

DAFTAR PUSTAKA

- Abao, L. N., Jamsransuren, D., Bui, V. N., Ngo, L. H., Trinh, D. Q., Yamaguchi, E., Vijaykrishna, D., Runstadler, J., Ogawa, H., Imai, K. 2013. Surveillance and characterization of avian influenza viruses from migratory water birds in eastern Hokkaido, the northern part of Japan, 2009–2010. *Virus Genes*. 46: 323–329. doi:10.1007/s11262-012-0868-9 [PubMed: 23264106]
- Abe, Y., Takashita, E., Sugawara, K., Matsuzaki, Y., Muraki, Y., and Hongo, S. 2004. Effect of the Addition of Oligosaccharides on the Biological Activities and Antigenicity of Influenza A/H3N2 Virus Hemagglutinin. *Journal of Virology*. 78(18): 9605–9611.
- Abid, M., Yaqub, T., Mehboob, A., Shabbir, M. Z. 2017. Characterization and phylogenetic analysis of avian influenza virus subtype H9N2 in Pakistan. *Hosts and Viruses*. 4(4):62–69.
- Adu, B. G., Sembiring, M. S. B., Sibarani, O. H., Mahardika, I. G. N. K., Suardana, I. B. K., Suartini, I. G. A. A., Nindhia, T. S. 2020. Seroprevalensi Virus Avian Influenza H9N2 pada Ayam Kampung (*Gallus domesticus*) di Pasar Beringkit, Kabupaten Badung, Bali. *J Vet*. 21(3): 258-366.
- Ansorge, W., Sproat, B. Stegemann, J., Schwager, C., Zenke, M. 1987. Automated DNA sequencing: ultrasensitive detection of fluorescent bands during electrophoresis. *Nucleic Acids Research*. 15(11): 4593–4602, <https://doi.org/10.1093/nar/15.11.4593>.
- Antara, I. M.S., Suartha, I. N., Wiryana, I. K.S., Sukada, I.M., Wirata, I.W., Prasetya, I.G.N.D., Dewi, N.M.R.K., Sari. T. K., dan Maharadika, I.G.N.K. 2009. Pola Distribusi Unggas dari Pasar tradisional Berperan Dalam Penyebaran Virus Flu Burung. *J Vet*. 10(2): 104-110.
- Antara, I. M.S., Suartha, I. N., Wiryana, I. K.S., Sukada, I.M., Wirata, I.W., Prasetya, I.G.N.D., Dewi, N.M.R.K., Sari. T. K., dan Maharadika, I.G.N.K. 2010. Peranan Pedagang Unggas dalam Penyebaran Virus Avian Influenza. *J Vet*. 11(4): 220-225.
- Aouini, R., Laamiri, N., & Ghram, A. 2018. Viral interference between low pathogenic avian influenza H9N2 and avian infectious bronchitis viruses in vitro and in ovo. *Journal of Virological Methods*. 259: 92–99. doi:10.1016/j.jviromet.2018.06.011
- Area, E., Martín-Benito, J., Gastaminza, P., Torreira, E., Valpuesta, J. M., Carrascosa, J. L., Ortín, J. 2004. 3D structure of the influenza virus

- polymerase complex: localization of subunit domains. *Proc Natl Acad Sci U S A*. 101(1): 308–313.
- Azizpour, A., Goudarzi, H., Charkhkar, S., Momayez, R., Hablolvarid, M. H. 2014. Experimental study on tissue tropism and dissemination of H9N2 avian influenza virus and *Ornithobacterium rhinotracheale* co-infection in SPF chickens. *J Anim and Plant Scien*. 24(6): 1655–1662.
- Barman, S., and Nayak, D. P. 2000. Analysis of the transmembrane domain of influenza virus neuraminidase, a type II transmembrane glycoprotein, for apical sorting and raft association. *J. Virol*. 74, 6538–6545. doi: 10.1128/JVI.74.14.6538-6545.2000
- Baron, J., Tarnow, C., Mayoli-Nüssle, D., Schilling, E., Meyer, D., Hammami, M., Schwalm, F., Steinmetzer, T., Guan, Y., Garten, W., *et al*. 2013. Matriptase, HAT, and TMPRSS2 activate the hemagglutinin of H9N2 influenza A viruses. *J Virol*. 87: 1811–1820. doi:10.1128/JVI.02320-12 [PubMed: 23192872]
- Beard, C. W. 1970. Demonstration of type-specific influenza antibody in mammalian and avian sera by immunodiffusion. *Bull World Health Organ*, 42(5): 779–785.
- Belser, J. A., Sun, X., Brock, N., Pappas, C., Pulit-Penaloza, J.A., Zeng, H., Jang, Y., Jones, J., Carney, P.J., Chang, J., Long, N.V., Diep, N.T., Thor, S., Di, H., Yang, G., Cook, P.W., Creager, H.M., Wang, D., McFarland, J., Dong, P.V., Wentworth, D.E., Tumpey, T.M., Barnes, J.R., Stevens, J., Davis, C.T., Maines, T.R. 2020. Genetically and antigenically divergent influenza A (H9N2) viruses exhibit differential replication and transmission phenotypes in mammalian models. *J Virol* 94:e00451-20. <https://doi.org/10.1128/JVI.00451-20>
- Bender, C., Hall, H., Huang, J., Klimov, A., Cox, N., Hay, A., Gregory, V., Cameron, K., Lim, W. & Subbarao, K. 1999. Characterization of the Surface Proteins of Influenza A (H5N1) Viruses Isolated from Humans in 1997–1998. *Virology*. 254 (1): 115-123.
- Berkhoff, E. G. M., Wit E, de, Geelhoed-Mieras, M. M., Boon, A. C. M., Symons, J., Faouchier, R. A. M., Osterhaus, A. D. M. E., Rimmelzwaan, G. F. 2005. Functional constraints of influenza A virus epitopes limit escape from cytotoxic T lymphocytes. *J Virol*. 79: 11239-11246.
- Biswas, S. K., Boutz, P. L., Nayak, D. P. 1998. Influenza virus nucleoprotein interacts with influenza virus polymerase proteins. *J Virol*. 72: 5493–5501.

- Biswas, P. K., Giasuddin, M., Chowdhury, P., Barua, H., Debnath, N.C., Yamage, M. 2017. Incidence of contamination of live bird markets in Bangladesh with influenza A virus and subtypes H5, H7 and H9. *Transbound Emerg Dis.* 00:1–9. <https://doi.org/10.1111/tbed.12788>.
- Blok, J., & Air, G. M. 1982. Variation in the membrane-insertion and “stalk” sequences in eight subtypes of influenza type A virus neuraminidase. *Biochemistry.* 21: 4001–4007.
- Bonfante, F., Mazzetto, E., Zanardello, C., Fortin, A., Gobbo, F., Maniero, S., Bigolaro, M., Davidson, I., Haddas, R., Cattoli, G., et al. 2018. A G1-lineage H9N2 virus with oviduct tropism causes chronic pathological changes in the infundibulum and a long-lasting drop in egg production. *Vet Res.* 49: 83. doi:10.1186/s13567-018-0575-1 [PubMed: 30157967].
- Borzi, M.M., Silva, K.R., Montassier, M.D.F.S., Fernando, F.S., Tamanine, M.D.L.F., Santos, R.M.D., Oliveira, E.S.D., Mariguela, V.C., Lopes, P.D., Reischak, D., Mendonça, A.O., Renato Luis Luciano, R.L., and Montassier, H.J. 2017. Development and application of an enzyme-link immunosorbent assay (ELISA) using a soluble recombinant nucleoprotein for the detection of antibodies to avian influenza virus. *AJMR.* 11(8): 697-704.
- Bos, T. J., Davis, A. R., and Nayak, D. P. 1984. NH₂-terminal hydrophobic region of influenza virus neuraminidase provides the signal function in translocation. *Proc. Natl. Acad. Sci. U. S. A.* 81: 2327–2331.
- Brand, N. J. 1995. Principles and applications of the polymerase chain reaction. In: Latchman DS ed. *PCR Applications in Pathology.* Oxford: *Oxford University Press*: 1-16.
- Brown, T. A. 2002. *Genomes. 2nd edition. Chapter 6, Sequencing Genomes.* Oxford: Wiley-Liss. Pp. 130-150.
- Bui, M., Whittaker, G., Helenius, A. 1996. Effect of M1 protein and low pH on nuclear transport of influenza virus ribonucleoproteins. *J Virol.* 70:8391-401.
- Bulaga, L.L., Garber, L., Senne, D. A., Myers, T. J., Good, R., Wainwright, S., Trock, S., Suarez, D. L. 2003. Epidemiologic and surveillance studies on avian influenza in live-bird markets in New York and New Jersey, 2001. *Avian Dis.* 47(3 Suppl):996-1001. doi: 10.1637/0005-2086-47.s3.996.
- Bullido, R., Gómez-Puertas, P., Albo, C., Portela, A. 2000. Several protein regions contribute to determine the nuclear and cytoplasmic localization of the influenza A virus nucleoprotein. *J Gen Virol.* 81(Pt 1):135–142.
- Burke, D. F., Smith, D. J. 2014. A Recommended Numbering Scheme for

- Influenza A HA Subtypes. *PloS ONE*. 9(11): e112302. Doi: 10.1371/journal.pone.0112302.
- Bush, R. M., Bender, C. A., Subbarao, K., Cox, N. J., Fitch, W. M. 1999. Predicting the evolution of human influenza A. *Science*. 286: 1921-1925.
- Butt, K. M., Smith, G. J. D., Chen, H., Zhang, L. J., Leung, Y. H. C., Xu, K. M., Lim, W., Webster, R.G., Yuen, K. Y., Peiris, J.S.M., Guan, Y. 2005. *Human Infection with an Avian H9N2 Influenza A Virus in Hong Kong in 2003. Journal of Clinical Microbiology*. 43(11): 5760–5767. doi:10.1128/jcm.43.11.5760-5767.2005.
- Caton, A. J., Brownlee, G. G., Yewdell, J. M., Gerhard., W. 1982. The antigenic structure of the influenza virus A/PR/8/34 hemagglutinin (H3 subtype). *Cell*. 31:417-427.
- Campitelli, L., Ciccozzi, M., Salemi, M., Taglia, F., Boros, S., Donatelli, I., Rezza, G. 2006. H5N1 influenza virus evolution: a comparison of different epidemics in birds and humans (1997-2004). *J Gen Virol*. 87: 955-960.
- Capua, I., Mutinelli, F. 2001. Low pathogenicity (LPAI) and highly pathogenic (HPAI) avian influenza in turkeys and chicken. In: Capua I, Mutinelli F. (eds.), *A Colour Atlas and Text on Avian Influenza*, Papi Editore, Bologna: 13-20.
- Cardona, C., Yee, K., & Carpenter, T. 2009. Are live bird markets reservoirs of avian influenza? *Poultry Science*. 88: 856–859. doi: 10.3382/ps.2008-00338.
- Carnaccini, S. & Perez, D.R. 2020. H9 Influenza Viruses: An Emerging Challenge. *Cold Spring Harb Perspect Med*. 10 (6): 1-11. doi:10.1101/cshperspect.a038588.
- Cdc.gov. (April 19, 2017). *Influenza Type A Viruses*. Diakses pada 11 Agustus 2020, dari <https://www.cdc.gov/flu/avianflu/influenza-a-virus-subtypes.htm>
- Chazal, N., Gerlier, D. 2003. Virus entry, assembly, budding, and membrane rafts. *Microbiol Mol Biol Rev*. 67: 226-237.
- Chen, J., Lee, K.H., Steinhauer, D.A., Stevens, D.J., Skehel, J.J., Wiley, D.C. 1998. Structure of the hemagglutinin precursor cleavage site, a determinant of influenza pathogenicity and the origin of the labile conformation. *Cell*. 95: 409–417.
- Chen, H., Smith, G. J. D., Li, K. S., Wang, J., Fan, X. H., Rayner, J. M., Vijaykrishna, D., Zhang, J. X., Zhang, L. J., Guo, C. T., Cheung, C. L., Xu,

- K. M., Duan, L., Huang, K., Qin, K., Leung, Y. H. C., Wu, W. L., Lu, H. R., Chen, Y., Xia, N. S., Naipospos, T. S. P., Yuen, K. Y., Hassan, S. S., Bahri, S., Nguyen, T. D., Webster, R. G., Peiris, J. S. M., Guan, Y. 2006. Establishment of multiple sublineages of H5N1 influenza virus in Asia: implications for pandemic control. *Proc Natl Acad Sci USA*. 103: 2845-2850.
- Chen, Y., Xu, F., Fan, X., Luo, H., Ge, S., Zheng, Q., Zhang, J. 2008. Evaluation of a rapid test for detection of H5N1 avian influenza virus. *Journal of Virological Methods*. 154(1-2): 213-215. doi:10.1016/j.jviromet.2008.08.013
- Chen, J.M., Sun, Y.X., Chen, J.W. 2009. Panorama phylogenetic diversity and distribution of type A influenza viruses based on their six internal gene sequences. *Virology Journal*. 6: 137.
- Chen, R. A., Lai, H. Z., Li, L., Liu, Y. P., Pan, W. L., Zhang, W. Y., Xu, J. H., He, D. S., Tang, Z. X. 2013. Genetic variation and phylogenetic analysis of hemagglutinin genes of H9 avian influenza viruses isolated in Cina during 2010-2012. *J Vet Microbiol*. 165: 312-318.
- Cheng, K.L., Wu, J., Shen, W.L., Wong, A.Y.L., Guo, Q., Yu, J., Zhuang, X., Su, W., Song, T., Peiris, M., Yen, H.L., Lau, E.H.Y. 2020. Avian Influenza Virus Detection Rates in Poultry and Environment at Live Poultry Markets, Guangdong, China. *Emerging Infectious Diseases*. 26 (3): 591-595. DOI: <https://doi.org/10.3201/eid2603.190888>. www.cdc.gov/eid
- Chin, A.W.H., Li, O.T.W, Mok, C.K.P., Ng, M.K.W., Peiris, M., Poon, L.L.M. 2014. Influenza A viruses with different amino acid residues at PB2-627 display distinct replication properties *in vitro* and *in vivo*: Revealing the sequence plasticity of PB2-627 position. *Elsevier Virology*. 468-470: 545-555. <https://doi.org/10.1016/j.virol.2014.09.008>.
- Clavijo, A., Tresnan, D. B., Jolie, R., Zhou, E. M. 2002. Comparison of embrionated chicken eggs with MDCK cell culture for the isolation of swine influenza virus. *Can J Vet Res*. 66: 117-121.
- Coleman, J. R. 2007. The PB1-F2 protein of influenza A virus: increasing pathogenicity by disrupting alveolar macrophages. *Virology*. 4: 1-5.
- Colman, P. M. 1989. NA enzyme and antigen. In: Sasaki Y, editor. *The influenza viruses*. New York: Plenum Publishing Corporation. pp. 175-218.
- Colman, P. M., Varghese, J. N., and Laver, W. G. 1983. Structure of the catalytic and antigenic sites in influenza virus neuraminidase. *Nature*. 303: 41-44. doi: 10.1038/303041a0.

- Compans, R. W., Content, J., Duesberg, P. H. 1972. Structure of the Ribonucleoprotein of Influenza Virus. *J Virol.* 10(4): 795–800.
- Cross, K. J., Wharton, S. A., Shekel, J. J., Wiley, D. C., Steinhauer, D. A. 2001. Studies on influenza hemagglutinin fusion peptide mutants generated by reverse genetics. *EMBO J.* 20: 4432-4442.
- Cui, L., Liu, D., Shi, W., Pan, J., Qi, X., Li, X., *et al.* 2014. Dynamic reassortments and genetic heterogeneity of the human-infecting influenza A (H7N9) virus. *Nature communications.* 5: 3142. PubMed PMID: 24457975.
- Das, S.R., Hensley, S.E., David, A., Schmidt, L., Gibbs, J.S., Puigbo, P., Ince, W.L., Bennink, J.R., and Yewdell, J.W. 2011. Fitness costs limit influenza A virus hemagglutinin glycosylation as an immune evasion strategy. *PNAS.* 108(51): E1417-E1422.
- Davidson, A., D. Giligan, T. E. Eckert, A. F. Ziegler, and R. J. Eckroade. 1999. Economic analysis of an outbreak of avian influenza. *J. Am. Vet. Med. Assoc.* 214:1164-1167.
- Deng, G., Bi, J., Kong, F., Li, X., Xu, Q., Dong, J., Zhang, M., Zhao, L., Luan, Z., Lv, N., and Qiao, J. 2010. Acute respiratory distress syndrome induced by H9N2 virus in mice. *Arch Virol.* 155(2): 187–195.
- Detrick, B., Hamilton, R.G., Folds, J.D. 2016. *Manual of Molecular and Clinical Laboratory Immunology.* 8th Edition. ASM Press, Washington DC.
- Dirjen PKH, Kementerian Pertanian. 2017. *Apakah AI H9N2 Sudah Merebak?* Disampaikan pada Seminar Antimikrobia dalam Industri Peternakan.
- Dirjen PKH, Kementerian Pertanian. 2018. *Deteksi Virus Avian Influenza dengan Teknik Real-Time Reverse Transcription Polymerase Chain Reaction (rRT-PCR).* FAO SOP book, Balai Besar Veteriner Wates.
- Ellakany, H. F., Elsamadony, H.A., Elbestawy, A.A., Ismael, H.A.S. 2017. Clinical, Biochemical and Histopathological Alteration in Broiler Chickens Experimentally Infected with H9N2 Avian Influenza Virus During Aflatoxicosis. *AJVS.* 53: 131-137.
- Elton, D., Simpson-Holley, M., Archer, K., Medcalf, L., Hallam, R., McCauley, J., Digard, P. 2001. Interaction of the influenza virus nucleoprotein with the cellular CRM1-mediated nuclear export pathway. *J Virol.* 75: 408-419.
- Ernst, A. M., Zacherl, S., Herrmann, A., Hacke, M., Nickel, W., Wieland, F. T. 2013. Differential transport of influenza A neuraminidase signal anchor

peptides to the plasma membrane. *FEBS Lett.* 587: 1411–1417. doi: 10.1016/j.febslet.2013.03.019.

[FAO] Food and Agriculture Organization. 2021. Avian Influenza: Wildlife: Wild birds Telemetry Studies. FAO Animal Production and Health Manual.

Feare, C. J., Yasue, M. 2006. Asymptomatic infection with highly pathogenic avian influenza H5N1 in wild birds: how sound is the evidence? *Virology.* 3: 96-100.

Fedorko, D. P., Nelson, N. A., McAuliffe, J. M., Subbarao, K. 2006. Performance of rapid tests for detection of avian influenza A virus type H5N1 and H9N2. *J Clin Microbiol.* 44: 1596-1597.

Fereidouni, S. R., Starick, E., Grund, C., Globig, A., Mettenleiter, T. C., Beer, M., Harder, T. 2009. Rapid molecular subtyping by reverse transcription polymerase chain reaction of the neuraminidase gene of avian influenza A viruses. *Vet Microbiol.* 135(3-4): 253-60. doi: 10.1016/j.vetmic.2008.09.077. Epub 2008 Oct 8. PMID: 19028027.

Fernandez-Sesma, A., Marukian, S., Ebersole, B. J., Kaminski, D., Park, M. S., Yuen, T., Sealfon, S. C., Garcia-Sastre, A., Moran, T. M. 2006. Influenza virus evades innate and adaptive immunity via the NS1 protein. *J Virol.* 80: 6295-6304.

Ferreira, N.R., Preto, A.J., Melo, R., Moreira, I.S., Brito, R.M.M. 2020. Review: The Central Role of Non-Structural Protein 1 (NS1) in Influenza Biology and Infection. *Int. J. Mol. Sci.* 21(1511): 1-24.

Fodor, E., Mingay, L.J., Crow, M., Deng, T., and Brown Lee, G. G., 2003. A single amino acid mutation in the PA subunit of the RNA polymerase promotes the generation of defective interfering RNAs. *J. Virol.* 77: 5017-5020.

Gallagher, P., Henneberry, J., Wilson, I., Sambrook, J., M J Gething, M. J. 1988. Addition of carbohydrate side chains at novel sites on influenza virus hemagglutinin can modulate the folding, transport, and activity of the molecule. *J Cell Biol.* 107(6 Pt 1):2059-73. doi: 10.1083/jcb.107.6.2059.

Gambaryan, A. S., Robertson, J.S., and Matrosovich, M.N. 1999. Effects of egg adaptation on the receptor-binding properties of human influenza A and B viruses. *Virology.* 258: 232-239.

Gambaryan, A., Yamnikova, S., Lvov, D. 2005. Receptor specificity of influenza viruses from birds and mammals: new data on involvement of the inner fragments of the carbohydrate chain. *Virology.* 334: 276-83.

- Gambaryan, A., Tuzikov, A., Pazynina, G., Bovin, N., Balish, A., Klimov, A. 2006. Evolution of the receptor binding phenotype of influenza A (H5) viruses. *Virology*. 344: 432-438.
- Ge, F. F., Zhou, J. P., Liu, J., Wang, J., Zhang, W. Y., Sheng, L. P., Xu, F., Ju, H. B., Sun, Q. Y and Liu, P. H. 2009. Genetic Evolution of H9 Subtype Influenza Viruses from Live Poultry Markets in Shanghai, China. *Journal of Clinical Microbiology*. 47(10): 3294–3300. doi:10.1128/JCM.00355-09.
- Gibbs, J. S., Malide, D., Hornung, F., Bennink, J. R., Yewdell, J. W. 2003. The Influenza A Virus PB1-F2 Protein Targets the Inner Mitochondrial Membrane via a Predicted Basic Amphipathic Helix That Disrupts Mitochondrial Function. *J. Virol.* 77(13):7214-7224.
- Gomez-Puertas, P., Albo, C., Perez-Pastrana, E., Vivo, A., Portela, A. 2000. Influenza virus matrix protein is the major driving force in virus budding. *J Virol.* 74: 11538-11547.
- Guan, Y., Shortridge, K. F., Krauss, S., Webster, R. G. 1999. Molecular characterization of H9N2 influenza viruses: Were they the donors of the "internal" genes of H5N1 viruses in Hong Kong? *J Virol.* 96: 9363-9367.
- Guan, Y., Shortridge, K.F., Krauss, S., Chin, P.S., Dyrting, K.C., Ellis, T.M., Webster, R.G., Peiris, M. 2000. H9N2 influenza viruses possessing H5N1-like internal genomes continue to circulate in poultry in southeastern China. *J Virol.* 74(20): 9372-9380. doi: 10.1128/jvi.74.20.9372-9380.
- Guo, Y. J., Krauss, S., Senne, D.A., Mo, I. P., Lo, K. S., Xiong, X. P., Norwood, M., Shortridge, K. F., Webster, R. G., Guan, Y. 2000. Characterization of the pathogenicity of members of the newly established H9N2 influenza virus lineages in Asia. *Virol.* 267(2): 279–88.
- Guu, T. S., Dong, L., Wittung-Stafshede, P. 2008. Mapping the domain structure of the influenza A virus polymerase acidic protein (PA) and its interaction with the basic protein 1 (PB1) subunit. *Virology*. 379: 135-142.
- Ha, Y., Stevens, D. J., Skehel, J. J., Wiley, D. C. 2001. X-ray structures of H-5 avian and H9 swine influenza virus haemagglutinins bound to avian and human receptor analogs. *Proc. Natl Acad. Sci. USA.* 98: 11181–11186.
- Halvorson, D. A., Kelleher, C. J., Pomeroy, B. S., Sivanandan, V., Abraham, A. S., Newman, J. A., Pearson, J. E. 2003. Surveillance procedures for avian influenza. *Avian Diseases*. 47: 155– 162.
- Hassan, M. M., M. A. Hoque, B. Ujvari, & M. Klaassen. 2018. Live bird markets

in Bangladesh as a potentially important source for Avian Influenza Virus transmission. *Preventive Veterinary Medicine*. 156: 22–27. doi:10.1016/j.prevetmed.2018.05.003.

Hara, K., Schmidt, F. I., Crow, M., Brownlee, G. G. 2006. Amino acid residues in the N-terminal region of the PA subunit of influenza A virus RNA polymerase play a critical role in protein stability, endonuclease activity, cap binding and virion RNA promoter binding. *J Virol*. 80: 7789-7798.

Harder, T. C., & Werner, O. 2006. *Influenza Report 2006, Chapter 2: Avian Influenza*. Flying Publisher: 48-86. <http://www.influenzareport.com>.

Harris, A., Cardone, G., Winkler, D. C., Heymann, J. B., Brecher, M., White, J. M., Steven, A. 2006. Influenza virus pleiomorphy characterized by cryoelectron tomography. *Proc Natl AcadSci USA*. 103: 19123-19127.

Harrison, S. C. 2008. Viral membrane fusion. *Nat. Struct. Mol. Biol*. 15: 690-698.

Heather, J.M., Chain, B. 2016. The sequence of sequencers: The history of sequencing DNA. *Genomics*. 107(1): 1-8.

Heid, C. A., Stevens, J., Livak, K. J., Williams, P. M.. 1996. Real time quantitative PCR. *Genome Res*. 6: 986-994.

Herrler, G., Hausmann, J., Klenk, H.D. 1995. Sialic acid as receptor determinant of ortho- and paramyxoviruses. In: *Rosenberg A (ed), Biology of the Sialic Acids*. Plenum Press NY:315-336

Hirst, G. K. 1941. The Agglutination of Red Cells by Allantoic Fluid of Chick Embryos Infected With Influenza Virus. *Science*. 94 (2427): 22-23. DOI: 10.1126/science.94.2427.22.

Homme, P. J., Easterday, B. C. 1970. Avian influenza virus infections. I: characteristics of influenza A/turkey/Wisconsin/1966 virus. *Avian Dis*. 14: 66–74. doi:10.2307/1588557 [PubMed: 4314007].

Honda, A., Mizumoto, K., Ishihama, A. 2002. Minimum molecular architectures for transcription and replication of the influenza virus. *Proc Natl Acad Sci USA*. 99: 13166-13171.

Horimoto T, Kawaoka Y. 2001. Pandemic threat posed by avian influenza A viruses. *Clin Microbiol Rev*. 14: 129-149.

Ilyushina, N. A., Bovin, N. V. & Webster, R. G. 2012. Decreased neuraminidase activity is important for the adaptation of H5N1 influenza virus to human airway epithelium. *J Virol*. 86(9): 4724-33.

- Indriani, R., G. Samaan, A. Gultom, L. Loth, S. Indryani, R. M. A. Adjid, N. L. P. I. Dharmayanti, J. Weaver, E. Mumford, K. Lokuge, P. M. Kelly, and Darminto. 2010. Environmental sampling for avian influenza virus A (H5N1) in live-bird markets, Indonesia. *Emerg. Infect. Dis.* 16(12): 1889-1895.
- Indriani, R., Indi, N. L. P., Darminto, D., dan Adjid, R. M. A. 2008. Survei Avian Influenza pada pasar unggas hidup: Titik kritis untuk pengambilan sampel. *Proceedings of KIVNAS 2008*: 261-262.
- Ito, T., Gorman, O.T., Kawaoka, Y., Bean, W.J., Webster, R.G. 1991. Evolutionary analysis of the influenza A virus M gene with comparison of the M1 and M2 proteins. *J Virol.* 65(10): 5491-5498.
- Ito, T., Suzuki, Y., Takada, A., Kawamoto, A., Otsuki, K., Masuda, H., Yamada, M., Suzuki, T., Kida, H., Kawaoka, Y. 1997. Differences in sialic acid-galactose linkages in the chicken egg amnion and allantois influence human influenza virus receptor specificity and variant selection. *J Virol.* 71: 3357-3362.
- Jakhesara, S. J., Bhatt, V. D., Patel, N.V., Prajapati, K.S., Joshi, C.G. 2014. Isolation & characterization of H9N2 Influenza virus isolates from poultry respiratory disease outbreak. *SpringerPlus.* 3:196.
- Jayawardena, S., Cheung, C.Y., Barr, I., Chan, K.H., Chen, H., Yi Guan, Y., Peiris, J.S.M., and Poon, L.L.M. 2007. Loop-Mediated Isothermal Amplification for Influenza A (H5N1) Virus. *Emerg Infect Dis.* 13(6): 899-901. doi: 10.3201/eid1306.061572
- Jensen, T.H., Gitte Ajjouri, G., Handberg, K.J., Slomka, M.J., Coward, V.J., Cherbonnel, M., Jestin, V., Lind, P., and Poul H Jørgensen, P.H. 2013. An enzyme-linked immunosorbent assay for detection of avian influenza virus subtypes H5 and H7 antibodies. *Acta Vet Scand.* 55(1): 84.
- Jiahao, Z., Kaixiong, M., Bo, L., Yiqun, C., Ziwen, Q., Jinchao, X., Jinyu, H., Chen, H., Yifan, H., Huanan, L., Dingxiang, L., Ming, L., Wenbao, Q. 2021. A risk marker of tribasic hemagglutinin cleavage site in influenza A (H9N2) virus. *Communications Biology.* 4:71 <https://doi.org/10.1038/s42003-020-01589-7>.
- Jin, H., Lesser, G., Lamb, R. A. 1997. Influenza virus hemagglutinin and neuraminidase cytoplasmic tails control particle shape. *EMBO J.* 16: 1236-1247.
- Jonas, M., Sahesti, A., Murwijati, T., Lestariningsih, C. L., Irine, I., Ayesda, C. S.,

- Mahardika, G. N. (2018). Identification of avian influenza virus subtype H9N2 in chicken farms in Indonesia. *Preventive Veterinary Medicine*. 159: 99–105. <https://doi.org/10.1016/j.prevetmed.2018.09.003>
- Jong, de J. C., Beyer, W. E., Palache, A. M., Rimmelzwaan, G. F., Osterhaus, A. D. 2000. Mismatch between the 1997/1998 influenza vaccine and the major epidemic A (H3N2) virus strain as the cause of an inadequate vaccine-induced antibody response to this strain in the elderly. *J Med Virol*. 61: 94-99.
- Kalthoff, D. Anja, G., Martin, B. 2010. (Highly pathogenic) avian influenza as a zoonotic agent. *J Vet Microbiol*. 140: 237–245.
- Kang, J., Wen-Ming, J., Shuo, L., Ji-Ming, Chen, Jie, C., Guang-Yu, H., Jin-Ping, L., Bao-Xu, H. 2010. Characterization of the hemagglutinin gene of subtype H9 avian influenza viruses isolated in 2007–2009 in China. *Journal of Virological Methods*. 163: 186–189. doi:10.1016/j.jviromet.2009.09.013
- Kaverin, N.V., Rudneva, I.A., Ilyushina, N.A., Lipatov, A.S., Krauss, S., Webster, R.G. 2004. Structural differences among hemagglutinins of influenza A virus subtypes are reflected in their antigenic architecture: analysis of H9 escape mutants. *J virol*. 78:240-249.
- Kimura, M. 1980. A simple method for estimating evolutionary rate of base substitutions through comparative studies of nucleotide sequences. *Journal of Molecular Evolution*. 16:111-120.
- Klenk, H. D., Garten, W. 1994. Host cell proteases controlling virus pathogenicity. *Trends Microbiol*. 2: 39–43.
- Klumpp, K., Ruigrok, R. W., Baudin, F. 1997. Roles of the influenza virus polymerase and nucleoprotein in forming a functional RNP structure. *EMBO J*. 16: 1246-1257.
- Kobasa, D., Wells, K., Kawaoka, Y. 2001. Amino acids responsible for the absolute sialidase activity of the influenza A virus neuraminidase: relationship to growth in the duck intestine. *J Virol*. 75: 11773-11780.
- Koch, G., García-Sastre, A., Martínez-Sobrido, L. 2007. Multiple Anti-Interferon Actions of the Influenza A Virus NS1 Protein. *Journal of Virology*. 81(13): 7011-7021.
- Kosik, I., Ince, W.L., Gentles, L.E., Oler, A.J., Kosikova, Angel, M.M., Magadan, J.G., Xie, H., Brooke, C.B., Yewdell, J.W. 2018. Influenza A virus hemagglutinin glycosylation compensates for antibody escape fitness costs. *PLoS Pathog*. 14(1): 1-19.e1006796

- Krauss, S., Walker, D., Pryor, S.P., Niles, L., Chenghong, L., Hinshaw, V.S., Webster, R.G. 2004. Influenza A viruses of migrating wild aquatic birds in North America. *Vector Borne Zoonotic Dis.* 4: 177-189.
- Kumar, S., Stecher, G., & Tamura, K. 2016. MEGA7: Molecular Evolutionary Genetics Analysis version 7.0 for bigger datasets. *Molecular and Biology Evolution.* 33: 1870-1874.
- Kundu, A., Jabbar, M. A., and Nayak, D. P. 1991. Cell surface transport, oligomerization, and endocytosis of chimeric type II glycoproteins: role of cytoplasmic and anchor domains. *Mol. Cell. Biol.* 11: 2675–2685. doi: 10.1128/MCB.11.5.2675.
- Kundu, A., and Nayak, D. P. 1994. Analysis of the signals for polarized transport of influenza virus (A/WSN/33) neuraminidase and human transferrin receptor, type II transmembrane proteins. *J. Virol.* 68: 1812–1818.
- Lamb, R. 1989. Genes and Protein of The Influenza Viruses. In : *The Influenza Viruses*. Krug RM New York. Plenum Press. 1-67.
- Lamb, R. A. & Krug, R. M. 2001. *Orthomyxoviridae: the viruses and their replication*. In: Fields Virology. Knipe DM & PM Howley (Eds). Philadelphia: Lippincott Williams and Wilkins.
- Lamb, R. A. Lai, C. J., Choppin, P. W. 1981. Sequences of mRNAs derived from genome RNA segment 7 of influenza virus: colinear and interrupted mRNAs code for overlapping proteins. *Proceedings of the National Academy of Sciences of the United States of America.* 78: 4170-4174. 10.1073/pnas.78.7.4170.
- Lane, P.W. 1962. Provision of pathogen-free animals. *Proc R Soc Med.* 55: 253–256.
- Lee, M.S., Chang, P. C., Shien, J. H., Cheng, M. C., Shieh, H. K. 2001. Identification and subtyping of avian influenza viruses by reverse transcription-PCR. *J Virol Methods.* 97: 13-27.
- Lehrach, H. 2013. DNA sequencing methods in human genetics and disease research. *F1000Prime Rep.* 5:34.
- Lestari., Wibawa, H., Lubis, E. P., Dharmawan, R., Rahayu, R. A., Mulyawan, H., Charoenkul, K., Nasamran, C., Poermadjaja, B., Amonsin, A. 2019. Co-circulation and characterization of HPAI-H5N1 and LPAI-H9N2 recovered from a duck farm, Yogyakarta, Indonesia. *Transbound Emerg Dis.* 67:994–1007. DOI: 10.1111/tbed.13434.

- Leung Ng, A. K., Zhang, H., Tan, K., Li, Z., Liu, J. H., Chan, P. K. S., Sui-Mui Li, Chan, W. Y., Au, S. W. N., Joachimiak, A., Walz, T., Wang, J. H., and Shaw, P. C. 2008. Structure of the influenza virus A H5N1 nucleoprotein: implications for RNA binding, oligomerization, and vaccine design. *FASEB J.* 22(10): 3638–3647. doi: 10.1096/fj.08-112110.
- Li, C., Yu, K., Tian, G., Yu, D., Liu, L., Jing, B. 2005. Evolution of H9N2 influenza viruses from domestic poultry in Mainland China. *Virology.* 340(1) :70-83. PubMed PMID: 16026813.
- Li, K. S., Xu, K. M., Peiris, J. S. M., Poon, L. L. M., Yu, K. Z., Yuen, K. Y., Shortridge, K. F., Webster, R. G., Guan, Y. 2003. Characterization of H9 subtype influenza viruses from the ducks of Southern China: a candidat for the next influenza pandemic in humans? *J Virol.* 77: 6988-6994.
- Li, M., Xie, Z., Xie, Z., Liu, J., Xie, L., Deng, X., Luo, S., Fan, Q., Huang, L., Huang, J., Zhang, Y., Zeng, T., Feng, J. 2015. Simultaneous detection of four different neuraminidase types of avian influenza A H5 viruses by multiplex reverse transcription PCR using a GeXP analyser. *Influenza and Other Respiratory Viruses.* *InfluenzaJournal.com.* pp 141-149. DOI:10.1111/irv.12370.
- Lin, Y. P., Shaw, M., Gregory, V., Cameron, K., Lim, W., Klimov, A., Subbarao, K., Guan, Y., Krauss, S., Shortridge, K., Webster, R., Cox, N., Hay, A. 2000. Avian-to-human transmission of H9N2 subtype influenza A viruses: relationship between H9N2 and H5N1 human isolates. *Proc. Natl Acad. Sci. USA.* 97: 9654–9658.
- Liu, J. P. 2005. Avian Influenza - A Pandemic Waiting to Happen?. *J microbiol Immunol Infect.* 39:4-10.
- Liu, H., Liu, X., Cheng, J., Peng, D., Jia, L., Huang, Y. 2003. Phylogenetic Analysis of the hemagglutinin genes of twenty-six avian influenza viruses of subtype H9N2 isolated form chicken in China during 1996-2001. *Avian Dis.* 47: 116-127.
- Liu, J., Okazaki, K., Ozaki, H., Sakoda, Y., Wu, Q., Chen, F., Kida, H. 2003. H9N2 influenza viruses prevalent in poultry in China are phylogenetically distinct from A/quail/Hong Kong/G1/97 presumed to be the donor of the internal protein genes of the H5N1 Hong Kong/97 virus. *Avian Pathol.* 32(5): 551-560. doi: 10.1080/0307-9450310001596728.
- Liu, S., Ji, K., Chen, J., Tai, D., Jiang, W., Hou, G., Chen, J., Li, J., Huang, B. 2009. Panorama phylogenetic diversity and distribution of type A influenza virus. *PLoS ONE.* 4: e5022. doi:10.1371/journal.pone.0005022 [PubMed: 19325912]

- Liu, D., Shi, W., Gao, G. F. 2014. Poultry carrying H9N2 act as incubators for novel human avian influenza viruses. *Lancet*. 8:383(9920):869. PubMed PMID: 24581684.
- Luo, G., Chung, J. & Palese, P. 1993. Alterations of the stalk of the influenza virus neuraminidase: deletions and insertions. *Virus Res*. 29: 141-153.
- Magalhaes R.J.S., Zhou, X., Jia, B., Guo, F., Pfeiffer, D.U., Martin, V. 2012. Live poultry trade in Southern China provinces and HPAIV H5N1 infection in humans and poultry: the role of Chinese new year festivities. *PLoS One*. 7(11): e49712.
- Manjili, S.A., Haghdoost, I.S., Mortazavi, P., Habibi, H., Lashini, H., and Esmaeil Saberfar, E. 2011. Detection of H9N2 avian Influenza virus in various organs of experimentally infected chickens. *African Journal of Microbiology Research*. 5(32): 5826-5830.
- Manz, B., Brunotte, L., Reuther, P., Schwemmle, M. 2012. Adaptive mutations in NEP compensate for defective H5N1 RNA replication in cultured human cells. *Nat Commun*. 3: 802.
- Manz, B., Schwemmle, M., Brunotte, L. 2013. Adaptation of Avian Influenza A Virus Polymerase in Mammals To Overcome the Host Species Barrier. *J Virol*. 87(13): 7200–7209. doi: 10.1128/JVI.00980-13.
- Matrosovich, M., Matrosovich, T., Gray, T., Roberts, N. A., Klenk, H. D. 2004. Neuraminidase is important for the initiation of influenza virus infection in human airway epithelium. *J. Virol*. 78:12665–12667.
- Matrosovich, M., Tuzikov, A., Bovin, N., Gambaryan, A., Klimov, A., Castrucci, M.R., Donatelli, I., Kawaoka, Y. 2000. Early alterations of the receptor-binding properties of H1, H2, and H3 avian influenza virus hemagglutinins after their introduction into mammals. *J Virol*. 74: 8502-8512.
- Min, K. & Hyung, K.J. 2017. Genetics and biological property analysis of Korea lineage of influenza A H9N2 viruses. *Jvetmic*. 204: 96-103. <https://doi.org/10.1016/j.vetmic.2017.04.014>.
- Mishin, V. P., Novikov, D., Hayden, F. G., Gubareva, L. V. 2005. Effect of hemagglutinin glycosylation on influenza virus susceptibility to neuraminidase inhibitors. *J Virol*. 79: 12416-12424.
- Moosakhani, F., Shoshtari, A.H., Pourbakhsh, S.A., Keyvanfar, Ghorbani, H.A. 2010. Phylogenetic analysis of the hemagglutinin genes of 12 H9N2

influenza viruses isolated from chickens in Iran from 2003 to 2005. *Avian Dis.* 54:870-874.

Mosleh, N., Dadras, H., Asasi, K., Taebipour, M. J., Tohidifar, S. S., Farjanikish, G. 2017. Evaluation of the timing of the *Escherichia coli* co-infection on pathogenicity of H9N2 avian influenza virus in broiler chickens. *Iran J Vet Res.* 18(2): 86–91.

Muflihanah, Andesfha, E., Wibawa, H., Zenal, F. C., Hendrawati, F., Siswani, Wahyuni, Kartini, D., Rahayuningtyas, I., Hadi, S., Mukartini, S., Poermadjaja, B., Rasa, F. S. T. 2017. Kasus Pertama *Low Pathogenic Avian Influenza* Subtipe H9N2 pada Peternakan Ayam Petelur di Kabupaten Sidrap, Sulawesi Selatan Indonesia. *Buletin InfoVet.* 16 (1): 1-13.

Munch, M., Nielsen, L. P., Handberg, K. J., Jorgensen, P. H. 2001. Detection and subtyping (H5 and H7) of avian type A influenza virus by reverse transcription-PCR and PCRELISA. *Arch Virol.* 146: 87-97.

Naguib, M. M., Ulrich, R., Kasbohm, E., Eng, C. L. P., Hoffmann, D., Grund, C., Beer, M., Harder, T. C. 2017. Natural reassortants of potentially zoonotic avian influenza viruses H5N1 and H9N2 from Egypt display distinct pathogenic phenotypes in experimentally infected chickens and ferrets. *J Virol.* 91: e01300. doi:10.1128/JVI.01300-17 [PubMed: 28931674]

Natih, K.K.N., Hidayanto, N.K., Ramlah, Irawati, C.D., Kartini, D., dan Mukartini, S. 2018. Uji Postulat Koch Virus Avian Influenza Subtipe H9N2 A/Chicken/Sidrap/07170094-44O/2017. *Prosiding Penyidikan Penyakit Hewan Rapat Teknis dan Pertemuan Ilmiah (RATEKPIL) dan Surveilans Kesehatan Hewan Tahun 02018*:117-126.

Neill, R.E.O., Talon, J., Palese, P. 1998. The influenza virus NEP (NS2 protein) mediates the nuclear export of viral ribonucleoproteins. *EMBO J.* 2;17(1):288-96. doi: 10.1093/emboj/17.1.288.

Nga, N. T. B., Van, L. T. H. & Hoa, L. T. 2011. Characterization of the neuraminidase (NA) polypeptide of the avian influenza virus A/H5N1 strains in poultry collected during 2004 - 2009 in Vietnam. *J Biotechnol.* 9(1): 47-54.

Nguyen D.C., Uyeki T.M., Jadhao S., Maines T., Shaw M., Matsuoka Y., Smith C., Rowe T., Lu X., Hall H., Xu H., Balish A., Klimov A., Tumpey T.M., Swayne D.E., Huynh L.P.T., Nghiem H.K., Nguyen H.H.T., Hoang L.T., Cox N.J., Katz J.M. 2005. Isolation and Characterization of Avian Influenza Viruses, Including Highly Pathogenic H5N1, from Poultry in Live Bird Markets in Hanoi, Vietnam, in 2001. *J Virol.* 79(7): 4201–4212.

- Nili, H. & Asasi, K. 2003. Avian influenza (H9N2) outbreak in Iran. *Av Dis.* 47:828-831.
- Nili, H., Asasi, K., Dadras, H., Ebrahimi, S. M. 2007. Pathobiology of H9N2 avian influenza virus in Japanese quail (*Coturnix coturnix japonica*). *Avian Dis.* 51: 390–392. doi:10.1637/7550-033106R1.1 [PubMed: 17494591].
- Notomi, T., Okayama, H., Masubuchi, H., Yonekawa, T., Watanabe, K., Amino, N., Hase, T. 2000. Loop-mediated isothermal amplification of DNA. *Nucleic Acids Res.* 15; 28(12):E63. doi: 10.1093/nar/28.12.e63.
- Novianti, A. N., Rahardjo, K., Prasetya, R. R., Natri, A. M., Dewantari, J. R., Rahardjo, A. P., Estoepangestie, A. T. S., Shimizu, Y. K., Poetranto, E. D., Soegiarto, G., Mori, Y., Shimizu, K. 2019. Whole-Genome Sequence of an Avian Influenza A/H9N2 Virus Isolated from an Apparently Healthy Chicken at a Live-Poultry Market in Indonesia. *Microbiol Resour Announc.* 25;8(17):e01671-18. doi: 10.1128/MRA.01671-18. PMID: 31023807; PMCID: PMC6486264.
- Nugroho, C.M.H., Soejoedono, Poetri, R.D., Nadia, O. 2018. Karakterisasi Molekuler Gen Hemagglutinin Virus Avian Influenza Subtipe H9N2 yang Diisolasi dari Ayam Layer di Pulau Jawa. *Scientific Repository.* IPB University.
- Ohuchi, M., Feldmann, A., Ohuchi, R., Klenk, H. D. 1995. Neuraminidase is essential for fowl plague virus hemagglutinin to show hemagglutinating activity. *Virology.* 212(1):77–83.
- [OIE] Office international des Epizooties. 2005. Update on avian influenza viruses, including highly pathogenic H5N1 from poultry in live bird market in Hanoi, Vietnam in 2001. *J Virol.* 79: 4201-4212.
- Office International Des Epizooties (OIE). 2008. *Chapter 2.3.4. Avian influenza In: MANUAL OF DIAGNOSTIC TESTS AND VACCINES FOR TERRESTRIAL ANIMALS* (mammals, birds and bees).
- OIE.int. (April 4, 2014). *Influenza A Cleavage Sites*. Diakses pada 8 Juli 2020, dari http://www.offlu.net/fileadmin/home/en/resource-centre/pdf/Influenza_A_Cleavage_Sites.pdf.
- Parvin, R.; Heenemann, K.; Halami, M.Y.; Chowdhury, E.H.; Islam, M.R.; Vahlenkamp, T.W. 2014. Full-genome analysis of avian influenza virus H9N2 from Bangladesh reveals internal gene reassortments with two distinct highly pathogenic avian influenza viruses. *Arch. Virol.* 159: 1651–1661.

- Parvin, R., Shehata, A. A., Heenemann, K., Gac, K., Rueckner, A., Halami, M. Y., Vahlenkamp, T. M. 2015. Differential replication properties among H9N2 avian influenza viruses of Eurasian origin. *Vet Res.* 46:75.
- Peacock, T.H.P., James, J., Sealy, J.E., Iqbal, M. 2019. A global perspective on H9N2 avian influenza virus. *Viruses.* 11: E620. [PubMed: 31284485]
- Peiris, M., Yuen, K., Leung, C., Chan, K., Ip, P., Lai, R., Orr, W.K., Shortridge, K. 1999. Human infection with influenza H9N2. *The Lancet.* 354(9182): 916–917. doi:10.1016/s0140-6736(99)03311-5.
- Pena, L., Vincent, A. L., Loving, C. L., Henningson, J. N., Lager, K. M., Li, W., Perez, D. R. 2012. Strain-dependent Effects of PB1-F2 of Triple Reassortant H3N2 Influenza Viruses in Swine. *J Gen Virol.*
- Perales, B., Sanz-Ezquerro, J. J., Gastaminza, P. 2000. The replication activity of influenza virus polymerase is linked to the capacity of the PA subunit to induce proteolysis. *J Virol.* 74: 1307-1312.
- Perez, D. R., de Wit, J. J. 2016. *Low-pathogenicity avian influenza In Animal influenza (ed. Swayne DE)*, pp. 271–301. Wiley, Hoboken, NJ.
- Petersen, T. N., Brunak, S., von Heijne, G., Nielsen, H. 2011. SignalP 4.0: discriminating signal peptide from transmembrane region. *Nat methods.* 8: 785-786.
- Pinto, L. H., Holsinger, L. J., Lamb, R. A. 1992. Influenza virus M2 protein has ion channel activity. *Cell.* 69: 517-528. 10.1016/0092-8674(92)90452-I.
- Plotkin, J. B., Dushoff, J. 2003. Codon bias and frequency dependent selection on the hemagglutinin epitopes of influenza A virus. *Proc Natl Acad Sci USA.* 100: 7152-7157.
- Portela, A., Digard, P. 2002. The influenza virus nucleoprotein: a multifunctional RNA-binding protein pivotal to virus replication. *J Gen Virol.* 83: 723-734.
- Pusch, E. A., & Suarez, D. L. 2018. The Multifaceted Zoonotic Risk of H9N2 Avian Influenza. *Vet. Sci.* 82 (5): 1-18. doi:10.3390/vetsci5040082.
- Ratnawati, A. dan Dharmayanti, NLP I. 2015. Deteksi Virus Avian Influenza Subtipe H5N1 di Beberapa Pasar Unggas Hidup dalam Wilayah Provinsi Jawa Barat Sekitarnya. *Jurnal Kedokteran Hewan.* 9 (1):14-19.
- Reich, S., Guilligay, D., Pflug, A., Malet, H., Berger, I., Crepin, T., Hart, D., Lunardi, T., Nanao, M., Ruigrok, R.W.H., Cusack, S. 2014. Structural

insight into cap-snatching and RNA synthesis by influenza polymerase. *Nature*. 516: 361–366.

Robb, N. C., Smith, M., Vreede, F. T., Fodor, E. 2009. NS2/NEP protein regulates transcription and replication of the influenza virus RNA genome. *J Gen Virol*. 90: 1398–1407.

Rogers, G.N., Paulson, J.C., Daniels, R.S., Skehel, J.J., Wilson, I.A., Wiley, D.C. 1983. Single amino acid substitutions in influenza haemagglutinin change receptor binding specificity. *Nature*. 304: 76-78.

Rotinsulu, D.A. 2013. *Kajian Keberadaan Virus Avian Influenza Pada Unggas di Pasar Burung Pramuka, Jakarta*. Institut Pertanian Bogor.

Ruigrok, R. W. H., Barge, A., Durrer, P., Brunner, J., Ma, K., Whittaker GR. 2000. Membrane interaction of influenza virus M1 protein. *Virology*. 267: 289-298.

Salomon, R., Franks, J., Govorkova, E. A., Ilyushina, N. A., Yen, H. L., Hulse-Post, D. J., Humberd, J., Trichet, M., Rehg, J. E. & other authors. 2006. The polymerase complex genes contribute to the high virulence of the human H5N1 influenza virus isolate A/Vietnam/1203/04. *J Exp Med*. 203: 689–697.

Sandri-Goldin, R. M. 2004. Viral regulation of mRNA export. *J Virol*. 78: 4389-4396.

Sanz-Ezquerro, J.J., de la Luna S., Ortin, J., and Nieto, A. 1996. The amino-terminal one-third of the influenza virus PA protein is responsible for the induction of proteolysis. *J. Virol*. 70: 1905-1911.

Saptana & Sumaryanto. 2009. Kebijakan Antisipatif Terhadap Peraturan dan Kebijakan Perunggasan Pemerintah DKI 2010. *Analisis Kebijakan Pertanian*. 7 (4): 319-335.

Satterly, N., Tsai, P. L., van Deursen, J., Nussenzveig, D. R., Wang, Y., Faria, P. A., Levy, A., Levy, D. E., Fontoura, B. M. A. 2007. Influenza virus targets the mRNA export machinery and the nuclear pore complex. *Proc Natl Acad Sci USA*. 104: 1853-1858.

Sayeed, Md. A., C. Smallwood, T. Imama, R. Mahmud, R. B. Hasan, M. Hasan, M. S. Anwerb, Md. H. Rashid, & Md. A Hoquea. 2017. Assessment of hygienic conditions of live bird markets on avian influenza in Chittagong metro, Bangladesh. *Preventive Veterinary Medicine*. 142: 7–15. <http://dx.doi.org/10.1016/j.prevetmed.2017.04.009>.

- Scannon, P. J. 2006. Pharmaceutical preparedness for a pandemic: H5N1 may be the first real test of rapid pharmaceutical response to a pandemic. *Bridge*. 36: 10-16.
- Scotch, M., Lam, T. T., Pabilonia, K. L., Anderson, T., Baroch, J., Kohler, D., DeLiberto, T. J. 2014. Diffusion of influenza viruses among migratory birds with a focus on the Southwest United States. *Infect Genet Evol*. 26: 185–193. doi:10.1016/j.meegid.2014.05.029 [PubMed: 24910106]
- Shalaby, A. A., Slemons, R. D., Swayne, D. E. 1994. Pathological studies of A/chicken/Alabama/7395/75 (H4N8) influenza virus in specific pathogen free laying hens. *Avian Dis*. 38: 22-32.
- Shang, R.F., Jian-ping Liang, J.P., Na, Z.Y., Yang, H.J., Lu, Y., Hua, L.Y., Guo, W.Z., Cui, Y., Wang, L. 2010. In vivo Inhibition of NAS Preparation on H9N2 Subtype AIV. *Virolog. Sin*. 25: 145-150.
- Shen, H. Q., Yan, Z. Q., Zeng, F. G., Liao, C. T., Zhou, Q. F., Qin, J. P., Xie, Q. M., Bi, Y. Z., Chen, F. 2015. Isolation and phylogenetic analysis of hemagglutinin gene of H9N2 influenza viruses from chickens in South China from 2012 to 2013. *J Vet Sci*. 16(3): 317-324. <http://dx.doi.org/10.4142/jvs.2015.16.3.317>
- Shibata, A., Hiono, T., Fukuhara, H., Sumiyoshi, R., Ohkawara, A., Matsuno, K., Okamatsu, M., Osaka, H., Sakoda, Y. 2018. Isolation and characterization of avian influenza viruses from raw poultry products illegally imported to Japan by international flight passengers. *Transbound Emerg Dis*. 65: 465–475. doi:10.1111/tbed.12726 [PubMed: 29034617].
- Shortridge, K. F. 1992. Pandemic influenza: a zoonosis? *Semin Respir Infect*. 7: 11–25. [PubMed: 1609163].
- Sidorenko, Y., Reichl, U. 2004. Structured model of influenza virus replication in MDCK cells. *Biotechnol Bioeng*. 88: 1-14.
- Skehel, J. J., Wiley, D. C. 2000. Receptor binding and membrane fusion in virus entry: the influenza hemagglutinin. *Rev Biochem*. 69:531–569.
- Skorko, R., Summers, D. F., Galarza, J. M. 1991. Influenza A virus in vitro transcription: roles of NS1 and NP proteins in regulating RNA synthesis. *Virology*. 180:668–677.
- Smith, G. D. J., Lapedes, A. S., Jong, J. C., de, Bastebroer, T. M., Rimmelzwaan, G. F., Osterhaus, A. D. M. E., Fouchier, R. A. M. 2004. Mapping the antigenic and genetic evolution of influenza virus. *Science*. 305: 371-375.

- Smith, G. D. J., Naipospos, T. S. P., Nguyen, T. D., Jong, M. D. je, Vijaikrishna, D., Usman, T. B., Hassan, S. S., Nguyen, T. V., Dao, T. V., Bui, N. A., Leung, Y. I. L. C., Cheung, C. L., Rayner, J. M., Zhang, J. X., Zhang, L. J., Poon, L. L. M., Li, K. S., Nguyen, V. C., Hien, T. T., Farrar, J., Webster, R. G., Chen, H., Peiris, J. S. M., Guan, Y. 2006. Evolution and adaptation of H5N1 influenza virus in avian and human hosts in Indonesia and Vietnam. *Virology*. 350: 258-268.
- Soda, K., Asakura, S., Okamatsu, M., Sakoda, Y. & Kida, H. 2011. H9N2 influenza virus acquires intravenous pathogenicity on the introduction of a pair of dibasic amino acid residues at the cleavage site of the hemagglutinin and consecutive passages in chickens. *Virol. J.* 8: 64.
- Spackman, E., Killian, M. L. 2014. Avian influenza virus isolation, propagation, and titration in embryonated chicken eggs. *Methods in Molecular Biology (Clifton, N.J.)*. 1161: 125-40. PMID 24899426. DOI: 10.1007/978-1-4939-0758-8_12
- Stech, O., Veits, J., Weber, S., Deckers, D., Schroer, D., Vahlenkamp, T.W., Breithaupt, A., Teifke, J., Mettenleiter, T.C., Stech, J. 2009. Acquisition of a polybasic hemagglutinin cleavage site by a low-pathogenic avian influenza virus is not sufficient for immediate transformation into a highly pathogenic strain. *J. Virol.* 83: 5864–5868.
- Steinhauer, D. A. 1999. Role of hemagglutinin cleavage for the pathogenicity of influenza virus. *Virology*. 258: 1-20.
- Steinhauer, D.A., Skehel, J.J., 2002. Genetics of Influenza Viruses. *Annu. Rev. Genet.* 36: 305-332.
- Stevens, J., Blixt, O., Tumpey, T. M., Taubenberger, J. K., Paulson, J. C., Wilson, I. A. 2006. Structure and receptor specificity of the hemagglutinin from an H5N1 influenza virus. *Science*. 312: 404-410.
- Stieneke-Grober, A., Vey, M., Angliker, H., Shaw, E., Thomas, G., Roberts, C. 1992. Influenza virus hemagglutinin with multibasic cleavage site is activated by furin, a subtilisin-like endoprotease. *EMBO J.* 11(7): 2407-2414.
- Sung-su Youk, Dong-Hun Lee, Jei-Hyun Jeong, Mary J. Pantin-Jackwood, Chang-seon Song & David E. Swayne. 2020. Live bird markets as evolutionary epicentres of H9N2 low pathogenicity avian influenza viruses in Korea. *Emerging Microbes & Infections*. 9:1, 616-627. DOI: 10.1080/22221751.2020.1738903.

- Suzuki, Y., Ito, T., Suzuki, T., Holland, R.E. Jr., Chambers, T.M., Kiso, M., Ishida, H., Kawaoka, Y. 2000. Sialic acid species as a determinant of the host range of influenza A viruses. *J Virol.* 74:11825-31.
- Suzuki, Y., Nei, M. 2002. Origin and evolution of influenza virus hemagglutinin genes. *Mol Biol Evol.* 19: 501-509.
- Suzuki, Y. 2005. Sialobiology of influenza: molecular mechanism of host range variation of influenza viruses. *Biol Pharm Bull.* 28: 399-408.
- Swayne, D., & Halvorson, D. 2003. Influenza. *Diseases of Poultry*: 135-160. ed. Iowa State Univ. Press, Ames.
- Swayne De, Suarez D. L. 2003. Biology of avian influenza especially the change of low pathogenicity virus to high pathogenicity. *Proc Latin American Poultry congress.* 7 Oktober 2003. <http://www.ars.usda.gov/research/publications/publications.html/> [23 Maret 2006].
- Takano, R., Nidom, C.A., Kiso, M., Muramoto, Y., Yamada, S., Sakai-Tagawa, Y., Macken, C., Kawaoka, Y. 2009. Phylogenetic characterization of H5N1 avian influenza viruses isolated in Indonesia from 2003-2007. *Virology.* 390(1):13-21. doi: 10.1016/j.virol.2009.04.024.
- Tate, M. D., Job, E. R., Deng, Y. M., Gunalan, V., Maurer-Stroh, S., Reading, P. C. 2014. Playing hide and seek: how glycosylation of the influenza virus hemagglutinin can modulate the immune response to infection. *Viruses.* 6: 1294–1316. doi:10.3390/v6031294 [PubMed: 24638204].
- Taubenberger, J. K., Reid, A. H., Lourens, R. M., Wang, R., Jin, G., Fanning, T. G. 2005. Characterization of the 1918 influenza virus polymerase genes. *Nature.* 437: 889-893.
- Teng, Q., Xu, D., Shen, W., Liu, Q., Rong, G., Li, X., Li, Z. 2016. A Single Mutation at Position 190 in Hemagglutinin Enhances Binding Affinity for Human Type Sialic Acid Receptor and Replication of H9N2 Avian Influenza Virus in Mice. *J Virol.* 90(21):9806–9825.
- Tombari, W., Nsiri, J., Larbi, I., Guerin, J.L., Ghram, A. 2011. Genetic evolution of low pathogenicity H9N2 Avian influenza viruses in Tunisia: acquisition of new mutations. *J Virol.* 8:467.
- Tran, Q. A., Thi, H. L., Le, X. T. T., & Long, T. T. 2020. The Presence of Poultry Influenza Strains in Two Live Bird Markets near the East-West Boundary of Vietnam. *BioMed Research International* :1-5. <https://doi.org/10.1155/2020/1487651>.

- Treanor, J. J., Tierney, E. L., Zebedee, S. L., Lamb, R. A., Murphy, B. R. 1990. Passively transferred monoclonal antibody to the M2 protein inhibits influenza A virus replication in mice. *Journal of Virology*. 64: 1375-1377.
- Tse, L. V., Hamilton, A. M., Friling, T., Whittaker, G. R. 2014. A novel activation mechanism of avian influenza virus H9N2 by furin. *J Virol*. 88: 1673–1683. doi:10.1128/JVI.02648-13 [PubMed: 24257604].
- Tsuchiya E., Sugawara, K., Hongo, S., Matsuzaki, Y., Muraki, Y., Li, Z.Y., Nakamura, K. 2001. Antigenic structure of the haemagglutinin of human influenza A/H2N2 virus. *J. Gen. Virol*. 82: 2475–2484.
- Turner, J. C. M., Feeroz, M. M., Hasan, M. K., Akhtar, S., Walker, D., Seiler, P., Barman, S., Franks, J., Jones-Engel, L., McKenzie, P., Krauss, S., Webby, R. J., Ghazi Kayali & Robert G Webster, R. G. 2017. Insight into live bird markets of Bangladesh: an overview of the dynamics of transmission of H5N1 and H9N2 avian influenza viruses. *Emerging Microbes & Infections*. 6(1): 1-8, DOI: 10.1038/emi.2016.142
- Varghese, J. N., Colman, P. M. 1991. Three-dimensional structure of the neuraminidase of influenza virus A/Tokyo/3/67 at 2.2 Å resolution. *J. Mol. Biol*. 221:473–486.
- Voeten, J. T., Bestebroer, T. M., Nieuwkoop, N. J., Fouchier, A. D., Osterhaus, A. D., Rimmelzwaan, G. F. 2000. Antigenic drift in the influenza A virus (H3N2) nucleoprotein and escape from recognition by cytotoxic T lymphocytes. *J Virol*. 74: 6800-6807.
- Vreede, F. T., Jung, T. E., Brownlee, G. G. 2004. Model suggesting that replication of influenza virus is regulated by stabilization of replicative intermediates. *J Virol*. 78: 9568-9572.
- Wagner, R., Wolf, T., Herwig, A., Pleschka, S., Klenk, H. D. 2000. Interdependence of hemagglutinin glycosylation and neuraminidase as regulators of influenza growth: a study by reverse genetics. *J. Virol*. 74:6316–6323.
- Webster, R. G., Bean, W. J., Gorman, O. T. 1992. Evolution and ecology of influenza A viruses. *Microbiol Rev*. 56(1):152–179.
- Webster, R.G. 1998. Influenza: An emerging disease. *Emerg Infect Dis*. 4: 436-441.
- Webster, R. G., Govorkova, E. A. 2006. H5N1-continuing evolution and spread. *N Engl J Med*. 355: 2174-2177.

- Weiss, W., Brown, J.H., Cusack, S., Paulson, J.C., Skehel, J.J., Wiley, D.C. 1988. Structure of the influenza virus haemagglutinin complexed with its receptor, sialic acid. *Nature*. 333: 426–431.
- Wellenberg, G. 2006. *Avian Influenza viruses: Detection methods*. Paper presented in the Workshop on Polymerase Chain Reaction (PCR) Technique. Indonesia – Netherlands. Bogor, 20 – 24 November 2006. BPMSOH and Animal Health Service Deventer, Netherland.
- Wenming, J., Shuo, L., Guangyu, H., Jinping, L., Qingye, Z., Suchun, W., Peng, Z., Jiming, C. 2012. Chinese and Global Distribution of H9 Subtype Avian Influenza Viruses. *PloS ONE*. 7(12): e52671. doi: 10.1371/journal.pone.0052671.
- Whittaker, G. R. 2001. Intracellular trafficking of influenza virus: Clinical implication for molecular medicine. *Expert Reviews in Molecular Medicine*. <http://www.expertreviews.org/> [6 Juni 2020].
- Wibowo, M. H., Asmara, W., Tabbu, C. R. 2006. Isolasi dan Identifikasi Serologis virus Avian Influenza dari Sampel Unggas yang Diperoleh di Daerah Istimewa Yogyakarta dan Jawa Tengah. *J Sain Vet*. 24(1): 77-83.
- Wibowo, M. H., Eko Agus Srihanto, E. A., Putri, K., Asmara, W., Tabbu, C. R. 2013. The Development of Pathogenicity of Avian Influenza Virus Isolated from Indonesia. *Indonesian Journal of Biotechnology*. 18 (2): 133-143.
- Wibowo, M. H., Susetya, H., Untari, T., Putri, K., Tabbu, C. R., Asmara, W. 2006. Molecular Study on The Pathogenicity of Avian Influenza Virus. *Indonesian Journal of Biotechnology*. 11 (2):901-907.
- [WHO] World Health Organization. 2002. *WHO manual on animal influenza. Diagnosis and surveillance*. <http://www.who.int/>. [12 September 2020].
- [WHO] World Health Organization. 2005. Avian Influenza A(H5N1) Infection in Humans. *N Engl J Med*. 353:1374-1385.
- Who.int. 2011. *Updated unified nomenclature system for the highly pathogenic H5N1 avian influenza viruses*. World Health Organization. Diakses tanggal 24 September 2020.
- Who.int. 2020. *Influenza at the human-animal interface. Summary and assessment, from 11 July to 23 October 2020*. Diakses pada tanggal 19 Juni 2021.

- Wiley, D.C., Skehel, J.J. 1987. The structure and function of the hemagglutinin membrane glycoprotein of influenza virus. *Annu Rev Biochem.* 56:365-394.
- Wood, J. M., Gaines-Das, R.E., Taylor, J. and Chakraverty, P. 1994. Comparison of influenza serological techniques by international collaborative study. *Vaccine.* 12:167–174.
- Wong, M. L., Medrano, J. F. 2005. Real-time PCR for mRNA quantitation. *BioTechniques.* 39:75-85.
- Wu, Y., Wu, Y., Tefsen, B., Shi, Y., & Gao, G. F. 2014. *Bat-derived influenza-like viruses H17N10 and H18N11.* *Trends in Microbiology.* 22(4): 183–191. doi:10.1016/j.tim.2014.01.010.
- Xu, K. M., Smith, G. J., Bahl, J., Duan, L., Tai, H., Vijaykrishna, D., Wang, J., Zhang, J. X., Li, K. S., Fan, X. H. 2007. The genesis and evolution of H9N2 influenza viruses in poultry from southern China, 2000 to 2005. *J Virol.* 81:10389–10401. doi:10.1128/JVI.00979-07 [PubMed: 17652402]
- Xue, R., Tian, Y., Hou, T., Bao, D., Chen, H., Teng, Q., Yang, J., Li, X., Wang, G., Li, Z., *et al.* 2018. H9N2 influenza virus isolated from minks has enhanced virulence in mice. *Transbound Emerg Dis.* 65: 904–910. doi:10.1111/tbed.12805 [PubMed: 29333687].
- Ye, Q., Krug, R. M., Tao, Y. J. 2006. The mechanism by which influenza A virus nucleoprotein forms oligomers and binds RNA. *Nature.* 444 (7122): 1078–1082.
- Yuan, J., Dong, Y., Hongguang, R., Zhiqiu, Y., Zhisong, H., Mingda, H., Beiping, L., Wei, Z., Junjie, Y., Long, L. 2014. Phylogeography of avian influenza A H9N2 in Cina. *Vet Res Biomed Central.* 15:1110.
- Zhang, P., Tang, Y., Liu, X., Peng, D., Liu, W., Liu, H., Lu, S., Liu, X. 2008. Characterization of H9N2 influenza viruses isolated from vaccinated flocks in an integrated broiler chicken operation in eastern Cina during a 5 year period (1998-2002). *J Gen Virol.* 89(12): 3102–3112.
- Zhang, M., Gaschen, B., Blay, W., Foley, B., Haigwood, N., Kuiken, C., Korber, B. 2004. Tracking global patterns of N-linked glycosylation site variation in highly variable viral glycoproteins: HIV, SIV, and HCV envelopes and influenza hemagglutinin. *Glycobiology.* 14: 1229–1246.
- Zhang, K., Xu, W., Zhang, Z., Wang, T., Sang, X., Cheng, K., Yu, Z., Zheng, X., Wang, H., Zhao, Y., *et al.* 2013. Experimental infection of non-human primates with avian influenza virus (H9N2). *Arch Virol.* 158: 2127–2134. doi:10.1007/s00705-013-1721-8 [PubMed: 23665767].

- Zhao, J., Chai, L. N., Wang, Z. L. 2011. Sequence and phylogenetic analysis of the haemagglutinin genes of H9N2 avian influenza viruses isolated in central Cina during 1998–2008. *Chin J Virol.* 27:122–128.
- Zhong, L., Wang, X., Li, Q., Liu, D., Chen, H., Zhao, M., Gu, X., He, L., Liu, X., Gu, M., Peng, D., Liu, X. 2014. Molecular Mechanism of the Airborne Transmissibility of H9N2 Avian Influenza A Viruses in Chickens. *Journal of Virology.* 88: 9568-9578.
- Zhou, J. Y., Shen, H. G., Chen, H. X., Tong, G. Z., Liao, M., Yang, H. C., Liu, J. X. 2006. Characterization of a highly pathogenic H5N1 influenza virus derived from bar-headed geese in China. *J Gen Virol.* 87: 1823-1833.
- Zhou, X., Li, Y., Wang, Y., Edwards, J., Guo, F., Clements, A. C. A., Huang, B., & Magalhaes, R. J. S. 2015. The role of live poultry movement and live bird market biosecurity in the epidemiology of influenza A (H7N9): A cross-sectional observational study in four eastern China provinces. *J Infect.* xx:1-10. <http://dx.doi.org/10.1016/j.jinf.2015.06.012>.
- Zhu, Y. C., Zhang, B., Sun, Z. H., Wang, X. J., Fan, X. H., Gao, L. X., Liang, Y., Chen, X. Y., Zhang, Z. F. 2018. Replication and pathology of duck influenza virus subtype H9N2 in Chukar. *Biomed Environ Sci.* 31: 306–310. [PubMed: 29773094].