

**Acknowledgments**

We thank Drs Yoichi Nakazato, Takanori Hirose, Nobuki Funada and Junko Hirato for reviewing the histology. We also thank Xijin Ge and Makoto Kano for their help in statistical analysis and Hiroko Meguro for her technical assistance. This work was supported by Grants-in-Aid from the Ministry of Education, Culture, Sports, Science and Technology, Japan (No. 11671357 and No. 13470184).

**References**

- Bigner SH, Matthews MR, Rasheed BK, Wiltshire RN, Friedman HS, Friedman AH, Stenzel TT, Dawes DM, McLendon RE and Bigner DD. (1999). *Am. J. Pathol.*, **155**, 375–386.
- Cairncross JG and Macdonald DR. (1988). *Ann. Neurol.*, **23**, 360–364.
- Cairncross JG, Ueki K, Zlatescu MC, Lisle DK, Finkelstein DM, Hammond RR, Silver JS, Stark PC, Macdonald DR, Ino Y, Ramsay DA and Louis DN. (1998). *J. Natl. Cancer Inst.*, **90**, 1473–1479.
- Caron H, van Schaik B, van der Mee M, Baas F, Riggins G, van Sluis P, Hermus MC, van Asperen R, Boon K, Voute PA, Heisterkamp S, van Kampen A and Versteeg R. (2001). *Science*, **291**, 1289–1292.
- Eisen MB, Spellman PT, Brown PO and Botstein D. (1998). *Proc. Natl. Acad. Sci. USA*, **95**, 14863–14868.
- Fero ML, Randel E, Gurley KE, Roberts JM and Kemp CJ. (1998). *Nature*, **396**, 177–180.
- Fults D, Brockmeyer D, Tullous MW, Pedone CA and Cawthon RM. (1992). *Cancer Res.*, **52**, 674–679.
- Golub TR, Slonim DK, Tamayo P, Huard C, Gaasenbeek M, Mesirov JP, Coller H, Loh ML, Downing JR, Caligiuri MA, Bloomfield CD and Lander ES. (1999). *Science*, **286**, 531–537.
- Gutmann DH, Loehr A, Zhang Y, Kim J, Henkemeyer M and Cashen A. (1999). *Oncogene*, **18**, 4450–4459.
- Huang H, Colella S, Kurrer M, Yonekawa Y, Kleihues P and Ohgaki H. (2000). *Cancer Res.*, **60**, 6868–6874.
- Husemann K, Wolter M, Buschges R, Bostrom J, Sabel M and Reifenberger G. (1999). *J. Neuropathol. Exp. Neurol.*, **58**, 1041–1050.
- Ino Y, Betensky RA, Zlatescu MC, Sasaki H, Macdonald DR, Stemmer-Rachamimov AO, Ramsay DA, Cairncross JG and Louis DN. (2001). *Clin. Cancer Res.*, **7**, 839–845.
- Ishii M, Hashimoto S, Tsutsumi S, Wada Y, Matsushima K, Kodama T and Aburatani H. (2000). *Genomics*, **68**, 136–143.
- Kenrick S, Watkins A and de Angelis E. (2000). *Hum. Mol. Genet.*, **9**, 879–886.
- Kim JG, Armstrong RC, v Agoston D, Robinsky A, Wiese C, Nagle J and Hudson LD. (1997). *J. Neurosci. Res.*, **50**, 272–290.
- Kleihues P and Cavenee WK. (ed). (2000). *Pathology and Genetics of Tumours of the Nervous System*. IARC Press: Lyon.
- Lockhart DJ, Dong H, Byrne MC, Follettie MT, Gallo MV, Chee MS, Mittmann M, Wang C, Kobayashi M, Horton H and Brown EL. (1996). *Nat. Biotechnol.*, **14**, 1675–1680.
- Mai M, Huang H, Reed C, Qian C, Smith JS, Alderete B, Jenkins R, Smith DI and Liu W. (1998). *Genomics*, **51**, 359–363.
- Nigro JM, Takahashi MA, Ginzinger DG, Law M, Passe S, Jenkins RB and Aldape K. (2001). *Am. J. Pathol.*, **158**, 1253–1262.
- Nutt CL, Noble M, Chambers AF and Cairncross JG. (2000). *Cancer Res.*, **60**, 4812–4818.
- Ohira M, Kageyama H, Miura M, Furuta S, Machida T, Shishikura T, Takayasu H, Islam A, Nakamura Y, Takahashi M, Tomioka N, Sakiyama S, Kaneko Y, Toyoda A, Hattori M, Sakaki Y, Ohki M, Horii A, Soeda E, Inazawa J, Seki N, Kuma H, Nozawa I and Nakagawa A. (2000). *Oncogene*, **19**, 4302–4307.
- Pollack JR, Perou CM, Alizadeh AA, Eisen MB, Pergamenschikov A, Williams CF, Jeffrey SS, Botstein D and Brown PO. (1999). *Nat. Genet.*, **23**, 41–46.
- Schwab M, Pram C and Amler LC. (1996). *Genes Chromosomes Cancer*, **16**, 211–229.
- Smith JS, Alderete B, Minn Y, Borell TJ, Perry A, Mohapatra G, Hosek SM, Kimmel D, O'Fallon J, Yates A, Feuerstein BG, Burger PC, Scheithauer BW and Jenkins RB. (1999). *Oncogene*, **18**, 4144–4152.
- Tanaka S, Kamitani H, Amin MR, Watanabe T, Oka H, Fujii K, Nagashima T and Hori T. (2000). *J. Neurooncol.*, **46**, 157–171.
- Ueki K, Ono Y, Henson JW, Efird JT, von Deimling A and Louis DN. (1996). *Cancer Res.*, **56**, 150–153.
- Ueki K, Nishikawa R, Nakazato Y, Hirose T, Hirato J, Funada N, Fujimaki T, Hojo S, Kubo O, Ide T, Usui M, Ochiai C, Ito S, Takahashi H, Mukasa A, Asai A and Kirino T. (2002). *Clin. Cancer Res.*, **8**, 196–201.
- Watson MA, Perry A, Budjhara V, Hicks C, Shannon WD and Rich KM. (2001). *Cancer Res.*, **61**, 1825–1829.