

## 6 Abbreviations

ADP	Adenosine diphosphate
ATP	Adenosine triphosphate
bp	Base pair (s)
BTP	1,3-bis[tris(hydroxymethyl)-methylamino] propane
COOH	Carboxyl-group
DAPI	4,6-diamidino-2-phenylindole
DNA	Deoxyribonucleic acid
EDTA	Ethylenediaminetetraacetic acid
EGTA	Ethyleneglycolbisaminoethylethertetraacetic acid
HEPES	4-(2-hydroxyethyl)-1-piperazineethanesulfonic acid
KCl	Potassiumchloride
kDa	kilo Dalton
M	mol/Liter
Mg	Magnesium
MgCl <sub>2</sub>	Magnesium chloride
Mr	Relative molecular mass
mRNA	Messenger RNA
NaCl	Sodiumchloride
NH <sub>2</sub>	Amino-group
PBS	Phosphate buffered saline
PCR	Poly chain reaction
P <sub>i</sub>	inorganic phosphate
PIPES	Piperazinebis(2-ethanesulfonicacid)
PMSF	Phenylmethylsulfonylfluoride
RNA	Ribonuclei acid
RT-PCR	Reverse transcriptase poly chain reaction
SDS	sodiumdodecylsulphate
TRIS	Tris-(hydroxymethyl)aminomethane

U	Units
VM26	Teniposide
VP16	Etoposide

## 7 Reference

- Adachi,Y., Mizuuchi, M., Robinson, E. A., Apella,E., O'Dea, M. H., Gellert, M. and Mizuuchi, K.**  
*Nucleic. Acids. Res.* **15:** 771, 1987.
- Adachi, Y., Luke, M. and Lämmli, U. K.**  
*Cell*, **64**:134, 1991.
- Andersen, A. H., Sørensen, B. S., Christiansen, K., Svejstrup, J. Q.,Lund, K. and Westergaard. O.**  
*J. Biol. Chem.*, **266**:9203, 1991.
- Andersen, A. H., Svejstrup J. Q and Westergaard. O.**  
*Advance in Pharmacology*, **29A**:3, 1994.
- Austin, C. A., Sng., J-H., Patel, S. and Fisher, M.**  
*Biochimica et biophyica Acta.*, **1172**: 283, 1993.
- Austin, C. A., Marsh, K. L., Wasserman, R. A., Willmore, E., Sayer, P. J., Wang, J. C. and Fischer, L. M.**  
*J. Biol. Chem.* , **270**:15739, 1995.
- Austin, C. A. and Marsh, K. L.**  
*Bioassay* , **226**:215,1998.
- Barret, J. F., Sutcliffe, J. A. and Gootz, T. D.**  
*Antimicobal Agents and Chemotherapy* **34**:1,1990.
- Beck, W. T., Danks, M.K., Wolverton, J. S., Kim, R. and Chen, M., Granzen, B., Kim, R. and Suttle, D .P.**  
*Adv. Pharmacol.*, **29B**: 145,1994a.
- Beck, W. T., Kim, R. and Chen, M.**  
*Cancer Chemother Pharmacol.*, **34** (Suppl.): S14-8, 1994b.
- Berger, J. M., Gamblin, S .J., Harrison, S. C. and Wang, J. C.,**  
*Nature*, **379**: 225,1996.
- Bhat, M. A., Philip, A. V., Glover, D. M. and Bellen, H.J.**  
*Cell*, **13**:1103,1996.
- Bjergbæk, L., Jensen, S., Westergaard, O. and Andersen, A. H.**  
*J. Biol. Chem.*., **274**:26529,1999.

- Boege, F.,**  
*Eur. J. Clin. Chem.. Clin. Biochem.*, **34**: 873,1996.
- Boege, F.,Andersen, A., Jensen, S., Zeidler, R. and Kreipe, H.**  
*Am.. J. Pathol.*, **1446**:1302,1995.
- Bornens, M., Paintrand, M., Berges, J., Marty, M-C. and Karsenti, E.**  
*Cell Motility and the cytoskeleton*, **8**: 238,1987.
- Boveri, T.**  
*Jena Z. Med. Naturw.*, **28**:1,1901.
- Brill, S, J., DiNardo, S.,Voelkel-Maiman, K., Sternglanz, R.**  
*Nature*, **326**:414,1987.
- Brock, I., Hipfner, D. R., Nielsen, S., Jensen, P. B., Deeley, R. G., Cole, S P. C. and Sehested, M.**  
*Cancer Res*, **55**:459,1995.
- Brown, C. R., Doxey, S. J., White, E. and Welch, W.J.**  
*J. Cell. Physiol.*, **160**: 47,1994.
- Brown, P. O., Peebles, C. L. and Cozzarelli, N. R.**  
*Proc. Natl. Acad. Sci. USA.*, **76**:6110,1979.
- Burden, A. D. and Sullivan, D. M.**  
*Biochemistry*, **33**: 14651,1994.
- Capranico ,G., Binaschi, M., Borgnetto, M. E., Zunico, F. and Palumbo, M.**  
*Trends Pharmacol. Sci.*, **18**: 303,1997.
- Carcia-Beato, R., Freu, J. M. P.,Lpoez-Otin, C., Blasco, R., Vinuela, E. and Salas, M. L.**  
*Virology*, **188**: 938,1992.
- Cardenas, M .E. and Gasser, S. M.**  
*J. Cell. Sci.*, **104**: 219,1993.
- Caron, P .R. and Wang, J. C.**  
*Adv. Pharmacol.*, **29B**:271, 1994.
- Castano, I. B, Broska, P. M. ,Sadoff, B. U., Chen, H. and Christman, M. F.**  
*Genes and Development*, **10**: 2564,1996.
- Chen, M. and Beck, W. T.**  
*Cancer Res.*, **55**:1509,1995.
- Champoux, J. J.**  
*Annu. Rev. Biochem.*, **47**:449,1978.
- Charly, N. ,Chen, X., Dentry, J. and Brown, D. L.**  
*Chromosome Res.*, **4**:457,1996.
- Chen, A, Y. and Liu, L. F.**  
*Annu. Rev. Pharmacol. Toxicol.*,**34**:191,1994.
- Christman, M. F.,Dietrich, F. S. and Fink, G. R.**

- Cell*, **55**: 413,1988.
- Chung, T. D. Y., Drake, F. H., Tan, K. B. ,Per ,S. R. Crooke, S. T. and Mirabelli, C. K.**  
*Proc. Natl. Acad. Sci. USA.*, **86**: 9431,1989.
- Compton, D. A. and Cleveland, D. W.**  
*J. Cell Biol.*, **120**:947,1993
- Corbett, A. H. and Osheroff, N.**  
*Chem. Res.Toxicol.*, **6**: 586,1993.
- Cornarotti, M., Tinelli, S., Willmore, E., Zunino, F., Fisher, L. M., Austin, C. A. and Capranico, G.**  
*Mol. Pharmacol.*, **50**:1463,1996.
- Cortes, F. and Pinero, J.**  
*Cancer Chemother. Pharmacol.*, **34**: 411, 1994.
- Crick, F. H. C.**  
*Proc. Natl. Acad. Sci. U.S.A.*, **73**: 2639,1976.
- Danks, M. K., Schmidt, C. A., Cirtain, M .C.,Suttle, D. P. and Beck, W. T.**  
*Biochemistry*, **27**:8861,1988.
- Darby, M. K., Schmitt, B., Songstra-Bilen, S. and Vosberg,H. P .C.**  
*EMBO J.*, **4**:2129,1985.
- Davies, S. L., Jenkins, J. R. and Hickson, I. D.**  
*Nucleic Acids Res.*, **21**:3719, 1993.
- Dereuddre, S., Delaporte, C., and Jacquemin Sablon, A.**  
*Cancer Res.*, **57**:4301,1997.
- Dictenberg, J., Zimmerman, W., Sparks, C., Young, A., Vidair, C., Zheng, Y., Carrington, W., Fay, F. and Doxsey, S.**  
*J. Cell Biol.*, **141**: 163,1998.
- DiNardo, S.,Voelkel, K. and Sternglanz, R.**  
*Proc. Natl. Acad .Sci. U.S.A.*, **82**:2616,1984.
- Doxsey ,S. J., Stein, P., Evans, L., Calarco, P. and Kirschner, M.**  
*Cell*, **76**: 639,1994.
- Drake, F. H. ,Zimmerman,J .P., McCabe, F. L., Bartus, H. F., Per, P. S., Sullivan, D. M., Ross, W. E., Mattern, M. R., Johnson, R. K., Crooke, S.T.and Mirabelli, C. K.**  
*J. Biol. Chem.*, **262**:16739,1987.
- Drlica, K. and Zhao, X.**  
*Microbiol. Mol. Biol. Rev.*, **61**:377,1997.
- Earnshaw, W. C. and Heck, M. M S.**

- J. Cell Biol.**, **100**:1716,1985.
- Feldhoff, P. W., Mirski, S. E. L., Cole, S. P. C. and Sullivan, D. M.**  
*Cancer Res.*, **54**:756,1994.
- Fisher, D., Hock, R. and Scheer, U.**  
*Exp. Cell Res.*, **209**: 255,1993.
- Fisher, L. M., Austin, C. A., Hopewell, R., Margerrison, E. E. C., Oram, M., Patel, S., Plummer, K. SNG, J. H., Speedharan, S.**  
*Phil. Trans R. Soc.(London)*, **336**:83,1992.
- Gale, K. C. and Osheroff, N.**  
*J. Biol. Chem.*, **267**:12090,1992.
- Gazdar, A. F., Carney, D. N., Russell, E. K., Sims, H. L., Baylin, S. B., Bunn, P. A. J., Guccion, J. G. and Minna, J. D.**  
*Cancer Res.*, **40**: 3502,1980.
- Gasser, S M. and Lämmli, U. K.,**  
*Trends Genet*, **3**:16,1987.
- Gellert, M.**  
*Annu. Rev . Biochem.*, **50**:879,1981.
- Gellert, M., Mizuuchi, K.,O'Dea, M. and Nash, H.**  
*Proc. Natl. Acad. Sci. USA.*, **73**:3872,1976.
- Geiseler, F., Kurz, E., Clark, M.,Leader, K. and Kroll, D.**  
*Proc. Am. Assoc. Cancer Res.*, **40**:209 #1387.,1999.
- Gorbsky, G. J.**  
*Cancer Res.*, **54**:1042,1994.
- Goswami., P. C. ,Roti Roti, J. L. and Hunt, C. R.**  
*Mol. Cell Biol.*, **16**:1500,1996.
- Gotto, T., Wang, J. C.**  
*Proc. Natl. Acad. Sci. USA.*, **82**:7178,1985.
- Griard, D. J., Aaronson, S. A., Todaro, G. J., Arnstein, P., Kersey, J. H., Dosik, H. and Parks, W. P.**  
*J. Nat. Cancer. Inst.*, **51**:1417,1973.
- Heck., M. M. S.and Earnshaw, W. C.**  
*J. Cell Biol.*,**103**:2569,1986.
- Heck., M. M. S., Hittelman, W. N. and Earnshaw, W. C.**  
*Proc. Natl. Acad. Sci. USA.*, **85**:1086,1988.
- Heck., M. M. S., Hittelman, W. N. and Earnshaw, W .C.**  
*J. Biol. Chem.*, **264**:15161,1989.
- Herzog, C. E. and Zwelling, L. A.**  
*Biochemical and biophysical Res Comm.*, **232**: 608, 1997.
- Hickson, I. D., Davies, S. L., Isaacs, R. J., Redwood, M. I., Sandri, M. I. and Wells, N.**

- J. Anti-cancer Drugs**, **7**:19,1996.
- Hirano, T. and Mitchison, T. J.**  
*J. Cell Bio.*, **120**:601,1993.
- Hirano, T., Kobayashi, . and Hirano, M.**  
*Cell*, **89**:511,1997.
- Hochhauser, D., Stanway, C. A., Harris, A. L. and Hickson, I. D.**  
*J. Biol. Chem.*, **267**: 18961,1992.
- Hock, R., Carl, M., Lieb, B., Gebauer, D. and Scheer, U.**  
*Chromosoma*, **104**: 358, 1996.
- Holm, C., Goto, T., Wang, J. C. and Botstein, D.**  
*Cell*, **41**:553,1985.
- Holm, C., Stearns, T. and Botstein, D.**  
*Mol. Cell. Biol.*, **9**:159,1989.
- Hsieh, T. S and Brutlag, D.**  
*Cell*, **21**:115,1980.
- Hsieh, T. S.**  
*Current Opinion in Cell Biology* , **4**:396,1992.
- Hsu, L-C. and White, R.L.**  
*Proc. Natl. Acad. Sci.U.S.A.*, **95**:12983,1998.
- Isaacs, R. J., Harris, A. L. and Hickson, I. D.**  
*J Biol.Chem.*, **271**: 16741, 1996.
- Isaacs, R. J., Davies, S. L., Sandri, M. I., Redwood, C., Wells, N. J., Hickson, I. D.**  
*Biochimica et Biophysica Acta*, **1400**:121,1998.
- Ishida, R., Sato ,M., Narita, T., Utsumi, K. R., Nishimoto, T.,Morita,T., Nagata, H. and Andoh, T.**  
*J. Cell. Biol.*, **126**:1341,1994.
- Ishida, R., Iwai ,M., Marsh, K. L., Austin, C. A., Yano, M., Shibata, N., Nozaki, A.,and Hara, J.**  
*J. Biol. Chem.*, **271**:30077,1996.
- Jans, D.**  
*Biochem. J.*,**311**:705,1995.
- Jenkins, J. R., Ayton, P., Jones, T., Davies, S. L., Simmons, D. L., Farris, H. L., Sheer, D. and Hickson, I. D.**  
*Nucleic Acid Res.*,**20**: 5587,1992.
- Jensen, P. B., Jensen,, P. S., Demant, E. J. F., Friche, E., Sørensen, B. S., Sehested, M., Wasserman, K., Vindeløv, L., Westergaard, O. and Hansen, H. H.**  
*Cancer Res.*, **51**: 5093,1991.
- Jensen, P. B., Christiansen, I. J., Sehested, M., Hansen, H. H. and Vindeløv, L. L.**  
*Br. J. Cancer*, **67**: 311,1993.
- Jensen. S., Redwood. C. S., Jenkins. J. R., Andersen, A. H., Hickson, I. D.**

- Mol. Gen. Genet.*, **252**:79,1996a.
- Jensen. S., Andersen, A. H., Kjeldsen, E., Biersack, H., Olsen, E. H. N., Andersen, T. B., Westergaard, O. and Jakobsen, B. K.  
*Mol. Cell. Biol.*, **16**:3866,1996b.
- Kaufmann, S. H., Karp, J. E., Jones, R. J., Miller, C. B., Schneider, E., Zswelling, L. A., Cowan, K., Wendel, K. and Burke, P. J.  
*Blood*, **83**:517,1994.
- Kato, J. L., Nishimura, Y., Imamura, R., Niki, H., Hiraga, S. and Suzuki, H.,  
*Cell*, **63**:393,1990.
- Kazuhiro, S. and Mitsuhiro, Y.  
*J. Cell Biol.*, **119**:1023,1992.
- Kellogg, D. R., Moritz, M. and Alberts, B. M.  
*Annu Rev. Biochem.*, **63**:639,1994.
- Kim, R. A. and Wang, J. C.  
*J. Mol. Biol.*, **208**:257,1989.
- Kimura, K., Nozaki, N., Saijo, M., Kikuchi, A., Ui, M. and Enomoto, T.  
*J. Biol. Chem.*, **245**:23,1994.
- Kimura, K., Nozaki, N., Enomoto, T., Tanaka, M. and Kikuchi, A..  
*J. Biol. Chem.*, **271**: 21439,1996.
- Kimura, K. and Hirano, T.  
*Cell*, **89**:511,1997.
- Kimura, K., Hirano, M., Kobayashi, R. and Hirano, T.  
*Science*, **282**:425,1998.
- Kochanski, R. S. and Borisy, G. G.  
*J. Cell Biol.*, **110**:1599,1990.
- Kimura, M., Matsuda, Y., Yoshioka, T. and Okano, Y.  
*J. Biol. Chem.*, **274**:7334,1999.
- Komesli, S., Tournier, F., Paintrand, M., Margolis, R. L., Job, G. and Bornens, M.  
*J. Cell. Biol.*, **109** :2869,1989.
- Kroll, D. J. and Rowe, T. C.  
*J. Biol. Chem.*, **266** :7957,1991.
- Kyhse-Andersen, J. J.  
*Biochem. Biophys Methods.*, **10** :203,1984.
- Lämmli, U .K.  
*Nature*, **227**: 680,1970.
- Lacey, K. R., Jackson, P. K. and Stearn, T.  
*Proc. Natl. Acad. Sci. USA.*, **96**: 2817,1999.
- Lang, A. J., Mirski, S. E. L., Cumming, H. J., Ya, Q., Gerlach, J. H. and Cole, S. P. C.

- Gene*, **221**:255,1998.
- Lee, M. P., Sander, M. and Hiesh, T-S.**  
*J. Biol. Chem.*, **264**:21779,1989.
- Levine, C., Hiasa, H. and Marians, K. J.**  
*Biochim. Biophys Acta*, **1400**:29,1998.
- Lindsley, J. E.and Wang, J. C.**  
*Proc. Natl. Acad. Sci. U.S.A.*,**88**:10485, 1991.
- Lindsley, J. E. and Wang, J. C.**  
*J. Biol.Chem.*, **268**:8096,1993.
- Liu, L. F.**  
*Annu. Rev. Biochem.*,**58**:351,1989.
- Liu, L. F. and Wang, J. C.**  
*Cell*, **15**: 697,1978.
- Liu, L. F., Liu, C. C., and Alberts, B. M.**  
*Nature*, **281**:456,1979.
- Liu, L. F., Liu, C. C. and Alberts, B. M.**  
*Cell*, **19**:697,1980.
- Liu, L. F., Rowe, T. C., Yang, L., Tewey, K. M., Chen, G. L.**  
*J. Biol. Chem.*, **258**:15365,1983.
- Maniatis, T., Fritsch, E. F. and Sambrook, J.**  
*Molecular cloning a laboratory manual.*, *Cold Spring Laboratory* , 1982.
- Marini, J. C., Miller. K. G., and Englund, P. T.**  
*J. Biol. Chem.*, **255**:4976,1980.
- Marsh, K. L., Willmore, E., Tinelli, S., Cornarotti, M., Meczes, E. L., Capranico, G., Fisher, M .L. and Austin, C. A.**  
*Biochem. Pharmacology.*, **52**:1675,1996.
- Maxwell, A. and Gellert, M.**  
*Adv. Protein Chem.*, **38**:69,1986.
- Maxwell, A.**  
*Trends Microbiol.*, **5**:102,1997.
- Meyer, K. N., Kjeldsen, E., Straub, T., Knudsen, B. K., Kikuchi, A., Hickson, I. D., Kreipe, H. and Boege, F.**  
*J. Cell Biol.*, **136**:775,1996.
- Miller, K. G., Liu, L. F. and Englind, P. T.**  
*J. Biol. Chem.*, **256**:9334,1981.
- Mirski, S. E. L. and Cole, S. P. C.**  
*Cancer Res.*, **55**:2129,1995.
- Mizuuchi, K., O'Dea, M. H. and Gellert, M.**

- Proc. Natl. Acad. Sci. U.S.A.*, **75**:5960,1978.
- Morais Cabral, J .H., Jackson, A. P., Shikotra, N., Maxwell, A. and Liddington, R. C.**  
*Nature*, **388** :903,1997.
- Ng, S. W., Liu, Y. and Schnipper, L. E.**  
*Gene*, **203**:113,1997.
- Negri, C., Chiesa, R., Cerini, A., Berstagno, M., Sala, C., Zini, N., Maraldi, N. R. and Astaldi Ricotti, G. C. B.**  
*Exp. Cell Res.*, **200** : 460,1992.
- Noritaka, A., Mitsuko, M., Satoshi, K., Ryunosuke, K., Hideki, K., and Akihiho. K.**  
*Nucleic Acids Res.*, **25**:3135,1997.
- Osheroff, N.**  
*J. Biol. Chem.*, **261**:9944,1986.
- Osheroff, N.**  
*Pharmac. Ther.*, **41**:223,1989.
- Osheroff, N., Shelton, E. R. and Brutlag, D. L.**  
*J. Biol. Chem.*, **258**:9536,1983.
- Osheroff, N. and Zechiedrich, E. L.**  
*Biochemistry*, **26**:4303,1987.
- Osheroff, N. and Zechiedrich, E. L. and Gale, K. C.**  
*BioEssays* ,**13**:269,1991.
- Petrov, P., Drake, F. H., Loranger, A.,Huanh, W. and Hancock, R.**  
*Exp. Cell Res.*, **204**:73,1993.
- Pietromonaco, S. F., Seluja, G. A., Aitken, A. and Elias, L.**  
*Blood Cells Mol. Dis.*, **22**:225,1996.
- Pommier, Y., Kerrigan, D., Schwarts, R. E., Swack, J. A. and McCurdy, A.**  
*Cancer Res.*, **46**:3075,1986.
- Rattner, J. J., Hendzel, M. J., Furbee, C. S., Muller, M. T. and Bazett-Jones, D. P.**  
*J. Cell. Biol.*, **134**:1097,1996.
- Roberge, M., Thing, J., Hamaguchi, J., and Branbury, E. M.**  
*J. Cell. Biol.*, **111**: 1753,1990.
- Roca, J.**  
*TIBS* ,**20**:156,1995.
- Roca, J. and Wang, J .C.**  
*Cell*, **71**:833,1992.
- Roca, J., Berger, J. M., and Wang, J. C.**  
*J. Biol. Chem.*, **268**:14250,1993.

- Roca, J. and Wang, J. C.**  
*Cell*, **77**:609,1994.
- Roca, J., Berger, J. M., Harrison, S. C. and Wang, J. C.**  
*Proc. Natl. Acad. Sci. USA.*, **93**:4057,1996.
- Rose, D. and Holm, C.**  
*Mol. Cell Biol.*, **13**:3445,1993.
- Saijo, M., Enomoto, T., Hanaoka, F. and Ui, M.**  
*Biochemistry*, **29**:583,1990.
- Sander , M. and Hsieh, T.**  
*J. Biol. Chem.*, **258**:8421,1983.
- Schmidt, V. K., Sørensen, B. S., Sørensen, H. V., Alsner, J and Westergaard, O.**  
*J. Mol. Biol.* **241**:18,1994.
- Schomburg, U. and Grosse, F.**  
*Eur. J. Biochem.*, **160**:451,1986.
- Shelton., E. R., Oscheroff, N. and Brutlag, D. L.**  
*J. Biol. Chem.*, **258**: 530,1983.
- Sng, J-H., Heaton, V. J., Bell, M., Maini, P., Austin, C. A. and Fisher, K. M.**  
*Biochimica et Biophysica Acta.*,**1444**:396,1999.
- Strick, R. and Lämmlli, U.K.**  
*Cell*, **83**:1137, 1995.
- Sugimoto, K., Yamada, K., Egashira, M., Yazaki, Y., Hirai., Kikichi, A., and Oshimi, K.**  
*Blood*, **91**:1407,1998.
- Sugino, A. and Cozzarelli, N. R.**  
*J. Biol. Chem.*, **255**:6299,1980.
- Sumner, A. T.**  
*Exp. Cell Res.*,**217**:440,1995.
- Sumner, A. T.**  
*Chromosome Res.*,**4**:5,1996.
- Swedlow, J. R., Sedat, J. W. and Agard, D. A.**  
*Cell*, **73**:97,1993.
- Takano, H., Kohno, K., Ono. M., Uchida, Y and Kuwano, M.**  
*Cancer Res.*, **51**:3951,1991.
- Takano, H. and Fojo, T.**  
*Proc. Am. Assoc. Cancer Res.*, **36**:451,1995.
- Tan, K. B., Dorman, T. E., Falls, K. M., Chung, T. D. Y.and Mirabelli, C. K.**  
*Cancer Res.*, **52**: 231, 1992.
- Tanabe, K., Ikegami, Y., Ishida,R. and Andoh, T.**  
*Cancer Res.*, **51**:4903,1991.

- Thomsen, B., Bendixen, C., Lund, K., Andersen. A. H., Sørensen, B. S. and Westergaard, O.**  
*J. Mol. Biol.*, **215**: 237,1990.
- Tovey, E. R. and Baldo, B. A.**  
*Electrophoresis*, **8**: 384,1987.
- T sai-Plugfelder, M., Liu, L. F., Liu, A. A., Tewey, K. M. Whang-Peng, J., Knutsen , T., Huebner, K., Croce, C. M. and Wang J. C.**  
*Proc.Natl.Sci.USA.*, **85**:7177,1988.
- Tse, Y. C., Kirkegaard, K. and Wang, J. C.**  
*J. Biol. Chem.*, **255**: 5560,1980.
- Turley, H., Comley, M., Houlbrook, S., Nozaki, N., Kikuchi, A., Hickson, I. D., Gatter, K. and Harris, A. L.**  
*British Jour. of Cancer*, **75**:1340, 1997.
- Uemura, T. and Yanagada, M.**  
*EMBO J.*, **3**:1737,1984.
- Uemura, T. and Yanagada, M.**  
*EMBO J.*, **5**:1003,1986.
- Uemura, T., Ohkura, H., Adachi, Y., Morino, K., Shizaki, K. and Yanagida, M.**  
*Cell*, **50**:917,1987.
- Vassetzsky, V. S., Alghisi, G-C., and Gasser, S. M.**  
*BioEassays*, **17**:767,1995.
- Vassetzsky, V. S., Dang, Q. I., Benedetti, P.and Gasser, S. M.**  
*Mol Cell Biol* **14**:6962,1994.
- Vosberg, H. P.**  
*Current Topic.Micro.Biol.Immunol.*, **114**:19,1985.
- Wang, J. C.**  
*J. Mol. Biol.*, **55**: 523,1971.
- Wang, J. C.**  
*Annu. Rev. Biochem .*, **54**: 665,1985.
- Wang. J. C.**  
*J. Biol. Chem.*, **266**: 6659,1991.
- Wang, J. C.**  
*Annu. Rev. Biochem.*, **65**: 635,1996a.
- Wang, J. C. and Liu, L. F.**  
*In Molecular Genetics ed.J.H. Taylor* **3** :656, N.Y. Academic,1979.
- Wang, Q., Zambetti, G. P. and Suttle, P. D.**  
*Mol. Cell. Biol.*, **17**: 389,1997.
- Wang, X., Watt, P. M., Louise, E. J., Borts, R. H. and Hickson, I. D.**  
*Nucleic Acids Res.*, **24**: 4791,1996b.
- Warburton, P.E. and Earnshaw, W. C.**

- BioEssays*, **19**: 97,1997.
- Watt. P. M. and Hickson, I. D.**  
*Biochem. J.*, **303**:681,1994.
- Watt, P. M., Louise, E. J., Borts, R. H. and Hickson, I. D.**  
*Cell*, **81**: 253,1995.
- Wells, N. J., Fry, A. M., Guano, C., Norbury,C. and Hickson, I. D.**  
*J. Biol. Chem.*, **270**,28357,1995.
- Wessel, I., Jensen, P. B., Falck, J.,Mirski, S. E. L., Cole, S. P .C. and Sehested, M.**  
*Cancer Res.*, **57**:4451,1997.
- Wigley, D. B., Davies, G. J., Dodson, E. J., Maxwell, A. and Dodson, G.**  
*Nature* ,**351**:624,1991.
- Woessner, R. D., Mattern, M. R., Mirabell, C. K., Johnson, R. K. and Drake, F. H.**  
*Cell Growth & Differ.*, **2**:209,1991.
- Wood, E. R. and Earnshaw, W. C.**  
*J. Cell Biol.*, **111**:2839,1990.
- Yanagida, M.**  
*Trends Cell Biol.*, **8**:144,1998.
- Zechiedrich, E. L. and Osheroff, N.**  
*EMBO J.*, **9**:4555,1990.
- Zimmerman, W. ,Sparks, C. A. and Doxsey, S. J.**  
*Current Opinion Cell Bio.*,**11**:122,1999.
- Zini, N., Martelli, A. M., Sabatelli, P., Santi, S., Negri, C., Ricotti, G. C. B. A. and Maraldi, N. M.**  
*Exp. Cell. Res.*, **200**:460,1992.

## **8 Figures**

- Figure 1 Reactions catalysed by type II topoisomerase.
- Figure 2 Biochemical characterization of DNA topoisomerase II $\alpha$  and II $\beta$  in H69-WT and H69-VP.
- Figure 3 Fluorescent image (x 630 magnification) of H69-WT cells and H69-VP at various stages of the cell cycle.
- Figure 4a Metaphases imaged at high resolution ( x 1000 magnification).
- Figure 4b Metaphases imaged at high resolution ( x 1000 magnification).
- Figure 5 Chromatin binding and affinity of topoisomerase II $\alpha$  and II $\beta$  in H69-WT and H69-VP.
- Figure 6 DNA mass distribution of H69-WT and H69-VP cells measured by flow cytometry.
- Figure 7 Fluorescent image ( x 2720 magnification) of A431 and peripheral human blood lymphocytes.
- Figure 8 Immunoblotting of DNA topoisomerase II $\alpha$  and  $\gamma$ -tubulin.
- Figure 9 A schematic representation of the domain of DNA topoisomerase II $\alpha$ .
- Figure 10 Topoisomerase II $\alpha$ -transcripts were analysed by RT-PCR.
- Figure 11 Phosphatase treatment.