**Supplementary File 1.** A list of international and regional GenBank submissions in addition to standard strains used to study genetic relation to our Iranian strains. The list includes the information of non-meq genes as well because the idea was to study the relation to the Iranian strains. The isolates included attenuated (att), mild (m), virulent (v), very virulent (vv) and very virulent plus (vv+) pathotypes for comparison. It also includes sequences with different meq sizes. The list is sorted based on the MEQ type, then meq size, then by PPPP number and finally by year. The MEQ size of 339 was used as a standard length. All the meq sequences are available as a dataset for download (Supplementary File 2). Clade I: group of viruses usually found in Euroasia. Clade II: group of viruses usually reported from the US, although other countries have recently reported them too. Clade III: viruses usually with longer meq size.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No | Isolate | Country | Host or source | year | Accession # | Gene | Size (aa) | Ins (aa) | Del (aa) | No of PPPPs | MEQ type | Pathotype | Clade | Ref. | Note |
| 1 | CVI988 | USA | Cell line | 2004 | AY243333 | meq | 438 | 100 | - | 8 | vl? | - | III | (Shamblin et al. 2004) | Longest isoform |
| 2 | Italy/Ck/847/17 | Italy | By. chicken | 2017 | MK139672 | meq | 418 | 79 | - | 10 | vl | - | I | (Mescolini et al. 2019) |  |
| 3 | Italy/Ck/507/15 | Italy | By. chicken | 2015 | MK139661 | meq | 418 | 79 | - | 9 | vl | - | I | (Mescolini et al. 2019) |  |
| 4 | CVI988 | Netherlands | Cell line | 1972 | DQ534538 | meq | 399 | 60 | - | 8 | l | att | III | (Rispens et al. 1972) | Intervet |
| 5 | JM/102/W | USA | - | 1962 | DQ534539 | meq | 399 | 60 | - | 7 | l | v | II | - |  |
| 6 | 3004 | Russia | - | - | EU032468 | meq | 398 | 59 | - | 7 | l | att | III | - | Before 2007 |
| 7 | l-meq | Japan | MDCC-MSB1 | 2002 | AB091107 | meq | 398 | 59 | - | ? | l | - | III | (Okada et al. 2007) |  |
| 8 | BC-1 | USA | MSB-1 cell line | 1974 | AY362707 | meq | 398 | 59 | - | 7 | l | v | - | (Shamblin et al. 2004) |  |
| 9 | CU2 | USA | Farm | 1973 | AY362708 | meq | 398 | 59 | - | 7 | l | m | III | (Smith and Calnek 1974) |  |
| 10 | GX060167 | China | - | - | EU697887 | meq | 398 | 59 | - | 6 | l | - | III | - |  |
| 11 | 04CRE | Australia | Layer | 2004 | EF523773 | meq | 398 | 59 | - | 5 | l | v | III | (Renz et al. 2012) |  |
| 12 | FT158 | Australia | Broiler breeder | 2002 | EF523771 | meq | 398 | 59 | - | 5 | l | vv | III | (Renz et al. 2012) |  |
| 13 | 02LAR | Australia | Broiler | 2002 | EF523772 | meq | 398 | 59 | - | 5 | l | vv | III | (Renz et al. 2012) |  |
| 14 | MPF57 | Australia | Layer | 1994 | EF523771 | meq | 398 | 59 | - | 5 | l | v | III | (Renz et al. 2012) |  |
| 15 | Woodlands1 | Australia | Chicken | 1992 | EF523775 | meq | 398 | 59 | - | 5 | l | vv | III | (Renz et al. 2012) |  |
| 16 | l-meq | Japan | Cell line | 1999 | AB033119 | meq | 394 | 55 | - | 7 | l | - | III | (S. I. Lee et al. 2000) | CVI988 isoform, removed due to unmatched c-term |
| 17 | CVI988 | USA | Cell line | 2004 | AY243336 | meq | 358 | 19 | - | 6 | l? | - |  | (Shamblin et al. 2004) | Long isoform |
| 18 | Italy/Ck/850/17 | Italy | By. chicken | 2017 | MK139674 | meq | 339 | - | - | 5 | m | - | I | (Mescolini et al. 2019) |  |
| 19 | tn-n2 | India | Dom. chicken | 2010 | HM749325 | meq | 339 | - | - | 5 | m | - | II | - |  |
| 20 | tn-n1 | India | Dom. chicken | 2010 | HM749324 | meq | 339 | - | - | 5 | m | - | II | - |  |
| 21 | HW/2009 | China | - | 2009 | KP888814 | meq | 339 | - | - | 5 | m | - | I | (Zhang et al. 2016) | Closest to the non-deleted 99-35 region |
| 22 | ATE | Hungary | - | <2004 | AY571784 | meq | 339 | - | - | 5 | m | - | I | - |  |
| 23 | ATE2539 | Hungary | - | 2000 | MF431493 | meq | 339 | - | - | 5 | m | vv+ | I | (Trimpert et al. 2017) |  |
| 24 | EU-1 | Israel | Chicken | 1992 | MF431494 | meq | 339 | - | - | 5 | m | - | I | (Trimpert et al. 2017) |  |
| 25 | RB1B | USA | Buffy coat | 1982 | AY243332 | meq | 339 | - | - | 5 | m | vv | II | (Spatz et al. 2007) |  |
| 26 | MD70/13 | Hungary | Chicken | 1970 | MF431495 | meq | 339 | - | - | 5 | m | v | II | (Trimpert et al. 2017) |  |
| 27 | GA | USA | - | 1964 | AF147806 | meq | 339 | - | - | 5 | m | v | II | (L. F. Lee et al. 2000) |  |
| 28 | TrMDV1/19 | Turkey | Dom. chicken | 2019 | MN817545 | meq | 339 | - | - | 4 | m | - | I | (Ozan et al. 2021) |  |
| 29 | Italy/Ck/625/16 | Italy | By. chicken | 2016 | MK139666 | meq | 339 | - | - | 4 | m | - | I | (Mescolini et al. 2019) | Close to the Iranians MDV-1 isolated from layers |
| 30 | TN 1013/16 | Tunisia | Chicken | 2016 | MK041219 | meq | 339 | - | - | 4 | m | vv | I | (Lachheb et al. 2020) |  |
| 31 | TN1014/16 | Tunisia | Chicken | 2016 | KY113150 | meq | 339 | - | - | 4 | m | vv | I | (Lachheb et al. 2020) |  |
| 32 | Elfeil-15A | Egypt | Chicken | 2015 | MH428671 | meq | 339 | - | - | 4 | m | - | I | - | Partial cds, Suez Canal University |
| 33 | MDV/1/SA/2013 | Saudi Arabia | Chicken | 2013 | KJ949617 | meq | 339 | - | - | 4 | m | - | I | (Mohamed et al. 2016) | Near complete cds |
| 34 | Polen5 | Poland | By. chickens | 2010 | MF431496 | meq | 339 | - | - | 4 | m | vv+ | I | (Trimpert et al. 2017) | hv\*\* mentioned in some texts |
| 35 | tn-n3 | India | Dom. chicken | 2010 | HM749326 | meq | 339 | - | - | 4 | m | - | II | - |  |
| 36 | 637 | USA | - | - | AY362713 | meq | 339 | - | - | 4 | m | v | I | (Shamblin et al. 2004) |  |
| 37 | Md5 | USA | - | 1977 | AF243438 | meq | 339 | - | - | 4 | m | vv | II | (Tulman et al. 2000) | vv in Tulman et al. 2000 |
| 38 | ZC2014 | China | Chicken | 2014 | KP144356 | meq | 339 | - | - | 3 | m | - | I | (Zhang et al. 2016) | Closest to non-deleted 99-35region |
| 39 | BY | Tibet | Chicken | - | HM991861 | meq | 339 | - | - | 3 | m | - | I | (Tian et al. 2011) | Article published in 2011 |
| 40 | UDEACO‐07/13 | Colombia | - | 2013 | KU058697 | meq | 339 | - | - | 3 | m | - | I | (López-Osorio et al. 2017) |  |
| 41 | LFY(JL/06/II) | China | Breeder | 2006 | HQ658615 | meq | 339 | - | - | 3 | m | - | I | (Zhang et al. 2011) |  |
| 42 | 571 | USA | - | - | AY362710 | meq | 339 | - | - | 3 | m | v | I | (Shamblin et al. 2004) |  |
| 43 | UDEACO‐06/13 | Colombia | - | 2013 | KU058696 | meq | 339 | - | - | 2 | m | - | I | (López-Osorio et al. 2017) |  |
| 44 | 643P | USA | - | - | AY362716 | meq | 339 | - | - | 2 | m | vv | II | (Shamblin et al. 2004) |  |
| 45 | 584A | USA | - | <2000 | DQ534532 | meq | 339 | - | - | 2 | m | vv+ | II | (Spatz et al. 2007) |  |
| 46 | 648A | USA | - | 1997 | AY362725 | meq | 339 | - | - | 2 | m | vv+ | II | (Spatz et al. 2007) |  |
| 47 | HNLH304 | China | Chicken | 2011 | HF546089 | meq | 338 | - | 1 | 4 | m | - | III | (Yu et al. 2013) |  |
| 48 | TQ12 | China | Broiler | 2009 | HQ638150 | meq | 338 | - | 1 | 4 | m | - | III | (Tian et al. 2011) |  |
| 49 | CVI988 | China | CEF | 2002 | AF493555 | meq | 338 | - | 1 | 4 | m | - | III | (Wei and Cui 2002) | Different isoform of meq |
| 50 | 814 | China | Vaccine | 1980’s | AF493551 | meq | 338 | - | 1 | 4 | m | - | III | (Wei and Cui 2002) | Longer isoform is att |
| 51 | Ind-TN06-07 | India | Chicken | 2007 | FJ620901 | meq | 336 | - | 3 | 1 | m | - | - | - | It did not align well, deleted from fasta file |
| 52 | Ind-TN01-06 | India | Chicken | 2006 | FJ620900 | meq | 325 | - | 14 | 1 | m | - | - | - | It did not align well, deleted from fasta file |
| 53 | Ind-TN13-07 | India | Chicken | 2007 | FJ620903 | meq | 323 | - | 16 | 0 | m | - | - | - | It did not align well, deleted from fasta file |
| 54 | MDV/2/SA/2013 | Saudi Arabia | Chicken | 2013 | KJ949618 | meq | 298 | - | 41 | 3 | s | - | I | (Mohamed et al. 2016) | Near complete cds |
| 55 | S-meq | Japan | Cell line | 2002 | AB087743 | meq | 298 | - | 41 | 3 | s | - | II | (Chang et al. 2002) | Isoform of CVI988 |
| 56 | Italy/Ck/855/17 | Italy | By. chicken | 2017 | MK139678 | meq | 298 | - | 41 | 2 | s | - | I | (Mescolini et al. 2019) |  |
| 57 | Iraq3A | Iraq | Chicken | 2010 | KC243262 | meq | 298 | - | 41 | 2 | s | - | I | (Wajid et al. 2013) |  |
| 58 | Iraq6F | Iraq | Chicken | 2010 | KC243264 | meq | 298 | - | 41 | 2 | s | - | I | (Wajid et al. 2013) |  |
| 59 | Iraq10A | Iraq | Chicken | 2010 | KC243264 | meq | 298 | - | 41 | 2 | s | - | I | (Wajid et al. 2013) |  |
| 60 | Sit-c1 | Japan | Dom. chicken | 2016 | BBE28998 | meq | 275 | - | 64 | 1 | s? |  | - | (Murata et al. 2013) |  |
| 61 | vs-meq | Japan | Cell line | 2002 | AB087744 | meq | 247 | - | 92 | 1 | vs | - | II | (Chang et al. 2002) | Shortest meg isoform reported |
| Partial meq genes used with cautious in this study (therefore the meq size and number of PPPP are estimates) | | | | | | | | | | | | | | | |
| 62 | MDV/Tur/2019 | Turkey | Chicken | 2019 | MN956505 | meq | 339 | - | - | 5 | m | - | I | - | Partial cds, Abayli et al. unpublished |
| 63 | 01-TR-2017 | Turkey | Layer | 2017 | MN045204 | meq | 339 | - | - | 4 | m | - | I | (Yilmaz et al. 2020) | Partial cds, 100% BLAST identity to Polen5, kept |
| 64 | 02-TR-2017 | Turkey | Layer | 2017 | MN045205 | meq | 339 | - | - | 4 | m | - | I | (Yilmaz et al. 2020) | Partial cds, 100% BLAST identity to Polen5, |
| 65 | 03-TR-2017 | Turkey | Layer | 2017 | MN045206 | meq | 339 | - | - | 4 | m | - | I | (Yilmaz et al. 2020) | Partial cds, 100% BLAST identity to Polen5 |
| 66 | 04-TR-2018 | Turkey | Layer | 2018 | MN045207 | meq | 339 | - | - | 4 | m | - | I | (Yilmaz et al. 2020) | Partial cds, 99.75% BLAST identity to Polen5,kept |
| 67 | 05-TR-2018 | Turkey | Layer | 2018 | MN045208 | meq | 339 | - | - | 4 | m | - | I | (Yilmaz et al. 2020) | Partial cds, 100% BLAST identity to Polen5 |
| 68 | 06-TR-2018 | Turkey | Layer | 2018 | MN045209 | meq | 339 | - | - | 4 | m | - | I | (Yilmaz et al. 2020) | Partial cds, 100% BLAST identity to Polen5 |
| 69 | 07-TR-2018 | Turkey | Layer | 2018 | MN045210 | meq | 339 | - | - | 4 | m | - | I | (Yilmaz et al. 2020) | Partial cds, 100% BLAST identity to Polen5 |
| 70 | 08-TR-2018 | Turkey | Layer | 2018 | MN045211 | meq | 339 | - | - | 4 | m | - | I | (Yilmaz et al. 2020) | Partial cds, 100% BLAST identity to Polen5 |
| 71 | 09-TR-2018 | Turkey | Layer | 2018 | MN045212 | meq | 339 | - | - | 4 | m | - | I | (Yilmaz et al. 2020) | Partial cds, 100% BLAST identity to Polen5 |
| 72 | Fayoum\_2018 | Egypt | Turkey | 2018 | MK261778 | meq | 339 | - | - | 3 | m | - | I | - | Partial cds |
| 73 | SMI14-Kampung | Indonesia | Chicken | 2014 | MF447460 | meq | 339 | - | - | 4 | m | vv | I | (Hartawan and Dharmayanti 2016) | Partial cds |
| Non-meq genes studied in this report | | | | | | | | | | | | | | | |
| 74 | UVAS-I | Pakistan | Chicken | 2019 | MN923517 | UL44 |  |  |  |  |  |  |  |  | 99.85% BLAST id. to Polen 5, Tunisia, China |
| 75 | UVAS-II | Pakistan | Chicken | 2019 | MN923518 | UL44 |  |  |  |  |  |  |  |  | 99.85% BLAST identity to Polen 5 |
| 76 | UVAS-III | Pakistan | Chicken | 2019 | MN923519 | UL44 |  |  |  |  |  |  |  |  | 99.85% BLAST identity to Polen 5 |
| 77 | UVAS-IV | Pakistan | Chicken | 2019 | MN923520 | UL44 |  |  |  |  |  |  |  |  | 99.85% BLAST identity to Polen 5 |
| 78 | Repeat sequence | Turkey | Chicken | 2019 | MN817546 | Rep. seq |  |  |  |  |  |  |  |  | 99.77% BLAST identity to M70/13 |
| 79 | TN 1014/16 | Tunisia | Chicken | 2016 | MN480313 | gC |  |  |  |  |  |  |  |  | 100% BLAST identity to 648A |
| 80 | - | Israel | - | 2001 | AF350325 | gB |  |  |  |  |  |  |  |  | 99.88% BLAST identity to Polen5 |
| 81 | Zagazig-clevb1 | Egypt | - | - | KU229907 | tr1 |  |  |  |  |  |  |  |  | 99% BLAST identity to Polen5 |
| 82 | JM | Russia | SPF chicken | 1995 | X91986 | gp57-65 |  |  |  |  |  |  |  |  | 100% BLAST identity to Md5 |

Chang, Kyung-Soo, Kazuhiko Ohashi, and Misao Onuma. 2002. “Diversity (Polymorphism) of the Meq Gene in the Attenuated Marek’s Disease Virus (MDV) Serotype 1 and MDV-Transformed Cell Lines.” *The Journal of Veterinary Medical Science* 64 (12): 1097–1101. https://doi.org/10.1292/jvms.64.1097.

Hartawan, Risza, and Ni Luh Putu Indi Dharmayanti. 2016. “The Meq Gene Molecular Profile of Marek’s Disease Virus Serotype 1 From Kampung and Arabic Chicken Farms in Sukabumi, West Java, Indonesia.” *HAYATI Journal of Biosciences* 23 (4): 160–67. https://doi.org/https://doi.org/10.1016/j.hjb.2016.12.004.

Lachheb, Jihene, Houssem Mastour, Jihene Nsiri, Khaled Kaboudi, Imed Choura, Faten Ammouna, Abdelkader Amara, and Abdeljelil Ghram. 2020. “Newly Detected Mutations in the Meq Oncogene and Molecular Pathotyping of Very Virulent Marek’s Disease Herpesvirus in Tunisia.” *Archives of Virology* 165 (11): 2589–97. https://doi.org/10.1007/s00705-020-04790-5.

Lee, L F, P Wu, D Sui, D Ren, J Kamil, H J Kung, and R L Witter. 2000. “The Complete Unique Long Sequence and the Overall Genomic Organization of the GA Strain of Marek’s Disease Virus.” *Proceedings of the National Academy of Sciences of the United States of America* 97 (11): 6091–96. https://doi.org/10.1073/pnas.97.11.6091.

Lee, S I, M Takagi, K Ohashi, C Sugimoto, and M Onuma. 2000. “Difference in the Meq Gene between Oncogenic and Attenuated Strains of Marek’s Disease Virus Serotype 1.” *The Journal of Veterinary Medical Science* 62 (3): 287–92. https://doi.org/10.1292/jvms.62.287.

López-Osorio, Sara, Diego Piedrahita, Maria A Espinal-Restrepo, Gloria C Ramírez-Nieto, Venugopal Nair, Susan M Williams, Susan Baigent, César Ventura-Polite, Diego A Aranzazu-Taborda, and Jenny J Chaparro-Gutiérrez. 2017. “Molecular Characterization of Marek’s Disease Virus in a Poultry Layer Farm from Colombia.” *Poultry Science* 96 (6): 1598–1608. https://doi.org/10.3382/ps/pew464.

Mescolini, Giulia, Caterina Lupini, Viviana Felice, Alessandro Guerrini, Flavio Silveira, Mattia Cecchinato, and Elena Catelli. 2019. “Molecular Characterization of the Meq Gene of Marek’s Disease Viruses Detected in Unvaccinated Backyard Chickens Reveals the Circulation of Low- and High-Virulence Strains.” *Poultry Science* 98 (8): 3130–37. https://doi.org/https://doi.org/10.3382/ps/pez095.

Mohamed, Mahmoud H A, Ibrahim M El-Sabagh, Malik A Al-Habeeb, and Yousef M Al-Hammady. 2016. “Diversity of Meq Gene from Clinical Marek’s Disease Virus Infection in Saudi Arabia.” *Veterinary World* 9 (6): 572–78. https://doi.org/10.14202/vetworld.2016.572-578.

Murata, Shiro, Tomoyuki Hashiguchi, Yuko Hayashi, Yuki Yamamoto, Ayumi Matsuyama-Kato, Sarah Takasaki, Masayoshi Isezaki, Misao Onuma, Satoru Konnai, and Kazuhiko Ohashi. 2013. “Characterization of Meq Proteins from Field Isolates of Marek’s Disease Virus in Japan.” *Infection, Genetics and Evolution : Journal of Molecular Epidemiology and Evolutionary Genetics in Infectious Diseases* 16 (June): 137–43. https://doi.org/10.1016/j.meegid.2012.12.032.

Okada, Tsukasa, Michihiro Takagi, Shiro Murata, Misao Onuma, and Kazuhiko Ohashi. 2007. “Identification and Characterization of a Novel Spliced Form of the Meq Transcript in Lymphoblastoid Cell Lines Derived from Marek’s Disease Tumours.” *The Journal of General Virology* 88 (Pt 8): 2111–20. https://doi.org/10.1099/vir.0.82744-0.

Ozan, Emre, Bahadir Muftuoglu, Ismail Sahindokuyucu, Hanne Nur Kurucay, Sinem Inal, Nilufer Kuruca, Ahmed Eisa Elhag, et al. 2021. “Marek’s Disease Virus in Vaccinated Poultry Flocks in Turkey: Its First Isolation with Molecular Characterization.” *Archives of Virology* 166 (2): 559–69. https://doi.org/10.1007/s00705-020-04943-6.

Renz, Katrin G, Julie Cooke, Nadeene Clarke, Brian F Cheetham, Zahid Hussain, A F M Fakhrul Islam, Gregory A Tannock, and Stephen W Walkden-Brown. 2012. “Pathotyping of Australian Isolates of Marek’s Disease Virus and Association of Pathogenicity with Meq Gene Polymorphism.” *Avian Pathology : Journal of the W.V.P.A* 41 (2): 161–76. https://doi.org/10.1080/03079457.2012.656077.

Rispens, B H, H van Vloten, N Mastenbroek, H J Maas, and K A Schat. 1972. “Control of Marek’s Disease in the Netherlands. I. Isolation of an Avirulent Marek’s Disease Virus (Strain CVI 988) and Its Use in Laboratory Vaccination Trials.” *Avian Diseases* 16 (1): 108–25.

Shamblin, Christine E, Natalie Greene, Vaithilingaraja Arumugaswami, Robert L Dienglewicz, and Mark S Parcells. 2004. “Comparative Analysis of Marek’s Disease Virus (MDV) Glycoprotein-, Lytic Antigen Pp38- and Transformation Antigen Meq-Encoding Genes: Association of Meq Mutations with MDVs of High Virulence.” *Veterinary Microbiology* 102 (3–4): 147–67. https://doi.org/10.1016/j.vetmic.2004.06.007.

Smith, M W, and B W Calnek. 1974. “Comparative Features of Low-Virulence and High-Virulence Marek’s Disease Virus Infections.” *Avian Pathology : Journal of the W.V.P.A* 3 (4): 229–46. https://doi.org/10.1080/03079457409353837.

Spatz, Stephen J, Yuguang Zhao, Lawrence Petherbridge, Lorraine P Smith, Susan J Baigent, and Venugopal Nair. 2007. “Comparative Sequence Analysis of a Highly Oncogenic but Horizontal Spread-Defective Clone of Marek’s Disease Virus.” *Virus Genes* 35 (3): 753–66. https://doi.org/10.1007/s11262-007-0157-1.

Tian, Mingxing, Yang Zhao, Yan Lin, Nianli Zou, Cheng Liu, Ping Liu, Sanjie Cao, Xintian Wen, and Yong Huang. 2011. “Comparative Analysis of Oncogenic Genes Revealed Unique Evolutionary Features of Field Marek’s Disease Virus Prevalent in Recent Years in China.” *Virology Journal* 8 (March): 121. https://doi.org/10.1186/1743-422X-8-121.

Trimpert, Jakob, Nicole Groenke, Maria Jenckel, Shulin He, Dusan Kunec, Moriah L Szpara, Stephen J Spatz, Nikolaus Osterrieder, and Dino P McMahon. 2017. “A Phylogenomic Analysis of Marek’s Disease Virus Reveals Independent Paths to Virulence in Eurasia and North America.” *Evolutionary Applications* 10 (10): 1091–1101. https://doi.org/10.1111/eva.12515.

Tulman, E R, C L Afonso, Z Lu, L Zsak, D L Rock, and G F Kutish. 2000. “The Genome of a Very Virulent Marek&#039;s Disease Virus.” *Journal of Virology* 74 (17): 7980–88. https://doi.org/10.1128/JVI.74.17.7980-7988.2000.

Wajid, Salih J, Margaret E Katz, Katrin G Renz, and Stephen W Walkden-Brown. 2013. “Prevalence of Marek’s Disease Virus in Different Chicken Populations in Iraq and Indicative Virulence Based on Sequence Variation in the EcoRI-Q (<span Class="genus-Species">meq</span>) Gene.” *Avian Diseases* 57 (2s1): 562–68. https://doi.org/10.1637/10342-083112-Reg.1.

Wei, P., and Z. Cui. 2002. “The Comparison of Meq Gene Sequences Amplified from Different Pathotypes of Marek’s Disease Virus.” *Chin. J. Prev. Vet. Med.* 24 (2): 88–92.

Yilmaz, A, N Turan, E Bayraktar, H E Tali, O Aydin, S Umar, B Cakan, et al. 2020. “Molecular Characterisation and Phylogenetic Analysis of Marek’s Disease Virus in Turkish Layer Chickens.” *British Poultry Science* 61 (5): 523–30. https://doi.org/10.1080/00071668.2020.1758301.

Yu, Zu-Hua, Man Teng, Jun Luo, Xin-Wei Wang, Ke Ding, Le-Le Yu, Jing-Wei Su, et al. 2013. “Molecular Characteristics and Evolutionary Analysis of Field Marek’s Disease Virus Prevalent in Vaccinated Chicken Flocks in Recent Years in China.” *Virus Genes* 47 (2): 282–91. https://doi.org/10.1007/s11262-013-0942-y.

Zhang, Yan-Ping, Chang-Jun Liu, Feng Zhang, Weisong Shi, and Jingmei Li. 2011. “Sequence Analysis of the Meq Gene in the Predominant Marek’s Disease Virus Strains Isolated in China during 2006-2008.” *Virus Genes* 43 (3): 353–57. https://doi.org/10.1007/s11262-011-0645-1.

Zhang, Yan-Ping, Hong-Chao Lv, Ke-Yan Bao, Yu-Long Gao, Hong-Lei Gao, Xiao- le Qi, Hong-Yu Cui, et al. 2016. “Molecular and Pathogenicity Characterization of Gallid Herpesvirus 2 Newly Isolated in China from 2009 to 2013.” *Virus Genes* 52 (1): 51–60. https://doi.org/10.1007/s11262-015-1264-z.