

CLAIMS

What is claimed is:

1. An antibody, or an antigen-binding fragment thereof, that is capable of binding to a neuraminidase (NA) from:

- (i) an influenza A virus (IAV), wherein the IAV comprises a Group 1 IAV, a Group 2 IAV, or both; and
- (ii) an influenza B virus (IBV).

~~2. The antibody or antigen-binding fragment of claim 1, which is human, humanized, or chimeric.~~

~~3. The antibody or antigen-binding fragment of claim 1 or 2, wherein:~~

- ~~(i) the Group 1 IAV NA comprises a N1, a N4, a N5, and/or a N8; and/or~~
- ~~(ii) the Group 2 IAV NA comprises a N2, a N3, a N6, a N7, and/or a N9.~~

~~4. The antibody or antigen-binding fragment of claim 3, wherein:~~

- ~~(i) the N1 is a N1 from any one or more of: A/California/07/2009, A/California/07/2009 I223R/H275Y, A/Swine/Jiangsu/J004/2018, A/Stockholm/18/2007, A/Brisbane/02/2018, A/Michigan/45/2015, A/Mississippi/3/2001, A/Netherlands/603/2009, A/Netherlands/602/2009, A/Vietnam/1203/2004, A/G4/SW/Shangdong/1207/2016, A/G4/SW/Henan/SN13/2018, A/G4/SW/Jiangsu/J004/2018, and A/New Jersey/8/1976;~~
- ~~(ii) the N4 is from A/mallard duck/Netherlands/30/2011;~~
- ~~(iii) the N5 is from A/aquatic bird/Korea/CN5/2009;~~
- ~~(iv) the N8 is from A/harbor seal/New Hampshire/179629/2011;~~
- ~~(v) the N2 is a N2 from any one or more of: A/Washington/01/2007, A/HongKong/68, A/South Australia/34/2019, A/Switzerland/8060/2017, A/Singapore/INFIMH-16-0019/2016, A/Switzerland/9715293/2013, A/Leningrad/134/17/57, A/Florida/4/2006, A/Netherlands/823/1992,~~

~~A/Norway/466/2014, A/Switzerland/8060/2017, A/Texas/50/2012, A/Victoria/361/2011, A/HongKong/2671/2019, A/SW/Mexico/SG1444/2011, A/Tanzania/205/2010, A/Aichi/2/1968, A/Bilthoven/21793/1972, A/Netherlands/233/1982, A/Shanghai/11/1987, A/Nanchang/933/1995, A/Fukui/45/2004, and A/Brisbane/10/2007;~~

~~(vi) — the N3 is from A/Canada/rv504/2004;~~

~~(v) — the N6 is from A/swine/Ontario/01911/1/99;~~

~~(vi) — the N7 is from A/Netherlands/078/03; and/or~~

~~(vii) — the N9 is a N9 from any one or more of: A/Anhui/2013 and A/Hong Kong/56/2015.~~

~~5. — The antibody or antigen-binding fragment of any one of claims 1-4, wherein the IBV NA is a NA from any one or more of: B/Lee/10/1940 (Ancestral); B/Brisbane/60/2008 (Victoria); B/Malaysia/2506/2004 (Victoria); B/Malaysia/3120318925/2013 (Yamagata); B/Wisconsin/1/2010 (Yamagata); B/Yamanashi/166/1998 (Yamagata); B/Brisbane/33/2008; B/Colorado/06/2017; B/Hubei-wujiang/158/2009; B/Massachusetts/02/2012; B/Netherlands/234/2011; B/Perth/211/2001; B/Texas/06/2011 (Yamagata); B/Perth/211/2011; B/HongKong/05/1972; B/Phuket/3073/2013, B/Harbin/7/1994 (Victoria), and B/Washington/02/2019 (Victoria).~~

~~6. — The antibody or antigen-binding fragment of any one of claims 1-5, wherein the antibody or antigen-binding fragment is capable of binding to each of:~~

~~(i) — a Group 1 IAV NA;~~

~~(ii) — a Group 2 IAV NA; and~~

~~(iii) — a IBV NA~~

~~-with an EC₅₀ in a range from about 0.1 µg/mL to about 50 µg/mL, or in a range from about 0.1 µg/mL to about 2 µg/mL, or in a range from 0.1 µg/mL to about 10 µg/mL, or in a range from 2 µg/mL to about 10 µg/mL, or in a range from about 0.4 µg/mL to about 50 µg/mL, or in a range from about 0.4 µg/mL to about 2 µg/mL, or in a range~~

from 0.4 µg/mL to about 10 µg/mL, or in a range from 2 µg/mL to about 10 µg/mL, or in a range from 0.4 µg/mL to about 1 µg/mL, or 0.4 µg/mL or less.

7. — The antibody or antigen-binding fragment of claim 6, wherein the antibody or antigen-binding fragment is capable of binding to:

(i) — the Group 1 IAV NA with an EC₅₀ in a range from about 0.4 µg/mL to about 50 µg/mL, from about 0.4 µg/mL to about 10 µg/mL, from about 0.4 µg/mL to about 2 µg/mL, from about 2 µg/mL to about 50 µg/mL, from about 2 µg/mL to about 10 µg/mL, or from about 10 µg/mL to about 50 µg/mL;

(ii) — the Group 2 IAV NA with an EC₅₀ in a range from about 0.4 µg/mL to about 50 µg/mL, or from about 0.4 µg/mL to about 10 µg/mL, or from about 0.4 µg/mL to about 2 µg/mL, or from about 2 µg/mL to about 50 µg/mL, or from about 2 µg/mL to about 10 µg/mL, or from about 10 µg/mL to about 50 µg/mL; and/or

(iii) — the IBV NA with an EC₅₀ of about 0.4 µg/mL, or in a range from about 0.1 µg/mL to about 1.9 µg/mL, or from about 0.1 µg/mL to about 1.5 µg/mL, or from about 0.1 µg/mL to about 1.0 µg/mL, or about 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, or 1.0 µg/mL.

8. — The antibody or antigen-binding fragment of claim 7, wherein the antibody or antigen-binding fragment is capable of binding to:

(i) — a N1 with an EC₅₀ of about 0.4 µg/mL, or in a range from about 0.4 µg/mL to about 50 µg/mL, or in a range from about 0.1 µg/mL to about 1.9 µg/mL, or from about 0.1 µg/mL to about 1.5 µg/mL, or from about 0.1 µg/mL to about 1.0 µg/mL, or about 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, or 1.0 µg/mL;

(ii) — a N4 with an EC₅₀ of about 0.4 µg/mL, or in a range from about 0.1 µg/mL to about 1.9 µg/mL, or from about 0.1 µg/mL to about 1.5 µg/mL, or from about 0.1 µg/mL to about 1.0 µg/mL, or about 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, or 1.0 µg/mL;

(iii) — a N5 with an EC₅₀ in a range from about 0.4 µg/mL to about 2 µg/mL;

(iv) — a N8 with an EC₅₀ of about 50 µg/mL;

(v) ~~—a N2 with an EC₅₀ in a range from about 0.4 µg/mL to about 20 µg/mL, or from about 0.4 µg/mL to about 10 µg/mL, or from about 0.4 µg/mL to about 2 µg/mL, from about 1 µg/mL to about 10 µg/mL, or from about 1 µg/mL to about 20 µg/mL, or from about 1 µg/mL to about 5 µg/mL, or about 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, or 20 µg/mL;~~

(vi) ~~—a N3 with an EC₅₀ of about 0.4 µg/mL, or in a range from about 0.1 µg/mL to about 1.9 µg/mL, or from about 0.1 µg/mL to about 1.5 µg/mL, or from about 0.1 µg/mL to about 1.0 µg/mL, or about 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, or 1.0 µg/mL;~~

(vii) ~~—a N6 with an EC₅₀ of about 0.4 µg/mL, or in a range from about 0.1 µg/mL to about 1.9 µg/mL, or from about 0.1 µg/mL to about 1.5 µg/mL, or from about 0.1 µg/mL to about 1.0 µg/mL, or about 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, or 1.0 µg/mL;~~

(viii) ~~—a N7 with an EC₅₀ in a range from about 2 µg/mL to about 50 µg/mL;~~

(ix) ~~—a N9 with an EC₅₀ of about 0.4 µg/mL, or in a range from about 0.1 µg/mL to about 1.9 µg/mL, or from about 0.1 µg/mL to about 1.5 µg/mL, or from about 0.1 µg/mL to about 1.0 µg/mL, or about 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, or 1.0 µg/mL; and/or~~

(xi) ~~—a IBV NA with an EC₅₀ of about 0.4 µg/mL, or in a range from about 0.1 µg/mL to about 1.9 µg/mL, or from about 0.1 µg/mL to about 1.5 µg/mL, or from about 0.1 µg/mL to about 1.0 µg/mL, or about 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, or 1.0 µg/mL.~~

9. ~~—The antibody or antigen-binding fragment of claim 7 or 8, wherein the antibody or antigen-binding fragment is capable of binding to:~~

(i) ~~—one or more of: N1 A/California/07/2009, N1 A/California/07/2009 I223R/H275Y, N1 A/Stockholm/18/2007, N1 A/Swine/Jiangsu/J004/2008, N4 A/mallard duck/Netherlands/30/2011, N5 A/aquatic bird/ Korea/CN5/2009, N2 A/Hong Kong/68, N2 A/Leningrad/134/17/57, N3 A/Canada/rv504/2004, N6 A/Swine/Ontario/01911/1/99, N9 A/Anhui/1/2013, B/Lee/10/1940 (Ancestral);~~

~~B/Brisbane/60/2008 (Victoria), B/Malaysia/2506/2004 (Victoria),
B/Malaysia/3120318925/2013 (Yamagata), B/Wisconsin/1/2010 (Yamagata), and
B/Yamanashi/166/1998 (Yamagata), with an EC₅₀ of about 0.4 µg/mL, or in a range of
from about 0.1 µg/mL to about 1.9 µg/mL, or of from about 0.1 µg/mL to about 1.5
µg/mL, or of from about 0.1 µg/mL to about 1.0 µg/mL, or about 0.1, 0.2, 0.3, 0.4, 0.5,
0.6, 0.7, 0.8, 0.9, or 1.0 µg/mL;~~

~~(ii) — N5 A/aquatic bird/ Korea/CN5/2009 with an EC₅₀ of about 2 µg/mL, or
in a range of from about 2 µg/mL to about 10 µg/mL;~~

~~(iii) — N8 A/harbor seal/New Hampshire/179629/2011 with an EC₅₀ of about
50 µg/mL;~~

~~(iv) — N2 A/Washington/01/2007 with an EC₅₀ in a range from about 2 µg/mL
to about 10 µg/mL;~~

~~(v) — N7 A/Netherlands/078/03 with an EC₅₀ in a range from about 2 µg/mL to
about 50 µg/mL;~~

~~(vi) — N2 A/South Australia/34/2019 with an EC₅₀ in a range of from about 0.4
µg/mL to about 50 µg/mL;~~

~~(vii) — N2 A/Switzerland/8060/2017 with an EC₅₀ in a range of from about 9.5
µg/mL to about 3.8 µg/mL;~~

~~(viii) — N2 A/Singapore/INFIMH-16-0019/2016 with an EC₅₀ in a range of from
about 18.4 µg/mL to about 2.2 µg/mL;~~

~~(iv) — N2 A/Switzerland/9715293/2013 with an EC₅₀ in a range of from about
1.6 µg/mL to about 1.2 µg/mL; and/or~~

~~(v) — N1 A/Swine/Jiangsu/J004/2018 with an EC₅₀ in a range of from about
0.4 µg/mL to about 50 µg/mL, or about 0.4, about 2, about 10, or about 50 µg/mL.~~

~~10. — The antibody or antigen-binding fragment of any one of claims 1–9,
wherein the NA is expressed on the surface of a host cell (e.g., a CHO cell) and binding
to NA is according to flow cytometry.~~

~~11. — The antibody or antigen-binding fragment of any one of claims 1-10, which is capable of binding to a NA with a KD of less than 1.0E-12 M, less than 1.0E-11 M, less than 1.0 E-11 M, or of 1.0E-12M or less, 1.0E-11M or less, or 1.0E-10 or less, or with a KD between 1.0E-10 and 1.0E-13, or with a KD between 1.0E-11 and 1.0E-13, wherein, optionally, the binding is as assessed by biolayer interferometry (BLI).~~

~~12. — The antibody or antigen-binding fragment of claim 11, wherein the NA is a N1, a N2, and/or a N9.~~

~~13. — The antibody or antigen-binding fragment of any one of claims 1-12, which is capable of binding to:~~

~~(1) — (i) a NA epitope that comprises any one or more of the following amino acids (N1 NA numbering): R368, R293, E228, E344, S247, D198, D151, R118; and/or (ii) a NA epitope that comprises any one or more of the following amino acids (N2 NA numbering): R371, R292, E227, E344, S247, D198, D151, R118;~~

~~and/or~~

~~(2) — (i) a NA epitope that comprises the amino acids R368, R293, E228, D151, and R118 (N1 NA numbering); and/or (ii) a NA epitope that comprises the amino acids R371, R292, E227, D151, and R118 (N2 NA numbering);~~

~~and/or~~

~~(3) — an epitope comprised in or comprising a NA active site, wherein, optionally, the NA active site comprises the following amino acids (N2 numbering): R118, D151, R152, R224, E276, R292, R371, Y406, E119, R156, W178, S179, D/N198, I222, E227, H274, E277, D293, E425;~~

~~and/or~~

~~(4) — an IBV NA epitope that comprises: (i) any one or more of the following amino acids: R116, D149, E226, R292, and R374; or (ii) the amino acids R116, D149, E226, R292, and R374.~~

~~14. — The antibody or antigen-binding fragment of claim 13, wherein:~~
~~(1) — the epitope further comprises any one or more of the following NA amino acids (N2 numbering): E344, E227, S247, and D198; and/or~~
~~(2) — the antibody or antigen-binding fragment is capable of binding to a NA comprising a S245N amino acid mutation and/or a E221D amino acid mutation.~~

~~15. — The antibody or antigen-binding fragment of any one of claims 1-14, which is capable of binding to a NA comprising a S245N amino acid mutation and/or a E221D amino acid mutation.~~

~~16. — The antibody or antigen-binding fragment of any one of claims 1-15, wherein the antibody or antigen-binding fragment is capable of inhibiting a sialidase activity of (i) an IAV NA, wherein the IAV NA comprises a Group 1 IAV NA, a Group 2 IAV NA, or both, and/or of (ii) an IBV NA in an *in vitro* model of infection, an *in vivo* animal model of infection, and/or in a human.~~

~~17. — The antibody or antigen-binding fragment of claim 16, wherein:~~
~~(i) — the Group 1 IAV NA comprises a H1N1 and/or a H5N1;~~
~~(ii) — the Group 2 IAV NA comprises a H3N2 and/or a H7N9; and/or~~
~~(iii) — the IBV NA comprises one or more of: B/Lee/10/1940 (Ancestral); B/HongKong/05/1972; B/Taiwan/2/1962 (Ancestral); B/Brisbane/33/2008 (Victoria); B/Brisbane/60/2008 (Victoria); B/Malaysia/2506/2004 (Victoria); B/New York/1056/2003 (Victoria); B/Florida/4/2006 (Yamagata); B/Jiangsu/10/2003 (Yamagata); B/Texas/06/2011 (Yamagata); B/Perth/211/2011; B/Harbin/7/1994 (Victoria); B/Colorado/06/2017 (Victoria); B/Washington/02/2019 (Victoria); B/Perth/211/2001 (Yamagata); B/Hubei-wujiagang/158/2009 (Yamagata); B/Wisconsin/01/2010 (Yamagata); B/Massachusetts/02/2012 (Yamagata); and B/Phuket/3073/2013 (Yamagata).~~

18. — The antibody or antigen-binding fragment of any one of claims 1-17, wherein the antibody or antigen-binding fragment is capable of inhibiting a sialidase activity by: a Group 1 IAV NA; a Group 2 IAV NA; and/or a IBV NA;

with an IC50 in a range of

from about 0.0008 µg/mL to about 4 µg/mL, from about 0.0008 µg/mL to about 3 µg/mL, from about 0.0008 µg/mL to about 2 µg/mL, from about 0.0008 µg/mL to about 1 µg/mL, from about 0.0008 µg/mL to about 0.9 µg/mL, from about 0.0008 µg/mL to about 0.8 µg/mL, from about 0.0008 µg/mL to about 0.7 µg/mL, from about 0.0008 µg/mL to about 0.6 µg/mL, from about 0.0008 µg/mL to about 0.5 µg/mL, from about 0.0008 µg/mL to about 0.4 µg/mL, from about 0.0008 µg/mL to about 0.3 µg/mL, from about 0.0008 µg/mL to about 0.2 µg/mL, from about 0.0008 µg/mL to about 0.1 µg/mL, from about 0.0008 µg/mL to about 0.09 µg/mL, from about 0.0008 µg/mL to about 0.08 µg/mL, from about 0.0008 µg/mL to about 0.07 µg/mL, from about 0.0008 µg/mL to about 0.06 µg/mL, about 0.0008 µg/mL to about 0.05 µg/mL, about 0.0008 µg/mL to about 0.04 µg/mL, about 0.0008 µg/mL to about 0.03 µg/mL, about 0.0008 µg/mL to about 0.02 µg/mL, about 0.0008 µg/mL to about 0.01 µg/mL, from 0.002 µg/mL to about 4 µg/mL, from about 0.001 µg/mL to 50 µg/mL, from about 0.1 µg/mL to about 30 µg/mL, from about 0.1 µg/mL to about 20 µg/mL, from about 0.1 µg/mL to about 10 µg/mL, from about 0.1 µg/mL to about 9 µg/mL, from about 0.1 µg/mL to about 8 µg/mL, from about 0.1 µg/mL to about 7 µg/mL, from about 0.1 µg/mL to about 6 µg/mL, from about 0.1 µg/mL to about 5 µg/mL, from about 0.1 µg/mL to about 4 µg/mL, from about 0.1 µg/mL to about 3 µg/mL, from about 0.1 µg/mL to about 2 µg/mL, from about 0.1 µg/mL to about 1 µg/mL, from about 0.1 µg/mL to about 0.9 µg/mL, from about 0.1 µg/mL to about 0.8 µg/mL, from about 0.1 µg/mL to about 0.7 µg/mL, from about 0.1 µg/mL to about 0.6 µg/mL, from about 0.1 µg/mL to about 0.5 µg/mL, from about 0.1 µg/mL to about 0.4 µg/mL, from about 0.1 µg/mL to about 0.3 µg/mL, from about 0.1 µg/mL to about 0.2 µg/mL, from about 0.8 µg/mL to about 30 µg/mL, from about 0.8 µg/mL to about 20 µg/mL, from about 0.8 µg/mL to about 10 µg/mL, from about 0.8 µg/mL to about 9 µg/mL, from about 0.8 µg/mL to about 8 µg/mL, from about 0.8 µg/mL to about 7 µg/mL, from about 0.8 µg/mL to about 6

~~μg/mL, from about 0.8 μg/mL to about 5 μg/mL, from about 0.8 μg/mL to about 4 μg/mL, from about 0.8 μg/mL to about 3 μg/mL, from about 0.8 μg/mL to about 2 μg/mL, from about 0.8 μg/mL to about 1 μg/mL, or of about 0.1 μg/mL, about 0.2 μg/mL, about 0.3 μg/mL, about 0.4 μg/mL, about 0.5 μg/mL, about 0.6 μg/mL, about 0.7 μg/mL, about 0.8 μg/mL, about 0.9 μg/mL, about 1.0 μg/mL, about 1.5 μg/mL, about 2.0 μg/mL, about 2.5 μg/mL, about 3.0 μg/mL, about 3.5 μg/mL, about 4.0 μg/mL, about 4.5 μg/mL, about 5.0 μg/mL, about 5.5 μg/mL, about 6.0 μg/mL, about 6.5 μg/mL, about 7.0 μg/mL, about 7.5 μg/mL, about 8.0 μg/mL, about 8.5 μg/mL, about 9.0 μg/mL, about 10 μg/mL, about 11 μg/mL, about 12 μg/mL, about 13 μg/mL, about 14 μg/mL, about 15 μg/mL, about 16 μg/mL, about 17 μg/mL, about 18 μg/mL, about 19 μg/mL, about 20 μg/mL, about 25 μg/mL, and/or about 30 μg/mL.~~

~~19. —The antibody or antigen-binding fragment of claim 18, which is capable of inhibiting NA sialidase activity of one or more Group 1 and/or Group 2 IAV, and/or of one or more IBV, with an IC₅₀ in a range of from: about .00001 μg/ml to about 25 μg/ml, or about 0.0001 μg/ml to about 10 μg/ml, or about 0.0001 μg/ml to about 1 μg/ml, or about 0.0001 μg/ml to about 0.1 μg/ml, or about 0.0001 μg/ml to about 0.01 μg/ml, or about 0.0001 μg/ml to about .001 μg/ml, or about 0.0001 μg/ml to about .0001 μg/ml, or about .0001 μg/ml to about 25 μg/ml, or about .0001 μg/ml to about 10 μg/ml, or about .0001 μg/ml to about 1 μg/ml, or about .0001 μg/ml to about 0.1 μg/ml, or about .0001 μg/ml to about 0.01 μg/ml, or about .001 μg/ml to about 25 μg/ml, or about .001 μg/ml to about 10 μg/ml, or about .001 μg/ml to about 1 μg/ml, or about .001 μg/ml to about 0.1 μg/ml, or about .001 μg/ml to about 0.01 μg/ml, or about .01 μg/ml to about 25 μg/ml, or about .01 μg/ml to about 10 μg/ml, or about .01 μg/ml to about 1 μg/ml, or about .01 μg/ml to about 0.1 μg/ml, or about 1 μg/ml to about 25 μg/ml, or about 1 μg/ml to about 10 μg/ml,~~

~~or of about 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7, 7.5, 8, 8.5, 9, 9.5, 10, 10.5, 11, 11.5, 12, 12.5, 13, 13.5, 14, 14.5, or 15 μg/ml.~~

~~20. — The antibody or antigen-binding fragment of any one of claims 1-19, which is capable of activating a human FcγRIIIa.~~

~~21. — The antibody or antigen-binding fragment of claim 20, wherein activation is as determined using a host cell (optionally, a Jurkat cell) comprising: (i) the human FcγRIIIa (optionally, a F158 allele); and (ii) a NFAT expression control sequence operably linked to a sequence encoding a reporter, such as a luciferase reporter, following incubation (e.g., of 23 hours) of the antibody or antigen-binding fragment with a target cell (e.g., a A549 cell) infected with a IAV.~~

~~22. — The antibody or antigen-binding fragment of claim 21, wherein activation is as determined following an incubation (optionally, for about 23 hours) of the antibody or antigen-binding fragment with the target cell infected with a H1N1 IAV, wherein, optionally, the H1N1 IAV is A/PR8/34, and/or wherein, optionally, the infection has a multiplicity of infection (MOI) of 6.~~

~~23. — The antibody or antigen-binding fragment of any one of claims 1-22, which is capable of neutralizing infection by an IAV and/or an IBV.~~

~~24. — The antibody or antigen-binding fragment of claim 23, wherein the IAV and/or the IBV is antiviral resistant, wherein, optionally, the antiviral is oseltamivir.~~

~~25. — The antibody or antigen-binding fragment of any one of claims 1-24, wherein the IAV comprises a N1 NA that comprises the amino acid mutation(s): H275Y; E119D + H275Y; S247N + H275Y; I222V; and/or N294S, wherein, optionally, the IAV comprises CA09 or A/Aichi.~~

~~26. — The antibody or antigen-binding fragment of any one of claims 1-25, wherein the IAV comprises a N2 NA that comprises the amino acid mutation(s) E119V, Q136K, and/or R292K.~~

~~27. — The antibody or antigen-binding fragment of any one of claims 1-26, wherein the antibody or antigen-binding fragment is capable of treating and/or preventing (i) an IAV infection and/or (ii) an IBV infection, in a subject.~~

~~28. — The antibody or antigen-binding fragment of any one of claims 1-27, wherein the antibody or antigen-binding fragment is capable of treating and/or attenuating an infection by:~~

~~(i) — a H1N1 virus, wherein, optionally, the H1N1 virus comprises A/PR8/34; and/or~~

~~(ii) — a H3N2 virus, wherein, optionally, the H3N2 virus optionally comprises A/Hong Kong/68.~~

~~29. — The antibody or antigen-binding fragment of any one of claims 1-28, wherein the antibody or antigen-binding fragment is capable of preventing weight loss in a subject infected by the IAV and/or IBV, optionally for (i) up to 15 days, or (ii) more than 15 days, following administration of an effective amount of the antibody or antigen-binding fragment.~~

~~30. — The antibody or antigen-binding fragment of any one of claims 1-29, wherein the antibody or antigen-binding fragment is capable of preventing a loss in body weight of greater than 10% in a subject having an IAV infection and/or an IBV infection, as determined by reference to the subject's body weight just prior to the IAV and/or IBV infection.~~

~~31. — The antibody or antigen-binding fragment of any one of claims 1-30, wherein the antibody or antigen-binding fragment is capable extending survival of a subject having an IAV infection and/or an IBV infection.~~

~~32.~~ The antibody or antigen-binding fragment of ~~any one of claims 1-31,~~ wherein the antibody or antigen-binding fragment has an *in vivo* half-life in a mouse (e.g., a ~~tg32~~ mouse):

(i) ~~in a range of from: about 10 days to about 14 days, about 10.2 days to about 13.8 days, about 10.5 days to about 13.5 days, about 11 days to about 13 days, about 11.5 days to about 12.5 days, between 10 days and 14 days, or between 10.5 days and 13.5 days, or between 11 days and 13 days, or of about 10.0, 10.1, 10.2, 10.3, 10.4, 10.5, 10.6, 10.7, 10.8, 10.9, 11.0, 11.1, 11.2, 11.3, 11.4, 11.5, 11.6, 11.7, 11.8, 11.9, 12.0, 12.1, 12.2, 12.3, 12.4, 12.5, 12.6, 12.7, 12.8, 12.9, 13.0, 13.1, 13.2, 13.3, 13.4, 13.5, 13.6, 13.7, 13.8, 13.9, or 14.0 days; or~~

(ii) ~~in a range of from about 12 days to about 16 days, about 12.5 days to 15.5 days, about 13 days to 15 days, about 13.5 days to about 14.5 days, or between 12 days and 16 days, or between 13 days and 15 days, or between 13.5 days and 14.5 days, or of about 12.0, 12.1, 12.2, 12.3, 12.4, 12.5, 12.6, 12.7, 12.8, 12.9, 13.0, 13.1, 13.2, 13.3, 13.4, 13.5, 13.6, 13.7, 13.8, 13.9, 14.0, 14.1, 14.2, 14.3, 14.4, 14.5, 14.6, 14.7, 14.8, 14.9, 15.0, 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.8, 15.9, or 16.0 days.~~

332. The antibody or antigen-binding fragment of ~~any one of claims 1-32,~~ comprising a heavy chain variable domain (VH) comprising a complementarity determining region (CDR)H1, a CDRH2, and a CDRH3, and a light chain variable domain (VL) comprising a CDRL1, a CDRL2, and a CDRL3, wherein:

(i) optionally, the CDRH1 comprises or consists of the amino acid sequence set forth in any one of SEQ ID NOs.: 147, 3, 15, 27, 39, 51, 63, 75, 87, 99, 111, 123, 135, 159, and 231, or a functional variant thereof comprising one, two, or three acid substitutions, one or more of which substitutions is optionally a conservative substitution and/or is a substitution to a germline-encoded amino acid;

(ii) optionally, the CDRH2 comprises or consists of the amino acid sequence set forth in any one of SEQ ID NOs.: 148, 4, 16, 28, 40, 52, 64, 76, 88, 100, 112, 124, 136, 160, and 232, or a functional variant thereof comprising one, two, or three amino

acid substitutions, one or more of which substitutions is optionally a conservative substitution and/or is a substitution to a germline-encoded amino acid;

(iii) the CDRH3 comprises or consists of the amino acid sequence set forth in any one of SEQ ID NOs.: 149, 5, 17, 29, 172, 41, 53, 65, 77, 89, 184, 101, 113, 125, 137, 161, and 233, or a functional variant thereof comprising one, two, or three amino acid substitutions, one or more of which substitutions is optionally a conservative substitution and/or is a substitution to a germline-encoded amino acid;

(iv) optionally, the CDRL1 comprises or consists of the amino acid sequence set forth in any one of SEQ ID NOs.: 153, 9, 21, 33, 45, 57, 69, 81, 93, 105, 117, 129, 141, 165, and 234, or a functional variant thereof comprising one, two, or three amino acid substitutions, one or more of which substitutions is optionally a conservative substitution and/or is a substitution to a germline-encoded amino acid;

(v) optionally, the CDRL2 comprises or consists of the amino acid sequence set forth in any one of SEQ ID NOs.: 154, 10, 22, 34, 46, 58, 70, 82, 94, 106, 118, 130, 142, 166, and 235, or a functional variant thereof comprising one, two, or three amino acid substitutions, one or more of which substitutions is optionally a conservative substitution and/or is a substitution to a germline-encoded amino acid; and/or

(vi) optionally, the CDRL3 comprises or consists of the amino acid sequence set forth in any one of SEQ ID NOs.: 155, 11, 23, 35, 175, 178, 181, 47, 59, 71, 83, 95, 187, 193, 107, 119, 131, 143, 190, 167, and 236, or a functional variant thereof comprising having one, two, or three amino acid substitutions, one or more of which substitutions is optionally a conservative substitution and/or is a substitution to a germline-encoded amino acid.

~~34. —The antibody or antigen-binding fragment of claim 33, comprising CDRH1, CDRH2, CDRH3, CDRL1, CDRL2, and CDRL3 amino acid sequences set forth in SEQ ID NOs.: (i) 147-149 and 153-155, respectively; (ii) 15-17 and 21-23, respectively; (iii) 27-29 and 33-35, respectively; (iv) 27, 28, 172, and 33-35, respectively; (v) 27-29, 33, 34, and 175, respectively; (vi) 27-29, 33, 34, and 178, respectively; (vii) 27-29, 33, 34, and 181, respectively; (viii) 27, 28, 172, 33, 34, and~~

~~175, respectively; (ix) 27, 28, 172, 33, 34, and 178, respectively; (x) 27, 28, 172, 33, 34, and 181, respectively; (xi) 39-41 and 45-47, respectively; (xii) 51-53 and 57-59, respectively; (xiii) 63-65 and 69-71, respectively; (xiv) 75-77 and 81-83, respectively; (xv) 87-89 and 93-95, respectively; (xvi) 87, 88, 184 and 93-95, respectively; (xvii) 87-89, 93, 94, and 187, respectively; (xviii) 87-89, 93, 94, and 190, respectively; (xix) 87-89, 93, 94, and 193, respectively; (xx) 87, 88, 184, 93, 94, and 187, respectively; (xxi) 87, 88, 184, 93, 94, and 190, respectively; (xxii) 87, 88, 184, 93, 94, and 193, respectively; (xxiii) 87-89, 141, 142, and 131, respectively; (xxiv) 99-101 and 105-107, respectively; (xxv) 111-113 and 117-119, respectively; (xxvi) 123-125 and 129-131, respectively; (xxvii) 135-137 and 141-143, respectively; (xxviii) 3-5 and 9-11, respectively; (xxix) 159-161 and 165-167, respectively; or (xxx) 231-233 and 234-236, respectively.~~

353. The antibody or antigen-binding fragment of ~~any one of claims 1-342~~, wherein:

(i) the VH comprises or consists of an amino acid sequence having at least 80% (*e.g.*, 80%, 85%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, or more) identity to the amino acid sequence set forth in any one of SEQ ID NOs.: 199, 2, 14, 26, 171, 38, 50, 62, 74, 86, 183, 98, 110, 122, 134, 146, 158, 203, 207, 216, and 228, wherein sequence variation is optionally limited to one or more framework regions and/or sequence variation comprises one or more substitution to a germline-encoded amino acid; and/or

(ii) the VL comprises or consists of an amino acid sequence having at least 80% (*e.g.*, 80%, 85%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, or more) identity to the amino acid sequence set forth in any one of SEQ ID NOs.: 201, 8, 20, 32, 44, 56, 68, 80, 92, 104, 116, 128, 140, 152, 174, 177, 180, 186, 189, 192, 164, 205, 209, 217, and 230, wherein sequence variation is optionally limited to one or more framework regions and/or sequence variation comprises one or more substitution to a germline-encoded amino acid.

36. — ~~The antibody or antigen-binding fragment of claims 1-35, wherein the VH and the VL comprise or consist of the amino acid sequences set forth in SEQ ID NOs.: (i) 199 and 201, respectively; (ii) 14 and 20, respectively; (iii) 26 and 32, respectively; (iv) 26 and 174, respectively; (v) 26 and 177, respectively; (vi) 26 and 180, respectively; (vii) 171 and 32, respectively; (viii) 171 and 174, respectively; (ix) 171 and 177, respectively; (x) 171 and 180, respectively; (xi) 38 and 44, respectively; (xii) 50 and 56, respectively; (xiii) 62 and 68, respectively; (xiv) 74 and 80, respectively; (xv) 86 and 92, respectively; (xvi) 86 and 186, respectively; (xvii) 86 and 189, respectively; (xviii) 86 and 192, respectively; (xix) 183 and 92, respectively; (xx) 183 and 186, respectively; (xxi) 183 and 189, respectively; (xxii) 183 and 192, respectively; (xxiii) 98 and 104, respectively; (xxiv) 110 and 116, respectively; (xxv) 122 and 128, respectively; (xxvi) 134 and 140, respectively; (xxvii) 146 and 152, respectively; (xxviii) 158 and 164, respectively; (xxix) 2 and 8, respectively; (xxx) 203 and 205, respectively; (xxxi) 207 and 209, respectively; (xxxii) 216 and 217, respectively; or (xxxiii) 228 and 230, respectively.~~

37. — ~~The antibody or antigen-binding fragment of any one of claims 1-36, comprising:~~

~~(1) — a CH1-CH3 comprising or consisting of the amino acid sequence set forth in SEQ ID NO.:210 or SEQ ID NO.:215; and/or~~

~~(2) — a CL comprising or consisting of the amino acid sequence set forth in SEQ ID NO.:211.~~

38. — ~~The antibody or antigen-binding fragment of any one of claims 1-37, comprising:~~

~~(1) — a heavy chain comprising or consisting of the amino acid sequence set forth in SEQ ID NO.:212 or 213; and~~

~~(2) — a light chain comprising or consisting of the amino acid sequence set forth in SEQ ID NO.:214.~~

39. — ~~The antibody or antigen-binding fragment of any one of claims 1-38, comprising:~~

(1) — ~~a heavy chain comprising or consisting of the amino acid sequence set forth in SEQ ID NO.:212; and~~

(2) — ~~a light chain comprising or consisting of the amino acid sequence set forth in SEQ ID NO.:214.~~

40. — ~~The antibody or antigen-binding fragment of any one of claims 1-39, comprising:s~~

(1) — ~~a heavy chain comprising or consisting of the amino acid sequence set forth in SEQ ID NO.: 213; and~~

(2) — ~~a light chain comprising or consisting of the amino acid sequence set forth in SEQ ID NO.:214.~~

41. — ~~An antibody, or antigen-binding fragment thereof, comprising a heavy chain-variable domain (VH) comprising a CDRH1, a CDRH2, and a CDRH3, and a light chain variable domain (VL) comprising a CDRL1, a CDRL2, and a CDRL3, wherein:~~

(i) — ~~the CDRH1, CDRH2, and CDRH3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 147-149, respectively, and the CDRL1, CDRL2, and CDRL3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 153-155, respectively;~~

(ii) — ~~the CDRH1, CDRH2, and CDRH3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 15-17, respectively, and the CDRL1, CDRL2, and CDRL3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 21-23, respectively;~~

(iii) — ~~the CDRH1, CDRH2, and CDRH3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 27, 28, and 29 or 172, respectively, and the CDRL1, CDRL2, and CDRL3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 33, 34, and 35 or 175 or 178 or 181, respectively;~~

(iv) ~~the CDRH1, CDRH2, and CDRH3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 39-41, respectively, and the CDRL1, CDRL2, and CDRL3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 45-47, respectively;~~

(v) ~~the CDRH1, CDRH2, and CDRH3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 51-53, respectively, and the CDRL1, CDRL2, and CDRL3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 57-59, respectively;~~

(vi) ~~the CDRH1, CDRH2, and CDRH3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 63-65, respectively, and the CDRL1, CDRL2, and CDRL3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 69-71, respectively;~~

(vii) ~~the CDRH1, CDRH2, and CDRH3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 75-77, respectively, and the CDRL1, CDRL2, and CDRL3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 81-83, respectively;~~

(viii) ~~the CDRH1, CDRH2, and CDRH3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 87, 88, and 89 or 184, respectively, and the CDRL1, CDRL2, and CDRL3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 93, 94, and 95 or 187 or 190 or 193, respectively;~~

(ix) ~~the CDRH1, CDRH2, and CDRH3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 87, 88, 184, respectively, and the CDRL1, CDRL2, and CDRL3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 93-95, respectively;~~

(x) ~~wherein the CDRH1, CDRH2, and CDRH3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 99-101, respectively, and the CDRL1, CDRL2, and CDRL3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 105-107, respectively;~~

(xi) ~~the CDRH1, CDRH2, and CDRH3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 111-113, respectively, and the CDRL1, CDRL2,~~

~~and CDRL3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 117-119, respectively;~~

~~(xii)—the CDRH1, CDRH2, and CDRH3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 123-125, respectively, and the CDRL1, CDRL2, and CDRL3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 129-131, respectively;~~

~~(xiii)—the CDRH1, CDRH2, and CDRH3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 135-137, respectively, and the CDRL1, CDRL2, and CDRL3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 141-143, respectively;~~

~~(xiv)—the CDRH1, CDRH2, and CDRH3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 3-5, respectively, and the CDRL1, CDRL2, and CDRL3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 9-11, respectively;~~

~~(xv)—the CDRH1, CDRH2, and CDRH3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 159-161, respectively, and the CDRL1, CDRL2, and CDRL3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 165-167, respectively;~~

~~(xvi)—the CDRH1, CDRH2, and CDRH3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 87-89, respectively, and the CDRL1, CDRL2, and CDRL3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 141, 142, and 131, respectively; or~~

~~(xvii)—the CDRH1, CDRH2, and CDRH3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 231-233, respectively, and the CDRL1, CDRL2, and CDRL3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 234-236, respectively~~

~~and wherein the antibody or antigen-binding fragment is capable of binding to a neuraminidase (NA) from: (i) an influenza A virus (IAV), wherein the IAV comprises a Group 1 IAV, a Group 2 IAV, or both; and/or (ii) an influenza B virus (IBV).~~

42. — An antibody, or antigen-binding fragment thereof, comprising a heavy chain-variable domain (VH) and a light chain-variable domain (VL), wherein: (i) the VH comprises or consists of the amino acid sequence set forth in SEQ ID NO: 199 and the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO: 201; (ii) the VH comprises or consists of the amino acid sequence set forth in SEQ ID NO: 14 and the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO: 20; (iii) the VH comprises or consists of the amino acid sequence set forth in SEQ ID NO: 26 or 171 and the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO: 32, 174, 177, or 180; (iv) the VH comprises or consists of the amino acid sequence set forth in SEQ ID NO: 38 and the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO: 44; (v) the VH comprises or consists of the amino acid sequence set forth in SEQ ID NO: 50 and the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO: 56; (vi) the VH comprises or consists of the amino acid sequence set forth in SEQ ID NO: 62 and the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO: 68; (vii) the VH comprises or consists of the amino acid sequence set forth in SEQ ID NO: 74 and the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO: 80; (viii) the VH comprises or consists of the amino acid sequence set forth in SEQ ID NO: 86 or 183 and the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO: 92, 186, 189, or 192; (ix) the VH comprises or consists of the amino acid sequence set forth in SEQ ID NO: 98 and the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO: 104; (x) the VH comprises or consists of the amino acid sequence set forth in SEQ ID NO: 110 and the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO: 116; (xi) the VH comprises or consists of the amino acid sequence set forth in SEQ ID NO: 122 and the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO: 128; (xii) the VH comprises or consists of the amino acid sequence set forth in SEQ ID NO: 134 and the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO: 140; (xiii) the VH comprises or consists of the amino acid sequence set forth in SEQ ID NO: 146 and the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO: 152;

~~(xiv) the VH comprises or consists of the amino acid sequence set forth in SEQ ID NO: 158 and the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO: 164; (xv) the VH comprises or consists of the amino acid sequence set forth in SEQ ID NO: 2 and the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO: 8; (xvi) the VH comprises or consists of the amino acid sequence set forth in SEQ ID NO: 203 and the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO: 205; (xvii) the VH comprises or consists of the amino acid sequence set forth in SEQ ID NO: 207 and the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO: 209; or (xviii) the VH comprises or consists of the amino acid sequence set forth in SEQ ID NO: 228 and the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO: 230.~~

~~43. — An antibody, or antigen-binding fragment thereof, comprising a heavy chain variable domain (VH) and a light chain variable domain (VL), wherein the VH comprises or consists of the amino acid sequence set forth in SEQ ID NO.:216 and the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO.:217.~~

~~44. — The antibody or antigen-binding fragment of claim 42 or 43, wherein the antibody or antigen-binding fragment is capable of binding to a neuraminidase (NA) from: (i) an influenza A virus (IAV), wherein the IAV comprises a Group 1 IAV, a Group 2 IAV, or both; and/or (ii) an influenza B virus (IBV), and wherein, optionally, the antibody or antigen-binding fragment is capable of (1) inhibiting NA sialidase activity and/or (2) neutralizing infection by the IAV and/or IBV.~~

454. A polypeptide comprising an amino acid sequence sequence according to SEQ ID NO.:219, wherein the polypeptide is capable of binding to an influenza virus neuraminidase (NA).

465. The polypeptide of claim 454, wherein the polypeptide comprises an antibody heavy chain variable domain (VH), or a fragment thereof, and the amino acid sequence according to SEQ ID NO.:219 is optionally comprised in the VH or fragment thereof.

476. The polypeptide of claim ~~45~~ or 464 or 5, wherein the amino acid sequence according to SEQ ID NO.:219 comprises any one of SEQ ID NOs.: 149, 5, 17, 29, 172, 41, 53, 65, 77, 89, 184, 101, 113, 125, 137, and 161.

487. The polypeptide of any one of claims ~~45-474~~ -6, wherein the polypeptide or VH further comprises:

- (i) an amino acid sequence according to SEQ ID NO.:220; and/or
- (ii) an amino acid sequence according to SEQ ID NO.:221.

498. The polypeptide of any one of claims ~~45-484~~ -7, further comprising an antibody light chain variable domain (VL), wherein, optionally, the VL comprises:

- (i) an amino acid sequence according to SEQ ID NO.:222;
- (ii) an amino acid sequence according to SEQ ID NO.:223; and/or
- (iii) an amino acid sequence according to SEQ ID NO.:224.

509. The polypeptide of any one of claims ~~46-495~~ -8, wherein the VH comprises or consists of an amino acid sequence having at least 90%, at least 92%, at least 95%, at least 97%, or at least 99% identity to the amino acid sequence of any one of SEQ ID NOs.: 199, 2, 14, 26, 171, 38, 50, 62, 74, 86, 183, 98, 110, 122, 134, 146, 158, 203, 207, 216, and 228.

5110. The polypeptide of claim ~~49~~ or 508 or 9, wherein the VL comprises or consists of an amino acid sequence having at least 90%, at least 92%, at least 95%, at least 97%, or at least 99% identity to the amino acid sequence of any one of SEQ ID

NOs.: 201, 8, 20, 32, 44, 56, 68, 80, 92, 104, 116, 128, 140, 152, 174, 177, 180, 186, 189, 192, 164, 205, 209, 217, and 230.

~~52~~11. The polypeptide of any one of claims ~~45-514-10~~, wherein the polypeptide comprises an antibody or an antigen-binding fragment thereof.

~~53~~12. An antibody or an antigen-binding fragment thereof, comprising a heavy chain variable domain (VH) amino acid sequence and a light chain variable domain (VL) amino acid sequence, wherein the VH comprises or consists of an amino acid sequence having at least 90%, at least 92%, at least 95%, at least 97%, or at least 99% identity to the amino acid sequence of any one of SEQ ID NOs.: 199, 2, 14, 26, 171, 38, 50, 62, 74, 86, 183, 98, 110, 122, 134, 146, 158, 203, 207, 216, and 228, and wherein the VL comprises or consists of an amino acid sequence having at least 90%, at least 92%, at least 95%, at least 97%, or at least 99% identity to the amino acid sequence of any one of SEQ ID NOs.: 201, 8, 20, 32, 44, 56, 68, 80, 92, 104, 116, 128, 140, 152, 174, 177, 180, 186, 189, 192, 164, 205, 209, 217, and 230,

wherein the antibody or antigen-binding fragment thereof is capable of binding to a neuraminidase (NA) from: (i) an influenza A virus (IAV), wherein the IAV comprises a Group 1 IAV, a Group 2 IAV, or both; and/or (ii) an influenza B virus (IBV).

~~54~~13. The polypeptide of any one of claims ~~45-524-11~~ or the antibody or antigen-binding fragment of claim ~~53~~12, which is capable of binding to a neuraminidase (NA) from: (i) an influenza A virus (IAV), wherein the IAV comprises a Group 1 IAV, a Group 2 IAV, or both; and/or (ii) an influenza B virus (IBV), and wherein, optionally, the antibody or antigen-binding fragment is capable of (1) inhibiting NA sialidase activity and/or (2) neutralizing infection by the IAV and/or IBV.

~~55. —An antibody, or an antigen-binding fragment thereof, that is capable of binding to:~~

(i) a NA epitope that comprises any one or more of the following amino acids (N1 NA numbering): R368, R293, E228, E344, S247, D198, D151, R118; and/or

(ii) a NA epitope that comprises any one or more of the following amino acids (N2 NA numbering): R371, R292, E227, E344, S247, D198, D151, R118.

56. — An antibody, or an antigen-binding fragment thereof, that is capable of binding to:

(i) — a NA epitope that comprises the amino acids R368, R293, E228, D151, and R118 (N1 NA numbering); and/or

(ii) — a NA epitope that comprises the amino acids R371, R292, E227, D151, and R118 (N2 NA numbering).

57. — An antibody, or an antigen-binding fragment thereof, that is capable of binding to an epitope comprised in or comprising a NA active site, wherein, optionally, the NA active site comprises the following amino acids (N2 numbering): R118, D151, R152, R224, E276, R292, R371, Y406, E119, R156, W178, S179, D/N198, I222, E227, H274, E277, D293, E425.

58. — The antibody or antigen-binding fragment of any one of claims 83–85 wherein the epitope further comprises any one or more of the following NA amino acids (N2 numbering): E344, E227, S247, and D198.

59. — The antibody or antigen-binding fragment of any one of claims 55–58, which is capable of binding to a NA comprising a S245N amino acid mutation and/or a E221D amino acid mutation.

60. — An antibody, or an antigen-binding fragment thereof, that is capable of binding to an IBV NA epitope that comprises any one or more of the following amino acids: R116, D149, E226, R292, and R374.

~~61. — An antibody, or an antigen-binding fragment thereof, that is capable of binding to an IBV NA epitope that comprises the amino acids R116, D149, E226, R292, and R374.~~

~~62. — The antibody or antigen-binding fragment of any one of claims 55-61, wherein the influenza comprises an influenza A virus, an influenza B virus, or both.~~

~~63~~14. The antibody or antigen-binding fragment of any one of claims ~~1-44 and 53-62~~1-3, 12 and 13, or the polypeptide of claim ~~52~~11, which is a IgG, IgA, IgM, IgE, or IgD isotype.

~~64~~15. The antibody or antigen-binding fragment of any one of claims ~~1-3 and 12-14~~1-3 and 12-14~~44 and 53-63~~, or the polypeptide of claim ~~52~~11, which is an IgG isotype selected from IgG1, IgG2, IgG3, and IgG4.

~~65~~16. The antibody or antigen-binding fragment of any one of claims ~~1-44 and 53-64~~1-3 and 12-15, or the polypeptide of claim ~~52~~11, wherein the antibody, or the antigen-binding fragment, comprises a human antibody, a monoclonal antibody, a purified antibody, a single chain antibody, a Fab, a Fab', a F(ab')₂, or Fv.

~~66~~17. The antibody or antigen-binding fragment of any one of claims ~~1-44 and 53-65~~1-3 and 12-16, or the polypeptide of claim ~~52~~11, wherein the antibody or antigen-binding fragment is a multi-specific antibody or antigen-binding fragment.

~~67. — The antibody or antigen-binding fragment of claim 66, or the polypeptide of claim 66, wherein the antibody or antigen-binding fragment is a bispecific antibody or antigen-binding fragment.~~

~~68. — The antibody or antigen-binding fragment of claim 66 or 67, comprising:~~
~~(i) — a first VH and a first VL; and~~

(ii) ~~—a second VH and a second VL,~~

~~wherein the first VH and the second VH are different and each independently comprise an amino acid sequence having at least 85% identity to the amino acid sequence set forth in any one of SEQ ID NOs.: 199, 2, 14, 26, 171-38, 50, 62, 74, 86, 183, 98, 110, 122, 134, 146, 158, 203, 207, 216, and 228 and~~

~~wherein the first VL and the second VL are different and each independently comprise an amino acid sequence having at least 85% identity to the amino acid sequence set forth in any one of SEQ ID NOs.: 201, 8, 20, 32, 174, 177, 180, 44, 56, 68, 80, 92, 186, 189, 192, 104, 116, 128, 140, 152, 164, 205, 209, 217, and 230,~~

~~and wherein the first VH and the first VL together form a first antigen-binding site, and wherein the second VH and the second VL together form a second antigen-binding site.~~

6918. The antibody or antigen-binding fragment of any one of claims ~~1-44 and 53-68~~1-3 and 12-17, or the polypeptide of claim 5211, wherein the antibody or antigen-binding fragment comprises an (*e.g.*, IgG1) Fc polypeptide or a fragment thereof.

7019. The antibody or antigen-binding fragment of claim 6918, or the polypeptide of claim 6918, wherein the Fc polypeptide or fragment thereof comprises:

(i) a mutation that increases binding affinity to a human FcRn (*e.g.*, as measured using surface plasmon resonance (SPR) (*e.g.*, Biacore, *e.g.*, T200 instrument, using manufacturer's protocols)), as compared to a reference Fc polypeptide that does not comprise the mutation; and/or

(ii) a mutation that increases binding affinity to a human FcγR (*e.g.*, as measured using surface plasmon resonance (SPR) (*e.g.*, Biacore, *e.g.*, T200 instrument, using manufacturer's protocols)) as compared to a reference Fc polypeptide that does not comprise the mutation.

~~71~~20. The antibody or antigen-binding fragment of claim ~~70~~19, or the polypeptide of claim ~~70~~19, wherein the mutation that increases binding affinity to a human FcRn comprises:

(1) M428L; N434S; N434H; N434A; N434S; M252Y; S254T; T256E; T250Q; P257I; Q311I; D376V; T307A; E380A; or any combination thereof; and/or

(2) S239D; I332E; A330L; G236A; or any combination thereof.

~~72. — The antibody or antigen-binding fragment of claim 70 or 71, or the polypeptide of claim 70 or 71, wherein the mutation that increases binding affinity to a human FcRn comprises: (i) M428L/N434S; (ii) M252Y/S254T/T256E; (iii) T250Q/M428L; (iv) P257I/Q311I; (v) P257I/N434H; (vi) D376V/N434H; (vii) T307A/E380A/N434A; or (viii) any combination of (i)-(vii).~~

~~73. — The antibody or antigen-binding fragment of any one of claims 70-72, or the polypeptide of any one of claims 70-72, wherein the mutation that increases binding affinity to a human FcRn comprises M428L/N434S.~~

~~74. — The antibody or antigen-binding fragment of any one of claims 70-73, or the polypeptide of any one of claims 70-73, wherein the mutation that enhances binding to a FcγR comprises S239D; I332E; A330L; G236A; or any combination thereof.~~

~~75. — The antibody or antigen-binding fragment of any one of claims 70-74, or the polypeptide of any one of claims 70-74, wherein the mutation that enhances binding to a FcγR comprises: (i) S239D/I332E; (ii) S239D/A330L/I332E; (iii) G236A/S239D/I332E; or (iv) G236A/A330L/I332E, wherein the Fc polypeptide or fragment thereof optionally comprises Ser at position 239.~~

~~76. — The antibody or antigen-binding fragment of any one of claims 1-44 and 53-75, or the polypeptide of any one of claims 45-52 and 63-75, which comprises a mutation that alters glycosylation, wherein the mutation that alters glycosylation~~

~~comprises N297A, N297Q, or N297G, and/or which is aglycosylated and/or afucosylated.~~

~~77. — An antibody comprising:~~

~~(1) — a heavy chain comprising or consisting of the amino acid sequence set forth in SEQ ID NO.:212; and~~

~~(2) — a light chain comprising or consisting of the amino acid sequence set forth in SEQ ID NO.:214.~~

~~78. — An antibody comprising:~~

~~(1) — a heavy chain comprising or consisting of the amino acid sequence set forth in SEQ ID NO.: 213; and~~

~~(2) — a light chain comprising or consisting of the amino acid sequence set forth in SEQ ID NO.:214.~~

~~79. — An antibody comprising:~~

~~(1) — two heavy chains, each comprising or consisting of the amino acid sequence set forth in SEQ ID NO.:212; and~~

~~(2) — two light chains, each comprising or consisting of the amino acid sequence set forth in SEQ ID NO.:214.~~

~~80. — An antibody comprising:~~

~~(1) — two heavy chains, each comprising or consisting of the amino acid sequence set forth in SEQ ID NO.: 213; and~~

~~(2) — two light chains, each comprising or consisting of the amino acid sequence set forth in SEQ ID NO.:214.~~

8121. An isolated polynucleotide encoding the antibody or antigen-binding fragment of any one of claims ~~1-44 and 53-801-3 and 12-20~~, or encoding a VH, a heavy chain, a VL, and/or a light chain of the antibody or the antigen-binding fragment.

~~8222.~~ An isolated polynucleotide encoding the polypeptide of any one of claims ~~45-52 and 63-76~~4-11 and 13-20.

~~8323.~~ The polynucleotide of claim ~~81-21~~ or ~~8222~~, wherein (1) the polynucleotide comprises deoxyribonucleic acid (DNA) or ribonucleic acid (RNA), wherein the RNA optionally comprises messenger RNA (mRNA); and/or-

~~84.~~ ~~The polynucleotide of any one of claims 81-83, comprising (2) the polynucleotide comprises~~ a modified nucleoside, a cap-1 structure, a cap-2 structure, or any combination thereof, wherein, optionally,-

~~85.~~ ~~The polynucleotide of claim 84, wherein~~ the polynucleotide comprises a pseudouridine, a N6-methyladenosine, a 5-methylcytidine, a 2-thiouridine, or any combination thereof, wherein, further optionally,-

~~86.~~ ~~The polynucleotide of claim 84, wherein~~ the pseudouridine comprises N1-methylpseudouridine.

~~87.~~ ~~The polynucleotide of any one of claims 81-86, which is codon-optimized for expression in a host cell.~~

~~88.~~ ~~The polynucleotide of claim 87, wherein the host cell comprises a human cell.~~

~~8924.~~ The polynucleotide of any one of claims ~~81-88~~21-23, comprising a polynucleotide having at least 50% (*e.g.*, 50%, 55%, 60%, 65%, 70%, 75%, 80%, 85%, 90%, 91%, 92%, 94%, 94%, 95%, 96%, 97%, 98%, 99%, or more) identity to the polynucleotide sequence set forth in any one or more of SEQ ID NOs.: 198, 200, 1, 13, 25, 170, 37, 49, 61, 73, 85, 182, 97, 109, 121, 133, 145, 157, 6, 18, 30, 42, 54, 66, 78, 90, 102, 114, 126, 138, 150, 162, 7, 19, 31, 173, 176, 179, 43, 55, 67, 79, 91, 185, 188,

191, 103, 115, 127, 139, 151, 163, 12, 24, 36, 48, 60, 72, 84, 96, 108, 120, 132, 144, 156, 168, 202, 206, 204, 208, 227, and 229.

~~90. —The polynucleotide of claim 89, comprising the polynucleotide sequence of SEQ ID NO.:198 and/or the polynucleotide sequence of SEQ ID NO.:200.~~

~~9125.~~ A recombinant vector comprising the polynucleotide of any one of claims ~~81-9021-24~~.

~~9226.~~ A host cell comprising the polynucleotide of any one of claims ~~81-9021-24~~ and/or the vector of claim ~~9125~~, wherein the polynucleotide is optionally heterologous to the host cell and/or wherein the host cell is capable of expressing the encoded antibody or antigen-binding fragment or polypeptide.

~~9327.~~ An isolated human B cell comprising the polynucleotide of any one of claims ~~81-9021-24~~ and/or the vector of claim ~~9125~~, wherein polynucleotide is optionally heterologous to the human B cell and/or wherein the human B cell is immortalized.

~~9428.~~ A composition comprising:

- (i) the antibody or antigen-binding fragment of any one of claims ~~1-44 and 53-801-3 and 12-20~~;
 - (ii) the polypeptide of any one of claims ~~4-11 and 13-2045-52 and 63-76~~;
 - (iii) the polynucleotide of any one of claims ~~81-9021-24~~;
 - (iv) the recombinant vector of claim ~~9125~~;
 - (v) the host cell of claim ~~9226~~; and/or
 - (vi) the human B cell of claim ~~9327~~,
- and a pharmaceutically acceptable excipient, carrier, or diluent.

~~95. —The composition of claim 94, comprising a first antibody or antigen-binding fragment and a second antibody or antigen-binding fragment, wherein each of~~

~~the first antibody or antigen-binding fragment and the second antibody or antigen-binding fragment are different and are each according any one of claims 1-44 and 53-80.~~

~~9629.~~ A composition comprising the polynucleotide of any one of claims ~~81-90~~21-24 or the vector of claim ~~91-25~~ encapsulated in a carrier molecule, wherein the carrier molecule optionally comprises a lipid, a lipid-derived delivery vehicle, such as a liposome, a solid lipid nanoparticle, an oily suspension, a submicron lipid emulsion, a lipid microbubble, an inverse lipid micelle, a cochlear liposome, a lipid microtubule, a lipid microcylinder, lipid nanoparticle (LNP), or a nanoscale platform.

~~9730.~~ A method of making an antibody or antigen-binding fragment of any one of claims ~~1-3 and 12-20~~1-44 and 53-80, comprising culturing the host cell of claim ~~92~~26 or the human B cell of claim ~~93-27~~ for a time and under conditions sufficient for the host cell or human B cell, respectively, to express the antibody or antigen-binding fragment, wherein, optionally, the method further comprises-

~~98.—The method of claim 97, further comprising~~ isolating the antibody or antigen-binding fragment.

~~99.—A method of treating or preventing an IAV infection and/or an IBV infection in a subject, the method comprising administering to the subject an effective amount of:~~

- ~~(i) — the antibody or antigen-binding fragment of any one of claims 1-44 and 53-80;~~
- ~~(ii) — the polypeptide of any one of claims 45-52 and 63-76;~~
- ~~(iii) — the polynucleotide of any one of claims 81-90;~~
- ~~(iv) — the recombinant vector of claim 91;~~
- ~~(v) — the host cell of claim 92;~~
- ~~(vi) — the human B cell of claim 93; and/or~~

~~(vii) — the composition of any one of claims 94–96.~~

~~100. — A method of treating or preventing an influenza infection in a human subject, the method comprising administering to the subject the polynucleotide of any one of claims 81–90, the recombinant vector of claim 91, or the composition of claim 96, wherein the polynucleotide comprises mRNA.~~

~~101. — The method of claim 100, wherein the influenza infection comprises an IAV infection and/or an IBV infection.~~

~~102. — The method of any one of claims 99–101, comprising administering a single dose of the antibody or antigen-binding fragment, polypeptide, polynucleotide, recombinant vector, host cell, or composition to the subject.~~

~~103. — The method of any one of claims 99–101, comprising administering two or more doses of the antibody or antigen-binding fragment, polypeptide, polynucleotide, recombinant vector, host cell, or composition to the subject.~~

~~104. — The method of any one of claims 99–103, comprising administering a dose of the antibody or antigen-binding fragment, polypeptide, polynucleotide, recombinant vector, host cell, or composition to the subject once yearly, optionally in advance of or during an influenza season.~~

~~105. — The method of any one of claims 99–103, comprising administering a dose of the antibody or antigen-binding fragment, polypeptide, polynucleotide, recombinant vector, host cell, or composition to the subject two or more times per year; e.g. about once every 6 months.~~

~~106.—The method of any one of claims 99-105, comprising administering the antibody or antigen-binding fragment, polypeptide, polynucleotide, recombinant vector, host cell, or composition intramuscularly, subcutaneously, or intravenously.~~

~~107.—The method of any one of claims 99-106, wherein the treatment and/or prevention comprises post-exposure prophylaxis.~~

~~108.—The method of any one of claims 99-107, wherein the subject has received, is receiving, or will receive an antiviral.~~

~~109.—The method of claim 108, wherein the antiviral comprises a neuraminidase inhibitor, an influenza polymerase inhibitor, or both.~~

~~110.—The method of claim 108 or 109, wherein the antiviral comprises oseltamivir, zanamivir, baloxavir, peramivir, laninamivir, or any combination thereof.~~

~~111.—The antibody or antigen-binding fragment of any one of claims 1-44 and 53-80, the polypeptide of any one of claims 45-52 and 63-76, the polynucleotide of any one of claims 81-90, the recombinant vector of claim 91, the host cell of claim 92, the human B cell of claim 93, and/or the composition of any one of claims 94-96, for use in a method of treating or preventing an IAV infection and/or an IBV infection in a subject.~~

~~11231. Use of t~~The antibody or antigen-binding fragment of any one of claims ~~1-3 and 12-201-44 and 53-80~~, the polypeptide of any one of claims ~~4-11 and 13-2045-52 and 63-76~~, the polynucleotide of any one of claims ~~81-9021-24~~, the recombinant vector of claim ~~9125~~, the host cell of claim ~~9226~~, the human B cell of claim ~~9327~~, and/or the composition of ~~any one of claims 94-9628 or 29, for use~~ in the preparation of a medicament for the treatment or prevention of an IAV infection and/or an IBV infection in a subject.

~~113~~32. A method for *in vitro* diagnosis of an IAV infection and/or an IBV infection, the method comprising:

- (i) contacting a sample from a subject with an antibody or antigen-binding fragment of any one of claims 1-3 and 12-201-44 and 53-80; and
- (ii) detecting a complex comprising an antigen and the antibody, or comprising an antigen and the antigen-binding fragment.

~~114~~33. ~~The method of any one of claims 99-110 and 113 or the antibody or antigen-binding fragment, the polypeptide, the polynucleotide, the recombinant vector, the host cell, the human B cell, and/or the composition for use of any one of claims 111 and 112~~Use according to claim 31, wherein:

- (i) the IAV comprises a Group 1 IAV, a Group 2 IAV, or both, wherein, optionally, the Group 1 IAV NA comprises a N1, a N4, a N5, and/or a N8; and/or the Group 2 IAV NA comprises a N2, a N3, a N6, a N7, and/or a N9, wherein, further optionally, the N1 is from A/California/07/2009, is from A/California/07/2009 I223R/H275Y, is from A/Swine/Jiangsu/J004/2018, is from A/Stockholm/18/2007, is from A/Brisbane/02/2018, is from A/Michigan/45/2015, is from A/Mississippi/3/2001, is from A/Netherlands/603/2009, is from A/Netherlands/602/2009, is from A/Vietnam/1203/2004, is from A/G4/SW/Shangdong/1207/2016, is from A/G4/SW/Henan/SN13/2018, is from A/G4/SW/Jiangsu/J004/2018, and/or is from A/New Jersey/8/1976; the N4 is from A/mallard duck/Netherlands/30/2011; the N5 is from A/aquatic bird/Korea/CN5/2009; the N8 is from A/harbor seal/New Hampshire/179629/2011; the N2 is from A/Washington/01/2007, is from A/HongKong/68, is from A/HongKong/2671/2019, is from A/South Australia/34/2019, is from A/Switzerland/8060/2017, is from A/Singapore/INFIMH-16-0019/2016, is from A/Switzerland/9715293/2013, is from A/Leningrad/134/17/57, is from A/Florida/4/2006, is from A/Netherlands/823/1992, is from A/Norway/466/2014, is from is from A/Texas/50/2012, is from A/Victoria/361/2011, is from A/SW/Mexico/SG1444/2011, is from A/Aichi/2/1968, is from A/Bilthoven/21793/1972, is from A/Netherlands/233/1982, is from

A/Shanghai/11/1987, is from A/Nanchang/933/1995, is from A/Fukui/45/2004, A/Brisbane/10/2007, is from A/Tanzania/205/2010; the N3 is from A/Canada/rv504/2004; the N6 is from A/swine/Ontario/01911/1/99; the N7 is from A/Netherlands/078/03; and/or the N9 is from A/Anhui/2013, is from A/Hong Kong/56/2015; and/or

(ii) the IBV NA is from: B/Lee/10/1940 (Ancestral); B/Brisbane/60/2008 (Victoria); B/Malaysia/2506/2004 (Victoria); B/Malaysia/3120318925/2013 (Yamagata); B/Wisconsin/1/2010 (Yamagata); B/Yamanashi/166/1998 (Yamagata); B/Brisbane/33/2008 (Victoria); B/Colorado/06/2017 (Victoria); B/Hubei-wujiang/158/2009 (Yamagata); B/Massachusetts/02/2012 (Yamagata); B/Netherlands/234/2011; B/Perth/211/2001(Yamagata); B/Phuket/3073/2013 (Yamagata); B/Texas/06/2011 (Yamagata); B/HongKong/05/1972; B/Harbin/7/1994 (Victoria); B/Washington/02/2019 (Victoria); B/Perth/211/2011, or any combination thereof.