

DAFTAR PUSTAKA

- Abbatecola, A.M., Giuliani, A., Biscetti, L., Scisciola, L., Battista, P., Barbieri, M., *et al.* (2024). Circulating biomarkers of inflammaging and Alzheimer's disease to track age-related trajectories of dementia: Can we develop a clinically relevant composite combination? *Ageing Res. Rev.* 96 : 102257. Available at: <https://doi.org/10.1016/J.ARR.2024.102257>
- Adriani, D., Imran, Y., Mawi, M., Amani, P., & Ilyas, E.I.I. (2020). Effect of Brain Gym® exercises on cognitive function and brain-derived neurotrophic factor plasma level in elderly: a randomized controlled trial. *Universa Medicina* 39 : 34–41. Available at: <https://doi.org/10.18051/univmed.2020.v39.34-41>
- Al Saedi, A., Chow, S., Vogrin, S., Guillemin, G.J., & Duque, G. (2022). Association Between Tryptophan Metabolites, Physical Performance, and Frailty in Older Persons. *Int. J. Tryptophan Res.* 15 : 11786469211069952. Available at: <https://doi.org/10.1177/11786469211069951>
- Alberro, A., Iribarren-Lopez, A., Sáenz-Cuesta, M., Matheu, A., Vergara, I., & Otaegui, D. (2021). Inflammaging markers characteristic of advanced age show similar levels with frailty and dependency. *Sci. Rep.* 11 : 4358. Available at: <https://doi.org/10.1038/S41598-021-83991-7>
- Andersen, L.L., López-Bueno, R., Núñez-Cortés, R., Cadore, E.L., Polo-López, A., & Calatayud, J. (2024). Association of Muscle Strength With All-Cause Mortality in the Oldest Old: Prospective Cohort Study From 28 Countries. *J. Cachexia Sarcopenia Muscle* 15 : 2756. Available at: <https://doi.org/10.1002/JCSM.13619>
- Andonian, B.J., Hippensteel, J.A., Abuabara, K., Boyle, E.M., Colbert, J.F., Devinney, M.J., *et al.* (2024). Inflammation and aging-related disease: A transdisciplinary inflammaging framework. *Geroscience* 47 : 515. Available at: <https://doi.org/10.1007/S11357-024-01364-0>
- Antuña, E., Cachán-Vega, C., Bermejo-Millo, J.C., Potes, Y., Caballero, B., Vega-Naredo, I., *et al.* (2022). Inflammaging: Implications in Sarcopenia. *International Journal of Molecular Sciences* 2022, Vol. 23, Page 15039 23 : 15039. Available at: <https://doi.org/10.3390/IJMS232315039>
- Appeadu, M.K., & Bordoni, B. (2023). Falls and Fall Prevention in Older Adults. *Geriatric Emergency Medicine: Principles and Practice* 343–350. Available at: <https://doi.org/10.1017/CBO9781139250986.033>
- Arnold, W.D., & Clark, B.C. (2023). Neuromuscular junction transmission failure in aging and sarcopenia: The nexus of the neurological and muscular systems. *Ageing Res. Rev.* 89 : 101966. Available at: <https://doi.org/10.1016/J.ARR.2023.101966>
- Badan Pusat Statistik Indonesia (2025). Jumlah Penduduk Menurut Kelompok Umur dan Jenis Kelamin tahun 2025 [WWW Document]. URL <https://www.bps.go.id/id/statistics-table/3/WVc0%20MGEyMxBkVFUxY25KeE9HdDZkbTQzWkVkb1p6MD>

- [kjMw==/jumlah-penduduk-menurut-kelompok-umur-dan-jenis-kelamin--2023.html](#) (accessed 10.2.25).
- Badrasawi, M., Jarradat, A., Khodour, Z., Lahaleh, R., & Irshaid, A. (2020). Sarcopenia prevalence and its correlations with age-related disorders among community-dwelling Palestinian older adults. *JOURNAL OF GERONTOLOGY AND GERIATRICS* 68 : 126–135. Available at: <https://doi.org/10.36150/2499-6564-377>
- Baechle, J.J., Chen, N., Makhijani, P., Winer, S., Furman, D., & Winer, D.A. (2023). Chronic inflammation and the hallmarks of aging. *Mol. Metab.* 74 : 101755. Available at: <https://doi.org/10.1016/J.MOLMET.2023.101755>
- Beavers, D.P., Kritchevsky, S.B., Gill, T.M., Ambrosius, W.T., Anton, S.D., Fielding, R.A., *et al.* (2021). Elevated IL-6 and CRP Levels Are Associated With Incident Self-Reported Major Mobility Disability: A Pooled Analysis of Older Adults With Slow Gait Speed. *The Journals of Gerontology: Series A* 76 : 2293–2299. Available at: <https://doi.org/10.1093/GERONA/GLAB093>
- Belfield, A.E., Wilkinson, T.J., Henson, J., Sargeant, J.A., Breen, L., Hall, A.P., *et al.* (2024). Sarcopenia prevalence using handgrip strength or chair stand performance in adults living with type 2 diabetes mellitus. *Age Ageing* 53 : afae090. Available at: <https://doi.org/10.1093/AGEING/AFAE090>
- Bergens, O., Nilsson, A., Papaioannou, K.G., & Kadi, F. (2021). Sedentary Patterns and Systemic Inflammation: Sex-Specific Links in Older Adults. *Front. Physiol.* 12 : 625950. Available at: <https://doi.org/10.3389/FPHYS.2021.625950/BIBTEX>
- Bohannon, R.W. (2019). Grip Strength: An Indispensable Biomarker For Older Adults. *Clin. Interv. Aging* 14 : 1681. Available at: <https://doi.org/10.2147/CIA.S194543>
- Bordano, V., Gerbino, C., Boscaro, V., Rubiolo, P., Marengo, A., Pizzimenti, S., *et al.* (2025). Balancing the Cellular Inflammatory-Homeostatic Axis Through Natural Ingredient Supplementation. *Nutrients* 17 : 2587. Available at: <https://doi.org/10.3390/NU17162587/S1>
- Borzuola, R., Giombini, A., Torre, G., Campi, S., Albo, E., Bravi, M., *et al.* (2020). Central and Peripheral Neuromuscular Adaptations to Ageing. *J. Clin. Med.* 9 : 741. Available at: <https://doi.org/10.3390/JCM9030741>
- Britting, S., Kob, R., Görlitz, A., Sieber, C.C., Freiberger, E., & Rohleder, N. (2024). Chronic stress and functional health in older adults with concerns about falling: a study protocol of a randomized controlled trial with multicomponent exercise intervention (FEARFALL). *Trials* 25 : 1–16. Available at: <https://doi.org/10.1186/S13063-024-08462-6/TABLES/5>
- Buchman, A.S., Yu, L., Boyle, P.A., Schneider, J.A., De Jager, P.L., & Bennett, D.A. (2016). Higher brain BDNF gene expression is associated with slower cognitive decline in older adults. *Neurology* 86 : 735. Available at: <https://doi.org/10.1212/WNL.0000000000002387>
- Campbell, S., Greenwood, M., Prior, S., Shearer, T., Walkem, K., Young, S., *et al.* (2020). Purposive sampling: complex or simple? Research case examples.

- Journal of Research in Nursing* 25. Available at: <https://doi.org/10.1177/1744987120927206>
- Cano-Ibáñez, N., & Bueno-Cavanillas, A. (2024). Lifestyle Interventions in an Aged Population: Challenges and Opportunities from a Public Health Perspective. *Nutrients* 16 : 173. Available at: <https://doi.org/10.3390/NU16010173>
- Cardinali, D.P. (2021). Melatonin and healthy aging. *Vitam. Horm.* 115 : 67–88. Available at: <https://doi.org/10.1016/BS.VH.2020.12.004>
- Centers for Disease Control and Prevention (2017). Assessment Timed Up & Go (TUG).
- Chojnacki, C., Gašiorowska, A., Popławski, T., Konrad, P., Chojnacki, M., Fila, M., *et al.* (2023). Beneficial Effect of Increased Tryptophan Intake on Its Metabolism and Mental State of the Elderly. *Nutrients* 15 : 847. Available at: <https://doi.org/10.3390/NU15040847>
- Chong, J.S.X., Chua, K.Y., Ng, K.K., Chong, S.W., Leong, R.L.F., Chee, M.W.L., *et al.* (2024). Higher handgrip strength is linked to higher salience ventral attention functional network segregation in older adults. *Commun. Biol.* 7 : 1–13. Available at: <https://doi.org/10.1038/S42003-024-05862-X>;TECHMETA
- Clemente-Suárez, V.J., Martín-Rodríguez, A., Curiel-Regueros, A., Rubio-Zarapuz, A., & Tornero-Aguilera, J.F. (2025). Neuro-Nutrition and Exercise Synergy: Exploring the Bioengineering of Cognitive Enhancement and Mental Health Optimization. *Bioengineering* 12 : 208. Available at: <https://doi.org/10.3390/BIOENGINEERING12020208>
- Conforto, R., Rizzo, V., Russo, R., Mazza, E., Maurotti, S., Pujia, C., *et al.* (2024). Advances in body composition and gender differences in susceptibility to frailty syndrome: Role of osteosarcopenic obesity. *Metabolism* 161 : 156052. Available at: <https://doi.org/10.1016/J.METABOL.2024.156052>
- Coto-Montes, A., Boga, J.A., Tan, D.X., & Reiter, R.J. (2016). Melatonin as a Potential Agent in the Treatment of Sarcopenia. *International Journal of Molecular Sciences* 2016, Vol. 17, Page 1771 17 : 1771. Available at: <https://doi.org/10.3390/IJMS17101771>
- da Costa Teixeira, L.A., Soares, L.A., Lima, L.P., Avelar, N.C.P., de Moura, J.A., Leopoldino, A.A.O., *et al.* (2024). Cognitive function is associated with performance in time up and go test and with leptin blood levels in community-dwelling older women. *Sci. Rep.* 14 : 1–9. Available at: <https://doi.org/10.1038/S41598-024-60274-5>;SUBJMETA
- Dalle, S., Rossmeislova, L., & Koppo, K. (2017). The Role of Inflammation in Age-Related Sarcopenia. *Front. Physiol.* 8 : 1045. Available at: <https://doi.org/10.3389/FPHYS.2017.01045>
- Damirchi, A., Hosseini, F., & Babaei, P. (2017). Mental Training Enhances Cognitive Function and BDNF More Than Either Physical or Combined Training in Elderly Women With MCI: A Small-Scale Study. *Am. J. Alzheimers Dis. Other Demen.* 33 : 20. Available at: <https://doi.org/10.1177/1533317517727068>

- de Gonzalo-Calvo, D., Neitzert, K., Fernández, M., Vega-Naredo, I., Caballero, B., García-Macía, M., *et al.* (2010). Differential inflammatory responses in aging and disease: TNF- α and IL-6 as possible biomarkers. *Free Radic. Biol. Med.* 49 : 733–737. Available at: <https://doi.org/10.1016/J.FREERADBIOMED.2010.05.019>
- Ding, J., Yang, G., Sun, W., Li, Y., Wang, N., Wang, J., *et al.* (2024). Association of interleukin-6 with sarcopenia and its components in older adults: a systematic review and meta-analysis of cross-sectional studies. *Ann. Med.* 56 : 2384664. Available at: <https://doi.org/10.1080/07853890.2024.2384664>
- Driscoll, I., Martin, B., An, Y., Maudsley, S., Ferrucci, L., Mattson, M.P., *et al.* (2012). Plasma BDNF Is Associated with Age-Related White Matter Atrophy but Not with Cognitive Function in Older, Non-Demented Adults. *PLoS One* 7 : e35217. Available at: <https://doi.org/10.1371/JOURNAL.PONE.0035217>
- Drobnik, J., Roemer-Ślimak, R., Siekierka, J., & Grata-Borkowska, U. (2024). Assessment of mobility of seniors using ‘Timed Up and Go’ test and the risk of falls by means of the Tinetti test in the context of various aspects of life in a population covered by the family doctor care. Available at: <https://doi.org/10.21203/RS.3.RS-3903441/V1>
- Faizah, U.Z., Widajanti, N., & Ichwani, J. (2022). Two-year Mortality Profile in Elderly with Frailty. An Observational Descriptive Study in Elderly Health Community in Surabaya, Indonesia. *Journal of Community Medicine and Public Health Research Faizah et al* 3. Available at: <https://doi.org/10.20472/jcmphr.v3i1.30283>
- Falck, R.S., Davis, J.C., Best, J.R., Crockett, R.A., & Liu-Ambrose, T. (2019). Impact of exercise training on physical and cognitive function among older adults: a systematic review and meta-analysis. *Neurobiol. Aging* 79 : 119–130. Available at: <https://doi.org/10.1016/J.NEUROBIOLAGING.2019.03.007>
- Fatchurohmah, W., Meliala, A., & Sulistyoningsih, R.C. (2019). Effect of banana peel extract on serotonin immunoreactivity and stool consistency in colon of healthy male Wistar rat. *AIP Conf. Proc.* 2094. Available at: <https://doi.org/10.1063/1.5097491>
- Fatima, S., Laeeq, M., Habib, E., Fatima, T., Ahmad, L., & Abbas, N. (2025). Relationship of Sedentary Behavior and Physical Activity Levels with Functional Mobility in University Students. *Journal of Health, Wellness and Community Research* e1068. Available at: <https://doi.org/10.61919/tx6zfv12>
- Flint, B., & Tadi, P. (2023). Physiology, Aging. *StatPearls*.
- Fountain, W.A., Naruse, M., Claiborne, A., Trappe, S., & Trappe, T.A. (2023). Controlling Inflammation Improves Aging Skeletal Muscle Health. *Exerc. Sport Sci. Rev.* 51. Available at: <https://doi.org/10.1249/JES.0000000000000313>
- Friedman, M. (2018). Analysis, Nutrition, and Health Benefits of Tryptophan. *Int. J. Tryptophan Res.* 11 : 1178646918802282. Available at: <https://doi.org/10.1177/1178646918802282>

- Gabela, A.M., Mthembu, N., & Hadebe, S. (2026). Tryptophan metabolism in health and disease- implications for non-communicable diseases. *Immunol. Lett.* 277 : 107093. Available at: <https://doi.org/10.1016/J.IMLET.2025.107093>
- Gasparian, M.E. (2023). Inflammatory Biomarkers: Unravelling the Key Players in Disease Diagnosis and Management. *Annals of Clinical Trials and Vaccines Research* 6 : 175–177. Available at: [https://doi.org/10.37532/ACTVR.2023.13\(6\).175-177](https://doi.org/10.37532/ACTVR.2023.13(6).175-177)
- Glud, M., Christiansen, T., Larsen, L.H., Richelsen, B., & Bruun, J.M. (2019). Changes in Circulating BDNF in relation to Sex, Diet, and Exercise: A 12-Week Randomized Controlled Study in Overweight and Obese Participants. *J. Obes.* 2019 : 4537274. Available at: <https://doi.org/10.1155/2019/4537274>
- Goel, N., & Bale, T.L. (2010). Sex Differences in the Serotonergic Influence on the Hypothalamic-Pituitary-Adrenal Stress Axis. *Endocrinology* 151 : 1784–1794. Available at: <https://doi.org/10.1210/EN.2009-1180>
- Goel, N., Innala, L., & Viau, V. (2014). Sex differences in serotonin (5-HT) 1A receptor regulation of HPA axis and dorsal raphe responses to acute restraint. *Psychoneuroendocrinology* 40 : 232–241. Available at: <https://doi.org/10.1016/J.PSYNEUEN.2013.11.020>
- Goetzl, E.J., Huang, M., Kon, J., Patel, K., Schwartz, J.B., Fast, K., *et al.* (2010). Gender specificity of altered human immune cytokine profiles in aging. *The FASEB Journal* 24 : 3580–3589. Available at: <https://doi.org/10.1096/FJ.10-160911;REQUESTEDJOURNAL:JOURNAL:15306860;WGROU:STRIN G:PUBLICATION>
- Gofir, A., & Klinik Memori RSUP Dr. Sardjito (2023). Senam Otak (2023 ver.) [WWW Document]. *Perhimpunan Dokter Spesialis Neurologi Indonesia (PERDOSNI)*. URL <https://drive.google.com/file/d/14hYkzkdGfm1abaB79IVGvPn-xNmBPxUC/view?usp=sharing> (accessed 12.11.25).
- Gonzalez Caldito, N. (2023). Role of tumor necrosis factor-alpha in the central nervous system: a focus on autoimmune disorders. *Front. Immunol.* 14 : 1213448. Available at: <https://doi.org/10.3389/FIMMU.2023.1213448/FULL>
- Gray, M., Gills, J.L., Glenn, J.M., Vincenzo, J.L., Walter, C.S., Madero, E.N., *et al.* (2021). Cognitive decline negatively impacts physical function. *Exp. Gerontol.* 143. Available at: <https://doi.org/10.1016/j.exger.2020.111164>
- Guo, Y., Huang, L., Kuang, J., Sun, T., Zhang, X., Tian, H., *et al.* (2024). Physical function is associated with cognitive status, brain amyloid-beta deposition, and blood biomarkers in Chinese Han population. *CNS Neurosci. Ther.* 30 : e14921. Available at: <https://doi.org/10.1111/CNS.14921>
- Håkansson, K., Ledreux, A., Daffner, K., Terjestam, Y., Bergman, P., Carlsson, R., *et al.* (2017). BDNF Responses in Healthy Older Persons to 35 Minutes of Physical Exercise, Cognitive Training, and Mindfulness: Associations with Working Memory Function. *J. Alzheimers Dis.* 55 : 645. Available at: <https://doi.org/10.3233/JAD-160593>
- Han, B., Zeng, Z., Wen, Y., Chen, C., Cheng, D., Li, Y., *et al.* (2025). Cumulative handgrip strength and longitudinal changes in cognitive function and daily

- functioning among people aged 50 years and older: evidence from two longitudinal cohort studies. *Archives of Public Health* 83 : 1–17. Available at: <https://doi.org/10.1186/S13690-025-01624-1/TABLES/6>
- Harimurti, K., Setiati, S., Soejono, C.H., Aryana, I.S., Sunarti, S., Budiningsih, F., *et al.* (2023). View of Sarcopenia in a Multiethnic State: A Cross-Sectional Data Analysis of Multicentre Indonesia Longitudinal Aging Study [WWW Document]. URL <https://www.actamedindones.org/index.php/ijim/article/view/2311/pdf> (accessed 10.6.25).
- Harrie, A., Hampstead, B.M., Lewis, C., Herreshoff, E., & Kotagal, V. (2022). Cognitive correlates of dual tasking costs on the timed up and go test in Parkinson disease. *Clin. Park. Relat. Disord.* 7 : 100158. Available at: <https://doi.org/10.1016/J.PRDOA.2022.100158>
- Hassamal, S. (2023). Chronic stress, neuroinflammation, and depression: an overview of pathophysiological mechanisms and emerging anti-inflammatory. *Front. Psychiatry* 14 : 1130989. Available at: <https://doi.org/10.3389/FPSYT.2023.1130989/FULL>
- Hayati, D.G., & Kamso, S. (2024). Analysis of Elderly Health Status through Intrinsic Capacity Assessment Using the Simple Elderly Screening (SKILAS) Instrument in the Community.
- He, Y., Xie, W., Li, H., Jin, H., Zhang, Y., & Li, Y. (2022). Cellular Senescence in Sarcopenia: Possible Mechanisms and Therapeutic Potential. *Front. Cell Dev. Biol.* 9. Available at: <https://doi.org/10.3389/FCELL.2021.793088>
- Herhaus, B., Heni, M., Bloch, W., & Petrowski, K. (2024). Dynamic interplay of cortisol and BDNF in males under acute and chronic psychosocial stress – A randomized controlled study. *Psychoneuroendocrinology* 170 : 107192. Available at: <https://doi.org/10.1016/J.PSYNEUEN.2024.107192>
- Hsieh, C.-Y., Huang, H.-Y., Liu, K.-C., Chen, K.-H., Hsu, S.J.-P., Chan, C.-T., *et al.* (2020). Subtask Segmentation of Timed Up and Go Test for Mobility Assessment of Perioperative Total Knee Arthroplasty. *Sensors* 2020, Vol. 20, 20 : 1–17. Available at: <https://doi.org/10.3390/S20216302>
- Hunter, S.K., Pereira, X.H.M., & Keenan, K.G. (2016). The aging neuromuscular system and motor performance. <https://doi.org/10.1152/jappphysiol.00475.2016> 121 : 982–995. Available at: <https://doi.org/10.1152/JAPPLPHYSIOL.00475.2016>
- Hwang, J., & Park, S. (2022). Gender-Specific Risk Factors and Prevalence for Sarcopenia among Community-Dwelling Young-Old Adults. *Int. J. Environ. Res. Public Health* 19 : 7232. Available at: <https://doi.org/10.3390/IJERPH19127232>
- Iyer, S.R., Shah, S.B., & Lovering, R.M. (2021). The Neuromuscular Junction: Roles in Aging and Neuromuscular Disease. *Int. J. Mol. Sci.* 22 : 8058. Available at: <https://doi.org/10.3390/IJMS22158058>
- Jang, J.Y., & Kim, J. (2015). Association between handgrip strength and cognitive impairment in elderly Koreans: a population-based cross-sectional study. *J. Phys. Ther. Sci.* 27 : 3911. Available at: <https://doi.org/10.1589/JPTS.27.3911>

- Jost, Z., & Kujach, S. (2025). Understanding Cognitive Decline in Aging: Mechanisms and Mitigation Strategies – A Narrative Review. *Clin. Interv. Aging*. Available at: <https://doi.org/10.2147/CIA.S510670>
- Juanita, J., Nurhasanah, N., Jufrizal, J., & Febriana, D. (2022). Health related quality of life of Indonesian older adults living in community. *Enferm. Clin.* 32 : S71–S75. Available at: <https://doi.org/10.1016/J.ENFCLI.2022.03.022>
- Kanova, M., & Kohout, P. (2021). Serotonin—Its Synthesis and Roles in the Healthy and the Critically Ill. *International Journal of Molecular Sciences* 2021, Vol. 22, Page 4837 22 : 4837. Available at: <https://doi.org/10.3390/IJMS22094837>
- Karim, A., Muhammad, T., & Qaisar, R. (2021). Prediction of Sarcopenia Using Multiple Biomarkers of Neuromuscular Junction Degeneration in Chronic Obstructive Pulmonary Disease. *J. Pers. Med.* 11 : 919. Available at: <https://doi.org/10.3390/JPM11090919>
- Kavanagh, J.J., McFarland, A.J., & Taylor, J.L. (2018). Enhanced availability of serotonin increases activation of unfatigued muscle but exacerbates central fatigue during prolonged sustained contractions. *J. Physiol.* 597 : 319. Available at: <https://doi.org/10.1113/JP277148>
- Kemala Sari, N., Stepvia, S., Ilyas, M.F., Setiati, S., Harimurti, K., & Fitriana, I. (2025). Handgrip strength as a potential indicator of aging: insights from its association with aging-related laboratory parameters. *Front. Med. (Lausanne)*. 12 : 1491584. Available at: <https://doi.org/10.3389/FMED.2025.1491584/BIBTEX>
- Khalil, B., Marwaha, K., & Bollu, P.C. (2025). Physiology, Neuromuscular Junction. *StatPearls*.
- Kikuchi, A.M., Tanabe, A., & Iwahori, Y. (2021). A systematic review of the effect of L-tryptophan supplementation on mood and emotional functioning. *J. Diet. Suppl.* 18 : 316–333. Available at: <https://doi.org/10.1080/19390211.2020.1746725;PAGE:STRING:ARTICLE/CHAPTER>
- Kim, K., Byun, M.S., Yi, D., Jung, J.H., Sohn, B.K., Jung, G., *et al.* (2025). Serum BDNF and progression to MCI in cognitively normal older adults: A prospective cohort study. *J. Prev. Alzheimers Dis.* 12 : 100210. Available at: <https://doi.org/10.1016/J.TJPAD.2025.100210>
- Klaessens, S., Stroobant, V., De Plaen, E., Van den Eynde, B.J., Li, J., Scalise, M., *et al.* (2022). Systemic tryptophan homeostasis. *Front. Mol. Biosci.* 9 : 897929. Available at: <https://doi.org/10.3389/FMOLB.2022.897929>
- Kob, R., Fellner, C., Bertsch, T., Wittmann, A., Mishura, D., Sieber, C.C., *et al.* (2015). Gender-specific differences in the development of sarcopenia in the rodent model of the ageing high-fat rat. *J. Cachexia Sarcopenia Muscle* 6 : 181. Available at: <https://doi.org/10.1002/JCSM.12019>
- Komleva, Y., Chernykh, A., Lopatina, O., Gorina, Y., Lokteva, I., Salmina, A., *et al.* (2021). Inflamm-Aging and Brain Insulin Resistance: New Insights and Role of Life-style Strategies on Cognitive and Social Determinants in Aging and Neurodegeneration. *Front. Neurosci.* 14 : 618395. Available at: <https://doi.org/10.3389/FNINS.2020.618395>

- Kumar, R., Seangpraw, K., Auttama, N., Somrongthong, R., Tonchoy, P., & Panta, P. (2020). Stress and associated risk factors among the elderly: a cross-sectional study from rural area of Thailand. *F1000Res*. 8 : 655. Available at: <https://doi.org/10.12688/F1000RESEARCH.17903.2>
- Larsson, L., Degens, H., Li, M., Salviati, L., Lee, Y. Il, Thompson, W., *et al.* (2019). Sarcopenia: Aging-related loss of muscle mass and function. *Physiol. Rev.* 99. Available at: <https://doi.org/10.1152/physrev.00061.2017>
- Lee, S.Y. (2021). Handgrip Strength: An Irreplaceable Indicator of Muscle Function. *Ann. Rehabil. Med.* 45 : 167. Available at: <https://doi.org/10.5535/ARM.21106>
- Lei, A.A., Phang, V.W.X., Lee, Y.Z., Kow, A.S.F., Tham, C.L., Ho, Y.C., *et al.* (2025). Chronic Stress-Associated Depressive Disorders: The Impact of HPA Axis Dysregulation and Neuroinflammation on the Hippocampus—A Mini Review. *Int. J. Mol. Sci.* 26 : 2940. Available at: <https://doi.org/10.3390/IJMS26072940>
- Leong, D.P., Teo, K.K., Rangarajan, S., Lopez-Jaramillo, P., Avezum, A., Orlandini, A., *et al.* (2015). Prognostic value of grip strength: Findings from the Prospective Urban Rural Epidemiology (PURE) study. *The Lancet* 386. Available at: [https://doi.org/10.1016/S0140-6736\(14\)62000-6](https://doi.org/10.1016/S0140-6736(14)62000-6)
- Li, X., Li, C., Zhang, W., Wang, Y., Qian, P., & Huang, H. (2023). Inflammation and aging: signaling pathways and intervention therapies. *Signal Transduct. Target. Ther.* 8 : 239. Available at: <https://doi.org/10.1038/S41392-023-01502-8>
- Lima Giacobbo, B., Doorduyn, J., Klein, H.C., Dierckx, R.A.J.O., Bromberg, E., & de Vries, E.F.J. (2018). Brain-Derived Neurotrophic Factor in Brain Disorders: Focus on Neuroinflammation. *Mol. Neurobiol.* 56 : 3295. Available at: <https://doi.org/10.1007/S12035-018-1283-6>
- Lin, T., Liu, G.A., Perez, E., Rainer, R.D., Febo, M., Cruz-Almeida, Y., *et al.* (2018). Systemic inflammation mediates age-related cognitive deficits. *Front. Aging Neurosci.* 10 : 380317. Available at: <https://doi.org/10.3389/FNAGI.2018.00236/BIBTEX>
- Liu, T., Li, H., Conley, Y.P., Primack, B.A., Wang, J., & Li, C. (2022). The Brain-Derived Neurotrophic Factor Functional Polymorphism and Hand Grip Strength Impact the Association between Brain-Derived Neurotrophic Factor Levels and Cognition in Older Adults in the United States. *Biol. Res. Nurs.* 24 : 226–234. Available at: <https://doi.org/10.1177/10998004211065151>
- Lommatzsch, M., Zingler, D., Schuhbaeck, K., Schloetcke, K., Zingler, C., Schuff-Werner, P., *et al.* (2005). The impact of age, weight and gender on BDNF levels in human platelets and plasma. *Neurobiol. Aging* 26 : 115–123. Available at: <https://doi.org/10.1016/J.NEUROBIOLAGING.2004.03.002>
- López-Otín, C., Blasco, M.A., Partridge, L., Serrano, M., & Kroemer, G. (2023). Hallmarks of aging: An expanding universe. *Cell*. Available at: <https://doi.org/10.1016/j.cell.2022.11.001>
- Lustikaiswi, D.K., Yuliani, S., Annura, R., & Rahmadani, E. (2021). Tryptophan in banana peel (*Musa paradisiaca*) as an anti-dementia alternative treatment:

- A narrative review. *Jurnal Kedokteran dan Kesehatan Indonesia*. Available at: <https://doi.org/10.20885/jkki.vol12.iss2.art11>
- Ma, L., & Chan, P. (2020). Understanding the Physiological Links Between Physical Frailty and Cognitive Decline. *Aging Dis.* 11 : 405. Available at: <https://doi.org/10.14336/AD.2019.0521>
- Maggio, M., Guralnik, J.M., Longo, D.L., & Ferrucci, L. (2006). Interleukin-6 in Aging and Chronic Disease: A Magnificent Pathway. *J. Gerontol. A Biol. Sci. Med. Sci.* 61 : 575. Available at: <https://doi.org/10.1093/GERONA/61.6.575>
- Marcos-Pérez, D., Sánchez-Flores, M., Proietti, S., Bonassi, S., Costa, S., Teixeira, J.P., *et al.* (2020). Association of inflammatory mediators with frailty status in older adults: results from a systematic review and meta-analysis. *Geroscience* 42 : 1451–1473. Available at: <https://doi.org/10.1007/S11357-020-00247-4/FIGURES/4>
- Markova, T.Z., Ciampa, C.J., Parent, J.H., LaPoint, M.R., D’Esposito, M., Jagust, W.J., *et al.* (2023). Poorer aging trajectories are associated with elevated serotonin synthesis capacity. *Mol. Psychiatry* 28 : 4390. Available at: <https://doi.org/10.1038/S41380-023-02177-X>
- Martins, V.F., Peyré-Tartaruga, L.A., Haas, A.N., Kanitz, A.C., Martinez, F.G., & Gonçalves, A.K. (2024). Observational evidence of the association between physical and psychological determinants of aging with cognition in older adults. *Sci. Rep.* 14 : 1–8. Available at: <https://doi.org/10.1038/S41598-024-58497-7;SUBJMETA>
- Mekhora, C., Lamport, D.J., & Spencer, J.P.E. (2024). An overview of the relationship between inflammation and cognitive function in humans, molecular pathways and the impact of nutraceuticals. *Neurochem. Int.* 181 : 105900. Available at: <https://doi.org/10.1016/J.NEUINT.2024.105900>
- Meliala, A., Narwidina, P., & Sumarno, Y.T. (n.d.). (manuscript in preparation). Modulating the Gut-Brain Axis in the Elderly: A Study on Tryptophan Functional Food, SCFA Production, and Correlative Effects on Serotonin, Cortisol, and Cognition.
- Meliala, A., Narwidina, P., Supriyanto, I., Sumarno, Y.T., Pratama, Y.Y., & Damayanti, R. (2022). The Role of Banana (*Musa balbisiana* Colla) Peel Floss as Functional Food Matrix to Alleviate Chronic Stress. *Open Access Maced. J. Med. Sci.* 10 : 1608–1616. Available at: <https://doi.org/10.3889/oamjms.2022.8432>
- Milan-Mattos, J.C., Anibal, F.F., Perseguini, N.M., Minatel, V., Rehder-Santos, P., Castro, C.A., *et al.* (2019). Effects of natural aging and gender on pro-inflammatory markers. *Brazilian Journal of Medical and Biological Research* 52 : e8392. Available at: <https://doi.org/10.1590/1414-431X20198392>
- Miranda, M., Morici, J.F., Zanoni, M.B., & Bekinschtein, P. (2019). Brain-Derived Neurotrophic Factor: A Key Molecule for Memory in the Healthy and the Pathological Brain. *Front. Cell. Neurosci.* 13 : 363. Available at: <https://doi.org/10.3389/FNCEL.2019.00363>
- Miyazaki, S., Iino, N., Koda, R., Narita, I., & Kaneko, Y. (2021). Brain-derived neurotrophic factor is associated with sarcopenia and frailty in Japanese

- hemodialysis patients. *Geriatr. Gerontol. Int.* 21. Available at: <https://doi.org/10.1111/ggi.14089>
- Motanova, E., Pirazzini, M., Negro, S., Rossetto, O., & Narici, M. (2024). Impact of ageing and disuse on neuromuscular junction and mitochondrial function and morphology: Current evidence and controversies. *Ageing Res. Rev.* 102 : 102586. Available at: <https://doi.org/10.1016/J.ARR.2024.102586>
- Mudjihartini, N. (2021). Brain-derived neurotrophic factor (BDNF) dan proses penuaan: sebuah tinjauan. *Jurnal Biomedika dan Kesehatan* 4. Available at: <https://doi.org/10.18051/jbiomedkes.2021.v4.120-129>
- Murdaca, G., Paladin, F., Casciaro, M., Vicario, C.M., Gangemi, S., & Martino, G. (2022). Neuro-Inflammaging and Psychopathological Distress. *Biomedicines* 10 : 2133. Available at: <https://doi.org/10.3390/BIOMEDICINES10092133>
- Mutalib, S.A., Mace, M., Seager, C., Burdet, E., Mathiowetz, V., & Goldsmith, N. (2022). Modernising grip dynamometry: Inter-instrument reliability between GripAble and Jamar. *BMC Musculoskelet. Disord.* 23. Available at: <https://doi.org/10.1186/S12891-022-05026-0>
- Nakano, I., Kinugawa, S., Hori, H., Fukushima, A., Yokota, T., Takada, S., *et al.* (2020). Serum brain-derived neurotrophic factor levels are associated with skeletal muscle function but not with muscle mass in patients with heart failure. *Int. Heart J.* 61. Available at: <https://doi.org/10.1536/ihj.19-400>
- Nascimento, M. de M., Gouveia, É.R., Marques, A., Gouveia, B.R., Marconcin, P., França, C., *et al.* (2022). The Role of Physical Function in the Association between Physical Activity and Gait Speed in Older Adults: A Mediation Analysis. *Int. J. Environ. Res. Public Health* 19. Available at: <https://doi.org/10.3390/ijerph191912581>
- Nicastri, C.M., McFeeley, B.M., Simon, S.S., Ledreux, A., Håkansson, K., Granholm, A.C., *et al.* (2022). BDNF mediates improvement in cognitive performance after computerized cognitive training in healthy older adults. *Alzheimer's & Dementia: Translational Research & Clinical Interventions* 8 : e12337. Available at: <https://doi.org/10.1002/TRC2.12337>
- Nishiguchi, S., Yorozu, A., Adachi, D., Takahashi, M., & Aoyama, T. (2017). Association between mild cognitive impairment and trajectory-based spatial parameters during timed up and go test using a laser range sensor. *J. Neuroeng. Rehabil.* 14 : 1–9. Available at: <https://doi.org/10.1186/S12984-017-0289-Z/TABLES/3>
- Northey, J.M., Cherbuin, N., Pumpa, K.L., Smee, D.J., & Rattray, B. (2018). Exercise interventions for cognitive function in adults older than 50: a systematic review with meta-analysis. *Br. J. Sports Med.* 52 : 154–160. Available at: <https://doi.org/10.1136/BJSPORTS-2016-096587>
- Ntiamoah, P., Ananni-Akollor, M.E., Frempong, M.T., Agordzo, S.K., Baah, E., Muanah, I.A., *et al.* (2024). Association Between Handgrip Strength, TNF- α Levels and the Presence of Chronic Diseases Among the Elderly. Available at: <https://doi.org/10.21203/RS.3.RS-4674200/V1>
- Okeke, Chizoba, Okonkwo, R., Ibeh, N., Chukwuma, O., & Okeke, Chisom (2023). Assessment of gender differences in some inflammatory cytokines of

- tuberculosis patients before and during treatment. *Afr. Health Sci.* 23 : 336. Available at: <https://doi.org/10.4314/AHS.V23I3.40>
- Pan, Y., & Ma, L. (2024). Inflammatory Markers Associated with Physical Frailty and Cognitive Impairment. *Aging Dis.* 16 : 859. Available at: <https://doi.org/10.14336/AD.2024.0258>
- Pelosi, L., Berardinelli, M.G., Forcina, L., Ascenzi, F., Rizzuto, E., Sandri, M., *et al.* (2021). Sustained Systemic Levels of IL-6 Impinge Early Muscle Growth and Induce Muscle Atrophy and Wasting in Adulthood. *Cells* 10 : 1816. Available at: <https://doi.org/10.3390/CELLS10071816>
- Phatak, S.P., Thaver, S., & Irani, A. (2024). Effect of Brain Gym Exercise in Addition to Balance Exercises Versus Balance Exercises on Fear of Fall and Balance in Patients with Parkinsonism. *International Journal of Physiotherapy and Research* 12 : 4768–4775. Available at: <https://doi.org/10.16965/IJPR.2024.126>
- Philippe, T.J., Bao, L., Koblanski, M.E., & Viau, V. (2022). Sex Differences in Serotonin 5-HT 1A Receptor Responses to Repeated Restraint Stress in Adult Male and Female Rats. *International Journal of Neuropsychopharmacology* 25 : 863–876. Available at: <https://doi.org/10.1093/IJNP/PYAC046>
- Popko, K., Gorska, E., Stelmazczyk-Emmel, A., Plywaczewski, R., Stoklosa, A., Gorecka, D., *et al.* (2010). Proinflammatory cytokines Il-6 and TNF- α and the development of inflammation in obese subjects. *Eur. J. Med. Res.* 15 Suppl 2 : 120–122. Available at: <https://doi.org/10.1186/2047-783X-15-S2-120>
- Pratt, J., Motanova, E., Narici, M. V., Boreham, C., & De Vito, G. (2025). Plasma brain-derived neurotrophic factor concentrations are elevated in community-dwelling adults with sarcopenia. *Age Ageing* 54. Available at: <https://doi.org/10.1093/AGEING/AFAF024>
- Prokopidis, K., Giannos, P., Ispoglou, T., Kirk, B., Witard, O.C., Dionyssiotis, Y., *et al.* (2022). Handgrip strength is associated with learning and verbal fluency in older men without dementia: insights from the NHANES. *Geroscience* 45 : 1049. Available at: <https://doi.org/10.1007/S11357-022-00703-3>
- Qi, C., Wang, X., Li, D., Ding, H., Shen, J., Jiao, Y., *et al.* (2024). The role of physical function and physical activity on cognitive function in the elderly. *Glob. Transit.* 6 : 85–92. Available at: <https://doi.org/10.1016/J.GLT.2024.02.002>
- Randhawa, S.S., & Varghese, D. (2023). Geriatric Evaluation and Treatment of Age-Related Cognitive Decline. *StatPearls*.
- Reid, M.B., & Li, Y.P. (2001). Tumor necrosis factor- α and muscle wasting: a cellular perspective. *Respir. Res.* 2 : 269. Available at: <https://doi.org/10.1186/RR67>
- Reis, M., Teixeira, M., Carvão, C., Martins, A.C., Reis, M., Teixeira, M., *et al.* (2025). Validity and Reliability of the Self-Administered Timed Up and Go Test in Assessing Fall Risk in Community-Dwelling Older Adults. *Geriatrics*

- 2025, Vol. 10, 10. Available at:
<https://doi.org/10.3390/GERIATRICS10030062>
- Rhayun, S., Fan, X., & Seo, J. (2023). Physical and cognitive function to explain the quality of life among older adults with cognitive impairment: exploring cognitive function as a mediator. *BMC Psychol.* 11 : 1–9. Available at:
<https://doi.org/10.1186/S40359-023-01087-5/FIGURES/2>
- Richards, J.C., Bachman, S.L., Leonard-Corzo, K., Aryal, S., Blankenship, J.M., Clay, I., *et al.* (2025). A Holistic Approach to the Measurement of Physical Function in Clinical Research. *Digit. Biomark.* 9 : 1. Available at:
<https://doi.org/10.1159/000542364>
- Robinson, M., Turnbull, S., Lee, B.Y., & Leonenko, Z. (2020). The effects of melatonin, serotonin, tryptophan and NAS on the biophysical properties of DPPC monolayers. *Biochimica et Biophysica Acta (BBA) - Biomembranes* 1862 : 183363. Available at:
<https://doi.org/10.1016/J.BBAMEM.2020.183363>
- Rondanelli, M., Cereda, E., Klersy, C., Faliva, M.A., Peroni, G., Nichetti, M., *et al.* (2020). Improving rehabilitation in sarcopenia: a randomized-controlled trial utilizing a muscle-targeted food for special medical purposes. *J. Cachexia Sarcopenia Muscle* 11 : 1535–1547. Available at:
<https://doi.org/10.1002/JCSM.12532;REQUESTEDJOURNAL:JOURNAL:1353921906009;WGROU:STRING:PUBLICATION>
- Salminen, A. (2022). Role of indoleamine 2,3-dioxygenase 1 (IDO1) and kynurenine pathway in the regulation of the aging process. *Ageing Res. Rev.* 75 : 101573. Available at: <https://doi.org/10.1016/J.ARR.2022.101573>
- Saruta, J., Lee, T., Shirasu, M., Takahashi, T., Sato, C., Sato, S., *et al.* (2010). Chronic stress affects the expression of brain-derived neurotrophic factor in rat salivary glands. *Stress* 13 : 53–60. Available at:
<https://doi.org/10.3109/10253890902875167;WGROU:STRING:PUBLICATION>
- Saul, D., & Kosinsky, R.L. (2021). Epigenetics of aging and aging-associated diseases. *Int. J. Mol. Sci.* Available at: <https://doi.org/10.3390/ijms22010401>
- Savage, R.A., Zafar, N., Yohannan, S., & Miller, J.-M.M. (2024). Melatonin. *StatPearls*.
- Schaap, L.A., Pluijm, S.M.F., Deeg, D.J.H., & Visser, M. (2006). Inflammatory Markers and Loss of Muscle Mass (Sarcopenia) and Strength. *American Journal of Medicine* 119 : 526.e9-526.e17. Available at:
<https://doi.org/10.1016/j.amjmed.2005.10.049>
- Scott, S.B., Graham-Engeland, J.E., Engeland, C.G., Smyth, J.M., Almeida, D.M., Katz, M.J., *et al.* (2015). The Effects of Stress on Cognitive Aging, Physiology and Emotion (ESCAPE) Project. *BMC Psychiatry* 15 : 146. Available at: <https://doi.org/10.1186/S12888-015-0497-7>
- Setiawan, C., Sari, A.Y., & Wijayanti, A.A. (2025). Effect Providing Brain Gym On Improving Cognitive Function In Elderly: Meta-Analysis. *FISIO MU: Physiotherapy Evidences* 6 : 128–136. Available at:
<https://doi.org/10.23917/FISIOMU.V6I2.8470>

- Shortz, A.E., & Mehta, R.K. (2017). Cognitive challenges, aging, and neuromuscular fatigue. *Physiol. Behav.* 170 : 19–26. Available at: <https://doi.org/10.1016/J.PHYSBEH.2016.11.034>
- Shumway-Cook, A., Brauer, S., & Woollacott, M. (2000). Predicting the probability for falls in community-dwelling older adults using the timed up and go test. *Phys. Ther.* 80. Available at: <https://doi.org/10.1093/ptj/80.9.896>
- Silakarma, D., & Sudewi, A.A.R. (2019). The role of brain-derived neurotrophic factor (BDNF) in cognitive functions. *Bali Medical Journal* 8 : 518–525. Available at: <https://doi.org/10.15562/BMJ.V8I2.1460>
- Songtachalert, T., Roomruangwong, C., Carvalho, A.F., Bourin, M., & Maes, M. (2018). Anxiety disorders: sex differences in serotonin and tryptophan metabolism.
- Sorgdrager, F.J.H., Naudé, P.J.W., Kema, I.P., Nollen, E.A., & De Deyn, P.P. (2019). Tryptophan metabolism in inflammaging: From biomarker to therapeutic target. *Front. Immunol.* 10 : 2565. Available at: <https://doi.org/10.3389/FIMMU.2019.02565/FULL>
- Suda, K., & Matsuda, K. (2022). How Microbes Affect Depression: Underlying Mechanisms via the Gut-Brain Axis and the Modulating Role of Probiotics. *Int. J. Mol. Sci.* Available at: <https://doi.org/10.3390/ijms23031172>
- Susanto, E., & Kusuma, S. (2024). The Role of Brain-Derived Neurotrophic Factor (BDNF) in the Pathogenesis of Sarcopenia: A Meta-Analysis of Molecular Mechanisms. *Bioscientia Medicina : Journal of Biomedicine and Translational Research* 8 : 5736–5748. Available at: <https://doi.org/10.37275/BSM.V8I12.1148>
- Sutandyo, N., Worowerdi Cintakaweni, D.M., Setiawan, L., Hariani, R., & Utami, N. (2023). Association of Body Composition and Handgrip Strength with Interleukin-6 (IL-6) and Vitamin D Level in Cancer Patients. *Int. J. Gen. Med.* 16 : 1995. Available at: <https://doi.org/10.2147/IJGM.S388457>
- Sutowijoyo, D., & Widodo, W.D. (2013). Kriteria Kematangan Pascapanen Pisang Raja Bulu dan Pisang Kepok.
- Svinøy, O.E., Hilde, G., Bergland, A., & Strand, B.H. (2021). Timed Up and Go: Reference Values for Community-Dwelling Older Adults with and without Arthritis and Non-Communicable Diseases: The Tromsø Study. *Clin. Interv. Aging* 16 : 335–343. Available at: <https://doi.org/10.2147/CIA.S294512>
- Szuhany, K.L., Bugatti, M., & Otto, M.W. (2014). A meta-analytic review of the effects of exercise on brain-derived neurotrophic factor. *J. Psychiatr. Res.* 60 : 56. Available at: <https://doi.org/10.1016/J.JPSYCHIRES.2014.10.003>
- Tan, L.S.Y., Francis, H.M., & Lim, C.K. (2021). Exploring the roles of tryptophan metabolism in MS beyond neuroinflammation and neurodegeneration: A paradigm shift to neuropsychiatric symptoms. *Brain Behav. Immun. Health* 12 : 100201. Available at: <https://doi.org/10.1016/J.BBIH.2021.100201>
- Tanabe, K., Matsushima-Nishiwaki, R., Yamaguchi, S., Iida, H., Dohi, S., & Kozawa, O. (2010). Mechanisms of tumor necrosis factor- α -induced interleukin-6 synthesis in glioma cells. *Journal of Neuroinflammation* 2010 7:17 : 16-. Available at: <https://doi.org/10.1186/1742-2094-7-16>

- Tay, L., Ding, Y.Y., Leung, B.P., Ismail, N.H., Yeo, A., Yew, S., *et al.* (2015). Sex-specific differences in risk factors for sarcopenia amongst community-dwelling older adults. *Age (Omaha)*. 37 : 121. Available at: <https://doi.org/10.1007/S11357-015-9860-3>
- Teo, R.H., Cheng, W.H., Cheng, L.J., Lau, Y., & Lau, S.T. (2023). Global prevalence of social isolation among community-dwelling older adults: A systematic review and meta-analysis. *Arch. Gerontol. Geriatr.* 107. Available at: <https://doi.org/10.1016/J.ARCHGER.2022.104904>
- Thorand, B., Baumert, J., Döring, A., Herder, C., Kolb, H., Rathmann, W., *et al.* (2006). Sex differences in the relation of body composition to markers of inflammation. *Atherosclerosis* 184 : 216–224. Available at: <https://doi.org/10.1016/j.atherosclerosis.2005.04.011>
- Topolyanskaya, S. V., Eliseeva, T.A., Godovkina, I.E., Vasilieva, I.S., Vakulenko, O.N., & Dvoretzki, L.I. (2021). Tumor Necrosis Factor-Alpha in very Elderly Patients with Coronary Artery Disease. Available at: <https://doi.org/10.33879/AMH.XXX.2020.10036>
- Tozih, M., Shademan, B., Yousefi, H., Avci, C.B., Nourazarian, A., & Dehghan, G. (2023). Melatonin: a promising neuroprotective agent for cerebral ischemia-reperfusion injury. *Front. Aging Neurosci.* 15 : 1227513. Available at: <https://doi.org/10.3389/FNAGI.2023.1227513/FULL>
- Trueta, C., Cercós, M.G., Trueta, C., & Cercós, M.G. (2024). Serotonin in the Nervous System: Few Neurons Regulating Many Functions. *Serotonin - Neurotransmitter and Hormone of Brain, Bowels and Blood*. Available at: <https://doi.org/10.5772/INTECHOPEN.1005385>
- Uesugi, Y., Maruyama, K., Saito, I., Tomoka, K., Takata, Y., Kawamura, R., *et al.* (2021). A Cross-Sectional Study of the Relationship of Timed Up & Go Test with Physical Characteristics and Physical Activity in Healthy Japanese: The Toon Health Study. *Healthcare* 9 : 933. Available at: <https://doi.org/10.3390/HEALTHCARE9080933>
- Vaishnavi V Siroya, Waqar M Naqvi, & Chaitanya A Kulkarni (2020). Importance of Brain gym as exercise in physiotherapy and rehabilitation. *International Journal of Research in Pharmaceutical Sciences* 11 : 1386–1389. Available at: <https://doi.org/10.26452/IJRPS.V11ISPL4.4310>
- Vaishya, R., Misra, A., Vaish, A., Ursino, N., & D'Ambrosi, R. (2024). Hand grip strength as a proposed new vital sign of health: a narrative review of evidences. *J. Health Popul. Nutr.* 43 : 7. Available at: <https://doi.org/10.1186/S41043-024-00500-Y>
- Varela, S., Ayán, C., Bidaurrezaga-Letona, I., Diz, J.C., & Duñabeitia, I. (2023). The effect of Brain Gym on cognitive function in older people: A systematic review and meta-analysis. *Geriatr. Nurs. (Minneap)*. 53 : 175–180. Available at: <https://doi.org/10.1016/J.GERINURSE.2023.07.015>
- Wang, L., Xian, X., Liu, M., Li, J., Shu, Q., Guo, S., *et al.* (2025). Predicting the decline of physical function among the older adults in China: A cohort study based on China longitudinal health and longevity survey (CLHLS). *Geriatr. Nurs. (Minneap)*. 61 : 378–389. Available at: <https://doi.org/10.1016/J.GERINURSE.2024.11.019>

- Westbrook, R., Chung, T., Lovett, J., Ward, C., Joca, H., Yang, H., *et al.* (2020). Kynurenines link chronic inflammation to functional decline and physical frailty. *JCI Insight* 5. Available at: <https://doi.org/10.1172/JCI.INSIGHT.136091>
- World Health Organization (2025). Ageing: Global population [WWW Document]. URL <https://www.who.int/news-room/questions-and-answers/item/population-ageing> (accessed 10.2.25).
- World Health Organization (2000). The Asia-Pacific Perspective : Redefining Obesity and its Treatment. http://www.who.int/bmi/index.jsp?introPage=intro_3.html.
- Xu, Y., Liu, Z., Xu, J., Xu, L., He, Z., Liu, F., *et al.* (2025). Role of brain-derived neurotrophic factor in frailty: From mechanisms to interventions. *Biomedicine & Pharmacotherapy* 186 : 118016. Available at: <https://doi.org/10.1016/J.BIOPHA.2025.118016>
- Xue, D., Guo, X., Liu, J., Li, Y., Liu, L., Liao, G., *et al.* (2024). Tryptophan-rich diet and its effects on Htr7+ Tregs in alleviating neuroinflammation and cognitive impairment induced by lipopolysaccharide. *J. Neuroinflammation* 21 : 241. Available at: <https://doi.org/10.1186/S12974-024-03239-9>
- ZanESCO, A.M., & Velloso, L.A. (2025). Brain-Derived Neurotrophic Factor (BDNF) and Sex Differences in Metabolic Regulation. *J. Neurochem.* 169 : e70245. Available at: <https://doi.org/10.1111/JNC.70245>
- Zhu, S., Patel, K. V., Bandinelli, S., Ferrucci, L., & Guralnik, J.M. (2009). Predictors of Interleukin-6 Elevation in Older Adults. *J. Am. Geriatr. Soc.* 57 : 1672. Available at: <https://doi.org/10.1111/J.1532-5415.2009.02426.X>