

## References

- Adham, I. M., Nayernia, K., Burkhardt-Gottges, E., Topaloglu, O., Dixkens, C., Holstein, A. F. and Engel, W. (2001). Teratozoospermia in mice lacking the transition protein 2 (Tnp2). *Mol Hum Reprod* **7**, 513-20.
- Adham, I. M., Nayernia, K. and Engel, W. (1997). Spermatozoa lacking acrosin protein show delayed fertilization. *Mol Reprod Dev* **46**, 370-6.
- Allen, C. A. and Green, D. P. (1997). The mammalian acrosome reaction: gateway to sperm fusion with the oocyte? *Bioessays* **19**, 241-7.
- Anway, M. D., Li, Y., Ravindranath, N., Dym, M. and Griswold, M. D. (2003). Expression of testicular germ cell genes identified by differential display analysis. *J Androl* **24**, 173-84.
- Baba, D., Kashiwabara, S., Honda, A., Yamagata, K., Wu, Q., Ikawa, M., Okabe, M. and Baba, T. (2002). Mouse sperm lacking cell surface hyaluronidase PH-20 can pass through the layer of cumulus cells and fertilize the egg. *J Biol Chem* **277**, 30310-4.
- Bartlett, J. M. (2003). Differential display: a technical overview. *Methods Mol Biol* **226**, 217-24.
- Baugh, L. R., Hill, A. A., Brown, E. L. and Hunter, C. P. (2001). Quantitative analysis of mRNA amplification by in vitro transcription. *Nucleic Acids Res* **29**, E29.
- Beckmann, A. M. and Wilce, P. A. (1997). Egr transcription factors in the nervous system. *Neurochem Int* **31**, 477-510; discussion 517-6.
- Boheler, K. R. and Stern, M. D. (2003). The new role of SAGE in gene discovery. *Trends Biotechnol* **21**, 55-7; discussion 57-8.
- Bortoluzzi, S., d'Alessi, F. and Danieli, G. A. (2000). A computational reconstruction of the adult human heart transcriptional profile. *J Mol Cell Cardiol* **32**, 1931-8.
- Brazma, A., Hingamp, P., Quackenbush, J., Sherlock, G., Spellman, P., Stoeckert, C., Aach, J., Ansorge, W., Ball, C. A., Causton, H. C. et al. (2001). Minimum information about a microarray experiment (MIAME)-toward standards for microarray data. *Nat Genet* **29**, 365-71.
- Brinster, R. L. (2002). Germline stem cell transplantation and transgenesis. *Science* **296**, 2174-6.
- Brinster, R. L. and Avarbock, M. R. (1994). Germline transmission of donor haplotype following spermatogonial transplantation. *Proc Natl Acad Sci U S A* **91**, 11303-7.
- Brinster, R. L. and Zimmermann, J. W. (1994). Spermatogenesis following male germ-cell transplantation. *Proc Natl Acad Sci U S A* **91**, 11298-302.
- Campbell, N. A., Reece, J. B. and Mitchell, L. G. (1999). *Biology*, 5th ed.: Pearson Benjamin Cummings. San Francisco.
- Carlson, A. E., Westenbroek, R. E., Quill, T., Ren, D., Clapham, D. E., Hille, B., Garbers, D. L. and Babcock, D. F. (2003). CatSper1 required for evoked Ca<sup>2+</sup> entry and control of flagellar function in sperm. *Proc Natl Acad Sci U S A* **100**, 14864-14868.
- Chiarini-Garcia, H., Raymer, A. M. and Russell, L. D. (2003). Non-random distribution of spermatogonia in rats: evidence of niches in the seminiferous tubules. *Reproduction* **126**, 669-80.
- Chiarini-Garcia, H. and Russell, L. D. (2001). High-resolution light microscopic characterization of mouse spermatogonia. *Biol Reprod* **65**, 1170-8.
- Chiarini-Garcia, H. and Russell, L. D. (2002). Characterization of mouse spermatogonia by transmission electron microscopy. *Reproduction* **123**, 567-77.
- The Chipping Forecast:** Supplement to Nature Genetics (1999). *Nat Genet* **21**, 1-60.

- Cho, C., Bunch, D. O., Faure, J. E., Goulding, E. H., Eddy, E. M., Primakoff, P. and Myles, D. G.** (1998). Fertilization defects in sperm from mice lacking fertilin  $\beta$ . *Science* **281**, 1857-9.
- Cho, C., Willis, W. D., Goulding, E. H., Jung-Ha, H., Choi, Y. C., Hecht, N. B. and Eddy, E. M.** (2001). Haploinsufficiency of protamine-1 or -2 causes infertility in mice. *Nat Genet* **28**, 82-6.
- Clermont, Y. and Bustos-Obregon, E.** (1968). Re-examination of spermatogonial renewal in the rat by means of seminiferous tubules mounted "in toto". *Am J Anat* **122**, 237-47.
- Collarini, E. J., Kuhn, R., Marshall, C. J., Monuki, E. S., Lemke, G. and Richardson, W. D.** (1992). Down-regulation of the POU transcription factor SCIP is an early event in oligodendrocyte differentiation in vitro. *Development* **116**, 193-200.
- de Kretser, D. M. and Kerr, J. B.** (1994). The cytology of the testis. In *Physiology of Reproduction*, (ed. E. Knobil and J. D. Neil), pp. 1177-1290. New York: Raven Press.
- de Kretser, D. M., Loveland, K. L., Meinhardt, A., Simorangkir, D. and Wreford, N.** (1998). Spermatogenesis. *Hum Reprod* **13 Suppl 1**, 1-8.
- De Martino, C., Floridi, A., Marcante, M. L., Malorni, W., Scorza Barcellona, P., Bellocci, M. and Silvestrini, B.** (1979). Morphological, histochemical and biochemical studies on germ cell mitochondria of normal rats. *Cell Tissue Res* **196**, 1-22.
- de Rooij, D. G.** (1998). Stem cells in the testis. *Int J Exp Pathol* **79**, 67-80.
- de Rooij, D. G.** (2001). Proliferation and differentiation of spermatogonial stem cells. *Reproduction* **121**, 347-54.
- de Rooij, D. G. and Grootegoed, J. A.** (1998). Spermatogonial stem cells. *Curr Opin Cell Biol* **10**, 694-701.
- Dettin, L., Ravindranath, N., Hofmann, M. C. and Dym, M.** (2003). Morphological characterization of the spermatogonial subtypes in the neonatal mouse testis. *Biol Reprod* **69**, 1565-71.
- Dobrinski, I., Ogawa, T., Avarbock, M. R. and Brinster, R. L.** (1999). Computer assisted image analysis to assess colonization of recipient seminiferous tubules by spermatogonial stem cells from transgenic donor mice. *Mol Reprod Dev* **53**, 142-8.
- Duggan, D. J., Bittner, M., Chen, Y., Meltzer, P. and Trent, J. M.** (1999). Expression profiling using cDNA microarrays. *Nat Genet* **21**, 10-4.
- Eddy, E. M. and O'Brien, D. A.** (1998). Gene Expression during mammalian meiosis. In *Meiosis and Gametogenesis*, (ed. M. A. Handel), pp. 141-200. San Diego: Academic Press.
- Eddy, E. M., Welch, J. E. and O'Brien, D. A.** (1993). Gene expression during spermatogenesis. In *Molecular Biology of the Male Reproductive System*, (ed. D. M. de Kretser), pp. 181-232. San Diego: Academic Press.
- Eisenbach, M.** (1999). Mammalian sperm chemotaxis and its association with capacitation. *Dev Genet* **25**, 87-94.
- Evsikov, A. V. and Solter, D.** (2003). Comment on " 'Stemness': transcriptional profiling of embryonic and adult stem cells" and "a stem cell molecular signature". *Science* **302**, 393.
- Florman, H. M. and Wassarman, P. M.** (1985). O-linked oligosaccharides of mouse egg ZP3 account for its sperm receptor activity. *Cell* **41**, 313-24.
- Fortunel, N. O., Otu, H. H., Ng, H. H., Chen, J., Mu, X., Chevassut, T., Li, X., Joseph, M., Bailey, C., Hatzfeld, J. A. et al.** (2003). Comment on " 'Stemness': transcriptional profiling of embryonic and adult stem cells" and "a stem cell molecular signature". *Science* **302**, 393.

- Foulkes, N. S., Mellstrom, B., Benusiglio, E. and Sassone-Corsi, P.** (1992). Developmental switch of CREM function during spermatogenesis: from antagonist to activator. *Nature* **355**, 80-4.
- Fraser, L. R.** (1998). Sperm capacitation and the acrosome reaction. *Hum Reprod* **13 Suppl 1**, 9-19.
- Garbers, D., Quill, T.** (2000). The molecular basis of sperm-egg interactions. In *The Testis: From Stem Cell to Sperm Function*, (ed. E. Goldberg), pp. 186-197. New York: Springer-Verlag.
- Garbers, D. L.** (1992). Guanylyl cyclase receptors and their endocrine, paracrine, and autocrine ligands. *Cell* **71**, 1-4.
- Gill, T. J., 3rd, Smith, G. J., Wissler, R. W. and Kunz, H. W.** (1989). The rat as an experimental animal. *Science* **245**, 269-76.
- Giulli, G., Tomljenovic, A., Labrecque, N., Oulad-Abdelghani, M., Rassoulzadegan, M. and Cuzin, F.** (2002). Murine spermatogonial stem cells: targeted transgene expression and purification in an active state. *EMBO Rep* **3**, 753-9.
- Griswold, M. D.** (1995). Interactions between germ cells and Sertoli cells in the testis. *Biol Reprod* **52**, 211-6.
- Guo, R., Yu, Z., Guan, J., Ge, Y., Ma, J., Li, S., Wang, S., Xue, S. and Han, D.** (2004). Stage-specific and tissue-specific expression characteristics of differentially expressed genes during mouse spermatogenesis. *Mol Reprod Dev* **67**, 264-72.
- Guo, Y., Costa, R., Ramsey, H., Starnes, T., Vance, G., Robertson, K., Kelley, M., Reinbold, R., Scholer, H. and Hromas, R.** (2002). The embryonic stem cell transcription factors Oct-4 and FoxD3 interact to regulate endodermal-specific promoter expression. *Proc Natl Acad Sci U S A* **99**, 3663-7.
- Gupta, V., Cherkassky, A., Chatis, P., Joseph, R., Johnson, A. L., Broadbent, J., Erickson, T. and DiMeo, J.** (2003). Directly labeled mRNA produces highly precise and unbiased differential gene expression data. *Nucleic Acids Res* **31**, e13.
- Hamra, F. K., Gatlin, J., Chapman, K. M., Grellhesl, D. M., Garcia, J. V., Hammer, R. E. and Garbers, D. L.** (2002). Production of transgenic rats by lentiviral transduction of male germ-line stem cells. *Proc Natl Acad Sci U S A* **99**, 14931-6.
- Hedrich, H. J.** (2000). History, Strains and Models. San Diego: Academic Press.
- Hegde, P., Qi, R., Abernathy, K., Gay, C., Dharap, S., Gaspard, R., Hughes, J. E., Snesrud, E., Lee, N. and Quackenbush, J.** (2000). A concise guide to cDNA microarray analysis. *Biotechniques* **29**, 548-54, 556, 558-60.
- Heid, C. A., Stevens, J., Livak, K. J. and Williams, P. M.** (1996). Real time quantitative PCR. *Genome Res* **6**, 986-94.
- Huckins, C.** (1971a). Cell cycle properties of differentiating spermatogonia in adult Sprague-Dawley rats. *Cell Tissue Kinet* **4**, 139-54.
- Huckins, C.** (1971b). The spermatogonial stem cell population in adult rats. I. Their morphology, proliferation and maturation. *Anat Rec* **169**, 533-57.
- Huckins, C.** (1971c). The spermatogonial stem cell population in adult rats. II. A radioautographic analysis of their cell cycle properties. *Cell Tissue Kinet* **4**, 313-34.
- Huckins, C.** (1971d). The spermatogonial stem cell population in adult rats. III. Evidence for a long-cycling population. *Cell Tissue Kinet* **4**, 335-49.
- Ivanova, N. B., Dimos, J. T., Schaniel, C., Hackney, J. A., Moore, K. A. and Lemischka, I. R.** (2002). A stem cell molecular signature. *Science* **298**, 601-4.
- Ivanova, N. B., Dimos, J. T., Schaniel, C., Hackney, J. A., Moore, K. A., Ramalho-Santos, M., Yoon, S., Matsuzaki, Y., Mulligan, R. C., Lemischka, I. R. et al.** (2003). Response to comments on " 'Stemness': Transcriptional profiling of embryonic and adult stem cells" and "A stem cell molecular signature". *Science* **302**, 393.

- Kadota, K., Nishimura, S., Bono, H., Nakamura, S., Hayashizaki, Y., Okazaki, Y. and Takahashi, K. (2003). Detection of genes with tissue-specific expression patterns using Akaike's information criterion procedure. *Physiol Genomics* **12**, 251-9.
- Kanatsu-Shinohara, M., Toyokuni, S. and Shinohara, T. (2004). CD9 is a surface marker on mouse and rat male germline stem cells. *Biol Reprod* **70**, 70-5.
- Kashiwabara, S., Noguchi, J., Zhuang, T., Ohmura, K., Honda, A., Sugiura, S., Miyamoto, K., Takahashi, S., Inoue, K., Ogura, A. et al. (2002). Regulation of spermatogenesis by testis-specific, cytoplasmic poly(A) polymerase TPAP. *Science* **298**, 1999-2002.
- Kawasaki, T., Oka, N., Tachibana, H., Akiguchi, I. and Shibasaki, H. (2003). Oct6, a transcription factor controlling myelination, is a marker for active nerve regeneration in peripheral neuropathies. *Acta Neuropathol (Berl)* **105**, 203-8.
- Kerr, S. M., Taggart, M. H., Lee, M. and Cooke, H. J. (1996a). Ott, a mouse X-linked multigene family expressed specifically during meiosis. *Hum Mol Genet* **5**, 1139-48.
- Kerr, S. M., Taggart, M. H., Lee, M. and Cooke, H. J. (1996b). Sequence and mapping of mouse synaptonemal complex protein genes Sycpl and Sycpl-rs. *Mamm Genome* **7**, 209-11.
- Kim, S. W., Muise, A. M., Lyons, P. J. and Ro, H. S. (2001). Regulation of adipogenesis by a transcriptional repressor that modulates MAPK activation. *J Biol Chem* **276**, 10199-206.
- Kisseberth, W. C., Brettingen, N. T., Lohse, J. K. and Sandgren, E. P. (1999). Ubiquitous expression of marker transgenes in mice and rats. *Dev Biol* **214**, 128-38.
- Klein, R. D., Gu, Q., Goddard, A. and Rosenthal, A. (1996). Selection for genes encoding secreted proteins and receptors. *Proc Natl Acad Sci U S A* **93**, 7108-13.
- Kubota, H., Avarbock, M. R. and Brinster, R. L. (2003). Spermatogonial stem cells share some, but not all, phenotypic and functional characteristics with other stem cells. *Proc Natl Acad Sci U S A* **100**, 6487-92.
- Lander, E. S., Linton, L. M., Birren, B., Nusbaum, C., Zody, M. C., Baldwin, J., Devon, K., Dewar, K., Doyle, M., FitzHugh, W. et al. (2001). Initial sequencing and analysis of the human genome. *Nature* **409**, 860-921.
- Leblond, C. P. and Clermont, Y. (1952). Spermiogenesis of rat, mouse, hamster and guinea pig as revealed by the "periodic acid-fuchsin sulfurous acid" technique. *Am J Anat* **90**, 167-215.
- Lee, M. A., Kopf, G. S. and Storey, B. T. (1987). Effects of phorbol esters and a diacylglycerol on the mouse sperm acrosome reaction induced by the zona pellucida. *Biol Reprod* **36**, 617-27.
- Lennon, G., Auffray, C., Polymeropoulos, M. and Soares, M. B. (1996). The I.M.A.G.E. Consortium: an integrated molecular analysis of genomes and their expression. *Genomics* **33**, 151-2.
- Liang, F., Holt, I., Perte, G., Karamycheva, S., Salzberg, S. L. and Quackenbush, J. (2000). Gene index analysis of the human genome estimates approximately 120,000 genes. *Nat Genet* **25**, 239-40.
- Lin, Y., Mahan, K., Lathrop, W. F., Myles, D. G. and Primakoff, P. (1994). A hyaluronidase activity of the sperm plasma membrane protein PH-20 enables sperm to penetrate the cumulus cell layer surrounding the egg. *J Cell Biol* **125**, 1157-63.
- Lipshutz, R. J., Fodor, S. P., Gingeras, T. R. and Lockhart, D. J. (1999). High density synthetic oligonucleotide arrays. *Nat Genet* **21**, 20-4.
- Liu, G., Loraine, A. E., Shigeta, R., Cline, M., Cheng, J., Valmeekam, V., Sun, S., Kulp, D. and Siani-Rose, M. A. (2003). NetAffx: Affymetrix probesets and annotations. *Nucleic Acids Res* **31**, 82-6.

- Lockhart, D. J., Dong, H., Byrne, M. C., Follettie, M. T., Gallo, M. V., Chee, M. S., Mittmann, M., Wang, C., Kobayashi, M., Horton, H. et al. (1996). Expression monitoring by hybridization to high-density oligonucleotide arrays. *Nat Biotechnol* **14**, 1675-80.
- Lok, D. and de Rooij, D. G. (1983a). Spermatogonial multiplication in the Chinese hamster. I. Cell cycle properties and synchronization of differentiating spermatogonia. *Cell Tissue Kinet* **16**, 7-18.
- Lok, D. and de Rooij, D. G. (1983b). Spermatogonial multiplication in the Chinese hamster. III. Labelling indices of undifferentiated spermatogonia throughout the cycle of the seminiferous epithelium. *Cell Tissue Kinet* **16**, 31-40.
- Lok, D., Jansen, M. T. and de Rooij, D. G. (1983). Spermatogonial multiplication in the Chinese hamster. II. Cell cycle properties of undifferentiated spermatogonia. *Cell Tissue Kinet* **16**, 19-29.
- Lok, D., Jansen, M. T. and de Rooij, D. G. (1984). Spermatogonial multiplication in the Chinese hamster. IV. Search for long cycling stem cells. *Cell Tissue Kinet* **17**, 135-43.
- Luzzi, V., Mahadevappa, M., Raja, R., Warrington, J. A. and Watson, M. A. (2003). Accurate and reproducible gene expression profiles from laser capture microdissection, transcript amplification, and high density oligonucleotide microarray analysis. *J Mol Diagn* **5**, 9-14.
- Ma, Y. J., Dissen, G. A., Rage, F. and Ojeda, S. R. (1996). RNase Protection Assay. *Methods* **10**, 273-8.
- Macfarlane, S. R., Seatter, M. J., Kanke, T., Hunter, G. D. and Plevin, R. (2001). Proteinase-activated receptors. *Pharmacol Rev* **53**, 245-82.
- Machida, S., Spangenburg, E. E. and Booth, F. W. (2003). Forkhead transcription factor FoxO1 transduces insulin-like growth factor's signal to p27Kip1 in primary skeletal muscle satellite cells. *J Cell Physiol* **196**, 523-31.
- Mali, P., Kaipia, A., Kangasniemi, M., Toppari, J., Sandberg, M., Hecht, N. B. and Parvinen, M. (1989). Stage-specific expression of nucleoprotein mRNAs during rat and mouse spermiogenesis. *Reprod Fertil Dev* **1**, 369-82.
- Malkov, M., Fisher, Y. and Don, J. (1998). Developmental schedule of the postnatal rat testis determined by flow cytometry. *Biol Reprod* **59**, 84-92.
- Manduchi, E., Scearce, L. M., Brestelli, J. E., Grant, G. R., Kaestner, K. H. and Stoeckert, C. J., Jr. (2002). Comparison of different labeling methods for two-channel high-density microarray experiments. *Physiol Genomics* **10**, 169-79.
- Mannan, A. U., Nayernia, K., Mueller, C., Burfeind, P., Adham, I. M. and Engel, W. (2003). Male mice lacking the Theg (testicular haploid expressed gene) protein undergo normal spermatogenesis and are fertile. *Biol Reprod* **69**, 788-96.
- Maratou, K., Forster, T., Costa, Y., Taggart, M., Speed, R. M., Ireland, J., Teague, P., Roy, D. and Cooke, H. J. (2004). Expression profiling of the developing testis in wild-type and *Dazl* knockout mice. *Mol Reprod Dev* **67**, 26-54.
- Mather, J. P., Saez, J. M. and Haour, F. (1981). Primary cultures of Leydig cells from rat, mouse and pig: advantages of porcine cells for the study of gonadotropin regulation of Leydig cell function. *Steroids* **38**, 35-44.
- McCarrey, J. R., Berg, W. M., Paragioudakis, S. J., Zhang, P. L., Dilworth, D. D., Arnold, B. L. and Rossi, J. J. (1992). Differential transcription of P<sub>gk</sub> genes during spermatogenesis in the mouse. *Dev Biol* **154**, 160-8.
- McCarrey, J. R., O'Brien, D. A. and Skinner, M. K. (1999). Construction and preliminary characterization of a series of mouse and rat testis cDNA libraries. *J Androl* **20**, 635-9.

- McGuinness, M. P., Linder, C. C., Morales, C. R., Heckert, L. L., Pikus, J. and Griswold, M. D.** (1994). Relationship of a mouse Sertoli cell line (MSC-1) to normal Sertoli cells. *Biol Reprod* **51**, 116-24.
- McLean, D. J., Friel, P. J., Johnston, D. S. and Griswold, M. D.** (2003). Characterization of spermatogonial stem cell maturation and differentiation in neonatal mice. *Biol Reprod* **69**, 2085-91.
- McMahon, A. P. and Bradley, A.** (1990). The Wnt-1 (int-1) proto-oncogene is required for development of a large region of the mouse brain. *Cell* **62**, 1073-85.
- Meijer, D., Graus, A., Kraay, R., Langeveld, A., Mulder, M. P. and Grosveld, G.** (1990). The octamer binding factor Oct6: cDNA cloning and expression in early embryonic cells. *Nucleic Acids Res* **18**, 7357-65.
- Melhuish, T. A., Gallo, C. M. and Wotton, D.** (2001). TGIF2 interacts with histone deacetylase 1 and represses transcription. *J Biol Chem* **276**, 32109-14.
- Meng, X., Lindahl, M., Hyvonen, M. E., Parvinen, M., de Rooij, D. G., Hess, M. W., Raatikainen-Ahokas, A., Sainio, K., Rauvala, H., Lakso, M. et al.** (2000). Regulation of cell fate decision of undifferentiated spermatogonia by GDNF. *Science* **287**, 1489-93.
- Mengerink, K. J., Moy, G. W. and Vacquier, V. D.** (2002). suREJ3, a polycystin-1 protein, is cleaved at the GPS domain and localizes to the acrosomal region of sea urchin sperm. *J Biol Chem* **277**, 943-8.
- Miki, K., Willis, W. D., Brown, P. R., Goulding, E. H., Fulcher, K. D. and Eddy, E. M.** (2002). Targeted disruption of the Akap4 gene causes defects in sperm flagellum and motility. *Dev Biol* **248**, 331-42.
- Miller, D. J., Macek, M. B. and Shur, B. D.** (1992). Complementarity between sperm surface  $\beta$ -1,4-galactosyltransferase and egg-coat ZP3 mediates sperm-egg binding. *Nature* **357**, 589-93.
- Moon, Y. A., Shah, N. A., Mohapatra, S., Warrington, J. A. and Horton, J. D.** (2001). Identification of a mammalian long chain fatty acyl elongase regulated by sterol regulatory element-binding proteins. *J Biol Chem* **276**, 45358-66.
- Nagano, M., Avarbock, M. R. and Brinster, R. L.** (1999). Pattern and kinetics of mouse donor spermatogonial stem cell colonization in recipient testes. *Biol Reprod* **60**, 1429-36.
- Nagano, M., Avarbock, M. R., Leonida, E. B., Brinster, C. J. and Brinster, R. L.** (1998). Culture of mouse spermatogonial stem cells. *Tissue Cell* **30**, 389-97.
- Nagano, M., Brinster, C. J., Orwig, K. E., Ryu, B. Y., Avarbock, M. R. and Brinster, R. L.** (2001). Transgenic mice produced by retroviral transduction of male germ-line stem cells. *Proc Natl Acad Sci U S A* **98**, 13090-5.
- Nagano, M., Ryu, B. Y., Brinster, C. J., Avarbock, M. R. and Brinster, R. L.** (2003). Maintenance of mouse male germ line stem cells in vitro. *Biol Reprod* **68**, 2207-14.
- Nagano, M., Shinohara, T., Avarbock, M. R. and Brinster, R. L.** (2000). Retrovirus-mediated gene delivery into male germ line stem cells. *FEBS Lett* **475**, 7-10.
- Nagano, M., Watson, D. J., Ryu, B. Y., Wolfe, J. H. and Brinster, R. L.** (2002). Lentiviral vector transduction of male germ line stem cells in mice. *FEBS Lett* **524**, 111-5.
- Nakae, J., Kitamura, T., Kitamura, Y., Biggs, W. H., 3rd, Arden, K. C. and Accili, D.** (2003). The forkhead transcription factor Foxo1 regulates adipocyte differentiation. *Dev Cell* **4**, 119-29.
- Narisawa, S., Hecht, N. B., Goldberg, E., Boatright, K. M., Reed, J. C. and Millan, J. L.** (2002). Testis-specific cytochrome c-null mice produce functional sperm but undergo early testicular atrophy. *Mol Cell Biol* **22**, 5554-62.
- Nayernia, K., Adham, I. M., Burkhardt-Gottges, E., Neesen, J., Rieche, M., Wolf, S., Sancken, U., Kleene, K. and Engel, W.** (2002). Asthenozoospermia in mice with

- targeted deletion of the sperm mitochondrion-associated cysteine-rich protein (Smcp) gene. *Mol Cell Biol* **22**, 3046-52.
- Nimgaonkar, A., Sanoudou, D., Butte, A. J., Haslett, J. N., Kunkel, L. M., Beggs, A. H. and Kohane, I. S.** (2003). Reproducibility of gene expression across generations of Affymetrix microarrays. *BMC Bioinformatics* **4**, 27.
- Noce, T., Okamoto-Ito, S. and Tsunekawa, N.** (2001). Vasa homolog genes in mammalian germ cell development. *Cell Struct Funct* **26**, 131-6.
- Oakberg, E. F.** (1971). Spermatogonial stem-cell renewal in the mouse. *Anat Rec* **169**, 515-31.
- O'Donovan, K. J., Tourtellotte, W. G., Millbrandt, J. and Baraban, J. M.** (1999). The EGR family of transcription-regulatory factors: progress at the interface of molecular and systems neuroscience. *Trends Neurosci* **22**, 167-73.
- Ogawa, T., Dobrinski, I. and Brinster, R. L.** (1999). Recipient preparation is critical for spermatogonial transplantation in the rat. *Tissue Cell* **31**, 461-72.
- Ohbo, K., Yoshida, S., Ohmura, M., Ohneda, O., Ogawa, T., Tsuchiya, H., Kuwana, T., Kehler, J., Abe, K., Scholer, H. R. et al.** (2003). Identification and characterization of stem cells in prepubertal spermatogenesis in mice small star, filled. *Dev Biol* **258**, 209-25.
- Okazaki, Y., Furuno, M., Kasukawa, T., Adachi, J., Bono, H., Kondo, S., Nikaido, I., Osato, N., Saito, R., Suzuki, H. et al.** (2002). Analysis of the mouse transcriptome based on functional annotation of 60,770 full-length cDNAs. *Nature* **420**, 563-73.
- Orwig, K. E., Avarbock, M. R. and Brinster, R. L.** (2002a). Retrovirus-mediated modification of male germline stem cells in rats. *Biol Reprod* **67**, 874-9.
- Orwig, K. E., Shinohara, T., Avarbock, M. R. and Brinster, R. L.** (2002b). Functional analysis of stem cells in the adult rat testis. *Biol Reprod* **66**, 944-9.
- Ostermeier, G. C., Dix, D. J., Miller, D., Khatri, P. and Krawetz, S. A.** (2002). Spermatozoal RNA profiles of normal fertile men. *Lancet* **360**, 772-7.
- Oulad-Abdelghani, M., Bouillet, P., Decimo, D., Gansmuller, A., Heyberger, S., Dolle, P., Bronner, S., Lutz, Y. and Chambon, P.** (1996). Characterization of a premeiotic germ cell-specific cytoplasmic protein encoded by *Stra8*, a novel retinoic acid-responsive gene. *J Cell Biol* **135**, 469-77.
- Packer, A. I., Besmer, P. and Bachvarova, R. F.** (1995). Kit ligand mediates survival of type A spermatogonia and dividing spermatocytes in postnatal mouse testes. *Mol Reprod Dev* **42**, 303-10.
- Pang, A. L., Taylor, H. C., Johnson, W., Alexander, S., Chen, Y., Su, Y. A., Li, X., Ravindranath, N., Dym, M., Rennert, O. M. et al.** (2003). Identification of differentially expressed genes in mouse spermatogenesis. *J Androl* **24**, 899-911.
- Parra, G., Agarwal, P., Abril, J. F., Wiehe, T., Fickett, J. W. and Guigo, R.** (2003). Comparative gene prediction in human and mouse. *Genome Res* **13**, 108-17.
- Pearse, R. V., 2nd, Drolet, D. W., Kalla, K. A., Hooshmand, F., Bermingham, J. R., Jr. and Rosenfeld, M. G.** (1997). Reduced fertility in mice deficient for the POU protein sperm-1. *Proc Natl Acad Sci U S A* **94**, 7555-60.
- Pease, A. C., Solas, D., Sullivan, E. J., Cronin, M. T., Holmes, C. P. and Fodor, S. P.** (1994). Light-generated oligonucleotide arrays for rapid DNA sequence analysis. *Proc Natl Acad Sci U S A* **91**, 5022-6.
- Pesce, M., Wang, X., Wolgemuth, D. J. and Scholer, H.** (1998). Differential expression of the Oct-4 transcription factor during mouse germ cell differentiation. *Mech Dev* **71**, 89-98.
- Primakoff, P. and Myles, D. G.** (2002). Penetration, adhesion, and fusion in mammalian sperm-egg interaction. *Science* **296**, 2183-5.

- Puskas, L. G., Zvara, A., Hackler, L., Jr., Micsik, T. and van Hummelen, P.** (2002). Production of bulk amounts of universal RNA for DNA microarrays. *Biotechniques* **33**, 898-900, 902, 904.
- Quignon, P., Kirkness, E., Cadieu, E., Touleimat, N., Guyon, R., Renier, C., Hitte, C., Andre, C., Fraser, C. and Galibert, F.** (2003). Comparison of the canine and human olfactory receptor gene repertoires. *Genome Biol* **4**, R80.
- Quill, T. A., Ren, D., Clapham, D. E. and Garbers, D. L.** (2001). A voltage-gated ion channel expressed specifically in spermatozoa. *Proc Natl Acad Sci U S A* **98**, 12527-31.
- Quill, T. A., Sugden, S. A., Rossi, K. L., Doolittle, L. K., Hammer, R. E. and Garbers, D. L.** (2003). Hyperactivated sperm motility driven by CatSper2 is required for fertilization. *Proc Natl Acad Sci U S A* **100**, 14869-14874.
- Ramalho-Santos, M., Yoon, S., Matsuzaki, Y., Mulligan, R. C. and Melton, D. A.** (2002). "Stemness": transcriptional profiling of embryonic and adult stem cells. *Science* **298**, 597-600.
- Reijo, R. A., Dorfman, D. M., Slee, R., Renshaw, A. A., Loughlin, K. R., Cooke, H. and Page, D. C.** (2000). DAZ family proteins exist throughout male germ cell development and transit from nucleus to cytoplasm at meiosis in humans and mice. *Biol Reprod* **63**, 1490-6.
- Ren, D., Navarro, B., Perez, G., Jackson, A. C., Hsu, S., Shi, Q., Tilly, J. L. and Clapham, D. E.** (2001). A sperm ion channel required for sperm motility and male fertility. *Nature* **413**, 603-9.
- Rodeheffer, C. and Shur, B. D.** (2004). Characterization of a novel ZP3-independent sperm-binding ligand that facilitates sperm adhesion to the egg coat. *Development* **131**, 503-12.
- Russell, L. D., Ettl, R. A., Sinha Hikim, A. P. and Clegg, E. D.** (1990). Histological and histopathological evaluation of the testis. Vienna, IL.: Cache River Press.
- Ryu, B. Y., Orwig, K. E., Avarbock, M. R. and Brinster, R. L.** (2003). Stem cell and niche development in the postnatal rat testis. *Dev Biol* **263**, 253-63.
- Sakamoto, M., Hirata, H., Ohtsuka, T., Bessho, Y. and Kageyama, R.** (2003). The bHLH genes Hesr1/Hey1 and Hesr2/Hey2 regulate maintenance of neural precursor cells in the brain. *J Biol Chem*.
- Sands, A. T.** (2003). The master mammal. *Nat Biotechnol* **21**, 31-2.
- Sassone-Corsi, P.** (2002). Unique chromatin remodeling and transcriptional regulation in spermatogenesis. *Science* **296**, 2176-8.
- Saunders, C. M., Larman, M. G., Parrington, J., Cox, L. J., Royse, J., Blayney, L. M., Swann, K. and Lai, F. A.** (2002). PLC $\zeta$ : a sperm-specific trigger of Ca<sup>2+</sup> oscillations in eggs and embryo development. *Development* **129**, 3533-44.
- Schageman, J. J., Basit, M., Gallardo, T. D., Garner, H. R. and Shohet, R. V.** (2002). MarC-V: a spreadsheet-based tool for analysis, normalization, and visualization of single cDNA microarray experiments. *Biotechniques* **32**, 338-40, 342, 344.
- Sha, J., Zhou, Z., Li, J., Yin, L., Yang, H., Hu, G., Luo, M., Chan, H. C. and Zhou, K.** (2002). Identification of testis development and spermatogenesis-related genes in human and mouse testes using cDNA arrays. *Mol Hum Reprod* **8**, 511-7.
- Shamsadin, R., Adham, I. M., Nayernia, K., Heinlein, U. A., Oberwinkler, H. and Engel, W.** (1999). Male mice deficient for germ-cell cyritestin are infertile. *Biol Reprod* **61**, 1445-51.
- Shelton, J. M., Lee, M. H., Richardson, J. A. and Patel, S. B.** (2000). Microsomal triglyceride transfer protein expression during mouse development. *J Lipid Res* **41**, 532-7.



- Shimomura, Y., Aoki, N., Ito, K. and Ito, M.** (2003). Gene expression of Sh3d19, a novel adaptor protein with five Src homology 3 domains, in anagen mouse hair follicles. *J Dermatol Sci* **31**, 43-51.
- Shinohara, T., Avarbock, M. R. and Brinster, R. L.** (1999).  $\beta$ 1- and  $\alpha$ 6-integrin are surface markers on mouse spermatogonial stem cells. *Proc Natl Acad Sci U S A* **96**, 5504-9.
- Shinohara, T., Avarbock, M. R. and Brinster, R. L.** (2000a). Functional analysis of spermatogonial stem cells in Steel and cryptorchid infertile mouse models. *Dev Biol* **220**, 401-11.
- Shinohara, T., Orwig, K. E., Avarbock, M. R. and Brinster, R. L.** (2000b). Spermatogonial stem cell enrichment by multiparameter selection of mouse testis cells. *Proc Natl Acad Sci U S A* **97**, 8346-51.
- Slonim, D. K.** (2002). From patterns to pathways: gene expression data analysis comes of age. *Nat Genet* **32 Suppl**, 502-8.
- Spargo, S. C. and Hope, R. M.** (2003). Evolution and nomenclature of the zona pellucida gene family. *Biol Reprod* **68**, 358-62.
- Swanson, W. J. and Vacquier, V. D.** (2002). The rapid evolution of reproductive proteins. *Nat Rev Genet* **3**, 137-44.
- Tadokoro, Y., Yomogida, K., Ohta, H., Tohda, A. and Nishimune, Y.** (2002). Homeostatic regulation of germinal stem cell proliferation by the GDNF/FSH pathway. *Mech Dev* **113**, 29-39.
- Talbot, P., Shur, B. D. and Myles, D. G.** (2003). Cell adhesion and fertilization: steps in oocyte transport, sperm-zona pellucida interactions, and sperm-egg fusion. *Biol Reprod* **68**, 1-9.
- Tanaka, K., Tamura, H., Tanaka, H., Katoh, M., Futamata, Y., Seki, N., Nishimune, Y. and Hara, T.** (2002). Spermatogonia-dependent expression of testicular genes in mice. *Dev Biol* **246**, 466-79.
- Toczyski, D. P., Matera, A. G., Ward, D. C. and Steitz, J. A.** (1994). The Epstein-Barr virus (EBV) small RNA EBER1 binds and relocalizes ribosomal protein L22 in EBV-infected human B lymphocytes. *Proc Natl Acad Sci U S A* **91**, 3463-7.
- Tourtellotte, W. G., Nagarajan, R., Auyeung, A., Mueller, C. and Milbrandt, J.** (1999). Infertility associated with incomplete spermatogenic arrest and oligozoospermia in Egr4-deficient mice. *Development* **126**, 5061-71.
- Uhrin, P., Dewerchin, M., Hilpert, M., Chrenek, P., Schofer, C., Zechmeister-Machhart, M., Kronke, G., Vales, A., Carmeliet, P., Binder, B. R. et al.** (2000). Disruption of the protein C inhibitor gene results in impaired spermatogenesis and male infertility. *J Clin Invest* **106**, 1531-9.
- van der Kooy, D. and Weiss, S.** (2000). Why stem cells? *Science* **287**, 1439-41.
- Van Gelder, R. N., von Zastrow, M. E., Yool, A., Dement, W. C., Barchas, J. D. and Eberwine, J. H.** (1990). Amplified RNA synthesized from limited quantities of heterogeneous cDNA. *Proc Natl Acad Sci U S A* **87**, 1663-7.
- Velculescu, V. E., Zhang, L., Vogelstein, B. and Kinzler, K. W.** (1995). Serial analysis of gene expression. *Science* **270**, 484-7.
- Venter, J. C., Adams, M. D., Myers, E. W., Li, P. W., Mural, R. J., Sutton, G. G., Smith, H. O., Yandell, M., Evans, C. A., Holt, R. A. et al.** (2001). The sequence of the human genome. *Science* **291**, 1304-51.
- Vogel, G.** (2003). Stem cells. 'Stemness' genes still elusive. *Science* **302**, 371.
- Wang, D., King, S. M., Quill, T. A., Doolittle, L. K. and Garbers, D. L.** (2003). A new sperm-specific  $\text{Na}^+/\text{H}^+$  exchanger required for sperm motility and fertility. *Nat Cell Biol* **5**, 1117-1122.

- Wang, L., Beserra, C. and Garbers, D. L.** (2004). A novel aminophospholipid transporter exclusively expressed in spermatozoa is required for membrane lipid asymmetry and normal fertilization. *Dev Biol*, In press.
- Wang, P. J., McCarrey, J. R., Yang, F. and Page, D. C.** (2001). An abundance of X-linked genes expressed in spermatogonia. *Nat Genet* **27**, 422-6.
- Waterston, R. H. Lindblad-Toh, K. Birney, E. Rogers, J. Abril, J. F. Agarwal, P. Agarwala, R. Ainscough, R. Alexandersson, M. An, P. et al.** (2002). Initial sequencing and comparative analysis of the mouse genome. *Nature* **420**, 520-62.
- Wheat, T. E., Hintz, M., Goldberg, E. and Margoliash, E.** (1977). Analyses of stage-specific multiple forms of lactate dehydrogenase and of cytochrome c during spermatogenesis in the mouse. *Differentiation* **9**, 37-41.
- Wilhelm, J. and Pingoud, A.** (2003). Real-time polymerase chain reaction. *Chembiochem* **4**, 1120-8.
- Xuan, Z., Wang, J. and Zhang, M. Q.** (2003). Computational comparison of two mouse draft genomes and the human golden path. *Genome Biol* **4**, R1.
- Yanggimachi, R.** (1994). In *The Physiology of Reproduction*, (ed. E. Knobil and D. Neill), pp. 152-162. New York: Raven.
- Young, J. M. and Trask, B. J.** (2002). The sense of smell: genomics of vertebrate odorant receptors. *Hum Mol Genet* **11**, 1153-60.
- Yu, Y. E., Zhang, Y., Unni, E., Shirley, C. R., Deng, J. M., Russell, L. D., Weil, M. M., Behringer, R. R. and Meistrich, M. L.** (2000). Abnormal spermatogenesis and reduced fertility in transition nuclear protein 1-deficient mice. *Proc Natl Acad Sci U S A* **97**, 4683-8.
- Zhao, G. Q. and Garbers, D. L.** (2002). Male germ cell specification and differentiation. *Dev Cell* **2**, 537-47.