

## DAFTAR PUSTAKA

1. Gan Wei, Liu Xin-Le, Yu Ti, Li Ting-Ting, Wang Shuang, Deng Jin, Wang Lan-Lan, Cai Jian Pai. (2018). *Urinary 8-oxo-7,8-dihydroguanosine as a Potential Biomarker of Aging*. Department of Laboratory Medicine, West China Hospital, Sichuan University, Chengdu, China. The MOH Key Laboratory of Geriatrics, Beijing Hospital, National Center of Gerontology, Beijing, China. 10.3389/fnagi.2018.00034. eCollection 2018. [[PMC free article](#)] [[PubMed](#)] [[Google Scholar](#)]
2. Otin C.L., Blasco M.A., Patridge L., Serrano M., Croemer G. (2013). *The Hallmarks of Aging*. 10.1016/j.cell.2013.05.039 [[PMC free article](#)] [[PubMed](#)] [[Google Scholar](#)]
3. Liochef S.I. (2015). *Which Is the Most Significant Cause of Aging?*. 10.3390/antiox4040793[[PMC](#)][[PubMed](#)][[Google Scholar](#)].
4. Nieuwenhuis-Mark R. E. (2011). *Healthy aging as disease?* Front. Aging Neurosci. 3:3. 10.3389/fnagi.2011.00003
5. Simm A., Johnson T. E. (2010). *Biomarkers of ageing: a challenge for the future*. Exp. Gerontol. 45, 731–732. 10.1016/j.exger.2010.08.006]
6. Banerjee C., Ulloor J., Dillon E. L., Dahodwala Q., Franklin B., Storer T., et al. . (2011). *Identification of serum biomarkers for aging and anabolic response*. Immun. Ageing. 8:5. 10.1186/1742-4933-8-5 []
7. Horvath S. (2013). *DNA methylation age of human tissues and cell types*. Genome Biol. 14:R115.10.1186/gb-2013-14-10-r115 []
8. Catera M., Borelli V., Malagolini N., Chiricolo M., Venturi G., Reis C. A., et al. . (2016). *Identification of novel plasma glycosylation-associated markers of aging*. Oncotarget 7, 7455–7468. 10.18632/oncotarget.7059 []
9. Sebastiani P., Thyagarajan B., Sun F., Schupf N., Newman A. B., Montano M., et al. . (2017). *Biomarker signatures of aging*. Aging Cell. 10.1111/acel.12557 ]
10. Gan W., Nie B., Shi F., Xu X. M., Qian J. C., Takagi Y., et al. . (2012). *Age-dependent increases in the oxidative damage of DNA, RNA, and their*

- metabolites in normal and senescence-accelerated mice analyzed by lc-ms/ms: urinary 8-oxoguanosine as a novel biomarker of aging.* Free Radic. Biol. Med. 52, 1700–1707. 10.1016/j.freeradbiomed.2012.02.016 [[PubMed](#)] [[CrossRef](#)] [[Google Scholar](#)]
11. Garratt L. W., Mistry V., Singh R., Sandhu J. K., Sheil B., Cooke M. S., et al. . (2010). *Interpretation of urinary 8-oxo-7,8-dihydro-2'-deoxyguanosine is adversely affected by methodological inaccuracies when using a commercial elisa.* Free Radic. Biol. Med. 48, 1460–1464. 10.1016/j.freeradbiomed.2010.02.017 [[PubMed](#)] [[CrossRef](#)] [[Google Scholar](#)]
  12. Andreoli R., Mutti A., Goldoni M., Manini P., Apostoli P., De Palma G. (2011). *Reference ranges of urinary biomarkers of oxidized guanine in (2'-deoxy)ribonucleotides and nucleic acids.* Free Radic. Biol. Med. 50, 254–261. 10.1016/j.freeradbiomed.2010.11.009 []
  13. Fumagalli M, Rossiello F, Clerici M, Barozzi S, Cittaro D, Kaplunov JM, Bucci G, Dobрева M, Matti V, Beausejour CM, et al. (2012). *Telomeric DNA damage is irreparable and causes persistent DNA-damage-response activation.* Nat Cell Biol. 14:355–365.]
  14. Hewitt G, Jurk D, Marques FD, Correia-Melo C, Hardy T, Gackowska A, Anderson R, Taschuk M, Mann J, Passos JF. (2012). *Telomeres are favoured targets of a persistent DNA damage response in ageing and stress-induced senescence.* Nat Commun. 3:708.]
  15. Hekimi S, Lapointe J, Wen Y. (2011). *Taking a “good” look at free radicals in the aging process.* Trends Cell Biol. 21:569–576.]
  16. Ristow M, Schmeisser S. (2011). *Extending life span by increasing oxidative stress.* Free Radic Biol Med. 51:327–336.
  17. Nakano M., Kawanishi Y., Kamohara S., Uchida Y., Shiota M., Inatomi Y., et al. . (2003). *Oxidative DNA damage (8-hydroxydeoxyguanosine) and body iron status: a study on 2507 healthy people.* Free Radic. Biol. Med. 35, 826–832. 10.1016/S0891-5849(03)00432-5 [

18. Guo C.Z., Ding P., Xie C., Ye C., Ye M., Pan C., Cao X., Zhang S., Zheng S. (2017) *Potential application of the oxidative nucleic acid damage biomarkers in detection of disease*. 8: 75767-75777.10.18632/oncotarget.20801. [PubMed] [CrossRef] [Google Scholar]
19. Evans, M.D.; Saparbaev, M.; Cooke, M.S. (2010). *DNA repair and the origins of urinary oxidized 2'-deoxyribonucleosides*. *Mutagenesis*. 25, 433–442. [Google Scholar] [CrossRef] [PubMed]
20. Il'yasova, D.; Scarbrough, P.; Spasojevic, I. (2012). *Urinary biomarkers of oxidative status*. *Clin. Chim. Acta*. 413, 1446–1453. [Google Scholar] [CrossRef] [PubMed]
21. Prasad, S.; Gupta, S.C.; Tyagi, A.K. (2017). *Reactive oxygen species (ROS) and cancer: Role of antioxidative Nutraceuticals*. *Cancer Lett*. 387, 95–105.]
22. Cooke, M.S.; Olinski, R.; Loft, S. (2008). *Measurement and Meaning of Oxidatively Modified DNA Lesions in Urine*. *Cancer Epidemiol. Biomark. Prev.* 17, 3–14.
23. Matt, S.; Hofmann, T.G. (2016). *The DNA damage-induced cell death response: A roadmap to kill cancer cells*. *Cell. Mol. Life Sci.* 73, 2829–2850. [Google Scholar] [CrossRef]
24. Z. Radak and I. Boldogh. (2010). "8-Oxo-7,8-dihydroguanine: links to gene expression, aging, and defense against oxidative stress" . *Free Radical Biology and Medicine*, vol. 49, no. 4, pp. 587–596. [Google Scholar]
25. F Safnas.; Thowfeik, F.S.; Merino Edward J. (2016). *Excessive Reactive OxygenSpecies and Exotic DNA Lession as an Exploitable Liability*. *Biokimia*. 10. 1021/acs.biochem.6b00703 [Google Scholar] [CrossRef] [PubMed]
26. Singh A.; Kukreti Ritushree.; Saso L.; Kukreti Shrikant. (2019). *Oxidative Stress: Role and Response of Short Guanine Tracts at Genomic Locations*.

- Int. J. Mol. 20(17), 4258. 10.3390/ijms20174258. [Google Scholar]  
[CrossRef] [PubMed]
27. Yano T, Shoji F, Baba H et al. Significance of the urinary 8-OHdG level as an oxidative stress marker in lung cancer patients. *Lung Cancer*. 2009 Jan;63(1):111-4.
  28. Aditama TY. (2008). Tuberkulosis Masalah dan Perkembangannya. Pidato Pengukuhan Guru Besar Tetap dalam Bidang Pulmonologi dan Ilmu Kedokteran Respirasi FK UI. UI Press: Jakarta. hal : 22-27.
  29. Akiibinu MO, Ogunyemi OE, Arinola OG, Adenaike AF, and Adegoke OD. (2008). Assessment of Antioxidants and Nutritional Status of Pulmonary Tuberculosis Patients in Nigeria. *Eur. J. Gen. Med.* 5(4): 208-211. \_\_\_\_\_ . (2011). Levels of Oxidative Metabolites, Antioxidants and Neopterin in Nigerian Pulmonary Tuberculosis Patients. *Eur. J. Gen. Med* 8(3): 213-218.
  30. Connell ND, and Venketaraman V. (2009). Control of Mycobacterium tuberculosis infection by Glutathione Recent Patients on Anti-Infective. *Drug Discovery* 4:214-226
  31. Dahlan MS. (2011). Statistik untuk Kedokteran dan Kesehatan : Deskriptif, Bivariat, dan Multivariat dilengkapi aplikasi dengan menggunakan SPSS. Salemba Medika : Jakarta.
  32. Dayaram YK, Talaue MT, Connell ND, and Venketaraman V. (2006). Characterization of a glutathione metabolic mutant of Mycobacterium tuberculosis and its resistance to glutathione and Nitrosoglutathione. *J Bacteriology* 188: 1364–1372
  33. Deneke SM, and Fanburg BL. (1989). Regulation of cellular glutathione. *Am J Physiol* 257(4 Pt 1): L163-173. Ghezzi P. (2005). Regulation of protein function by glutathionylation. *Free Radic Res.* 39(6):573– 580.
  34. Ghezzi P, and Simplicio P. (2007). Glutathionylation pathways in drug response. *Curr Opin Pharmacol.* 7(4):398–403.
  35. Green RM, A. Seth, and ND Connell. (2000). A peptide permease mutant of Mycobacterium bovis BCG resistant to the toxic peptides glutathione and S-nitrosoglutathione. *Infect. Immun* 68:429– 436.
  36. Guerra C, Devin M, Andrea S, Steven K, Meshare F, Dennis G, Michelle T, Frederick G, Fadi TK, and Venketaraman V. (2011). Glutathione and Adaptive Immune Response Against Mycobacterium tuberculosis Infection in Healthy and HIV Infected Individual. *PLoSOne* 6(12):e28378.
  37. Hashmi MA, Bilal A, Syed IAS, and Muhammad IUK. (2012). Antioxidant Capacity and Lipid Peroxidation Product in Pulmonary Tuberculosis. *Al Ameen J Med Sci* 5 (3 ):313-319

38. Kumar A, Aisha F, Ioni G, Vikram S, Mary H, and Adrie JCS. (2011). Redox Homeostasis in Mycobacteria : The Key to Tuberculosis Control ? Expert Review in Molecular Medicine 13:39-49.
39. Kwiatkowska S, Piasecka G, Zieba M, Piotmoski W, and Nowak D. (1999). Increased Serum Concentration of Conjugated malondialdehyde in patients with pulmonary tuberculosis. *Respir Med.* 93:272-276.
40. Lamsal M, Narayan G, Narendra B, Bishamber DT, Shymal KB, and Nirmal B. (2007). Evaluation of Lipid Peroxidation Product, Nitrite And Antioxidant Levels In Newly Diagnosed And Two Months Follow-Up Patients With Pulmonary Tuberculosis. *Southeast Asian J Trop Med Public Health* 38(4):695-703
41. Zanolin, M.E 2015).; Girardi, P.; Degan, P.; Rava, M.; Olivieri, M.; Di Gennaro, G.; Nicolis, M.; De Marco, R. Measurement of a urinary marker (8-hydroxydeoxy-guanosine, 8-ohdg) of DNA oxidative stress in epidemiological surveys: A pilot study. *Int. J. Biol. Markers* 2015, 30, e341–e345. [CrossRef] [PubMed]
42. Martinez-Moral, M.P.; Kannan, K. How stable is oxidative stress level? An observational study of intra- and inter-individual variability in urinary oxidative stress biomarkers of DNA, proteins, and lipids in healthy individuals. *Environ. Int.* 2019, 123, 382–389. [CrossRef] [PubMed]
43. Zanolin, M.E.; Girardi, P.; Degan, P.; Rava, M.; Olivieri, M.; Di Gennaro, G.; Nicolis, M.; De Marco, R. Measurement of a urinary marker (8-hydroxydeoxy-guanosine, 8-ohdg) of DNA oxidative stress in epidemiological surveys: A pilot study. *Int. J. Biol. Markers* 2015, 30, e341–e345. [CrossRef] [PubMed]
44. Barregard, L.; Moller, P.; Henriksen, T.; Mistry, V.; Koppen, G.; Rossner, P., Jr.; Sram, R.J.; Weimann, A.; Poulsen, H.E.; Nataf, R.; et al. Human and methodological sources of variability in the measurement of urinary 8-oxo-7,8-dihydro-2'-deoxyguanosine. *Antioxid. Redox Signal.* 2013, 18, 2377–2391. [CrossRef]
45. Andreoli, R.; Mutti, A.; Goldoni, M.; Manini, P.; Apostoli, P.; De Palma, G. Reference ranges of urinary biomarkers of oxidized guanine in (2'-

- deoxy)ribonucleotides and nucleic acids. *Free Radic. Biol. Med.* 2011, 50, 254–261. [CrossRef] [PubMed]
46. Shigenaga, M.K.; Gimeno, C.J.; Ames, B.N. Urinary 8-hydroxy-2'-deoxyguanosine as a biological marker of in vivo oxidative DNA damage. *Proc. Natl. Acad. Sci. USA* 1989, 86, 9697–9701. [CrossRef] [PubMed]
47. Hakim, I.A.; Chow, H.H.; Harris, R.B. Green tea consumption is associated with decreased DNA damage among *gstm1*-positive smokers regardless of their *hogg1* genotype. *J. Nutr.* 2008, 138, 1567s–1571s. [CrossRef] [PubMed]
48. Lee, K.F.; Chung, W.Y.; Benzie, I.F. Urine 8-oxo-7,8-dihydro-2'-deoxyguanosine (8-oxodg), a specific marker of oxidative stress, using direct, isocratic lc-ms/ms: Method evaluation and application in study of biological variation in healthy adults. *Clin. Chim. Acta Int. J. Clin. Chem.* 2010, 411, 416–422. [CrossRef] [PubMed]
49. Lushchak, V.I. Free radicals, reactive oxygen species, oxidative stress and its classification. *Chem. Biol. Interact.* 2014, 224, 164–175. [CrossRef] [PubMed]
50. B. S. Mandavilli, J. H. Santos, and B. Van Houten, "Mitochondrial DNA repair and aging," *Mutation Research: Fundamental and Molecular Mechanisms of Mutagenesis*, vol. 509, no. 1-2, pp. 127–151, 2002.
51. G. Block, M. Dietrich, E. P. Norkus, and L. Packer, "Oxidative stress in human's populations," in *Critical Reviews of Oxidative Stress and Aging: Advances in Basic Science, Diagnostic and Interventions*, R. G. Cutler and H. Rodriguez, Eds., pp. 870–880, World Scientific Publishing, Singapore, 2003.
52. F. L. Muller, M. S. Lustgarten, Y. Jang, A. Richardson, and H. Van Remmen, "Trends in oxidative aging theories," *Free Radical Biology and Medicine*, vol. 43, no. 4, pp. 477–503, 2007.
53. D. Harman, "Aging: a theory based on free radical and radiation chemistry," *Journal of Gerontology*, vol. 11, no. 3, pp. 298–300, 1956.
54. D. Harman, "The biologic clock: the mitochondria?" *Journal of the American Geriatrics Society*, vol. 20, no. 4, pp. 145–147, 1972.

55. R. Stadtman, "Role of oxidant species in aging," *Current Medicinal Chemistry*, vol. 11, no. 9, pp. 1105–1112, 2004.
56. H. Sies, "Introductory remarks," in *Oxidative Stress*, pp. 1–8, Academic Press, London, UK, 1985
57. H. Kasai, K. Kawai, and Y. Li, "Analysis of 8-OH-dG and 8-OHGua as biomarkers of oxidative stress," *Genes and Environment*, vol. 30, no. 2, pp. 33–40, 2008.
58. B. Malayappan, T. J. Garrett, M. Segal, and C. Leeuwenburgh, "Urinary analysis of 8-oxoguanine, 8-oxoguanosine, fapyguanine and 8-oxo-2'-deoxyguanosine by high-performance liquid chromatography-electrospray tandem mass spectrometry as a measure of oxidative stress," *Journal of Chromatography A*, vol. 1167, no. 1, pp. 54–62, 2007.
59. H. Hayakawa and M. Sekiguchi, "Human polynucleotide phosphorylase protein in response to oxidative stress," *Biochemistry*, vol. 45, no. 21, pp. 6749–6755, 2006.
60. X. Shan, H. Tashiro, and C.-L. G. Lin, "The identification and characterization of oxidized RNAs in Alzheimer's disease," *Journal of Neuroscience*, vol. 23, no. 12, pp. 4913–4921, 2003.
61. X. Shan, Y. Chang, and C.-L. G. Lin, "Messenger RNA oxidation is an early event preceding cell death and causes reduced protein expression," *FASEB Journal*, vol. 21, no. 11, pp. 2753–2764, 2007.
62. S. Choi, H.-H. Choi, S.-H. Lee et al., "Anti-inflammatory effects of 8-hydroxy-2'-deoxyguanosine on lipopolysaccharide-induced inflammation via Rac suppression in Balb/c mice," *Free Radical Biology and Medicine*, vol. 43, no. 12, pp. 1594–1603, 2007
63. M. Irie, K. Tamae, N. Iwamoto-Tanaka, and H. Kasai, "Occupational and lifestyle factors and urinary 8-hydroxydeoxyguanosine," *Cancer Science*, vol. 96, no. 9, pp. 600–606, 2005
64. World Health Organization, *Global Tuberculosis Report*, World Health Organization, 2017.
65. Glaziou, D. Falzon, K. Floyd, and M. Raviglione, "Global epidemiology of tuberculosis," *Seminars in Respiratory and Critical Care Medicine*, vol. 34, no. 1, pp. 3–16, 2013.

66. L. Jordao, C. K. Bleck, L. Mayorga, G. Griffiths, and E. Anes, "On the killing of mycobacteria by macrophages," *Cellular Microbiology*, vol. 10, no. 2, pp. 529–548, 2008.
67. R. O'Toole, "Chapter 3 - experimental models used to study human tuberculosis," *Advances in Applied Microbiology*, vol. 71, pp. 75–89, 2010.
68. W. C. Chong, M. D. Shastri, and R. Eri, "Endoplasmic reticulum stress and oxidative stress: a vicious nexus implicated in bowel disease pathophysiology," *International Journal of Molecular Sciences*, vol. 18, no. 4, p. 771, 2017.
69. F. Holguin, "Oxidative stress in airway diseases," *Annals of the American Thoracic Society*, vol. 10, Supplement, pp. S150– S157, 2013. [25] E. Birben, U. M. Sahiner, C. Sackesen, S. Erzurum, and O. Kalayci, "Oxidative stress and antioxidant defense," *World Allergy Organization Journal*, vol. 5, no. 1, pp. 9–19, 2012.
70. B. Ezraty, A. Gennaris, F. Barras, and J. F. Collet, "Oxidative stress, protein damage and repair in bacteria," *Nature Reviews Microbiology*, vol. 15, no. 7, pp. 385–396, 2017.
71. H. Jamaati, E. Mortaz, Z. Pajouhi et al., "Nitric oxide in the pathogenesis and treatment of tuberculosis," *Frontiers in Microbiology*, vol. 8, p. 2008, 2017.
72. M. I. Voskuil, I. L. Bartek, K. Visconti, and G. K. Schoolnik, "The response of *Mycobacterium tuberculosis* to reactive oxygen and nitrogen species," *Frontiers in Microbiology*, vol. 2, p. 105, 2011.

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