

REFERENCES

- Albertini R.J., Anderson D., Douglas G.R., Hagmar L., Hemminki K., Merlo F., Natarajan A.T., Norppa H., Shuker D.E.G., Tice R., Waters M.D., Aitio A. 2000. IPCS guidelines for the monitoring of genotoxic effects of carcinogen in humans. *Mutat. Res.*, 463, 111-172.
- Anderson D., Francis A.J., Godbert P., Jenkinson P.C., Butterworth K.R. 1991. Chromosome aberration (CA), sister-chromatid exchanges (SCE) and mitogen-induced blastogenesis in cultured peripheral lymphocytes from 48 control individuals, sampled 8 times over 2 years. *Mutat. Res.*, 250, 467-476.
- Andreoli C., Leopardi P., Crebelli R. 1997. Detection of DNA damage in human lymphocytes by single cell gel electrophoresis after exposure to benzene or benzene metabolites. *Mutat. Res.*, 377, 95-104.
- Au W.W. 1991. Monitoring human population for the effects of radiation and chemical exposures using cytogenetic techniques, in: Wilkinson G. (Ed.), *Occupational Medicine, State of the Art Reviews*, Hanley and Belfus Inc., pp. 597-611.
- Au W.W., Walker D.M., Ward Jr. J.B., Whorton Jr. E.B., Legator M.S., Singh V. 1991. Factors contributing to chromosome damage in lymphocytes of cigarette smokers. *Mutat. Res.*, 260, 137-144.

- Au W.W., Bechtold W.E., Whorton Jr. E.B., Legator M.S. 1995. Chromosomal aberrations and response to γ -ray challenge in lymphocytes of workers exposed to 1,3 butadiene. *Mutat. Res.*, 334, 125-130.
- Au W.W., Cajas-Salazar N., Salama S. 1998. Factors contributing to discrepancies in population monitoring studies. *Mutat. Res.*, 400, 467-478.
- Au W.W., Oberheitmann B., Harms C. 2002. Assessing DNA damage and health risk using biomarkers. *Mutat. Res.*, 509, 153-163.
- Bajpoayee M., Dhawan A., Parmar D., Pandey A.K., Mathur N., Seth P.K. 2002. Gender-related differences in basal DNA damage in lymphocytes of a healthy Indian population using the alkaline Comet assay. *Mutat. Res.*, 520, 83-91.
- Ballardin M., Gemignani F., Bodei L., Mariani G., Ferdeghini M., Rossi A.M., Migliore L., Barale R. 2002. Formation of micronuclei and clastogenic factor(s) in patients receiving therapeutic dose of iodine-131. *Mutat. Res.*, 514, 77-85.
- Barale R., Chelotti L., Davini T., Del Ry S., Andreassi M.G., Ballardini M., Bulleri M., He J., Baldacci S., Di Pede F., Gemignani F., Landi S. 1998. Sister chromatid exchanges and micronucleus frequency in human lymphocytes of 1650 subjects in an Italian population: II. Contribution of sex, age and life style. *Environ. Molec. Mutagen.*, 31, 228-242.
- Bender M.A., Gooch P.C. 1966. Somatic chromosome aberrations induced by human irradiation: the 'reduplex' irradiation accident. *Radait. Res.*, 29, 568-582.
- Betti C., Davini T., Giannessi L., Loprineno N., Barale R. 1994. Microgel electrophoresis assay (Comet assay) and SCE analysis in human lymphocytes from 100 normal subjects. *Mutat. Res.*, 307, 323-333.

- Berwick M., Vineis P. 2000. Markers of DNA repair and susceptibility to cancer in humans: an epidemiological review. *J. Natl. Cancer Inst.*, 91, 874-897.
- Bickham J.W., Sandhu S., Hebert P.D.N., Chikhi L., Athwal R. 2000. Effects of chemical contaminants on genetic diversity in natural populations: for biomonitoring and ecotoxicology. *Mutat. Res.*, 463, 33-51.
- Binkova B., Lewtas J., Miskova I., Rössner P., Cerna M., Mrackova G., Peterkova K., Mumford J., Meyer S., Sram R.J. 1996. Biomarker studies in Northern Bohemia. *Environ. Health Perspect.*, 104(3), 591-597.
- Bogen K.T. 1993. Reassessment of human peripheral T-lymphocyte lifespan deduced from cytogenetic and cytotoxic effects of radiation. *Int. J. Radiat. Biol.*, 64, 192-204.
- Bolognesi C., Abbondandolo R.B., Casalone R. 1997. Age-related increase of baseline frequencies of sister chromatid exchanges, chromosome aberrations, and micronuclei in human lymphocytes. *Cancer Epidemiol. Biomark. Prev.*, 6, 249-256.
- Bonassi S., Abbondandolo A., Camurri L., Dal-Pra L., De-Ferrari M., Degrassi F., Forni A., Lamberti L., Lando C., Padovani P. 1995. Are chromosomal aberrations in circulating lymphocytes predictive of future cancer onset in humans? Preliminary results of an Italian cohort study. *Cancer Genet. Cytogenet.*, 79(2), 133-135.

- Bonassi S., Hagmar L., Stromberg U., Montagud A.H., Tinnerberg H., Forni A., Heikkila P., Wanders S., Wilhardt P., Hansteen I.L., Knudsen L.E., Norppa H. 2000. Chromosomal aberrations in lymphocyte predict human cancer independently of exposure to carcinogens: European study group on cytogenetic biomarkers and health. *Cancer Res.*, 60, 1619-1625.
- Bonassi S., Au W.W. 2002. Biomarkers in molecular epidemiology studies for health risk prediction. *Mutat. Res.*, 511, 73-86.
- Brittebo E.V. 1997. Metabolism-dependent activation and toxicity of chemicals in nasal glands. *Mutat. Res.*, 380, 61-75.
- Brown J.K., William A., Withers H.R., Ow K.T., Gramacho C., Amoes C. 1997. Sources of variability in the determination of micronuclei in irradiated peripheral blood lymphocytes. *Mutat. Res.*, 389, 123-128.
- Bukvic N., Gentile M., Susca F., Fanelli M., Serio G., Bounadonna L., Capurso A., Guanti G. 2001. Sex chromosome loss, micronuclei, sister chromatid exchange and aging: a study including 16 centenarians. *Mutat. Res.*, 498, 159-167.
- Carbonell E., Valbuena A., Xamena N., Creus A., Marcos R. 1995. Temporary variations in chromosomal aberrations in a group of agricultural workers exposed to pesticides. *Mutat. Res.*, 344, 127-134.
- Carbonell E., Xamena N., Creus A., Marcos R. 1993. Cytogenetic biomonitoring in a Spanish group of agricultural workers exposed to pesticides. *Mutagenesis*, 8, 511-517.

- Carere A., Antovvia A., Crebelli R., Degrassi F., Fiore M., Iavarone I., Isacchi G., Lagorio S., Leopardi P., Marcon F., Palitti F., Tanzarella C., Zijno A. 1995. Genetic effects of petroleum fuels: cytogenetic monitoring of gasoline station attendants. *Mutat. Res.*, 332, 17-26.
- Carter S.B. 1967. Effects of cytochalasin on mammalian cells. *Nature*, 213, 261-264.
- Černá M., Spěváčková V., Čejchanová M., Beneš B., Rössner P., Bavorová H., Očadlíková D., Šmíd J., Kubínová R. 1997. Population-based biomonitoring in the Czech Republic-the system and selected results. *Sci. Total Environ.*, 204, 263-270.
- Choucroun P., Gillet d., Dorange G., Sawicki B., Dewitte J.D. 2001. Comet assay and early apoptosis. *Mutat. Res.*, 478, 89-96.
- Collins A.R., Dobson V.L., Dušinská M., Kennedy G., Štětina R. 1997. The comet assay: what can it really tell us?. *Mutat. Res.*, 375, 183-193.
- Collins A.R., Dušinská M., Gedix C.M., Stetina R. 1996. Oxidative damage to DNA: Do we have a reliable biomarker?. *Environ. Health Perspect.*, 104(Sup. 3), 465-469.
- Collins A., Dušinská M., Franklin M., Somorovská M., Petrovská H., Duthie S., Fillion L., Panayiotidis M., Rašlová K., Voughan N. 1997. Comet assay in human biomonitoring studies: reliability, validation and applications. *Environ. Molec. Mutagen.*, 30, 139-146.
- Crebelli R., Carta P., Andreoli C., Aru G., Dobrowolny G., Rossi S., Zijno A. 2002. Biomonitoring of primary aluminium industry workers: detection of micronuclei and repairable DNA lesion by alkaline SCGE. *Mutat. Res.*, 516, 63-70.

- Da Cruz A.D., McArthur A.G., Silva C.C., Curado M.P., Glickman B.W. 1994. Human micronucleus counts are correlated with age, smoking and cesium-137 dose in the Goiana (Brazil) radiological accident. *Mutat. Res.*, 313, 57-68.
- Davies H.W., Kennedy S.M., Teschke K., Quintana P.J.E. 1998. Cytogenetic analysis of South Asian berry pickers in British Columbia using the micronucleus assay in peripheral lymphocytes. *Mutat. Res.*, 416, 101-113.
- Dean B.J., Danford N. 1984. Assay for the detection of chemically-induced chromosome damage in cultured mammalian cells, in: Venitt S. and Parry J.M. (Eds.), *Mutagenesis Testing*, IRL Press Limited, Oxford, pp. 187-232.
- De Boeck M., Touil N., De Visscher G., Aka Vende P., Kirsch-Volders M. 2000. Validation and implementation of an internal standard in comet assay analysis. *Mutat. Res.*, 469, 181-197.
- De Ferrari M., Artuso M., Bonassi S., Bonatti S., Cavalieri Z., Pescatore D., Marchini E., Pisano V., Abbondandolo A. 1991. Cytogenetic biomonitoring of an Italian population exposed to pesticides: chromosome aberration and sister chromatid exchange analysis in peripheral blood lymphocytes. *Mutat. Res.*, 260, 105-113.
- Dhawan A., Mathur N., Seth P.K. 2001. The effect of smoking and eating habits on DNA damage in Indian populations as measured in the comet assay. *Mutat. Res.*, 474, 121-128.
- Dulout F.N., Grillo C.A., Seoane A.I., Maderna C.R., Nilsson R., Vahter M., Darroudi F., Natarajan A.T. 1996. Chromosomal aberrations in peripheral blood lymphocytes from native Andean women and children from Northwestern Argentina exposed to arsenic in drinking water. *Mutat. Res.*, 370, 151-158.

- Duthie S.J., Pirie L., Jenkinson A. Mc E., Narayanan S. 2002. Cryopreserved versus freshly isolated lymphocytes in human biomonitoring: endogenous and induced DNA damage, antioxidant status and repair capability. *Mutagenesis*, 17(3), 211-214.
- Fairbairn D.W., Olive P.L., O'Neill K. 1995. The comet assay: a comprehensive review. *Mutat. Res.*, 339, 37-59.
- Fenech M. 1993. The cytokinesis-block micronucleus technique and its application to genotoxicity studies in human populations. *Environ. Health Perspect.*, 101, 101-107.
- Fenech M. 1997. The advantages and disadvantages of the cytokinesis-block micronucleus method. *Mutat. Res.*, 392, 11-18.
- Fenech M. 1998. Important variables that influence base-line micronucleus frequency in cytokinesis-blocked lymphocytes-a biomarker for DNA damage in human populations. *Mutat. Res.*, 404, 155-165.
- Fenech M. 2000. The in vitro micronucleus technique. *Mutat Res.*, 455, 81-95.
- Fenech M., Aitken C., Rinaldi J. 1998. Folate, vitamin B12, homocysteine status and chromosome damage rate in young Australian adults. *Carcinogenesis*, 19, 1163-1171.
- Fenech M., Chang W.P., Kirsch-Volders M., Holland N., Bonassi S., Zeiger E. 2003. HUMN project: detailed description of the scoring criteria for the cytokinesis-block micronucleus assay using isolated human lymphocytes cultures. *Mutat. Res.*, 534, 65-75.

- Fenech M., Holland N., Chang W.P., Zeiger E., Bonassi S. 1999. The Human Micronucleus Project-An international collaborative study on the use of the micronucleus technique for measuring DNA damage in human. *Mutat. Res.*, 428, 271-283.
- Fenech M., Morley A.A. 1985. Measurement of micronuclei in lymphocytes. *Mutat. Res.*, 147, 233-246.
- Fenech M., Perepetskaya G., Mikhalevich L. 1997. A more comprehensive application of the micronucleus technique for biomonitoring of genetics damage rates in human populations: experience from the Chernobyl catastrophe. *Environ. Molec. Mutagen.*, 30, 112-118.
- Fenech M., Rinaldy J. 1994. The relationship between micronuclei in human lymphocytes and plasma of vitamin C, vitamin E, vitamin B₁₂ and folic acid. *Carcinogenesis*, 15, 1405-1411.
- Flato S. Hemminki K., Thunberg E., Georgellis A. 1996. DNA adduct formation in human nasal mucosa as a biomarker of exposure to environmental mutagens and carcinogens. *Environ. Health Perspect.*, 104, 471-473.
- Friis L., Vaghef H., Edling C., Hellman B. 1997. No increased DNA damage in peripheral lymphocytes of sewage workers as evaluated by the alkaline single cell gel electrophoresis. *Occup. Environ. Med.*, 54, 494-498.
- Gajalaskshmi P., Balasundaram A., Venkatesan P., Santhiya S.T., Ramesh A. 2002. Cytogenetic studies on spray painters in south India. *Mutat. Res.*, 514, 1-6.

- Gedik C.M., Ewen S.W.B., Collin A.R. 1992. Single cell gel electrophoresis applied to the analysis of UV-C damage and its repair in human cells. *Int. J. Radiat. Biol.*, 62, 313-320.
- Gómez-Arroyo S., Díaz-Sánchez Y., Meneses-Pérez M.A., Villalobos-Pietrini R., De León-Rodríguez J. 2000. Cytogenetic biomonitoring in a Mexican floriculture worker group exposed to pesticides. *Mutat. Res.*, 466, 117-124.
- Gonsebatt M.E., Vega L., Salazar A.M., Montero R., Guzmán P., Blas J., Del Razo L., García-Vargas M., Albores A., Cebrián M.E., Kelsh M., Ostrosky-Wegman P. 1997. Cytogenetic effects in human exposure to arsenic. *Mutat. Res.*, 386, 219-228.
- Green M.H.L., Lowe J.E., Harcourt S.A., Akinluyi P., Rowe T., Cole J., Anstey A.V. 1992. UV-C sensitivity of unstimulated and stimulated human lymphocytes from normal and xeroderma pigmentosum donors in the comet assay: a potential diagnostic technique. *Mutat. Res.*, 273, 137-144.
- Hagmar L., Brogger A., Hansteen I.-L., Heim S., Högsteck B., Knudsen L., Lambert B., Linnainmaa K., Mitelman F., Sorsa M. 1994. Cancer risk in humans predicted by increased levels of chromosomal aberrations in lymphocytes: Nordic study group on the health risk of chromosome damage. *Cancer Res.*, 54, 1919-1922.
- Hagmar L., Bonassi S., Stromberg U., Brogger A., Knudsen L.E., Norppa H., Reuterwall. 1998. Chromosomal aberrations in lymphocytes predict human cancer: a report from the European Study Group on Cytogenetic biomarkers and Health (ESCH). *Cancer Res.*, 58, 4117-4121.

- Hartmann A., Fender H., Speit G. 1998. Comparative biomonitoring study of workers at a waste disposal site using cytogenetic tests and the comet (single-cell gel) assay. *Environ. Molec. Mutagen.*, 32, 17-24.
- Hartmann A., Plappert U., Raddatz K., Grünert-Fachs M., Speit G. 1994. Does physical activity induce DNA damage?. *Mutagenesis*, 9, 269-272.
- Heddle J.A. 1973. A rapid in vivo test for chromosome damage. *Mutat. Res.*, 18, 187-192.
- Heimers A., Schröder H., Lengfelder E., Schmitz-Feuerhake I. 1995. Chromosome aberration analysis in aircrew members. *Radiat. Prot. Dosim.*, 60, 171-175.
- Heimers A. 2000. Chromosome aberration analysis in Concorde pilots. *Mutat. Res.*, 467, 169-176.
- Holmen A., Karlsson A., Bratt I., Hogstedt B. 1995. Increased frequencies of micronuclei in T-lymphocytes of smokers. *Mutat. Res.*, 334, 205-208.
- Hsu T.C. 1952. Mammalian chromosomes in vitro. I. The karyotype of man. *J. Heredit.*, 43, 167-172.
- Huber R., Braselmann H., Bauchinger M. 1992. Intra-and inter-individual variation of background and radiation induced micronucleus frequencies in human lymphocytes. *Int. J. Radiat. Biol.*, 61, 655-661.
- Hulka B.S., Wilcosky T.C., Griffith J.D. 1990. *Biology Markers in Epidemiology*, New York, Oxford University Press.
- Hüttner E., Götze A., Nikolova T. 1999. Chromosomal aberrations in human as genetic endpoints to assess the impact of population. *Mutat. Res.*, 445, 251-257.

- Iha A.N., Sharma T. 1991. Enhanced frequency of chromosome aberration in workers occupationally exposed to diagnostic X-rays. *Mutat. Res.*, 260, 343-348.
- Jacob P., Court Brown W.M. 1961 Distribution of human chromosome count in relation to age. *Nature*, 191, 1178-1180.
- Joksić G., Vidaković A., Spasojević-Tišma V. 1997. Cytogenetic monitoring of pesticide sprayers. *Environ. Res.*, 75, 113-118.
- Kalina I., Brezáni P., Gajdošová D., Binková B., Šalagovič J., Habalová V., Mračková G., Dobiáš L., Šrám R.J. 1998. Cytogenetic monitoring in coke oven workers. *Mutat. Res.*, 417, 9-17.
- Kassie F., Parzefall W., Knasmüller S. 2000. Single cell gel electrophoresis: a new technique for biomonitoring studies. *Mutat. Res.*, 463, 13-31.
- Kasuba V., Sentija K., Garaj- Vrhovac V., Fucic A. 1995. Chromosomal aberrations in peripheral blood lymphocytes from control individuals. *Mutat. Res.*, 346, 487-495.
- King C.M., Bristow-Craig H.E., Gillespie E.S., Barnett Y.A. 1997. In vivo antioxidant status, DNA damage, mutation and DNA repair capacity in cultured lymphocytes from healthy 75-to 80-year-old humans. *Mutat. Res.*, 377, 137-147.
- Kirland D. 1998. Chromosome aberration testing in genetic toxicology-past, present and future. *Mutat. Res.*, 404, 173-185.
- Kirsch-Volders M., Elhajouji A., Cundari E., Van Hummelen P. 1997. The *in vitro* micronucleus test: a multi-end point assay to detect simultaneously mitotic delay, apoptotic, chromosome breakage, chromosome loss and non-disjunction. *Mutat. Res.*, 392, 19-30.

Klaude M., Erikson S., Nygren J., Ahnstrom G. 1996. The comet assay: mechanisms and technical considerations. *Mutat. Res.*, 363, 89-96.

Klemans W., Vleminckx C., Schriewer L., Joris I., Lijssen N., Maes A., Ottogali M., Pays A., Planard C., Rigaux G., Ros Y., Vande Rivi re M., Vandenvelde J., Verschaeve L., Deplaen P., Lakhanisky T.H. 1995. Cytogenetic biomonitoring of a population of children allegedly exposed to environmental pollutants Phase 2: Results of a three-year longitudinal study. *Mutat. Res.*, 342, 147-156.

Kobayashi H., Sugiyama C., Morikawa Y., Hayashi M., Sofuni T. 1995. A comparison between manual microscopic analysis and computerized image analysis in the single cell gel electrophoresis assay. *MMS Commun.*, 3(2), 103-115.

K teles G.J., Bojtor I., Szirmai S., B rces J.,  tos M. 1993. Micronucleus frequency in cultured lymphocytes of an urban population. *Mutat. Res.*, 319, 267-271.

Kubiak R., Belowski J., Szczeklik J., Smolik E., Mielzynska D., Baj M., Szczesna A. 1999. Biomarkers of carcinogenesis in humans exposed to polycyclic aromatic hydrocarbons. *Mutat. Res.*, 445, 175-180.

Landi S., Iazzolino E., Barale R. 2000. Are baseline frequencies of SCEs, CAs, and MNs in human lymphocytes related to haematological values?. *Mutat. Res.*, 469, 159-166.

Lazutka J.R., Lekevi cius R., Dedonut  V., Maciulevi iut  L., Mierauskien  J., Rudaitien  S., Slap yt  G. 1999. Chromosomal aberrations and sister-chromatid exchanges in Lithuanian populations: effects of occupational and environmental exposures. *Mutat. Res.*, 445, 225-239.

- Lebailly P., Vigreux C., Lechevrel C., Ledemeney D., Godard T., Sichel F., LeTalaer J.Y., Henry-Amar M., Gauduchon P. 1998. DNA damage in mononuclear leukocytes of farmers measured using the alkaline comet assay: modifications of DNA damage levels after a one-day field spraying period with selected pesticides. *Cancer Epidemiol. Biomark. Prev.*, 7, 929-940.
- Legator M.S., Au W.W. 1994. Application of integrated genetic monitoring: the optimal approach for detecting environmental carcinogens. *Environ. Health Perspect.*, 102, 125-132.
- Lucas J.N., Deng W., Moore D., Hill F., Wade M., Lewis A., Sailes F., Kramer C., Hsieh A., Galvan N. 1999. Background ionizing radiation plays a minor role in the production of chromosome translocations in a control population. *Int. J. Radiat. Biol.*, 75, 819-827.
- Lucero L., Pastor S., Suárez S., Durbán R., Gómez C., Parrón T., Creus A., Marcos R. 2000. Cytogenetic biomonitoring of Spanish greenhouse workers exposed to pesticides: micronuclei analysis in peripheral blood lymphocytes and buccal epithelial cells. *Mutat. Res.*, 464, 255-262.
- Maffei F., Fimognari C., Castelli E., Stefanini G.F., Forti G.C., Hrelia P. 2000. Increased cytogenetic damage detected by FISH analysis on micronuclei in peripheral lymphocytes from alcoholics. *Mutagenesis*, 15(6), 517-523.
- Maffei F., Forti G.C., Castelli E., Stefanini G.F., Mattioli S., Hrelia P. 2002. Biomarker to assess the genetic damage induced by alcohol abuse in human lymphocytes. *Mutat. Res.*, 516, 49-58.

- Mahimkar M.B., Buch S.C., Samant T.A., Kapoor M.D., Bhisey R.A. 2001. Influence of smokeless tobacco exposure on detoxification status and chromosomal damage in male and female habitués. *Mutat. Res.*, 491, 111-117.
- Maluf S.W., Erdtmann B. 2000. Follow-up study of the genetic damage in lymphocytes of pharmacists and nurses handling antineoplastic drugs evaluated by cytokinesis-block micronuclei analysis and single cell gel electrophoresis assay. *Mutat. Res.*, 471, 21-27.
- Mayer C., Popanda O., Zelezny O., Von Brevern M.-C., Bach A., Bartsch H., Schmezer P. 2002. DNA repair capacity after γ -irradiation and expression profiles of DNA repair genes in resting and proliferating human peripheral blood lymphocytes. *DNA Repair*, 1, 237-250.
- McKelvey-Martin V.J., Green M.H.L., Schmezer P., Pool-Zobel B.L., De Méo M.P., Collins A.R. 1993. The single cell gel electrophoresis assay (comet assay): A European review. *Mutat. Res.*, 288, 47-63.
- Meng Z., Zhang B. 1997. Chromosomal aberrations and micronuclei in lymphocytes of workers at a phosphate fertilizer factory. *Mutat. Res.*, 393, 283-288.
- Michalska J., Motykiewicz G., Pendzich J., Kalinowska E., Midro A., Chorąży M. 1999. Measurement of cytogenetic endpoints in women environmentally exposed to air pollution. *Mutat Res.*, 445, 139-145.
- Migliore L., Parrini M., Sbrana I., Biagini C., Battaglia A., Loprieno N. 1991. Micronucleated lymphocytes in people occupationally exposed to potential environmental contaminants: the age effect. *Mutat. Res.*, 256, 13-20.

- Miller B., Albertini S., Locher F., Thybaud V., Lorge E. 1997. Comparative evaluation of the in vitro micronucleus test and the in vitro chromosome aberration test: industrial experience. *Mutat. Res.*, 392, 45-59.
- Mitacek E.J., Brunnemann K.D., Polennak A.P., Hoffman D., Suttajit M. 1991. Composition of popular tobacco products in Thailand, and its disease prevention. *Prev. Med.*, 20, 764-773.
- Mitelman F., Mertens F., Johansson B. 1997. A breakpoint map of a recurrent chromosomal rearrangements in human neoplasia. *Nat. Genet.*, 15, 417-474.
- Mungmai W., Itthipoonthanakorn T., Jarikphakorn C., Rodpasa J., Kajorncheepunngam A., Piladang V., Wiwatanadate P., Bovornkitti S. 2000. Indoor radon in Chiang Mai Province, Thailand. *Intern. Med.*, 16, 18-22.
- Müller W.-U., Bauch T., Streffer C., Niedereicholz F., Böcker W.. 1994. Comet assay studies of radiation-induced DNA damage and DNA repair in various tumour cell lines. *Int. J. Radiat. Biol.*, 65, 315-319.
- Nakachi K., Limtrakul P., Sonklin P., Sonklin O., Torcharoen C., Lipigorngoson S., Arai K., Sone Y., Imai K., Matsuyama S., Shimizu H., Takahashi T., Suttajit M. 1999. Risk factors for lung cancer among northern Thai women: epidemiological, nutritional, serological and bacteriological surveys of residents in high and low incidence areas. *Jpn. J. Cancer Res.*, 90, 1-9.
- Olive P.L. 1989. Cell Proliferation as a requirement for development of the contact effect in the Chinese Hamster V79 spheroids. *Radiat. Res.*, 117, 79-92.
- Olive, P.L., Banáth J.P., Durand R.E. 1990. Heterogeneity in radiation-induced DNA damage and repair in tumour and normal cells measured using the "Comet" assay. *Radiat. Res.*, 122, 86-94.

- Olive P.L., Wlodex D., Durand R.E., Banath J.P. 1992. Factors influencing DNA migration from individual cells subjected to gel electrophoresis. *Exp. Cell Res.*, 198, 259-267.
- Ostling O. Johanson K.J. 1984. Microelectrophoretic study of radiation-induced DNA damages in individual mammalian cells. *Biochem. Biophys. Res. Commun.*, 123, 291-298.
- Palitti F. 1998. Mechanisms of the origin of chromosomal aberrations. *Mutat. Res.*, 404, 133-137.
- Pastor S., Gutiérrez S., Creus A., Cebulski-Wasilewska A., Marcos R. 2001. Micronuclei in peripheral blood lymphocytes and buccal epithelial cells of Polish farmers exposed to pesticides. *Mutat. Res.*, 495, 147-156.
- Parkin D.M., Muir C.S., Whelan S.L., Gao Y.T., Farlay J., Powell J. 1992. Cancer incidence in five continents Vol. 5. Lyon, IARC Scientific Publications No.120.
- Perera F.P., Hemminki K., Gryzbowska E., Motykiewicz G., Michalska J., Santella R.M., Young, Dicky C., Brandt-Rauf P., De Vivo I., Blaner W., Tsai W.-Y., Chorazy M. 1992. Molecular and genetic damage in human from environmental pollution in Poland. *Nature*, 360, 256-258.
- Perera F.P., Whyatt R.M. 1994. Biomarkers and molecular epidemiology in mutation/cancer research. *Mutat. Res.*, 313, 117-129.
- Pinto D., Ceballos J.M., García G., Guzmán P., Del Razo L.M., Vera E., Gómez H., García A., Gonshebat M.E. 2000. Increased cytogenetic damage in outdoor painters. *Mutat. Res.*, 467, 105-111.

- Pitarque M., Carbonell E., Lapena N., Marsa M., Torres M., Creus A., Xamena N., Marcos R. 1996a. No increase in micronuclei frequency in cultured blood lymphocytes from a group of filling station attendants. *Mutat. Res.*, 367, 161-167.
- Pitarque M., Creus A., Marcos R. Hughes J.A., Anderson D. 1996b. Examination of various biomarkers measuring genotoxic endpoints from Barcelona airport personnel. *Mutat. Res.*, 440, 195-204.
- Poli P., Buschini A., Maria F., Restivo M., Ficarelli A., Cassoni F., Ferrero I., Rossi C. 1999. Comet assay application in environmental monitoring: DNA damage in human leukocytes and plant cells in comparison with bacterial and yeast tests. *Mutagenesis*, 14(6) 547-555.
- Rajae-Bebahani N., Schmezer P., Risch A., Rittgen W., Kayser K.W., Dienemann H., Schulz V., Drings P., Thiel S., Bartsch H. 2001. Altered DNA repair capacity and bleomycin sensitivity as risk markers for non-small cell lung cancer. *Int. J. Cancer (Pred. Oncol.)*, 95, 86-91.
- Ramsey M.J., Moore II D.H., Briner J.F., Lee D.A., Olsen L.A., Senft J.R., Tucker J.D. 1995. The effects of age and lifestyle factors on the accumulation of cytogenetic damage as measured by chromosome painting. *Mutat. Res.*, 338, 95-106.
- Roe F.J.C. 1994. Diet is important in assessing lung cancer risk factors in nonsmokers. *Nutrition and Cancer*, 22, 203-205.
- Rojas E., Lopez M.C., Valverde M. 1999. Single cell gel electrophoresis assay: methodology and applications. *J. Chromatogr. B*, 722, 225-254.

- Rössner P., Šrám R.J., Bavorová H., Očadlíková D., Černá M., Švandová E. 1998. Spontaneous level of chromosomal aberrations in peripheral blood lymphocytes of control individuals of Czech Republic population. *Toxicol. Lett.*, 96, 97, 137-142.
- Salama S.A., Serrana M., Au W.W. 1999. Biomonitoring using accessible human cells for exposure and health risk assessment. *Mutat. Res.*, 436, 99-112.
- Sardas S., Aygün N., Gamli M., Ünal Y., Berk N., Karakaya A.E. 1998. Use of alkaline comet assay (single-cell gel electrophoresis technique) to detect DNA damage in lymphocytes of operating room personnel occupationally exposed to anaesthetic gases. *Mutat. Res.*, 418, 93-100.
- Sari-Monodier I., Orsière T., Bellon L., Pompili J., Sapin C., Botta A. 2002. Cytogenetic monitoring of industrial radiographers using the micronucleus assay. *Mutat. Res.*, 521, 37-46.
- Sax K. 1933. Induction by X-rays of chromosome aberrations in *Tradescantia* microspores. *Genetics*, 23, 494-526.
- Scarpato R., Migliore L., Angotzi G., Fedi A., Miligi L., Loprieno N. 1996. Cytogenetic monitoring of a group of Italian floriculturists: no evidence of DNA damage related to pesticide exposure. *Mutat. Res.*, 367, 73-82.
- Schmezer P., Rajaei-Behbahani N., Risch A., Thiel S., Rittgen W., Drings P., Dienemann H., Kayser K.W., Schul V., Bartsch H. 2001. Rapid screening assay for mutagen sensitivity and DNA repair capacity in human peripheral blood lymphocytes. *Mutagenesis*, 16(1), 25-30.
- Schmid W. 1975. The micronucleus test, *Mutat. Res.*, 31, 9-15.

- Scott D., Barber J.B.P., Levine E.L., Burrill W., Roberts S.A. 1998. Radiation-induced micronucleus induction in lymphocytes identifies a high frequency of radiosensitive cases among breast cancer patients: a test for predisposition. *Br. J. Cancer*, 77, 614-620.
- Simarak S., De Jong U.W., Breslow N., Dahl C.J., Ruckphaopunt K., MacLennan R. 1977. Cancer in the oral cavity, pharynx and lung in north Thailand: case control study and analysis of cigar smoke. *Br. J. Cancer*, 36, 130-140.
- Singh N.P. 2000. Microgels for estimation of DNA strand breaks, DNA protein crosslinks and apoptosis. *Mutat. Res.*, 455, 111-127.
- Singh N.P., McCoy M.T., Tice R.R., Schneider E.L. 1988. A simple technique for quantitation of low level DNA damage in individual cells. *Exp. Cell Res.*, 175, 184-191.
- Singh N.P., Stephens R.E. 1997. Microgel electrophoresis: sensitivity, mechanisms, and DNA electrostretching. *Mutat. Res.*, 383, 167-175.
- Smerhovsky Z., Landa K., Rössner, Brabec M., Zudova Z., Hola N., Pokorna Z., Mareckova J., Hurychova D. 2001. Risk of cancer in an occupationally exposed cohort with increased level of chromosomal aberrations. *Environ. Health Perspect.*, 109, 41-45.
- Smerhovsky Z., Landa K., Rossner P., Juzova D., Brabec M., Zudova Z., Hola N., Zarska H., Nevsimalova E. 2002. Increase risk of cancer in radon-exposed miners with elevated frequency of chromosome aberrations. *Mutat Res.*, 514, 165-176.

Somorovská M., Jahnová E., Tulinská J., Zámečníková M., Šarmanová J., Terenová A., Vodičková L., Lísková A., Vallová B., Souček P., Hemminki K., Norppa H., Hirvonen A., Tate A.D., Fuortes L., Dušinská M., Vodička P. 1999a. Biomonitoring of occupational exposure to styrene in a plastics lamination plant. *Mutat. Res.*, 428, 255-269.

Somorovská M., Szabová E., Vodička P., Tulinská J., Barančoková M., Fábry R., Lísková A., Riegerová Z., Petrovská H., Kubová J., Rausová K., Dušinská M., Collins A. 1999b. Biomonitoring of genotoxic risk in workers in a rubber factory; comparison of the Comet assay with cytogenetic methods and immunology. *Mutat. Res.*, 445, 181-192.

Sone Y., Sakamoto N., Suga K., Imai K., Nakachi K., Sonklin P., Sonklin O., Lipigorngoson S., Limtrakul P., Suttajit M. 1998. Comparison of diets among elderly female residents in two suburban districts in Chiang Mai Province, Thailand, in dry season survey on high and low risk districts of lung cancer incidence. *App. Hum. Sci.*, 17(2), 49-56.

Speit G., Hartmann A. 1995. The contribution to excision repair to the DNA-effects seen in the alkaline single cell gel test (comet assay). *Mutagenesis*, 10, 555-559.

Speit G., Hartmann A. 1999. The comet assay (single-cell gel test)-a sensitive genotoxicity test for the detection of DNA damage and repair, in: Henderson S.D. (Ed.), *Method in molecular biology*, Vol 113, DNA repair protocols: Eukaryotic Systems, Humana Press, New Jersey, pp. 203-212.

Sram R.J., Podrazilova K., Dejmek J., Mrackova G., Pilcik T. 1998. Single cell gel electrophoresis assay: sensitivity of peripheral white blood cells in human population studies. *Mutagenesis*, 13, 99-103.

- Šrám R.J., Rössner P., Peltonen K., Podrazilová K., Mračková G., Demopoulos N.A., Stephanou G., Vlachodimitropoulos D., Darroudi F., Bates A.D. 1998. Chromosomal aberrations, sister-chromatid exchanges, cells with high frequency of SCE, micronuclei and comet assay parameters in 1,3-butadiene-exposed workers. *Mutat. Res.*, 419, 145-154.
- Stephan G., Pressl S. 1999. Chromosomal aberrations in peripheral lymphocytes from healthy subjects as detected in first cell division. *Mutat. Res.*, 446, 231-237.
- Surrallés J., Natarajan A.T. 1997. Human lymphocytes micronucleus assay in Europe. An international survey. *Mutat. Res.*, 392, 165-174.
- Suttajit M., Mitacek D., Martin N. 1994. "Toxicological study of tradition tobacco smoking related to high incidence of lung cancer in Chiang Mai", Abstract of forth cancer research symposium, Faculty of Medicine, Chiang Mai University, pp. 33-34.
- Testa A., Ranaldi R., Carpineto L., Pacchierotti F., Tirindelli D., Fabiani L., Giuliani A.R., Urso M., Rossini A., Materazzo F., Petyx M., Leoni V. 2002. Cytogenetic biomonitoring of workers from laboratories of clinical analyses occupationally exposed to chemicals. *Mutat. Res.*, 520, 73-82.
- Tice R.R. 1995. The single cell gel/comet assay: A microgel electrophoretic technique for the detection of DNA damage and repair in individual cells, in: Phillips D.H. and Venitt S. (Eds.), *Environmental Mutagenesis*, BIOS Scientific Publishers, Oxford, pp. 315-339.

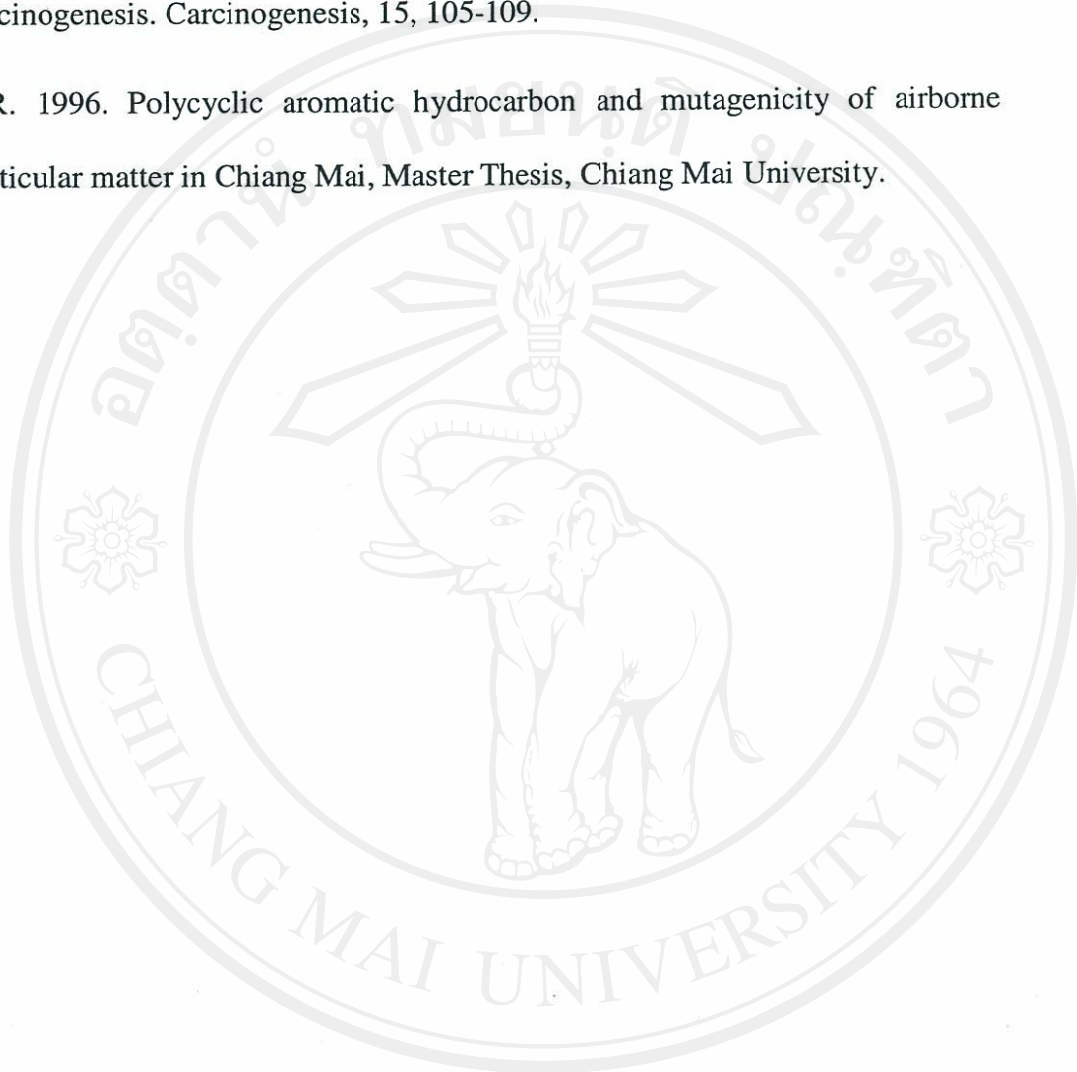
- Tice R.R., Agrurell E., Anderson D., Burlinson B., Hartmann A., Kobayashi H., Miyamae Y., Rojas E., Ryu J.C., Sasaki Y.F. 2000. Single cell gel/comet assay: guideline for in vitro and in vivo genetic toxicology testing. *Environ. Molec. Mutagen.*, 35, 206-221.
- Tice R.R., Andrews P.W., Singh N.P. 1990. The single cell gel (SCG) assay: an electrophoretic technique for evaluating intercellular differences in DNA damage and repair, in: Sutherland B. and Woodhead A. (Eds.) *Method for the Detection of DNA Damages in Human Cells*, Plenum Press, New York, pp. 291-301.
- Titenko-Holland N., Windham G., Kolachanna P., Reinisch F., Parvatham S., Osorio A.M., Smith M.T. 1997. Genotoxicity of malathion in human lymphocytes assessed using the micronucleus assay in vitro and in vivo: A study of malathion-exposed workers. *Mutat. Res.*, 388, 85-95.
- Tomanin K., Ballarin C., Nardini B., Mastrangelo G., Sarto F. 1991. Influence of smoking habits on the frequency of micronuclei in human lymphocytes by cytokinesis block method. *Mutagenesis*, 6, 123-126.
- Tompa A., Major J., Jakab M.G. 1994. Monitoring of benzene-exposed worker for genotoxic effects of benzene: improved-working condition-related decrease in the frequencies of chromosomal aberrations in peripheral blood lymphocytes. *Mutat. Res.*, 304, 159-165.
- Tucker J., Preston R. 1996. Chromosome aberrations, micronuclei, aneuploidy, sister chromatid exchanges, and cancer risk assessment. *Mutat. Res.*, 365, 147-159.

- Türkel B., Egeli Ü. 1996. Cytogenetic findings on shoe workers exposed long-term to benzene. *Environ Health Perspect.*, 104(Sup. 6), 1313-1317.
- Vaglenov A., Carbonell E., Marcos R. 1998. Biomonitoring of workers exposed to lead. Genotoxic effects, its modulation by polyvitamin treatment and evaluation of the induced radioresistance. *Mutat. Res.*, 448, 79-92.
- Valverde M., Lopez M.C., Lopez I., Sanchez I., Fortoul T.I., Ostrosky-Wegman P., Rojas E. 1997. DNA damage in leukocytes and buccal and nasal epithelial cells of individual exposed to air pollution in Mexico city. *Environ. Molec. Mutagen.*, 30, 147-152.
- Vanhouwaert A., Vanparys P., Kirsch-Volders M., 2001. The *in vivo* gut micronucleus test detects clastogens and aneugens given by gavage. *Mutagenesis*, 16(1), 39-50.
- Van Diemen P.C.M., Massdam D., Vermeulen S., Darrouidi F., Natarajan A.T. 1995. Influence of smoking habits on the frequency of structural and numerical chromosomal aberrations in human peripheral blood lymphocytes using the fluorescence in situ hybridization (FISH) technique. *Mutagenesis*, 10, 487-495.
- Vatanasapt V., Martin N., Sriplung H., Chindavijak K., Sontipong S., Sriamporn S., Parkin D.M., Ferlay J. 1993. Cancer in Thailand 1988-1991. Lyon, International agency for research on cancer technical report No. 16.
- Vatanasapt V., Martin N., Sriplung H., Chindavijak K., Sontipong S., Sriamporn S., Parkin D.M., Ferlay J. 1995. Cancer incidence in Thailand, 1988-1991. *Cancer Epidemiol. Biomark. Prev.*, 4, 475-483.

- Vijayalaxmi, Tice R.R., Strauss G.H.S. 1992. Assessment of radiation-induced DNA damage in human blood lymphocytes using single cell gel electrophoresis technique. *Mutat. Res.*, 271, 243-252.
- Vinitketkumnue U., Kalayanamitra K., Chewonarin T., Kamens R. 2002. Particulate matter, PM 10 & PM 2.5 levels, and airborne mutagenicity in Chiang Mai, Thailand. *Mutat. Res.*, 519, 121-131.
- Weisburger J.H., Williams G.M. 1981. Carcinogen testing: current problems and new approaches. *Science*, 214, 401-407.
- Wiwatanadate P., Voravong R., Mahawana T., Wiwatanadate M., Sirisomboon T., Ngamlur N., Itthipoonthanakorn T., Bovornkitti S. 2001. Lung cancer prevalence and indoor radon in Saraphi District, Chiang Mai, Thailand. *Intern. Med.*, 17(1) 26-32.
- Wojewódzka M., Kruszewski M., Iwaneńko T., Collins A.R., Szumiel I. 1998. Application of the comet assay for monitoring DNA damage in workers exposed to chronic low-dose irradiation I. Strand breakage. *Mutat. Res.*, 416, 21-35.
- World Health Organization. 1985. "Environmental Health Criteria 46; Guidelines for the study of genetic effects in human population." [Online]. Available: <http://www.inchem.org/document/ehc/ehc/ehc46.htm> (28 November 2003).
- World Health Organization. 1993. "Environmental Health Criteria 155; Biomarkers and risk assessment: concepts and principles." [Online]. Available: <http://www.inchem.org/document/ehc/ehc/ehc155.htm> (28 November 2003).
- Zeljezic D., Garaj-Vrhovac. 2001. Chromosomal aberration and single cell gel electrophoresis (Comet) assay in the longitudinal risk assessment of occupational exposure to pesticides. *Mutagenesis*, 16(4) 359-363.

Zhang L. 1994. The value of glutathione S-transferase and gamma-glutamyltranspeptidase as markers of altered foci during hamster pouch carcinogenesis. *Carcinogenesis*, 15, 105-109.

Zhang R. 1996. Polycyclic aromatic hydrocarbon and mutagenicity of airborne particular matter in Chiang Mai, Master Thesis, Chiang Mai University.



ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

Copyright© by Chiang Mai University

All rights reserved