

## REFERENCES

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1. Swanson, N.L., Leu, A., Abrahamson, J. & Wallet, B. Genetically engineered crops, glyphosate and the deterioration of health in the United States of America. *J. Organic Systems* 9 (2014) 6–37.
2. World Health Organization. IARC Monographs Volume 112: Evaluation of Five Organophosphate Insecticides and Herbicides . (20 March 2015).
3. Guyton, K.Z., Loomis, D., Grosse, Y., El Ghissassi F., Benbrahim-Tallaa, L., Guha, N., Scoccianti, C., Mattock, H. & Straif, K., on behalf of the International Agency for Research on Cancer Monograph Working Group, IARC, Lyon, France. Carcinogenicity of tetrachlorvinphos, parathion, malathion, diazinon, and glyphosate. *The Lancet* 16 (2015) 490–491.
4. Jayasumana, C., Gunatilake, S. & Senanayake, P. Glyphosate, hard water and nephrotoxic metals: Are they the culprits behind the epidemic of chronic kidney disease of unknown etiology in Sri Lanka? *Int. J. Environ. Res. Public Health* 11 (2014) 2125–2147.
5. Jayasumana, C., Paranagama, P., Agampodi, S., Wijewardane, C., Gunatilake, S. & Siribaddana, S. Drinking well water and occupational exposure to Herbicides is associated with chronic kidney disease, in Padavi-Sripura, Sri Lanka. *Environ. Health* 14 (2015) 6.
6. Stengel, B. Chronic kidney disease and cancer: a troubling connection. *J. Nephrol.* 23 (2010) 253–262.
7. S.ralini, G.E., Clair, E., Mesnage, R., Defarge, N., Malatesta, M., Hennequin, D. & Spiroux de Vend.mois, J. Republished study: Long-term toxicity of a Roundup herbicide and a Roundup-tolerant genetically modified maize. *Environ. Sci. Eur.* 26 (2014) 14.
8. Miller, K. Estrogen and DNA damage: The silent source of breast cancer? *Natl Cancer Inst.* 95 (2003) 100–102.
9. Thongprakaisang, S., Thiantanawat, A., Rangkadilok, N., Suriyo, T. & Satayavivad, J. Glyphosate induces human breast cancer cells growth via estrogen receptors. *Food Chem. Toxicol.* 39 (2013) 129–136.
10. Vandenberg, L.N., Colborn, T., Hayes, T.B., Heindel, J.J., Jacobs, D.R. Jr., Lee, D.- H., Shioda, T., Soto, A.M., vom Saal, F.S., Welshons, W.V., Zoeller, T.Z. & Myers, J.P. Hormones and endocrine-disrupting chemicals: Low-dose effects and nonmonotonic dose responses. *Endocr. Rev.* 33 (2012) 378–455.
11. Samsel, A. & Seneff, S. Glyphosate's suppression of cytochrome P450 enzymes and amino acid biosynthesis by the gut microbiome: pathways to modern diseases. *Entropy* 15 (2013) 1416–1463.
12. Balkwill, F., Charles, K.A. & Mantovani, A. Smoldering and polarized inflammation in the initiation and promotion of malignant disease. *Cancer Cell* 7 (2005) 211–217.
13. Monsanto. A three-generation reproduction study in rats with glyphosate. Final Report. Bio/dynamics Project No. 77-2063. Submitted to EPA for evaluation. (31 March 1981).
14. Monsanto. Addendum to pathology report for a three generation reproduction study in rats with glyphosate. R.D. #374; Special Report MSL-1724. EPA Registration No 524-308, Action Code 401. Accession No 247793. CASWELL#661A. (6 July 1982).
15. Stout, L.D. & Ruecker, F.A. Chronic study of glyphosate administered in feed to albino rats. Unpublished Study, Project No. MSL-10495. Monsanto Agricultural Company (2,175 pp.) EPA MRID 416438-01 (26 September 1990).
16. Hogan, G.K. & Knezevich, A.L. A chronic feeding study of glyphosate (Roundup technical) in mice. Unpublished Study No. BDN-77420, Project No 77-2061. Bio/dynamics Inc for Monsanto (3,419 pp.) Accession

#251007-251014 MRID 130406 (1983).

17. Lankas, G.R. and Hogan, G.K. A lifetime feeding study of glyphosate (Roundup technical) in rats Project #77-2062. (Unpublished study received 20 January 1982 under 524-308; Bio/dynamics Inc., submitted by Monsanto to the EPA. Includes the study's 4-volume Quality Control evaluation of the Bio/dynamics assessment performed by Experimental Pathology Laboratories, Inc. (2,914 pp.) CDL:246617-A; 246618; 246619; 246620; 246621). MRID 00093879.
18. Knezevich, A.L. & Hogan, G.K. A chronic feeding study of glyphosate (Roundup technical) in mice. Project # 77-2061. (Unpublished study received 29 January 1982 under 524-308; prepared by Bio/dynamics, Inc., submitted by Monsanto to EPA Washington, DC., CDL:246617-A; 246618; 246619; 246620; 246621). MRID #00093879 (1983).
19. Nakatsuji, S., Yamate, J. & Sakuma, S. Macrophages, myofibroblasts, and extracellular matrix accumulation in interstitial fibrosis of chronic progressive nephropathy in aged rats. *Vet. Pathol.* 35 (1998) 352–360.
20. Shimizu, A., Masuda, Y., Ishizaki, M., Sugisaki, Y. & Yamanaka, N. Tubular dilatation in the repair process of ischaemic tubular necrosis. *Virchows Arch.* 425 (1994) 281–290.
21. Meyer, T.W. Tubular injury in glomerular disease. *Kidney Intl* 63 (2003) 774–787.
22. Niendorf, E.R., Parker, J.A., Yechoor, V., Garber, J.R. & Boisselle, P.M. Thymic hyperplasia in thyroid cancer patients. *J. Thoracic Imaging.* 20 (2005) 1–4.
23. Lee, D.K., Hakim, F.T. & Gress, R.E. The thymus and the immune system: Layered levels of control. *J. Thoracic Oncol.* 5 (10, Suppl 4) (2010) S273–S276.
24. European Commission. Guidance document for GLP inspectors and GLP test facilities. Version 2, 2004–11-26 / MPA-RH.
25. Ridley, W.P. & Mirly, K. The metabolism of glyphosate in Sprague Dawley rats. Part I. Excretion and tissue distribution of glyphosate and its metabolites following intravenous and oral administration. (Unpublished study MSL-7215 conducted by Monsanto's Environmental Health Laboratory and submitted to the EPA July 1988) MRID#407671-01. (1988).
26. Howe, R.K., Chott, R.C. & McClanahan, R.H. The metabolism of glyphosate in Sprague Dawley rats. Part II. Identification, characterization and quantification of glyphosate and its metabolites after intravenous and oral administration. (Unpublished study MSL-7206 conducted by Monsanto and submitted to the EPA July 1988) MRID#407671-02. (1988).
27. Colvin, L.B., Moran, S.J. & Miller, J.A. Final report on CP 67573 residue and metabolism. Part 11. The metabolism of aminomethylphosphonic acid-<sup>14</sup>C (CP 50435- <sup>14</sup>C) in laboratory rat. Monsanto Commercial Products Co. Agricultural Research Report No. 303 (1973); EPA Accession No. 93849.
28. Sutherland, M.L. Metabolism of N-nitrosophosphonomethylglycine in the laboratory rat. Monsanto Final Report No. MSL-0242 (1978); EPA Accession No. 233913.
29. Mesnage, R., Defarge, N., Rocque, L.-M., Spiroux de Vendomois, J. & Seralini, G.- E. Laboratory rodent diets contain toxic levels of environmental contaminants: Implications for regulatory tests. *PLoS ONE* 10 (2015) e0128429.
30. Dixon, D., Heider, K. & Elwell, M.R. Incidence of nonneoplastic lesions in historical control male and female Fischer-344 rats from 90-day toxicity studies. *Toxicol. Pathol.* 23 (1995) 338–348.

31. Korc, M. (1983) Manganese action on pancreatic protein synthesis in normal and diabetic rats. *Am. J. Physiol.* 245 Part 1 (1983) G628–34.
32. Dosselaere, F. & Vanderleyden, J. A metabolic node in action: Chorismate-utilizing enzymes in microorganisms. *Crit. Rev. Microbiol.* 27 (2001) 75–131.
33. Yi, K. Folate and DNA methylation: A mechanistic link between folate deficiency and colorectal cancer? *Cancer Epidemiol. Biomarkers Prevention* 13 (2004) 511–519.
34. Duthie, S.J. Folic acid deficiency and cancer: Mechanisms of DNA instability. *Br. Med. Bull.* 55 (1999) 578–592.
35. Scapari, T.S., Bramati, V. & Erba, A. New uses of choline chloride in agrochemical formulations. European Patent Application Number 11305356.5 (10 March 2012).
36. Richman, E.L., Kenfield, S.A., Stampfer, M.J., Giovannucci, E.L., Zeisel, S.H., Willett, W.C. & Chan, J.M. Choline intake and risk of lethal prostate cancer: incidence and survival. *Am. J. Clin. Nutr.* 96 (2012) 855–863.
37. Marc, J., Mulner-Lorillon, O. & Bell, R. Glyphosate-based pesticides affect cell cycle regulation. *Biol. Cell* 96 (2004) 245–249.
38. How, V., Hashim, Z., Ismail, P., Md Said, S., Omar, D. & Bahri Mohd Tamrin, S. Exploring cancer development in adulthood: cholinesterase depression and genotoxic effect from chronic exposure to organophosphate pesticides among rural farm children. *J. Agromed.* 19 (2014) 35–43.
39. Modesto, K.A. & Martinez, C.B.R. Roundup causes oxidative stress in liver and inhibits acetylcholinesterase in muscle and brain of the fish *Prochilodus lineatus*. *Chemosphere* 78 (2010) 294–299.
40. Bolognesi, C., Bonatti, S., Degan, P., Gallerani, E., Peluso, M., Rabboni, R., Roggieri, P. & Abbondandolo, A. Genotoxic activity of glyphosate and its technical formulation Roundup. *J. Agric. Food Chem.* 45 (1997) 1957–1962.
41. Braz-Mota, S., Sadauskas-Henrique, H., Duarte, R.M., Val, A.L. & Almeida-Val, V.M. Roundup exposure promotes gills and liver impairments, DNA damage and inhibition of brain cholinergic activity in the Amazon teleost fish *Colossoma macropomum*. *Chemosphere* 135 (2015) 53–60.
42. Cavas, T. & K.en, S. Detection of cytogenetic and DNA damage in peripheral erythrocytes of goldfish (*Carassius auratus*) exposed to a glyphosate formulation using the micronucleus test and the comet assay. *Mutagenesis* 22 (2007) 263–268.
43. Guilherme, S., Santos, M.A., Barroso, C., Gaiv.o, I. & Pacheco, M. Differential genotoxicity of Roundup formulation and its constituents in blood cells of fish (*Anguilla anguilla*): considerations on chemical interactions and DNA damaging mechanisms. *Ecotoxicology* 21 (2012) 1381–1390.
44. Guilherme, S., Gaiv.o, I., Santos, M.A. & Pacheco, M. European eel (*Anguilla anguilla*) genotoxic and prooxidant responses following short-term exposure to Roundup glyphosate-based herbicide. *Mutagenesis* 25 (2010) 523–530.
45. Ames, B.N. DNA damage from micronutrient deficiencies is likely to be a major cause of cancer. *Mutation Res.* 475 (2001) 7–20.
46. Rossi, M., Amaretti, A. & Raimondi, S. Folate production by probiotic bacteria. *Nutrients* 3 (2011) 118–134.
47. Shehata, A.A., Schr.dl, W., Aldin, A.A., Hafez, H.M. & Krüger, M. The effect of glyphosate on potential pathogens and beneficial members of poultry microbiota in vitro. *Curr. Microbiol.* 66 (2013) 350–358.
48. Lu, W., Li, L., Chen, M., Zhou, Z., Zhang, W., Ping, S., Yan, Y., Wang, J. & Lin, M. Genome-wide

- transcriptional responses of *Escherichia coli* to glyphosate, a potent inhibitor of the shikimate pathway enzyme 5-enolpyruvylshikimate-3-phosphate synthase. *Mol. Biosys.* 9 (2013) 522–530.
49. Benachour, N. & S.ralini G.-E. Glyphosate formulations induce apoptosis and necrosis in human umbilical, embryonic, and placental cells. *Chem. Res. Toxicol.* 22 (2009) 97–105
50. Richard, S., Moslemi, S., Sipahutar, H., Benachour, N. & S.ralini, G.E. Differential effects of glyphosate and Roundup on human placental cells and aromatase. *Environ. Health Perspect.* 113 (2005) 716–720.
51. Benachour, N., Sipahutar, H., Moslemi, S., Gasnier, C., Traver, C., and S.ralini, G.E. Time and dose-dependent effects of Roundup on human embryonic and placental cells and aromatase inhibition. *Arch. Environ. Contam. Toxicol.* 53 (2007) 126–133.
52. Ugarte, R. Interaction between glyphosate and mitochondrial succinate dehydrogenase. *Computational Theor. Chem.* 1043 (2014) 54–63.
53. Peixoto, F. Comparative effects of the Roundup and glyphosate on mitochondrial oxidative phosphorylation. *Chemosphere* 61 (2005) 1115–1122.
54. King, A., Selak, M.A. & Gottlieb, E. Succinate dehydrogenase and fumarate hydratase: Linking mitochondrial dysfunction and cancer. *Oncogene* 25 (2006) 4675–4682.
55. Woods, W.G., Gao, R.N., Shuster, J.J., Robison, L.L., Bernstein, M., Weitzman, S., Bunin, G., Levy, I., Brossard, J., Dougherty, G., Tuchman, M. & Lemieux, B. Screening of infants and mortality due to neuroblastoma. *N. Engl. J. Med.* 346 (2002) 1041–1046.
56. Rapizzi, E., Ercolino, T., Fucci, R., Zampetti, B., Felici, R., Guasti, D., Morandi, A., Giannoni, E., Giach., V., Bani, D., Chiarugi, A. & Mannelli, M. Succinate dehydrogenase subunit B mutations modify human neuroblastoma cell metabolism and proliferation. *Hormones Cancer* 5 (2014) 174–184.
57. Warburg, O. On the origin of cancer cells. *Science* 123 (1956) 309–314.
58. Kim, J.W. & Dang, C.V. Cancer's molecular sweet tooth and the Warburg effect. *Cancer Res.* 66 (2006) 8927–8930.
59. Rippert, P., Scimemi, C., Dubald, M. & Matringe, M. Engineering plant shikimate pathway for production of tocotrienol and improving herbicide resistance. *Plant Physiol.* 134 (2004) 92–100.
60. Cleary C.M., Moreno, J.A., Fernandez, B., Ortiz, A., Parra, E.G., Gracia, C., Blanco- Colio, L.M., Barat, A. & Egido, J. Glomerular haematuria, renal interstitial haemorrhage and acute kidney injury. *Nephrol. Dialysis Transplantation* 25 (2010) 4103–4106.
61. Nagababu, E., Chrest, F.J. & Rifkind, J.M. Hydrogenperoxide-induced heme degradation in red blood cells: The protective roles of catalase and glutathione peroxidase. *Biochim Biophys Acta.* 1620 (2003) 211–217.
62. Ayala, A., Muñoz, M.F. & Argüelles, S. Lipid peroxidation: Production, metabolism, and signaling mechanisms of malondialdehyde and 4-hydroxy-2-nonenal. *Oxidative Med. Cellular Longevity* 2014 (2014) 360438.
63. Nielsen, F., Mikkelsen, B.B., Nielsen, J.B., Andersen, H.R. & Grandjean, P. Plasma malondialdehyde as biomarker for oxidative stress: reference interval and effects of lifestyle factors. *Clin. Chem.* 43 (1997) 1209–1214.
64. Beuret, C.J., Zirulnik, F. & Gimenez, M.S. Effect of the herbicide glyphosate on liver lipoperoxidation in pregnant rats and their fetuses. *Reprod. Toxicol.* 19 (2005) 501–504.
65. Desai, K.M., Chang, T., Wang, H., Banigesh, A., Dhar, A., Liu, J., Untereiner, A. & Wu, L. Oxidative stress

and aging: Is methylglyoxal the hidden enemy? *Can. J. Physiol. Pharmacol.* 88 (2010) 273–284.

66. Wang, Y. & Ho, C.T. Flavour chemistry of methylglyoxal and glyoxal. *Chem. Soc. Rev.* 41 (2012) 4140–4149.

67. Stopper, H., Schinzel, R., Sebekova, K. & Heidland, A. Genotoxicity of advanced glycation end products in mammalian cells. *Cancer Lett.* 190 (2003) 151–156.

68. Tan, D., Wang, Y., Lo, C.Y. & Ho, C.T. Methylglyoxal: Its presence and potential scavengers. *Asia Pacific J. Clin. Nutr.* 17 (Suppl 1) (2008) 261–264.

69. Alibhai, M.F. & Stallings, W.C. Closing down on glyphosate inhibition with a new structure for drug discovery. *Proc. Natl Acad. Sci. USA* 98 (2001) 2944–2946.

70. Grüning, N.M., Du, D., Keller, M.A., Luisi, B.F. & Ralser, M. Inhibition of triosephosphate isomerase by phosphoenolpyruvate in the feedback-regulation of glycolysis. *Open Biol.* 4 (2014) 130232.

71. Fraenkel, D.G. The phosphoenolpyruvate-initiated pathway of fructose metabolism in *Escherichia coli*. *J. Biol. Chem.* 243 (24) (1968) 6458–6463.

72. Richard, J.P. Mechanism for the formation of methylglyoxal from triosephosphates. *Biochem. Soc. Trans.* 21 (1993) 549–553.

73. Ahmed, N., Battah, S., Karachalias, N., Babaei-Jadidi, R., Hor.nyi, M., Bar.ti, K., Hollan, S. & Thornalley, P.J. Increased formation of methylglyoxal and protein glycation, oxidation and nitrosation in triosephosphate isomerase deficiency. *Biochim. Biophys. Acta* 1639 (2003) 121–132.

74. Rabbani, N. & Thornalley, P.J. The critical role of methylglyoxal and glyoxalase 1 in diabetic nephropathy. *Diabetes* 63 (2014) 50–52.

75. Rendeiro, C., Masnik, A.M., Mun, J.G., Du, K., Clark, D., Dilger, R.N., Dilger, A.C. & Rhodes, J.S. Fructose decreases physical activity and increases body fat without affecting hippocampal neurogenesis and learning relative to an isocaloric glucose diet. *Sci. Rep.* 5 (2015) 9589.

76. Dhar, I., Dhar, A., Wu, L. & Desai, K.M. Increased methylglyoxal formation with upregulation of renin angiotensin system in fructose fed Sprague Dawley rats. *PLoS One* 8 (2013) e74212.

77. Papsoulis, A., Al-Abed, Y. & Bucala, R. Identification of N2 -(1-carboxyethyl)guanine (CEG) as a guanine advanced glycosylation end product. *Biochemistry* 34 (1995) 648–655.

78. Xu, X.C., Brinker, R.J., Reynolds, T.L., Abraham, W. & Graham, J.A. Pesticide compositions containing oxalic acid. US patent number 6, 992, 045 (2006).

79. Buc, H.A., Demaugre, F., Moncion, A. & Leroux, J.P. Metabolic consequences of pyruvate kinase inhibition by oxalate in intact rat hepatocytes. *Biochimie* 63 (1981) 595–602.

80. Okombo, J. & Liebman, M. Probiotic-induced reduction of gastrointestinal oxalate absorption in healthy subjects. *Urol. Res.* 38 (2010) 169–178.

81. Svedruzica, D., J.nsson, S., Toyota, C.G., Reinhardt, L.A., Ricagno, S., Lindqvist, Y. & Richards, N.G.J. The enzymes of oxalate metabolism: unexpected structures and mechanisms. *Arch. Biochem. Biophys.* 433 (2005) 176–192.

82. Samsel, A. & Seneff, S. Glyphosate, pathways to modern diseases III: Manganese, neurological diseases, and associated pathologies. *Surg. Neurol. Int.* 6 (2015) 45.

83. Krüger, M., Schr.dl, W., Neuhaus, J. & Shehata, A.A. Field investigations of glyphosate in urine of Danish

dairy cows. *J. Environ. Anal. Toxicol.* 3 (2013) 17.

84. Nikiforova, V.J., Giesbertz, P., Wiemer, J., Bethan, B., Looser, R., Liebenberg, V., Noppinger, P.R., Daniel, H. & Rein D. Glyoxylate, a new marker metabolite of type 2 diabetes. *J.Diabetes Res.* 2014 (2014) 685204.

85. Duncan, R.J. & Tipton, K.F. The oxidation and reduction of glyoxylate by lactic dehydrogenase. *Eur. J. Biochem.* 11 (1969) 58–61.

86. Novoa, W.B., Winer, A.D., Glaid, A.J. & Schwert, G.W. Lactic dehydrogenase: V. Inhibition by oxamate and by oxalate. *J. Biol. Chem.* 234 (1959) 1143–1148.

87. Moser, H. Process for producing N-phosphonomethylglycine. US patent number 4,534,904. (1984).

88. Rogers, TE & Smith, LR. Process for the preparation of glyphosate and glyphosate derivatives. European Patent Application #85870195.6. (1985).

89. Pollegioni, L., Schonbrunn, E. & Siehl, D. Molecular basis of glyphosate resistance—different approaches through protein engineering. *FEBS J.* 278 (2011) 2753–2766.

90. Shangari, N., Chan, T.S., Popovic, M. & O'Brien, P.J. Glyoxal markedly compromises hepatocytes resistance to hydrogen peroxide. *Biochem. Pharmacol.* 71 (2006) 1610–1618.

91. Shangari, N. & O'Brien, P.J. The cytotoxic mechanism of glyoxal involves oxidative stress. *Biochem. Pharmacol.* 68 (2004) 1433–1442.

92. Johnson, D.E. 21-day dermal toxicity study in rabbits. (Unpublished study 401-168, March 10, 1982 By IRDC, Mattawan, MI) submitted by Monsanto to EPA Washington, DC., MRID#00098460.

93. Kalapos, M.P. Methylglyoxal in living organisms: Chemistry, biochemistry, toxicology and biological implications. *Toxicol. Lett.* 110 (1999) 145–175.

94. de Liz Oliveira Cavalli, V.L., Cattani, D., Heinz Rieg, C.E., Pierozan, P., Zanatta, L., Benedetti Parisotto, E., Wilhelm Filho, D., Mena Barreto Silva, F.R., Pessoa-Pureur, R. & Zamoner, A. Roundup disrupts male reproductive functions by triggering calciummediated cell death in rat testis and Sertoli cells. *Free Radical Biol. Med.* 65 (2013) 335–346.

95. Murata-Kamiya, N. & Kamiya, H. Methylglyoxal, an endogenous aldehyde, crosslinks DNA polymerase and the substrate DNA. *Nucl. Acids Res.* 29 (2001) 3433–3438.

96. Nagao, M., Fujita, Y., Sugimura, T. & Kosuge, T. Methylglyoxal in beverages and foods: Its mutagenicity and carcinogenicity. *IARC Scientific Publications* 70 (1986) 283– 291.

97. Nafziger, E.D., Widholm, J.M., Steinrcken, H.C. & Killmer, J.L. Selection and characterization of a carrot cell line tolerant to glyphosate. *Plant Physiol.* 76 (1984) 571–574.

98. Ferla, M.P. & Patrick, W.M. Bacterial methionine biosynthesis. *Microbiology* 160 (2014) 1571–1584.

99. Brouwers, O., Niessen, P.M., Ferreira, I., Miyata, T., Scheffer, P.G., Teerlink, T., Schrauwen, P., Brownlee, M., Stehouwer, C.D. & Schalkwijk, C.G. Overexpression of glyoxalase-I reduces hyperglycemia-induced levels of advanced glycation end products and oxidative stress in diabetic rats. *J. Biol. Chem.* 286 (2011) 1374–1380.

100. Jain, M., Choudhary, D., Kale, R.K. & Bhalla-Sarin, N. Saltand glyphosate-induced increase in glyoxalase I activity in cell lines of groundnut (*Arachis hypogaea* ). *Physiologia Plantarum* 114 (2002) 499–505.

101. Cheng, W.-L., Tsai, M.-M., Tsai, C.-Y., Huang, Y.-H., Chen, C.-Y., Chi, H.-C., Tseng, Y.-H., Chao, I.-W., Lin, W.-C., Wu, S.-M., Liang, Y., Liao, C.-J., Lin, Y.- H., Chung, I.-H., Chen, W.-J., Lin, P.Y., Wang, C.-S. & Lin, K.-H. Glyoxalase-I is a novel prognosis factor associated with gastric cancer progression. *PLoS ONE* 7 (2012)

102. Baunacke, M., Horn, L.C., Trettner, S., Engel, K.M., Hemdan, N.Y., Wiechmann, V., Stolzenburg, J.U., Bigl, M. & Birkenmeier, G. Exploring glyoxalase 1 expression in prostate cancer tissues: targeting the enzyme by ethyl pyruvate defangs some malignancy-associated properties. *Prostate* 74 (2014) 48–60.
103. Jemal, A., Siegel, R., Ward, E., Hao, Y., Xu, J., Murray, T. & Thun, M.J. Cancer statistics. *CA Cancer J. Clin.* 58 (2008) 71–96.
104. Wu, G.S. Role of mitogen-activated protein kinase phosphatases (MKPs) in cancer. *Cancer Metastasis Rev.* 26 (2007) 579–85.
105. Pickering Laboratories, Inc. Analysis of N-Nitroso Glyphosate in Glyphosate Samples. LCGC (Feb 1, 2010). <http://www.chromatographyonline.com/analysis-nnitrosoglyphosate-glyphosate-samples>. (Last accessed 12 June 2015).
106. Loh, Y.H., Jakszyn, P., Luben, R.N., Mulligan, A.A., Mitrou, P.N. & Khaw, K.-T. N-nitroso compounds and cancer incidence: the European Prospective Investigation into Cancer and Nutrition (EPIC) Norfolk Study. *Am. J. Clin. Nutr.* 93 (2011) 1053–1061.
107. Bogovski, P. & Bogovski, S. Animal species in which N-nitroso compounds induce cancer. *Int. J. Cancer* 27 (1981) 471–474.
108. Schm. hl, D. & Habs, M. Carcinogenicity of N-nitroso compounds. *Oncology* 37 (1980) 237–242.
109. Montesano, R. & Magee, P.N. Metabolism of dimethylnitrosamine by human liver slices in vitro. *Nature (Lond.)* 228 (1970) 173–174.
110. Wogan, G.N. & Tannenbaum, S.R. Environmental N-nitroso compounds: Implications for public health. *Toxicol. Appl. Pharmacol.* 31 (1975) 375–383.
111. Lijinsky, W. Intestinal cancer induced by N-nitroso compounds. *Toxicol. Pathol.* 16 (1988) 198–204.
112. Zhu, Y., Wang, P.P., Zhao, J., Green, R., Sun, Z., Roebathan, B., Squires, J., Buehler, S., Dicks, E., Zhao, J., Cotterchio, M., Campbell, P.T., Jain, M., Parfrey, P.S., McLaughlin, J.R. Dietary N-nitroso compounds and risk of colorectal cancer: a case-control study in Newfoundland and Labrador and Ontario. *Br. J. Nutr.* 111 (2014) 1109–1117.
113. FAO Specifications and Evaluations for Plant Protection Products: Glyphosate, N-(phosphonomethyl)glycine, (evaluation report 284) (2001).
114. Monsanto Agricultural Products Company, Standard Analytical Method No. AQC- 684-86 (1986).
115. Kim, M., Stripeikis, J., In, n, F. & Tudino, M. A simplified approach to the determination of N-nitroso glyphosate in technical glyphosate using HPLC with post-derivatization and colorimetric detection. *Talanta* 72 (2007) 1054–1058.
116. Liu, C.-M., McLean, P.A., Sookdeo, C.C. & Cannon, F.C. Degradation of the herbicide glyphosate by members of the family Rhizobiaceae. *Appl. Environ. Microbiol.* 57 (1991) 1799–1804.
117. Wogan, G.N., Pagliarunga, S., Archer, M.C. & Tannenbaum, S.R. Carcinogenicity of nitrosation products of ephedrine, sarcosine, folic acid, and creatinine. *Cancer Res.* 35 (1975) 1981–1984.
118. Sreekumar, A., Poisson, L.M., Rajendiran, T.M., Khan, A.P., Cao, Q., Yu, J., Laxman, B., Mehra, R., Lonigro, R.J., Li, Y., et al. Metabolomic profiles delineate potential role for sarcosine in prostate cancer progression. *Nature* 457 (2009) 910–914.
119. Khan, A.P., Rajendiran, T.M., Ateeq, B., Asangani, I.A., Athanikar, J.N., Yocum, A.K., Mehra, R., Siddiqui, J., Palapattu, G., Wei, J.T., Michailidis, G., Sreekumar, A. & Chinnaiyan, A.M. The role of sarcosine

metabolism in prostate cancer progression. *Neoplasia* 15 (2013) 491–501.

120. Jemal, A., Bray, F., Center, M.M., Ferlay, J., Ward, E. & Forman, D. Global cancer statistics. *CA Cancer J. Clin.* 61 (2011) 69–90.

121. Li, Q., Lambrechts, M.J., Zhang, Q., Liu, S., Ge, D., Yin, R., Xi, M. & You, Z. Glyphosate and AMPA inhibit cancer cell growth through inhibiting intracellular glycine synthesis. *Drug Design Development Therapy* 7 (2013) 635–43.

122. Rose, M.L., Cattley, R.C., Dunn, C., Wong, V., Li, X. & Thurman, R.G. Dietary glycine prevents the development of liver tumors caused by the peroxisome proliferator WY-14,643. *Carcinogenesis* 20 (1999) 2075–81.

123. Yamashina, S., Ikejima, K., Rusyn, I., Sato, N. Glycine as a potent anti-angiogenic nutrient for tumor growth. *J. Gastroenterol. Hepatol.* 22 (Suppl. 1) (2007) S62–64.

124. Lees, H.J., Swann, J.R., Wilson, I.D., Nicholson, J.K. & Holmes, E. Hippurate: the natural history of a mammalian microbial cometabolite. *J. Proteome Res.* 12 (2013) 1527–1546.

125. Gregus, Z., Fekete, T., Varga, F. & Klaassen, C.D. Dependence of glycine conjugation on availability of glycine: role of the glycine cleavage system. *Xenobiotica* 23 (1993) 141–153.

126. Waldram, A., Holmes, E., Wang, Y., Rantalainen, M., Wilson, I.D., Tuohy, K.M., McCartney, A.L., Gibson, G.R. & Nicholson, J.K. Top-down systems biology modeling of host metabolite-microbiome associations in obese rodents. *J. Proteome Res.* 8 (2009) 2361–2375.

127. Calvani, R., Miccheli, A., Capuani, G., Tomassini Miccheli, A., Puccetti, C., Delfini, M., Iaconelli, A., Nanni, G. & Mingrone, G. Gut microbiome-derived metabolites characterize a peculiar obese urinary metabolite. *Int. J. Obesity* 34 (2010) 1095–1098.

128. Williams, H.R.T., Cox, I.J., Walker, D.G., North, B.V., Patel, V.M., Marshall, S.E., Jewell, D.P., Ghosh, S., Thomas, H.J.W., Teare, J.P., Jakobovits, S., Zeki, S., Welsh, K.I., Taylor-Robinson, S.D. & Orchard, T.R. Characterization of inflammatory bowel disease with urinary metabolic profiling. *Am. J. Gastroenterol.* 104 (2009) 1435–1444.

129. Hemminki, K., Li, X., Sundquist J. & Sundquist, K. Cancer risks in Crohn disease patients. *Ann. Oncol.* 20 (3) (2009) 574–580.

130. Lim, J.S., Mietus-Snyder, M., Valente, A., Schwarz, J.-M. & Lustig, R.H. The role of fructose in the pathogenesis of NAFLD and the metabolic syndrome. *Nature Rev. Gastroenterol. Hepatol.* 7 (2010) 251–264.

131. Michelotti, G.A., Machado, M.V. & Diehl, A.M. NAFLD, NASH and liver cancer. *Nature Rev. Gastroenterol. Hepatol.* 10 (2013) 656–665.

132. Ascha, M.S., Hanouneh, I.A., Lopez, R., Tamimi, T.A., Feldstein, A.F. & Zein, N.N. The incidence and risk factors of hepatocellular carcinoma in patients with nonalcoholic steatohepatitis. *Hepatology* 51 (2010) 1972–1978.

133. Fernandez-Zamorano, A., Arnalich, F., Codoceo, R., Vignera, M.R., Valverde, F., Jara, P. & Vazquez, J.J. Hemolytic anemia and susceptibility to hydrogen-peroxide hemolysis in children with vitamin E-deficiency and chronic liver disease. *J. Med.* 19 (1988) 317–334.

134. Masuda, Y., Ichii, H., Vaziri, N.D. At pharmacologically relevant concentrations intravenous iron preparations cause pancreatic beta cell death. *Am. J. Transl. Res.* 6 (2014) 64–70.

135. Villeneuve, J.P. & Pichette, V. Cytochrome P450 and liver diseases. *Curr. Drug Metab.* 5 (2004) 273–282.

136. Hotamisligil, G.S. Inflammation and metabolic disorders. *Nature* 444 (2006) 860–867.



137. Tsuei, J., Chau, T., Mills, D. & Wan, Y-J.Y. Bile acid dysregulation, gut dysbiosis, and gastrointestinal cancer. *Exp. Biol. Med.* 239 (2014) 1489–1504.
138. Shanab, A.A., Scully, P., Crosbie, O., Buckley, M., O'Mahony, L., Shanahan, F., Gazareen, S., Murphy, E. & Quigley, E.M. Small intestinal bacterial overgrowth in nonalcoholic steatohepatitis: association with toll-like receptor 4 expression and plasma levels of interleukin 8. *Digestive Dis. Sci.* 56 (2011) 1524–1534.
139. Ilan, Y. Leaky gut and the liver: a role for bacterial translocation in nonalcoholic steatohepatitis. *World J. Gastroenterol.* 18 (2012) 2609–2618.
140. Kappas, A., Sassa, S., Galbraith, R.A. & Nordmann, Y. The porphyrias. In: Scriver, C.R., Beaudet, A.L., Sly, W.S. & Valle, D., eds. *The Metabolic and Molecular Bases of Inherited Disease*. 7th ed. Vol. 2. New York: McGraw-Hill, 2103-59. (1995).
141. Kauppinen, R. & Mustajoki, P. Acute hepatic porphyria and hepatocellular carcinoma. *Br. J. Cancer* 57 (1988) 117–20.
142. Andersson, C., Bjersing, L. & Lithner, F. The epidemiology of hepatocellular carcinoma in patients with acute intermittent porphyria. *J. Intern. Med.* 240 (1996) 195–201.
143. Hardell, L., Bengtsson, N.O., Jonsson, U., Eriksson, S. & Larsson, L.G. Aetiological aspects on primary liver cancer with special regard to alcohol, organic solvents and acute intermittent porphyria { an epidemiological investigation. *Br. J. Cancer* 50 (1984) 389– 397.
144. Kitchen, L.M., Witt, W.W. & Rieck, C.E. Inhibition of -aminolevulinic acid synthesis by glyphosate. *Weed Sci.* 29 (1981) 571–577.
145. Kitchen, L.M., Witt, W.W. & Rieck, C.E. Inhibition of chlorophyll accumulation by glyphosate. *Weed Science* 29 (4) (1981) 513–516.
146. Lee, D.H., Blomhoff, R. & Jacobs, D.R. Jr. Is serum gamma glutamyltransferase a marker of oxidative stress? *Free Radical Res.* 38 (2004) 535–539.
147. Fentiman, I.S. Gamma-glutamyl transferase: risk and prognosis of cancer. *Br. J. Cancer* 106 (2012) 1467–1468.
148. Whitfield, J.B. Serum -glutamyltransferase and risk of disease. *Clin. Chem.* 53 (2007) 1–2.
149. Kazemi-Shirazi, L., Endler, G., Winkler, S., Schickbauer, T., Wagner, O. & Marsik, C. Gamma glutamyltransferase and long-term survival: Is it just the liver? *Clin. Chem.* 53 (2007) 940–946.
150. Mok, Y., Son, D.K., Yun Y.D., Jee, S.H. & Samet, J.M. Glutamyltransferase and cancer risk: the Korean Cancer Prevention Study. *Int. J. Cancer* (2015) [Epub ahead of print].
151. Paolicchi, A., Tongiani, R., Tonarelli, P., Comporti, M. & Pompella, A. gamma-Glutamyl transpeptidase-dependent lipid peroxidation in isolated hepatocytes and HepG2 hepatoma cells. *Free Radical Biol. Med.* 22 (1997) 853–860.
152. Drozd, R., Parmentier, C., Hachad, H., Leroy, P., Siest, G. & Wellman, M. gamma-Glutamyltransferase dependent generation of reactive oxygen species from a glutathione/transferrin system. *Free Radical Biol. Med.* 25 (1998) 786–792.
153. Mastellone, V., Tudisco, R., Monastra, G., Pero, M.E., Calabro, S., Lombardi, P., Grossi, M., Cutrignelli, M.I., Avallone, L. & Infascelli, F. Gamma-glutamyl transferase activity in kids born from goats fed genetically modified soybean. *Food Nutr. Sci.* 4 (2013) 50–54.
154. Bohn, T., Cuhra, M., Traavik, T., Sanden, M., Fagan, J. & Primicerio, R. Compositional differences in soybeans on the market: Glyphosate accumulates in Roundup Ready GM soybeans. *Food Chem.* 153 (2014)

155. Benedetti, A.L., Vituri Cde, L., Trentin, A.G., Domingues, M.A. & Alvarez-Silva, M. The effects of sub-chronic exposure of Wistar rats to the herbicide Glyphosate-Biocarb. *Toxicol. Lett.* 153 (2004) 227–232.
156. Ala-Kokko, L., Pihlajaniemi, T., Myers, J.C., Kivirikko, K.I. & Savolainen, E.R. Gene expression of type I, III and IV collagens in hepatic fibrosis induced by dimethylnitrosamine in the rat. *Biochem. J.* 244 (1987) 75–79.
157. Hietanen, E., Linnainmaa, K. & Vainio, H. Effects of phenoxyherbicides and glyphosate on the hepatic and intestinal biotransformation activities in the rat. *Acta Pharmacol. Toxicol.* 53 (1983) 103–112.
158. Samsel, A. & Seneff, S. Glyphosate, pathways to modern diseases II: celiac sprue and gluten intolerance. *Interdiscip. Toxicol.* 6 (2013) 159–184.
159. Qian, L., Zolfaghari, R. & Ross, A.C. Liver-specific cytochrome P450 CYP2C22 is a direct target of retinoic acid and a retinoic acid-metabolizing enzyme in rat liver. *J. Lipid Res.* 51 (2010) 1781–1792. 160. Helms, J., Thaller, C. & Eichele, G. Relationship between retinoic acid and sonic hedgehog, two polarizing signals in the chick wing bud. *Development* 120 (1994) 3267–3274.
161. Philips, G.M., Chan, I.S., Swiderska, M., Schroder, V.T., Guy, C., Karaca, G.F., Moylan, C., Venkatraman, T., Feuerlein, S., Syn, W.-K., Jung, Y., Witek, R.P., Choi, S., Michelotti, G.A., Rangwala, F., Merkle, E., Lascola, C. & Diehl, A.M. Hedgehog signaling antagonist promotes regression of both liver fibrosis and hepatocellular carcinoma in a murine model of primary liver cancer. *PLoS ONE* 6 (2011) e23943.
162. Paganelli, A., Gnazzo, V., Acosta, H., Lopez, S.L. & Carrasco, A.E. Glyphosate-based herbicides produce teratogenic effects on vertebrates by impairing retinoic acid signaling. *Chem. Res. Toxicol.* 23 (2010) 1586–1595.
163. Jemal, A., Thomas, A., Murray, T. & Thun, M. Cancer statistics, 2002. *CA Cancer J. Clin.* 52 (2002) 23–47.
164. Dhar, A., Dhar, I., Jiang, B., Desai, K.M. & Wu, L. Chronic methylglyoxal injection by minipump causes pancreatic beta-cell dysfunction and induces type 2 diabetes in Sprague Dawley rats. *Diabetes* 60 (2011) 899–908.
165. Baly, D.L., Curry, D.L., Keen, C.L. & Hurley, L.S. Effect of manganese deficiency on insulin secretion and carbohydrate homeostasis in rats. *J. Nutr.* 114 (1984) 1438–1446.
166. Klimstra, D.S., Heffess, C.S., Oertel, J.E. & Rosai, J. Acinar cell carcinoma of the pancreas: A clinicopathologic study of 28 cases. *Am. J. Surg. Pathol.* 16 (1992) 815–837.
167. Malatesta, M., Caporaloni, C., Rossi, L., Battistelli, S., Rocchi, M.B.L., Tonucci, F. & Gazzanelli, G. Ultrastructural analysis of pancreatic acinar cells from mice fed on genetically modified soybean. *J. Anat.* 201 (2002) 409–415.
168. Brooks, S.E. & Golden, M.H. The exocrine pancreas in kwashiorkor and marasmus. Light and electron microscopy. *West Indian Med. J.* 41 (1992) 56–60. 169. Kau, A.L., Planer, J.D., Liu, J., Rao, S., Yatsunenkov, T., Trehan, I., Manary, M.J., Liu, T.-C., Stappenbeck, T.S., Maleta, K.M., Ashorn, P., Dewey, K.G., Houpt, E.R., Hsieh, C.-S. & Gordon, J.I. Functional characterization of IgA-targeted bacterial taxa from undernourished Malawian children that produce diet-dependent enteropathy. *Sci. Transl. Med.* 7 (276) (2015) 276ra24.
170. United States Environmental Protection Agency. Glyphosate-EPA Registration No. 524-308 - 2-Year Chronic Feeding/Oncogenicity Study in Rats with Technical Glyphosate. (13 December 1991). [sustainablepulse.com/2015/03/26/who-glyphosate-report-ends-thirtyyear-cancer-cover-up/#.VSPVZ2Z3bJK](https://www.sustainablepulse.com/2015/03/26/who-glyphosate-report-ends-thirtyyear-cancer-cover-up/#.VSPVZ2Z3bJK) (Last accessed 10 June 2015).

171. US Renal Data Systems. USRDS 2006 Annual Data Report: Atlas of End-Stage Renal Disease in the United States. Bethesda, Maryland: National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases (2007).
172. Coresh, J., Selvin, E., Stevens, L.A., Manzi, J., Kusek, J.W., Eggers, P., Van Lente F. & Levey, A.S. Prevalence of chronic kidney disease in the United States. *JAMA* 298 (2007) 2038–2047.
173. Tian, N., Arany, I., Waxman, D.J. & Baliga, R. Cytochrome P450 2B1 gene silencing attenuates puromycin aminonucleoside-induced cytotoxicity to glomerular epithelial cells. *Kidney Int.* 78 (2010) 182–190.
174. Chen, X., Mori, T., Guo, Q., Hu, C., Ohsaki, Y., Yoneki, Y., Zhu, W., Jiang, Y., Endo, S., Nakayama, K., Ogawa, S., Nakayama, M., Miyata, T. & Ito, S. Carbonyl stress induces hypertension and cardio-renal vascular injury in Dahl salt-sensitive rats. *Hypertens. Res.* 36 (2013) 361–367.
175. Sule, N., Yakupoglu, U., Shen, S.S., Krishnan, B., Yang, G., Lerner, S., Sheikh-Hamad, D. & Truong, L.D. Calcium oxalate deposition in renal cell carcinoma associated with acquired cystic kidney disease: A comprehensive study. *Am. J. Surg. Pathol.* 29 (2005) 443–451.
176. Rioux-Leclercq, N.C. & Epstein, J.I. Renal cell carcinoma with intratumoral calcium oxalate crystal deposition in patients with acquired cystic disease of the kidney. *Arch. Pathol. Lab. Med.* 127 (2003) E89–E92.
177. Torres, V.E., Bengal, R.J., Litwiler, R.D. & Wilson, D.M. Aggravation of polycystic kidney disease in Han:SPRD rats by buthionine sulfoximine. *J. Am. Soc. Nephrol.* 8 (1997) 1283–1291.
178. Chiang, C.C., Lin, C.L., Peng, C.L., Sung, F.C. & Tsai, Y.Y. Increased risk of cancer in patients with early-onset cataracts: a nationwide population-based study. *Cancer Sci.* 105 (2014) 431–436.
179. Palsamy, P., Bidasee, K.R., Ayaki, M., Augusteyn, R.C., Chan, J.Y. & Shinohara, T. Methylglyoxal induces endoplasmic reticulum stress and DNA demethylation in the Keap1 promoter of human lens epithelial cells and aged-related cataracts. *Free Radical Biol. Med.* 72 (2014) 134–148.
180. Shamsi, F.A., Lin, K., Sady, C. & Nagaraj, R.H. Methylglyoxal-derived modifications in lens aging and cataract formation. *Invest. Ophthalmol. Vis. Sci.* 39 (1998) 2355–2364.
181. Okonkwo, F.O., Ejike, C.E.C.C., Anoka, A.N. & Onwurah, I.N.E. Toxicological studies on the short term exposure of *Clarias albopunctatus* (Lamonte and Nichole 1927) to sublethal concentrations of Roundup. *Pakistan J. Biol. Sci.* 16 (2013) 939–944.
182. Floreani, A., Baragiotta, A., Martines, D., Naccarato, R. & D'odorico, A. Plasma antioxidant levels in chronic cholestatic liver diseases. *Aliment. Pharmacol. Ther.* 14 (2000) 353–358.
183. Ribaya-Mercado, J.D. & Blumberg J.B. Lutein and zeaxanthin and their potential roles in disease prevention. *J. Am. Coll. Nutr.* 23 (6, Suppl) (2004) 567S–587S.
184. Gao, S., Qin, T., Liu, Z., Caceres, M.A., Ronchi, C.F., Chen, C.Y., Yeum, K.J., Taylor, A., Blumberg, J.B., Liu, Y. & Shang, F. Lutein and zeaxanthin supplementation reduces H<sub>2</sub>O<sub>2</sub>-induced oxidative damage in human lens epithelial cells. *Mol. Vision* 17 (2011) 3180–3190.
185. Ohrloff, C., Stoffel, C., Koch, H.R., Wefers, U., Bours, J. & Hockwin, O. Experimental cataracts in rats due to tryptophan-free diet. *Arch. Klin. Exp. Ophthalmol.* 205 (1978) 73–79.
186. Zarnowski, T., Rejdak, R., Zielinska-Rzecka, E., Zrenner, E., Grieb, P., Zag. rski, Z., Junemann, A. & Turski, W.A. Elevated concentrations of kynurenic acid, a tryptophan derivative, in dense nuclear cataracts. *Curr. Eye Res.* 32 (2007) 27–32.
187. De Roos, A.J., Blair, A., Rusiecki, J.A., Hoppin, J.A., Svec, M., Dosemeci, M., Sandler, D.P. & Alavanja, M.C. Cancer incidence among glyphosate-exposed pesticide applicators in the agricultural health study. *Environ. Health Perspectives* 113 (2005) 49–54.

188. George, J. & Shukla, Y. Emptying of intracellular calcium pool and oxidative stress imbalance are associated with the glyphosate-induced proliferation in human skin keratinocytes HaCaT cells. *ISRN Dermatol.* 2013 (2013) Article ID:825180.
189. Brenner, M. & Hearing, V.J. The protective role of melanin against UV damage in human skin. *Photochem. Photobiol.* 84 (2008) 539–549.
190. Raposo, G. & Marks, M.S. Melanosomes—dark organelles enlighten endosomal membrane transport. *Nature Rev. Mol. Cell. Biol.* 8 (2007) 786–797.
191. Slominski, A., Moellmann, G., Kuklinska, E., Bomirski, A. & Pawelek, J. Positive regulation of melanin pigmentation by two key substrates of the melanogenic pathway, L-tyrosine and L-dopa. *J. Cell Sci.* 89 (1988) 287–296.
192. Becerra, T.A., von Ehrenstein, O.S., Heck, J.E., Olsen, J., Arah, O.A., Jeste, S.S., Rodriguez, M. & Ritz, B. Autism spectrum disorders and race, ethnicity, and nativity: a population-based study. *Pediatrics* 134 (2014) e63–e71.
193. Magnusson, C., Rai, D., Goodman, A., Lundberg, M., Idring, S., Svensson, A., Koupil, I., Serlachius, E. & Dalman, C. Migration and autism spectrum disorder: population-based study. *Br. J. Psychiatry* 201 (2012) 109–115.
194. Keen, D.V., Reid, F.D. & Arnone, D. Autism, ethnicity and maternal immigration. *Br. J. Psychiatry* 196 (4) (2010) 274–281.
195. Hamilton, P.J., Campbell, N.G., Sharma, S., Erreger, K., Herborg Hansen, F., Saunders, C., Belovich, A.N., NIH ARRA Autism Sequencing Consortium, Sahai, M.A., Cook, E.H., Gether, U., McHaourab, H.S., Matthies, H.J., Sutcliffe, J.S. & Galli, A. De novo mutation in the dopamine transporter gene associates dopamine dysfunction with autism spectrum disorder. *Mol. Psychiatry* 18 (2013) 1315–1323.
196. Emanuele, E. Does reverse transport of dopamine play a role in autism? *EBioMedicine* 2 (2015) 98–99.
197. Nakamura, K., Anitha, A., Yamada, K., Tsujii, M., Iwayama, Y., Hattori, E., Toyota, T., Suda, S., Takei, N., Iwata, Y., Suzuki, K., Matsuzaki, H., Kawai, M., Sekine, Y., Tsuchiya, K.J., Sugihara, G., Ouchi, Y., Sugiyama, T., Yoshikawa, T. & Mori, N. Genetic and expression analyses reveal elevated expression of syntaxin 1A (STX1A) in high functioning autism. *Int. J. Neuropsychopharmacol.* 11 (2008) 1073–1084.
198. Qian, Y., Chen, M., Forssberg, H., Diaz & Heijtz R. Genetic variation in dopaminerelated gene expression influences motor skill learning in mice. *Genes Brain Behav.* 12 (2013) 604–614.
199. Munn, D.H., Shafizadeh, E., Attwood, J.T., Bondarev, I., Pashine, A., Mellor, A.L. Inhibition of T cell proliferation by macrophage tryptophan catabolism. *J. Exp. Med.* 189 (1999) 1363–1372.
200. Hwu, P., Du, M.X., Lapointe, R., Do, M., Taylor, M.W. & Young, H.A. Indoleamine 2,3-dioxygenase production by human dendritic cells results in the inhibition of T cell proliferation. *J. Immunol.* 164 (2000) 3596–3599.
201. Astigiano, S., Morandi, B., Costa, R., Mastracci, L., D'Agostino, A., Ratto, G.B., Melioli, G. & Frumento, G. Eosinophil granulocytes account for indoleamine 2,3-dioxygenase-mediated immune escape in human non-small-cell lung cancer. *Neoplasia* 7 (2005) 390–396.
202. Amberger, A. Prognostic value of indoleamine 2,3-dioxygenase expression in colorectal cancer: effect on tumor-infiltrating T cells. *Clin. Cancer Res.* 12 (2006) 1144–1151.
203. Ishio, T., Goto, S., Tahara, K., Tone, S., Kawano, K. & Kitano, S. Immunoactivative role of indoleamine

- 2,3-dioxygenase in human hepatocellular carcinoma. *J.Gastroenterol. Hepatol.* 19 (2004) 319–326.
204. Basu, G.D., Tinder, T.L., Bradley, J.M., Tu, T., Hattrup, C.L., Pockaj, B.A. & Mukherjee, P. Cyclooxygenase-2 inhibitor enhances the efficacy of a breast cancer vaccine: role of IDO. *J. Immunol.* 177 (2006) 2391–2402.
205. Chen, P.W., Mellon, J.K., Mayhew, E., Wang, S., He, Y.G., Hogan, N. & Niederkorn, J.Y. Uveal melanoma expression of indoleamine 2,3-deoxygenase: Establishment of an immune privileged environment by tryptophan depletion. *Exp. Eye Res.* 85 (2007) 617–625.
206. Weinlich, G., Murr, C., Richardsen, L., Winkler, C. & Fuchs, D. Decreased serum tryptophan concentration predicts poor prognosis in malignant melanoma patients. *Dermatology* 214 (2007) 8–14.
207. Serbecic, N. & Beutelspacher, S.C. Indoleamine 2,3-dioxygenase protects corneal endothelial cells from UV mediated damage. *Exp. Eye Res.* 82 (2006) 416–426.
208. Takikawa, O., Littlejohn, T., Jamie, J.F., Walker, M.J. & Truscott, R.J. Regulation of indoleamine 2,3-dioxygenase, the first enzyme in UV filter biosynthesis in the human lens. Relevance for senile nuclear cataract. *Adv. Exp. Med. Biol.* 467 (1999) 241–245.
209. Bald, T., Quast, T., Landsberg, J., Rogava, M., Glodde, N., Lopez-Ramos, D., Kohlmeyer, J., Riesenberger, S., van den Boorn-Konijnenberg, D., Hmig-H. Izel, C., Reuten, R., Schadow, B., Weighardt, H., Wenzel, D., Helfrich, I., Schadendorf, D., Bloch, W., Bianchi, M.E., Lugassy, C., Barnhill, R.L., Koch, M., Fleischmann, B.K., F.rster, I., Kastenmüller, W., Kolanus, W., H. Izel, M., Gaffal, E. & Tüting, T. Ultraviolet radiation-induced inflammation promotes angiogenesis and metastasis in melanoma. *Nature* 507 (2014) 109–113.
210. Duntas, L.H. The role of selenium in thyroid autoimmunity and cancer. *Thyroid* 16 (2006) 455–60.
211. Whitehead, K., Versalovic, J., Roos, S. & Britton, R.A. Genomic and genetic characterization of the bile stress response of probiotic *Lactobacillus reuteri* ATCC 55730. *Appl. Environ. Microbiol.* 74 (2008) 1812–1819.
212. Lin, Y.P., Thibodeaux, C.H., Pena, J.A., Ferry, G.D. & Versalovic, J. Probiotic *Lactobacillus reuteri* suppress proinflammatory cytokines via c-Jun. *Inflamm. Bowel Dis.* 14 (2008) 1068–1083.
213. Galano, E., Mangiapane, E., Bianga, J., Palmese, A., Pessione, E., Szpunar, J., Lobinski, R. & Amoresano, A. Privileged incorporation of selenium as selenocysteine in *Lactobacillus reuteri* proteins demonstrated by selenium<sup>1</sup>-specific imaging and proteomics. *Mol. Cell Proteomics* 12 (2013) 2196–2204.
214. Archibald, F.S. & Duong, M.N. Manganese acquisition by *Lactobacillus plantarum*. *J. Bacteriol.* 158 (1984) 1–8.
215. Archibald, F.S. & Fridovich, I. Manganese, superoxide dismutase, and oxygen tolerance in some lactic acid bacteria. *J. Bacteriol.* 146 (1981) 928–936.
216. Chlebowski, R.T., Hendrix, S.L., Langer, R.D., Stefanick, M.L., Gass, M., Lane, D., Rodabough, R.J., Gilligan, M.A., Cyr, M.G., Thomson, C.A., Khandekar, J., Petrovitch, H., McTiernan, A. & WHI Investigators. Influence of estrogen plus progestin on breast cancer and mammography in healthy postmenopausal women: the Women's Health Initiative Randomized Trial. *JAMA* 289 (2003) 3243–3253.
217. Hou, N., Hong, S., Wang, W., Olopade, O.I., Dignam, J.J. & Huo, D. Hormone replacement therapy and breast cancer: Heterogeneous risks by race, weight, and breast density. *J. Natl Cancer Inst.* 105 (2013) 1365–1372.
218. Kochukov, Y., Jeng, J. & Watson, S. Alkylphenol xenoestrogens with varying carbon chain lengths differentially and potently activate signaling and functional responses in GH3/B6/F10 somatomammotropes. *Environ. Health Perspectives* 117 (2009) 723–730.
219. Laden, F., Ishibe, N., Hankinson, S.E., Wolff, M.S., Gertig, D.M., Hunter, D.J. & Kelsey, K.T.

- Polychlorinated biphenyls, cytochrome P450 1A1, and breast cancer risk in the Nurses Health Study. *Cancer Epidemiol. Biomarkers Prevention* 11 (2002) 1560–1565.
220. Meldahl, A.C., Nithipatikom, K. & Lech, J.J. Metabolism of several 14C-nonylphenol isomers by rainbow trout (*Oncorhynchus mykiss*): In vivo and in vitro microsomal metabolites. *Xenobiotica* 26 (1996) 1167–1180.
221. Niwa, T., Fujimoto, M., Kishimoto, K., Yabusaki, Y., Ishibashi, F. & Katagiri, M. Metabolism and interaction of bisphenol A in human hepatic cytochrome P450 and steroidogenic CYP17. *Biol. Pharm. Bull.* 24 (9) (2001) 1064–1067.
222. Liehr, J.G. & Jones, J. Role of iron in estrogen-induced cancer. *Current Med. Chem.* 8 (2001) 839–849.
223. Kwiatkowska, M., Huras, B. & Bukowska, B. The effect of metabolites and impurities of glyphosate on human erythrocytes (in vitro). *Pestic. Biochem. Physiol.* 109 (2014) 34–43.
224. Nagababu, E. & Rifkind, J.M. Heme degradation by reactive oxygen species. *Antioxidants Redox Signaling* 6 (2004) 967–978.
225. Aberkane, H., Stoltz, J.-F.; Galteau, M.-M. & Wellman, M. Erythrocytes as targets for gamma-glutamyltranspeptidase initiated pro-oxidant reaction. *Eur. J. Haematol.* 68 (2002) 262–271.
226. Adamson, P., Bray, F., Costantini, A.S., Tao, M.H., Weiderpass, E. & Roman, E. Time trends in the registration of Hodgkin and non-Hodgkin lymphomas in Europe. *Eur. J. Cancer* 43 (2007) 391–401.
227. Eltom, M.A., Jemal, A., Mbulaiteye, S.M., Devesa, S.S. & Biggar, R.J. Trends in Kaposi sarcoma and non-Hodgkins lymphoma incidence in the United States from 1973 through 1998. *J. Natl. Cancer Inst.* 94 (2002) 1204–1210.
228. Schinasi, L. & Leon, M.E. Non-Hodgkin lymphoma and occupational exposure to agricultural pesticide chemical groups and active ingredients: a systematic review and meta-analysis. *Int. J. Environ. Res. Public Health* 11 (2014) 4449–4527.
229. Hardell, L., Eriksson, M. & Nordstrom, M. Exposure to pesticides as risk factor for non-Hodgkins Lymphoma and hairy cell leukemia: pooled analysis of two Swedish casecontrol studies. *Leuk. Lymphoma* 43 (2002) 1043–1049.
230. Eriksson, M., Hardell, L., Carlberg, M. & Akerman, M. Pesticide exposure as risk factor for non-Hodgkin lymphoma including histopathological subgroup analysis. *Int. J. Cancer* 123 (2008) 1657–1663.
231. McDuffie, H.H., Pahwa, P., McLaughlin, J.R., Spinelli, J.J., Fincham, S., Dosman, J.A., Robson, D., Skinnider, L.F. & Choi, N.W. Non-Hodgkins lymphoma and specific pesticide exposures in men: Cross-Canada study of pesticides and health. *Cancer Epidemiol. Biomarkers Prevention* 10 (2001) 1155–1163.
232. Pervaiz, S. & Clement, M.V. Superoxide anion: Oncogenic reactive oxygen species? *Int. J. Biochem. Cell Biol.* 39 (2007) 1297–1304.
233. Candas, D. & Li, J.J. MnSOD in oxidative stress response potential regulation via mitochondrial protein inx. *Antioxid. Redox. Signal.* 20 (2014) 1599–1617.
234. Van Remmen, H., Ikeno, Y., Hamilton, M., Pahlavani, M., Wolf, N., Thorpe, S.R., Alderson, N.L., Baynes, J.W., Epstein, C.J., Huang, T.-T., Nelson, J., Strong, R. & Richardson, A. Life-long reduction in MnSOD activity results in increased DNA damage and higher incidence of cancer but does not accelerate aging. *Physiol. Genomics* 16 (2003) 29–37.
235. Jaramillo, M.C., Briehl, M.M., Crapo, J.D., Batinic-Haberle, I. & Tome, M.E. Manganese porphyrin, MnTE-2-PyP5+, acts as a pro-oxidant to potentiate glucocorticoid-induced apoptosis in lymphoma cells. *Free Radical Biol. Med.* 52 (2012) 1272–1284.

236. Wang, Y.H., Yang, X.L., Han, X., Zhang, L.F. & Li, H.L. Mimic of manganese superoxide dismutase to induce apoptosis of human non-Hodgkin lymphoma Raji cells through mitochondrial pathways. *Int. Immunopharmacol.* 14 (2012) 620–628.
237. Jaramillo, M.C., Frye, J.B., Crapo, J.D., Briehl, M.M. & Tome, M.E. Increased manganese superoxide dismutase expression or treatment with manganese porphyrin potentiates dexamethasone-induced apoptosis in lymphoma cells. *Cancer Res.* 69 (2009) 5450–5457.
238. Crapo, J., Day, B. & Fridovich, I. Development of manganic porphyrin mimetics of superoxide dismutase activity. *Madame Curie Bioscience Database. Landes Bioscience.* Retrieved 10 June 2015.
239. Cuzzocrea, S., Zingarelli, B., Costantino, G. & Caputi, A. Beneficial effects of Mn(III)tetrakis (4-benzoic acid) porphyrin (MnTBAP), a superoxide dismutase mimetic, in carrageenan-induced pleurisy. *Free Radical Biol. Med.* 26 (1999) 25–33.
240. Conlan, M.G., Bast, M., Armitage, J.O. & Weisenburger, D.D. Bone marrow involvement by non-Hodgkin's lymphoma: the clinical significance of morphologic discordance between the lymph node and bone marrow. *Nebraska Lymphoma Study Group. J. Clin. Oncol.* 8 (1990) 1163–1172.
241. Ridley, W.P. A study of the plasma and bone marrow levels of glyphosate following intraperitoneal administration in the rat. Unpublished report, study No. 830109, project No. ML-83-218, dated 24 October 1988, from Monsanto Environmental Health Laboratory, St. Louis, Missouri, USA. Submitted to WHO by Monsanto Int. Services SA, Brussels, Belgium (1983).
242. Prasad, S., Srivastava, S., Singh, M. & Shukla, Y. Clastogenic effects of glyphosate in bone marrow cells of Swiss albino mice. *J. Toxicol.* 2009 (2009) article ID:308985.
243. Raab, M.S., Podar, K., Breitkreutz, I., Richardson, P.G. & Anderson, K.C. Multiple myeloma. *Lancet* 374 (2009) 324–339.
244. Kapur, G., Patwari, A.K., Narayan, S. & Anand, V.K. Serum prolactin in celiac disease. *J. Trop. Pediatr.* 50 (2004) 37–40.
245. Goloubkova, T., Ribeiro, M.F., Rodrigues, L.P., Cecconello, A.L. & Spritzer, P.M. Effects of xenoestrogen bisphenol A on uterine and pituitary weight, serum prolactin levels and immunoreactive prolactin cells in ovariectomized Wistar rats. *Arch. Toxicol.* 74 (2000) 92–98.
246. Gudelsky, G.A., Nansel, D.D. & Porter, J.C. Role of estrogen in the dopaminergic control of prolactin secretion. *Endocrinology* 108 (1981) 440–444.