

Table S1. Cryo-EM data collection and refinement statistics.

Sample	9-6-17 TV 5-12-18 dataset	9-6-17 TV Without DTT	9-6-17 TV With DTT
Data collection			
Grid	Lacey grid coated with graphene oxide, 300 mesh	Quantifoil grid coated with graphene oxide R1.2/1.3 300 mesh	
Voltage (kV)		300	
Total Dose (e-/Å ²)	23		25
Nominal Magnification	81,000		105,000
Number of Movies	969	503	771
Physical Pixel Size (Å)	1.73		1.384
Intended Defocus (µm)	0.8-2.2		1.5-2.5
Number of Frames	35		30
Image processing			
Particles Picked	48,505	20,260	132,461
Number of Particles After 2D classification	27,187	18,397	44,239
Final number of particles	11,645	16,777	44,239
Resolution (Å)	3.2	2.73	2.63
Final Map Pixel Size (Å)	1.2975	1.035	1.104
Refinement			
Map CC	0.73	0.81	0.85
All-atom Clashscore	15.25	6.79	8.88
Rotamer Outliers (%)	4.90	2.3	1.99
Ramachandran plot			
Outliers (%)	0.20	0.26	0.33
Allowed (%)	11.27	9.71	11.84
Favored (%)	88.53	90.03	87.84

Table S2. Residue identity at the 8 mutation sites in VP1 of 10 Recovirus homologues in *Calicivirus* family

a.a. position	a.a. in wild - type TV	a.a. in 9- 6- 17 T V	10 Recoviruses capsid protein Uniprot Entry ID

3	N	S	S(AHE37931.1;AHE37934.1;AHE37928.1;AHE37919.1; AHE37916.1; AHE37913.1), K(AHE37922.1;AFV48067.1;AHE37925.1;AHE37947.1)
284	N	H	H(AHE37919.1; AHE37916.1; AHE37913.1), Q(AHE37925.1; AHE37947.1; AHE37931.1; AHE37934.1; AHE37928.1), N(AFV48067.1), K(AHE37922.1)
334	F	V	V(AHE37922.1;AFV48067.1;AHE37925.1;AHE37947.1;AHE37919.1;AHE37916.1;A HE37913.1), T(AHE37931.1; AHE37934.1; AHE37928.1)
335	A	E	D(AHE37922.1; AFV48067.1; AHE37925.1; AHE37947.1; AHE37919.1; AHE37916.1; AHE37913.1; AHE37931.1; AHE37934.1; AHE37928.1)
343	A	T	A(AHE37922.1; AFV48067.1; AHE37925.1; AHE37947.1; AHE37916.1; AHE37913.1; AHE37931.1; AHE37934.1; AHE37928.1), T (AHE37919.1)
367	S	K	S(AHE37919.1; AHE37916.1; AHE37913.1; AHE37931.1; AHE37934.1; AHE37928.1), I(AHE37922.1; AFV48067.1; AHE37925.1; AHE37947.1)
451	I	M	I(AHE37922.1; AFV48067.1; AHE37925.1; AHE37947.1; AHE37919.1; AHE37916.1; AHE37913.1; AHE37931.1; AHE37934.1; AHE37928.1)
452	R	C	R(AHE37922.1; AFV48067.1; AHE37925.1; AHE37947.1; AHE37919.1; AHE37916.1; AHE37913.1; AHE37931.1; AHE37934.1; AHE37928.1)

*References: (AHE37922.1; AHE37925.1; AHE37947.1; AHE37919.1; AHE37916.1;
AHE37913.1; AHE37931.1; AHE37934.1; AHE37928.1) [27]; AFV48067.1 [28].