

## Daftar Pustaka

- Adlard, P.A., Perreau, V.M. & Cotman, C.W., 2005. The exercise-induced expression of BDNF within the hippocampus varies across life-span. *Neurobiol. Aging* (2005):511–20.
- Aguiar Jr., A.S. & Pinho, R.A., 2007. Effects of physical exercise over the redox brain state. *Rev. Bras. Med. Esporte* 13(5):322-27.
- Alliot, J., Boghossian, S., Jourdan, D., Veyrat-Durebex, C., Pickering, G., Meynial-Denis, D. *et al.*, 2002. The LOU/c/jall rat as an animal model of healthy aging?. *J. Gerontol.* 57A(8):B312-20.
- Aminuddin, M., Partadiredja, G. & Sari, D.C.R., 2012. The effects of black garlic (*Allium sativum* L.) ethanol extract on the estimated total number of Purkinje cells and motor coordination of male adolescent Wistar rats treated with monosodium glutamate. *Anat. Sci. Int.* 90(2):75–81.
- Andersen, B.B., Gundersen, H.J. & Pakkenberg, B., 2003. Aging of the human cerebellum: a stereological study. *J. Comp. Neurol.* 466(3):356-65.
- Austin, A.R., 2012. *Effects of D-Galactose treatment and moderate exercise on spatial memory in rats* [Tesis]. Western Michigan University.
- Banji, D., Banji, O.D.F., Dasaraju, S. & Kranthi, K.C.H., 2013. Curcumin and piperine abrogate lipid and protein oxidation induced by d-galactose in rat brain. *Brain Res.* 1515:1–11.
- Bathina, S. & Das U.N., 2015. Brain-derived neurotrophic factor and its clinical implications. *Arch. Med. Sci.* 11(6):1164-78.
- Bear, M.F., Connors, B.W. & Paradiso, M.A., 2007. *Neuroscience Exploring The Brain*. 3<sup>rd</sup> Ed. Lippincot Williams & Wilkins.
- Bernard, J.A. & Seidler, R.D., 2014. Moving forward: Age effects on the cerebellum underlie cognitive and motor declines. *Neurosci. Biobehav. Rev.* 42:193–207.
- Bolduc, V., Thorin-Trescases, N. & Thorin, E., 2013. Endothelium-dependent control of cerebrovascular functions through age: exercise for healthy cerebrovascular aging. *Am J Physiol Heart Circ Physiol* 305: H620–33.
- Bonni, A., Brunet, A.E., West, S., Datta, R., Takasu, M.A. & Greenberg, M.E., 1999. Cell survival promoted by the Ras-MAPK signaling pathway by transcription-dependent and independent mechanisms. *Science* 286: 1358-62.

- Brooks, G.A. & White, T.P., 1978. Determination of metabolic and heart rate responses of rats to treadmill exercise. *J. Appl. Physiol.* 45(6):323-32.
- Brown, D.A., Johnson, M.S., Armstrong, C.J., Lynch, J.M., Caruso, N.M., Ehlers, L.B. *et al.*, 2007. Short-term treadmill running in the rat: what kind of stressor is it?. *J. Appl. Physiol.* 103:1979-85.
- Brunet, A., Bonni, A. & Zigmaond, M.J., 1999. Akt promotes cell survival by phosphorylating and inhibiting a forkhead transcription factor. *Cell* 96: 857-68.
- Budni, J., Pacheco, R., da Silva, S., Garcez, M.L., Mina, F., Bellettini-Santos, T. *et al.*, 2016. Oral administration of D-galactose induces cognitive impairment and oxidative damage in rats. *Behav. Brain Res.* 302:35-43.
- Budni, J., Garcez, M.L., Mina, F., Bellettini-Santos, T. da Silva, S., da Luz, A.P. *et al.*, 2017. The oral administration of D-galactose induces abnormalities within the mitochondrial respiratory chain in the brain of rats. *Metab. Brain Dis.*
- Candelario-Jalil, E., Gonzales-Valcon, A., Garcia-Cabrera, M., Leon, O.S. & Fiebich, B.L., 2004. Wide therapeutic time window for denuroprotection in a model of transient focal cerebri ischemia in the rat. *Brain Res.* 1007(1):98-108.
- Caporali, A. & Emanuelli, C., 2009. Cardiovascular actions of neurotrophins. *Physiol. Rev.* 89:279-308.
- Cardoso, A., Magano, S., Marrana, F. & Andrade, J.P., 2015. D-Galactose high-dose administration failed to induce accelerated aging changes in neurogenesis, anxiety, and spatial memory on young male wistar rats. *Rejuven. Res.* 18(6):497-507.
- Carter, R.J., Morton, A.J. & Dunnet, S.B., 2001. Motor coordination and balance in rodent. *Behav. Neurosci.* 15(Suppl8):1-14.
- Cebe, T., Atukeren., Yanar, K., Kuruc, A.I., Ozan, T., Kunbaz, A., Sitar, M.E. *et al.*, 2014. Oxidation scrutiny in persuaded aging and chronological aging at systemic redox homeostasis level. *Exp. Gerontol.* 57:132-40.
- Cechetti, F., Foschesatto, C., Scopel, D., Nardin, P., Goncalves, C.A., Netto, C.A. *et al.*, 2008. Effect of a neuroprotective exercise protocol on oxidative state and BDNF levels in the rat hippocampus. *Brain Res.* 1188(1):182-8.
- Cui, X., Zuo, P., Zhang, Q., Li, X., Hu, Y., Long, J. *et al.*, 2006. Chronic systemic d-galactose exposure induces memory loss, neurodegeneration, and oxidative damage in mice: Protective effects of R- $\alpha$ -lipoic acid. *J. Neurosci. Res.* 83(8):1584-90.

- Cui, L., Hofer, T., Rani, A., Leeuwenburgh, C. & Foster, T.C., 2007. Comparison of lifelong and late life exercise on oxidative stress in the cerebellum. *Neurobiol. Aging* 30:903-9.
- Cunha, N.B., Ilha, J., Centenaro, L.A., Lovatel, G.A., Balbinot, L.F. & Achaval, M., 2011. The effect of treadmill training on young and mature rats after traumatic peripheral nerve lesion. *Neurosci. Lett.* 501(1):15-9.
- Dahlan, M.S., 2011. *Statistik untuk Kedokteran dan Kesehatan*. 5<sup>th</sup> ed. Jakarta: Salemba Medika.
- Delafontaine, P., Song, Y.H., & Li, Y., 2004. Expression, regulation, and function of IGF-1, IGF-1R, and IGF-1 binding protein in blood vessels. *Arterioscler. Thromb. Vasc. Biol.* 24(3):435-44.
- Depkes RI, 2015. Pelayanan dan Peningkatan Kesehatan Usia Lanjut. *Pusat Komunikasi Publik Sekretariat Jenderal Kementerian Kesehatan RI*.
- Dimitropoulou, A. & Bixby, J.L., 2000. Regulation of retinal neurite growth by alterations in MAPK/ERK kinase (MEK) activity. *Brain Res.* 858:205-14.
- Donovan, M.J., Miranda, R.C. & Kraemer, R., 1995. Neurotrophin and neurotrophin receptors in vascular smooth muscle cells. Regulation of expression in response to injury. *Am. J. Pathol.* 147:309-24.
- Elfving, B., Ploughmann, P.H. & Wegener, G., 2010. Detection of brain-derived neurotrophic factor (BDNF) in rat blood and brain preparations using ELISA: pitfalls and solutions. *J. Neurosci. Meth.* 187:73-77.
- Farooqui, T. & Farooqui, A.A., 2009. Aging: an important factor for the pathogenesis of neurodegenerative disease. *Mech. Ageing Dev.* 130(4):203-15.
- Festing, M., Baumans, V., Combes, R., Halder, M., Hendriksen, C., Howard, B., Lovell, D. *et al.*, 1998. Reducing the use of laboratory animals in biomedical research: problem and possible solutions. *ATLA* 26:283-301.
- Gao, J., He, H., Jiang, W., Chang, X., Zhu, L., Luo, F. *et al.*, 2015. Salidroside ameliorates cognitive impairment in a d-galactose-induced rat model of Alzheimer's disease. *Behav. Brain Res.* 293:27-33.
- Garatachea, N., Pareja-Galeano, H., Sanchis-Gomar, F., Santos-Lozano, A., Fiuza-Luces, C., Moran, M. *et al.*, 2015. Exercise attenuates the major hallmarks of aging. *Rejuven. Res.* 18(1):57-89.
- García-Mesa, Y., Colie, S., Corpas, R., Cristofol, R., Comellas, F., Nebreda, A.R. *et al.*, 2015. Oxidative stress is a central target for physical exercise neuroprotection against pathological brain aging. *J. Gerontol.* 71(1):40-9.

Gould, T.D., Dao, D.T. & Kovacsics, C.E., 2009. The open field test. In: Gould, T.D. (Ed.): *Mood and Anxiety Related Phenotypes in Mice*, pp: 1-20. Humana Press, New York.

Gu, X., Zhou, Y., Hu, X., Gu, Q., Cao, M., Ke, K., *et al.*, 2013. Reduced numbers of cortical GABA-immunoreactive neurons in the chronic d-galactose treatment model of brain aging. *Neurosci. Lett.* 549:82-6.

Hadzi-Petrushev, N., Stojkovski, V., Mitrov, D. & Mladenov, M., 2015. D-galactose induced changes in enzymatic antioxidant status in rats of different ages. *Physiol. Res.* 64:61–70.

Hadzi-Petrushev, N., Stojkovski, V., Mitrov, D. & Mladenov, M., 2014. D-galactose induced inflammation lipid peroxidation and platelet activation in rats. *Cytokine* 69(1):150–3.

Haider, S., Liaquat, L., Shahzad, S., Sadir, S., Madiha, S. Batool, Z. *et al.*, 2015. A high dose of short term exogenous d-galactose administration in young male rats produces symptoms simulating the natural aging process. *Life Sci.* 124(2015):110-9.

Hall, J.E., 2016. *Guyton and Hall Text Book of Physiology*. 13<sup>th</sup> ed. Philadelphia: Saunders Elsevier.

Hao, L. Huang, H., Gao, J., Marshall, C., Chen, Y. & Xiao, M., 2014. The influence of gender, age and treatment time on brain oxidative stress and memory impairment induced by d-galactose in mice. *Neurosci. Lett.* 45-9.

Ho, S.C., Liu, J.H. & Wu, R.Y., 2003. Establishment of the mimetic aging effect in mice caused by d-galactose. *Biogerontol.* 4(1):15–18.

Hung, C., Chen, Y., Hsieh, W., Chiou, S. & Kao, C., 2010. Ageing and neurodegenerative diseases. *Ageing Res. Rev.* 9(SUPPL):S36–46.

Isaacs, K.R., Anderson, B.J., Alcantara, A.A., Black, J.E. & Greenough, W.T., 1992. Exercise and the brain: angiogenesis in the adult rat cerebellum after vigorous physical activity and motor skill learning. *J. Cereb. Blood Flow Metab.* 12:110–9.

Ito, M., 2012. *The cerebellum: Brain for an implicit self*. 1<sup>st</sup> ed. New Jersey: Pearson Education, Inc.

Kaliman, P., Parrizas, M., Lalanza, J.F., Camins, A, Escorihuela, R.M. & Pallas, M., 2011. Neurophysiological and epigenetic effects of physical exercise on the aging process. *Ageing Res. Rev.* 10(4):475-86.

Kennard, J.A. & Woodruff-Pak, D.S., 2011. Aging and exercise effect on motor learning and spatial memory. *Ageing Res.* 2(1):4.

- Khan, S.H.S., 2015. *Biomolecular and physiological study of some antiaging factors in animal cell senescence markers in aged rats* [Disertasi]. University of Mosul College of Science.
- Lalonde, R. & Strazielle, C., 2011. Genetic Models of Cerebellar Dysfunction. In: Lane, E.L., Dunnet, S.B., (Ed): *Animal Models of Movement Disorders Vol. II*, pp: 243-61. Humana Press, New York.
- Larsen, J.O., Skalicky, M. & Viidik, A., 2000. Does long-term physical exercise counteract age-related Purkinje cell loss? a stereological study of rat cerebellum. *J. Compar. Neurol.* 428:213–22.
- Li, J.J., Zhu, Q., Lu, Y-P., Zhao, P., Feng, Z-B., Qian, Z-M. *et al.*, 2015. Ligustilide prevents cognitive impairment and attenuates neurotoxicity in d-galactose induced aging mice brain. *Brain Res.* 1595:19–28.
- Li, L., Xu, M., Shen, B., Li, M., Gao, Q. & Wei, S., 2016. Moderate exercise prevents neurodegeneration in D-galactose-induced aging mice. *Neural Regen. Res.* 11(5):807–15.
- Lista, I. & Sorrentino, G., 2010. Biological mechanisms of physical activity in preventing cognitive decline. *Cell Mol. Neurobiol.* 30(4):493–503.
- Llorens-Martin, M., Torres, A. & Trejo, J.L., 2008. Growth factors as mediators of exercise actions on the brain. *Neuromol. Med.* 10(2):99–107.
- Ma, K., Wu, A., Yang, T., Sheng, D., Chen, L., Li, L., *et al.*, 2014. Progressive impairment of motor skill learning in a d-galactose- induced aging mouse model. *Pakistan J. Zool.* 46(1):215–21.
- Markowska, A.L., Mooney, M. & Sonntag, W.E., 1998. Insulin-like growth factor-1 ameliorates age-related behavioral deficits. *Neurosci.* 87(3):559-69.
- Marton, O., Koltai, E., Nyakas, C., Bakonyi, T., Zentno-Savin, T., Kumagai, S., *et al.*, 2010. Aging and exercise affect the level of protein acetylation and SIRT1 activity in cerebellum of male rats. *Biogerontol.* 11:679-86.
- Mattson, M.P. & Magnus T., 2006. Ageing and neuronal vulnerability. *Nat. Rev. Neurosci.* 7(4):278–94.
- Mauk, M.D. & W.T. Thach., 2008. Cerebellum. In: L. Squire *et al.* (Ed.): *Fundamental Neuroscience*. 3<sup>rd</sup> ed. pp: 751-74. Academic Press, San Diego.
- Meuchel, L.W., Thompson, M.A., Cassivi, S.D., Pabelick, C.M. & Prakash, Y.S., 2011. Neurotrophins induce nitric oxide generation in human pulmonary artery endothelial cells. *Cardiovasc. Res.* 91:668-76.

- Nam, S.M., Kim, J.W., Yoo, D.Y., Yim, H.S., Kim, D.W., Choi, J.H. *et al.*, 2014. Physical exercise ameliorates the reduction of neural stem cell, cell proliferation and neuroblast differentiation in senescent mice induced by d-galactose. *B.M.C. Neurosci.* 15:116.
- Parameshwaran, K., Irwin, M., H., Steliou, K. & Pinkert, C.A., 2010. D-Galactose effectiveness in modeling aging and therapeutic antioxidant treatment in mice. *Rejuven. Res.* 13(6):729–35.
- Partadiredja, G. & Bedi, K.S., 2011. Mice undernourished before, but not after, weaning perform better in motor coordination and spatial learning task than well-fed controls. *Nutr. Neurosci.* 14(4):129-37.
- Pianca, E., Neto, W.K., Pithon-Curi, T.C., Gama, E.F., Sabbag, A. & de Souza, R.R., 2015. Endurance training induces structural dan morphoquantitative changes in rat vagus nerve. *Rev. Bras. Med. Esporte* 21(5).
- Perluigi M., Swomley, A.M. & Butterfield, D.A., 2014. Redox proteomics and the dynamic molecular landscape of the aging brain. *Ageing Res. Rev.* 13(1):75-89.
- Pescatello, L.S., Arena, R., Riebe, D. & Thompson, P.D., 2014. *ACSM's Guidelines for Exercise Testing and Prescription*. 9<sup>th</sup> ed. Lippincot Williams & Wilkins.
- Phillips, C., Baktir, M.A., Srivatsan, M. & Salehi, 2014. Neuroprotective effects of physical activity on the brain: a closer look to trophic factor signaling. *Frontiers Cell Neurosci.* (8).
- Porges, S.W., 2007. The polyvagal perspective. *Biol. Psychol.* 74(2):116-43.
- Porges, S.W., 2009. The polyvagal theory: new insights into adaptive reactions of the autonomic nervous system. *Cleve. Clin. J. Med.* 76(Suppl2):S86-90.
- van Praag, H., 2009. Exercise and the brain: something to chew on. *Trends Neurosci.* 32(5):283-90.
- Purves, D., Augustine, G.J., Fitzpatrick, D., Hall, W.C., LaMantia, A.S., McNamara, J.O. *et al.*, 2004. *Neuroscience*. 3<sup>rd</sup> ed. Massachusetts: Sinauer Associates Inc.
- Rasmussen, P., Brassard, P., Adser, H., Pedersen., M.V., Leick, L. & Hart, E., 2009. Evidence for a release of BDNF from the brain during exercise. *Exp. Physiol.* 94(10):1062-9.
- Rauf, S., Soejono, S.K. & Partadiredja, G., 2015. Effects of treadmill exercise training on cerebellar estrogen and estrogen receptors, serum estrogen, and

motor coordination performance of ovariectomized rats. *Iranian J. Basic Med. Sci.* 18(6):587–92.

Rodrigues, A.F., Biasibetti, H., Zanotto, B.S., Sanches, E.F., Schmitz., Nunes, V.T. *et al.*, 2016. D-Galactose causes motor coordination impairment, and histological and biochemical changes in the cerebellum of rats. *Mol. Neurobiol.* 1–11.

Seidler, R.D., Bernard, J.A., Burutulu, T.B., Fling, B.W., Gordon, M.T., Gwin, J.T. *et al.*, 2010. Motor control and aging: links do age-related brain structural, functional, and biochemical effects. *Neurosci. Biobehav. Rev.* 34(5):721-33.

Sherrard, R. 2011. Cerebellar Control of Motor Function. In: Lane, E.L., Dunnet, S.B., (Ed): *Animal Models of Movement Disorders Vol. II*, pp: 262-79 Humana Press, New York.

Sherwood, L., 2014. *Fisiologi Manusia: Dari Sel ke Sistem*. 8<sup>th</sup> Ed. Jakarta: E.G.C.

Silva, A.J., Kogan, J.H., Frankland, P.W. & Kida, S., 1998. CREB and memory. *Ann. Neuro.* 21(1):127-48.

Song, X., Bao, M., Li, D. & Li, Y.M., 1999. Advanced glycation in d-galactose induced mouse aging model. *Mech. Ageing Dev.* 108(3):239–51.

Spiegelman, B.M., 2007. Transcriptional control of mitochondrial energy metabolism through the PGC1 coactivators. *Novartis Found. Symp.* 287:60-3.

Sukhanov, S., Higashi, Y., Shai, S.Y., Vaughn, C., Mohler, J., Li, Y. *et al.*, 2007. IGF-1 reduces inflammatory responses, suppresses oxidative stress, and decreases atherosclerosis progression in ApoE-deficient mice. *Arterioscler. Thromb. Vasc. Biol.* 27(12):2684-90.

Swain, R.A., Berggren, K.L., Kerr, A.L., Patel, A., Peplinski, C. & Sikorski, A.M., 2012. On aerobic exercise and behavioral and neural plasticity. *Brain Sci.* (2):709-44.

Tang, T. & He, B., 2013. Treatment of d-galactose induced mouse aging with *Lycium barbarum* polysaccharides and its mechanism study. *Afr. J. Tradit. Complement Altern. Med.* 10(4):12-17.

Telgmann, R., 2009. Molecular genetis analysis of a human insulin-like growth factor 1 promoter P1 variation. *F.A.S.E.B. J.* 23:1303-13.

Tortora, G.J. & Derrickson, B., 2009. *Principles of Anatomy and Physiology*. 12<sup>th</sup> ed. John Wiley & Sons, Inc.

- Troen, B.R., 2003. The biology of aging. *Mt. Sinai J. Med.* 70(1):3-22.
- Ullah, F., Ali, T., Ullah, N. & Kim, M.O., 2015. Caffeine prevents d-galactose-induced cognitive deficits, oxidative stress, neuroinflammation and neurodegeneration in the adult rat brain. *Neurochem. Intern.* 90(2015):114-24.
- Vanderah, T.W. & Gould, D.J., 2016. *Nolte's The Human Brain*. 7<sup>th</sup> Ed. Philadelphia: Elsevier.
- Wisloff, U., Helgerud, J., Kemi, O.J. & Ellingsen, O., 2001. Intensity-controlled treadmill running in rats:  $\dot{V}O_2$ max and cardiac hypertrophy. *Am. J. Heart Circ. Physiol.* 280:H1301-10.
- Woodruff-Pak, D.S., Foy, M.R., Akopian, G.G., Lee, K.H., Zach, J., Nguyen, K.P.T., *et al.*, 2010. Differential effects and rates of normal aging in cerebellum and hippocampus. *P.N.A.S.* 107(4):1624-9.
- Wrann, C.D., White, J.P., Salogiannis, J., Laznik-Bogoslavski, D., Wu, J., Ma, D. *et al.*, 2013. Exercise induces hippocampal BDNF through a PGC-1 $\alpha$ /FNDC5 pathway. *Cell Metab.* 18(5):649-59.
- Yamanaka, M., Itakura, Y. & Inoue, T., 2006. Protective effect of brain-derived neurotrophic factor on pancreatic islets in obese diabetic mice. *Metabolism* 55:1286-92.
- Yeoman, M., Scutt, G. & Faragher, R., 2012. Insights into CNS ageing from animal models of senescence. *Nat. Rev. Neurosci.* 13(6):435-45.
- Yu, Y., Bai, F., Wang, W., Liu, Y., Yuan, Q., Qu, S. *et al.*, 2015. Fibroblast growth factor 21 protects mouse brain against d-galactose induced aging via suppression of oxidative stress response and advanced glycation end products formation. *Pharmacol. Biochem. Behav.* 133:122-31.
- Yu, F., Xu, B., Song, C., Ji, L., & Zhang, X., 2013. Treadmill exercise slows cognitive deficits in aging rats by antioxidation and inhibition of amyloid production. *Neuroreport* 24(6):342-7.
- Zhang, C., Zhu, Q. & Hua, T., 2010. Aging of cerebellar Purkinje cells. *Cell Tissue Res.* 341(3):341-47.
- Zhu, Q., Ren, X. & Zhang, C., 2015. Effects of d-galactose on the structure of nerve fibers in cerebellar white matter. *Pakistan J. Zool.* 47(1):187-92.
- Zhou, Y.Y., Ji, X.F., Fu, J.P., Zhu, X.J., Li, R.H., Mu, C.K. *et al.*, 2015. Gene transcriptional and metabolic profile changes in mimetic aging mice induced by d-galactose. *PLoS. One* 10(7):1-16.