

- Armas, M.T., Mederos, A., Gili, P., Dominguez, S., Hernandez-Molina, R., Lorenzo, P., Araujo, M.L., Brito, F., Otero, A., Castellanos, M.G. 2004. Speciation in the chromium (III)-glutathione system. *Chemical Speciation and Bioavailability*. 16(2), pp.45-52.
- ATSDR. 2013. *Chromium toxicity: how should patients exposed to chromium be treated and managed?* Agency for Toxic Substances and Disease Registry. Available from: <https://atsdr.cdc.gov/csem/csem.asp?csem=10&po=13/> [Accessed 12 December 2019].
- ATSDR. 2015. *Public health statement for chromium*. Agency for Toxic Substances and Disease Registry. Available from: <https://www.atsdr.cdc.gov/phs/phs.asp?id=60&tid=17/> [Accessed 17 October 2019].
- Bielicka, A., Bojanowska, I., Wisniewski, A. 2005. Two faces of chromium-pollutant and bio element. *Pol. J. Environ. Stud.* 14(1), pp.5-10.
- Caglieri, A., Goldoni, M., Acampa, O., Andreoli, R., Vettori, M.V., Corradi, M., Apostoli, P., Mutti, A. 2006. The effect of inhaled chromium on different exhaled breath condensate biomarkers among chrome-plating workers. *Environ Health Perspect.* 114(4), pp.542-546.
- Campbell, J.D. 2001. Lifestyle, minerals, and health. *Medical Hypotheses*. 57(5), pp.521-531.
- Cardiosmart. 2011. *Chromium*. American College of Cardiology. Available from: <https://www.cardiosmart.org/healthwise/ut10/24sp/ec/ut1024spec/> [Accessed 12 December 2019].
- Csejtei, A., Tibold A., Varga, Z., Koltai, K., Ember, A., Orsoz, Z., Feher, G., Horvath, OP., Ember, I., Kiss, I. 2008. GSTM, GSTT and p53 polymorphisms as modifiers of clinical outcome in colorectal cancer. *Anticancer Res.* 28, pp.1917-1922.
- Dahlan, M. 2003. *Besar sampel dan cara pengambilan sampel dalam penelitian kedokteran dan kesehatan*. 3rd ed. Jakarta: Salemba Medika.
- Darmiyanti, D., Murachman, B., and Fandeli, C. 2003. Pencemaran udara di ruang proses pembatikan industri rumah tangga batik: studi kasus industri rumah tangga batik di Kampung Taman Kotamadya Yogyakarta. *J Manusia dan Lingkungan*. 10(1), pp.19-32.
- Davies, S., Howard, J. M., Hunnisett, A., Howard, M. 1997. Age-related decrease in chromium levels in 51.665 hair, sweat, and serum samples from 40.872 patients-implications for the prevention of cardiovascular disease and type II diabetes mellitus. *Metabolism*. 46(5), pp.469-473.
- Diedrich, A., Bock, H.C., König, F., Schulz, T.G., Ludwig, H.C., Herken, R., Quondamatteo, F. 2006. Expression of glutathione s-transferase T1 (*GSTT1*) in human brain tumors. *Histol Histopathol.* 21, pp.1199-1207.
- Deng, Y., Wang, M., Tian, T., Lin, S., Xu, P., Zhou, L., Dai, C., Hao, Q., Wu, Y., Zhai, Z., Zhu, Y., Zhuang, G. and Dai, Z. 2019. The effect of hexavalent chromium on the incidence and mortality of human cancers: a meta-analysis based on published epidemiological cohort studies. *Frontiers in Oncology*. 9(24).

- Ercegovac, M., Jovic, N., Sokic, D., Savic-Radojevic, A., Coric, V., Radic, T., Nikolic, D., Kecmanovic, M., Matic, M., Simic, T., Pljesa-Ercegovac, M. 2015. GSTA1, GSTM1, GSTP1 and *GSTT1* polymorphisms in progressive myoclonus epilepsy: a Serbian case-control study. *Seizure-Eur J of Epilepsy*. 32, pp.30-36.
- Economopoulos, K.P., Sergentanis, T.N. 2010. GSTM1, *GSTT1*, GSTP1, GSTA1 and colorectal cancer risk: a comprehensive meta-analysis. *Eur J of Cancer*. 46(9), pp.1617-1631.
- Gaspar, P.A., Hutz, M.H., Salzano, F.M., Hill, K., Kurtando, A.M., Petz-Erler, M.L., Tsuneto, L.T., and Weimer, T.A. 2002. Polymorphisms of CYP1A1, CYP2E1, GSTM1, *GSTT1*, and TP53 genes in Amerindians. *Am J of Phys Anthr*. 119(3), pp.249-256.
- Genetics Home Reference*. 2019. *What is a gene?* National Institutes of Health. Available from: <https://ghr.nlm.nih.gov/primer/basics/gene> [accessed 1 March 2019].
- Gumulec, J., Raudenska, M., Hlavna, M., Stracina, T., Sztalmachova, M., Tanhauserova, V., Pacal, L., Ruttkay-Nedecky, B., Sochor, J., Zitka, O., Babula, P., Adam, V., Kizek, R., Novakova, M., Masarik, M. 2013. Determination of oxidative stress of antioxidant enzymes in guinea pigs treated with haloperidol. *Exp Ther Med*. 5(2), pp.479-484.
- Hasan, M.M., Hosain, S., Poddar, P., Chowdhury, A.B.M., Katengeza, E.W., Roy, U.K. 2019. Heavy metal toxicity from the leather industry in Bangladesh: a case study of human exposure in Dhaka industrial area. *Environ Monit Assess*. 191, pp.530.
- Hastuti, P., Sunarti, Prasetyastuti, Ngadikun, Tasmini, Rubi, D.S., Sutarni, S., Harahap, I.K., Dananjoyo, K., Suhartini, Pidada, I.B.G.S.P., Widagdo, H., Suciningtyas, M. 2018. Hubungan timbal dan krom pada pemakaian pewarna batik dengan kadar hemoglobin dan packed cell volume pada pengrajin batik di Kecamatan Lendah Kulon Progo. *J Community Empowerment Health*. 1(1), pp.28-35.
- He, X., Lin, G.X., Chen, M.G., Zhang, J.X., Ma, Q. 2007. Protection against chromium (VI)-induced oxidative stress and apoptosis by Nrf2. *Toxicol Sci*. 98(1), pp.298-309.
- Hossain, M.M.A.A., Yajima, I., Tazaki, A., Xu, H., Saheduzzaman, M., Ohgami, N., Ahsan, N., Akhand, A.A., Kato, M. 2019. Chromium-mediated hyperpigmentation of skin in male tannery workers in Bangladesh. *Chemosphere*. 229, pp.611-617.
- Institute of Medicine (US) Panel on Micronutrients*. 2001. *Dietary reference intakes for vitamin A, vitamin K, arsenic, boron, chromium, copper, iodine, iron, manganese, molybdenum, nickel, silicon, vanadium, and zinc*. 6th ed. Washington (DC): National Academies Press.
- International Agency for Research on Cancer*. 2012. *IARC monographs on the evaluation of carcinogenic risks to humans: arsenics, metals, fibres and dusts*. Lyon, France: World Health Organization.
- Ismail, S. & Essawi, M. 2012. Genetic polymorphism studies in humans. *Middle East J Med Genet*. 1(2), pp.57-63.

- Jaishankar, M., Tseten, T., Anbalagan, N., Mathew, B., Beeregowda, K.N. 2014. Toxicity, mechanism, and health effects of some heavy metals. *Interdiscip Toxicol.* 7(2), pp.60-72.
- Joshi, M. & Deshpande, J.D. 2010. Polymerase chain reaction: methods, principles, and applications. *Int J Med Res.* 1(5), pp.81-97.
- Khalilzadeh, S., Afrand, M., Froozan-Nia, S.K., Sheikha, M.H. 2014. Evaluation of Glutathione S-transferase T1 (*GSTT1*) deletion polymorphism on type 2 diabetes mellitus risk in a sample of Yazdian females in Yazd, Iran. *Electron Physician.* 6(3), pp.856-862.
- Kim, S., Kim, M., Kim, K., Song, J., Yim, S., Chung, J. 2008. Impact of Glutathione S-transferase M1 and T1 gene polymorphisms on the smoking-related coronary artery disease. 2008. *J Korean Med Sci.* 23(3), pp.365-372.
- Klautau-Guimarães, M.N., Hiragi, C.O., Ascensão, R.F., Oliviera., S.F., Grisolia, S.F., Hatagima, A., Ferrari, I. 2005. Distribution of *Glutathione* S-transferase GSTM1 and *GSTT1* null phenotypes in Brazilian Amerindians. *Genet Mol Biol.* 28(1), pp.32-35.
- Krstevec, S. & Knutsson, A. 2019. Occupational risk factors for prostate cancer: a meta-analysis. *J Cancer Prev.* 24(2), pp.91-111.
- Kumari, K., Khare, A., Dange, S. 2014. The applicability of oxidative stress biomarkers in assessing chromium induced toxicity in the fish *labeo rohita*. *Biomed Res Int.*
- Laboratory of Electronics Technology. 2014. *ICP-OES*. C-MET RoHS Division. Available from: <https://www.rohs-cmet.in/cont.../> [Accessed 17 Dec 2019]
- Lindgas. 2019. *Inductively coupled plasma*. The Linde Group. Available from: https://hiq.lindgas.com/en/analytical_methods/inductively_coupled_plasma.html/ [Accessed 17 Dec 2019]
- Malik, S. S., Kazmi, Z., Fatima, I., Shabbir, R., Perveen, S., Masood, N. 2016. Genetic polymorphism of GSTM1 and *GSTT1* and risk of prostatic carcinoma - a meta-analysis of 7.281 prostate cancer cases and 9.082 healthy controls. *Asian Pac J Cancer Prev.* 17(5), pp.2629-2635.
- Mathew, B., Tiwari, A., Jatawa, S. 2011. Free radicals and antioxidants: a review. *J Pharm Res.* 4(12), pp.4340-4343.
- Moein, S., Javanmard, S.H., Abedi, M., Izadpanahi, M.H., Gheisari, Y. 2017. Identification of appropriate housekeeping genes for gene expression analysis in long-term hypoxia-treated kidney cells. *Adv Biomed Res.* 6, pp.15
- Nasseri, G., Zahedi, T., and Saadat, M. 2015. Prevalence of null genotype of Glutathione S-transferase T1 (*GSTT1*) and M1 (*GSTM1*) in seven Iranian populations. *Iran J Public Health.* 44(12), pp.1655-1661.
- National Human Genome Research Institute. 2015. Deoxyribonucleic acid (*DNA*). Available from: <https://www.genome.gov/25520880/deoxyribonucleic-acid-DNA-fact-sheet/>. [Accessed 1 March 2019].
- National Institutes of Health. 2019. *Office of dietary supplements-dietary supplements fact sheet: chromium*. Available from: <https://ods.od.nih.gov/factsheets/Chromium-HealthProfessional/>. [Accessed 12 December 2019].
- Nature Education. 2010. An overview of the flow of information from *DNA* to protein in a eukaryote. Available from:

- <https://www.nature.com/scitable/topicpage/gene-expression-14121669/>
[Accessed 1 March 2019].
- Nebert, D.W. & Vasiliou, V. 2004. Analysis of the Glutathione S-transferase (GST) gene family. *Hum Genomics*. 1(6), pp.460-464.
- Offenbacher, E.G. 1992. Chromium in the elderly. *Biol Trace Elem Res*; 32, pp.123-131.
- Proctor, D. M., Suh, M., Mittal, L., Hirsch, S., Salgado, R.V., Bartlett, C., Landingham, C.V., Rohr, A., Crump, K. 2016. Inhalation cancer risk assessment of hexavalent chromium based on updated mortality for Painesville chromate production workers. *J Expo Sci Environ Epidemiol*. 26, pp.224-231.
- Rodwell, V.W., Bender, D.A., Botham, K.M., Kennely, P.J., Weil, P.A. *Harper's illustrated biochemistry*. 31st ed. USA: McGraw-Hill Education.
- Rudge, S.R. & Monnig, C.A. 2000. *Separation & purification reviews: electrophoresis techniques*. 29th ed. UK: Taylor & Francis Group, pp.129-148.
- Sivoňová, M., Waczulíková, I., Dobrota, D., Matáková, T., Hatok, J., Račay, P., Kliment, J. 2009. Polymorphisms of Glutathione S-transferase M1, T1, P1 and the risk of prostate cancer: a case-control study. *J Exp & Clin Cancer Res*. 28 (32).
- Soemirat, J. 2008. *Kesehatan lingkungan*. 2nd ed. Yogyakarta: Gadjah Mada University Press.
- Smith, D.R., Nordberg, M. 2015. *Chapter 2 – general chemistry, sampling, analytical methods, and speciation*. In: Nordberg, G.F., Fowler, B.A., Nordberg, M. *Handbook on the toxicology of metals*. 4th ed. USA: Elsevier.
- Sripichai, O. & Fucharoen, S. 2007. Genetic polymorphism and implications for human diseases. *J Med Assoc Thai*. 90(2), pp.394-395.
- Suh, M., Wikoff, D., Lipworth, L., Goodman, M., Fitch, S., Mittal, L., Ring, C. and Proctor, D. 2019. Hexavalent chromium and stomach cancer: a systematic review and meta-analysis. *Crit Rev Toxicol*. 49(2), pp.140-159.
- Suzuki, Y., Fukuda, K. 1990. Reduction of hexavalent chromium by ascorbic acid and glutathione with special reference to the rat lung. *Arch Toxicol*. 64, pp.169-176.
- Tamam, M.H.B. 2012. Pengertian dan cara kerja elektroforesis. *Generasi Biologi*. Available from: <https://www.generasibiologi.com/2012/08/elektroforesis.html/>
[Accessed 16 December 2019]
- Tchounwou, P.B., Yedjou, C.G., Patlolla, A.K., Sutton, D.J. 2012. Heavy metals toxicity and the environment. *Exp Suppl*. 101, pp.133-164.
- Wang, Y., Yang, H. and Wang, H. 2015. The association of *GSTT1* deletion polymorphism with lung cancer risk among Chinese population: evidence based on a cumulative meta-analysis. *Oncotargets Ther*. pp.2875.
- Wiechula, D., Loska, K., Ungier, D., Fischer, A. 2012. Chromium, zinc, and magnesium concentrations in the pubic hair of obese and overweight women. *Biol Trace Elem Res*. 148 (1), pp.18-24.
- Wiegand, H.J, Ottenwälder, H., Bolt, H.M. 1984. The reduction of chromium (VI) to chromium (III) by glutathione: an intracellular redox pathway in the metabolism of the carcinogen chromate. *Toxicology*. 33, pp.341-348.
- Wiegand, H.J, Ottenwälder, H., Bolt, H.M. 1985. The formation of glutathione-chromium complexes and their possible role in chromium disposition. *Arch Toxicol Suppl*. 8, pp.319-321.

- Wiegand, H.J, Ottenwalder, H., Bolt, H. 1987. Bioavailability and metabolism of hexavalent chromium compounds. *Toxicol Environ Chem.* 14(4), pp.263-275.
- Westermeyner, R. 2004. *Electrophoresis in practice: a guide to methods and applications of DNA and protein separations.* 4th ed. New Jersey: John Wiley & Sons inc, pp.9-43.
- Wu, F., Tsai, F., Kuo, H., Tsai, C., Wu, W., Wang, R., Lai, J. 2000. Cytogenetic study of workers exposed to chromium compounds. *Mutat Res.* 464(2), pp.289-296.
- Wu, F., Tsai, F., Kuo, H., Tsai, C., Wu, W., Wang, R., Lai, J. 2001. Effect of genotoxic exposure to chromium among electroplating workers in Taiwan. *Sci Total Environ.* 279(3), pp.21-28.
- Yourgenome. 2016a. *What is gene expression?* Available at: <https://www.yourgenome.org/facts/what-is-gene-expression/> [Accessed 1 March 2019].
- Yourgenome. 2016b. *What is gel electrophoresis?* Available at: <https://www.yourgenome.org/facts/what-is-gel-electrophoresis/> [Accessed 16 December 2019].
- Zamay, T.N., Zamay, G.S., Kolovskaya, O.S., Zukov, R.A., Petrova, M.M., Gargaun, A., Verezhovskiy, M.V., Kichkailo, A.S. 2017. Current and prospective protein biomarkers of lung cancer. *Cancers.* 9(