DAFTAR PUSTAKA

Aashaq, S., Batool, A., Mir, S. A., Beigh, M. A., Andrabi, K. I., & Shah, Z. A. (2022). TGF-β1 signaling: A recap of SMAD—independent and—dependent pathways. *J Cell Physiol*, 237, 59–85. https://doi.org/10.1002/jcp.30529

Abdel Aziz, M. A., Badary, D. M., & Hussein, M. R. A. (2017). Renal damage following alloxan-induced diabetes is associated with generation of reactive oxygen species, alterations of p53, TGF-β1, and extracellular matrix metalloproteinases in rats. *Cell Biology International*, *41*(5), 525-533.

Abu Khadra, B. A., Abu-Samak, M. S., & Alqudah, M. A. Y. (2024). Association between reactive oxygen species and antioxidant enzymes activity with glycemic control in type 2 diabetes mellitus. *European Journal of Medical Research, 29*, 67. https://doi.org/10.1186/s40001-024-01906-4

Agung Putra, A., & Soebandrio, A. (Eds.). (2019). Basic Molecular Stem Cell. Semarang: Unissula Press.

Aguwa, U. S., Okeke, S. N., Eze, C., & Ovie, F. (2020). Evaluating methods of rat euthanasia on the liver and kidney of wistar rats: cervical dislocation, chloroform inhalation, diethyl ether inhalation and formalin inhalation. *Letters in Health Biological Science*, *5*(1), 8-13.

Al-Azzawi, B., McGuigan, D. H., Manderson Koivula, F. N., Elttayef, A., Dale, T. P., Yang, Y., Kelly, C., & Forsyth, N. R. (2020). The secretome of mesenchymal stem cells prevents islet beta cell apoptosis via an IL-10-dependent mechanism. *The Open Stem Cell Journal, 6*(1), 1–12. https://doi.org/10.2174/1876893802006010001

American Diabetes Association. (2023). *Standards of medical care in diabetes—2023. Diabetes Care*, 46(Supplement_1), S1–S291. https://doi.org/10.2337/dc23-Sint

American Diabetes Association; 2. Classification and Diagnosis of Diabetes: *Standards of Medical Care in Diabetes—2021. Diabetes Care* 1 January 2021; 44 (Supplement_1): S15–S33. https://doi.org/10.2337/dc21-S002

Asim, M., Jamil, M., Aftab, M. N., & Basit, A. (2024). Oxidative stress in type-2 diabetes mellitus. In S. S. Sreekumar & P. K. Radhakrishnan (Eds.), *Recent advances in diabetes research and treatment* (pp. 103–119). Springer. https://doi.org/10.1007/978-3-031-69962-7_5

Augello, A., Kurth, T., & De Bari, C. (2010). Mesenchymal stem cells: A perspective from in vitro cultures to in vivo migration and niches.

European Cells and Materials, 20, 121–133. https://doi.org/10.22203/ecm.v020a11

Ayub, S., Shafi, T., Rasool, R., Dangroo, M. A., Bindroo, M. A., Gull, A., & Shah, Z. A. (2024). Evaluating the role of active TGF-β1 as inflammatory biomarker in systemic sclerosis. *Advances in Rheumatology, 64*, Article 91. https://doi.org/10.1186/s42358-024-00433-4

Azizah, M. I., Mulyani, R., Hartati, Y. W., & Maksum, I. P. (2024). Mutasi pada DNA mitokondria dan pengaruhnya terhadap diabetes melitus tipe 2 dan kompleks fosforilasi oksidatif. *Chimica et Natura Acta, 12*(2), 128–137. https://doi.org/10.24198/cna.v12.n2.49970

Azlan, N. A. B. N., Vitus, V., Rashid, N. N., Nordin, F., Tye, G. J., & Zaman, W. S. W. K. (2024). Human mesenchymal stem cell secretomes: Factors affecting profiling and challenges in clinical application. *Cell and Tissue Research, 395*, 227–250. https://doi.org/10.1007/s00441-023-03857-4

Behl, T., Gupta, A., Sehgal, A., Singh, S., Sharma, N., Garg, M.,& Bungau, S. (2022). Exploring the multifaceted role of TGF-β1 signaling in diabetic complications. *Environmental Science and Pollution Research, 29*, 35643–35656. https://doi.org/10.1007/s11356-022-19499-y

Bender Kim, C. F., Jackson, E. L., Woolfenden, A. E., Lawrence, S., Babar, I., Vogel, S., & Jacks, T. (2005). Identification of bronchioalveolar stem cells in normal lung and lung cancer. Cell, 121(6), 823–835. https://doi.org/10.1016/j.cell.2005.03.032

Bentzinger, C. F., Wang, Y. X., & Rudnicki, M. A. (2013). Building muscle: Molecular regulation of myogenesis. Cold Spring Harbor Perspectives in Biology, 5(2), a008342. https://doi.org/10.1101/cshperspect.a008342

Boregowda, S. V., & Phinney, D. G. (2012). MSCs: Paracrine Effects. Dalam *Mesenchymal Stromal Cells* (hlm. 145–167). Springer. https://doi.org/10.1007/978-1-4614-5711-4_9

Branitamahisi, B. (2021). *Perbaikan sensitivitas insulin diabetes melitus tipe 2 oleh media terkondisi sel punca mesensimal*. Praxis: Jurnal Sains, Teknologi, dan Humaniora, Universitas Katolik Soegijapranata. Retrieved from https://journal.unika.ac.id/index.php/praxis/article/download/1629/1129

Budi, A. (2024). Optimasi pencucian sel menggunakan PBS dalam kultur MSCs. *Jurnal Bioteknologi Tropis,* 12(1), 33–40.

Bukhari, H.A., Afzal, M., Al-Abbasi, F.A. *et al.* (2024). In vivo and computational investigation of butin against alloxan-induced diabetes via biochemical, histopathological, and molecular interactions. *Sci Rep* **14**, 20633. https://doi.org/10.1038/s41598-024-71577-y

Cahyaningrum, P. L., Yuliari, S. A. M., & Suta, I. B. P. (2019). Antidiabetic activity test using Amla fruit (Phyllanthus emblica L.) extract in alloxan-induced BALB/c mice. *Journal of Vocational Health Studies, 3*(2), 123–130.

Caplan, A. I. (2017). Mesenchymal stem cells: Time to change the name! Stem Cells Translational Medicine, 6(6), 1445–1451. https://doi.org/10.1002/sctm.17-0051

Caturano, A., Galiero, R., Rinaldi, L., Acierno, C., Brunetti, A., Raguzzini, A., Santulli, R., & Santopaolo, F. (2023). Oxidative stress and type 2 diabetes: From pathophysiology to novel therapeutic targets. *Biomedicines, 11*(4), 986. https://doi.org/10.3390/biomedicines11040986

Chouw, A., Sartika, C. R., Milanda, T., & Faried, A. (2022). Effect of Type 2 Diabetes Mellitus Patient's Serum as Preconditioning on Umbilical Cord Mesenchymal–Derived Secretome Production. *Regenerative Engineering and Translational Medicine,* 8, 607–614. https://doi.org/10.1007/s40883-022-00259-w

de Jager, J., Kooy, A., Lehert, P., Wulffelé, M. G., van der Kolk, J., Bets, D., ... & Stehouwer, C. D. (2010). Long term treatment with metformin in patients with type 2 diabetes and risk of vitamin B-12 deficiency: Randomised placebo controlled trial. BMJ, 340, c2181. https://doi.org/10.1136/bmj.c2181

Decroli, E. (2019). Diabetes Melitus Tipe 2. Padang: Pusat Penerbitan Bagian Ilmu Penyakit Dalam, Fakultas Kedokteran Universitas Andalas.

Decroli, E. (2022). Mekanisme molekuler dari resistensi insulin pada diabetes melitus tipe dua. *Majalah Kedokteran Andalas, 45*(4), 610–618. https://doi.org/10.25077/mka.v45.i4.p610-618.2022

Dewi, R. K., Pramono, B., & Widyarti, S. (2019). Estimasi volume insula pancreatica tikus Wistar menggunakan metode Cavalieri. Jurnal Biologi Indonesia, 15(2), 123–130.

Eibl, G., & Rozengurt, E. (2021). Metformin: Review of epidemiology and mechanisms of action in pancreatic cancer. Cancer and Metastasis Reviews, 40(3), 865–878. https://doi.org/10.1007/s10555-021-09977-z

Eleuteri, S., & Fierabracci, A. (2019). Insights into the secretome of mesenchymal stem cells and its potential applications. *International Journal of Molecular Sciences, 20*(18), 4597. https://doi.org/10.3390/ijms20184597

Ferreira, J. R., Teixeira, G. Q., Santos, S. G., Barbosa, M. A., & Gonçalves, R. M. (2018). Mesenchymal stromal cell secretome: Influencing therapeutic potential by cellular pre-conditioning. *Frontiers in Immunology, 9*, 2837. https://doi.org/10.3389/fimmu.2018.02837

Foretz, M., Guigas, B., & Viollet, B. (2019). Understanding the glucoregulatory mechanisms of metformin in type 2 diabetes mellitus. Nature Reviews Endocrinology, 15(10), 569–589. https://doi.org/10.1038/s41574-019-0242-2

Frangogiannis, N. G. (2020). Transforming growth factor–β in tissue fibrosis. *Journal of Experimental Medicine, 217*(3), e20190103. https://doi.org/10.1084/jem.20190103

Galicia-Garcia, U., Benito-Vicente, A., Jebari, S., Larrea-Sebal, A., Siddiqi, H., Uribe, K. B., Ostolaza, H., & Martín, C. (2020). Pathophysiology of type 2 diabetes mellitus. *International Journal of Molecular Sciences, 21*(17), 6275. https://doi.org/10.3390/ijms21176275

Ghanbari Rad, M., Sharifi, M., Meamar, R., & Soltani, N. (2022). The role of pancreas to improve hyperglycemia in STZ-induced diabetic rats by thiamine disulfide. Nutrition & Diabetes, 12, Article 32. https://doi.org/10.1038/s41387-022-00211-5

Giarratana, A. O., Prendergast, C. M., Salvatore, M. M., & Capaccione, K. M. (2024). TGF-β1 signaling: Critical nexus of fibrogenesis and cancer. *Journal of Translational Medicine, 22*, 594. https://doi.org/10.1186/s12967-024-05411-4

Habibah, N. R. (2020). *Sekretom sebagai agen regeneratif terhadap kerusakan hepar dan ren tikus putih yang diinduksi cisplatin* [Skripsi, Universitas Gadjah Mada]. UGM Repository. https://etd.repository.ugm.ac.id/penelitian/detail/174485

Hadiningrat, F. M. (2017). *Uji efek antihiperglikemia ekstrak etanol 70% daun seledri Jepang (Angelica keiskei) pada tikus putih jantan galur Sprague Dawley dengan metode induksi aloksan* (Skripsi). Fakultas Kedokteran dan Ilmu Kesehatan, UIN Syarif Hidayatullah Jakarta. https://repository.uinjkt.ac.id/dspace/bitstream/123456789/35948/1/Faris%20Mohammad%20Hadiningrat-FKIK.pdf

Hahm, K. B., Im, Y. H., Lee, C., Parks, W. T., Bang, Y. J., Green, J. E., & Kim, S. J. (2000). Loss of TGF-β1 signaling contributes to autoimmune pancreatitis. Journal of Clinical Investigation, 105(4), 585–593. https://doi.org/10.1172/JCI8337

Han, Y., Yang, J., Fang, J., Zhou, Y., Candi, E., Wang, J., & Shi, Y. (2022). The secretion profile of mesenchymal stem cells and potential applications in treating human diseases. *Signal Transduction and Targeted Therapy*, 7(1), 92.

Hou, Y., Ding, W., Wu, P., Liu, C., Ding, L., Liu, J., & Wang, X. (2022). Adipose-derived stem cells alleviate liver injury induced by type 1 diabetes mellitus by inhibiting mitochondrial stress and attenuating inflammation. Stem Cell Research & Therapy, 13(1), 132.

Huang, Y., Wu, Q., & Tam, P. K. H. (2022). Immunomodulatory mechanisms of mesenchymal stem cells and their potential clinical applications. *International Journal of Molecular Sciences, 23*(17), 10023. https://doi.org/10.3390/ijms231710023

Hutapea, C. M. (2022). *Pengaruh pemberian ekstrak bunga telang terhadap ekspresi gen TGF-β1 dan densitas kolagen (Studi eksperimental in vivo pada tikus jantan galur Wistar dengan penurunan kolagen akibat terpapar UVB intensitas tinggi)* [Tesis, Universitas Islam Sultan Agung]. https://repository.unissula.ac.id/25190/1/MBK2016010195_fullpdf.pdf

International Diabetes Federation. (2021). *IDF Diabetes Atlas* (10th ed.). Brussels: IDF. https://www.diabetesatlas.org

International Diabetes Federation. (2023). IDF Diabetes Atlas (10th ed.). Brussels: International Diabetes Federation.

International Diabetes Federation. (2025). *IDF Diabetes Atlas* (11th ed.). Brussels: IDF. https://www.diabetesatlas.org

Inzucchi, S. E., Lipska, K. J., Mayo, H., Bailey, C. J., & McGuire, D. K. (2014). Metformin in patients with type 2 diabetes and kidney disease: A systematic review. JAMA, 312(24), 2668–2675. https://doi.org/10.1001/jama.2014.15298

Jiang Y, Fischbach S, Xiao X. The Role of the TGFβ Receptor Signaling Pathway in Adult Beta Cell Proliferation. Int J Mol Sci. 2018 Oct 12;19(10):3136. doi: 10.3390/ijms19103136. PMID: 30322036; PMCID: PMC6212884.

Jiang, Y., Huang, W., Wang, J., Xu, Z., He, J., Lin, X.,& Zhang, J. (2014). Metformin plays a dual role in MIN6 pancreatic β cell function through AMPK-dependent autophagy. *International journal of biological sciences*, *10*(3), 268.

Kanwal, A., Kanwar, N., Bharati, S., Srivastava, P., Singh, S. P., & Amar, S. (2022). Exploring new drug targets for type 2 diabetes: Success, challenges and opportunities. Biomedicines, 10(2), 331. https://doi.org/10.3390/biomedicines10020331

Kementerian Kesehatan Republik Indonesia. (2023). *Laporan Hasil Survei Kesehatan Indonesia (SKI) 2023*. Badan Kebijakan Pembangunan Kesehatan. https://pusdatin.kemkes.go.id

Kern, S., Eichler, H., Stoeve, J., Klüter, H., & Bieback, K. (2006). Comparative analysis of mesenchymal stem cells from bone marrow, umbilical cord blood, or adipose tissue. *Stem Cells, 24*(5), 1294–1301. https://doi.org/10.1634/stemcells.2005-0342

Khanyisani, Z., Mazibuko-Mbeje, S. E., Mthembu, S. X. H., et al. (2023). Anti-obesity effects of metformin: A scoping review evaluating the feasibility of brown adipose tissue as a therapeutic target. International Journal of Molecular Sciences, 24(3), 2227. https://doi.org/10.3390/ijms24032227

Kralik, P., & Ricchi, M. (2017). A basic guide to real time PCR in microbial diagnostics: definitions, parameters, and everything. Frontiers in microbiology, 8, 108.

Kubiczkova, L., Sedlarikova, L., Hajek, R., & Sevcikova, S. (2012). TGF-β1 – an excellent servant but a bad master. *Journal of Translational Medicine, 10*, 183. https://doi.org/10.1186/1479-5876-10-183

Lenzen, S. (2008). The mechanisms of alloxan- and streptozotocin-induced diabetes. *Diabetologia, 51*(2), 216–226. https://doi.org/10.1007/s00125-007-0886-7

Li, L., Hua, S., You, L., & Zhong, T. (2024). Secretome derived from mesenchymal stem/stromal cells: A promising strategy for diabetes and its complications. *Current Stem Cell Research & Therapy, 19*(10), 1328–1350. https://doi.org/10.2174/1574888X19666230913154544

Liu, F., Qiu, H., Xue, M., Zhang, S., Zhang, X., Xu, J., Chen, J., Yang, Y., & Xie, J. (2019). MSC-secreted TGF-β1 regulates lipopolysaccharide-stimulated macrophage M2-like polarization via the Akt/FoxO1 pathway. *Stem Cell Research & Therapy, 10*, 345. https://doi.org/10.1186/s13287-019-1447-y

Livak, K. J., & Schmittgen, T. D. (2001). Analysis of relative gene expression data using real-time quantitative PCR and the 2−ΔΔCT method. *Methods*, 25(4), 402–408. https://doi.org/10.1006/meth.2001.1262

Margaretha, M. (2016). Efek Induksi Diabetes Mellitus Tipe-1 Pada Histopatologi Pancreas Tikus Putih (Rattus Norvegicus). *VITEK: Bidang Kedokteran Hewan*, *6*.

Meiliana, A., Dewi, N. M., & Wijaya, A. (2019). Mesenchymal Stem Cell Secretome: Cell-free Therapeutic Strategy in Regenerative Medicine. *The Indonesian Biomedical Journal*, 11(2), 113–124. https://doi.org/10.18585/inabj.v11i2.839

Mikhail, G., Divashuk., Ekaterina, A., Nikitina., Victoria, M., Sokolova., A.I., Yurkina., A, A, Kocheshkova., Olga, V., Razumova., Gennady, I., Karlov., Pavel, Yu., Kroupin. (2022). qPCR as a Selective Tool for Cytogenetics. Plants, doi: 10.3390/plants12010080.

Mitalipov, S., & Wolf, D. P. (2009). Totipotency, pluripotency and nuclear reprogramming. Advances in Biochemical Engineering/Biotechnology, 114, 185–199. https://doi.org/10.1007/10_2008_45

Montero, Trinidad Vilchez,. Álvaro Sierra-Sánchez2,3, Manuel Sanchez-Diaz,Maria Isabel Quiñones-Vico. 2021. Mesenchymal Stromal Cell-Conditioned Medium for Skin Diseases: A Systematic Review. Frontiers in Cell and Developmental. Vol (9).

Noviantari, A., & Febrianti, T. (2021). Kajian: Alternatif pengganti trypsin pada kultur sel punca mesenkim. Seminar Nasional Riset Kedokteran (Sensorik II), 2(1), 73–80.

Noviantari, A., & Khariri. (2020). Ragam penelitian dan pengembangan isolasi dan kultur sel punca mesenkim dari berbagai sumber. Prosiding Seminar Nasional Masyarakat Biodiversitas Indonesia, 6(1), 611–618.

Ormazabal, V., Nova-Lampeti, E., Rojas, D., Zúñiga, F. A., Escudero, C., Lagos, P., Aguayo, C. (2022). Secretome from human mesenchymal stem cells-derived endothelial cells promotes wound healing in a type-2 diabetes mouse model. *International Journal of Molecular Sciences*, 23(2), 941. https://doi.org/10.3390/ijms23020941

Pakgohar, A., & Mehrannia, H. (2024). Sample size calculation in clinical trial and animal studies. *International Journal of Diabetes and Obesity*, 6(2), 65–70.

Pan, F. C., & Wright, C. (2011). Pancreas organogenesis: From bud to plexus to gland. *Developmental Dynamics,* 240(3), 530–565. https://doi.org/10.1002/dvdy.22584

Pantsulaia, T. (2006). Role of TGF-beta in pathogenesis of diabetic nephropathy. *Georgian medical news*, (131), 13-18.

Phelps, J., Nezhad, A. S., Ungrin, M., Duncan, N. A., & Sen, A. (2018). Bioprocessing of mesenchymal stem cells and their derivatives: Toward cell-free therapeutics. *Stem Cells International*, 2018, 1–23.

Pinheiro-Machado, E., de Haan, B. J., Engelse, M. A., & Smink, A. M. (2025). Secretome analysis of human and rat pancreatic islets co-cultured with adipose-derived stromal cells reveals a signature with enhanced regenerative capacities. *Cells, 14*(4), 302. https://doi.org/10.3390/cells14040302

Pogodziński, D., Ostrowska, L., Smarkusz-Zarzecka, J., & Zyśk, B. (2022). Secretome of Adipose Tissue as the Key to Understanding the Endocrine Function of Adipose Tissue. *International Journal of Molecular Sciences*, *23*(4), 2309. https://doi.org/10.3390/ijms23042309

Pongoh, A. F., de Queljoe, E., & Rotinsulu, H. (2020). Uji antidiabetik ekstrak etanol bunga pepaya (Carica papaya L.) terhadap tikus putih jantan (Rattus norvegicus) yang diinduksi aloksan. *Pharmacon: Jurnal Ilmiah Farmasi – UNSRAT,* *9*(1), 1–8. https://ejournal.unsrat.ac.id/index.php/pharmacon/article/download/27423/26975

Pryor, R., & Cabreiro, F. (2015). Repurposing metformin: An old drug with new tricks in its binding pockets. Biochemical Journal, 471(3), 307–322. https://doi.org/10.1042/BJ20150497

Purmessur, D., Cornejo, M. C., Cho, S. K., & Lotz, J. C. (2012). Biological therapies for disc degeneration: Mesenchymal stem cell implantation and cell homing. *European Spine Journal, 21*(Suppl 6), 897–907. https://doi.org/10.1007/s00586-012-2333-3

Putra, I. M. W. A., Fakhrudin, N., Nurrochmad, A., & Wahyuono, S. (2023). A Review of Medicinal Plants with Renoprotective Activity in Diabetic Nephropathy Animal Models. *Life*, *13*(2), 560. https://doi.org/10.3390/life13020560

Rajaei, E., Jalali, M. T., Shahrabi, S., Asnafi, A. A., & Pezeshki, S. M. S. (2019). HLAs in autoimmune diseases: Dependable diagnostic biomarkers? Current Rheumatology Reviews, 15(4), 269–276.

Runa, F., Ortiz-Soto, G., de Barros, N. R., & Kelber, J. A. (2024). Targeting SMAD-Dependent Signaling: Considerations in Epithelial and Mesenchymal Solid Tumors. *Pharmaceuticals*, *17*(3), 326. https://doi.org/10.3390/ph17030326

Sakai, D., & Andersson, G. B. J. (2015). Stem cell therapy for intervertebral disc regeneration: Obstacles and solutions. *Nature Reviews Rheumatology, 11*(4), 243–256. https://doi.org/10.1038/nrrheum.2015.13

Salzig, D., Schmiermund, A., Grace, P. P., Elseberg, C., Weber, C., & Czermak, P. (2014). Enzymatic detachment of therapeutic mesenchymal stromal cells grown on glass carriers in a bioreactor. Open Biomedical Engineering Journal, 7(1), 147–158.

Sari, M. I., Jusuf, N. K., Munir, D., Putra, A., Putra, I. B., Farhat, F., Ilyas, S., & Muhar, A. M. (2024). Mesenchymal stem cell secretome therapy on inflammation: A systematic review. *Journal of Pharmacy & Pharmacognosy Research,* 12(1), 39–49. https://doi.org/10.56499/jppres23.1726_12.1.39

Segeritz, C. P. (2017). Human pluripotent stem cell culture: Current trends and challenges. Biochemical Society Transactions, 45(3), 843–856. https://doi.org/10.1042/BST20160471

Seino, Y., Nanjo, K., Tajima, N., Kadowaki, T., Kashiwagi, A., Araki, E., Ito, C., Inagaki, N., Iwamoto, Y., Kasuga, M., Hanafusa, T., Haneda, M., & Ueki, K. (2010). Report of the Committee on the classification and diagnostic criteria of diabetes mellitus. *Journal of Diabetes Investigation, 1*(5), 212–228. https://doi.org/10.1111/j.2040-1124.2010.00074.x

Suparno, A. C., Rubinadzari, N., & Kasasiah, A. (2022). Generasi berikutnya: Sel punca mesenkim sebagai sistem penghantaran obat berbasis sel. *Majalah Farmasetika, 7*(2), 123–132. https://jurnal.unpad.ac.id/farmasetika/article/view/36303

Szkudelski, T. (2001). The mechanism of alloxan and streptozotocin action in B cells of the rat pancreas. *Physiological Research, 50*(6), 537–546.

Szkudelski, T. (2012). Streptozotocin–nicotinamide-induced diabetes in the rat: Characteristics of the experimental model. *Experimental Biology and Medicine, 237*(5), 481–490. https://doi.org/10.1258/ebm.2012.011372

Taherian, M., Bayati, P., & Mojtabavi, N. (2024). Stem cell-based therapy for fibrotic diseases: Mechanisms and pathways. *Stem Cell Research & Therapy, 15*(170). https://doi.org/10.1186/s13287-024-03782-5

Takahashi, K., & Yamanaka, S. (2006). Induction of pluripotent stem cells from mouse embryonic and adult fibroblast cultures by defined factors. Cell, 126(4), 663–676. https://doi.org/10.1016/j.cell.2006.07.024

Talathi, S. S., Zimmerman, R., & Young, M. (2023). Anatomy, abdomen and pelvis, pancreas. In StatPearls [Internet]. StatPearls Publishing. https://europepmc.org/article/MED/30422507

Trounson, A., & McDonald, C. (2015). Stem cell therapies in clinical trials: Progress and challenges. *Cell Stem Cell, 17*(1), 11–22. https://doi.org/10.1016/j.stem.2015.06.007

Trzyna, A., & Banaś-Ząbczyk, A. (2021). Adipose-derived stem cells secretome and its potential application in stem cell-free therapy. *Biomolecules, 11*(6), 878. https://doi.org/10.3390/biom11060878

Tuleta, I., & Skowasch, D. (2021). *Transforming growth factor-β and related molecules in cardiac fibrosis—markers, targets, and novel therapies*. International Journal of Molecular Sciences, 22(14), 7234. https://doi.org/10.3390/ijms22147234

Vieira, R., Souto, S. B., Sánchez-López, E., López Machado, A., Severino, P., Jose, S.,& Souto, E. B. (2019). Sugar-lowering drugs for type 2 diabetes mellitus and metabolic syndrome—strategies for in vivo administration: part-II. *Journal of clinical medicine*, *8*(9), 1332.

Vizoso, F. J., Eiro, N., Cid, S., Schneider, J., & Pérez-Fernández, R. (2017). Mesenchymal stem cell secretome: Toward cell-free therapeutic strategies in regenerative medicine. *International Journal of Molecular Sciences*, 18(9), 1852. https://doi.org/10.3390/ijms18091852

VSS, P., Adapa, D., Vana, D. R., Choudhury, A., Asadullah, J., & Chatterjee, A. (2018). Nutritional components relevant to type-2-diabetes: Dietary sources, metabolic functions and glycaemic effects. *Journal of Research in Medical and Dental Science*, *6*(5), 52-75.

Wang, C., Wu, Y., & Jiang, J. (2025). The role and mechanism of mesenchymal stem cells in immunomodulation of type 1 diabetes mellitus and its complications: Recent research progress and challenges. *Stem Cell Research & Therapy, 16*, Article 308. https://doi.org/10.1186/s13287-025-04431-1

Wang, H. L., Wang, L., Zhao, C. Y., & Lan, H. Y. (2022). Role of TGF-beta signaling in beta cell proliferation and function in diabetes. *Biomolecules, 12*(3), 373. https://doi.org/10.3390/biom12030373

Wang, L., Deng, J., Tian, W., Xiang, B., Yang, T., & Li, G. (2018). Adipose-derived stem cells are an effective cell candidate for treatment of heart failure: A meta-analysis of preclinical studies. Stem Cell Research & Therapy, 9(1), 1–12. https://doi.org/10.1186/s13287-018-1007-4

White, M. G., Shaw, J. A. M., & Taylor, R. (2016). Type 2 diabetes: The pathologic basis of reversible β-cell dysfunction. *Diabetes Care, 39*(11), 2080–2088. https://doi.org/10.2337/dc16-0619

Widiastuti, R., & Riyanto, B. (2024). Perbandingan metode pemeriksaan glukosa darah pada tikus diabetes menggunakan teknik heksokinase dan peroksidase. Jurnal Farmasi Eksperimen, 20(1), 33–40.

Widyaningsih, W., Putra, A., Priyantini, S., Muhar, A. M., Sumarawati, T., Trisnadi, S., Amalina, N. D., Alif, I., Prasetio, A., & Irawan, R. C. S. (2024). Secretome of Hypoxia-Preconditioned Mesenchymal Stem Cells Ameliorates Hyperglycemia in Type 2 Diabetes Mellitus Rats. Trends in Sciences, 1(1), *Article* 7278. https://doi.org/10.48048/tis.2024.7278

World Health Organization. (2019). *Classification of diabetes mellitus 2019* (WHO/NMH/CHP/19.2). World Health Organization. https://apps.who.int/iris/handle/10665/325182

Wu, D., Guo, J., Qi, B., & Xiao, H. (2021). TGF-β1 induced proliferation, migration, and ECM accumulation through the SNHG11/miR-34b/LIF pathway in human pancreatic stellate cells. *Endocrine Journal*, 68(11), 1347–1357. https://doi.org/10.1507/endocrj.EJ21-0176

Wulandari, N. L. W. E., Udayani, N. N. W., Dewi, N. L. K. A. A., Triansyah, G. A. P., Kumari Dewi, N. P. E. M., Widiasriani, I. A. P., & Prabandari, A. A. S.

S. (2024). Pengaruh pemberian induksi aloksan terhadap gula darah tikus: Sebuah tinjauan literatur. *Indonesian Journal of Pharmaceutical Education, 4*(2), 205–216. https://ejurnal.ung.ac.id/index.php/ijpe/article/download/26494/8844

Xiao, Y., Wang, Y., Ryu, J., Liu, W., Zou, H., Zhang, R., & Dong, L. Q. (2023). Upregulated TGF-β1 contributes to hyperglycaemia in type 2 diabetes by potentiating glucagon signalling. *Diabetologia, 66*(3), 1142–1155. https://doi.org/10.1007/s00125-023-05889-5

Xingguo, Han., Karin, Beck., Helmut, Bürgmann., Beat, Frey., Beat, Stierli., Aline, Frossard. (2023). Synthetic oligonucleotides as quantitative PCR standards for quantifying microbial genes. Frontiers in Microbiology, doi: 10.3389/fmicb.2023.1279041

Yin P, Wang Y, Yang L, Sui J, Liu Y. (2018). Hypoglycemic Effects in Alloxan-Induced Diabetic Rats of the Phenolic Extract from Mongolian Oak Cups Enriched in Ellagic Acid, Kaempferol and Their Derivatives. *Molecules*. 30;23(5):1046. doi: 10.3390/molecules23051046. PMID: 29710864; PMCID: PMC6100579.

Zeinhom, M. M., Fadallah, S. A., & Mahmoud, M. (2024). Human mesenchymal stem/stromal cell based-therapy in diabetes mellitus: Experimental and clinical perspectives. *Stem Cell Research & Therapy, 15*, Article 384. https://doi.org/10.1186/s13287-024-03974-z

Zhang, Y., Ma, Z., Zou, L., Gao, S., Sun, J., Zheng, Y., & Chen, L. (2021). MSC-derived exosomes alleviate diabetes mellitus by modulating pancreatic β-cell dedifferentiation. Stem Cell Reports, 16(9), 2096–2110. https://doi.org/10.1016/j.stemcr.2021.07.009

Zhou, G., Myers, R., Li, Y., Chen, Y., Shen, X., Fenyk-Melody, J., ... & Moller, D. E. (2021). Role of AMP-activated protein kinase in mechanism of metformin action. Journal of Clinical Investigation, 108(8), 1167–1174. https://doi.org/10.1172/JCI13505

Zhou, Q., Brown, J., Kanarek, A., Rajagopal, J., & Melton, D. A. (2014). In vivo reprogramming of adult pancreatic exocrine cells to β-cells. *Nature, 455*(7213), 627–632. https://doi.org/10.1038/nature07314

Ziqubu, K., Mazibuko-Mbeje, S. E., Mthembu, S. X. H., Mabhida, S. E., Jack, B. U., Nyambuya, T. M., Nkambule, B. B., Basson, A. K., Tiano, L., & Dludla, P. V. (2023). Anti-Obesity Effects of Metformin: A Scoping Review Evaluating the Feasibility of Brown Adipose Tissue as a Therapeutic Target. *International Journal of Molecular Sciences*, *24*(3), 2227. https://doi.org/10.3390/ijms24032227

Zou, M. L., Chen, Z. H., Teng, Y. Y., Liu, S. Y., Jia, Y., Zhang, K. W., & Yuan, F. L. (2021). The Smad dependent TGF-β1 and BMP signaling pathway in bone remodeling and therapies. *Frontiers in molecular biosciences*, *8*, 593310.

Zou, W., Liu, B., Wang, Y., Shi, F., & Pang, S. (2022). Metformin attenuates high glucose-induced injury in islet microvascular endothelial cells. Bioengineered, 13(2), 4385–4396. https://doi.org/10.1080/21655979.2022.2033411