

## Panagiotis **GEORGIADIS**

PhD /Associate Research Professor

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### **Curriculum Vitae – Current Research Interests**

#### EDUCATION

- February 1992: Ph.D. Degree in Biochemistry at the University College London, Department of Biochemistry and Molecular Biology, University of London. Title of the PhD thesis " Studies on the structure and repair of oligonucleotides containing O<sup>6</sup>-alkylguanine and O<sup>4</sup>-alkylthymine ".
- March 1986: Degree in Chemistry, National and Kapodistrian University of Athens, Faculty of Science, Department of Chemistry

#### SCIENTIFIC EXPERIENCE- APPOINTMENTS

- 1996-present: Researcher (associate research professor since 2013), National Hellenic Research Foundation, Institute of Biological Research and Biotechnology (renamed to Institute of Biology, Medicinal Chemistry and Biotechnology in 2012), Athens, Greece
- 1994-1996: Post-doctorate Fellow with S.A Kyrtopoulos at the Laboratory of Chemical Carcinogenesis, Institute of Biological Research and Biotechnology, National Hellenic Research Foundation, Athens, Greece
- 1987-1992: Research assistant and subsequently research fellow at Cancer Research Campaign-Nitrosamine induced Cancer Group, University College and Middlesex School of Medicine, University College, London, U.K

#### CURRENT RESEARCH INTERESTS

- Application of –omics technologies in human population studies as biomarkers of environmental exposure and cancer risk
- Role of DNA damage and repair in the mechanism of chemical carcinogenesis and of cytotoxicity by alkylating anticancer drugs
- Development of biomarkers of environmental carcinogenesis and their application in molecular epidemiology studies

- Mechanism-based assessment of carcinogenic hazards and risks
  - Environmental health
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## Teaching experience

- 2000-now Supervisor of several undergraduate, M. Sc., Ph. D. students as well as post docs.
- 1995-1996 Assistant professor in the Technical Education Institute of Athens, department of Food Technology, teaching Instrumental Analysis in Food Chemistry.
- 1987-1992 As a research assistant I was involved in teaching and supervising students in various laboratory courses (e.g. Biochemistry, molecular biology) of our department.

## Research projects and collaboration

Participation in several research projects with international collaboration and funding;

### ONGOING/RECENT EU PROJECTS

1. Exposomics - Enhanced exposure assessment and omic profiling for high priority environmental exposures in Europe (EU FP7, Collaborative project); duration: 2012-2016
2. EnviroGenomarkers – Genomics biomarkers of environmental health (EU FP7, Collaborative project), coordinator; duration: 2009-2013
3. ECNIS2: towards ECNIS Centre for Research and Education on Cancer, Environment and Food (EU FP7, Coordination and Support action); duration: 2011-2013
5. NewGeneris - Newborns and genotoxic exposure risks (EU FP6, Integrated Project). duration: 2006-2011
6. ECNIS - Environmental cancer, nutrition and individual susceptibility (EU FP6, Network of Excellence); duration: 2005-2010

### GREEK COORDINATOR IN EU AND OTHER INTERNATIONALLY FUNDED PROGRAMS

- 2013-2016 PHYTOME- Phytochemicals to reduce nitrite in meat products (EU FP7, SME); Co-ordinator Teo de Kok, University of Maastricht. Total budget 3,500,000 Euros

- 2004-2007 RMG «Mechanisms of induction of cancers in the head and neck region by tobacco and alcohol and their prevention» Co-ordinator Prof. P. Nilsson , Nofer Inst. Of Occupational medicine, Lodz, Poland. Collaboration with six European Institutes and Universities, total budget 1,000,000 US dollars funded by The Research Management Group, Philip Morris Inc.

### Distinctions

1. Reviewer in several high impact international journals such as Cancer Research, Carcinogenesis, Mutagenesis, Atmospheric Environment, Mutation Research,
2. **INVITED speaker in** UKMEG / ECNIS2-sponsored Workshop on Design of Future Molecular Epidemiology Studies and New Biomarkers, 30 Νοεμβρίου 2012, Λονδίνο, με θέμα **“Epigenomics in molecular epidemiology - experience from the EnviroGenomarkers’ project’**
3. **INVITED speaker in** ECNIS-GUM\_DKFZ workshop on Biomarkers, Sep 29-30 2006, Heidelberg, Germany με θέμα **‘Progress towards the Development of new immunochemical assays for DNA adducts and DNA repair, with high-throughput potential’**
4. **INVITED speaker in** στο 41st Congress of the European Societies of Toxicology **EUROTOX 2003** sep 28- Oct 1 2003 Florence, Italy
5. **INVITED speaker in** : NATO Advanced study Institute; Human monitoring after environmental and occupational exposure to chemical and physical agents Sep 23-Oct 3, 1999, Antalya, Turkey.

### Presentations/announcements

1. Graves, R. J. Georgiadis P. Li B.F.L. Swann P.F. (1988) DNA repair using synthetic oligonucleotides-kinetics of repair of O<sup>6</sup>-methylguanine, O<sup>6</sup>-ethylguanine, O<sup>6</sup>-isopropylguanine and of O<sup>4</sup>-methylthymine by E. Coli O<sup>6</sup>-alkylguanine-DNA alkyltransferase Proceedings of the American Association of Cancer Research volume 29 p.p 111
2. Georgiadis, P and S.A. Kyrtopoulos (1996) Frequent detection of O<sup>6</sup>-methylguanine in maternal and cord blood DNA of humans suffering general environmental exposure A.A.C.R./I.A.R.C. Joint conference Carcinogenesis from Environmental pollution: Assessment of human risk and strategies for prevention, Budapest, Hungary
3. Georgiadis, P., Kaila, S., Samoli, E., Katsouyanni, K. and Kyrtopoulos, S.A. (1997) O<sup>6</sup>-methylguanine is a ubiquitous lesion in human DNA. Mutat. Res. Volume 379 (supp 1) p.p. s161-s162.
4. Georgiadis, P., Stoikidou, M., Topinka, J., Autrup, H., Bekyrou, M., Kaila, S., Gioka, M., Katsouyianni K., Sram R., and S.A. Kyrtopoulos (1998) Biomarkers of genotoxicity of urban air pollution (the Aulis project): Relationships between PM<sub>2.5</sub> and polynuclear aromatic hydrocarbon exposures, DNA adducts and genotypes in a Western European population. The third International Conference of Environmental Mutagens in Human Populations, Bangkok, Thailand.
5. Gioka, M., Stoikidou, M., Georgiadis, P., Kaila, S., Katsouyianni K., and S.A.Kyrtopoulos (1998) Factors affecting Personal exposure levels to PM<sub>2.5</sub>: An epidemiological study in two cities in Greece. Epidemiology, volume 9 (supplement) p.p S116

6. Georgiadis, P., Topinka, J., Stoikidou, M., Kaila, S., Gioka, M., Katsouyanni, K., Sram, R., Autrup, H. and Kyrtopoulos, S.A, Genotoxic effects of environmental tobacco smoke in subjects suffering low exposure to urban air pollution. 30<sup>th</sup> Annual meeting of the European Environmental Mutagen Society, August 25-30, 2000, Budapest, Hungary
7. P.Loli, J.Topinka, , P.Georgiadis, M.Hurbankova, S.A. Kyrtopoulos, and T.Wolff Mutagenicity of amosite fibres in lung of lacI transgenic rats. 31<sup>th</sup> Annual meeting of the European Environmental Mutagen Society, Sept 1-5, 2001, Ghent, Belgium
8. P. Georgiadis, J. Topinka, M. Stoikidou, M. Bekirou, K. Katsouyianni, R. Sram; H. Autrup; A. Kyrtopoulos Impact of polymorphisms in phase I or phase II enzymes on lymphocyte DNA adducts in populations suffering medium to low exposure to PAH .Κεντρικός ομιλητής στο 31<sup>th</sup> Annual meeting of the European Environmental Mutagen Society, Sept 1-5, 2001, Ghent, Belgium
9. J.Topinka, P.Loli, P.Georgiadis, M.Hurbankova, S.A. Kyrtopoulos, and T.Wolff: Mutagenicity of amosite in rat lung and its interaction with benzo[a]pyrene, Naunyn-Schmiedeberg´s Archives of Pharmacology, Supplement 1, 365 (2002) 143.
10. J.Topinka, P.Loli, P.Georgiadis, M.Hurbankova, S.A. Kyrtopoulos, and T.Wolff: Mutagenic effect of asbestos fibres and their substitutes in the lung tissue of rats in vivo ; Oral presentation on the Summer Institute for Rural and Environmental Health, 27.-28.6. 2002, Trnava, Slovakia.
11. J.Topinka, P.Loli, P.Georgiadis, M.Hurbankova, T.Wolff, S.A. Kyrtopoulos: Mutagenic effect of asbestos fibres and their substitutes in the lung of transgenic rats *in vivo*, 2<sup>nd</sup> Silesia days of Preventive Medicine, Karvina, Czech Republic, 12.-14.2. 2002.
12. P. Georgiadis, J. Topinka, M. Stoikidou, S. Kaila, K. Katsouyianni, R. Sram; H. Autrup; A. Kyrtopoulos. Gene-environment interactions dictate the effects of DNA repair enzyme polymorphisms on lymphocyte DNA adducts in subjects exposed to air pollution. 35<sup>th</sup> annual meeting of the European Environmental Mutagen Society, July 3-7, 2005, Kos, Greece
13. P. Georgiadis, V. Pletsas, S. Kaila, S. A Kyrtopoulos. Development of high throughput immunochemical assay for the assessments of functional methylguanine-DNA methyltransferase (MGMT) levels 36<sup>th</sup> annual meeting of the European Environmental Mutagen Society, July 2-6, 2006, Prague, Czech Republic.
14. P. Georgiadis, V. Pletsas, S. Kaila, S. A Kyrtopoulos. Development of high throughput immunochemical assay for the assessment of functional methylguanine-DNA methyltransferase (MGMT) levels 2<sup>nd</sup> International Conference on MGMT June 13-16 2007 Mainz, Germany
15. P Makedonopoulou , P Georgiadis , V Pletsas, SA Kyrtopoulos Covalent binding of agt to DNA through a bis-functional agent and its possible implication to human carcinogenesis ICEM 2009, August 20-25, Firenze – Italy
16. E Makrinou, M Botsivali, P Georgiadis, SA Kyrtopoulos Genomics biomarkers of environmental health”: A new FP7 molecular epidemiology project ICEM 2009, August 20-25, Firenze – Italy
17. K Kovacs , P Georgiadis, S Kaila, L Anna, B Schoket, SA Kyrtopoulos Validation of a new immunochemical assay with high-throughput potential for PAH-DNA adduct detection ICEM 2009, August 20-25, Firenze – Italy
18. P Georgiadis, P Makedonopoulou, S Kaila, MC. Poirier SA Kyrtopoulos Application of high sensitivity, high-throughput immunochemical assays for DNA adducts for use in molecular epidemiology ICEM 2009, August 20-25, Firenze – Italy
19. P Makedonopoulou , P Georgiadis , V Pletsas, SA Kyrtopoulos Covalent binding of agt to DNA through a bis-functional agent and its possible implication to human

- carcinogenesis 60th annual meeting of the Hellenic Society of biochemistry and Molecular Biology 2009 Athens, Greece
20. E Makrinou, M Botsivali, P Georgiadis, SA Kyrtopoulos Genomics biomarkers of environmental health": A new FP7 molecular epidemiology project 60th annual meeting of the Hellenic Society of biochemistry and Molecular Biology 2009 Athens, Greece
  21. P Georgiadis, P Makedonopoulou, S Kaila, MC. Poirier SA Kyrtopoulos Application of high sensitivity, high-throughput immunochemical assays for DNA adducts for use in molecular epidemiology carcinogenesis 60th annual meeting of the Hellenic Society of biochemistry and Molecular Biology 2009 Athens, Greece
  22. S.A. Kyrtopoulos, N. Polyhronaki, P. Georgiadis. Progress in High throughput assays of MGMT and APE1 in Cell extracts. 40<sup>th</sup> Annual meeting of the European Environmental Mutagen Society, September , 2010, Oslo, Norway
  23. P Georgiadis, C. Papadopoulou, I Bergdahl, D Palli S.A Kyrtopoulos Applicability of high-throughput omics technologies in epidemiological studies using biobank samples 62th annual meeting of the Hellenic Society of Biochemistry and Molecular Biology 2011 Athens, Greece
  24. P. Georgiadis, T.M. de Kok, D. Hebels, S.A Kyrtopoulos Validation of a new microarray for whole human genome methylation analysis. 62th annual meeting of the Hellenic Society of Biochemistry and Molecular Biology 2011 Athens, Greece
  25. C. Papadopoulou, , I Bergdahl, D Palli S.A Kyrtopoulos P Georgiadis, Epigenetic effects of environmental chemicals: association between methylation of long interspersed nuclear elements (LINEs-1) and exposure to heavy metals and persistent organic pollutants (POPs) 62th annual meeting of the Hellenic Society of Biochemistry and Molecular Biology 2011 Athens, Greece
  26. T.M. de Kok, D. Hebels, H. Keun, R. Vermeulen, P. A. Georgiadis , S.A. Kyrtopoulos Applicability of high-throughput –omics technologies in epidemiological studies using biobank samples SOT's 51st Annual Meeting, March 11–15, 2012, at the Moscone Convention Center in San Francisco, California.

## Publications

### BOOK CHAPTERS

- 1) Molecular Epidemiology in Preventive Medicine (2002)**  
 Biomarkers of genotoxicity of urban air pollution Achievements, Problems, Prospects. S.A Kyrtopoulos and P. Georgiadis (ed W.A. Jedrychowsky, F.P. Perrera, U. Maugeri) pp 66-79 published by the International Center for Studies and research in Biomedicine, Luxeburg
- 2) Biomarkers of carcinogen exposure and early effects (2006)**  
 Biomarkers of N-nitroso compounds P. Georgiadis, R. Nilsson S.A Kyrtopoulos (edited by P. Farmer, J.M. Emery) Published by the Nofer Institute of Occupational Medicine
- 3) State of validation of biomarkers of carcinogen exposure and early effects and their applicability to molecular epidemiology (2007)**  
 N-nitroso compounds P. Georgiadis, (edited by P. Farmer, S.A Kyrtopoulos , J.M. Emery) Published by the Nofer Institute of Occupational Medicine

## PUBLICATIONS IN REFEREED JOURNALS

1. Valavanis I, Sifakis E, Georgiadis P, Kyrtopoulos SA and Chatziioannou A. Derivation of Cancer Related Biomarkers from DNA Methylation Data from an Italian Epidemiological Cohort ***Springer LNCS Proceedings (2013) in press***
2. Merlo DF, Agramunt S, Anna L, Besselink H, Botsivali M, Brady NJ, Ceppi M, Chatzi L, Chen B, Decordier I, Farmer PB, Fleming S, Fontana V, Försti A, Fthenou E, Gallo F, Georgiadis P, Gmuender H, Godschalk RW, Granum B, Hardie LJ, Hemminki K, Hochstenbach K, Knudsen LE, Kogevinas M, Kovács K, Kyrtopoulos SA, Løvik M, Nielsen JK, Nygaard UC, Pedersen M, Rydberg P, Schoket B, Segerbäck D, Singh R, Sunyer J, Törnqvist M, van Loveren H, van Schooten FJ, Vande Loock K, von Stedingk H, Wright J, Kleinjans JC, Kirsch-Volders M, van Delft JH. Micronuclei in Cord Blood Lymphocytes and Associations with Biomarkers of Exposure to Carcinogens and Hormonally Active Factors, Gene Polymorphisms, and Gene Expression: The NewGeneris Cohort. ***Environ Health Perspect.* 2013** Nov 19.
3. **Hebels DGAJ**, Georgiadis P, Keun HC, Athersuch JT, Vineis P, Vermeulen R, Portengen L, Bergdahl AI, Hallmans G, Palli D, Bendinelli B, Krogh V, Tumino R, Sacerdote C, Panico S, Kleinjans CSJ, de Kok MCM T, Smith, TM and Kyrtopoulos S A on behalf of the EnviroGenomarkers project consortium Evaluation of the performance in omics analyses of blood samples in long-term storage: Opportunities for the exploitation of existing biobanks in environmental health. ***Environmental Health Perspectives*, 2013** Apr;121(4):480-7. **(names in bold equally contributed)**
4. Georgiadis P, Kovács K, Kaila S, Makedonopoulou P, Anna L, Poirier MC, Knudsen LE, Schoket B, Kyrtopoulos SA. Development and validation of a direct sandwich chemiluminescence immunoassay for measuring DNA adducts of benzo[a]pyrene and other polycyclic aromatic hydrocarbons. ***Mutagenesis.* 2012** Sep;27(5):589-97.
5. Georgiadis P, Polychronaki N, Kyrtopoulos SA. Progress in high-throughput assays of MGMT and APE1 activities in cell extracts. ***Mutat Res.* 2012** Aug 1;736(1-2):25-32.
6. Valavanis I , Sifakis E, Georgiadis P, Kyrtopoulos S.A. , Chatziioannou A.A Analysis of DNA Methylation Epidemiological Data through a Generic Composite Statistical Framework 12th ***International Conference on Bioinformatics & Bioengineering (BIBE) 2012***
7. Hebels DG, Brauers KJ, van Herwijnen MH, Georgiadis PA, Kyrtopoulos SA, Kleinjans JC, de Kok TM. Time-series analysis of gene expression profiles induced by nitrosamides and nitrosamines elucidates modes of action underlying their genotoxicity in human colon cells. ***Toxicol Lett.* 2011** Dec 15;207(3):232-41.
8. Georgiadis P, Kaila S, Makedonopoulou P, Fthenou E, Chatzi L, Pletsa V, Kyrtopoulos SA. Development and validation of a new, sensitive immunochemical assay for O<sup>6</sup>-methylguanine in DNA and its application in a population study. ***Cancer Epidemiol Biomarkers Prev.* 2011** Jan;20(1):82-90.
9. Ricceri F, Godschalk RW, Peluso M, Phillips DH, Agudo A, Georgiadis P, Loft S, Tjonneland A, Raaschou-Nielsen O, Palli D, Perera F, Vermeulen R, Taioli E, Sram RJ, Munnia A, Rosa F, Allione A, Matullo G, Vineis P. Bulky DNA adducts

- in white blood cells: a pooled analysis of 3,600 subjects. ***Cancer Epidemiol Biomarkers Prev.* 2010** Dec;19(12):3174-81.
10. Ladoukakis, E., Georgiadis, P., Chatziioannou, A. An epidemiological population study reveals a sex-related differential effect of PAH exposure and gene polymorphisms on bulky DNA adducts formation. ***Proceedings of the IEEE/EMBS, ITAB, 2010***, Article number5687782
  11. Ricceri F, Godschalk RW, Peluso M, Phillips DH, Agudo A, Georgiadis P, Loft S, Tjonneland A, Raaschou-Nielsen O, Palli D, Perera F, Vermeulen R, Taioli E, Sram RJ, Munnia A, Rosa F, Allione A, Matullo G, Vineis P. Pooled analysis on Bulky DNA adducts in healthy subjects. ***Epidemiologia & Prevenzione*** 34 (5-6):145-145
  12. Georgiadis P, Kaila S, Makedonopoulou P, Fthenou E, Chatzi L, Pletsa V, Kyrtopoulos SA. Development and application of high sensitivity, high-throughput immunochemical assays for DNA adducts for use in molecular epidemiology. ***Toxicol Lett.* 2008** 180(sup 1): S85-S85.
  13. Ayi Fanou L, Mobio TA, Creppy EE, Fayomi B, Fustoni S, Møller P, Kyrtopoulos S, Georgiades P, Loft S, Sanni A, Skov H, Ovrebø S, Autrup H. Survey of air pollution in Cotonou, Benin--air monitoring and biomarkers. ***Sci Total Environ.* 2006** Apr 1;358(1-3):85-96.
  14. Topinka J, Loli P, Hurbáková M, Kováčiková Z, Volkovová K, Wolff T, Oesterle D, Kyrtopoulos SA, Georgiadis P. Benzo[a]pyrene-enhanced mutagenesis by man-made mineral fibres in the lung of lambda-lacI transgenic rats. ***Mutat Res.* 2006** Mar 20;595(1-2):167-73.
  15. Topinka J, Loli P, Dusinská M, Hurbáková M, Kováčiková Z, Volkovová K, Kazimírová A, Barancoková M, Tatrai E, Wolff T, Oesterle D, Kyrtopoulos SA, Georgiadis P. Mutagenesis by man-made mineral fibres in the lung of rats. ***Mutat Res.* 2006** Mar 20;595(1-2):174-83.
  16. Georgiadis P, Topinka J, Vlachodimitropoulos D, Stoikidou M, Gioka M, Stephanou G, Autrup H, Demopoulos NA, Katsouyanni K, Sram R, Kyrtopoulos SA. Interactions between CYP1A1 polymorphisms and exposure to environmental tobacco smoke in the modulation of lymphocyte bulky DNA adducts and chromosomal aberrations. ***Carcinogenesis.* 2005** Jan;26(1):93-101.
  17. Loli P, Topinka J, Georgiadis P, Dusinská M, Hurbáková M, Kováčiková Z, Volkovová K, Wolff T, Oesterle D, Kyrtopoulos SA. Benzo[a]pyrene-enhanced mutagenesis by asbestos in the lung of lambda-lacI transgenic rats. ***Mutat Res.* 2004** Sep 3;553(1-2):79-90.
  18. Topinka J, Loli P, Georgiadis P, Dusinská M, Hurbáková M, Kováčiková Z, Volkovová K, Kazimírová A, Barancoková M, Tatrai E, Oesterle D, Wolff T, Kyrtopoulos SA. Mutagenesis by asbestos in the lung of lambda-lacI transgenic rats. ***Mutat Res.* 2004** Sep 3;553(1-2):67-78.
  19. Georgiadis P, Demopoulos NA, Topinka J, Stephanou G, Stoikidou M, Bekyrou M, Katsouyianni K, Sram R, Autrup H, Kyrtopoulos SA. Impact of phase I or phase II enzyme polymorphisms on lymphocyte DNA adducts in subjects exposed to urban air pollution and environmental tobacco smoke. ***Toxicol Lett.* 2004** Apr 1;149(1-3):269-80.
  20. Kyrtopoulos S.A. and Georgiadis P. (2002) Biomarkers of genotoxicity of urban air pollution: Achievements, problems, prospects. *J. Epidemiol*, 56, 215-229
  21. Kyrtopoulos SA, Georgiadis P, Autrup H, Demopoulos NA, Farmer P, Haugen A, Katsouyanni K, Lambert B, Ovrebø S, Sram R, Stephanou G, Topinka J. Biomarkers of genotoxicity of urban air pollution. Overview and descriptive data

- from a molecular epidemiology study on populations exposed to moderate-to-low levels of polycyclic aromatic hydrocarbons: the AULIS project. ***Mutat Res.* 2001** Sep 20;496(1-2):207-28.
22. Georgiadis P, Topinka J, Stoikidou M, Kaila S, Gioka M, Katsouyanni K, Sram R, Autrup H, Kyrtopoulos SA; AULIS Network. Biomarkers of genotoxicity of air pollution (the AULIS project): bulky DNA adducts in subjects with moderate to low exposures to airborne polycyclic aromatic hydrocarbons and their relationship to environmental tobacco smoke and other parameters. ***Carcinogenesis.* 2001** Sep;22(9):1447-57.
  23. Georgiadis P, Stoikidou M, Topinka J, Kaila S, Gioka M, Katsouyanni K, Sram R, Kyrtopoulos SA. Personal exposures to PM(2.5) and polycyclic aromatic hydrocarbons and their relationship to environmental tobacco smoke at two locations in Greece. ***J Expo Anal Environ Epidemiol.* 2001** May-Jun;11(3):169-83.
  24. Georgiadis P, Samoli E, Kaila S, Katsouyanni K, Kyrtopoulos SA. Ubiquitous presence of O6-methylguanine in human peripheral and cord blood DNA. ***Cancer Epidemiol Biomarkers Prev.* 2000** Mar;9(3):299-305.
  25. Georgiadis P, Kyrtopoulos SA. Molecular epidemiological approaches to the study of the genotoxic effects of urban air pollution. ***Mutat Res.* 1999** Jul 16;428(1-2):91-8.
  26. Kyrtopoulos SA, Anderson LM, Chhabra SK, Souliotis VL, Pletsas V, Valavanis C, Georgiadis P. DNA adducts and the mechanism of carcinogenesis and cytotoxicity of methylating agents of environmental and clinical significance. ***Cancer Detect Prev.* 1997**;21(5):391-405.
  27. Georgiadis P, Xu YZ, Swann PF. Nitrosamine-induced cancer: O4-alkylthymine produces sites of DNA hyperflexibility. ***Biochemistry.* 1991** Dec 17;30(50):11725-32
  28. Georgiadis P, Smith CA, Swann PF. Nitrosamine-induced cancer: selective repair and conformational differences between O6-methylguanine residues in different positions in and around codon 12 of rat H-ras. ***Cancer Res.* 1991** Nov1;51(21):5843-50.
  29. Wilkinson MC, Potter PM, Cawkwell L, Georgiadis P, Patel D, Swann PF, Margison GP. Purification of the E. coli ogt gene product to homogeneity and its rate of action on O6-methylguanine, O6-ethylguanine and O4-methylthymine in dodecadeoxyribonucleotides. ***Nucleic Acids Res.* 1989** Nov 11;17(21):8475-84.
  30. Graves, R. J. Georgiadis P, Li B.F.L. Swann P.F. DNA repair using synthetic oligonucleotides-kinetics of repair of O<sup>6</sup>-methylguanine, O<sup>6</sup>-ethylguanine, O<sup>6</sup>-isopropylguanine and of O<sup>4</sup>-methylthymine by E. Coli O<sup>6</sup>-alkylguanine-DNA alkyltransferase ***Proceedings of the American Association of Cancer Research* 1988** 29:111