



Full wwPDB X-ray Structure Validation Report ⓘ

May 25, 2020 – 12:06 pm BST

PDB ID : 6GAP
Title : Crystal structure of the T3D reovirus sigma1 coiled coil tail and body
Authors : Dietrich, M.H.; Stehle, T.
Deposited on : 2018-04-11
Resolution : 2.15 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 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 : 2.11
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) : 2.11

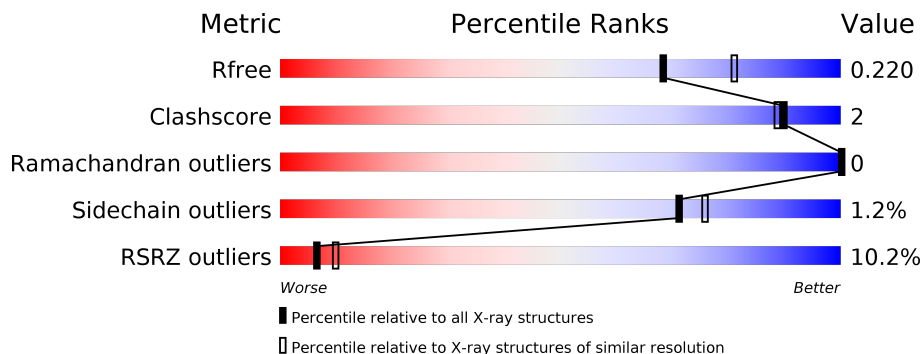
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.15 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	1479 (2.16-2.16)
Clashscore	141614	1585 (2.16-2.16)
Ramachandran outliers	138981	1560 (2.16-2.16)
Sidechain outliers	138945	1559 (2.16-2.16)
RSRZ outliers	127900	1456 (2.16-2.16)

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 on 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 $\leq 5\%$. 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	A	261	 10% 79% 5% 16%
1	B	261	 7% 78% 15% 18%
1	C	261	 9% 77% 14% 18%

2 Entry composition [i](#)

There are 2 unique types of molecules in this entry. The entry contains 5186 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 Outer capsid protein sigma-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	218	1606	983	295	326	2	0	1	0
1	B	214	1586	965	295	324	2	0	0	0
1	C	213	1579	962	290	325	2	0	0	0

There are 69 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	2	MET	-	initiating methionine	UNP P03528
A	3	GLY	-	expression tag	UNP P03528
A	4	SER	-	expression tag	UNP P03528
A	5	SER	-	expression tag	UNP P03528
A	6	HIS	-	expression tag	UNP P03528
A	7	HIS	-	expression tag	UNP P03528
A	8	HIS	-	expression tag	UNP P03528
A	9	HIS	-	expression tag	UNP P03528
A	10	HIS	-	expression tag	UNP P03528
A	11	HIS	-	expression tag	UNP P03528
A	12	SER	-	expression tag	UNP P03528
A	13	SER	-	expression tag	UNP P03528
A	14	GLY	-	expression tag	UNP P03528
A	15	LEU	-	expression tag	UNP P03528
A	16	VAL	-	expression tag	UNP P03528
A	17	PRO	-	expression tag	UNP P03528
A	18	ARG	-	expression tag	UNP P03528
A	19	GLY	-	expression tag	UNP P03528
A	20	SER	-	expression tag	UNP P03528
A	21	HIS	-	expression tag	UNP P03528
A	22	MET	-	expression tag	UNP P03528
A	23	ALA	-	expression tag	UNP P03528
A	24	SER	-	expression tag	UNP P03528

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Chain	Residue	Modelled	Actual	Comment	Reference
B	2	MET	-	initiating methionine	UNP P03528
B	3	GLY	-	expression tag	UNP P03528
B	4	SER	-	expression tag	UNP P03528
B	5	SER	-	expression tag	UNP P03528
B	6	HIS	-	expression tag	UNP P03528
B	7	HIS	-	expression tag	UNP P03528
B	8	HIS	-	expression tag	UNP P03528
B	9	HIS	-	expression tag	UNP P03528
B	10	HIS	-	expression tag	UNP P03528
B	11	HIS	-	expression tag	UNP P03528
B	12	SER	-	expression tag	UNP P03528
B	13	SER	-	expression tag	UNP P03528
B	14	GLY	-	expression tag	UNP P03528
B	15	LEU	-	expression tag	UNP P03528
B	16	VAL	-	expression tag	UNP P03528
B	17	PRO	-	expression tag	UNP P03528
B	18	ARG	-	expression tag	UNP P03528
B	19	GLY	-	expression tag	UNP P03528
B	20	SER	-	expression tag	UNP P03528
B	21	HIS	-	expression tag	UNP P03528
B	22	MET	-	expression tag	UNP P03528
B	23	ALA	-	expression tag	UNP P03528
B	24	SER	-	expression tag	UNP P03528
C	2	MET	-	initiating methionine	UNP P03528
C	3	GLY	-	expression tag	UNP P03528
C	4	SER	-	expression tag	UNP P03528
C	5	SER	-	expression tag	UNP P03528
C	6	HIS	-	expression tag	UNP P03528
C	7	HIS	-	expression tag	UNP P03528
C	8	HIS	-	expression tag	UNP P03528
C	9	HIS	-	expression tag	UNP P03528
C	10	HIS	-	expression tag	UNP P03528
C	11	HIS	-	expression tag	UNP P03528
C	12	SER	-	expression tag	UNP P03528
C	13	SER	-	expression tag	UNP P03528
C	14	GLY	-	expression tag	UNP P03528
C	15	LEU	-	expression tag	UNP P03528
C	16	VAL	-	expression tag	UNP P03528
C	17	PRO	-	expression tag	UNP P03528
C	18	ARG	-	expression tag	UNP P03528
C	19	GLY	-	expression tag	UNP P03528
C	20	SER	-	expression tag	UNP P03528

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Chain	Residue	Modelled	Actual	Comment	Reference
C	21	HIS	-	expression tag	UNP P03528
C	22	MET	-	expression tag	UNP P03528
C	23	ALA	-	expression tag	UNP P03528
C	24	SER	-	expression tag	UNP P03528

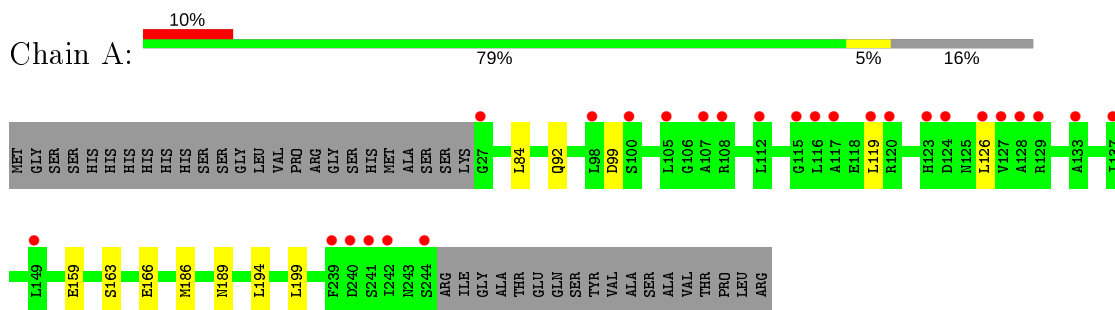
- Molecule 2 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	148	Total O 148 148	0	0
2	B	119	Total O 119 119	0	0
2	C	148	Total O 148 148	0	0

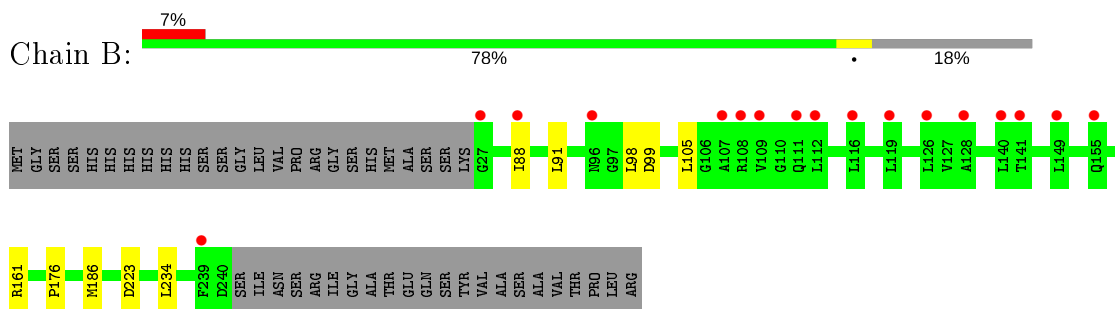
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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.

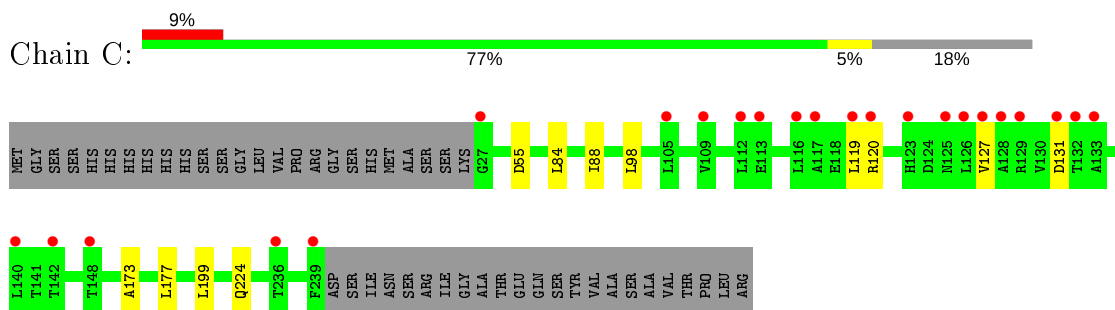
- Molecule 1: Outer capsid protein sigma-1



- Molecule 1: Outer capsid protein sigma-1



- Molecule 1: Outer capsid protein sigma-1



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	350.71Å 41.53Å 63.32Å 90.00° 94.98° 90.00°	Depositor
Resolution (Å)	49.15 – 2.15 49.15 – 2.15	Depositor EDS
% Data completeness (in resolution range)	99.9 (49.15-2.15) 99.9 (49.15-2.15)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.12 (at 2.16Å)	Xtrriage
Refinement program	BUSTER 2.10.0	Depositor
R, R_{free}	0.208 , 0.249 0.219 , 0.220	Depositor DCC
R_{free} test set	2513 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	30.4	Xtrriage
Anisotropy	0.424	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 53.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	5186	wwPDB-VP
Average B, all atoms (Å ²)	48.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 14.83% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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	0.49	0/1617	0.60	0/2194
1	B	0.48	0/1593	0.60	0/2161
1	C	0.48	0/1586	0.58	0/2151
All	All	0.48	0/4796	0.59	0/6506

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 [i](#)

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	1606	0	1597	11	0
1	B	1586	0	1581	11	0
1	C	1579	0	1584	10	0
2	A	148	0	0	0	0
2	B	119	0	0	0	0
2	C	148	0	0	1	0
All	All	5186	0	4762	17	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 2.

All (17) 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:A:194:LEU:HD21	1:B:176:PRO:HD3	1.85	0.59
1:B:88:ILE:HD11	1:C:88:ILE:HD11	1.88	0.55
1:B:234:LEU:HD12	1:C:224:GLN:HB3	1.90	0.51
1:C:55:ASP:HB3	2:C:413:HOH:O	2.10	0.51
1:A:84:LEU:HD22	1:C:88:ILE:HD12	1.92	0.49
1:A:199:LEU:HD22	1:B:186:MET:CE	2.42	0.48
1:A:194:LEU:CD2	1:B:176:PRO:HD3	2.42	0.48
1:B:99:ASP:HA	1:C:98:LEU:HD21	1.96	0.47
1:A:99:ASP:HA	1:B:98:LEU:HD21	1.97	0.46
1:A:119:LEU:HD13	1:C:120:ARG:HD2	1.98	0.45
1:B:88:ILE:HD13	1:C:84:LEU:HD22	1.99	0.44
1:A:159:GLU:OE2	1:B:161:ARG:NH2	2.44	0.44
1:A:166:GLU:OE2	1:B:161:ARG:HD2	2.19	0.42
1:A:126:LEU:HD13	1:C:127:VAL:HG22	2.00	0.42
1:A:92:GLN:HG2	1:B:91:LEU:HD13	2.02	0.42
1:A:186:MET:CE	1:C:199:LEU:HD22	2.50	0.41
1:C:173:ALA:HB1	1:C:177:LEU:HB2	2.03	0.41

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 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	A	217/261 (83%)	217 (100%)	0	0	100	100
1	B	212/261 (81%)	211 (100%)	1 (0%)	0	100	100
1	C	211/261 (81%)	209 (99%)	2 (1%)	0	100	100
All	All	640/783 (82%)	637 (100%)	3 (0%)	0	100	100

There are no Ramachandran outliers to report.

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	A	172/221 (78%)	170 (99%)	2 (1%)	71	76
1	B	171/221 (77%)	169 (99%)	2 (1%)	71	76
1	C	173/221 (78%)	171 (99%)	2 (1%)	71	76
All	All	516/663 (78%)	510 (99%)	6 (1%)	71	76

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	163	SER
1	A	189	ASN
1	B	105	LEU
1	B	223	ASP
1	C	119	LEU
1	C	131	ASP

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	C	206	ASN

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 carbohydrates 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, 95th 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	A	218/261 (83%)	0.61	26 (11%) 4 6	21, 40, 83, 112	0
1	B	214/261 (81%)	0.55	17 (7%) 12 17	21, 43, 87, 102	0
1	C	213/261 (81%)	0.68	23 (10%) 5 8	21, 42, 87, 102	0
All	All	645/783 (82%)	0.62	66 (10%) 6 10	21, 42, 86, 112	0

All (66) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	128	ALA	5.7
1	C	131	ASP	4.6
1	A	244	SER	4.5
1	A	128	ALA	4.3
1	C	236	THR	4.2
1	B	119	LEU	4.1
1	A	241	SER	4.1
1	C	27	GLY	3.8
1	C	140	LEU	3.7
1	C	112	LEU	3.6
1	C	119	LEU	3.5
1	C	125	ASN	3.4
1	B	108	ARG	3.4
1	A	124	ASP	3.3
1	B	112	LEU	3.3
1	A	242	ILE	3.2
1	A	119	LEU	3.2
1	C	109	VAL	3.2
1	A	98	LEU	3.2
1	C	132	THR	3.1
1	B	128	ALA	3.1
1	A	27	GLY	3.1
1	B	239	PHE	3.1

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Mol	Chain	Res	Type	RSRZ
1	C	127	VAL	3.0
1	C	120	ARG	3.0
1	A	116	LEU	3.0
1	C	123	HIS	2.9
1	A	126	LEU	2.9
1	A	240	ASP	2.9
1	B	149	LEU	2.9
1	C	239	PHE	2.9
1	B	140	LEU	2.9
1	A	149	LEU	2.8
1	B	126	LEU	2.8
1	A	137	ILE	2.8
1	A	105	LEU	2.8
1	C	105	LEU	2.7
1	B	111	GLN	2.7
1	A	239	PHE	2.7
1	C	117	ALA	2.6
1	A	127	VAL	2.6
1	A	120	ARG	2.6
1	A	129	ARG	2.5
1	C	129	ARG	2.5
1	A	100	SER	2.5
1	B	96	ASN	2.5
1	A	107	ALA	2.5
1	C	133	ALA	2.4
1	B	27	GLY	2.4
1	B	116	LEU	2.3
1	C	113	GLU	2.3
1	A	112	LEU	2.3
1	C	116	LEU	2.3
1	A	123	HIS	2.3
1	B	109	VAL	2.3
1	C	148	THR	2.3
1	A	117	ALA	2.3
1	B	141	THR	2.2
1	C	142	THR	2.2
1	B	107	ALA	2.1
1	C	126	LEU	2.1
1	B	88	ILE	2.0
1	A	115	GLY	2.0
1	A	108	ARG	2.0
1	B	155	GLN	2.0

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Mol	Chain	Res	Type	RSRZ
1	A	133	ALA	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 carbohydrates 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.