

DAFTAR PUSTAKA

- Adi, A. M. (2013) 'Teknik Imunostaining', *Bahan ajar*.
- Amarya, S., Singh, K. and Sabharwal, M. (2018) 'Ageing Process and Physiological Changes', *Gerontology*, pp. 3–24. doi: 10.5772/intechopen.76249.
- American Heart Association, I. (2020) '2020 Heart Disease & Stroke Statistical Update Fact Sheet Global Burden of Disease', *American Heart Association, Inc*, (Cvd), pp. 9–11.
- Andersen, M. L. and Winter, L. M. F. (2019) 'Animal models in biological and biomedical research – experimental and ethical concerns', *An Acad Bras Cienc*, 91(1), pp. 1–14. doi: 10.1590/0001-3765201720170238.1.
- Andreollo, N. A. et al. (2012) 'Rat's age versus human's age: what is the relationship?', *Arquivos brasileiros de cirurgia digestiva : ABCD = Brazilian archives of digestive surgery*, 25(1), pp. 49–51. doi: 10.1590/s0102-67202012000100011.
- Bar, A. (2000) 'Trehalose: Produced By a Novel Enzymatic Process', *Bioresearch Management and Consulting Ltd.*, pp. 2–3.
- Berry, A. et al. (2020) 'Trehalose administration in C57BL/6N old mice affects healthspan improving motor learning and brain anti-oxidant defences in a sex-dependent fashion: a pilot study', *Experimental Gerontology*. Elsevier, 129(October 2019), p. 110755. doi: 10.1016/j.exger.2019.110755.
- Biwas, I. and Rezaie, A. R. (2018) 'Vascular inflammation in aging', 10(12), pp. 3634–3635.
- Blankstein, R., Libby, P. and Bhatt, D. L. (2019) 'Arterial Inflammation', 73(12), pp. 10–12.
- Burch, J. B. et al. (2014) 'Advances in geroscience: Impact on healthspan and chronic disease', *Journals of Gerontology - Series A Biological Sciences and Medical Sciences*, 69(SUPPL. 1), pp. 1–3. doi: 10.1093/gerona/glu041.
- Cartwright, T., Perkins, N. D. and L Wilson, C. (2016) 'NFKB1: a suppressor of inflammation, ageing and cancer', *The FEBS journal*, 283(10), pp. 1812–1822. doi: 10.1111/febs.13627.
- Charalambous, M. P. et al. (2009) 'Expression of cox-2, nf-kb-p65, nf-kb-p50 and ikk α in malignant and adjacent normal human colorectal tissue', *British Journal of Cancer*, 101(1), pp. 106–115. doi: 10.1038/sj.bjc.6605120.
- Chen, Y. S. et al. (2007) 'Effects of prebiotic oligosaccharides and trehalose on growth and production of bacteriocins by lactic acid bacteria', *Letters in Applied Microbiology*, 45(2), pp. 190–193. doi: 10.1111/j.1472-765X.2007.02167.x.
- Echigo, R. et al. (2012) 'Trehalose treatment suppresses inflammation, oxidative stress, and vasospasm induced by experimental subarachnoid hemorrhage', *Journal of Translational Medicine*, 10(1), pp. 1–13. doi: 10.1186/1479-5876-10-80.

- Eikendal, A. L. M. *et al.* (2015) 'Relation between circulating inflammatory chemokines and vascular characteristics in healthy, young children', *Journal of the American Heart Association*, 4(12), pp. 1–10. doi: 10.1161/JAHA.115.002346.
- Fernández-Friera, L. *et al.* (2019) 'Vascular Inflammation in Subclinical Atherosclerosis Detected by Hybrid PET/MRI', *Journal of the American College of Cardiology*, 73(12), pp. 1371–1382. doi: 10.1016/j.jacc.2018.12.075.
- Gutierrez, H. and Davies, A. (2011) 'Regulation of neural process growth, elaboration and structural plasticity by NF-κB.', *Trends Neurosci.*, 34(6), pp. 316–325.
- Hansen Kørnerup, A. (2011) *Handbook of Laboratory Animal Science*. 3rd edn, *Handbook of Laboratory Animal Science, volume I*. 3rd edn. Edited by J. Hau and S. Schapiro. New York: CRC Press. Available at: http://books.google.com/books?id=Jvxg87fBSNoC&dq=intitle:Handbook+of+Laboratory+Animal+Science+Volume+2+Animal+Models&hl=&cd=2&source=gbs_api&papers3://publication/uuid/5FBF076A-18E1-4D97-B233-CFF608452C37.
- Higashiyama, T. (2002) 'Novel functions and applications of trehalose', *Pure and Applied Chemistry*, 74(7), pp. 1263–1269. doi: 10.1351/pac200274071263.
- Hosseinpour-Moghaddam, K., Caraglia, M. and Sahebkar, A. (2018) 'Autophagy induction by trehalose: Molecular mechanisms and therapeutic impacts', *Journal of Cellular Physiology*, 233(9), pp. 6524–6543. doi: 10.1002/jcp.26583.
- Janega, P. *et al.* (2014) 'Red wine extract decreases pro-inflammatory markers, nuclear factor-κB and inducible NOS, in experimental metabolic syndrome', *Food and Function*, 5(9), pp. 2202–2207. doi: 10.1039/c4fo00097h.
- Jaul, E. and Barron, J. (2017) 'Age-Related Diseases and Clinical and Public Health Implications for the 85 Years Old and Over Population', *Frontiers in Public Health*, 5(December), pp. 1–7. doi: 10.3389/fpubh.2017.00335.
- Jayakumar, T. *et al.* (2014) 'Brazilin ameliorates high glucose-induced vascular inflammation via inhibiting ROS and CAMs production in human umbilical vein endothelial cells', *BioMed Research International*, 2014. doi: 10.1155/2014/403703.
- Jørgensen, N. O. G. (2009) 'Carbohydrates', *Encyclopedia of Inland Waters*, 1(February), pp. 727–742. doi: 10.1016/B978-012370626-3.00258-1.
- Kaplon, R. E. *et al.* (2016) 'Oral trehalose supplementation improves resistance artery endothelial function in healthy middle-aged and older adults', *Aging*, 8(6), pp. 1167–1183. doi: 10.18632/aging.100962.
- Kitada, M., Ogura, Y. and Koya, D. (2016) 'The protective role of Sirt1 in vascular tissue: Its relationship to vascular aging and atherosclerosis', *Aging*, 8(10), pp. 2290–2307. doi: 10.18632/AGING.101068.
- Lee, S. J. and Park, S. H. (2013) 'Arterial ageing', *Korean Circulation Journal*, 43(2), pp.

- 73–79. doi: 10.4070/kcj.2013.43.2.73.
- Lopez-candales, A. et al. (2017) ‘Linking Chronic Inflammation with Cardiovascular Disease: From Normal Aging to the Metabolic Syndrome’, 3(4).
- Maharani, A. et al. (2019) ‘Cardiovascular disease risk factor prevalence and estimated 10-year cardiovascular risk scores in Indonesia: The SMARThealth Extend study’, *PLoS ONE*, 14(4), pp. 1–13. doi: 10.1371/journal.pone.0215219.
- Malik, V. S. et al. (2013) ‘Sugar-sweetened beverages and weight gain in children and adults: A systematic review and meta-analysis’, *American Journal of Clinical Nutrition*, 98(4), pp. 1084–1102. doi: 10.3945/ajcn.113.058362.
- Napetschnig, J. and Wu, H. (2013) ‘Molecular basis of NF-κB signaling.’, *Annu Rev Biophys.*, 42, pp. 443–468.
- Nistiar, F. et al. (2012) ‘Age dependency on some physiological and biochemical parameters of male Wistar rats in controlled environment’, *Journal of Environmental Science and Health - Part A Toxic/Hazardous Substances and Environmental Engineering*, 47(9), pp. 1224–1233. doi: 10.1080/10934529.2012.672071.
- Partridge, L. (2009) ‘Ageing and Ageing-related Disease’, pp. 1–6.
- Peiró, C. et al. (2016) ‘Inflammation, glucose, and vascular cell damage: The role of the pentose phosphate pathway’, *Cardiovascular Diabetology*. BioMed Central, 15(1), pp. 1–15. doi: 10.1186/s12933-016-0397-2.
- Rattan, S. (2019) *Biomarkers of Human Aging*. Volume 10. Edited by A. Moskalev. Switzerland: Springer. Available at: <http://www.springer.com/series/13277>.
- Di Rienzi, S. C. and Britton, R. A. (2020) ‘Adaptation of the Gut Microbiota to Modern Dietary Sugars and Sweeteners’, *Advances in Nutrition*. Oxford University Press, 11(3), pp. 616–629. doi: 10.1093/advances/nmz118.
- Sarkar, S. et al. (2007) ‘Trehalose, a novel mTOR-independent autophagy enhancer, accelerates the clearance of mutant huntingtin and α-synuclein’, *Journal of Biological Chemistry*, 282(8), pp. 5641–5652. doi: 10.1074/jbc.M609532200.
- Schorin, M. D. et al. (2012) ‘The Science of Sugars, Part 4’, *Nutrition Today*, 47(6), pp. 275–280. doi: 10.1097/nt.0b013e318244201e.
- Sciarretta, S. et al. (2018) ‘Trehalose-Induced Activation of Autophagy Improves Cardiac Remodeling After Myocardial Infarction’, *Journal of the American College of Cardiology*, 71(18), pp. 1999–2010. doi: 10.1016/j.jacc.2018.02.066.
- Seo, Y. et al. (2018) ‘Metabolic shift from glycogen to trehalose promotes lifespan and healthspan in *Caenorhabditis elegans*’, *Proceedings of the National Academy of Sciences of the United States of America*, 115(12), pp. E2791–E2800. doi: 10.1073/pnas.1714178115.
- Sergin, I. et al. (2017) ‘Exploiting macrophage autophagy-lysosomal biogenesis as a

- therapy for atherosclerosis', *Nature Communications*. Nature Publishing Group, 8, pp. 1–20. doi: 10.1038/ncomms15750.
- Shendurje, A. M. and Khedkar, C. D. (2015) *Glucose: Properties and Analysis*. 1st edn, *Encyclopedia of Food and Health*. 1st edn. Elsevier Ltd. doi: 10.1016/B978-0-12-384947-2.00353-6.
- Singh, V. and Gupta, D. (2015) 'NF-κB as a key player in regulation of cellular radiation responses and identification of radiation countermeasures', *Discoveries*, 3(1), p. e35. doi: 10.15190/d.2015.27.
- Spencer, J. (2005) 'The Sugar Comparison ✖ Sucrose vs . Trehalose', (5), pp. 1–9.
- Steven, S. et al. (2019) 'Vascular inflammation and oxidative stress: Major triggers for cardiovascular disease', *Oxidative Medicine and Cellular Longevity*, 2019. doi: 10.1155/2019/7092151.
- Suckow. (2016) 'Anatomy of Rat', *American College of The Laboratory Animal Medicine Series*, 66(1), pp. 92–102. doi: 10.7868/s0044467716010093.
- Svenkrtova (2017) 'Stratification of Yeast Cells during Chronological Aging by Size Points to the Role of Trehalose in Cell Vitality', 17(2), pp. 395–408. doi: 10.1007/s10522-015-9625-5.Stratification.
- Ungvari, Z. et al. (2018) 'Mechanism of Vascular Aging', *Circ Res*, 123(7), pp. 849–867. doi: 10.1161/CIRCRESAHA.118.311378.Mechanisms.
- Wissler, R. W. et al. (1993) 'Natural history of aortic and coronary atherosclerotic lesions in youth: Findings from the PDAY study', *Arteriosclerosis and Thrombosis*, 13(9), pp. 1291–1298. doi: 10.1161/01.atv.13.9.1291.
- World Health Organization (2013) 'Global Atlas on Cardiovascular Disease Prevention and Control.'
- World Health Organization (2021) 'Risk factors of CVD'. doi: 10.5005/jp/books/13037_36.
- Wu, Y. T. et al. (2020) 'Modulations of growth performance, gut microbiota, and inflammatory cytokines by trehalose on *Salmonella Typhimurium*-challenged broilers', *Poultry Science*. Elsevier Inc., 99(8), pp. 4034–4043. doi: 10.1016/j.psj.2020.03.053.
- Yoshizane, C. et al. (2020) 'Daily consumption of one teaspoon of trehalose can help maintain glucose homeostasis: A double-blind, randomized controlled trial conducted in healthy volunteers', *Nutrition Journal*. Nutrition Journal, 19(1), pp. 1–9. doi: 10.1186/s12937-020-00586-0.
- Yu, Y., Wan, Y. and Huang, C. (2009) 'The Biological Functions of NF-KB1 (p50) and its Potential as an Anti-Cancer Target', *Current Cancer Drug Targets*, 9(4), pp. 566–571. doi: 10.2174/156800909788486759.
- Yudiarto, F. L. and Sjahrir, H. (2011) 'Proses Penuaan Otak - Bagaimana Kita Bisa Mencegahnya ?', *Neurona*, 28(2).

Yurista, S. R., Ferdian, R. A. and Sargowo, D. (2017) 'Principles of the 3Rs and ARRIVE Guidelines in Animal Research', *Indonesian Journal of Cardiology*, 37(3), pp. 156–63.
doi: 10.30701/ijc.v37i3.579.

Lampiran 1: Rekomendasi Persetujuan Etik

**KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN
UNIVERSITAS HASANUDDIN FAKULTAS KEDOKTERAN
KOMITE ETIK PENELITIAN KESEHATAN
RSUP Dr. WAHIDIN SUDIROHUSODO MAKASSAR**

Sekretariat : Lantai 2 Gedung Laboratorium Terpadu
JL.PERINTIS KEMERDEKAAN KAMPUS TAMALANREA KM.10 MAKASSAR 90245.
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REKOMENDASI PERSETUJUAN ETIK
Nomor : 173/UN4.6.4.5.31/ PP36/ 2021

Tanggal: 17 Maret 2021

Dengan ini Menyatakan bahwa Protokol dan Dokumen yang Berhubungan Dengan Protokol berikut ini telah mendapatkan Persetujuan Etik :

No Protokol	UH21020099	No Sponsor	
Peneliti Utama	dr. Inggrid	Sponsor	
Judul Peneliti	Pengaruh Pemberian Trehalosa Terhadap Biomarker Inflamasi Makrovaskular Pada Tikus Tua		
No Versi Protokol	1	Tanggal Versi	18 Februari 2021
No Versi PSP		Tanggal Versi	
Tempat Penelitian	Laboratorium Entomologi Fakultas Kedokteran Hasanuddin Makassar		
Jenis Review	<input type="checkbox"/> Exempted <input checked="" type="checkbox"/> Expedited <input type="checkbox"/> Fullboard Tanggal	Masa Berlaku 17 Maret 2021 sampai 17 Maret 2022	Frekuensi review lanjutan
Ketua Komisi Etik Penelitian Kesehatan FKUH	Nama Prof.Dr.dr. Suryani As'ad, M.Sc.,Sp.GK (K)	Tanda tangan 	
Sekretaris Komisi Etik Penelitian Kesehatan FKUH	Nama dr. Agussalim Bukhari, M.Med.,Ph.D.,Sp.GK (K)	Tanda tangan 	

Kewajiban Peneliti Utama:

- Menyerahkan Amandemen Protokol untuk persetujuan sebelum di implementasikan
- Menyerahkan Laporan SAE ke Komisi Etik dalam 24 jam dan dilengkapi dalam 7 hari dan Lapor SUSAR dalam 72 Jam setelah Peneliti Utama menerima laporan
- Menyerahkan Laporan Kemajuan (progress report) setiap 6 bulan untuk penelitian resiko tinggi dan setiap setahun untuk penelitian resiko rendah
- Menyerahkan laporan akhir setelah Penelitian berakhir
- Melaporkan penyimpangan dari protokol yang disetujui (protocol deviation / violation)
- Mematuhi semua peraturan yang ditentukan

Lampiran 2: Data Dasar Penelitian

No.	Subyek	Usia (bulan)	BB awal (gram)	BB akhir (gram)	Distribusi IHC	Intensitas IHC	Total	Interpretasi
1	A1	3	148	159	3	2	5	Positif kuat
2	A2	3	150	173	2	2	4	Positif kuat
3	A3	3	143	152	2	2	4	Positif kuat
4	A4	3	145	167	3	2	5	Positif kuat
5	A5	4	147	157	-	-	-	-
6	A6	4	148	165	-	-	-	-
7	A7	4	159	172	-	-	-	-
8	B1	14	201	311	-	-	-	-
9	B2	14	196	294	3	2	5	Positif kuat
10	B3	14	228	286	3	2	5	Positif kuat
11	B4	14	189	270	3	2	5	Positif kuat
12	B5	14	251	290	-	-	-	-
13	B6	15	230	306	2	2	4	Positif kuat
14	B7	17	305	358	-	-	-	-
15	C1	14	238	273	3	2	5	Positif kuat
16	C2	14	188	292	-	-	-	-
17	C3	14	208	304	3	2	5	Positif kuat
18	C4	15	236	313	2	2	4	Positif kuat
19	C5	14	227	199	-	-	-	-
20	C6	15	253	368	-	-	-	-
21	C7	17	346	331	2	2	4	Positif kuat
22	D1	14	188	257	-	-	-	-
23	D2	14	197	327	-	-	-	-
24	D3	17	325	359	2	2	4	Positif kuat
25	D4	14	191	265	1	2	3	Positif kuat
26	D5	14	225	289	-	-	-	-
27	D6	14	232	328	1	1	2	Positif lemah
28	D7	14	227	218	1	2	3	Positif kuat

Lampiran 3: Data Hasil Analisis Statistik

1. Uji Normalitas

Tests of Normality^b

Grup		Shapiro-Wilk		
		Statistic	df	Sig.
Usia	K-Tua	.630	4	.001
	Sukrosa	.827	4	.161
	Trehalosa	.630	4	.001
BB_Awal	K-Muda	.972	4	.855
	K-Tua	.826	4	.158
	Sukrosa	.814	4	.130
	Trehalosa	.881	4	.342
BB_Akhir	K-Muda	.983	4	.920
	K-Tua	.994	4	.976
	Sukrosa	.969	4	.837
	Trehalosa	.962	4	.790
BB_Selisih	K-Muda	.826	4	.158
	K-Tua	.987	4	.941
	Sukrosa	.952	4	.730
	Trehalosa	.967	4	.824
IHC	K-Muda	.729	4	.024
	K-Tua	.630	4	.001
	Sukrosa	.729	4	.024
	Trehalosa	.945	4	.683

2. Gambaran Data Berdasarkan Kelompok

Descriptives

Variabel	Kelompok	N	Mean	Median	SD	Minimum	Maximum
Umur	K-Muda	4	3.000	3.000	0.000	3	3
	K-Tua	4	14.250	14.000	0.500	14	15
	Sukrosa	4	15.000	14.500	1.414	14	17
	Trehalosa	4	14.750	14.000	1.500	14	17
BB Akhir	K-Muda	4	162.750	163.000	9.179	152	173
	K-Tua	4	289.000	290.000	15.100	270	306
	Sukrosa	4	305.250	308.500	24.254	273	331
	Trehalosa	4	292.500	296.500	63.217	218	359
IHC	K-Muda	4	4.500	4.500	0.577	4	5
	K-Tua	4	4.750	5.000	0.500	4	5
	Sukrosa	4	4.500	4.500	0.577	4	5
	Trehalosa	4	3.000	3.000	0.816	2	4

Descriptives

Variabel	Kelompok	N	Mean	Median	SD	Minimum	Maximum
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3. Gambaran Data Berdasarkan Variabel

Descriptives

Variabel	N	Mean	Median	SD	Minimum	Maximum
Umur	16	12.000	14.000	5.310	3	17
ABB	16	47.880	46.500	38.62	-15	98
IHC	16	4.000	4.000	0.911	2	5

4. Uji Hipotesis (Mann-Whitney Test)

- NPar Tests: Uji Hipotesis I

Ranks

Grup	N	Mean Rank	Sum of Ranks
IHC	K-Muda	4	16.00
	K-Tua	4	20.00
	Total	8	

Test Statistics^b

	IHC
Mann-Whitney U	6.000
Wilcoxon W	16.000
Z	-.683
Asymp. Sig. (2-tailed)	.495
Exact Sig. [2*(1-tailed Sig.)]	.686 ^a

a. Not corrected for ties.

b. Grouping Variable: Grup

- NPar Tests: Uji Hipotesis II

Ranks

Grup	N	Mean Rank	Sum of Ranks
IHC	Trehalosa	4	10.50
	K-Tua	4	25.50
	Total	8	

Test Statistics^b

	IHC
Mann-Whitney U	.500
Wilcoxon W	10.500
Z	-2.247
Asymp. Sig. (2-tailed)	.025
Exact Sig. [2*(1-tailed Sig.)]	.029 ^a

a. Not corrected for ties.

Ranks

Grup	N	Mean Rank	Sum of Ranks
IHC Trehalosa	4	2.63	10.50
K-Tua	4	6.38	25.50

b. Grouping Variable: Grup

- **NPar Tests: Uji Hipotesis III**

Ranks

Grup	N	Mean Rank	Sum of Ranks
IHC Trehalosa	4	2.75	11.00
Sukrosa	4	6.25	25.00
Total	8		

Test Statistics^b

	IHC
Mann-Whitney U	1.000
Wilcoxon W	11.000
Z	-2.097
Asymp. Sig. (2-tailed)	.036
Exact Sig. [2*(1-tailed Sig.)]	.057 ^a

a. Not corrected for ties.

b. Grouping Variable: Grup

- **NPar Tests: Uji Hipotesis IV**

Ranks

Grup	N	Mean Rank	Sum of Ranks
IHC Trehalosa	4	2.63	10.50
Kontrol Tua	4	6.38	25.50
Total	8		

Test Statistics^b

	IHC
Mann-Whitney U	.500
Wilcoxon W	10.500
Z	-2.247
Asymp. Sig. (2-tailed)	.025
Exact Sig. [2*(1-tailed Sig.)]	.029 ^a

a. Not corrected for ties.

b. Grouping Variable: Grup

5. Uji Korelasi Usia dan Berat Badan Akhir dengan IHC (Spearman)

Correlations

	Usia	BB_Akhir	IHC
Spearman's rho	1.000	.895**	-.266

	Sig. (2-tailed)	.	.000	.319
N		16	16	16
BB_Aakhir	Correlation Coefficient	.895**	1.000	-.215
	Sig. (2-tailed)	.000	.	.424
N		16	16	16
IHC	Correlation Coefficient	-.266	-.215	1.000
	Sig. (2-tailed)	.319	.424	.
N		16	16	16

**. Correlation is significant at the 0.01 level (2-tailed).

6. NPar Tests: Usia Berdasarkan Kelompok (Kruskal-Wallis)

Ranks

Grup	N	Mean Rank
Usia K-Muda	4	2.50
K-Tua	4	9.75
Sukrosa	4	11.50
Trehalosa	4	10.25
Total	16	

Test Statistics^{a,b}

	Usia
Chi-Square	10.197
df	3
Asymp. Sig.	.017

a. Kruskal Wallis Test

b. Grouping Variable: Grup

7. Par Tests: Berat Badan Akhir Berdasarkan Kelompok (One Away ANOVA)

Test of Homogeneity of Variances

BB_Aakhir

Levene Statistic	df1	df2	Sig.
7.813	3	12	.004

ANOVA

BB_Aakhir

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	53519.250	3	17839.750	14.572	.000
Within Groups	14690.500	12	1224.208		
Total	68209.750	15			

Robust Tests of Equality of Means

BB_Aakhir

	Statistic ^a	df1	df2	Sig.
Welch	77.437	3	6.019	.000

a. Asymptotically F distributed.

8. Pair Tests: ΔBB Berdasarkan Kelompok Tikus Tua (One Away ANOVA)

ANOVA

Perubahan_BB

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2360.667	2	1180.333	0.732	0.508
Within Groups	14518.250	9	1613.139		
Total	16878.917	11			

9. Post Hoc Test

Multiple Comparisons

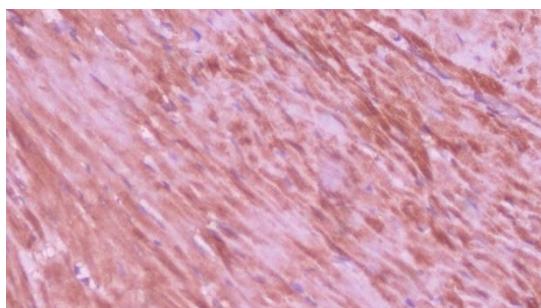
Dependent Variable:BB_Akhir

	(I) Grup	(J) Grup	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	K-Muda	K-Tua	-126.250*	24.741	.001	-199.70	-52.80
		Sukrosa	-142.500*	24.741	.000	-215.95	-69.05
		Trehalosa	-129.750*	24.741	.001	-203.20	-56.30
	K-Tua	K-Muda	126.250*	24.741	.001	52.80	199.70
		Sukrosa	-16.250	24.741	.911	-89.70	57.20
		Trehalosa	-3.500	24.741	.999	-76.95	69.95
	Sukrosa	K-Muda	142.500*	24.741	.000	69.05	215.95
		K-Tua	16.250	24.741	.911	-57.20	89.70
		Trehalosa	12.750	24.741	.954	-60.70	86.20
LSD	Trehalosa	K-Muda	129.750*	24.741	.001	56.30	203.20
		K-Tua	3.500	24.741	.999	-69.95	76.95
		Sukrosa	-12.750	24.741	.954	-86.20	60.70
	K-Muda	K-Tua	-126.250*	24.741	.000	-180.16	-72.34
		Sukrosa	-142.500*	24.741	.000	-196.41	-88.59
		Trehalosa	-129.750*	24.741	.000	-183.66	-75.84
	K-Tua	K-Muda	126.250*	24.741	.000	72.34	180.16
		Sukrosa	-16.250	24.741	.524	-70.16	37.66
		Trehalosa	-3.500	24.741	.890	-57.41	50.41
	Sukrosa	K-Muda	142.500*	24.741	.000	88.59	196.41
		K-Tua	16.250	24.741	.524	-37.66	70.16
		Trehalosa	12.750	24.741	.616	-41.16	66.66
	Trehalosa	K-Muda	129.750*	24.741	.000	75.84	183.66
		K-Tua	3.500	24.741	.890	-50.41	57.41
		Sukrosa	-12.750	24.741	.616	-66.66	41.16

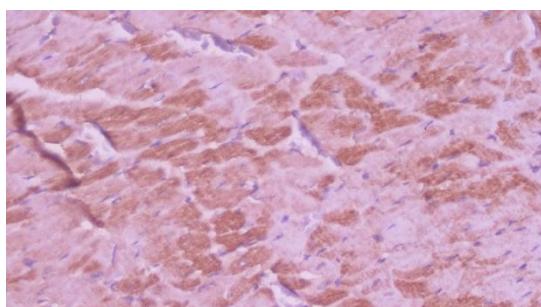
*. The mean difference is significant at the 0.05 level.

Lampiran 4: Gambar hasil IHC

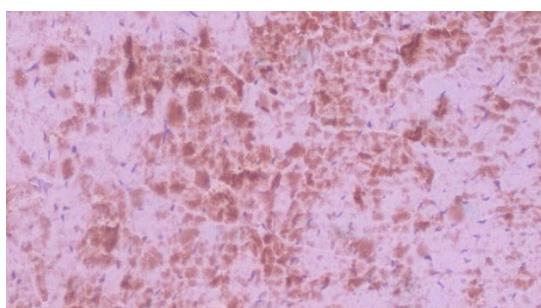
Kelompok A (Kontrol Muda)



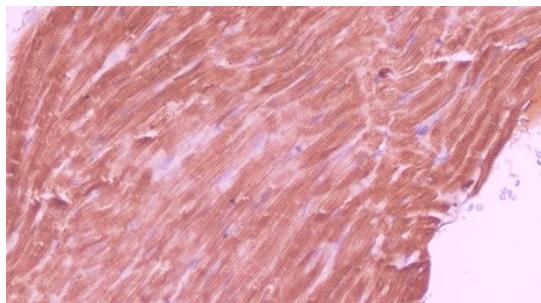
Gambaran hasil IHC jaringan aorta A1: Distribusi + Intensitas = **3 + 2 = 5 (Positif kuat)**



Gambaran hasil IHC jaringan aorta A2: Distribusi + Intensitas = **2 + 2 = 4 (Positif kuat)**

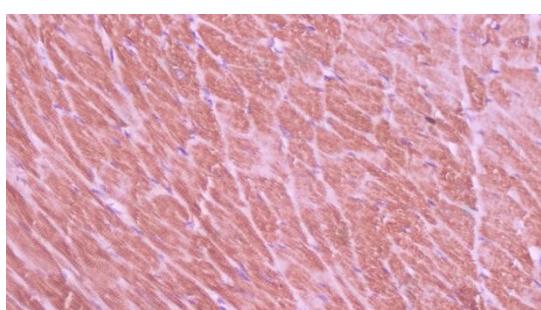


Gambaran hasil IHC jaringan aorta A3: Distribusi + Intensitas = **2 + 2 = 4 (Positif kuat)**

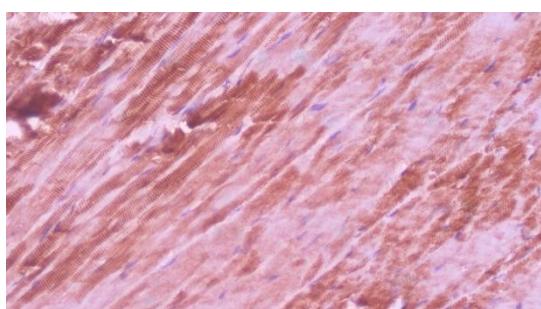


Gambaran hasil IHC jaringan aorta A4: Distribusi + Intensitas = **3 + 2 = 5 (Positif kuat)**

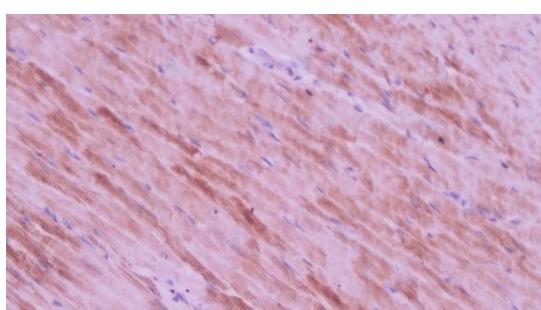
Kelompok B (Kontrol Tua)



Gambaran hasil IHC jaringan aorta B2: Distribusi + Intensitas = **3 + 2 = 5 (Positif kuat)**



Gambaran hasil IHC jaringan aorta B3: Distribusi + Intensitas = **3 + 2 = 5 (Positif kuat)**

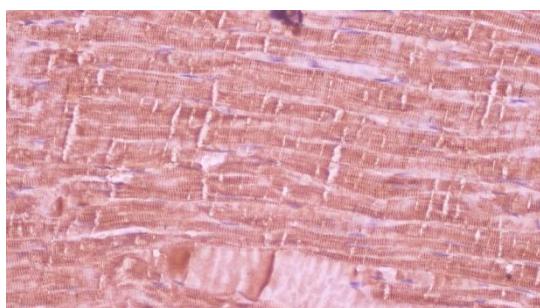


Gambaran hasil IHC jaringan aorta B4: Distribusi + Intensitas = **3 + 2 = 5 (Positif kuat)**

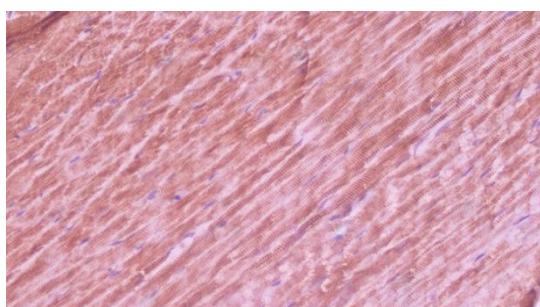


Gambaran hasil IHC jaringan aorta B6: Distribusi + Intensitas = **2 + 2 = 4 (Positif kuat)**

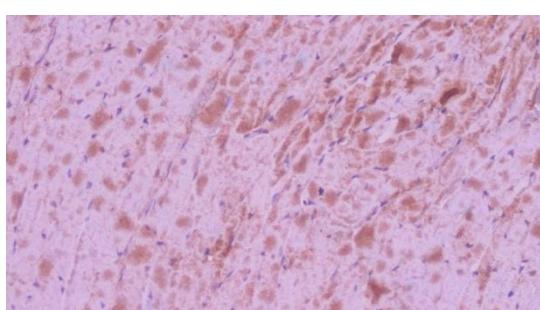
Kelompok C (Sukrosa)



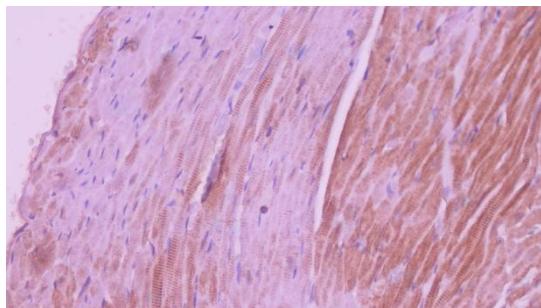
Gambaran hasil IHC jaringan aorta C1: Distribusi + Intensitas = **3 + 2 = 5 (Positif kuat)**



Gambaran hasil IHC jaringan aorta C3: Distribusi + Intensitas = **3 + 2 = 5 (Positif kuat)**

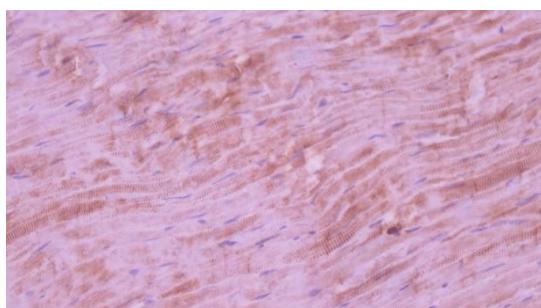


Gambaran hasil IHC jaringan aorta C4: Distribusi + Intensitas = **2 + 2 = 4 (Positif kuat)**

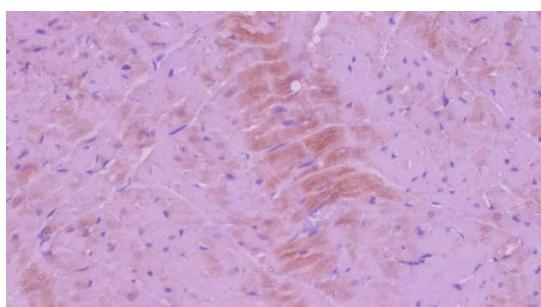


Gambaran hasil IHC jaringan aorta C7: Distribusi + Intensitas = **2 + 2 = 4 (Positif kuat)**

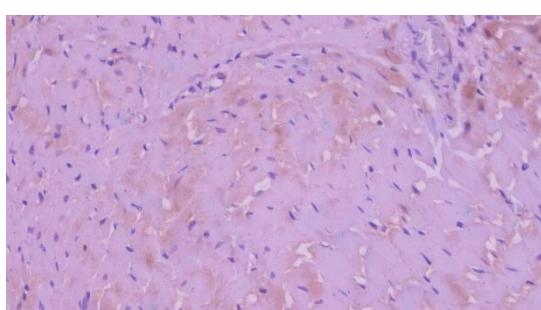
Kelompok D (Trehalosa)



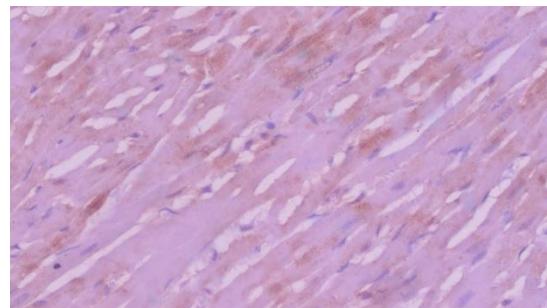
Gambaran hasil IHC jaringan aorta D3: Distribusi + Intensitas = **2 + 2 = 4 (Positif kuat)**



Gambaran hasil IHC jaringan aorta D4: Distribusi + Intensitas = **1 + 2 = 3 (Positif kuat)**



Gambaran hasil IHC jaringan aorta D6: Distribusi + Intensitas = **1 + 1 = 2 (Positif lemah)**



Gambaran hasil IHC jaringan aorta D7: Distribusi + Intensitas = **1 + 2 = 3 (Positif kuat)**