

Supplementary Figure 1. Direct contact transmission experiments using H2 influenza viruses. Each experiment was done in triplicate; ferrets were intranasally (i.n.) inoculated with 106 EID50 of virus and placed in individual cages. A naïve contact ferret was added to the cage with the inoculated ferret twenty four hours later. Nasal wash samples were collected from inoculated and contact ferrets on alternating days, starting on day 1 post inoculation/direct contact (p.i./p.d.c.). A) Ferrets inoculated with human virus Eng67; B) swMO; C) mallMD; D) ckPA. Bars with the same pattern represent nasal wash titers of inoculated/contact ferret pair, the bars on the left side correspond to inoculated ferret and on the right side to the contact ferret.

**Supplementary Table 1.** Overall percent protein identity of swMO in relation to the other viruses used in this study.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **PB2** | **PB1** | **PA** | **HA** | **NP** | **NA** | **M1** | **NS1** |
| **mallMD** | 97.2 | 97.1 | 99.1 | 96.9 | 94 | 96.4 | 98.4 | 84.5 |
| **ckPA** | 96.9 | 97.1 | 98.3 | 87.7 | 92.2 | 51.2\* | 97.6 | 83.1 |
| **Eng67** | 94.6 | 96.7 | 94.4 | 87.1 | 90.6 | 51.2\* | 96.8 | 80.4 |

HA and NA genes are of avian origin while the others are derived from swine triple reassortant virus

\*Viruses of different NA subtype (N2 versus N3)

**Supplementary Table 2.** Glycans covalently attached on the glycan microarray.

Different categories of glycans on the array are color-coded in column 1 as follows: No color, sialic acid; blue, α2-3-linked sialosides; red, α2-6-linked sialosides, violet, mixed α2-3/ α2-6-linked biantennaries; green, N-glycolylneuraminic acid-linked glycans; brown, α2-8-linked sialosides; pink, β2-6-linked as well as 9-O-acetylated-linked sialic acids; grey, asialo-glycans.

|  |  |  |
| --- | --- | --- |
| **Chart #** | **Structure** | **Description** |
| 1 | α-Neu5Ac | α-Neu5Ac |
| 2 | α-Neu5Ac | α-Neu5Ac |
| 3 | b-Neu5Ac | β-Neu5Ac |
| 4 | Neu5Acα2-3(6-O-Su)Galβ1-4(Fucα1-3)GlcNAcβ | α2-3 so4 |
| 5 | Neu5Acα2-3Galβ1-3[6OSO3]GalNAcα | α2-3 so4 |
| 6 | Neu5Acα2-3Galβ1-4[6OSO3]GlcNAcβ | α2-3 so4 |
| 7 | Neu5Acα2-3Galβ1-4(Fucα1-3)(6OSO3)GlcNAcβ | α2-3 so4 |
| 8 | Neu5Acα2-3Galβ1-3(6OSO3)GlcNAc | α2-3 so4 |
| 9 | Neu5Acα2-3Galβ1-3(Neu5Acα2-3Galβ1-4)GlcNAcβ | di-sialoside |
| 10 | Neu5Acα2-3Galβ1-3(Neu5Acα2-3Galβ1-4GlcNAcβ1-6)GalNAcβ | di-sialoside |
| 11 | Neu5Acα2-3Galβ1-4GlcNAcβ1-2Manα1-3(Neu5Acα2-3Galβ1-4GlcNAcβ1­2Manα1-6)Manβ1-4GlcNAcβ1-4GlcNAcβ | α2-3 biantennary |
| 12 | Neu5Acα2-3Galβ | α2-3 |
| 13 | Neu5Acα2-3GalNAcα | α2-3 |
| 14 | Neu5Acα2-3Galβ1-3GalNAcα | α2-3 |
| 15 | Neu5Acα2-3Galβ1-3GlcNAcβ | α2-3 |
| 16 | Neu5Acα2-3Galβ1-3GlcNAcβ | α2-3 |
| 17 | Neu5Acα2-3Galβ1-4Glcβ | α2-3 |
| 18 | Neu5Acα2-3Galβ1-4Glcβ | α2-3 |
| 19 | Neu5Acα2-3Galβ1-4GlcNAcβ | α2-3 |
| 20 | Neu5Acα2-3Galβ1-4GlcNAcβ | α2-3 |
| 21 | Neu5Acα2-3GalNAcβ1-4GlcNAcβ | α2-3 |
| 22 | Neu5Acα2-3Galβ1-4GlcNAcβ1-3Galβ1-4GlcNAcβ | α2-3 |
| 23 | Neu5Acα2-3Galβ1-3GlcNAcβ1-3Galβ1-3GlcNAcβ | α2-3 |
| 24 | Neu5Acα2-3Galβ1-4GlcNAcβ1-3Galβ1-4GlcNAcβ1-3Galβ1-4GlcNAcβ | α2-3 |
| 25 | Neu5Acα2-3Galβ1-4GlcNAcβ1-3Galβ1-3GlcNAcβ | α2-3 |
| 26 | Neu5Acα2-3Galβ1-3GalNAcα | α2-3 |
| 27 | Galβ1-3(Neu5Acα2-3Galβ1-4(Fucα1-3)GlcNAcβ1-6)GalNAcβ | α2-3 fucosylated |
| 28 | Neu5Acα2-3Galβ1-3(Fucα1-4)GlcNAcβ | α2-3 fucosylated |
| 29 | Neu5Acα2-3Galβ1-4(Fucα1-3)GlcNAcβ | α2-3 fucosylated |
| 30 | Neu5Acα2-3Galβ1-4(Fucα1-3)GlcNAcβ | α2-3 fucosylated |
| 31 | Neu5Acα2-3Galβ1-4(Fucα1-3)GlcNAcβ1-3Galβ | α2-3 fucosylated |
| 32 | Neu5Acα2-3Galβ1-4(Fucα1-3)GlcNAcβ1-3Galβ1-4GlcNAcβ | α2-3 fucosylated |
| 33 | Neu5Acα2-3Galβ1-4(Fucα1-3)GlcNAcβ1-3Galβ1-4(Fucα1-3)GlcNAcβ1­3Galβ1-4(Fucα1-3)GlcNAcβ | α2-3 fucosylated |
| 34 | Neu5Acα2-3Galβ1-4GlcNAcβ1-3Galβ1-4(Fucα1-3)GlcNAc | α2-3 fucosylated |
| 35 | Neu5Acα2-3(GalNAcβ1-4)Galβ1-4GlcNAcβ | α2-3 internal |
| 36 | Neu5Acα2-3(GalNAcβ1-4)Galβ1-4GlcNAcβ | α2-3 internal |
| 37 | Neu5Acα2-3(GalNAcβ1-4)Galβ1-4Glcβ | α2-3 internal |
| 38 | Galβ1-3GalNAcβ1-4(Neu5Acα2-3)Galβ1-4Glcβ | α2-3 internal |
| 39 | Fucα1-2Galβ1-3GalNAcβ1-4(Neu5Acα2-3)Galβ1-4Glcβ | α2-3 internal |
| 40 | Fucα1-2Galβ1-3GalNAcβ1-4(Neu5Acα2-3)Galβ1-4Glcβ | α2-3 internal |
| 41 | Neu5Acα2-6Galβ1-4[6OSO3]GlcNAcβ | α2-6 so4 |
| 42 | Galβ1-4GlcNAcβ1-2Manα1-3(Neu5Acα2-6Galβ1-4GlcNAcβ1-2Manα1­6)Manβ1-4GlcNAcβ1-4GlcNAcβ | α2-6 branched |
| 43 | GlcNAcβ1-2Manα1-3(Neu5Acα2-6Galβ1-4GlcNAcβ1-2Manα1-6)Manβ1­4GlcNAcβ1-4GlcNAcβ | α2-6 branched |
| 44 | Galβ1-4GlcNAcβ1-2Manα1-3(Neu5Acα2-6Galβ1-4GlcNAcβ1-2Manα1­6)Manβ1-4GlcNAcβ1-4GlcNAcβ | α2-6 branched |
| 45 | Neu5Acα2-6Galβ1-4GlcNAcβ1-2Manα1-3(GlcNAcβ1-2Manα1-6)Manβ1­4GlcNAcβ1-4GlcNAcβ | α2-6 branched |
| 46 | Neu5Acα2-6Galβ1-4GlcNAcβ1-2Manα1-3(Neu5Acα2-6Galβ1-4GlcNAcβ1­2Manα1-6)Manβ1-4GlcNAcβ1-4GlcNAcβ | α2-6 biantenary |
| 47 | Neu5Acα2-6Galβ1-4GlcNAcβ1-2Manα1-3(Neu5Acα2-6Galβ1-4GlcNAcβ1­2Manα1-6)Manβ1-4GlcNAcβ1-4GlcNAcβ | α2-6 biantenary |
| 48 | Neu5Acα2-6Galβ1-4GlcNAcβ1-2Manα1-3(Neu5Acα2-6Galβ1-4GlcNAcβ1­2Manα1-6)Manβ1-4GlcNAcβ1-4GlcNAcβ | α2-6 biantenary |
| 49 | Neu5Acα2-6Galβ1-4GlcNAcβ1-2Manα1-3(Galβ1-4GlcNAcβ1-2Manα1­6)Manβ1-4GlcNAcβ1-4GlcNAcβ | α2-6 biantenary |
| 50 | Neu5Acα2-6GalNAcα | α2-6 |
| 51 | Neu5Acα2-6Galβ | α2-6 |
| 52 | Neu5Acα2-6Galβ1-4Glcβ | α2-6 |
| 53 | Neu5Acα2-6Galβ1-4GlcNAcβ | α2-6 |
| 54 | Neu5Acα2-6Galβ1-4GlcNAcβ | α2-6 |
| 55 | Neu5Acα2-6GalNAcβ1-4GlcNAcβ | α2-6 |
| 56 | Neu5Acα2-6Galβ1-4GlcNAcβ1-3Galβ1-4GlcNAcβ | α2-6 |
| 57 | Neu5Acα2-6Galβ1-4GlcNAcβ1-3Galβ1-4(Fucα1-3)GlcNAcβ1-3Galβ1­4(Fucα1-3)GlcNAcβ | α2-6 + fucosylation |
| 58 | Galβ1-3(Neu5Acα2-6)GlcNAcβ1-3Galβ1-4Glcβ | α2-6 internal |
| 59 | Galβ1-3(Neu5Acα2-6)GalNAcα | α2-6 internal |
| 60 | Neu5Acα2-3Galβ1-4GlcNAcβ1-2Manα1-3(Neu5Acα2-6Galβ1-4GlcNAcβ1­2Manα1-6)Manβ1-4GlcNAcβ1-4GlcNAcβ | α2-3/6 biantennary |
| 61 | Neu5Acα2-6Galβ1-4GlcNAcβ1-2Manα1-3(Neu5Acα2-3Galβ1-4GlcNAcβ1­2Manα1-6)Manβ1-4GlcNAcβ1-4GlcNAcβ | α2-3/6 biantennary |
| 62 | Neu5Acα2-3Galβ1-3(Neu5Acα2-6)GalNAc | α2-3/6 disialoside |
| 63 | Neu5Acα2-3Galβ1-3(Neu5Acα2-6)GalNAcα | α2-3/6 disialoside |
| 64 | Neu5Acα2-3(Neu5Acα2-6)GalNAcα | α2-3/6 disialoside |
| 65 | Neu5Gcα | Neu5Gc α |
| 66 | Neu5Gcα2-3Galβ1-3(Fucα1-4)GlcNAcβ | Neu5Gc α2-3 |
| 67 | Neu5Gca2-3Galβ1-3GlcNAcβ | Neu5Gc α2-3 |
| 68 | Neu5Gcα2-3Galβ1-4(Fucα1-3)GlcNAcβ | Neu5Gc α2-3 |
| 69 | Neu5Gcα2-3Galβ1-4GlcNAcβ | Neu5Gc α2-3 |
| 70 | Neu5Gcα2-3Galβ1-4Glcβ | Neu5Gc α2-3 |
| 71 | Neu5Gcα2-6GalNAcα | Neu5Gc α2-6 |
| 72 | Neu5Gcα2-6Galβ1-4GlcNAcβ | Neu5Gc α2-6 |
| 73 | Neu5Acα2-8Neu5Acα | Neu5Ac α2-8 |
| 74 | Neu5Acα2-8Neu5Acα2-8Neu5Acα | Neu5Ac α2-8 |
| 75 | Neu5Acα2-8Neu5Acα2-3(GalNAcβ1-4)Galβ1-4Glcβ | Neu5Ac α2-8 α2-3 |
| 76 | Neu5Acα2-8Neu5Acα2-3Galβ1-4Glcβ | Neu5Ac α2-8 α2-3 |
| 77 | Neu5Acα2-8Neu5Acα2-8Neu5Acα2-3(GalNAcβ1-4)Galβ1-4Glcβ | Neu5Ac α2-8 α2-8 α2-3 |
| 78 | Neu5Acα2-8Neu5Acα2-8Neu5Acα2-3Galβ1-4Glcβ | Neu5Ac α2-8 α2-8 α2-3 |
| 79 | Neu5Acα2-8Neu5Acα | Neu5Ac α2-8 |
| 80 | Neu5Acα2-8Neu5Acβ | Neu5Ac α2-8 |
| 81 | Neu5Acα2-8Neu5Acα2-8Neu5Acβ | Neu5Ac α2-8 α2-8 |
| 82 | Neu5Acβ2-6GalNAcα | β2-6 |
| 83 | Neu5Acβ2-6Galβ1-4GlcNAcβ | β2-6 |
| 84 | Neu5Gcβ2-6Galβ1-4GlcNAc | β2-6 |
| 85 | Galβ1-3(Neu5Acβ2-6)GalNAcα | β2-6 |
| 86 | 9NAcNeu5Aca | 9NAcNeu5 |
| 87 | 9NAcNeu5Acα2-6Galβ1-4GlcNAcβ | 9NAcNeu5 |
| 88 | Galβ1-4GlcNAcβ1-3Galβ1-4GlcNAcβ1-3Galβ1-4GlcNAcβ | asialo |
| 89 | Galβ1-3GlcNAcβ1-3Galβ1-3GlcNAcβ | asialo |
| 90 | Fucα1-2Galβ1-3GlcNAcβ1-3Galβ1-4Glcβ | asialo |
| 91 | Fucα1-2Galβ1-4(Fucα1-3)GlcNAcβ1-3Galβ1-4(Fucα1-3)GlcNAcβ | asialo |
| 92 | GalNAcα1-3(Fucα1-2)Galβ1-3GlcNAcβ | asialo |
| 93 | GalNAcα1-3(Fucα1-2)Galβ1-4GlcNAcβ | asialo |
| 94 | Galα1-3(Fucα1-2)Galβ1-3GlcNAcβ | asialo |
| 95 | Galα1-3(Fucα1-2)Galβ1-4(Fucα1-3)GlcNAcβ | asialo |
| 96 | Galβ1-3GalNAc | asialo |

***Key:***

Neu5Ac = Sialic acid

Neu5Gc = N-glycolylneuraminic acid

OSO3= sulfate; Gal = galactose

Fuc = fucose

GlcNAc = N-Acetyl-D-glucosamine

GalNAc = N-acetyl-D-galactosamine

Glc = D-glucose

Man = D-mannose

9NAc = 9-*O*-acetyl