

REFERENCES

- Adamson, S. S., Brace, L. E., & Kennedy, B. K. (2017). Alcohol and aging: From epidemiology to mechanism. *Translational Medicine of Aging*, 1, 18–23.
<https://doi.org/10.1016/j.tma.2017.09.001>
- Addor, F. (2018). Beyond photoaging: additional factors involved in the process of skin aging. *Clinical, Cosmetic and Investigational Dermatology*, Volume 11, 437–443.
<https://doi.org/10.2147/ccid.s177448>
- Adioetomo, S. M. (2014). *UNFPA Indonesia Monograph Series: Indonesia on the Threshold of Population Ageing*.
https://indonesia.unfpa.org/sites/default/files/pub-pdf/BUKU_Monograph_No1_Ageing_03_Low-res.pdf
- Allahbakhshian-Farsani, M., Abdian, N., Ghasemi-Dehkordi, P., Sadeghiani, M., Saffari-Chaleshtori, J., Hashemzadeh-Chaleshtori, M., & Khosravi-Farsani, S. (2013). Cytogenetic analysis of human dermal fibroblasts (HDFs) in early and late passages using both karyotyping and comet assay techniques. *Cytotechnology*, 66(5), 815–822. <https://doi.org/10.1007/s10616-013-9630-y>
- Alnuqaydan, A. M., & Sanderson, B. J. (2016). Toxicity and Genotoxicity of Beauty Products on Human Skin Cells In Vitro. *Journal of Clinical Toxicology*, 6(4).
<https://doi.org/10.4172/2161-0495.1000315>
- Antell, D. E., & Taczanowski, E. M. (1999). How Environment and Lifestyle Choices Influence the Aging Process. *Annals of Plastic Surgery*, 43(6), 585–588.
<https://doi.org/10.1097/00000637-199912000-00001>
- Baumann, L. (2005). How to Prevent Photoaging? *Journal of Investigative Dermatology*, 125(4), xii–xiii. <https://doi.org/10.1111/j.0022-202x.2005.23810.x>
- Baumann, L., Bernstein, E. F., Weiss, A. S., Bates, D., Humphrey, S., Silberberg, M., & Daniels, R. (2021). Clinical Relevance of Elastin in the Structure and Function of Skin. *Aesthetic Surgery Journal Open Forum*, 3(3). <https://doi.org/10.1093/asjof/ojab019>
- Bentov, I., Damodarasamy, M., Plymate, S., & Reed, M. J. (2014). Decreased proliferative capacity of aged dermal fibroblasts in a three dimensional matrix is associated with reduced IGF1R expression and activation. *Biogerontology*, 15(4), 329–337.
<https://doi.org/10.1007/s10522-014-9501-8>
- Bilodeau, K. (2018, June 12). *Skin serum: What it can and can't do*. Harvard Health.
<https://www.health.harvard.edu/blog/skin-serum-what-it-can-and-cant-do-2018061214029>
- Biological evaluation of medical devices - Part 5: Tests for in vitro cytotoxicity*. (2009a).
<https://nhiso.com/wp-content/uploads/2018/05/ISO-10993-5-2009.pdf>
- Biological evaluation of medical devices - Part 5: Tests for in vitro cytotoxicity*. (2009b).
<https://nhiso.com/wp-content/uploads/2018/05/ISO-10993-5-2009.pdf>
- Biological evaluation of medical devices - Part 5: Tests for in vitro cytotoxicity*. (2009c).
<https://nhiso.com/wp-content/uploads/2018/05/ISO-10993-5-2009.pdf>

- Bissett, D. L., Oblong, J. E., & Berge, C. A. (2006). Niacinamide: A B Vitamin that Improves Aging Facial Skin Appearance. *Dermatologic Surgery*, 31, 860–866.
<https://doi.org/10.1111/j.1524-4725.2005.31732>
- Boo, Y. C. (2021). Mechanistic Basis and Clinical Evidence for the Applications of Nicotinamide (Niacinamide) to Control Skin Aging and Pigmentation. *Antioxidants*, 10(8), 1315.
<https://doi.org/10.3390/antiox10081315>
- Bradshaw, P. C. (2019). Cytoplasmic and Mitochondrial NADPH-Coupled Redox Systems in the Regulation of Aging. *Nutrients*, 11(3). <https://doi.org/10.3390/nu11030504>
- Brown, T. M., & Karthik Krishnamurthy. (2018, December 6). *Histology, Dermis*. Nih.gov; StatPearls Publishing. <https://www.ncbi.nlm.nih.gov/books/NBK535346/>
- Budiasih, S., Masyitah, I., Jiyauddin, K., Kaleemullah, M., Samer, A. D., Fadli, A. M., & Yusuf, E. (2018). Formulation and Characterization of Cosmetic Serum Containing Argan Oil as Moisturizing Agent. *Proceedings of BROMO Conference*. <https://doi.org/10.5220/0008361702970304>
- Callahan, C. (2019, April). *What is face serum and should you use it? Here's everything you need to know*. TODAY.com.
<https://www.today.com/style/what-serum-everything-know-about-face-serum-t149981>
- Carroll, R. G. (2007). The Integument. *Elsevier's Integrated Physiology*, 11–17.
<https://doi.org/10.1016/b978-0-323-04318-2.50008-x>
- Cayman Chemical. (2020). *CAYMAN CHEMICAL*. <https://cdn.caymanchem.com/cdn/insert/11684.pdf>
- Chaudhuri, R. K., & Bojanowski, K. (2014). Bakuchiol: a retinol-like functional compound revealed by gene expression profiling and clinically proven to have anti-aging effects. *International Journal of Cosmetic Science*, 36(3), 221–230. <https://doi.org/10.1111/ics.12117>
- ChemSrc. (2021). *Sodium Hyaluronate*. [Www.chemsrc.com.](https://www.chemsrc.com/en/cas/9067-32-7_167220.html)
https://www.chemsrc.com/en/cas/9067-32-7_167220.html
- Coondoo, A., & Chattopadhyay, C. (2013). Drug interactions in dermatology: What the dermatologist should know. *Indian Journal of Dermatology*, 58(4), 249.
<https://doi.org/10.4103/0019-5154.113928>
- Dalgleish, R. (2008). *COL1A1 collagen type I alpha 1 chain [Homo sapiens (human)] - Gene - NCBI*. Wwww.ncbi.nlm.nih.gov; Bethesda (MD): National Library of Medicine (US), National Center for Biotechnology Information. <https://www.ncbi.nlm.nih.gov/gene/1277#summary>
- Ernster, V. L., Grady, D., Miike, R., Black, D., Selby, J., & Kerlikowske, K. (1995). Facial wrinkling in men and women, by smoking status. *American Journal of Public Health*, 85(1), 78–82.
<https://doi.org/10.2105/ajph.85.1.78>
- Fang, F., Ni, K., Cai, Y., Ye, Z., Shang, J., Shen, S., & Xiong, C. (2017). Biological characters of human dermal fibroblasts derived from foreskin of male infertile patients. *Tissue and Cell*, 49(1), 56–63. <https://doi.org/10.1016/j.tice.2016.12.003>
- Farage, M. A., Miller, K. W., Elsner, P., & Maibach, H. I. (2008). Intrinsic and extrinsic factors in skin ageing: a review. *International Journal of Cosmetic Science*, 30(2), 87–95.
<https://doi.org/10.1111/j.1468-2494.2007.00415.x>

- Farage, M. A., Miller, K. W., Elsner, P., & Maibach, H. I. (2013). Characteristics of the Aging Skin. *Advances in Wound Care*, 2(1), 5–10. <https://doi.org/10.1089/wound.2011.0356>
- Farwick, M., Lersch, P., & Strutz, G. (2008). *Low Molecular Weight Hyaluronic Acid: Its Effects on Epidermal Gene Expression and Skin Ageing*. *Low Molecular Weight Hyaluronic Acid: Its Effects on Epidermal Gene Expression and Skin Ageing*. <https://skiningredients.com/wp-content/uploads/2019/03/Understanding-Low-Medium-and-High-MW-Hyaluronic-Acid.pdf>
- Fedarko, N. S. (2014). Osteoblast/Osteoclast Development and Function in Osteogenesis Imperfecta. *Osteogenesis Imperfecta*, 45–56. <https://doi.org/10.1016/b978-0-12-397165-4.00005-8>
- Ferreira, M. S., Magalhães, M. C., Sousa-Lobo, J. M., & Almeida, I. F. (2020). Trending Anti-Aging Peptides. *Cosmetics*, 7(4), 91. <https://doi.org/10.3390/cosmetics7040091>
- Fisher, G. J., Choi, H.-C., Bata-Csorgo, Z., Shao, Y., Datta, S., Wang, Z.-Q., Kang, S., & Voorhees, J. J. (2001). Ultraviolet Irradiation Increases Matrix Metalloproteinase-8 Protein in Human Skin In Vivo. *Journal of Investigative Dermatology*, 117(2), 219–226. <https://doi.org/10.1046/j.0022-202x.2001.01432.x>
- Frantz, C., Stewart, K. M., & Weaver, V. M. (2010). The extracellular matrix at a glance. *Journal of Cell Science*, 123(24), 4195–4200. <https://doi.org/10.1242/jcs.023820>
- Frey, F. (2020, September 1). *Skincare Products: False Claims and Broken Promises at Your Expense* -. 50-plus Today. <https://50plus-today.com/false-claims-skin-care/>
- Furrer, P. (2018). The central role of excipients in drug formulation. *European Pharmaceutical Review*, 18(2), 67–70. <https://www.europeanpharmaceuticalreview.com/article/18434/the-central-role-of-excipients-in-drug-formulation-2/>
- Ganceviciene, R., Liakou, A. I., Theodoridis, A., Makrantonaki, E., & Zouboulis, C. C. (2012). Skin anti-aging strategies. *Dermato-Endocrinology*, 4(3), 308–319. <https://doi.org/10.4161/derm.22804>
- Garre, A., Narda, M., Valderas-Martinez, P., Piquero, J., & Granger, C. (2018). Antiaging effects of a novel facial serum containing L-ascorbic acid, proteoglycans, and proteoglycan-stimulating tripeptide: ex vivo skin explant studies and in vivo clinical studies in women. *Clinical, Cosmetic and Investigational Dermatology, Volume 11*, 253–263. <https://doi.org/10.2147/ccid.s161352>
- Gilbert, S. F. (2019). *Aging: The Biology of Senescence*. Nih.gov; Sinauer Associates. <https://www.ncbi.nlm.nih.gov/books/NBK10041/>
- Greive, K., Tran, D., Townley, J., & Barnes, T. (2014). An antiaging skin care system containing alpha hydroxy acids and vitamins improves the biomechanical parameters of facial skin. *Clinical, Cosmetic and Investigational Dermatology*, 9-17, 9. <https://doi.org/10.2147/ccid.s75439>
- Gunin, A. G., Kornilova, N. K., Petrov, V. V., & Vasil'eva, O. V. (2011). [Age-related changes in the number and proliferation of fibroblasts in the human skin]. *Advances in Gerontology = Uspekhi Gerontologii*, 24(1), 43–47. <https://pubmed.ncbi.nlm.nih.gov/21809619/>
- IMARC. (2021). *Market Research Company, Market Research Reports and Consulting Services*. [Www.imarcgroup.com](http://www.imarcgroup.com). <https://www.imarcgroup.com>

- International Organization for Standardization. (2009). *Biological evaluation of medical devices - Part 5: Tests for in vitro cytotoxicity.* <https://nhiso.com/wp-content/uploads/2018/05/ISO-10993-5-2009.pdf>
- Jenkins, G., Wainwright, L. J., Holland, R., Barrett, K. E., & Casey, J. (2013). Wrinkle reduction in post-menopausal women consuming a novel oral supplement: a double-blind placebo-controlled randomized study. *International Journal of Cosmetic Science*, 36(1), 22–31. <https://doi.org/10.1111/ics.12087>
- Jia, Y., & Turek, J. J. (2004). Polyenoic Fatty Acid Ratios Alter Fibroblast Collagen Production Via PGE2and PGE Receptor Subtype Response. *Experimental Biology and Medicine*, 229(7), 676–683. <https://doi.org/10.1177/153537020422900712>
- Kálmán, S., Garbett, K. A., Janka, Z., & Mircics, K. (2016). Human dermal fibroblasts in psychiatry research. *Neuroscience*, 320, 105–121. <https://doi.org/10.1016/j.neuroscience.2016.01.067>
- Karol, M. H. (2009). How Environmental Agents Influence the Aging Process. *Biomolecules and Therapeutics*, 17(2), 113–124. <https://doi.org/10.4062/biomolther.2009.17.2.113>
- Kim, C., Ryu, H.-C., & Kim, J.-H. (2010). Low-dose UVB irradiation stimulates matrix metalloproteinase-1 expression viaa BLT2-linked pathway in HaCaT cells. *Experimental and Molecular Medicine*, 42(12), 833. <https://doi.org/10.3858/emm.2010.42.12.086>
- Kim, H. M., An, H. S., Bae, J.-S., Kim, J. Y., Choi, C. H., Kim, J. Y., Lim, J. H., Choi, J., Song, H., Moon, S. H., Park, Y. J., Chang, S.-J., & Choi, S. Y. (2017). Effects of palmitoyl-KVK-L-ascorbic acid on skin wrinkles and pigmentation. *Archives of Dermatological Research*, 309(5), 397–402. <https://doi.org/10.1007/s00403-017-1731-6>
- Kim, S., Kim, Y., Lee, Y., & Chung, J. H. (2008). Ceramide accelerates ultraviolet-induced MMP-1 expression through JAK1/STAT-1 pathway in cultured human dermal fibroblasts. *Journal of Lipid Research*, 49(12), 2571–2581. <https://doi.org/10.1194/jlr.m800112-jlr200>
- Kuivaniemi, H., & Tromp, G. (2019). Type III collagen (COL3A1): Gene and protein structure, tissue distribution, and associated diseases. *Gene*, 707, 151–171. <https://doi.org/10.1016/j.gene.2019.05.003>
- Kular, J. K., Basu, S., & Sharma, R. I. (2014). The extracellular matrix: Structure, composition, age-related differences, tools for analysis and applications for tissue engineering. *Journal of Tissue Engineering*, 5, 204173141455711. <https://doi.org/10.1177/2041731414557112>
- Kusindarta, D. L., & Wihadmadyatami, H. (2018). The Role of Extracellular Matrix in Tissue Regeneration, Tissue Regeneration. *IntechOpen*.
- Lembaga Bantuan Hukum Pengayoman. (2021, March 25). *JERAT HUKUM PRODUKSI DAN PENJUALAN KOSMETIK TANPA IZIN BPOM*. LBH "Pengayoman" UNPAR. <https://lbhpengayoman.unpar.ac.id/jerat-hukum-produksi-dan-penjualan-kosmetik-tanpa-izin-bpom/>
- Li, W.-H., Wong, H.-K., Serrano, J., Randhawa, M., Kaur, S., Southall, M. D., & Parsa, R. (2017). Topical stabilized retinol treatment induces the expression of HAS genes and HA production in human skin in vitro and in vivo. *Archives of Dermatological Research*, 309(4), 275–283. <https://doi.org/10.1007/s00403-017-1723-6>
- Lyu, J.-L., Liu, Y.-J., Wen, K.-C., Chiu, C.-Y., Lin, Y.-H., & Chiang, H.-M. (2022). Protective Effect of Djulis (*Chenopodium formosanum*) Extract against UV- and AGEs-Induced Skin Aging via Alleviating

Oxidative Stress and Collagen Degradation. *Molecules*, 27(7), 2332.
<https://doi.org/10.3390/molecules27072332>

Martini, F., Judi Lindsley Nath, & Bartholomew, E. F. (2015). *Fundamentals of anatomy & physiology*. Pearson.

Matts, P. J., Oblong, J. E., & Bisset, D. L. (2002). A review of the range of effects of niacinamide in human skin. *IFSCC Magazine*, 285–289.
<https://www.refreshskinscience.com/wp-content/uploads/2021/08/Niacinamide-Case-Study.pdf>

Mayes, A. E., Murray, P. G., Gunn, D. A., Tomlin, C. C., Catt, S. D., Wen, Y. B., Zhou, L. P., Wang, H. Q., Catt, M., & Granger, S. P. (2010). Environmental and Lifestyle Factors Associated with Perceived Facial Age in Chinese Women. *PLoS ONE*, 5(12), e15270.
<https://doi.org/10.1371/journal.pone.0015270>

Menon, G. K., Dryer, L., & Kalafsky, R. (2009). Approaches to the Development of Cosmetic Products to Counter the Effects of Skin Aging. *Skin Aging Handbook*, 265–290.
<https://doi.org/10.1016/b978-0-8155-1584-5.50015-6>

MERCK. (2021). *Human Dermal Fibroblasts (HDF) Culture Protocol*. MERCK.
<https://www.sigmaldrich.com/ID/en/technical-documents/protocol/cell-culture-and-cell-culture-analysis/primary-cell-culture/human-dermal-fibroblasts>

Meza, D., Li, W. -H., Seo, I., Parsa, R., Kaur, S., Kizoulis, M., & Southall, M. D. (2020). A blackberry–dill extract combination synergistically increases skin elasticity. *International Journal of Cosmetic Science*, 42(5), 444–451. <https://doi.org/10.1111/ics.12644>

Millis, A. J. T., Sottile, J., Hoyle, M., Mann, D. M., & Diemer, V. (1989). Collagenase production by early and late passage cultures of human fibroblasts. *Experimental Gerontology*, 24(5-6), 559–575.
[https://doi.org/10.1016/0531-5565\(89\)90060-0](https://doi.org/10.1016/0531-5565(89)90060-0)

Mithieux, S. M., & Weiss, A. S. (2005). Elastin. *Fibrous Proteins: Coiled-Coils, Collagen and Elastomers*, 437–461. [https://doi.org/10.1016/s0065-3233\(05\)70013-9](https://doi.org/10.1016/s0065-3233(05)70013-9)

Moghimipour, E. (2012). Hydroxy Acids, the Most Widely Used Anti-aging Agents. *Jundishapur Journal of Natural Pharmaceutical Products*, 7(1), 9–10.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3941867/>

Montemurro, B., & Gillen, M. M. (2013). Wrinkles and Sagging Flesh: Exploring Transformations in Women's Sexual Body Image. *Journal of Women & Aging*, 25(1), 3–23.
<https://doi.org/10.1080/08952841.2012.720179>

Mukherjee, S., Date, A., Patravale, V., Korting, H. C., Roeder, A., & Weindl, G. (2006). Retinoids in the treatment of skin aging: an overview of clinical efficacy and safety. *Clinical Interventions in Aging*, 1(4), 327–348. <https://doi.org/10.2147/ciia.2006.1.4.327>

Narda, M., Brown, A., Muscatelli-Groux, B., Grimaud, J. A., & Granger, C. (2020). Epidermal and Dermal Hallmarks of Photoaging are Prevented by Treatment with Night Serum Containing Melatonin, Bakuchiol, and Ascorbyl Tetraisopalmitate: In Vitro and Ex Vivo Studies. *Dermatology and Therapy*, 10(1), 191–202. <https://doi.org/10.1007/s13555-019-00349-8>

National Center for Biotechnology Information. (2022). *Use of allantoin as a pro-collagen synthesis agent in cosmetic compositions - Patent US-2008108681-A1 - PubChem*.
Pubchem.ncbi.nlm.nih.gov. <https://pubchem.ncbi.nlm.nih.gov/patent/US-2008108681-A1>

- NIH. (2021). *Natural Doesn't Necessarily Mean Safer, or Better*. NCCIH.
<https://www.nccih.nih.gov/health/know-science/natural-doesnt-mean-better>
- Nusgens, B.-V. . (2010). Acide hyaluronique et matrice extracellulaire : une molécule primitive ?
Annales de Dermatologie et de Vénéréologie, 137, S3–S8.
[https://doi.org/10.1016/s0151-9638\(10\)70002-8](https://doi.org/10.1016/s0151-9638(10)70002-8)
- Olshansky, S. J., Hayflick, L., & Carnes, B. A. (2002). Position Statement on Human Aging. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, 57(8), B292–B297.
<https://doi.org/10.1093/gerona/57.8.b292>
- Papakonstantinou, E., Roth, M., & Karakiulakis, G. (2012). Hyaluronic acid: A key molecule in skin aging. *Dermato-Endocrinology*, 4(3), 253–258. <https://doi.org/10.4161/derm.21923>
- Philips, N., Chalensouk-Khaosaat, J., & Gonzalez, S. (2015). Stimulation of the Fibrillar Collagen and Heat Shock Proteins by Nicotinamide or Its Derivatives in Non-Irradiated or UVA Radiated Fibroblasts, and Direct Anti-Oxidant Activity of Nicotinamide Derivatives. *Cosmetics*, 2(2), 146–161. <https://doi.org/10.3390/cosmetics2020146>
- Porcheron, A., Latreille, J., Jdid, R., Tschachler, E., & Morizot, F. (2014). Influence of skin ageing features on Chinese women's perception of facial age and attractiveness. *International Journal of Cosmetic Science*, 36(4), 312–320. <https://doi.org/10.1111/ics.12128>
- Procter, P., & Gamble. (2016). *A Review of the range of effects of niacinamide in human skin Visual perception and assessment of human skin condition View project Visual perception and assessment of human hair View project*.
<https://www.refreshskinscience.com/wp-content/uploads/2021/08/Niacinamide-Case-Study.pdf>
- PubChem. (2019). *Allantoin*. Nih.gov; PubChem.
<https://pubchem.ncbi.nlm.nih.gov/compound/allantoin>
- PubChem. (2021, November 25). *Retinol*. Pubchem.ncbi.nlm.nih.gov.
<https://pubchem.ncbi.nlm.nih.gov/compound/Retinol#section=Experimental-Properties>
- Pullar, J. M., Carr, A. C., & Vissers, M. C. M. (2017). The Roles of Vitamin C in Skin Health. *Nutrients*, 9(8), 866. <https://doi.org/10.3390/nu9080866>
- Rabionet, M., Gorgas, K., & Sandhoff, R. (2014). Ceramide synthesis in the epidermis. *Biochimica et Biophysica Acta (BBA) - Molecular and Cell Biology of Lipids*, 1841(3), 422–434.
<https://doi.org/10.1016/j.bbkalip.2013.08.011>
- Ramaswamy, A. K., Sides, R. E., Cunnane, E. M., Lorentz, K. L., Reines, L. M., Vorp, D. A., & Weinbaum, J. S. (2019). Adipose-derived stromal cell secreted factors induce the elastogenesis cascade within 3D aortic smooth muscle cell constructs. *Matrix Biology Plus*, 4, 100014.
<https://doi.org/10.1016/j.mbtplus.2019.100014>
- RefSeq. (2008). *HAS2 hyaluronan synthase 2 [Homo sapiens (human)] - Gene - NCBI*.
Www.ncbi.nlm.nih.gov. <https://www.ncbi.nlm.nih.gov/gene/3037>
- RefSeq. (2017). *ELN elastin [Homo sapiens (human)] - Gene - NCBI*. Www.ncbi.nlm.nih.gov.
<https://www.ncbi.nlm.nih.gov/gene/2006>
- Reilly, D. M., & Lozano, J. (2021). Skin collagen through the lifestages: importance for skin health and beauty. *Plastic and Aesthetic Research*, 8(2). <https://doi.org/10.20517/2347-9264.2020.153>

- Ricard-Blum, S. (2010). The Collagen Family. *Cold Spring Harbor Perspectives in Biology*, 3(1), a004978-a004978. <https://doi.org/10.1101/cshperspect.a004978>
- Riss, T. L., Moravec, R. A., Niles, A. L., Duellman, S., Benink, H. A., Worzella, T. J., & Minor, L. (2016, July). *Cell Viability Assays*. Nih.gov; Eli Lilly & Company and the National Center for Advancing Translational Sciences. <https://www.ncbi.nlm.nih.gov/books/NBK144065/>
- Risteli, L., Koivula, M.-K., & Risteli, J. (2014). Procollagen Assays in Cancer. *Advances in Clinical Chemistry*, 79–100. <https://doi.org/10.1016/b978-0-12-801401-1.00003-7>
- Robinson, L. R., Fitzgerald, N. C., Doughty, D. G., Dawes, N. C., Berge, C. A., & Bissett, D. L. (2005). Topical palmitoyl pentapeptide provides improvement in photoaged human facial skin1. *International Journal of Cosmetic Science*, 27(3), 155–160. <https://doi.org/10.1111/j.1467-2494.2005.00261.x>
- Rodan, K., Fields, K., Majewski, G., & Falla, T. (2016). Skincare Bootcamp. *Plastic and Reconstructive Surgery - Global Open*, 4(12), e1152. <https://doi.org/10.1097/gox.0000000000001152>
- Rossetti, D., Kielmanowicz, M. G., Vigodman, S., Hu, Y. P., Chen, N., Nkengne, A., Oddos, T., Fischer, D., Seiberg, M., & Lin, C. B. (2011). A novel anti-ageing mechanism for retinol: induction of dermal elastin synthesis and elastin fibre formation. *International Journal of Cosmetic Science*, 33(1), 62–69. <https://doi.org/10.1111/j.1468-2494.2010.00588.x>
- Sakamoto, S., Putalun, W., Vimolmangkang, S., Phoolcharoen, W., Shoyama, Y., Tanaka, H., & Morimoto, S. (2017). Enzyme-linked Immunosorbent Assay for the quantitative/qualitative Analysis of Plant Secondary Metabolites. *Journal of Natural Medicines*, 72(1), 32–42. <https://doi.org/10.1007/s11418-017-1144-z>
- Sasidharan, S., Joseph, P., & Junise. (2014). Formulation and evaluation of fairness serum using polyherbal extracts. *International Journal of Pharmacy*, 4(3). pharmascholar.
- Shanbhag, S., Nayak, A., Narayan, R., & Nayak, U. (2019). Anti-aging and Sunscreens: Paradigm Shift in Cosmetics. *Adv Pharm Bull*, 2019(3), 348–359. <https://doi.org/10.15171/apb.2019.042>
- Sheskey, P. J., Cook, W. G., Gable, C. G., & American Pharmacists Association. (2017). *Handbook of pharmaceutical excipients*. Apha/Pharmaceutical Press.
- Smartlegal. (2020, March 1). *HATI-HATI! Produsen / Penjual Kosmetik Tanpa Izin Bisa Dipenjara - SL ID*. Smart Legal ID. <https://smartlegal.id/galeri-hukum/legal-story/2020/03/01/hati-hati-produsen-dan-penjual-kosmetik-tanpa-izin-edar-bisa-dipenjara/>
- Sparavigna, A. (2020). Role of the extracellular matrix in skin aging and dedicated treatment - State of the art. *Plastic and Aesthetic Research*, 2020. <https://doi.org/10.20517/2347-9264.2019.73>
- Stefánsson, H. (2005). The science of ageing and anti-ageing. *EMBO Reports*, 6, S1–S3. <https://doi.org/10.1038/sj.embo.7400430>
- The National Team For The Acceleration Of Poverty Reduction, & The SMERU Research Institute. (2020). *The Situation of the Elderly in Indonesia and Access to Social Protection Programs: Secondary Data Analysis* (pp. 3–4). <http://tnp2k.go.id/download/83338Elderly%20Study%20-%20Secondary%20Data%20Analysi s.pdf>

- Tobin, D. J. (2017). Introduction to skin aging. *Journal of Tissue Viability*, 26(1), 37–46.
<https://doi.org/10.1016/j.jtv.2016.03.002>
- Tortora, G. J., & Derrickson, B. (2017). *Principles of anatomy and physiology* (14th ed.). Wiley.
- Tromp, G., Kuivaniemi, H., Stacey, A., Shikata, H., Baldwin, C. T., Jaenisch, R., & Prockop, D. J. (1988). Structure of a full-length cDNA clone for the pro α 1(I) chain of human type I procollagen. *Biochemical Journal*, 253(3), 919–922. <https://doi.org/10.1042/bj2530919>
- Uitto, J. (2008). The role of elastin and collagen in cutaneous aging: intrinsic aging versus photoexposure. *Journal of Drugs in Dermatology*, 7(2 Suppl)(s12–s16.).
- Varani, J., Dame, M. K., Rittie, L., Fligiel, S. E. G., Kang, S., Fisher, G. J., & Voorhees, J. J. (2006). Decreased Collagen Production in Chronologically Aged Skin. *The American Journal of Pathology*, 168(6), 1861–1868. <https://doi.org/10.2353/ajpath.2006.051302>
- Wang, A. S., & Dreesen, O. (2018). Biomarkers of Cellular Senescence and Skin Aging. *Frontiers in Genetics*, 9(247). <https://doi.org/10.3389/fgene.2018.00247>
- Wessels, Q., Pretorius, E., Smith, C. M., & Nel, H. (2012). The potential of a niacinamide dominated cosmeceutical formulation on fibroblast activity and wound healing in vitro. *International Wound Journal*, 11(2), 152–158. <https://doi.org/10.1111/j.1742-481x.2012.01052.x>
- West, B. J., Alabi, I., & Deng, S. (2021). A Face Serum Containing Palmitoyl Tripeptide-38, Hydrolyzed Hyaluronic Acid, Bakuchiol and a Polyherbal and Vitamin Blend Improves Skin Quality. *Journal of Cosmetics, Dermatological Sciences and Applications*, 11(03), 237–252. <https://doi.org/10.4236/jcdsa.2021.113020>
- Wlaschek, M., Maity, P., Makrantonaki, E., & Scharffetter-Kochanek, K. (2021). Connective Tissue and Fibroblast Senescence in Skin Aging. *Journal of Investigative Dermatology*, 141(4), 985–992. <https://doi.org/10.1016/j.jid.2020.11.010>
- Wollina, U., Goldman, A., Berger, U., & Abdel-Naser, M. B. (2008). Esthetic and cosmetic dermatology. *Dermatologic Therapy*, 21(2), 118–130. <https://doi.org/10.1111/j.1529-8019.2008.00179.x>
- Wong, R., Geyer, S., Weninger, W., Guimberteau, J.-C., & Wong, J. K. (2015). The dynamic anatomy and patterning of skin. *Experimental Dermatology*, 25(2), 92–98. <https://doi.org/10.1111/exd.12832>
- Wu, M., & Crane, J. S. (2019, April 21). *Biochemistry, Collagen Synthesis*. Nih.gov; StatPearls Publishing. <https://www.ncbi.nlm.nih.gov/books/NBK507709/>
- Xuan, L., Han, F., Gong, L., Lv, Y., Wan, Z., Liu, H., Ren, L., Yang, S., Zhang, W., Li, T., Tan, C., & Liu, L. (2020). Ceramide induces MMP-9 expression through JAK2/STAT3 pathway in airway epithelium. *Lipids in Health and Disease*, 19(1). <https://doi.org/10.1186/s12944-020-01373-w>
- Zasada, M., & Budzisz, E. (2019). Retinoids: active molecules influencing skin structure formation in cosmetic and dermatological treatments. *Advances in Dermatology and Allergology*, 36(4), 392–397. <https://doi.org/10.5114/ada.2019.87443>
- Zerbinati, N., Sommatis, S., Maccario, C., Di Francesco, S., Capillo, M. C., Rauso, R., Herrera, M., Bencini, P. L., Guida, S., & Mocchi, R. (2021). The Anti-Ageing and Whitening Potential of a Cosmetic Serum Containing 3-O-ethyl-L-ascorbic Acid. *Life*, 11(5), 406. <https://doi.org/10.3390/life11050406>

- Zhang, S., & Duan, E. (2018). Fighting against Skin Aging. *Cell Transplantation*, 27(5), 729–738.
<https://doi.org/10.1177/0963689717725755>
- Zhou, Y., Yan, M., Pan, R., Wang, Z., Tao, X., Li, C., Xia, T., Liu, X., & Chang, Q. (2021). Radix Polygalae extract exerts antidepressant effects in behavioral despair mice and chronic restraint stress-induced rats probably by promoting autophagy and inhibiting neuroinflammation. *Journal of Ethnopharmacology*, 265, 113317. <https://doi.org/10.1016/j.jep.2020.113317>
- Zouboulis, C. C., Ganceviciene, R., Liakou, A. I., Theodoridis, A., Elewa, R., & Makrantonaki, E. (2019). Aesthetic aspects of skin aging, prevention, and local treatment. *Clinics in Dermatology*, 37(4), 365–372. <https://doi.org/10.1016/j.clindermatol.2019.04.002>