

DAFTAR PUSTAKA

- Asfa, N., Widianto, A. S., Pratama, M. K. A., Rosa, R. A., Mu'arif, A., Yulianty, R., & Nainu, F. 2023. Curcumin-mediated gene expression changes in *Drosophila melanogaster*. *Pharmacy Education*, 23(2), 84–91. <https://doi.org/10.46542/pe.2023.232.8491>
- Behnel, H. J. 1982. Comparative Puffing Study Of Protein Synthesis Salivary Heat-Shock Treated Activity With Glands The Well-Known Effect Of Chloramphenicol (CAP) is to inhibit selectively the 70s-ribosomal translation at the level of the peptidyltransferase system [11 . 142.
- Brischigliaro, M., Fernandez-Vizarra, E., & Visconti, C. 2023. Mitochondrial Neurodegeneration: Lessons from *Drosophila melanogaster* Models. *Biomolecules*, 13(2), 1–22. <https://doi.org/10.3390/biom13020378>
- Carvalho, G. B., Ja, W. W., & Benzer, S. 2009. Non-lethal genotyping of single *Drosophila*. *Journal of Biological Chemistry*, 46(4), 312–314. <https://doi.org/10.2144/000113088>.Non-lethal
- Dela Cruz, C.S., & Kang, M.J. 2018. Mitochondrial dysfunction and damage associated molecular patterns (DAMPs) in chronic inflammatory diseases. *Mitochondrion*, 41, 37-44. <https://doi.org/10.1016/j.mito.2017.12.001>
- Gullan, P.J., & Cranston, P.S. 2014. *The Insects An Outline Of Entomology*, 5th ed, John Wiley & Sons, USA.
- Humphries, A. D., Streimann, I. C., Stojanovski, D., Johnston, A. J., Yano, M., Hoogenraad, N. J., & Ryan, M. T. 2005. Dissection of the mitochondrial import and assembly pathway for human Tom40. *Journal of Biological Chemistry*, 280(12), 11535–11543. <https://doi.org/10.1074/jbc.M413816200>
- Kannan, K., & Rogina, B. 2021. The role of citrate transporter indy in metabolism and stem cell homeostasis. *Metabolites*, 11(10). <https://doi.org/10.3390/metabo11100705>
- Kim, Y. H., Kim, Y. S., & Kim, Y. H. 2020. Evaluation of reference genes for gene expression studies using quantitative real-time PCR in *Drosophila melanogaster* after chemical exposures. *Journal of Asia-Pacific Entomology*, 23(2), 385–394. <https://doi.org/10.1016/j.aspen.2020.01.008>
- Krittika, S. & Yadav, P. 2019. An overview of two decades of diet restriction studies using *Drosophila*. *Biogerontology*, 20, 723-740.

- Lee, S. H., & Min, K. J. 2019. *Drosophila melanogaster* as a model system in the study of pharmacological interventions in aging. *Translational Medicine of Aging*, 3, 98–103. <https://doi.org/10.1016/j.tma.2019.09.004>
- Li, C. H., Cheng, Y. W., Liao, P. L., Yang, Y. T., & Kang, J. J. 2010. Chloramphenicol causes mitochondrial stress, decreases ATP biosynthesis, induces matrix metalloproteinase-13 expression, and solid-tumor cell invasion. *Toxicological Sciences*, 116(1), 140–150. <https://doi.org/10.1093/toxsci/kfq085>
- Ling, D., & Salvaterra, P. M. 2011. Robust RT-qPCR data normalization: Validation and selection of internal reference genes during post-experimental data analysis. *PLoS ONE*, 6(3). <https://doi.org/10.1371/journal.pone.0017762>
- Liu, W., Duan, X., Fang, X., Shang, W., & Tong, C. 2018. Mitochondrial protein import regulates cytosolic protein homeostasis and neuronal integrity. *Autophagy*, 14(8), 1293–1309. <https://doi.org/10.1080/15548627.2018.1474991>
- Lü, J., Yang, C., Zhang, Y., & Pan, H. 2018. Selection of reference genes for the normalization of RT-qPCR data in gene expression studies in insects: A systematic review. *Frontiers in Physiology*, 9(NOV). <https://doi.org/10.3389/fphys.2018.01560>
- Mainland, R. L., Lyons, T. A., Ruth, M. M., & Kramer, J. M. 2017. Optimal RNA isolation method and primer design to detect gene knockdown by qPCR when validating *Drosophila* transgenic RNAi lines. *BMC Research Notes*, 10(1), 1–7. <https://doi.org/10.1186/s13104-017-2959-0>
- Mishra, D., Kannan, K., Meadows, K., Macro, J., Li, M., Frankel, S., & Rogina, B. 2021. INDY—From Flies to Worms, Mice, Rats, Non-Human Primates, and Humans. *Frontiers in Aging*, 2(December), 1–11. <https://doi.org/10.3389/fragi.2021.782162>
- Moraes, K. C. M., & Montagne, J. 2021. *Drosophila melanogaster*: A Powerful Tiny Animal Model for the Study of Metabolic Hepatic Diseases. *Frontiers in Physiology*, 12(September), 1–10. <https://doi.org/10.3389/fphys.2021.728407>
- Nainu, F. 2018. Review : Penggunaan *Drosophila melanogaster* Sebagai Organisme Model Dalam Penemuan Obat. *Jurnal Farmasi Galenika (Galenika Journal of Pharmacy) (e-Journal)*, 4(1), 50–67. <https://doi.org/10.22487/j24428744.2018.v4.i1.9969>
- Neretti, N., Wang, P. Y., Brodsky, A. S., Nyguyen, H. H., White, K. P., Rogina, B., & Helfand, S. L. 2009. Long-lived Indy induces reduced mitochondrial reactive oxygen species production and oxidative

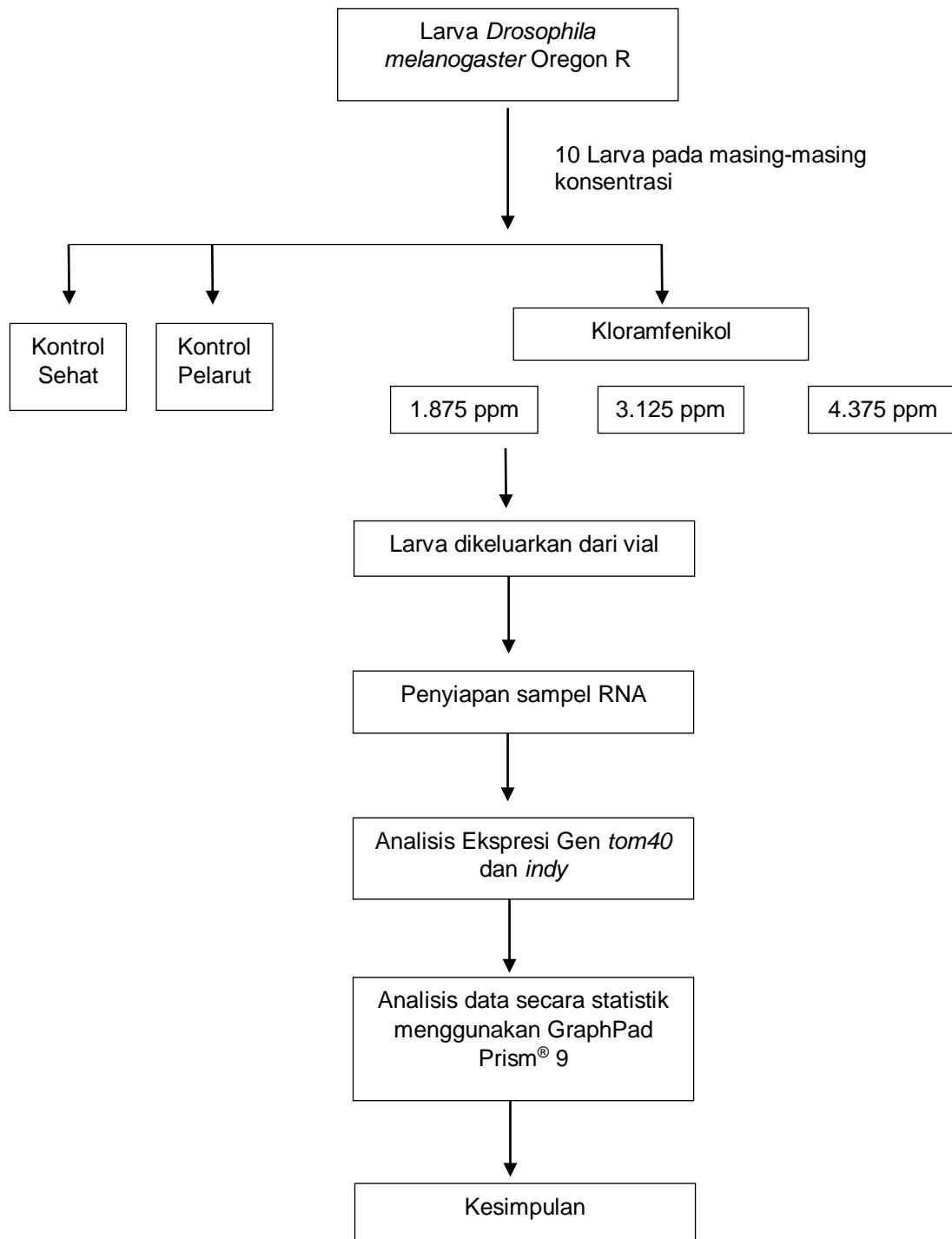
- damage. *Proceedings of the National Academy of Sciences of the United States of America*, 106(7), 2277–2282. <https://doi.org/10.1073/pnas.0812484106>
- Nguyen, L. M., Nguyen, N. T. T., Nguyen, T. T. T., Nguyen, T. T., Nguyen, D. T. C., & Tran, T. Van. 2022. Occurrence, toxicity and adsorptive removal of the chloramphenicol antibiotic in water: a review. In *Environmental Chemistry Letters* (Vol. 20, Issue 3). Springer International Publishing. <https://doi.org/10.1007/s10311-022-01416-x>
- Periasamy, A., Mitchell, N., Zaytseva, O., Chahal, A. S., Zhao, J., Colman, P. M., Quinn, L. M. & Gulbis, J. M. 2022. An Increase In Mitochondrial Tom activates apoptosis to drive retinal neurodegeneration. *Scientific Reports*, 12.
- Pilehvar, S., Dardenne, F., Blust, R., & De Wael, K. 2012. Electrochemical sensing of phenicol antibiotics at gold. *International Journal of Electrochemical Science*, 7(6), 5000–5011. [https://doi.org/10.1016/s1452-3981\(23\)19598-8](https://doi.org/10.1016/s1452-3981(23)19598-8)
- Pitt, A. S., & Buchanan, S. K. 2021. A biochemical and structural understanding of tom complex interactions and implications for human health and disease. *Cells*, 10(5). <https://doi.org/10.3390/cells10051164>
- Ponton, F., Chapuis, M. P., Pernice, M., Sword, G. A., & Simpson, S. J. 2011. Evaluation of potential reference genes for reverse transcription-qPCR studies of physiological responses in *Drosophila melanogaster*. *Journal of Insect Physiology*, 57(6), 840–850. <https://doi.org/10.1016/j.jinsphys.2011.03.014>
- Rao, S., Schmidt, O., Harbauer, A. B., Schönfisch, B., Guiard, B., Pfanner, N., & Meisinger, C. 2012. Biogenesis of the preprotein translocase of the outer mitochondrial membrane: Protein kinase A phosphorylates the precursor of Tom40 and impairs its import. *Molecular Biology of the Cell*, 23(9), 1618–1627. <https://doi.org/10.1091/mbc.E11-11-0933>
- Rogina, B. 2017. INDY-A new link to metabolic regulation in animals and humans. *Frontiers in Genetics*, 8(MAY), 4–10. <https://doi.org/10.3389/fgene.2017.00066>
- Shukla, P., Bansode, F. W., & Singh, R. K. 2011. Chloramphenicol Toxicity : A Review. *Journal of Medicine and Medical Sciences*, 2(13), 1313–1316.
- Spremulli, L. L. 2014. *From Mammalian Tissues*. May, 33–49. <https://doi.org/10.1007/978-1-59745-365-3>
- Sultan, R., Stampas, A., Goldberg, M. B., & Baker, N. E. 2001. Drug resistance of bacteria commensal with *Drosophila melanogaster* in

- laboratory cultures. *Dros. Inf. Serv.*, 84, 175–180.
- Sykes, J. E. 2014. *Canine and Feline Infectious Diseases*. Elsevier.
- Tang, Z., Takahashi, Y., He, H., Hattori, T., Chen, C., Liang, X., Chen, H., Young, M. M., & Wang, H. G. 2019. TOM40 Targets Atg2 to Mitochondria-Associated ER Membranes for Phagophore Expansion. *Cell Reports*, 28(7), 1744-1757.e5. <https://doi.org/10.1016/j.celrep.2019.07.036>
- Wiedemann, N., Truscott, K. N., Pfannschmidt, S., Guiard, B., Meisinger, C., & Pfanner, N. 2004. Biogenesis of the protein import channel Tom40 of the mitochondrial outer membrane: Intermembrane space components are involved in an early stage of the assembly pathway. *Journal of Biological Chemistry*, 279(18), 18188–18194. <https://doi.org/10.1074/jbc.M400050200>
- Wiest, D. B., Cochran, J. B., & Tecklenburg, F. W. 2012. Chloramphenicol Toxicity Revisited: A 12-Year-Old Patient With a Brain Abscess. *The Journal of Pediatric Pharmacology and Therapeutics*, 17(2), 182–188. <https://doi.org/10.5863/1551-6776-17.2.182>
- Willmes, D. M., Kurzbach, A., Henke, C., Schumann, T., Zahn, G., Heifetz, A., Jordan, J., Helfand, S. L., & Birkenfeld, A. L. 2018. The longevity gene INDY (I'm Not Dead Yet) in metabolic control: Potential as pharmacological target. *Pharmacology and Therapeutics*, 185(October 2017), 1–11. <https://doi.org/10.1016/j.pharmthera.2017.10.003>
- Zeitlow, K., Charlambous, L., Ng, I., Gagrani, S., Mihovilovic, M., Luo, S., Rock, D. L., Saunders, A., Roses, A. D., & Gottschalk, W. K. 2017. The biological foundation of the genetic association of TOMM40 with late-onset Alzheimer's disease. *Biochimica et Biophysica Acta - Molecular Basis of Disease*, 1863(11), 2973–2986. <https://doi.org/10.1016/j.bbadi.2017.07.031>
- Zhou, C.-Y., Jiang, F., & Huang, C.-X. 2024. Current trends in nanomaterials-mediated biosensing platforms and signal amplification strategies for antibiotics detection in dairy products. *Food and Health*, 6(1), 4. <https://doi.org/10.53388/fh2024004>

LAMPIRAN

Lampiran 1. Skema Kerja

Lampiran 1.1 Perlakuan Uji dan Analisis Data



Lampiran 2. Perhitungan Konsentrasi

Lampiran 2.1 Pembuatan Larutan Kloramfenikol

Larutan stok 50.000 ppm

$$\begin{aligned} 50.000 \text{ ppm} &= 50 \text{ g/L} \\ &= 50.000 \text{ mg/1000 mL} \\ &= 0.5 \text{ g/10 mL} \end{aligned}$$

Selanjutnya dibuat pengenceran dengan konsentrasi sebagai berikut.

Konsentrasi 1.875 ppm

$$\begin{aligned} N_1 \times V_1 &= N_2 \times V_2 \\ 50.000 \times V_1 &= 1.875 \times 5 \text{ mL} \\ V_1 &= 0,1875 \text{ mL} \\ V_1 &= 187,5 \mu\text{L} \text{ (dari larutan kloramfenikol 50.000 ppm, ad 5 mL pakan)} \end{aligned}$$

Konsentrasi 3.125 ppm

$$\begin{aligned} N_1 \times V_1 &= N_2 \times V_2 \\ 50.000 \times V_1 &= 3.125 \times 5 \text{ mL} \\ V_1 &= 0,3125 \text{ mL} \\ V_1 &= 312,5 \mu\text{L} \text{ (dari larutan kloramfenikol 50.000 ppm, ad 5 mL pakan)} \end{aligned}$$

Konsentrasi 4.375 ppm

$$\begin{aligned} N_1 \times V_1 &= N_2 \times V_2 \\ 50.000 \times V_1 &= 4.375 \times 5 \text{ mL} \\ V_1 &= 0,4375 \text{ mL} \\ V_1 &= 437,5 \mu\text{L} \text{ (dari larutan kloramfenikol 50.000 ppm, ad 5 mL pakan)} \end{aligned}$$

Lampiran 3. Data Statistik

Tabel 2. Hasil one-way annova ekspresi gen *tom40*

ANOVA summary	Value
F	75,18
P value	0,0001
P value summary	***
Significant diff. among means (P < 0,05)?	Yes
R squared	0,9836

Tabel 3. Hasil uji lanjutan Tukey's Multiple Comparison Test ekspresi gen *tom40*

Tukey's multiple comparisons test	Mean Diff,	Summary	Adjusted P Value
Kontrol Sehat vs. Kontrol Pelarut	0,006500	ns	0,9531
Kontrol Sehat vs. 1875 ppm	0,08350	**	0,0018
Kontrol Sehat vs. 3125 ppm	-0,002000	ns	0,9994
Kontrol Sehat vs. 4375 ppm	-0,08250	**	0,0019
Kontrol Pelarut vs. 1875 ppm	0,07700	**	0,0026
Kontrol Pelarut vs. 3125 ppm	-0,008500	ns	0,8907
Kontrol Pelarut vs. 4375 ppm	-0,08900	**	0,0013
1875 ppm vs. 3125 ppm	-0,08550	**	0,0016
1875 ppm vs. 4375 ppm	-0,1660	****	<0,0001
3125 ppm vs. 4375 ppm	-0,08050	**	0,0021

Tabel 4. Hasil one-way annova ekspresi gen *indy*

ANOVA summary	Value
F	1,380
P value	0,3600
P value summary	ns
Significant diff. among means (P < 0,05)?	No
R squared	0,5247

Tabel 5. Hasil uji lanjutan *Tukey's Multiple Comparison Test* ekspresi gen *indy*

Tukey's multiple comparisons test	Mean Diff,	Summary	Adjusted P Value
Kontrol Sehat vs. Kontrol Pelarut	0,08000	ns	0,9049
Kontrol Sehat vs. 1875 ppm	-0,07100	ns	0,9345
Kontrol Sehat vs. 3125 ppm	-0,08050	ns	0,9031
Kontrol Sehat vs. 4375 ppm	-0,1180	ns	0,7295
Kontrol Pelarut vs. 1875 ppm	-0,1510	ns	0,5547
Kontrol Pelarut vs. 3125 ppm	-0,1605	ns	0,5071
Kontrol Pelarut vs. 4375 ppm	-0,1980	ns	0,3456
1875 ppm vs. 3125 ppm	-0,009500	ns	>0,9999
1875 ppm vs. 4375 ppm	-0,04700	ns	0,9841
3125 ppm vs. 4375 ppm	-0,03750	ns	0,9931

Lampiran 4. Dokumentasi Penelitian



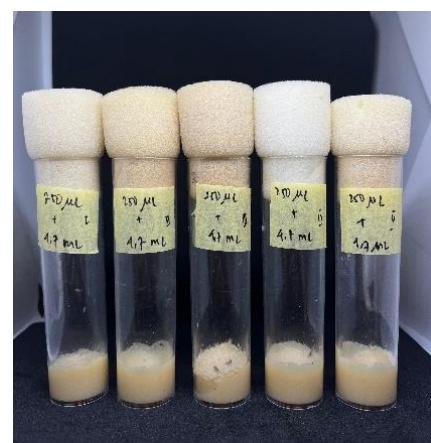
Gambar 9. Penyiapan Hewan Uji



Gambar 10. Pembuatan Pakan



Gambar 11. Pembuatan Pakan Kloramfenikol



Gambar 12. Pakan Kloramfenikol



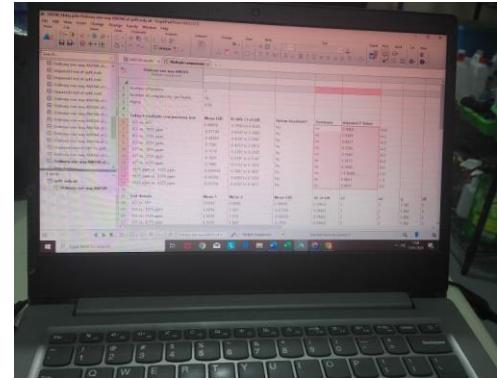
Gambar 13. Persiapan *Collecting*



Gambar 14. Isolasi RNA



Gambar 15. Pengujian PCR



Gambar 16. Analisis Statistik