Full wwPDB X-ray Structure Validation Report (i)

Apr 16, 2025 – 01:11 pm BST

PDB ID	:	9QWO / pdb_00009qwo
Title	:	Vinculin tail bound to paxillin LD2
Authors	:	Diaz-Palacios, K.; Lietha, D.
Deposited on	:	2025-04-14
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 (i) 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 (i)) were used in the production of this report:

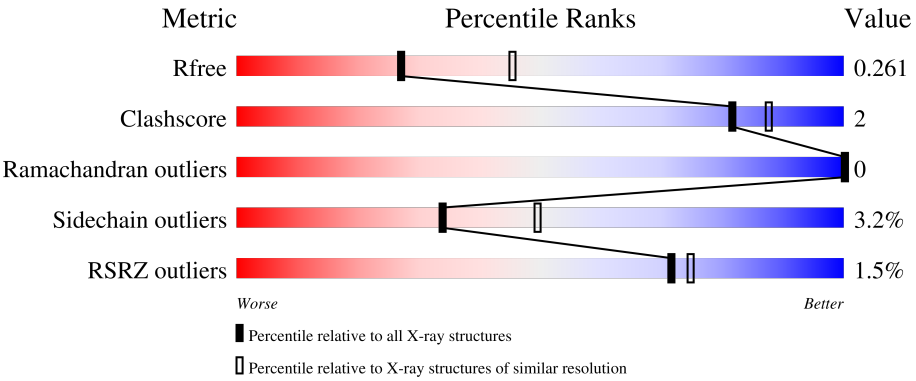
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.42

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 2.54 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}	164625	1004 (2.54-2.54)
Clashscore	180529	1055 (2.54-2.54)
Ramachandran outliers	177936	1048 (2.54-2.54)
Sidechain outliers	177891	1048 (2.54-2.54)
RSRZ outliers	164620	1004 (2.54-2.54)

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	A	181	89% 8%
1	B	181	86% 5% 9%
1	C	181	91% 6%
1	D	181	84% 7% 8%
2	E	19	16% 74% 16% 11%

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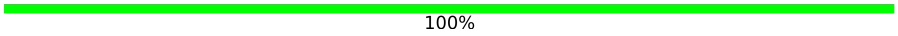
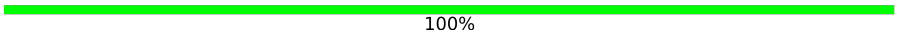
Mol	Chain	Length	Quality of chain
2	F	19	
3	G	13	
3	H	13	

2 Entry composition (i)

There are 6 unique types of molecules in this entry. The entry contains 5922 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 Isoform 1 of Vinculin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	175	Total	C	N	O	S	0	0	0
			1369	843	257	257	12			
1	B	165	Total	C	N	O	S	0	0	0
			1270	776	240	242	12			
1	C	175	Total	C	N	O	S	0	0	0
			1369	843	257	257	12			
1	D	166	Total	C	N	O	S	0	0	0
			1282	785	242	243	12			

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	886	GLY	-	expression tag	UNP P18206
A	887	PRO	-	expression tag	UNP P18206
A	888	LEU	-	expression tag	UNP P18206
A	889	GLY	-	expression tag	UNP P18206
A	890	SER	-	expression tag	UNP P18206
B	886	GLY	-	expression tag	UNP P18206
B	887	PRO	-	expression tag	UNP P18206
B	888	LEU	-	expression tag	UNP P18206
B	889	GLY	-	expression tag	UNP P18206
B	890	SER	-	expression tag	UNP P18206
C	886	GLY	-	expression tag	UNP P18206
C	887	PRO	-	expression tag	UNP P18206
C	888	LEU	-	expression tag	UNP P18206
C	889	GLY	-	expression tag	UNP P18206
C	890	SER	-	expression tag	UNP P18206
D	886	GLY	-	expression tag	UNP P18206
D	887	PRO	-	expression tag	UNP P18206
D	888	LEU	-	expression tag	UNP P18206
D	889	GLY	-	expression tag	UNP P18206
D	890	SER	-	expression tag	UNP P18206

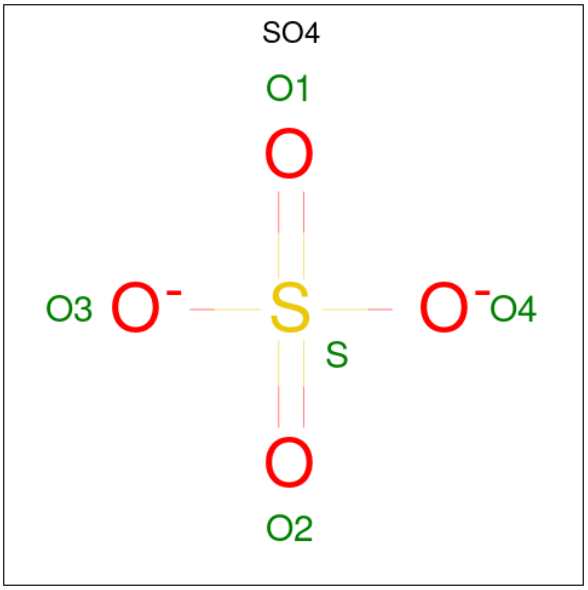
- Molecule 2 is a protein called Isoform Gamma of Paxillin.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	E	17	Total	C	N	O	0	0	0
			134	83	23	28			
2	F	16	Total	C	N	O	0	0	0
			125	78	21	26			

- Molecule 3 is a protein called Paxillin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	G	13	Total	C	N	O	S	0	0	0
			97	59	13	24	1			
3	H	13	Total	C	N	O	S	0	0	0
			97	59	13	24	1			

- Molecule 4 is SULFATE ION (CCD ID: SO4) (formula: O_4S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	O	S	0	0
			5	4	1		
4	A	1	Total	O	S	0	0
			5	4	1		
4	B	1	Total	O	S	0	0
			5	4	1		
4	C	1	Total	O	S	0	0
			5	4	1		
4	C	1	Total	O	S	0	0
			5	4	1		

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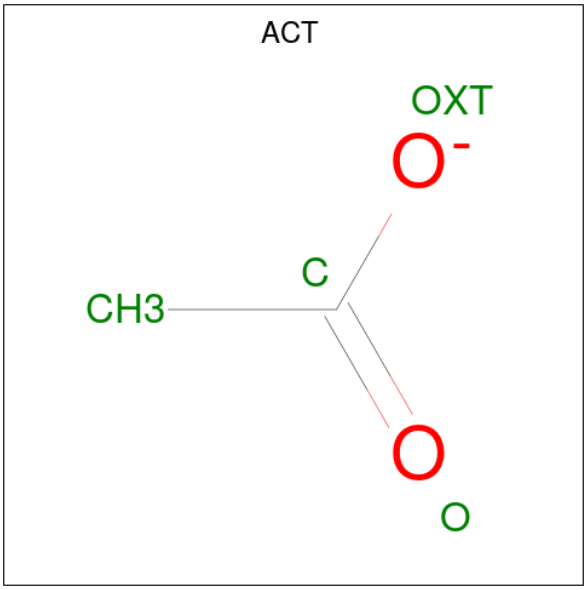
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	C	1	Total O S 5 4 1	0	0
4	C	1	Total O S 5 4 1	0	0
4	D	1	Total O S 5 4 1	0	0

- Molecule 5 is ACETATE ION (CCD ID: ACT) (formula: $C_2H_3O_2$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C O 4 2 2	0	0
5	A	1	Total C O 4 2 2	0	0
5	B	1	Total C O 4 2 2	0	0
5	B	1	Total C O 4 2 2	0	0
5	G	1	Total C O 4 2 2	0	0
5	C	1	Total C O 4 2 2	0	0
5	C	1	Total C O 4 2 2	0	0
5	D	1	Total C O 4 2 2	0	0

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	D	1	Total C O 4 2 2	0	0
5	D	1	Total C O 4 2 2	0	0

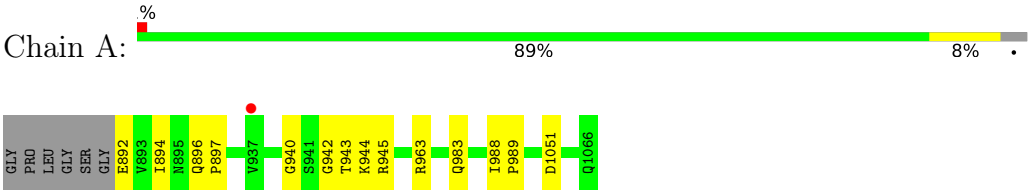
- Molecule 6 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	28	Total O 28 28	0	0
6	B	21	Total O 21 21	0	0
6	E	6	Total O 6 6	0	0
6	G	4	Total O 4 4	0	0
6	C	23	Total O 23 23	0	0
6	D	12	Total O 12 12	0	0
6	F	5	Total O 5 5	0	0

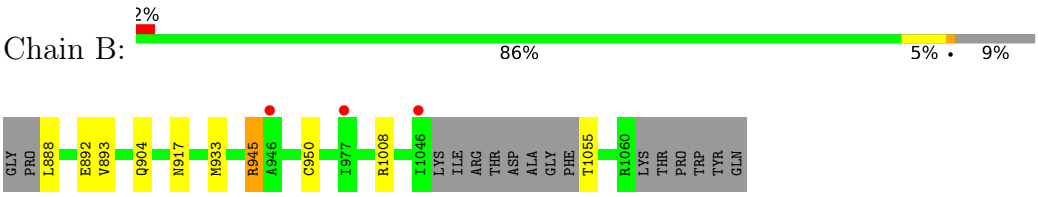
3 Residue-property plots (i)

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.

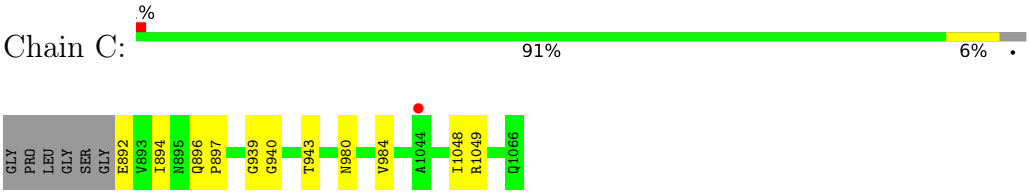
• Molecule 1: Isoform 1 of Vinculin



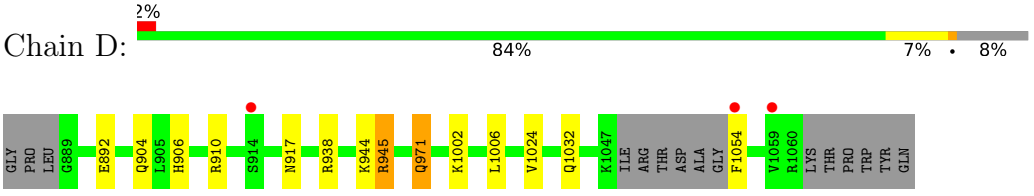
• Molecule 1: Isoform 1 of Vinculin



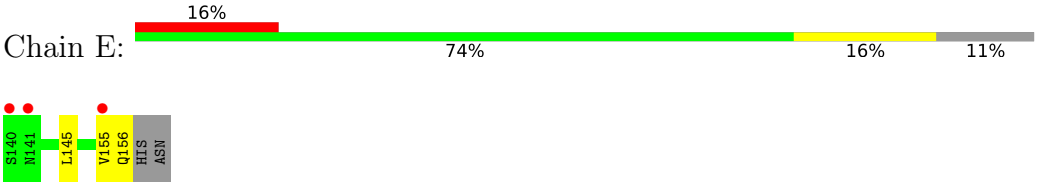
• Molecule 1: Isoform 1 of Vinculin



• Molecule 1: Isoform 1 of Vinculin



• Molecule 2: Isoform Gamma of Paxillin

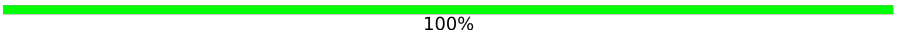


• Molecule 2: Isoform Gamma of Paxillin

Chain F:

• Molecule 3: Paxillin

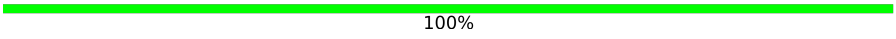
Chain G:



There are no outlier residues recorded for this chain.

• Molecule 3: Paxillin

Chain H:



There are no outlier residues recorded for this chain.

4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	177.38Å 70.56Å 117.37Å 90.00° 131.25° 90.00°	Depositor
Resolution (Å)	44.87 – 2.54 44.87 – 2.54	Depositor EDS
% Data completeness (in resolution range)	99.3 (44.87-2.54) 99.3 (44.87-2.54)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.44 (at 2.54Å)	Xtriage
Refinement program	REFMAC 5.8.0425	Depositor
R, R_{free}	0.225 , 0.259 0.233 , 0.261	Depositor DCC
R_{free} test set	1677 reflections (4.67%)	wwPDB-VP
Wilson B-factor (Å^2)	49.6	Xtriage
Anisotropy	0.658	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.36 , 75.0	EDS
L-test for twinning[2]	$< \|L\| > = 0.51$, $< L^2 > = 0.35$	Xtriage
Estimated twinning fraction	0.329 for -h-2*l,-k,l	Xtriage
F_o,F_c correlation	0.90	EDS
Total number of atoms	5922	wwPDB-VP
Average B, all atoms (Å^2)	71.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.60% 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

Bond lengths and bond angles in the following residue types are not validated in this section: SO4, ACT

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	0.36	0/1381	0.66	0/1854
1	B	0.30	0/1276	0.62	0/1709
1	C	0.31	0/1381	0.61	0/1854
1	D	0.30	0/1289	0.59	0/1725
2	E	0.33	0/133	0.69	0/179
2	F	0.35	0/124	0.67	0/167
3	G	0.35	0/96	0.59	0/129
3	H	0.34	0/96	0.64	0/129
All	All	0.32	0/5776	0.62	0/7746

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	1369	0	1429	9	0
1	B	1270	0	1331	5	0
1	C	1369	0	1429	9	0
1	D	1282	0	1342	8	0
2	E	134	0	138	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	F	125	0	130	1	0
3	G	97	0	92	0	0
3	H	97	0	92	0	0
4	A	10	0	0	0	0
4	B	5	0	0	0	0
4	C	20	0	0	0	0
4	D	5	0	0	0	0
5	A	8	0	6	0	0
5	B	8	0	6	0	0
5	C	8	0	6	0	0
5	D	12	0	9	1	0
5	G	4	0	3	1	0
6	A	28	0	0	1	0
6	B	21	0	0	2	0
6	C	23	0	0	0	0
6	D	12	0	0	0	0
6	E	6	0	0	0	0
6	F	5	0	0	0	0
6	G	4	0	0	0	0
All	All	5922	0	6013	28	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 (28) 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:C:940:GLY:O	1:C:943:THR:HG23	1.66	0.94
1:C:940:GLY:C	1:C:943:THR:HG23	2.15	0.66
1:C:940:GLY:O	1:C:943:THR:CG2	2.44	0.66
1:A:940:GLY:N	1:A:943:THR:HG21	2.11	0.65
1:A:940:GLY:O	1:A:943:THR:HG23	1.97	0.64
1:C:939:GLY:C	1:C:943:THR:HG21	2.19	0.62
1:B:893:VAL:HA	1:C:892:GLU:OE1	2.00	0.61
1:B:945:ARG:HD3	5:G:101:ACT:OXT	2.01	0.61
1:A:940:GLY:C	1:A:943:THR:HG23	2.22	0.60
1:B:1055:THR:N	6:B:1201:HOH:O	2.35	0.59
1:C:940:GLY:N	1:C:943:THR:HG21	2.21	0.55
1:D:945:ARG:HD2	5:D:1104:ACT:H1	1.90	0.54
1:A:896:GLN:HB2	1:A:897:PRO:HD3	1.92	0.52
1:C:896:GLN:HB2	1:C:897:PRO:HD3	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:945:ARG:NH2	6:B:1202:HOH:O	2.43	0.51
1:A:892:GLU:OE1	1:D:938:ARG:NH1	2.37	0.51
1:B:933:MET:HG3	1:B:950:CYS:SG	2.51	0.50
1:D:1002:LYS:O	1:D:1006:LEU:HG	2.13	0.49
1:D:906:HIS:O	1:D:910:ARG:HB2	2.14	0.47
1:C:1048:ILE:HG22	1:C:1049:ARG:O	2.17	0.45
1:C:980:ASN:O	1:C:984:VAL:HG23	2.18	0.44
1:A:944:LYS:NZ	6:A:1203:HOH:O	2.50	0.43
1:D:944:LYS:HB2	1:D:945:ARG:HE	1.84	0.42
1:D:971:GLN:OE1	1:D:1054:PHE:HB3	2.20	0.42
1:A:945:ARG:NH2	1:D:1032:GLN:OE1	2.53	0.42
1:A:988:ILE:N	1:A:989:PRO:CD	2.83	0.41
2:F:144:GLU:OE2	2:F:147:ARG:NH2	2.54	0.40
1:A:942:GLY:HA3	1:D:1024:VAL:HG11	2.03	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	173/181 (96%)	171 (99%)	2 (1%)	0	100	100
1	B	161/181 (89%)	155 (96%)	6 (4%)	0	100	100
1	C	173/181 (96%)	173 (100%)	0	0	100	100
1	D	162/181 (90%)	156 (96%)	6 (4%)	0	100	100
2	E	15/19 (79%)	15 (100%)	0	0	100	100
2	F	14/19 (74%)	14 (100%)	0	0	100	100
3	G	11/13 (85%)	11 (100%)	0	0	100	100
3	H	11/13 (85%)	10 (91%)	1 (9%)	0	100	100
All	All	720/788 (91%)	705 (98%)	15 (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	148/151 (98%)	144 (97%)	4 (3%)	40 57
1	B	138/151 (91%)	132 (96%)	6 (4%)	25 36
1	C	148/151 (98%)	147 (99%)	1 (1%)	81 90
1	D	139/151 (92%)	134 (96%)	5 (4%)	30 44
2	E	16/18 (89%)	13 (81%)	3 (19%)	1 1
2	F	15/18 (83%)	14 (93%)	1 (7%)	13 17
3	G	11/11 (100%)	11 (100%)	0	100 100
3	H	11/11 (100%)	11 (100%)	0	100 100
All	All	626/662 (95%)	606 (97%)	20 (3%)	34 49

All (20) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	894	ILE
1	A	963	ARG
1	A	983	GLN
1	A	1051	ASP
1	B	888	LEU
1	B	892	GLU
1	B	904	GLN
1	B	917	ASN
1	B	945	ARG
1	B	1008	ARG
2	E	145	LEU
2	E	155	VAL
2	E	156	GLN
1	C	894	ILE
1	D	892	GLU
1	D	904	GLN

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Mol	Chain	Res	Type
1	D	917	ASN
1	D	945	ARG
1	D	971	GLN
2	F	145	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	895	ASN
1	A	1026	ASN
1	B	917	ASN
1	B	1010	ASN
1	B	1028	GLN
1	C	895	ASN
1	C	980	ASN
1	C	1026	ASN
1	D	906	HIS
1	D	917	ASN
1	D	971	GLN
1	D	980	ASN
1	D	994	GLN

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 oligosaccharides in this entry.

5.6 Ligand geometry

18 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
4	SO4	B	1101	-	4,4,4	0.38	0	6,6,6	0.05	0
5	ACT	A	1104	-	3,3,3	0.98	0	3,3,3	0.80	0
4	SO4	C	1101	-	4,4,4	0.37	0	6,6,6	0.05	0
4	SO4	D	1101	-	4,4,4	0.34	0	6,6,6	0.06	0
5	ACT	C	1106	-	3,3,3	0.89	0	3,3,3	0.89	0
4	SO4	A	1101	-	4,4,4	0.37	0	6,6,6	0.08	0
5	ACT	B	1103	-	3,3,3	1.02	0	3,3,3	0.77	0
4	SO4	A	1102	-	4,4,4	0.37	0	6,6,6	0.05	0
5	ACT	D	1102	-	3,3,3	0.80	0	3,3,3	0.91	0
5	ACT	D	1103	-	3,3,3	0.94	0	3,3,3	0.78	0
5	ACT	A	1103	-	3,3,3	0.97	0	3,3,3	0.83	0
5	ACT	C	1105	-	3,3,3	0.99	0	3,3,3	0.78	0
4	SO4	C	1103	-	4,4,4	0.34	0	6,6,6	0.09	0
5	ACT	D	1104	-	3,3,3	0.91	0	3,3,3	0.96	0
5	ACT	G	101	-	3,3,3	0.97	0	3,3,3	0.76	0
5	ACT	B	1102	-	3,3,3	0.99	0	3,3,3	0.73	0
4	SO4	C	1104	-	4,4,4	0.33	0	6,6,6	0.09	0
4	SO4	C	1102	-	4,4,4	0.34	0	6,6,6	0.09	0

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.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	D	1104	ACT	1	0
5	G	101	ACT	1	0

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	A	175/181 (96%)	0.30	1 (0%) 85 88	50, 65, 87, 99	0
1	B	165/181 (91%)	0.22	3 (1%) 67 71	52, 70, 119, 148	0
1	C	175/181 (96%)	0.26	1 (0%) 85 88	52, 66, 89, 98	0
1	D	166/181 (91%)	0.22	3 (1%) 67 71	52, 69, 122, 144	0
2	E	17/19 (89%)	0.23	3 (17%) 4 6	47, 59, 111, 111	0
2	F	16/19 (84%)	-0.14	0 100 100	45, 56, 99, 108	0
3	G	13/13 (100%)	0.30	0 100 100	64, 67, 82, 90	0
3	H	13/13 (100%)	0.24	0 100 100	62, 68, 84, 85	0
All	All	740/788 (93%)	0.24	11 (1%) 71 75	45, 67, 105, 148	0

All (11) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	914	SER	2.4
1	B	977	ILE	2.4
2	E	140	SER	2.4
1	D	1054	PHE	2.3
1	B	946	ALA	2.1
1	B	1046	ILE	2.1
1	D	1059	VAL	2.1
2	E	155	VAL	2.0
1	C	1044	ALA	2.0
1	A	937	VAL	2.0
2	E	141	ASN	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 (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, 95^{th} 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(Å^2)	Q<0.9
4	SO4	D	1101	5/5	0.92	0.09	89,89,96,101	0
4	SO4	C	1101	5/5	0.95	0.10	93,96,99,99	0
4	SO4	A	1101	5/5	0.95	0.09	91,95,99,102	0
5	ACT	G	101	4/4	0.95	0.09	67,71,74,77	0
5	ACT	A	1104	4/4	0.96	0.09	70,70,72,73	0
4	SO4	A	1102	5/5	0.96	0.12	80,90,92,99	0
5	ACT	C	1106	4/4	0.96	0.10	43,46,46,47	0
5	ACT	D	1104	4/4	0.96	0.11	40,40,42,49	0
5	ACT	C	1105	4/4	0.97	0.12	65,67,69,69	0
5	ACT	B	1102	4/4	0.97	0.15	52,53,56,56	0
4	SO4	B	1101	5/5	0.97	0.09	107,116,125,127	0
5	ACT	B	1103	4/4	0.98	0.07	68,70,72,73	0
4	SO4	C	1102	5/5	0.98	0.08	61,62,74,75	0
5	ACT	A	1103	4/4	0.98	0.09	56,56,57,58	0
4	SO4	C	1103	5/5	0.98	0.09	54,54,65,68	0
5	ACT	D	1102	4/4	0.98	0.07	25,30,33,34	0
5	ACT	D	1103	4/4	0.98	0.09	46,49,51,54	0
4	SO4	C	1104	5/5	0.98	0.12	69,70,78,79	0

6.5 Other polymers (i)

There are no such residues in this entry.