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DAFTAR PUSTAKA

Abdur Rohim, Yunianta, Teti Estiasih., (2018) Ulasan Ilmiah. Senyawa-senyawa bioaktif pada rumput laut coklat sargassum sp.

Adawiyah, R., & Komari, N. (2021). Interaksi Senyawa Taxifolin Dari Buah Kasturi (Mangifera Casturi) Sebagai Antikanker Payudara: Evaluasi Docking Molekular. *Jurnal Natural Scientiae*, 1(1).

Akash MSH, Rehman K, Liaqat A., (2017) Tumor necrosis Factor-Alpha: Role in development of insulin resistance and pathogenesis of Type 2 diabetes mellitus. *J Cell Biochem*. 22;119(1):105–10

Alfaridz F, Amalia R., (2018) Classification and Pharmacological Activity of Active Flavonoid Compounds. Pharmacy. 16(3):1–9

Ali Affan Silalahi a*, Fahma Shufyani b, Syati Manaharawan Siregar c., (2025) Analisis docking tanaman meniran (*Phyllanthus niruri* L.) terhadap penghambatan asetilkolinesterase penyakit alzheimer.

Amara A, Oktiani BW, Taufiqurrahman I., (2019) Effect of flavonoid extract of propolis kelulut (G.thoracica) on the number of neutrophil cells in periodontitis (in vivo study of male Wistar rats Rattus norvegicus). Dentin ;3(1):10–16

Andarini D, Edison, Elsa A, Subaryono, Taufik H., (2023) Chemical composition, bioactive compounds, antioxidant activity, and inhibitor alpha-glucosidase enzyme of Sargassum sp. *food science and technology journal.*

Andrukhov O, Ulm C, Reischl H, Nguyen PQ, Matejka M, Rausch-Fan X., (2011) Serum cytokine levels in periodontitis patients in relation to the bacterial load. *J Periodontol*. 82:885–92

Artasensi A, Pedretti A, Vistoli G, Fumagalli L., (2020) Type 2 Diabetes Mellitus: A Review of Multi-Target Drugs. Molecules.

Arunan E, Desiraju GR, Klein RA, Sadlej JS., (2011) Definition of the hydrogen bond. Pure Appl Chem 83(8): 1637-1641

Audrey Gracelia Riwu1, Insani Fitrahulil Jannah, Katty Hendriana Priscilia Riwu, Maria Laurenci Fanny Permata Kale, Fhady Riskhy Loe, Halena Meldy Asa., (2024) Molecular Docking Analysis of Anti-Dengue Activity of Kelor Leaves (Moringa oleifera) Bioactive Compounds. *Cendana Medical Journal.*

UNIVERSITAS GADJAH MADA
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Azuma Y, Kaji K, Katogi R, Takeshita S, Kudo A., (2000) Tumor necrosis factor-α induces differentiation of and bone resorption by osteoclasts. *J Biol Chem*. 275(7): 4858-64

Baek, M., McHugh, R., Anishchenko, I. et al., (2024) Accurate prediction of protein– nucleic acid complexes using RoseTTAFoldNA. Nat Methods 21, 117–121

Baeza M, Morales A, Cisterna C, Cavalla F, Jara G, Isamitt Y, et al., (2020) Effect of periodontal treatment in patients with periodontitis and diabetes: systematic review and meta-analysis. *J Appl Oral Sci*.

Bathla S., (2017) Textbook of Periodontics. New Delhi: Jaypee Brother Medical Publishers. p.129, 145, 330–1

Byrne E, Watkinson S., (2021) Patient and clinician satisfaction with video consultations during the COVID-19 pandemic: an opportunity for a new way of working. *J Orthod*. 48(1):64–73

C. H. Peng, Y. S. Yang, K. C. Chan, E. Kornelius, J. Y. Chiou, and C. N. Huang., (2017) Periodontal treatment and the risks of cardiovascular disease in patients with type 2 diabetes: a retrospective cohort study, Internal Medicine, vol. 56, no. 9, pp. 1015–1021

Cao R, Li Q, Wu Q, Yao M, Chen Y, Zhou H., (2019) Effect of non-surgical periodontal therapy on glycemic control of type 2 diabetes mellitus: a systematic review and Bayesian network meta-analysis. *BMC Oral Health* 19:176

Carriches C, Lopez JM, Marti´nez G, Donado RM., (2006) Variations of interleukin-6 after surgical removal of lower third molars. Medicine oral, Patologia oraly cirugia Bucal, 11: E520-E526

Cavalla F, Biguetti CC, Garlet TP, Trombone APF, Garlet GP., (2018) Inflammatory pathways of bone resorption in periodontitis. In: Bostanci N, Belibasakis G, editors. Pathogenesis of Periodontal Diseases. Cham: Springer. pp. 59-85

Cekici A, Kantarci A, Hasturk H, Van Dyke TE., (2014) Inflammatory and immune pathways in the pathogenesis of periodontal disease. *Periodontology 2000*. 64(1):57-80

Chen B, Wu W, Sun W, Zhang Q, Yan F, Xiao Y., (2014) RANKL Expression in Periodontal Disease: Where Does RANKL Come from Biomed Res Int.;2014:1–7

Chen YF, Zhan Q, Wu CZ, Yuan YH, Chen W, Yu FY, et al., (2021) Baseline hbA1c level influences the effect of periodontal therapy on glycemic

UNIVERSITAS GADJAH MADA
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control in people with type 2 diabetes and periodontitis: A systematic review on randomized controlled trails. *Diabetes Ther* 12:1249–78

Cutler CW, Machen RL, Jotwani R, Iacopino AM., (1999) Heightened gingival inflammation and attachment loss in type 2 diabetics with hyperlipidemia. *J Periodontol*. 70:1313-21

Di Domenico GL, Minoli M, Discepoli N, Ambrosi A, De Sanctis M., (2023) Effectiveness of periodontal treatment to improve glycemic control: an umbrella review. *Acta Diabetol* 60:101–13

Doganci A, Sauer K, Karwot R, Finotto S., (2005) Pathological role of IL-6 in the experimental allergic bronchial asthma in mice. Clin Rev Allergy Immunol ;28:257-70

Du, M. et al., (2019) Effects of IL-1beta on MMP-9 expression in cementoblast-derived cell line and MMP-mediated degradation of type I collagen. Inflammation 42, 413–425

Dutzan N, Gamonal J, Silva A, Sanz M, Vernal R. Over-expression of forkhead box P3 and its association with receptor activator of nuclear factor-kappa B ligand, interleukin (IL)-17, IL-10 and transforming growth factor-beta during the progression of chronic periodontitis. *Journal of Clinical Periodontology.*

Esteves Lima RP, Cota LO, Silva TA, Cortelli SC, Cortelli JR, Costa FO., (2017) Periodontitis and type 2 diabetes among women with previous gestational diabetes: epidemiological and immunological aspects in a follow-up of three years. *J Appl Oral* Sci 130–139

F. Llambés., (2015) Relationship between diabetes and periodontal infection, World J. Diabetes.

Faizuddin, M., Bharathi, S. H. & Rohini, N. V., (2003) Estimation of interleukin-1beta levels in the gingival crevicular fluid in health and in inflammatory periodontal disease. *J. Periodontal* Res. 38, 111–114

Faricha, Firdaus., (2020) The effect of phlorotannin sargassum sp extract on colon profile diabetic rats.

França CN, de Oliveira Izar MC, do Amaral JB, Tegani DM, FAH F., (2014) Micropartículas como possíveis biomarcadores da doença cardiovascular. Arq Bras Cardiol. 104:169–74

Genco RJ, Borgnakke WS., (2020) Diabetes as a potential risk for periodontitis: association studies. *Periodontol 2000*. 83:40–5

UNIVERSITAS GADJAH MADA
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George AK, Narayan V, Kurian N, Joseph AE, Anil S., (2021) A pilot study on glycemia and insulin resistance in patients with severe periodontitis. *J Indian Soc Periodontol*. 25:393–8

Graves DT, Ding Z, Yang Y., (2020) The impact of diabetes on periodontal diseases. *Periodontol 2000*. 82:214–24

Graziani F, Gennai S, Solini A, Petrini M., (2018) A systematic review and meta-analysis of epidemiologic observational evidence on the effect of periodontitis on diabetes An update of the EFP-AAP review. *J Clin Periodontol.* 45:167–87

Gupta, S., Cox, S., & Abu-Ghannam, N., (2011). Effect of different drying temperatures on the moisture and phytochemical constituents of edible Irish brown seaweed. LWT-Food Sci and Technol. 44(5), 1266-1272.

Han MX, Ding C, Kyung HM., (2015) Genetic polymorphisms in pattern recognition receptors and risk of periodontitis: Evidence based on 12,793 subjects. Human Immunology. 76(7):496-504.

Han Y, Jin Y, Miao Y, Shi T, Lin X., (2019) Improved RANKL expression and osteoclastogenesis induction of CD27+CD38- memory B cells: A link between B cells and alveolar bone damage in periodontitis. *J Periodontal* Res. 54:73–80

Harsas NA, Lessang R, Soeroso Y, Putri GA., (2019) Periodontal Status Differences between Chronic Periodontitis Patient with and Without Type 2 Diabetes Mellitus. *Journal of International Dental and Medical* Research.12(1):175–80

Harsas NA, Lessang R, Soeroso Y, Putri GA., (2019) Periodontal Status Differences between Chronic Periodontitis Patient with and Without Type 2 Diabetes Mellitus. *Journal of International Dental and Medical* Research. 12(1): 175-80

Hartanti, "Efek Kontrol Glikemik Teradap Penyakit Periodontal Penderita Diabetes Mellitus The Effect Of Glycemic Control On Periodontal Disease In Diabetic Patient," FKIK Univ. Muhammadiyah Yogyakarta, vol. 2, no. 2, p. 98, 2013

Hockensmith K, Dillard K, Sanders B, Harville BA., (2016) Identification and characterization of a chymotrypsin-like serine protease from periodontal pathogen, Tannerella forsythia. Microb Pathog 100:37–42

Hofbauer LC, Neubauer A, Heufelder AE., (2001) Receptor activator of nuclear factor-kappaB ligand and osteoprotegerin: Potential implications for the

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GADJAH MADA
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pathogenesis and treatment of malignant bone diseases. Cancer. 92(3):460-470

Holdt SL, Kraan S., (2011) Bioactive compounds in seaweed: functional food applications and legislation. *Journal of Applied Phycology*. 23:543–597

Hosokawa, M., Miyashita, T., Nishikawa, S., Emi, S., Tsukui, T., Beppu, F., Okada, T., & Miyashita, K., (2010) Fucoxanthin regulates adipocytokine mRNA expression in white adipose tissue of diabetic/obese KK-Ay mice. Archives of Biochemistry and Biophysics, 504(1), 17–25

Hyeon lee, hye-yoon shin, jong-hwi park, song yi koo, sang min kim, seoung-hoon yang., (2021) Fuxoanthin from microalgae phaeodactylum tricornutum inhibits pro-inflamatory cytokines by regulating both NF-kb and NLRP3 inflammasome activation.

Indria E, Sumardianto, Ulfah A., (2017) Skrining senyawa fitokimia rumput laut sargassum sp dan aktivitasnya sebagai antibakteri terhadap S.aureus dan E.Coli.

International Diabetes Federation. IDF Diabetes Atlas Internet. Ninth edition; 2019 updated 2019; cited 2025 February 28.

Irvin Fonseca-Barahona, kaveh Shahbaz, said Baroutian., (2025) Bioactive from brown algae : antioxidant, anti-inflamatory, anticancer, and antimicrobial potential.

José Luis Muñoz-Carrillo, Viridiana Elizabeth Hernández-Reyes, Oscar Eduardo García-Huerta, Francisca Chávez-Ruvalcaba, María Isabel Chávez-Ruvalcaba, Karla Mariana Chávez-Ruvalcaba and Lizbeth Díaz-Alfaro (2019) Pathogenesis of periodontal disease. *intechopen.86548*

Kadi A. Beberapa Catatan Kehadiran Marga Sargassum., (2005) *Jurnal Oseana*. Volume XXX; No.4:19–29

Kang W, Hu Z, Ge S., (2016) Healthy and inflamed gingival fibroblasts differ in their inflammatory response to Porphyromlonas gingivalis lipopolysaccharide. Inflammation. 39(5):1842-1852

Khumaedi AI, Purnamasari D, Wijaya IP, Soeroso Y., (2019) The relationship of diabetes, periodontitis and cardiovascular disease. Diabetes Metab Syndr. 13:1675–8

Kiswaluyo., (2013) Perawatan Periodontitis pada Puskesmas Sumbersari, Puskesmas Wuluhan dan RS Bondowoso, stomatognatic (J. K. G Unej).

UNIVERSITAS GADJAH MADA
INTERAKSI KANDUNGAN SENYAWA AKTIF ALGA COKLAT (Sargassum sp) TERHADAP SITOKIN PROINFLAMASI PADA PERIODONTITIS DIABETIKA (Studi In Silico Molecular Docking)
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Kobayashi, M. et al., (2005) Role of interleukin-1 and tumor necrosis factor alpha in matrix degradation of human osteoarthritic cartilage. Arthritis Rheum. 52,128–135

Lamont RJ, Koo H, Hajishengallis G., (2018) The oral microbiota: dynamic communities and host interactions. Nat Rev Microbiol 16:745–59

Launphaisarnnont T., (2009) Intermolecular forces :Van der waals interaction.

Lee JW, Kobayashi Y, Nakamichi Y, Udagawa N, Takahashi N, Im NK, et al. Alisol-B., (2010) a novel phyto-steroid, suppresses the RANKL-induced osteoclast formation and prevents bone loss in mice. *Biochemical Pharmacology*. 80(3):352-361

Li Y, Du Z, Xie X, Zhang Y, Liu H, Zhou Z, et al., (2021) Epigenetic changes caused by diabetes and their potential role in the development of periodontitis. *J Diabetes Investig* 12:1326–35

Liccardo D, Cannavo A, Spagnuolo G, Ferrara N, Cittadini A, Rengo C, et al., (2019) Periodontal disease: a risk factor for diabetes and cardiovascular disease. *Int J Mol Sci*. 20:1414

Lin X, Xu Y, Pan X, Xu J, Ding Y, Sun X, et al., (2020) Global, regional, and national burden and trend of diabetes in 195 countries and territories: an analysis from 1990 to 2025

Lin, W. W. et al., (2015) The adaptor protein TRAF3 inhibits interleukin-6 receptor signaling in B cells to limit plasma cell development. Sci. Signal. 8, ra88.

Liu, Y. C., Lerner, U. H. & Teng, Y. T., (2010) Cytokine responses against periodontal infection: protective and destructive roles. *Periodontol 2000* 52, 163–206.

Luong A, Tawfik AN, Islamoglu H, Gobriel HS, Ali N, Ansari P, et al., (2021) Periodontitis and diabetes mellitus co-morbidity: A molecular dialogue. *J Oral Biosci* 63:360–9

M. Muhtar, Yulistinawati, Rahmawati Sri (2022) The effect of brown algae (Sargassum sp.) gel on the number of osteoclasts in periodontitis rats

M. Sanz, A. Ceriello, M. Buysschaert et al., (2018) Scientific evidence on the links between periodontal diseases and diabetes: consensus report and guidelines of the joint workshop on periodontal diseases and diabetes by the International Diabetes Federation and the European Federation of Periodontology, Diabetes Research and Clinical Practice, vol. 137, pp. 231–241

UNIVERSITAS GADJAH MADA
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

M. Soory., (2010) Chronic periodontitis as a risk marker for systemic diseases with reference to cardiometabolic disorders: common pathways in their progression, Immunology and Immunogenetics Insights, vol. 2, pp. 7–21, 20

Mabate, B., Daub, C. D., Malgas, S., Edkins, A. L., & Pletschke, B. I. (2021). Fucoidan structure and its impact on glucose metabolism: Implications for diabetes and cancer therapy. *Marine Drugs*, *19*(1), 1-20.

Madianos P, Bobetsis YA, Van Dyke T. Ch., (2014) 3. Infection and Inflammation. In: Genco RJ,Williams RC, editors. Periodontal disease and overall health: A clinician's guide. 2nd ed. Yardley,PA:Professional AudienceCommunications; p. 30–48.

Mantovani A, Dinarello CA, Molgora M, Garlanda C., (2019) Interleukin-1 and related cytokines in the regulation of inflammation and immunity. Immunity. 50:778– 95

Margaryan S, Kriegova E, Fillerova R, Smotkova Kraiczova V, Manukyan G., (2020) Hypomethylation of IL1RN and NFKB1 genes is linked to the dysbalance in IL1beta/IL-1Ra axis in female patients with type 2 diabetes mellitus. PloS One 15:e0233737

Martínez-Aguilar VM, Carrillo-Ávila BA, Sauri-Esquivel EA, et al., (2019) Quantification of TNF-α in patients with periodontitis and type 2 diabetes. *BioMed* Res Int;2019:7984891

Menezes R, Garlet TP, Letra A, Bramante CM, Campanelli AP, Figueira Rde C, et al., (2008) Differential patterns of receptor activator of nuclear factor kappa B ligand/osteoprotegerin expression in human periapical granulomas: Possible association with progressive or stable nature of the lesions. *Journal of Endodontia*. 34(8):932-938

Meng, X. Y., Zhang, H. X., Mezei, M., & Cui, M. (2011). *Molecular docking: A powerful approach for structure-based drug discovery.* Current Computer-Aided Drug Design, 7(2), 146–157

Mihara M, Moriya Y, Kishimoto T, Ohsugi Y. Interleukin-6 (IL-6) induces the proliferation of synovial fibroblastic cells in the presence of soluble IL-6 receptor. *Br J Rheumatol* 1995;34:321-5

Mingcan Zhao1, Yuandong Xie1,2, Wenjia Gao1,2, Chunwang Li1,2, Qiang Ye1 and Yi Li1., (2023) Diabetes mellitus promotes susceptibility to periodontitis—novel insight into the molecular mechanisms.

Molayem S, Pontes CC., (2020) The Mouth-COVID Connection: IL-6 Levels in Periodontal Disease — Potential Role in COVID-19-Related Respiratory

UNIVERSITAS GADJAH MADA
INTERAKSI KANDUNGAN SENYAWA AKTIF ALGA COKLAT (Sargassum sp) TERHADAP SITOKIN PROINFLAMASI PADA PERIODONTITIS DIABETIKA (Studi In Silico Molecular Docking)
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Complications. *Journal of the California Dental Association*. 48(10):485–499

Morris EC, Neelapu SS, Giavridis T, Sadelain M., (2022) Cytokine release syndrome and associated neurotoxicity in cancer immunotherapy. Nat Rev Immunol. 22:85– 96

Mufida R., (2013) Herbal and dental health knowledge relations. *Dentika Dent J* 13:115-9.

Muñoz-Carrillo JL, Contreras-Cordero JF, Gutiérrez-Coronado O,Villalobos-Gutiérrez PT, Ramos-Gracia LG, Hernández-Reyes VE. Cytokine Profiling Plays a Crucial Role in Activating Immune System to Clear Infectious Pathogens.London: *IntechOpen*.

Muñoz-Carrillo JL, Ortega-Martín Del Campo J, Gutiérrez-Coronado O, Villalobos-Gutiérrez PT, Contreras- Cordero JF, Ventura-Juárez J., (2018) Adipose tissue and inflammation. In: Szablewski L, editor. Adipose Tissue. London: *InTechOpen*; pp. 93-121

Murayama, R., Kobayashi, M., Takeshita, A., Yasui, T. & Yamamoto, M. MAPKs., (2011) activator protein-1 and nuclear factor-kappaB mediate production of interleukin-1beta-stimulated cytokines, prostaglandin E(2) and MMP-1 in human periodontal ligament cells. *J. Periodontal* Res. 46, 568–575

Muslimin, M., & Sari, W. K. P. (2018). Budidaya rumput laut Sargassum sp. dengan metode kantong pada beberapa tingkat kedalaman di dua wilayah perairan berbeda. Jurnal Riset Akuakultur, 12(3), 221-230

N.A. Akbar, S. Amin, W.T. Wulandari., (2022) Studi in silico senyawa yang terkandung dalam tanaman daun sirih merah (Piper Crocatum RUITZ & PAV) Sebagai kandidat anti SARS CoV-2, 2:378-91

Nascimento GG, Leite FRM, Vestergaard P, Scheutz F, López R., (2018) Does diabetes increase the risk of periodontitis? A systematic review and meta-regression analysis of longitudinal prospective studies. Acta Diabetol 55:653–67

Newman MG, Takei H, Klokkevold PR., (2012) Carranza FA. Carranza's Clinical Periodontology. 11th ed. *Elsevier Saunders*.

Newman MG, Takei HH, Klokkevold PR., (2019) Carranza FA. Newman and Carranza's Clinical Periodontology. 13th ed. Philadelphia: *Elsevier.* p.55–396.

UNIVERSITAS GADJAH MADA
INTERAKSI KANDUNGAN SENYAWA AKTIF ALGA COKLAT (Sargassum sp) TERHADAP SITOKIN PROINFLAMASI PADA PERIODONTITIS DIABETIKA (Studi In Silico Molecular Docking)
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Nicu EA, Loos BG., (2016) Polymorphonuclear neutrophils in periodontitis and their possible modulation as a therapeutic approach. *Periodontol 2000* 71:140–63

Nilsson J, Jovinge S, Niemann A, Reneland R, Lithell H. Relation between plasma tumor necrosis factor-A and insulin sensitivity in elderly men with Non–Insulin-Dependent diabetes mellitus. Arterioscler Thromb Vasc Biol. 1998 Aug 1;18(8):1199–202

Nishimura F, Iwamoto Y, Mineshiba J, Shimizu A, Soga Y, Murayama Y., (2003) Periodontal disease and diabetes mellitus: the role of tumor necrosis factor-α in a 2-way relationship. *J Periodontol* 74(01):97–102.

Nurlindah Hamrun, sri oktawati, asmawati, irene, hardianti maulidita haryo, ira farwiany, andi nurazizah (2020) Effectiveness of Fucoidan Extract from Brown Algae to Inhibit Bacteria Causes of Oral Cavity Damage

Ochoa, R., & Lira, A. (2020) *Redocking validation of molecular docking protocols for drug discovery.* Journal of Chemical Information and Modeling, 60(7), 3312–3320.

Ohgi K, Kajiya H, Goto TK, Okamoto F, Yoshinaga Y, Okabe K, et al., (2018) Toll-like receptor 2 activation primes and upregulates osteoclastogenesis via lox-1. Lipids Health Dis 17:132

Olivia M, Jusak N, Moh. Hasan, Agus T., (2021) in silico study on the promising active components of terpenoid and fucoidan from sargassum sp. In inhibiting cgrp and tnf-a. in silico study.

Pakidi CS, Manajemen J, Perairan S, Pertanian F, Musamus U., (2016) Potensi dan Pemanfaatan Bahan Aktif Alga Cokelat. Jurnal Octopus. (1):551–62.

Papapanou PN, Sanz M, Buduneli N, Dietrich T, Feres M, Fine DH, et al., (2018) Periodontitis: Consensus report of workgroup 2 of the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions. *J Periodontol*. 89 Suppl 1:S173–82

Polak D, Sanui T, Nishimura F, Shapira L., (2020) Diabetes as a risk factor for periodontal disease-plausible mechanisms. *Periodontol 2000* 83:46–58

Polak D, Shapira L., (2018) An update on the evidence for pathogenic mechanisms that may link periodontitis and diabetes. *J Clin Periodontol*. 45(2):150–166

Pranowo H.D. & Hetadi A.K.R. (2011). Pengantar Kimia Komputasi. Penerbit Lubuk Agung, Bandung: 1-118.

UNIVERSITAS GADJAH MADA
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Prasetya RC, Purwanti N, Haniastuti T., (2014) Neutrophil infiltration in rats with periodontitis after administration of mangosteen peel ethanolic extract. *Ind Denti Mag*. 21(1):33

Preshaw PM, Bissett SM., (2019) Periodontitis and diabetes. *Br Dent J*. 227:577–84

Preshaw PM, Taylor JJ., (2011) How has research into cytokine interactions and their role in driving immune responses impacted our understanding of periodontitis. *J Clin Periodontol*. 38 (Suppl. 11): 60–84

Pulivarthi P, Chava VK, Gunupati S., (2022) Salivary tumor necrosis factor-alpha levels in periodontitis associated with diabetes mellitus after low level laser therapy as an adjunct to scaling and root planning: A randomized clinical trial. *Journal of Indian Society of Periodontology*.

Qiao YC, Chen YL, Pan YH, et al., (2017) The change of serum tumor necrosis factor alpha in patients with type 1 diabetes mellitus: a systematic review and meta-analysis. PLoS One 12(04): e0176157

Reddy A.S. et al. (2007). Virtual Screening in Drug Discovery – A Computational Perspective. Current Protein and Peptide Science, 8(4): 329-351

Rohim A, Estiasih T., (2019) Bioactive compounds on Sargassum sp. brown seaweed: a review. *J Agric Tech*. 20(2):115–126

Romano F, Perotto S, Mohamed SEO, Bernardi S, Giraudi M, Caropreso P, et al., (2021) Bidirectional association between metabolic control in type-2 diabetes mellitus and periodontitis inflammatory burden: A cross-sectional study in an Italian population. *J Clin Med* 10:1787

S. K. Sonnenschein and J. Meyle, “Local inflammatory reactions in patients with diabetes and periodontitis,” Periodontology 2000, vol. 69, no. 1, pp. 221–254, 2015

Sakamoto D, Bando H., (2020) Recent trend from the clinical point of view for periodontitis and diabetes mellitus. Dental Research and Management.

Sani, I.A., Cahyani, S.M., Fariha, S., Oliresianela, Diah.,(2021). Bioinformatic approach of propolis as an inhibitor of peptidoglycan glycosyltransferase to improve antibacterial agent: An in-silico study, *Dental Journal* 2021 December; 54(4): 221–226

Santonocito S, Polizzi A, Marchetti E, Dalessandri D, Migliorati M, Lupi SM, et al., (2022) Impact of periodontitis on glycemic control and metabolic status in diabetes patients: current knowledge on early disease markers and therapeutic perspectives. Mediators Inflammation 2022.

UNIVERSITAS GADJAH MADA
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Sari DR, Lestari C, Yandi S., (2018) Effect of Administration of Usnic Acid on Osteoblast Cell Number in Periodontitis Mice. *B-Dent J*. 124–134

Sari MI, Tala ZZ, Wahyuni DD., (2019) Association between glycated hemoglobin with the levels of serum proinflammatory cytokines and antioxidants in patients with type 2 diabetes mellitus in Universitas Sumatera Utara Hospital. Basic Sci, 715-20

Savarrio L, Donati M, Carr C, Kinane DF, Berglundh T., (2007) Interleukin-24, RANTES and CCR5 gene polymorphisms are not associated with chronic adult periodontitis. *Journal of Periodontal Research*. 42(2):152–158

Scheller J, Ohnesorge N, Rose-John S. IL-6 trans-signalling in chronic inflammation and cancer. *Scand J Immunol*. 2005;28:257-70

Schett, G., Dayer, J. M. & Manger, B., (2016) Interleukin-1 function and role in rheumatic disease. Nat. Rev. Immunol. 12, 14–24

Sedjati S, Santosa A, Supriyantini E., (2017) Aktivitas Antioksidan dan Kandungan Senyawa Fenolik Makroalga. *Jurnal Kelautan Tropis*. 20(2):117–23

Sepehri Z, Kiani Z, Afshari M, Kohan F, Dalvand A, Ghavami S., (2017) Inflammasomes and type 2 diabetes: An updated systematic review. Immunol Lett 192:97–103

Setiawan, H., & Irawan, M. I. (2017). Kajian Pendekatan Penempatan Ligan pada Protein Menggunakan Algoritma Genetika. *Jurnal Sains dan Seni ITS*, 6(2), A68-A72

Setyaning P, Renita W, Dedy K., (2021) Kajian Pustaka : Potensi Kandungan Polifenol pada Sargassum sp. Sebagai alternatif penanganan diabetes melitus tipe 2.

Singh VP, Bali A, Singh N, Jaggi AS., (2021) Advanced glycation end products and diabetic complications. *Korean J Physiol Pharmacol*. 18(1):1

Sinha, S., & Pande, V. (2020) *Assessment of docking accuracy and performance of docking protocols for molecular docking applications.* Journal of Molecular Modeling, 26(7), 168

Song B, Zhang YL, Chen LJ, Zhou T, Huang WK, Zhou X, et al., (2017) The role of Toll-like receptors in periodontitis. Oral Diseases. 168-180

Sreelakshmi V, Raj N, Abraham A., (2017) Evaluation of the drug-like properties of kaempferol, chrysophanol and emodin and their interactions with EGFR tyrosine kinase - An in silico approach. Nat Prod Commun. 915–

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Stöhr J, Barbaresko J, Neuenschwander M, Schlesinger S., (2021) Bidirectional association between periodontal disease and diabetes mellitus: a systematic review and meta-analysis of cohort studies. Sci Rep 11:13686

Suherlan Et Al., (2021) Uji Aktivitas Antikanker Payudara Senyawa Andrografolida Dari Tumbuhan Sambiloto (Andrographis Paniculata (Burm F) Ness.) Terhadap Human Epidermal Growth Factor Receptor 2 (Her-2) Secara In Silico. *Jurnal Ilmiah Farmasi Farmasyifa*, Vol 4 (2) 39-50.

Teixeira QE, Ferreira DC, da Silva AMP, Goncalves LS, Pires FR, Carrouel F, et al., (2021) Aging as a risk factor on the immunoexpression of pro-inflammatory IL-1beta, IL-6 and TNF-alpha cytokines in chronic apical periodontitis lesions. Biol (Basel).11:14

Tong HV, Luu NK, Son HA, Hoan NV, Hung TT, Velavan TP, et al., (2017) Adiponectin and pro-inflammatory cytokines are modulated in Vietnamese patients with type 2 diabetes mellitus. *J Diabetes Investig* 8:295–305

Tunell DH, Tymkiw KD, Johnson GK., (2010) A multiplex immunoassay demonstrates reductions in gingival crevicular fuid cytokines following initial periodontal therapy. *Journal of Periodontal Research*. 148–152

Vasina EM., (2013) Aging-and activation-induced platelet microparticles suppress apoptosis in monocytic cells and differentially signal to proinflammatory mediator release. *Am J Blood* Res. 3:107–23

Vitra sodik, swasono r tamat, tisno suwarno, dedi noviendri (2022) Ekstraksi Dan Purifikasi Fukosantin Dari Rumput Laut Cokelat Sargassum Sp.Sebagai Antioksidan.

Wijaksana, I.K.E. (2019), "Periodontal Chart Dan Periodontal Risk Assessment Sebagai Bahan Evaluasi Dan Edukasi Pasien Dengan Penyakit Periodontal", *Jurnal Kesehatan Gigi*, Vol. 6 No. 1, p. 19.

Wolf, J., Rose-John, S. & Garbers, C., (2014) Interleukin-6 and its receptors: a highly regulated and dynamic system. Cytokine 70, 11–20.

Wu CZ, Yuan YH, Liu HH, Li SS, Zhang BW, Chen W, et al., (2020) Epidemiologic relationship between periodontitis and type 2 diabetes mellitus. *BMC Oral Health* 20:204

Yamamoto Y, Morozumi T, Hirata T, Takahashi T, Fuchida S, Toyoda M, et al., (2020) Effect of periodontal disease on diabetic retinopathy in type 2 diabetic patients: a cross-sectional pilot study. *J Clin Med*.1–11

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Yost S, Duran-Pinedo AE., (2018) The contribution of Tannerella forsythia dipeptidyl aminopeptidase IV in the breakdown of collagen. *Mol Oral Microbiol*.33:407–19

Zhao P, Song X, Wang Q, Zhang P, Nie L, Ding Y, et al., (2021) Effect of adjunctive diode laser in the non-surgical periodontal treatment in patients with diabetes mellitus: a systematic review and meta-analysis. *Lasers Med Sci*. 36:939–50

Zou X, Lei Q, Luo X, Yin J, Chen S, Hao C, et al., (2023) Advances in biological functions and applications of apoptotic vesicles. *Cell Commun Signal*. 21:260