

## DAFTAR PUSTAKA

- Adams, J. S., & Hewison, M. (2012). Extrarenal expression of the 25-hydroxyvitamin D-1-hydroxylase. *Archives of Biochemistry and Biophysics*, *523*(1), 95–102. <https://doi.org/10.1016/j.abb.2012.02.016>
- Al-Badr, W., & Martin, K. J. (2008). Vitamin D and kidney disease. *Clinical Journal of the American Society of Nephrology*, *3*(5), 1555–1560. <https://doi.org/10.2215/CJN.01150308>
- Almeida, Y. E., Fessel, M. R., do Carmo, L. S., Jorgetti, V., Farias-Silva, E., Pescatore, L. A., ... Liberman, M. (2020). Excessive cholecalciferol supplementation increases kidney dysfunction associated with intrarenal artery calcification in obese insulin-resistant mice. *Scientific Reports*, *10*(1), 1–12. <https://doi.org/10.1038/s41598-019-55501-3>
- Anderson, S., Chapman, J. G., Oyama, T. T., & Komers, R. (2010). Effect of orchietomy on renal function in control and diabetic rats with chronic inhibition of nitric oxide. *Clinical and Experimental Pharmacology and Physiology*, *37*(1), 19–23. <https://doi.org/10.1111/j.1440-1681.2009.05206.x>
- Bansal, N., Katz, R., De Boer, I. H., Kestenbaum, B., Siscovick, D. S., Hoofnagle, A. N., ... Ix, J. H. (2013). Influence of estrogen therapy on calcium, phosphorus, and other regulatory hormones in postmenopausal women: The MESA study. *Journal of Clinical Endocrinology and Metabolism*, *98*(12), 4890–4898. <https://doi.org/10.1210/jc.2013-2286>
- Bikle, D. D. (2014). Vitamin D metabolism, mechanism of action, and clinical applications. *Chemistry and Biology*, *21*(3), 319–329. <https://doi.org/10.1016/j.chembiol.2013.12.016>
- Blomberg Jensen, M., Nielsen, J. E., Jørgensen, A., Rajpert-De Meyts, E., Kristensen, D. M., Jørgensen, N., ... Leffers, H. (2010). Vitamin D receptor and vitamin D metabolizing enzymes are expressed in the

- human male reproductive tract. *Human Reproduction*, 25(5), 1303–1311. <https://doi.org/10.1093/humrep/deq024>
- Burt, M. G., Mangelsdorf, B. L., Stranks, S. N., & Mangoni, A. A. (2016). Relationship between vitamin D status and autonomic nervous system activity. *Nutrients*, 8(9), 1–10. <https://doi.org/10.3390/nu8090565>
- Canguven, O., Talib, R. A., El Ansari, W., Yassin, D. J., & Al Naimi, A. (2017). Vitamin D treatment improves levels of sexual hormones, metabolic parameters and erectile function in middle-aged vitamin D deficient men. *Aging Male*, 20(1), 9–16. <https://doi.org/10.1080/13685538.2016.1271783>
- Cheema, C., Grant, B. F., & Marcus, R. (1989). Effects of estrogen on circulating 'free' and total 1,25-dihydroxyvitamin D and on the parathyroid-vitamin D axis in postmenopausal women. *Journal of Clinical Investigation*, 83(2), 537–542. <https://doi.org/10.1172/JCI113915>
- Cheville, N. F. (2006). *Introduction to Veterinary Pathology*.
- Chew, D., DiBortola, S., & Schenck, P. (2010). *Canine and Feline Urology*. <https://doi.org/10.1016/C2009-0-53834-2>
- Christakos, S., Dhawan, P., Verstuyf, A., Verlinden, L., & Carmeliet, G. (2015). Vitamin D: Metabolism, molecular mechanism of action, and pleiotropic effects. *Physiological Reviews*, 96(1), 365–408. <https://doi.org/10.1152/physrev.00014.2015>
- de Boer, I. H. (2010). Vitamin D Deficiency. *Chronic Kidney Disease, Dialysis, and Transplantation*, 115–127. <https://doi.org/10.1016/B978-1-4377-0987-2.00009-1>
- De Toni, L., De Filippis, V., Tescari, S., Ferigo, M., Ferlin, A., Scattolini, V., ... Foresta, C. (2014). Uncarboxylated osteocalcin stimulates 25-hydroxy vitamin D production in Leydig cell line through a GPRC6a-dependent pathway. *Endocrinology*, 155(11), 4266–4274. <https://doi.org/10.1210/en.2014-1283>

- Dick, L. M., Prince, R. L., Kelly, J. J., & Ho, K. K. Y. (1995). Oestrogen effects on calcitriol levels in post-menopausal women: A comparison of oral versus transdermal administration. *Clinical Endocrinology*, *43*(2), 219–224. <https://doi.org/10.1111/j.1365-2265.1995.tb01918.x>
- Edelstein, C. L., Ling, H., & Schrier, R. W. (1997). The nature of renal cell injury. *Kidney International*, *51*(5), 1341–1351. <https://doi.org/10.1038/ki.1997.183>
- Elliot, S. J., Karl, M., Berho, M., Potier, M., Zheng, F., Leclercq, B., ... Striker, L. J. (2003). Estrogen deficiency accelerates progression of glomerulosclerosis in susceptible mice. *American Journal of Pathology*, *162*(5), 1441–1448. [https://doi.org/10.1016/S0002-9440\(10\)64277-0](https://doi.org/10.1016/S0002-9440(10)64277-0)
- Eroschenko, V. P. (2008). *Atlas Of Histology with Functional Correlations* (11th ed.). Lippincott Williams & Wilkins.
- Fesseha, H. (2019). Non-Surgical Sterilization Methods in Male Animals: A Review. *Veterinary Medicine – Open Journal*, *4*(2), 49–56. <https://doi.org/10.17140/vmoj-4-136>
- Foresta, C., Selice, R., De Toni, L., Di Mambro, A., Carraro, U., Plebani, M., & Garolla, A. (2013). Altered bone status in unilateral testicular cancer survivors: Role of CYP2R1 and its luteinizing hormone-dependency. *Journal of Endocrinological Investigation*, *36*(6), 379–384. <https://doi.org/10.3275/8650>
- Foresta, Carlo, Strapazzon, G., De Toni, L., Perilli, L., Di Mambro, A., Muciaccia, B., ... Selice, R. (2011). Bone mineral density and testicular failure: Evidence for a role of vitamin D 25-hydroxylase in human testis. *Journal of Clinical Endocrinology and Metabolism*, *96*(4), 646–652. <https://doi.org/10.1210/jc.2010-1628>
- Fortepiani, L. A., Yanes, L., Zhang, H., Racusen, L. C., & Reckelhoff, J. F. (2003). Role of Androgens in Mediating Renal Injury in Aging SHR. *Hypertension*, *42*(5), 952–955. <https://doi.org/10.1161/01.HYP.0000099241.53121.7F>
- Francis, R. M., Peacock, M., Aaron, J. E., Selby, P. L., Taylor, G. A.,

- Thompson, J., ... Horsman, A. (1986). Osteoporosis in hypogonadal men: Role of decreased plasma 1,25-dihydroxyvitamin D, calcium malabsorption, and low bone formation. *Bone*, 7(4), 261–268. [https://doi.org/10.1016/8756-3282\(86\)90205-X](https://doi.org/10.1016/8756-3282(86)90205-X)
- Gallagher, J. C., Riggs, B. L., & Deluca, H. F. (1980). Effect of estrogen on calcium absorption and serum vitamin D metabolites in postmenopausal osteoporosis. *Journal of Clinical Endocrinology and Metabolism*, 51(6), 6–1364. <https://doi.org/10.1210/jcem-51-6-1359>
- Gani, L. U., & How, C. H. (2015). Vitamin D deficiency. *Singapore Medical Journal*, 56(8), 433–437. <https://doi.org/10.11622/smedj.2015119>
- Garland, C. F., Gorham, E. D., Mohr, S. B., & Garland, F. C. (2009). Vitamin D for Cancer Prevention: Global Perspective. *Annals of Epidemiology*, 19(7), 468–483. <https://doi.org/10.1016/j.annepidem.2009.03.021>
- Gluhovschi, G., Gluhovschi, A., Anastasiu, D., Petrica, L., Gluhovschi, C., & Velciov, S. (2012). Chronic kidney disease and the involvement of estrogen hormones in its pathogenesis and progression. *Romanian Journal of Internal Medicine = Revue Roumaine de Médecine Interne*, 50(2), 135–144.
- Gois, P. H. F., Wolley, M., Ranganathan, D., & Seguro, A. C. (2018). Vitamin D deficiency in chronic kidney disease: Recent evidence and controversies. *International Journal of Environmental Research and Public Health*, 15(8), 1–16. <https://doi.org/10.3390/ijerph15081773>
- Gruber, B. M. (2015). The phenomenon of vitamin D. *Postępy Higieny i Medycyny Doświadczalnej (Online)*, 69, 127–139. <https://doi.org/10.5604/01.3001.0009.6485>
- Guo, Y., Sun, N., Duan, X., Xu, X., Zheng, L., Seriwatanachai, D., ... Yuan, Q. (2016). Estrogen deficiency leads to further bone loss in the mandible of CKD mice. *PLoS ONE*, 11(2), 1–11. <https://doi.org/10.1371/journal.pone.0148804>
- Hanley, D. A., & Davison, K. S. (2005). Symposium: Vitamin D Insufficiency: A Significant Risk Factor in Chronic Diseases and Potential Disease-

- Specific Biomarkers of Vitamin D Sufficiency Vitamin D Insufficiency in North America 1. *J. Nutr*, 135(February), 332–337.
- Hanwell, H. (2016). Vitamin D Fact Sheet. *MS Society of Canada*, 2, 1–8.
- Harmon, Q. E., Umbach, D. M., & Baird, D. D. (2016). Use of estrogen-containing contraception is associated with increased concentrations of 25-hydroxy Vitamin D. *Journal of Clinical Endocrinology and Metabolism*, 101(9), 3370–3377. <https://doi.org/10.1210/jc.2016-1658>
- Huang, H., Guo, J., Chen, Q., Chen, X., Yang, Y., Zhang, W., ... Yang, D. (2019). The synergistic effects of Vitamin D and estradiol deficiency on metabolic syndrome in Chinese postmenopausal women. *Menopause*, 26(10), 1171–1177. <https://doi.org/10.1097/GME.0000000000001370>
- Ibrahim, N. S., & Zaid, N. W. (2017). Dogs' hormonal levels drop after surgical gonadectomy in Iraq. *Advances in Animal and Veterinary Sciences*, 5(5), 208–212. <https://doi.org/10.17582/journal.aavs/2017/5.5.208.212>
- Inda Filho, A. J. os., & Melamed, M. L. eor. (2013). Vitamin D and kidney disease: what we know and what we do not know. *Jornal Brasileiro de Nefrologia : 'orgão Oficial de Sociedades Brasileira e Latino-Americana de Nefrologia*, 35(4), 323–331. <https://doi.org/10.5935/0101-2800.20130051>
- Jensen, M. B. (2014). Vitamin D and male reproduction. *Nature Reviews Endocrinology*, 10(3), 175–186. <https://doi.org/10.1038/nrendo.2013.262>
- Kelly, D. M., & Jones, T. H. (2013). Testosterone: A metabolic hormone in health and disease. *Journal of Endocrinology*, 217(3). <https://doi.org/10.1530/JOE-12-0455>
- Kim, C. S., & Kim, S. W. (2014). Vitamin D and chronic kidney disease. *Korean Journal of Internal Medicine*, 29(4), 416–427. <https://doi.org/10.3904/kjim.2014.29.4.416>
- Kummer, S., Jeruschke, S., van Wegerich, L., Peters, A., Lehmann, P.,

- Seibt, A., ... Oh, J. (2011). Estrogen receptor alpha expression in podocytes mediates protection against apoptosis in-vitro and in-vivo. *PLoS ONE*, 6(11), 1–10. <https://doi.org/10.1371/journal.pone.0027457>
- Levin, A., Bakris, G. L., Molitch, M., Smulders, M., Tian, J., Williams, L. A., & Andress, D. L. (2007). Prevalence of abnormal serum vitamin D, PTH, calcium, and phosphorus in patients with chronic kidney disease: Results of the study to evaluate early kidney disease. *Kidney International*, 71(1), 31–38. <https://doi.org/10.1038/sj.ki.5002009>
- Little, S. (2015). *August's Consultations in Feline Internal Medicine*.
- Mackovic, M., Zimolo, Z., Burckhardt, G., & Sabolic, I. (1986). Isolation of renal brush-border membrane vesicles by a low-speed centrifugation; effect of sex hormones on Na<sup>+</sup>-H<sup>+</sup> exchange in rat and mouse kidney. *862*, 141–152.
- Maddox, D. A., Fortin, S. M., Tartini, A., Barnes, W. D., & Gennari, F. J. (1992). Effect of acute changes in glomerular filtration rate on Na<sup>+</sup>/H<sup>+</sup> exchange in rat renal cortex. *Journal of Clinical Investigation*, 89(4), 1296–1303. <https://doi.org/10.1172/JCI115715>
- Matovinović, M. S. (2009). M. Sabljar Matovinović Pathophysiology and classification of kidney disease 1. PATHOPHYSIOLOGY AND CLASSIFICATION OF KIDNEY DISEASES. *Ejifcc*, 20(December 2004), 2–11. Retrieved from <http://www.ifcc.org>
- McDonnell, S. L., Baggerly, C., French, C. B., Baggerly, L. L., Garland, C. F., Gorham, E. D., ... Heaney, R. P. (2016). Serum 25-hydroxyvitamin d concentrations ≥40 ng/ml are associated with >65% lower cancer risk: Pooled analysis of randomized trial and prospective cohort study. *PLoS ONE*, 11(4), 1–15. <https://doi.org/10.1371/journal.pone.0152441>
- McGavin, M. D., Carlton, W., Zachary, J. F., & R G, T. (2001). *Thomson's Special Veterinary Pathology*. St. Louis.
- Messaurina, A. D., Triono, A., Baroto, R. P., Satria, C. D., & Sumadiono, S. (2020). Hubungan antara Kadar 25-OH D3 dengan Derajat Fungsi Ginjal pada Pasien Lupus Sistemik Eritematosus. *Sari Pediatri*, 21(4),

213. <https://doi.org/10.14238/sp21.4.2019.213-7>

Mizobuchi, M., Morrissey, J., Finch, J. L., Martin, D. R., Liapis, H., Akizawa, T., & Slatopolsky, E. (2007). Combination therapy with an angiotensin-converting enzyme inhibitor and a vitamin D analog suppresses the progression of renal insufficiency in uremic rats. *Journal of the American Society of Nephrology*, 18(6), 1796–1806. <https://doi.org/10.1681/ASN.2006091028>

Moldave, K., & Rhodes, L. (2013). *Contraception and Fertility Control in Dogs and Cats*. (February), 154. Retrieved from <http://www.accd.org/docs/default-source/Resource-Library-Docs/accd-e-book.pdf?sfvrsn=0>

Møller, U. K., Vid Streym, S., Jensen, L. T., Mosekilde, L., Schoenmakers, I., Nigdikar, S., & Rejnmark, L. (2013). Increased plasma concentrations of vitamin D metabolites and vitamin D binding protein in women using hormonal contraceptives: A cross-sectional study. *Nutrients*, 5(9), 3470–3480. <https://doi.org/10.3390/nu5093470>

Murray, I., & Paolini, M. A. (2020). *Histology, Kidney and Glomerulus*. Retrieved from <http://europepmc.org/books/NBK554544>

Nakagawa, K., Marji, J. S., Schwartzman, M. L., Waterman, M. R., & Capdevila, J. H. (2003). Androgen-mediated induction of the kidney arachidonate hydroxylases is associated with the development of hypertension. *American Journal of Physiology - Regulatory Integrative and Comparative Physiology*, 284(4 53-4), 1055–1062. <https://doi.org/10.1152/ajpregu.00459.2002>

Nelson, L. R., & Bulun, S. E. (2001). Estrogen production and action. *Journal of the American Academy of Dermatology*, 45(3), S116–S124. <https://doi.org/10.1067/mjd.2001.117432>

Nielsen, C. B., Flyvbjerg, A., Bruun, J. M., Forman, A., Wogensen, L., & Thomsen, K. (2003). Decreases in Renal Functional Reserve and Proximal Tubular Fluid Output in Conscious Oophorectomized Rats: Normalization with Sex Hormone Substitution. *Journal of the American*

- Society of Nephrology*, 14(12), 3102–3110.  
<https://doi.org/10.1097/01.ASN.0000096262.18679.25>
- Płudowski, P., Ducki, C., Konstantynowicz, J., & Jaworski, M. (2016). Vitamin D status in Poland. *Polskie Archiwum Medycyny Wewnętrznej*, 126(7–8), 530–539. <https://doi.org/10.20452/pamw.3479>
- Plumb, J. (2018). *Health Maintenance Of Cultured Fishes: Principal Microbial Disease*. <https://doi.org/10.1201/9781351073141>
- Portale, A. A., Perwad, F., & Miller, W. L. (2012). Rickets Due to Hereditary Abnormalities of Vitamin d Synthesis or Action. In *Pediatric Bone* (Second Edi). <https://doi.org/10.1016/B978-0-12-382040-2.10025-5>
- Potier, M., Karl, M., Zheng, F., Elliot, S. J., Striker, G. E., & Striker, L. J. (2002). Estrogen-related abnormalities in glomerulosclerosis-prone mice: Reduced mesangial cell estrogen receptor expression and prosclerotic response to estrogens. *American Journal of Pathology*, 160(5), 1877–1885. [https://doi.org/10.1016/S0002-9440\(10\)61134-0](https://doi.org/10.1016/S0002-9440(10)61134-0)
- Price, S. A., Wilson, L. M., & Hill, M. (1983). *Pathophysiology: Clinical Concepts of Disease Processes*. [https://doi.org/10.1016/s0001-2092\(07\)70020-0](https://doi.org/10.1016/s0001-2092(07)70020-0)
- Quan, A., Chakravarty, S., Chen, J. K., Chen, J. C., Loleh, S., Saini, N., ... Quigley, R. (2004). Androgens augment proximal tubule transport. *American Journal of Physiology - Renal Physiology*, 287(3 56-3), 452–459. <https://doi.org/10.1152/ajprenal.00188.2003>
- Ritterhouse, L. L., Lu, R., Shah, H. B., Robertson, J. M., Fife, D. A., Maecker, H. T., ... James, J. A. (2014). Vitamin D deficiency in a multiethnic healthy control cohort and altered immune response in vitamin D deficient European-American healthy controls. *PLoS ONE*, 9(4). <https://doi.org/10.1371/journal.pone.0094500>
- Root Kustritz, M. V. (2012). Effects of surgical sterilization on canine and feline health and on society. *Reproduction in Domestic Animals*, 47(SUPPL.4), 214–222. <https://doi.org/10.1111/j.1439-0531.2012.02078.x>



- Salim, M. N. (2014). STRUKTUR MIKROSKOPIK GINJAL DENGAN PEMBERIAN VITAMIN D3 PADA TIKUS OVAREKTOMI. *Jurnal Ilmiah Peternakan*, 2(1), 23–28.
- Sardjana, I. K. W. (2013). Pengendalian Populasi Kucing Liar di Rumah Sakit Umum Daerah Dr. Soetomo Surabaya Melalui Kastrasi dan Ovariohistektomi. *Vetmrdika-Junral Klinik Veteriner*, 1(2), 44–47. Retrieved from [https://ebookcentral.proquest.com/lib/\[SITE\\_ID\]/detail.action?docID=4000658%0Ahttps://www.jstor.org/stable/43696553%0Ahttp://www.tandfonline.com/doi/abs/10.1080/03075079.2013.873026%0Ahttp://www.eskom.co.za/CustomerCare/TariffsAndCharges/Documents/RSA](https://ebookcentral.proquest.com/lib/[SITE_ID]/detail.action?docID=4000658%0Ahttps://www.jstor.org/stable/43696553%0Ahttp://www.tandfonline.com/doi/abs/10.1080/03075079.2013.873026%0Ahttp://www.eskom.co.za/CustomerCare/TariffsAndCharges/Documents/RSA) Dis
- Sayed, S. G., Jouret, F., Vermeersch, M., Pérez-Morga, D., & Schurmans, S. (2017). The lipid 5-phosphatase SHIP2 controls renal brush border ultrastructure and function by regulating the activation of ERM proteins. *Kidney International*, 92(1), 125–139. <https://doi.org/10.1016/j.kint.2017.01.008>
- Seftel, A. (2011). Effect of vitamin D supplementation on testosterone levels in men: Editorial comment. *Journal of Urology*, 186(1), 239–240. <https://doi.org/10.1016/j.juro.2011.03.091>
- Sherwood, L. (2019). *Introduction to Human Physiology*.
- Shortliffe, L. M. D., Ye, Y., Behr, B., & Wang, B. (2014). Testosterone changes bladder and kidney structure in juvenile male rats. *Journal of Urology*, 191(6), 1913–1919. <https://doi.org/10.1016/j.juro.2014.01.012>
- Silbiger, S. R. (2011). Raging hormones: Gender and renal disease. *Kidney International*, 79(4), 382–384. <https://doi.org/10.1038/ki.2010.474>
- Silbiger, S. R., & Neugarten, J. (2003). The role of gender in the progression of renal disease. *Advances in Renal Replacement Therapy*, 10(1), 3–14. <https://doi.org/10.1053/jarr.2003.50001>
- Slee, A. D. (2012). Exploring metabolic dysfunction in chronic kidney disease. *Nutrition and Metabolism*, 9, 1–16. <https://doi.org/10.1186/1743-7075-9-36>

- Snell, R. S. (2007). *Clinical a Natomy*. Lippincott Williams & Wilkins.
- Somjen, D., Katzburg, S., Stern, N., Kohen, F., Sharon, O., Limor, R., ... Weisman, Y. (2007). 25 hydroxy-vitamin D<sub>3</sub>-1 $\alpha$  hydroxylase expression and activity in cultured human osteoblasts and their modulation by parathyroid hormone, estrogenic compounds and dihydrotestosterone. *Journal of Steroid Biochemistry and Molecular Biology*, 107(3–5), 238–244. <https://doi.org/10.1016/j.jsbmb.2007.03.048>
- Spasovski, D. (2016). Some Aspects of the Evaluation of Brush Border Enzymuria Originating from Proximal Renal Tubules as Screening Test in Patients with Psoriatic Arthritis. *Archives of Clinical Nephrology*, 2, 038–043. <https://doi.org/10.17352/acn.000013>
- Sudisman, I. G. N. (2021). OVARIOHYSTERECTOMY. “*The Truth Of Castration and OH Surgery, How Should It Be Done*, (52).
- Tiwari, P., & Sharma, N. (2017). Role of Vitamin D in Various Illnesses: A Review. *Journal of Pharmaceutical Care & Health Systems*, 04(03). <https://doi.org/10.4172/2376-0419.1000176>
- Tomiyoshi, Y., Sakemi, T., Aoki, S., & Miyazono, M. (2002). Different effects of castration and estrogen administration on glomerular injury in spontaneously hyperglycemic Otsuka Long-Evans Tokushima Fatty (OLETF) rats. *Nephron*, 92(4), 860–867. <https://doi.org/10.1159/000065442>
- Tremblay, A. M., Dufour, C. R., Ghahremani, M., Reudelhuber, T. L., & Giguère, V. (2010). Physiological genomics identifies estrogen-related receptor  $\alpha$  as a regulator of renal sodium and potassium homeostasis and the renin-angiotensin pathway. *Molecular Endocrinology*, 24(1), 22–32. <https://doi.org/10.1210/me.2009-0254>
- Urea-Torres, P., Metzger, M., Haymann, J. P., Karras, A., Boffa, J. J., Flamant, M., ... Stengel, B. (2011). Association of kidney function, vitamin D deficiency, and circulating markers of mineral and bone disorders in CKD. *American Journal of Kidney Diseases*, 58(4), 544–

553. <https://doi.org/10.1053/j.ajkd.2011.04.029>
- Velho, A. M., & Velho, R. M. (2013). Anatomy and physiology series: infrastructure of the kidney. *Journal of Renal Nursing*, 5(5), 228–231.
- Voss, M. R., Stallone, J. N., Li, M., Cornelussen, R. N. M., Knuefermann, P., & Knowlton, A. A. (2003). Gender differences in the expression of heat shock proteins: The effect of estrogen. *American Journal of Physiology - Heart and Circulatory Physiology*, 285(2 54-2), 687–692. <https://doi.org/10.1152/ajpheart.01000.2002>
- Wang, H., Naghavi, M., Allen, C., Barber, R. M., Carter, A., Casey, D. C., ... Zuhlke, L. J. (2016). Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980–2015: a systematic analysis for the Global Burden of Disease Study 2015. *The Lancet*, 388(10053), 1459–1544. [https://doi.org/10.1016/S0140-6736\(16\)31012-1](https://doi.org/10.1016/S0140-6736(16)31012-1)
- Wang, T. J., Zhang, F., Richards, J. B., Kestenbaum, B., Van Meurs, J. B., Berry, D., ... Spector, T. D. (2010). Common genetic determinants of vitamin D insufficiency: A genome-wide association study. *The Lancet*, 376(9736), 180–188. [https://doi.org/10.1016/S0140-6736\(10\)60588-0](https://doi.org/10.1016/S0140-6736(10)60588-0)
- Wilson, C. M., & McPhaul, M. J. (1996). A and B forms of the androgen receptor are expressed in a variety of human tissues. *Molecular and Cellular Endocrinology*, 120(1), 51–57. [https://doi.org/10.1016/0303-7207\(96\)03819-1](https://doi.org/10.1016/0303-7207(96)03819-1)
- Yanes, L. L., Sartori-Valinotti, J. C., & Reckelhoff, J. F. (2008). Sex steroids and renal disease: Lessons from animal studies. *Hypertension*, 51(4 PART 2 SUPPL.), 976–981. <https://doi.org/10.1161/HYPERTENSIONAHA.107.105767>
- Yuliana, Wiryanthini, I. A. D., Karmaya, N. M., & Widarsa, T. (2012). Penurunan Osteoclast Epifysis Tulang Radius Mencit Perimenopause dengan Pemberian Estrogen dan Berenang. *Jurnal Veteriner*, 13(4), 440–444.
- Yuniarti, W. M., Yudaniayanti, I. S., & Triakoso, N. (2006). *GAMBARAN*

*HISTOPATOLOGIK DAN MINERALISASI GINJAL TIKUS PUTIH (Rattus Norvegicus) PASCA OVARIOHISTEREKTOMI DENGAN SUPLEMEN KALSIUM KARBONAT DOSIS TINGGI.*

Zadka, K., Pałkowska-Goździk, E., & Rosołowska-Huszcz, D. (2018). The state of knowledge about nutrition sources of vitamin D, its role in the human body, and necessity of supplementation among parents in central Poland. *International Journal of Environmental Research and Public Health*, 15(7). <https://doi.org/10.3390/ijerph15071489>

Zhu, N., Wang, J., Gu, L., Wang, L., & Yuan, W. (2015). Vitamin D supplements in chronic kidney disease. *Renal Failure*, 37(6), 917–924. <https://doi.org/10.3109/0886022X.2015.1043920>

# LAMPIRAN

## HASIL UJI STATISTIK

### Karakteristik 24 Sampel

- **Sterilisasi**

#### Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Panjang tikus awal	20,033	12	,3025	,0873
	Panjang tikus akhir	23,650	12	,6722	,1940
Pair 2	Berat tikus awal	174,875	12	13,5682	3,9168
	Berat tikus akhir	231,792	12	8,9885	2,5948
Pair 3	IMT Awal	,435750	12	,0321917	,0092930
	IMT Akhir	,415117	12	,0254896	,0073582

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Panjang tikus awal - Panjang tikus akhir	-3,6167	,7408	,2139	-4,0873	-3,1460	-16,912	11	,000
Pair 2	Berat tikus awal - Berat tikus akhir	-56,9167	13,3992	3,8680	-65,4301	-48,4032	-14,715	11	,000
Pair 3	IMT Awal - IMT Akhir	,0206328	,0416136	,0120128	-,0058073	,0470728	1,718	11	,114

### Non-Sterilisasi

#### Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Panjang tikus awal	19,625	12	,4712	,1360
	Panjang tikus akhir	22,550	12	,6303	,1820
Pair 2	Berat tikus awal	176,458	12	13,5067	3,8990
	Berat tikus akhir	194,083	12	11,5243	3,3268
Pair 3	IMT Awal	,459227	12	,0466318	,0134614
	IMT Akhir	,383286	12	,0416197	,0120146

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Panjang tikus awal - Panjang tikus akhir	-2,9250	,5259	,1518	-3,2592	-2,5908	-19,266	11	,000
Pair 2	Berat tikus awal - Berat tikus akhir	-17,6250	18,7582	5,4150	-29,5434	-5,7066	-3,255	11	,008
Pair 3	IMT Awal - IMT Akhir	,0759409	,0594546	,0171631	,0381652	,1137165	4,425	11	,001

## Kadar Vitamin D Tikus Betina

### Uji Normalitas data

#### Tests of Normality

	Kelompok	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Kadar Vitamin D	Kasus	,267	6	,200*	,873	6	,238
	kontrol	,331	6	,039	,712	6	,008

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

### Mann-Whitney

#### Group Statistics

	Kelompok	N	Mean	Std. Deviation	Std. Error Mean
Kadar Vitamin D	Kasus	6	8,2300	2,00504	,81856
	kontrol	6	17,9700	15,13713	6,17971

#### Test Statistics<sup>a</sup>

	Kadar Vitamin D
Mann-Whitney U	5,000
Wilcoxon W	26,000
Z	-2,082
Asymp. Sig. (2-tailed)	,037
Exact Sig. [2*(1-tailed Sig.)]	,041 <sup>b</sup>

## Kadar Vitamin D Tikus Jantan Pada Kelompok Kasus Dan Kontrol

### 1. Uji Normalitas data

#### Tests of Normality

	Kelompok	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Kadar Vitamin D	Kasus	,302	6	,093	,889	6	,315
	kontrol	,329	6	,041	,836	6	,121

a. Lilliefors Significance Correction

### 2. Uji Independent t test

#### Group Statistics

	Kelompok	N	Mean	Std. Deviation	Std. Error Mean
Kadar Vitamin D	Kasus	6	9,5217	1,41816	,57896
	kontrol	6	10,1267	,98788	,40330

#### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Kadar Vitamin D	Equal variances assumed	,032	,862	-.857	10	,411	-.60500	,70558	2,17714	,96714
	Equal variances not assumed			-.857	8,928	,414	-.60500	,70558	2,20311	,99311



## kerusakan ginjal betina \* kelompok Crosstabulation

			kelompok		Total
			ovariohisterectomy	non sterilisasi	
kerusakan ginjal betina	normal	Count	2	5	7
		Expected Count	3,5	3,5	7,0
	tidak normal	Count	4	1	5
		Expected Count	2,5	2,5	5,0
Total		Count	6	6	12
		Expected Count	6,0	6,0	12,0

## Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3,086 <sup>a</sup>	1	,079		
Continuity Correction <sup>b</sup>	1,371	1	,242		
Likelihood Ratio	3,256	1	,071		
Fisher's Exact Test				,242	,121
Linear-by-Linear Association	2,829	1	,093		
N of Valid Cases	12				

a. 4 cells (100,0%) have expected count less than 5. The minimum expected count is 2,50.

b. Computed only for a 2x2 table

## kerusakan ginjal jantan \* kelompok Crosstabulation

			kelompok		Total
			orchiectomy	non sterilisasi	
kerusakan ginjal jantan	normal	Count	0	5	5
		Expected Count	2,5	2,5	5,0
	tidak normal	Count	6	1	7
		Expected Count	3,5	3,5	7,0
Total		Count	6	6	12
		Expected Count	6,0	6,0	12,0

## Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8,571 <sup>a</sup>	1	,003		
Continuity Correction <sup>b</sup>	5,486	1	,019		
Likelihood Ratio	10,894	1	,001		
Fisher's Exact Test				,015	,008
Linear-by-Linear Association	7,857	1	,005		
N of Valid Cases	12				

a. 4 cells (100,0%) have expected count less than 5. The minimum expected count is 2,50.

b. Computed only for a 2x2 table

## Tikus Betina (Pada Kelompok Sterilisasi Dengan Non-Sterilisasi)

- Ginjal Kiri

### Tests of Normality

	KELOMPOK	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
BERAT GINJAL	Kasus	,192	6	,200 <sup>*</sup>	,927	6	,555
BETINA	Kontrol	,202	6	,200 <sup>*</sup>	,906	6	,412

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

### Uji Independent sampel test

#### Group Statistics

	KELOMPOK	N	Mean	Std. Deviation	Std. Error Mean
BERAT GINJAL	Kasus	6	,9067	,18338	,07486
BETINA	Kontrol	6	,7500	,02683	,01095

#### Independent Samples Test

	Levene's Test for Equality of Variances	t-test for Equality of Means								
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
BERAT GINJAL	Equal variances assumed	8,351	,016	2,071	10	,065	,15667	,07566	-,01191	,32525
BETINA	Equal variances not assumed			2,071	5,214	,091	,15667	,07566	-,03545	,34878

- Ginjal Kanan

#### Tests of Normality

	KELOMPOK	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
BERAT	Kasus	,157	6	,200*	,987	6	,981
GINJAL	Kontrol	,279	6	,160	,904	6	,400
BETINA							

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

#### Group Statistics

	KELOMPOK	N	Mean	Std. Deviation	Std. Error Mean
BERAT GINJAL	Kasus	6	,8533	,13186	,05383
BETINA	Kontrol	6	,7367	,02422	,00989

#### Independent Samples Test

	Levene's Test for Equality of Variances	t-test for Equality of Means								
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
BERAT GINJAL BETINA	Equal variances assumed	4,907	,051	2,132	10	,059	,11667	,05473	-,00528	,23862
	Equal variances not assumed			2,132	5,337	,083	,11667	,05473	-,02139	,25473

## Tikus Jantan (Pada Kelompok Sterilisasi Dengan Non-Sterilisasi)

- Ginjal Kiri

### Tests of Normality

	KELOMPOK	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
BERAT GINJAL	Kasus	,193	6	,200 <sup>*</sup>	,980	6	,954
JANTAN	Kontrol	,187	6	,200 <sup>*</sup>	,963	6	,841

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

### Group Statistics

	KELOMPOK	N	Mean	Std. Deviation	Std. Error Mean
BERAT GINJAL	Kasus	6	,7300	,15060	,06148
JANTAN	Kontrol	6	,7950	,07176	,02930

### Independent Samples Test

	Levene's Test for Equality of Variances	t-test for Equality of Means								
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
BERAT GINJAL JANTAN	Equal variances assumed	1,389	,266	-,954	10	,362	-,06500	,06811	-,21675	,08675
	Equal variances not assumed			-,954	7,159	,371	-,06500	,06811	-,22532	,09532

- **Ginjal Kanan**

- a. Normalitas data

**Tests of Normality**

	KELOMPOK	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
BERAT	Kasus	,263	6	,200*	,915	6	,468
GINJAL	Kontrol	,309	6	,076	,811	6	,073
JANTAN							

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

- b. Uji Independent sampel t test









**Group Statistics**

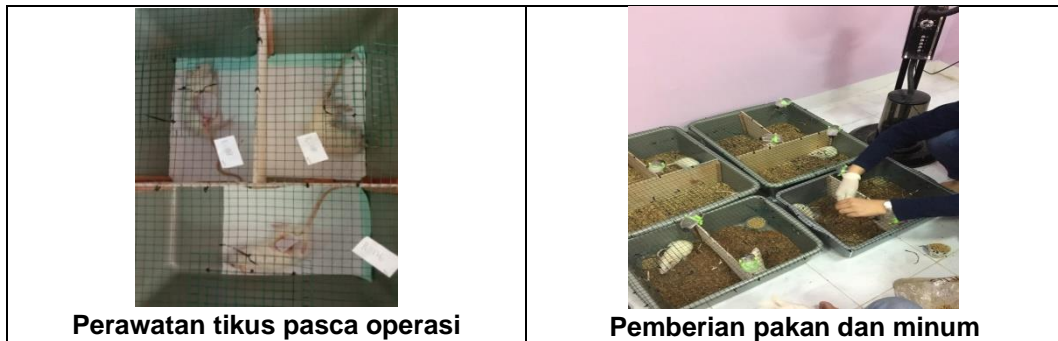
	KELOMPOK	N	Mean	Std. Deviation	Std. Error Mean
BERAT GINJAL	Kasus	6	,7617	,16030	,06544
JANTAN	Kontrol	6	,7833	,05391	,02201

**Independent Samples Test**

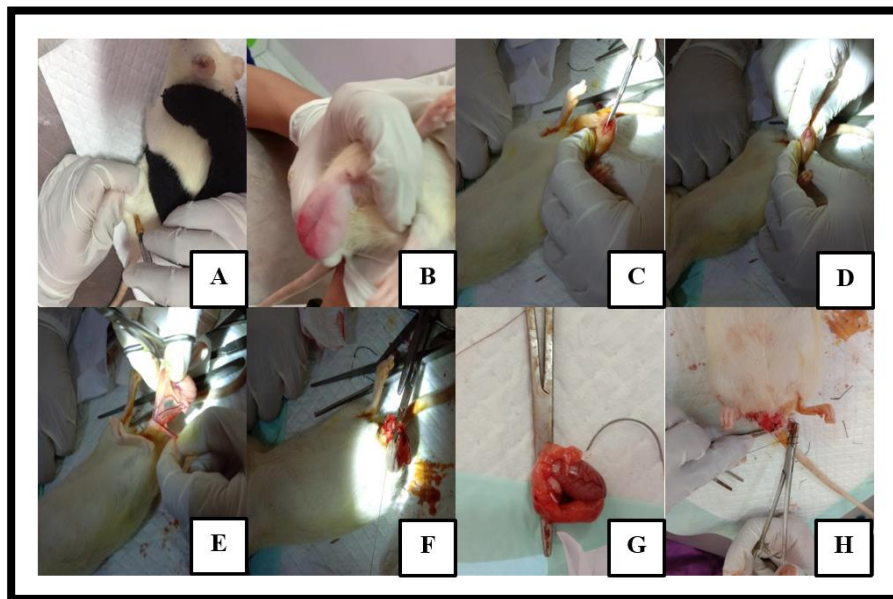
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
BERAT GINJAL	Equal variances assumed	2,088	,179	-,314	10	,760	-,02167	,06905	-,17551	,13218
JANTAN	Equal variances not assumed			-,314	6,117	,764	-,02167	,06905	-,18983	,14650

**DOKUMENTASI**

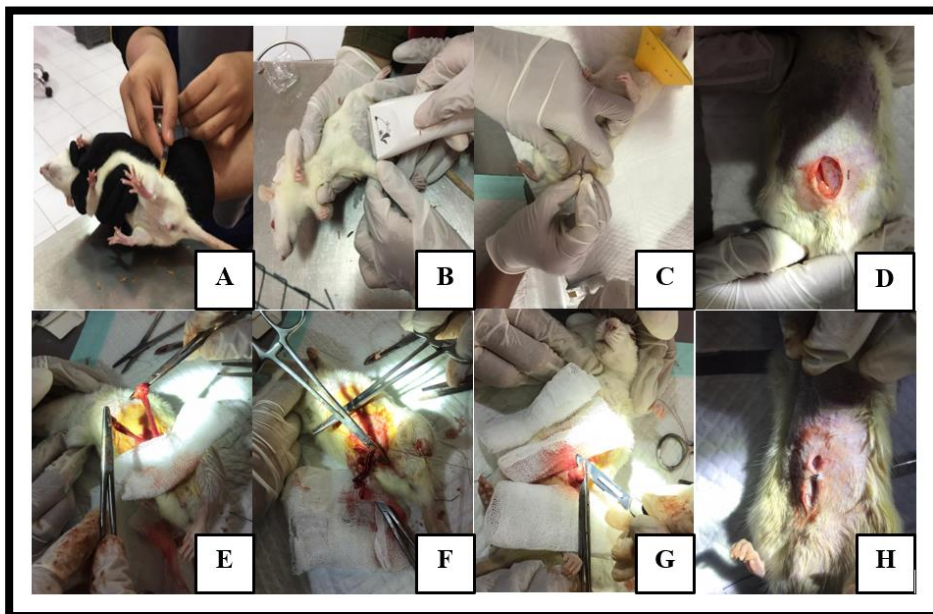
 <p><b>Persiapan kandang tikus</b></p>	 <p><b>Aklimatisasi tikus</b></p>
 <p><b>Persiapan alat dan bahan operasi</b></p>	 <p><b>Persiapan Ruang Operasi</b></p>
 <p><b>Injeksi Anestesi</b></p>	 <p><b>Pencukuran</b></p>
 <p><b>Bedah Ovariohisterectomy</b></p>	 <p><b>Bedah Orchiectomy</b></p>



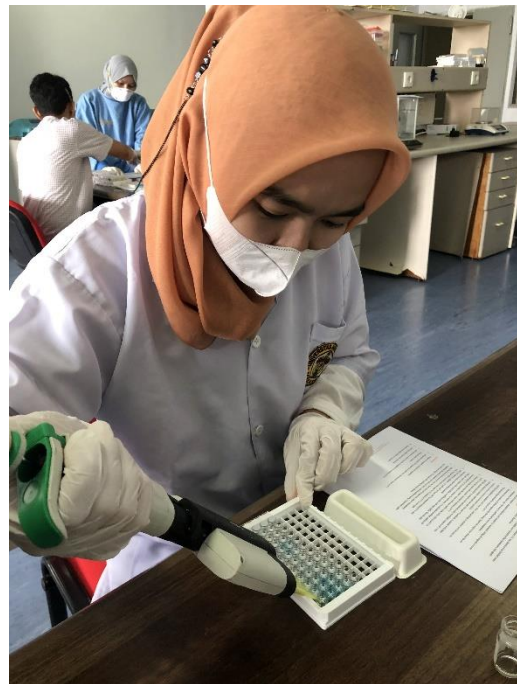
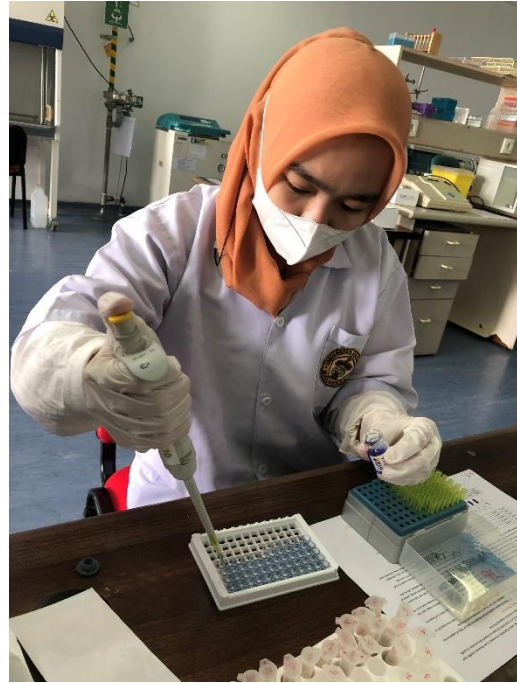
### Metode Orchiectomy



### Metode ovariectomy



## DOKUMENTASI





## PERSETUJUAN ETIK



KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN  
UNIVERSITAS HASANUDDIN FAKULTAS KEDOKTERAN  
KOMITE ETIK PENELITIAN KESEHATAN  
RSPTN UNIVERSITAS HASANUDDIN  
RSUP Dr. WAHIDIN SUDIROHUSODO MAKASSAR  
Sekretariat : Lantai 2 Gedung Laboratorium Terpadu  
JL.PERINTIS KEMERDEKAAN KAMPUS TAMALANREA KM.10 MAKASSAR 90245.



Contact Person: dr. Agussalim Bukhari.,M.Med,PhD, SpGK TELP. 081241850858, 0411 5780103, Fax : 0411-581431

### REKOMENDASI PERSETUJUAN ETIK

Nomor : 68/UN4.6.4.5.31/ PP36/ 2021

Tanggal: 9 Februari 2021

Dengan ini Menyatakan bahwa Protokol dan Dokumen yang Berhubungan Dengan Protokol berikut ini telah mendapatkan Persetujuan Etik :

No Protokol	UH21010005	No Sponsor	
Peneliti Utama	<b>Hamria Pratiwi,S.Pd</b>	Protokol	
Judul Peneliti	Pengaruh Orchiectomy Pada Tikus Jantan dan Ovariohisterectomy Pada Tikus Betina Terhadap Ginjal dan Kadar Vitamin D		
No Versi Protokol	<b>1</b>	Tanggal Versi	5 Januari 2021
No Versi PSP		Tanggal Versi	
Tempat Penelitian	<b>Klinik Hewan Pendidikan Universitas Hasanuddin Makassar</b>		
Jenis Review	<input type="checkbox"/> Exempted <input checked="" type="checkbox"/> Expedited <input type="checkbox"/> Fullboard Tanggal	Masa Berlaku	Frekuensi review lanjutan
Ketua Komisi Etik Penelitian Kesehatan FKUH	Nama <b>Prof.Dr.dr. Suryani As'ad, M.Sc.,Sp.GK (K)</b>	Tanda tangan	9 <b>Februari</b> 2021 sampai 9 <b>Februari</b> 2022
Sekretaris Komisi Etik Penelitian Kesehatan FKUH	Nama <b>dr. Agussalim Bukhari, M.Med.,Ph.D.,Sp.GK (K)</b>	Tanda tangan	

**Kewajiban Peneliti Utama:**

- Menyerahkan Amandemen Protokol untuk persetujuan sebelum di implementasikan
- Menyerahkan Laporan SAE ke Komisi Etik dalam 24 Jam dan dilengkapi dalam 7 hari dan Laporan SUSAR dalam 72 Jam setelah Peneliti Utama menerima laporan
- Menyerahkan Laporan Kemajuan (progress report) setiap 6 bulan untuk penelitian resiko tinggi dan setiap setahun untuk penelitian resiko rendah
- Menyerahkan laporan akhir setelah Penelitian berakhir
- Melaporkan penyimpangan dari protokol yang disetujui (protocol deviation / violation)
- Mematuhi semua peraturan yang ditentukan