

DAFTAR PUSTAKA

Alabadi, B., Civera, M., De la Rosa, A., Martinez-Hervas, S., Gomez-Cabrera, M.C. and Real, J.T. (2023) 'Low Muscle Mass Is Associated with Poorer Glycemic Control and Higher Oxidative Stress in Older Patients with Type 2 Diabetes', *Nutrients*, 15(14), p. 3167. Available at: <https://doi.org/10.3390/nu15143167>.

Amthor, Helge., Huang, Ruijin., McKinnell, Iain., Christ, B., Kambadur, R., Sharma, M. and Patel, K. (2002) 'The regulation and action of myostatin as a negative regulator of muscle development during avian embryogenesis', *National Library of Medicine*, 15;251(2), pp. 214–57.

Andreassen, C.S., J.J., & F.A. (2014) 'Muscle strength in type 2 diabetes', *Diabetes*, 63(3), pp. 1068–1069.

Aryana, I.S. (2021) *Sarkopenia Pada Lansia: Problem Diagnosis dan Tatalaksana*. Edited by K.V.Yuwana and I.M.J. Darmika. Bali: Penunduh Atma Waras.

Baig, M.H., Ahmad, K., Moon, J.S., Park, S.-Y., Ho Lim, J., Chun, H.J., Qadri, A.F., Hwang, Y.C., Jan, A.T., Ahmad, S.S., Ali, S., Shaikh, S., Lee, E.J. and Choi, I. (2022) 'Myostatin and its Regulation: A Comprehensive Review of Myostatin Inhibiting Strategies', *Frontiers in Physiology*, 13. Available at: <https://doi.org/10.3389/fphys.2022.876078>.

Biesemann, N., Wietelmann, A., Hermann, S., Schäfers, M., Kruger, M. and Braun, T. (2014) 'Myostatin regulates energy homeostasis in the heart and prevents heart failure', *Circulation research*, 115(2), pp. 263–310.

Bilous MD, Rudy and Donnelly MD, R. (2015) *Buku Pegangan DIABETES*. Ke Empat. Jakarta: Bumi Medika.

Bilous MD, R. and Donnelly MD, R. (2015) *Buku Pegangan Diabetes*. Edisi Ke Empat. Jakarta: Bumi Medika.

Bongarzone, S., Savickas, V., Luzi, F. and Gee, A.D. (2017) 'Targetting the Receptor for Advanced Glycation Endproducts (RAGE): A Medicinal Chemistry Perspective', *Journal of Medicinal Chemistry*. American Chemical Society, pp. 7213–7232. Available at: <https://doi.org/10.1021/acs.jmedchem.7b00058>.

Butcher, J.T., Ali, M.I., Ma, M.W., McCarthy, C.G., Islam, B.N., Fox, L.G., Mintz, J.D., Larion, S., Fulton, D.J. and Stepp, D.W. (2017) 'Effect of myostatin deletion on cardiac and microvascular function', *Physiological Reports*, 5(23). Available at: <https://doi.org/10.14814/phy2.13525>.

Camporez, J.P.G., Petersen, M.C., Abudukadier, A., Moreira, G. V., Jurczak, M.J., Friedman, G. and Shulman, G.I. (2016) 'Antimyostatin antibody increases muscle mass and strength and improves insulin sensitivity in old mice', *Proceedings of the National Academy of Sciences*, 113(8), pp. 2212–2217.

Ciarambino, T., Crispino, P., Leto, G., Mastrolorenzo, E., Para, O. and Giordano, M. (2022) 'Influence of Gender in Diabetes Mellitus and Its Complication', *International Journal of Molecular Sciences*. MDPI. Available at: <https://doi.org/10.3390/ijms23168850>.

Clegg, D.J. and Mauvais-Jarvis, F. (2018) 'An integrated view of sex differences in metabolic physiology and disease', *Molecular Metabolism*, 15, pp. 1–2. Available at: <https://doi.org/10.1016/j.molmet.2018.06.011>.

Coleman, S.K., Rebalka, I.A., D'Souza, D.M., Deodhare, N., Desjardins, E.M. and Hawke, T.J. (2016) 'Myostatin inhibition therapy for insulin-deficient type 1 diabetes', *Scientific reports*, 6(1), pp. 1–9.

Dhumale, S.S., Waghela, B.N. and Pathak, C. (2015) 'Quercetin protects necrotic insult and promotes apoptosis by attenuating the expression of RAGE and its ligand HMGB1 in human breast adenocarcinoma cells', *IUBMB Life*, 67(5), pp. 361–373. Available at: <https://doi.org/10.1002/iub.1379>.

Dial, A.G., Monaco, C.M.F., Grafham, G.K., Romanova, N., Simpson, J.A., Tarnopolsky, M.A., Perry, C.G.R., Kalaitzoglou, E. and Hawke, T.J. (2020) 'Muscle and serum myostatin expression in type 1 diabetes', *Physiological Reports*, 8(13). Available at: <https://doi.org/10.14814/phy2.14500>.

Dominique, J.E. and Gérard, C. (2006) 'Myostatin regulation of muscle development: molecular basis, natural mutations, physiopathological aspect', *Experimental cell research*, 312(13), pp. 2401–2414.

Dozio, E., Vettoretti, S., Lungarella, G., Messa, P. and Romanelli, M.M.C. (2021a) 'Sarcopenia in chronic kidney disease: Focus on advanced glycation end products as mediators and markers of oxidative stress', *Biomedicines*, 9(4). Available at: <https://doi.org/10.3390/biomedicines9040405>.

Dozio, E., Vettoretti, S., Lungarella, G., Messa, P. and Romanelli, M.M.C. (2021b) 'Sarcopenia in chronic kidney disease: Focus on advanced glycation end products as mediators and markers of oxidative stress', *Biomedicines*, 9(4). Available at: <https://doi.org/10.3390/biomedicines9040405>.

Du, H., Ma, Y., Wang, X., Zhang, Y., Zhu, L., Shi, S., Pan, S. and Liu, Z. (2023) 'Advanced glycation end products induce skeletal muscle atrophy and insulin resistance via activating ROS-mediated ER stress PERK/FOXO1 signaling', *American Journal of Physiology-Endocrinology and Metabolism*, 324(3), pp. E279–E287. Available at: <https://doi.org/10.1152/ajpendo.00218.2022>.

Durruty, P., Sanzana, M. and Sanhueza, L. (2019) 'Pathogenesis of Type 2 Diabetes Mellitus', in *Type 2 Diabetes [Working Title]*. IntechOpen. Available at: <https://doi.org/10.5772/intechopen.83692>.

Elashry, M.I., Otto, A., Matsakas, A., El-Morsy, S.E., Jones, L., Anderson, B. and Patel, K. (2011) 'Axon and muscle

spindle hyperplasia in the myostatin null mouse', *Journal of anatom*, 218(2), pp. 173–184.

Elliott B, Renshaw D, Getting S and Mackenzie R (2012) 'The central role of myostatin in skeletal muscle and whole body homeostasis.', *Acta Physiol (Oxf)*, 205(3), pp. 324–340.

Elsayed, N.A., Aleppo, G., Aroda, V.R., Bannuru, R.R., Brown, F.M., Bruemmer, D., Collins, B.S., Hilliard, M.E., Isaacs, D., Johnson, E.L., Kahan, S., Khunti, K., Kosiborod, M., Leon, J., Lyons, S.K., Murdock, L., Perry, M. Lou, Prahalad, P., Pratley, R.E., Seley, J.J., Stanton, R.C. and Gabbay, R.A. (2023) 'Classification and Diagnosis of Diabetes: Standards of Care in Diabetes—2023', *Diabetes Care*, 46, pp. S19–S40. Available at: <https://doi.org/10.2337/dc23-S002>.

Faramarz, I.B. (2012) 'Pathogenesis and glycemic management of type 2 diabetes Melitus', *physiological approach*. [Preprint].

Fatimah, R.N. (2018) *Diabetes Melitus Tipe 2, J MAJORITY* |.

Ferlita, S., Yegiazaryan, A., Noori, N., Lal, G., Nguyen, T., To, K. and Venketaraman, V. (2019) 'Type 2 Diabetes Mellitus and Altered Immune System Leading to Susceptibility to Pathogens, Especially Mycobacterium tuberculosis', *Journal of Clinical Medicine*, 8(12), p. 2219. Available at: <https://doi.org/10.3390/jcm8122219>.

Fishman, S.L., Sonmez, H., Basman, C., Singh, V. and Poretsky, L. (2018a) 'The role of advanced glycation end-products in the development of coronary artery disease in patients with and without diabetes mellitus: A review', *Molecular Medicine*. BioMed Central Ltd. Available at: <https://doi.org/10.1186/s10020-018-0060-3>.

Fishman, S.L., Sonmez, H., Basman, C., Singh, V. and Poretsky, L. (2018b) 'The role of advanced glycation end-products in the development of coronary artery disease in patients with and without diabetes mellitus: A review',

Molecular Medicine. BioMed Central Ltd. Available at: <https://doi.org/10.1186/s10020-018-0060-3>.

Genuth, S., Sun, W., Cleary, P., Gao, X., Sell, D.R., Lachin, J. and Monnier, V.M. (2015) 'Skin advanced glycation end products glucosepane and methylglyoxal hydroimidazolone are independently associated with long-Term microvascular complication progression of type 1 diabetes', *Diabetes*, 64(1), pp. 266–278. Available at: <https://doi.org/10.2337/db14-0215>.

Goldin, A., Beckman, J.A., Schmidt, A.M. and Creager, M.A. (2006) 'Advanced Glycation End Products Sparking the Development of Diabetic Vascular Injury', *Circulation*, 114(6).

Hamrick, M.W., Samaddar, T., Pennington, C. and McCormick, J. (2006) 'Increased muscle mass with myostatin deficiency improves gains in bone strength with exercise.', *Journal of bone and mineral research*, 21(3), pp. 477–483.

Hayashi, Y., Mikawa, S., Ogawa, C., Masumoto, K., Katou, F. and Sato, K. (2018) 'Myostatin expression in the adult rat central nervous system', *Journal of chemical neuroanatomy*, 94, pp. 125–134.

IDF (2021) *Diabetes Atlas*, International Diabetes Federation.

Illingworth, RS., Gruenewald-Schneider U., Webb, S., Kerr, ARW., James, KD., Turner, DJ., Harrison, DJ., Smith, C., Andrews, R. and Bird, A. (2010) 'Orphan cpg island identify numerous conserved promoters in the mammalian genome', *PLoS Genet*, 6(9), pp. 1–15.

Irwan (2016) *Epidemiologi Penyakit Tidak Menular*. Yogyakarta: deepublish publisher.

Jones, M.R., Villalon, E., Northcutt, A.J., Calcutt, N.A. and Garcia, M.I. (2010) 'Differential effects of myostatin deficiency on motor and sensory axons', *Muscle & nerve*, 56(6), pp. E100–E107.

Jurkutė, E., Radzevičienė, L., Verkauskienė, R., Kardonaitė, D. and Danelienė, M. (2023) 'Advanced glycation end products association in patients with diabetes mellitus', *Endocrine*

Abstracts [Preprint]. Available at:
<https://doi.org/10.1530/endoabs.90.EP258>.

Kang, M.J., Moon, J.W., Lee, J.O., Kim, J.H., Jung, E.J., Kim, S.J., Oh, J.Y., Wu, S.W., Lee, P.R., Park, S.H. and Kim, H.S. (2022) 'Metformin induces muscle atrophy by transcriptional regulation of myostatin via HDAC6 and FoxO3a', *Journal of Cachexia, Sarcopenia and Muscle*, 13(1), pp. 605–620. Available at: <https://doi.org/10.1002/jcsm.12833>.

Khasanah, H., Khaerunnisa, I. and Widianingrum, D.C. (2022) *Aplikasi Myostatin di Bidang Bioteknologi Hewan*. 1st edn. Malang: Inara Publisher.

Kocsis, T., Trencsenyi, G., Szabo, K., Baan, J.A., Muller, G., Mendler, L. and Keller-Pinter, A. (2017) 'Myostatin propeptide mutation of the hypermuscular Compact mice decreases the formation of myostatin and improves insulin sensitivity', *American Journal of Physiology-Endocrinology and Metabolism*, 312(3), pp. E150–E160.

Kurniawan, L.B. (2024) 'HbA1c As Diabetes Mellitus Biomarker and Its Methods Evolution', *Indonesian Journal Of Clinical Pathology and Medical Laboratory*, 30(2), pp. 191–196.

Lee, S.-J. (2023) 'Myostatin: A Skeletal Muscle Chalone', *Annual Review of Physiology*, 85(1), pp. 269–291. Available at: <https://doi.org/10.1146/annurev-physiol-012422-112116>.

Lee, S.-J. and McPherron, A.C. (2001) *Regulation of myostatin activity and muscle growth*. Available at: www.pnas.org/cgi/doi/10.1073/pnas.151270098.

León, J., Garzón, J., Rojas, W., Marquez, A. and Angulo, O. (2020) *Body Composition Distribution in Type 2 Diabetic Patients at The Hospital De San José*.

Li, J., Li, J., Shangguan, H., Chen, X., Ye, X., Ye, X., Zhong, B., Chen, P., Wang, Y., Xin, B., Bi, Y., Bi, Y., Zhu, D. and Zhu, D. (2020) 'Advanced glycation end product levels were correlated with inflammation and carotid atherosclerosis in

type 2 diabetes patients', *Open Life Sciences*, 15(1), pp. 364–372. Available at: <https://doi.org/10.1515/biol-2020-0042>.

Lim, M., Park, L., Shin, G., Hong, H., Kang, I. and Park, Y. (2008) 'Induction of apoptosis of Beta cells of the pancreas by advanced glycation end-products, important mediators of chronic complications of diabetes mellitus', *National Library Of Medicine* [Preprint].

Lim MD, S., McMahon, C.D., Matthews Kenneth G., Devlin MD, G.P. and Conaglen MD, J. V. (2018) 'Absence of Myostatin Improves Cardiac Function Following Myocardial Infarction', *Heart, Lung and Circulation*, 27(6), pp. 693–701.

Lin, C.L., Yu, N.C., Wu, H.C., Lee, Y.Y., Lin, W.C., Chiu, I.Y., Chien, W.C. and Liu, Y.C. (2021) 'Association of body composition with type 2 diabetes: A retrospective chart review study', *International Journal of Environmental Research and Public Health*, 18(9). Available at: <https://doi.org/10.3390/ijerph18094421>.

Liu, D., Zhong, J., Ruan, Y., Zhang, Z., Sun, J. and Chen, H. (2021) 'The association between fat-to-muscle ratio and metabolic disorders in type 2 diabetes', *Diabetology & Metabolic Syndrome*, 13(1), p. 129. Available at: <https://doi.org/10.1186/s13098-021-00748-y>.

Liu, X.-H., Bauman, W.A. and Cardozo, C.P. (2018) 'Myostatin inhibits glucose uptake via suppression of insulin-dependent and -independent signaling pathways in myoblasts', *Physiological Reports*, 6(17), p. e13837. Available at: <https://doi.org/10.14814/phy2.13837>.

MyBioSource (2021a) *Instruction manual Elisa Kit For Human Advanced Glycation End Products (AGEs)*. Kit Catalog Number : MBS267540.

MyBioSource (2021b) *Instruction manual Elisa Kit For Human MSTN (Myostatin)*. Catalog Number : MBS2700528.

Nurjannah, M. and Asthiningsih, N.W.W. (2023) *Hipoglikemia Pada Penderita Diabetes Mellitus Tipe 2*. Pertama. Porwokerto: Pena Persada.

O'Bryan, S.J. and Hiam, D. (2022) 'The benefits of physical activity on neuromuscular structure and function in old age', *The Journal of Physiology*, 600(10), pp. 2283–2285. Available at: <https://doi.org/10.1113/JP283102>.

Omura, T. and Araki, A. (2022) 'Skeletal muscle as a treatment target for older adults with diabetes mellitus: The importance of a multimodal intervention based on functional category', *Geriatrics & Gerontology International*, 22(2), pp. 110–120. Available at: <https://doi.org/10.1111/ggi.14339>.

Passarelli, M. and Machado, U.F. (2021) 'AGEs-Induced and Endoplasmic Reticulum Stress/Inflammation-Mediated Regulation of GLUT4 Expression and Atherogenesis in Diabetes Mellitus', *Cells*, 11(1), p. 104. Available at: <https://doi.org/10.3390/cells11010104>.

Passarelli, M. and Machado, U.F. (2022) 'Ages-induced and endoplasmic reticulum stress/inflammation-mediated regulation of glut4 expression and atherogenesis in diabetes mellitus', *Cells*, 11(1). Available at: <https://doi.org/10.3390/cells11010104>.

PERKENI (2021) *Pedoman Pengelolaan dan Pencegahan Diabetes Mellitus Tipe 2 Dewasa di Indonesia*. Jakarta: PB PERKENI.

Powers, A. (2005) 'Diabetes Melitus in Harrison's Principles of Internal Medicine', 2 *MCGraw-H*, pp. 2152–63.

Quinlan, J.I., Dhaliwal, A., Williams, F.R., Allen, S.L., Choudhary, S., Rowlands, A., Breen, L., Lavery, G.G., Lord, J.M., Elsharkawy, A.M., Armstrong, M.J. and Greig, C.A. (2023) 'Impaired lower limb muscle mass, quality and function in end stage liver disease: A cross-sectional study',

Experimental Physiology, 108(8), pp. 1066–1079. Available at: <https://doi.org/10.1113/EP091157>.

Rabbani, N. and Thornalley, P.J. (2018) 'Advanced glycation end products in the pathogenesis of chronic kidney disease', *Kidney International*. Elsevier B.V., pp. 803–813. Available at: <https://doi.org/10.1016/j.kint.2017.11.034>.

Reddy, V.P., Aryal, P. and Darkwah, E.K. (2022) 'Advanced Glycation End Products in Health and Disease', *Microorganisms*, 10(9), p. 1848. Available at: <https://doi.org/10.3390/microorganisms10091848>.

de Ritter, R., Sep, S.J.S., van Greevenbroek, M.M.J., Kusters, Y.H.A.M., Vos, R.C., Bots, M.L., Kooi, M.E., Dagnelie, P.C., Eussen, S.J.P.M., Schram, M.T., Koster, A., Brouwers, M.C.G., van der Sangen, N.M.R., Peters, S.A.E., van der Kallen, C.J.H. and Stehouwer, C.D.A. (2023) 'Sex differences in body composition in people with prediabetes and type 2 diabetes as compared with people with normal glucose metabolism: the Maastricht Study', *Diabetologia*, 66(5), pp. 861–872. Available at: <https://doi.org/10.1007/s00125-023-05880-0>.

Rodriguez, J., Vernus, B., Chelh, I., Cassar-Malek, I., Gabillard, J.C., Sassi, A.H. and Bonnieu, A. (2014) 'Myostatin and the skeletal muscle atrophy and hypertrophy signaling pathways.', *Cellular and Molecular Life Sciences*, 71(22), pp. 4361–4371.

Rondeau, P. and Bourdon, E. (2011) 'The glycation of albumin: Structural and functional impacts', *Biochimie*, 93(4), pp. 645–658.

Rungratanawanich, W., Qu, Y., Wang, X., Essa, M.M. and Song, B.J. (2021) 'Advanced glycation end products (AGEs) and other adducts in aging-related diseases and alcohol-mediated tissue injury', *Experimental and Molecular Medicine*. Springer Nature, pp. 168–188. Available at: <https://doi.org/10.1038/s12276-021-00561-7>.

Saini, V.M., Liu, K.R., Surve, A.S., Gupta, S. and Gupta, A. (2022a) 'MicroRNAs as biomarkers for monitoring

cardiovascular changes in Type II Diabetes Mellitus (T2DM) and exercise', *Journal of Diabetes and Metabolic Disorders*. Springer Science and Business Media Deutschland GmbH, pp. 1819–1832. Available at: <https://doi.org/10.1007/s40200-022-01066-4>.

Saini, V.M., Liu, K.R., Surve, A.S., Gupta, S. and Gupta, A. (2022b) 'MicroRNAs as biomarkers for monitoring cardiovascular changes in Type II Diabetes Mellitus (T2DM) and exercise', *Journal of Diabetes and Metabolic Disorders*. Springer Science and Business Media Deutschland GmbH, pp. 1819–1832. Available at: <https://doi.org/10.1007/s40200-022-01066-4>.

Schorr, M., Dichtel, L.E., Gerweck, A. V., Valera, R.D., Torriani, M., Miller, K.K. and Bredella, M.A. (2018) 'Sex differences in body composition and association with cardiometabolic risk', *Biology of Sex Differences*, 9(1). Available at: <https://doi.org/10.1186/s13293-018-0189-3>.

Schwartz, S.S., Epstein, S., Corkey, B.E., Grant, S.F.A., Gavin III, J.R. and Aguilar, R.B. (2016) 'The time is right for a new classification system for diabetes: rationale and implications of the β -cell–centric classification schema', *Diabetes Care*, 39(2), pp. 179–186.

Sergi, D., Boulestin, H., Campbell, F.M. and Williams, L.M. (2021) 'The Role of Dietary Advanced Glycation End Products in Metabolic Dysfunction', *Molecular Nutrition and Food Research*. Wiley-VCH Verlag. Available at: <https://doi.org/10.1002/mnfr.201900934>.

Sharma, A., Weber, D., Raupbach, J., Dakal, T.C., Fließbach, K., Ramirez, A., Grune, T. and Wüllner, U. (2020) 'Advanced glycation end products and protein carbonyl levels in plasma reveal sex-specific differences in Parkinson's and Alzheimer's disease', *Redox Biology*, 34. Available at: <https://doi.org/10.1016/j.redox.2020.101546>.

Sharma, M., McFarlane, C., Kambadur, R., Kukreti, H., Bonala, S. and Srinivasan, S. (2015) 'Myostatin: expanding horizons', *IUBMB life*, 67(8), pp. 589–600.

Srikanth, V., Maczurek, A., Phan, T., Steele, M., Westcott, B., Juskiw, D. and Muench, G. (2011) 'Advanced glycation endproducts and their receptor RAGE in Alzheimer's disease', *Neurobiology of Aging*, 32(5), pp. 763–777.

Su, S., Chien, M., Lin, C., Chen, M. and Yang, S. (2015) 'RAGE gene polymorphism and environmental factor in the risk of oral cancer', *Journal of Dental Research*, 94(3), pp. 403–411. Available at: <https://doi.org/10.1177/0022034514566215>.

Suh, J., Kim, N.K., Lee, S.H., Eom, J.H., Lee, Y., Park, J.C. and Lee, Y.S. (2020) 'GDF11 promotes osteogenesis as opposed to MSTN, and follistatin, a MSTN/GDF11 inhibitor, increases muscle mass but weakens bone', *Proceedings of the National Academy of Sciences*, 117(9), pp. 4910–4920.

Suryawan, A., Frank, J.W., Nguyen, H. V. and Davis, T.A. (2006) 'Expression of the TGF- β family of ligands is developmentally regulated in skeletal muscle of neonatal rats.', *Pediatric research*, 59(2), pp. 175–179.

Takao, N., Kurose, S., Miyauchi, T., Onishi, K., Tamanoi, A., Tsuyuguchi, R., Fujii, A., Yoshiuchi, S., Takahashi, K., Tsutsumi, H. and Kimura, Y. (2021) 'The relationship between changes in serum myostatin and adiponectin levels in patients with obesity undergoing a weight loss program', *BMC Endocrine Disorders*, 21(1). Available at: <https://doi.org/10.1186/s12902-021-00808-4>.

Tan, Z., Zhao, M., Li, J., Li, S., Zhu, S., Yao, X., Gao, X. and Yang, S. (2022) 'Myostatin is involved in skeletal muscle dysfunction in chronic obstructive pulmonary disease via Drp-1 mediated abnormal mitochondrial division', *Annals of Translational Medicine*, 10(4), pp. 162–162. Available at: <https://doi.org/10.21037/atm-22-377>.

Tanto, C. and Hustrini, N.M. (2014) *Kapita Selektta Kedokteran*. Edisi IV. Jakarta: Media Aesculapius.

Terada, T., Reed, J.L., Vidal-Almela, S., Mistura, M., Kamiya, K. and Way, K.L. (2022) 'Sex-specific associations of fat mass and muscle mass with cardiovascular disease risk factors in adults with type 2 diabetes living with overweight and obesity: secondary analysis of the Look AHEAD trial', *Cardiovascular Diabetology*, 21(1). Available at: <https://doi.org/10.1186/s12933-022-01468-x>.

Thomas M, L.B., Berry, C., Sharma, M., Kirk, S., Bass, J. and Kambadur, R. (2000) 'Myostatin. a negative regulator of muscle growth. functions by inhibiting myoblast proliferation', *Bio Chem*, 275(51), pp. 40235–40243.

Twarda-clapa, A., Olczak, A., Białkowska, A.M. and Koziolkiewicz, M. (2022) 'Advanced Glycation End-Products (AGEs): Formation, Chemistry, Classification, Receptors, and Diseases Related to AGEs', *Cells*. MDPI. Available at: <https://doi.org/10.3390/cells11081312>.

Uribarri, J., Cai, W., Ramdas, M., Goodman, S., Pyzik, R., Xue, C., Li, Z., Striker, G.E. and Vlassara, H. (2011) 'Restriction of advanced glycation end products improves insulin resistance in human type 2 diabetes: Potential role of AGER1 and SIRT1', *Diabetes Care*, 34(7), pp. 1610–1616. Available at: <https://doi.org/10.2337/dc11-0091>.

Walpurgis, K., Agricola, J., Thomas, A. and Thevis, M. (2023) 'Myostatin inhibitory peptides in sports drug testing', *Drug Testing and Analysis*, 15(11–12), pp. 1477–1487. Available at: <https://doi.org/10.1002/dta.3473>.

Wautier, M.P., Guillausseau, P.J. and Jean Luc T, W. (2017) 'Activation of the receptor for advanced glycation end products and consequences on health', *Diabetes Metab Syndrom*, 11(4), pp. 305–309.

Wu, T.H., Tsai, S.C., Lin, H.W., Chen, C.N. and Hwu, C.M. (2022) 'Increased serum levels of advanced glycation end products are negatively associated with relative muscle strength in patients with type 2 diabetes mellitus', *BMC*

Endocrine Disorders, 22(1). Available at: <https://doi.org/10.1186/s12902-022-01035-1>.

Yacoub, R., Nugent, M., Cai, W., Nadkarni, G.N., Chaves, L.D., Abyad, S., Honan, A.M., Thomas, S.A., Zheng, W., Valiyaparambil, S.A., Bryniarski, M.A., Sun, Y., Buck, M., Genco, R.J., Quigg, R.J., He, J.C. and Uribarri, J. (2017) 'Advanced glycation end products dietary restriction effects on bacterial gut microbiota in peritoneal dialysis patients; A randomized open label controlled trial', *PLoS ONE*, 12(9). Available at: <https://doi.org/10.1371/journal.pone.0184789>.

Yang, M., Liu, C., Jiang, N., Liu, Y., Luo, S., Li, C., Zhao, H., Han, Y., Chen, W., Li, L., Xiao, L. and Sun, L. (2023) 'Myostatin: a potential therapeutic target for metabolic syndrome', *Frontiers in Endocrinology*, 14. Available at: <https://doi.org/10.3389/fendo.2023.1181913>.

Yang, P., Feng, J., Peng, Q., Liu, X., Fan, Z. and Luca, M. (2019) 'Advanced Glycation End Products: Potential Mechanism and Therapeutic Target in Cardiovascular Complications under Diabetes', *Oxidative Medicine and Cellular Longevity*. Hindawi Limited. Available at: <https://doi.org/10.1155/2019/9570616>.

Zgutka, K., Tkacz, M., Tomasiak, P. and Tarnowski, M. (2023) 'A Role for Advanced Glycation End Products in Molecular Ageing', *International Journal of Molecular Sciences*, 24(12), p. 9881. Available at: <https://doi.org/10.3390/ijms24129881>.

Zhu, S.Y., Zhuang, J.S., Wu, Q., Liu, Z.Y., Liao, C.R., Luo, S.G., Chen, J.T. and Zhong, Z.M. (2018) 'Advanced oxidation protein products induce pre-osteoblast apoptosis through a nicotinamide adenine dinucleotide phosphate oxidase-dependent, mitogen-activated protein kinases-mediated intrinsic apoptosis pathway', *Aging Cell*, 17(4). Available at: <https://doi.org/10.1111/acer.12764>.

Żuchnik, M., Rybkowska, A., Szczuraszek, P., Szczuraszek, H., Bętkowska, P., Radulski, J., Tomkiewicz, M., Paluch, M.,

Licak, G. and Olko, P. (2023) 'Type 2 diabetes - factors of occurrence and its complications', *Quality in Sport*, 10(1), pp. 32–40. Available at: <https://doi.org/10.12775/QS.2023.10.01.003>.

LAMPIRAN

Lampiran 1. *Ethical Clearance*



KEMENTERIAN PENDIDIKAN, KEBUDAYAAN, RISET DAN TEKNOLOGI
UNIVERSITAS HASANUDDIN FAKULTAS KEDOKTERAN
KOMITE ETIK PENELITIAN UNIVERSITAS HASANUDDIN
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. Agusalim Bukhari, MMed, PhD, SpGK. TELP. 081241850858, 0411 5780103, Fax : 0411-581431

REKOMENDASI PERSETUJUAN ETIK

Nomor : 946/UN4.6.4.5.31/ PP36/ 2023

Tanggal: 13 Desember 2023

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

No Protokol	UH23110830	No Sponsor	
Peneliti Utama	Nurma Andi Malli	Sponsor	
Judul Peneliti	Hubungan Advanced End Glicated (AGEs) dan Myostatin Serum Pada Subjek Diabetes Melitus Tipe 2		
No Versi Protokol	2	Tanggal Versi	12 Desember 2023
No Versi PSP	2	Tanggal Versi	12 Desember 2023
Tempat Penelitian	RS Universitas Hasanuddin (HUM-RC) dan RS Wahidin Sudirohusodo Makassar		
Jenis Review	<input type="checkbox"/> Exempted <input checked="" type="checkbox"/> Expedited <input type="checkbox"/> Fullboard Tanggal	Masa Berlaku 13 Desember 2023 sampai 13 Desember 2024	Frekuensi review lanjutan
Ketua KEP Universitas Hasanuddin	Nama Prof. dr. Muh Nasrum Massi, PhD, SpMK, Subsp. Bakt(K)	Tanda tangan	
Sekretaris KEP Universitas Hasanuddin	Nama dr. Firdaus Hamid, PhD, SpMK(K)	Tanda tangan	

Kewajiban Peneliti Utama:

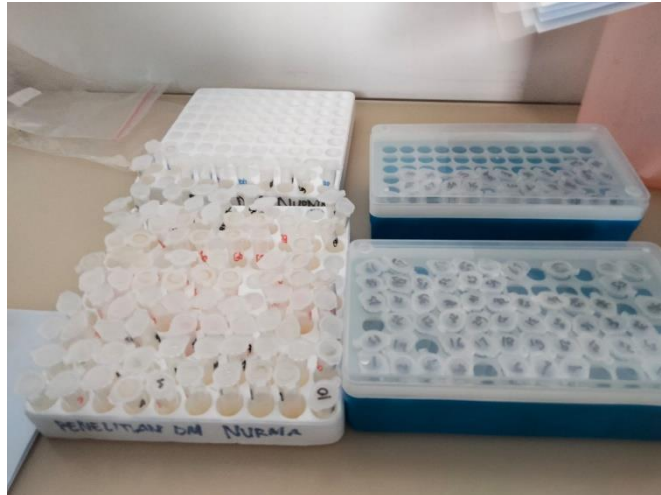
- Menyerahkan Amandemen Protokol untuk persetujuan sebelum di implementasikan
- Menyerahkan Laporan SAE ke Komisi Etik dalam 24 Jam dan dilengkapi dalam 7 hari dan Laporan SUSAR dalam 72 Jam setelah Peneliti Utama menerima laporan
- Menyerahkan Laporan Kemajuan (progress report) setiap 6 bulan untuk 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

Lampiran 2. Data Dasar Penelitian

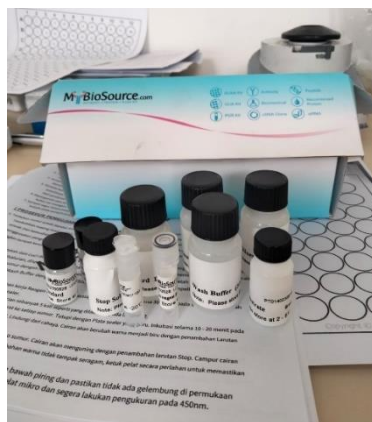
No	No. Sampel	Umur (Tahun)	JK	HbA1c (%)	GDP (mg/dL)	AGEs (ng/mL)	Myostatin (ng/mL)
1	2	41	L	12.3	182	30,78	5,73
2	4	50	L	9.7	237	23,96	7,00
3	10	62	L	8.6	119	25,45	6,39
4	13	68	L	12.9	104	14,78	9,45
5	26	56	L	6.7	103	32,43	18,06
6	41	66	L	6.8	102	20,66	14,46
7	46	54	L	6.8	105	25,00	8,75
8	58	55	L	9.7	164	22,96	7,41
9	65	39	L	7.5	107	18,05	10,29
10	67	57	L	9.6	123	27,08	11,89
11	76	56	L	7.9	160	17,84	12,14
12	87	57	L	9.1	236	18,82	11,56
13	94	50	L	9.0	286	29,50	14,18
14	101	46	L	8.2	224	23,93	7,44
15	105	57	L	10.7	159	28,56	24,34
16	108	37	L	13.6	291	22,38	25,71
17	109	72	L	6.6	145	18,06	17,29
18	110	57	L	9.7	176	28,76	13,47
19	111	64	L	9.6	239	24,80	23,05
20	112	74	L	8.9	136	17,71	12,26
21	22	63	L	6.8	161	14,52	9,78
22	95	69	L	6.7	91	19,21	5,67
23	31	54	L	8.7	115	13,71	5,68
24	59	58	L	10.3	178	15,79	6,82
25	64	48	L	10.2	131	18,80	6,86
26	3	61	P	9.8	132	22,15	9,90
27	5	58	P	8.5	149	13,72	7,05
28	6	54	P	10.8	195	20,51	8,72
29	8	76	P	6.1	87	17,95	8,12
30	12	62	P	6.8	105	12,21	7,65
31	14	72	P	8.8	218	16,80	9,35
32	16	53	P	11.1	171	11,02	15,30
33	17	73	P	11.0	161	25,43	18,89
34	19	54	P	10.6	168	26,63	14,17
35	21	50	P	8.5	130	16,88	10,71

No	No. Sampe l	Umur (Tahun)	JK	HbA1 c (%)	GDP (mg/dL)	AGEs (ng/mL)	Myostatin (ng/mL)
36	23	48	P	8.4	143	20,45	11,92
37	25	58	P	8.5	81	20,50	10,08
38	28	47	P	11.4	212	19,77	11,05
39	33	59	P	5.7	145	22,52	8,72
40	34	69	P	10.7	128	18,37	7,45
41	35	58	P	10.2	139	22,06	8,55
42	37	61	P	6.6	120	33,40	29,57
43	39	57	P	6.7	130	24,64	11,55
44	42	61	P	6.8	158	24,30	15,51
45	44	58	P	6.4	95	15,48	17,64
46	49	49	P	6.3	105	29,31	15,09
47	69	64	P	8.3	129	36,99	10,86
48	72	53	P	10.8	168	26,05	14,18
49	73	52	P	10.7	223	32,78	19,13
50	77	61	P	9.5	277	12,63	7,95
51	80	58	P	9.0	201	28,28	14,09
52	82	79	P	7.8	152	17,62	8,10
53	83	36	P	9.0	153	23,40	20,13
54	84	69	P	8.5	114	22,04	10,80
55	85	30	P	8.3	185	23,57	21,36
56	91	22	P	8.9	75	28,49	11,72
57	96	49	P	11.7	215	23,73	9,14
58	100	38	P	5.3	90	17,15	18,57
59	103	55	P	9.8	154	17,36	21,28
60	20	63	P	9.6	92	22,41	8,77
61	38	61	P	6.8	150	20,27	7,55
62	90	55	P	6.3	156	18,67	6,71

Lampiran 3. Dokumentasi



Sampel penelitian subjek DM Tipe 2



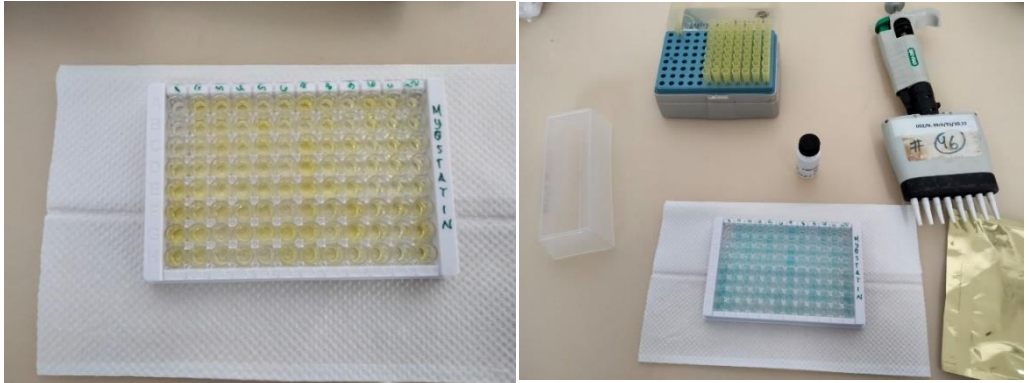
Reagen pemeriksaan AGEs dan Myostatin serum



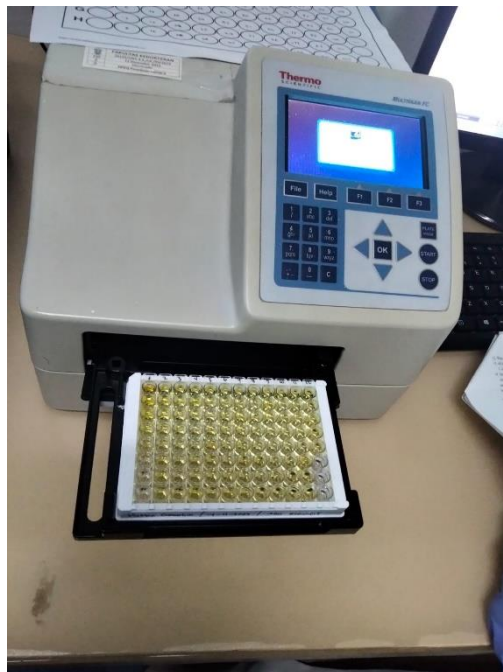
Proses pengerjaan sampel



Proses Inkubasi Sampel



Perubahan warna setelah penambahan reagen warna



Tahap Pengukuran AGEs dan Myostatin Pada Analyzer

Lampiran 4. Riwayat Hidup (Curriculum Vitae)

DATA PRIBADI

Nama : Nurma Andi Malli
Tempat, tanggal lahir : Matompi, 09 November 1991
Agama : Islam
Email : andimallinurma09@gmail.com
Pekerjaan : PNS
Alamat : Jl. Maliaro Puncak, Kel. Maliaro Kec. Kota ternate Tengah, Kota Ternate, Prov. Maluku Utara



Riwayat Pendidikan :

No	STRATA	INSTITUSI	TEMPAT	TAHUN LULUS
1	SD	SDN 268 Towuti	Luwu Timur	2003
2	SMP	SMPN 1 Towuti	Luwu Timur	2006
3	SMA	SMAN 1 Towuti	Luwu Timur	2009
4	DIII	Universitas Indonesia Timur (Jurusan DIII Analis Kesehatan)	Makassar	2012
5	DIV	Poltekkes Kemenkes Makassar (Jurusan DIV Analis Kesehatan)	Makassar	2013
6	S2	Pascasarjana UNHAS (Ilmu Biomedik, Kons. Kimia Klinik)	Makassar	2024