REFERENCES

1. Madanagopal TT., et al. Carbon nanocomposites for implant dentistry and bone tissue engineering. Elsevier. 2019: 47.
2. Pedersen GW. Buku Ajar Praktis Bedah Mulut (terj.). Penerbit Buku Kedokteran EGC. 1996; pp. 29-100.
3. Sari DS., et al. The role of probiotic on alveolar bone resorption. Dent. J. 2011; 44(3) : 117–20
4. Hienz S., et al. Mechanisms of bone resorption in periodontitis. Journal of Immunology Research. 2015; (615486) : 1-4
5. Rahmania., et al. Densitas tulang alveolar pada penderita periodontitis kronis dan periodontitis agresif melalui radiografi. JRDI. 2019; 3(2) : 7
6. Prasetya RC., et al. Infiltrasi neutrofil pada tikus dengan periodontitis setelah pemberian ekstrak etanolik kulit manggis. Maj Ked Gi. 2014; 21(1): 33-4
7. Kementerian Kesehatan RI. Laporan nasional RISKESDAS 2018. Lembaga Penerbit Badan Penelitian dan Pengembangan Kesehatan (LPB). 2019; p. 204
8. Suratri MAL. Pengaruh hipertensi terhadap kejadian penyakit jaringan periodontal (periodontitis) pada masyarakat indonesia (data riskesdas 2018). Buletin Penelitian Kesehatan. 2020; 48(4) : 227-8

9. Ardhiyanto HB. Peran hidroksiapatit sebagai bone graft dalam proses penyembuhan tulang. Stomatognatic - Jurnal Kedokteran Gigi. 2011; 8(2) : 118-120
10. Herda E and Puspitasari D. Tinjauan peran dan sifat material yang digunakan sebagai scaffold dalam rekayasa jaringan. JMKG 2016; 1(5) : 56-8
11. Poernomo H. Teknik bone tissue engineering (BTE) untuk regenerasi jaringan periodontal dan estetik pada edentulous ridge. Universitas Mahasaraswati Denpasar. 2015: 57.
12. Li B., et al. Fucoidan : structure and bioactivity. 2008; 13 : 1671-2
13. Sihombing I and friends. Peran estrogen pada remodeling tulang. Jurnal Biomedik. 2012; 4(3) : S18-23
14. Florencio SR., et al. Biology of bone tissue: structure, function and factors that influence bone cells. J. Biomed Research International. 2015; Article ID 421746 : 1-6
15. Kenkree JS, Bassett JHD. The bone remodelling cycle. Annals of Clinical Biochemistry. 2018; 55(3): 308–14
16. Mohamed. An overview of bone cells and their regulating factors of differentiation. Malaysian Journal of Medical Sciences. 2008; 15(1) : 6
17. Teitelbaum SL. Osteoclasts: what do they do and how do they do it?. The American Journal of Pathology. 2007; 170(2) : 427-9
18. Lande R et al. Gambaran faktor risiko dan komplikasi pencabutan gigi di rsgm pspdg-fk unsrat. e-GiGi J. 2015; 3(2) : 477

19. Howe GL. The extraction of teeth. 2nd ed. Medical Book Publisher EGC. 1999. p.1, 84-95
20. Newman and Carranza. Carranza's clinical periodontology. 13th ed. Saunders. 2018. p. 346-62
21. Raggatt LJ and Partridge NC. Cellular and molecular mechanisms of bone remodeling. The Journal of Biological Chemistry. 2010; 285(33): 25103–25107
22. Rucci N. Molecular biology of bone remodeling. Clinical Cases in Mineral and Bone Metabolism. 2008; 5(1): 49-52
23. Artese, L., et al. Immunohistochemical analysis of inflammatory infiltrate in aggressive and chronic periodontitis: a comparative study. Clin Oral Invest. 2011; 15(1): 233-240
24. Roshna T and Nandakumar K. Generalized aggressive periodontitis and its treatment options: case reports and review of the literature. Hindawi Publishing Corporation Case Reports in Medicine. 2012; Article ID 535321 : 1-2
25. Huang X., et al. The roles of osteocytes in alveolar bone destruction in periodontitis. Journal of Translational Medicine. 2020; 18(479): 1-5
26. Clarke B. Normal bone anatomy and physiology. Clin J. Am Soc Nephrol. 2008; 3: S131–5
27. Venkatesan et al. Macroalgal fucoidan for biomedical applications. Algal Technologies And Phytochemicals. 2019. p. 11-5

28. Cho YS. Beneficial effects of fucoidan on osteoblastic MG-63 cell differentiation. Elsevier. 2009; 116 : 990–3
29. Saima S., et al. Bone grafts and bone substitutes in dentistry. Journal of Oral Research and Review. 2016; 8 : 36-8
30. Kumar P., et al. Bone grafts in dentistry. Journal of Pharmacy and Bioallied Sciences.2013; 5(1) : S125-7
31. Mahanani ES. Hydrogel Scaffolds for Bone Tissue Engineering Applications. IDJ. 2013; 2(2): 51-3
32. Amini AR., et al. Bone tissue engineering: recent advances and challenges. Crit Rev Biomed Eng. 2012; 40(5): 1-13
33. Qu H., et al. Biomaterials for bone tissue engineering scaffolds: a review. RSC Adv. 2019; 9, 26252–62
34. Dhandayuthapani B., et al. Polymeric scaffolds in tissue engineering application: a review. International Journal of Polymer Science. 2011
35. Luthuli S., et al. Therapeutic effects of fucoidan: a review on recent studies. Mar. Drugs J. 2019; 17(9): 487
36. Sardi, N., et al. Peningkatan sel osteoblast mandibula tikus wistar jantan setelah pemberian fermentasi teh kombucha. Interdental: Jurnal Kedokteran Gigi. 2018; 14(2) : 51-54
37. Chandika P and Jung W. Marine algae based biomaterials for osteoblast differentiation and tissue regeneration. Textbook of Marine Algae Extracts: Processes, Products, and Applications. 2015; pp. 489-92

38. Zhang R., at al. Composition, isolation, purification and biological activities of sargassum fusiforme polysaccharides: a review. Carbohydrate Polymers 228. 2020; Article ID 115381 : 1-3

39. Mukhamejanov E, Kurilenko V. Fucoidan: A nutraceutical for metabolic and regulatory systems homeostasis maintenance. World journal of advances research and reviews. 2020; 6(1): 258.

40. Hwang P., et al. The in vitro and in vivo effects of the low molecular weight fucoidan on the bone osteogenic differentiation properties. Cytotechnology. 2015. p. 1-6

41. Park S., et al. The sulfated polysaccharide fucoidan stimulates osteogenic differentiation of human adipose-derived stem cells. Stem Cells and Development. 2012; 21(12) : 2205-8

42. Kim BS., et al. Fucoidan-induced osteogenic differentiation promotes angiogenesis by inducing vascular endothelial growth factor secretion and accelerates bone repair. J. Tissue Eng Regen Med. 2018; 1-17

43. Kim BS., et al. Fucoidan promotes osteoblast differentiation via JNK- and ERK-dependent BMP2–Smad 1/5/8 signaling in human mesenchymal stem cells. J. Experimental & Molecular Medicine. 2015; 1-4

44. Hsu FY., et al. Preparation of a fucoidan-grafted hyaluronan composite hydrogel for the induction of osteoblast differentiation in osteoblast-like cells. J. Materials. 2021; 14(1168) : 1-12

LAMPIRAN

JOURNAL SYNTHESIS TABLE

NO	Author's name	Journal Title (Year)	Journal Name	Subject of Research	Object of Research	Results and Conclusion
1	Hwang P., et al	The in vitro and in vivo effects of the low molecular weight fucoidan on the bone osteogenic differentiation properties (2015)	Cythotechnology	Low Molecular Weight Fucoidan on Osteogenic differentiation of bone	ALP activity and Osteocalcin secretion	ALP activity increased to 135.35 ± 2.91% at 2mg/ml Fucoidan and increased Osteocalcin secretion at concentrations from 0.5-2mg/ml by 7F2 cells cultured with Fucoidan LMW
2	Park S., et al	The Sulfated Polysaccharide Fucoidan	STEM CELLS AND DEVELOPMENT	Fucoidan stimulates the differentiation of	Comparison of hADSC cultured with and without	hADSC cells cultured with fucoidan in osteogenic media (OS +

		Stimulates Osteogenic Differentiation of Human Adipose-Derived Stem Cells (2012)		human adipose-derived stem cells (hADSCs) into osteoblasts	Fucoidan in Osteogenic media	Fuco) were highly positive compared without fucoidan in ALP, ARS and VK staining assays so that Fucoidan markedly induced osteogenic differentiation
3	Kim BS., et al	Fucoidan-induced osteogenic differentiation promotes angiogenesis by inducing vascular endothelial growth factor secretion and accelerates bone repair (2018)	J. Tissue Eng Regen Med	Fucoidan induces Osteogenic differentiation	Mesenchymal stem cells (MSCs were cultured and treated with Fucoidan	ALP activity test was performed, which was determined by staining, which showed the highest ALP activity after treatment with 1g/ml fucoidan, so it can be concluded that fucoidan induces osteoblast

						differentiation in MSCs depending on the dose.
4	Kim BS., et al	Fucoidan promotes osteoblast differentiation via JNK- and ERK-dependent BMP2–Smad 1/5/8 signaling in human mesenchymal stem cells (2015)	J. Experimental & Molecular Medicine	Effect of Fucoidan on Osteoblast differentiation	Human alveolar bone marrow-derived mesenchymal stem cells (hABM-MSC)	The results of the ALP staining test showed that fucoidan significantly ($P<0.01$) induced ALP activity in the range of 0.1–1.0 gml− 1; and Real-time PCR test results reported that the mRNA expression level of Osteoblast marker genes (RUNX2, Col. 1, OC and ALP) increased after treatment with 1μgml Fucoidan.

5	Hsu FY., et al	Preparation of a fucoidan-grafted hyaluronan composite hydrogel for the induction of osteoblast differentiation in osteoblast-like cells (2021)	J. Materials	Hyaluronan (HA) and Fucoidan crosses in inducing osteoblast differentiation for the manufacture of composite hydrogels	ALP activity test	The results of the ALP activity test for three days showed that fucoidan was able to increase ALP activity as a phenotypic marker for early-stage osteoblast differentiation of MG63 cells.

KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN
UNIVERSITAS HASANUDDIN
FAKULTAS KEDOKTERAN GIGI
JL. Perintis Kemerdekaan KM. 10 Makassar 90245
Telp. (0411) 586012 Fax : (0411) 584641
Website: www.dent.unhas.ac.id, Email : fkg@unhas.ac.id

SURAT PENUGASAN
No. 1256/UN4.13/TD.06/2021

Dari : Dekan Fakultas Kedokteran Gigi Universitas Hasanuddin

Kepada : **Dr. Nurlindah Hamrun, drg., M.Kes**

Isi : 1. Menugaskan kepada Saudara sebagai Dosen Pembimbing Skripsi mahasiswa pada Program Studi Pendidikan Kedokteran Gigi Fakultas Kedokteran Gigi Universitas Hasanuddin, yakni:

Angkatan 2019:
- Daranisa Wulan Purnamasari (J011191098)
- Nadia Risda Kurnia (J011191078)

2. Bahwa Saudara yang namanya tersebut pada surat penugasan ini dipandang cakap dan memenuhi syarat untuk melaksanakan tugas tersebut.
3. Agar penugasan ini dilaksanakan dengan sebaik-baiknya dengan penuh rasa tanggung jawab.
4. Surat penugasan ini berlaku sejak tanggal ditetapkan, dengan ketentuan bahwa apabila dikemudian hari terdapat kekeliruan dalam surat penugasan ini, akan diadakan perbaikan sebagaimana mestinya

Makassar, 6 Mei 2021
Dekan,

Muhammad Ruslin, drg., M.Kes., Ph.D., Sp.BM(K)
NIP. 19790702 200112 1 001

Tembusan Yth:
1. Wakil Dekan Bidang Akademik, Riset dan Inovasi FKG Unhas;
2. Kepala Bagian Tata Usaha FKG Unhas.

KEMENTERIAN PENDIDIKAN, KEBUDAYAAN,
RISET, DAN TEKNOLOGI
UNIVERSITAS HASANUDDIN
FAKULTAS KEDOKTERAN GIGI
DEPARTEMEN ORAL BIOLOGI
Jl. Perintis Kemerdekaan Km. 10, Makassar 90245
Telepon (0411) 586012, 584641 Faximile. (0411) 584641
Laman: dent.unhas.ac.id

Nomor : 4223/UN4.13.7/PT.01.06/2021 17 Desember 2021
Hal : Undangan Seminar Proposal Skripsi

Kepada Yth,

1. Dr. Nurlindah Hamrun, drg., M.Kes (Pembimbing)
2. Prof. Dr. Asmawati, drg., M.Kes (Penguji I)
3. Dr. A. St. Asmidar Anas, drg., M.Kes (Penguji II)

Fakultas Kedokteran Gigi Universitas Hasanuddin
Makassar

Dengan hormat, Bersama ini kami mengundang Bapak/Ibu untuk menghadiri Seminar Proposal Skripsi **secara daring by zoom** atas nama mahasiswa :

No	Nama	Nim	Judul
1.	Daranisa Wulan Purnamasari	J011191098	Effectiveness of Fucoidan in Stimulating Osteoblast Cells in Bone Regeneration
2.	Nadia Risda Kurnia	J011191078	Pemanfaatan Alginat Sebagai Bahan Scaffold Pada Kasus Kerusakan Tulang Alveolar

Yang akan dilaksanakan pada :

Hari / Tanggal : Rabu, 22 Desember 2021
Waktu : 20.00 WITA – selesai
Meeting ID : **915 988 5071**
Passcode : **OB2021**

Atas perhatian dan partisipasi Bapak/Ibu, kami ucapkan terima kasih.

Mengetahui,
Ketua Departemen Oral Biologi

Prof. Dr. Irene Edith Rieuwpassa, drg., M.Si
Nip. 19711012 199903 2 001

Tembusan :
1. Pembantu Dekan 1 FKG Unhas;
2. Arsip.

KEMENTERIAN PENDIDIKAN, KEBUDAYAAN,
RISET, DAN TEKNOLOGI
UNIVERSITAS HASANUDDIN
FAKULTAS KEDOKTERAN GIGI
DEPARTEMEN ORAL BIOLOGI
Jl. Perintis Kemerdekaan Km. 10, Makassar 90245
Telepon (0411) 586012, 584641 Faximile. (0411) 584641
Laman: dent.unhas.ac.id

Nomor : 204/UN4.13.7/PT.01.06/2022 17 Januari 2022
Hal : Undangan Seminar Hasil Skripsi

Kepada Yth,

1. Dr. Nurlindah Hamrun, drg., M.Kes (Pembimbing)
2. Prof. Dr. Asmawati, drg., M.Kes (Penguji I)
3. Dr. A. St. Asmidar Anas, drg., M.Kes (Penguji II)

Fakultas Kedokteran Gigi Universitas Hasanuddin
Makassar

Dengan hormat, Bersama ini kami mengundang Bapak/Ibu untuk menghadiri Seminar Hasil Skripsi **secara daring by zoom** atas nama mahasiswa :

No	Nama	Nim	Judul
1.	Daranisa Wulan Purnamasari	J011191098	Effectiveness of Fucoidan in Stimulating Osteoblast Cells in Bone Regeneration
2.	Nadia Risda Kurnia	J011191078	Pemanfaatan Alginat Sebagai Bahan Scaffold Pada Kasus Kerusakan Tulang Alveolar

Yang akan dilaksanakan pada :

Hari / Tanggal : Jumat, 21 Januari 2022
Waktu : 20.00 WITA – selesai
Meeting ID : **915 988 5071**
Passcode : **OB2021**

Atas perhatian dan partisipasi Bapak/Ibu, kami ucapkan terima kasih.

Mengetahui,
Ketua Departemen Oral Biologi

Prof. Dr. Irene Edith Rieuwpassa, drg., M.Si
Nip. 19711012 199903 2 001

Tembusan :
1. Pembantu Dekan 1 FKG Unhas;
2. Yang bersangkutan;
3. Arsip.

KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN UNIVERSITAS HASANUDDIN
FAKULTAS KEDOKTERAN GIGI
DEPARTEMEN ORAL BIOLOGI
Jl. Perintis Kemerdekaan Km. 10, Makassar 90245
Telepon (0411) 586012, 584641 Faximile. (0411)584641
Website : http://dent.unhas.ac.id, Email: fkg@unhas.ac.id

KARTU KONTROL SKRIPSI

Nama : Daranisa Wulan Purnamasari

NIM : J011191098

Judul : Efektivitas Fucoidan Dalam Merangsang Sel-Sel Osteoblas Pada Regenerasi Tulang

No.	Hari, tanggal	Materi konsultasi	Paraf	
			Mahasiswa	Pembimbing
1.	Senin, 19 Juli 2021	Perkenalan dan arahan membuat judul		
2	Selasa, 31 Juli 2021	Pengajuan bahan jurnal untuk membuat judul		
3	Sabtu, 7 Agustus 2021	Konfirmasi skripsi systematic review/literature review		
4	Jum'at, 17 September 2021	ACC Judul		
5	Kamis, 2 Desember 2021	Pengajuan BAB I, II dan III		
6	Jumat, 7 Desember 2021	Revisi BAB I, II dan III		
7	Jum'at, 17 Desember 2021	ACC dan persiapan ujian proposal		

8	Jum'at, 24 Desember 2021	Ujian I/ seminar proposal		
9	Selasa, 4 Januari 2022	Pengajuan revisi proposal dan BAB IV, V		
10	Jum'at, 14 Januari 2022	Diskusi hasil		
11	Rabu, 19 Januari 2022	ACC dan persiapan ujian hasil		
12	Jum'at, 21 Januari 2022	Ujian II/ seminar hasil		
14	Selasa, 25 Januari 2022	Diskusi dan arahan naskah akhir skripsi		
15	Sabtu, 12 Februari 2022	Pengajuan naskah akhir skripsi		
16	Selasa, 15 Februari 2022	Pengesahan dan tanda tangan		

Makassar, 12 September 2022

Dosen Pembimbing,

Dr. drg. Nurlindah Hamrun, M.Kes

NIP. 19680505 199903 2 001