



Full wwPDB X-ray Structure Validation Report ⓘ

Jan 25, 2023 – 07:19 AM EST

PDB ID : 3OQL
Title : Crystal structure of a TenA homolog (PSPTO1738) from *Pseudomonas syringae* pv. tomato str. DC3000 at 2.54 Å resolution
Authors : Joint Center for Structural Genomics (JCSG)
Deposited on : 2010-09-03
Resolution : 2.54 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
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.31.2
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) : 2.31.2

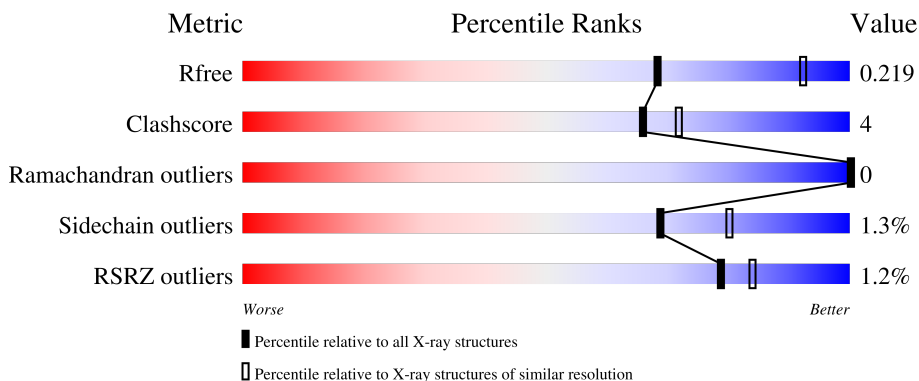
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.54 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	1284 (2.56-2.52)
Clashscore	141614	1332 (2.56-2.52)
Ramachandran outliers	138981	1315 (2.56-2.52)
Sidechain outliers	138945	1315 (2.56-2.52)
RSRZ outliers	127900	1272 (2.56-2.52)

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 $\leq 5\%$. 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	262	 84% 8% 7%
1	B	262	 84% 9% 7%
1	C	262	 83% 9% 8%
1	D	262	 81% 12% 7%

2 Entry composition [i](#)

There are 2 unique types of molecules in this entry. The entry contains 7812 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 TenA homolog.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	N	O	S	Se			
1	A	243	Total 1949	C 1237	N 346	O 350	S 6	Se 10	0	2	0
1	B	244	Total 1951	C 1238	N 345	O 352	S 6	Se 10	0	2	0
1	C	242	Total 1932	C 1227	N 343	O 346	S 6	Se 10	0	1	0
1	D	244	Total 1923	C 1220	N 341	O 346	S 6	Se 10	0	1	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	GLY	-	expression tag	UNP Q885U3
B	0	GLY	-	expression tag	UNP Q885U3
C	0	GLY	-	expression tag	UNP Q885U3
D	0	GLY	-	expression tag	UNP Q885U3

- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	9	Total 9	O 9	0	0
2	B	7	Total 7	O 7	0	0
2	C	18	Total 18	O 18	0	0
2	D	23	Total 23	O 23	0	0

R242	ASP
C243	LYS
I244	VAL
Q245	LYS
I246	SER
	PRO
	ARG
	GLY
	ARG
	VAL
	ALA
	ALA
	LEU
	GLU
	MSE

4 Data and refinement statistics

Property	Value	Source
Space group	P 41 2 2	Depositor
Cell constants a, b, c, α , β , γ	67.34Å 67.34Å 479.13Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.88 – 2.54 29.88 – 2.54	Depositor EDS
% Data completeness (in resolution range)	(Not available) (29.88-2.54) 99.8 (29.88-2.54)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.71 (at 2.54Å)	Xtrriage
Refinement program	BUSTER-TNT BUSTER 2.8.0, BUSTER 2.8.0	Depositor
R, R_{free}	0.176 , 0.202 0.193 , 0.219	Depositor DCC
R_{free} test set	1887 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å ²)	65.0	Xtrriage
Anisotropy	0.011	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 47.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.41$, $\langle L^2 \rangle = 0.23$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	7812	wwPDB-VP
Average B, all atoms (Å ²)	70.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.78% 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

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	0.50	0/1996	0.60	0/2696
1	B	0.50	0/1999	0.59	0/2703
1	C	0.52	0/1973	0.60	0/2666
1	D	0.53	0/1968	0.61	0/2664
All	All	0.52	0/7936	0.60	0/10729

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	A	1949	0	1871	13	0
1	B	1951	0	1863	16	0
1	C	1932	0	1849	16	0
1	D	1923	0	1821	23	0
2	A	9	0	0	0	0
2	B	7	0	0	0	0
2	C	18	0	0	0	0
2	D	23	0	0	1	0
All	All	7812	0	7404	60	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 4.

All (60) 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:D:72:MSE:HE1	1:D:101:GLU:HG3	1.48	0.93
1:C:72:MSE:HE1	1:C:101:GLU:HG3	1.60	0.82
1:C:69:ALA:HA	1:C:72:MSE:HE3	1.69	0.74
1:A:66:GLU:O	1:B:91[B]:ARG:NH2	2.26	0.67
1:C:134:LEU:HD11	1:C:158:ILE:HD11	1.79	0.62
1:C:91[B]:ARG:NH2	1:D:66:GLU:O	2.34	0.60
1:A:72:MSE:HE1	1:A:101:GLU:HG3	1.85	0.58
1:D:69:ALA:HA	1:D:72:MSE:HE3	1.86	0.58
1:D:20:TRP:CZ2	1:D:213:VAL:HG21	2.39	0.57
1:D:91[A]:ARG:HG2	1:D:95:MSE:HE2	1.87	0.56
1:C:91[A]:ARG:HG2	1:C:95:MSE:HE2	1.88	0.56
1:B:75:ASN:HA	1:B:78:LYS:HD2	1.88	0.55
1:B:91[A]:ARG:HG2	1:B:95:MSE:HE2	1.86	0.55
1:C:66:GLU:O	1:D:91[B]:ARG:NH2	2.40	0.54
1:C:20:TRP:CZ2	1:C:213:VAL:HG21	2.43	0.53
1:D:89:MSE:HE2	1:D:208:ILE:HG13	1.90	0.53
1:C:102:LEU:HD12	1:D:95:MSE:HE3	1.92	0.52
1:B:20:TRP:CZ2	1:B:213:VAL:HG21	2.44	0.51
1:D:189:LYS:HD2	1:D:193:MSE:HE3	1.92	0.51
1:B:69:ALA:HA	1:B:72:MSE:HE2	1.93	0.51
1:A:72:MSE:CE	1:A:101:GLU:HG3	2.41	0.50
1:A:91[A]:ARG:HG2	1:A:95:MSE:HE2	1.94	0.50
1:D:20:TRP:CZ2	1:D:213:VAL:CG2	2.95	0.50
1:D:97:ASN:OD1	1:D:201:HIS:HE1	1.94	0.49
1:A:134:LEU:HD11	1:A:158:ILE:HD11	1.95	0.49
1:C:95:MSE:HE3	1:D:102:LEU:HD12	1.94	0.49
1:D:213:VAL:HG11	1:D:225:LEU:HD11	1.95	0.49
1:B:69:ALA:HA	1:B:72:MSE:CE	2.43	0.48
1:A:102:LEU:HD12	1:B:95:MSE:HE3	1.96	0.47
1:A:12:MSE:HG2	1:A:203:TRP:CD1	2.48	0.47
1:C:12:MSE:HG2	1:C:203:TRP:CD1	2.50	0.46
1:B:72:MSE:HE1	1:B:101:GLU:HG3	1.96	0.46
1:D:68:PHE:CD2	1:D:72:MSE:HE2	2.51	0.46
1:A:60:GLY:O	1:A:63:PRO:HD2	2.16	0.46
1:B:12:MSE:HG2	1:B:203:TRP:CD1	2.51	0.45
1:C:60:GLY:O	1:C:63:PRO:HD2	2.17	0.45
1:B:50:SER:HB3	1:B:53:ILE:HD12	1.98	0.45
1:B:60:GLY:O	1:B:63:PRO:HD2	2.16	0.45
1:D:60:GLY:O	1:D:63:PRO:HD2	2.16	0.44
1:D:43:GLN:NE2	2:D:266:HOH:O	2.50	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:154:THR:HA	1:D:158:ILE:HG12	1.99	0.44
1:D:50:SER:HB3	1:D:53:ILE:HD12	1.99	0.43
1:B:20:TRP:CZ2	1:B:213:VAL:CG2	3.01	0.43
1:A:124:ASP:HB3	1:A:126[B]:ARG:HE	1.84	0.43
1:C:20:TRP:CZ2	1:C:213:VAL:CG2	3.02	0.42
1:C:162:THR:HA	1:C:165:TRP:NE1	2.34	0.42
1:C:213:VAL:HG12	1:C:221:LEU:HD21	2.01	0.42
1:B:198:ASP:C	1:B:200:ALA:H	2.23	0.41
1:A:12:MSE:HE1	1:A:199:ASP:HB2	2.02	0.41
1:B:129:PRO:HB3	1:D:231:LYS:HG3	2.02	0.41
1:D:20:TRP:CH2	1:D:213:VAL:HG21	2.56	0.41
1:A:50:SER:HB3	1:A:53:ILE:HD12	2.02	0.41
1:D:127:VAL:HB	1:D:131:LEU:HD12	2.02	0.41
1:A:129:PRO:HB3	1:C:231:LYS:HG3	2.02	0.41
1:C:50:SER:HB3	1:C:53:ILE:HD12	2.02	0.41
1:D:162:THR:HA	1:D:165:TRP:NE1	2.35	0.41
1:A:162:THR:HA	1:A:165:TRP:NE1	2.36	0.40
1:B:162:THR:HA	1:B:165:TRP:NE1	2.36	0.40
1:D:242:ARG:HD2	1:D:242:ARG:HA	1.93	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	241/262 (92%)	236 (98%)	5 (2%)	0	100	100
1	B	244/262 (93%)	237 (97%)	7 (3%)	0	100	100
1	C	239/262 (91%)	235 (98%)	4 (2%)	0	100	100
1	D	243/262 (93%)	235 (97%)	8 (3%)	0	100	100
All	All	967/1048 (92%)	943 (98%)	24 (2%)	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	198/208 (95%)	196 (99%)	2 (1%)	76	84
1	B	197/208 (95%)	193 (98%)	4 (2%)	55	70
1	C	195/208 (94%)	192 (98%)	3 (2%)	65	77
1	D	192/208 (92%)	191 (100%)	1 (0%)	88	93
All	All	782/832 (94%)	772 (99%)	10 (1%)	69	80

All (10) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	92	ARG
1	A	220	GLN
1	B	182	GLU
1	B	186	LYS
1	B	220	GLN
1	B	244	ILE
1	C	116	ASP
1	C	159	GLU
1	C	220	GLN
1	D	244	ILE

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

Mol	Chain	Res	Type
1	D	201	HIS

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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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	233/262 (88%)	-0.02	3 (1%) 77 82	53, 70, 97, 118	0
1	B	234/262 (89%)	0.14	7 (2%) 50 57	54, 75, 104, 137	0
1	C	232/262 (88%)	-0.14	1 (0%) 92 96	52, 64, 83, 100	0
1	D	234/262 (89%)	-0.21	0 100 100	50, 65, 88, 106	0
All	All	933/1048 (89%)	-0.06	11 (1%) 79 84	50, 68, 95, 137	0

All (11) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	3	ASP	4.1
1	B	219	LEU	3.2
1	A	246	LEU	3.1
1	B	154	THR	2.4
1	A	219	LEU	2.4
1	B	99	ARG	2.2
1	A	99	ARG	2.1
1	B	217	PRO	2.1
1	C	8	THR	2.1
1	B	114	ALA	2.0
1	B	61	GLY	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.