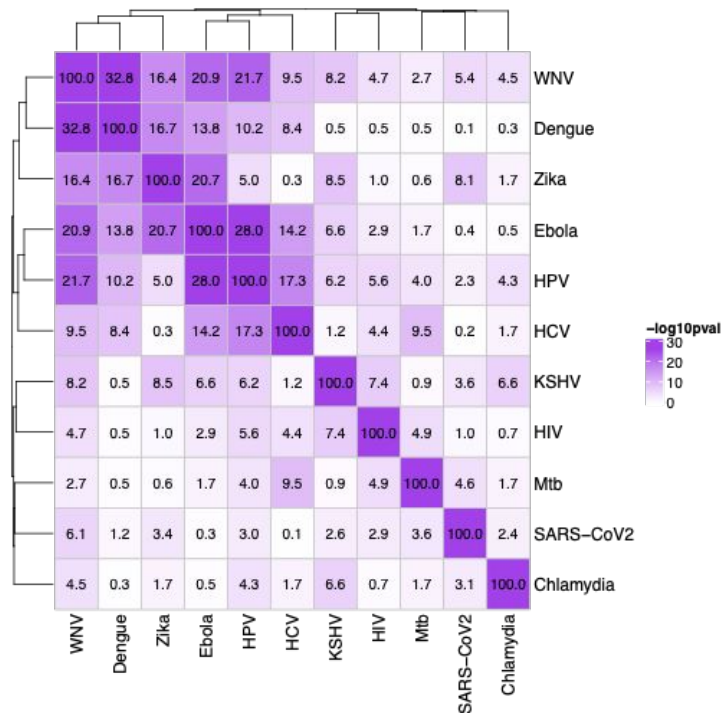
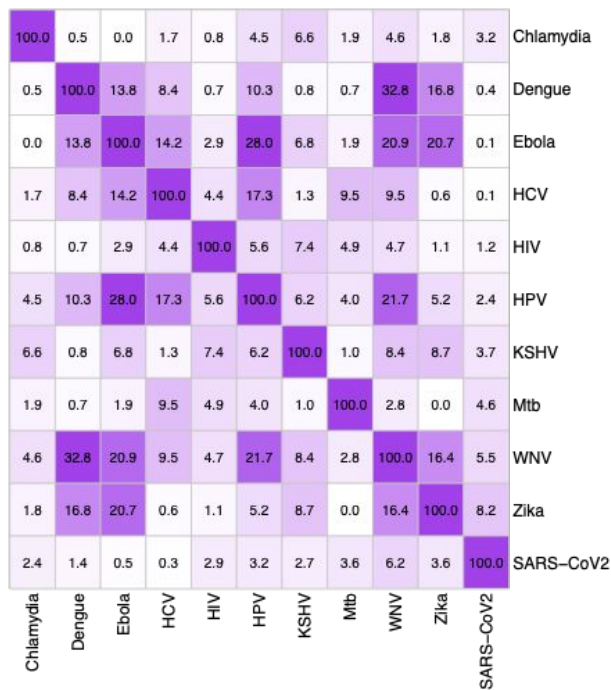


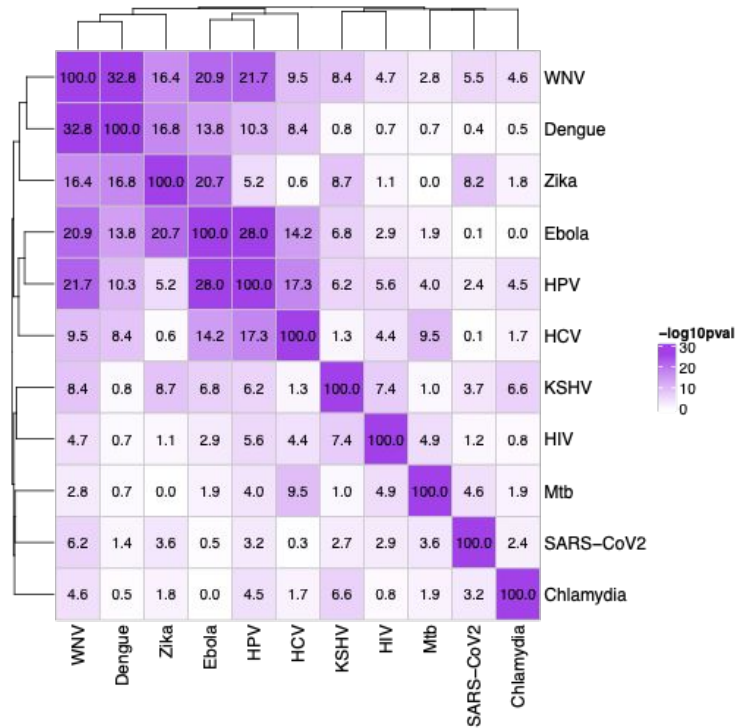
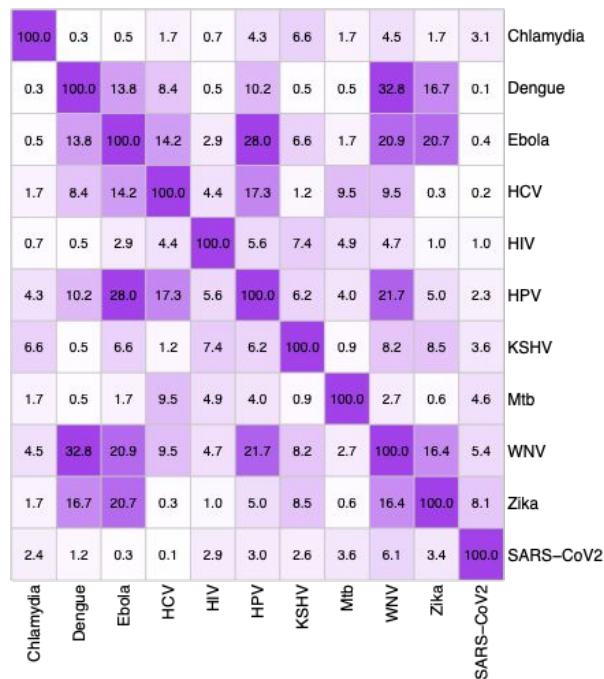
Hypergeometric and Fisher's Exact test for PPI

Hypergeometric Test Between Pathogens



Comparison between hypergeometric test pvals
(Nonclustered(left) and Clustered(right))

Fisher's Exact Test Between Pathogens



Comparison between fisher's exact test pvals
(Nonclustered(left) and Clustered(right))

Statistical tests between
baits of specific
pathogens

Hypergeometric Test Between SARS-CoV2 and WNV

Hypergeometric Test SARS-CoV2 vs WNV Baits

-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	0.3	-0.0	SARS-CoV2 E
-0.0	-0.0	0.3	-0.0	-0.0	0.1	-0.0	-0.0	SARS-CoV2 M
0.1	-0.0	-0.0	-0.0	-0.0	-0.0	0.1	-0.0	SARS-CoV2 N
-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	SARS-CoV2 nsp1
-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	SARS-CoV2 nsp10
-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	SARS-CoV2 nsp11
0.1	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	SARS-CoV2 nsp12
-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	SARS-CoV2 nsp13
-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	SARS-CoV2 nsp14
-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	SARS-CoV2 nsp15
-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	SARS-CoV2 nsp2
-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	SARS-CoV2 nsp4
-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	SARS-CoV2 nsp5_C145A
-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	SARS-CoV2 nsp5
-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	SARS-CoV2 nsp6
-0.0	-0.0	-0.0	-0.0	-0.0	0.0	-0.0	-0.0	SARS-CoV2 nsp7
0.2	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	SARS-CoV2 nsp8
-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	SARS-CoV2 nsp9
-0.0	-0.0	-0.0	-0.0	-0.0	0.1	-0.0	-0.0	SARS-CoV2 orf10
-0.0	-0.0	-0.0	-0.0	-0.0	0.1	-0.0	-0.0	SARS-CoV2 orf3a
-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	SARS-CoV2 orf3b
-0.0	-0.0	-0.0	-0.0	-0.0	0.4	-0.0	-0.0	SARS-CoV2 orf6
-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	SARS-CoV2 orf7a
-0.0	1.5	-0.0	-0.0	-0.0	0.0	-0.0	-0.0	SARS-CoV2 orf8
-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	SARS-CoV2 orf9b
-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	SARS-CoV2 orf9c
-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	SARS-CoV2 Spike
Capsid	NS1	NS2b_3	NS3	NS4a	NS4b	NS5	preME_TM2	

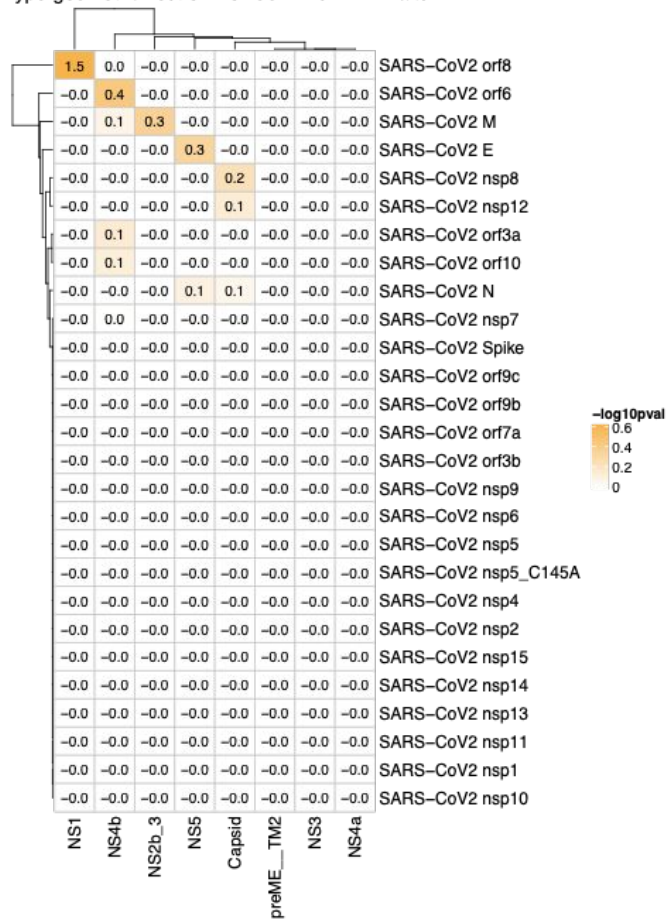


SARS-CoV2 orf8 (1.5): Involved in interspecies transmission, transmembrane protein
NS1: suspected to be involved in immune evasion activity

SARS-CoV2 orf6 (0.4): A protein is localized to the ER/Golgi membrane in infected cells where it binds to and disrupts nuclear import complex formation by tethering karyopherin alpha 2 and karyopherin beta 1 to the membrane

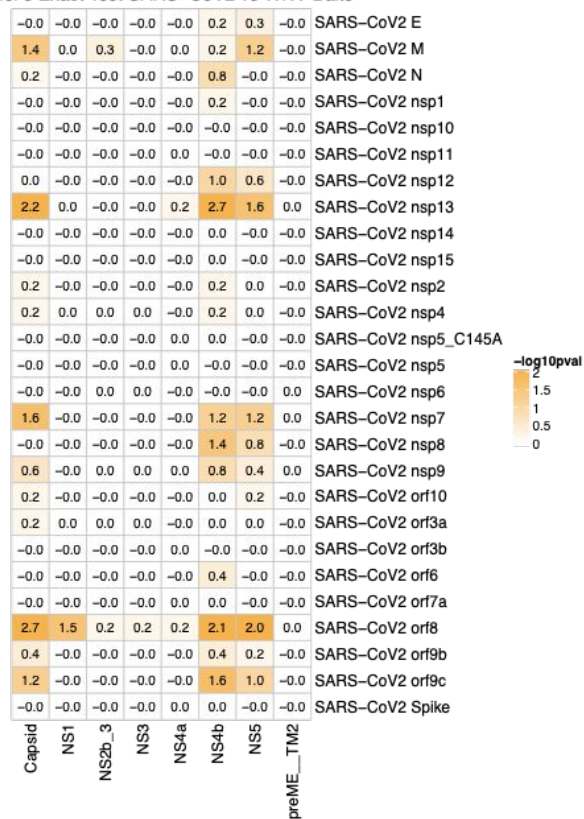
NS4b: prevents the establishment of cellular antiviral state by blocking the IFN-alpha/beta pathway

□



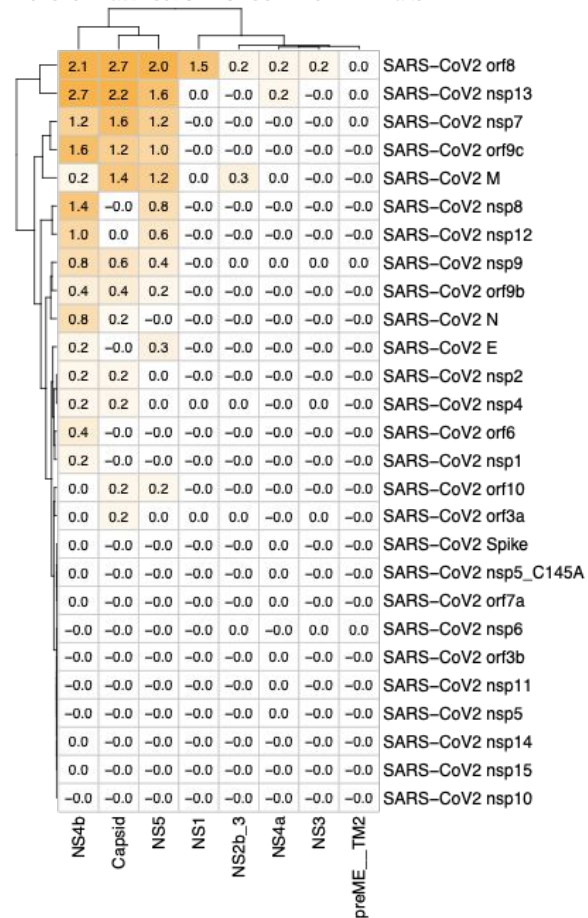
Fisher's Exact Test Between SARS-CoV2 and WNV

Fisher's Exact Test SARS-CoV2 vs WNV Baits

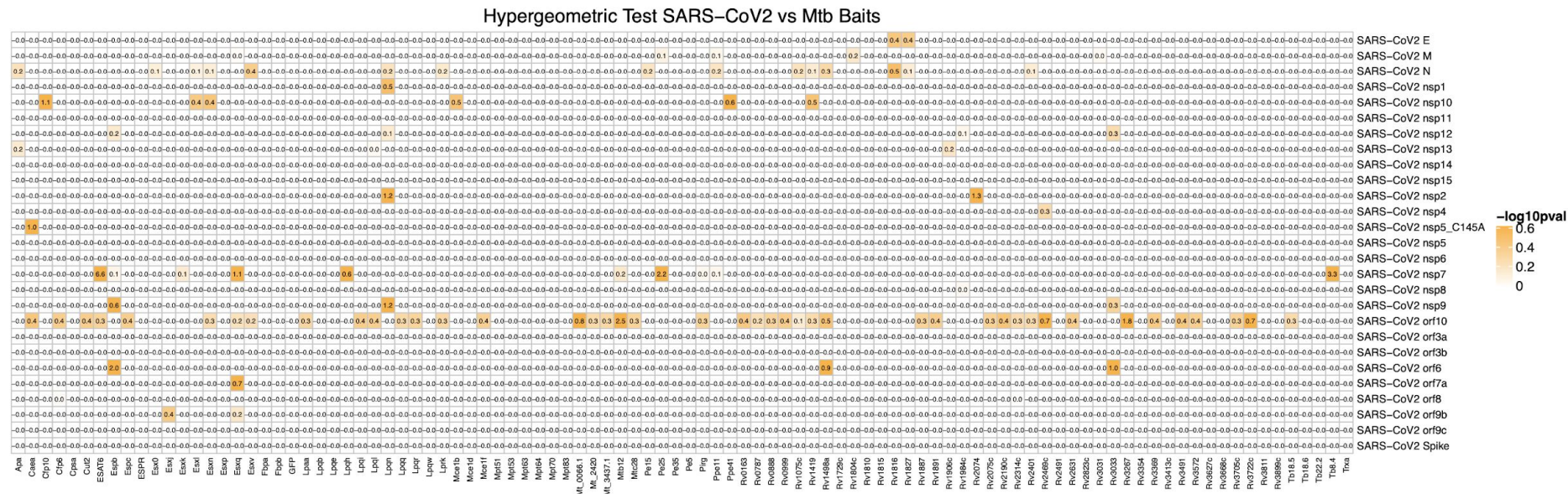


SARS-CoV2 orf8 (2.7): Involved in interspecies transmission, transmembrane protein
Capsid: Blocks host cell apoptosis during virus replication

SARS-CoV2 nsp13 (2.7): A helicase that separates double-stranded RNA (dsRNA) or DNA (dsDNA) with a 5'→3' polarity, using the energy of nucleotide hydrolysis
NS4b: prevents the establishment of cellular antiviral state by blocking the IFN-alpha/beta pathway



Hypergeometric Test Between SARS-CoV2 and Mtb



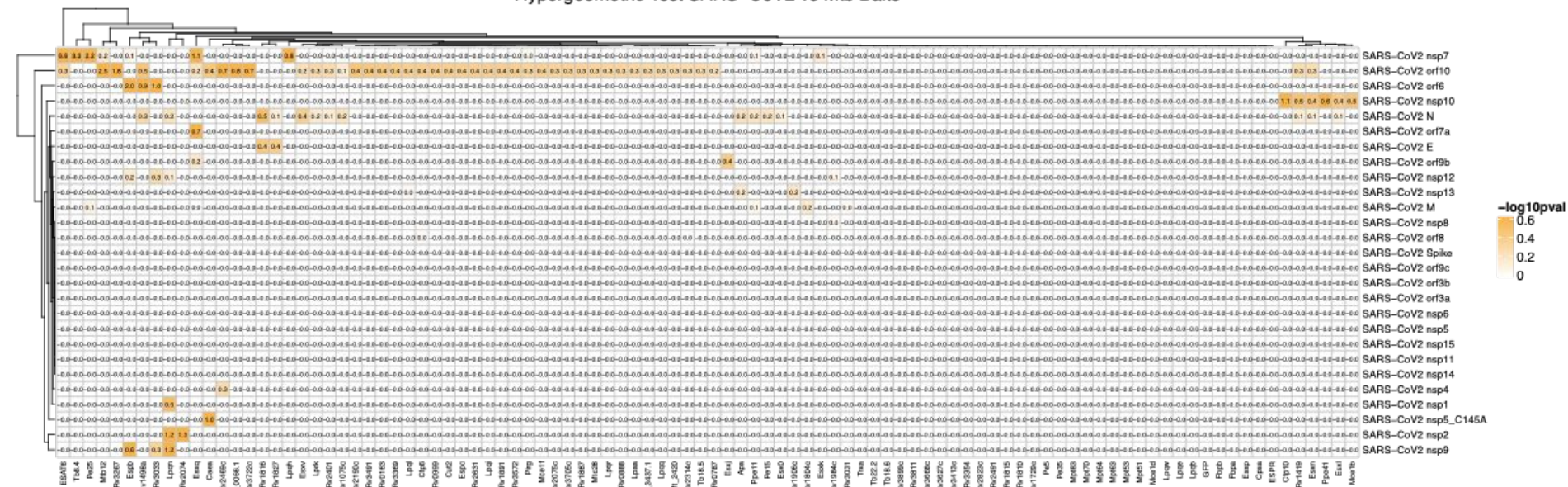
SARS-CoV2 nsp7 (6.6): Part of a complex with nsp8 that is a unique multimeric RNA polymerase capable of both *de novo* initiation and primer extension

ESTAT6: An important virulence factor, on it's own it is known to modulate host immune responses

SARS-CoV2 orf10 (2.5): In a heterodimer with nsp16 complex is essential for capping viral mRNA transcripts for efficient translation and to evade immune surveillance

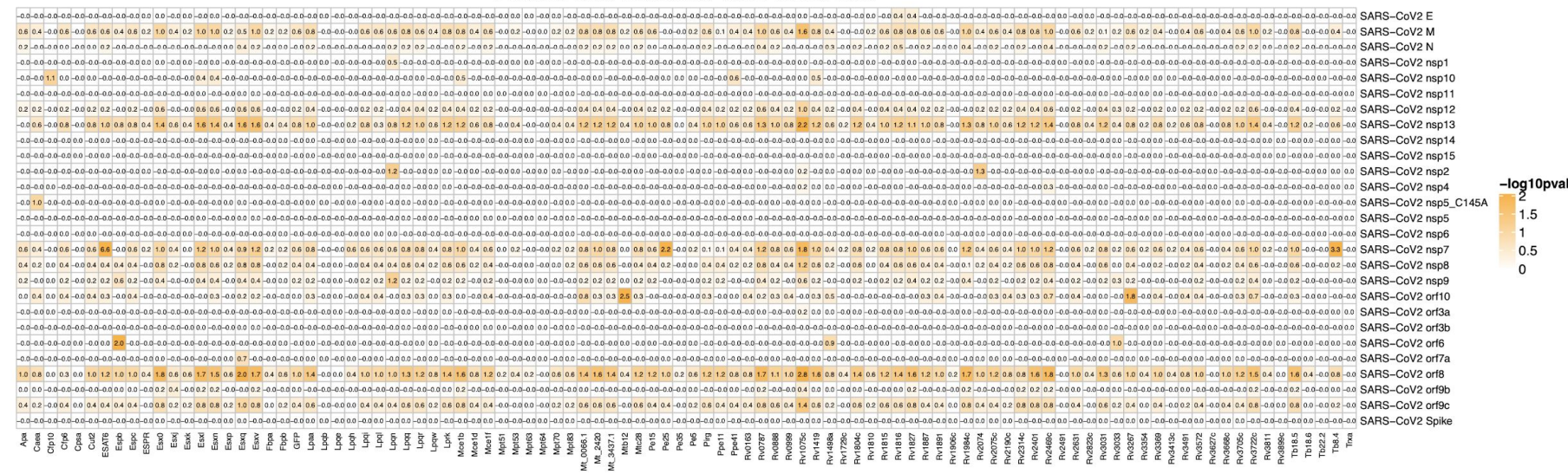
Mtb12:

Hypergeometric Test SARS-CoV2 vs Mtb Baits



Fisher's Exact Test Between SARS-CoV2 and Mtb

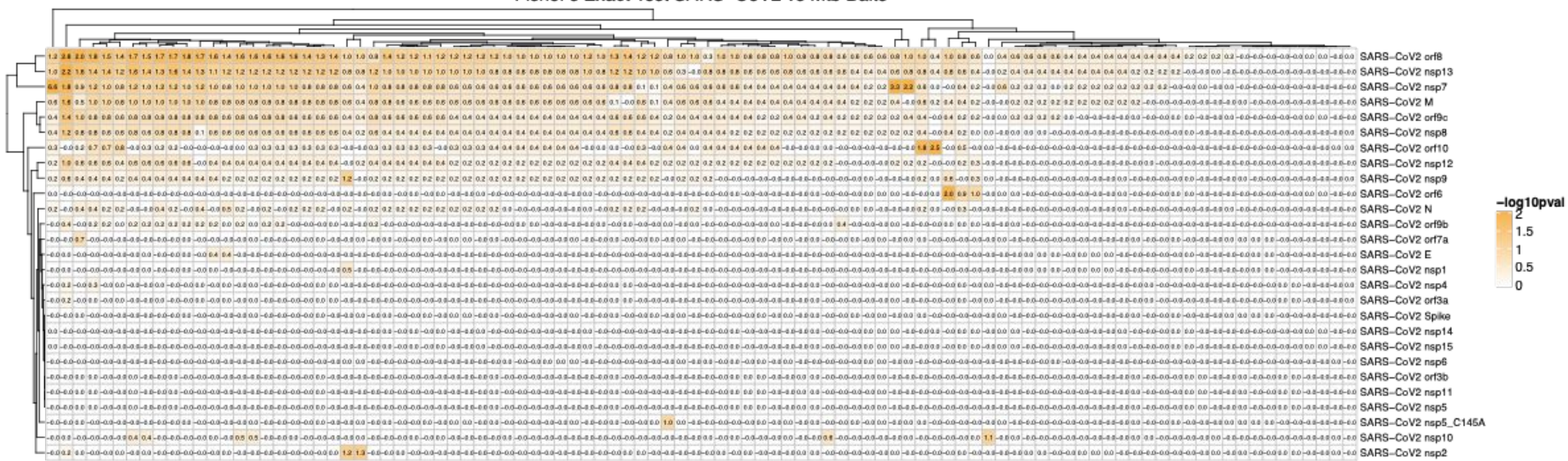
Fisher's Exact Test SARS-CoV2 vs Mtb Baits



SARS-CoV2 nsp7: Part of a complex with nsp8 that is a unique multimeric RNA polymerase capable of both *de novo* initiation and primer extension

SARS-CoV2 orf8: Involved in interspecies transmission, transmembrane protein

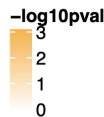
Fisher's Exact Test SARS-CoV2 vs Mtb Baits



Hypergeometric Test Between Dengue and WNV

Hypergeometric Test Dengue vs WNV Baits

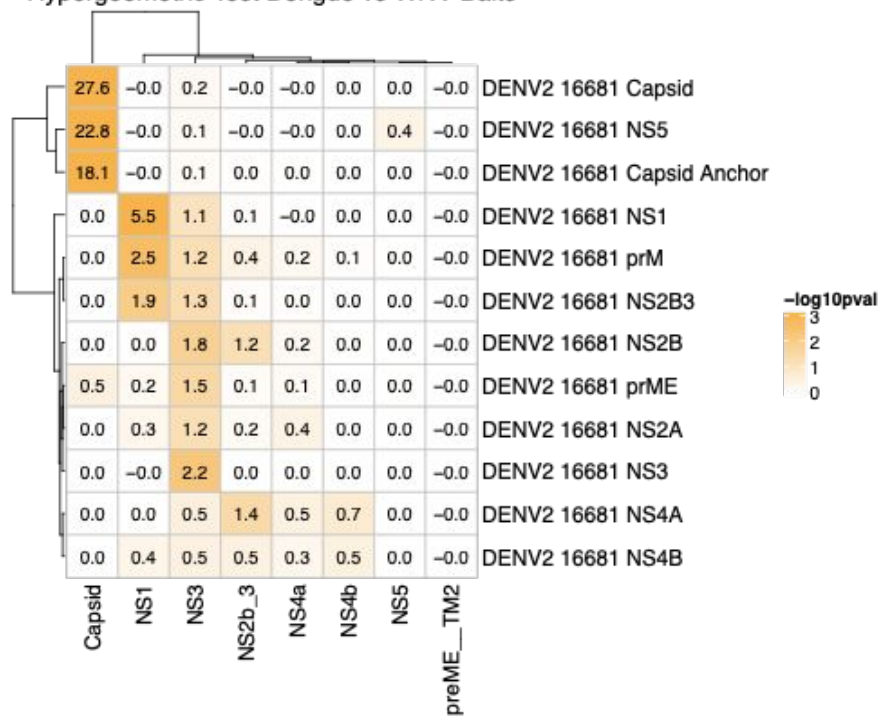
27.6	-0.0	-0.0	0.2	-0.0	0.0	0.0	-0.0	DENV2 16681 Capsid
18.1	-0.0	0.0	0.1	0.0	0.0	0.0	-0.0	DENV2 16681 Capsid Anchor
0.0	5.5	0.1	1.1	-0.0	0.0	0.0	-0.0	DENV2 16681 NS1
0.0	0.3	0.2	1.2	0.4	0.0	0.0	-0.0	DENV2 16681 NS2A
0.0	0.0	1.2	1.8	0.2	0.0	0.0	-0.0	DENV2 16681 NS2B
0.0	1.9	0.1	1.3	0.0	0.0	0.0	-0.0	DENV2 16681 NS2B3
0.0	-0.0	0.0	2.2	0.0	0.0	0.0	-0.0	DENV2 16681 NS3
0.0	0.0	1.4	0.5	0.5	0.7	0.0	-0.0	DENV2 16681 NS4A
0.0	0.4	0.5	0.5	0.3	0.5	0.0	-0.0	DENV2 16681 NS4B
22.8	-0.0	-0.0	0.1	-0.0	0.0	0.4	-0.0	DENV2 16681 NS5
0.0	2.5	0.4	1.2	0.2	0.1	0.0	-0.0	DENV2 16681 prM
0.5	0.2	0.1	1.5	0.1	0.0	0.0	-0.0	DENV2 16681 prME
Capsid	NS1	NS2b_3	NS3	NS4a	NS4b	NS5	preME_TM2	



DENV2 16681 Capsid (27.6): Plays a role in virus budding by binding to the cell membrane and gathering the viral RNA into a nucleocapsid that forms the core of a mature virus particle
Capsid: Blocks host cell apoptosis during virus replication

DENV2 16681 NS5 (22.8): Replicates the viral (+) and (-) RNA genome, and performs the capping of genomes in the cytoplasm.
Capsid: Blocks host cell apoptosis during virus replication

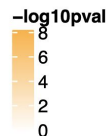
Hypergeometric Test Dengue vs WNV Baits



Fisher's Exact Test Between Dengue and WNV

Fisher's Exact Test Dengue vs WNV Baits

27.6	1.2	1.4	-0.0	1.8	8.1	1.9	-0.0	DENV2 16681 Capsid
18.1	0.6	0.3	-0.0	0.7	6.7	1.2	-0.0	DENV2 16681 Capsid Anchor
3.3	5.5	-0.0	1.1	0.8	2.7	1.7	-0.0	DENV2 16681 NS1
3.8	0.1	-0.0	1.0	0.2	4.6	2.5	-0.0	DENV2 16681 NS2A
3.8	0.3	1.0	1.8	0.0	1.3	2.1	-0.0	DENV2 16681 NS2B
2.6	1.9	0.1	1.2	0.4	3.2	1.3	0.3	DENV2 16681 NS2B3
1.6	1.2	0.9	2.2	0.6	4.0	2.2	-0.0	DENV2 16681 NS3
3.5	0.5	1.3	0.3	0.2	0.5	3.0	0.3	DENV2 16681 NS4A
3.5	0.2	0.3	0.3	0.1	0.3	3.4	-0.0	DENV2 16681 NS4B
22.8	1.2	1.7	-0.0	2.1	10.4	0.1	-0.0	DENV2 16681 NS5
4.3	2.5	0.3	1.1	0.0	0.5	1.1	0.0	DENV2 16681 prM
0.2	-0.0	-0.0	1.3	-0.0	6.5	0.9	-0.0	DENV2 16681 prME
Capsid	NS1	NS2b_3	NS3	NS4a	NS4b	NS5	prME_TM2	

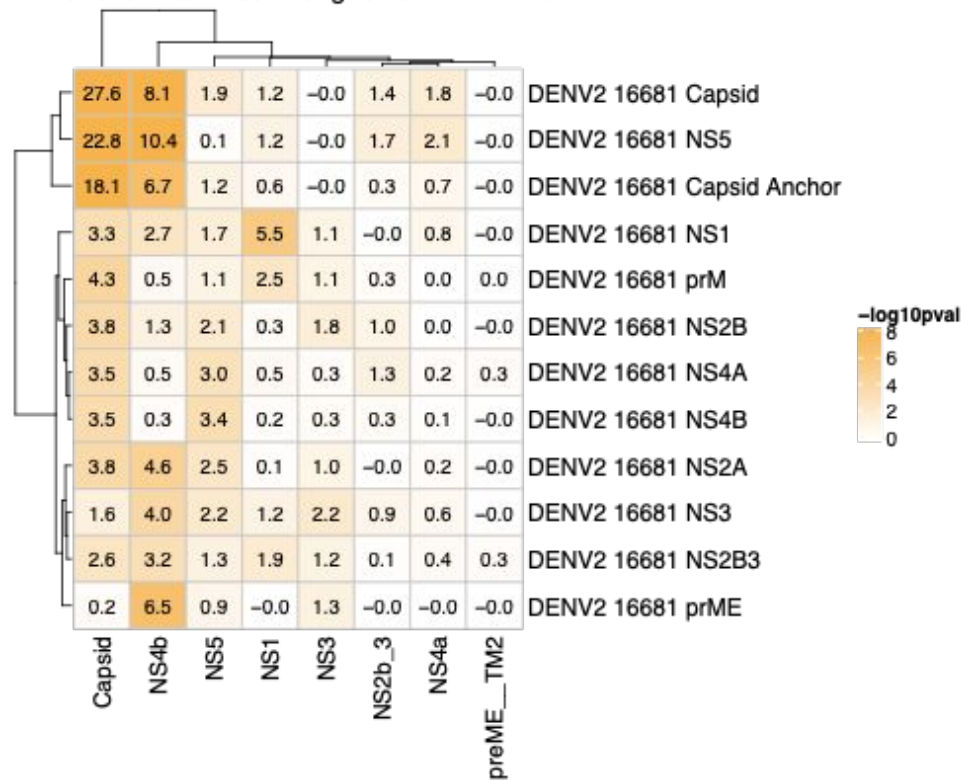


DENV2 16681 Capsid (27.6): Plays a role in virus budding by binding to the cell membrane and gathering the viral RNA into a nucleocapsid that forms the core of a mature virus particle
Capsid: Blocks host cell apoptosis during virus replication

DENV2 16681 NS5 (10.4): Replicates the viral (+) and (-) RNA genome, and performs the capping of genomes in the cytoplasm.

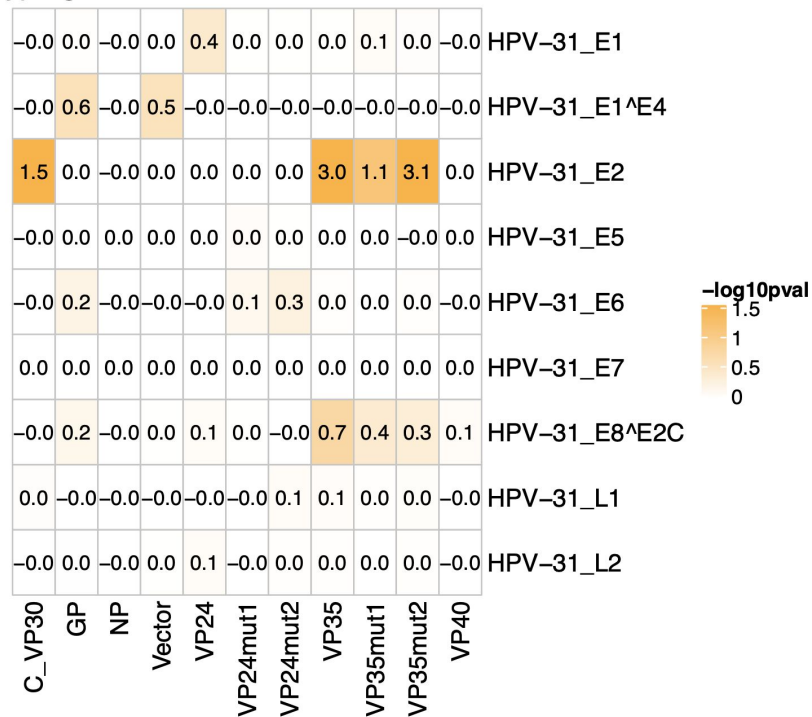
NS4b: prevents the establishment of cellular antiviral state by blocking the IFN-alpha/beta pathway

Fisher's Exact Test Dengue vs WNV Baits



Hypergeometric Test Between HPV and Ebola

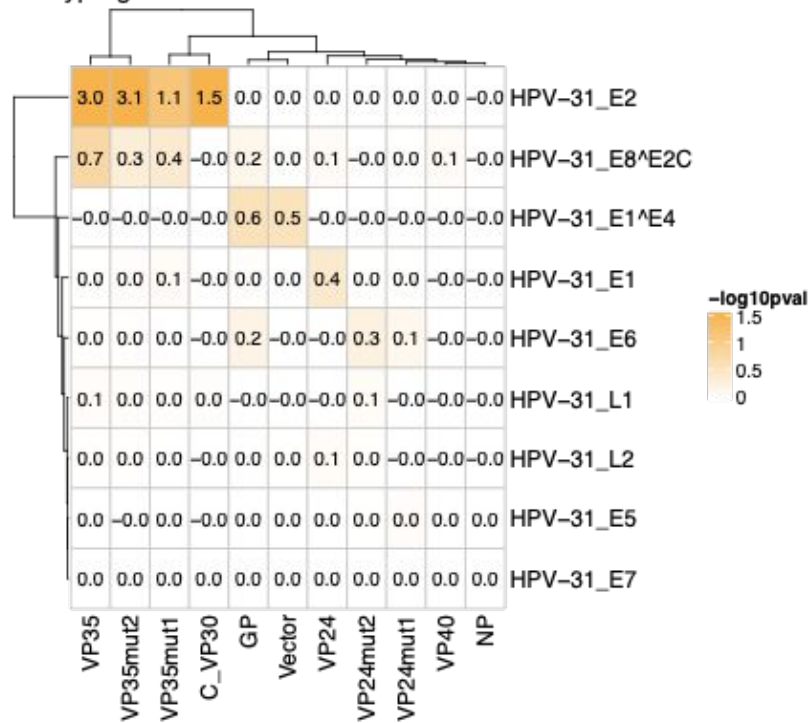
Hypergeometric Test HPV vs Ebola Baits



HPV-31 E6 (3.0): Binds ACCN6GGT sequences and activates heterologous promoters from multimerized binding sites (basically has functions in replication)
 VP35: Plays an essential role in viral RNA synthesis and also a role in suppressing innate immune signaling. Acts as a polymerase cofactor in the RNA polymerase transcription and replication complexes.

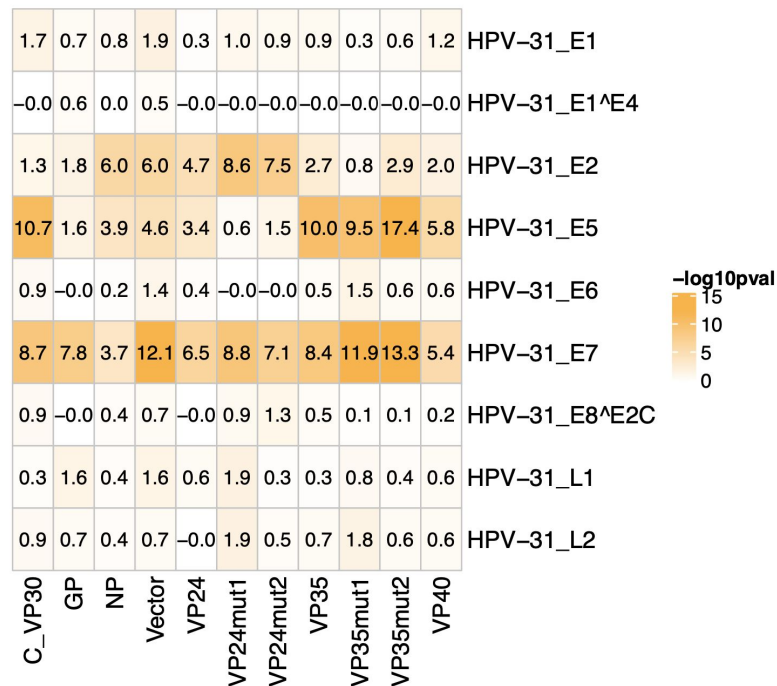
HPV-31 E6 (1.5): Binds ACCN6GGT sequences and activates heterologous promoters from multimerized binding sites (basically has functions in replication)
 C_VP30: Shown to play an essential role in Ebola virus replication, most likely by stabilizing nascent mRNA

Hypergeometric Test HPV vs Ebola Baits



Fisher's Exact Test Between HPV and Ebola

Fisher's Exact Test HPV vs Ebola Baits



HPV-31 E5: Supports Cell Cycle Progression and Activates Late Viral Functions upon Epithelial Differentiation

HPV-31 E7: Along with E6, it is found to be able to immortalize human keratinocytes *in vitro* and likely contribute to the development of anogenital malignancies *in vivo*

Fisher's Exact Test HPV vs Ebola Baits

