

DAFTAR PUSTAKA

- Akhmetov, A., J. M. Laurent, J. Gollihar, E. C. Gardner, R. K. Garge, A. D. Ellington, A. H. Kachroo, dan E. M. Marcotte. 2018. Single-step Precision Genome Editing in Yeast Using CRISPR-Cas9. *Bio-Protocol* 8 (6): e2765.
- Baltes, N. J., A. W. Hummel, E. Konecna, R. Cegan, A. N. Bruns, D. M. Bisaro, dan D. F. Voytas. 2015. Conferring resistance to geminiviruses with the CRISPR-Cas prokaryotic immune system. *Nature Plants* 1 (15145): 1-4.
- Bravo, J. P. K., M. S. Liu, G. N. Hibshman, T. L. Dangerfield, K. Jung, R. S. McCool, K. A. Johnson, dan D. W. Taylor. 2022. Structural basis for mismatch surveillance by CRISPR-Cas9. *Nature* 603: 343-347.
- Brouns, S. J. J., M. M. Jore, M. Lundgren, E. R. Westra, R. J. H. Slijkhuis, A. P. L. Snijders, M. J. Dickman, K. S. Makarova, E. V. Koonin, dan J. V. D. Oost. 2008. Small CRISPR RNAs Guide Antiviral Defense in Prokaryotes. *Science* 321 (5891): 960-964.
- Budhathoki, J. B., Y. Xiao, G. Schuler, C. Hu, A. Cheng, F. Ding, dan A. Ke. 2020. Real-time observation of CRISPR spacer acquisition by Cas1-Cas2 integrase. *Nature Structural & Molecular Biology* 27: 489-499.
- Cai, P., J. Gao, dan Y. Zhou. 2019. CRISPR-mediated genome editing in non-conventional yeasts for biotechnological applications. *Microbial Cell Factories* 18 (63): 1-12.
- Carte, J., R. Wang, H. Li, R. M. Terns, dan M. P. Terns. 2008. Cas6 is an endoribonuclease that generates guide RNAs for invader defense in prokaryotes. *Genes & Development* 22: 3489-3496.
- Chan, V., L. F. Dreolini, K. A. Flintoff, S. J. Lloyd, dan A. A. Mattenley. 2002. The Effect of Increasing Plasmid Size on Transformation Efficiency in *Escherichia coli*. *Journal of Experimental Microbiology and Immunology (JEMI)* 2: 207-223.
- Chen, J. S., Y. S. Dagdas, B. P. Kleinstiver, M. M. Welch, A. A. Sousa, L. B. Harrington, S. H. Sternberg, J. K. Joung, A. Yildiz, dan J. A. Doudna. 2017. Enhanced proofreading governs CRISPR-Cas9 targeting accuracy. *Nature* 550: 407-410.
- Christian, M., T. Cermak, E. L. Doyle, C. Schmidt, F. Zhang, A. Hummel, A. J. Bogdanove, dan D. F. Voytas. 2010. Targeting DNA double-strand breaks with TAL effector nucleases. *Genetics* 186 (2): 757-761.
- Deltcheva, E., K. Chylinski, C. M. Sharma, K. Gonzales, Y. Chao, Z. A. Pirzada, M. R. Eckert, J. Vogel, dan E. Charpentier. 2011. CRISPR RNA maturation

- by trans-encoded small RNA and host factor RNase III. *Nature* 471: 602-607.
- Gao, H., M. J. Gadlage, H. R. Lafitte, B. Lenderts, M. Yang, M. Schroder, J. Farrell, K. Snopek, D. Peterson, L. Feigenbutz, S. Jones, G. S. Clair, M. Rahe, N. Sanyour-Doyel, C. Peng, L. Wang, J. K. Young, M. Beatty, B. Dahlke, J. Hazebroek, T. W. Greene, A. M. Cigan, N. D. Chilcoat, dan R. B. Meeley. 2020. Superior field performance of waxy corn engineered using CRISPR-Cas9. *Nature Biotechnology* 38 (5): 579-581.
- García, C. C., M. H. J. Barfuss, E. M. Sehr, G. E. Barboza, R. Samuel, E. A. Moscone, dan F. Ehrendorfer. 2016. Phylogenetic relationships, diversification and expansion of chili peppers (*Capsicum*, *Solanaceae*). *Annals of Botany* 35-51.
- Georgiou, C. D., and I. Papapostolou. 2006. Assay for the quantification of intact/fragmented genomic DNA. *Analytical Biochemistry* 358 (2): 247-256.
- Gillmore, J. D., E. Gane, J. Taubel, J. Kao, M. Fontana, M. L. Maitland, J. Seitzer, D. O'Connell, K. R. Walsh, K. Wood, J. Phillips, Y. Xu, A. Amaral, A. P. Boyd, J. E. Cehelsky, M. D. McKee, A. Schiermeier, O. Harari, A. Murphy, C. A. Kyratsous, B. Zambrowicz, R. Soltys, D. E. Gutstein, J. Leonard, L. Sepp-Lorenzino, dan D. Lebowhl. 2021. CRISPR-Cas9 In Vivo Gene Editing for Transthyretin Amyloidosis. *The New England Journal of Medicine* 385 (6): 493-502.
- Golenberg, E. M., A. Bickel, dan P. Weihs. 1996. Effect of Highly Fragmented DNA on PCR. *Nucleic Acids Research* 24 (24): 5026-5033.
- Gong, G., Y. Zhang, Z. Wang, L. Liu, S. Shi, V. Siewers, Q. Yuan, J. Nielsen, X. Zhang, dan Z. Liu. 2021. GTR 2.0: gRNA-tRNA Array and Cas9-NG Based Genome Disruption and Single-Nucleotide Conversion in *Saccharomyces cerevisiae*. *ACS Synthetic Biology* 10 (6): 1328-1337.
- Hanahan, D., J. Jessee, dan F. R. Bloom. 1991. Plasmid transformation of *Escherichia coli* and other bacteria. *Methods in Enzymology* 204: 63-113.
- Hartmann, R. K., M. Gößringer, B. Späth, S. Fischer, dan A. Marchfelder. 2009. The making of tRNAs and more - RNase P and tRNase Z. *Progress in Molecular Biology and Translational Science* 85: 319-368.
- Haurwitz, R. E., M. Jinek, B. Wiedenheft, K. Zhou, dan J. A. Doudna. 2010. Sequence- and Structure-Specific RNA Processing by a CRISPR Endonuclease. *Science* 329 (5997): 1355-1358.
- He, Z. Y., Y. G. Zhang, Y. H. Yang, C. C. Ma, P. Wang, W. Du, L. Li, R. Xiang, X. R. Song, X. Zhao, S. H. Yao, dan Y. Q. Wei. 2018. In Vivo Ovarian

- Cancer Gene Therapy Using CRISPR-Cas9. *Human Gene Therapy* 29 (2): 223-233.
- Herskovitz, J., M. Hasan, M. Patel, W. R. Blomberg, J. D. Cohen, J. Machhi, F. Shahjin, R. L. Mosley, J. McMillan, B. D. Kevadiya, dan H. E. Gendelman. 2021. CRISPR-Cas9 Mediated Exonic Disruption for HIV-1 Elimination. *EBioMedicine* 73: 103678.
- Hu, X. X., X. B. Meng, Q. Liu, J. Y. Li, dan K. J. Wang. 2018. Increasing the efficiency of CRISPR-Cas9-VQR precise genome editing in rice. *Plant Biotechnology Journal* 16 (1): 292-297.
- Hu, X., C. Wang, Y. Fu, Q. Liu, X. Jiao, dan K. Wang. 2016. Expanding the range of CRISPR/Cas9 genome editing in rice. *Molecular Plant* 9 (6): 943-945.
- Hutchison, C. A., S. Phillips, M. H. Edgell, S. Gillam, P. Jahnke, dan M. Smith. 1978. Mutagenesis at a Specific Position in a DNA Sequence. *The Journal of Biological Chemistry* 253 (18): 6551-6560.
- Ishino, Y., H. Shinagawa, K. Makino, M. Amemura, dan A. Nakata. 1987. Nucleotide Sequence of the *iap* Gene, Responsible for Alkaline Phosphatase Isozyme Conversion in *Escherichia coli*, and Identification of the Gene Product. *Journal of Bacteriology* 169 (12): 5429-5433.
- Jinek, M., K. Chylinski, I. Fonfara, M. Hauer, J. A. Doudna, dan E. Charpentier. 2012. A programmable dual RNA-guided DNA endonuclease in adaptive bacterial immunity. *Science* 337 (6096): 816-821.
- Kieu, N. P., M. Lenman, E. S. Wang, B. L. Petersen, dan E. Andreasson. 2021. Mutations introduced in susceptibility genes through CRISPR/Cas9 genome editing confer increased late blight resistance in potatoes. *Scientific Reports* 11: 4487.
- Kim, Y. G., J. Cha, dan S. Chandrasegaran. 1996. Hybrid restriction enzymes: zinc finger fusions to Fok I cleavage domain. *Proceedings of the National Academy of Sciences of the United States of America* 93 (3): 1156-1160.
- Kleinstiver, B. P., V. Pattanayak, M. S. Prew, S. Q. Tsai, N. T. Nguyen, Z. Zheng, dan J. K. Joung. 2016. High-fidelity CRISPR-Cas9 nucleases with no detectable genome-wide off-target effects. *Nature* 529: 490-495.
- Lemak, S., M. A. Serbanescu, A. N. Khusnutdinova, M. Ruzkowski, N. Beloglazova, X. Xu, G. Brown, H. Cui, K. Tan, A. Joachimiak, D. G. Cvitkovitch, A. Savchenko, dan A. F. Yakunin. 2021. Structural and biochemical insights into CRISPR RNA processing by the Cas5c ribonuclease SMU1763 from *Streptococcus mutans*. *Journal of Biological Chemistry* 297 (5): 101251.
- Li, F., Q. Huang, T. A. Luster, H. Hu, H. Zhang, W. L. Ng, A. Khodadadi-Jamayran, W. Wang, T. Chen, J. Deng, M. Ranieri, Z. Fang, V. Pyon, C. M. Dowling,

- E. Bagdatlioglu, C. Almonte, K. Labbe, H. Silver, A. R. Rabin, K. Jani, A. Tsigos, T. Papagiannakopoulos, P. S. Hammerman, V. Velcheti, G. J. Freeman, J. Qi, G. Miller, dan K. K. Wong. 2020. In Vivo Epigenetic CRISPR Screen Identifies *Asf1a* as Immunotherapeutic Target in Kras-Mutant Lung Adenocarcinoma. *Cancer Discovery* 10 (2): 270-287.
- Li, H., Y. Yang, W. Hong, M. Huang, M. Wu, dan X. Zhao. 2020. Applications of genome editing technology in the targeted therapy of human diseases: mechanisms, advances and prospects. *Signal Transduction and Targeted Therapy* 5 (1): 1-23.
- Li, J. F., J. E. Norville, J. Aach, M. McCormack, D. Zhang, J. Bush, G. M. Church, dan J. Sheen. 2013. Multiplex and homologous recombination-mediated genome editing in *Arabidopsis* and *Nicotiana benthamiana* using guide RNA and Cas9. *Nature Biotechnology* 31: 688-691.
- Martinez-Lage, M., R. Torres-Ruiz, P. Puig-Serra, P. Moreno-Gaona, M. C. Martin, F. J. Moya, O. Quintana-Bustamante, S. Garcia-Silva, A. M. Carcaboso, P. Petazzi, C. Bueno, J. Mora, H. Peinado, J. C. Segovia, P. Menendez, dan S. Rodriguez-Perales. 2020. In vivo CRISPR/Cas9 targeting of fusion oncogenes for selective elimination of cancer cells. *Nature Communications* 11: 5060.
- Mason, M. G., dan J. R. Botella. 2020. Rapid (30-second), equipment-free purification of nucleic acids using easy-to-make dipsticks. *nature protocols* 15: 3663-3677.
- Millman, A., A. Bernheim, A. S. Avihail, T. Fedorenko, M. Voichkek, A. Leavitt, Y. O. Shaanan, dan R. Sorek. 2020. Bacterial Retrons Function in Anti-Phage Defense. *Cell* 183 (6): 1551-1561.
- Nishimasu, H., F. A. Ran, P. D. Hsu, S. Konermann, S. Shehata, N. Dohmae, R. Ishitani, F. Zhang, dan O. Nureki. 2014. Crystal Structure of Cas9 in Complex with Guide RNA and Target DNA. *Cell* 156 (5): 935-949.
- Nonaka, S., C. Arai, M. Takayama, C. Matsukura, dan H. Ezura. 2017. Efficient increase of γ -aminobutyric acid (GABA) content in tomato fruits by targeted mutagenesis. *Scientific Reports* 7 (7057): 1-14.
- Oliva, R., C. Ji, G. Atienza-Grande, J. C. Huguet-Tapia, A. Perez-Quintero, T. Li, J-S. Eom, C. Li, H. Nguyen, B. Liu, F. Auguy, C. Sciallano, V. T. Luu, G. S. Dossa, S. Cunnac, S. M. Schmidt, I. H. Slamet-Loedin, C. V. Cruz, B. Szurek, W. B. Frommer, F. F. White, dan B. Yang. 2019. Broad-spectrum resistance to bacterial blight in rice using genome editing. *Nature Biotechnology* 37: 1344-1350.
- Ramstein, G. P., S. E. Jensen, dan E. S. Buckler. 2019. Breaking the curse of dimensionality to identify causal variants in Breeding 4. *Theoretical and Applied Genetics* 132: 559-567.

- Ren, C., Y. Liu, Y. Guo, W. Duan, P. Fan, S. Li, dan Z. Liang. 2021. Optimizing the CRISPR/Cas9 system for genome editing in grape by using grape promoters. *Horticulture Research* 8: 52.
- ThermoFisher Scientific. 2017. Zero Blunt TOPO PCR Cloning Kit. *ThermoFisher Scientific*. April 24. Accessed September 8, 2022.
- Settlage, S. B., R. G. See, dan L. Hanley-Bowdoin. 2005. Geminivirus C3 Protein: Replication Enhancement and Protein Interactions. *Journal of Virology* 79 (15): 9885-9895.
- Shmakov, S., A. Smargon, D. Scott, D. Cox, N. Pyzocha, W. Yan, O. O. Abudayyeh, J. S. Gootenberg, K. S. Makarova, Y. I. Wolf, K. Severinov, F. Zhang, dan E. V. Koonin. 2017. Diversity and evolution of class 2 CRISPR-Cas systems. *Nature Reviews Microbiology* 15: 169-182.
- Swasti, E. 2019. *Dasar-Dasar Pemuliaan Tanaman: Metoda Pemuliaan pada Tanaman Menyerbuk Sendiri*. Padang: UNAND.
- Tamura, K., G. Stecher, dan S. Kumar. 2021. MEGA11: Molecular Evolutionary Genetics Analysis Version 11. *Molecular Biology and Evolution* 3022-3027.
- Wang, C., Q. Liu, Y. Shen, Y. Hua, J. Wang, J. Lin, M. Wu, T. Sun, Z. Cheng, R. Mercier, dan K. Wang. 2019. Clonal seeds from hybrid rice by simultaneous genome engineering of meiosis and fertilization genes. *Nature Biotechnology* 37: 283-286.
- Wilson, G. G., H. Wang, D. F. Heiter, dan K. D. Lunnen. 2012. Restriction Enzymes in Microbiology, Biotechnology, and Biochemistry. *Encuentro* 93: 19-48.
- Xie, K., B. Minkenberg, dan Y. Yang. 2015. Boosting CRISPR/Cas9 multiplex editing capability with the endogenous tRNA-processing system. *PNAS* 112 (11): 3570-3575.
- Yukawa, Y., M. Sugita, N. Choisne, I. Small, dan M. Sugiura. 2000. The TATA motif, the CAA motif and the poly(T) transcription termination motif are all important for transcription re-initiation on plant tRNA genes. *The Plant Journal* 22 (5): 439-447.
- Zhang, Y., J. Wang, Z. Wang, Y. Zhang, S. Shi, J. Nielsen, dan Z. Liu. 2019. A gRNA-tRNA array for CRISPR-Cas9 based rapid multiplexed genome editing in *Saccharomyces cerevisiae*. *Nature Communications* 10: 1053.
- Zhou, H., B. Liu, D. P. Weeks, M. H. Spalding, dan B. Yang. 2014. Large chromosomal deletions and heritable small genetic changes induced by CRISPR/Cas9 in rice. *Nucleic Acids Research* 42 (17): 10903-10914