

## DAFTAR PUSTAKA

- ABclonal (2025). ABScript Neo RT Master Mix for qPCR with gDNA Remover.
- Ahmadi, S., Sasaki, T., Sabariego, M., Leibold, C., Leutgeb, S., & Leutgeb, J.K. (2025). Distinct roles of dentate gyrus and medial entorhinal cortex inputs for phase precession and temporal correlations in the hippocampal CA3 area. *Nat. Commun.* 16 : 13. Available at: <https://doi.org/10.1038/s41467-024-54943-2>
- Anisimova, A.S., Alexandrov, A.I., Makarova, N.E., Gladyshev, V.N., & Dmitriev, S.E. (2018). Protein synthesis and quality control in aging. *Aging (Albany, NY)*. 10 : 4269–4288. Available at: <https://doi.org/10.18632/aging.101721>
- Belicza, M. (2009). Evaluation of morphologically determined apoptotic index. *Acta Med. Croatica* 63 Suppl 2 : 3–12.
- Bettio, L.E.B., Rajendran, L., & Gil-Mohapel, J. (2017). The effects of aging in the hippocampus and cognitive decline. *Neurosci. Biobehav. Rev.* 79 : 66–86. Available at: <https://doi.org/10.1016/j.neubiorev.2017.04.030>
- Bioline, M. (2025). SensiFAST qPCR Guide: Superior Fast Gene Expression Analysis.
- Canvax (2023). Data Sheet Primezol Reagent, Canvax Reagents, S.L.U. Boecillo Valladolid : .
- Celikel, T., Marx, V., Freudenberg, F., Zivkovic, A., Resnik, E., Hasan, M.T., *et al.* (2007). Select Overexpression of Homer1a in Dorsal Hippocampus Impairs Spatial Working Memory. *Front. Neurosci.* 1 : 97–110. Available at: <https://doi.org/10.3389/neuro.01.1.1.007.2007>
- Chauhan, P., Jethwa, K., Rathawa, A., Chauhan, G., & Mehra, S. (2021). The Anatomy of the Hippocampus, in: *Cerebral Ischemia*. pp. 17–30, Exon Publications. Available at: <https://doi.org/10.36255/exonpublications.cerebralischemia.2021.hippocampus>
- Chen, Y., Wang, B., Yang, C., Shi, Y., Dong, Z., & Troy, F.A. (2021). Functional Correlates and Impact of Dietary Lactoferrin Intervention and its Concentration-dependence on Neurodevelopment and Cognition in Neonatal Piglets. *Mol. Nutr. Food Res.* 65. Available at: <https://doi.org/10.1002/mnfr.202001099>
- Choi, H.-S., Ahn, J.H., Park, J.H., Won, M.-H., & Lee, C.-H. (2016). Age-dependent changes in the protein expression levels of Redd1 and mTOR in the gerbil hippocampus during normal aging. *Mol. Med. Rep.* 13 : 2409–2414. Available at: <https://doi.org/10.3892/mmr.2016.4835>
- Choręziak, A., Rosiejka, D., Michałowska, J., & Bogdański, P. (2025). Nutritional Quality, Safety and Environmental Benefits of Alternative Protein Sources-An Overview. *Nutrients* 17. Available at: <https://doi.org/10.3390/nu17071148>
- Clemente-Suárez, V.J., Martín-Rodríguez, A., Curiel-Regueros, A., Rubio-Zarapuz, A., & Tornero-Aguilera, J.F. (2025a). 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>
- Clemente-Suárez, V.J., Redondo-Flórez, L., Martín-Rodríguez, A., Curiel-Regueros, A., Rubio-Zarapuz, A., & Tornero-Aguilera, J.F. (2025b). Impact of Vegan and Vegetarian Diets on Neurological Health: A Critical Review. *Nutrients* 17 : 884.

Available at: <https://doi.org/10.3390/nu17050884>

- Clifton, N.E., Cameron, D., Trent, S., Sykes, L.H., Thomas, K.L., & Hall, J. (2017). Hippocampal Regulation of Postsynaptic Density Homer1 by Associative Learning. *Neural Plast.* 2017 : 1–11. Available at: <https://doi.org/10.1155/2017/5959182>
- Clifton, N.E., Trent, S., Thomas, K.L., & Hall, J. (2019). Regulation and Function of Activity-Dependent Homer in Synaptic Plasticity. *Mol. neuropsychiatry* 5 : 147–161. Available at: <https://doi.org/10.1159/000500267>
- Couteur, D.G. Le, Solon-Biet, S., Cogger, V.C., Mitchell, S.J., Senior, A., de Cabo, R., *et al.* (2016). The impact of low-protein high-carbohydrate diets on aging and lifespan. *Cell. Mol. Life Sci.* 73 : 1237–1252. Available at: <https://doi.org/10.1007/s00018-015-2120-y>
- Curdt, N., Schmitt, F.W., Bouter, C., Iseni, T., Weile, H.C., Altunok, B., *et al.* (2022). Search strategy analysis of Tg4 - 42 Alzheimer Mice in the Morris Water Maze reveals early spatial navigation deficits. *Sci. Rep.* 1–14. Available at: <https://doi.org/10.1038/s41598-022-09270-1>
- Damodaran, T., Cheah, P.S., Murugaiyah, V., & Hassan, Z. (2020). The nootropic and anticholinesterase activities of *Clitoria ternatea* Linn. root extract: Potential treatment for cognitive decline. *Neurochem. Int.* 139 : 104785. Available at: <https://doi.org/10.1016/j.neuint.2020.104785>
- Danjo, T. (2020). Allocentric representations of space in the hippocampus. *Neurosci. Res.* 153 : 1–7. Available at: <https://doi.org/10.1016/j.neures.2019.06.002>
- Darbandi, N., Komijani, M., & Tajiani, Z. (2023). New findings about comparing the effects of antibiotic therapy and phage therapy on memory and hippocampal pyramidal cells in rats. *J. Clin. Lab. Anal.* 37. Available at: <https://doi.org/10.1002/jcla.24942>
- Dhull, S.B., Kidwai, M.K., Noor, R., Chawla, P., & Rose, P.K. (2022). A review of nutritional profile and processing of faba bean (*Vicia faba* L.). *Legum. Sci.* 4. Available at: <https://doi.org/10.1002/leg3.129>
- Dong, B., Qi, Y., Sundas, H., Yang, R., Zhou, J., & Li, Z. (2023). Soy protein increases cognitive level in mice by modifying hippocampal nerve growth, oxidative stress, and intestinal microbiota. *J. Sci. Food Agric.* 103 : 4085–4094. Available at: <https://doi.org/10.1002/jsfa.12388>
- Dorostghoal, M., Sorooshnia, F., & Zardkaf, A. (2011). Stereological Analysis of Wistar Rat Testis During Early Post-natal Development. *Anat. Histol. Embryol.* 40 : 89–94. Available at: <https://doi.org/10.1111/j.1439-0264.2010.01043.x>
- Draganidis, D., Karagounis, L.G., Athanailidis, I., Chatzinikolaou, A., Jamurtas, A.Z., & Fatouros, I.G. (2016). Inflammaging and Skeletal Muscle: Can Protein Intake Make a Difference? *J. Nutr.* 146 : 1940–1952. Available at: <https://doi.org/10.3945/jn.116.230912>
- Duan, J., Zhang, T., Zhu, Y., Lu, B., Zheng, Q., & Mu, N. (2023). Atorvastatin Alleviates Myocardial Ischemia-Reperfusion Injury via miR-26a-5p/FOXO1. *J. Biosci. Med.* 11 : 215–231. Available at: <https://doi.org/10.4236/jbm.2023.112017>
- Dulka, B.N., Pullins, S.E., Cullen, P.K., Moyer, J.R., & Helmstetter, F.J. (2020). Age-related memory deficits are associated with changes in protein degradation in

- brain regions critical for trace fear conditioning. *Neurobiol. Aging* 91 : 160–166. Available at: <https://doi.org/10.1016/j.neurobiolaging.2020.03.001>
- Foscolou, A., Critselis, E., Tyrovolas, S., Chrysohoou, C., Naumovski, N., Sidossis, L.S., *et al.* (2021). The association of animal and plant protein with successful ageing: a combined analysis of MEDIS and ATTICA epidemiological studies. *Public Health Nutr.* 24 : 2215–2224. Available at: <https://doi.org/10.1017/S1368980020000427>
- Galen, I. van, Birkisdóttir, M.B., Ozinga, R.A., Brandt, R.M.C., Barnhoorn, S., Imholz, S., *et al.* (2025). High protein intake causes gene-length-dependent transcriptional decline, shortens lifespan and accelerates ageing in progeroid DNA repair-deficient mice. *npj Metab. Heal. Dis.* 3 : 20. Available at: <https://doi.org/10.1038/s44324-025-00064-3>
- Giovannini, M.G., & Lana, D. (2016). mTOR Involvement in the Mechanisms of Memory, in: *Molecules to Medicine with MTOR*. pp. 169–184, Elsevier. Available at: <https://doi.org/10.1016/B978-0-12-802733-2.00018-9>
- Giovannini, M.G., Lana, D., & Pepeu, G. (2015). The integrated role of ACh, ERK and mTOR in the mechanisms of hippocampal inhibitory avoidance memory. *Neurobiol. Learn. Mem.* 119 : 18–33. Available at: <https://doi.org/10.1016/j.nlm.2014.12.014>
- Granhölm, A.-C. (2010). Why Do We Need to Use Animal Models to Study Cognition and Aging? *Neuropsychopharmacology* 35 : 1621–1622. Available at: <https://doi.org/10.1038/npp.2010.45>
- Graves, A.R., Moore, S.J., Bloss, E.B., Mense, B.D., Kath, W.L., & Spruston, N. (2012). Hippocampal pyramidal neurons comprise two distinct cell types that are countermodulated by metabotropic receptors. *Neuron* 76 : 776–89. Available at: <https://doi.org/10.1016/j.neuron.2012.09.036>
- Gueugneau, M. (2023). The value of dietary plant protein in older people. *Curr. Opin. Clin. Nutr. Metab. Care* 26 : 3–7. Available at: <https://doi.org/10.1097/MCO.0000000000000884>
- Haider, S., & Tabassum, S. (2018). Impact of 1-day and 4-day MWM training techniques on oxidative and neurochemical profile in rat brain: A comparative study on learning and memory functions. *Neurobiol. Learn. Mem.* 155 : 390–402. Available at: <https://doi.org/10.1016/j.nlm.2018.09.003>
- Han, X., Liu, X., Jiang, Y., Wu, S., Zhang, Z., Gao, C., *et al.* (2024). The probe trial in a water maze test should not exceed two times. Available at: <https://doi.org/10.21203/rs.3.rs-4134660/v1>
- Hernández-Frausto, M., & Vivar, C. (2024). Entorhinal cortex–hippocampal circuit connectivity in health and disease. *Front. Hum. Neurosci.* 18. Available at: <https://doi.org/10.3389/fnhum.2024.1448791>
- Hoang, T.-H., Böge, J., & Manahan-Vaughan, D. (2021). Hippocampal subfield-specific Homer1a expression is triggered by learning-facilitated long-term potentiation and long-term depression at medial perforant path synapses. *Hippocampus* 31 : 897–915. Available at: <https://doi.org/10.1002/hipo.23333>
- Højfeldt, G., Bülow, Jacob, Agergaard, J., Asmar, A., Schjerling, P., Simonsen, L., *et al.* (2020). Impact of habituated dietary protein intake on fasting and postprandial whole-body protein turnover and splanchnic amino acid metabolism in elderly

- men: a randomized, controlled, crossover trial. *Am. J. Clin. Nutr.* 112 : 1468–1484. Available at: <https://doi.org/10.1093/ajcn/nqaa201>
- Ibrahim, M.Z. Bin, Benoy, A., & Sajikumar, S. (2022). Long-term plasticity in the hippocampus: maintaining within and ‘tagging’ between synapses. *FEBS J.* 289 : 2176–2201. Available at: <https://doi.org/10.1111/febs.16065>
- Inoue, N., Nakao, H., Migishima, R., Hino, T., Matsui, M., Hayashi, F., *et al.* (2009). Requirement of the immediate early gene vesl-1S/homer-1a for fear memory formation. *Mol. Brain* 2 : 7. Available at: <https://doi.org/10.1186/1756-6606-2-7>
- Jin, M., & Cai, S.-Q. (2023). Mechanisms Underlying Brain Aging Under Normal and Pathological Conditions. *Neurosci. Bull.* 39 : 303–314. Available at: <https://doi.org/10.1007/s12264-022-00969-9>
- Journel, M., Chaumontet, C., Darcel, N., Fromentin, G., & Tomé, D. (2012). Brain Responses to High-Protein Diets. *Adv. Nutr.* 3 : 322–329. Available at: <https://doi.org/10.3945/an.112.002071>
- Kaja, S., Sumien, N., Borden, P.K., Khullar, N., Iqbal, M., Collins, J.L., *et al.* (2013). Homer-1a immediate early gene expression correlates with better cognitive performance in aging. *Age (Omaha)*. 35 : 1799–1808. Available at: <https://doi.org/10.1007/s11357-012-9479-6>
- Kerchner, G.A., & Nicoll, R.A. (2008). Silent synapses and the emergence of a postsynaptic mechanism for LTP. *Nat. Rev. Neurosci.* 9 : 813–825. Available at: <https://doi.org/10.1038/nrn2501>
- Kinman, A.I., Merryweather, D.N., Erwin, S.R., Campbell, R.E., Sullivan, K.E., Kraus, L., *et al.* (2025). Atypical hippocampal excitatory neurons express and govern object memory. *Nat. Commun.* 16 : 1195. Available at: <https://doi.org/10.1038/s41467-025-56260-8>
- Knox, E.G., Aburto, M.R., Clarke, G., Cryan, J.F., & O’Driscoll, C.M. (2022). The blood-brain barrier in aging and neurodegeneration. *Mol. Psychiatry* 27 : 2659–2673. Available at: <https://doi.org/10.1038/s41380-022-01511-z>
- Koek, L.A., Sanderson, T.M., Georgiou, J., & Collingridge, G.L. (2024). The role of calcium stores in long-term potentiation and synaptic tagging and capture in mouse hippocampus. *Philos. Trans. R. Soc. B Biol. Sci.* 379. Available at: <https://doi.org/10.1098/rstb.2023.0241>
- Kudełka, W., Kowalska, M., & Popis, M. (2021). Quality of Soybean Products in Terms of Essential Amino Acids Composition. *Molecules* 26. Available at: <https://doi.org/10.3390/molecules26165071>
- Kumari, A., Kumar, R., Alam, A., & Sahu, B. (2025). Wistar Rat Model Of Alzheimer’s Disease: Behavioral Assessment and Therapeutic Screening. *Int. J. Pharm. Heal. Care Res.* 13 : 46–64.
- Lakatos, I., Bogacsovics, G., Tiba, A., Priksz, D., Juhász, B., Erdélyi, R., *et al.* (2025). AI-Driven Framework for Enhanced and Automated Behavioral Analysis in Morris Water Maze Studies. *Sensors* 25 : 1564. Available at: <https://doi.org/10.3390/s25051564>
- Learman, L.N. (2021). Mechanism of Homer1a Expression in Neurons and Disruption in Persistent MTORC1 Signaling. Johns Hopkins University.
- Li, F., He, R., Yue, Z., Yi, H., Lu, L., Zhang, L., *et al.* (2025). Effect of a 12-mo intervention with whey protein powder on cognitive function in older adults with

- mild cognitive impairment: a randomized controlled trial. *Am. J. Clin. Nutr.* 121 : 256–264. Available at: <https://doi.org/10.1016/j.ajcnut.2024.11.019>
- Li, Y., Tian, X., Luo, J., Bao, T., Wang, S., & Wu, X. (2024). Molecular mechanisms of aging and anti-aging strategies. *Cell Commun. Signal.* 22 : 285. Available at: <https://doi.org/10.1186/s12964-024-01663-1>
- Liu, X., Guo, B., Li, Q., & Nie, J. (2024). mTOR in metabolic homeostasis and disease. *Exp. Cell Res.* 441 : 114173. Available at: <https://doi.org/10.1016/j.yexcr.2024.114173>
- Livak, K.J., & Schmittgen, T.D. (2001). Analysis of Relative Gene Expression Data Using Real-Time Quantitative PCR and the 2- $\Delta\Delta$ CT Method. *Methods* 25 : 402–408. Available at: <https://doi.org/10.1006/meth.2001.1262>
- Lu, H., Liu, S., Zhang, S., Chen, J., & Chen, Q. (2025). Suppression of Alzheimer's disease by *Agaricus sinodeliciosus* var. *Chaidam* exopolysaccharide with amyloid- $\beta$  clearance activity via gut microbiota-metabolite regulation. *Int. J. Biol. Macromol.* 305 : 141048. Available at: <https://doi.org/10.1016/j.ijbiomac.2025.141048>
- Luis, C.O.S., & Ryan, T.J. (2022). Understanding the physical basis of memory: Molecular mechanisms of the engram. *J. Biol. Chem.* 298 : 101866. Available at: <https://doi.org/10.1016/j.jbc.2022.101866>
- Ma, T., Hoeffler, C.A., Capetillo-Zarate, E., Yu, F., Wong, H., Lin, M.T., *et al.* (2010). Dysregulation of the mTOR Pathway Mediates Impairment of Synaptic Plasticity in a Mouse Model of Alzheimer's Disease. *PLoS One* 5 : e12845. Available at: <https://doi.org/10.1371/journal.pone.0012845>
- Marques-Ramos, A., & Cervantes, R. (2023). Expression of mTOR in normal and pathological conditions. *Mol. Cancer* 22 : 112. Available at: <https://doi.org/10.1186/s12943-023-01820-z>
- Martineau-Côté, D., Achouri, A., Karboune, S., & L'Hocine, L. (2022). Faba Bean: An Untapped Source of Quality Plant Proteins and Bioactives. *Nutrients* 14. Available at: <https://doi.org/10.3390/nu14081541>
- Medawar, E., Huhn, S., Villringer, A., & Veronica Witte, A. (2019). The effects of plant-based diets on the body and the brain: a systematic review. *Transl. Psychiatry* 9 : 226. Available at: <https://doi.org/10.1038/s41398-019-0552-0>
- Ménard, C., & Quirion, R. (2012). Group 1 Metabotropic Glutamate Receptor Function and Its Regulation of Learning and Memory in the Aging Brain. *Front. Pharmacol.* 3. Available at: <https://doi.org/10.3389/fphar.2012.00182>
- Milan, A.M., D'Souza, R.F., Pundir, S., Pileggi, C.A., Barnett, M.P.G., Markworth, J.F., *et al.* (2015). Older adults have delayed amino acid absorption after a high protein mixed breakfast meal. *J. Nutr. Heal. aging* 19 : 839–845. Available at: <https://doi.org/10.1007/s12603-015-0500-5>
- Mohamed, N.H., Elsayad, H., Elsherbini, Y.M., & Abdraboh, M.E. (2022). Neuroprotective effect of peanut against oxidative stress in streptozotocin-induced diabetic rats. *Egypt. J. Basic Appl. Sci.* 9 : 542–559. Available at: <https://doi.org/10.1080/2314808X.2022.2106693>
- Monroy, E., Aguilar-Hernandez, L., de la Cruz-López, F., Flores, G., & Morales-Medina, J.C. (2025). Dendritic spine degeneration is associated with age-related decline in recognition and spatial memory in male mice. *Brain Struct. Funct.* 230

- : 142. Available at: <https://doi.org/10.1007/s00429-025-03002-7>
- Mustafa, M., Ahmad, R., Tantry, I.Q., Ahmad, W., Siddiqui, S., Alam, M., *et al.* (2024). Apoptosis: A Comprehensive Overview of Signaling Pathways, Morphological Changes, and Physiological Significance and Therapeutic Implications. *Cells* 13 : 1838. Available at: <https://doi.org/10.3390/cells13221838>
- Nair, A., & Jacob, S. (2016). A simple practice guide for dose conversion between animals and human. *J. Basic Clin. Pharm.* 7 : 27. Available at: <https://doi.org/10.4103/0976-0105.177703>
- Nakayama, K., Saito, Y., Sanbongi, C., Murata, K., & Urashima, T. (2021). Effects of low-dose milk protein supplementation following low-to-moderate intensity exercise training on muscle mass in healthy older adults: a randomized placebo-controlled trial. *Eur. J. Nutr.* 60 : 917–928. Available at: <https://doi.org/10.1007/s00394-020-02302-4>
- Navakkode, S., & Kennedy, B.K. (2024). Neural ageing and synaptic plasticity: prioritizing brain health in healthy longevity. *Front. Aging Neurosci.* 16. Available at: <https://doi.org/10.3389/fnagi.2024.1428244>
- Ngcobo, N.N. (2025). Influence of Ageing on the Pharmacodynamics and Pharmacokinetics of Chronically Administered Medicines in Geriatric Patients: A Review. *Clin. Pharmacokinet.* Available at: <https://doi.org/10.1007/s40262-024-01466-0>
- Nitschke, L. (2025). Snapshot: What is the Morris Water Maze Test? [WWW Document]. *Natl. Ataxia Found.* URL <https://www.ataxia.org/scasourceposts/snapshot-morris-water-maze-test/>
- Nugent, F.S., Li, K.W., & Chen, L. (2023). Editorial: Synaptic plasticity and dysfunction, friend or foe? *Front. Synaptic Neurosci.* 15. Available at: <https://doi.org/10.3389/fnsyn.2023.1204605>
- Panwar, V., Singh, A., Bhatt, M., Tonk, R.K., Azizov, S., Raza, A.S., *et al.* (2023). Multifaceted role of mTOR (mammalian target of rapamycin) signaling pathway in human health and disease. *Signal Transduct. Target. Ther.* 8 : 375. Available at: <https://doi.org/10.1038/s41392-023-01608-z>
- Puzzo, D., Fiorito, J., Purgatorio, R., Gulisano, W., Palmeri, A., Arancio, O., *et al.* (2016). Molecular Mechanisms of Learning and Memory\*\*The authors declare no competing financial interests., in: *Genes, Environment and Alzheimer's Disease*. pp. 1–27, Elsevier. Available at: <https://doi.org/10.1016/B978-0-12-802851-3.00001-2>
- Rátkai, A., Tárnok, K., Aouad, H. El, Micska, B., Schlett, K., & Szücs, A. (2021). Homeostatic plasticity and burst activity are mediated by hyperpolarization-activated cation currents and T-type calcium channels in neuronal cultures. *Sci. Rep.* 11 : 3236. Available at: <https://doi.org/10.1038/s41598-021-82775-3>
- Reagan-Shaw, S., Nihal, M., & Ahmad, N. (2008). Dose translation from animal to human studies revisited. *FASEB J.* 22 : 659–661. Available at: <https://doi.org/10.1096/fj.07-9574LSF>
- Rehman, S.U., Ali, R., Zhang, H., Zafar, M.H., & Wang, M. (2023). Research progress in the role and mechanism of Leucine in regulating animal growth and development. *Front. Physiol.* 14. Available at:

<https://doi.org/10.3389/fphys.2023.1252089>

- Ren, M., Li, H., Fu, Z., & Li, Q. (2022). Centenarian-Sourced *Lactobacillus casei* Combined with Dietary Fiber Complex Ameliorates Brain and Gut Function in Aged Mice. *Nutrients* 14 : 324. Available at: <https://doi.org/10.3390/nu14020324>
- Reshetnikov, V. V., Kisaretova, P.E., Ershov, N.I., Shulyupova, A.S., Oshchepkov, D.Y., Klimova, N. V., *et al.* (2020). Genes associated with cognitive performance in the Morris water maze: an RNA-seq study. *Sci. Rep.* 10 : 22078. Available at: <https://doi.org/10.1038/s41598-020-78997-6>
- Rony, M.K.K., Parvin, M.R., Wahiduzzaman, M., Akter, K., & Ullah, M. (2024). Challenges and Advancements in the Health-Related Quality of Life of Older People. *Adv. Public Heal.* 2024 : 1–18. Available at: <https://doi.org/10.1155/2024/8839631>
- Ros, E., Singh, A., & O’Keefe, J.H. (2021). Nuts: Natural Pleiotropic Nutraceuticals. *Nutrients* 13 : 3269. Available at: <https://doi.org/10.3390/nu13093269>
- Roshankhah, S., Sadeghi, E., Jalili, C., & Salahshoor, M. (2019). Impacts of low-protein diet on the hippocampal CA1 neurons and learning deficits in rats. *Adv. Hum. Biol.* 9 : 124. Available at: [https://doi.org/10.4103/AIHB.AIHB\\_31\\_19](https://doi.org/10.4103/AIHB.AIHB_31_19)
- Rozov, A., Zivkovic, A.R., & Schwarz, M.K. (2012). Homer1 gene products orchestrate Ca<sup>2+</sup>-permeable AMPA receptor distribution and LTP expression. *Front. Synaptic Neurosci.* 4. Available at: <https://doi.org/10.3389/fnsyn.2012.00004>
- Sachdev, N., Goomer, S., Singh, L.R.K., & Chowhan, R.K. (2024). Preparation and nutritional characterisation of protein concentrate prepared from foxtail millet (*Setaria italica*). *Food Sci. Technol. Int.* 30 : 699–712. Available at: <https://doi.org/10.1177/10820132231159819>
- Santos, J.L. dos, Quadros, A.S. de, Weschenfelder, C., Garofallo, S.B., & Marcadenti, A. (2020). Oxidative Stress Biomarkers, Nut-Related Antioxidants, and Cardiovascular Disease. *Nutrients* 12. Available at: <https://doi.org/10.3390/nu12030682>
- Sato, H., Tsukamoto-Yasui, M., Takado, Y., Kawasaki, N., Matsunaga, K., Ueno, S., *et al.* (2020). Protein Deficiency-Induced Behavioral Abnormalities and Neurotransmitter Loss in Aged Mice Are Ameliorated by Essential Amino Acids. *Front. Nutr.* 7 : 23. Available at: <https://doi.org/10.3389/fnut.2020.00023>
- Serdar, C.C., Cihan, M., Yücel, D., & Serdar, M.A. (2021). Sample size, power and effect size revisited: simplified and practical approaches in pre-clinical, clinical and laboratory studies. *Biochem. medica* 31 : 010502. Available at: <https://doi.org/10.11613/BM.2021.010502>
- Sheppard, P.A.S., Choleris, E., & Galea, L.A.M. (2019). Structural plasticity of the hippocampus in response to estrogens in female rodents. *Mol. Brain* 12 : 28–30. Available at: <https://doi.org/10.1186/s13041-019-0442-7>
- Slipeczuk, L., Bekinschtein, P., Katche, C., Cammarota, M., Izquierdo, I., & Medina, J.H. (2009). BDNF activates mTOR to regulate GluR1 expression required for memory formation. *PLoS One* 4 : e6007. Available at: <https://doi.org/10.1371/journal.pone.0006007>
- Solon-Biet, S.M., Walters, K.A., Simanainen, U.K., McMahon, A.C., Ruohonen, K., Ballard, J.W.O., *et al.* (2015). Macronutrient balance, reproductive function, and

- lifespan in aging mice. *Proc. Natl. Acad. Sci.* 112 : 3481–3486. Available at: <https://doi.org/10.1073/pnas.1422041112>
- Stein, I.S., Donaldson, M.S., & Hell, J.W. (2014). CaMKII binding to GluN2B is important for massed spatial learning in the Morris water maze. *F1000Research* 3 : 193. Available at: <https://doi.org/10.12688/f1000research.4660.1>
- Stoodley, I.L., Williams, L.M., & Wood, L.G. (2023). Effects of Plant-Based Protein Interventions, with and without an Exercise Component, on Body Composition, Strength and Physical Function in Older Adults: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. *Nutrients* 15. Available at: <https://doi.org/10.3390/nu15184060>
- Su, Z.-W., Liao, J., Zhang, H., Zhang, T., Wu, F., Tian, X.-H., *et al.* (2015). Postnatal high-protein diet improves learning and memory in premature rats via activation of mTOR signaling. *Brain Res.* 1611 : 1–7. Available at: <https://doi.org/10.1016/j.brainres.2015.01.052>
- Sudakov, S.K., Alekseeva, E. V., Nazarova, G.A., & Bashkatova, V.G. (2021). Age-Related Individual Behavioural Characteristics of Adult Wistar Rats. *Animals* 11 : 2282. Available at: <https://doi.org/10.3390/ani11082282>
- Sunarti (2024). Kandungan Nutrisi Susu Nabati Bagi Lansia. S00202416187.
- Suzuki, H., Yamashiro, D., Ogawa, S., Kobayashi, M., Cho, D., Iizuka, A., *et al.* (2020). Intake of Seven Essential Amino Acids Improves Cognitive Function and Psychological and Social Function in Middle-Aged and Older Adults: A Double-Blind, Randomized, Placebo-Controlled Trial. *Front. Nutr.* 7. Available at: <https://doi.org/10.3389/fnut.2020.586166>
- Tan, H.L., Chiu, S.-L., Zhu, Q., & Haganir, R.L. (2020). GRIP1 regulates synaptic plasticity and learning and memory. *Proc. Natl. Acad. Sci.* 117 : 25085–25091. Available at: <https://doi.org/10.1073/pnas.2014827117>
- Temido-Ferreira, M., Coelho, J.E., Pousinha, P.A., & Lopes, L. V. (2019). Novel Players in the Aging Synapse: Impact on Cognition. *J. Caffeine Adenosine Res.* 9 : 104–127. Available at: <https://doi.org/10.1089/caff.2019.0013>
- Toutirais, L., Vaysse, C., Gueugneau, M., & Walrand, S. (2024). Plant proteins: are they a good alternative to animal proteins in older people? *Curr. Opin. Clin. Nutr. Metab. Care* 27 : 372–377. Available at: <https://doi.org/10.1097/MCO.0000000000001026>
- Turrigiano, G. (2012). Homeostatic Synaptic Plasticity: Local and Global Mechanisms for Stabilizing Neuronal Function. *Cold Spring Harb. Perspect. Biol.* 4 : a005736–a005736. Available at: <https://doi.org/10.1101/cshperspect.a005736>
- Vanacore, G., Christensen, J.B., & Bayin, N.S. (2024). Age-dependent regenerative mechanisms in the brain. *Biochem. Soc. Trans.* 52 : 2243–2252. Available at: <https://doi.org/10.1042/BST20230547>
- Vorhees, C. V, & Williams, M.T. (2006). Morris water maze: procedures for assessing spatial and related forms of learning and memory. *Nat. Protoc.* 1 : 848–58. Available at: <https://doi.org/10.1038/nprot.2006.116>
- Wahl, D., Cavalier, A.N., & LaRocca, T.J. (2021). Novel Strategies for Healthy Brain Aging. *Exerc. Sport Sci. Rev.* 49 : 115–125. Available at: <https://doi.org/10.1249/JES.0000000000000242>
- Wang, M., Brandt, L.T.L., Wang, X., Russell, H., Mitchell, E., Kamimae-Lanning,

- A.N., *et al.* (2023). Genotoxic aldehyde stress prematurely ages hematopoietic stem cells in a p53-driven manner. *Mol. Cell* 83 : 2417-2433.e7. Available at: <https://doi.org/10.1016/j.molcel.2023.05.035>
- Wang, Y., Zhao, M., Shang, L., Zhang, Y., Huang, C., He, Z., *et al.* (2020). Homer1a protects against neuronal injury via PI3K/AKT/mTOR signaling pathway. *Int. J. Neurosci.* 130 : 621–630. Available at: <https://doi.org/10.1080/00207454.2019.1702535>
- Wellington, R.L., Bilder, R.M., Napolitano, B., & Szeszko, P.R. (2013). Effects of age on prefrontal subregions and hippocampal volumes in young and middle-aged healthy humans. *Hum. Brain Mapp.* 34 : 2129–2140. Available at: <https://doi.org/10.1002/hbm.22054>
- WHO (2025). Ageing.
- Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., *et al.* (2019). Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. *Lancet* 393 : 447–492. Available at: [https://doi.org/10.1016/S0140-6736\(18\)31788-4](https://doi.org/10.1016/S0140-6736(18)31788-4)
- Wong, L., Chong, Y.S., Lin, W., Kisiswa, L., Sim, E., Ibáñez, C.F., *et al.* (2021). Age-related changes in hippocampal-dependent synaptic plasticity and memory mediated by p75 neurotrophin receptor. *Aging Cell* 20. Available at: <https://doi.org/10.1111/accel.13305>
- Wu, W., Gong, X., Qin, Z., & Wang, Y. (2025). Molecular mechanisms of excitotoxicity and their relevance to the pathogenesis of neurodegenerative diseases—an update. *Acta Pharmacol. Sin.* Available at: <https://doi.org/10.1038/s41401-025-01576-w>
- Wu, X.-Q., Su, N., Fei, Z., & Fei, F. (2022). Homer signaling pathways as effective therapeutic targets for ischemic and traumatic brain injuries and retinal lesions. *Neural Regen. Res.* 17 : 1454. Available at: <https://doi.org/10.4103/1673-5374.330588>
- Xu, B., Sun, A., He, Y., Qian, F., Xi, S., Long, D., *et al.* (2018). Loss of thin spines and small synapses contributes to defective hippocampal function in aged mice. *Neurobiol. Aging* 71 : 91–104. Available at: <https://doi.org/10.1016/j.neurobiolaging.2018.07.010>
- Yan, B.C., Jiang, D., Wang, J., Zhang, Y., Zhu, X., Xu, P., *et al.* (2018). Both decreased Akt expression and mTOR phosphorylation are related to decreased neuronal differentiation in the hippocampal alveus of aged mice. *Aging Clin. Exp. Res.* 30 : 737–743. Available at: <https://doi.org/10.1007/s40520-017-0833-5>
- Yeh, T.-S., Yuan, C., Ascherio, A., Rosner, B.A., Blacker, D., & Willett, W.C. (2022). Long-term dietary protein intake and subjective cognitive decline in US men and women. *Am. J. Clin. Nutr.* 115 : 199–210. Available at: <https://doi.org/10.1093/ajcn/nqab236>
- Yuan, Z., Zhou, H., Zhou, N., Dong, D., Chu, Y., Shen, J., *et al.* (2019). Dynamic Evaluation Indices in Spatial Learning and Memory of Rat Vascular Dementia in the Morris Water Maze. *Sci. Rep.* 9 : 7224. Available at: <https://doi.org/10.1038/s41598-019-43738-x>
- Yunus, J., Prakosa, D., & Sari, D.C.R. (2012). Neuroprotective effect of vitamin D3 toward apoptosis induced by ethanol in CA1 pyramidal cells of rat hippocampus.

*J Med Sci* 44 : 1–9.

- Zheng, L., & Ekstrom, A.D. (2025). Spatial memory and its role in navigation and episodic memory, in: *Learning and Memory: A Comprehensive Reference*. pp. 76–92, Elsevier. Available at: <https://doi.org/10.1016/B978-0-443-15754-7.00021-3>
- Zwaluw, N.L. van der, Rest, O. van de, Tieland, M., Adam, J.J., Hiddink, G.J., Loon, L.J.C. van, *et al.* (2014). The impact of protein supplementation on cognitive performance in frail elderly. *Eur. J. Nutr.* 53 : 803–812. Available at: <https://doi.org/10.1007/s00394-013-0584-9>