Full wwPDB X-ray Structure Validation Report ⓘ

Jan 30, 2023 – 12:53 pm GMT

PDB ID	:	7PAA
Title	:	JC polyomavirus VP1 in complex with scFv 29B1
Authors	:	Harprecht, C.; Stroeh, L.J.; Freytag, J.; Stehle, T.
Deposited on	:	2021-07-29
Resolution	:	3.10 Å(reported)

This is a Full wwPDB X-ray Structure Validation 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/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ 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 ⓘ) were used in the production of this report:

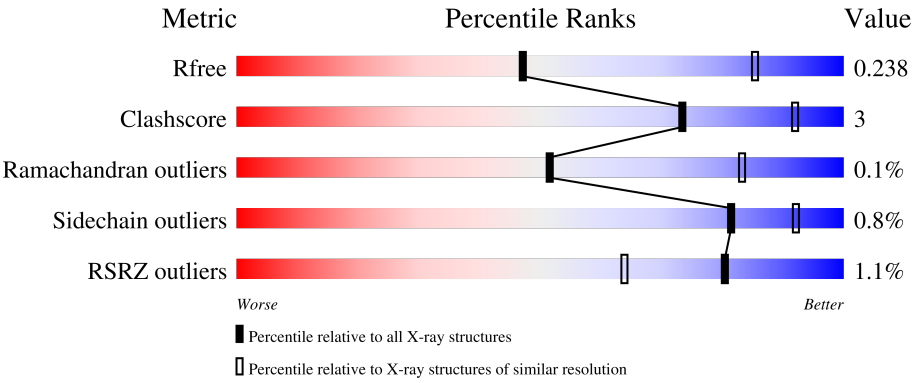
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.31.3
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.31.3

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

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)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1094 (3.10-3.10)
Clashscore	141614	1184 (3.10-3.10)
Ramachandran outliers	138981	1141 (3.10-3.10)
Sidechain outliers	138945	1141 (3.10-3.10)
RSRZ outliers	127900	1067 (3.10-3.10)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower 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% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	KKK	252	83% 9% 8%
1	WWW	252	85% 8% 6%
1	XXX	252	10% 85% 6% 9%
1	YYY	252	84% 8% 7%
1	ZZZ	252	83% 9% 8%

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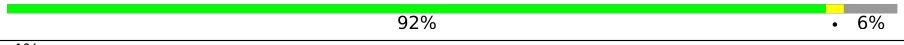
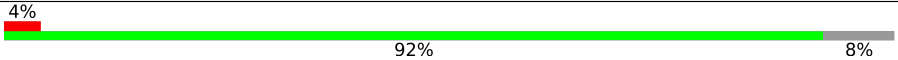
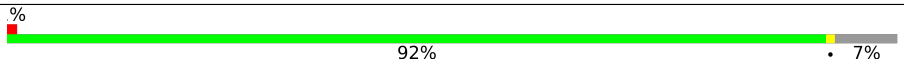
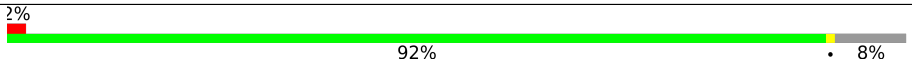
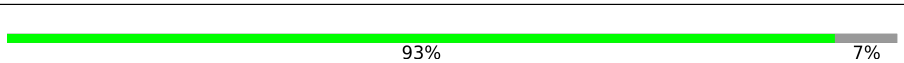
Mol	Chain	Length	Quality of chain
1	aaa	252	
1	bbb	252	
1	ccc	252	
1	ddd	252	
1	eee	252	
2	AAA	272	
2	BBB	272	
2	CCC	272	
2	DDD	272	
2	EEE	272	
2	FFF	272	
2	GGG	272	
2	HHH	272	
2	III	272	
2	JJJ	272	

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 37872 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, 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 scFv 29B1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	ZZZ	232	Total	C	N	O	S	0	0	0
			1735	1084	299	344	8			
1	KKK	232	Total	C	N	O	S	0	0	0
			1750	1093	305	344	8			
1	aaa	236	Total	C	N	O	S	0	0	0
			1765	1102	305	350	8			
1	bbb	232	Total	C	N	O	S	0	0	0
			1746	1090	304	344	8			
1	ccc	234	Total	C	N	O	S	0	0	0
			1750	1095	301	346	8			
1	ddd	233	Total	C	N	O	S	0	0	0
			1743	1092	300	343	8			
1	eee	235	Total	C	N	O	S	0	0	0
			1750	1095	299	348	8			
1	WWW	236	Total	C	N	O	S	0	0	0
			1773	1108	307	350	8			
1	XXX	229	Total	C	N	O	S	0	0	0
			1713	1071	296	338	8			
1	YYY	234	Total	C	N	O	S	0	0	0
			1756	1098	304	346	8			

- Molecule 2 is a protein called Major capsid protein VP1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	AAA	264	Total	C	N	O	S	0	3	0
			2062	1299	352	399	12			
2	BBB	259	Total	C	N	O	S	0	5	0
			2037	1288	347	391	11			
2	CCC	259	Total	C	N	O	S	0	7	0
			2045	1293	351	390	11			
2	DDD	259	Total	C	N	O	S	0	5	0
			2031	1282	347	391	11			

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	EEE	259	Total	C	N	O	S	0	2	0
			2026	1278	349	388	11			
2	FFF	259	Total	C	N	O	S	0	4	0
			2028	1280	347	390	11			
2	GGG	258	Total	C	N	O	S	0	5	0
			2032	1285	346	390	11			
2	HHH	258	Total	C	N	O	S	0	8	0
			2047	1295	352	389	11			
2	III	259	Total	C	N	O	S	0	5	0
			2031	1282	347	391	11			
2	JJJ	259	Total	C	N	O	S	0	2	0
			2029	1279	350	389	11			

There are 40 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AAA	18	GLY	-	expression tag	UNP P03089
AAA	19	SER	-	expression tag	UNP P03089
AAA	20	HIS	-	expression tag	UNP P03089
AAA	21	MET	-	expression tag	UNP P03089
BBB	18	GLY	-	expression tag	UNP P03089
BBB	19	SER	-	expression tag	UNP P03089
BBB	20	HIS	-	expression tag	UNP P03089
BBB	21	MET	-	expression tag	UNP P03089
CCC	18	GLY	-	expression tag	UNP P03089
CCC	19	SER	-	expression tag	UNP P03089
CCC	20	HIS	-	expression tag	UNP P03089
CCC	21	MET	-	expression tag	UNP P03089
DDD	18	GLY	-	expression tag	UNP P03089
DDD	19	SER	-	expression tag	UNP P03089
DDD	20	HIS	-	expression tag	UNP P03089
DDD	21	MET	-	expression tag	UNP P03089
EEE	18	GLY	-	expression tag	UNP P03089
EEE	19	SER	-	expression tag	UNP P03089
EEE	20	HIS	-	expression tag	UNP P03089
EEE	21	MET	-	expression tag	UNP P03089
FFF	18	GLY	-	expression tag	UNP P03089
FFF	19	SER	-	expression tag	UNP P03089
FFF	20	HIS	-	expression tag	UNP P03089
FFF	21	MET	-	expression tag	UNP P03089
GGG	18	GLY	-	expression tag	UNP P03089
GGG	19	SER	-	expression tag	UNP P03089
GGG	20	HIS	-	expression tag	UNP P03089

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Chain	Residue	Modelled	Actual	Comment	Reference
GGG	21	MET	-	expression tag	UNP P03089
HHH	18	GLY	-	expression tag	UNP P03089
HHH	19	SER	-	expression tag	UNP P03089
HHH	20	HIS	-	expression tag	UNP P03089
HHH	21	MET	-	expression tag	UNP P03089
III	18	GLY	-	expression tag	UNP P03089
III	19	SER	-	expression tag	UNP P03089
III	20	HIS	-	expression tag	UNP P03089
III	21	MET	-	expression tag	UNP P03089
JJJ	18	GLY	-	expression tag	UNP P03089
JJJ	19	SER	-	expression tag	UNP P03089
JJJ	20	HIS	-	expression tag	UNP P03089
JJJ	21	MET	-	expression tag	UNP P03089

- Molecule 3 is water.

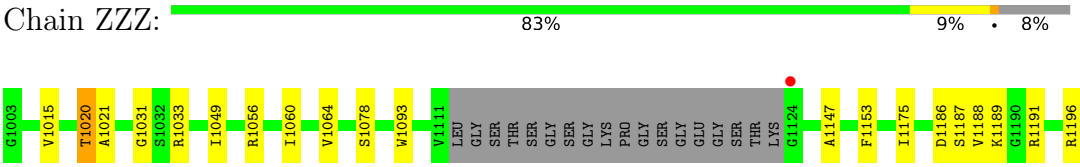
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	ZZZ	1	Total O 1 1	0	0
3	AAA	2	Total O 2 2	0	0
3	BBB	3	Total O 3 3	0	0
3	CCC	1	Total O 1 1	0	0
3	DDD	1	Total O 1 1	0	0
3	EEE	5	Total O 5 5	0	0
3	FFF	1	Total O 1 1	0	0
3	GGG	2	Total O 2 2	0	0
3	HHH	2	Total O 2 2	0	0
3	ccc	1	Total O 1 1	0	0
3	WWW	2	Total O 2 2	0	0
3	XXX	1	Total O 1 1	0	0
3	YYY	1	Total O 1 1	0	0

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 and electron density. 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. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). 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.

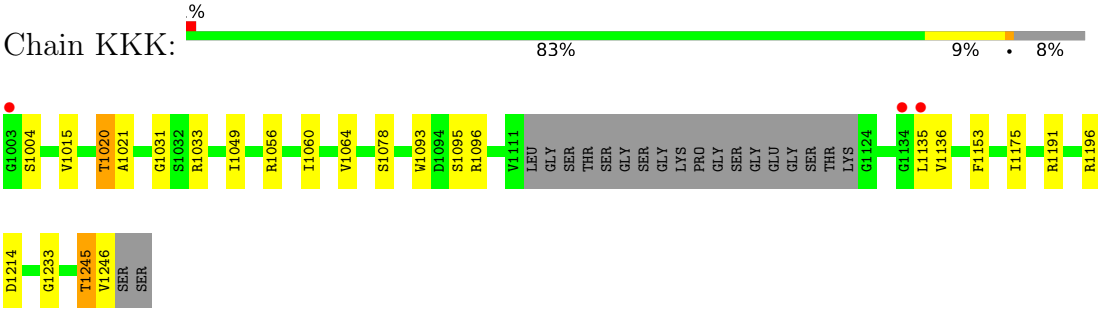
- Molecule 1: scFv 29B1

Chain ZZZ:



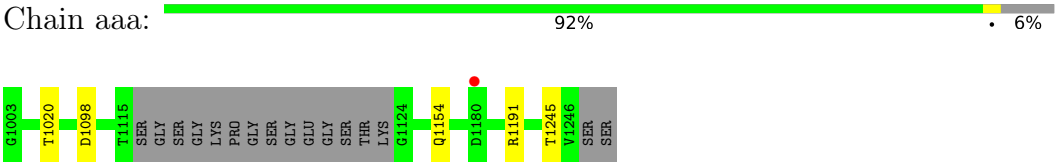
- Molecule 1: scFv 29B1

Chain KKK:



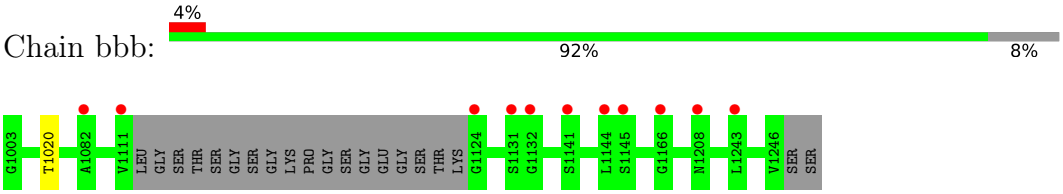
- Molecule 1: scFv 29B1

Chain aaa:



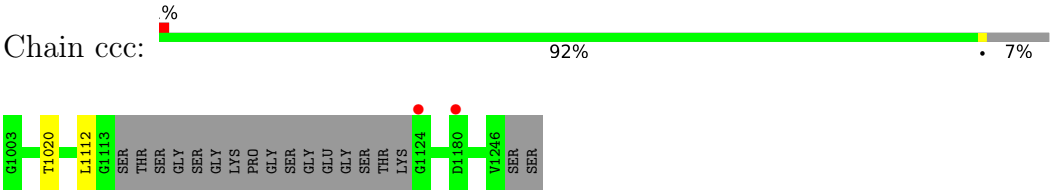
- Molecule 1: scFv 29B1

Chain bbb:



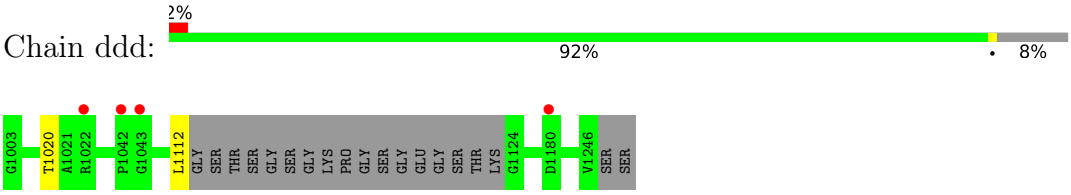
- Molecule 1: scFv 29B1

Chain ccc:



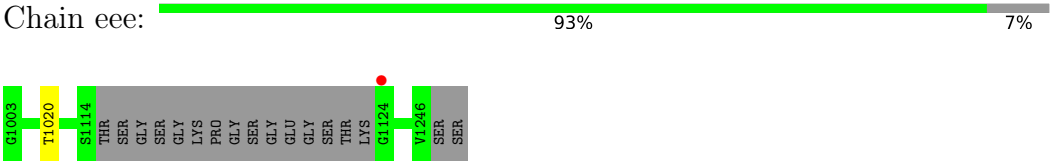
• Molecule 1: scFv 29B1

Chain ddd:



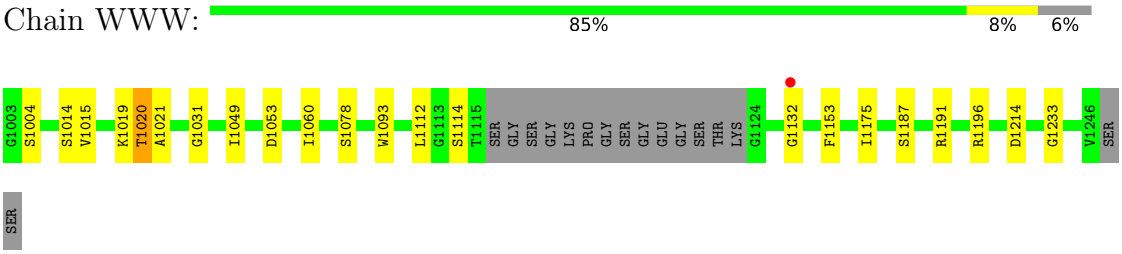
• Molecule 1: scFv 29B1

Chain eee:



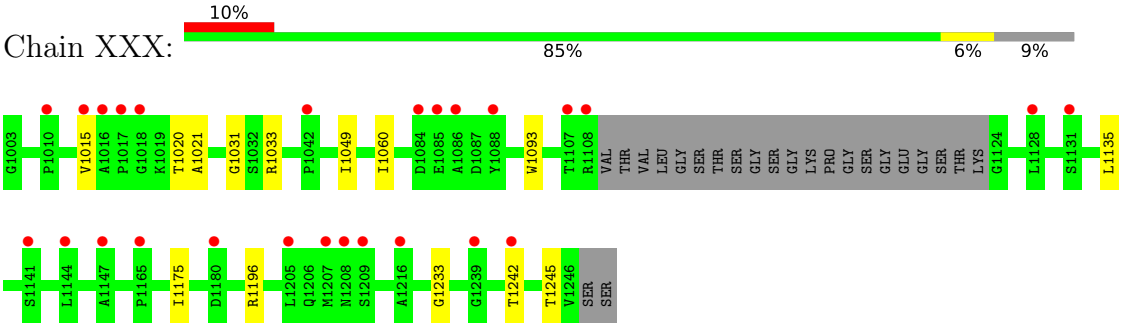
• Molecule 1: scFv 29B1

Chain WWW:



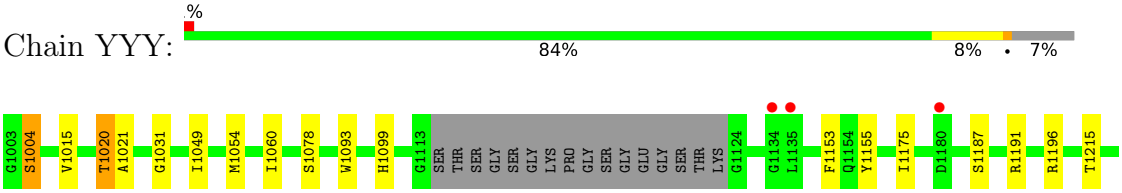
• Molecule 1: scFv 29B1

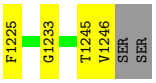
Chain XXX:



• Molecule 1: scFv 29B1

Chain YYY:



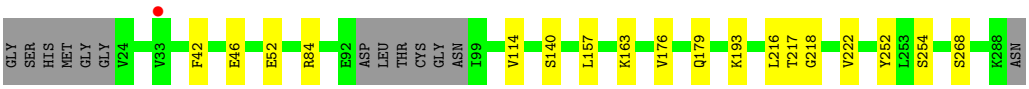


• Molecule 2: Major capsid protein VP1

Chain AAA:

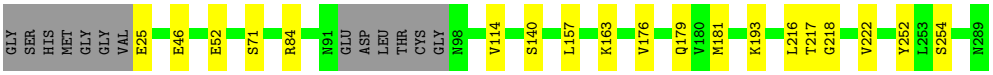
• Molecule 2: Major capsid protein VP1

Chain BBB:



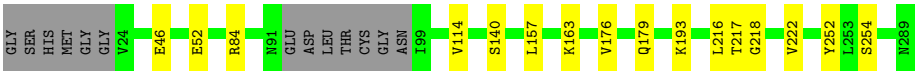
• Molecule 2: Major capsid protein VP1

Chain CCC:



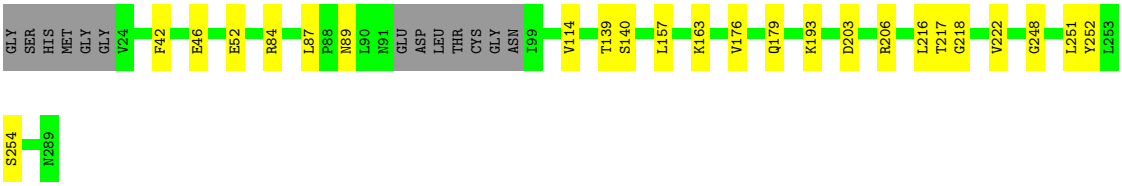
• Molecule 2: Major capsid protein VP1

Chain DDD:



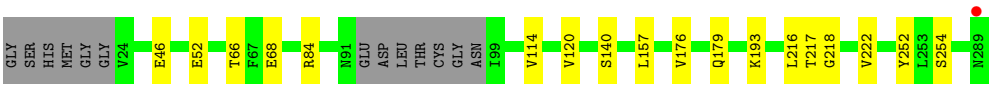
• Molecule 2: Major capsid protein VP1

Chain EEE:



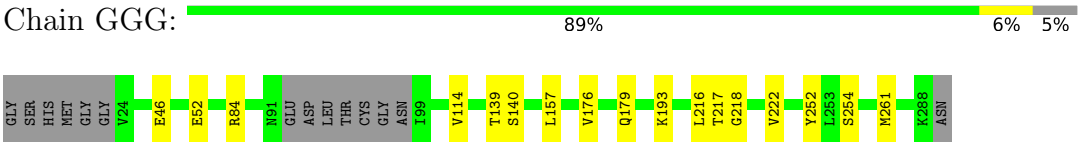
• Molecule 2: Major capsid protein VP1

Chain FFF:



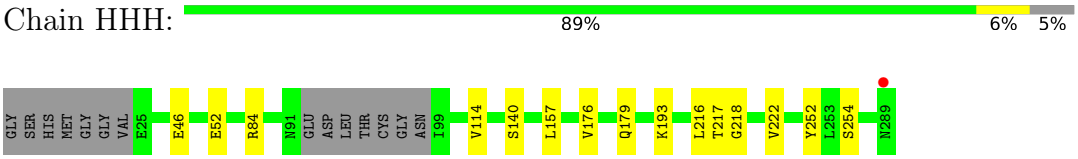
• Molecule 2: Major capsid protein VP1

Chain GGG:



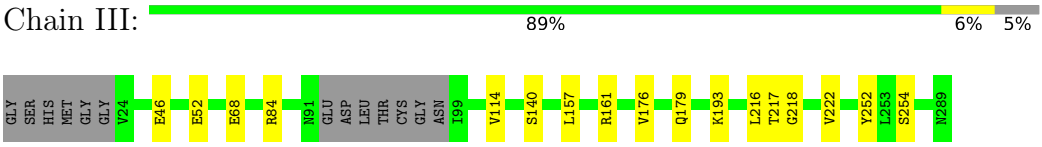
• Molecule 2: Major capsid protein VP1

Chain HHH:



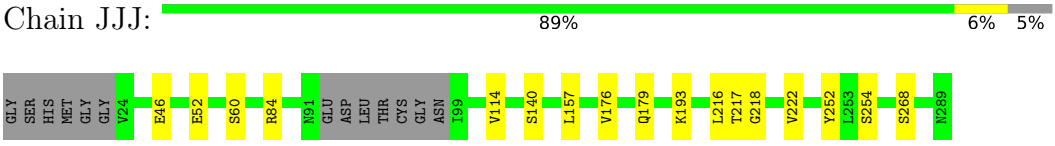
• Molecule 2: Major capsid protein VP1

Chain III:



• Molecule 2: Major capsid protein VP1

Chain JJJ:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	124.13Å 172.53Å 159.71Å 90.00° 104.53° 90.00°	Depositor
Resolution (Å)	48.51 – 3.10 48.51 – 3.10	Depositor EDS
% Data completeness (in resolution range)	99.9 (48.51-3.10) 100.0 (48.51-3.10)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.60 (at 3.12Å)	Xtriage
Refinement program	REFMAC 5.8.0258	Depositor
R, R_{free}	0.225 , 0.240 0.224 , 0.238	Depositor DCC
R_{free} test set	5881 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å^2)	44.6	Xtriage
Anisotropy	0.226	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.30 , 34.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.89	EDS
Total number of atoms	37872	wwPDB-VP
Average B, all atoms (Å^2)	49.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.62% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

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	KKK	0.66	0/1793	0.78	0/2442
1	WWW	0.66	0/1816	0.78	0/2473
1	XXX	0.67	0/1756	0.76	0/2393
1	YYY	0.65	0/1799	0.76	0/2451
1	ZZZ	0.66	0/1778	0.77	0/2424
1	aaa	0.65	0/1808	0.79	0/2465
1	bbb	0.66	0/1789	0.76	0/2438
1	ccc	0.66	0/1793	0.77	0/2444
1	ddd	0.67	0/1786	0.76	0/2435
1	eee	0.66	0/1793	0.77	0/2445
2	AAA	0.64	0/2116	0.77	0/2875
2	BBB	0.64	0/2098	0.75	0/2850
2	CCC	0.64	0/2112	0.75	0/2868
2	DDD	0.64	0/2091	0.74	0/2841
2	EEE	0.63	0/2077	0.76	0/2821
2	FFF	0.63	0/2085	0.75	0/2833
2	GGG	0.63	0/2093	0.74	0/2843
2	HHH	0.63	0/2118	0.75	0/2876
2	III	0.63	0/2091	0.75	0/2841
2	JJJ	0.63	0/2080	0.75	0/2825
All	All	0.65	0/38872	0.76	0/52883

There are no bond length outliers.

There are no bond angle outliers.

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	KKK	1750	0	1637	13	0
1	WWW	1773	0	1663	11	1
1	XXX	1713	0	1586	7	0
1	YYY	1756	0	1640	15	0
1	ZZZ	1735	0	1606	14	0
1	aaa	1765	0	1641	0	0
1	bbb	1746	0	1626	0	0
1	ccc	1750	0	1629	0	0
1	ddd	1743	0	1624	0	0
1	eee	1750	0	1623	0	0
2	AAA	2062	0	2009	27	0
2	BBB	2037	0	1995	17	0
2	CCC	2045	0	2005	21	0
2	DDD	2031	0	1988	16	0
2	EEE	2026	0	1983	20	1
2	FFF	2028	0	1983	14	0
2	GGG	2032	0	1993	14	0
2	HHH	2047	0	2010	14	0
2	III	2031	0	1988	13	0
2	JJJ	2029	0	1987	12	0
3	AAA	2	0	0	0	0
3	BBB	3	0	0	0	0
3	CCC	1	0	0	1	0
3	DDD	1	0	0	0	0
3	EEE	5	0	0	0	0
3	FFF	1	0	0	0	0
3	GGG	2	0	0	0	0
3	HHH	2	0	0	0	0
3	WWW	2	0	0	0	0
3	XXX	1	0	0	0	0
3	YYY	1	0	0	0	0
3	ZZZ	1	0	0	0	0
3	ccc	1	0	0	0	0
All	All	37872	0	36216	186	1

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 3.

All (186) 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)
1:ZZZ:1211:ARG:CB	1:ZZZ:1213:GLU:OE2	1.97	1.13
2:AAA:94:LEU:HD12	2:AAA:95:THR:N	1.86	0.90
2:AAA:94:LEU:HD12	2:AAA:95:THR:O	1.79	0.82
2:AAA:139:THR:HG23	2:AAA:218:GLY:HA2	1.67	0.75
2:GGG:52:GLU:O	2:HHH:176:VAL:HG23	1.90	0.72
2:FFF:176:VAL:HG23	2:JJJ:52:GLU:O	1.89	0.72
2:AAA:94:LEU:CD1	2:AAA:95:THR:N	2.55	0.70
2:BBB:163:LYS:HE3	1:WWW:1031:GLY:O	1.95	0.66
2:AAA:90:LEU:HD22	2:AAA:284:LYS:HE2	1.78	0.66
1:XXX:1135:LEU:HD23	1:XXX:1245:THR:OG1	1.97	0.64
2:AAA:90:LEU:HD21	2:AAA:102:TRP:CZ2	2.33	0.63
2:AAA:94:LEU:CD1	2:AAA:95:THR:O	2.46	0.62
2:AAA:140:SER:O	2:AAA:216:LEU:HD12	2.00	0.62
2:AAA:52:GLU:O	2:BBB:176:VAL:HG23	2.01	0.61
2:JJJ:140:SER:O	2:JJJ:216:LEU:HD12	2.02	0.59
2:CCC:25:GLU:N	3:CCC:301:HOH:O	2.34	0.59
1:ZZZ:1187:SER:O	1:ZZZ:1191:ARG:NH1	2.34	0.59
2:CCC:52:GLU:O	2:DDD:176:VAL:HG23	2.02	0.59
2:III:140:SER:O	2:III:216:LEU:HD12	2.03	0.59
2:BBB:52:GLU:O	2:CCC:176:VAL:HG23	2.03	0.59
1:YYY:1187:SER:O	1:YYY:1191:ARG:NH1	2.35	0.59
1:KKK:1136:VAL:O	1:KKK:1246:VAL:HA	2.03	0.58
2:HHH:140:SER:O	2:HHH:216:LEU:HD12	2.04	0.58
2:AAA:114:VAL:O	2:BBB:216:LEU:HD22	2.04	0.58
2:AAA:176:VAL:HG23	2:EEE:52:GLU:O	2.04	0.58
2:BBB:218:GLY:O	2:BBB:222:VAL:HG21	2.05	0.57
2:CCC:163:LYS:HE3	1:YYY:1031:GLY:O	2.03	0.57
2:JJJ:218:GLY:O	2:JJJ:222:VAL:HG21	2.05	0.57
1:KKK:1135:LEU:HD23	1:KKK:1245:THR:OG1	2.04	0.57
2:DDD:140:SER:O	2:DDD:216:LEU:HD12	2.05	0.57
2:III:52:GLU:O	2:JJJ:176:VAL:HG23	2.05	0.57
2:AAA:90:LEU:HD21	2:AAA:102:TRP:CE2	2.39	0.57
2:CCC:140:SER:O	2:CCC:216:LEU:HD12	2.04	0.56
2:EEE:140:SER:O	2:EEE:216:LEU:HD12	2.05	0.56
2:FFF:176:VAL:CG2	2:JJJ:52:GLU:O	2.54	0.56
2:FFF:140:SER:O	2:FFF:216:LEU:HD12	2.05	0.55
2:BBB:140:SER:O	2:BBB:216:LEU:HD12	2.06	0.55
2:DDD:52:GLU:O	2:EEE:176:VAL:HG23	2.06	0.55
2:HHH:114:VAL:O	2:III:216:LEU:HD22	2.06	0.55
2:AAA:218:GLY:O	2:AAA:222:VAL:HG21	2.06	0.55
2:FFF:217:THR:HG22	2:FFF:222:VAL:HG11	1.89	0.55
2:GGG:140:SER:O	2:GGG:216:LEU:HD12	2.07	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:ZZZ:1093:TRP:CG	1:ZZZ:1233:GLY:HA3	2.42	0.55
2:DDD:218:GLY:O	2:DDD:222:VAL:HG21	2.07	0.55
1:YYY:1049:ILE:HA	1:YYY:1060:ILE:HG12	1.90	0.54
1:YYY:1175:ILE:HD13	1:YYY:1196:ARG:HG3	1.90	0.54
2:HHH:218:GLY:O	2:HHH:222:VAL:HG21	2.07	0.54
1:YYY:1215:THR:HG22	1:YYY:1246:VAL:N	2.23	0.54
2:EEE:84:ARG:HD2	2:EEE:252:TYR:OH	2.07	0.54
1:WWW:1093:TRP:CG	1:WWW:1233:GLY:HA3	2.43	0.54
2:GGG:52:GLU:O	2:HHH:176:VAL:CG2	2.56	0.54
2:DDD:114:VAL:O	2:EEE:216:LEU:HD22	2.08	0.54
2:HHH:217:THR:HG22	2:HHH:222:VAL:HG11	1.91	0.54
2:BBB:84:ARG:HD2	2:BBB:252:TYR:OH	2.09	0.53
2:DDD:217:THR:HG22	2:DDD:222:VAL:HG11	1.91	0.53
2:GGG:217:THR:HG22	2:GGG:222:VAL:HG11	1.91	0.53
1:ZZZ:1049:ILE:HA	1:ZZZ:1060:ILE:HG12	1.90	0.53
1:KKK:1191:ARG:NH2	1:KKK:1214:ASP:OD2	2.41	0.53
2:GGG:218:GLY:O	2:GGG:222:VAL:HG21	2.09	0.53
1:WWW:1175:ILE:HD13	1:WWW:1196:ARG:HG3	1.91	0.53
2:HHH:52:GLU:O	2:III:176:VAL:HG23	2.08	0.53
2:JJJ:217:THR:HG22	2:JJJ:222:VAL:HG11	1.91	0.53
1:XXX:1093:TRP:CG	1:XXX:1233:GLY:HA3	2.44	0.53
1:ZZZ:1175:ILE:HD13	1:ZZZ:1196:ARG:HG3	1.91	0.53
2:AAA:163:LYS:HE3	1:KKK:1031:GLY:O	2.09	0.53
2:CCC:217:THR:HG22	2:CCC:222:VAL:HG11	1.91	0.53
2:III:217:THR:HG22	2:III:222:VAL:HG11	1.91	0.52
2:AAA:217:THR:HG22	2:AAA:222:VAL:HG11	1.92	0.52
2:CCC:46:GLU:HG2	2:CCC:193:LYS:CG	2.40	0.52
2:EEE:217:THR:HG22	2:EEE:222:VAL:HG11	1.92	0.52
2:BBB:217:THR:HG22	2:BBB:222:VAL:HG11	1.92	0.52
1:XXX:1175:ILE:HD13	1:XXX:1196:ARG:HG3	1.91	0.52
1:XXX:1049:ILE:HA	1:XXX:1060:ILE:HG12	1.92	0.52
2:EEE:218:GLY:O	2:EEE:222:VAL:HG21	2.09	0.52
2:AAA:46:GLU:HG2	2:AAA:193:LYS:CG	2.40	0.52
2:III:84:ARG:HD2	2:III:252:TYR:OH	2.10	0.52
2:AAA:216:LEU:HD22	2:EEE:114:VAL:O	2.09	0.51
1:KKK:1049:ILE:HA	1:KKK:1060:ILE:HG12	1.92	0.51
2:FFF:218:GLY:O	2:FFF:222:VAL:HG21	2.10	0.51
2:FFF:216:LEU:HD22	2:JJJ:114:VAL:O	2.10	0.51
1:WWW:1049:ILE:HA	1:WWW:1060:ILE:HG12	1.91	0.51
2:JJJ:46:GLU:HG2	2:JJJ:193:LYS:CG	2.41	0.51
2:DDD:163:LYS:HE3	1:XXX:1031:GLY:O	2.10	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:HHH:46:GLU:HG2	2:HHH:193:LYS:CG	2.41	0.51
1:YYY:1093:TRP:CG	1:YYY:1233:GLY:HA3	2.46	0.51
2:GGG:46:GLU:HG2	2:GGG:193:LYS:CG	2.41	0.50
2:DDD:46:GLU:HG2	2:DDD:193:LYS:CG	2.41	0.50
2:III:46:GLU:HG2	2:III:193:LYS:CG	2.42	0.50
1:KKK:1093:TRP:CG	1:KKK:1233:GLY:HA3	2.47	0.50
1:KKK:1175:ILE:HD13	1:KKK:1196:ARG:HG3	1.92	0.50
2:BBB:46:GLU:HG2	2:BBB:193:LYS:CG	2.42	0.50
2:III:218:GLY:O	2:III:222:VAL:HG21	2.12	0.50
2:AAA:94:LEU:HD12	2:AAA:94:LEU:C	2.30	0.49
2:CCC:218:GLY:O	2:CCC:222:VAL:HG21	2.12	0.49
1:YYY:1215:THR:HG22	1:YYY:1246:VAL:H	1.77	0.49
2:FFF:114:VAL:O	2:GGG:216:LEU:HD22	2.13	0.49
2:BBB:42[A]:PHE:CD2	2:CCC:181:MET:HG2	2.47	0.49
2:HHH:84:ARG:HD2	2:HHH:252:TYR:OH	2.12	0.49
1:ZZZ:1031:GLY:O	2:EEE:163:LYS:HE3	2.13	0.49
2:FFF:66:THR:OG1	2:FFF:68[B]:GLU:HG2	2.13	0.48
2:AAA:90:LEU:CD2	2:AAA:284:LYS:HE2	2.43	0.48
2:EEE:84:ARG:HD2	2:EEE:252:TYR:CZ	2.48	0.48
2:DDD:84:ARG:HD2	2:DDD:252:TYR:OH	2.14	0.48
2:FFF:46:GLU:HG2	2:FFF:193:LYS:CG	2.44	0.48
2:GGG:114:VAL:O	2:HHH:216:LEU:HD22	2.13	0.48
2:AAA:157:LEU:O	2:AAA:179:GLN:HA	2.15	0.47
2:CCC:114:VAL:O	2:DDD:216:LEU:HD22	2.14	0.47
1:ZZZ:1020:THR:HB	1:ZZZ:1078:SER:HA	1.96	0.47
1:KKK:1095:SER:O	1:KKK:1096:ARG:HG2	2.15	0.47
2:CCC:84:ARG:HD2	2:CCC:252:TYR:OH	2.14	0.47
2:EEE:46:GLU:HG2	2:EEE:193:LYS:CG	2.45	0.47
1:WWW:1020:THR:HB	1:WWW:1078:SER:HA	1.97	0.47
2:AAA:163:LYS:NZ	1:KKK:1033:ARG:O	2.46	0.46
2:CCC:52:GLU:HB3	1:YYY:1225:PHE:CD1	2.51	0.46
2:EEE:87:LEU:HD21	2:EEE:251:LEU:HB2	1.97	0.46
2:GGG:139:THR:HG23	2:GGG:218:GLY:HA2	1.98	0.46
1:ZZZ:1033:ARG:O	2:EEE:163:LYS:NZ	2.48	0.46
1:WWW:1014:SER:HB3	1:WWW:1112:LEU:HD23	1.97	0.46
1:ZZZ:1188:VAL:HA	1:ZZZ:1191:ARG:NH1	2.31	0.46
2:FFF:84:ARG:HD2	2:FFF:252:TYR:OH	2.15	0.46
2:EEE:203:ASP:OD2	2:EEE:206[A]:ARG:HD2	2.16	0.45
2:JJJ:84:ARG:HD2	2:JJJ:252:TYR:OH	2.16	0.45
1:KKK:1020:THR:HB	1:KKK:1078:SER:HA	1.98	0.45
1:WWW:1191:ARG:NH2	1:WWW:1214:ASP:OD2	2.50	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:AAA:46:GLU:HG2	2:AAA:193:LYS:HG2	1.98	0.45
2:BBB:163:LYS:NZ	1:WWW:1053:ASP:OD2	2.49	0.45
1:YYY:1004:SER:HB3	1:YYY:1099:HIS:CE1	2.51	0.45
2:AAA:94:LEU:CD1	2:AAA:95:THR:H	2.28	0.45
2:BBB:157:LEU:O	2:BBB:179:GLN:HA	2.17	0.45
2:AAA:84:ARG:HD2	2:AAA:252:TYR:OH	2.16	0.45
2:CCC:157:LEU:O	2:CCC:179:GLN:HA	2.16	0.45
2:GGG:84:ARG:HD2	2:GGG:252:TYR:OH	2.17	0.45
2:CCC:46:GLU:HG2	2:CCC:193:LYS:HG2	1.99	0.45
2:CCC:71[A]:SER:HB3	1:YYY:1054:MET:HG2	1.99	0.45
1:XXX:1015:VAL:HG21	1:XXX:1021:ALA:HB2	1.97	0.45
2:CCC:71[B]:SER:HB3	1:YYY:1054:MET:HG2	1.99	0.44
2:GGG:157:LEU:O	2:GGG:179:GLN:HA	2.17	0.44
1:KKK:1015:VAL:HG21	1:KKK:1021:ALA:HB2	2.00	0.44
1:YYY:1015:VAL:HG21	1:YYY:1021:ALA:HB2	1.98	0.44
2:JJJ:46:GLU:HG2	2:JJJ:193:LYS:HG2	1.99	0.44
1:ZZZ:1153:PHE:O	1:ZZZ:1196:ARG:NH2	2.51	0.44
2:DDD:46:GLU:HG2	2:DDD:193:LYS:HG2	2.00	0.44
1:WWW:1015:VAL:HG21	1:WWW:1021:ALA:HB2	1.99	0.44
2:BBB:52:GLU:O	2:CCC:176:VAL:CG2	2.65	0.43
2:BBB:84:ARG:HD2	2:BBB:252:TYR:CZ	2.53	0.43
1:ZZZ:1015:VAL:HG21	1:ZZZ:1021:ALA:HB2	2.00	0.43
2:EEE:89:ASN:OD1	2:EEE:89:ASN:O	2.35	0.43
2:III:157:LEU:O	2:III:179:GLN:HA	2.19	0.43
2:FFF:157:LEU:O	2:FFF:179:GLN:HA	2.18	0.43
2:III:46:GLU:HG2	2:III:193:LYS:HG2	2.00	0.43
2:BBB:114:VAL:O	2:CCC:216:LEU:HD22	2.18	0.43
1:YYY:1020:THR:HB	1:YYY:1078:SER:HA	2.01	0.43
2:EEE:157:LEU:O	2:EEE:179:GLN:HA	2.19	0.43
2:HHH:46:GLU:HG2	2:HHH:193:LYS:HG2	2.01	0.43
2:GGG:46:GLU:HG2	2:GGG:193:LYS:HG2	2.01	0.43
2:BBB:46:GLU:HG2	2:BBB:193:LYS:HG2	2.01	0.42
2:HHH:84:ARG:HD2	2:HHH:252:TYR:CZ	2.54	0.42
2:CCC:52:GLU:O	2:DDD:176:VAL:CG2	2.67	0.42
2:FFF:52:GLU:O	2:GGG:176:VAL:HG23	2.19	0.42
2:EEE:139:THR:HG23	2:EEE:218:GLY:HA2	2.01	0.42
2:III:114:VAL:O	2:JJJ:216:LEU:HD22	2.18	0.42
2:AAA:52:GLU:O	2:BBB:176:VAL:CG2	2.66	0.42
2:III:84:ARG:HD2	2:III:252:TYR:CZ	2.54	0.42
1:KKK:1056:ARG:HD3	1:KKK:1064:VAL:O	2.20	0.42
2:CCC:46:GLU:HG2	2:CCC:193:LYS:HG3	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:DDD:84:ARG:HD2	2:DDD:252:TYR:CZ	2.55	0.42
2:FFF:120:VAL:HG11	2:GGG:261:MET:HE1	2.02	0.42
2:DDD:157:LEU:O	2:DDD:179:GLN:HA	2.20	0.41
2:CCC:84:ARG:HD2	2:CCC:252:TYR:CZ	2.55	0.41
2:HHH:157:LEU:O	2:HHH:179:GLN:HA	2.20	0.41
2:JJJ:157:LEU:O	2:JJJ:179:GLN:HA	2.21	0.41
1:KKK:1153:PHE:O	1:KKK:1196:ARG:NH2	2.54	0.41
2:EEE:46:GLU:HG2	2:EEE:193:LYS:HG2	2.03	0.41
2:III:68[A]:GLU:CG	2:III:161:ARG:NH1	2.84	0.41
1:YYY:1153:PHE:O	1:YYY:1196:ARG:NH2	2.54	0.41
2:AAA:176:VAL:CG2	2:EEE:52:GLU:O	2.68	0.41
2:FFF:84:ARG:HD2	2:FFF:252:TYR:CZ	2.56	0.41
1:ZZZ:1056:ARG:HD3	1:ZZZ:1064:VAL:O	2.21	0.41
1:WWW:1187:SER:O	1:WWW:1191:ARG:NH1	2.53	0.41
1:ZZZ:1186:ASP:HA	1:ZZZ:1189:LYS:HE3	2.03	0.41
2:AAA:181:MET:HG2	2:EEE:42:PHE:CD1	2.56	0.41
2:DDD:163:LYS:NZ	1:XXX:1033:ARG:O	2.49	0.40
2:DDD:176:VAL:HG11	1:YYY:1155:TYR:CE2	2.56	0.40
2:HHH:46:GLU:HG2	2:HHH:193:LYS:HG3	2.02	0.40
1:WWW:1153:PHE:O	1:WWW:1196:ARG:NH2	2.55	0.40
1:ZZZ:1147:ALA:HA	1:ZZZ:1202:THR:HG22	2.04	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:EEE:248:GLY:O	1:WWW:1132:GLY:O[2_654]	1.83	0.37

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 X-ray entries followed by that with respect to entries of similar resolution.

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	KKK	228/252 (90%)	211 (92%)	17 (8%)	0	100	100
1	WWW	232/252 (92%)	215 (93%)	16 (7%)	1 (0%)	34	69
1	XXX	225/252 (89%)	208 (92%)	16 (7%)	1 (0%)	34	69
1	YYY	230/252 (91%)	212 (92%)	17 (7%)	1 (0%)	34	69
1	ZZZ	228/252 (90%)	210 (92%)	18 (8%)	0	100	100
1	aaa	232/252 (92%)	216 (93%)	16 (7%)	0	100	100
1	bbb	228/252 (90%)	210 (92%)	18 (8%)	0	100	100
1	ccc	230/252 (91%)	214 (93%)	15 (6%)	1 (0%)	34	69
1	ddd	229/252 (91%)	213 (93%)	16 (7%)	0	100	100
1	eee	231/252 (92%)	213 (92%)	18 (8%)	0	100	100
2	AAA	263/272 (97%)	250 (95%)	13 (5%)	0	100	100
2	BBB	260/272 (96%)	248 (95%)	12 (5%)	0	100	100
2	CCC	262/272 (96%)	250 (95%)	12 (5%)	0	100	100
2	DDD	260/272 (96%)	249 (96%)	11 (4%)	0	100	100
2	EEE	257/272 (94%)	244 (95%)	13 (5%)	0	100	100
2	FFF	259/272 (95%)	247 (95%)	12 (5%)	0	100	100
2	GGG	259/272 (95%)	247 (95%)	12 (5%)	0	100	100
2	HHH	262/272 (96%)	250 (95%)	12 (5%)	0	100	100
2	III	260/272 (96%)	248 (95%)	12 (5%)	0	100	100
2	JJJ	257/272 (94%)	244 (95%)	13 (5%)	0	100	100
All	All	4892/5240 (93%)	4599 (94%)	289 (6%)	4 (0%)	51	83

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	WWW	1114	SER
1	YYY	1004	SER
1	ccc	1112	LEU
1	XXX	1242	THR

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 X-ray entries followed by that with respect to entries of similar resolution.

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	KKK	184/204 (90%)	181 (98%)	3 (2%)	62	84
1	WWW	187/204 (92%)	184 (98%)	3 (2%)	62	84
1	XXX	178/204 (87%)	177 (99%)	1 (1%)	86	94
1	YYY	184/204 (90%)	182 (99%)	2 (1%)	73	89
1	ZZZ	181/204 (89%)	179 (99%)	2 (1%)	73	89
1	aaa	185/204 (91%)	180 (97%)	5 (3%)	44	74
1	bbb	183/204 (90%)	182 (100%)	1 (0%)	88	94
1	ccc	183/204 (90%)	182 (100%)	1 (0%)	88	94
1	ddd	182/204 (89%)	180 (99%)	2 (1%)	73	89
1	eee	183/204 (90%)	182 (100%)	1 (0%)	88	94
2	AAA	232/237 (98%)	231 (100%)	1 (0%)	91	96
2	BBB	230/237 (97%)	227 (99%)	3 (1%)	69	87
2	CCC	230/237 (97%)	229 (100%)	1 (0%)	91	96
2	DDD	229/237 (97%)	228 (100%)	1 (0%)	91	96
2	EEE	227/237 (96%)	226 (100%)	1 (0%)	91	96
2	FFF	228/237 (96%)	227 (100%)	1 (0%)	91	96
2	GGG	230/237 (97%)	229 (100%)	1 (0%)	91	96
2	HHH	231/237 (98%)	230 (100%)	1 (0%)	91	96
2	III	229/237 (97%)	228 (100%)	1 (0%)	91	96
2	JJJ	228/237 (96%)	225 (99%)	3 (1%)	69	87
All	All	4124/4410 (94%)	4089 (99%)	35 (1%)	81	92

All (35) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	ZZZ	1020	THR
1	ZZZ	1213	GLU
2	AAA	254	SER
2	BBB	254	SER
2	BBB	268[A]	SER
2	BBB	268[B]	SER
2	CCC	254	SER
2	DDD	254	SER

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Mol	Chain	Res	Type
2	EEE	254	SER
2	FFF	254	SER
2	GGG	254	SER
2	HHH	254	SER
2	III	254	SER
2	JJJ	60	SER
2	JJJ	254	SER
2	JJJ	268	SER
1	KKK	1004	SER
1	KKK	1020	THR
1	KKK	1245	THR
1	aaa	1020	THR
1	aaa	1098	ASP
1	aaa	1154	GLN
1	aaa	1191	ARG
1	aaa	1245	THR
1	bbb	1020	THR
1	ccc	1020	THR
1	ddd	1020	THR
1	ddd	1112	LEU
1	eee	1020	THR
1	WWW	1004	SER
1	WWW	1019	LYS
1	WWW	1020	THR
1	XXX	1020	THR
1	YYY	1020	THR
1	YYY	1245	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA (i)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains (i)

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

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

There are no ligands in this entry.

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95^{th} percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å^2)	Q<0.9
1	KKK	232/252 (92%)	0.01	3 (1%) 77 59	33, 57, 96, 117	0
1	WWW	236/252 (93%)	-0.29	1 (0%) 92 84	20, 39, 62, 88	0
1	XXX	229/252 (90%)	0.85	26 (11%) 5 2	30, 93, 137, 162	0
1	YYY	234/252 (92%)	-0.03	3 (1%) 77 59	20, 53, 93, 124	0
1	ZZZ	232/252 (92%)	-0.12	1 (0%) 92 84	32, 51, 78, 99	0
1	aaa	236/252 (93%)	-0.25	1 (0%) 92 84	26, 48, 67, 81	0
1	bbb	232/252 (92%)	0.46	11 (4%) 31 15	34, 79, 123, 161	0
1	ccc	234/252 (92%)	0.05	2 (0%) 84 69	32, 55, 85, 105	0
1	ddd	233/252 (92%)	0.40	4 (1%) 70 49	33, 79, 119, 144	0
1	eee	235/252 (93%)	-0.16	1 (0%) 92 84	34, 48, 68, 81	0
2	AAA	264/272 (97%)	-0.41	0 100 100	21, 33, 53, 81	0
2	BBB	259/272 (95%)	-0.46	1 (0%) 92 84	23, 32, 52, 68	0
2	CCC	259/272 (95%)	-0.39	0 100 100	23, 33, 53, 69	0
2	DDD	259/272 (95%)	-0.28	0 100 100	26, 38, 56, 71	0
2	EEE	259/272 (95%)	-0.37	0 100 100	24, 35, 53, 66	0
2	FFF	259/272 (95%)	-0.37	1 (0%) 92 84	26, 38, 57, 72	0
2	GGG	258/272 (94%)	-0.34	0 100 100	27, 40, 58, 75	0
2	HHH	258/272 (94%)	-0.28	1 (0%) 92 84	30, 41, 56, 69	0
2	III	259/272 (95%)	-0.34	0 100 100	27, 39, 55, 68	0
2	JJJ	259/272 (95%)	-0.41	0 100 100	27, 37, 54, 71	0
All	All	4926/5240 (94%)	-0.15	56 (1%) 80 64	20, 44, 95, 162	0

All (56) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	ddd	1180	ASP	4.1
1	XXX	1207	MET	3.8
1	XXX	1131	SER	3.7
1	bbb	1144	LEU	3.6
1	XXX	1042	PRO	3.6
1	XXX	1205	LEU	3.4
2	FFF	289	ASN	3.3
1	XXX	1239	GLY	3.3
1	XXX	1088	TYR	3.1
1	XXX	1209	SER	3.0
1	XXX	1010	PRO	3.0
1	KKK	1003	GLY	2.9
1	ddd	1043	GLY	2.9
1	XXX	1165	PRO	2.9
1	XXX	1018	GLY	2.8
1	XXX	1180	ASP	2.8
1	XXX	1107	THR	2.8
2	HHH	289	ASN	2.8
1	bbb	1166	GLY	2.7
1	bbb	1141	SER	2.6
1	XXX	1017	PRO	2.6
1	eee	1124	GLY	2.6
1	aaa	1180	ASP	2.6
1	bbb	1243	LEU	2.5
1	XXX	1084	ASP	2.5
1	XXX	1141	SER	2.5
1	XXX	1242	THR	2.4
2	BBB	33	VAL	2.4
1	XXX	1085	GLU	2.4
1	YYY	1135	LEU	2.4
1	ddd	1042	PRO	2.4
1	bbb	1124	GLY	2.4
1	XXX	1147	ALA	2.3
1	bbb	1145	SER	2.3
1	KKK	1135	LEU	2.3
1	XXX	1086	ALA	2.3
1	ccc	1180	ASP	2.2
1	bbb	1082	ALA	2.2
1	bbb	1131	SER	2.2
1	bbb	1208	ASN	2.1
1	WWW	1132	GLY	2.1
1	XXX	1108	ARG	2.1
1	XXX	1015	VAL	2.1

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Mol	Chain	Res	Type	RSRZ
1	ddd	1022	ARG	2.1
1	XXX	1128	LEU	2.1
1	bbb	1111	VAL	2.1
1	YYY	1180	ASP	2.1
1	ccc	1124	GLY	2.1
1	XXX	1216	ALA	2.1
1	XXX	1016	ALA	2.1
1	bbb	1132	GLY	2.1
1	KKK	1134	GLY	2.0
1	YYY	1134	GLY	2.0
1	ZZZ	1124	GLY	2.0
1	XXX	1144	LEU	2.0
1	XXX	1208	ASN	2.0

6.2 Non-standard residues in protein, DNA, RNA chains (i)

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

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

There are no ligands in this entry.

6.5 Other polymers (i)

There are no such residues in this entry.