57. Lenski, C., Abidi, F., Meindl, A., Gibson, A., Platzer, M., Frank Kooy, R., Lubs, H. A., Stevenson, R. E., Ramser, J. & Schwartz, C. E. (2004). Novel truncating mutations in the polyglutamine tract binding protein 1 gene (PQBP1) cause Renpenning syndrome and X-linked mental retardation in another family with microcephaly. *Am J Hum Genet* 74, 777-80.
58. Kalscheuer, V. M., Freude, K., Musante, L., Jensen, L. R., Yntema, H. G. *et al.* (2003). Mutations in the polyglutamine binding protein 1 gene cause X-linked mental retardation. *Nat Genet* 35, 313-5.
59. Neri, G., Gurrieri, F., Gal, A. & Lubs, H. A. (1991). XLMR genes: update 1990. *Am J Med Genet* 38, 186-9.
60. Frints, S. G., Froyen, G., Marynen, P. & Fryns, J. P. (2002). X-linked mental retardation: vanishing boundaries between non-specific (MRX) and syndromic (MRXS) forms. *Clin Genet* 62, 423-32.
61. Stevenson, R. E. (2000). Splitting and lumping in the nosology of XLMR. *Am J Med Genet* 97, 174-82.
62. Strømme, P., Mangelsdorf, M. E., Shaw, M. A., Lower, K. M., Lewis, S. M., Bruyere, H., Lutcherath, V., Gedeon, A. K., Wallace, R. H., Scheffer, I. E., Turner, G., Partington, M., Frints, S. G., Fryns, J. P., Sutherland, G. R., Mulley, J. C. & Gecz, J. (2002). Mutations in the human ortholog of *Aristaless* cause X-linked mental retardation and epilepsy. *Nat Genet* 30, 441-5.
63. Suri, M. (2005). The phenotypic spectrum of ARX mutations. *Dev Med Child Neurol* 47, 133-7.
64. Ruiz, J. C., Cuppens, H., Legius, E., Fryns, J. P., Glover, T., Marynen, P. & Cassiman, J. J. (1995). Mutations in L1-CAM in two families with X linked complicated spastic paraplegia, MASA syndrome, and HSAS. *J Med Genet* 32, 549-52.
65. Hsiao, K., Baker, H. F., Crow, T. J., Poulter, M., Owen, F., Terwilliger, J. D., Westaway, D., Ott, J. & Prusiner, S. B. (1989). Linkage of a prion protein missense variant to Gerstmann-Strausler syndrome. *Nature* 338, 342-5.
66. Owen, F., Poulter, M., Shah, T., Collinge, J., Lofthouse, R., Baker, H., Ridley, R., McVey, J. & Crow, T. J. (1990). An in-frame insertion in the prion protein gene in familial Creutzfeldt-Jakob disease. *Brain Res Mol Brain Res* 7, 273-6.
67. Medori, R., Tritschler, H. J., LeBlanc, A., Villare, F., Manetto, V., Chen, H. Y., Xue, R., Leal, S., Montagna, P., Cortelli, P. & *et al.* (1992). Fatal familial insomnia, a

- prion disease with a mutation at codon 178 of the prion protein gene. *N Engl J Med* 326, 444-9.
68. Chiurazzi, P., Tabolacci, E. & Neri, G. (2004). X-linked mental retardation (XLMR): from clinical conditions to cloned genes. *Crit Rev Clin Lab Sci* 41, 117-58.
 69. Stevenson, R. E. (2005). Advances in X-linked mental retardation. *Curr Opin Pediatr* 17, 720-4.
 70. Ropers, H. H. & Hamel, B. C. (2005). X-linked mental retardation. *Nat Rev Genet* 6, 46-57.
 71. Raymond, F. L. (2006). X linked mental retardation: a clinical guide. *J Med Genet* 43, 193-200.
 72. Santos-Reboucas, C. B., Abdalla, C. B., Fullston, T., Campos, M., Jr., Pimentel, M. M. & Géczy, J. (2006). Lack of FMR3 expression in a male with non-syndromic mental retardation and a microdeletion immediately distal to FRAXE CCG repeat. *Neurosci Lett* 397, 245-8.
 73. Lugtenberg, D., Yntema, H. G., Banning, M. J., Oudakker, A. R., Firth, H. V., Willatt, L., Raynaud, M., Kleefstra, T., Fryns, J. P., Ropers, H. H., Chelly, J., Moraine, C., Gecz, J., Reeuwijk, J., Nabuurs, S. B., de Vries, B. B., Hamel, B. C., de Brouwer, A. P. & Bokhoven, H. (2006). ZNF674: A New Krüppel-Associated Box-Containing Zinc-Finger Gene Involved in Nonsyndromic X-Linked Mental Retardation. *Am J Hum Genet* 78, 265-78.
 74. Hoopes, R. R., Jr., Shrimpton, A. E., Knohl, S. J., Hueber, P., Hoppe, B., Matyus, J., Simckes, A., Tasic, V., Toenshoff, B., Suchy, S. F., Nussbaum, R. L. & Scheinman, S. J. (2005). Dent Disease with mutations in OCRL1. *Am J Hum Genet* 76, 260-7.
 75. Kleefstra, T. & Hamel, B. C. (2005). X-linked mental retardation: further lumping, splitting and emerging phenotypes. *Clin Genet* 67, 451-67.
 76. Turner, G., Webb, T., Wake, S. & Robinson, H. (1996). Prevalence of fragile X syndrome. *Am J Med Genet* 64, 196-7.
 77. Biancalana, V., Beldjord, C., Taillandier, A., Szpiro-Tapia, S., Cusin, V., Gerson, F., Philippe, C. & Mandel, J. L. (2004). Five years of molecular diagnosis of Fragile X syndrome (1997-2001): a collaborative study reporting 95% of the activity in France. *Am J Med Genet* 129A, 218-24.
 78. Grønskov, K., Hjalgrim, H., Nielsen, I. M. & Brøndum-Nielsen, K. (2004). Screening of the ARX gene in 682 retarded males. *Eur J Hum Genet* 12, 701-5.
 79. Gedeon, A. K., Donnelly, A. J., Mulley, J. C., Kerr, B. & Turner, G. (1996). How many X-linked genes for non-specific mental retardation (MRX) are there? *Am J Med Genet* 64, 158-62.
 80. Herbst, D. S. & Miller, J. R. (1980). Nonspecific X-linked mental retardation II: the frequency in British Columbia. *Am J Med Genet* 7, 461-9.
 81. Chiurazzi, P., Hamel, B. C. & Neri, G. (2001). XLMR genes: update 2000. *Eur J Hum Genet* 9, 71-81.
 82. Gecz, J. & Mulley, J. (2000). Genes for cognitive function: developments on the X. *Genome Res* 10, 157-63.
 83. Ropers, H. H., Hoeltzenbein, M., Kalscheuer, V., Yntema, H., Hamel, B., Fryns, J. P., Chelly, J., Partington, M., Gecz, J. & Moraine, C. (2003). Nonsyndromic X-linked mental retardation: where are the missing mutations? *Trends Genet* 19, 316-20.
 84. Mandel, J. L. & Chelly, J. (2004). Monogenic X-linked mental retardation: is it as frequent as currently estimated? The paradox of the ARX (Aristaless X) mutations. *Eur J Hum Genet* 12, 689-93.
 85. Basel-Vanagaite, L., Attia, R., Yahav, M., Ferland, R. J., Anteki, L., Walsh, C. A., Olender, T., Straussberg, R., Magal, N., Taub, E., Drasinover, V., Alkelai, A., Bercovich, D., Rechavi, G., Simon, A. J. & Shohat, M. (2006). The CC2D1A, a member of a new gene family with C2 domains, is involved in autosomal recessive non-syndromic mental retardation. *J Med Genet* 43, 203-10.
 86. Garshasbi, M., Motazacker, M. M., Kahrizi, K., Behjati, F., Abedini, S. S., Nieh, S. E., Firouzabadi, S. G., Becker, C., Ruschendorf, F., Nurnberg, P., Tzschach, A., Vazifehmand, R., Erdogan, F., Ullmann, R., Lenzner, S., Kuss, A. W., Ropers, H. H. & Najmabadi, H. (2006). SNP array-based homozygosity mapping reveals MCPH1 deletion in family with autosomal recessive mental retardation and mild microcephaly. *Hum Genet* 118, 708-15.
 87. Higgins, J. J., Pucilowska, J., Lombardi, R. Q. & Rooney, J. P. (2004). A mutation in a novel ATP-dependent Lon protease gene in a kindred with mild mental retardation. *Neurology* 63, 1927-31.
 88. Molinari, F., Rio, M., Meskenaite, V., Encha-Razavi, F., Auge, J., Bacq, D., Briault, S., Vekemans, M., Munnich, A., Attie-Bitach, T., Sonderegger, P. & Colleaux, L. (2002). Truncating neurotrophin mutation in autosomal recessive nonsyndromic mental retardation. *Science* 298, 1779-81.
 89. Hussain, S. Z., Evans, A. L., Ahmed, O. A., Jones, D., McDermot, K. D., Svennevik, E. C. & Hastings, R. J. (2000). Non-syndromic mental retardation segregating with an apparently balanced t(1;17) reciprocal translocation through three generations. *Am J Med Genet* 95, 99-104.
 90. Higgins, J. J., Pucilowska, J., Lombardi, R. Q. & Rooney, J. P. (2004). Candidate genes for recessive non-syndromic mental retardation on chromosome 3p (MRT2A). *Clin Genet* 65, 496-500.
 91. Higgins, J. J., Rosen, D. R., Loveless, J. M., Clyman, J. C. & Grau, M. J. (2000). A gene for nonsyndromic mental retardation maps to chromosome 3p25-pter. *Neurology* 55, 335-40.
 92. Longo, I., Frints, S. G., Fryns, J. P., Meloni, I., Pescucci, C., Ariani, F., Borghgraef, M., Raynaud, M., Marynen, P., Schwartz, C., Renieri, A. & Froyen, G. (2003). A third MRX family (MRX68) is the result of mutation in the long chain fatty acid-CoA ligase 4 (FACL4) gene: proposal of a rapid enzymatic assay for screening mentally retarded patients. *J Med Genet* 40, 11-7.
 93. Meloni, I., Muscettola, M., Raynaud, M., Longo, I., Brutini, M., Moizard, M. P., Gomot, M., Chelly, J., des Portes, V., Fryns, J. P., Ropers, H. H., Magi, B., Bellan, C., Volpi, N., Yntema, H. G., Lewis, S. E., Schaffer, J. E. & Renieri, A. (2002). FACL4, encoding fatty acid-CoA ligase 4, is mutated in nonspecific X-linked mental retardation. *Nat Genet* 30, 436-40.
 94. Ichiki, T., Labosky, P. A., Shiota, C., Okuyama, S., Imagawa, Y., Fogo, A., Niimura, F., Ichikawa, I., Hogan, B. L. & Inagami, T. (1995). Effects on blood pressure and exploratory behaviour of mice lacking angiotensin II type-2 receptor. *Nature* 377, 748-50.
 95. Vervoort, V. S., Beachem, M. A., Edwards, P. S., Ladd, S., Miller, K. E., de Mollerat, X., Clarkson, K., DuPont, B., Schwartz, C. E., Stevenson, R. E., Boyd, E. & Srivastava, A. K. (2002). AGTR2 mutations in X-linked mental retardation. *Science* 296, 2401-3.
 96. Kutsche, K., Yntema, H., Brandt, A., Jantke, I., Nothwang, H. G., Orth, U., Boavida, M. G., David, D., Chelly, J., Fryns, J. P., Moraine, C., Ropers, H. H., Hamel, B. C., van Bokhoven, H. & Gal, A. (2000). Mutations in ARHGEF6, encoding a guanine nucleotide exchange factor for Rho GTPases, in patients with X-linked mental retardation. *Nat Genet* 26, 247-50.
 97. Mishima, W., Suzuki, A., Yamaji, S., Yoshimi, R., Ueda, A., Kaneko, T., Tanaka, J., Miwa, Y., Ohno, S. & Ishigatsubo, Y. (2004). The first CH domain of affixin activates Cdc42 and Rac1 through alphaPIX, a Cdc42/Rac1-specific guanine nucleotide exchanging factor. *Genes Cells* 9, 193-204.
 98. Rosenberger, G., Gal, A. & Kutsche, K. (2005). AlphaPIX associates with calpain 4, the small subunit of calpain, and has a dual role in integrin-mediated cell spreading. *J Biol Chem* 280, 6879-89.
 99. Tarpey, P., Parnau, J., Blow, M., Woffendin, H., Bignell, G. *et al.* (2004). Mutations in the DLG3 gene cause

- nonsyndromic X-linked mental retardation. *Am J Hum Genet* 75, 318-24.
100. Müller, B. M., Kistner, U., Kindler, S., Chung, W. J., Kuhlendahl, S., Fenster, S. D., Lau, L. F., Veh, R. W., Haganir, R. L., Gundelfinger, E. D. & Garner, C. C. (1996). SAP102, a novel postsynaptic protein that interacts with NMDA receptor complexes in vivo. *Neuron* 17, 255-65.
 101. Schroer, A., Scheer, M. P., Zacharias, S., Schneider, S., Ropers, H. H., Nothwang, H. G., Chelly, J., Hamel, B., Fryns, J. P., Shaw, P. & Moraine, C. (2000). Cosegregation of T108A Elk-1 with mental retardation. *Am J Med Genet* 95, 404-5.
 102. Yang, S. H., Vickers, E., Brehm, A., Kouzarides, T. & Sharrocks, A. D. (2001). Temporal recruitment of the mSin3A-histone deacetylase corepressor complex to the ETS domain transcription factor Elk-1. *Mol Cell Biol* 21, 2802-14.
 103. Yang, S. H., Yates, P. R., Whitmarsh, A. J., Davis, R. J. & Sharrocks, A. D. (1998). The Elk-1 ETS-domain transcription factor contains a mitogen-activated protein kinase targeting motif. *Mol Cell Biol* 18, 710-20.
 104. Cesari, F., Brecht, S., Vintersten, K., Vuong, L. G., Hofmann, M., Klingel, K., Schnorr, J. J., Arsenian, S., Schild, H., Herdegen, T., Wiebel, F. F. & Nordheim, A. (2004). Mice deficient for the ets transcription factor elk-1 show normal immune responses and mildly impaired neuronal gene activation. *Mol Cell Biol* 24, 294-305.
 105. Gu, Y. & Nelson, D. L. (2003). FMR2 function: insight from a mouse knockout model. *Cytogenet Genome Res* 100, 129-39.
 106. Gu, Y., McIlwain, K. L., Weeber, E. J., Yamagata, T., Xu, B., Antalfy, B. A., Reyes, C., Yuva-Paylor, L., Armstrong, D., Zoghbi, H., Sweatt, J. D., Paylor, R. & Nelson, D. L. (2002). Impaired conditioned fear and enhanced long-term potentiation in Fmr2 knock-out mice. *J Neurosci* 22, 2753-63.
 107. Gu, Y., Shen, Y., Gibbs, R. A. & Nelson, D. L. (1996). Identification of FMR2, a novel gene associated with the FRAXE CCG repeat and CpG island. *Nat Genet* 13, 109-13.
 108. Gecz, J., Gedeon, A. K., Sutherland, G. R. & Mulley, J. C. (1996). Identification of the gene FMR2, associated with FRAXE mental retardation. *Nat Genet* 13, 105-8.
 109. Hillman, M. A. & Gecz, J. (2001). Fragile XE-associated familial mental retardation protein 2 (FMR2) acts as a potent transcription activator. *J Hum Genet* 46, 251-9.
 110. Gecz, J. (2000). FMR3 is a novel gene associated with FRAXE CpG island and transcriptionally silent in FRAXE full mutations. *J Med Genet* 37, 782-4.
 111. Feder, M., Pas, J., Wyrwicz, L. S. & Bujnicki, J. M. (2003). Molecular phylogenetics of the RrmJ/fibrillarin superfamily of ribose 2'-O-methyltransferases. *Gene* 302, 129-38.
 112. Caldas, T., Binet, E., Bouloc, P., Costa, A., Desgres, J. & Richarme, G. (2000). The FtsJ/RrmJ heat shock protein of *Escherichia coli* is a 23 S ribosomal RNA methyltransferase. *J Biol Chem* 275, 16414-9.
 113. Freude, K., Hoffmann, K., Jensen, L. R., Delatycki, M. B., Des Portes, V., Moser, B., Hamel, B., Van Bokhoven, H., Moraine, C., Fryns, J. P., Chelly, J., Gecz, J., Lenzner, S., Kalscheuer, V. M. & Ropers, H. H. (2004). Mutations in the FTSJ1 Gene Coding for a Novel S-Adenosylmethionine-Binding Protein Cause Nonsyndromic X-Linked Mental Retardation. *Am J Hum Genet* 75, 305-9.
 114. D'Adamo, P., Menegon, A., Lo Nigro, C., Grasso, M., Gulisano, M., Tamanini, F., Bienvenu, T., Gedeon, A. K., Oostra, B., Wu, S. K., Tandon, A., Valtorta, F., Balch, W. E., Chelly, J. & Toniolo, D. (1998). Mutations in GDI1 are responsible for X-linked non-specific mental retardation. *Nat Genet* 19, 134-9.
 115. D'Adamo, P., Welzl, H., Papadimitriou, S., Raffaele di Barletta, M., Tiveron, C., Tatangelo, L., Pozzi, L., Chapman, P. F., Knevett, S. G., Ramsay, M. F., Valtorta, F., Leoni, C., Menegon, A., Wolfer, D. P., Lipp, H. P. & Toniolo, D. (2002). Deletion of the mental retardation gene Gdi1 impairs associative memory and alters social behavior in mice. *Hum Mol Genet* 11, 2567-80.
 116. Sasaki, T., Kikuchi, A., Araki, S., Hata, Y., Isomura, M., Kuroda, S. & Takai, Y. (1990). Purification and characterization from bovine brain cytosol of a protein that inhibits the dissociation of GDP from and the subsequent binding of GTP to smg p25A, a ras p21-like GTP-binding protein. *J Biol Chem* 265, 2333-7.
 117. Ohira, K., Kumanogoh, H., Sahara, Y., Homma, K. J., Hirai, H., Nakamura, S. & Hayashi, M. (2005). A truncated tropomyosin-related kinase B receptor, T1, regulates glial cell morphology via Rho GDP dissociation inhibitor 1. *J Neurosci* 25, 1343-53.
 118. Pfeffer, S. R., Dirac-Svejstrup, A. B. & Soldati, T. (1995). Rab GDP dissociation inhibitor: putting rab GTPases in the right place. *J Biol Chem* 270, 17057-9.
 119. Erdman, R. A. & Maltese, W. A. (2001). Different Rab GTPases associate preferentially with alpha or beta GDP-dissociation inhibitors. *Biochem Biophys Res Commun* 282, 4-9.
 120. Fischer von Mollard, G., Stahl, B., Khokhlatchev, A., Sudhof, T. C. & Jahn, R. (1994). Rab3C is a synaptic vesicle protein that dissociates from synaptic vesicles after stimulation of exocytosis. *J Biol Chem* 269, 10971-4.
 121. Fischer von Mollard, G., Sudhof, T. C. & Jahn, R. (1991). A small GTP-binding protein dissociates from synaptic vesicles during exocytosis. *Nature* 349, 79-81.
 122. Ishizaki, H., Miyoshi, J., Kamiya, H., Togawa, A., Tanaka, M., Sasaki, T., Endo, K., Mizoguchi, A., Ozawa, S. & Takai, Y. (2000). Role of rab GDP dissociation inhibitor alpha in regulating plasticity of hippocampal neurotransmission. *Proc Natl Acad Sci U S A* 97, 11587-92.
 123. Carrié, A., Jun, L., Bienvenu, T., Vinet, M. C., McDonell, N. *et al.* (1999). A new member of the IL-1 receptor family highly expressed in hippocampus and involved in X-linked mental retardation. *Nat Genet* 23, 25-31.
 124. Bahi, N., Friocourt, G., Carrié, A., Graham, M. E., Weiss, J. L., Chafey, P., Fauchereau, F., Burgoyne, R. D. & Chelly, J. (2003). IL1 receptor accessory protein like, a protein involved in X-linked mental retardation, interacts with Neuronal Calcium Sensor-1 and regulates exocytosis. *Hum Mol Genet* 12, 1415-25.
 125. Nef, S., Fiumelli, H., de Castro, E., Raes, M. B. & Nef, P. (1995). Identification of neuronal calcium sensor (NCS-1) possibly involved in the regulation of receptor phosphorylation. *J Recept Signal Transduct Res* 15, 365-78.
 126. Allen, K. M., Gleeson, J. G., Bagrodia, S., Partington, M. W., MacMillan, J. C., Cerione, R. A., Mulley, J. C. & Walsh, C. A. (1998). PAK3 mutation in nonsyndromic X-linked mental retardation. *Nat Genet* 20, 25-30.
 127. Bagrodia, S., Taylor, S. J., Creasy, C. L., Chernoff, J. & Cerione, R. A. (1995). Identification of a mouse p21Cdc42/Rac activated kinase. *J Biol Chem* 270, 22731-7.
 128. Boda, B., Alberi, S., Nikonenko, I., Node-Langlois, R., Jourdain, P., Moosmayer, M., Parisi-Jourdain, L. & Müller, D. (2004). The mental retardation protein PAK3 contributes to synapse formation and plasticity in hippocampus. *J Neurosci* 24, 10816-25.
 129. Meng, J., Meng, Y., Hanna, A., Janus, C. & Jia, Z. (2005). Abnormal long-lasting synaptic plasticity and cognition in mice lacking the mental retardation gene Pak3. *J Neurosci* 25, 6641-50.
 130. Zhang, H., Webb, D. J., Asmussen, H., Niu, S. & Horwitz, A. F. (2005). A GIT1/PIX/Rac/PAK signaling module regulates spine morphogenesis and synapse formation through MLC. *J Neurosci* 25, 3379-88.
 131. Berns, K., Hijmans, E. M., Mullenders, J., Brummelkamp, T. R., Velds, A., Heimerikx, M., Kerkhoven, R. M., Madiredjo, M., Nijkamp, W., Weigelt, B., Agami, R., Ge, W., Cavet, G., Linsley, P. S., Beijersbergen, R. L. &

- Bernards, R. (2004). A large-scale RNAi screen in human cells identifies new components of the p53 pathway. *Nature* 428, 431-7.
132. Yntema, H. G., van den Helm, B., Kissing, J., van Duijnhoven, G., Poppelaars, F., Chelly, J., Moraine, C., Fryns, J. P., Hamel, B. C., Heilbronner, H., Pander, H. J., Brunner, H. G., Ropers, H. H., Cremers, F. P. & van Bokhoven, H. (1999). A novel ribosomal S6-kinase (RSK4; RPS6KA6) is commonly deleted in patients with complex X-linked mental retardation. *Genomics* 62, 332-43.
133. Myers, A. P., Corson, L. B., Rossant, J. & Baker, J. C. (2004). Characterization of mouse Rsk4 as an inhibitor of fibroblast growth factor-RAS-extracellular signal-regulated kinase signaling. *Mol Cell Biol* 24, 4255-66.
134. Zemni, R., Bienvenu, T., Vinet, M. C., Sefiani, A., Carrie, A. *et al.* (2000). A new gene involved in X-linked mental retardation identified by analysis of an X;2 balanced translocation. *Nat Genet* 24, 167-70.
135. Abidi, F. E., Holinski-Feder, E., Rittinger, O., Kooy, F., Lubs, H. A., Stevenson, R. E. & Schwartz, C. E. (2002). A novel 2 bp deletion in the TM4SF2 gene is associated with MRX58. *J Med Genet* 39, 430-3.
136. Gomot, M., Ronce, N., Dessay, S., Zemni, R., Ayrault, A. D., Moizard, M. P., Nivelon, A., Gilgenkrantz, S., Dourlens, J., Des Portes, V., Chelly, J. & Moraine, C. (2002). TM4SF2 gene involvement reconsidered in an XLMR family after neuropsychological assessment. *Am J Med Genet* 112, 400-4.
137. Maranduba, C. M., Sa Moreira, E., Muller Orabona, G., Pavanello, R. C., Vianna-Morgante, A. M. & Passos-Bueno, M. R. (2004). Does the P172H mutation at the TM4SF2 gene cause X-linked mental retardation? *Am J Med Genet* 124A, 413-5.
138. Takagi, S., Fujikawa, K., Imai, T., Fukuhara, N., Fukudome, K., Minegishi, M., Tsuchiya, S., Konno, T., Hinuma, Y. & Yoshie, O. (1995). Identification of a highly specific surface marker of T-cell acute lymphoblastic leukemia and neuroblastoma as a new member of the transmembrane 4 superfamily. *Int J Cancer* 61, 706-15.
139. Kopczyński, C. C., Davis, G. W. & Goodman, C. S. (1996). A neural tetraspanin, encoded by late bloomer, that facilitates synapse formation. *Science* 271, 1867-70.
140. Fradkin, L. G., Kamphorst, J. T., DiAntonio, A., Goodman, C. S. & Noordermeer, J. N. (2002). Genomewide analysis of the Drosophila tetraspanins reveals a subset with similar function in the formation of the embryonic synapse. *Proc Natl Acad Sci U S A* 99, 13663-8.
141. Lahn, B. T. & Page, D. C. (2000). A human sex-chromosomal gene family expressed in male germ cells and encoding variably charged proteins. *Hum Mol Genet* 9, 311-9.
142. Zou, S. W., Zhang, J. C., Zhang, X. D., Miao, S. Y., Zong, S. D., Sheng, Q. & Wang, L. F. (2003). Expression and localization of VCX/Y proteins and their possible involvement in regulation of ribosome assembly during spermatogenesis. *Cell Res* 13, 171-7.
143. Van Esch, H., Hollanders, K., Badisco, L., Melotte, C., Van Hummelen, P., Vermeesch, J. R., Devriendt, K., Fryns, J. P., Marynen, P. & Froyen, G. (2005). Deletion of VCX-A due to NAHR plays a major role in the occurrence of mental retardation in patients with X-linked ichthyosis. *Hum Mol Genet* 14, 1795-803.
144. Fukami, M., Kirsch, S., Schiller, S., Richter, A., Benes, V., Franco, B., Muroya, K., Rao, E., Merker, S., Niesler, B., Ballabio, A., Ansorge, W., Ogata, T. & Rappold, G. A. (2000). A member of a gene family on Xp22.3, VCX-A, is deleted in patients with X-linked nonspecific mental retardation. *Am J Hum Genet* 67, 563-73.
145. Roth, A. F., Feng, Y., Chen, L. & Davis, N. G. (2002). The yeast DHH cysteine-rich domain protein Akr1p is a palmitoyl transferase. *J Cell Biol* 159, 23-8.
146. Mansouri, M. R., Marklund, L., Gustavsson, P., Davey, E., Carlsson, B., Larsson, C., White, I., Gustavson, K. H. & Dahl, N. (2005). Loss of ZDHHHC15 expression in a woman with a balanced translocation t(X;15)(q13.3;cen) and severe mental retardation. *Eur J Hum Genet* 13, 970-7.
147. van der Maarel, S. M., Scholten, I. H., Huber, I., Philippe, C., Suijkerbuijk, R. F., Gilgenkrantz, S., Kere, J., Cremers, F. P. & Ropers, H. H. (1996). Cloning and characterization of DXS6673E, a candidate gene for X-linked mental retardation in Xq13.1. *Hum Mol Genet* 5, 887-97.
148. Smedley, D., Hamoudi, R., Lu, Y. J., Cooper, C. & Shipley, J. (1999). Cloning and mapping of members of the MYM family. *Genomics* 60, 244-7.
149. Raffa, G. D., Cenci, G., Siriaco, G., Goldberg, M. L. & Gatti, M. (2005). The putative Drosophila transcription factor woc is required to prevent telomeric fusions. *Mol Cell* 20, 821-31.
150. Margolin, J. F., Friedman, J. R., Meyer, W. K., Vissing, H., Thiesen, H. J. & Rauscher, F. J., 3rd (1994). Krüppel-associated boxes are potent transcriptional repression domains. *Proc Natl Acad Sci U S A* 91, 4509-13.
151. Friedman, J. R., Fredericks, W. J., Jensen, D. E., Speicher, D. W., Huang, X. P., Neilson, E. G. & Rauscher, F. J., III (1996). KAP-1, a novel corepressor for the highly conserved KRAB repression domain. *Genes Dev* 10, 2067-78.
152. Shoichet, S. A., Hoffmann, K., Menzel, C., Trautmann, U., Moser, B., Hoeltzenbein, M., Echenne, B., Partington, M., Van Bokhoven, H., Moraine, C., Fryns, J. P., Chelly, J., Rott, H. D., Ropers, H. H. & Kalscheuer, V. M. (2003). Mutations in the ZNF41 gene are associated with cognitive deficits: identification of a new candidate for X-linked mental retardation. *Am J Hum Genet* 73, 1341-54.
153. Lossi, A. M., Laugier-Anfossi, F., Depetris, D., Gecz, J., Gedeon, A., Kooy, F., Schwartz, C., Mattei, M. G., Croquette, M. F. & Villard, L. (2002). Abnormal expression of the KLF8 (ZNF741) gene in a female patient with an X;autosomal translocation t(X;21)(p11.2;q22.3) and non-syndromic mental retardation. *J Med Genet* 39, 113-7.
154. Turner, J. & Crossley, M. (1998). Cloning and characterization of mCtBP2, a co-repressor that associates with basic Krüppel-like factor and other mammalian transcriptional regulators. *EMBO J* 17, 5129-40.
155. van Vliet, J., Turner, J. & Crossley, M. (2000). Human Krüppel-like factor 8: a CACCC-box binding protein that associates with CtBP and represses transcription. *Nucleic Acids Res* 28, 1955-62.
156. Kleefstra, T., Yntema, H. G., Oudakker, A. R., Banning, M. J., Kalscheuer, V. M., Chelly, J., Moraine, C., Ropers, H. H., Fryns, J. P., Janssen, I. M., Sistermans, E. A., Nillesen, W. N., de Vries, L. B., Hamel, B. C. & van Bokhoven, H. (2004). Zinc finger 81 (ZNF81) mutations associated with X-linked mental retardation. *J Med Genet* 41, 394-9.
157. Huang, D., Sun, W. & Strom, C. M. (2005). Sequence variations in AGTR2 are unlikely to be associated with X-linked mental retardation. *Am J Med Genet A* 139, 243-4.
158. Bienvenu, T., Poirier, K., Van Esch, H., Hamel, B., Moraine, C., Fryns, J. P., Ropers, H. H., Beldjord, C., Yntema, H. G. & Chelly, J. (2003). Rare polymorphic variants of the AGTR2 gene in boys with non-specific mental retardation. *J Med Genet* 40, 357-9.
159. Nishimura, H., Yerkes, E., Hohenfellner, K., Miyazaki, Y., Ma, J., Hunley, T. E., Yoshida, H., Ichiki, T., Threadgill, D., Phillips, J. A., 3rd, Hogan, B. M., Fogo, A., Brock, J. W., 3rd, Inagami, T. & Ichikawa, I. (1999). Role of the angiotensin type 2 receptor gene in congenital anomalies of the kidney and urinary tract, CAKUT, of mice and men. *Mol Cell* 3, 1-10.
160. Lesca, G., Sinilnikova, O., Theuil, G., Blanc, J., Edery, P. & Till, M. (2005). Xp22.3 microdeletion including

- VCX-A and VCX-B1 genes in an X-linked ichthyosis family: no difference in deletion size for patients with and without mental retardation. *Clin Genet* 67, 367-8.
161. Kitamura, K., Yanazawa, M., Sugiyama, N., Miura, H., Iizuka-Kogo, A. *et al.* (2002). Mutation of ARX causes abnormal development of forebrain and testes in mice and X-linked lissencephaly with abnormal genitalia in humans. *Nat Genet* 32, 359-69.
 162. Bienvenu, T., Poirier, K., Friocourt, G., Bahi, N., Beaumont, D. *et al.* (2002). ARX, a novel Prd-class-homeobox gene highly expressed in the telencephalon, is mutated in X-linked mental retardation. *Hum Mol Genet* 11, 981-91.
 163. Miura, H., Yanazawa, M., Kato, K. & Kitamura, K. (1997). Expression of a novel aristaless related homeobox gene 'Arx' in the vertebrate telencephalon, diencephalon and floor plate. *Mech Dev* 65, 99-109.
 164. Schneitz, K., Spielmann, P. & Noll, M. (1993). Molecular genetics of aristaless, a prd-type homeo box gene involved in the morphogenesis of proximal and distal pattern elements in a subset of appendages in Drosophila. *Genes Dev* 7, 114-29.
 165. Nawara, M., Szczaluba, K., Poirier, K., Chrzanowska, K., Pilch, J., Bal, J., Chelly, J. & Mazurczak, T. (2006). The ARX mutations: A frequent cause of X-linked mental retardation. *Am J Med Genet A* 140, 727-32.
 166. Partington, M. W., Turner, G., Boyle, J. & Gecz, J. (2004). Three new families with X-linked mental retardation caused by the 428-451dup(24bp) mutation in ARX. *Clin Genet* 66, 39-45.
 167. Poirier, K., Abriol, J., Souville, I., Laroche-Raynaud, C., Beldjord, C., Gilbert, B., Chelly, J. & Bienvenu, T. (2005). Maternal mosaicism for mutations in the ARX gene in a family with X linked mental retardation. *Hum Genet* 118, 45-8.
 168. Poirier, K., Lacombe, D., Gilbert-Dussardier, B., Raynaud, M., Desportes, V., de Brouwer, A. P., Moraine, C., Fryns, J. P., Ropers, H. H., Beldjord, C., Chelly, J. & Bienvenu, T. (2006). Screening of ARX in mental retardation families: consequences for the strategy of molecular diagnosis. *Neurogenetics* 7, 39-46.
 169. Stepp, M. L., Cason, A. L., Finnis, M., Mangelsdorf, M., Holinski-Feder, E., Macgregor, D., MacMillan, A., Holden, J. J., Gecz, J., Stevenson, R. E. & Schwartz, C. E. (2005). XLMR in MRX families 29, 32, 33 and 38 results from the dup24 mutation in the ARX (Aristaless related homeobox) gene. *BMC Med Genet* 6, 16.
 170. Friocourt, G., Poirier, K., Rakic, S., Parnavelas, J. G. & Chelly, J. (2006). The role of ARX in cortical development. *Eur J Neurosci* 23, 869-76.
 171. Melkman, T. & Sengupta, P. (2005). Regulation of chemosensory and GABAergic motor neuron development by the C. elegans Aristaless/Arx homolog alr-1. *Development* 132, 1935-49.
 172. Yoshihara, S., Omichi, K., Yanazawa, M., Kitamura, K. & Yoshihara, Y. (2005). Arx homeobox gene is essential for development of mouse olfactory system. *Development* 132, 751-62.
 173. Seufert, D. W., Prescott, N. L. & El-Hodiri, H. M. (2005). Xenopus aristaless-related homeobox (xARX) gene product functions as both a transcriptional activator and repressor in forebrain development. *Dev Dyn* 232, 313-24.
 174. Gibbons, R. J., Bachoo, S., Picketts, D. J., Aftimos, S., Asenbauer, B., Bergoffen, J., Berry, S. A., Dahl, N., Fryer, A., Keppler, K., Kurosawa, K., Levin, M. L., Masuno, M., Neri, G., Pierpont, M. E., Slaney, S. F. & Higgs, D. R. (1997). Mutations in transcriptional regulator ATRX establish the functional significance of a PHD-like domain. *Nat Genet* 17, 146-8.
 175. Gibbons, R. J., Picketts, D. J., Villard, L. & Higgs, D. R. (1995). Mutations in a putative global transcriptional regulator cause X-linked mental retardation with alpha-thalassemia (ATR-X syndrome). *Cell* 80, 837-45.
 176. Guerrini, R., Shanahan, J. L., Carrozzo, R., Bonanni, P., Higgs, D. R. & Gibbons, R. J. (2000). A nonsense mutation of the ATRX gene causing mild mental retardation and epilepsy. *Ann Neurol* 47, 117-21.
 177. Yntema, H. G., Poppelaars, F. A., Derksen, E., Oudakker, A. R., van Roosmalen, T., Jacobs, A., Obbema, H., Brunner, H. G., Hamel, B. C. & van Bokhoven, H. (2002). Expanding phenotype of XNP mutations: mild to moderate mental retardation. *Am J Med Genet* 110, 243-7.
 178. Wieland, I., Sabathil, J., Ostendorf, A., Rittinger, O., Ropke, A., Winnepeninckx, B., Kooy, F., Holinski-Feder, E. & Wieacker, P. (2005). A missense mutation in the coiled-coil motif of the HP1-interacting domain of ATR-X in a family with X-linked mental retardation. *Neurogenetics* 6, 45-7.
 179. Abidi, F. E., Cardoso, C., Lossi, A. M., Lowry, R. B., Depetris, D., Mattei, M. G., Lubs, H. A., Stevenson, R. E., Fontes, M., Chudley, A. E. & Schwartz, C. E. (2005). Mutation in the 5' alternatively spliced region of the XNP/ATR-X gene causes Chudley-Lowry syndrome. *Eur J Hum Genet* 13, 176-83.
 180. Carlson, M. & Laurent, B. C. (1994). The SNF/SWI family of global transcriptional activators. *Curr Opin Cell Biol* 6, 396-402.
 181. Bérubé, N. G., Smeenk, C. A. & Picketts, D. J. (2000). Cell cycle-dependent phosphorylation of the ATRX protein correlates with changes in nuclear matrix and chromatin association. *Hum Mol Genet* 9, 539-47.
 182. Bérubé, N. G., Mangelsdorf, M., Jagla, M., Vanderluit, J., Garrick, D., Gibbons, R. J., Higgs, D. R., Slack, R. S. & Picketts, D. J. (2005). The chromatin-remodeling protein ATRX is critical for neuronal survival during corticogenesis. *J Clin Invest* 115, 258-67.
 183. Cardoso, C., Timsit, S., Villard, L., Khrestchatsky, M., Fontes, M. & Colleaux, L. (1998). Specific interaction between the XNP/ATR-X gene product and the SET domain of the human EZH2 protein. *Hum Mol Genet* 7, 679-84.
 184. Tang, J., Wu, S., Liu, H., Stratt, R., Barak, O. G., Shiekhhattar, R., Picketts, D. J. & Yang, X. (2004). A novel transcription regulatory complex containing death domain-associated protein and the ATR-X syndrome protein. *J Biol Chem* 279, 20369-77.
 185. De La Fuente, R., Viveiros, M. M., Wigglesworth, K. & Eppig, J. J. (2004). ATRX, a member of the SNF2 family of helicase/ATPases, is required for chromosome alignment and meiotic spindle organization in metaphase II stage mouse oocytes. *Dev Biol* 272, 1-14.
 186. Nelson, M. E., Thurmes, P. J., Hoyer, J. D. & Steensma, D. P. (2005). A novel 5' ATRX mutation with splicing consequences in acquired alpha thalassemia-myelodysplastic syndrome. *Haematologica* 90, 1463-70.
 187. Wada, T., Sakakibara, M., Fukushima, Y. & Saitoh, S. (2005). A novel splicing mutation of the ATRX gene in ATR-X syndrome. *Brain Dev*.
 188. Picketts, D. J., Higgs, D. R., Bachoo, S., Blake, D. J., Quarrell, O. W. & Gibbons, R. J. (1996). ATRX encodes a novel member of the SNF2 family of proteins: mutations point to a common mechanism underlying the ATR-X syndrome. *Hum Mol Genet* 5, 1899-907.
 189. Pasteris, N. G., Cadle, A., Logie, L. J., Porteous, M. E., Schwartz, C. E., Stevenson, R. E., Glover, T. W., Wilroy, R. S. & Gorski, J. L. (1994). Isolation and characterization of the faciogenital dysplasia (Aarskog-Scott syndrome) gene: a putative Rho/Rac guanine nucleotide exchange factor. *Cell* 79, 669-78.
 190. Lebel, R. R., May, M., Pouls, S., Lubs, H. A., Stevenson, R. E. & Schwartz, C. E. (2002). Non-syndromic X-linked mental retardation associated with a missense mutation (P312L) in the FGD1 gene. *Clin Genet* 61, 139-45.
 191. Shalev, S. A., Chervinski, E., Weiner, E., Mazor, G., Friez, M. J. & Schwartz, C. E. (2006). Clinical variation

- of Aarskog syndrome in a large family with 2189delA in the FGD1 gene. *Am J Med Genet A* 140, 162-5.
192. Orrico, A., Galli, L., Buoni, S., Hayek, G., Luchetti, A., Lorenzini, S., Zappella, M., Pomponi, M. G. & Sorrentino, V. (2005). Attention-deficit/hyperactivity disorder (ADHD) and variable clinical expression of Aarskog-Scott syndrome due to a novel FGD1 gene mutation (R408Q). *Am J Med Genet A* 135, 99-102.
 193. Kim, K., Hou, P., Gorski, J. L. & Cooper, J. A. (2004). Effect of Fgd1 on cortactin in Arp2/3 complex-mediated actin assembly. *Biochemistry* 43, 2422-7.
 194. Wilsker, D., Patsialou, A., Dallas, P. B. & Moran, E. (2002). ARID proteins: a diverse family of DNA binding proteins implicated in the control of cell growth, differentiation, and development. *Cell Growth Differ* 13, 95-106.
 195. Tzschach, A., Lenzner, S., Moser, B., Reinhardt, R., Chelly, J., Fryns, J. P., Kleefstra, T., Raynaud, M., Turner, G., Ropers, H. H., Kuss, A. & Jensen, L. R. (2006). Novel JARID1C/SMCX mutations in patients with X-linked mental retardation. *Hum Mutat* 27, 389.
 196. Jensen, L. R., Amende, M., Gurok, U., Moser, B., Gimmel, V. *et al.* (2005). Mutations in the JARID1C Gene, Which Is Involved in Transcriptional Regulation and Chromatin Remodeling, Cause X-Linked Mental Retardation. *Am J Hum Genet* 76, 227-36.
 197. Santos, C., Rodriguez-Revenga, L., Madrigal, I., Badesas, C., Pineda, M. & Mila, M. (2006). A novel mutation in JARID1C gene associated with mental retardation. *Eur J Hum Genet*.
 198. Clissold, P. M. & Ponting, C. P. (2001). JmjC: cupin metalloenzyme-like domains in jumonji, hairless and phospholipase A2beta. *Trends Biochem Sci* 26, 7-9.
 199. Hagens, O., Dubos, A., Abidi, F., Barbi, G., Van Zutven, L., Hoeltzenbein, M., Tommerup, N., Moraine, C., Fryns, J. P., Chelly, J., van Bokhoven, H., Gecz, J., Dollfus, H., Ropers, H. H., Schwartz, C. E., de Cassia Stocco Dos Santos, R., Kalscheuer, V. & Hanauer, A. (2006). Disruptions of the novel KIAA1202 gene are associated with X-linked mental retardation. *Hum Genet* 118, 578-90.
 200. Hagens, O., Ballabio, A., Kalscheuer, V., Kraehenbuhl, J. P., Schiaffino, M. V., Smith, P., Staub, O., Hildebrand, J. & Wallingford, J. B. (2006). A new standard nomenclature for proteins related to Apx and Shroom. *BMC Cell Biol* 7, 18-9.
 201. Amir, R. E., Van den Veyver, I. B., Wan, M., Tran, C. Q., Francke, U. & Zoghbi, H. Y. (1999). Rett syndrome is caused by mutations in X-linked MECP2, encoding methyl-CpG-binding protein 2. *Nat Genet* 23, 185-8.
 202. Clayton-Smith, J., Watson, P., Ramsden, S. & Black, G. C. (2000). Somatic mutation in MECP2 as a non-fatal neurodevelopmental disorder in males. *Lancet* 356, 830-2.
 203. Meloni, I., Bruttini, M., Longo, I., Mari, F., Rizzolio, F., D'Adamo, P., Denvriendt, K., Fryns, J. P., Toniolo, D. & Renieri, A. (2000). A mutation in the rett syndrome gene, MECP2, causes X-linked mental retardation and progressive spasticity in males. *Am J Hum Genet* 67, 982-5.
 204. Orrico, A., Lam, C., Galli, L., Dotti, M. T., Hayek, G., Tong, S. F., Poon, P. M., Zappella, M., Federico, A. & Sorrentino, V. (2000). MECP2 mutation in male patients with non-specific X-linked mental retardation. *FEBS Lett* 481, 285-8.
 205. Villard, L., Kpebe, A., Cardoso, C., Chelly, P. J., Tardieu, P. M. & Fontes, M. (2000). Two affected boys in a Rett syndrome family: clinical and molecular findings. *Neurology* 55, 1188-93.
 206. Couvert, P., Bienvenu, T., Aquaviva, C., Poirier, K., Moraine, C., Gendrot, C., Verloes, A., Andres, C., Le Fevre, A. C., Souville, I., Steffann, J., des Portes, V., Ropers, H. H., Yntema, H. G., Fryns, J. P., Briault, S., Chelly, J. & Cherif, B. (2001). MECP2 is highly mutated in X-linked mental retardation. *Hum Mol Genet* 10, 941-6.
 207. Imessaoudene, B., Bonnefont, J. P., Royer, G., Cormier-Daire, V., Lyonnet, S., Lyon, G., Munnich, A. & Amiel, J. (2001). MECP2 mutation in non-fatal, non-progressive encephalopathy in a male. *J Med Genet* 38, 171-4.
 208. Watson, P., Black, G., Ramsden, S., Barrow, M., Super, M., Kerr, B. & Clayton-Smith, J. (2001). Angelman syndrome phenotype associated with mutations in MECP2, a gene encoding a methyl CpG binding protein. *J Med Genet* 38, 224-8.
 209. Yntema, H. G., Oudakker, A. R., Kleefstra, T., Hamel, B. C., van Bokhoven, H., Chelly, J., Kalscheuer, V. M., Fryns, J. P., Raynaud, M., Moizard, M. P. & Moraine, C. (2002). In-frame deletion in MECP2 causes mild non-specific mental retardation. *Am J Med Genet* 107, 81-3.
 210. Kleefstra, T., Yntema, H. G., Nillesen, W. M., Oudakker, A. R., Mullaart, R. A., Geerdink, N., van Bokhoven, H., de Vries, B. B., Sijm, E. A. & Hamel, B. C. (2004). MECP2 analysis in mentally retarded patients: implications for routine DNA diagnostics. *Eur J Hum Genet* 12, 24-8.
 211. Lewis, J. D., Meehan, R. R., Henzel, W. J., Maurer-Fogy, I., Jeppesen, P., Klein, F. & Bird, A. (1992). Purification, sequence, and cellular localization of a novel chromosomal protein that binds to methylated DNA. *Cell* 69, 905-14.
 212. Nan, X., Campoy, F. J. & Bird, A. (1997). MeCP2 is a transcriptional repressor with abundant binding sites in genomic chromatin. *Cell* 88, 471-81.
 213. Fuks, F., Hurd, P. J., Wolf, D., Nan, X., Bird, A. P. & Kouzarides, T. (2003). The methyl-CpG-binding protein MeCP2 links DNA methylation to histone methylation. *J Biol Chem* 278, 4035-40.
 214. Young, J. I. & Zoghbi, H. Y. (2004). X-chromosome inactivation patterns are unbalanced and affect the phenotypic outcome in a mouse model of rett syndrome. *Am J Hum Genet* 74, 511-20.
 215. Ghosh, A., Carnahan, J. & Greenberg, M. E. (1994). Requirement for BDNF in activity-dependent survival of cortical neurons. *Science* 263, 1618-23.
 216. Bonni, A., Brunet, A., West, A. E., Datta, S. R., Takasu, M. A. & Greenberg, M. E. (1999). Cell survival promoted by the Ras-MAPK signaling pathway by transcription-dependent and -independent mechanisms. *Science* 286, 1358-62.
 217. Davis, R. L. & Turner, D. L. (2001). Vertebrate hairy and Enhancer of split related proteins: transcriptional repressors regulating cellular differentiation and embryonic patterning. *Oncogene* 20, 8342-57.
 218. Klauck, S. M., Lindsay, S., Beyer, K. S., Splitt, M., Burn, J. & Poustka, A. (2002). A mutation hot spot for non-specific X-linked mental retardation in the MECP2 gene causes the PPM-X syndrome. *Am J Hum Genet* 70, 1034-7.
 219. Moretti, P., Levenson, J. M., Battaglia, F., Atkinson, R., Teague, R., Antalffy, B., Armstrong, D., Arancio, O., Sweatt, J. D. & Zoghbi, H. Y. (2006). Learning and memory and synaptic plasticity are impaired in a mouse model of Rett syndrome. *J Neurosci* 26, 319-27.
 220. Nelson, E. D., Kavalali, E. T. & Monteggia, L. M. (2006). MeCP2-Dependent Transcriptional Repression Regulates Excitatory Neurotransmission. *Curr Biol* 16, 710-6.
 221. Horike, S., Cai, S., Miyano, M., Cheng, J. F. & Kohwi-Shigematsu, T. (2005). Loss of silent-chromatin looping and impaired imprinting of DLX5 in Rett syndrome. *Nat Genet* 37, 31-40.
 222. Asaka, Y., Jugloff, D. G., Zhang, L., Eubanks, J. H. & Fitzsimonds, R. M. (2006). Hippocampal synaptic plasticity is impaired in the MeCP2-null mouse model of Rett syndrome. *Neurobiol Dis* 21, 217-27.
 223. Masuyama, T., Matsuo, M., Jing, J. J., Tabara, Y., Kitsuiki, K., Yamagata, H., Kan, Y., Miki, T., Ishii, K. & Kondo, I. (2005). Classic Rett syndrome in a boy with R133C mutation of MECP2. *Brain Dev* 27, 439-42.

224. Poirier, K., Francis, F., Hamel, B., Moraine, C., Fryns, J. P., Ropers, H. H., Chelly, J. & Bienvenu, T. (2005). Mutations in exon 1 of MECP2B are not a common cause of X-linked mental retardation in males. *Eur J Hum Genet* 13, 523-4.
225. Shahbazian, M. D., Antalffy, B., Armstrong, D. L. & Zoghbi, H. Y. (2002). Insight into Rett syndrome: MeCP2 levels display tissue- and cell-specific differences and correlate with neuronal maturation. *Hum Mol Genet* 11, 115-24.
226. Laumonnier, F., Bonnet-Brilhault, F., Gomot, M., Blanc, R., David, A., Moizard, M. P., Raynaud, M., Ronce, N., Lémonnier, E., Calvas, P., Laudier, B., Chelly, J., Fryns, J. P., Ropers, H. H., Hamel, B. C., Andres, C., Barthelemy, C., Moraine, C. & Briault, S. (2004). X-linked mental retardation and autism are associated with a mutation in the NLGN4 gene, a member of the neuroligin family. *Am J Hum Genet* 74, 552-7.
227. Jamain, S., Quach, H., Betancur, C., Rastam, M., Colineaux, C., Gillberg, I. C., Soderstrom, H., Giros, B., Leboyer, M., Gillberg, C. & Bourgeron, T. (2003). Mutations of the X-linked genes encoding neuroligins NLGN3 and NLGN4 are associated with autism. *Nat Genet* 34, 27-9.
228. Song, J. Y., Ichtchenko, K., Sudhof, T. C. & Brose, N. (1999). Neuroligin 1 is a postsynaptic cell-adhesion molecule of excitatory synapses. *Proc Natl Acad Sci U S A* 96, 1100-5.
229. Scheiffele, P., Fan, J., Choh, J., Fetter, R. & Serafini, T. (2000). Neuroligin expressed in nonneuronal cells triggers presynaptic development in contacting axons. *Cell* 101, 657-69.
230. Chih, B., Afridi, S. K., Clark, L. & Scheiffele, P. (2004). Disorder-associated mutations lead to functional inactivation of neuroligins. *Hum Mol Genet* 13, 1471-7.
231. Billuart, P., Bienvenu, T., Ronce, N., des Portes, V., Vinet, M. C., Zemni, R., Roest Crolius, H., Carrie, A., Fauchereau, F., Cherry, M., Briault, S., Hamel, B., Fryns, J. P., Beldjord, C., Kahn, A., Moraine, C. & Chelly, J. (1998). Oligophrenin-1 encodes a rhoGAP protein involved in X-linked mental retardation. *Nature* 392, 923-6.
232. Govek, E. E., Newey, S. E., Akerman, C. J., Cross, J. R., Van der Veken, L. & Van Aelst, L. (2004). The X-linked mental retardation protein oligophrenin-1 is required for dendritic spine morphogenesis. *Nat Neurosci* 7, 364-72.
233. Tentler, D., Gustavsson, P., Leisti, J., Schueler, M., Chelly, J., Timonen, E., Anneren, G., Willard, H. F. & Dahl, N. (1999). Deletion including the oligophrenin-1 gene associated with enlarged cerebral ventricles, cerebellar hypoplasia, seizures and ataxia. *Eur J Hum Genet* 7, 541-8.
234. Zanni, G., Saillour, Y., Nagara, M., Billuart, P., Castelnau, L., Moraine, C., Faivre, L., Bertini, E., Durr, A., Guichet, A., Rodriguez, D., des Portes, V., Beldjord, C. & Chelly, J. (2005). Oligophrenin 1 mutations frequently cause X-linked mental retardation with cerebellar hypoplasia. *Neurology* 65, 1364-9.
235. Fichera, M., Falco, M., Lo Giudice, M., Castiglia, L., Guarnaccia, V., Cali, F., Spalletta, A., Scuderi, C. & Avola, E. (2005). Skewed X-inactivation in a family with mental retardation and PQBP1 gene mutation. *Clin Genet* 67, 446-7.
236. Cossée, M., Demeer, B., Blanchet, P., Echenne, B., Singh, D., Hagens, O., Antin, M., Finck, S., Vallee, L., Dollfus, H., Hegde, S., Springell, K., Thelma, B. K., Woods, G., Kalscheuer, V. & Mandel, J. L. (2006). Exonic microdeletions in the X-linked PQBP1 gene in mentally retarded patients: a pathogenic mutation and in-frame deletions of uncertain effect. *Eur J Hum Genet* 14, 418-25.
237. Kleefstra, T., Franken, C. E., Arens, Y. H., Ramakers, G. J., Yntema, H. G., Sistermans, E. A., Hulsmans, C. F., Nillesen, W. N., van Bokhoven, H., de Vries, B. B. & Hamel, B. C. (2004). Genotype-phenotype studies in three families with mutations in the polyglutamine-binding protein 1 gene (PQBP1). *Clin Genet* 66, 318-26.
238. Okazawa, H., Rich, T., Chang, A., Lin, X., Waragai, M., Kajikawa, M., Enokido, Y., Komuro, A., Kato, S., Shibata, M., Hatanaka, H., Mouradian, M. M., Sudol, M. & Kanazawa, I. (2002). Interaction between mutant ataxin-1 and PQBP-1 affects transcription and cell death. *Neuron* 34, 701-13.
239. Waragai, M., Junn, E., Kajikawa, M., Takeuchi, S., Kanazawa, I., Shibata, M., Mouradian, M. M. & Okazawa, H. (2000). PQBP-1/Npw38, a nuclear protein binding to the polyglutamine tract, interacts with U5-15kD/dim1p via the carboxyl-terminal domain. *Biochem Biophys Res Commun* 273, 592-5.
240. Waragai, M., Lammers, C. H., Takeuchi, S., Imafuku, I., Udagawa, Y., Kanazawa, I., Kawabata, M., Mouradian, M. M. & Okazawa, H. (1999). PQBP-1, a novel polyglutamine tract-binding protein, inhibits transcription activation by Brn-2 and affects cell survival. *Hum Mol Genet* 8, 977-87.
241. Okuda, T., Hattori, H., Takeuchi, S., Shimizu, J., Ueda, H., Palvimo, J. J., Kanazawa, I., Kawano, H., Nakagawa, M. & Okazawa, H. (2003). PQBP-1 transgenic mice show a late-onset motor neuron disease-like phenotype. *Hum Mol Genet* 12, 711-25.
242. Yoshimura, N., Horiuchi, D., Shibata, M., Saitoe, M., Qi, M. L. & Okazawa, H. (2006). Expression of human PQBP-1 in *Drosophila* impairs long-term memory and induces abnormal courtship. *FEBS Lett* 580, 2335-40.
243. Qi, Y., Hoshino, M., Wada, Y., Marubuchi, S., Yoshimura, N., Kanazawa, I., Shinomiya, K. & Okazawa, H. (2005). PQBP-1 is expressed predominantly in the central nervous system during development. *Eur J Neurosci* 22, 1277-86.
244. Golabi, M., Ito, M. & Hall, B. D. (1984). A new X-linked multiple congenital anomalies/mental retardation syndrome. *Am J Med Genet* 17, 367-74.
245. Hamel, B. C., Mariman, E. C., van Beersum, S. E., Schoonbrood-Lenssen, A. M. & Ropers, H. H. (1994). Mental retardation, congenital heart defect, cleft palate, short stature, and facial anomalies: a new X-linked multiple congenital anomalies/mental retardation syndrome: clinical description and molecular studies. *Am J Med Genet* 51, 591-7.
246. Trivier, E., De Cesare, D., Jacquot, S., Pannetier, S., Zackai, E., Young, I., Mandel, J. L., Sassone-Corsi, P. & Hanauer, A. (1996). Mutations in the kinase Rsk-2 associated with Coffin-Lowry syndrome. *Nature* 384, 567-70.
247. Merienne, K., Jacquot, S., Pannetier, S., Zeniou, M., Bankier, A., Gecz, J., Mandel, J. L., Mulley, J., Sassone-Corsi, P. & Hanauer, A. (1999). A missense mutation in RPS6KA3 (RSK2) responsible for non-specific mental retardation. *Nat Genet* 22, 13-4.
248. Sassone-Corsi, P., Mizzen, C. A., Cheung, P., Crosio, C., Monaco, L., Jacquot, S., Hanauer, A. & Allis, C. D. (1999). Requirement of Rsk-2 for epidermal growth factor-activated phosphorylation of histone H3. *Science* 285, 886-91.
249. Silva, A. J., Kogan, J. H., Frankland, P. W. & Kida, S. (1998). CREB and memory. *Annu Rev Neurosci* 21, 127-48.
250. Yang, X., Matsuda, K., Bialek, P., Jacquot, S., Masuoka, H. C., Schinke, T., Li, L., Brancorsini, S., Sassone-Corsi, P., Townes, T. M., Hanauer, A. & Karsenty, G. (2004). ATF4 is a substrate of RSK2 and an essential regulator of osteoblast biology; implication for Coffin-Lowry Syndrome. *Cell* 117, 387-98.
251. Woo, M. S., Ohta, Y., Rabinovitz, I., Stossel, T. P. & Blenis, J. (2004). Ribosomal S6 kinase (RSK) regulates phosphorylation of filamin A on an important regulatory site. *Mol Cell Biol* 24, 3025-35.
252. Zeniou, M., Gattoni, R., Hanauer, A. & Stevenin, J. (2004). Delineation of the mechanisms of aberrant splic-

- ing caused by two unusual intronic mutations in the RSK2 gene involved in Coffin-Lowry syndrome. *Nucleic Acids Res* 32, 1214-23.
253. Thomas, G. M., Rumbaugh, G. R., Harrar, D. B. & Haganir, R. L. (2005). Ribosomal S6 kinase 2 interacts with and phosphorylates PDZ domain-containing proteins and regulates AMPA receptor transmission. *Proc Natl Acad Sci U S A* 102, 15006-11.
254. Cho, Y. Y., He, Z., Zhang, Y., Choi, H. S., Zhu, F., Choi, B. Y., Kang, B. S., Ma, W. Y., Bode, A. M. & Dong, Z. (2005). The p53 protein is a novel substrate of ribosomal S6 kinase 2 and a critical intermediary for ribosomal S6 kinase 2 and histone H3 interaction. *Cancer Res* 65, 3596-603.
255. Sheffler, D. J., Kroeze, W. K., Garcia, B. G., Deutch, A. Y., Hufeisen, S. J., Leahy, P., Bruning, J. C. & Roth, B. L. (2006). p90 ribosomal S6 kinase 2 exerts a tonic brake on G protein-coupled receptor signaling. *Proc Natl Acad Sci U S A* 103, 4717-22.
256. Hahn, K. A., Salomons, G. S., Tackels-Horne, D., Wood, T. C., Taylor, H. A., Schroer, R. J., Lubs, H. A., Jakobs, C., Olson, R. L., Holden, K. R., Stevenson, R. E. & Schwartz, C. E. (2002). X-linked mental retardation with seizures and carrier manifestations is caused by a mutation in the creatine-transporter gene (SLC6A8) located in Xq28. *Am J Hum Genet* 70, 1349-56.
257. Rosenberg, E. H., Almeida, L. S., Kleefstra, T., deGrauw, R. S., Yntema, H. G., Bahi, N., Moraine, C., Ropers, H. H., Frys, J. P., deGrauw, T. J., Jakobs, C. & Salomons, G. S. (2004). High prevalence of SLC6A8 deficiency in X-linked mental retardation. *Am J Hum Genet* 75, 97-105.
258. Mancini, G. M., Catsman-Berrevvoets, C. E., de Co, I. F., Aarsen, F. K., Kamphoven, J. H., Huijman, J. G., Duran, M., van der Knaap, M. S., Jakobs, C. & Salomons, G. S. (2005). Two novel mutations in SLC6A8 cause creatine transporter defect and distinctive X-linked mental retardation in two unrelated Dutch families. *Am J Med Genet A* 132, 288-95.
259. Nave, K. A., Bloom, F. E. & Milner, R. J. (1987). A single nucleotide difference in the gene for myelin proteolipid protein defines the jimpy mutation in mouse. *J Neurochem* 49, 1873-7.
260. Gencic, S., Abuelo, D., Ambler, M. & Hudson, L. D. (1989). Pelizaeus-Merzbacher disease: an X-linked neurologic disorder of myelin metabolism with a novel mutation in the gene encoding proteolipid protein. *Am J Hum Genet* 45, 435-42.
261. Saugier-Verber, P., Munnich, A., Bonneau, D., Rozet, J. M., Le Merrer, M., Gil, R. & Boespflug-Tanguy, O. (1994). X-linked spastic paraplegia and Pelizaeus-Merzbacher disease are allelic disorders at the proteolipid protein locus. *Nat Genet* 6, 257-62.
262. McGrath, J. A. (1999). Dyskeratosis congenita: new clinical and molecular insights into ribosome function. *Lancet* 353, 1204-5.
263. Mitchell, J. R., Wood, E. & Collins, K. (1999). A telomerase component is defective in the human disease dyskeratosis congenita. *Nature* 402, 551-5.
264. Fukuda, M. (1994). Biogenesis of the lysosomal membrane. *Subcell Biochem* 22, 199-230.
265. Mitchison, T. & Kirschner, M. (1988). Cytoskeletal dynamics and nerve growth. *Neuron* 1, 761-72.
266. Kabsch, W. & Vandekerckhove, J. (1992). Structure and function of actin. *Annu Rev Biophys Biomol Struct* 21, 49-76.
267. Condeelis, J. (1993). Life at the leading edge: the formation of cell protrusions. *Annu Rev Cell Biol* 9, 411-44.
268. Goodman, C. S. & Shatz, C. J. (1993). Developmental mechanisms that generate precise patterns of neuronal connectivity. *Cell* 72 Suppl, 77-98.
269. Singer, M., Nordlander, R. H. & Egar, M. (1979). Axonal guidance during embryogenesis and regeneration in the spinal cord of the newt: the blueprint hypothesis of neuronal pathway patterning. *J Comp Neurol* 185, 1-21.
270. Nardi, J. B. (1983). Neuronal pathfinding in developing wings of the moth *Manduca sexta*. *Dev Biol* 95, 163-74.
271. Tosney, K. W. & Landmesser, L. T. (1985). Development of the major pathways for neurite outgrowth in the chick hindlimb. *Dev Biol* 109, 193-214.
272. Lumsden, A. G. & Davies, A. M. (1986). Chemotropic effect of specific target epithelium in the developing mammalian nervous system. *Nature* 323, 538-9.
273. Purpura, D. P. (1974). Dendritic spine "dysgenesis" and mental retardation. *Science* 186, 1126-8.
274. Huttenlocher, P. R. (1974). Dendritic development in neocortex of children with mental defect and infantile spasms. *Neurology* 24, 203-10.
275. Bauman, M. L. & Kemper, T. L. (1982). Morphologic and histoanatomic observations of the brain in untreated human phenylketonuria. *Acta Neuropathol (Berl)* 58, 55-63.
276. Benitez-Bribiesca, L., De la Rosa-Alvarez, I. & Mansilla-Olivares, A. (1999). Dendritic spine pathology in infants with severe protein-calorie malnutrition. *Pediatrics* 104, e21.
277. Kaufmann, W. E. & Moser, H. W. (2000). Dendritic anomalies in disorders associated with mental retardation. *Cereb Cortex* 10, 981-91.
278. Dobkin, C., Rabe, A., Dumas, R., El Idrissi, A., Haubensstock, H. & Brown, W. T. (2000). Fmr1 knockout mouse has a distinctive strain-specific learning impairment. *Neuroscience* 100, 423-9.
279. Braun, K. & Segal, M. (2000). FMRP involvement in formation of synapses among cultured hippocampal neurons. *Cereb Cortex* 10, 1045-52.
280. Comery, T. A., Harris, J. B., Willems, P. J., Oostra, B. A., Irwin, S. A., Weiler, I. J. & Greenough, W. T. (1997). Abnormal dendritic spines in fragile X knockout mice: maturation and pruning deficits. *Proc Natl Acad Sci U S A* 94, 5401-4.
281. Nimchinsky, E. A., Oberlander, A. M. & Svoboda, K. (2001). Abnormal development of dendritic spines in FMR1 knock-out mice. *J Neurosci* 21, 5139-46.
282. Galofré, E., Ferrer, I., Fabregues, I. & Lopez-Tejero, D. (1987). Effects of prenatal ethanol exposure on dendritic spines of layer V pyramidal neurons in the somatosensory cortex of the rat. *J Neurol Sci* 81, 185-95.
283. Diaz-Cintra, S., Cintra, L., Ortega, A., Kemper, T. & Morgane, P. J. (1990). Effects of protein deprivation on pyramidal cells of the visual cortex in rats of three age groups. *J Comp Neurol* 292, 117-26.
284. Rees, S., Breen, S., Loeliger, M., McCrabb, G. & Harding, R. (1999). Hypoxemia near mid-gestation has long-term effects on fetal brain development. *J Neuropathol Exp Neurol* 58, 932-45.
285. Thompson, C. C. & Potter, G. B. (2000). Thyroid hormone action in neural development. *Cereb Cortex* 10, 939-45.
286. Luo, L. (2000). Rho GTPases in neuronal morphogenesis. *Nat Rev Neurosci* 1, 173-80.
287. Pollard, T. D. & Borisy, G. G. (2003). Cellular motility driven by assembly and disassembly of actin filaments. *Cell* 112, 453-65.
288. Fischer, M., Kaech, S., Knutti, D. & Matus, A. (1998). Rapid actin-based plasticity in dendritic spines. *Neuron* 20, 847-54.
289. Svitkina, T. M., Bulanova, E. A., Chaga, O. Y., Vignjevic, D. M., Kojima, S., Vasiliev, J. M. & Borisy, G. G. (2003). Mechanism of filopodia initiation by reorganization of a dendritic network. *J Cell Biol* 160, 409-21.
290. Hall, Z. W. & Sanes, J. R. (1993). Synaptic structure and development: the neuromuscular junction. *Cell* 72 Suppl, 99-121.
291. Zheng, Y., Fischer, D. J., Santos, M. F., Tigyi, G., Pasteris, N. G., Gorski, J. L. & Xu, Y. (1996). The faciogenital dysplasia gene product FGD1 functions as a Cdc42Hs-specific guanine-nucleotide exchange factor. *J Biol Chem* 271, 33169-72.

292. Weed, S. A. & Parsons, J. T. (2001). Cortactin: coupling membrane dynamics to cortical actin assembly. *Oncogene* 20, 6418-34.
293. Weaver, A. M., Karginov, A. V., Kinley, A. W., Weed, S. A., Li, Y., Parsons, J. T. & Cooper, J. A. (2001). Cortactin promotes and stabilizes Arp2/3-induced actin filament network formation. *Curr Biol* 11, 370-4.
294. Olson, M. F., Pasteris, N. G., Gorski, J. L. & Hall, A. (1996). Faciogenital dysplasia protein (FGD1) and Vav, two related proteins required for normal embryonic development, are upstream regulators of Rho GTPases. *Curr Biol* 6, 1628-33.
295. Xiao, B., Tu, J. C. & Worley, P. F. (2000). Homer: a link between neural activity and glutamate receptor function. *Curr Opin Neurobiol* 10, 370-4.
296. Sala, C., Futai, K., Yamamoto, K., Worley, P. F., Hayashi, Y. & Sheng, M. (2003). Inhibition of dendritic spine morphogenesis and synaptic transmission by activity-inducible protein Homer1a. *J Neurosci* 23, 6327-37.
297. Joneson, T., McDonough, M., Bar-Sagi, D. & Van Aelst, L. (1996). RAC regulation of actin polymerization and proliferation by a pathway distinct from Jun kinase. *Science* 274, 1374-6.
298. Lower, K. M. & Gecz, J. (2001). Characterization of ARHGEF6, a guanine nucleotide exchange factor for Rho GTPases and a candidate gene for X-linked mental retardation: mutation screening in Borjeson-Forsman-Lehmann syndrome and MRX27. *Am J Med Genet* 100, 43-8.
299. Manser, E., Loo, T. H., Koh, C. G., Zhao, Z. S., Chen, X. Q., Tan, L., Tan, I., Leung, T. & Lim, L. (1998). PAK kinases are directly coupled to the PIX family of nucleotide exchange factors. *Mol Cell* 1, 183-92.
300. Baird, D., Feng, Q. & Cerione, R. A. (2006). Biochemical characterization of the Cool (Cloned-out-of-Library)/Pix (Pak-interactive exchange factor) proteins. *Methods Enzymol* 406, 58-69.
301. Daniels, R. H., Zenke, F. T. & Bokoch, G. M. (1999). alphaPix stimulates p21-activated kinase activity through exchange factor-dependent and -independent mechanisms. *J Biol Chem* 274, 6047-50.
302. Lee, C. S., Kim, K. Y., Im, J. B., Choi, J. W., Kim, H. K., Park, J. S., Shin, E. Y., Kim, S. R. & Kim, E. G. (2004). betaPAK-interacting exchange factor may regulate actin cytoskeleton through interaction with actin. *Exp Mol Med* 36, 582-7.
303. Schoenwaelder, S. M. & Burridge, K. (1999). Bidirectional signaling between the cytoskeleton and integrins. *Curr Opin Cell Biol* 11, 274-86.
304. Yamaji, S., Suzuki, A., Sugiyama, Y., Koide, Y., Yoshida, M., Kanamori, H., Mohri, H., Ohno, S. & Ishigatsubo, Y. (2001). A novel integrin-linked kinase-binding protein, affixin, is involved in the early stage of cell-substrate interaction. *J Cell Biol* 153, 1251-64.
305. Wang, J. Y., Wigston, D. J., Rees, H. D., Levey, A. I. & Falls, D. L. (2000). LIM kinase 1 accumulates in presynaptic terminals during synapse maturation. *J Comp Neurol* 416, 319-34.
306. Edwards, D. C., Sanders, L. C., Bokoch, G. M. & Gill, G. N. (1999). Activation of LIM-kinase by Pak1 couples Rac/Cdc42 GTPase signalling to actin cytoskeletal dynamics. *Nat Cell Biol* 1, 253-9.
307. Bamburg, J. R. & Bray, D. (1987). Distribution and cellular localization of actin depolymerizing factor. *J Cell Biol* 105, 2817-25.
308. Arber, S., Barbayannis, F. A., Hanser, H., Schneider, C., Stanyon, C. A., Bernard, O. & Caroni, P. (1998). Regulation of actin dynamics through phosphorylation of cofilin by LIM-kinase. *Nature* 393, 805-9.
309. Yang, N., Higuchi, O., Ohashi, K., Nagata, K., Wada, A., Kangawa, K., Nishida, E. & Mizuno, K. (1998). Cofilin phosphorylation by LIM-kinase 1 and its role in Rac-mediated actin reorganization. *Nature* 393, 809-12.
310. Meng, Y., Zhang, Y., Tregoubov, V., Janus, C., Cruz, L., Jackson, M., Lu, W. Y., MacDonald, J. F., Wang, J. Y., Falls, D. L. & Jia, Z. (2002). Abnormal spine morphology and enhanced LTP in LIMK-1 knockout mice. *Neuron* 35, 121-33.
311. Ang, L. H., Chen, W., Yao, Y., Ozawa, R., Tao, E., Yonekura, J., Uemura, T., Keshishian, H. & Hing, H. (2006). Lim kinase regulates the development of olfactory and neuromuscular synapses. *Dev Biol* 293, 178-90.
312. Frangiskakis, J. M., Ewart, A. K., Morris, C. A., Mervis, C. B., Bertrand, J., Robinson, B. F., Klein, B. P., Ensing, G. J., Everett, L. A., Green, E. D., Proschel, C., Gutowski, N. J., Noble, M., Atkinson, D. L., Odelberg, S. J. & Keating, M. T. (1996). LIM-kinase1 hemizygosity implicated in impaired visuospatial constructive cognition. *Cell* 86, 59-69.
313. Tassabehji, M., Metcalfe, K., Karmiloff-Smith, A., Carette, M. J., Grant, J., Dennis, N., Reardon, W., Splitt, M., Read, A. P. & Donnai, D. (1999). Williams syndrome: use of chromosomal microdeletions as a tool to dissect cognitive and physical phenotypes. *Am J Hum Genet* 64, 118-25.
314. Gray, V., Karmiloff-Smith, A., Funnell, E. & Tassabehji, M. (2006). In-depth analysis of spatial cognition in Williams syndrome: A critical assessment of the role of the LIMK1 gene. *Neuropsychologia* 44, 679-85.
315. Rosso, S., Bollati, F., Bisbal, M., Peretti, D., Sumi, T., Nakamura, T., Quiroga, S., Ferreira, A. & Caceres, A. (2004). LIMK1 regulates Golgi dynamics, traffic of Golgi-derived vesicles, and process extension in primary cultured neurons. *Mol Biol Cell* 15, 3433-49.
316. Nishita, M., Tomizawa, C., Yamamoto, M., Horita, Y., Ohashi, K. & Mizuno, K. (2005). Spatial and temporal regulation of cofilin activity by LIM kinase and Slingshot is critical for directional cell migration. *J Cell Biol* 171, 349-59.
317. Gorovoy, M., Niu, J., Bernard, O., Profirovic, J., Minshall, R., Neamu, R. & Voyno-Yasenetskaya, T. (2005). LIM kinase 1 coordinates microtubule stability and actin polymerization in human endothelial cells. *J Biol Chem* 280, 26533-42.
318. Lee-Hoeflich, S. T., Causing, C. G., Podkowa, M., Zhao, X., Wrana, J. L. & Attisano, L. (2004). Activation of LIMK1 by binding to the BMP receptor, BMPRII, regulates BMP-dependent dendritogenesis. *EMBO J* 23, 4792-801.
319. Schrott, G. M., Tuebing, F., Nigh, E. A., Kane, C. G., Sabatini, M. E., Kiebler, M. & Greenberg, M. E. (2006). A brain-specific microRNA regulates dendritic spine development. *Nature* 439, 283-9.
320. Endris, V., Wogatzky, B., Leimer, U., Bartsch, D., Zatyka, M., Latif, F., Maher, E. R., Tariverdian, G., Kirsch, S., Karch, D. & Rappold, G. A. (2002). The novel Rho-GTPase activating gene MEGAP/srGAP3 has a putative role in severe mental retardation. *Proc Natl Acad Sci U S A* 99, 11754-9.
321. Wong, K., Ren, X. R., Huang, Y. Z., Xie, Y., Liu, G., Saito, H., Tang, H., Wen, L., Brady-Kalnay, S. M., Mei, L., Wu, J. Y., Xiong, W. C. & Rao, Y. (2001). Signal transduction in neuronal migration: roles of GTPase activating proteins and the small GTPase Cdc42 in the Slit-Robo pathway. *Cell* 107, 209-21.
322. Kidd, T., Brose, K., Mitchell, K. J., Fetter, R. D., Tessier-Lavigne, M., Goodman, C. S. & Tear, G. (1998). Roundabout controls axon crossing of the CNS midline and defines a novel subfamily of evolutionarily conserved guidance receptors. *Cell* 92, 205-15.
323. Wu, W., Wong, K., Chen, J., Jiang, Z., Dupuis, S., Wu, J. Y. & Rao, Y. (1999). Directional guidance of neuronal migration in the olfactory system by the protein Slit. *Nature* 400, 331-6.
324. Attree, O., Olivos, I. M., Okabe, I., Bailey, L. C., Nelson, D. L., Lewis, R. A., McInnes, R. R. & Nussbaum, R. L. (1992). The Lowe's oculocerebrorenal syndrome gene encodes a protein highly homologous to inositol polyphosphate-5-phosphatase. *Nature* 358, 239-42.

325. Addis, M., Loi, M., Lepiani, C., Cau, M. & Melis, M. A. (2004). OCRL mutation analysis in Italian patients with Lowe syndrome. *Hum Mutat* 23, 524-5.
326. Suchy, S. F., Olivos-Glander, I. M. & Nussbaum, R. L. (1995). Lowe syndrome, a deficiency of phosphatidylinositol 4,5-bisphosphate 5-phosphatase in the Golgi apparatus. *Hum Mol Genet* 4, 2245-50.
327. Dressman, M. A., Olivos-Glander, I. M., Nussbaum, R. L. & Suchy, S. F. (2000). Ocr1, a PtdIns(4,5)P(2) 5-phosphatase, is localized to the trans-Golgi network of fibroblasts and epithelial cells. *J Histochem Cytochem* 48, 179-90.
328. Suchy, S. F. & Nussbaum, R. L. (2002). The deficiency of PIP2 5-phosphatase in Lowe syndrome affects actin polymerization. *Am J Hum Genet* 71, 1420-7.
329. Azuma, T., Witke, W., Stossel, T. P., Hartwig, J. H. & Kwiatkowski, D. J. (1998). Gelsolin is a downstream effector of rac for fibroblast motility. *EMBO J* 17, 1362-70.
330. Nakagawa, T., Engler, J. A. & Sheng, M. (2004). The dynamic turnover and functional roles of α -actinin in dendritic spines. *Neuropharmacology* 47, 734-45.
331. Faucherre, A., Desbois, P., Satre, V., Lunardi, J., Dorseuil, O. & Gacon, G. (2003). Lowe syndrome protein OCRL1 interacts with Rac GTPase in the trans-Golgi network. *Hum Mol Genet* 12, 2449-56.
332. Faucherre, A., Desbois, P., Nagano, F., Satre, V., Lunardi, J., Gacon, G. & Dorseuil, O. (2005). Lowe syndrome protein Ocr1 is translocated to membrane ruffles upon Rac GTPase activation: a new perspective on Lowe syndrome pathophysiology. *Hum Mol Genet* 14, 1441-8.
333. Feng, Y., Gutekunst, C. A., Eberhart, D. E., Yi, H., Warren, S. T. & Hersch, S. M. (1997). Fragile X mental retardation protein: nucleocytoplasmic shuttling and association with somatodendritic ribosomes. *J Neurosci* 17, 1539-47.
334. Jin, P. & Warren, S. T. (2003). New insights into fragile X syndrome: from molecules to neurobehaviors. *Trends Biochem Sci* 28, 152-8.
335. Kobayashi, K., Kuroda, S., Fukata, M., Nakamura, T., Nagase, T., Nomura, N., Matsuura, Y., Yoshida-Kubomura, N., Iwamatsu, A. & Kaibuchi, K. (1998). p140Sra-1 (specifically Rac1-associated protein) is a novel specific target for Rac1 small GTPase. *J Biol Chem* 273, 291-5.
336. Blagg, S. L., Stewart, M., Sambles, C. & Insall, R. H. (2003). PIR121 regulates pseudopod dynamics and SCAR activity in Dictyostelium. *Curr Biol* 13, 1480-7.
337. Schenck, A., Bardoni, B., Moro, A., Bagni, C. & Mandel, J. L. (2001). A highly conserved protein family interacting with the fragile X mental retardation protein (FMRP) and displaying selective interactions with FMRP-related proteins FXR1P and FXR2P. *Proc Natl Acad Sci U S A* 98, 8844-9.
338. Schenck, A., Bardoni, B., Langmann, C., Harden, N., Mandel, J. L. & Giangrande, A. (2003). CYFIP/Sra-1 controls neuronal connectivity in Drosophila and links the Rac1 GTPase pathway to the fragile X protein. *Neuron* 38, 887-98.
339. Gantois, I., Vandesompele, J., Speleman, F., Reyniers, E., D'Hooge, R., Severijnen, L. A., Willemsen, R., Tassone, F. & Kooy, R. F. (2006). Expression profiling suggests underexpression of the GABA_A receptor subunit δ in the fragile X knockout mouse model. *Neurobiol Dis* 21, 346-57.
340. Maestrini, E., Patrosso, C., Mancini, M., Rivella, S., Rocchi, M., Repetto, M., Villa, A., Frattini, A., Zoppe, M., Vezzoni, P. & et al. (1993). Mapping of two genes encoding isoforms of the actin binding protein ABP-280, a dystrophin like protein, to Xq28 and to chromosome 7. *Hum Mol Genet* 2, 761-6.
341. Fox, J. W., Lamperti, E. D., Eksioğlu, Y. Z., Hong, S. E., Feng, Y., Graham, D. A., Scheffer, I. E., Dobyms, W. B., Hirsch, B. A., Radtke, R. A., Berkovic, S. F., Huttenlocher, P. R. & Walsh, C. A. (1998). Mutations in filamin 1 prevent migration of cerebral cortical neurons in human periventricular heterotopia. *Neuron* 21, 1315-25.
342. Hartwig, J. H. & Stossel, T. P. (1975). Isolation and properties of actin, myosin, and a new actin-binding protein in rabbit alveolar macrophages. *J Biol Chem* 250, 5696-705.
343. Brotschi, E. A., Hartwig, J. H. & Stossel, T. P. (1978). The gelation of actin by actin-binding protein. *J Biol Chem* 253, 8988-93.
344. Stossel, T. P., Condeelis, J., Cooley, L., Hartwig, J. H., Noegel, A., Schleicher, M. & Shapiro, S. S. (2001). Filamins as integrators of cell mechanics and signalling. *Nat Rev Mol Cell Biol* 2, 138-45.
345. Gorlin, J. B., Yamin, R., Egan, S., Stewart, M., Stossel, T. P., Kwiatkowski, D. J. & Hartwig, J. H. (1990). Human endothelial actin-binding protein (ABP-280, nonmuscle filamin): a molecular leaf spring. *J Cell Biol* 111, 1089-105.
346. Hlavin, M. L. & Lemmon, V. (1991). Molecular structure and functional testing of human L1CAM: an interspecies comparison. *Genomics* 11, 416-23.
347. Jouet, M., Rosenthal, A., MacFarlane, J., Kenrick, S. & Donnai, D. (1993). A missense mutation confirms the L1 defect in X-linked hydrocephalus (HSAS). *Nat Genet* 4, 331.
348. Van Camp, G., Vits, L., Coucke, P., Lyonnet, S., Schrandt-Stumpel, C., Darby, J., Holden, J., Munnich, A. & Willems, P. J. (1993). A duplication in the L1CAM gene associated with X-linked hydrocephalus. *Nat Genet* 4, 421-5.
349. Rosenthal, A., Jouet, M. & Kenrick, S. (1992). Aberrant splicing of neural cell adhesion molecule L1 mRNA in a family with X-linked hydrocephalus. *Nat Genet* 2, 107-12.
350. Jouet, M., Rosenthal, A., Armstrong, G., MacFarlane, J., Stevenson, R., Paterson, J., Metzberg, A., Ionasescu, V., Temple, K. & Kenrick, S. (1994). X-linked spastic paraplegia (SPG1), MASA syndrome and X-linked hydrocephalus result from mutations in the L1 gene. *Nat Genet* 7, 402-7.
351. Kenrick, S., Watkins, A. & De Angelis, E. (2000). Neural cell recognition molecule L1: relating biological complexity to human disease mutations. *Hum Mol Genet* 9, 879-86.
352. Godenschwege, T. A., Kristiansen, L. V., Uthaman, S. B., Hortsch, M. & Murphey, R. K. (2006). A conserved role for Drosophila Neuroglian and human L1-CAM in central-synapse formation. *Curr Biol* 16, 12-23.
353. Lemmon, V., Farr, K. L. & Lagenaur, C. (1989). L1-mediated axon outgrowth occurs via a homophilic binding mechanism. *Neuron* 2, 1597-603.
354. Wiencken-Barger, A. E., Mavity-Hudson, J., Bartsch, U., Schachner, M. & Casagrande, V. A. (2004). The role of L1 in axon pathfinding and fasciculation. *Cereb Cortex* 14, 121-31.
355. Hortsch, M., O'Shea, K. S., Zhao, G., Kim, F., Vallejo, Y. & Dubreuil, R. R. (1998). A conserved role for L1 as a transmembrane link between neuronal adhesion and membrane cytoskeleton assembly. *Cell Adhes Commun* 5, 61-73.
356. Bennett, V. & Davis, J. (1981). Erythrocyte ankyrin: immunoreactive analogues are associated with mitotic structures in cultured cells and with microtubules in brain. *Proc Natl Acad Sci U S A* 78, 7550-4.
357. Davis, L. H. & Bennett, V. (1990). Mapping the binding sites of human erythrocyte ankyrin for the anion exchanger and spectrin. *J Biol Chem* 265, 10589-96.
358. Georgatos, S. D. & Marchesi, V. T. (1985). The binding of vimentin to human erythrocyte membranes: a model system for the study of intermediate filament-membrane interactions. *J Cell Biol* 100, 1955-61.
359. Malhotra, J. D., Tsiotra, P., Karagogeos, D. & Hortsch, M. (1998). Cis-activation of L1-mediated ankyrin re-

- cruitment by TAG-1 homophilic cell adhesion. *J Biol Chem* 273, 33354-9.
360. Gleeson, J. G., Lin, P. T., Flanagan, L. A. & Walsh, C. A. (1999). Doublecortin is a microtubule-associated protein and is expressed widely by migrating neurons. *Neuron* 23, 257-71.
361. Koizumi, H., Tanaka, T. & Gleeson, J. G. (2006). Doublecortin-like kinase functions with doublecortin to mediate fiber tract decussation and neuronal migration. *Neuron* 49, 55-66.
362. Deuel, T. A., Liu, J. S., Corbo, J. C., Yoo, S. Y., Rorke-Adams, L. B. & Walsh, C. A. (2006). Genetic interactions between doublecortin and doublecortin-like kinase in neuronal migration and axon outgrowth. *Neuron* 49, 41-53.
363. des Portes, V., Pinard, J. M., Billuart, P., Vinet, M. C., Koulakoff, A., Carrie, A., Gelot, A., Dupuis, E., Motte, J., Berwald-Netter, Y., Catala, M., Kahn, A., Beldjord, C. & Chelly, J. (1998). A novel CNS gene required for neuronal migration and involved in X-linked subcortical laminar heterotopia and lissencephaly syndrome. *Cell* 92, 51-61.
364. Gleeson, J. G., Allen, K. M., Fox, J. W., Lamperti, E. D., Berkovic, S., Scheffer, I., Cooper, E. C., Dobyns, W. B., Minnerath, S. R., Ross, M. E. & Walsh, C. A. (1998). Doublecortin, a brain-specific gene mutated in human X-linked lissencephaly and double cortex syndrome, encodes a putative signaling protein. *Cell* 92, 63-72.
365. Berg, M. J., Schifitto, G., Powers, J. M., Martinez-Capolino, C., Fong, C. T., Myers, G. J., Epstein, L. G. & Walsh, C. A. (1998). X-linked female band heterotopia-male lissencephaly syndrome. *Neurology* 50, 1143-6.
366. Kappeler, C., Saillour, Y., Baudoin, J. P., Tuy, F. P., Alvarez, C., Houbbron, C., Gaspar, P., Hamard, G., Chelly, J., Metin, C. & Francis, F. (2006). Branching and nucleokinesis defects in migrating interneurons derived from doublecortin knockout mice. *Hum Mol Genet* 15, 1387-400.
367. Tanaka, T., Serneo, F. F., Higgins, C., Gambello, M. J., Wynshaw-Boris, A. & Gleeson, J. G. (2004). Lis1 and doublecortin function with dynein to mediate coupling of the nucleus to the centrosome in neuronal migration. *J Cell Biol* 165, 709-21.
368. Moores, C. A., Perderiset, M., Francis, F., Chelly, J., Houdusse, A. & Milligan, R. A. (2004). Mechanism of microtubule stabilization by doublecortin. *Mol Cell* 14, 833-9.
369. Gordon-Weeks, P. R. (2004). Microtubules and growth cone function. *J Neurobiol* 58, 70-83.
370. Tsukada, M., Prokscha, A., Ungewickell, E. & Eichele, G. (2005). Doublecortin association with actin filaments is regulated by neurabin II. *J Biol Chem* 280, 11361-8.
371. de Conciliis, L., Marchitelli, A., Wapenaar, M. C., Boriani, G., Giglio, S., Mariani, M., Consalez, G. G., Zufardi, O., Franco, B., Ballabio, A. & Banfi, S. (1998). Characterization of Cxorf5 (71-7A), a novel human cDNA mapping to Xp22 and encoding a protein containing coiled-coil alpha-helical domains. *Genomics* 51, 243-50.
372. Ferrante, M. I., Giorgio, G., Feather, S. A., Bulfone, A., Wright, V., Ghiani, M., Selicorni, A., Gammara, L., Scolari, F., Woolf, A. S., Sylvie, O., Bernard, L., Malcolm, S., Winter, R., Ballabio, A. & Franco, B. (2001). Identification of the gene for oral-facial-digital type I syndrome. *Am J Hum Genet* 68, 569-76.
373. Morisawa, T., Yagi, M., Surono, A., Yokoyama, N., Ohmori, M., Terashi, H. & Matsuo, M. (2004). Novel double-deletion mutations of the OFD1 gene creating multiple novel transcripts. *Hum Genet* 115, 97-103.
374. Wettke-Schafer, R. & Kantner, G. (1983). X-linked dominant inherited diseases with lethality in hemizygous males. *Hum Genet* 64, 1-23.
375. Budny, B., Chen, W., Omran, H., Fliegauf, M., Tzschach, A., Wisniewska, M., Jensen, L. R., Raynaud, M., Shoichet, S. A., Badura, M., Lenzner, S., Latos-Bielenska, A. & Ropers, H. H. (2006). A novel X-linked recessive mental retardation syndrome comprising macrocephaly and ciliary dysfunction is allelic to oral-facial-digital type I syndrome. *Hum Genet* 120, 171-8.
376. Ferrante, M. I., Zullo, A., Barra, A., Bimonte, S., Messaddeq, N., Studer, M., Dolle, P. & Franco, B. (2006). Oral-facial-digital type I protein is required for primary cilia formation and left-right axis specification. *Nat Genet* 38, 112-7.
377. Emes, R. D. & Ponting, C. P. (2001). A new sequence motif linking lissencephaly, Treacher Collins and oral-facial-digital type 1 syndromes, microtubule dynamics and cell migration. *Hum Mol Genet* 10, 2813-20.
378. Gerlitz, G., Darhin, E., Giorgio, G., Franco, B. & Reiner, O. (2005). Novel functional features of the Lis-H domain: role in protein dimerization, half-life and cellular localization. *Cell Cycle* 4, 1632-40.
379. Koenig, M., Hoffman, E. P., Bertelson, C. J., Monaco, A. P., Feener, C. & Kunkel, L. M. (1987). Complete cloning of the Duchenne muscular dystrophy (DMD) cDNA and preliminary genomic organization of the DMD gene in normal and affected individuals. *Cell* 50, 509-17.
380. Chelly, J., Hamard, G., Koulakoff, A., Kaplan, J. C., Kahn, A. & Berwald-Netter, Y. (1990). Dystrophin gene transcribed from different promoters in neuronal and glial cells. *Nature* 344, 64-5.
381. D'Souza, V. N., Nguyen, T. M., Morris, G. E., Karges, W., Pillers, D. A. & Ray, P. N. (1995). A novel dystrophin isoform is required for normal retinal electrophysiology. *Hum Mol Genet* 4, 837-42.
382. Bar, S., Barnea, E., Levy, Z., Neuman, S., Yaffe, D. & Nudel, U. (1990). A novel product of the Duchenne muscular dystrophy gene which greatly differs from the known isoforms in its structure and tissue distribution. *Biochem J* 272, 557-60.
383. Byers, T. J., Lidov, H. G. & Kunkel, L. M. (1993). An alternative dystrophin transcript specific to peripheral nerve. *Nat Genet* 4, 77-81.
384. Lidov, H. G., Selig, S. & Kunkel, L. M. (1995). Dp140: a novel 140 kDa CNS transcript from the dystrophin locus. *Hum Mol Genet* 4, 329-35.
385. Lederfein, D., Levy, Z., Augier, N., Mornet, D., Morris, G., Fuchs, O., Yaffe, D. & Nudel, U. (1992). A 71-kilodalton protein is a major product of the Duchenne muscular dystrophy gene in brain and other nonmuscle tissues. *Proc Natl Acad Sci U S A* 89, 5346-50.
386. Acosta, R., Montanez, C., Fuentes-Mera, L., Gonzalez, E., Gomez, P., Quintero-Mora, L., Mornet, D., Alvarez-Salas, L. M. & Cisneros, B. (2004). Dystrophin Dp71 is required for neurite outgrowth in PC12 cells. *Exp Cell Res* 296, 265-75.
387. Howard, P. L., Klamut, H. J. & Ray, P. N. (1998). Identification of a novel actin binding site within the Dp71 dystrophin isoform. *FEBS Lett* 441, 337-41.
388. Quaderi, N. A., Schweiger, S., Gaudenz, K., Franco, B., Rugarli, E. I., Berger, W., Feldman, G. J., Volta, M., Andolfi, G., Gilgenkrantz, S., Marion, R. W., Hennekam, R. C., Opitz, J. M., Muenke, M., Ropers, H. H. & Ballabio, A. (1997). Opitz G/BBB syndrome, a defect of midline development, is due to mutations in a new RING finger gene on Xp22. *Nat Genet* 17, 285-91.
389. Kossel, A. (1884). Über einen peptoartigen Bestandteil des Zellkerns. *Z Physiol Chem* 8.
390. Phillips, D. M. & Johns, E. W. (1965). A Fractionation of the Histones of Group F2a from Calf Thymus. *Biochem J* 94, 127-30.
391. DeLange, R. J., Fambrough, D. M., Smith, E. L. & Bonner, J. (1969). Calf and pea histone IV. 3. Complete amino acid sequence of pea seedling histone IV; comparison with the homologous calf thymus histone. *J Biol Chem* 244, 5669-79.
392. Thomas, J. O. & Kornberg, R. D. (1975). An octamer of histones in chromatin and free in solution. *Proc Natl Acad Sci U S A* 72, 2626-30.

393. Finch, J. T., Lutter, L. C., Rhodes, D., Brown, R. S., Rushton, B., Levitt, M. & Klug, A. (1977). Structure of nucleosome core particles of chromatin. *Nature* 269, 29-36.
394. Luger, K., Mäder, A. W., Richmond, R. K., Sargent, D. F. & Richmond, T. J. (1997). Crystal structure of the nucleosome core particle at 2.8 Å resolution. *Nature* 389, 251-60.
395. Kornberg, R. D. (1974). Chromatin structure: a repeating unit of histones and DNA. *Science* 184, 868-71.
396. Spadafora, C., Bellard, M., Compton, J. L. & Chambon, P. (1976). The DNA repeat lengths in chromatins from sea urchin sperm and gastrule cells are markedly different. *FEBS Lett* 69, 281-5.
397. Müller, U., Zentgraf, H., Eicken, I. & Keller, W. (1978). Higher order structure of simian virus 40 chromatin. *Science* 201, 406-15.
398. Urban, M. K., Franklin, S. G. & Zweidler, A. (1979). Isolation and characterization of the histone variants in chicken erythrocytes. *Biochemistry* 18, 3952-60.
399. Kornberg, R. D. & Lorch, Y. (1992). Chromatin structure and transcription. *Annu Rev Cell Biol* 8, 563-87.
400. Sung, M. T., Harford, J., Bundman, M. & Vidalakas, G. (1977). Metabolism of histones in avian erythroid cells. *Biochemistry* 16, 279-85.
401. Desrosiers, R. & Tanguay, R. M. (1988). Methylation of Drosophila histones at proline, lysine, and arginine residues during heat shock. *J Biol Chem* 263, 4686-92.
402. Racey, L. A. & Byvoet, P. (1971). Histone acetyltransferase in chromatin. Evidence for in vitro enzymatic transfer of acetate from acetyl-coenzyme A to histones. *Exp Cell Res* 64, 366-70.
403. Libby, P. R. (1970). Activity of histone deacetylase in rat liver and Novikoff hepatoma. *Biochim Biophys Acta* 213, 234-6.
404. Wallwork, J. C., Lee, C. T. & Duerre, J. A. (1978). A sensitive assay for histone methyltransferase. *Anal Biochem* 84, 103-10.
405. Langan, T. A. (1969). Action of adenosine 3',5'-monophosphate-dependent histone kinase in vivo. *J Biol Chem* 244, 5763-5.
406. Strahl, B. D. & Allis, C. D. (2000). The language of covalent histone modifications. *Nature* 403, 41-5.
407. Goldknopf, I. L., Taylor, C. W., Baum, R. M., Yeoman, L. C., Olson, M. O., Prestayko, A. W. & Busch, H. (1975). Isolation and characterization of protein A24, a "histone-like" non-histone chromosomal protein. *J Biol Chem* 250, 7182-7.
408. Shio, Y. & Eisenman, R. N. (2003). Histone sumoylation is associated with transcriptional repression. *Proc Natl Acad Sci U S A* 100, 13225-30.
409. Levy-Wilson, B. (1983). Glycosylation, ADP-ribosylation, and methylation of Tetrahymena histones. *Biochemistry* 22, 484-9.
410. Brownell, J. E., Zhou, J., Ranalli, T., Kobayashi, R., Edmondson, D. G., Roth, S. Y. & Allis, C. D. (1996). Tetrahymena histone acetyltransferase A: a homolog to yeast Gcn5p linking histone acetylation to gene activation. *Cell* 84, 843-51.
411. Sun, Z. W. & Allis, C. D. (2002). Ubiquitination of histone H2B regulates H3 methylation and gene silencing in yeast. *Nature* 418, 104-8.
412. Rea, S., Eisenhaber, F., O'Carroll, D., Strahl, B. D., Sun, Z. W., Schmid, M., Opravil, S., Mechtler, K., Ponting, C. P., Allis, C. D. & Jenuwein, T. (2000). Regulation of chromatin structure by site-specific histone H3 methyltransferases. *Nature* 406, 593-9.
413. Jenuwein, T. & Allis, C. D. (2001). Translating the histone code. *Science* 293, 1074-80.
414. Hong, L., Schroth, G. P., Matthews, H. R., Yau, P. & Bradbury, E. M. (1993). Studies of the DNA binding properties of histone H4 amino terminus. Thermal denaturation studies reveal that acetylation markedly reduces the binding constant of the H4 "tail" to DNA. *J Biol Chem* 268, 305-14.
415. Lachner, M., O'Carroll, D., Rea, S., Mechtler, K. & Jenuwein, T. (2001). Methylation of histone H3 lysine 9 creates a binding site for HP1 proteins. *Nature* 410, 116-20.
416. Dhalluin, C., Carlson, J. E., Zeng, L., He, C., Aggarwal, A. K. & Zhou, M. M. (1999). Structure and ligand of a histone acetyltransferase bromodomain. *Nature* 399, 491-6.
417. Grunstein, M. (1997). Histone acetylation in chromatin structure and transcription. *Nature* 389, 349-52.
418. Braunstein, M., Rose, A. B., Holmes, S. G., Allis, C. D. & Broach, J. R. (1993). Transcriptional silencing in yeast is associated with reduced nucleosome acetylation. *Genes Dev* 7, 592-604.
419. Mohandas, T., Sparkes, R. S. & Shapiro, L. J. (1981). Reactivation of an inactive human X chromosome: evidence for X inactivation by DNA methylation. *Science* 211, 393-6.
420. Alberts, B., Johnson, A., Julian Lewis, J., Raff, M., Roberts, K. & Walter, P. (2002) Molecular Biology of the Cell, 4th edition. Garland Science, New York, USA
421. Davey, C. A., Sargent, D. F., Luger, K., Maeder, A. W. & Richmond, T. J. (2002). Solvent mediated interactions in the structure of the nucleosome core particle at 1.9 Å resolution. *J Mol Biol* 319, 1097-113.
422. Santos-Rosa, H. & Caldas, C. (2005). Chromatin modifier enzymes, the histone code and cancer. *Eur J Cancer* 41, 2381-402.
423. Rogakou, E. P., Pilch, D. R., Orr, A. H., Ivanova, V. S. & Bonner, W. M. (1998). DNA double-stranded breaks induce histone H2AX phosphorylation on serine 139. *J Biol Chem* 273, 5858-68.
424. Sullivan, B. A. & Karpen, G. H. (2004). Centromeric chromatin exhibits a histone modification pattern that is distinct from both euchromatin and heterochromatin. *Nat Struct Mol Biol* 11, 1076-83.
425. Stayton, C. L., Dabovic, B., Gulisano, M., Gecz, J., Broccoli, V., Giovanazzi, S., Bossolasco, M., Monaco, L., Rastan, S., Boncinelli, E. & et al. (1994). Cloning and characterization of a new human Xq13 gene, encoding a putative helicase. *Hum Mol Genet* 3, 1957-64.
426. Wada, T., Sakakibara, M., Fukushima, Y. & Saitoh, S. (2006). A novel splicing mutation of the ATRX gene in ATR-X syndrome. *Brain Dev* 28, 322-5.
427. Hirschhorn, J. N., Brown, S. A., Clark, C. D. & Winston, F. (1992). Evidence that SNF2/SWI2 and SNF5 activate transcription in yeast by altering chromatin structure. *Genes Dev* 6, 2288-98.
428. Le Douarin, B., Nielsen, A. L., Garnier, J. M., Ichinose, H., Jeanmougin, F., Losson, R. & Chambon, P. (1996). A possible involvement of TIF1 alpha and TIF1 beta in the epigenetic control of transcription by nuclear receptors. *EMBO J* 15, 6701-15.
429. Czermin, B., Melfi, R., McCabe, D., Seitz, V., Imhof, A. & Pirrotta, V. (2002). Drosophila enhancer of Zeste/ESC complexes have a histone H3 methyltransferase activity that marks chromosomal Polycomb sites. *Cell* 111, 185-96.
430. Hollenbach, A. D., McPherson, C. J., Mientjes, E. J., Iyengar, R. & Grosveld, G. (2002). Daxx and histone deacetylase II associate with chromatin through an interaction with core histones and the chromatin-associated protein Dek. *J Cell Sci* 115, 3319-30.
431. Yang, X., Khosravi-Far, R., Chang, H. Y. & Baltimore, D. (1997). Daxx, a novel Fas-binding protein that activates JNK and apoptosis. *Cell* 89, 1067-76.
432. Li, R., Pei, H., Watson, D. K. & Papas, T. S. (2000). EAP1/Daxx interacts with ETS1 and represses transcriptional activation of ETS1 target genes. *Oncogene* 19, 745-53.
433. Gibbons, R. J., McDowell, T. L., Raman, S., O'Rourke, D. M., Garrick, D., Ayyub, H. & Higgs, D. R. (2000). Mutations in ATRX, encoding a SWI/SNF-like protein, cause diverse changes in the pattern of DNA methylation. *Nat Genet* 24, 368-71.

434. Aasland, R., Gibson, T. J. & Stewart, A. F. (1995). The PHD finger: implications for chromatin-mediated transcriptional regulation. *Trends Biochem Sci* 20, 56-9.
435. Baumstark, A., Lower, K. M., Sinkus, A., Andriuskeviciute, I., Jurkeniene, L., Gecz, J. & Just, W. (2003). Novel PHF6 mutation p.D333del causes Borjeson-Forsssman-Lehmann syndrome. *J Med Genet* 40, e50.
436. Lower, K. M., Solders, G., Bondeson, M. L., Nelson, J., Brun, A., Crawford, J., Malm, G., Borjeson, M., Turner, G., Partington, M. & Gecz, J. (2004). 1024C> T (R342X) is a recurrent PHF6 mutation also found in the original Borjeson-Forsssman-Lehmann syndrome family. *Eur J Hum Genet* 12, 787-9.
437. Lower, K. M., Turner, G., Kerr, B. A., Mathews, K. D., Shaw, M. A. *et al.* (2002). Mutations in PHF6 are associated with Borjeson-Forsssman-Lehmann syndrome. *Nat Genet* 32, 661-5.
438. Vallee, D., Chevrier, E., Graham, G. E., Lazzaro, M. A., Lavigne, P. A., Hunter, A. G. & Picketts, D. J. (2004). A novel PHF6 mutation results in enhanced exon skipping and mild Borjeson-Forsssman-Lehmann syndrome. *J Med Genet* 41, 778-83.
439. Crawford, J., Lower, K. M., Hennekam, R. C., Van Esch, H., Megarbane, A., Lynch, S. A., Turner, G. & Gecz, J. (2006). Mutation screening in Borjeson-Forsssman-Lehmann syndrome: identification of a novel de novo PHF6 mutation in a female patient. *J Med Genet* 43, 238-43.
440. Laumonnier, F., Holbert, S., Ronce, N., Faravelli, F., Lenzner, S., Schwartz, C. E., Lespinasse, J., Van Esch, H., Lacombe, D., Goizet, C., Phan-Dinh Tuy, F., van Bokhoven, H., Fryns, J. P., Chelly, J., Ropers, H. H., Moraine, C., Hamel, B. C. & Briault, S. (2005). Mutations in PHF8 are associated with X linked mental retardation and cleft lip/cleft palate. *J Med Genet* 42, 780-6.
441. Ayoub, N., Noma, K., Isaac, S., Kahan, T., Grewal, S. I. & Cohen, A. (2003). A novel jmjC domain protein modulates heterochromatinization in fission yeast. *Mol Cell Biol* 23, 4356-70.
442. Hanas, J. S., Hazuda, D. J., Bogenhagen, D. F., Wu, F. Y. & Wu, C. W. (1983). Xenopus transcription factor A requires zinc for binding to the 5 S RNA gene. *J Biol Chem* 258, 14120-5.
443. Schultz, D. C., Ayyanathan, K., Negorev, D., Maul, G. G. & Rauscher, F. J., 3rd (2002). SETDB1: a novel KAP-1-associated histone H3, lysine 9-specific methyltransferase that contributes to HP1-mediated silencing of euchromatic genes by KRAB zinc-finger proteins. *Genes Dev* 16, 919-32.
444. Eissenberg, J. C., James, T. C., Foster-Hartnett, D. M., Hartnett, T., Ngan, V. & Elgin, S. C. (1990). Mutation in a heterochromatin-specific chromosomal protein is associated with suppression of position-effect variegation in *Drosophila melanogaster*. *Proc Natl Acad Sci U S A* 87, 9923-7.
445. Heard, E., Rougeulle, C., Arnaud, D., Avner, P., Allis, C. D. & Spector, D. L. (2001). Methylation of histone H3 at Lys-9 is an early mark on the X chromosome during X inactivation. *Cell* 107, 727-38.
446. Shi, Y., Sawada, J., Sui, G., Affar el, B., Whetstine, J. R., Lan, F., Ogawa, H., Luke, M. P. & Nakatani, Y. (2003). Coordinated histone modifications mediated by a CtBP co-repressor complex. *Nature* 422, 735-8.
447. Erikson, E. & Maller, J. L. (1985). A protein kinase from *Xenopus* eggs specific for ribosomal protein S6. *Proc Natl Acad Sci U S A* 82, 742-6.
448. Hanauer, A. & Young, I. D. (2002). Coffin-Lowry syndrome: clinical and molecular features. *J Med Genet* 39, 705-13.
449. De Cesare, D., Jacquot, S., Hanauer, A. & Sassone-Corsi, P. (1998). Rsk-2 activity is necessary for epidermal growth factor-induced phosphorylation of CREB protein and transcription of c-fos gene. *Proc Natl Acad Sci U S A* 95, 12202-7.
450. Chrivia, J. C., Kwok, R. P., Lamb, N., Hagiwara, M., Montminy, M. R. & Goodman, R. H. (1993). Phosphorylated CREB binds specifically to the nuclear protein CBP. *Nature* 365, 855-9.
451. Ogryzko, V. V., Schiltz, R. L., Russanova, V., Howard, B. H. & Nakatani, Y. (1996). The transcriptional coactivators p300 and CBP are histone acetyltransferases. *Cell* 87, 953-9.
452. Zeniou, M., Ding, T., Trivier, E. & Hanauer, A. (2002). Expression analysis of RSK gene family members: the RSK2 gene, mutated in Coffin-Lowry syndrome, is prominently expressed in brain structures essential for cognitive function and learning. *Hum Mol Genet* 11, 2929-40.
453. Wong, E. V., Schaefer, A. W., Landreth, G. & Lemmon, V. (1996). Involvement of p90^{rsk} in neurite outgrowth mediated by the cell adhesion molecule L1. *J Biol Chem* 271, 18217-23.
454. Dummler, B. A., Hauge, C., Silber, J., Yntema, H. G., Kruse, L. S., Kofoed, B., Hemmings, B. A., Alessi, D. R. & Frodin, M. (2005). Functional characterization of human RSK4, a new 90-kDa ribosomal S6 kinase, reveals constitutive activation in most cell types. *J Biol Chem* 280, 13304-14.
455. Smith, J. A., Poteet-Smith, C. E., Malarkey, K. & Sturgill, T. W. (1999). Identification of an extracellular signal-regulated kinase (ERK) docking site in ribosomal S6 kinase, a sequence critical for activation by ERK in vivo. *J Biol Chem* 274, 2893-8.
456. Gille, H., Kortenjann, M., Thomae, O., Moomaw, C., Slaughter, C., Cobb, M. H. & Shaw, P. E. (1995). ERK phosphorylation potentiates Elk-1-mediated ternary complex formation and transactivation. *EMBO J* 14, 951-62.
457. Marais, R., Wynne, J. & Treisman, R. (1993). The SRF accessory protein Elk-1 contains a growth factor-regulated transcriptional activation domain. *Cell* 73, 381-93.
458. Ludwig, J., Kerscher, S., Brandt, U., Pfeiffer, K., Getlawi, F., Apps, D. K. & Schagger, H. (1998). Identification and characterization of a novel 9.2-kDa membrane sector-associated protein of vacuolar proton-ATPase from chromaffin granules. *J Biol Chem* 273, 10939-47.
459. Nguyen, G., Delarue, F., Burckle, C., Bouzahir, L., Giller, T. & Sraer, J. D. (2002). Pivotal role of the renin/prorenin receptor in angiotensin II production and cellular responses to renin. *J Clin Invest* 109, 1417-27.
460. Ramser, J., Abidi, F. E., Burckle, C. A., Lenski, C., Toriello, H., Wen, G., Lubs, H. A., Engert, S., Stevenson, R. E., Meindl, A., Schwartz, C. E. & Nguyen, G. (2005). A unique exonic splice enhancer mutation in a family with X-linked mental retardation and epilepsy points to a novel role of the renin receptor. *Hum Mol Genet* 14, 1019-27.
461. Rettig, R., Ganten, D., Lang, R. E. & Unger, T. (1987). The renin-angiotensin system in the central control of blood pressure. *Eur Heart J* 8 Suppl B, 129-32.
462. Nan, X., Ng, H. H., Johnson, C. A., Laherty, C. D., Turner, B. M., Eisenman, R. N. & Bird, A. (1998). Transcriptional repression by the methyl-CpG-binding protein MeCP2 involves a histone deacetylase complex. *Nature* 393, 386-9.
463. Jones, P. L., Veenstra, G. J., Wade, P. A., Vermaak, D., Kass, S. U., Landsberger, N., Strouboulis, J. & Wolffe, A. P. (1998). Methylated DNA and MeCP2 recruit histone deacetylase to repress transcription. *Nat Genet* 19, 187-91.
464. Brero, A., Easwaran, H. P., Nowak, D., Grunewald, I., Cremer, T., Leonhardt, H. & Cardoso, M. C. (2005). Methyl CpG-binding proteins induce large-scale chromatin reorganization during terminal differentiation. *J Cell Biol* 169, 733-43.
465. Wang, W., Côté, J., Xue, Y., Zhou, S., Khavari, P. A., Biggar, S. R., Muchardt, C., Kalpana, G. V., Goff, S. P., Yaniv, M., Workman, J. L. & Crabtree, G. R. (1996). Pu-

- rification and biochemical heterogeneity of the mammalian SWI-SNF complex. *EMBO J* 15, 5370-82.
466. Harikrishnan, K. N., Chow, M. Z., Baker, E. K., Pal, S., Bassal, S., Brasacchio, D., Wang, L., Craig, J. M., Jones, P. L., Sif, S. & El-Osta, A. (2005). Brahma links the SWI/SNF chromatin-remodeling complex with MeCP2-dependent transcriptional silencing. *Nat Genet* 37, 254-64.
467. Stancheva, I., Collins, A. L., Van den Veyver, I. B., Zoghbi, H. & Meehan, R. R. (2003). A mutant form of MeCP2 protein associated with human Rett syndrome cannot be displaced from methylated DNA by notch in *Xenopus* embryos. *Mol Cell* 12, 425-35.
468. Chen, W. G., Chang, Q., Lin, Y., Meissner, A., West, A. E., Griffith, E. C., Jaenisch, R. & Greenberg, M. E. (2003). Derepression of BDNF transcription involves calcium-dependent phosphorylation of MeCP2. *Science* 302, 885-9.
469. Chang, Q., Khare, G., Dani, V., Nelson, S. & Jaenisch, R. (2006). The disease progression of *Mecp2* mutant mice is affected by the level of BDNF expression. *Neuron* 49, 341-8.
470. Makedonski, K., Abuhatzira, L., Kaufman, Y., Razin, A. & Shemer, R. (2005). MeCP2 deficiency in Rett syndrome causes epigenetic aberrations at the PWS/AS imprinting center that affects UBE3A expression. *Hum Mol Genet* 14, 1049-58.
471. Tao, J., Van Esch, H., Hagedorn-Greife, M., Hoffmann, K., Moser, B., Raynaud, M., Sperner, J., Fryns, J. P., Schwinger, E., Gecz, J., Ropers, H. H. & Kalscheuer, V. M. (2004). Mutations in the X-Linked Cyclin-Dependent Kinase-Like 5 (CDKL5/STK9) Gene Are Associated with Severe Neurodevelopmental Retardation. *Am J Hum Genet* 75, 1149-54.
472. Weaving, L. S., Christodoulou, J., Williamson, S. L., Friend, K. L., McKenzie, O. L., Archer, H., Evans, J., Clarke, A., Pelka, G. J., Tam, P. P., Watson, C., Lahooti, H., Ellaway, C. J., Bennetts, B., Leonard, H. & Gecz, J. (2004). Mutations of CDKL5 Cause a Severe Neurodevelopmental Disorder with Infantile Spasms and Mental Retardation. *Am J Hum Genet* 75, 1079-93.
473. Montini, E., Andolfi, G., Caruso, A., Buchner, G., Walpole, S. M., Mariani, M., Consalez, G., Trump, D., Balabio, A. & Franco, B. (1998). Identification and characterization of a novel serine-threonine kinase gene from the Xp22 region. *Genomics* 51, 427-33.
474. Kalscheuer, V. M., Tao, J., Donnelly, A., Hollway, G., Schwinger, E., Kubart, S., Menzel, C., Hoeltzenbein, M., Tommerup, N., Eyre, H., Harbord, M., Haan, E., Sutherland, G. R., Ropers, H. H. & Gecz, J. (2003). Disruption of the serine/threonine kinase 9 gene causes severe X-linked infantile spasms and mental retardation. *Am J Hum Genet* 72, 1401-11.
475. Mari, F., Azimonti, S., Bertani, I., Bolognese, F., Colombo, E. *et al.* (2005). CDKL5 belongs to the same molecular pathway of MeCP2 and it is responsible for the early-onset seizure variant of Rett syndrome. *Hum Mol Genet* 14, 1935-46.
476. Lin, C., Franco, B. & Rosner, M. R. (2005). CDKL5/Stk9 kinase inactivation is associated with neuronal developmental disorders. *Hum Mol Genet* 14, 3775-86.
477. Müller, M., Affolter, M., Leupin, W., Otting, G., Wuthrich, K. & Gehring, W. J. (1988). Isolation and sequence-specific DNA binding of the Antennapedia homeodomain. *EMBO J* 7, 4299-304.
478. Otting, G., Qian, Y. Q., Billeter, M., Müller, M., Affolter, M., Gehring, W. J. & Wuthrich, K. (1990). Protein-DNA contacts in the structure of a homeodomain-DNA complex determined by nuclear magnetic resonance spectroscopy in solution. *EMBO J* 9, 3085-92.
479. Lewis, E. B. (1978). A gene complex controlling segmentation in *Drosophila*. *Nature* 276, 565-70.
480. Harding, K., Wedeen, C., McGinnis, W. & Levine, M. (1985). Spatially regulated expression of homeotic genes in *Drosophila*. *Science* 229, 1236-42.
481. Galliot, B. & Miller, D. (2000). Origin of anterior patterning. How old is our head? *Trends Genet* 16, 1-5.
482. Sutherland, G. R. & Baker, E. (1992). Characterisation of a new rare fragile site easily confused with the fragile X. *Hum Mol Genet* 1, 111-3.
483. Knight, S. J., Flannery, A. V., Hirst, M. C., Campbell, L., Christodoulou, Z., Phelps, S. R., Pointon, J., Middleton-Price, H. R., Barnicoat, A., Pembrey, M. E. & *et al.* (1993). Trinucleotide repeat amplification and hypermethylation of a CpG island in FRAXE mental retardation. *Cell* 74, 127-34.
484. Miller, W. J., Skinner, J. A., Foss, G. S. & Davies, K. E. (2000). Localization of the fragile X mental retardation 2 (FMR2) protein in mammalian brain. *Eur J Neurosci* 12, 381-4.
485. Ng, D., Thakker, N., Corcoran, C. M., Donnai, D., Perveen, R., Schneider, A., Hadley, D. W., Tift, C., Zhang, L., Wilkie, A. O., van der Smagt, J. J., Gorlin, R. J., Burgess, S. M., Bardwell, V. J., Black, G. C. & Biesecker, L. G. (2004). Oculofaciocardiodental and Lenz microphthalmia syndromes result from distinct classes of mutations in BCOR. *Nat Genet* 36, 411-6.
486. Horn, D., Chyrek, M., Kleier, S., Luttgen, S., Bolz, H., Hinkel, G. K., Korenke, G. C., Riess, A., Schell-Appacik, C., Tinschert, S., Wieczorek, D., Gillesen-Kaesbach, G. & Kutsche, K. (2005). Novel mutations in BCOR in three patients with oculo-facio-cardio-dental syndrome, but none in Lenz microphthalmia syndrome. *Eur J Hum Genet* 13, 563-9.
487. Huynh, K. D., Fischle, W., Verdin, E. & Bardwell, V. J. (2000). BCoR, a novel corepressor involved in BCL-6 repression. *Genes Dev* 14, 1810-23.
488. Ye, B. H., Rao, P. H., Chaganti, R. S. & Dalla-Favera, R. (1993). Cloning of *bcl-6*, the locus involved in chromosome translocations affecting band 3q27 in B-cell lymphoma. *Cancer Res* 53, 2732-5.
489. Santos, C., Rodriguez-Revena, L., Madrigal, I., Badesnas, C., Pineda, M. & Mila, M. (2006). A novel mutation in JARID1C gene associated with mental retardation. *Eur J Hum Genet* 14, 583-6.
490. Stevanovic, M., Lovell-Badge, R., Collignon, J. & Goodfellow, P. N. (1993). SOX3 is an X-linked gene related to SRY. *Hum Mol Genet* 2, 2013-8.
491. Laumonier, F., Ronce, N., Hamel, B. C., Thomas, P., Lespinasse, J., Raynaud, M., Paringaux, C., Van Bokhoven, H., Kalscheuer, V., Fryns, J. P., Chelly, J., Moraine, C. & Briault, S. (2002). Transcription factor SOX3 is involved in X-linked mental retardation with growth hormone deficiency. *Am J Hum Genet* 71, 1450-5.
492. Rizzoti, K., Brunelli, S., Carmignac, D., Thomas, P. Q., Robinson, I. C. & Lovell-Badge, R. (2004). SOX3 is required during the formation of the hypothalamo-pituitary axis. *Nat Genet* 36, 247-55.
493. Giese, K., Cox, J. & Grosschedl, R. (1992). The HMG domain of lymphoid enhancer factor 1 bends DNA and facilitates assembly of functional nucleoprotein structures. *Cell* 69, 185-95.
494. Bustin, M. & Reeves, R. (1996). High-mobility-group chromosomal proteins: architectural components that facilitate chromatin function. *Prog Nucleic Acid Res Mol Biol* 54, 35-100.
495. Ross, E. D., Hardwidge, P. R. & Maher, L. J., 3rd (2001). HMG proteins and DNA flexibility in transcription activation. *Mol Cell Biol* 21, 6598-605.
496. Bagga, R., Michalowski, S., Sabnis, R., Griffith, J. D. & Emerson, B. M. (2000). HMG I/Y regulates long-range enhancer-dependent transcription on DNA and chromatin by changes in DNA topology. *Nucleic Acids Res* 28, 2541-50.
497. Ramón y Cajal, S. (1888). Estructura de los centros nerviosos de les aves. *Rev Trim Histol Norm Pat* 1, 1-10.
498. Ramón y Cajal, S. (1899) La textura del sistema nervioso del hombre y los vertebrados, Madrid: Moya

499. Albin, R. L. & Gilman, S. (1990). Autoradiographic localization of inhibitory and excitatory amino acid neurotransmitter receptors in human normal and olivopontocerebellar atrophy cerebellar cortex. *Brain Res* 522, 37-45.
500. Staal, R. G., Mosharov, E. V. & Sulzer, D. (2004). Dopamine neurons release transmitter via a flickering fusion pore. *Nat Neurosci* 7, 341-6.
501. Hertting, G. & Axelrod, J. (1961). Fate of tritiated noradrenaline at the sympathetic nerve-endings. *Nature* 192, 172-3.
502. Loewi, O. & Navratil, E. (1926). Humoral transfer of heat-nerve action. X. Fate of the vagus substance. *Pflügers Archiv für die Gesamte Physiologie des Menschen und der Tiere* 214, 678-88.
503. Dale, H. H. (1914). The action of certain esters and ethers of choline, and their relation to muscarine. *J Pharmacol Exp Ther* 6, 147-90.
504. Alexander, S. P. H., Mathie, A. & Peters, J. A. (2006). Guide to Receptors and Channels, 2nd edition. *Br J Pharmacol* 147 Suppl 3, S1-S180.
505. Dale, H. H. & Dudley, H. (1929). The presence of histamine and acetylcholine in the spleen of the ox and horse. *J Physiol (Lond)* 68, 97-123.
506. Henn, F. A., Goldstein, M. N. & Hamberger, A. (1974). Uptake of the neurotransmitter candidate glutamate by glia. *Nature* 249, 663-4.
507. Rapport, M. M., Green, A. A. & Page, I. H. (1948). Serum Vasoconstrictor (Serotonin) .4. Isolation and Characterization. *J Biol Chem* 176, 1243-51.
508. Roberts, E. & Frankel, S. (1950). gamma-Aminobutyric acid in brain: its formation from glutamic acid. *J Biol Chem* 187, 55-63.
509. Awapara, J., Landua, A. J., Fuerst, R. & Seale, B. (1950). Free gamma-aminobutyric acid in brain. *J Biol Chem* 187, 35-9.
510. Davidoff, R. A., Shank, R. P., Graham, L. T., Jr., Aprison, M. H. & Werman, R. (1967). Is glycine a neurotransmitter? Association of glycine with spinal interneurons. *Nature* 214, 680-1.
511. Werman, R., Davidoff, R. A. & Aprison, M. H. (1967). Is glycine a neurotransmitter? Inhibition of motoneurons by iontophoresis of glycine. *Nature* 214, 681-3.
512. Meltzer, H. Y. & Deutch, A. Y. (1999) Neurochemistry of schizophrenia. In: Basic Neurochemistry: Molecular, cellular and medical aspects, pp. 1053-72 (Siegel, G. J., Agranoff, B. W., Albers, R. W., Fisher, S. K. and Uhler, M. D., Eds.) Lippincott - Raven, New York, USA.
513. Barchas, J. D. & Altemus, M. (1999) Biochemical hypotheses of mood and anxiety disorders. In: Basic Neurochemistry: Molecular, cellular and medical aspects, pp. 1073-93 (Siegel, G. J., Agranoff, B. W., Albers, R. W., Fisher, S. K. and Uhler, M. D., Eds.) Lippincott - Raven, New York, USA.
514. Bernheimer, H., Birkmayer, W., Hornykiewicz, O., Jellinger, K. & Seitelberger, F. (1973). Brain dopamine and the syndromes of Parkinson and Huntington. Clinical, morphological and neurochemical correlations. *J Neural Sci* 20, 415-55.
515. De Camilli, P., Haucke, V., Takei, K. & Mugnaini, E. (2001) The structure of synapses. In: Synapses, pp. 89-133 (Cowan, W. M., Südhof, T. C. and Stevens, C. F., Eds.) The Johns Hopkins University Press, Baltimore, USA.
516. Kandel, E. R., Schwartz, J. H. & Jessell, T. M. (2000) Principles of Neural Science, 4th edition. McGraw-Hill, New York, USA
517. Hodgkin, A. L. & Huxley, A. F. (1939). Action potentials recorded from inside a nerve fiber. *Nature* 144, 710-11.
518. Llinás, R., Sugimori, M. & Silver, R. B. (1992). Microdomains of high calcium concentration in a presynaptic terminal. *Science* 256, 677-9.
519. Heuser, J. E. (1976) Synaptic vesicle exocytosis revealed in quick-frozen frog NMJ treated with 4-aminopyridine and given a single electric shock. In: Approaches to the Cell Biology of Neurons, pp. 215-39 (Cowan, W. M. and Ferrendelli, J., Eds.) Society for Neuroscience, Bethesda, USA.
520. Nimchinsky, E. A., Yasuda, R., Oertner, T. G. & Svoboda, K. (2004). The number of glutamate receptors opened by synaptic stimulation in single hippocampal spines. *J Neurosci* 24, 2054-64.
521. Simons, K. & Zerial, M. (1993). Rab proteins and the road maps for intracellular transport. *Neuron* 11, 789-99.
522. Barbacid, M. (1994). The Trk family of neurotrophin receptors. *J Neurobiol* 25, 1386-403.
523. Bibel, M. & Barde, Y. A. (2000). Neurotrophins: key regulators of cell fate and cell shape in the vertebrate nervous system. *Genes Dev* 14, 2919-37.
524. D'Adamo, P., Wolfer, D. P., Kopp, C., Tobler, I., Toniolo, D. & Lipp, H. P. (2004). Mice deficient for the synaptic vesicle protein Rab3a show impaired spatial reversal learning and increased explorative activity but none of the behavioral changes shown by mice deficient for the Rab3a regulator Gdi1. *Eur J Neurosci* 19, 1895-905.
525. Südhof, T. C. (1990). The structure of the human synapsin I gene and protein. *J Biol Chem* 265, 7849-52.
526. De Camilli, P., Harris, S. M., Jr., Huttner, W. B. & Greengard, P. (1983). Synapsin I (Protein I), a nerve terminal-specific phosphoprotein. II. Its specific association with synaptic vesicles demonstrated by immunocytochemistry in agarose-embedded synaptosomes. *J Cell Biol* 96, 1355-73.
527. Hilfiker, S., Benfenati, F., Doussau, F., Nairn, A. C., Czernik, A. J., Augustine, G. J. & Greengard, P. (2005). Structural domains involved in the regulation of transmitter release by synapsins. *J Neurosci* 25, 2658-69.
528. Hilfiker, S., Pieribone, V. A., Czernik, A. J., Kao, H. T., Augustine, G. J. & Greengard, P. (1999). Synapsins as regulators of neurotransmitter release. *Philos Trans R Soc Lond B Biol Sci* 354, 269-79.
529. Garcia, C. C., Blair, H. J., Seager, M., Coulthard, A., Tennant, S., Buddles, M., Curtis, A. & Goodship, J. A. (2004). Identification of a mutation in synapsin I, a synaptic vesicle protein, in a family with epilepsy. *J Med Genet* 41, 183-6.
530. Giovedi, S., Vaccaro, P., Valtorta, F., Darchen, F., Greengard, P., Cesareni, G. & Benfenati, F. (2004). Synapsin is a novel Rab3 effector protein on small synaptic vesicles. I. Identification and characterization of the synapsin I-Rab3 interactions in vitro and in intact nerve terminals. *J Biol Chem* 279, 43760-8.
531. Giovedi, S., Darchen, F., Valtorta, F., Greengard, P. & Benfenati, F. (2004). Synapsin is a novel Rab3 effector protein on small synaptic vesicles. II. Functional effects of the Rab3A-synapsin I interaction. *J Biol Chem* 279, 43769-79.
532. Godenschwege, T. A., Reisch, D., Diegelmann, S., Eberle, K., Funk, N. *et al.* (2004). Flies lacking all synapsins are unexpectedly healthy but are impaired in complex behaviour. *Eur J Neurosci* 20, 611-22.
533. Gitler, D., Takagishi, Y., Feng, J., Ren, Y., Rodriguez, R. M., Wetsel, W. C., Greengard, P. & Augustine, G. J. (2004). Different presynaptic roles of synapsins at excitatory and inhibitory synapses. *J Neurosci* 24, 11368-80.
534. Bolliger, M. F., Frei, K., Winterhalter, K. H. & Gloor, S. M. (2001). Identification of a novel neuroligin in humans which binds to PSD-95 and has a widespread expression. *Biochem J* 356, 581-8.
535. Tabolacci, E., Pomponi, M. G., Pietrobono, R., Terracciano, A., Chiurazzi, P. & Neri, G. (2006). A truncating mutation in the IL1RAPL1 gene is responsible for X-linked mental retardation in the MRX21 family. *Am J Med Genet A* 140, 482-7.
536. Pongs, O., Lindemeier, J., Zhu, X. R., Theil, T., Engelkamp, D., Krah-Jentgens, I., Lambrecht, H. G., Koch, K. W., Schwemer, J., Rivosecchi, R. & *et al.* (1993). Frequentin—a novel calcium-binding protein that modulates

- synaptic efficacy in the *Drosophila* nervous system. *Neuron* 11, 15-28.
537. Tsujimoto, T., Jeromin, A., Saitoh, N., Roder, J. C. & Takahashi, T. (2002). Neuronal calcium sensor 1 and activity-dependent facilitation of P/Q-type calcium currents at presynaptic nerve terminals. *Science* 295, 2276-9.
538. Ferrante, M. I., Ghiani, M., Bulfone, A. & Franco, B. (2001). IL1RAPL2 maps to Xq22 and is specifically expressed in the central nervous system. *Gene* 275, 217-21.
539. Sans, N., Petralia, R. S., Wang, Y. X., Blahos, J., 2nd, Hell, J. W. & Wenthold, R. J. (2000). A developmental change in NMDA receptor-associated proteins at hippocampal synapses. *J Neurosci* 20, 1260-71.
540. Mayer, M. L., Westbrook, G. L. & Guthrie, P. B. (1984). Voltage-dependent block by Mg^{2+} of NMDA responses in spinal cord neurones. *Nature* 309, 261-3.
541. Madison, D. V., Malenka, R. C. & Nicoll, R. A. (1991). Mechanisms underlying long-term potentiation of synaptic transmission. *Annu Rev Neurosci* 14, 379-97.
542. Bliss, T. V. & Collingridge, G. L. (1993). A synaptic model of memory: long-term potentiation in the hippocampus. *Nature* 361, 31-9.
543. Tarpey, P., Parnau, J., Blow, M., Woffendin, H., Bignell, G. et al. (2004). Mutations in the DLG3 Gene Cause Nonsyndromic X-Linked Mental Retardation. *Am J Hum Genet* 75, 318-24.
544. Christophe-Hobertus, C., Kooy, F., Gecz, J., Abramowicz, M. J., Holinski-Feder, E., Schwartz, C. & Christophe, D. (2004). TM4SF10 gene sequencing in XLMR patients identifies common polymorphisms but no disease-associated mutation. *BMC Med Genet* 5, 22.
545. Hare, M. L. C. (1928). Tyramine oxidase. I. A new enzyme system in liver. *Biochem J* 22, 968-79.
546. Cotzias, G. C. & Dole, V. P. (1951). Metabolism of amines. II. Mitochondrial localization of monoamine oxidase. *Proc Soc Exp Biol Med* 78, 157-60.
547. Blaschko, H., Richter, D. & Schlossmann, H. (1937). The inactivation of adrenaline. *J Physiol* 90, 1-19.
548. Sian, J., Youdim, M. B. H., Riederer, P. & Gerlach, M. (1999) Neurotransmitters and disorders of the basal ganglia. In: Basic Neurochemistry: Molecular, cellular and medical aspects, pp. 917-47 (Siegel, G. J., Agranoff, B. W., Albers, R. W., Fisher, S. K. and Uhler, M. D., Eds.) Lippincott - Raven, New York, USA.
549. Frazer, A. & Hensler, J. G. (1999) Serotonin. In: Basic Neurochemistry: Molecular, cellular and medical aspects, pp. 263-92 (Siegel, G. J., Agranoff, B. W., Albers, R. W., Fisher, S. K. and Uhler, M. D., Eds.) Lippincott - Raven, New York, USA.
550. Chen, Z. Y., Hotamisligil, G. S., Huang, J. K., Wen, L., Ezzeddine, D., Aydin-Muderrisoglu, N., Powell, J. F., Huang, R. H., Breakefield, X. O., Craig, I. & et al. (1991). Structure of the human gene for monoamine oxidase type A. *Nucleic Acids Res* 19, 4537-41.
551. Brunner, H. G., Nelen, M., Breakefield, X. O., Ropers, H. H. & van Oost, B. A. (1993). Abnormal behavior associated with a point mutation in the structural gene for monoamine oxidase A. *Science* 262, 578-80.
552. Cases, O., Seif, I., Grimsby, J., Gaspar, P., Chen, K., Pournin, S., Muller, U., Aguet, M., Babinet, C., Shih, J. C. & et al. (1995). Aggressive behavior and altered amounts of brain serotonin and norepinephrine in mice lacking MAOA. *Science* 268, 1763-6.
553. Cohen, I. L., Liu, X., Schutz, C., White, B. N., Jenkins, E. C., Brown, W. T. & Holden, J. J. (2003). Association of autism severity with a monoamine oxidase A functional polymorphism. *Clin Genet* 64, 190-7.
554. Stamps, V. R., Abeling, N. G., van Gennip, A. H., van Cruchten, A. G. & Gurling, H. M. (2001). Mild learning difficulties and offending behaviour--is there a link with monoamine oxidase A deficiency? *Psychiatr Genet* 11, 173-6.
555. Kawada, Y., Hattori, M., Dai, X. Y. & Nanko, S. (1995). Possible association between monoamine oxidase A gene and bipolar affective disorder. *Am J Hum Genet* 56, 335-6.
556. Lim, L. C., Powell, J., Sham, P., Castle, D., Hunt, N., Murray, R. & Gill, M. (1995). Evidence for a genetic association between alleles of monoamine oxidase A gene and bipolar affective disorder. *Am J Med Genet* 60, 325-31.
557. Preisig, M., Bellivier, F., Fenton, B. T., Baud, P., Berney, A., Courtet, P., Hardy, P., Golaz, J., Leboyer, M., Mallet, J., Matthey, M. L., Mouthon, D., Neidhart, E., Nosten-Bertrand, M., Stadelmann-Dubuis, E., Guimon, J., Ferrero, F., Buresi, C. & Malafosse, A. (2000). Association between bipolar disorder and monoamine oxidase A gene polymorphisms: results of a multicenter study. *Am J Psychiatry* 157, 948-55.
558. Kirov, G., Norton, N., Jones, I., McCandless, F., Craddock, N. & Owen, M. J. (1999). A functional polymorphism in the promoter of monoamine oxidase A gene and bipolar affective disorder. *Int J Neuropsychopharmacol* 2, 293-8.
559. Craddock, N., Daniels, J., Roberts, E., Rees, M., McGuffin, P. & Owen, M. J. (1995). No evidence for allelic association between bipolar disorder and monoamine oxidase A gene polymorphisms. *Am J Med Genet* 60, 322-4.
560. Nothen, M. M., Eggemann, K., Albus, M., Borrmann, M., Rietschel, M., Korner, J., Maier, W., Minges, J., Lichtermann, D., Franzek, E. & et al. (1995). Association analysis of the monoamine oxidase A gene in bipolar affective disorder by using family-based internal controls. *Am J Hum Genet* 57, 975-8.
561. Jönsson, E. G., Norton, N., Forslund, K., Mattila-Evendén, M., Rylander, G., Asberg, M., Owen, M. J. & Sedvall, G. C. (2003). Association between a promoter variant in the monoamine oxidase A gene and schizophrenia. *Schizophr Res* 61, 31-7.
562. Fan, J. B., Yang, M. S., Tang, J. X., He, L., Xing, Y. L., Shi, J. G., Zhao, S. M., Zhu, S. M., Ji, L. P., Gu, N. F., Feng, G. Y. & St Clair, D. (2004). Family-based association study of the functional monoamine oxidase A gene promoter polymorphism and schizophrenia. *Schizophr Res* 67, 107-9.
563. Hotamisligil, G. S., Girmen, A. S., Fink, J. S., Tivol, E., Shalish, C., Trofater, J., Baenziger, J., Diamond, S., Markham, C., Sullivan, J. & et al. (1994). Hereditary variations in monoamine oxidase as a risk factor for Parkinson's disease. *Mov Disord* 9, 305-10.
564. Nanko, S., Ueki, A. & Hattori, M. (1996). No association between Parkinson's disease and monoamine oxidase A and B gene polymorphisms. *Neurosci Lett* 204, 125-7.
565. Russell, D. H. & Snyder, S. H. (1969). Amine synthesis in regenerating rat liver: extremely rapid turnover of ornithine decarboxylase. *Mol Pharmacol* 5, 253-62.
566. Bates, P. C., Grimble, G. K., Sparrow, M. P. & Millward, D. J. (1983). Myofibrillar protein turnover. Synthesis of protein-bound 3-methylhistidine, actin, myosin heavy chain and aldolase in rat skeletal muscle in the fed and starved states. *Biochem J* 214, 593-605.
567. Lee, Y. B., Kauffman, R. G. & DeVenecia, G. (1977). The incorporation of 2-[14C]glycine into porcine lens protein. *Exp Eye Res* 25, 621-9.
568. Varshavsky, A. (2006). The early history of the ubiquitin field. *Protein Sci* 15, 647-54.
569. Giles, J. (2004). Chemistry Nobel for trio who revealed molecular death-tag. *Nature* 431, 729.
570. DeSalle, L. M. & Pagano, M. (2001). Regulation of the G1 to S transition by the ubiquitin pathway. *FEBS Lett* 490, 179-89.
571. Hoyt, M. A. (1997). Eliminating all obstacles: regulated proteolysis in the eukaryotic cell cycle. *Cell* 91, 149-51.
572. del Pozo, J. C. & Estelle, M. (2000). F-box proteins and protein degradation: an emerging theme in cellular regulation. *Plant Mol Biol* 44, 123-8.

573. Moon, J., Parry, G. & Estelle, M. (2004). The ubiquitin-proteasome pathway and plant development. *Plant Cell* 16, 3181-95.
574. Craig, K. L. & Tyers, M. (1999). The F-box: a new motif for ubiquitin dependent proteolysis in cell cycle regulation and signal transduction. *Prog Biophys Mol Biol* 72, 299-328.
575. Conaway, R. C., Brower, C. S. & Conaway, J. W. (2002). Emerging roles of ubiquitin in transcription regulation. *Science* 296, 1254-8.
576. Desterro, J. M., Rodriguez, M. S. & Hay, R. T. (2000). Regulation of transcription factors by protein degradation. *Cell Mol Life Sci* 57, 1207-19.
577. Ciechanover, A. (2003). The ubiquitin proteolytic system and pathogenesis of human diseases: a novel platform for mechanism-based drug targeting. *Biochem Soc Trans* 31, 474-81.
578. Schlesinger, D. H., Goldstein, G. & Niall, H. D. (1975). The complete amino acid sequence of ubiquitin, an adenylate cyclase stimulating polypeptide probably universal in living cells. *Biochemistry* 14, 2214-8.
579. Papa, F. R. & Hochstrasser, M. (1993). The yeast DOA4 gene encodes a deubiquitinating enzyme related to a product of the human *trc-2* oncogene. *Nature* 366, 313-9.
580. Ciechanover, A., Heller, H., Katz-Etzion, R. & Hershko, A. (1981). Activation of the heat-stable polypeptide of the ATP-dependent proteolytic system. *Proc Natl Acad Sci U S A* 78, 761-5.
581. Ciechanover, A., Elias, S., Heller, H. & Hershko, A. (1982). "Covalent affinity" purification of ubiquitin-activating enzyme. *J Biol Chem* 257, 2537-42.
582. Hershko, A., Heller, H., Elias, S. & Ciechanover, A. (1983). Components of ubiquitin-protein ligase system. Resolution, affinity purification, and role in protein breakdown. *J Biol Chem* 258, 8206-14.
583. Kalchman, M. A., Graham, R. K., Xia, G., Koide, H. B., Hodgson, J. G., Graham, K. C., Goldberg, Y. P., Gietz, R. D., Pickart, C. M. & Hayden, M. R. (1996). Huntingtin is ubiquitinated and interacts with a specific ubiquitin-conjugating enzyme. *J Biol Chem* 271, 19385-94.
584. Ardley, H. C. & Robinson, P. A. (2005). E3 ubiquitin ligases. *Essays Biochem* 41, 15-30.
585. Chau, V., Tobias, J. W., Bachmair, A., Marriott, D., Ecker, D. J., Gonda, D. K. & Varshavsky, A. (1989). A multiubiquitin chain is confined to specific lysine in a targeted short-lived protein. *Science* 243, 1576-83.
586. Tanaka, K., Ii, K., Ichihara, A., Waxman, L. & Goldberg, A. L. (1986). A high molecular weight protease in the cytosol of rat liver. I. Purification, enzymological properties, and tissue distribution. *J Biol Chem* 261, 15197-203.
587. Peters, J. M., Cejka, Z., Harris, J. R., Kleinschmidt, J. A. & Baumeister, W. (1993). Structural features of the 26 S proteasome complex. *J Mol Biol* 234, 932-7.
588. Baumeister, W., Walz, J., Zuhl, F. & Seemuller, E. (1998). The proteasome: paradigm of a self-compartmentalizing protease. *Cell* 92, 367-80.
589. Thrower, J. S., Hoffman, L., Rechsteiner, M. & Pickart, C. M. (2000). Recognition of the polyubiquitin proteolytic signal. *EMBO J* 19, 94-102.
590. Bachmair, A., Finley, D. & Varshavsky, A. (1986). In vivo half-life of a protein is a function of its amino-terminal residue. *Science* 234, 179-86.
591. Ciechanover, A. (2006). The ubiquitin proteolytic system: from a vague idea, through basic mechanisms, and onto human diseases and drug targeting. *Neurology* 66, S7-19.
592. Willems, A. R., Schwab, M. & Tyers, M. (2004). A hitchhiker's guide to the cullin ubiquitin ligases: SCF and its kin. *Biochim Biophys Acta* 1695, 133-70.
593. Liu, Y. C. (2004). Ubiquitin ligases and the immune response. *Annu Rev Immunol* 22, 81-127.
594. Ang, X. L. & Wade Harper, J. (2005). SCF-mediated protein degradation and cell cycle control. *Oncogene* 24, 2860-70.
595. Huijbregtse, J. M., Scheffner, M., Beaudenon, S. & Howley, P. M. (1995). A family of proteins structurally and functionally related to the E6-AP ubiquitin-protein ligase. *Proc Natl Acad Sci U S A* 92, 2563-7.
596. Joazeiro, C. A. & Weissman, A. M. (2000). RING finger proteins: mediators of ubiquitin ligase activity. *Cell* 102, 549-52.
597. Joazeiro, C. A., Wing, S. S., Huang, H., Levenson, J. D., Hunter, T. & Liu, Y. C. (1999). The tyrosine kinase negative regulator c-Cbl as a RING-type, E2-dependent ubiquitin-protein ligase. *Science* 286, 309-12.
598. Kwon, Y. T., Reiss, Y., Fried, V. A., Hershko, A., Yoon, J. K., Gonda, D. K., Sangan, P., Copeland, N. G., Jenkins, N. A. & Varshavsky, A. (1998). The mouse and human genes encoding the recognition component of the N-end rule pathway. *Proc Natl Acad Sci U S A* 95, 7898-903.
599. Heller, H. & Hershko, A. (1990). A ubiquitin-protein ligase specific for type III protein substrates. *J Biol Chem* 265, 6532-5.
600. Irniger, S., Piatti, S., Michaelis, C. & Nasmyth, K. (1995). Genes involved in sister chromatid separation are needed for B-type cyclin proteolysis in budding yeast. *Cell* 81, 269-78.
601. King, R. W., Peters, J. M., Tugendreich, S., Rolfe, M., Hieter, P. & Kirschner, M. W. (1995). A 20S complex containing CDC27 and CDC16 catalyzes the mitosis-specific conjugation of ubiquitin to cyclin B. *Cell* 81, 279-88.
602. Iwai, K., Yamanaka, K., Kamura, T., Minato, N., Conaway, R. C., Conaway, J. W., Klausner, R. D. & Pause, A. (1999). Identification of the von Hippel-Lindau tumor-suppressor protein as part of an active E3 ubiquitin ligase complex. *Proc Natl Acad Sci U S A* 96, 12436-41.
603. Maxwell, P. H., Wiesener, M. S., Chang, G. W., Clifford, S. C., Vaux, E. C., Cockman, M. E., Wyckoff, C. C., Pugh, C. W., Maher, E. R. & Ratcliffe, P. J. (1999). The tumour suppressor protein VHL targets hypoxia-inducible factors for oxygen-dependent proteolysis. *Nature* 399, 271-5.
604. Wang, G. L., Jiang, B. H., Rue, E. A. & Semenza, G. L. (1995). Hypoxia-inducible factor 1 is a basic-helix-loop-helix-PAS heterodimer regulated by cellular O₂ tension. *Proc Natl Acad Sci U S A* 92, 5510-4.
605. Coscoy, L. & Ganem, D. (2003). PHD domains and E3 ubiquitin ligases: viruses make the connection. *Trends Cell Biol* 13, 7-12.
606. Cyr, D. M., Hohfeld, J. & Patterson, C. (2002). Protein quality control: U-box-containing E3 ubiquitin ligases join the fold. *Trends Biochem Sci* 27, 368-75.
607. Borden, K. L. & Freemont, P. S. (1996). The RING finger domain: a recent example of a sequence-structure family. *Curr Opin Struct Biol* 6, 395-401.
608. Ohi, M. D., Vander Kooi, C. W., Rosenberg, J. A., Chazin, W. J. & Gould, K. L. (2003). Structural insights into the U-box, a domain associated with multi-ubiquitination. *Nat Struct Biol* 10, 250-5.
609. Skowyra, D., Craig, K. L., Tyers, M., Elledge, S. J. & Harper, J. W. (1997). F-box proteins are receptors that recruit phosphorylated substrates to the SCF ubiquitin-ligase complex. *Cell* 91, 209-19.
610. Bai, C., Sen, P., Hofmann, K., Ma, L., Goebel, M., Harper, J. W. & Elledge, S. J. (1996). SKP1 connects cell cycle regulators to the ubiquitin proteolysis machinery through a novel motif, the F-box. *Cell* 86, 263-74.
611. Mathias, N., Johnson, S. L., Winey, M., Adams, A. E., Goetsch, L., Pringle, J. R., Byers, B. & Goebel, M. G. (1996). Cdc53p acts in concert with Cdc4p and Cdc34p to control the G1-to-S-phase transition and identifies a conserved family of proteins. *Mol Cell Biol* 16, 6634-43.

612. Lisztwan, J., Marti, A., Sutterluty, H., Gstaiger, M., Wirbelauer, C. & Krek, W. (1998). Association of human CUL-1 and ubiquitin-conjugating enzyme CDC34 with the F-box protein p45(SKP2): evidence for evolutionary conservation in the subunit composition of the CDC34-SCF pathway. *EMBO J* 17, 368-83.
613. Pause, A., Lee, S., Worrell, R. A., Chen, D. Y., Burgess, W. H., Linehan, W. M. & Klausner, R. D. (1997). The von Hippel-Lindau tumor-suppressor gene product forms a stable complex with human CUL-2, a member of the Cdc53 family of proteins. *Proc Natl Acad Sci U S A* 94, 2156-61.
614. Du, M., Sansores-Garcia, L., Zu, Z. & Wu, K. K. (1998). Cloning and expression analysis of a novel salicylate suppressible gene, Hs-CUL-3, a member of cullin/Cdc53 family. *J Biol Chem* 273, 24289-92.
615. Chen, L. C., Manjeshwar, S., Lu, Y., Moore, D., Ljung, B. M., Kuo, W. L., Dairkee, S. H., Wernick, M., Collins, C. & Smith, H. S. (1998). The human homologue for the *Caenorhabditis elegans* cul-4 gene is amplified and overexpressed in primary breast cancers. *Cancer Res* 58, 3677-83.
616. Kipreos, E. T., Lander, L. E., Wing, J. P., He, W. W. & Hedgecock, E. M. (1996). cul-1 is required for cell cycle exit in *C. elegans* and identifies a novel gene family. *Cell* 85, 829-39.
617. Burnatowska-Hledin, M. A., Spielman, W. S., Smith, W. L., Shi, P., Meyer, J. M. & Dewitt, D. L. (1995). Expression cloning of an AVP-activated, calcium-mobilizing receptor from rabbit kidney medulla. *Am J Physiol* 268, F1198-210.
618. Dias, D. C., Dolios, G., Wang, R. & Pan, Z. Q. (2002). CUL7: A DOC domain-containing cullin selectively binds Skp1.Fbx29 to form an SCF-like complex. *Proc Natl Acad Sci U S A* 99, 16601-6.
619. Nikolaev, A. Y., Li, M., Puskas, N., Qin, J. & Gu, W. (2003). Parc: a cytoplasmic anchor for p53. *Cell* 112, 29-40.
620. Yu, H., Peters, J. M., King, R. W., Page, A. M., Hieter, P. & Kirschner, M. W. (1998). Identification of a cullin homology region in a subunit of the anaphase-promoting complex. *Science* 279, 1219-22.
621. Patton, E. E., Willems, A. R., Sa, D., Kuras, L., Thomas, D., Craig, K. L. & Tyers, M. (1998). Cdc53 is a scaffold protein for multiple Cdc34/Skp1/F-box protein complexes that regulate cell division and methionine biosynthesis in yeast. *Genes Dev* 12, 692-705.
622. Michel, J. J. & Xiong, Y. (1998). Human CUL-1, but not other cullin family members, selectively interacts with SKP1 to form a complex with SKP2 and cyclin A. *Cell Growth Differ* 9, 435-49.
623. Ohta, T., Michel, J. J., Schottelius, A. J. & Xiong, Y. (1999). ROC1, a homolog of APC11, represents a family of cullin partners with an associated ubiquitin ligase activity. *Mol Cell* 3, 535-41.
624. Lammer, D., Mathias, N., Laplaza, J. M., Jiang, W., Liu, Y., Callis, J., Goebel, M. & Estelle, M. (1998). Modification of yeast Cdc53p by the ubiquitin-related protein rub1p affects function of the SCFCdc4 complex. *Genes Dev* 12, 914-26.
625. Liakopoulos, D., Doenges, G., Matuschewski, K. & Jentsch, S. (1998). A novel protein modification pathway related to the ubiquitin system. *EMBO J* 17, 2208-14.
626. Kamitani, T., Kito, K., Nguyen, H. P. & Yeh, E. T. (1997). Characterization of NEDD8, a developmentally down-regulated ubiquitin-like protein. *J Biol Chem* 272, 28557-62.
627. Kamura, T., Koepf, D. M., Conrad, M. N., Skowyra, D., Moreland, R. J., Iliopoulos, O., Lane, W. S., Kaelin, W. G., Jr., Elledge, S. J., Conaway, R. C., Harper, J. W. & Conaway, J. W. (1999). Rbx1, a component of the VHL tumor suppressor complex and SCF ubiquitin ligase. *Science* 284, 657-61.
628. Seol, J. H., Feldman, R. M., Zachariae, W., Shevchenko, A., Correll, C. C., Lyapina, S., Chi, Y., Galova, M., Claypool, J., Sandmeyer, S., Nasmyth, K. & Deshaies, R. J. (1999). Cdc53/cullin and the essential Hrt1 RING-H2 subunit of SCF define a ubiquitin ligase module that activates the E2 enzyme Cdc34. *Genes Dev* 13, 1614-26.
629. Skowyra, D., Koepf, D. M., Kamura, T., Conrad, M. N., Conaway, R. C., Conaway, J. W., Elledge, S. J. & Harper, J. W. (1999). Reconstitution of G1 cyclin ubiquitination with complexes containing SCFGrr1 and Rbx1. *Science* 284, 662-5.
630. Yaron, A., Hatzubai, A., Davis, M., Lavon, I., Amit, S., Manning, A. M., Andersen, J. S., Mann, M., Mercurio, F. & Ben-Neriah, Y. (1998). Identification of the receptor component of the I κ B α -ubiquitin ligase. *Nature* 396, 590-4.
631. Jentsch, S., Seufert, W., Sommer, T. & Reins, H. A. (1990). Ubiquitin-conjugating enzymes: novel regulators of eukaryotic cells. *Trends Biochem Sci* 15, 195-8.
632. Kolman, C. J., Toth, J. & Gonda, D. K. (1992). Identification of a portable determinant of cell cycle function within the carboxyl-terminal domain of the yeast CDC34 (UBC3) ubiquitin conjugating (E2) enzyme. *EMBO J* 11, 3081-90.
633. Silver, E. T., Gwozd, T. J., Ptak, C., Goebel, M. & Ellison, M. J. (1992). A chimeric ubiquitin conjugating enzyme that combines the cell cycle properties of CDC34 (UBC3) and the DNA repair properties of RAD6 (UBC2): implications for the structure, function and evolution of the E2s. *EMBO J* 11, 3091-8.
634. Mathias, N., Steussy, C. N. & Goebel, M. G. (1998). An essential domain within Cdc34p is required for binding to a complex containing Cdc4p and Cdc53p in *Saccharomyces cerevisiae*. *J Biol Chem* 273, 4040-5.
635. Zhang, H., Kobayashi, R., Galaktionov, K. & Beach, D. (1995). p19Skp1 and p45Skp2 are essential elements of the cyclin A-CDK2 S phase kinase. *Cell* 82, 915-25.
636. Ng, R. W., Arooz, T., Yam, C. H., Chan, I. W., Lau, A. W. & Poon, R. Y. (1998). Characterization of the cullin and F-box protein partner Skp1. *FEBS Lett* 438, 183-9.
637. Patton, E. E., Willems, A. R. & Tyers, M. (1998). Combinatorial control in ubiquitin-dependent proteolysis: don't Skp the F-box hypothesis. *Trends Genet* 14, 236-43.
638. Yam, C. H., Ng, R. W., Siu, W. Y., Lau, A. W. & Poon, R. Y. (1999). Regulation of cyclin A-Cdk2 by SCF component Skp1 and F-box protein Skp2. *Mol Cell Biol* 19, 635-45.
639. Li, F. N. & Johnston, M. (1997). Grr1 of *Saccharomyces cerevisiae* is connected to the ubiquitin proteolysis machinery through Skp1: coupling glucose sensing to gene expression and the cell cycle. *EMBO J* 16, 5629-38.
640. Zhou, P. & Howley, P. M. (1998). Ubiquitination and degradation of the substrate recognition subunits of SCF ubiquitin-protein ligases. *Mol Cell* 2, 571-80.
641. Wu, G., Xu, G., Schulman, B. A., Jeffrey, P. D., Harper, J. W. & Pavletich, N. P. (2003). Structure of a beta-TrCP1-Skp1-beta-catenin complex: destruction motif binding and lysine specificity of the SCF(beta-TrCP1) ubiquitin ligase. *Mol Cell* 11, 1445-56.
642. Zheng, N., Schulman, B. A., Song, L., Miller, J. J., Jeffrey, P. D., Wang, P., Chu, C., Koepf, D. M., Elledge, S. J., Pagano, M., Conaway, R. C., Conaway, J. W., Harper, J. W. & Pavletich, N. P. (2002). Structure of the Cul1-Rbx1-Skp1-F boxSkp2 SCF ubiquitin ligase complex. *Nature* 416, 703-9.
643. Schulman, B. A., Carrano, A. C., Jeffrey, P. D., Bowen, Z., Kinnucan, E. R., Finnin, M. S., Elledge, S. J., Harper, J. W., Pagano, M. & Pavletich, N. P. (2000). Insights into SCF ubiquitin ligases from the structure of the Skp1-Skp2 complex. *Nature* 408, 381-6.
644. Cardozo, T. & Pagano, M. (2004). The SCF ubiquitin ligase: insights into a molecular machine. *Nat Rev Mol Cell Biol* 5, 739-51.

645. Jin, J., Cardozo, T., Lovering, R. C., Elledge, S. J., Pagano, M. & Harper, J. W. (2004). Systematic analysis and nomenclature of mammalian F-box proteins. *Genes Dev* 18, 2573-80.
646. Smith, T. F., Gaitatzes, C., Saxena, K. & Neer, E. J. (1999). The WD repeat: a common architecture for diverse functions. *Trends Biochem Sci* 24, 181-5.
647. Kobe, B. & Kajava, A. V. (2001). The leucine-rich repeat as a protein recognition motif. *Curr Opin Struct Biol* 11, 725-32.
648. Verma, R., Annan, R. S., Huddleston, M. J., Carr, S. A., Reynard, G. & Deshaies, R. J. (1997). Phosphorylation of Sic1p by G1 Cdk required for its degradation and entry into S phase. *Science* 278, 455-60.
649. Pagano, M., Tam, S. W., Theodoras, A. M., Beer-Romero, P., Del Sal, G., Chau, V., Yew, P. R., Draetta, G. F. & Rolfe, M. (1995). Role of the ubiquitin-proteasome pathway in regulating abundance of the cyclin-dependent kinase inhibitor p27. *Science* 269, 682-5.
650. Feldman, R. M., Correll, C. C., Kaplan, K. B. & Deshaies, R. J. (1997). A complex of Cdc4p, Skp1p, and Cdc53p/cullin catalyzes ubiquitination of the phosphorylated CDK inhibitor Sic1p. *Cell* 91, 221-30.
651. Henchoz, S., Chi, Y., Catarin, B., Herskowitz, I., Deshaies, R. J. & Peter, M. (1997). Phosphorylation- and ubiquitin-dependent degradation of the cyclin-dependent kinase inhibitor Far1p in budding yeast. *Genes Dev* 11, 3046-60.
652. Drury, L. S., Perkins, G. & Diffley, J. F. (1997). The Cdc4/34/53 pathway targets Cdc6p for proteolysis in budding yeast. *EMBO J* 16, 5966-76.
653. Kornitzer, D., Raboy, B., Kulka, R. G. & Fink, G. R. (1994). Regulated degradation of the transcription factor Gcn4. *EMBO J* 13, 6021-30.
654. Latres, E., Chiaur, D. S. & Pagano, M. (1999). The human F box protein β -Trcp associates with the Cul1/Skp1 complex and regulates the stability of β -catenin. *Oncogene* 18, 849-54.
655. Musti, A. M., Treier, M. & Bohmann, D. (1997). Reduced ubiquitin-dependent degradation of c-Jun after phosphorylation by MAP kinases. *Science* 275, 400-2.
656. Glickman, M. H. & Ciechanover, A. (2002). The ubiquitin-proteasome proteolytic pathway: destruction for the sake of construction. *Physiol Rev* 82, 373-428.
657. Scheffner, M., Werness, B. A., Huijbregtse, J. M., Levine, A. J. & Howley, P. M. (1990). The E6 oncoprotein encoded by human papillomavirus types 16 and 18 promotes the degradation of p53. *Cell* 63, 1129-36.
658. Slingerland, J. & Pagano, M. (2000). Regulation of the cdk inhibitor p27 and its deregulation in cancer. *J Cell Physiol* 183, 10-7.
659. Abriel, H., Loffing, J., Rebhun, J. F., Pratt, J. H., Schild, L., Horisberger, J. D., Rotin, D. & Staub, O. (1999). Defective regulation of the epithelial Na⁺ channel by Nedd4 in Liddle's syndrome. *J Clin Invest* 103, 667-73.
660. Ingram, V. M. (1956). A specific chemical difference between the globins of normal human and sickle cell anemia haemoglobin. *Nature* 178, 792-4.
661. Gitschier, J., Wood, W. I., Goralka, T. M., Wion, K. L., Chen, E. Y., Eaton, D. H., Vehar, G. A., Capon, D. J. & Lawn, R. M. (1984). Characterization of the human factor VIII gene. *Nature* 312, 326-30.
662. Robson, K. J., Chandra, T., MacGillivray, R. T. & Woo, S. L. (1982). Polysome immunoprecipitation of phenylalanine hydroxylase mRNA from rat liver and cloning of its cDNA. *Proc Natl Acad Sci U S A* 79, 4701-5.
663. Strathdee, C. A., Gavish, H., Shannon, W. R. & Buchwald, M. (1992). Cloning of cDNAs for Fanconi's anaemia by functional complementation. *Nature* 356, 763-7.
664. Shiang, R., Thompson, L. M., Zhu, Y. Z., Church, D. M., Fielder, T. J., Bocian, M., Winokur, S. T. & Wasmuth, J. J. (1994). Mutations in the transmembrane domain of FGFR3 cause the most common genetic form of dwarfism, achondroplasia. *Cell* 78, 335-42.
665. Dietz, H. C., Cutting, G. R., Pyeritz, R. E., Maslen, C. L., Sakai, L. Y., Corson, G. M., Puffenberger, E. G., Hamosh, A., Nanthakumar, E. J., Curristin, S. M. & et al. (1991). Marfan syndrome caused by a recurrent de novo missense mutation in the fibrillin gene. *Nature* 352, 337-9.
666. Collins, F. S. (1995). Positional cloning moves from perditional to traditional. *Nat Genet* 9, 347-50.
667. Strachan, T. & Read, A. P. (2004) Human Molecular Genetics, 3rd edition. Garland Science, London, UK
668. Kong, A., Gudbjartsson, D. F., Sainz, J., Jonsdottir, G. M., Gudjonsson, S. A., Richardsson, B., Sigurdardottir, S., Barnard, J., Hallbeck, B., Masson, G., Shlien, A., Palsson, S. T., Frigge, M. L., Thorgeirsson, T. E., Gulcher, J. R. & Stefansson, K. (2002). A high-resolution recombination map of the human genome. *Nat Genet* 31, 241-7.
669. Jeffreys, A. J., Kauppi, L. & Neumann, R. (2001). Intensely punctate meiotic recombination in the class II region of the major histocompatibility complex. *Nat Genet* 29, 217-22.
670. Tease, C. & Hultèn, M. A. (2004). Inter-sex variation in synaptonemal complex lengths largely determine the different recombination rates in male and female germ cells. *Cytogenet Genome Res* 107, 208-15.
671. Barlow, A. L. & Hultèn, M. A. (1998). Crossing over analysis at pachytene in man. *Eur J Hum Genet* 6, 350-8.
672. Tease, C., Hartshorne, G. M. & Hultèn, M. A. (2002). Patterns of meiotic recombination in human fetal oocytes. *Am J Hum Genet* 70, 1469-79.
673. Morton, N. E. (1955). Sequential tests for the detection of linkage. *Am J Hum Genet* 7, 277-318.
674. Murray, J. M., Davies, K. E., Harper, P. S., Meredith, L., Mueller, C. R. & Williamson, R. (1982). Linkage relationship of a cloned DNA sequence on the short arm of the X chromosome to Duchenne muscular dystrophy. *Nature* 300, 69-71.
675. Knudson, A. G., Jr. (1971). Mutation and cancer: statistical study of retinoblastoma. *Proc Natl Acad Sci U S A* 68, 820-3.
676. Cavenee, W. K., Dryja, T. P., Phillips, R. A., Benedict, W. F., Godbout, R., Gallie, B. L., Murphree, A. L., Strong, L. C. & White, R. L. (1983). Expression of recessive alleles by chromosomal mechanisms in retinoblastoma. *Nature* 305, 779-84.
677. Okamoto, M., Sato, C., Kohno, Y., Mori, T., Iwama, T., Tonomura, A., Miki, Y., Utsunomiya, J., Nakamura, Y., White, R. & et al. (1990). Molecular nature of chromosome 5q loss in colorectal tumors and desmoids from patients with familial adenomatous polyposis. *Hum Genet* 85, 595-9.
678. Ishkanian, A. S., Malloff, C. A., Watson, S. K., DeLeeuw, R. J., Chi, B., Coe, B. P., Snijders, A., Albertson, D. G., Pinkel, D., Marra, M. A., Ling, V., MacAulay, C. & Lam, W. L. (2004). A tiling resolution DNA microarray with complete coverage of the human genome. *Nat Genet* 36, 299-303.
679. Youings, S., Ellis, K., Ennis, S., Barber, J. & Jacobs, P. (2004). A study of reciprocal translocations and inversions detected by light microscopy with special reference to origin, segregation, and recurrent abnormalities. *Am J Med Genet* 126A, 46-60.
680. Antonarakis, S. E., Rossiter, J. P., Young, M., Horst, J., de Moerloose, P., Sommer, S. S., Ketterling, R. P., Kazazian, H. H., Jr., Negrier, C., Vinciguerra, C. & et al. (1995). Factor VIII gene inversions in severe hemophilia A: results of an international consortium study. *Blood* 86, 2206-12.
681. Crolla, J. A. & van Heyningen, V. (2002). Frequent chromosome aberrations revealed by molecular cytogenetic studies in patients with aniridia. *Am J Hum Genet* 71, 1138-49.
682. Mahadevaiah, S. K., Turner, J. M., Baudat, F., Rogakou, E. P., de Boer, P., Blanco-Rodriguez, J., Jasin, M.,

- Keeney, S., Bonner, W. M. & Burgoyne, P. S. (2001). Recombinational DNA double-strand breaks in mice precede synapsis. *Nat Genet* 27, 271-6.
683. Zickler, D. & Kleckner, N. (1998). The leptotene-zygotene transition of meiosis. *Annu Rev Genet* 32, 619-97.
684. Scherthan, H. (1990). Localization of the repetitive telomeric sequence (TTAGGG)_n in two muntjac species and implications for their karyotypic evolution. *Cytogenet Cell Genet* 53, 115-7.
685. Robertson, W. R. B. (1916). Chromosome studies. I. Taxonomic relationships shown in the chromosomes of Tettigidae and Acrididae. V-shaped chromosomes and their significance in Acrididae, Locustidae and Gryllidae: chromosome and variation. *J Morph* 27, 179-331.
686. Lejeune, J., Turpin, R. & Gautier, M. (1959). [Mongolism; a chromosomal disease (trisomy)]. *Bull Acad Natl Med* 143, 256-65.
687. Down, J. L. (1862). Observations on an Ethnic Classification of Idiots. *Lond Hosp Rep* 3, 259 - 62.
688. Nakamura, T., Alder, H., Gu, Y., Prasad, R., Canaani, O., Kamada, N., Gale, R. P., Lange, B., Crist, W. M., Nowell, P. C. & et al. (1993). Genes on chromosomes 4, 9, and 19 involved in 11q23 abnormalities in acute leukemia share sequence homology and/or common motifs. *Proc Natl Acad Sci U S A* 90, 4631-5.
689. Mullis, K., Faloona, F., Scharf, S., Saiki, R., Horn, G. & Erlich, H. (1986). Specific enzymatic amplification of DNA in vitro: the polymerase chain reaction. *Cold Spring Harb Symp Quant Biol* 51 Pt 1, 263-73.
690. Waterston, R. H., Lindblad-Toh, K., Birney, E., Rogers, J., Abril, J. F. et al. (2002). Initial sequencing and comparative analysis of the mouse genome. *Nature* 420, 520-62.
691. Reich, D. E., Schaffner, S. F., Daly, M. J., McVean, G., Mullikin, J. C., Higgins, J. M., Richter, D. J., Lander, E. S. & Altshuler, D. (2002). Human genome sequence variation and the influence of gene history, mutation and recombination. *Nat Genet* 32, 135-42.
692. Orita, M., Suzuki, Y., Sekiya, T. & Hayashi, K. (1989). Rapid and sensitive detection of point mutations and DNA polymorphisms using the polymerase chain reaction. *Genomics* 5, 874-9.
693. Oefner, P. J. & Underhill, P. A. (1995). Comparative DNA sequencing by denaturing high-performance liquid chromatography (DHPLC). *Am J Hum Genet* 57 Suppl., A266.
694. Xiao, W. & Oefner, P. J. (2001). Denaturing high-performance liquid chromatography: A review. *Hum Mutat* 17, 439-74.
695. Pourzand, C. & Cerutti, P. (1993). Genotypic mutation analysis by RFLP/PCR. *Mutat Res* 288, 113-21.
696. Sanger, F., Nicklen, S. & Coulson, A. R. (1977). DNA sequencing with chain-terminating inhibitors. *Proc Natl Acad Sci U S A* 74, 5463-7.
697. Southern, E. M. (1975). Detection of specific sequences among DNA fragments separated by gel electrophoresis. *J Mol Biol* 98, 503-17.
698. Anson, M. L. (1938). The estimation of pepsin, trypsin, papain, and cathepsin with hemoglobin. *J Gen Physiol* 22, 79-89.
699. Dulbecco, R. & Freeman, G. (1959). Plaque production by the polyoma virus. *Virology* 8, 396-7.
700. Eagle, H. (1959). Amino acid metabolism in mammalian cell cultures. *Science* 130, 432-7.
701. Riboni, L., Prinetti, A., Bassi, R., Caminiti, A. & Tettamanti, G. (1995). A mediator role of ceramide in the regulation of neuroblastoma Neuro2a cell differentiation. *J Biol Chem* 270, 26868-75.
702. Moore, G. E., Gerner, R. E. & Franklin, H. A. (1967). Culture of normal human leukocytes. *JAMA* 199, 519-24.
703. Adams, A., Gottschling, D., Kaiser, C. & Stearns, T. (1998) *Methods in yeast genetics: A laboratory course manual*, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York
704. Preis, P. N., Saya, H., Nadasdi, L., Hochhaus, G., Levin, V. & Sadee, W. (1988). Neuronal cell differentiation of human neuroblastoma cells by retinoic acid plus herbimycin A. *Cancer Res* 48, 6530-4.
705. Rogers, M. V., Buensuceso, C., Montague, F. & Mahadevan, L. (1994). Vanadate stimulates differentiation and neurite outgrowth in rat pheochromocytoma PC12 cells and neurite extension in human neuroblastoma SH-SY5Y cells. *Neuroscience* 60, 479-94.
706. Hall, T. A. (1999). BioEdit: a user-friendly biological sequence alignment editor and analysis program for Windows 95/98/NT. *Nucl Acids Symp Ser* 41, 95-8.
707. Guex, N. & Peitsch, M. C. (1997). SWISS-MODEL and the Swiss-PdbViewer: an environment for comparative protein modeling. *Electrophoresis* 18, 2714-23.
708. Rice, P., Longden, I. & Bleasby, A. (2000). EMBOS: the European Molecular Biology Open Software Suite. *Trends Genet* 16, 276-7.
709. Bonfield, J. K., Smith, K. & Staden, R. (1995). A new DNA sequence assembly program. *Nucleic Acids Res* 23, 4992-9.
710. Nicholas, K. B., Nicholas, H. B. J. & Deerfield, D. W. I. (1997). GeneDoc: Analysis and Visualization of Genetic Variation. *The BioInformer* 1, 14.
711. Perrière, G. & Gouy, M. (1996). WWW-query: an on-line retrieval system for biological sequence banks. *Biochimie* 78, 364-9.
712. Staden, R. (1996). The Staden sequence analysis package. *Mol Biotechnol* 5, 233-41.
713. Page, R. D. (1996). TreeView: an application to display phylogenetic trees on personal computers. *Comput Appl Biosci* 12, 357-8.
714. Solovyev, V. V., Salamov, A. A. & Lawrence, C. B. (1994). Predicting internal exons by oligonucleotide composition and discriminant analysis of spliceable open reading frames. *Nucleic Acids Res* 22, 5156-63.
715. Solovyev, V. V., Salamov, A. A. & Lawrence, C. B. (1995). Identification of human gene structure using linear discriminant functions and dynamic programming. *Proc Int Conf Intell Syst Mol Biol* 3, 367-75.
716. Lukashin, A. V. & Borodovsky, M. (1998). GeneMark.hmm: new solutions for gene finding. *Nucleic Acids Res* 26, 1107-15.
717. Burge, C. & Karlin, S. (1997). Prediction of complete gene structures in human genomic DNA. *J Mol Biol* 268, 78-94.
718. Xu, Y., Mural, R. J. & Uberbacher, E. C. (1994). Constructing gene models from accurately predicted exons: an application of dynamic programming. *Comput Appl Biosci* 10, 613-23.
719. Krogh, A. (1997). Two methods for improving performance of an HMM and their application for gene finding. *Proc Int Conf Intell Syst Mol Biol* 5, 179-86.
720. Zhang, M. Q. (1997). Identification of protein coding regions in the human genome by quadratic discriminant analysis. *Proc Natl Acad Sci U S A* 94, 565-8.
721. Fairbrother, W. G., Yeh, R. F., Sharp, P. A. & Burge, C. B. (2002). Predictive identification of exonic splicing enhancers in human genes. *Science* 297, 1007-13.
722. Lowe, T. M. & Eddy, S. R. (1997). tRNAscan-SE: a program for improved detection of transfer RNA genes in genomic sequence. *Nucleic Acids Res* 25, 955-64.
723. Lupas, A., Van Dyke, M. & Stock, J. (1991). Predicting coiled coils from protein sequences. *Science* 252, 1162-4.
724. Cserzo, M., Wallin, E., Simon, I., von Heijne, G. & Elofsson, A. (1997). Prediction of transmembrane alpha-helices in prokaryotic membrane proteins: the dense alignment surface method. *Protein Eng* 10, 673-6.
725. King, R. D. & Sternberg, M. J. (1996). Identification and application of the concepts important for accurate and

- reliable protein secondary structure prediction. *Protein Sci* 5, 2298-310.
726. Kyte, J. & Doolittle, R. F. (1982). A simple method for displaying the hydropathic character of a protein. *J Mol Biol* 157, 105-32.
727. Eisenberg, D., Weiss, R. M. & Terwilliger, T. C. (1982). The helical hydrophobic moment: a measure of the amphiphilicity of a helix. *Nature* 299, 371-4.
728. Pasquier, C., Promponas, V. J., Palaios, G. A., Hamodrakas, J. S. & Hamodrakas, S. J. (1999). A novel method for predicting transmembrane segments in proteins based on a statistical analysis of the SwissProt database: the PRED-TMR algorithm. *Protein Eng* 12, 381-5.
729. Frishman, D. & Argos, P. (1996). Incorporation of non-local interactions in protein secondary structure prediction from the amino acid sequence. *Protein Eng* 9, 133-42.
730. Nakai, K. & Kanehisa, M. (1992). A knowledge base for predicting protein localization sites in eukaryotic cells. *Genomics* 14, 897-911.
731. Wootton, J. C. & Federhen, S. (1996). Analysis of compositionally biased regions in sequence databases. *Methods Enzymol* 266, 554-71.
732. Nielsen, H., Engelbrecht, J., Brunak, S. & von Heijne, G. (1997). Identification of prokaryotic and eukaryotic signal peptides and prediction of their cleavage sites. *Protein Eng* 10, 1-6.
733. Levin, J. M., Robson, B. & Garnier, J. (1986). An algorithm for secondary structure determination in proteins based on sequence similarity. *FEBS Lett* 205, 303-8.
734. Juretic, D., Jeroncic, A. & Zucic, D. (1999). Sequence analysis of membrane proteins with the Web server SPLIT. *Croat Chem Acta* 72, 975-97.
735. Persson, B. & Argos, P. (1994). Prediction of transmembrane segments in proteins utilising multiple sequence alignments. *J Mol Biol* 237, 182-92.
736. Krogh, A., Larsson, B., von Heijne, G. & Sonnhammer, E. L. (2001). Predicting transmembrane protein topology with a hidden Markov model: application to complete genomes. *J Mol Biol* 305, 567-80.
737. Hofmann, K. & Stoffel, W. (1993). TMbase - A database of membrane spanning proteins segments. *Biol Chem Hoppe-Seyler* 374, 166.
738. Thompson, J. D., Higgins, D. G. & Gibson, T. J. (1994). CLUSTAL W: improving the sensitivity of progressive multiple sequence alignment through sequence weighting, position-specific gap penalties and weight matrix choice. *Nucleic Acids Res* 22, 4673-80.
739. Morgenstern, B. (1999). DIALIGN 2: improvement of the segment-to-segment approach to multiple sequence alignment. *Bioinformatics* 15, 211-8.
740. Haas, S. A., Beissbarth, T., Rivals, E., Krause, A. & Vingron, M. (2000). GeneNest: automated generation and visualization of gene indices. *Trends Genet* 16, 521-3.
741. Needleman, S. B. & Wunsch, C. D. (1970). A general method applicable to the search for similarities in the amino acid sequence of two proteins. *J Mol Biol* 48, 443-53.
742. Smith, T. F. & Waterman, M. S. (1981). Identification of common molecular subsequences. *J Mol Biol* 147, 195-7.
743. Schwartz, S., Elnitski, L., Li, M., Weirauch, M., Riemer, C., Smit, A., Green, E. D., Hardison, R. C. & Miller, W. (2003). MultiPipMaker and supporting tools: Alignments and analysis of multiple genomic DNA sequences. *Nucleic Acids Res* 31, 3518-24.
744. Altschul, S. F., Gish, W., Miller, W., Myers, E. W. & Lipman, D. J. (1990). Basic local alignment search tool. *J Mol Biol* 215, 403-10.
745. Schwartz, S., Zhang, Z., Frazer, K. A., Smit, A., Riemer, C., Bouck, J., Gibbs, R., Hardison, R. & Miller, W. (2000). PipMaker—a web server for aligning two genomic DNA sequences. *Genome Res* 10, 577-86.
746. Kurtz, S. & Schleiermacher, C. (1999). REPuter: fast computation of maximal repeats in complete genomes. *Bioinformatics* 15, 426-7.
747. Bradford, M. M. (1976). A rapid and sensitive method for the quantitation of microgram quantities of protein utilizing the principle of protein-dye binding. *Anal Biochem* 72, 248-54.
748. Chan, W. C. & White, P. D. (2000) Fmoc solid phase peptide synthesis : a practical approach, Oxford University Press, New York, USA
749. Schnorrenberg, G. & Gerhardt, H. (1989). Fully-automatic simultaneous multiple peptide-synthesis in micromolar scale: Rapid synthesis of series of peptides for screening in biological assays. *Tetrahedron* 45, 7759-64.
750. Karas, M. & Hillenkamp, F. (1988). Laser desorption ionization of proteins with molecular masses exceeding 10,000 daltons. *Anal Chem* 60, 2299-301.
751. Bussow, K., Cahill, D., Nietfeld, W., Bancroft, D., Scherzinger, E., Lehrach, H. & Walter, G. (1998). A method for global protein expression and antibody screening on high-density filters of an arrayed cDNA library. *Nucleic Acids Res* 26, 5007-8.
752. Stelzl, U., Worm, U., Lalowski, M., Haenig, C., Brembeck, F. H. *et al.* (2005). A human protein-protein interaction network: a resource for annotating the proteome. *Cell* 122, 957-68.
753. Reynolds, E. S. (1963). The use of lead citrate at high pH as an electron-opaque stain in electron microscopy. *J Cell Biol* 17, 208-12.
754. Henikoff, S. & Henikoff, J. G. (1992). Amino acid substitution matrices from protein blocks. *Proc Natl Acad Sci U S A* 89, 10915-9.
755. den Dunnen, J. T. & Antonarakis, S. E. (2001). Nomenclature for the description of human sequence variations. *Hum Genet* 109, 121-4.
756. Siebert, P. D., Chenchik, A., Kellogg, D. E., Lukyanov, K. A. & Lukyanov, S. A. (1995). An improved PCR method for walking in uncloned genomic DNA. *Nucleic Acids Res* 23, 1087-8.
757. Nagase, T., Ishikawa, K., Kikuno, R., Hirose, M., Nomura, N. & Ohara, O. (1999). Prediction of the coding sequences of unidentified human genes. XV. The complete sequences of 100 new cDNA clones from brain which code for large proteins in vitro. *DNA Res* 6, 337-45.
758. Cenciarelli, C., Chiaur, D. S., Guardavaccaro, D., Parks, W., Vidal, M. & Pagano, M. (1999). Identification of a family of human F-box proteins. *Curr Biol* 9, 1177-9.
759. Hagens, O., Minina, E., Schweiger, S., Ropers, H. H. & Kalscheuer, V. (2006). Characterization of FBX25, encoding a novel brain-expressed F-box protein. *Biochim Biophys Acta* 1760, 110-8.
760. Bonfield, J. K., Smith, K. & Staden, R. (1995). A new DNA sequence assembly program. *Nucleic Acids Res* 23, 4992-9.
761. Kozak, M. (1986). Point mutations define a sequence flanking the AUG initiator codon that modulates translation by eukaryotic ribosomes. *Cell* 44, 283-92.
762. Bodine, S. C., Latres, E., Baumhueter, S., Lai, V. K., Nunez, L., Clarke, B. A., Poueymirou, W. T., Panaro, F. J., Na, E., Dharmarajan, K., Pan, Z. Q., Valenzuela, D. M., DeChiara, T. M., Stitt, T. N., Yancopoulos, G. D. & Glass, D. J. (2001). Identification of ubiquitin ligases required for skeletal muscle atrophy. *Science* 294, 1704-8.
763. Staropoli, J. F., McDermott, C., Martinat, C., Schulman, B., Demireva, E. & Abeliovich, A. (2003). Parkin is a component of an SCF-like ubiquitin ligase complex and protects postmitotic neurons from kainate excitotoxicity. *Neuron* 37, 735-49.
764. Winston, J. T., Koepp, D. M., Zhu, C., Elledge, S. J. & Harper, J. W. (1999). A family of mammalian F-box proteins. *Curr Biol* 9, 1180-2.

765. Cenciarelli, C., Chiaur, D. S., Guardavaccaro, D., Parks, W., Vidal, M. & Pagano, M. (1999). Identification of a family of human F-box proteins. *Curr Biol* 9, 1177-9.
766. Gerbi, S. A., Borovjagin, A. V. & Lange, T. S. (2003). The nucleolus: a site of ribonucleoprotein maturation. *Curr Opin Cell Biol* 15, 318-25.
767. Caldas, C., So, C. W., MacGregor, A., Ford, A. M., McDonald, B., Chan, L. C. & Wiedemann, L. M. (1998). Exon scrambling of MLL transcripts occur commonly and mimic partial genomic duplication of the gene. *Gene* 208, 167-76.
768. Nigro, J. M., Cho, K. R., Fearon, E. R., Kern, S. E., Ruppert, J. M., Oliner, J. D., Kinzler, K. W. & Vogelstein, B. (1991). Scrambled exons. *Cell* 64, 607-13.
769. Okazaki, N., F-Kikuno, R., Ohara, R., Inamoto, S., Koseki, H., Hiraoka, S., Saga, Y., Seino, S., Nishimura, M., Kaisho, T., Hoshino, K., Kitamura, H., Nagase, T., Ohara, O. & Koga, H. (2004). Prediction of the coding sequences of mouse homologues of KIAA gene: IV. The complete nucleotide sequences of 500 mouse KIAA-homologous cDNAs identified by screening of terminal sequences of cDNA clones randomly sampled from size-fractionated libraries. *DNA Res* 11, 205-18.
770. Gross, E., Arnold, N., Goette, J., Schwarz-Boeger, U. & Kiechle, M. (1999). A comparison of BRCA1 mutation analysis by direct sequencing, SSCP and DHPLC. *Hum Genet* 105, 72-8.
771. Jones, A. C., Austin, J., Hansen, N., Hoogendoorn, B., Oefner, P. J., Cheadle, J. P. & O'Donovan, M. C. (1999). Optimal temperature selection for mutation detection by denaturing HPLC and comparison to single-stranded conformation polymorphism and heteroduplex analysis. *Clin Chem* 45, 1133-40.
772. Lakich, D., Kazazian, H. H., Jr., Antonarakis, S. E. & Gitschier, J. (1993). Inversions disrupting the factor VIII gene are a common cause of severe haemophilia A. *Nat Genet* 5, 236-41.
773. Fischbeck, K. H. (2001). Polyglutamine expansion neurodegenerative disease. *Brain Res Bull* 56, 161-3.
774. Greber, B., Lehrach, H. & Himmelbauer, H. (2005). Mouse splice mutant generation from ENU-treated ES cells—a gene-driven approach. *Genomics* 85, 557-62.
775. Cho, K. O., Hunt, C. A. & Kennedy, M. B. (1992). The rat brain postsynaptic density fraction contains a homolog of the *Drosophila* discs-large tumor suppressor protein. *Neuron* 9, 929-42.
776. Niebuhr, K., Ebel, F., Frank, R., Reinhard, M., Domann, E., Carl, U. D., Walter, U., Gertler, F. B., Wehland, J. & Chakraborty, T. (1997). A novel proline-rich motif present in ActA of *Listeria monocytogenes* and cytoskeletal proteins is the ligand for the EVH1 domain, a protein module present in the Ena/VASP family. *EMBO J* 16, 5433-44.
777. Hildebrand, J. D. & Soriano, P. (1999). Shroom, a PDZ domain-containing actin-binding protein, is required for neural tube morphogenesis in mice. *Cell* 99, 485-97.
778. Songyang, Z., Fanning, A. S., Fu, C., Xu, J., Marfatia, S. M., Chishti, A. H., Crompton, A., Chan, A. C., Anderson, J. M. & Cantley, L. C. (1997). Recognition of unique carboxyl-terminal motifs by distinct PDZ domains. *Science* 275, 73-7.
779. Staub, O., Verrey, F., Kleyman, T. R., Benos, D. J., Rossier, B. C. & Kraehenbuhl, J. P. (1992). Primary structure of an apical protein from *Xenopus laevis* that participates in amiloride-sensitive sodium channel activity. *J Cell Biol* 119, 1497-506.
780. Schiaffino, M. V., Bassi, M. T., Rugarli, E. I., Renieri, A., Galli, L. & Ballabio, A. (1995). Cloning of a human homologue of the *Xenopus laevis* APX gene from the ocular albinism type 1 critical region. *Hum Mol Genet* 4, 373-82.
781. Karlen, S., Staub, O., Rohrbach, B. & Braathen, L. R. (2000). The cytoplasmic tail of the melanoma cell adhesion molecule MCAM mediates selective binding of APXL2, a new member of the Apx/Shroom actin-binding protein family, unpublished.
782. Dietz, M. L., Bernaciak, T. M., Vendetti, F., Kielec, J. M. & Hildebrand, J. D. (2006). Differential Actin-dependent Localization Modulates the Evolutionarily Conserved Activity of Shroom Family Proteins. *J Biol Chem* 281, 20542-54.
783. Sugars, R. V., Olsson, M. L., Waddington, R. & Wendel, M. (2006). Substitution of bovine dentine sialoprotein with chondroitin sulfate glycosaminoglycan chains. *Eur J Oral Sci* 114, 89-92.
784. Wallace, R. H., Wang, D. W., Singh, R., Scheffer, I. E., George, A. L., Jr., Phillips, H. A., Saar, K., Reis, A., Johnson, E. W., Sutherland, G. R., Berkovic, S. F. & Mulley, J. C. (1998). Febrile seizures and generalized epilepsy associated with a mutation in the Na⁺-channel beta1 subunit gene SCN1B. *Nat Genet* 19, 366-70.
785. Riordan, J. R., Rommens, J. M., Kerem, B., Alon, N., Rozmahel, R., Grzelczak, Z., Zielenski, J., Lok, S., Plavsic, N., Chou, J. L. & et al. (1989). Identification of the cystic fibrosis gene: cloning and characterization of complementary DNA. *Science* 245, 1066-73.
786. de Coo, I. F., Smeets, H. J., Gabreels, F. J., Arts, N. & van Oost, B. A. (1996). Isolated case of mental retardation and ataxia due to a de novo mitochondrial T8993G mutation. *Am J Hum Genet* 58, 636-8.
787. Griffith, K. J., Chan, E. K., Lung, C. C., Hamel, J. C., Guo, X., Miyachi, K. & Fritzler, M. J. (1997). Molecular cloning of a novel 97-kd Golgi complex autoantigen associated with Sjogren's syndrome. *Arthritis Rheum* 40, 1693-702.
788. Balch, W. E. (1990). Molecular dissection of early stages of the eukaryotic secretory pathway. *Curr Opin Cell Biol* 2, 634-41.
789. Raychowdhury, M. K., Ibarra, C., Damiano, A., Jackson, G. R., Jr., Smith, P. R., McLaughlin, M., Prat, A. G., Ausiello, D. A., Lader, A. S. & Cantiello, H. F. (2004). Characterization of Na⁺-permeable cation channels in LLC-PK1 renal epithelial cells. *J Biol Chem* 279, 20137-46.
790. Zuckerman, J. B., Chen, X., Jacobs, J. D., Hu, B., Kleyman, T. R. & Smith, P. R. (1999). Association of the epithelial sodium channel with Apx and alpha-spectrin in A6 renal epithelial cells. *J Biol Chem* 274, 23286-95.
791. Dent, E. W. & Gertler, F. B. (2003). Cytoskeletal dynamics and transport in growth cone motility and axon guidance. *Neuron* 40, 209-27.
792. Kaufmann, U., Zuppinger, C., Waibler, Z., Rudiger, M., Urbich, C., Martin, B., Jockusch, B. M., Eppenberger, H. & Starzinski-Powitz, A. (2000). The armadillo repeat region targets ARVCF to cadherin-based cellular junctions. *J Cell Sci* 113 (Pt 22), 4121-35.
793. Hoogenraad, N. J. & Ryan, M. T. (2001). Translocation of proteins into mitochondria. *IUBMB Life* 51, 345-50.
794. Hines, V., Brandt, A., Griffiths, G., Horstmann, H., Brutsch, H. & Schatz, G. (1990). Protein import into yeast mitochondria is accelerated by the outer membrane protein MAS70. *EMBO J* 9, 3191-200.
795. McBride, H. M., Millar, D. G., Li, J. M. & Shore, G. C. (1992). A signal-anchor sequence selective for the mitochondrial outer membrane. *J Cell Biol* 119, 1451-7.
796. Ikonen, E., Fiedler, K., Parton, R. G. & Simons, K. (1995). Prohibitin, an antiproliferative protein, is localized to mitochondria. *FEBS Lett* 358, 273-7.
797. Bubeck, P., Pistor, S., Wehland, J. & Jockusch, B. M. (1997). Ligand recruitment by vinculin domains in transfected cells. *J Cell Sci* 110 (Pt 12), 1361-71.
798. McCoy, M., Stavridi, E. S., Waterman, J. L., Wieczorek, A. M., Opella, S. J. & Halazonetis, T. D. (1997). Hydrophobic side-chain size is a determinant of the three-dimensional structure of the p53 oligomerization domain. *EMBO J* 16, 6230-6.
799. Warren, C. M., Krzesinski, P. R. & Greaser, M. L. (2003). Vertical agarose gel electrophoresis and elec-

- troblotting of high-molecular-weight proteins. *Electrophoresis* 24, 1695-702.
800. Franke, W. W., Schmid, E., Osborn, M. & Weber, K. (1978). Different intermediate-sized filaments distinguished by immunofluorescence microscopy. *Proc Natl Acad Sci U S A* 75, 5034-8.
801. Boyne, L. J., Fischer, I. & Shea, T. B. (1996). Role of vimentin in early stages of neurogenesis in cultured hippocampal neurons. *Int J Dev Neurosci* 14, 739-48.
802. Shea, T. B., Beermann, M. L. & Fischer, I. (1993). Transient requirement for vimentin in neurogenesis: intracellular delivery of anti-vimentin antibodies and antisense oligonucleotides inhibit neurite initiation but not elongation of existing neurites in neuroblastoma. *J Neurosci Res* 36, 66-76.
803. Schotta, G., Ebert, A., Krauss, V., Fischer, A., Hoffmann, J., Rea, S., Jenuwein, T., Dorn, R. & Reuter, G. (2002). Central role of Drosophila SU(VAR)3-9 in histone H3-K9 methylation and heterochromatic gene silencing. *EMBO J* 21, 1121-31.
804. O'Carroll, D., Scherthan, H., Peters, A. H., Opravil, S., Haynes, A. R., Laible, G., Rea, S., Schmid, M., Leber-sorger, A., Jerratsch, M., Sattler, L., Mattei, M. G., Denny, P., Brown, S. D., Schweizer, D. & Jenuwein, T. (2000). Isolation and characterization of Suv39h2, a second histone H3 methyltransferase gene that displays testis-specific expression. *Mol Cell Biol* 20, 9423-33.
805. Doyon, Y. & Cote, J. (2004). The highly conserved and multifunctional NuA4 HAT complex. *Curr Opin Genet Dev* 14, 147-54.
806. Ikura, T., Ogryzko, V. V., Grigoriev, M., Groisman, R., Wang, J., Horikoshi, M., Scully, R., Qin, J. & Nakatani, Y. (2000). Involvement of the TIP60 histone acetylase complex in DNA repair and apoptosis. *Cell* 102, 463-73.
807. Xue, Y., Wong, J., Moreno, G. T., Young, M. K., Cote, J. & Wang, W. (1998). NURD, a novel complex with both ATP-dependent chromatin-remodeling and histone deacetylase activities. *Mol Cell* 2, 851-61.
808. Aubry, F., Mattei, M. G. & Galibert, F. (1998). Identification of a human 17p-located cDNA encoding a protein of the Snf2-like helicase family. *Eur J Biochem* 254, 558-64.
809. Tetsuka, T., Uranishi, H., Imai, H., Ono, T., Sonta, S., Takahashi, N., Asamitsu, K. & Okamoto, T. (2000). Inhibition of nuclear factor-kappaB-mediated transcription by association with the amino-terminal enhancer of split, a Groucho-related protein lacking WD40 repeats. *J Biol Chem* 275, 4383-90.
810. Palaparti, A., Baratz, A. & Stifani, S. (1997). The Groucho/transducin-like enhancer of split transcriptional repressors interact with the genetically defined amino-terminal silencing domain of histone H3. *J Biol Chem* 272, 26604-10.
811. Keleher, C. A., Redd, M. J., Schultz, J., Carlson, M. & Johnson, A. D. (1992). Ssn6-Tup1 is a general repressor of transcription in yeast. *Cell* 68, 709-19.
812. Lyapina, S., Cope, G., Shevchenko, A., Serino, G., Tsuge, T., Zhou, C., Wolf, D. A., Wei, N. & Deshaies, R. J. (2001). Promotion of NEDD-CUL1 conjugate cleavage by COP9 signalosome. *Science* 292, 1382-5.
813. Mosavi, L. K., Cammett, T. J., Desrosiers, D. C. & Peng, Z. Y. (2004). The ankyrin repeat as molecular architecture for protein recognition. *Protein Sci* 13, 1435-48.
814. Kohroki, J., Nishiyama, T., Nakamura, T. & Masuho, Y. (2005). ASB proteins interact with Cullin5 and Rbx2 to form E3 ubiquitin ligase complexes. *FEBS Lett* 579, 6796-802.
815. Kile, B. T., Schulman, B. A., Alexander, W. S., Nicola, N. A., Martin, H. M. & Hilton, D. J. (2002). The SOCS box: a tale of destruction and degradation. *Trends Biochem Sci* 27, 235-41.
816. Mannen, H., Tseng, H. M., Cho, C. L. & Li, S. S. (1996). Cloning and expression of human homolog HSMT3 to yeast SMT3 suppressor of MIF2 mutations in a centromere protein gene. *Biochem Biophys Res Commun* 222, 178-80.
817. Hay, R. T. (2005). SUMO: a history of modification. *Mol Cell* 18, 1-12.
818. Goehler, H., Lalowski, M., Stelzl, U., Waelter, S., Stroedicke, M. et al. (2004). A protein interaction network links GIT1, an enhancer of huntingtin aggregation, to Huntington's disease. *Mol Cell* 15, 853-65.
819. Moroianu, J., Hijikata, M., Blobel, G. & Radu, A. (1995). Mammalian karyopherin alpha 1 beta and alpha 2 beta heterodimers: alpha 1 or alpha 2 subunit binds nuclear localization signal and beta subunit interacts with peptide repeat-containing nucleoporins. *Proc Natl Acad Sci U S A* 92, 6532-6.
820. Moroianu, J., Blobel, G. & Radu, A. (1995). Previously identified protein of uncertain function is karyopherin alpha and together with karyopherin beta docks import substrate at nuclear pore complexes. *Proc Natl Acad Sci U S A* 92, 2008-11.
821. Drummond, A. E. (2005). TGFbeta signalling in the development of ovarian function. *Cell Tissue Res* 322, 107-15.
822. Cho, D. I., Oak, M. H., Yang, H. J., Choi, H. K., Janssen, G. M. & Kim, K. M. (2003). Direct and biochemical interaction between dopamine D3 receptor and elongation factor-1Bbetagamma. *Life Sci* 73, 2991-3004.
823. Ejiri, S. (2002). Moonlighting functions of polypeptide elongation factor 1: from actin bundling to zinc finger protein R1-associated nuclear localization. *Biosci Biotechnol Biochem* 66, 1-21.
824. Wilson, D. N. & Nierhaus, K. H. (2003). The ribosome through the looking glass. *Angew Chem Int Ed Engl* 42, 3464-86.
825. Riis, B., Rattan, S. I., Clark, B. F. & Merrick, W. C. (1990). Eukaryotic protein elongation factors. *Trends Biochem Sci* 15, 420-4.
826. Jiang, Z., Johnson, H. J., Nie, H., Qin, J., Bird, T. A. & Li, X. (2003). Pellino 1 is required for interleukin-1 (IL-1)-mediated signaling through its interaction with the IL-1 receptor-associated kinase 4 (IRAK4)-IRAK-tumor necrosis factor receptor-associated factor 6 (TRAF6) complex. *J Biol Chem* 278, 10952-6.
827. Choy, F. Y. (1985). Gaucher disease: comparative study of acid phosphatase and glucocerebrosidase in normal and type-1 Gaucher tissues. *Am J Med Genet* 21, 519-28.
828. Spearman, C. (1904). "General intelligence" objectively determined and measured. *Am J Psychol* 15, 201-92.
829. Sternberg, R. J. (1985) Beyond IQ: A triarchic theory of human intelligence., Cambridge University Press, New York, USA
830. Plomin, R. (1999). Genetics and general cognitive ability. *Nature* 402, C25-9.
831. Chipuer, H. M., Rovine, M. J. & Plomin, R. (1990). LISREL Modeling - Genetic and Environmental Influences on IQ Revisited. *Intelligence* 14, 11-29.
832. Craig, I. & Plomin, R. (2006). Quantitative trait loci for IQ and other complex traits: single-nucleotide polymorphism genotyping using pooled DNA and microarrays. *Genes Brain Behav* 5 Suppl 1, 32-7.
833. Petrill, S. A. (1997). Molarity versus modularity of cognitive functioning? A behavioral genetic perspective. *Curr Dir Psychol Sci* 6, 96-9.
834. Petrill, S. A., Saudino, K. S., Wilkerson, B. & Plomin, R. (2001). Genetic and environmental molarity and modularity of cognitive functioning in 2-year-old twins. *Intelligence* 29, 31-43.
835. Drillien, C. M., Jameson, S. & Wilkinson, E. M. (1966). Studies in mental handicap. I. Prevalence and distribution by clinical type and severity of defect. *Arch Dis Child* 41, 528-38.
836. Gustavson, K. H., Hagberg, B., Hagberg, G. & Sars, K. (1977). Severe mental retardation in a Swedish county. I. Epidemiology, gestational age, birth weight and asso-

- ciated CNS handicaps in children born 1959--70. *Acta Paediatr Scand* 66, 373-9.
837. Gustavson, K. H., Holmgren, G., Jonsell, R. & Son Blomquist, H. K. (1977). Severe mental retardation in children in a northern Swedish county. *J Ment Defic Res* 21, 161-80.
838. Warburton, D. (1991). De novo balanced chromosome rearrangements and extra marker chromosomes identified at prenatal diagnosis: clinical significance and distribution of breakpoints. *Am J Hum Genet* 49, 995-1013.
839. Turner, G. & Turner, B. (1974). X-linked mental retardation. *J Med Genet* 11, 109-13.
840. Leonard, H. & Wen, X. (2002). The epidemiology of mental retardation: challenges and opportunities in the new millennium. *Ment Retard Dev Disabil Res Rev* 8, 117-34.
841. Allan, W., Herndon, C. N. & Dudley, F. C. (1944). Some examples of the inheritance of mental deficiency: apparently sex-linked idiocy and microcephaly. *Am J Ment Defic* 48, 325-34.
842. Dobbing, J. & Sands, J. (1973). Quantitative growth and development of human brain. *Arch Dis Child* 48, 757-67.
843. Peacock, W. J. (1995). Hemispherectomy for the treatment of intractable seizures in childhood. *Neurosurg Clin N Am* 6, 549-63.
844. Purpura, D. P. (1975) Dendritic differentiation in human cerebral cortex: normal and aberrant developmental patterns. In: *Advances in neurology*, pp. 91-134 (Kreutzberg, G. W., Ed.) Raven Press, New York, USA.
845. Hauser, W. A. (1994). The prevalence and incidence of convulsive disorders in children. *Epilepsia* 35 Suppl 2, S1-6.
846. Leviton, A. & Cowan, L. D. (1981). Methodological issues in the epidemiology of seizure disorders in children. *Epidemiol Rev* 3, 67-89.
847. Sander, J. W. & Shorvon, S. D. (1996). Epidemiology of the epilepsies. *J Neurol Neurosurg Psychiatry* 61, 433-43.
848. Bell, G. S. & Sander, J. W. (2001). The epidemiology of epilepsy: the size of the problem. *Seizure* 10, 306-16.
849. Goulden, K. J., Shinnar, S., Koller, H., Katz, M. & Richardson, S. A. (1991). Epilepsy in children with mental retardation: a cohort study. *Epilepsia* 32, 690-7.
850. Ellenberg, J. H., Hirtz, D. G. & Nelson, K. B. (1986). Do seizures in children cause intellectual deterioration? *N Engl J Med* 314, 1085-8.
851. Bourgeois, B. F., Prensky, A. L., Palkes, H. S., Talent, B. K. & Busch, S. G. (1983). Intelligence in epilepsy: a prospective study in children. *Ann Neurol* 14, 438-44.
852. Kerker, B. D., Owens, P. L., Zigler, E. & Horwitz, S. M. (2004). Mental health disorders among individuals with mental retardation: challenges to accurate prevalence estimates. *Public Health Rep* 119, 409-17.
853. Gastaut, H., Gastaut, Y. & Broughton, R. (1984). Gustave Flaubert's illness: a case report in evidence against the erroneous notion of psychogenic epilepsy. *Epilepsia* 25, 622-37.
854. Sidenvall, R., Forsgren, L. & Heijbel, J. (1996). Prevalence and characteristics of epilepsy in children in northern Sweden. *Seizure* 5, 139-46.
855. Murphy, C. C., Trevathan, E. & Yeargin-Allsopp, M. (1995). Prevalence of epilepsy and epileptic seizures in 10-year-old children: results from the Metropolitan Atlanta Developmental Disabilities Study. *Epilepsia* 36, 866-72.
856. Gillberg, C., Persson, E., Grufman, M. & Themner, U. (1986). Psychiatric disorders in mildly and severely mentally retarded urban children and adolescents: epidemiological aspects. *Br J Psychiatry* 149, 68-74.
857. Blomquist, H. K., Gustavson, K. H. & Holmgren, G. (1981). Mild mental retardation in children in a northern Swedish county. *J Ment Defic Res* 25, 169-86.
858. Hagberg, B., Hagberg, G., Lewerth, A. & Lindberg, U. (1981). Mild mental retardation in Swedish school children. II. Etiologic and pathogenetic aspects. *Acta Paediatr Scand* 70, 445-52.
859. Corbett, J. A., Harris, R. & Robinson, R. G. (1975) Epilepsy. In: *Mental retardation and developmental disabilities*, Vol. VII, pp. 79-111 (Wortis, J., Ed.) Brunner/Mazel, New York, USA.
860. Airaksinen, E. M., Matilainen, R., Mononen, T., Mustonen, K., Partanen, J., Jokela, V. & Halonen, P. (2000). A population-based study on epilepsy in mentally retarded children. *Epilepsia* 41, 1214-20.
861. Abernathy, R. S. (1966). A survey of 156 seizure patients in a general pediatric clinic. *Lancet* 86, 115-20.
862. Arieff, A. J. & Yacorzyński, G. K. (1942). Deterioration of patients with organic epilepsy. *J Nerv Ment Dis* 96, 49-55.
863. Collins, A. L. & Lennox, W. G. (1947). The intelligence of 300 private epileptic patients. *Proc Assoc Res Nerv Ment Dis* 26, 586-603.
864. Collins, A. L. (1951). Epileptic intelligence. *J Consult Psychol* 15, 392-9.
865. Klove, H. & Matthews, C. G. (1966). Psychometric and adaptive abilities in epilepsy with differential etiology. *Epilepsia* 7, 330-8.
866. Winfield, D. L. (1951). Intellectual performance of cryptogenic epileptics, symptomatic epileptics, and post-traumatic encephalopaths. *J Abnorm Psychol* 46, 336-43.
867. Di Nuovo, S. F. & Buono, S. (2006). Psychiatric syndromes comorbid with mental retardation: Differences in cognitive and adaptive skills. *J Psychiatr Res*.
868. Vasconcellos, E., Wyllie, E., Sullivan, S., Stanford, L., Bulacio, J., Kotagal, P. & Bingaman, W. (2001). Mental retardation in pediatric candidates for epilepsy surgery: the role of early seizure onset. *Epilepsia* 42, 268-74.
869. Dikmen, S., Matthews, C. G. & Harley, J. P. (1975). The effect of early versus late onset of major motor epilepsy upon cognitive-intellectual performance. *Epilepsia* 16, 73-81.
870. Dikmen, S., Matthews, C. G. & Harley, J. P. (1977). Effect of early versus late onset of major motor epilepsy on cognitive-intellectual performance: further considerations. *Epilepsia* 18, 31-6.
871. O'Leary, D. S., Lovell, M. R., Sackellares, J. C., Berent, S., Giordani, B., Seidenberg, M. & Boll, T. J. (1983). Effects of age of onset of partial and generalized seizures on neuropsychological performance in children. *J Nerv Ment Dis* 171, 624-9.
872. Steffenburg, U., Hagberg, G. & Kyllerman, M. (1996). Characteristics of seizures in a population-based series of mentally retarded children with active epilepsy. *Epilepsia* 37, 850-6.
873. Brodtkorb, E. (1994). The diversity of epilepsy in adults with severe developmental disabilities: age at seizure onset and other prognostic factors. *Seizure* 3, 277-85.
874. Chevrie, J. J. & Aicardi, J. (1978). Convulsive disorders in the first year of life: neurological and mental outcome and mortality. *Epilepsia* 19, 67-74.
875. Huttenlocher, P. R. & Hapke, R. J. (1990). A follow-up study of intractable seizures in childhood. *Ann Neurol* 28, 699-705.
876. Blümcke, I., Züschratter, W., Schewe, J. C., Suter, B., Lie, A. A., Riederer, B. M., Meyer, B., Schramm, J., Elger, C. E. & Wiestler, O. D. (1999). Cellular pathology of hilar neurons in Ammon's horn sclerosis. *J Comp Neurol* 414, 437-53.
877. Multani, P., Myers, R. H., Blume, H. W., Schomer, D. L. & Sotrel, A. (1994). Neocortical dendritic pathology in human partial epilepsy: a quantitative Golgi study. *Epilepsia* 35, 728-36.
878. Swann, J. W., Al-Noori, S., Jiang, M. & Lee, C. L. (2000). Spine loss and other dendritic abnormalities in epilepsy. *Hippocampus* 10, 617-25.
879. von Campe, G., Spencer, D. D. & de Lanerolle, N. C. (1997). Morphology of dentate granule cells in the hu-

- man epileptogenic hippocampus. *Hippocampus* 7, 472-88.
880. Ramakers, G. J. (2002). Rho proteins, mental retardation and the cellular basis of cognition. *Trends Neurosci* 25, 191-9.
881. van Galen, E. J. & Ramakers, G. J. (2005). Rho proteins, mental retardation and the neurobiological basis of intelligence. *Prog Brain Res* 147, 295-317.
882. Newey, S. E., Velamoor, V., Govek, E. E. & Van Aelst, L. (2005). Rho GTPases, dendritic structure, and mental retardation. *J Neurobiol* 64, 58-74.
883. Moser, M. B., Trommald, M. & Andersen, P. (1994). An increase in dendritic spine density on hippocampal CA1 pyramidal cells following spatial learning in adult rats suggests the formation of new synapses. *Proc Natl Acad Sci U S A* 91, 12673-5.
884. Airey, D. C., Kroodsma, D. E. & DeVoogd, T. J. (2000). Differences in the complexity of song tutoring cause differences in the amount learned and in dendritic spine density in a songbird telencephalic song control nucleus. *Neurobiol Learn Mem* 73, 274-81.
885. Knafo, S., Libersat, F. & Barkai, E. (2005). Olfactory learning-induced morphological modifications in single dendritic spines of young rats. *Eur J Neurosci* 21, 2217-26.
886. Desmond, N. L. & Levy, W. B. (1988). Synaptic interface surface area increases with long-term potentiation in the hippocampal dentate gyrus. *Brain Res* 453, 308-14.
887. Trachtenberg, J. T., Chen, B. E., Knott, G. W., Feng, G., Sanes, J. R., Welker, E. & Svoboda, K. (2002). Long-term in vivo imaging of experience-dependent synaptic plasticity in adult cortex. *Nature* 420, 788-94.
888. Trommald, M., Hulleberg, G. & Andersen, P. (1996). Long-term potentiation is associated with new excitatory spine synapses on rat dentate granule cells. *Learn Mem* 3, 218-28.
889. Fuerst, D., Shah, J., Kupsky, W. J., Johnson, R., Shah, A., Hayman-Abello, B., Ergh, T., Poore, Q., Canady, A. & Watson, C. (2001). Volumetric MRI, pathological, and neuropsychological progression in hippocampal sclerosis. *Neurology* 57, 184-8.
890. DeGiorgio, C. M., Correale, J. D., Gott, P. S., Ginsburg, D. L., Bracht, K. A., Smith, T., Boutros, R., Loskota, W. J. & Rabinowicz, A. L. (1995). Serum neuron-specific enolase in human status epilepticus. *Neurology* 45, 1134-7.
891. Belichenko, P. V., Sourander, P., Malmgren, K., Nordborg, C., von Essen, C., Rydenhag, B., Lindstrom, S., Hedstrom, A., Uvebrant, P. & Dahlstrom, A. (1994). Dendritic morphology in epileptogenic cortex from TRPE patients, revealed by intracellular Lucifer Yellow microinjection and confocal laser scanning microscopy. *Epilepsy Res* 18, 233-47.
892. Isokawa, M. (1998). Remodeling dendritic spines in the rat pilocarpine model of temporal lobe epilepsy. *Neurosci Lett* 258, 73-6.
893. Jiang, M., Lee, C. L., Smith, K. L. & Swann, J. W. (1998). Spine loss and other persistent alterations of hippocampal pyramidal cell dendrites in a model of early-onset epilepsy. *J Neurosci* 18, 8356-68.
894. Gonzalez-Burgos, I., Lopez-Vazquez, M. A. & Beas-Zarate, C. (2004). Density, but not shape, of hippocampal dendritic spines varies after a seizure-inducing acute dose of monosodium glutamate in rats. *Neurosci Lett* 363, 22-4.
895. Sloviter, R. S. (1987). Decreased hippocampal inhibition and a selective loss of interneurons in experimental epilepsy. *Science* 235, 73-6.
896. Sloviter, R. S. & Damiano, B. P. (1981). On the relationship between kainic acid-induced epileptiform activity and hippocampal neuronal damage. *Neuropharmacology* 20, 1003-11.
897. Nishizuka, M., Okada, R., Seki, K., Arai, Y. & Iizuka, R. (1991). Loss of dendritic synapses in the medial amygdala associated with kindling. *Brain Res* 552, 351-5.
898. Willmore, L. J., Ballinger, W. E., Jr., Boggs, W., Sypert, G. W. & Rubin, J. J. (1980). Dendritic alterations in rat isocortex within an iron-induced chronic epileptic focus. *Neurosurgery* 7, 142-6.
899. Mizrahi, A., Crowley, J. C., Shtoyerman, E. & Katz, L. C. (2004). High-resolution in vivo imaging of hippocampal dendrites and spines. *J Neurosci* 24, 3147-51.
900. Rensing, N., Ouyang, Y., Yang, X. F., Yamada, K. A., Rothman, S. M. & Wong, M. (2005). In vivo imaging of dendritic spines during electrographic seizures. *Ann Neurol* 58, 888-98.
901. Engert, F. & Bonhoeffer, T. (1999). Dendritic spine changes associated with hippocampal long-term synaptic plasticity. *Nature* 399, 66-70.
902. Maletic-Savatic, M., Malinow, R. & Svoboda, K. (1999). Rapid dendritic morphogenesis in CA1 hippocampal dendrites induced by synaptic activity. *Science* 283, 1923-7.
903. Dailey, M. E. & Smith, S. J. (1996). The dynamics of dendritic structure in developing hippocampal slices. *J Neurosci* 16, 2983-94.
904. Dunaevsky, A., Tashiro, A., Majewska, A., Mason, C. & Yuste, R. (1999). Developmental regulation of spine motility in the mammalian central nervous system. *Proc Natl Acad Sci U S A* 96, 13438-43.
905. Lendvai, B., Stern, E. A., Chen, B. & Svoboda, K. (2000). Experience-dependent plasticity of dendritic spines in the developing rat barrel cortex in vivo. *Nature* 404, 876-81.
906. Grutzendler, J., Kasthuri, N. & Gan, W. B. (2002). Long-term dendritic spine stability in the adult cortex. *Nature* 420, 812-6.
907. Tan, N. C., Mulley, J. C. & Scheffer, I. E. (2006). Genetic dissection of the common epilepsies. *Curr Opin Neurol* 19, 157-63.
908. Mulley, J. C., Scheffer, I. E., Harkin, L. A., Berkovic, S. F. & Dibbens, L. M. (2005). Susceptibility genes for complex epilepsy. *Hum Mol Genet* 14 Spec No. 2, R243-9.
909. Mulley, J. C., Scheffer, I. E., Petrou, S. & Berkovic, S. F. (2003). Channelopathies as a genetic cause of epilepsy. *Curr Opin Neurol* 16, 171-6.
910. Kaneko, S., Iwasa, H. & Okada, M. (2002). Genetic identifiers of epilepsy. *Epilepsia* 43 Suppl 9, 16-20.
911. Kaneko, S., Okada, M., Iwasa, H., Yamakawa, K. & Hirose, S. (2002). Genetics of epilepsy: current status and perspectives. *Neurosci Res* 44, 11-30.
912. Lerche, H., Weber, Y. G., Jurkat-Rott, K. & Lehmann-Horn, F. (2005). Ion channel defects in idiopathic epilepsies. *Curr Pharm Des* 11, 2737-52.
913. Gardiner, M. (2005). Genetics of idiopathic generalized epilepsies. *Epilepsia* 46 Suppl 9, 15-20.
914. Hirose, S., Mitsudome, A., Okada, M. & Kaneko, S. (2005). Genetics of idiopathic epilepsies. *Epilepsia* 46 Suppl 1, 38-43.
915. Gourfinkel-An, I., Baulac, S., Nabbout, R., Ruberg, M., Baulac, M., Brice, A. & LeGuern, E. (2004). Monogenic idiopathic epilepsies. *Lancet Neurol* 3, 209-18.
916. Steinlein, O. K. (2004). Genes and mutations in human idiopathic epilepsy. *Brain Dev* 26, 213-8.
917. Makino, K., Kuwahara, H., Masuko, N., Nishiyama, Y., Morisaki, T., Sasaki, J., Nakao, M., Kuwano, A., Nakata, M., Ushio, Y. & Saya, H. (1997). Cloning and characterization of NE-dlg: a novel human homolog of the Drosophila discs large (dlg) tumor suppressor protein interacts with the APC protein. *Oncogene* 14, 2425-33.
918. Lau, L. F., Mammen, A., Ehlers, M. D., Kindler, S., Chung, W. J., Garner, C. C. & Huganir, R. L. (1996). Interaction of the N-methyl-D-aspartate receptor complex with a novel synapse-associated protein, SAP102. *J Biol Chem* 271, 21622-8.

919. Jo, S., Lee, K. H., Song, S., Jung, Y. K. & Park, C. S. (2005). Identification and functional characterization of cereblon as a binding protein for large-conductance calcium-activated potassium channel in rat brain. *J Neurochem* 94, 1212-24.
920. Errigiers, V. & Kooy, R. F. (2004). Genetic modifiers in mice: the example of the fragile X mouse model. *Cytogenet Genome Res* 105, 448-54.
921. Steinbach, P. (1986). Mental impairment in Martin-Bell syndrome is probably determined by interaction of several genes: simple explanation of phenotypic differences between unaffected and affected males with the same X chromosome. *Hum Genet* 72, 248-52.
922. Chamberlain, S. J., Johnstone, K. A., DuBose, A. J., Simon, T. A., Bartolomei, M. S., Resnick, J. L. & Brannan, C. I. (2004). Evidence for genetic modifiers of postnatal lethality in PWS-IC deletion mice. *Hum Mol Genet* 13, 2971-7.
923. Witsch-Baumgartner, M., Gruber, M., Kraft, H. G., Rossi, M., Clayton, P., Giros, M., Haas, D., Kelley, R. I., Krajewska-Walasek, M. & Utermann, G. (2004). Maternal apo E genotype is a modifier of the Smith-Lemli-Opitz syndrome. *J Med Genet* 41, 577-84.
924. Dipple, K. M. & McCabe, E. R. (2000). Phenotypes of patients with "simple" Mendelian disorders are complex traits: thresholds, modifiers, and systems dynamics. *Am J Hum Genet* 66, 1729-35.
925. Wallwork, S. C. (1962). Hydrogen-Bond Radii. *Acta Crystallogr* 15, 758-8.
926. Zhao, Y. H., Abraham, M. H. & Zissimos, A. M. (2003). Fast calculation of van der Waals volume as a sum of atomic and bond contributions and its application to drug compounds. *J Org Chem* 68, 7368-73.
927. Cocquerelle, C., Daubersies, P., Majerus, M. A., Kerckaert, J. P. & Bailleul, B. (1992). Splicing with inverted order of exons occurs proximal to large introns. *EMBO J* 11, 1095-8.
928. Zaphiropoulos, P. G. (1996). Circular RNAs from transcripts of the rat cytochrome P450 2C24 gene: correlation with exon skipping. *Proc Natl Acad Sci U S A* 93, 6536-41.
929. Zaphiropoulos, P. G. (1997). Exon skipping and circular RNA formation in transcripts of the human cytochrome P-450 2C18 gene in epidermis and of the rat androgen binding protein gene in testis. *Mol Cell Biol* 17, 2985-93.
930. Capel, B., Swain, A., Nicolis, S., Hacker, A., Walter, M., Koopman, P., Goodfellow, P. & Lovell-Badge, R. (1993). Circular transcripts of the testis-determining gene Sry in adult mouse testis. *Cell* 73, 1019-30.
931. Crawford, J., Ianzano, L., Savino, M., Whitmore, S., Cleton-Jansen, A. M., Settasatian, C., d'apolito, M., Seshadri, R., Pronk, J. C., Auerbach, A. D., Verlander, P. C., Mathew, C. G., Tipping, A. J., Doggett, N. A., Zelante, L., Callen, D. F. & Savoia, A. (1999). The PISLRE gene: structure, exon skipping, and exclusion as tumor suppressor in breast cancer. *Genomics* 56, 90-7.
932. Jarrell, K. A. (1993). Inverse splicing of a group II intron. *Proc Natl Acad Sci U S A* 90, 8624-7.
933. Pasmán, Z., Been, M. D. & Garcia-Blanco, M. A. (1996). Exon circularization in mammalian nuclear extracts. *RNA* 2, 603-10.
934. Shao, X., Shepelev, V. & Fedorov, A. (2006). Bioinformatic analysis of exon repetition, exon scrambling and trans-splicing in humans. *Bioinformatics* 22, 692-8.
935. Liedtke, W., Battistini, L., Brosnan, C. F. & Raine, C. S. (1994). A comparison of methods for RNA extraction from lymphocytes for RT-PCR. *PCR Methods Appl* 4, 185-7.
936. Li, S., Guan, J. L. & Chien, S. (2005). Biochemistry and biomechanics of cell motility. *Annu Rev Biomed Eng* 7, 105-50.
937. Negroni, M., Ricchetti, M., Nouvel, P. & Buc, H. (1995). Homologous recombination promoted by reverse transcriptase during copying of two distinct RNA templates. *Proc Natl Acad Sci U S A* 92, 6971-5.
938. Odelberg, S. J., Weiss, R. B., Hata, A. & White, R. (1995). Template-switching during DNA synthesis by *Thermus aquaticus* DNA polymerase I. *Nucleic Acids Res* 23, 2049-57.
939. Pääbo, S., Irwin, D. M. & Wilson, A. C. (1990). DNA damage promotes jumping between templates during enzymatic amplification. *J Biol Chem* 265, 4718-21.
940. Vu, P. K. & Sakamoto, K. M. (2000). Ubiquitin-mediated proteolysis and human disease. *Mol Genet Metab* 71, 261-6.
941. Sakamoto, K. M. (2002). Ubiquitin-dependent proteolysis: its role in human diseases and the design of therapeutic strategies. *Mol Genet Metab* 77, 44-56.
942. Parkinson, J. (1817) An essay on the shaking palsy, Whittingham and Rowland, London, UK
943. Polymeropoulos, M. H., Higgins, J. J., Golbe, L. I., Johnson, W. G., Ide, S. E., Di Iorio, G., Sanges, G., Stenroos, E. S., Pho, L. T., Schaffer, A. A., Lazzarini, A. M., Nussbaum, R. L. & Duvoisin, R. C. (1996). Mapping of a gene for Parkinson's disease to chromosome 4q21-q23. *Science* 274, 1197-9.
944. Dunnett, S. B. & Bjorklund, A. (1999). Prospects for new restorative and neuroprotective treatments in Parkinson's disease. *Nature* 399, A32-9.
945. Kitada, T., Asakawa, S., Hattori, N., Matsumine, H., Yamamura, Y., Minoshima, S., Yokochi, M., Mizuno, Y. & Shimizu, N. (1998). Mutations in the parkin gene cause autosomal recessive juvenile parkinsonism. *Nature* 392, 605-8.
946. Nussbaum, R. L. & Polymeropoulos, M. H. (1997). Genetics of Parkinson's disease. *Hum Mol Genet* 6, 1687-91.
947. Shimura, H., Hattori, N., Kubo, S., Mizuno, Y., Asakawa, S., Minoshima, S., Shimizu, N., Iwai, K., Chiba, T., Tanaka, K. & Suzuki, T. (2000). Familial Parkinson disease gene product, parkin, is a ubiquitin-protein ligase. *Nat Genet* 25, 302-5.
948. Koff, A., Giordano, A., Desai, D., Yamashita, K., Harper, J. W., Elledge, S., Nishimoto, T., Morgan, D. O., Franza, B. R. & Roberts, J. M. (1992). Formation and activation of a cyclin E-cdk2 complex during the G1 phase of the human cell cycle. *Science* 257, 1689-94.
949. Copani, A., Uberti, D., Sortino, M. A., Bruno, V., Nicoletti, F. & Memo, M. (2001). Activation of cell-cycle-associated proteins in neuronal death: a mandatory or dispensable path? *Trends Neurosci* 24, 25-31.
950. Padmanabhan, J., Park, D. S., Greene, L. A. & Shelanski, M. L. (1999). Role of cell cycle regulatory proteins in cerebellar granule neuron apoptosis. *J Neurosci* 19, 8747-56.
951. Beites, C. L., Xie, H., Bowser, R. & Trimble, W. S. (1999). The septin CDCrel-1 binds syntaxin and inhibits exocytosis. *Nat Neurosci* 2, 434-9.
952. Zhang, Y., Gao, J., Chung, K. K., Huang, H., Dawson, V. L. & Dawson, T. M. (2000). Parkin functions as an E2-dependent ubiquitin-protein ligase and promotes the degradation of the synaptic vesicle-associated protein, CDCrel-1. *Proc Natl Acad Sci U S A* 97, 13354-9.
953. Dong, Z., Ferger, B., Paterna, J. C., Vogel, D., Furler, S., Osinde, M., Feldon, J. & Bueler, H. (2003). Dopamine-dependent neurodegeneration in rats induced by viral vector-mediated overexpression of the parkin target protein, CDCrel-1. *Proc Natl Acad Sci U S A* 100, 12438-43.
954. Uéda, K., Fukushima, H., Masliah, E., Xia, Y., Iwai, A., Yoshimoto, M., Otero, D. A., Kondo, J., Ihara, Y. & Saitoh, T. (1993). Molecular cloning of cDNA encoding an unrecognized component of amyloid in Alzheimer disease. *Proc Natl Acad Sci U S A* 90, 11282-6.
955. Abeliovich, A., Schmitz, Y., Farinas, I., Choi-Lundberg, D., Ho, W. H., Castillo, P. E., Shinsky, N., Verdugo, J. M., Armanini, M., Ryan, A., Hynes, M., Phillips, H., Sulzer, D. & Rosenthal, A. (2000). Mice lacking α -synuclein display functional deficits in the nigrostriatal dopamine system. *Neuron* 25, 239-52.

956. Polymeropoulos, M. H., Lavedan, C., Leroy, E., Ide, S. E., Dehejia, A. *et al.* (1997). Mutation in the α -synuclein gene identified in families with Parkinson's disease. *Science* 276, 2045-7.
957. Spillantini, M. G., Schmidt, M. L., Lee, V. M., Trojanowski, J. Q., Jakes, R. & Goedert, M. (1997). Alpha-synuclein in Lewy bodies. *Nature* 388, 839-40.
958. Bennett, M. C., Bishop, J. F., Leng, Y., Chock, P. B., Chase, T. N. & Mouradian, M. M. (1999). Degradation of α -synuclein by proteasome. *J Biol Chem* 274, 33855-8.
959. Chung, K. K., Zhang, Y., Lim, K. L., Tanaka, Y., Huang, H., Gao, J., Ross, C. A., Dawson, V. L. & Dawson, T. M. (2001). Parkin ubiquitinates the α -synuclein-interacting protein, synphilin-1: implications for Lewy-body formation in Parkinson disease. *Nat Med* 7, 1144-50.
960. Larsen, C. N., Price, J. S. & Wilkinson, K. D. (1996). Substrate binding and catalysis by ubiquitin C-terminal hydrolases: identification of two active site residues. *Biochemistry* 35, 6735-44.
961. Larsen, C. N., Krantz, B. A. & Wilkinson, K. D. (1998). Substrate specificity of deubiquitinating enzymes: ubiquitin C-terminal hydrolases. *Biochemistry* 37, 3358-68.
962. Leroy, E., Boyer, R., Auburger, G., Leube, B., Ulm, G., Mezey, E., Harta, G., Brownstein, M. J., Jonnalagada, S., Chernova, T., Dehejia, A., Lavedan, C., Gasser, T., Steinbach, P. J., Wilkinson, K. D. & Polymeropoulos, M. H. (1998). The ubiquitin pathway in Parkinson's disease. *Nature* 395, 451-2.
963. Wintermeyer, P., Kruger, R., Kuhn, W., Muller, T., Voitalla, D., Berg, D., Becker, G., Leroy, E., Polymeropoulos, M., Berger, K., Przuntek, H., Schols, L., Epplen, J. T. & Riess, O. (2000). Mutation analysis and association studies of the UCHL1 gene in German Parkinson's disease patients. *Neuroreport* 11, 2079-82.
964. Liu, Y., Fallon, L., Lashuel, H. A., Liu, Z. & Lansbury, P. T., Jr. (2002). The UCH-L1 gene encodes two opposing enzymatic activities that affect α -synuclein degradation and Parkinson's disease susceptibility. *Cell* 111, 209-18.
965. Wilkinson, K. D., Lee, K. M., Deshpande, S., Duerksen-Hughes, P., Boss, J. M. & Pohl, J. (1989). The neuron-specific protein PGP 9.5 is a ubiquitin carboxyl-terminal hydrolase. *Science* 246, 670-3.
966. Doran, J. F., Jackson, P., Kynoch, P. A. & Thompson, R. J. (1983). Isolation of PGP 9.5, a new human neuron-specific protein detected by high-resolution two-dimensional electrophoresis. *J Neurochem* 40, 1542-7.
967. Lowe, J., McDermott, H., Landon, M., Mayer, R. J. & Wilkinson, K. D. (1990). Ubiquitin carboxyl-terminal hydrolase (PGP 9.5) is selectively present in ubiquitinated inclusion bodies characteristic of human neurodegenerative diseases. *J Pathol* 161, 153-60.
968. Saigoh, K., Wang, Y. L., Suh, J. G., Yamanishi, T., Sakai, Y., Kiyosawa, H., Harada, T., Ichihara, N., Wakana, S., Kikuchi, T. & Wada, K. (1999). Intragenic deletion in the gene encoding ubiquitin carboxy-terminal hydrolase in gad mice. *Nat Genet* 23, 47-51.
969. Yamazaki, K., Wakasugi, N., Tomita, T., Kikuchi, T., Mukoyama, M. & Ando, K. (1988). Gracile axonal dystrophy (GAD), a new neurological mutant in the mouse. *Proc Soc Exp Biol Med* 187, 209-15.
970. van Leeuwen, F. W., de Kleijn, D. P., van den Hurk, H. H., Neubauer, A., Sonnemans, M. A., Sluijs, J. A., Koycu, S., Ramdjielal, R. D., Salehi, A., Martens, G. J., Grosveld, F. G., Peter, J., Burbach, H. & Hol, E. M. (1998). Frameshift mutants of beta amyloid precursor protein and ubiquitin-B in Alzheimer's and Down patients. *Science* 279, 242-7.
971. Lam, Y. A., Pickart, C. M., Alban, A., Landon, M., Jamieson, C., Ramage, R., Mayer, R. J. & Layfield, R. (2000). Inhibition of the ubiquitin-proteasome system in Alzheimer's disease. *Proc Natl Acad Sci U S A* 97, 9902-6.
972. Banfi, S., Servadio, A., Chung, M. Y., Kwiatkowski, T. J., Jr., McCall, A. E., Duvick, L. A., Shen, Y., Roth, E. J., Orr, H. T. & Zoghbi, H. Y. (1994). Identification and characterization of the gene causing type 1 spinocerebellar ataxia. *Nat Genet* 7, 513-20.
973. Pulst, S. M., Nechiporuk, A., Nechiporuk, T., Gispert, S., Chen, X. N., Lopes-Cendes, I., Pearlman, S., Starkman, S., Orozco-Diaz, G., Lunkes, A., DeJong, P., Rouleau, G. A., Auburger, G., Korenberg, J. R., Figueroa, C. & Sahba, S. (1996). Moderate expansion of a normally biallelic trinucleotide repeat in spinocerebellar ataxia type 2. *Nat Genet* 14, 269-76.
974. Kawaguchi, Y., Okamoto, T., Taniwaki, M., Aizawa, M., Inoue, M., Katayama, S., Kawakami, H., Nakamura, S., Nishimura, M., Akiyoshi, I. & *et al.* (1994). CAG expansions in a novel gene for Machado-Joseph disease at chromosome 14q32.1. *Nat Genet* 8, 221-8.
975. The Huntington's Disease Collaborative Research Group (1993). A novel gene containing a trinucleotide repeat that is expanded and unstable on Huntington's disease chromosomes. *Cell* 72, 971-83.
976. La Spada, A. R., Roling, D. B., Harding, A. E., Warner, C. L., Spiegel, R., Hausmanowa-Petrusewicz, I., Yee, W. C. & Fischbeck, K. H. (1992). Meiotic stability and genotype-phenotype correlation of the trinucleotide repeat in X-linked spinal and bulbar muscular atrophy. *Nat Genet* 2, 301-4.
977. Chung, K. K., Dawson, V. L. & Dawson, T. M. (2001). The role of the ubiquitin-proteasomal pathway in Parkinson's disease and other neurodegenerative disorders. *Trends Neurosci* 24, S7-14.
978. Sherman, M. Y. & Goldberg, A. L. (2001). Cellular defenses against unfolded proteins: a cell biologist thinks about neurodegenerative diseases. *Neuron* 29, 15-32.
979. Bence, N. F., Sampat, R. M. & Kopito, R. R. (2001). Impairment of the ubiquitin-proteasome system by protein aggregation. *Science* 292, 1552-5.
980. Jana, N. R., Zemskov, E. A., Wang, G. & Nukina, N. (2001). Altered proteasomal function due to the expression of polyglutamine-expanded truncated N-terminal huntingtin induces apoptosis by caspase activation through mitochondrial cytochrome c release. *Hum Mol Genet* 10, 1049-59.
981. Cummings, C. J., Reinstein, E., Sun, Y., Antalffy, B., Jiang, Y., Ciechanover, A., Orr, H. T., Beaudet, A. L. & Zoghbi, H. Y. (1999). Mutation of the E6-AP ubiquitin ligase reduces nuclear inclusion frequency while accelerating polyglutamine-induced pathology in SCA1 mice. *Neuron* 24, 879-92.
982. Murphey, R. K. & Godenschwege, T. A. (2002). New roles for ubiquitin in the assembly and function of neuronal circuits. *Neuron* 36, 5-8.
983. Hegde, A. N. & DiAntonio, A. (2002). Ubiquitin and the synapse. *Nat Rev Neurosci* 3, 854-61.
984. Huang, Y., Baker, R. T. & Fischer-Vize, J. A. (1995). Control of cell fate by a deubiquitinating enzyme encoded by the fat facets gene. *Science* 270, 1828-31.
985. DiAntonio, A., Haghighi, A. P., Portman, S. L., Lee, J. D., Amaranto, A. M. & Goodman, C. S. (2001). Ubiquitination-dependent mechanisms regulate synaptic growth and function. *Nature* 412, 449-52.
986. Wan, H. I., DiAntonio, A., Fetter, R. D., Bergstrom, K., Strauss, R. & Goodman, C. S. (2000). Highwire regulates synaptic growth in Drosophila. *Neuron* 26, 313-29.
987. Wu, C., Wairkar, Y. P., Collins, C. A. & DiAntonio, A. (2005). Highwire function at the Drosophila neuromuscular junction: spatial, structural, and temporal requirements. *J Neurosci* 25, 9557-66.
988. Speese, S. D., Trotta, N., Rodesch, C. K., Aravamudan, B. & Broadie, K. (2003). The ubiquitin proteasome system acutely regulates presynaptic protein turnover and synaptic efficacy. *Curr Biol* 13, 899-910.
989. Yamamoto, N., Hegde, A. N., Chain, D. G. & Schwartz, J. H. (1999). Activation and degradation of the transcription factor C/EBP during long-term facilitation in Aplysia. *J Neurochem* 73, 2415-23.
990. Hegde, A. N., Inokuchi, K., Pei, W., Casadio, A., Ghirardi, M., Chain, D. G., Martin, K. C., Kandel, E. R. &

- Schwartz, J. H. (1997). Ubiquitin C-terminal hydrolase is an immediate-early gene essential for long-term facilitation in *Aplysia*. *Cell* 89, 115-26.
991. Lopez-Salon, M., Alonso, M., Vianna, M. R., Viola, H., Mello e Souza, T., Izquierdo, I., Pasquini, J. M. & Medina, J. H. (2001). The ubiquitin-proteasome cascade is required for mammalian long-term memory formation. *Eur J Neurosci* 14, 1820-6.
992. Muralidhar, M. G. & Thomas, J. B. (1993). The *Drosophila* bendless gene encodes a neural protein related to ubiquitin-conjugating enzymes. *Neuron* 11, 253-66.
993. Oh, C. E., McMahon, R., Benzer, S. & Tanouye, M. A. (1994). bendless, a *Drosophila* gene affecting neuronal connectivity, encodes a ubiquitin-conjugating enzyme homolog. *J Neurosci* 14, 3166-79.
994. Borg, I., Freude, K., Kubart, S., Hoffmann, K., Menzel, C., Laccone, F., Firth, H., Ferguson-Smith, M. A., Tommerup, N., Ropers, H. H., Sargan, D. & Kalscheuer, V. M. (2005). Disruption of *Netrin G1* by a balanced chromosome translocation in a girl with Rett syndrome. *Eur J Hum Genet* 13, 921-7.
995. Nakashiba, T., Ikeda, T., Nishimura, S., Tashiro, K., Honjo, T., Culotti, J. G. & Itohara, S. (2000). *Netrin-G1*: a novel glycosyl phosphatidylinositol-linked mammalian netrin that is functionally divergent from classical netrins. *J Neurosci* 20, 6540-50.
996. Serafini, T., Colamarino, S. A., Leonardo, E. D., Wang, H., Beddington, R., Skarnes, W. C. & Tessier-Lavigne, M. (1996). *Netrin-1* is required for commissural axon guidance in the developing vertebrate nervous system. *Cell* 87, 1001-14.
997. Saito, S. (1997). Effects of lysophosphatidic acid on primary cultured chick neurons. *Neurosci Lett* 229, 73-6.
998. Campbell, D. S. & Holt, C. E. (2001). Chemotropic responses of retinal growth cones mediated by rapid local protein synthesis and degradation. *Neuron* 32, 1013-26.
999. Bellugi, U., Lichtenberger, L., Jones, W., Lai, Z. & St George, M. (2000). I. The neurocognitive profile of Williams Syndrome: a complex pattern of strengths and weaknesses. *J Cogn Neurosci* 12 Suppl 1, 7-29.
1000. Burn, J. (1986). Williams syndrome. *J Med Genet* 23, 389-95.
1001. Tursun, B., Schluter, A., Peters, M. A., Viehweger, B., Ostendorff, H. P., Soosairajah, J., Drung, A., Bossenz, M., Johnsen, S. A., Schweizer, M., Bernard, O. & Bach, I. (2005). The ubiquitin ligase *Rnf6* regulates local LIM kinase 1 levels in axonal growth cones. *Genes Dev* 19, 2307-19.
1002. De Falco, F., Cainarca, S., Andolfi, G., Ferrentino, R., Berti, C., Rodriguez Criado, G., Rittinger, O., Dennis, N., Odent, S., Rastogi, A., Liebelt, J., Chitayat, D., Winter, R., Jawanda, H., Ballabio, A., Franco, B. & Meroni, G. (2003). X-linked Opitz syndrome: novel mutations in the *MID1* gene and redefinition of the clinical spectrum. *Am J Med Genet A* 120, 222-8.
1003. So, J., Suckow, V., Kijas, Z., Kalscheuer, V., Moser, B. et al. (2005). Mild phenotypes in a series of patients with Opitz GBBB syndrome with *MID1* mutations. *Am J Med Genet A* 132, 1-7.
1004. Trockenbacher, A., Suckow, V., Foerster, J., Winter, J., Krauss, S., Ropers, H. H., Schneider, R. & Schweiger, S. (2001). *MID1*, mutated in Opitz syndrome, encodes a ubiquitin ligase that targets phosphatase 2A for degradation. *Nat Genet* 29, 287-94.
1005. Liu, J., Prickett, T. D., Elliott, E., Meroni, G. & Brautigan, D. L. (2001). Phosphorylation and microtubule association of the Opitz syndrome protein mid-1 is regulated by protein phosphatase 2A via binding to the regulatory subunit alpha 4. *Proc Natl Acad Sci U S A* 98, 6650-5.
1006. Murata, K., Wu, J. & Brautigan, D. L. (1997). B cell receptor-associated protein alpha4 displays rapamycin-sensitive binding directly to the catalytic subunit of protein phosphatase 2A. *Proc Natl Acad Sci U S A* 94, 10624-9.
1007. Albrecht, U., Sutcliffe, J. S., Cattanaach, B. M., Beechey, C. V., Armstrong, D., Eichele, G. & Beaudet, A. L. (1997). Imprinted expression of the murine Angelman syndrome gene, *Ube3a*, in hippocampal and Purkinje neurons. *Nat Genet* 17, 75-8.
1008. Buxton, J. L., Chan, C. T., Gilbert, H., Clayton-Smith, J., Burn, J., Pembrey, M. & Malcolm, S. (1994). Angelman syndrome associated with a maternal 15q11-13 deletion of less than 200 kb. *Hum Mol Genet* 3, 1409-13.
1009. Kishino, T., Lalonde, M. & Wagstaff, J. (1997). *UBE3A/E6-AP* mutations cause Angelman syndrome. *Nat Genet* 15, 70-3.
1010. Matsuura, T., Sutcliffe, J. S., Fang, P., Galjaard, R. J., Jiang, Y. H., Benton, C. S., Rommens, J. M. & Beaudet, A. L. (1997). De novo truncating mutations in *E6-AP* ubiquitin-protein ligase gene (*UBE3A*) in Angelman syndrome. *Nat Genet* 15, 74-7.
1011. Jiang, Y. H., Armstrong, D., Albrecht, U., Atkins, C. M., Noebels, J. L., Eichele, G., Sweatt, J. D. & Beaudet, A. L. (1998). Mutation of the Angelman ubiquitin ligase in mice causes increased cytoplasmic p53 and deficits of contextual learning and long-term potentiation. *Neuron* 21, 799-811.
1012. Sudhof, T. C., Lottspeich, F., Greengard, P., Mehl, E. & Jahn, R. (1987). A synaptic vesicle protein with a novel cytoplasmic domain and four transmembrane regions. *Science* 238, 1142-4.
1013. Alder, J., Lu, B., Valtorta, F., Greengard, P. & Poo, M. M. (1992). Calcium-dependent transmitter secretion reconstituted in *Xenopus* oocytes: requirement for synaptophysin. *Science* 257, 657-61.
1014. Alder, J., Xie, Z. P., Valtorta, F., Greengard, P. & Poo, M. M. (1992). Antibodies to synaptophysin interfere with transmitter secretion at neuromuscular synapses. *Neuron* 9, 759-68.
1015. Janz, R., Sudhof, T. C., Hammer, R. E., Unni, V., Siegelbaum, S. A. & Bolshakov, V. Y. (1999). Essential roles in synaptic plasticity for synaptogyrin I and synaptophysin I. *Neuron* 24, 687-700.
1016. Mullany, P. M. & Lynch, M. A. (1998). Evidence for a role for synaptophysin in expression of long-term potentiation in rat dentate gyrus. *Neuroreport* 9, 2489-94.
1017. Tang, A. H., Neufeld, T. P., Kwan, E. & Rubin, G. M. (1997). *PHYL* acts to down-regulate *TTK88*, a transcriptional repressor of neuronal cell fates, by a SINA-dependent mechanism. *Cell* 90, 459-67.
1018. Wheeler, T. C., Chin, L. S., Li, Y., Roudabush, F. L. & Li, L. (2002). Regulation of synaptophysin degradation by mammalian homologues of seven in absentia. *J Biol Chem* 277, 10273-82.
1019. Isaacs, A. M., Oliver, P. L., Jones, E. L., Jeans, A., Potter, A., Hovik, B. H., Nolan, P. M., Vizor, L., Glenister, P., Simon, A. K., Gray, I. C., Spurr, N. K., Brown, S. D., Hunter, A. J. & Davies, K. E. (2003). A mutation in *Af4* is predicted to cause cerebellar ataxia and cataracts in the robotic mouse. *J Neurosci* 23, 1631-7.
1020. Oliver, P. L., Bitoun, E., Clark, J., Jones, E. L. & Davies, K. E. (2004). Mediation of *Af4* protein function in the cerebellum by *Siah* proteins. *Proc Natl Acad Sci U S A* 101, 14901-6.
1021. Gschwend, T. P., Krueger, S. R., Kozlov, S. V., Wolfer, D. P. & Sonderegger, P. (1997). Neurotrypsin, a novel multidomain serine protease expressed in the nervous system. *Mol Cell Neurosci* 9, 207-19.
1022. Hicke, L. (2001). Protein regulation by monoubiquitin. *Nat Rev Mol Cell Biol* 2, 195-201.
1023. Hicke, L. (2001). A new ticket for entry into budding vesicles-ubiquitin. *Cell* 106, 527-30.
1024. Hicke, L. (1999). Gettin' down with ubiquitin: turning off cell-surface receptors, transporters and channels. *Trends Cell Biol* 9, 107-12.
1025. Bonifacino, J. S. & Weissman, A. M. (1998). Ubiquitin and the control of protein fate in the secretory and endocytic pathways. *Annu Rev Cell Dev Biol* 14, 19-57.

1026. Raiborg, C., Bache, K. G., Gillooly, D. J., Madshus, I. H., Stang, E. & Stenmark, H. (2002). Hrs sorts ubiquitinated proteins into clathrin-coated microdomains of early endosomes. *Nat Cell Biol* 4, 394-8.
1027. Katzmann, D. J., Babst, M. & Emr, S. D. (2001). Ubiquitin-dependent sorting into the multivesicular body pathway requires the function of a conserved endosomal protein sorting complex, ESCRT-I. *Cell* 106, 145-55.
1028. Burbea, M., Dreier, L., Dittman, J. S., Grunwald, M. E. & Kaplan, J. M. (2002). Ubiquitin and AP180 regulate the abundance of GLR-1 glutamate receptors at postsynaptic elements in *C. elegans*. *Neuron* 35, 107-20.
1029. Buttner, C., Sadtler, S., Leyendecker, A., Laube, B., Griffon, N., Betz, H. & Schmalzing, G. (2001). Ubiquitination precedes internalization and proteolytic cleavage of plasma membrane-bound glycine receptors. *J Biol Chem* 276, 42978-85.
1030. Gomes, M. D., Lecker, S. H., Jagoe, R. T., Navon, A. & Goldberg, A. L. (2001). Atrogin-1, a muscle-specific F-box protein highly expressed during muscle atrophy. *Proc Natl Acad Sci U S A* 98, 14440-5.
1031. den Engelsman, J., Keijsers, V., de Jong, W. W. & Boelens, W. C. (2003). The small heat-shock protein alpha B-crystallin promotes FBX4-dependent ubiquitination. *J Biol Chem* 278, 4699-704.
1032. Tetzlaff, M. T., Yu, W., Li, M., Zhang, P., Finegold, M., Mahon, K., Harper, J. W., Schwartz, R. J. & Elledge, S. J. (2004). Defective cardiovascular development and elevated cyclin E and Notch proteins in mice lacking the Fbw7 F-box protein. *Proc Natl Acad Sci U S A* 101, 3338-45.
1033. Sidow, A., Bulotsky, M. S., Kerrebrock, A. W., Birren, B. W., Altshuler, D., Jaenisch, R., Johnson, K. R. & Lander, E. S. (1999). A novel member of the F-box/WD40 gene family, encoding dactylin, is disrupted in the mouse dactylaplasia mutant. *Nat Genet* 23, 104-7.
1034. Moberg, K. H., Bell, D. W., Wahrer, D. C., Haber, D. A. & Hariharan, I. K. (2001). Archipelago regulates Cyclin E levels in *Drosophila* and is mutated in human cancer cell lines. *Nature* 413, 311-6.
1035. Strohmaier, H., Spruck, C. H., Kaiser, P., Won, K. A., Sangfelt, O. & Reed, S. I. (2001). Human F-box protein hCdc4 targets cyclin E for proteolysis and is mutated in a breast cancer cell line. *Nature* 413, 316-22.
1036. Spruck, C. H., Strohmaier, H., Sangfelt, O., Muller, H. M., Hubalek, M., Muller-Holzner, E., Marth, C., Widschwendter, M. & Reed, S. I. (2002). hCDC4 gene mutations in endometrial cancer. *Cancer Res* 62, 4535-9.
1037. Perez-Losada, J., Mao, J. H. & Balmain, A. (2005). Control of genomic instability and epithelial tumor development by the p53-Fbxw7/Cdc4 pathway. *Cancer Res* 65, 6488-92.
1038. Carrano, A. C., Eytan, E., Hershko, A. & Pagano, M. (1999). SKP2 is required for ubiquitin-mediated degradation of the CDK inhibitor p27. *Nat Cell Biol* 1, 193-9.
1039. Sutterlüty, H., Chatelain, E., Marti, A., Wirbelauer, C., Senften, M., Muller, U. & Krek, W. (1999). p45SKP2 promotes p27Kip1 degradation and induces S phase in quiescent cells. *Nat Cell Biol* 1, 207-14.
1040. Tsvetkov, L. M., Yeh, K. H., Lee, S. J., Sun, H. & Zhang, H. (1999). p27(Kip1) ubiquitination and degradation is regulated by the SCF(Skp2) complex through phosphorylated Thr187 in p27. *Curr Biol* 9, 661-4.
1041. Min, Y. H., Cheong, J. W., Lee, M. H., Kim, J. Y., Lee, S. T., Hahn, J. S. & Ko, Y. W. (2004). Elevated S-phase kinase-associated protein 2 protein expression in acute myelogenous leukemia: its association with constitutive phosphorylation of phosphatase and tensin homologue protein and poor prognosis. *Clin Cancer Res* 10, 5123-30.
1042. Seki, R., Okamura, T., Koga, H., Yakushiji, K., Hashiguchi, M., Yoshimoto, K., Ogata, H., Imamura, R., Nakashima, Y., Kage, M., Ueno, T. & Sata, M. (2003). Prognostic significance of the F-box protein Skp2 expression in diffuse large B-cell lymphoma. *Am J Hematol* 73, 230-5.
1043. Latres, E., Chiarle, R., Schulman, B. A., Pavletich, N. P., Pellicer, A., Inghirami, G. & Pagano, M. (2001). Role of the F-box protein Skp2 in lymphomagenesis. *Proc Natl Acad Sci U S A* 98, 2515-20.
1044. Shim, E. H., Johnson, L., Noh, H. L., Kim, Y. J., Sun, H., Zeiss, C. & Zhang, H. (2003). Expression of the F-box protein SKP2 induces hyperplasia, dysplasia, and low-grade carcinoma in the mouse prostate. *Cancer Res* 63, 1583-8.
1045. Yang, G., Ayala, G., De Marzo, A., Tian, W., Frolov, A., Wheeler, T. M., Thompson, T. C. & Harper, J. W. (2002). Elevated Skp2 protein expression in human prostate cancer: association with loss of the cyclin-dependent kinase inhibitor p27 and PTEN and with reduced recurrence-free survival. *Clin Cancer Res* 8, 3419-26.
1046. Hershko, D., Bornstein, G., Ben-Izhak, O., Carrano, A., Pagano, M., Krausz, M. M. & Hershko, A. (2001). Inverse relation between levels of p27(Kip1) and of its ubiquitin ligase subunit Skp2 in colorectal carcinomas. *Cancer* 91, 1745-51.
1047. Oliveira, A. M., Okuno, S. H., Nascimento, A. G. & Lloyd, R. V. (2003). Skp2 protein expression in soft tissue sarcomas. *J Clin Oncol* 21, 722-7.
1048. Penin, R. M., Fernandez-Figueras, M. T., Puig, L., Rex, J., Ferrandiz, C. & Ariza, A. (2002). Over-expression of p45(SKP2) in Kaposi's sarcoma correlates with higher tumor stage and extracutaneous involvement but is not directly related to p27(KIP1) down-regulation. *Mod Pathol* 15, 1227-35.
1049. Dong, Y., Sui, L., Watanabe, Y., Sugimoto, K. & Tokuda, M. (2003). S-phase kinase-associated protein 2 expression in laryngeal squamous cell carcinomas and its prognostic implications. *Oncol Rep* 10, 321-5.
1050. Gstaiger, M., Jordan, R., Lim, M., Catzavelos, C., Meistan, J., Slingerland, J. & Krek, W. (2001). Skp2 is oncogenic and overexpressed in human cancers. *Proc Natl Acad Sci U S A* 98, 5043-8.
1051. Kudo, Y., Kitajima, S., Sato, S., Miyauchi, M., Ogawa, I. & Takata, T. (2001). High expression of S-phase kinase-interacting protein 2, human F-box protein, correlates with poor prognosis in oral squamous cell carcinomas. *Cancer Res* 61, 7044-7.
1052. Alzheimer's Disease Collaborative Group (1995). The structure of the presenilin 1 (S182) gene and identification of six novel mutations in early onset AD families. *Nat Genet* 11, 219-22.
1053. Levy-Lahad, E., Wasco, W., Poorkaj, P., Romano, D. M., Oshima, J., Pettingell, W. H., Yu, C. E., Jondro, P. D., Schmidt, S. D., Wang, K. & et al. (1995). Candidate gene for the chromosome 1 familial Alzheimer's disease locus. *Science* 269, 973-7.
1054. Sherrington, R., Rogaev, E. I., Liang, Y., Rogaeva, E. A., Levesque, G., Ikeda, M., Chi, H., Lin, C., Li, G., Holman, K. & et al. (1995). Cloning of a gene bearing missense mutations in early-onset familial Alzheimer's disease. *Nature* 375, 754-60.
1055. Rogaev, E. I., Sherrington, R., Rogaeva, E. A., Levesque, G., Ikeda, M., Liang, Y., Chi, H., Lin, C., Holman, K., Tsuda, T. & et al. (1995). Familial Alzheimer's disease in kindreds with missense mutations in a gene on chromosome 1 related to the Alzheimer's disease type 3 gene. *Nature* 376, 775-8.
1056. Borchelt, D. R., Thinakaran, G., Eckman, C. B., Lee, M. K., Davenport, F. et al. (1996). Familial Alzheimer's disease-linked presenilin 1 variants elevate Abeta1-42/1-40 ratio in vitro and in vivo. *Neuron* 17, 1005-13.
1057. Citron, M., Westaway, D., Xia, W., Carlson, G., Diehl, T. et al. (1997). Mutant presenilins of Alzheimer's disease increase production of 42-residue amyloid beta-protein in both transfected cells and transgenic mice. *Nat Med* 3, 67-72.

1058. De Strooper, B. (2003). Aph-1, Pen-2, and Nicastrin with Presenilin generate an active gamma-Secretase complex. *Neuron* 38, 9-12.
1059. De Strooper, B., Saftig, P., Craessaerts, K., Vanderstichele, H., Guhde, G., Annaert, W., Von Figura, K. & Van Leuven, F. (1998). Deficiency of presenilin-1 inhibits the normal cleavage of amyloid precursor protein. *Nature* 391, 387-90.
1060. Sennvik, K., Fastbom, J., Blomberg, M., Wahlund, L. O., Winblad, B. & Benedikz, E. (2000). Levels of alpha- and beta-secretase cleaved amyloid precursor protein in the cerebrospinal fluid of Alzheimer's disease patients. *Neurosci Lett* 278, 169-72.
1061. Li, J., Pauley, A. M., Myers, R. L., Shuang, R., Brashler, J. R., Yan, R., Buhl, A. E., Ruble, C. & Gurney, M. E. (2002). SEL-10 interacts with presenilin 1, facilitates its ubiquitination, and alters A-beta peptide production. *J Neurochem* 82, 1540-8.
1062. Wu, G., Hubbard, E. J., Kitajewski, J. K. & Greenwald, I. (1998). Evidence for functional and physical association between *Caenorhabditis elegans* SEL-10, a Cdc4p-related protein, and SEL-12 presenilin. *Proc Natl Acad Sci U S A* 95, 15787-91.
1063. Mizukami, K., Ishikawa, M., Iwakiri, M., Hidaka, S., Kato, N. & Asada, T. (2002). Alterations of ubiquitin immunoreactivity in the hippocampal formation after perforant pathway lesion. *Acta Neuropathol (Berl)* 103, 453-7.
1064. Iseki, E., Li, F., Odawara, T., Hino, H., Suzuki, K., Kosaka, K., Akiyama, H., Ikeda, K. & Kato, M. (1998). Ubiquitin-immunohistochemical investigation of atypical Pick's disease without Pick bodies. *J Neurol Sci* 159, 194-201.
1065. Furukawa, Y., Iseki, E., Hino, H., Odawara, T., Ikeda, K., Tsuchiya, K. & Kosaka, K. (2004). Ubiquitin and ubiquitin-related proteins in the brains of patients with atypical Pick's disease without Pick bodies and dementia with motor neuron disease. *Neuropathology* 24, 306-14.
1066. van Leeuwen, F. W., van Tijn, P., Sonnemans, M. A., Hobo, B., Mann, D. M., Van Broeckhoven, C., Kumar-Singh, S., Cras, P., Leuba, G., Savioz, A., Maat-Schieman, M. L., Yamaguchi, H., Kros, J. M., Kamberhorst, W., Hol, E. M., de Vos, R. A. & Fischer, D. F. (2006). Frameshift proteins in autosomal dominant forms of Alzheimer disease and other tauopathies. *Neurology* 66, S86-92.
1067. Sloviter, R. S. (1983). "Epileptic" brain damage in rats induced by sustained electrical stimulation of the perforant path. I. Acute electrophysiological and light microscopic studies. *Brain Res Bull* 10, 675-97.
1068. Sloviter, R. S. & Damiano, B. P. (1981). Sustained electrical stimulation of the perforant path duplicates kainate-induced electrophysiological effects and hippocampal damage in rats. *Neurosci Lett* 24, 279-84.
1069. Olney, J. W., deGubareff, T. & Sloviter, R. S. (1983). "Epileptic" brain damage in rats induced by sustained electrical stimulation of the perforant path. II. Ultrastructural analysis of acute hippocampal pathology. *Brain Res Bull* 10, 699-712.
1070. Guerrini, R. (2005). Genetic malformations of the cerebral cortex and epilepsy. *Epilepsia* 46 Suppl 1, 32-7.
1071. Guerrini, R., Sicca, F. & Parmeggiani, L. (2003). Epilepsy and malformations of the cerebral cortex. *Epileptic Disord* 5 Suppl 2, S9-26.
1072. Sheen, V. L. & Walsh, C. A. (2003). Developmental genetic malformations of the cerebral cortex. *Curr Neurol Neurosci Rep* 3, 433-41.
1073. Culic, M., Saponjic, J., Jankovic, B. & Rakic, L. (1994). Amphetamine and haloperidol modulatory effects on Purkinje cell activity and on EEG power spectra in the acute rat model of epilepsy. *Neurosci Lett* 182, 259-62.
1074. Barclay, J., Balaguero, N., Mione, M., Ackerman, S. L., Letts, V. A., Brodbeck, J., Canti, C., Meir, A., Page, K. M., Kusumi, K., Perez-Reyes, E., Lander, E. S., Frankel, W. N., Gardiner, R. M., Dolphin, A. C. & Rees, M. (2001). Ducky mouse phenotype of epilepsy and ataxia is associated with mutations in the *Caen2d2* gene and decreased calcium channel current in cerebellar Purkinje cells. *J Neurosci* 21, 6095-104.
1075. Dam, M., Bolwig, T., Hertz, M., Bajorec, J., Lomax, P. & Dam, A. M. (1984). Does seizure activity produce Purkinje cell loss? *Epilepsia* 25, 747-51.
1076. Salzman, M., Defendini, R., Correll, J. & Gilman, S. (1978). Neuropathological changes in cerebellar biopsies of epileptic patients. *Ann Neurol* 3, 10-9.
1077. No authors listed (1983). Epilepsy, the cerebellum, and cerebellar stimulation. *Lancet* 2, 1122-3.
1078. Farrington, S. M., Cunningham, C., Boyle, S. M., Wyllie, A. H. & Dunlop, M. G. (1996). Detailed physical and deletion mapping of 8p with isolation of YAC clones from tumour suppressor loci involved in colorectal cancer. *Oncogene* 12, 1803-8.
1079. Xu, J., Zheng, S. L., Hawkins, G. A., Faith, D. A., Kelly, B., Isaacs, S. D., Wiley, K. E., Chang, B., Ewing, C. M., Bujnovszky, P., Carpten, J. D., Bleecker, E. R., Walsh, P. C., Trent, J. M., Meyers, D. A. & Isaacs, W. B. (2001). Linkage and association studies of prostate cancer susceptibility: evidence for linkage at 8p22-23. *Am J Hum Genet* 69, 341-50.
1080. Wiklund, F., Jonsson, B. A., Goransson, I., Bergh, A. & Gronberg, H. (2003). Linkage analysis of prostate cancer susceptibility: confirmation of linkage at 8p22-23. *Hum Genet* 112, 414-8.
1081. Seitz, S., Rohde, K., Bender, E., Nothnagel, A., Kolble, K., Schlag, P. M. & Scherneck, S. (1997). Strong indication for a breast cancer susceptibility gene on chromosome 8p12-p22: linkage analysis in German breast cancer families. *Oncogene* 14, 741-3.
1082. Wright, K., Wilson, P. J., Kerr, J., Do, K., Hurst, T., Khoo, S. K., Ward, B. & Chenevix-Trench, G. (1998). Frequent loss of heterozygosity and three critical regions on the short arm of chromosome 8 in ovarian adenocarcinomas. *Oncogene* 17, 1185-8.
1083. Gurling, H. M., Kalsi, G., Brynjolfsson, J., Sigmundsson, T., Sherrington, R., Mankoo, B. S., Read, T., Murphy, P., Blaveri, E., McQuillin, A., Petursson, H. & Curtis, D. (2001). Genomewide genetic linkage analysis confirms the presence of susceptibility loci for schizophrenia, on chromosomes 1q32.2, 5q33.2, and 8p21-22 and provides support for linkage to schizophrenia, on chromosomes 11q23.3-24 and 20q12.1-11.23. *Am J Hum Genet* 68, 661-73.
1084. Zubenko, G. S., Maher, B. S., Hughes, H. B., 3rd, Zubenko, W. N., Scott Stiffler, J. & Marazita, M. L. (2004). Genome-wide linkage survey for genetic loci that affect the risk of suicide attempts in families with recurrent, early-onset, major depression. *Am J Med Genet B Neuropsychiatr Genet* 129, 47-54.
1085. Cheng, R., Juo, S. H., Loth, J. E., Nee, J., Iossifov, I., Blumenthal, R., Sharpe, L., Kanyas, K., Lerer, B., Lilliston, B., Smith, M., Trautman, K., Gilliam, T. C., Endicott, J. & Baron, M. (2006). Genome-wide linkage scan in a large bipolar disorder sample from the National Institute of Mental Health genetics initiative suggests putative loci for bipolar disorder, psychosis, suicide, and panic disorder. *Mol Psychiatry* 11, 252-60.
1086. Haravuori, H., Siitonen, H. A., Mahjneh, I., Hackman, P., Lahti, L., Somer, H., Peltonen, L., Kestila, M. & Udd, B. (2004). Linkage to two separate loci in a family with a novel distal myopathy phenotype (MPD3). *Neuromuscul Disord* 14, 183-7.
1087. Adeyemo, A., Luke, A., Cooper, R., Wu, X., Tayo, B., Zhu, X., Rotimi, C., Bouzekri, N. & Ward, R. (2003). A genome-wide scan for body mass index among Nigerian families. *Obes Res* 11, 266-73.
1088. Freedman, B. I., Langefeld, C. D., Rich, S. S., Valis, C. J., Sale, M. M., Williams, A. H., Brown, W. M., Beck, S. R., Hicks, P. J. & Bowden, D. W. (2004). A genome

- scan for ESRD in black families enriched for nondiabetic nephropathy. *J Am Soc Nephrol* 15, 2719-27.
1089. Appel, S., Filter, M., Reis, A., Hennies, H. C., Bergheim, A., Ogilvie, E., Arndt, S., Simmons, A., Lovett, M., Hide, W., Ramsay, M., Reichwald, K., Zimmermann, W. & Rosenthal, A. (2002). Physical and transcriptional map of the critical region for keratolytic winter erythema (KWE) on chromosome 8p22-p23 between D8S550 and D8S1759. *Eur J Hum Genet* 10, 17-25.
1090. Starfield, M., Hennies, H. C., Jung, M., Jenkins, T., Wienker, T., Hull, P., Spurdle, A., Kuster, W., Ramsay, M. & Reis, A. (1997). Localization of the gene causing keratolytic winter erythema to chromosome 8p22-p23, and evidence for a founder effect in South African Afrikaans-speakers. *Am J Hum Genet* 61, 370-8.
1091. Scriver, C. R. & Waters, P. J. (1999). Monogenic traits are not simple: lessons from phenylketonuria. *Trends Genet* 15, 267-72.
1092. Weatherall, D. J. (2001). Phenotype-genotype relationships in monogenic disease: lessons from the thalassaemias. *Nat Rev Genet* 2, 245-55.
1093. Stocco dos Santos, R. C., Barretto, O. C., Nonoyama, K., Castro, N. H., Ferraz, O. P., Walter-Moura, J., Vescio, C. C. & Becak, W. (1991). X-linked syndrome: mental retardation, hip luxation, and G6PD variant [Gd(+)] Butantan]. *Am J Med Genet* 39, 133-6.
1094. Stocco dos Santos, R. C., Castro, N. H., Lillia Holmes, A., Becak, W., Tackels-Horne, D., Lindsey, C. J., Lubs, H. A., Stevenson, R. E. & Schwartz, C. E. (2003). Stocco dos Santos X-linked mental retardation syndrome: clinical elucidation and localization to Xp11.3-Xq21.3. *Am J Med Genet* 118A, 255-9.
1095. Sheardown, S., Norris, D., Fisher, A. & Brockdorff, N. (1996). The mouse Smcx gene exhibits developmental and tissue specific variation in degree of escape from X inactivation. *Hum Mol Genet* 5, 1355-60.
1096. Sharp, A., Robinson, D. & Jacobs, P. (2000). Age- and tissue-specific variation of X chromosome inactivation ratios in normal women. *Hum Genet* 107, 343-9.
1097. Gale, R. E., Wheadon, H., Boulous, P. & Linch, D. C. (1994). Tissue specificity of X-chromosome inactivation patterns. *Blood* 83, 2899-905.
1098. Pegoraro, E., Whitaker, J., Mowery-Rushton, P., Surti, U., Lanasa, M. & Hoffman, E. P. (1997). Familial skewed X inactivation: a molecular trait associated with high spontaneous-abortion rate maps to Xq28. *Am J Hum Genet* 61, 160-70.
1099. Lanasa, M. C., Hogge, W. A., Kubik, C., Blancato, J. & Hoffman, E. P. (1999). Highly skewed X-chromosome inactivation is associated with idiopathic recurrent spontaneous abortion. *Am J Hum Genet* 65, 252-4.
1100. Sangha, K. K., Stephenson, M. D., Brown, C. J. & Robinson, W. P. (1999). Extremely skewed X-chromosome inactivation is increased in women with recurrent spontaneous abortion. *Am J Hum Genet* 65, 913-7.
1101. Ranum, L. P. & Day, J. W. (2002). Dominantly inherited, non-coding microsatellite expansion disorders. *Curr Opin Genet Dev* 12, 266-71.
1102. Chung, M. Y., Ranum, L. P., Duvick, L. A., Servadio, A., Zoghbi, H. Y. & Orr, H. T. (1993). Evidence for a mechanism predisposing to intergenerational CAG repeat instability in spinocerebellar ataxia type I. *Nat Genet* 5, 254-8.
1103. Ng, L. F. & Liu, D. X. (2002). Membrane association and dimerization of a cysteine-rich, 16-kilodalton polypeptide released from the C-terminal region of the coronavirus infectious bronchitis virus 1a polyprotein. *J Virol* 76, 6257-67.
1104. Frankel, A. D., Bredt, D. S. & Pabo, C. O. (1988). Tat protein from human immunodeficiency virus forms a metal-linked dimer. *Science* 240, 70-3.
1105. Dua, R., Levy, D. L. & Campbell, J. L. (1999). Analysis of the essential functions of the C-terminal protein/protein interaction domain of *Saccharomyces cerevisiae* pol epsilon and its unexpected ability to support growth in the absence of the DNA polymerase domain. *J Biol Chem* 274, 22283-8.
1106. Brtva, T. R., Drugan, J. K., Ghosh, S., Terrell, R. S., Campbell-Burk, S., Bell, R. M. & Der, C. J. (1995). Two distinct Raf domains mediate interaction with Ras. *J Biol Chem* 270, 9809-12.
1107. Borden, K. L. (1998). RING fingers and B-boxes: zinc-binding protein-protein interaction domains. *Biochem Cell Biol* 76, 351-8.
1108. Burrus, L. W., Zuber, M. E., Lueddecke, B. A. & Olwin, B. B. (1992). Identification of a cysteine-rich receptor for fibroblast growth factors. *Mol Cell Biol* 12, 5600-9.
1109. Hohenester, E., Sasaki, T. & Timpl, R. (1999). Crystal structure of a scavenger receptor cysteine-rich domain sheds light on an ancient superfamily. *Nat Struct Biol* 6, 228-32.
1110. Saldanha, J., Singh, J. & Mahadevan, D. (1998). Identification of a Frizzled-like cysteine rich domain in the extracellular region of developmental receptor tyrosine kinases. *Protein Sci* 7, 1632-5.
1111. Kamine, J., Elangovan, B., Subramanian, T., Coleman, D. & Chinnadurai, G. (1996). Identification of a cellular protein that specifically interacts with the essential cysteine region of the HIV-1 Tat transactivator. *Virology* 216, 357-66.
1112. Dingwall, C. & Laskey, R. A. (1991). Nuclear targeting sequences--a consensus? *Trends Biochem Sci* 16, 478-81.
1113. Condeelis, J. & Singer, R. H. (2005). How and why does beta-actin mRNA target? *Biol Cell* 97, 97-110.
1114. Melchior, F. (2000). SUMO - nonclassical ubiquitin. *Annu Rev Cell Dev Biol* 16, 591-626.
1115. Steffan, J. S., Agrawal, N., Pallos, J., Rockabrand, E., Trotman, L. C., Slepko, N., Illes, K., Lukacsovich, T., Zhu, Y. Z., Cattaneo, E., Pandolfi, P. P., Thompson, L. M. & Marsh, J. L. (2004). SUMO modification of Huntingtin and Huntington's disease pathology. *Science* 304, 100-4.
1116. Sobko, A., Ma, H. & Firtel, R. A. (2002). Regulated SUMOylation and ubiquitination of DdMEK1 is required for proper chemotaxis. *Dev Cell* 2, 745-56.
1117. Joseph, J., Tan, S. H., Karpova, T. S., McNally, J. G. & Dasso, M. (2002). SUMO-1 targets RanGAP1 to kinetochores and mitotic spindles. *J Cell Biol* 156, 595-602.
1118. Lin, X., Sun, B., Liang, M., Liang, Y. Y., Gast, A., Hildebrand, J., Brunnicardi, F. C., Melchior, F. & Feng, X. H. (2003). Opposed regulation of corepressor CtBP by SUMOylation and PDZ binding. *Mol Cell* 11, 1389-96.
1119. Rodriguez, M. S., Dargemont, C. & Hay, R. T. (2001). SUMO-1 conjugation in vivo requires both a consensus modification motif and nuclear targeting. *J Biol Chem* 276, 12654-9.
1120. Nathan, D., Ingvarsdottir, K., Sterner, D. E., Bylebyl, G. R., Dokmanovic, M., Dorsey, J. A., Whelan, K. A., Krsmanovic, M., Lane, W. S., Meluh, P. B., Johnson, E. S. & Berger, S. L. (2006). Histone sumoylation is a negative regulator in *Saccharomyces cerevisiae* and shows dynamic interplay with positive-acting histone modifications. *Genes Dev* 20, 966-76.
1121. Gill, G. (2004). SUMO and ubiquitin in the nucleus: different functions, similar mechanisms? *Genes Dev* 18, 2046-59.
1122. Gill, G. (2005). Something about SUMO inhibits transcription. *Curr Opin Genet Dev* 15, 536-41.
1123. Hong, Y., Rogers, R., Matunis, M. J., Mayhew, C. N., Goodson, M. L., Park-Sarge, O. K. & Sarge, K. D. (2001). Regulation of heat shock transcription factor 1 by stress-induced SUMO-1 modification. *J Biol Chem* 276, 40263-7.
1124. Terui, Y., Saad, N., Jia, S., McKeon, F. & Yuan, J. (2004). Dual role of sumoylation in the nuclear localization and transcriptional activation of NFAT1. *J Biol Chem* 279, 28257-65.

1125. Shea, T. B. (1990). Transient increase in vimentin in axonal cytoskeletons during differentiation in NB2a/d1 cells. *Brain Res* 521, 338-42.
1126. Dubey, M., Hoda, S., Chan, W. K., Pimenta, A., Ortiz, D. D. & Shea, T. B. (2004). Reexpression of vimentin in differentiated neuroblastoma cells enhances elongation of axonal neurites. *J Neurosci Res* 78, 245-9.
1127. Janssen, G. M., van Damme, H. T., Kriek, J., Amons, R. & Moller, W. (1994). The subunit structure of elongation factor 1 from *Artemia*. Why two alpha-chains in this complex? *J Biol Chem* 269, 31410-7.
1128. Kobayashi, S., Kidou, S. & Ejiri, S. (2001). Detection and characterization of glutathione S-transferase activity in rice EF-1betabeta'gamma and EF-1gamma expressed in *Escherichia coli*. *Biochem Biophys Res Commun* 288, 509-14.
1129. Weiler, I. J., Irwin, S. A., Klintsova, A. Y., Spencer, C. M., Brazelton, A. D., Miyashiro, K., Comery, T. A., Patel, B., Eberwine, J. & Greenough, W. T. (1997). Fragile X mental retardation protein is translated near synapses in response to neurotransmitter activation. *Proc Natl Acad Sci U S A* 94, 5395-400.
1130. Greenough, W. T., Klintsova, A. Y., Irwin, S. A., Galvez, R., Bates, K. E. & Weiler, I. J. (2001). Synaptic regulation of protein synthesis and the fragile X protein. *Proc Natl Acad Sci U S A* 98, 7101-6.
1131. Weiler, I. J., Spangler, C. C., Klintsova, A. Y., Grossman, A. W., Kim, S. H., Bertaina-Anglade, V., Khaliq, H., de Vries, F. E., Lambers, F. A., Hatia, F., Base, C. K. & Greenough, W. T. (2004). Fragile X mental retardation protein is necessary for neurotransmitter-activated protein translation at synapses. *Proc Natl Acad Sci U S A* 101, 17504-9.
1132. Todd, P. K., Mack, K. J. & Malter, J. S. (2003). The fragile X mental retardation protein is required for type-I metabotropic glutamate receptor-dependent translation of PSD-95. *Proc Natl Acad Sci U S A* 100, 14374-8.
1133. Sutton, M. A. & Schuman, E. M. (2005). Local translational control in dendrites and its role in long-term synaptic plasticity. *J Neurobiol* 64, 116-31.
1134. Zhong, J., Zhang, T. & Bloch, L. M. (2006). Dendritic mRNAs encode diversified functionalities in hippocampal pyramidal neurons. *BMC Neurosci* 7, 17.
1135. Bassell, G. J., Powers, C. M., Taneja, K. L. & Singer, R. H. (1994). Single mRNAs visualized by ultrastructural in situ hybridization are principally localized at actin filament intersections in fibroblasts. *J Cell Biol* 126, 863-76.
1136. Yang, F., Demma, M., Warren, V., Dharmawardhane, S. & Condeelis, J. (1990). Identification of an actin-binding protein from *Dictyostelium* as elongation factor 1a. *Nature* 347, 494-6.
1137. Kurasawa, Y., Watanabe, Y. & Numata, O. (1996). Characterization of F-actin bundling activity of Tetrahymena elongation factor 1 alpha investigated with rabbit skeletal muscle actin. *Zoolog Sci* 13, 371-5.
1138. Izawa, T., Fukata, Y., Kimura, T., Iwamatsu, A., Dohi, K. & Kaibuchi, K. (2000). Elongation factor-1 alpha is a novel substrate of rho-associated kinase. *Biochem Biophys Res Commun* 278, 72-8.
1139. Waters, N., Svensson, K., Haadsma-Svensson, S. R., Smith, M. W. & Carlsson, A. (1993). The dopamine D3-receptor: a postsynaptic receptor inhibitory on rat locomotor activity. *J Neural Transm Gen Sect* 94, 11-9.
1140. Accili, D., Fishburn, C. S., Drago, J., Steiner, H., Lachowicz, J. E., Park, B. H., Gauda, E. B., Lee, E. J., Cool, M. H., Sibley, D. R., Gerfen, C. R., Westphal, H. & Fuchs, S. (1996). A targeted mutation of the D3 dopamine receptor gene is associated with hyperactivity in mice. *Proc Natl Acad Sci U S A* 93, 1945-9.
1141. Steiner, H., Fuchs, S. & Accili, D. (1997). D3 dopamine receptor-deficient mouse: evidence for reduced anxiety. *Physiol Behav* 63, 137-41.
1142. Hitchcott, P. K., Bonardi, C. M. & Phillips, G. D. (1997). Enhanced stimulus-reward learning by intra-amygdala administration of a D3 dopamine receptor agonist. *Psychopharmacology (Berl)* 133, 240-8.
1143. Dietz, M. L., Bernaciak, T. M., Vendetti, F. & Hildebrand, J. D. (2006). Differential actin-dependent localization modulates the evolutionarily conserved activity of shroom-family proteins. *J Biol Chem* 281, 20542-54.
1144. Haigo, S. L., Hildebrand, J. D., Harland, R. M. & Wallingford, J. B. (2003). Shroom induces apical constriction and is required for hinge point formation during neural tube closure. *Curr Biol* 13, 2125-37.
1145. Hildebrand, J. D. (2005). Shroom regulates epithelial cell shape via the apical positioning of an actomyosin network. *J Cell Sci* 118, 5191-203.
1146. Sheng, M. & Sala, C. (2001). PDZ domains and the organization of supramolecular complexes. *Annu Rev Neurosci* 24, 1-29.
1147. Brône, B. & Eggermont, J. (2005). PDZ proteins retain and regulate membrane transporters in polarized epithelial cell membranes. *Am J Physiol Cell Physiol* 288, C20-9.
1148. Zhang, M. & Wang, W. (2003). Organization of signaling complexes by PDZ-domain scaffold proteins. *Acc Chem Res* 36, 530-8.
1149. Kim, E. & Sheng, M. (2004). PDZ domain proteins of synapses. *Nat Rev Neurosci* 5, 771-81.
1150. Kim, E., Niethammer, M., Rothschild, A., Jan, Y. N. & Sheng, M. (1995). Clustering of Shaker-type K⁺ channels by interaction with a family of membrane-associated guanylate kinases. *Nature* 378, 85-8.
1151. Niethammer, M., Kim, E. & Sheng, M. (1996). Interaction between the C terminus of NMDA receptor subunits and multiple members of the PSD-95 family of membrane-associated guanylate kinases. *J Neurosci* 16, 2157-63.
1152. Kornau, H. C., Schenker, L. T., Kennedy, M. B. & Seeburg, P. H. (1995). Domain interaction between NMDA receptor subunits and the postsynaptic density protein PSD-95. *Science* 269, 1737-40.
1153. Gertler, F. B., Niebuhr, K., Reinhard, M., Wehland, J. & Soriano, P. (1996). Mena, a relative of VASP and *Drosophila Enabled*, is implicated in the control of microfilament dynamics. *Cell* 87, 227-39.
1154. Sala, C., Piech, V., Wilson, N. R., Passafaro, M., Liu, G. & Sheng, M. (2001). Regulation of dendritic spine morphology and synaptic function by Shank and Homer. *Neuron* 31, 115-30.
1155. Fagni, L., Worley, P. F. & Ango, F. (2002). Homer as Both a Scaffold and Transduction Molecule. *Sci STKE* 137, 1-7.
1156. Crick, F. (1982). Do dendritic spines twitch? *Trends Neurosci* 5, 44-6.
1157. Pavlik, L. L. & Moshkov, D. A. (1991). Actin in synaptic cytoskeleton during long-term potentiation in hippocampal slices. *Acta Histochem Suppl* 41, 257-64.
1158. Kim, C. H. & Lisman, J. E. (1999). A role of actin filament in synaptic transmission and long-term potentiation. *J Neurosci* 19, 4314-24.
1159. Krucker, T., Siggins, G. R. & Halpain, S. (2000). Dynamic actin filaments are required for stable long-term potentiation (LTP) in area CA1 of the hippocampus. *Proc Natl Acad Sci U S A* 97, 6856-61.
1160. Okamoto, K., Nagai, T., Miyawaki, A. & Hayashi, Y. (2004). Rapid and persistent modulation of actin dynamics regulates postsynaptic reorganization underlying bidirectional plasticity. *Nat Neurosci* 7, 1104-12.
1161. Fukazawa, Y., Saitoh, Y., Ozawa, F., Ohta, Y., Mizuno, K. & Inokuchi, K. (2003). Hippocampal LTP is accompanied by enhanced F-actin content within the dendritic spine that is essential for late LTP maintenance in vivo. *Neuron* 38, 447-60.
1162. Theriot, J. A. (1997). Accelerating on a treadmill: ADF/cofilin promotes rapid actin filament turnover in the dynamic cytoskeleton. *J Cell Biol* 136, 1165-8.
1163. Rothkegel, M., Mayboroda, O., Rohde, M., Wucherpfennig, C., Valenta, R. & Jockusch, B. M. (1996). Plant

- and animal profilins are functionally equivalent and stabilize microfilaments in living animal cells. *J Cell Sci* 109 (Pt 1), 83-90.
1164. Finkel, T., Theriot, J. A., Dose, K. R., Tomaselli, G. F. & Goldschmidt-Clermont, P. J. (1994). Dynamic actin structures stabilized by profilin. *Proc Natl Acad Sci U S A* 91, 1510-4.
1165. Ackermann, M. & Matus, A. (2003). Activity-induced targeting of profilin and stabilization of dendritic spine morphology. *Nat Neurosci* 6, 1194-200.
1166. Chechlac, M. & Gleeson, J. G. (2003). Is mental retardation a defect of synapse structure and function? *Pediatr Neurol* 29, 11-7.
1167. Blanpied, T. A. & Ehlers, M. D. (2004). Microanatomy of dendritic spines: emerging principles of synaptic pathology in psychiatric and neurological disease. *Biol Psychiatry* 55, 1121-7.
1168. Church, D. M., Stotler, C. J., Rutter, J. L., Murrell, J. R., Trofatter, J. A. & Buckler, A. J. (1994). Isolation of genes from complex sources of mammalian genomic DNA using exon amplification. *Nat Genet* 6, 98-105.
1169. Sampedro, M. N., Bussineau, C. M. & Cotman, C. W. (1981). Postsynaptic density antigens: preparation and characterization of an antiserum against postsynaptic densities. *J Cell Biol* 90, 675-86.
1170. Haffter, P., Granato, M., Brand, M., Mullins, M. C., Hammerschmidt, M., Kane, D. A., Odenthal, J., van Eeden, F. J., Jiang, Y. J., Heisenberg, C. P., Kelsh, R. N., Furutani-Seiki, M., Vogelsang, E., Beuchle, D., Schach, U., Fabian, C. & Nusslein-Volhard, C. (1996). The identification of genes with unique and essential functions in the development of the zebrafish, *Danio rerio*. *Development* 123, 1-36.
1171. Driever, W., Solnica-Krezel, L., Schier, A. F., Neuhauss, S. C., Malicki, J., Stemple, D. L., Stainier, D. Y., Zwartkruis, F., Abdelilah, S., Rangini, Z., Belak, J. & Boggs, C. (1996). A genetic screen for mutations affecting embryogenesis in zebrafish. *Development* 123, 37-46.
1172. Ekker, S. C. & Larson, J. D. (2001). Morphant technology in model developmental systems. *Genesis* 30, 89-93.
1173. Roeleveld, N., Zielhuis, G. A. & Gabreels, F. (1997). The prevalence of mental retardation: a critical review of recent literature. *Dev Med Child Neurol* 39, 125-32.
1174. Penrose, L. S. (1933) Mental Defect, Sidgwick and Jackson, London, UK
1175. Penrose, L. S. (1963) The biology of mental defect, 3rd edition. Sidgwick and Jackson, London, UK
1176. Neri, G. & Opitz, J. M. (2000). Sixty years of X-linked mental retardation: a historical footnote. *Am J Med Genet* 97, 228-33.
1177. Borjeson, M., Forssman, H. & Lehmann, O. (1962). An X-linked, recessively inherited syndrome characterized by grave mental deficiency, epilepsy, and endocrine disorder. *Acta Med Scand* 171, 13-21.
1178. Lehrke, R. G. (1968) Sex-linked mental retardation and verbal disability, Michigan University Press, Ann Arbor, USA
1179. Anastasi, A. (1972). Four hypotheses with a dearth of data: response to Lehrke's 'A Theory of X-Linkage of Major Intellectual Traits'. *Am J Ment Defic* 76, 620-2.
1180. Nance, W. E. & Engel, E. (1972). One X and four hypotheses: response to Lehrke's 'A Theory of X-Linkage of Major Intellectual Traits'. *Am J Ment Defic* 76, 623-5.
1181. Turner, G. & Partington, M. W. (1991). Genes for intelligence on the X chromosome. *J Med Genet* 28, 429.
1182. Turner, G. (1996). Intelligence and the X chromosome. *Lancet* 347, 1814-5.
1183. Turner, G. (1996). Author's reply to E.B. Hook. *Lancet* 348, 826.
1184. Turner, G. (1996). Finding genes on the X chromosome by which homo may have become sapiens. *Am J Hum Genet* 58, 1109-10.
1185. Turner, G., Turner, B. & Collins, E. (1970). Renpenning's syndrome - X-linked mental retardation. *Lancet* 2, 365-6.
1186. Fishburn, J., Turner, G., Daniel, A. & Brookwell, R. (1983). The diagnosis and frequency of X-linked conditions in a cohort of moderately retarded males with affected brothers. *Am J Med Genet* 14, 713-24.
1187. Wakefield, M. J. & Graves, J. A. (1996). Comparative maps of vertebrates. *Mamm Genome* 7, 715-6.
1188. Duboule, D. & Wilkins, A. S. (1998). The evolution of 'bricolage'. *Trends Genet* 14, 54-9.
1189. Jacob, F. (1977). Evolution and tinkering. *Science* 196, 1161-6.
1190. Morton, N. E. (1978). Effect of inbreeding on IQ and mental retardation. *Proc Natl Acad Sci U S A* 75, 3906-8.
1191. Morton, N. E. (1992). Genes for intelligence on the X chromosome. *J Med Genet* 29, 71.
1192. Stevenson, R. E. & Schwartz, C. E. (2002). Clinical and molecular contributions to the understanding of X-linked mental retardation. *Cytogenet Genome Res* 99, 265-75.
1193. Mayr, E. (1942) Systematics and the Origin of Species, Columbia University Press, New York, USA
1194. Miller, G. (2000). Mental traits as fitness indicators. Expanding evolutionary psychology's adaptationism. *Ann N Y Acad Sci* 907, 62-74.
1195. Wilda, M., Bachner, D., Zechner, U., Kehrer-Sawatzki, H., Vogel, W. & Hameister, H. (2000). Do the constraints of human speciation cause expression of the same set of genes in brain, testis, and placenta? *Cytogenet Cell Genet* 91, 300-2.
1196. Plomin, R., DeFries, J. C., McClearn, G. E. & McGuffin, P. (2001) Behavioral genetics, 4th edition. Worth Publishers, New York, USA
1197. Walker, A., Falk, D., Smith, R. & Pickford, M. (1983). The skull of *Proconsul africanus*: reconstruction and cranial capacity. *Nature* 305, 525-7.
1198. Lande, R. & Arnold, S. J. (1985). Evolution of mating preference and sexual dimorphism. *J Theor Biol* 117, 651-64.
1199. Zechner, U., Wilda, M., Kehrer-Sawatzki, H., Vogel, W., Fundele, R. & Hameister, H. (2001). A high density of X-linked genes for general cognitive ability: a run-away process shaping human evolution? *Trends Genet* 17, 697-701.
1200. Haldane, J. B. S. (1922). Sex-ratio and unisexual sterility in hybrid animals. *J Genet* 12, 101-9.
1201. Wang, P. J., McCarrey, J. R., Yang, F. & Page, D. C. (2001). An abundance of X-linked genes expressed in spermatogonia. *Nat Genet* 27, 422-6.
1202. Saifi, G. M. & Chandra, H. S. (1999). An apparent excess of sex- and reproduction-related genes on the human X chromosome. *Proc Biol Sci* 266, 203-9.
1203. Lubs, H., Chiurazzi, P., Arena, J., Schwartz, C., Tranebjaerg, L. & Neri, G. (1999). XLMR genes: update 1998. *Am J Med Genet* 83, 237-47.
1204. Schmitt, I., Bachner, D., Megow, D., Henklein, P., Hameister, H., Epplen, J. T. & Riess, O. (1995). Expression of the Huntington disease gene in rodents: cloning the rat homologue and evidence for downregulation in non-neuronal tissues during development. *Hum Mol Genet* 4, 1173-82.
1205. Ebersberger, I., Metzler, D., Schwarz, C. & Paabo, S. (2002). Genomewide comparison of DNA sequences between humans and chimpanzees. *Am J Hum Genet* 70, 1490-7.
1206. Gagneux, P. & Varki, A. (2001). Genetic differences between humans and great apes. *Mol Phylogenet Evol* 18, 2-13.
1207. Dabbs, J. M., Jr. & Mohammed, S. (1992). Male and female salivary testosterone concentrations before and after sexual activity. *Physiol Behav* 52, 195-7.
1208. Kondo, S., Hozumi, Y. & Aso, K. (1990). Organ culture of human scalp hair follicles: effect of testosterone and

- oestrogen on hair growth. *Arch Dermatol Res* 282, 442-5.
1209. Shabsigh, R. (1997). The effects of testosterone on the cavernous tissue and erectile function. *World J Urol* 15, 21-6.
1210. Jabs, A. D., Frantz, A. G., Smith-Vaniz, A. & Hugo, N. E. (1990). Mammary hypertrophy is not associated with increased estrogen receptors. *Plast Reconstr Surg* 86, 64-6.
1211. Motofei, I. G. & Rowland, D. L. (2005). The physiological basis of human sexual arousal: neuroendocrine sexual asymmetry. *Int J Androl* 28, 78-87.
1212. Winter, J. S., Faïman, C., Hobson, W. C. & Reyes, F. I. (1980). The endocrine basis of sexual development in the chimpanzee. *J Reprod Fertil Suppl* 28, 131-8.
1213. Hagey, L. R. & Czekala, N. M. (2003). Comparative urinary androstanes in the great apes. *Gen Comp Endocrinol* 130, 64-9.
1214. Vadakkadath Meethal, S. & Atwood, C. S. (2005). The role of hypothalamic-pituitary-gonadal hormones in the normal structure and functioning of the brain. *Cell Mol Life Sci* 62, 257-70.
1215. McEwen, B. S. (1992). Steroid hormones: effect on brain development and function. *Horm Res* 37 Suppl 3, 1-10.
1216. Harris, G. W. (1964). Sex Hormones, Brain Development and Brain Function. *Endocrinology* 75, 627-48.
1217. Toran-Allerand, C. D. (1984). Gonadal hormones and brain development: implications for the genesis of sexual differentiation. *Ann N Y Acad Sci* 435, 101-11.
1218. Melcangi, R. C., Magnaghi, V. & Martini, L. (1999). Steroid metabolism and effects in central and peripheral glial cells. *J Neurobiol* 40, 471-83.
1219. Mercier, G., Turque, N. & Schumacher, M. (2001). Early activation of transcription factor expression in Schwann cells by progesterone. *Brain Res Mol Brain Res* 97, 137-48.
1220. Tramontin, A. D., Wingfield, J. C. & Brenowitz, E. A. (2003). Androgens and estrogens induce seasonal-like growth of song nuclei in the adult songbird brain. *J Neurobiol* 57, 130-40.
1221. Goldstein, L. A. & Sengelaub, D. R. (1993). Motoneuron morphology in the dorsolateral nucleus of the rat spinal cord: normal development and androgenic regulation. *J Comp Neurol* 338, 588-600.
1222. MacLusky, N. J., Hajszan, T. & Leranath, C. (2004). Effects of dehydroepiandrosterone and flutamide on hippocampal CA1 spine synapse density in male and female rats: implications for the role of androgens in maintenance of hippocampal structure. *Endocrinology* 145, 4154-61.
1223. Kashon, M. L. & Sisk, C. L. (1994). Pubertal maturation is associated with an increase in the number of androgen receptor-immunoreactive cells in the brains of male ferrets. *Brain Res Dev Brain Res* 78, 237-42.
1224. Azurmendi, A., Braza, F., Sorozabal, A., Garcia, A., Braza, P., Carreras, M. R., Munoz, J. M., Cardas, J. & Sanchez-Martin, J. R. (2005). Cognitive abilities, androgen levels, and body mass index in 5-year-old children. *Horm Behav* 48, 187-95.
1225. Isgor, C. & Sengelaub, D. R. (2003). Effects of neonatal gonadal steroids on adult CA3 pyramidal neuron dendritic morphology and spatial memory in rats. *J Neurobiol* 55, 179-90.
1226. Christiansen, K. & Knussmann, R. (1987). Sex hormones and cognitive functioning in men. *Neuropsychobiology* 18, 27-36.
1227. Gouchie, C. & Kimura, D. (1991). The relationship between testosterone levels and cognitive ability patterns. *Psychoneuroendocrinology* 16, 323-34.
1228. Sano, M. (2000). Understanding the role of estrogen on cognition and dementia. *J Neural Transm Suppl* 59, 223-9.
1229. Jasienska, G., Ziolkiewicz, A., Ellison, P. T., Lipson, S. F. & Thune, I. (2004). Large breasts and narrow waists indicate high reproductive potential in women. *Proc Biol Sci* 271, 1213-7.
1230. Rhodes, G., Hickford, C. & Jeffery, L. (2000). Sex-typicality and attractiveness: are supermale and superfemale faces super-attractive? *Br J Psychol* 91 (Pt 1), 125-40.
1231. Perrett, D. I., Lee, K. J., Penton-Voak, I., Rowland, D., Yoshikawa, S., Burt, D. M., Henzi, S. P., Castles, D. L. & Akamatsu, S. (1998). Effects of sexual dimorphism on facial attractiveness. *Nature* 394, 884-7.
1232. Cellerino, A. (2003). Psychobiology of facial attractiveness. *J Endocrinol Invest* 26, 45-8.
1233. Furlow, F. B., Armijo-Prewitt, T., Gangestad, S. W. & Thornhill, R. (1997). Fluctuating asymmetry and psychometric intelligence. *Proc Biol Sci* 264, 823-9.
1234. Scutt, D. & Manning, J. T. (1996). Symmetry and ovulation in women. *Hum Reprod* 11, 2477-80.
1235. Gagneux, P., Amess, B., Diaz, S., Moore, S., Patel, T., Dillmann, W., Parekh, R. & Varki, A. (2001). Proteomic comparison of human and great ape blood plasma reveals conserved glycosylation and differences in thyroid hormone metabolism. *Am J Phys Anthropol* 115, 99-109.
1236. Diarra, A., Lefauconnier, J. M., Valens, M., Georges, P. & Grippois, D. (1989). Tyrosine content, influx and accumulation rate, and catecholamine biosynthesis measured in vivo, in the central nervous system and in peripheral organs of the young rat. Influence of neonatal hypo- and hyperthyroidism. *Arch Int Physiol Biochim* 97, 317-32.
1237. Delange, F. (2000). The role of iodine in brain development. *Proc Nutr Soc* 59, 75-9.
1238. Boyages, S. C. & Halpern, J. P. (1993). Endemic cretinism: toward a unifying hypothesis. *Thyroid* 3, 59-69.
1239. Durkin, M. S., Khan, N. Z., Davidson, L. L., Huq, S., Munir, S., Rasul, E. & Zaman, S. S. (2000). Prenatal and postnatal risk factors for mental retardation among children in Bangladesh. *Am J Epidemiol* 152, 1024-33.
1240. Correia, H. R., Balseiro, S. C. & de Areia, M. L. (2005). Are genes of human intelligence related to the metabolism of thyroid and steroids hormones? - endocrine changes may explain human evolution and higher intelligence. *Med Hypotheses* 65, 1016-23.
1241. Previc, F. H. (1999). Dopamine and the origins of human intelligence. *Brain Cogn* 41, 299-350.
1242. Lubs, H. A. (1999). The other side of the coin: a hypothesis concerning the importance of genes for high intelligence and evolution of the X chromosome. *Am J Med Genet* 85, 206-8.
1243. Hedges, L. V. & Nowell, A. (1995). Sex differences in mental test scores, variability, and numbers of high-scoring individuals. *Science* 269, 41-5.
1244. Resnick, S. M., Berenbaum, S. A., Gottesman, I. I. & Bouchard, T. J. (1986). Early hormonal influences on cognitive functioning in congenital adrenal hyperplasia. *Dev Psychol* 22, 191-8.
1245. Lubahn, D. B., Joseph, D. R., Sullivan, P. M., Willard, H. F., French, F. S. & Wilson, E. M. (1988). Cloning of human androgen receptor complementary DNA and localization to the X chromosome. *Science* 240, 327-30.
1246. Hines, M., Chiu, L., McAdams, L. A., Bentler, P. M. & Lipcamon, J. (1992). Cognition and the corpus callosum: verbal fluency, visuospatial ability, and language lateralization related to midsagittal surface areas of callosal subregions. *Behav Neurosci* 106, 3-14.
1247. de Courten-Myers, G. M. (1999). The human cerebral cortex: gender differences in structure and function. *J Neuropathol Exp Neurol* 58, 217-26.
1248. Shaywitz, B. A., Shaywitz, S. E., Pugh, K. R., Constable, R. T., Skudlarski, P., Fulbright, R. K., Bronen, R. A., Fletcher, J. M., Shankweiler, D. P., Katz, L. & Gore, J. C. (1995). Sex differences in the functional organization of the brain for language. *Nature* 373, 607-9.
1249. Bartolomei, M. S. & Tilghman, S. M. (1997). Genomic imprinting in mammals. *Annu Rev Genet* 31, 493-525.

1250. Skuse, D. H., James, R. S., Bishop, D. V., Coppin, B., Dalton, P., Aamodt-Leeper, G., Bacarese-Hamilton, M., Creswell, C., McGurk, R. & Jacobs, P. A. (1997). Evidence from Turner's syndrome of an imprinted X-linked locus affecting cognitive function. *Nature* 387, 705-8.
1251. Davies, W., Isles, A., Smith, R., Karunadasa, D., Burmann, D., Humby, T., Ojarikre, O., Biggin, C., Skuse, D., Burgoyne, P. & Wilkinson, L. (2005). Xlr3b is a new imprinted candidate for X-linked parent-of-origin effects on cognitive function in mice. *Nat Genet* 37, 625-9.
1252. Eccles, J. S. (1987). Gender roles and women's achievement-related decisions. *Psychol Women Quart* 11, 135-72.
1253. Balaesque, P., Toupance, B., Quintana, M., Crouau-Roy, B. & Heyer, E. (2004). Sex-specific selection on the human X chromosome? *Genet Res* 83, 169-76.
1254. Mitchell, E. A. & Stewart, A. W. (1997). Gender and the sudden infant death syndrome. New Zealand Cot Death Study Group. *Acta Paediatr* 86, 854-6.
1255. Xu, J., Burgoyne, P. S. & Arnold, A. P. (2002). Sex differences in sex chromosome gene expression in mouse brain. *Hum Mol Genet* 11, 1409-19.
1256. Cocconi, G. & Morrison, P. (1959). Searching for Interstellar Communications. *Nature* 184, 844-6.
1257. Drake, F. D. (1961). Project Ozma. *Phys Today* 14, 40-2.
1258. Drake, F. & Sobel, D. (1994) *Is Anyone Out There? The Scientific Search for Extraterrestrial Intelligence.*, Bantam Doubleday Dell, New York
1259. Hohlfeld, R. G. & Terzian, Y. (1977). Multiple Stars and Number of Habitable Planets in Galaxy. *Icarus* 30, 598-600.
1260. Shklovskii, I. S. & Sagan, C. I. (1966) *Intelligent Life in the Universe*, Dell, New York, USA
1261. Calvin, M. (1961) The path of carbon in photosynthesis. In: Nobel Lectures, Chemistry 1942-1962 (1964) Elsevier, Amsterdam, The Netherlands.
1262. Pinker, S. (1997) *How the Mind Works*, W. W. Norton & Company, New York, USA
1263. Gordon, I. E. (1967). Stimulus probability and simple reaction time. *Nature* 215, 895-6.
1264. Herget, C. M. (1950). Reaction Time of the Common Housefly (*Musca-Domestica*). *Science* 112, 62.
1265. Gasparini, Z., Cichowolski, M. & Lazo, D. G. (2005). First record of *Metricorhynchus* (Reptilia : Crocodyliformes) in the Bathonian (Middle Jurassic) of the eastern Pacific. *J Paleontol* 79, 801-5.
1266. Clark, J. M., Xu, X., Forster, C. A. & Wang, Y. (2004). A Middle Jurassic 'sphenosuchian' from China and the origin of the crocodylian skull. *Nature* 430, 1021-4.
1267. Mayr, E. (1993). The Search for Intelligence. *Science* 259, 1522-23.
1268. Drake, F., Rummel, J. D. & Raup, D. M. (1993). Extraterrestrial Intelligence. *Science* 260, 474-5.
1269. Ward, P. D. & Brownlee, D. (2000) *Rare Earth. Why Complex Life is Uncommon in the Universe*, Copernicus Books, New York, USA
1270. Duric, N. & Field, L. (2003). On the detectability of intelligent civilizations in the galaxy. *Serb Astron J* 167, 1-10.
1271. Plomin, R. & Bergeman, C. S. (1991). The nature of nurture: Genetic influence on 'environmental' measures. *Behav Brain Sci* 14, 373-85.
1272. Braungart, J. M., Fulker, D. W. & Plomin, R. (1992). Genetic Mediation of the Home Environment During Infancy: A Sibling Adoption Study of the HOME. *Dev Psychol* 28, 1048-55.
1273. Plomin, R., Fulker, D. W., Corley, R. & DeFries, J. C. (1997). Nature, nurture, and cognitive development from 1 to 16 years: A parent-offspring adoption study. *Psychol Sci* 8, 442-7.
1274. Plomin, R. (1986) *Development, genetics and psychology*, Erlbaum, Hillsdale, USA
1275. McGue, M., Bouchard, T. J., Jr., Iacono, W. G. & Lykken, D. T. (1993) Behavioral genetics of cognitive ability: a life-span perspective. In: *Nature, nurture, and psychology*, pp. 59-76 (Plomin, R. and McClearn, G. E., Eds.) American Psychological Association, Washington, USA.
1276. Jencks, C., Bartlett, S., Corcoran, M. & Dunanc, G. J. (1979) *Who gets ahead? The determinants of economic success in America.*, Basic Books, New York, USA
1277. Moffitt, T. E., Gabrielli, W. F., Mednick, S. A. & Schulsinger, F. (1981). Socioeconomic status, IQ, and delinquency. *J Abnorm Psychol* 90, 152-6.
1278. Jensen, A. R. (1969). How much can we boost IQ and scholastic achievement? *Harv Educ Rev* 39, 1-123.
1279. Herrnstein, R. J. & Murray, C. (1994) *The bell curve: Intelligence and class structure in American life*, Free Press, New York, USA
1280. Prentky, R. A. (2000). Mental illness and roots of genius. *Creativity Res J* 13, 95-104.
1281. Kaufman, J. C. (2001). Genius, lunatics, and poets: mental illness in prize-winning authors. *Imagination, Cognition and Personality* 20, 305-14.
1282. Carson, S. H., Peterson, J. B. & Higgins, D. M. (2003). Decreased latent inhibition is associated with increased creative achievement in high-functioning individuals. *J Pers Soc Psychol* 85, 499-506.
1283. Doerr-Zegers, O. (2003). Phenomenology of genius and psychopathology. *Seishin Shinkeigaku Zasshi* 105, 277-86.
1284. Nnadi, C. U., Mimiko, O. A., McCurtis, H. L. & Cadet, J. L. (2005). Neuropsychiatric effects of cocaine use disorders. *J Natl Med Assoc* 97, 1504-15.
1285. Spanagel, R. & Heilig, M. (2005). Addiction and its brain science. *Addiction* 100, 1813-22.
1286. Thuillier, J. (1999) Fabricating human mental illness: 'mind poisons'. In: *Ten Years That Changed the Face of Mental Illness*, pp. 60-87 Martin Dunitz, London, UK.
1287. Terman, L. M. (1916) *The measurement of intelligence*, Houghton Mifflin, Boston, USA
1288. Wechsler, D. (1981) *Wechsler adult intelligence scale-revised (WAIS-R) manual*, The Psychological Corporation, New York, USA
1289. Roid, G. H. (2003) *Stanford-Binet intelligence scales, fifth edition*, Riverside Publishing, Itasca, USA
1290. Simon, J. L. (1968). What does the normal curve 'mean'? *J Educ Res* 61, 435-8.
1291. Simon, J. L. (1997). Four comments on The Bell Curve. *Genetica* 99, 199-205.
1292. Cronbach, L. J. & Snow, R. E. (1977) *Aptitudes and instructional methods*, Irvington, New York, USA
1293. Rehberg, R. A. & Rosenthal, E. R. (1978) *Class and merit in the American high school*, Longman, New York, USA
1294. Hunter, J. E. (1983) A causal analysis of cognitive ability, job knowledge, job performance, and supervisor ratings. In: *Performance measurement and theory*, pp. 257-66 (Landy, E., Zedeck, S. and Cleveland, J., Eds.) Erlbaum, Hillsdale, USA.
1295. Sternberg, R. J. (2000) The concept of intelligence. In: *Handbook of intelligence*, pp. 3-15 (Sternberg, R. J., Ed.) Cambridge University Press, Cambridge, UK.
1296. Super, C. M. (1983) Cultural variation in the meaning and uses of children's 'intelligence'. In: *Explorations in cross-cultural psychology* (Deregnwski, J. B., Dziurawiec, S. and Annis, R. C., Eds.) Swets & Zeitlinger, Lisse, The Netherlands.
1297. Spearman, C. (1927) *The abilities of man*, Macmillan, New York, USA
1298. Thomson, G. H. (1939) *The factorial analysis of human ability*, Houghton Mifflin, Boston, USA
1299. Gustafsson, J.-E. (1984). A unifying model for the structure of intellectual abilities. *Intelligence* 8, 179-203.
1300. Reed, T. E. & Jensen, A. R. (1992). Conduction velocity in a brain nerve pathway of normal adults correlates with intelligence level. *Intelligence* 16, 259-72.

1301. Serpell, R. (1979). How specific are perceptual skills? A cross-cultural study of pattern reproduction. *Br J Psychol* 70, 365-80.
1302. Fuchs, D. & Fuchs, L. S. (1986). Test procedure bias: A meta-analysis of examiner familiarity effects. *Rev Educ Res* 56, 243-62.
1303. Lighthall, F., Ruebush, B., Sarason, S. & Zweibelson, I. (1959). Change in mental ability as a function of test anxiety and type of mental test. *J Consult Psychol* 23, 34-8.
1304. Sattler, J. (1982) Assessment of children's intelligences and special abilities, Allyn & Bacon, Boston, USA
1305. Gould, S. J. (1981) The mismeasure of man, W. W. Norton, New York, USA
1306. Lynn, R. (1983). IQ in Japan and the United States. *Nature* 306, 291-2.
1307. Lynn, R. (1982). IQ in Japan and the United States shows a growing disparity. *Nature* 297, 222-3.
1308. Flynn, J. R. (1991) Asian-Americans: Achievement beyond IQ., Erlbaum, Hillsdale, USA
1309. Neisser, U., Boodoo, G., Bouchard, T. J. J., W., B. A., Brody, N., Ceci, S. J., Halpern, D. E., Loehlin, J. C., Perloff, R., Sternberg, R. J. & Urbina, S. (1996). Intelligence: Knowns and Unknowns. *Am Psychol* 51, 77-101.
1310. Smith, C. R. (1991) Learning disabilities: The interaction of learner, task, and setting., Allyn and Bacon, Boston, USA
1311. Uttl, B., Graf, P. & Richter, L. K. (2002). Verbal Paired Associates tests limits on validity and reliability. *Arch Clin Neuropsychol* 17, 567-81.
1312. Gardner, H. (1983) Frames of mind: The theory of multiple intelligences., Basic Books, New York, USA
1313. Beebe, D. W., Piffner, L. J. & McBurnett, K. (2000). Evaluation of the validity of the Wechsler Intelligence Scale for Children--Third Edition comprehension and picture arrangement subtests as measures of social intelligence. *Psychol Assess* 12, 97-101.
1314. Tapia, M. (2001). Measuring emotional intelligence. *Psychol Rep* 88, 353-64.
1315. Coles, R. (1997) Moral intelligence, Random House, New York, USA
1316. DeBono, E. (1967) New think: The use of lateral thinking in the generation of new ideas., Basic Books, New York, USA
1317. Buzan, T. & Buzan, B. (1996) The mind map book: How to use radiant thinking to maximize your brain's untapped potential., Plume, New York, USA
1318. Pascual-Leone, J. & Ijaz, H. (1989) Mental capacity testing as form of intellectual-developmental assessment. In: Assessment and placement of minority students (Samuda, R. J., Kong, S. L., Cummins, J., Lewis, J. and Pascual-Leone, J., Eds.) Hogrefe & Huber, Toronto, Canada.
1319. Jones, H. E. & Bayley, N. (1941). The Berkeley growth study. *Child Dev* 12, 167-73.
1320. Bunday, S., Webb, T. P., Thake, A. & Todd, J. (1985). A community study of severe mental retardation in the West Midlands and the importance of the fragile X chromosome in its aetiology. *J Med Genet* 22, 258-66.
1321. Bunday, S., Thake, A. & Todd, J. (1989). The recurrence risks for mild idiopathic mental retardation. *J Med Genet* 26, 260-6.
1322. Lamont, M. A. & Dennis, N. R. (1988). Aetiology of mild mental retardation. *Arch Dis Child* 63, 1032-8.
1323. Greenfield, P. M. (1997). You can't take it with you : Why ability assessments don't cross cultures. *Am Psychol* 52, 1115-24.
1324. Herrnstein, R. J., Nickerson, R. S., Desanchez, M. & Swets, J. A. (1986). Teaching thinking skills. *Am Psychol* 41, 1279-89.
1325. Locurto, C. (1991). Beyond IQ in preschool programs. *Intelligence* 15, 295-312.
1326. Flynn, J. R. (1987). Massive IQ gains in 14 nations: What IQ tests really measure. *Psychol Bull* 101, 171-91.
1327. Flynn, J. R. (1984). The mean IQ of Americans: Massive gains 1932 to 1978. *Psychol Bull* 95, 29-51.
1328. Lynn, R. (1990). The role of nutrition in secular increases in intelligence. *Pers Individ Differ* 11, 273-85.
1329. Kohn, M. L. & Schooler, C. (1973). Occupational experience and psychological functioning: An assessment of reciprocal effects. *Am Sociol Rev* 38, 97-118.
1330. Weaver, D. D. & Gartler, S. M. (1975). Evidence for two active X chromosomes in a human XXY triploid. *Hu-mangenetik* 28, 39-42.
1331. Jacobs, P. A., Matsuyama, A. M., Buchanan, I. M. & Wilson, C. (1979). Late replicating X chromosomes in human triploidy. *Am J Hum Genet* 31, 446-57.
1332. Clerc, P. & Avner, P. (1998). Role of the region 3' to Xist exon 6 in the counting process of X-chromosome inactivation. *Nat Genet* 19, 249-53.
1333. Brown, C. J., Lafreniere, R. G., Powers, V. E., Sebastio, G., Ballabio, A., Pettigrew, A. L., Ledbetter, D. H., Levy, E., Craig, I. W. & Willard, H. F. (1991). Localization of the X inactivation centre on the human X chromosome in Xq13. *Nature* 349, 82-4.
1334. Monk, M. & Harper, M. I. (1979). Sequential X chromosome inactivation coupled with cellular differentiation in early mouse embryos. *Nature* 281, 311-3.
1335. Borsani, G., Tonlorenzi, R., Simmler, M. C., Dandolo, L., Arnaud, D., Capra, V., Grompe, M., Pizzuti, A., Muzny, D., Lawrence, C. & et al. (1991). Characterization of a murine gene expressed from the inactive X chromosome. *Nature* 351, 325-9.
1336. Brockdorff, N., Ashworth, A., Kay, G. F., Cooper, P., Smith, S., McCabe, V. M., Norris, D. P., Penny, G. D., Patel, D. & Rastan, S. (1991). Conservation of position and exclusive expression of mouse Xist from the inactive X chromosome. *Nature* 351, 329-31.
1337. Brown, C. J., Ballabio, A., Rupert, J. L., Lafreniere, R. G., Grompe, M., Tonlorenzi, R. & Willard, H. F. (1991). A gene from the region of the human X inactivation centre is expressed exclusively from the inactive X chromosome. *Nature* 349, 38-44.
1338. Brockdorff, N. (2002). X-chromosome inactivation: closing in on proteins that bind Xist RNA. *Trends Genet* 18, 352-8.
1339. Lee, J. T., Davidow, L. S. & Warshawsky, D. (1999). Tsix, a gene antisense to Xist at the X-inactivation centre. *Nat Genet* 21, 400-4.
1340. Priest, J. H., Heady, J. E. & Priest, R. E. (1967). Delayed onset of replication of human X chromosomes. *J Cell Biol* 35, 483-7.
1341. Mermoud, J. E., Popova, B., Peters, A. H., Jenuwein, T. & Brockdorff, N. (2002). Histone H3 lysine 9 methylation occurs rapidly at the onset of random X chromosome inactivation. *Curr Biol* 12, 247-51.
1342. Plath, K., Fang, J., Mlynarczyk-Evans, S. K., Cao, R., Worringer, K. A., Wang, H., de la Cruz, C. C., Otte, A. P., Panning, B. & Zhang, Y. (2003). Role of histone H3 lysine 27 methylation in X inactivation. *Science* 300, 131-5.
1343. Jeppesen, P. & Turner, B. M. (1993). The inactive X chromosome in female mammals is distinguished by a lack of histone H4 acetylation, a cytogenetic marker for gene expression. *Cell* 74, 281-9.
1344. Costanzi, C. & Pehrson, J. R. (1998). Histone macroH2A1 is concentrated in the inactive X chromosome of female mammals. *Nature* 393, 599-601.
1345. Norris, D. P., Brockdorff, N. & Rastan, S. (1991). Methylation status of CpG-rich islands on active and inactive mouse X chromosomes. *Mamm Genome* 1, 78-83.
1346. Cattanaach, B. M. (1974). Position effect variegation in the mouse. *Genet Res* 23, 291-306.
1347. Lingenfelter, P. A., Adler, D. A., Poslinski, D., Thomas, S., Elliott, R. W., Chapman, V. M. & Disteche, C. M. (1998). Escape from X inactivation of Smcx is preceded by silencing during mouse development. *Nat Genet* 18, 212-3.

1348. Wengler, G., Gorlin, J. B., Williamson, J. M., Rosen, F. S. & Bing, D. H. (1995). Nonrandom inactivation of the X chromosome in early lineage hematopoietic cells in carriers of Wiskott-Aldrich syndrome. *Blood* 85, 2471-7.
1349. Devriendt, K., Matthijs, G., Legius, E., Schollen, E., Blockmans, D., van Geet, C., Degreef, H., Cassiman, J. J. & Fryns, J. P. (1997). Skewed X-chromosome inactivation in female carriers of dyskeratosis congenita. *Am J Hum Genet* 60, 581-7.
1350. Nesbitt, M. N. (1971). X chromosome inactivation mosaicism in the mouse. *Dev Biol* 26, 252-63.
1351. McLaren, A. (1972). Numerology of development. *Nature* 239, 274-6.
1352. Tan, S. S., Williams, E. A. & Tam, P. P. (1993). X-chromosome inactivation occurs at different times in different tissues of the post-implantation mouse embryo. *Nat Genet* 3, 170-4.
1353. Carrel, L. & Willard, H. F. (1999). Heterogeneous gene expression from the inactive X chromosome: an X-linked gene that escapes X inactivation in some human cell lines but is inactivated in others. *Proc Natl Acad Sci U S A* 96, 7364-9.
1354. Mendel, G. (1866). Versuche über Pflanzen-Hybriden. *Verh naturforsch Ver Brünn* 4, 3-47.
1355. Correns, C. G. (1900). Mendel's Regel über das Verhalten der Nachkommenschaft der Rassenbastarde. *Ber dtsh Bot Ges* 18, 158-68.
1356. Morgan, T. H., Sturtevant, A. H., Muller, H. J. & Bridges, C. B. (1915) The mechanism of Mendelian heredity, Henry Holt, New York, USA
1357. Beadle, G. W. & Tatum, E. L. (1941). Genetic control of biochemical reactions in *Neurospora*. *Proc Natl Acad Sci U S A* 27, 499-506.
1358. Braconnot, H. (1820). Sur la Conversion des matières animales en nouvelles substances par le moyen de l'acide sulfurique. *Ann Chim Phys* 13, 113-26.
1359. Proust, L. J. (1819). Sur le principe qui assaisonne les fromages. *Ann Chim Phys* 10, 29-49.
1360. Meyer, C. E. & Rose, W. C. (1936). The spatial configuration of α -amino- β -hydroxy-n-butyric acid. *J Biol Chem* 115, 721-9.
1361. McCoy, R. H., Meyer, C. E. & Rose, W. C. (1935). Feeding experiments with mixtures of highly purified amino acids - VIII. Isolation and identification of a new essential amino acid. *J Biol Chem* 112, 283-302.
1362. Fischer, E. (1902). Über die Hydrolyse der Proteinstoffe. *Chem Ztg* 26, 939-40.
1363. Miescher, F. (1871). Über die chemische Zusammensetzung der Eiterzellen. *Hoppe-Seyler's med chem Untersuchungen* 4, 441-60.
1364. Levene, P. A. & Jacobs, W. A. (1912). On the structure of thymus nucleic acid. *J Biol Chem* 12, 411-20.
1365. Levene, P. A. & London, E. S. (1929). Guanine-desoxyriboside from thymus nucleic acid. *J Biol Chem* 81, 711-2.
1366. Avery, O. T., MacLeod, C. M. & McCarty, M. (1944). Studies of the chemical nature of the substance inducing transformation of pneumococcal types. Induction of transformation by a desoxyribonucleic acid fraction isolated from *Pneumococcus* Type III. *J Exp Med* 79, 137-58.
1367. Vischer, E., Zamenhof, S. & Chargaff, E. (1949). Microbial nucleic acids - The desoxyribonucleic acids of avian tubercle bacilli and yeast. *J Biol Chem* 177, 429-38.
1368. Mirsky, A. E. & Ris, H. (1951). The desoxyribonucleic acid content of animal cells and its evolutionary significance. *J Gen Physiol* 34, 451-62.
1369. McCarty, M. & Avery, O. T. (1946). Studies of the chemical nature of the substance inducing transformation of pneumococcal types III. Effect of desoxyribonuclease on the biological activity of the transforming substance. *J Exp Med* 83, 89-96.
1370. Hershey, A. D. & Chase, M. (1952). Independent functions of viral protein and nucleic acid in growth of bacteriophage. *J Gen Physiol* 36, 39-56.
1371. Schrödinger, E. (1945) What is life?, Cambridge University Press, New York, USA
1372. Squires, G. L. (2003). The discovery of the structure of DNA. *Cont Phys* 44, 289-305.
1373. Olby, R. (1970). Francis Crick, DNA, and the Central Dogma. *Daedalus* 99, 938-87.
1374. Franklin, S. E. & Gosling, R. G. (1953). Molecular configuration in sodium thymonucleate. *Nature* 171, 740-1.
1375. Pauling, L. (1948). Molecular architecture and the process of life. 21st Sir Jesse Boot Foundation Lecture, Nottingham, UK.
1376. Watson, J. D. & Crick, F. H. (1953). Molecular structure of nucleic acids; a structure for deoxyribose nucleic acid. *Nature* 171, 737-8.
1377. Garrod, A. E. (1902). The incidence of alkaptonuria: A study in chemical individuality. *Lancet* 2, 1616-20.
1378. Garrod, A. E. (1908). The Croonian lectures on inborn errors of metabolism. Lecture II. Alkaptonuria. *Lancet* 2, 73-9.
1379. Pauling, L., Itano, H. A., Singer, S. J. & Wells, I. C. (1949). Sickle cell anemia, a molecular disease. *Science* 110, 543-8.
1380. Sanger, F. (1950). Some chemical investigations on the structure of insulin. *Cold Spring Harb Symp Quant Biol* 14, 153-60.
1381. Hanawa, H., Watanabe, K., Nakamura, T., Ogawa, Y., Toba, K., Fuse, I., Kodama, M., Kato, K., Fuse, K. & Aizawa, Y. (2002). Identification of cryptic splice site, exon skipping, and novel point mutations in type I CD36 deficiency. *J Med Genet* 39, 286-91.
1382. D'Souza, I., Poorkaj, P., Hong, M., Nochlin, D., Lee, V. M., Bird, T. D. & Schellenberg, G. D. (1999). Missense and silent tau gene mutations cause frontotemporal dementia with parkinsonism-chromosome 17 type, by affecting multiple alternative RNA splicing regulatory elements. *Proc Natl Acad Sci U S A* 96, 5598-603.
1383. Cooper, D. N. & Krawczak, M. (1993) Human Gene Mutation, bios Scientific, Oxford, UK
1384. Hentze, M. W. & Kulozik, A. E. (1999). A perfect message: RNA surveillance and nonsense-mediated decay. *Cell* 96, 307-10.
1385. Imbrici, P., Eunson, L. H., Graves, T. D., Bhatia, K. P., Wadia, N. H., Kullmann, D. M. & Hanna, M. G. (2005). Late-onset episodic ataxia type 2 due to an in-frame insertion in CACNA1A. *Neurology* 65, 944-6.
1386. Robitaille, Y., Lopes-Cendes, I., Becher, M., Rouleau, G. & Clark, A. W. (1997). The neuropathology of CAG repeat diseases: review and update of genetic and molecular features. *Brain Pathol* 7, 901-26.
1387. Stott, K., Blackburn, J. M., Butler, P. J. & Perutz, M. (1995). Incorporation of glutamine repeats makes protein oligomerize: implications for neurodegenerative diseases. *Proc Natl Acad Sci U S A* 92, 6509-13.
1388. Dietz, H. C., Valle, D., Francomano, C. A., Kendzior, R. J., Jr., Pyeritz, R. E. & Cutting, G. R. (1993). The skipping of constitutive exons in vivo induced by nonsense mutations. *Science* 259, 680-3.
1389. Brook, J. D., McCurrach, M. E., Harley, H. G., Buckler, A. J., Church, D., Aburatani, H., Hunter, K., Stanton, V. P., Thirion, J. P., Hudson, T. & et al. (1992). Molecular basis of myotonic dystrophy: expansion of a trinucleotide (CTG) repeat at the 3' end of a transcript encoding a protein kinase family member. *Cell* 68, 799-808.
1390. Ramser, J., Winnepenninckx, B., Lenski, C., Errjgers, V., Platzer, M., Schwartz, C. E., Meindl, A. & Kooy, R. F. (2004). A splice site mutation in the methyltransferase gene FTSJ1 in Xp11.23 is associated with non-syndromic mental retardation in a large Belgian family (MRX9). *J Med Genet* 41, 679-83.
1391. Kaler, S. G., Gallo, L. K., Proud, V. K., Percy, A. K., Mark, Y., Segal, N. A., Goldstein, D. S., Holmes, C. S. & Gahl, W. A. (1994). Occipital horn syndrome and a mild

- Menkes phenotype associated with splice site mutations at the MNK locus. *Nat Genet* 8, 195-202.
1392. Hayashi, T., Gekka, T., Omoto, S., Takeuchi, T. & Kitahara, K. (2005). Dominant optic atrophy caused by a novel OPA1 splice site mutation (IVS20+1G-->A) associated with intron retention. *Ophthalmic Res* 37, 214-24.
1393. Wibawa, T., Takeshima, Y., Mitsuyoshi, I., Wada, H., Surono, A., Nakamura, H. & Matsuo, M. (2000). Complete skipping of exon 66 due to novel mutations of the dystrophin gene was identified in two Japanese families of Duchenne muscular dystrophy with severe mental retardation. *Brain Dev* 22, 107-12.
1394. Miné, M., Brivet, M., Touati, G., Grabowski, P., Abitbol, M. & Marsac, C. (2003). Splicing error in E1alpha pyruvate dehydrogenase mRNA caused by novel intronic mutation responsible for lactic acidosis and mental retardation. *J Biol Chem* 278, 11768-72.
1395. Crossley, M. & Brownlee, G. G. (1990). Disruption of a C/EBP binding site in the factor IX promoter is associated with haemophilia B. *Nature* 345, 444-6.
1396. Higgs, D. R., Goodbourn, S. E., Lamb, J., Clegg, J. B., Weatherall, D. J. & Proudfoot, N. J. (1983). α -thalassaemia caused by a polyadenylation signal mutation. *Nature* 306, 398-400.
1397. Nicholls, R. D., Knoll, J. H., Butler, M. G., Karam, S. & Lalonde, M. (1989). Genetic imprinting suggested by maternal heterodisomy in nondeletion Prader-Willi syndrome. *Nature* 342, 281-5.
1398. Wong, N. A., Britton, M. P., Choi, G. S., Stanton, T. K., Bicknell, D. C., Wilding, J. L. & Bodmer, W. F. (2004). Loss of CDX1 expression in colorectal carcinoma: promoter methylation, mutation, and loss of heterozygosity analyses of 37 cell lines. *Proc Natl Acad Sci U S A* 101, 574-9.
1399. Wallace, D. C., Singh, G., Lott, M. T., Hodge, J. A., Schurr, T. G., Lezza, A. M., Elsas, L. J., 2nd & Nikoskelainen, E. K. (1988). Mitochondrial DNA mutation associated with Leber's hereditary optic neuropathy. *Science* 242, 1427-30.
1400. Wallace, M. R., Andersen, L. B., Saulino, A. M., Gregory, P. E., Glover, T. W. & Collins, F. S. (1991). A *de novo* Alu insertion results in neurofibromatosis type 1. *Nature* 353, 864-6.
1401. Kazazian, H. H., Jr., Wong, C., Youssoufian, H., Scott, A. F., Phillips, D. G. & Antonarakis, S. E. (1988). Haemophilia A resulting from *de novo* insertion of L1 sequences represents a novel mechanism for mutation in man. *Nature* 332, 164-6.
1402. Fantes, J., Redeker, B., Breen, M., Boyle, S., Brown, J., Fletcher, J., Jones, S., Bickmore, W., Fukushima, Y., Mannens, M., Sarah Danes, S., van Heyningen, V. & Hanson, I. (1995). Aniridia-associated cytogenetic rearrangements suggest that a position effect may cause the mutant phenotype. *Hum Mol Genet* 4, 415-22.
1403. Sasaki, R., Inamo, Y., Saitoh, K., Hasegawa, T., Kinoshita, E. & Ogata, T. (2003). Mental retardation in a boy with congenital adrenal hypoplasia: a clue to contiguous gene syndrome involving DAX1 and IL1RAPL. *Endocr J* 50, 303-7.
1404. Bayés, M., Magano, L. F., Rivera, N., Flores, R. & Pérez Jurado, L. A. (2003). Mutational mechanisms of Williams-Beuren syndrome deletions. *Am J Hum Genet* 73, 131-51.
1405. Pentao, L., Wise, C. A., Chinault, A. C., Patel, P. I. & Lupski, J. R. (1992). Charcot-Marie-Tooth type 1A duplication appears to arise from recombination at repeat sequences flanking the 1.5 Mb monomer unit. *Nat Genet* 2, 292-300.
1406. Nathans, J., Piantanida, T. P., Eddy, R. L., Shows, T. B. & Hogness, D. S. (1986). Molecular genetics of inherited variation in human color vision. *Science* 232, 203-10.
1407. Zimran, A., Sorge, J., Gross, E., Kubitz, M., West, C. & Beutler, E. (1990). A glucocerebrosidase fusion gene in Gaucher disease. Implications for the molecular anatomy, pathogenesis, and diagnosis of this disorder. *J Clin Invest* 85, 219-22.
1408. Raile, K., Klammt, J., Schneider, A., Keller, A., Laue, S., Smith, R., Pfaffle, R., Kratzsch, J., Keller, E. & Kiess, W. (2006). Clinical and functional characteristics of the human Arg59Ter insulin-like growth factor I receptor (IGF1R) mutation: implications for a gene dosage effect of the human IGF1R. *J Clin Endocrinol Metab* 91, 2264-71.
1409. Van Esch, H., Bauters, M., Ignatius, J., Jansen, M., Raynaud, M., Hollanders, K., Lugtenberg, D., Bienvenu, T., Jensen, L. R., Gecz, J., Moraine, C., Marynen, P., Fryns, J. P. & Froyen, G. (2005). Duplication of the MECP2 region is a frequent cause of severe mental retardation and progressive neurological symptoms in males. *Am J Hum Genet* 77, 442-53.
1410. Krüger, S., Silber, A. S., Engel, C., Gorgens, H., Mangold, E., Pagenstecher, C., Holinski-Feder, E., von Knebel Doeberitz, M., Moeslein, G., Dietmaier, W., Stemmler, S., Friedl, W., Ruschoff, J. & Schackert, H. K. (2005). Arg462Gln sequence variation in the prostate-cancer-susceptibility gene RNASEL and age of onset of hereditary non-polyposis colorectal cancer: a case-control study. *Lancet Oncol* 6, 566-72.
1411. Fokstuen, S., Ginsburg, C., Zachmann, M. & Schinzel, A. (1999). Maternal uniparental disomy 14 as a cause of intrauterine growth retardation and early onset of puberty. *J Pediatr* 134, 689-95.
1412. Kurosawa, K., Sasaki, H., Sato, Y., Yamanaka, M., Shimizu, M., Ito, Y., Okuyama, T., Matsuo, M., Imaizumi, K., Kuroki, Y. & Nishimura, G. (2002). Paternal UPD14 is responsible for a distinctive malformation complex. *Am J Med Genet* 110, 268-72.
1413. Iliopoulos, D., Sekerli, E., Vassiliou, G., Sidiropoulou, V., Topalidis, A., Dimopoulou, D. & Voyiatzis, N. (2006). Patau syndrome with a long survival (146 months): a clinical report and review of literature. *Am J Med Genet A* 140, 92-3.
1414. Petek, E., Pertl, B., Tschernigg, M., Bauer, M., Mayr, J., Wagner, K. & Kroisel, P. M. (2003). Characterisation of a 19-year-old "long-term survivor" with Edwards syndrome. *Genet Couns* 14, 239-44.
1415. Linden, M. G. & Bender, B. G. (2002). Fifty-one prenatally diagnosed children and adolescents with sex chromosome abnormalities. *Am J Med Genet* 110, 11-8.
1416. Gunther, D. F., Eugster, E., Zagar, A. J., Bryant, C. G., Davenport, M. L. & Quigley, C. A. (2004). Ascertainment bias in Turner syndrome: new insights from girls who were diagnosed incidentally in prenatal life. *Pediatrics* 114, 640-4.
1417. Leisti, J. T., Raivio, K. O., Rapola, M. H., Saksela, E. J. & Aula, P. P. (1974). The phenotype of human triploidy. *Birth Defects Orig Artic Ser* 10, 248-53.
1418. Guc-Scekic, M., Milasin, J., Stevanovic, M., Stojanov, L. J. & Djordjevic, M. (2002). Tetraploidy in a 26-month-old girl (cytogenetic and molecular studies). *Clin Genet* 61, 62-5.
1419. Abuzzahab, M. J., Schneider, A., Goddard, A., Grigorescu, F., Lautier, C., Keller, E., Kiess, W., Klammt, J., Kratzsch, J., Osgood, D., Pfaffle, R., Raile, K., Seidel, B., Smith, R. J. & Chernausk, S. D. (2003). IGF-I receptor mutations resulting in intrauterine and postnatal growth retardation. *N Engl J Med* 349, 2211-22.
1420. Timchenko, L. T. & Caskey, C. T. (1999). Triplet repeat disorders: discussion of molecular mechanisms. *Cell Mol Life Sci* 55, 1432-47.
1421. Fu, Y. H., Kuhl, D. P., Pizzuti, A., Pieretti, M., Sutcliffe, J. S., Richards, S., Verkerk, A. J., Holden, J. J., Fenwick, R. G., Jr., Warren, S. T. & et al. (1991). Variation of the CGG repeat at the fragile X site results in genetic instability: resolution of the Sherman paradox. *Cell* 67, 1047-58.
1422. Teisberg, P. (1995). The genetic background of anticipation. *J R Soc Med* 88, 185-7.

1423. Leeflang, E. P., Tavare, S., Marjoram, P., Neal, C. O., Srinidhi, J., MacFarlane, H., MacDonald, M. E., Gusella, J. F., de Young, M., Wexler, N. S. & Arnheim, N. (1999). Analysis of germline mutation spectra at the Huntington's disease locus supports a mitotic mutation mechanism. *Hum Mol Genet* 8, 173-83.
1424. Trottier, Y., Biancalana, V. & Mandel, J. L. (1994). Instability of CAG repeats in Huntington's disease: relation to parental transmission and age of onset. *J Med Genet* 31, 377-82.
1425. Petruska, J., Hartenstine, M. J. & Goodman, M. F. (1998). Analysis of strand slippage in DNA polymerase expansions of CAG/CTG triplet repeats associated with neurodegenerative disease. *J Biol Chem* 273, 5204-10.
1426. Chi, L. M. & Lam, S. L. (2005). Structural roles of CTG repeats in slippage expansion during DNA replication. *Nucleic Acids Res* 33, 1604-17.
1427. Nag, D. K., Suri, M. & Stenson, E. K. (2004). Both CAG repeats and inverted DNA repeats stimulate spontaneous unequal sister-chromatid exchange in *Saccharomyces cerevisiae*. *Nucleic Acids Res* 32, 5677-84.
1428. Darnell, J. E., Jelinek, W. R. & Molloy, G. R. (1973). Biogenesis of mRNA: genetic regulation in mammalian cells. *Science* 181, 1215-21.
1429. Sheiness, D., Puckett, L. & Darnell, J. E. (1975). Possible relationship of poly(A) shortening to mRNA turnover. *Proc Natl Acad Sci U S A* 72, 1077-81.
1430. Proudfoot, N. J. & Brownlee, G. G. (1976). 3' non-coding region sequences in eukaryotic messenger RNA. *Nature* 263, 211-4.
1431. Richard, I. & Beckmann, J. S. (1995). How neutral are synonymous codon mutations? *Nat Genet* 10, 259.
1432. Surani, M. A., Reik, W. & Allen, N. D. (1988). Transgenes as molecular probes for genomic imprinting. *Trends Genet* 4, 59-62.
1433. Keshet, I., Yisraeli, J. & Cedar, H. (1985). Effect of regional DNA methylation on gene expression. *Proc Natl Acad Sci U S A* 82, 2560-4.
1434. Anderson, S., Bankier, A. T., Barrell, B. G., de Bruijn, M. H., Coulson, A. R., Drouin, J., Eperon, I. C., Nierlich, D. P., Roe, B. A., Sanger, F., Schreier, P. H., Smith, A. J., Staden, R. & Young, I. G. (1981). Sequence and organization of the human mitochondrial genome. *Nature* 290, 457-65.
1435. Hutchison, C. A., 3rd, Newbold, J. E., Potter, S. S. & Edgell, M. H. (1974). Maternal inheritance of mammalian mitochondrial DNA. *Nature* 251, 536-8.
1436. Holt, I. J., Harding, A. E. & Morgan-Hughes, J. A. (1988). Deletions of muscle mitochondrial DNA in patients with mitochondrial myopathies. *Nature* 331, 717-9.
1437. Denver, D. R., Morris, K., Lynch, M., Vassilieva, L. L. & Thomas, W. K. (2000). High direct estimate of the mutation rate in the mitochondrial genome of *Caenorhabditis elegans*. *Science* 289, 2342-4.
1438. Larsson, N. G. & Clayton, D. A. (1995). Molecular genetic aspects of human mitochondrial disorders. *Annu Rev Genet* 29, 151-78.
1439. Poulton, J. & Holt, I. J. (1994). Mitochondrial DNA: does more lead to less? *Nat Genet* 8, 313-5.
1440. Ullu, E. & Tschudi, C. (1984). Alu sequences are processed 7SL RNA genes. *Nature* 312, 171-2.
1441. Dewannieux, M. & Heidmann, T. (2005). LINEs, SINEs and processed pseudogenes: parasitic strategies for genome modeling. *Cytogenet Genome Res* 110, 35-48.
1442. Ledbetter, D. H. & Engel, E. (1995). Uniparental disomy in humans: development of an imprinting map and its implications for prenatal diagnosis. *Hum Mol Genet* 4 Spec No, 1757-64.
1443. Cox, A. W. (1999). Autosomal trisomies: what neonatal nurses need to know. *Neonatal Netw* 18, 7-15.
1444. Roizen, N. J. & Patterson, D. (2003). Down's syndrome. *Lancet* 361, 1281-9.
1445. Jacobs, P. A. & Strong, J. A. (1959). A case of human intersexuality having a possible XXY sex-determining mechanism. *Nature* 183, 302-3.
1446. Klinefelter, H. F., Reifenstein, E. C. & Albright, F. (1942). Syndrome characterized by gynecomastia, aspermatogenesis without a-leydigism, and increased excretion of follicle-stimulating hormone. *J Clin Endocrinol* 2, 615-27.
1447. Ford, C. E., Jones, K. W., Polani, P. E., De Almeida, J. C. & Briggs, J. H. (1959). A sex-chromosome anomaly in a case of gonadal dysgenesis (Turner's syndrome). *Lancet* 1, 711-3.
1448. Turner, H. H. (1938). A syndrome of infantilism, congenital webbed neck, and cubitus valgus. *Endocrinology* 23, 566-74.
1449. Hook, E. B. (1978). Spontaneous deaths of fetuses with chromosomal abnormalities diagnosed prenatally. *N Engl J Med* 299, 1036-8.
1450. Jamieson, M. E., Coutts, J. R. & Connor, J. M. (1994). The chromosome constitution of human preimplantation embryos fertilized in vitro. *Hum Reprod* 9, 709-15.
1451. Clouston, H. J., Herbert, M., Fenwick, J., Murdoch, A. P. & Wolstenholme, J. (2002). Cytogenetic analysis of human blastocysts. *Prenat Diagn* 22, 1143-52.