**Appendix A1.1.** Rate estimates used for the meta-analysis. The rates estimated in this study correspond to the mean value. The analysis code corresponds to those in Appendix A1.2.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Family** | **Genus** | **Analysis code** | **Rate estimate (substitutions/site/year)** | **Sampling time-frame (years)** | **Number of replicates that pass the date-randomisation test** | **Sampling-level** | **Nucleic acid** | **Reference** |
| Adenoviridae | *Aviadenovirus* | FAdenovir+AF8-N18 | 2.78E-004 | 5 | 0 | tip dating | dsDNA | This study |
| Adenoviridae | *Mastadenovirus* | hAdvB+AF8-111 | 5.69E-006 | 20 | 1 | tip dating | dsDNA | This study |
| Adenoviridae | *Mastadenovirus* | HuAdenovir+AF8-N19 | 2.85E-003 | 11 | 3 | tip dating | dsDNA | This study |
| Alphaflexiviridae | *Potexvirus* | PXV+AF8-N3 | 1.27E-004 | 42 | 3 | tip dating | ssRNA | This study |
| Arenaviridae | *Arenavirus* | LassVir+AF8-N47 | 1.03E-002 | 6 | 3 | tip dating | ssRNA | This study |
| Arteriviridae | *Arterivirus* | PRRCV-49 | 2.79E-003 | 0.54 | 3 | tip dating | ssRNA | This study |
| Asfarviridae | *Asfivirus* | ASF+AF8-N10 | 4.05E-005 | 51 | 3 | tip dating | dsDNA | This study |
| Asfarviridae | *Asfivirus* | ASFV+AF8-N20 | 4.88E-005 | 56 | 3 | tip dating | dsDNA | This study |
| Birnaviridae | *Avibirnavirus* | IBDV+AF8-N34 | 4.49E-003 | 2 | 3 | tip dating | dsDNA | This study |
| Bunyaviridae | *Nairovirus* | CCHV+AF8-M+AF8-55 | 4.66E-004 | 37 | 1 | tip dating | ssRNA | This study |
| Bunyaviridae | *Nairovirus* | CCHV+AF8-S+AF8-55 | 1.08E-004 | 47 | 3 | tip dating | ssRNA | This study |
| Bunyaviridae | *Hantavirus* | Hantavir+AF8-N46 | 1.52E-003 | 7 | 3 | tip dating | ssRNA | This study |
| Bunyaviridae | *Hantavirus* | seov+AF8-m+AF8-35 | 3.30E-004 | 6 | 2 | tip dating | ssRNA | This study |
| Bunyaviridae | *Hantavirus* | seov+AF8-s+AF8-35 | 2.30E-004 | 6 | 1 | tip dating | ssRNA | This study |
| Caliciviridae | *Norovirus* | norovir+AF8-125 | 3.65E-003 | 13 | 3 | tip dating | ssRNA | This study |
| Caliciviridae | *Norovirus* | Norovir+AF8-43 | 2.99E-003 | 22 | 3 | tip dating | ssRNA | This study |
| Caliciviridae | *Calicivirus* | RCVA1+AF8-121 | 1.06E-004 | 25 | 1 | tip dating | ssRNA | This study |
| Caliciviridae | *Lagovirus* | RHDV+AF8-122 | 1.21E-004 | 21 | 2 | tip dating | ssRNA | This study |
| Caliciviridae | *Lagovirus* | rhdv+AF8-63 | 4.30E-004 | 22 | 2 | tip dating | ssRNA | This study |
| Circoviridae | *Circovirus* | PCV1+AF8-32 | 1.67E-004 | 12 | 1 | tip dating | ssRNA | This study |
| Closteroviridae | *Closterovirus* | CTV30 | 2.03E-004 | 20 | 0 | tip dating | ssRNA | This study |
| Coronaviridae | *Betacoronavirus* | HuCo+AF8-N36 | 8.39E-003 | 2 | 3 | tip dating | ssRNA | This study |
| Coronaviridae | *Alphacoronavirus* | HuCo+AF8-N39 | 1.11E-003 | 8 | 3 | tip dating | ssRNA | This study |
| Dicistroviridae | *Aparavirus* | Aspavir+AF8-N38 | 2.35E-003 | 18 | 3 | tip dating | ssRNA | This study |
| Filoviridae | *Ebolavirus* | EBOV+AF8-N2 | 1.08E-003 | 32 | 3 | tip dating | ssRNA | This study |
| Filoviridae | *Ebolavirus* | Zebola+AF8-N45 | 3.59E-004 | 9 | 3 | tip dating | ssRNA | This study |
| Flaviviridae | *Flavivirus* | DeV3+AF8-N41 | 1.20E-003 | 23 | 3 | tip dating | ssRNA | This study |
| Flaviviridae | *Flavivirus* | DV4+AF8-36 | 7.26E-004 | 49 | 3 | tip dating | ssRNA | This study |
| Flaviviridae | *Hepacivirus* | HCV+AF8-e131 | 1.47E-003 | 8 | 3 | tip dating | ssRNA | This study |
| Flaviviridae | *Hepacivirus* | HCV+AF8-ns5b31 | 1.11E-003 | 8 | 3 | tip dating | ssRNA | This study |
| Flaviviridae | *Flavivirus* | tbev+AF8-123 | 2.58E-005 | 67 | 0 | tip dating | ssRNA | This study |
| Flaviviridae | *Flavivirus* | YFV+AF8-53 | 3.85E-005 | 53 | 1 | tip dating | ssRNA | This study |
| Flaviviridae | *Flavivirus* | YFV+AF8-62 | 4.24E-005 | 28 | 0 | tip dating | ssRNA | This study |
| Flaviviridae | *Hepacivirus* | Hepatitis C virus | 2.50E-004 | 0.0192 | - | mutation | ssRNA | [1] |
| Geminiviridae | *Begomovirus* | ACMV25 | 2.54E-003 | 7 | 3 | tip dating | ssDNA | This study |
| Geminiviridae | *Begomovirus* | TYLCV+AF8-mild | 2.60E-004 | 11 | 0 | tip dating | ssDNA | This study |
| Geminiviridae | *Begomovirus* | TYLCV+AF8-severe | 1.01E-004 | 18 | 3 | tip dating | ssDNA | This study |
| Geminiviridae | *Mastrevirus* | Oat dwarf virus | 1.00E-008 | 4 | - | co-divergence | ssDNA | [2] |
| Hepadnaviridae | *Orthohepadnavirus* | HBV | 8.48E-005 | 23 | 3 | tip dating | ssRNA | This study |
| Hepadnaviridae | *Avihepadnavirus* | HBV+AF8-avian | 6.63E-005 | 20 | 0 | tip dating | ssRNA | This study |
| Hepadnaviridae | *Orthohepadnavirus* | HBV+AF8-C | 2.39E-004 | 20 | 3 | tip dating | ssRNA | This study |
| Hepadnaviridae | *Orthohepadnavirus* | HBV+AF8-D | 1.25E-004 | 22 | 1 | tip dating | ssRNA | This study |
| Hepadnaviridae | *Orthohepadnavirus* | HBV+AF8-N42 | 3.17E-003 | 33 | 3 | tip dating | ssRNA | This study |
| Hepadnaviridae | *Orthohepadnavirus* | Hepatitis B virus | 2.20E-006 | 6600 | - | co-divergence | ssRNA | [3] |
| Hepadnaviridae | *Orthohepadnavirus* | Hepatitis B virus | 5.40E-005 | 49 | - | serial sample | ssRNA | [4] |
| Hepadnaviridae | *Orthohepadnavirus* | Hepatitis B virus | 5.40E-005 | 18.3 | - | serial sample | ssRNA | [4] |
| Hepadnaviridae | *Orthohepadnavirus* | Hepatitis B virus | 1.60E-005 | 18.3 | - | serial sample | ssRNA | [4] |
| Hepadnaviridae | *Orthohepadnavirus* | Hepatitis B virus | 1.30E-004 | 18.3 | - | serial sample | ssRNA | [4] |
| Hepadnaviridae | *Avihepadnavirus* | Duck hepatitis B virus | 5.80E-004 | 0.0027 | - | mutation | dsDNA | [5] |
| Herpesviridae | *Simplexvirus* | hsv+AF8-111 | 2.62E-004 | 10 | 1 | tip dating | dsDNA | This study |
| Herpesviridae | *Cytomegalovirus* | HuCytVir+AF8-N17 | 7.23E-006 | 50 | 0 | tip dating | dsDNA | This study |
| Herpesviridae | *Simplexvirus* | HuHV1+AF8-N14 | 2.22E-001 | 7 | 1 | tip dating | dsDNA | This study |
| Herpesviridae | *Simplexvirus* | huHV2+AF8-N15 | 1.83E-005 | 11 | 0 | tip dating | dsDNA | This study |
| Herpesviridae | *Simplexvirus* | HuHV3+AF8-N16 | 3.72E-003 | 5 | 1 | tip dating | dsDNA | This study |
| Herpesviridae | *Mardivirus* | MardVir+AF8-N13 | 1.12E-003 | 16 | 3 | tip dating | dsDNA | This study |
| Herpesviridae | *Simplexvirus* | Herpes simplex viruses | 2.90E-004 | 0.0027 | - | mutation | dsDNA | [6] |
| Iflaviridae | *Iflavirus* | DWV+AF8-N1 | 2.37E-002 | 28.7 | 3 | tip dating | ssRNA | This study |
| Inoviridae | *Inovirus* | Phage M13 | 2.90E-004 | 0.0027 | - | mutation | ssDNA | [7] |
| Iridoviridae | *Lymphocystivirus* | LCV+AF8-N11 | 8.03E-005 | 49 | 0 | tip dating | dsDNA | This study |
| Iridoviridae | *Lymphocystivirus* | LDV+AF8-N21 | 9.03E-005 | 49 | 1 | tip dating | dsDNA | This study |
| Iridoviridae | *Megalocytivirus* | McV+AF8-N22 | 1.85E-004 | 16 | 3 | tip dating | dsDNA | This study |
| Iridoviridae | *Ranavirus* | RanaVir+AF8-N23 | 1.01E-002 | 7 | 2 | tip dating | dsDNA | This study |
| Leviviridae | *Allolevirus* | Phage QB | 2.54E-002 | 0.0027 | - | mutation | ssRNA | [8] |
| Leviviridae | *Allolevirus* | Phage QB | 2.10E-003 | 0.00137 | - | mutation | ssRNA | [9] |
| Luteoviridae | *Luteovirus* | BYDV | 2.65E-005 | 86 | 1 | tip dating | ssRNA | This study |
| Luteoviridae | *Luteovirus* | CabYV126 | 2.56E-003 | 5 | 3 | tip dating | ssRNA | This study |
| Luteoviridae | *Luteovirus* | CYDV126 | 1.02E-003 | 81 | 3 | tip dating | ssRNA | This study |
| Luteoviridae | *Luteovirus* | SDV126 | 9.11E-006 | 13 | 2 | tip dating | ssRNA | This study |
| Malacoherpesviridae | *Ostreavirus* | OSV+AF8-N9 | 7.10E-004 | 17 | 3 | tip dating | dsDNA | This study |
| Metaviridae | *Metavirus* | Saccharomyces cerevisiae Ty1 virus | 3.07E-003 | 0.0027 | - | mutation | ssRNA | [10,11] |
| Microviridae | *Microvirus* | Phage Phi 6 | 5.89E-003 | 0.019 | - | mutation | ssDNA | [9] |
| Microviridae | *Microvirus* | Phage Phi X 174 | 7.66E-004 | 0.019 | - | mutation | ssDNA | [12] |
| Microviridae | *Microvirus* | Phage Phi X 174 | 3.65E-004 | 0.019 | - | mutation | ssDNA | [13] |
| Microviridae | *Microvirus* | Bacteriophage phi6 | 1.50E-004 | 0.011 | - | mutation | ssDNA | [14] |
| Microviridae | *Microvirus* | Phage Phi X174 | 1.60E-004 | 0.0082 | - | mutation | ssDNA | [14] |
| Myoviridae | *T4-like-viruses* | Phage T2 | 7.30E-005 | 0.019 | - | mutation | dsDNA | [15] |
| Nanoviridae | *Nanovirus* | FbNYV+AF8-N5 | 1.53E-003 | 6 | 2 | tip dating | ssDNA | This study |
| Nodaviridae | *Betanodavirus* | Betanodavirus+AF8-rna1+AF8-34 | 4.70E-004 | 16 | 3 | tip dating | ssRNA | This study |
| Nodaviridae | *Betanodavirus* | Betanodavirus+AF8-rna2+AF8-34 | 2.55E-004 | 16 | 3 | tip dating | ssRNA | This study |
| Orthomyxoviridae | *Influenzavirus* | h5n2+AF8-s5+AF8-101 | 2.18E-003 | 15 | 3 | tip dating | ssRNA | This study |
| Orthomyxoviridae | *Influenzavirus* | h9n2+AF8-s4+AF8-99 | 2.53E-003 | 42 | 3 | tip dating | ssRNA | This study |
| Orthomyxoviridae | *Influenzavirus* | h9n2+AF8-s5+AF8-99 | 4.63E-003 | 29 | 3 | tip dating | ssRNA | This study |
| Orthomyxoviridae | *Influenzavirus* | h9n2+AF8-s6+AF8-99 | 5.56E-003 | 29 | 3 | tip dating | ssRNA | This study |
| Orthomyxoviridae | *Influenzavirus* | InfA+AF8-N43 | 1.76E-004 | 45 | 3 | tip dating | ssRNA | This study |
| Orthomyxoviridae | *Isavirus* | SAV+AF8-f+AF8-37 | 2.86E-005 | 20 | 0 | tip dating | ssRNA | This study |
| Orthomyxoviridae | *Isavirus* | SAV+AF8-he+AF8-37 | 6.11E-005 | 20 | 0 | tip dating | ssRNA | This study |
| Orthomyxoviridae | *influenzavirus* | Influenza A | 1.20E-002 | 0.0027 | - | mutation | ssRNA | [8] |
| Orthomyxoviridae | *Influenzavirus* | Influenza A | 8.22E-004 | 0.013 | - | mutation | ssRNA | [16] |
| Orthomyxoviridae | *Influenzavirus* | Influenza A | 1.20E-003 | 0.0055 | - | serial sample | ssRNA | [17] |
| Orthomyxoviridae | *Influenzavirus* | Influenza A | 4.10E-003 | 0.011 | - | mutation | ssRNA | [18] |
| Orthomyxoviridae | *Influenzavirus* | Influenza A | 1.38E-003 | 0.0055 | - | mutation | ssRNA | [17] |
| Orthomyxoviridae | *Influenzavirus* | Influenza B | 4.70E-003 | 0.0082 | - | serial sample | ssRNA | [19] |
| Papillomaviridae | *Deltapapillomavirus* | BPV+AF8-N25 | 7.29E-002 | 7 | 0 | tip dating | dsDNA | This study |
| Papillomaviridae | *Alphapapillomavirus* | HPV16+AF8-N24 | 1.08E-003 | 17 | 3 | tip dating | dsDNA | This study |
| Papillomaviridae | *Papillomavirus* | HPV31+AF8-N33 | 4.58E-005 | 6 | 3 | tip dating | dsDNA | This study |
| Papillomaviridae | *Alphapapillomavirus* | HPV6+AF8-N32 | 9.73E-005 | 9 | 2 | tip dating | dsDNA | This study |
| Papillomaviridae | *Papillomavirus* | Several papillomaviruses | 9.70E-009 | 95000000 | - | co-divergence | dsDNA | [20] |
| Papillomaviridae | *Papillomavirus* | Several papillomaviruses | 7.10E-009 | 95000000 | - | co-divergence | dsDNA | [20] |
| Papillomaviridae | *Papillomavirus* | Non-mammalian papillomaviruses | 1.10E-008 | 225000000 | - | co-divergence | dsDNA | [21] |
| Paramyxoviridae | *Pneumovirus* | HRSV+AF8-B+AF8-N3 | 1.53E-003 | 44 | 3 | tip dating | ssRNA | This study |
| Paramyxoviridae | *Pneumovirus* | HuPnV+AF8-N6 | 2.39E-005 | 86 | 3 | tip dating | ssRNA | This study |
| Paramyxoviridae | *Morbillivirus* | MeVir+AF8-N44 | 6.42E-004 | 36 | 3 | tip dating | ssRNA | This study |
| Paramyxoviridae | *Morbillivirus* | Measles virus | 3.20E-003 | 0.013 | - | mutation | ssRNA | [22] |
| Parvoviridae | *Bocavirus* | humanBV+AF8-60 | 7.44E-004 | 5 | 1 | tip dating | ssDNA | This study |
| Parvoviridae | *Erythrovirus* | Human parvovirus B19 | 4.46E-004 | 30 | - | serial sample | ssDNA | [23] |
| Parvoviridae | *Erythrovirus* | Human parvovirus B19 | 4.42E-004 | 26 | - | co-divergence | ssDNA | [24] |
| Picornaviridae | *Enterovirus* | echovirus | 1.07E-004 | 10.5 | 3 | tip dating | ssRNA | This study |
| Picornaviridae | *Enterovirus* | HuEntC+AF8-N40 | 1.34E-002 | 7 | 3 | tip dating | ssRNA | This study |
| Picornaviridae | *Poliovirus* | Poliovirus | 1.78E-002 | 0.0027 | - | mutation | ssRNA | [25] |
| Picornaviridae | *Enterovirus* | Human enterovirus C | 3.25E-003 | 0.083 | - | mutation | ssRNA | [26] |
| Picornaviridae | *Enterovirus* | Human enterovirus C | 1.00E-002 | 10 | - | mutation | dsDNA | [27] |
| Picornaviridae | *Enterovirus* | Human rhinovirus | 3.65E-003 | 0.0082 | - | mutation | ssRNA | [28] |
| Picornaviridae | *Enterovirus* | Human rhinovirus | 8.76E-002 | 0.0055 | - | mutation | ssRNA | [29] |
| Picornaviridae | *Enterovirus* | Poliovirus | 3.65E-003 | 0.0027 | - | mutation | dsDNA | [28] |
| Picornaviridae | *Enterovirus* | Poliovirus | 8.03E-003 | 0.0027 | - | mutation | dsDNA | [30] |
| Picornaviridae | *Enterovirus* | Poliovirus | 4.02E-002 | 0.0027 | - | mutation | dsDNA | [31] |
| Picornaviridae | *Kobuvirus* | Porcine and bovine Kobuvirus | 2.60E-005 | 2 | - | co-divergence | ssRNA | [32] |
| Polyomaviridae | *Polyomavirus* | bk+AF8-111 | 6.46E-004 | 66 | 0 | tip dating | dsDNA | This study |
| Polyomaviridae | *Polyomavirus* | BKvir+AF8-N26 | 9.59E-005 | 3 | 3 | tip dating | dsDNA | This study |
| Polyomaviridae | *Polyomavirus* | jcv+AF8-107 | 2.08E-005 | 33 | 0 | tip dating | dsDNA | This study |
| Polyomaviridae | *Polyomavirus* | JCvir+AF8-N27 | 1.64E-003 | 16 | 3 | tip dating | dsDNA | This study |
| Polyomaviridae | *Poliomavirus* | JC polyomavirus | 1.70E-005 | 33 | - | co-divergence | dsDNA | [33,34] |
| Polyomaviridae | *Polyomavirus* | Simian polyomaviruses | 2.45E-005 | 1100000 | - | co-divergence | dsDNA | [35] |
| Potyviridae | *Potyvirus* | AmPRSV | 1.25E-004 | 300 |  | co-divergence | ssRNA | [36] |
| Potyviridae | *Tritimovirus* | WSMV19 | 3.79E-005 | 68 | 3 | tip dating | ssRNA | This study |
| Potyviridae | *Potyvirus* | Turnip mosaic virus | 6.88E-005 | 0.096 | - | mutation | ssRNA | [37] |
| Potyviridae | *Potyvirus* | Potyviridae | 1.10E-004 | 68 | - | co-divergence | ssRNA | [38] |
| Potyviridae | *Potyvirus* | Tobacco etch potyvirus | 1.90E-003 | 0.15 | - | mutation | ssRNA | [39] |
| Potyviridae | *Potyvirus* | Tobacco etch potyvirus | 1.09E-002 | 0.0027 | - | mutation | ssRNA | [40] |
| Poxiviridae | *Avipoxivirus* | AVIpoxiPA | 1.20E-005 | 6 | 1 | tip dating | dsDNA | This study |
| Poxviridae | *Avipoxvirus* | Avpox+AF8-N28 | 2.49E-005 | 28 | 0 | tip dating | dsDNA | This study |
| Poxviridae | *Orthopoxvirus* | Bupox+AF8-N30 | 3.15E-004 | 13 | 0 | tip dating | dsDNA | This study |
| Poxviridae | *Capripoxvirus* | Capox+AF8-N29 | 6.98E-005 | 54 | 3 | tip dating | dsDNA | This study |
| Poxviridae | *Orthopoxvirus* | VacVir+AF8-N12 | 3.21E-005 | 6 | 3 | tip dating | dsDNA | This study |
| Poxviridae | *Orthopoxvirus* | Varvir+AF8-N31 | 8.59E-006 | 27 | 3 | tip dating | dsDNA | This study |
| Reoviridae | *Rotavirus* | humanRV+AF8-118 | 5.19E-004 | 13 | 3 | tip dating | dsRNA | This study |
| Retroviridae | *Lentivirus* | SIVsmHIV2env+AF8-132 | 3.06E-004 | 28 | 2 | tip dating | ssRNA | This study |
| Retroviridae | *Gammaretrovirus* | Murine leukaemia virus | 3.14E-003 | 0.0027 | - | mutation | ssRNA | [8] |
| Retroviridae | *Gammaretrovirus* | Spleen necrosis virus | 3.37E-003 | 0.0027 | - | mutation | ssRNA | [8] |
| Retroviridae | *Gammaretrovirus* | Murine leukaemia virus | 5.81E-004 | 0.0027 | - | mutation | ssRNA | [8] |
| Retroviridae | *Alpharetrovirus* | Rous sarcoma virus | 7.59E-003 | 0.0027 | - | mutation | ssRNA | [8] |
| Retroviridae | *Lentivirus* | HIV+AC0-1 | 6.10E-006 | 0.0027 | - | mutation | ssRNA | [41] |
| Retroviridae | *Deltaretrovirus* | Bovine leukaemia virus | 9.00E-005 | 0.0027 | - | mutation | ssRNA | [42] |
| Retroviridae | *Gammaretrovirus* | Murine leukaemia virus | 2.20E-003 | 0.0027 | - | mutation | ssRNA | [43] |
| Retroviridae | *Gammaretrovirus* | Spleen necrosis virus | 3.37E-003 | 0.027 | - | mutation | ssRNA | [8] |
| Retroviridae | *Gammaretrovirus* | Spleen necrosis virus | 8.80E-003 | 0.0027 | - | mutation | ssRNA | [44] |
| Retroviridae | *Gammaretrovirus* | Murine leukaemia virus | 2.10E-002 | 0.0027 | - | mutation | ssRNA | [45] |
| Retroviridae | *Gammaretrovirus* | Murine leukaemia virus | 2.20E-003 | 0.0027 | - | mutation | ssRNA | [43] |
| Retroviridae | *Gammaretrovirus* | Murine leukaemia virus | 1.50E-002 | 0.0027 | - | mutation | ssRNA | [46] |
| Retroviridae | *Deltaretrovirus* | Human T+AC0-lymphotropic virus | 4.00E-002 | 0.0027 | - | mutation | ssRNA | [47] |
| Retroviridae | *Lentivirus* | HLV+AC0-1 | 6.20E-003 | 0.0027 | - | mutation | ssRNA | [48] |
| Retroviridae | *Lentivirus* | HIV+AC0-1 | 5.80E-003 | 0.0027 | - | serial sample | ssRNA | [49] |
| Retroviridae | *Lentivirus* | HIV+AC0-1 | 1.80E-002 | 0.0055 | - | mutation | ssRNA | [50] |
| Retroviridae | *Lentivirus* | HIV+AC0-1 | 1.23E-002 | 0.0071 | - | mutation | ssRNA | [51] |
| Retroviridae | *Lentivirus* | HIV+AC0-1 | 8.88E-005 | 0.0082 | - | mutation | ssRNA | [52] |
| Retroviridae | *Alpharetrovirus* | Rous sarcoma virus | 8.03E-003 | 0.0055 | - | mutation | ssRNA | [53] |
| Retroviridae | *Spumavirus* | Several foamy viruses | 3.80E-002 | 0.038 | - | mutation | ssRNA | [54] |
| Retroviridae | *Lentivirus* | Feline immunodeficiency virus | 3.40E-003 | 3 | - | serial sample | ssRNA | [55] |
| Retroviridae | *Lentivirus* | Feline immunodeficiency virus | 1.54E-001 | 4.1 | - | serial sample | ssRNA | [56] |
| Retroviridae | *Lentivirus* | Feline immunodeficiency virus | 1.54E-001 | 4.1 | - | serial sample | ssRNA | [56] |
| Retroviridae | *Lentivirus* | HIV+AC0-1 | 3.72E-003 | 35 | - | serial sample | ssRNA | [57] |
| Retroviridae | *Lentivirus* | FIVPA | 8.60E-003 | 1.1 | 3 | tip dating | ssRNA | This study |
| Retroviridae | *Lentivirus* | FIVPA | 3.00E-004 | 1.1 | 3 | tip dating | ssRNA | This study |
| Retroviridae | *Lentivirus* | HIV-1PA | 2.40E-003 | 15 | 3 | tip dating | ssRNA | This study |
| Rhabdoviridae | *Lyssavirus* | LBV+AF8-N4 | 1.55E-004 | 52 | 3 | tip dating | ssRNA | This study |
| Rhabdoviridae | *Lyssavirus* | rabv+AF8-128 | 4.84E-004 | 20 | 3 | tip dating | ssRNA | This study |
| Rhabdoviridae | *Lyssavirus* | rabv+AF8-44 | 2.62E-004 | 34 | 3 | tip dating | ssRNA | This study |
| Rhabdoviridae | *Vesciculovirus* | Vescicular stomatitis virus | 5.18E-002 | 0.0027 | - | mutation | ssRNA | [8] |
| Rhabdoviridae | *Vesciculovirus* | Vescicular stomatitis virus | 2.19E-003 | 0.083 | - | mutation | ssRNA | [58] |
| Rhabdoviridae | *Vesciculovirus* | Vesicular stomatitis virus | 1.30E-002 | 0.0027 | - | mutation | ssRNA | [59] |
| Roniviridae | *Okavirus* | Okavir+AF8-N37 | 5.16E-004 | 8 | 3 | tip dating | ssRNA | This study |
| Siphoviridae | *Lambda-like-viruses* | Phage lambda | 2.88E-005 | 0.019 | - | mutation | dsDNA | [60] |
| Retroviridae | *Spumavirus* | Foamy virus | 3.80E-002 | 0.0055 | - | mutation | ssRNA | [54] |
| Togaviridae | *Alphavirus* | EqEn+AF8-61 | 2.23E-003 | 55 | 3 | tip dating | ssRNA | This study |
| Togaviridae | *Rubivirus* | rubVE1+AF8-124 | 7.98E-005 | 8 | 0 | tip dating | ssRNA | This study |
| Togaviridae | *Rubivirus* | RubellaVirusPA | 9.20E-004 | 51 | 3 | tip dating | ssRNA | This study |
| Unassigned | *Emaravirus* | FMVnuc+AF8-N2 | 1.48E-003 | 3 | 3 | tip dating | ssRNA | This study |
| Unassigned | *Deltavirus* | HDV+AF8-N8 | 3.62E-003 | 7 | 3 | tip dating | ssRNA | This study |
| Unassigned | *Varicosavirus* | LBVV+AF8-N7 | 2.04E-003 | 13 | 3 | tip dating | ssRNA | This study |
| Unassigned | *Sobemovirus* | RYMV26 | 3.12E-005 | 27 | 0 | tip dating | ssRNA | This study |
| Virgaviridae | *Tobamovirus* | Tobacco mosaic virus | 1.70E-003 | 35 | - | mutation | ssRNA |  |

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