

DAFTAR PUSTAKA

- Abeeleh M A, Zuhair BI, Alzaben K R, Abu-Halaweh SA, Al-Essa MK Abuabeeleh J, Moaath M. Alsmady, 2009, Induction of Diabetes Melitus in Rats Using Intraperitoneal *Streptozotocin*: A Comparison Between 2 Strains of Rats, *European Journal of Scientific Research* 32(3): 398-402.
- Akbarzadeh, A., Norouzian, D., Mehrabi, M. R., Jamshidi, Sh., Farhangi, A., Verdi, A. A., Mofidian, S. M. A., and Rad, B. L., 2007, Induction of Diabetes by *Streptozotocin* in Rats, *Indian Journal of Clinical Biochemistry*, 22(2): 60-64.
- Ana, S., Erika, R., Arturo, H., Sergio, S.G., Hugo, L., Leticia, B-O., Lilia, S., Hector, A., Silvestre, G.D.L.P., Betha, V., Xochitl, G., Cristina, V., 2013. Morphological Study of Bone Cranial in Athymic Mice. *International Journal of Morphology*, 31(1): 321-328.
- Anitha, A., Sowmya, S., Kumar, P.T., Deepthi, S., Chennazhi, K.P., Ehrlich, H., Tsurkan, M., and Jayakumar, R., 2014, Chitin and *Chitosan* in Selected Biomedical Applications. *Progress in Polymer Science*, 39: 1644-1667.
- Arora, S., Ojha, S.K., Vohora, D., 2009, Characterisation of *Streptozotocin* Induced Diabetes Melitus in Swiss Albino Mice, *Global Journal of Pharmacology*, 3(2): 81-84.
- Asmara, MA., Rahardjo., Dwirahardjo B., 2015, Pengaruh Aplikasi Topikal Simvastatin Terhadap Ekspresi Osteokalsin pada Proses Penyembuhan Tulang Tikus Model Diabetes Melitus, *J Ked Gigi*, vol 6, No. 4: 354-360.
- Bellido, T., Plotkin, L.I., Bruzzaniti, A., 2014, Bone Cells, dalam Burr, D.B., Allen, M.R., *Basic and Applied Bone Biology*, Academic Press. London, pp. 27-46.
- Bellido, T., Gallant, K.M.H., 2014, Hormonal Effect on Bone Cells, dalam Burr, D.B., Allen, M.R., *Basic and Applied Bone Biology* Academic Press. London, pp. 297-310.
- Bouillon R., 1991, Diabetic Bone Disease, *Calcif Tissue J Int* 49: 155 – 160.
- Bukka, P., McKee, M.D., and Karaplis, A.C., 2014, *Molecular regulation of osteoblas differentiation* dalam Bronner, F., *et al. Bone formation*, Spinger. London, pp.3.

- Burr, D.B. & Akkus O., 2014, Bone Morphology and Organization dalam Burr, D.B., & Allen, M.R., *Basic and Applied Bone Biology*, Academic Press. London, pp. 3-25.
- Chesnutt, B.M., Yuan, Y., Buddington, K., Haggard, W.O., Bumgardner, J.D., 2009, Composite *Chitosan*/Nano-Hydroxyapatite Scaffolds Induce Osteocalcin Production by Osteoblast In Vitro and Support Bone Formation In Vivo, *J. Biomedical Engineering*: 2571-2579.
- Costa-Pinto, A.R., Reis, R.L., Neves, N.M., 2011, Scaffold Based Bone Tissue Engineering: The Role of *Chitosan*, *Tissue Eng Part B Rev*, 17(5): 331-334
- Datta, P., Ghosh, P., Ghosh, K., Maity, P., Samanta, S. K., Ghosh, S.K., Mohapatra, P.K.D., Chatterje, J., Dhara, S., 2013, In Vitro ALP and Osteocalcin Gene Expression Analysis and In Vivo Biocompatibility of N-Methylene Phosphonic *Chitosan* Nanofibers for Bone Regeneration, *J. Biomedical Nanotechnology* (9): 870-879.
- Doblare, M., Garcia, J.M., Gomez, M.J., 2004, Modelling Bone Tissue Fracture and Healing: A Review, *Engineering Fracture Mechanics* 71: 1809-1840.
- Ezoddini-Ardakani, F., Azam, A. N., Yassaei, S., Fatehi, F., Rouhi, G., 2011, *Effects of Chitosan on Dental Bone Repair*, *Health* 3(4): 202-203.
- Fawcett, D. W., 2002, *Buku Ajar Histologi (A Text Book of Histology) (terj)*, 12th ed, EGC. Jakarta, pp. 174-277
- Fogelman, I., Gnanasegaran., G., Van der Wall, H. (Eds.), 2012, *Radionuclide and Hybrid Bone Imaging*. Springer-Verlag. Berlin Heidelberg, pp. 29- 57.
- Fouda, M.M.G., 2005, *Use of Natural Polysaccharides in Medical Textile Applications*, (disertasi) Fachbereich Chemie University Duisburg-Essen, Germany. pp.8.
- Govoni, E.K, 2012, Insulin Like Growth Factor-1 Molecular Pathway In Osteoblast: Potential Targets For Pharmacological Manipulation, *J current Molecular Pharmacology*, 5: 142-152.
- Graves, D.T, Alblowi J, Paglia DN, o'connor J.P, Lin S, 2011, Review article Impact of Diabetes on Fracture Healing, *Journal of Experimental and Clinical Medicine*; 3(1):3e8, Elsevier Taiwan LLC: .3-6
- Gyliene, O., Inga, R., Rima, T., Ona, N., 2003, Chemical Composition and Sorption Properties of *Chitosan* Produced from Fly Larva Shells, *Chemija (Vilnius)*, 14(3): 121-127.

- Gundberg-Carpenter, C. & Lian, J. B., 1989, *Circulating Osteokalsin: A Bone-Specific Marker of Osteoblas Activity*, dalam E. Lindh and J. I. Thorell, (ed): *Clinical Impact of Bone and Connective tissue Markers*, Academic Press. London, pp.315-324.
- Gurney, A. M., and Howarth, F. C., 2009, Effects of *Streptozotocin*-induced diabetes on The Pharmacology of Rat Conduit and Resistance Intrapulmonary Arteries, *Cardiovascular Diabetology*, 8(4):1-10.
- Ho Ming-hua, Yao, Chih-Jung, Liao, Mei-Hsiu, Lin, Pei-I, Liu, Shing-hwa, Chen Ruei-Ming, 2015, *Chitosan* nano fiber scaffold improves bone healing via stimulating trabecular bone production due to upregulation of the runx2/osteocalcin/ alkaline phosphatase signaling pathway, *Int J Of Nanomedicine* 10: 5941-5954.
- Hudalla, G.A, Murphy, W.L, 2011, Biomaterials that regulate growth factor activity via Bioinspired interaction, advanced functional. *materials journal*. 21: 1754-1768.
- Infodatin, 2014. *Situasi Dan Analisis Diabetes*. www.depkes.go.id/resources/download/pusInfodatin/infoInfodatin/infoInfodatin-diabetes.pdf?opwvc=1. diakses pada tanggal 22 september 2018 pukul 20.00.
- Ivaska, K., 2005, *Novel Insights Into the Use of Osteocalcin as a Determinant of Bone Metabolism*, University of Turku, Finland, pp.11-114.
- Jagtap, V.R., Ganu J.V., 2011, Serum Osteocalcin: A Specific Marker for Bone Formation in Postmenopausalosteoporis, *Int J Pharm Bio Sci* 1(4): 510-517.
- Jayakumar, R., Prabakaran, M., Kumar, P.T.S., Nair, S.V., and Tamura, H., 2011, Biomaterials Based on *Chitin* and *Chitosan* in Wound Dressing Applications. *Biotechnol. Adv.* 29: 322-337.
- Junqueira, C.L & Carneiro., 2007, *Atlas dan Teks Histologi*. EGC. Jakarta, pp.134-6, 145-7.
- Kagel, E. M., & Einhorn, T. A., 1996, Alterations of Fracture Healing in The Diabetic Condition, *Iowa Orthop. J.* (16): 147–152.
- Kanazawa, I., Yamaguchi, T., Yamamoto, M., Yamauchi, M., Yano, S., and Sugimoto, T., 2009, Serum Osteocalcin/Bone-Specific Alkaline Phosphatase Ratio Is a Predictor for The Presence of Vertebral Fractures in Men with Type 2 Diabetes, *Calcif Tissue Int* 85: 228-234.
- Kim, S., Bedigrew, K., Guda, T., 2014, Novel Osteoinductive Photo-Cross-Linkable *Chitosan*-Lactide-Fibrinogen Hydrogels Enhance Bone Regeneration in Critical Size Segmental Bone Defects, *Acta Biomaterialia*, 10(12): 5021-5033.

- Klokkevold, P.R., Vandemark, L., Kenney, E.B., Bernard, G.W, 1996, Osteogenesis Enhanced by *Chitosan* (Poly-N-Acetyl Glucosaminoglycan) In Vitro, *J. Periodontol* 67: 1170-1175.
- Lachin, T., & Reza, H., 2012, Anti Diabetic Effect of Cherries in Alloxan Induced Diabetic Rats, Recent Patents on Endocrine, Metabolic & Immune Drug Discovery, *Bentham Science Publishers*, 6(1): 67-71.
- Lee, A. J., Hodges, S., Eastell, R., 2000, Measurement of Osteocalcin, *Ann Clin Biochem*; 37: 432-446.
- Lieberman, J.R & Friedlaender, G.E., 2007, *Bone Regeneration and Repair: Biology & Clinical Applications*. Humans Press Inc: Totowa NJ. pp.345-346.
- Li, J. & Stocum, D. L., 2014, Fracture Healing, dalam Bur, D.B., & Allen, M.R., *Basic and Applied Bone Biology*, Academic Press. London, pp.205-204.
- Li, Y., Kim, J.H., Choi, E.H., Han, I., 2019, Promotion of Osteogenic Differentiation by Non-Thermal Biocompatibility Plasma Treated *Chitosan* Scaffold, *J. Scientific Reports* 9: 1-10.
- Lian, J.B., Stein, G. S., Gerstenfeld, L., and Glowacki, J., 1989, *Gene Expression and Functional Studies of The Vitamin K-Dependent Protein of Bone, Osteokalsin*, in E. Lindh and J. I. Thorell, (ed): *Clinical Impact of Bone and Connective tissue Markers* Academic Press. London, pp.121-131.
- Mansjoer, A., Triyanti, K., Savitri, R., Wardhani, W.I., Setiowulan, W., 1999, *Kapita Selektta Kedokteran*, ed.3. Media Aesculapius. Jakarta, pp.580-588
- Marks Jr, S.C., & Odgren, P.R., 2002, Structure and Development of The Skeleton dalam Bilezikian, J.P., *Principles of Bone biology 2nd*, Academic Press. Florida, pp. 3-16.
- Martel-Estrada, S.A., Olivas-Amendariz, I., Martinez-Perez, C. A., Hernandez, T., Acosta-Gomez, E.I., Chacon-Nova, J.G., Jimenez-Vega, F., Garci-Casillas, P.E., 2012, *Chitosan/poly (DL, lactide-co-glycolide) scaffolds for tissue engineering*, *J Mater Sci* 23: 2893-2901.
- Mitchell, R. N., Kumar, V., Abbas, A. K., Fausto, N., 2009, *Robbins dan Cotran Buku Saku Dasar Patologis Penyakit (terj.)*, EGC. Jakarta, pp.669-678.
- Mizuno, K *et al*, 2002, Effect of *Chitosan* film containing basic fibroblast growth factor on wound healing in genetically diabetic mice. *Wiley periodicals, Inc.J Biomed Mater Res* 64A: 177-181.
- Motyl K, McCabe LR, 2009, *Streptozotocin*, Type I Diabetes Severity and Bone, *Shulin Li (ed.)*, *Biological Procedures Online*, 11(1): 296-311.

- Muzzarelli, R.A.A., 2011, *Chitosan Scaffold for Bone Regeneration*, dalam Se-Kwon K., *Chitin, Chitosan, Oligosaccharides and Their Derivatives (Biological Activities and Applications)*, Florida: Taylor and Francis Group, pp.223-240.
- Nakhaee, A., Bokaelan, M., Saravani, M., and Akbarzadeh, A., 2009, *Attenuation of Oxydative Stress in Streptozotocin-Induced Diabetic Rats by Eucalyptus Globulus*, *Indian Journal of Biochemistry*, 24(4): 419-425.
- Nanci A. 2003. *Ten Cate's Oral Histology: development, structure, and function*. 6th ed. St. Louis: Mosby, pp.115-119.
- Nather, A., Ong, H.J.C., Aziz, Z., 2005, Structure of Bone, dalam Nather, A., *Bone Grafts and Bone Subtitutes*, World Scientific Publishing Co. Pte. Ltd. Singapore, pp.3-17.
- Nwe N., Furuike T., Tamura H., 2011, *Production, properties and Applications of Fungi Cell Wall Polysaccharides: Chitosan and Glucan*, Springer. Berlin Heidelberg, pp.187-208.
- Oryan, A., Alidadi, S., Bigham-Sadegh, A., Moshiri, A., 2016. Comparative Study on The Role of Gelatin, *Chitosan* and Their Combination as Tissue Engineered Scaffolds on Healing and Regeneration of Critical sized Bone Defects: An In Vivo Study, *J. Mater Sci: Mater Med* 27: 1-14.
- Oryan, A., Alidadi, S., Moshiri, A., 2013. Current concerns regarding healing of bone defect, *Hard Tissue* 2(2): 13.
- Patti, A., Gennari, L., Merlotti, D., Dotta, F., Nuti, R., 2013, Endocrine Actions of Osteokalsin. *International Journal of Endocrinology*. Vol. 2013: 1-10.
- Petrica, A., Brinzeu, C., Brinzeu, A., Petrica, R., Ionac, M., 2009, Accuracy Of Surgical Wound Infection Definitions-The First Step Towards Surveillance Of Surgical Site Infections, *Timisoara Medical Journal*, 59(3-4): 362-365.
- Plotkin, L.I & Bivi, N., 2014, Local Regulation of Bone Cell Function, dalam Burr, D.B., & Allen, M.R., *Basic and Applied Bone Biology*, Academic Press. London, pp.47-72.
- Pogorielov MV, Sikora VZ., 2015, *Chitosan* as a Hemostatic Agent: Current State, *European Journal of Medicin. Series B* (2): 24-33.
- Pournaghi, P., Sadrkhanlou R.A, Hasanzadeh S, Foroughi A, 2012, An Investigation on Body Weights, Blood Glucose Levels and Pituitary-Gonadal Axis Hormones in Diabetis and Metformin Treated Diabetic Female Rats, *Vet Res Forum* 3(2) 79-84.

- Purnamasari, D., 2009, Diagnosis Dan Klasifikasi Diabetes Melitus dalam Sudoyo, A.W., Setiyohadi, B., Alwi, I., Simadibrata, K.M., Setiati, S., *Buku Ajar Ilmu Penyakit Dalam, InternaPublishing, Jakarta Pusat, pp.1880-1883.*
- Puspawati, N.M & Simpen I.N, 2010. Optimasi deasetilasi khitin dari kulit udang dan cakang kepiting limbah restoran seafood menjadi khitosan melalui variasi konsentrasi NaOH. *Jurnal Kimia Vol.4(1): 79-90.*
- Retzepe M & Donos N, 2010, Invited Review, The Effect of Diabetes Melitus on Osseous Healing, *Clinical Oral Implant Research (21): 673-681.*
- Ribeiro, M.P., Espiga, A., Silva, D., Baptista, P., Henriques, J., Ferreira, C., Silva, J.C., Borges, J.P., Pires, E., Chaves, P., and Correia, C.J., 2009, Development of A New *Chitosan* Hydrogel for Wound Dressing. *Wound Repair Regen 17: 817-823.*
- Ridwan Endi, 2013. Etika Pemanfaatan Hewan Percobaan dalam Penelitian Kesehatan, *J Indon Med Assoc, 63(3): 112-116*
- Ross, M. H., Kaye, G. I., and Pawlina, W., 2002, *Histology: A Text and Atlas 4th ed.*, Lippincott Williams and Wilkins. London, pp.190-203.
- Rubenstein D., wayne D., bradley J., 2007. Kedokteran klinis, edisi 6th, Jakarta: Erlangga. pp.177-218.
- Saladin, K.S., 2010, *Anatomy dan Physiology The Unity of Form dan Function*, McGraw Hill. Boston. pp.74-99.
- Sandor, G.K.B., 2003, *The Minimization Of Morbidity In Cranio-maxillofacial Osseous Reconstruction*, Academic Disertation, University of Oulu. Finland.
- Schteingart, D.E., 2006, Pankreas; Metabolisme Glukosa dan Diabetes Melitus, dalam Price, S.A & Wilson, L.M., *Patofisiologi Konsep Klinis Proses-Proses Penyakit., edisi 6.*, Penerbit Buku Kedokteran EGC. Jakarta, pp. 1259-1270.
- Shanmugasundaram, O.L, 2006. *Chitosan* Coated Cotton Yarn and It's effect Antimicrobial Activity, *JTATM, 5(3): 1-6.*
- Singh, D.K. and Ray, A.R., 2000, Biomedical Applications of *Chitin, Chitosan*, and Their Derivatives. *Journal of Macromolecular Sciences, Part C: Polymer Reviews, 40:1, 70: 69-80*
- Soepribadi, I., 2013, *Regenerasi dan Penyembuhan untuk Kedokteran Gigi*, Sagung Seto. Jakarta, pp.45-49.

- Suryanto, 2016, Pengaruh Pemberian *Chitosan* Terhadap Ekspresi Osteokalsin dan Kadar Fosfatase Alkali pada Proses Penyembuhan Tulang (Penelitian Eksperimental pada Defek Mandibular Tikus Model). *Thesis*. Program Pendidikan Dokter Gigi Spesialis Fakultas Kedokteran Gigi Universitas Gadjah Mada. pp. 46.
- Suyono, S., 2009, *Buku Ajar Ilmu Penyakit Dalam*, edisi 5, Interna publishing. Jakarta Pusat. pp.1873- 1883.
- Szkudelski, T., 2012, *Streptozotocin–Nicotinamide Induced Diabetes in The Rat*. Characteristics of the experimental model. *Experimental Biology and Medicine* 237: 481–490.
- Szkudelski T, 2001, The Mechanism of Alloxan and *Streptozotocin* Action in B Cells of the Rat Pancreas, *Physiol. Res.*, 50: 536-546.
- Tanaka, S., Matsuzaka, K., Sato, D., and Inoue T., 2007, Characteristics of Newly Formed Bone During Guided Bone Regeneration: Analisis of CBFA-1, Osteokalsin and VEGF Expression, *J. of Oral Implantology*; (XXXIII) 6: 321-326.
- Teng, D., 2012, *From Chitin to Chitosan, Chitosan-Based Hydrogels Functions and Applications*, CRC Press. Florida, pp. 2-3, 435-436.
- Termine, J. D., 1989, *Biochemistry of The Bone Matrix*, in E. Lindh and J. I. Thorell: *Clinical Impact of Bone and Connective tissue Markers*, Academic Press. London, pp. 91-98.
- Thomas, SDC., 2012. Bone turnover markers. Abnormal Laboratory Result. *Australian Prescriber* (35): 156-158.
- Thraillkill, K., Bunn, R. C., Lumpkin, C., Wahl, E., Cockrell, G., Morris, L., Nyman, J. S., 2014, Loss of insulin receptor in osteoprogenitor cells impairs structural strength of bone, *Journal of Diabetes Research*: 1-9
- VandeVord, P.J., Matthew, H.W.T., DeSilva, S.P., Mayton, L., Wu, B., Wooley, P.H., 2001, Evaluation of the biocompatibility of a *chitosan* scaffold in mice, *jbm*. 1270: 585-590
- Vázquez M.R, Ruiz B.V, Zúñiga R.R, Koppel D.A.S, Olvera L.F.Q., 2015, *Chitosan* and Its Potential Use a Scaffold for Tissue Engineering in Regenerative Medicine, *J. BioMed Research International*: 1-11.
- Wang, W., Lin, S., Xiao, Y., 2008. Acceleration of Diabetic Wound Healing with *Chitosan*-Crosslinked Collagen Sponge Containing Recombinant Human Acidic Fibroblast Growth Factor in Healing-Impaired STZ Diabetic Rats. *Life Sciences* 82(3): 190-204.

- Wang, C., Li, J., Yao, F., 2012, *Application of Chitosan-Based Biomaterials in Tissue Engineering, Chitosan-Based Hydrogels Functions and Applications*, CRC Press. Florida, pp. 436-446.
- Wei, M., Ong, L., Smith, M. T., Ross, F. B., Schmid, K., Hoey, A. J., Burstow, D., and Brown, L., 2003, The Streptozotocin-Diabetic Rat as a Model of the Chronic Complications of Human Diabetes, *J of Heart, Lung and Circulation* (12): 44-50.
- Wild, S., Roglic, G., Sicree, R., Green, A., and King, H., 2004, Global Prevalence of Diabetes Estimates for The Year 2000 and Projection for 2030, *Diabetes Care*; (27) 5: 1047-1053.
- Williams, D.F., 2018, Biocompatibility Pathways in Tissue-Engineering Templates, *Engineering 4*: 286-290.
- Wu, K. K., Huan Y., 2008, *Streptozotocin-Induced Diabetic models in Mice and Rats*, *Current Protocols in Pharmacology* 5. 47: 1-14.
- X. Li., Ma, Xiang-Yu., Feng, Ya-Fei., Ma, Zhen-Sheng., Wang, J., Ma, Tian-Cheng., Qi, W., Lei, W., Wang, L., 2015, Osseointegration of *Chitosan* Coated Porous Titanium Alloy Implant by Reactive Oxygen Species-Mediated Activation of The PI3K/AKT Pathway Under Diabetic Conditions, *J. Biomaterials* 36: 44-54.
- Yulina, I.K., 2011, Aktivitas Antibakteri *Chitosan* berdasarkan Perbedaan Derajat Deasetilasi dan Bobot Molekul. *Thesis*. sekolah Pasca Sarjana Departemen Kimia Institut Pertanian Bogor. Bogor. pp.1-7.
- Yao, K., Li, J., Yao, F., Yin, Y., 2012, *Chitosan-Based Hydrogels Function and Applications*, Taylor and Francis Group. London, pp.284.



UNIVERSITAS
GADJAH MADA

**PENGARUH APLIKASI TOPIKAL GEL CHITOSAN TERHADAP EKSPRESI OSTEOKALSIN PADA
PROSES PENYEMBUHAN
TULANG KONDISI DIABETES MELITUS (Kajian pada Tikus Sprague Dawley)**
ARYA KUSUMA AGRAHA, drg. Poerwati Soetji Rahajoe, Sp.BM(K); drg. Bambang Dwirahardjo, Sp.BM(K)
Universitas Gadjah Mada, 2020 | Diunduh dari <http://etd.repository.ugm.ac.id/>