Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 04:52 AM GMT

PDB ID	:	2OJQ
Title	:	Crystal structure of Alix V domain
Authors	:	Lee, S.; Hurley, J.H.
Deposited on	:	2007-01-13
Resolution	:	2.87 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
http://wwpdb.org/validation/2016/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:

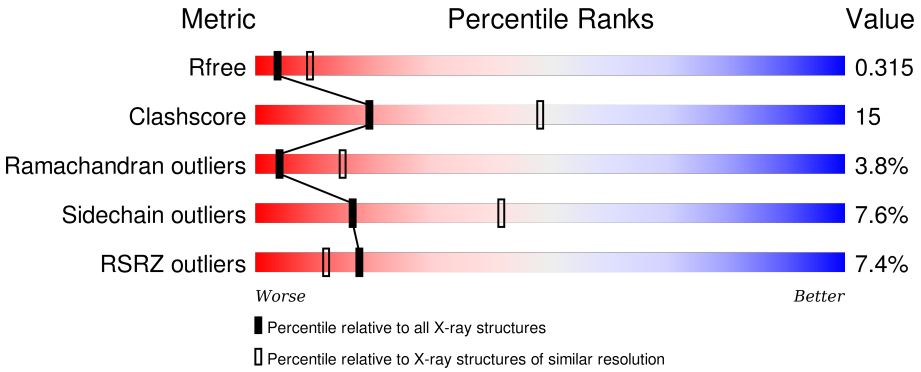
MolProbity	:	4.02b-467
Mogul	:	1.7 (RC4), CSD as536be (2015)
Xtriage (Phenix)	:	1.9-1692
EDS	:	rb-20026688
Percentile statistics	:	20151230.v01 (using entries in the PDB archive December 30th 2015)
Refmac	:	5.8.0135
CCP4	:	6.5.0
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	trunk26865

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 2.87 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}	91344	1945 (2.90-2.86)
Clashscore	102246	2202 (2.90-2.86)
Ramachandran outliers	100387	2149 (2.90-2.86)
Sidechain outliers	100360	2152 (2.90-2.86)
RSRZ outliers	91569	1950 (2.90-2.86)

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. 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	A	348	7%, 64%, 30%

2 Entry composition (i)

There is only 1 type of molecule in this entry. The entry contains 2704 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 Programmed cell death 6-interacting protein.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	N	O	S	Se			
1	A	343	2704	1678	475	544	3	4	0	0	0

There are 10 discrepancies between the modelled and reference sequences:

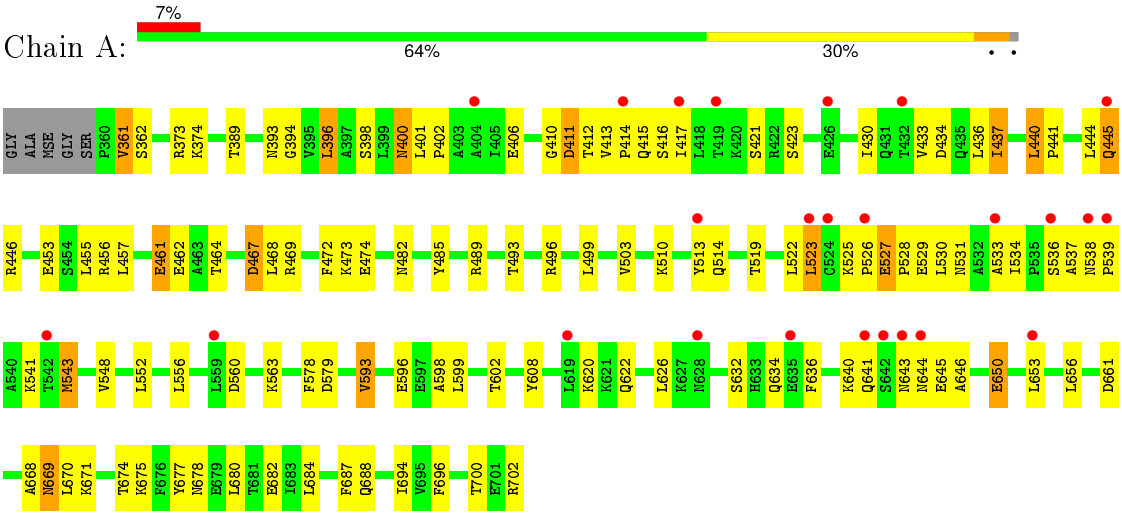
Chain	Residue	Modelled	Actual	Comment	Reference
A	355	GLY	-	CLONING ARTIFACT	UNP Q8WUM4
A	356	ALA	-	CLONING ARTIFACT	UNP Q8WUM4
A	357	MSE	-	CLONING ARTIFACT	UNP Q8WUM4
A	358	GLY	-	CLONING ARTIFACT	UNP Q8WUM4
A	359	SER	-	CLONING ARTIFACT	UNP Q8WUM4
A	385	MSE	MET	MODIFIED RESIDUE	UNP Q8WUM4
A	543	MSE	MET	MODIFIED RESIDUE	UNP Q8WUM4
A	550	SER	ASN	SEE REMARK 999	UNP Q8WUM4
A	580	MSE	MET	MODIFIED RESIDUE	UNP Q8WUM4
A	639	MSE	MET	MODIFIED RESIDUE	UNP Q8WUM4

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 errors 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: Programmed cell death 6-interacting protein

Chain A:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	37.65Å 55.38Å 113.17Å 90.00° 92.37° 90.00°	Depositor
Resolution (Å)	113.23 – 2.87 37.69 – 2.87	Depositor EDS
% Data completeness (in resolution range)	96.3 (113.23-2.87) 96.3 (37.69-2.87)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	5.09 (at 2.85Å)	Xtriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.250 , 0.318 0.245 , 0.315	Depositor DCC
R_{free} test set	1027 reflections (10.92%)	DCC
Wilson B-factor (Å^2)	63.5	Xtriage
Anisotropy	0.684	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.29 , 85.8	EDS
Estimated twinning fraction	0.028 for h,-k,-l	Xtriage
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Outliers	0 of 10444 reflections	Xtriage
F_o,F_c correlation	0.92	EDS
Total number of atoms	2704	wwPDB-VP
Average B, all atoms (Å^2)	75.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 8.79% 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, 0.375 respectively for untwinned datasets, and 0.333, 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	0.71	3/2728 (0.1%)	0.73	0/3673

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	423	SER	CB-OG	14.33	1.60	1.42
1	A	645	GLU	CD-OE2	7.08	1.33	1.25
1	A	645	GLU	CD-OE1	6.49	1.32	1.25

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	2704	0	2741	82	0
All	All	2704	0	2741	82	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 15.

All (82) 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:469:ARG:NH1	1:A:469:ARG:HG3	1.94	0.81
1:A:462:GLU:OE2	1:A:489:ARG:NH1	2.15	0.80
1:A:469:ARG:HH11	1:A:469:ARG:HG3	1.49	0.77
1:A:530:LEU:HA	1:A:534:ILE:HG12	1.67	0.76
1:A:461:GLU:HG2	1:A:485:TYR:OH	1.84	0.75
1:A:526:PRO:HD2	1:A:528:PRO:HD2	1.76	0.67
1:A:527:GLU:H	1:A:528:PRO:HD2	1.61	0.66
1:A:527:GLU:H	1:A:528:PRO:CD	2.10	0.65
1:A:433:VAL:O	1:A:437:ILE:HG13	1.99	0.63
1:A:469:ARG:HH11	1:A:469:ARG:CG	2.12	0.62
1:A:598:ALA:O	1:A:602:THR:HG23	2.00	0.62
1:A:361:VAL:CG1	1:A:361:VAL:O	2.46	0.62
1:A:696:PHE:O	1:A:700:THR:HG22	1.99	0.62
1:A:485:TYR:O	1:A:489:ARG:HG3	2.02	0.60
1:A:538:ASN:N	1:A:539:PRO:HD3	2.18	0.59
1:A:413:VAL:O	1:A:413:VAL:HG12	2.03	0.58
1:A:522:LEU:HA	1:A:525:LYS:HE2	1.88	0.54
1:A:510:LYS:O	1:A:514:GLN:HB3	2.07	0.54
1:A:469:ARG:HH21	1:A:482:ASN:HD21	1.56	0.53
1:A:453:GLU:OE2	1:A:456:ARG:HD3	2.09	0.53
1:A:684:LEU:O	1:A:687:PHE:N	2.42	0.52
1:A:523:LEU:HD21	1:A:656:LEU:CD2	2.39	0.52
1:A:461:GLU:HG3	1:A:462:GLU:N	2.23	0.52
1:A:668:ALA:O	1:A:669:ASN:C	2.47	0.52
1:A:434:ASP:HA	1:A:437:ILE:HD12	1.91	0.52
1:A:523:LEU:HD21	1:A:656:LEU:HD22	1.92	0.52
1:A:436:LEU:HB2	1:A:670:LEU:HD23	1.93	0.50
1:A:680:LEU:O	1:A:680:LEU:HG	2.12	0.50
1:A:464:THR:O	1:A:467:ASP:OD1	2.30	0.49
1:A:441:PRO:O	1:A:445:GLN:NE2	2.46	0.49
1:A:541:LYS:HB3	1:A:543:MSE:HB3	1.95	0.49
1:A:374:LYS:HG3	1:A:608:TYR:OH	2.13	0.49
1:A:361:VAL:HG13	1:A:361:VAL:O	2.12	0.48
1:A:444:LEU:HD22	1:A:677:TYR:OH	2.14	0.48
1:A:434:ASP:HA	1:A:437:ILE:CD1	2.43	0.48
1:A:537:ALA:HB3	1:A:539:PRO:HG3	1.96	0.48
1:A:513:TYR:CG	1:A:514:GLN:N	2.82	0.47
1:A:456:ARG:O	1:A:457:LEU:C	2.52	0.47
1:A:578:PHE:O	1:A:579:ASP:HB3	2.14	0.47
1:A:430:ILE:O	1:A:434:ASP:N	2.43	0.47
1:A:444:LEU:HD21	1:A:503:VAL:CG2	2.45	0.47
1:A:469:ARG:NH1	1:A:469:ARG:CG	2.65	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:530:LEU:HA	1:A:534:ILE:CG1	2.42	0.46
1:A:406:GLU:OE1	1:A:415:GLN:HB3	2.16	0.46
1:A:578:PHE:O	1:A:579:ASP:CB	2.62	0.46
1:A:412:THR:CG2	1:A:530:LEU:HD22	2.46	0.46
1:A:462:GLU:OE2	1:A:489:ARG:NH2	2.49	0.46
1:A:674:THR:O	1:A:675:LYS:C	2.55	0.45
1:A:417:ILE:O	1:A:421:SER:N	2.49	0.45
1:A:361:VAL:HG22	1:A:593:VAL:HA	1.99	0.45
1:A:529:GLU:O	1:A:533:ALA:HB3	2.18	0.44
1:A:455:LEU:HD12	1:A:496:ARG:HH21	1.82	0.44
1:A:361:VAL:HG23	1:A:593:VAL:HG12	1.99	0.44
1:A:415:GLN:C	1:A:417:ILE:H	2.19	0.44
1:A:464:THR:HG22	1:A:468:LEU:HD12	1.99	0.44
1:A:440:LEU:N	1:A:441:PRO:HD2	2.34	0.43
1:A:401:LEU:N	1:A:402:PRO:HD2	2.34	0.43
1:A:634:GLN:C	1:A:636:PHE:H	2.22	0.43
1:A:462:GLU:OE2	1:A:489:ARG:CZ	2.67	0.42
1:A:421:SER:OG	1:A:523:LEU:O	2.28	0.42
1:A:702:ARG:HD2	1:A:702:ARG:HA	1.76	0.42
1:A:529:GLU:HG3	1:A:530:LEU:N	2.34	0.42
1:A:646:ALA:O	1:A:650:GLU:N	2.52	0.42
1:A:446:ARG:NH2	1:A:678:ASN:HA	2.35	0.42
1:A:400:ASN:ND2	1:A:653:LEU:HB2	2.34	0.42
1:A:684:LEU:O	1:A:687:PHE:HB3	2.20	0.41
1:A:670:LEU:O	1:A:671:LYS:C	2.57	0.41
1:A:394:GLY:O	1:A:398:SER:HB3	2.21	0.41
1:A:543:MSE:HG3	1:A:543:MSE:O	2.20	0.41
1:A:461:GLU:CG	1:A:485:TYR:OH	2.62	0.41
1:A:646:ALA:O	1:A:650:GLU:HB2	2.21	0.41
1:A:678:ASN:HD22	1:A:678:ASN:H	1.68	0.41
1:A:393:ASN:ND2	1:A:661:ASP:OD1	2.54	0.41
1:A:622:GLN:HE21	1:A:626:LEU:HD11	1.85	0.41
1:A:682:GLU:OE1	1:A:682:GLU:HA	2.20	0.41
1:A:560:ASP:HA	1:A:563:LYS:HB2	2.04	0.40
1:A:410:GLY:O	1:A:411:ASP:C	2.59	0.40
1:A:469:ARG:O	1:A:472:PHE:O	2.38	0.40
1:A:396:LEU:HD21	1:A:556:LEU:HD11	2.02	0.40
1:A:373:ARG:NH1	1:A:596:GLU:OE2	2.44	0.40
1:A:361:VAL:CG2	1:A:593:VAL:HA	2.51	0.40
1:A:413:VAL:N	1:A:414:PRO:HD3	2.36	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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	341/348 (98%)	282 (83%)	46 (14%)	13 (4%)	4 15

All (13) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	527	GLU
1	A	543	MSE
1	A	400	ASN
1	A	531	ASN
1	A	640	LYS
1	A	641	GLN
1	A	473	LYS
1	A	361	VAL
1	A	536	SER
1	A	644	ASN
1	A	411	ASP
1	A	416	SER
1	A	620	LYS

5.3.2 Protein sidechains

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	304/301 (101%)	281 (92%)	23 (8%)	16 42

All (23) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	362	SER
1	A	389	THR
1	A	396	LEU
1	A	437	ILE
1	A	440	LEU
1	A	445	GLN
1	A	461	GLU
1	A	467	ASP
1	A	474	GLU
1	A	493	THR
1	A	499	LEU
1	A	519	THR
1	A	523	LEU
1	A	548	VAL
1	A	552	LEU
1	A	593	VAL
1	A	599	LEU
1	A	632	SER
1	A	643	ASN
1	A	650	GLU
1	A	669	ASN
1	A	688	GLN
1	A	694	ILE

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	445	GLN
1	A	482	ASN
1	A	494	ASN
1	A	516	HIS
1	A	616	GLN
1	A	628	ASN
1	A	633	HIS
1	A	662	ASN

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 carbohydrates 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 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	A	339/348 (97%)	0.53	25 (7%) 17 12	61, 75, 85, 89	0

All (25) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	538	ASN	5.2
1	A	523	LEU	5.2
1	A	542	THR	4.3
1	A	513	TYR	4.0
1	A	414	PRO	3.8
1	A	426	GLU	3.5
1	A	643	ASN	3.2
1	A	653	LEU	3.0
1	A	635	GLU	2.8
1	A	641	GLN	2.8
1	A	417	ILE	2.7
1	A	559	LEU	2.7
1	A	536	SER	2.6
1	A	628	ASN	2.5
1	A	526	PRO	2.4
1	A	539	PRO	2.4
1	A	419	THR	2.4
1	A	445	GLN	2.3
1	A	644	ASN	2.3
1	A	533	ALA	2.3
1	A	642	SER	2.3
1	A	524	CYS	2.2
1	A	619	LEU	2.2
1	A	432	THR	2.1
1	A	404	ALA	2.0

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

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

6.3 Carbohydrates

There are no carbohydrates in this entry.

6.4 Ligands

There are no ligands in this entry.

6.5 Other polymers

There are no such residues in this entry.