



Full wwPDB X-ray Structure Validation Report ⓘ

Aug 28, 2020 – 02:03 PM BST

PDB ID : 6SE7
Title : R600A mutant from Mycoplasma genitalium P110 Adhesin at 1.87 Angstroms resolution
Authors : Fita, I.; Aparicio, D.
Deposited on : 2019-07-29
Resolution : 1.87 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 : 2.13
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) : 2.13

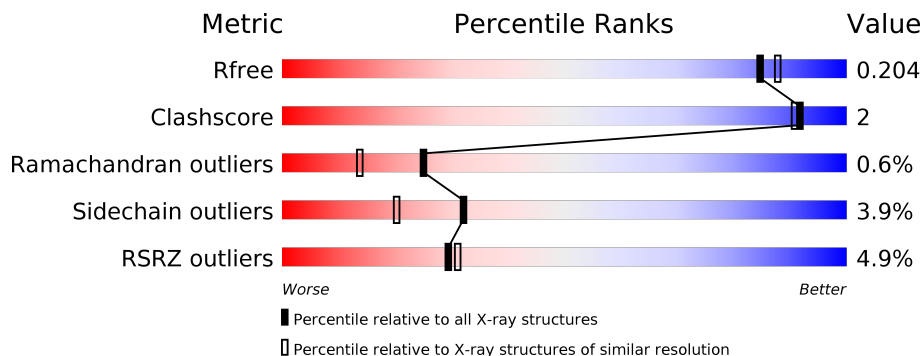
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.87 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	9470 (1.90-1.86)
Clashscore	141614	10282 (1.90-1.86)
Ramachandran outliers	138981	10152 (1.90-1.86)
Sidechain outliers	138945	10152 (1.90-1.86)
RSRZ outliers	127900	9303 (1.90-1.86)

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	923	

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 7515 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 Mgp-operon protein 3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	885	6814	4276	1136	1396	6	0	0	0

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	939	HIS	-	expression tag	UNP P22747
A	940	HIS	-	expression tag	UNP P22747
A	941	HIS	-	expression tag	UNP P22747
A	942	HIS	-	expression tag	UNP P22747
A	943	HIS	-	expression tag	UNP P22747
A	944	HIS	-	expression tag	UNP P22747

- Molecule 2 is POTASSIUM ION (three-letter code: K) (formula: K).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	K	0	0
			1	1		

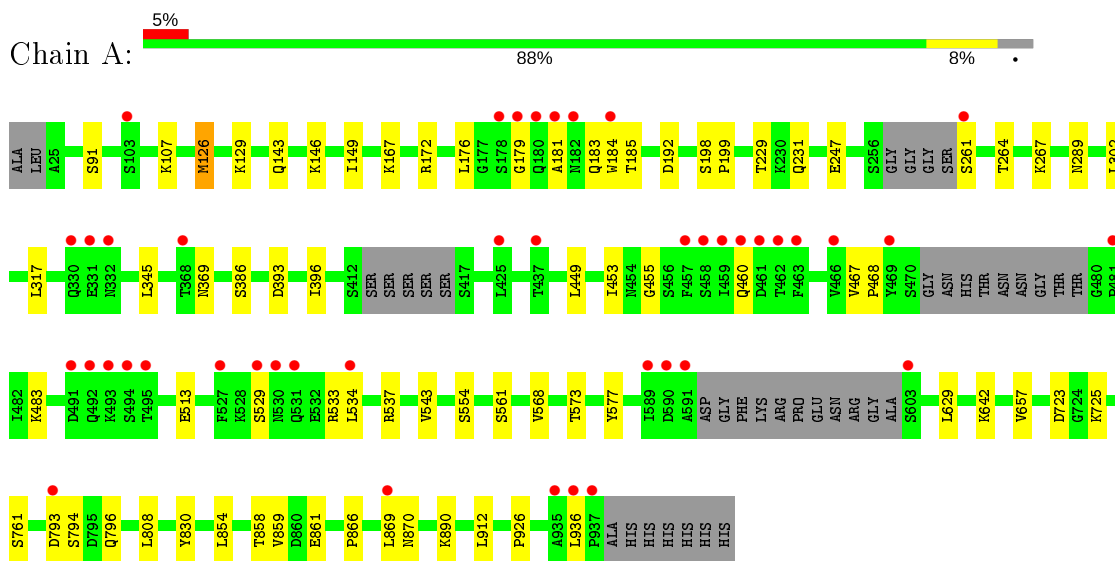
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	700	Total	O	0	0
			700	700		

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: Mgp-operon protein 3



4 Data and refinement statistics

Property	Value	Source
Space group	I 2 2 2	Depositor
Cell constants a, b, c, α , β , γ	109.39Å 150.70Å 176.22Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	27.36 – 1.87 88.53 – 1.87	Depositor EDS
% Data completeness (in resolution range)	61.5 (27.36-1.87) 61.5 (88.53-1.87)	Depositor EDS
R_{merge}	0.04	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.68 (at 1.87Å)	Xtrriage
Refinement program	BUSTER 2.10.3	Depositor
R, R_{free}	0.172 , 0.207 0.174 , 0.204	Depositor DCC
R_{free} test set	3693 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	40.2	Xtrriage
Anisotropy	0.047	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 57.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	7515	wwPDB-VP
Average B, all atoms (Å ²)	60.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.29% 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](#)

Bond lengths and bond angles in the following residue types are not validated in this section:
K

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	0.50	1/6954 (0.0%)	0.69	0/9459

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	126	MET	SD-CE	-5.54	1.46	1.77

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	6814	0	6596	21	0
2	A	1	0	0	0	0
3	A	700	0	0	3	0
All	All	7515	0	6596	21	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 (21) 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:126:MET:HE1	1:A:129:LYS:HD2	1.46	0.97
1:A:796:GLN:HB3	3:A:1321:HOH:O	1.67	0.94
1:A:167:LYS:HD2	1:A:513:GLU:HB3	1.76	0.67
1:A:289:ASN:CG	3:A:1103:HOH:O	2.33	0.66
1:A:554:SER:HB2	1:A:568:VAL:HG13	1.77	0.65
1:A:192:ASP:O	1:A:483:LYS:HD2	2.00	0.62
1:A:858:THR:HG23	1:A:861:GLU:H	1.72	0.55
1:A:723:ASP:HB3	1:A:725:LYS:H	1.71	0.55
1:A:533:ARG:HD3	1:A:577:TYR:HE2	1.76	0.51
1:A:184:TRP:CD2	1:A:199:PRO:HB3	2.46	0.50
1:A:231:GLN:HG2	1:A:267:LYS:HB3	1.94	0.50
1:A:912:LEU:HD23	3:A:1140:HOH:O	2.15	0.47
1:A:176:LEU:HD13	1:A:183:GLN:HG2	1.97	0.47
1:A:172:ARG:HD2	1:A:181:ALA:HA	1.99	0.45
1:A:859:VAL:HG11	1:A:890:LYS:HG3	2.01	0.43
1:A:866:PRO:HA	1:A:869:LEU:CD2	2.49	0.42
1:A:172:ARG:HG3	1:A:176:LEU:HD12	2.01	0.42
1:A:345:LEU:HD22	1:A:573:THR:HG21	2.00	0.42
1:A:143:GLN:HA	1:A:146:LYS:HE3	2.03	0.41
1:A:396:ILE:HG22	1:A:629:LEU:HD21	2.03	0.40
1:A:830:TYR:CE1	1:A:926:PRO:HD3	2.56	0.40

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	875/923 (95%)	843 (96%)	27 (3%)	5 (1%)	25 14

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	794	SER

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Mol	Chain	Res	Type
1	A	179	GLY
1	A	460	GLN
1	A	453	ILE
1	A	455	GLY

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	774/802 (96%)	744 (96%)	30 (4%)	32 20

All (30) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	91	SER
1	A	107	LYS
1	A	149	ILE
1	A	185	THR
1	A	198	SER
1	A	229	THR
1	A	247	GLU
1	A	261	SER
1	A	264	THR
1	A	302	LEU
1	A	317	LEU
1	A	369	ASN
1	A	386	SER
1	A	393	ASP
1	A	449	LEU
1	A	467	VAL
1	A	468	PRO
1	A	529	SER
1	A	534	LEU
1	A	537	ARG
1	A	543	VAL
1	A	561	SER

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Mol	Chain	Res	Type
1	A	642	LYS
1	A	657	VAL
1	A	761	SER
1	A	793	ASP
1	A	808	LEU
1	A	854	LEU
1	A	870	ASN
1	A	936	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	143	GLN
1	A	369	ASN
1	A	891	GLN

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](#)

Of 1 ligands modelled in this entry, 1 is monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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	885/923 (95%)	0.45	43 (4%) 29 31	26, 55, 107, 165	0

All (43) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	459	ILE	12.0
1	A	492	GLN	8.4
1	A	460	GLN	6.9
1	A	461	ASP	6.9
1	A	591	ALA	5.9
1	A	179	GLY	5.7
1	A	182	ASN	5.2
1	A	261	SER	5.1
1	A	180	GLN	4.9
1	A	178	SER	4.8
1	A	937	PRO	4.5
1	A	181	ALA	4.5
1	A	589	ILE	4.1
1	A	469	TYR	4.0
1	A	331	GLU	3.9
1	A	590	ASP	3.9
1	A	463	PHE	3.8
1	A	935	ALA	3.6
1	A	462	THR	3.5
1	A	529	SER	3.5
1	A	493	LYS	3.4
1	A	458	SER	3.3
1	A	437	THR	3.1
1	A	495	THR	3.1
1	A	527	PHE	3.0
1	A	530	ASN	3.0
1	A	184	TRP	2.9

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Mol	Chain	Res	Type	RSRZ
1	A	494	SER	2.7
1	A	332	ASN	2.7
1	A	793	ASP	2.7
1	A	330	GLN	2.6
1	A	481	PRO	2.6
1	A	457	PHE	2.6
1	A	368	THR	2.6
1	A	603	SER	2.5
1	A	491	ASP	2.4
1	A	869	LEU	2.4
1	A	425	LEU	2.3
1	A	466	VAL	2.2
1	A	103	SER	2.2
1	A	534	LEU	2.2
1	A	936	LEU	2.1
1	A	531	GLN	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](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	K	A	1001	1/1	1.00	0.18	32,32,32,32	0

6.5 Other polymers [i](#)

There are no such residues in this entry.