

DAFTAR PUSTAKA

- Alasmari, W.A., Abdelfattah-Hassan, A., El-Ghazali, H.M., Abdo, S.A., Ibrahim, D., ElSawy, N.A., El-Shetry, E.S., Saleh, A.A., Abourehab, M.A.S., Mahfouz, H., 2022. Exosomes Derived from BM-MSCs Mitigate the Development of Chronic Kidney Damage Post-Menopause via Interfering with Fibrosis and Apoptosis. *Biomolecules*, 12(5), 663.
- Arfian, N., Wahyudi, D.A.P., Zulfatima, I.B., Citta, A.N., Anggorowati, N., Multazam, A., Romi, M.M., Sari, D.C.R., 2019. Chlorogenic acid attenuates kidney ischemic/reperfusion injury via reducing inflammation, tubular injury, and myofibroblast formation. *BioMed Research International 2019*. <https://doi.org/10.1155/2019/542370>.
- Arora, P., Vasa, P., Brenner, D., Iglar, K., McFarlane, P., Morrison, H *et al.* 2013. Prevalence estimates of chronic kidney disease in Canada: results of a nationally representative survey. *Canadian Medical Association Journal*, 185(9), 417-442.
- Artiles, A., Domínguez, A., Subiela, J.D., Boissier, R., Campi, R., Prudhomme, T., Pecoraro, A., Breda, A., Burgos, F.J., Territo, A., Hevia, V., 2023. Kidney Transplant Outcomes in Elderly Population: A Systematic Review and Meta-analysis. *European Urology Open Science*. <https://doi.org/10.1016/j.euros.2023.02.011>.
- Badan Penelitian dan Pengembangan Kesehatan, Kementerian Kesehatan Republik Indonesia. Laporan Riset Kesehatan Dasar (Riskesdas) 2018.
- Bechtel, W & Zeisberg, M. 2009. Twist: a new link from hypoxia to fibrosis. *Kidney International*. 75, 1255 – 1256. doi: 10.1038/ki.2009.102.
- Birtwistle, L., Chen, X.M., Pollock, C., 2021. Mesenchymal stem cell-derived extracellular vesicles to the rescue of renal injury. *International Journal of Molecular Sciences*. MDPI.
- Boutet, A., De Frutos, C. A., Maxwell, P. H., Mayol, M. J., Romero, J. & Nieto, M. A 2006. Snail activation disrupts tissue homeostasis and induces fibrosis in the adult kidney. *The EMBO Journal*, 25(23), 5603-5613.
- Brianna, Ling, A.P.K., Wong, Y.P., 2022. Applying stem cell therapy in intractable diseases: a narrative review of decades of progress and challenges. *Stem Cell Investig*. <https://doi.org/10.21037/sci-2022-021>.
- Cahyawati, P.N., Ngatidjan, Sari, D.C.R., Romi, M.M., Arfian, N., Romi, M.M., *et al.*, 2017. Simvatisan Attenuates Renal Failure in Mice With a 5/6 Subtotal Nephrectomy. *International Journal of Pharmacy and Pharmaceutical Sciences* 9(5): 12
- Cahyawati, P.N., Satriyasa, B.K., 2021. Subtotal Nephrectomy as a Model of Chronic Kidney Disease: A Systematic Review. *Indian Journal of Public Health Research & Development* 12(3): 150–157.
- Chen, F., Chen, N.N., Xia, C., Wang, H., Shao, L., Zhou, C., *et al.*, 2023. Mesenchymal Stem Cell Therapy in Kidney Diseases: Potential and Challenges. *Cell Transplantation*. SAGE Publications Ltd.

- Chen, T. K., Knicely, D. H., Grams, M. E., 2019. Chronic Kidney Disease Diagnosis and Management: A Review. *JAMA - Journal of the American Medical Association*. <https://doi.org/10.1001/jama.2019.14745>.
- Cherng, S., Young, J., Ma, H. 2008. Alpha Smooth Muscule Actin (α -SMA). *Journal of Animal Science*. 4(4), 7-9.
- Chuang, P.Y., Menon, M.C., & He, J.C.2013. Molecular targets for treatment of kidney fibrosis. *Journal Molekuler Medicine*, 91(5), 549-559.
- Colletti, M., Galardi, A., De Santis, M., Guidelli, G.M., Di Giannatale, A., Di Luigi, L., and Antinozzi, C., 2019. Exosomes in Systemic Sclerosis: Messengers Between Immune, Vascular and Fibrotic Components?. *Internatiol. Journal of Molecular Science*, 20, 4337; doi:10.3390/ijms20184337.
- Cui, C., Zang, N., Song, J., Guo, X., He, Q., Hu, H., Yang, M., Wang, Y., Yang, J., Zou, Y., Gao, J., Wang, L., Wang, C., Liu, F., He, H., Hou, X., Chen, L. 2022. Exosomes derived from mesenchymal stem cells attenuate diabetic kidney disease by inhibiting cell apoptosis and epithelial-to-mesenchymal transition via miR-424-5p. *The FASEB Journal*. 36cc22517. <https://doi.org/10.1096/IJ.202200488R>.
- De Chiara, L., Conte, C., Antonelli, G., Lazzeri, E., 2021. Tubular cell cycle response upon AKI: Revising old and new paradigms to identify novel targets for CKD prevention. *International Journal of Molecular Sciences*. MDPI.
- Duffield, J. S. 2014. Review series Cellular and molecular mechanisms in kidney fibrosis. *Journal of Clinical Investigation*, 124(6), 2299-2306.
- Federer, W., 1963. *Experimental Design, Theory And Application*. New York: Mac Millan.
- Genovese, F Manresa, A. A, Leeming, D., Karsdal, M., & Boor, P. 2014. The extracellular matrix in the kidney: a source of novel non-invasive biomarkers of kidney fibrosis? *Fibrogenesis & Tissue Repair*, 7(1), 4.
- Gillenwater JY., 2002. *Adult and Pediatric Urology*. Lippincott Williams & Wilkins, Philadelphia.
- Gluba-Sagr, A., Franczyk, B., Rysz-Górzyńska, M., Ławiński, J., Rysz, J. 2023. The Role of miRNA in Renal Fibrosis Leading to Chronic Kidney Disease. *Biomedicines* , 11, 2358. <https://doi.org/10.3390/biomedicines11092358>.
- Gorriz, J. L., & Martinez-Castelao, A. 2012. Proteinuria: Detection and role in native renal disease progression. *Transplantation Reviews*, 26(1), 3-13.
- Grande, M. T., Sánchez-Laorden, B. López-Blau, C. De Frutos, C. A., Boutet, A., Arévalo, M. Rowe, R. G., Weiss, S. J., López-Novoa, J. M., Nieto, M. A. 2015. Snail1-induced partial epithelial-to-mesenchymal transition drives renal fibrosis in mice and can be targeted to reverse established disease. *nature medicine*. doi:10.1038/nm.3901.
- Guyton, A.C. dan Hall J.E., 2016. *Buku Ajar Fisiologi Kedokteran*. Singapore: Elsevier.
- Hanif, M. O., Bali, A., Ramphul, K., 2023. Acute Renal Tubular Necrosis. *Stat Pearls Publishing LLC*. Available at:[s://www.ncbi.nlm.nih.gov/books/NBK507815/?report=printable](https://www.ncbi.nlm.nih.gov/books/NBK507815/?report=printable).

- Hinz, B. 2015. Myofibroblast. *Experiment Eye Research*, 142, 56-70.
- Honoré, S. M., Cabrera, W. M., Genta, S. B., & Sánchez, S. S. 2012. Protective effect of yacon leaves decoction against early nephropathy in experimental diabetic rats. *Food and Chemical Toxicology*, 50(5), 1704-1715.
- Hood, J. L., Scott, M. J., Wickline, S. A. 2013. Maximizing exosome colloidal stability following electroporation. *Analytical Biochemistry*. <http://dx.doi.org/10.1016/j.ab.2013.12.001>.
- Hu, Q., Gao, L., Peng, B., & Liu, X. 2017. Baicalin and baicalein attenuate renal fibrosis in vitro via inhibition of the TGF-B1 signaling pathway. *Experimental and Therapeutic Medicine*, 14, 3074-3080.
- Huang, R., Fu, P., Ma, L., 2023. Kidney fibrosis: from mechanisms to therapeutic medicine. *Signal Transduction and Targeted Therapy*, 8, 129.
- Hwang, S., & Choi, H. J. (2018). The role of fibrosis in chronic kidney disease. *Nature Reviews Nephrology*, 14(1), 34-46.
- Ishiy, C. S. R. A., Ormanji, M. S., Maquigussa, E., Ribeiro, R. S., da Silva Novaes, A., Boim, M. A. 2020. Comparison of the effects of mesenchymal stem cells with their extracellular vesicles on the treatment of kidney damage induced by chronic renal artery stenosis. *Stem. Cells Int.* 2020, 8814574.
- Kanwar, Y. S., Wada, J., Sun, L., Xie, P., Wallner, E. L., Chen, S., et al, 2008. Diabetic Nephropathy: Mechanisms of Renal Disease Progression. *Experimental Biology and Medicine*, 233(1), 4-11.
- Kramann, R., Goettsch, C., Wongboonsin, J., Iwata, H., Schneider, R.K., Kuppe, C., Kaesler, N., Chang-Panesso, M., Machado, F.G., Gratwohl, S., Madhurima, K., Hutcheson, J.D., Jain, S., Aikawa, E., Humphreys, B.D., 2016. Adventitial MSC-like Cells Are Progenitors of Vascular Smooth Muscle Cells and Drive Vascular Calcification in Chronic Kidney Disease. *Journal of Cell & Stem Cell* 19, 628-642. <https://doi.org/10.1016/j.stem.2016.08.001>.
- Kovesdy, C. P., 2022. Epidemiology of chronic kidney disease: an update 2022. *Kidney International Supplement*, 12, 7-11.
- Leventhal, A., Chen, G., Negro, A., Boehm, M., 2012. The benefits and risks of stem cell technology. *Journal of Oral Disease* 18, 217-222. <https://doi.org/10.1111/j.1601-0825.2011.01870>.
- Lin, S. L., Kisseleva, T., Brenner, D. A., & Duffield, J. S, 2008. Pericytes and Perivascular Fibroblasts Are the Primary Source of Collagen-Producing Cells in Obstructive Fibrosis of the Kidney. *The American Journal of Pathology*, 173(6).1617-1627.
- Liu, B., Hu, D., Zhou, Y., Yu, Y., Shen, L., Long, C., et al., 2020. Exosomes released by human umbilical cord mesenchymal stem cells protect against renal interstitial fibrosis through ROS-mediated P38MAPK/ERK signaling pathway. *Am J Transl Res* 12(9): 4998-5014.
- Liu, Y., Guo, Y., Bao, S., Huang, H., Liu, W., Guo, W., 2022. Bone marrow mesenchymal stem cell-derived exosomal microRNA-381-3p alleviates vascular calcification in chronic kidney disease by targeting NFAT5. *Journal of Cell Death & Disease* 13. <https://doi.org/10.1038/s41419-022-04703-1>

- Liu, Y., Zhang, Q., Zhang, X., Zhang, Y., & Wang, L. 2022. Urinary bladder-derived mesenchymal stem cell exosomes ameliorate kidney fibrosis in diabetic nephropathy via targeting Snail and TGF- β 1. *Cell Death & Disease*, 13(1), 1004.
- López-Novoa, J. M., Martínez-Salgado, C., Rodríguez-Peña, A. B., & Hernández F. J. L. 2010. Common pathophysiological mechanisms of chronic kidney disease: Therapeutic perspectives. *Pharmacology & Therapeutics*, 128,61-81.
- Lusiana, E., Saleh, I., Sinaga, E., Hafy, Z., 2023. Buku Referensi Model Hewan Coba Fibrosis Ginjal dengan Berbagai Teknik Induksi. *Bening Media Publishing*.<https://books.google.co.id/books>.
- Luyckx, V.A., Tonelli, M., Stanifer, J.W., 2018. The global burden of kidney disease and the sustainable development goals. *Bull World Health Organ* 96, 414-422C. <https://doi.org/10.2471/BLT.17.206441>.
- Ma, Z. J., Wang, Y. H., Li, Z. G., Wang, Y., Li, B.Y., Kang, H. Y., 2019. Immunosuppressive Effect of Exosomes from Mesenchymal Stromal Cells in Defined Medium on Experimental Colitis. *Int J Stem Cells*. 12(3): 440-448.
- Mack, M., & Yanagita, M. 2015. Origin of myofibroblasts and cellular events triggering fibrosis. *Kidney International*, 87(2), 297-307.
- Marieb EN., 2012. Essentials of Human Anatomy and Physiology. 10th edn. *Benjamin Cummings*, San Francisco
- Momen, L.T., Abdolmaleki, A., Asadi, A and Akram, M., 2021. Regeneration and Diagnosis of Kidney Disease Using Exosomes. *Jentashapir Journal Cellular and Molecular Biology*. 12(4):e120113. doi: 10.5812/jjcm.b.120113.
- Nagamura-Inoue, T., 2014. Umbilical cord-derived mesenchymal stem cells: Their advantages and potential clinical utility. *World Journal Stem Cells* 6, 195. <https://doi.org/10.4252/wjsc.v6.i2.195>
- Noble, Kidney H., Kelly, Research D., & Institute, Hudson, P., 2013. Experiences of toasters carers supporting supporting dying renal patients managed without dialysis. *Journal of Advanced Nursing*, 69(8), 1829-1839.
- Shang, Y., Guan, H., Zhou, F., 2021. Biological Characteristics of Umbilical Cord Mesenchymal Stem Cells and Its Therapeutic Potential for Hematological Disorders. *Frontiers in Cell and Developmental Biology*. Frontiers Media S.A.
- Schnaper, H.W., 2005. Renal fibrosis. In: Varga, J., Brenner, D. A., Phan, S. H. (Ed): *Methods in Molecular Medicine*, Vol. 117: Fibrosis Research: Methods and Protocol. Human Press Inc., Totowa.
- Sherwood, L., 2012. Fisiologi Kedokteran: Dari Sel ke Sistem. Jakarta: EGC.

- Shi, Q. & Chen, Y.-G. 2017. Interplay between TGF-beta signaling and receptor tyrosine kinases in tumor development. *Science China. Life Sciences*, 1-9.
- Smith, B. N., & Odero-Marah, V. A. 2012. The role of Snail in prostate cancer. *Cell Adhesion and Migration*, 6(5), 433-441.
- Soriano, R. M., Penfold, D., Leslie, S. W. 2023. Anatomy, Abdomen and Pelvis: Kidney. *StatsPearls*. <https://www.ncbi.nlm.nih.gov/books/NBK482385/>.
- Sulistiyowati, I., Yunus, J., Sari, D.C.R., Arfian, N., 2020. Upregulation of p16, bax and bcl-2 mrna expression associated with epithelial apoptosis and myofibroblast proliferation in kidney fibrosis model in mice. *Malaysian Journal of Medical Sciences* 27(2): 37–44.
- Sun, Y. B. Y., Qu, X., Caruana, G, & Li, J. 2016. The origin of renal fibroblasts/myofibroblasts and the signals that trigger fibrosis. *Differentiation*, 2(3), 102-107.
- Strutz, F., & Zeisberg, M. 2006. Renal Fibroblasts and Myofibroblasts in Chronic Kidney Disease. *Journal of the American Society of Nephrology*, 17, 2992-2998.
- Tomasek, J. J., Gabbiani, G., Hinz, B., Chaponnier, C., & Brown, R. A. 2002. Myofibroblast and mechano-regulation of connective tissue remodelling. *Nature Reviews Molecular Cell Biology*, 3(5), 349-363.
- Tonelli M, Dickinson JA., 2020. Early Detection of CKD: Implications for Low-Income, Middle-Income, and High-Income Countries. *Journal of the American Society of Nephrology*. Sep;31(9):1931-1940. doi: 10.1681/ASN.2020030277. PMID: 32839279; PMCID: PMC7461685.
- Tortota, G. J., & Derrickson, B., 2014. *Principles of Anatomy & Physiology 14th Edition*. Wiley.
- Tseng, W.C., Lee, P.Y., Tsai, M.T., Chang, F.P., Chen, N.J., Chien, C.T., *et al.*, 2021. Hypoxic mesenchymal stem cells ameliorate acute kidney ischemia-reperfusion injury via enhancing renal tubular autophagy. *Stem Cell Research and Therapy* 12(1):.
- Tsuji, K., Kitamura, S., Wada, J. 2020. Immunomodulatory and Regenerative Effects of Mesenchymal Stem Cell-Derived Extracellular Vesicles In Renal Diseases. *Internatiol Journal of Moleculer Siences*. 21, 756; doi:10.3390/ijms21030756.
- Tzng, E., Bayardo, N., Yang, P. C. 2023. Current challenges surrounding exosome treatments. *Extracellular Vesicle* 2. 100023.
- Velvo, A.M., Velvo, R.M., 2013. Anatomy and physiology series: infrastructure of the kidney. *journal of renal nursing*, vol 5 no 5.
- Villatoro, A.J., Martín-Astorga, M.D.C., Alcoholado, C., Sánchez-Martín, M.D.M., Becerra, J., 2021. Proteomic analysis of the secretome and exosomes of feline adipose-derived mesenchymal stem cells. *Animals* 11(2): 1–15.
- Wang, B., Yao, K., Huuskes, B. M., Shen, H. H., Zhuang, J., Godson, C., Brennan, E. P. Wilkinson-Berka, J. L., Wise, A. F., Ricardo, S. D. 2016. Mesenchymal stem cells deliver exogenous microRNA-let7c via exosomes to attenuate renal fibrosis. *Mol. Ther.* 24, 1290–1301.

- Wang, S. J., Qiu, Z. Z., Chen, F. W., Mao, A. L., Bai, J. C., Hong, Y. J., Zhang, Z. P., Zhu, W. A., Zhang, Z. W., Zhou, H., 2022. Bone marrow mesenchymal stem cell-derived extracellular vesicles containing miR-181d protect rats against renal fibrosis by inhibiting KLF6 and the NF- κ B signaling pathway. *Journal of Cell Death & Disease* 13. <https://doi.org/10.1038/s41419-022-04875-w>
- Wang, X., Wang, P., Wang, X., Li, X., Li, J., Zhang, Y., Wang, Z. 2021. Exosome-Derived Microvesicles from Human Adipose-Derived Stem Cells Inhibit Inflammation and Fibrosis in a Rat Model of Chronic Kidney Disease. *Stem Cell Research & Therapy*, 12(1), 1-15.
- Wanyan, P., Wang, X., Li, N., Huang, Y., She, Y., Zhang, L., 2023. Mesenchymal stem cells therapy for acute kidney injury: A systematic review with meta-analysis based on rat model. *Frontiers in Pharmacology*. Frontiers Media S.A.
- Wen, Y., Yang, C., Menez, S.P., Rosenberg, A.Z., Parikh, C.R., 2020. A Systematic Review of Clinical Characteristics and Histologic Descriptions of Acute Tubular Injury. *Kidney International Reports* 5(11): 1993–2001.
- White, S. L., Polkinghorne, K. R., Atkins, R. C., & Chadban, S. J. 2010. Comparison of the Prevalence and Mortality Risk of CKD in Australia Using the CKD Epidemiology Collaboration (CKD-EPI) and Modification of Diet in Renal Disease (MDRD) Study GFR Estimating Equations: The AusDiab (Australian Diabetes, Obesity and Lifestyle) Study. *American Journal of Kidney Diseases*, 55(4), 660-670.
- Yamauchi, E., Shoji, S., Nishihara, M., Shimoda, T., Nishima, S., 2008. Contribution of lung fibroblast migration in the fibrotic process of airway remodeling in asthma. *Allergology international*, 57, 73-78.
- Yoshida, H, Wada, T. 2015. Kidney Disease and Laboratory Examinations-Opening Remarks: For Better Understanding of CKD. *Rinsho Byori*, 63(2), 250-251.
- Zakrzewski, W., Dobrzyński, M., Szymonowicz, M., Rybak, Z., 2019. Stem cells: Past, present, and future. *Stem Cell Research and Therapy*. BioMed Central Ltd.
- Zeisberg, E. M., Potenta, S. E., Sugimoto, H., Zeisberg, M., & Kalluri, R. 2008. Fibroblasts in Kidney Fibrosis Emerge via Endothelial-to-Mesenchymal Transition. *Journal of the American Society of Nephrology*, 19(12), 2282-2288.
- Zhang, Y., Bi, J., Huang, J., Tang, Y., Du, S., Li, P. 2020. Exosome: A Review of Its Classification, Isolation Techniques, Storage, Diagnostic and Targeted Therapy Applications. *International Journal of Nanomedicine*. 2020:15 6917–6934.
- Zhu, F., Octavia L.S., Shin, C.L., Pei, G., Hu, Z., Yang, J., Zhu, H., Wang, M., Mou, J., Sun, J., Wang, Y., Yang, Q., Zhao, Z., Xu, H., Gao, H., Yao, W., Luo, X., Liao, W., Xu, G., Zeng, R., Yao, Y., 2017. Adipose-derived mesenchymal stem cells employed exosomes to attenuate AKI-CKD transition through tubular epithelial cell dependent Sox9 activation. *Oncotarget*, 2017, Vol. 8, (No. 41), pp: 70707-70726.



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**PENGARUH PEMBERIAN EKSOSOM HUC-MSC TERHADAP EKSPRESI mRNA TGF-Beta1, SNAIL,
Alpha-SMA DAN SEBARAN
MYOFIBROBLAST PADA GINJAL MODEL 5/6 SUBTOTAL NEPHRECTOMY**

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