wwPDB EM Validation Summary Report

Nov 20, 2022 – 01:48 AM EST

PDB ID	:	3IZX
EMDB ID	:	EMD-5256
Title	:	3.1 Angstrom cryoEM structure of cytoplasmic polyhedrosis virus
Authors	:	Yu, X.; Ge, P.; Jiang, J.; Atanasov, I.; Zhou, Z.H.
Deposited on	:	2011-01-15
Resolution	:	3.10 Å(reported)

This is a wwPDB EM Validation Summary Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the (i) symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

The following versions of software and data (see references (i)) were used in the production of this report:

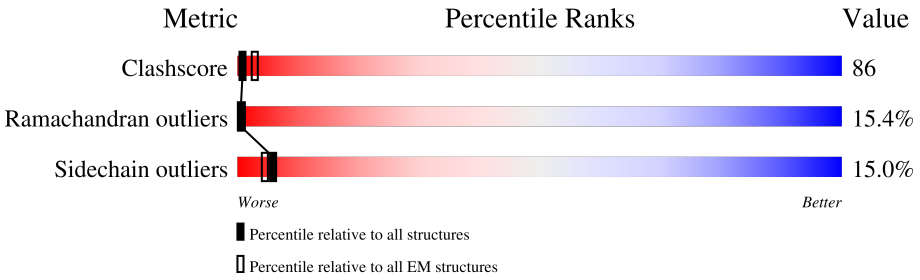
EMDB validation analysis	:	0.0.1.dev43
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	FAILED
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.31.3

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 3.10 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5%

Mol	Chain	Length	Quality of chain
1	A	1058	20% 54% 23% ·
2	B	1333	17% 49% 21% · 11%
2	C	1333	21% 50% 20% · 6%
3	D	448	15% 34% 14% · 35%
3	E	448	15% 35% 14% · 35%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 32209 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Structural protein VP3.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	1057	Total	C	N	O	S	0	0
			8434	5345	1457	1587	45		

- Molecule 2 is a protein called Capsid protein VP1.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	1191	Total	C	N	O	S	0	0
			9397	5937	1634	1789	37		
2	C	1249	Total	C	N	O	S	0	0
			9844	6213	1712	1882	37		

- Molecule 3 is a protein called Viral structural protein 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	D	290	Total	C	N	O	S	0	0
			2267	1440	398	422	7		
3	E	290	Total	C	N	O	S	0	0
			2267	1440	398	422	7		

There are 2 discrepancies between the modelled and reference sequences:

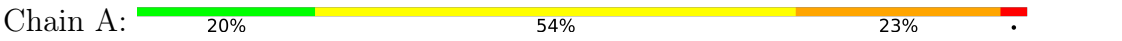
Chain	Residue	Modelled	Actual	Comment	Reference
D	37	TRP	TYR	conflict	UNP C6K2M8
E	37	TRP	TYR	conflict	UNP C6K2M8

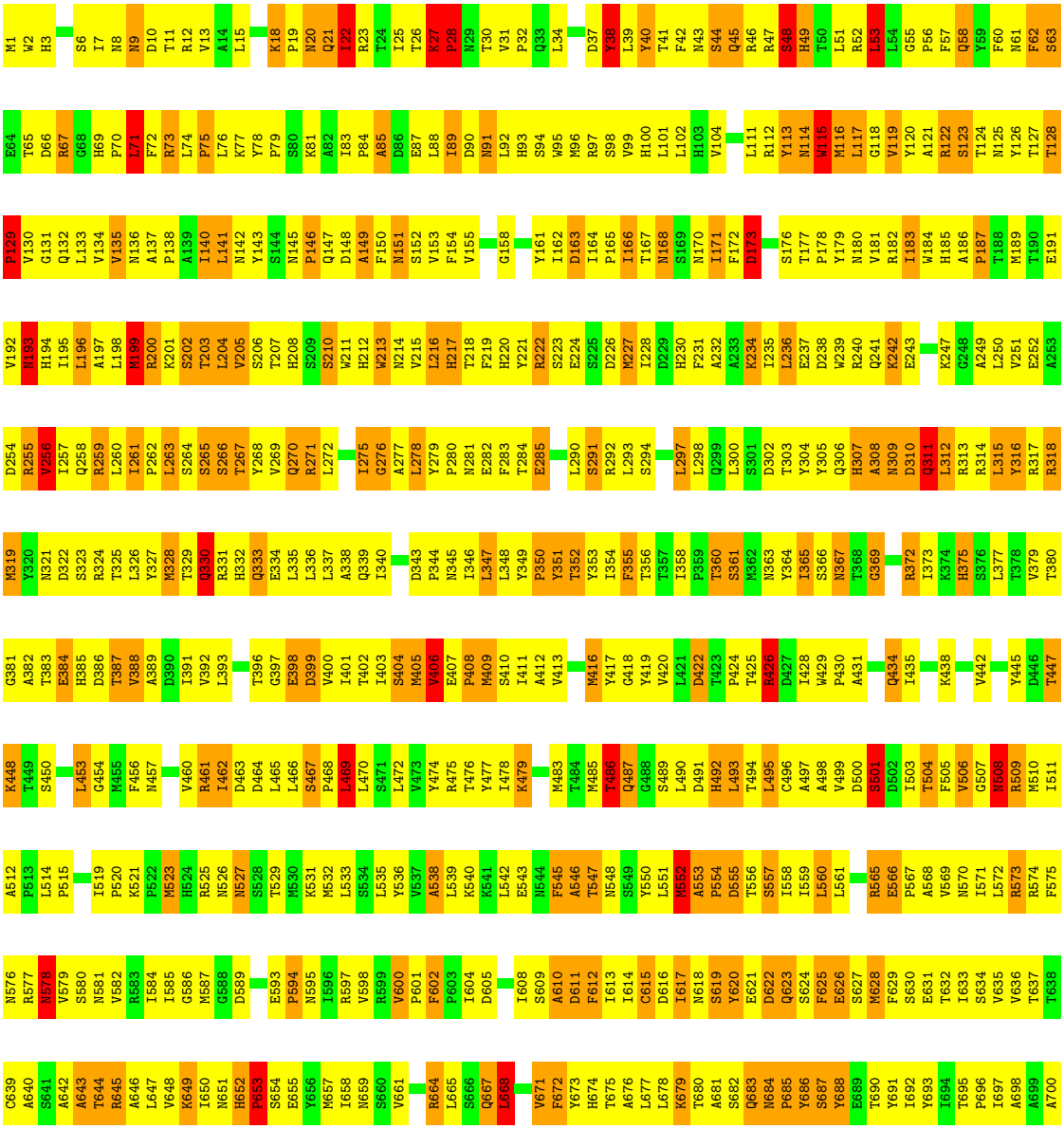
3 Residue-property plots (i)

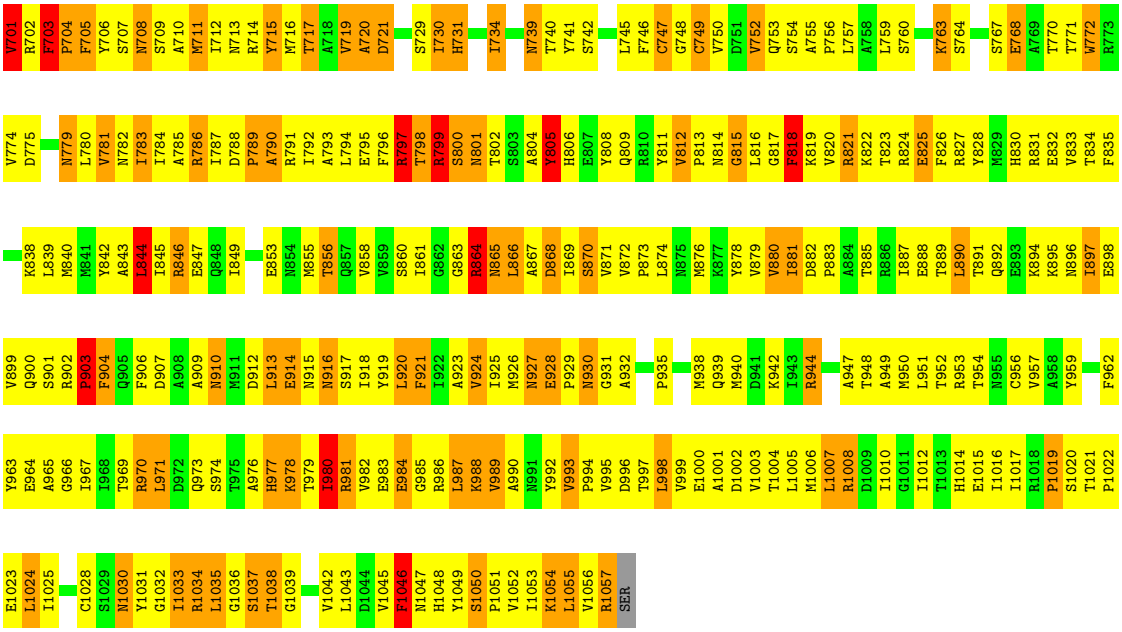
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Structural protein VP3

Chain A:

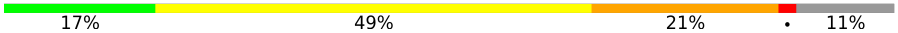


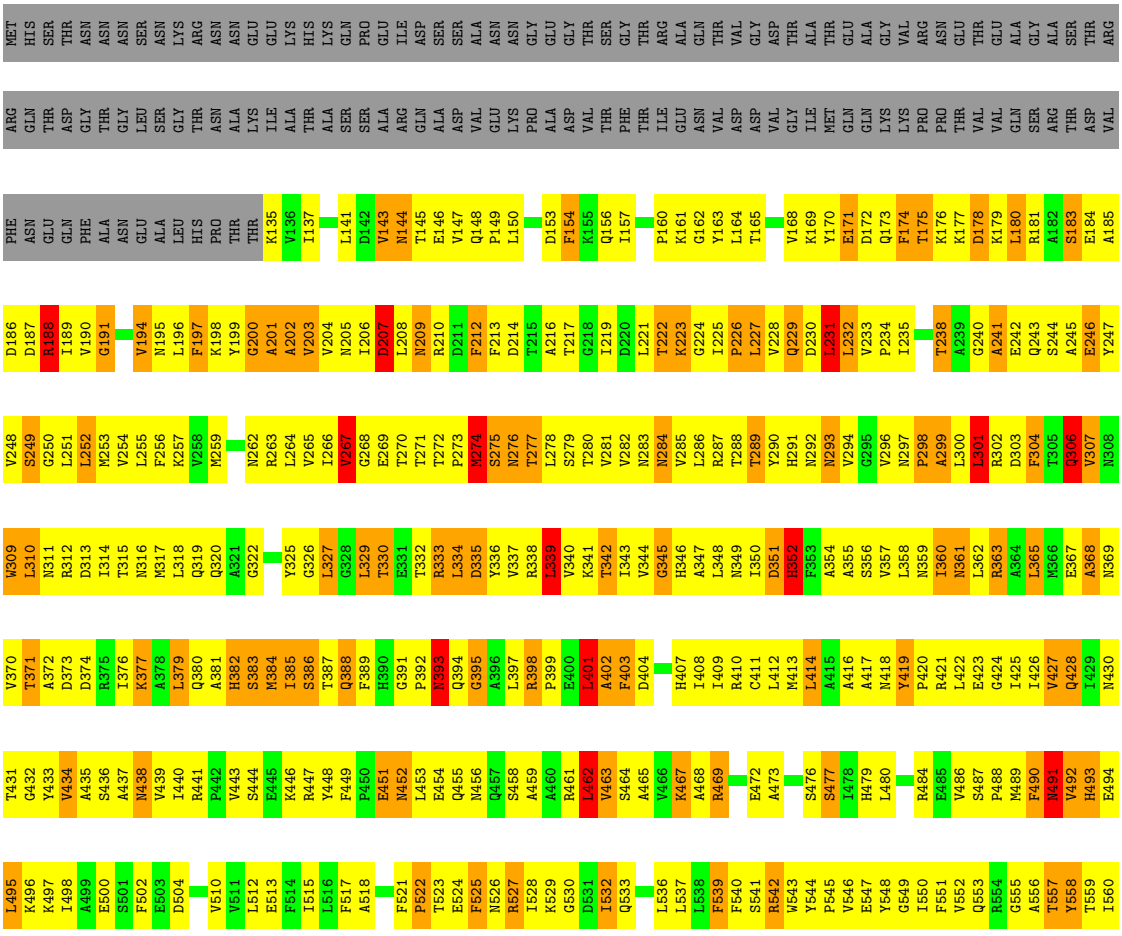


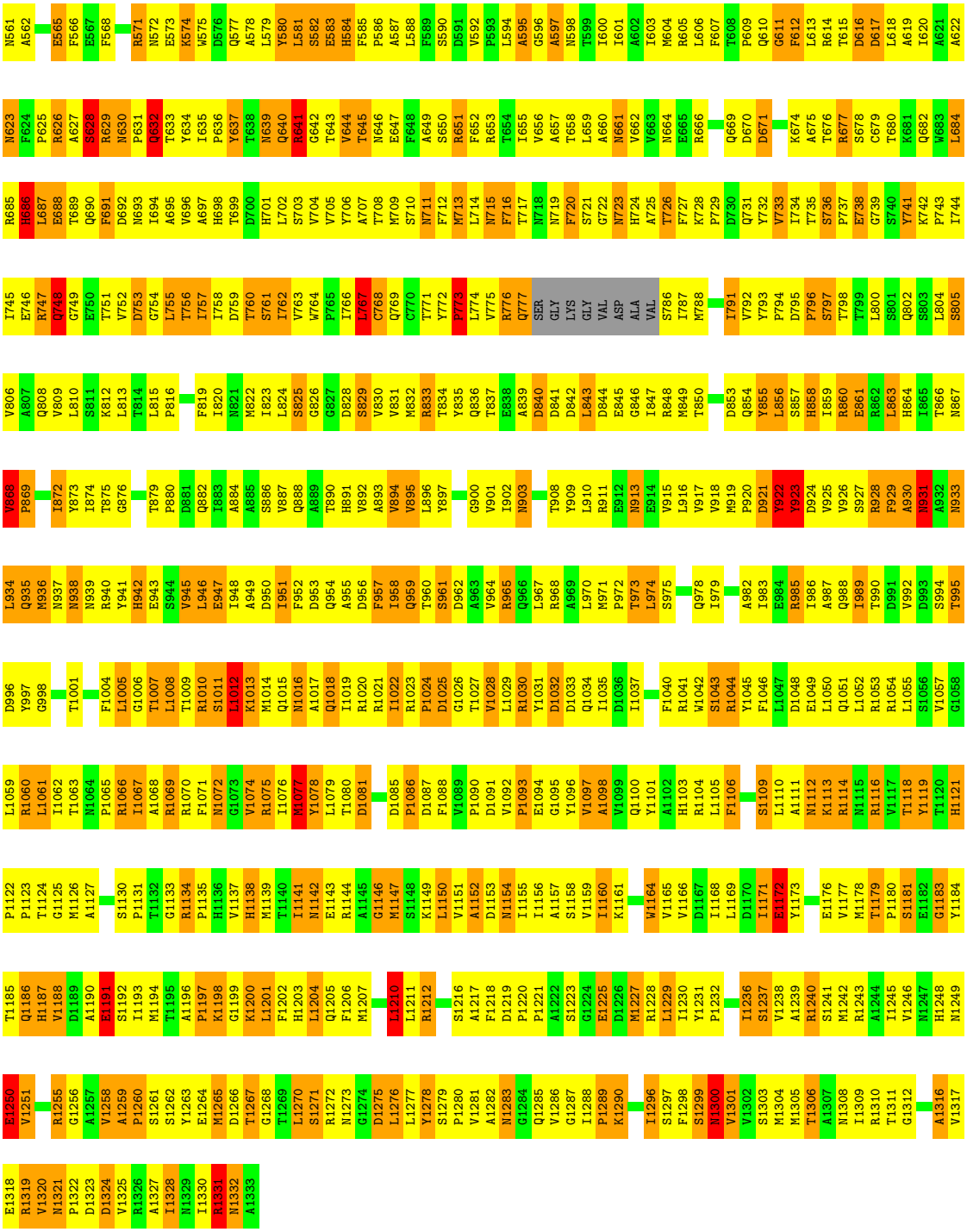


• Molecule 2: Capsid protein VP1

Chain B:

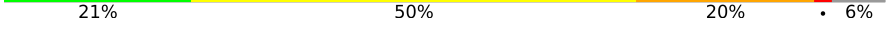


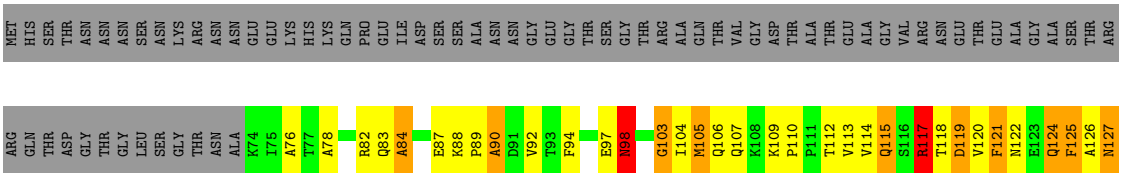


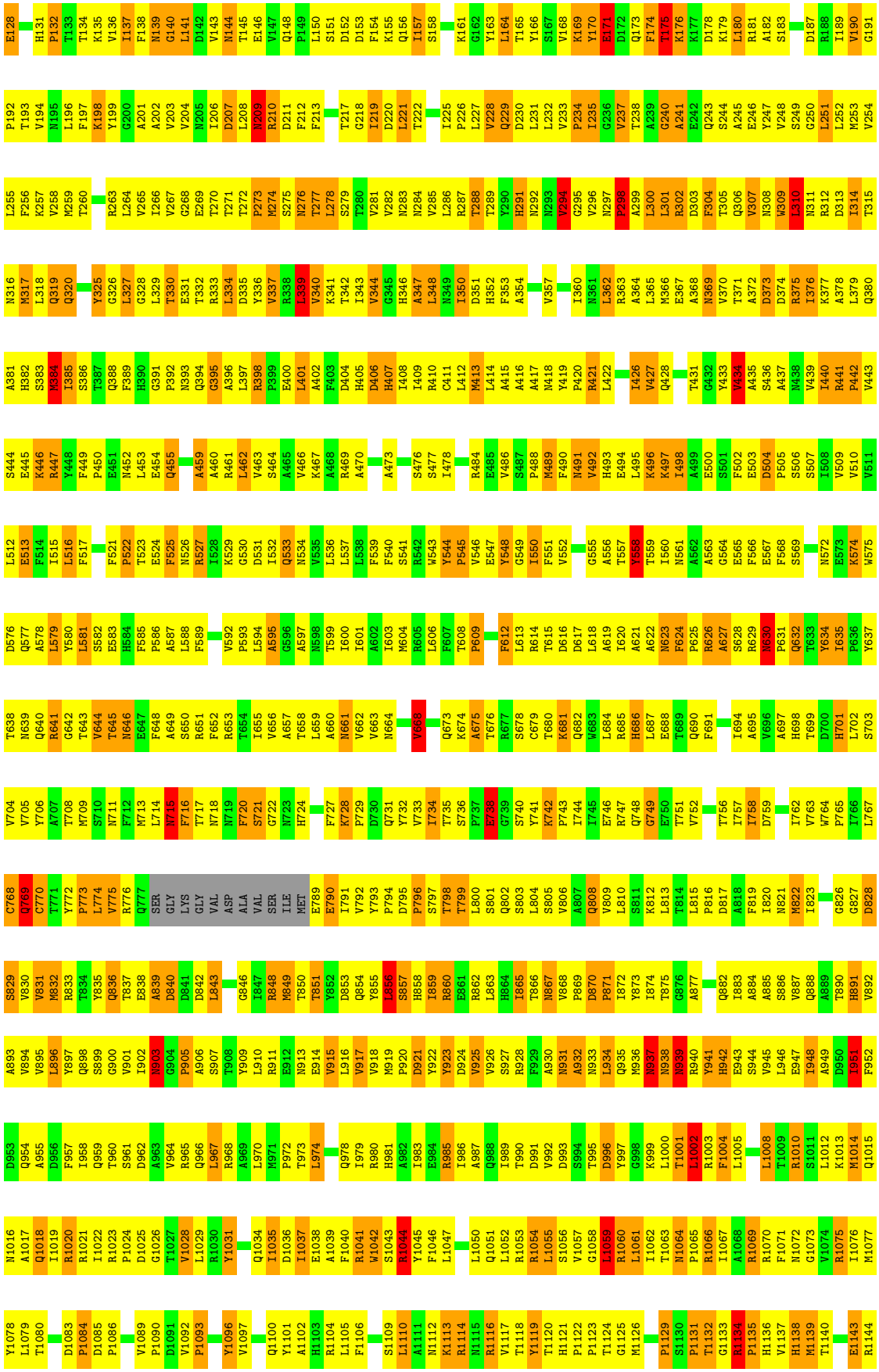


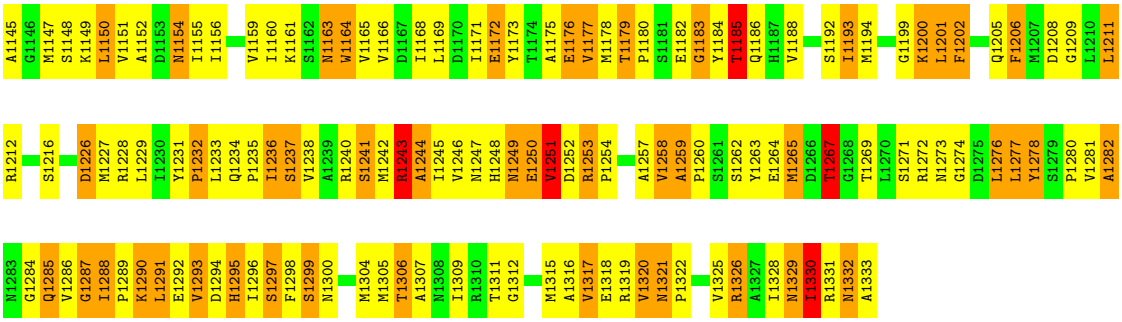
• Molecule 2: Capsid protein VP1

Chain C:



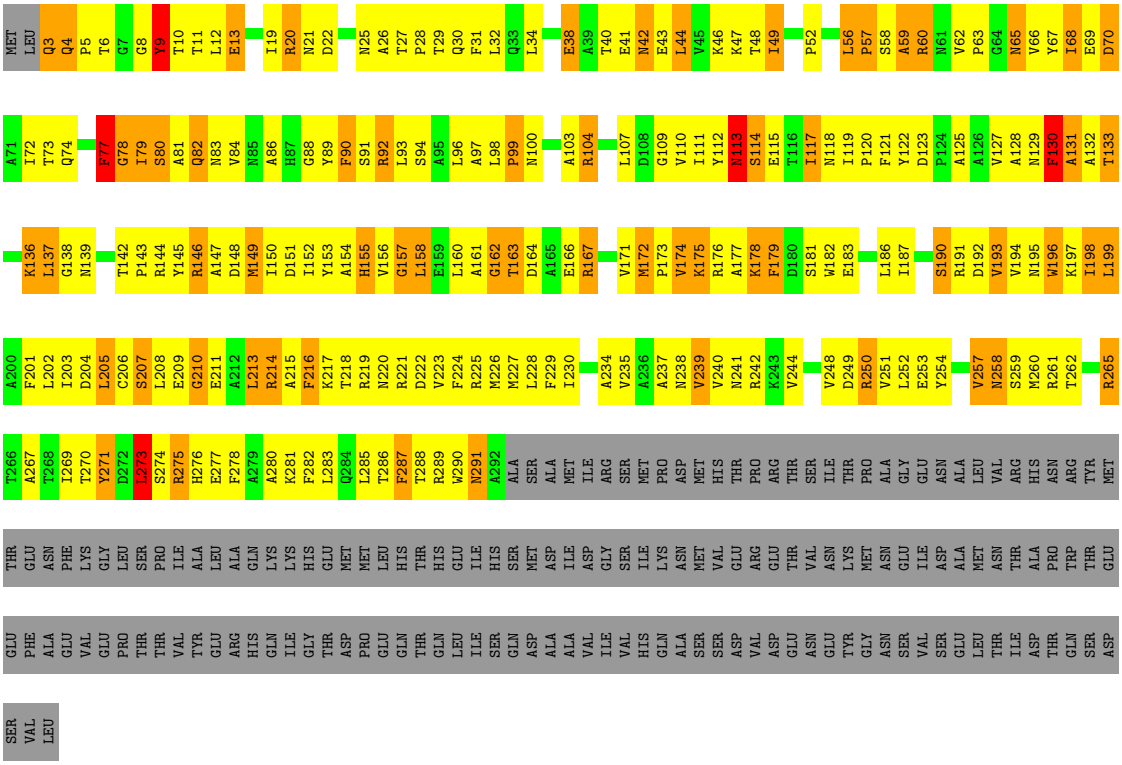






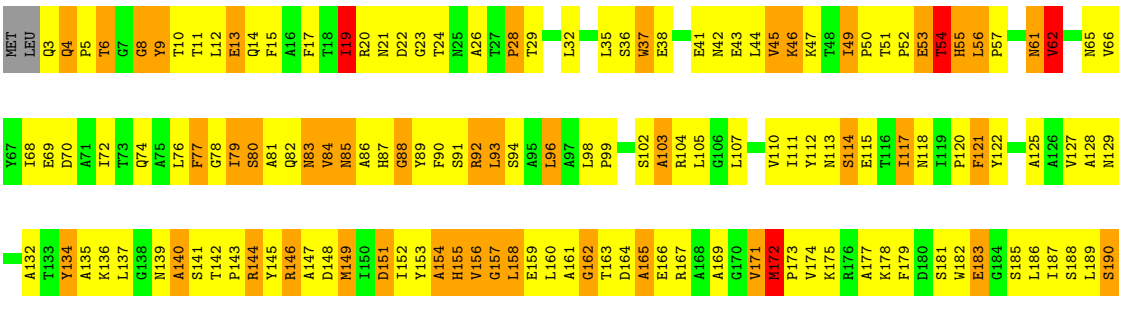
• Molecule 3: Viral structural protein 5

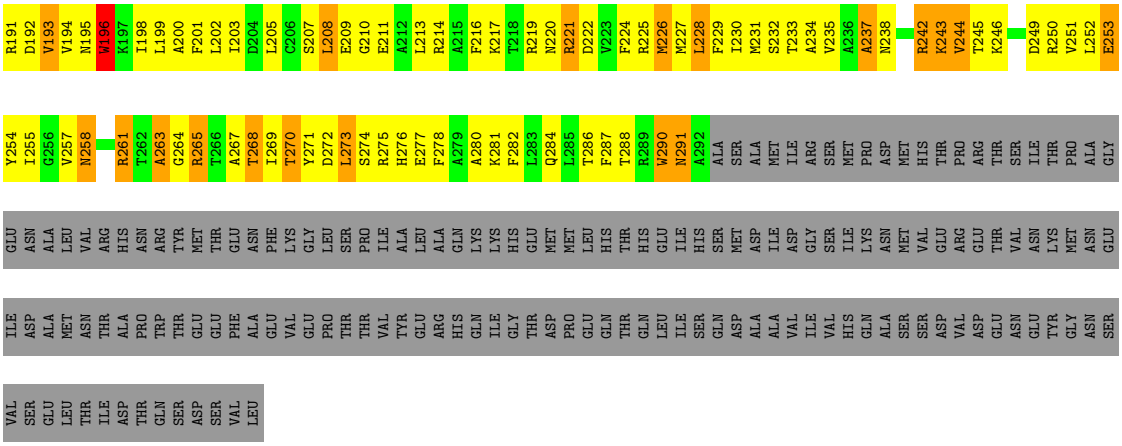
Chain D:



• Molecule 3: Viral structural protein 5

Chain E:




R191 D192 V193 V194 N195 W196 K197 I198 L199 A200 F201 L202 I203 D204 L205 C206 S207 L208 E209 G210 E211 A212 L213 R214 A215 F216 K217 T218 R219 N220 R221 D222 V223 F224 R225 M226 M227 L228 F229 I230 M231 S232 T233 A234 V235 A236 A237 N238 R242 K243 V244 T245 K246 D249 R250 V251 L252 E253
Y254 I255 G256 V257 N258 R261 T262 A263 G264 R265 T266 A267 T268 I269 T270 Y271 D272 L273 S274 R275 H276 E277 F278 A279 A280 K281 F282 L283 Q284 L285 T286 F287 T288 R289 W290 N291 A292 ALA SER ALA MET ILE ARG SER MET PRO ASP MET HIS THR PRO ARG THR SER ILE THR PRO ALA GLY
GLU ASN ALA LEU VAL ARG HIS ASN ARG TYR MET THR GLU ASN PHE LYS GLY LEU SER PRO ILE ALA LEU ALA GLN LYS LYS HIS GLU MET MET LEU HIS THR HIS GLU ILE HIS SER MET ASP ILE ASP GLY SER ILE LYS ASN MET VAL GLU ARG GLU THR VAL ASN LYS MET ASN GLU
ILE ASP ALA MET ASN THR ALA PRO TRP THR GLU GLU PHE ALA GLU VAL GLU PRO THR THR VAL TYR GLU ARG HIS GLN ILE GLY THR ASP PRO GLU GLN THR GLN LEU ILE SER GLN ASP ALA ALA VAL ILE VAL HIS GLN ALA SER SER ASP VAL ASP GLU ASN GLU TYR GLY ASN SER
VAL SER GLU LEU THR ILE ASP THR GLN SER ASP SER VAL LEU

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, I	Depositor
Number of particles used	28993	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	Each particle	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	25	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	59000	Depositor
Image detector	KODAK SO-163 FILM	Depositor

5 Model quality

5.1 Standard geometry

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|$ >5	RMSZ	#$\|Z\|$ >5
1	A	0.68	9/8619 (0.1%)	1.04	42/11737 (0.4%)
2	B	0.77	16/9590 (0.2%)	1.08	49/13056 (0.4%)
2	C	0.69	7/10045 (0.1%)	1.07	42/13678 (0.3%)
3	D	0.63	0/2314	1.03	17/3147 (0.5%)
3	E	0.65	0/2314	0.98	12/3147 (0.4%)
All	All	0.71	32/32882 (0.1%)	1.06	162/44765 (0.4%)

The worst 5 of 32 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	202	ALA	CA-CB	11.75	1.77	1.52
2	B	1098	ALA	CA-CB	8.29	1.69	1.52
2	C	114	VAL	CA-CB	8.29	1.72	1.54
2	C	1320	VAL	CA-CB	7.62	1.70	1.54
1	A	232	ALA	CA-CB	-7.29	1.37	1.52

The worst 5 of 162 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	C	550	ILE	CB-CA-C	-9.49	92.62	111.60
2	C	1059	LEU	CA-CB-CG	9.28	136.65	115.30
2	C	1316	ALA	CB-CA-C	8.39	122.68	110.10
1	A	971	LEU	CA-CB-CG	-8.22	96.39	115.30
2	B	863	LEU	CA-CB-CG	-8.15	96.55	115.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen

atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	8434	0	8395	1501	0
2	B	9397	0	9313	1584	0
2	C	9844	0	9749	1701	0
3	D	2267	0	2260	343	0
3	E	2267	0	2260	348	0
All	All	32209	0	31977	5388	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 86.

The worst 5 of 5388 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:1242:MET:HE1	2:C:1260:PRO:CD	1.25	1.60
2:C:615:THR:CG2	2:C:632:GLN:HB3	1.26	1.60
3:D:26:ALA:CB	3:D:30:GLN:HE21	1.13	1.60
2:C:832:MET:CE	2:C:946:LEU:HD12	1.34	1.56
2:B:202:ALA:CA	2:B:202:ALA:CB	1.77	1.56

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	1055/1058 (100%)	659 (62%)	233 (22%)	163 (16%)	0 0
2	B	1187/1333 (89%)	800 (67%)	183 (15%)	204 (17%)	0 0
2	C	1245/1333 (93%)	861 (69%)	207 (17%)	177 (14%)	0 1
3	D	288/448 (64%)	203 (70%)	46 (16%)	39 (14%)	0 1

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
3	E	288/448 (64%)	191 (66%)	55 (19%)	42 (15%)	0 1
All	All	4063/4620 (88%)	2714 (67%)	724 (18%)	625 (15%)	0 0

5 of 625 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	48	SER
1	A	63	SER
1	A	123	SER
1	A	135	VAL
1	A	202	SER

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	942/943 (100%)	786 (83%)	156 (17%)	2 9
2	B	1038/1153 (90%)	891 (86%)	147 (14%)	3 14
2	C	1088/1153 (94%)	928 (85%)	160 (15%)	3 13
3	D	238/379 (63%)	204 (86%)	34 (14%)	3 14
3	E	238/379 (63%)	203 (85%)	35 (15%)	3 13
All	All	3544/4007 (88%)	3012 (85%)	532 (15%)	6 12

5 of 532 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	D	3	GLN
3	D	130	PHE
2	C	1332	ASN
3	E	172	MET
2	B	462	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 136 such sidechains are listed below:

Mol	Chain	Res	Type
2	C	959	GLN
2	C	1203	HIS
3	D	276	HIS
2	B	388	GLN
2	B	352	HIS

5.3.3 RNA

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates

There are no monosaccharides in this entry.

5.6 Ligand geometry

There are no ligands in this entry.

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

6 Map visualisation

This section contains visualisations of the EMDB entry EMD-5256. These allow visual inspection of the internal detail of the map and identification of artifacts.

No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

This section was not generated.

6.2 Central slices

This section was not generated.

6.3 Largest variance slices

This section was not generated.

6.4 Orthogonal surface views

This section was not generated.

6.5 Mask visualisation

This section was not generated. No masks/segmentation were deposited.

7 Map analysis

This section contains the results of statistical analysis of the map.

7.1 Map-value distribution

This section was not generated.

7.2 Volume estimate versus contour level

This section was not generated.

7.3 Rotationally averaged power spectrum

This section was not generated. The rotationally averaged power spectrum had issues being displayed.

8 Fourier-Shell correlation (i)

This section was not generated. No FSC curve or half-maps provided.

9 Map-model fit

This section was not generated.