Full wwPDB X-ray Structure Validation Report (i)

Jun 25, 2024 – 03:53 PM EDT

PDB ID	:	6R16
Title	:	Crystal structure of the SUN1-KASH4 6:6 complex
Authors	:	Gurusaran, M.; Davies, O.R.
Deposited on	:	2019-03-13
Resolution	:	2.75 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:

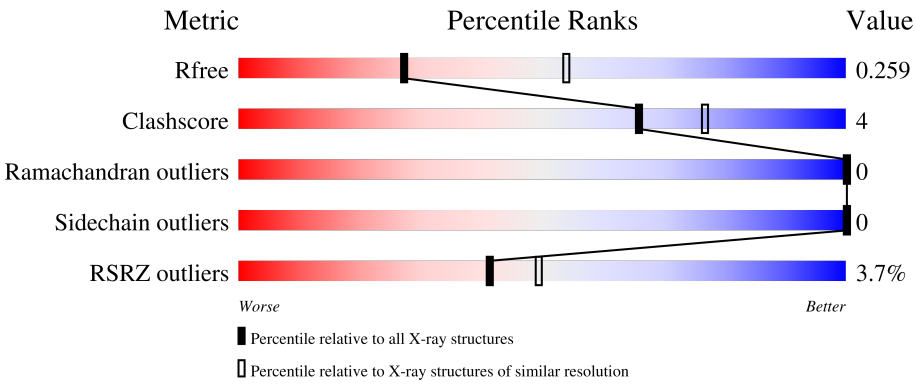
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.37.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

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 2.75 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	1235 (2.78-2.74)
Clashscore	141614	1277 (2.78-2.74)
Ramachandran outliers	138981	1257 (2.78-2.74)
Sidechain outliers	138945	1257 (2.78-2.74)
RSRZ outliers	127900	1207 (2.78-2.74)

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	203	2%, 86%, 10%, •
1	B	203	83%, 13%, •
1	C	203	89%, 7%, •
1	D	203	3%, 85%, 11%, •
1	E	203	5%, 89%, 7%, •

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Mol	Chain	Length	Quality of chain
1	F	203	4% 82% 13%
2	G	32	12% 72% 9% 19%
2	H	32	16% 72% 9% 19%
2	I	32	9% 66% 12% 22%
2	J	32	81% 16%
2	K	32	12% 66% 6% 28%
2	L	32	6% 59% 12% 28%

2 Entry composition (i)

There are 6 unique types of molecules in this entry. The entry contains 10562 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 SUN domain-containing protein 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	195	1547	991	255	293	8	0	0	0
			Total	C	N	O	S			
1	B	194	1537	985	253	291	8	0	0	0
			Total	C	N	O	S			
1	C	194	1537	985	253	291	8	0	0	0
			Total	C	N	O	S			
1	D	195	1608	1025	266	308	9	0	8	0
			Total	C	N	O	S			
1	E	194	1537	985	253	291	8	0	0	0
			Total	C	N	O	S			
1	F	194	1537	985	253	291	8	0	0	0

There are 36 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	610	GLY	-	expression tag	UNP O94901
A	611	SER	-	expression tag	UNP O94901
A	612	GLY	-	expression tag	UNP O94901
A	613	GLY	-	expression tag	UNP O94901
A	614	SER	-	expression tag	UNP O94901
A	615	GLY	-	expression tag	UNP O94901
B	610	GLY	-	expression tag	UNP O94901
B	611	SER	-	expression tag	UNP O94901
B	612	GLY	-	expression tag	UNP O94901
B	613	GLY	-	expression tag	UNP O94901
B	614	SER	-	expression tag	UNP O94901
B	615	GLY	-	expression tag	UNP O94901
C	610	GLY	-	expression tag	UNP O94901
C	611	SER	-	expression tag	UNP O94901
C	612	GLY	-	expression tag	UNP O94901
C	613	GLY	-	expression tag	UNP O94901
C	614	SER	-	expression tag	UNP O94901

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Chain	Residue	Modelled	Actual	Comment	Reference
C	615	GLY	-	expression tag	UNP O94901
D	610	GLY	-	expression tag	UNP O94901
D	611	SER	-	expression tag	UNP O94901
D	612	GLY	-	expression tag	UNP O94901
D	613	GLY	-	expression tag	UNP O94901
D	614	SER	-	expression tag	UNP O94901
D	615	GLY	-	expression tag	UNP O94901
E	610	GLY	-	expression tag	UNP O94901
E	611	SER	-	expression tag	UNP O94901
E	612	GLY	-	expression tag	UNP O94901
E	613	GLY	-	expression tag	UNP O94901
E	614	SER	-	expression tag	UNP O94901
E	615	GLY	-	expression tag	UNP O94901
F	610	GLY	-	expression tag	UNP O94901
F	611	SER	-	expression tag	UNP O94901
F	612	GLY	-	expression tag	UNP O94901
F	613	GLY	-	expression tag	UNP O94901
F	614	SER	-	expression tag	UNP O94901
F	615	GLY	-	expression tag	UNP O94901

- Molecule 2 is a protein called Nesprin-4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	G	26	197	127	35	33	2	0	0	0
			Total	C	N	O	S			
2	H	26	197	127	35	33	2	0	0	0
			Total	C	N	O	S			
2	I	25	193	125	34	32	2	0	0	0
			Total	C	N	O	S			
2	J	27	201	129	36	34	2	0	0	0
			Total	C	N	O	S			
2	K	23	180	117	32	30	1	0	0	0
			Total	C	N	O	S			
2	L	23	180	117	32	30	1	0	0	0

There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
G	373	GLY	-	expression tag	UNP Q8N205
G	374	SER	-	expression tag	UNP Q8N205
G	375	MET	-	expression tag	UNP Q8N205

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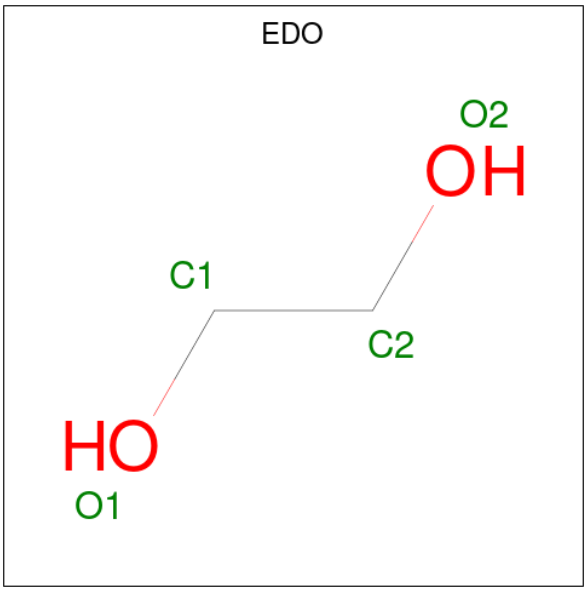
Chain	Residue	Modelled	Actual	Comment	Reference
H	373	GLY	-	expression tag	UNP Q8N205
H	374	SER	-	expression tag	UNP Q8N205
H	375	MET	-	expression tag	UNP Q8N205
I	373	GLY	-	expression tag	UNP Q8N205
I	374	SER	-	expression tag	UNP Q8N205
I	375	MET	-	expression tag	UNP Q8N205
J	373	GLY	-	expression tag	UNP Q8N205
J	374	SER	-	expression tag	UNP Q8N205
J	375	MET	-	expression tag	UNP Q8N205
K	373	GLY	-	expression tag	UNP Q8N205
K	374	SER	-	expression tag	UNP Q8N205
K	375	MET	-	expression tag	UNP Q8N205
L	373	GLY	-	expression tag	UNP Q8N205
L	374	SER	-	expression tag	UNP Q8N205
L	375	MET	-	expression tag	UNP Q8N205

- Molecule 3 is POTASSIUM ION (three-letter code: K) (formula: K).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	K		
3	A	1	1	1	0	0
			Total	K		
3	B	1	1	1	0	0
			Total	K		
3	C	1	1	1	0	0
			Total	K		
3	D	1	1	1	0	0
			Total	K		
3	E	1	1	1	0	0
			Total	K		
3	F	1	1	1	0	0

- Molecule 4 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: $C_2H_6O_2$).



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

- Molecule 5 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Zn		
5	G	1	1	1	0	0
			Total	Zn		
5	H	1	1	1	0	0
			Total	Zn		
5	I	1	1	1	0	0

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
6	A	15	15	15	0	0
			Total	O		
6	B	18	18	18	0	0
			Total	O		
6	C	27	27	27	0	0

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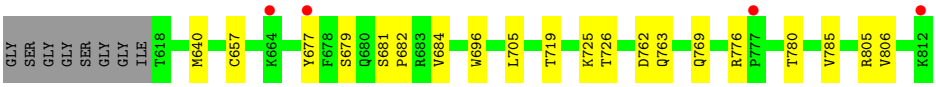
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	D	13	Total O 13 13	0	0
6	E	6	Total O 6 6	0	0
6	F	5	Total O 5 5	0	0
6	G	1	Total O 1 1	0	0
6	H	2	Total O 2 2	0	0
6	J	1	Total O 1 1	0	0
6	K	2	Total O 2 2	0	0

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: SUN domain-containing protein 1

Chain A:

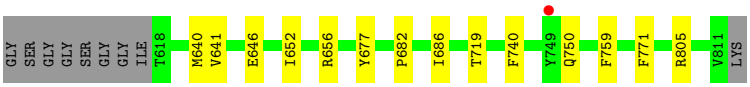


• Molecule 1: SUN domain-containing protein 1

Chain B:

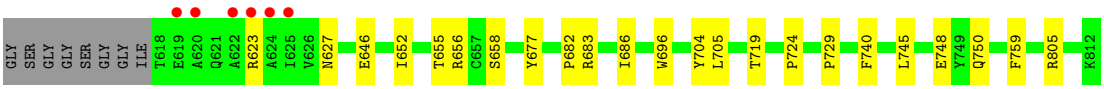
• Molecule 1: SUN domain-containing protein 1

Chain C:



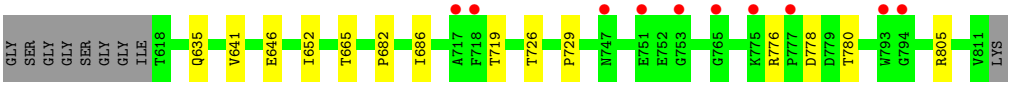
• Molecule 1: SUN domain-containing protein 1

Chain D:



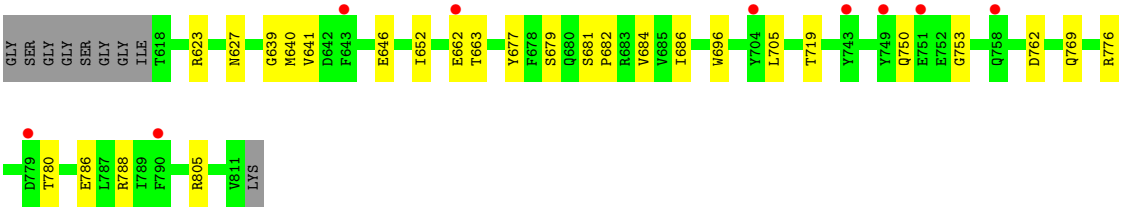
• Molecule 1: SUN domain-containing protein 1

Chain E:



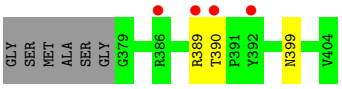
• Molecule 1: SUN domain-containing protein 1

Chain F:



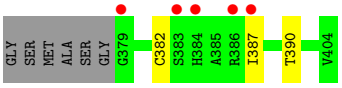
• Molecule 2: Nesprin-4

Chain G:



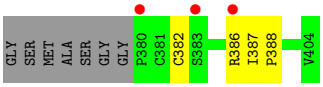
• Molecule 2: Nesprin-4

Chain H:



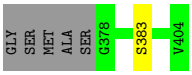
• Molecule 2: Nesprin-4

Chain I:



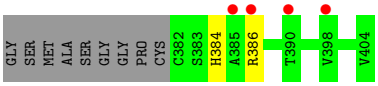
• Molecule 2: Nesprin-4

Chain J:



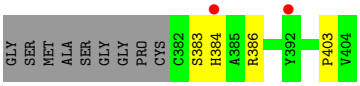
• Molecule 2: Nesprin-4

Chain K:



• Molecule 2: Nesprin-4

Chain L:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	104.37Å 117.21Å 138.42Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.83 – 2.75 48.83 – 2.75	Depositor EDS
% Data completeness (in resolution range)	99.3 (48.83-2.75) 99.7 (48.83-2.75)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.59 (at 2.77Å)	Xtriage
Refinement program	PHENIX (1.14_3260: ???)	Depositor
R, R_{free}	0.219 , 0.255 0.222 , 0.259	Depositor DCC
R_{free} test set	2255 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å^2)	66.8	Xtriage
Anisotropy	0.126	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 41.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	10562	wwPDB-VP
Average B, all atoms (Å^2)	80.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.27% 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 (i)

5.1 Standard geometry (i)

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

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	0.25	0/1588	0.42	0/2153
1	B	0.25	0/1578	0.42	0/2142
1	C	0.25	0/1578	0.43	0/2142
1	D	0.25	0/1649	0.42	0/2235
1	E	0.25	0/1578	0.42	0/2142
1	F	0.25	0/1578	0.42	0/2142
2	G	0.24	0/204	0.47	0/280
2	H	0.23	0/204	0.45	0/280
2	I	0.24	0/200	0.43	0/274
2	J	0.26	0/208	0.42	0/285
2	K	0.25	0/186	0.44	0/255
2	L	0.25	0/186	0.48	0/255
All	All	0.25	0/10737	0.42	0/14585

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	1547	0	1499	13	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	1537	0	1486	16	0
1	C	1537	0	1486	9	0
1	D	1608	0	1553	14	0
1	E	1537	0	1486	11	0
1	F	1537	0	1486	19	0
2	G	197	0	198	4	0
2	H	197	0	198	4	0
2	I	193	0	196	5	0
2	J	201	0	202	1	0
2	K	180	0	184	2	0
2	L	180	0	184	7	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
3	E	1	0	0	0	0
3	F	1	0	0	0	0
4	B	4	0	6	1	0
4	D	4	0	6	1	0
4	E	4	0	6	0	0
5	G	1	0	0	0	0
5	H	1	0	0	0	0
5	I	1	0	0	0	0
6	A	15	0	0	0	0
6	B	18	0	0	1	0
6	C	27	0	0	0	0
6	D	13	0	0	0	0
6	E	6	0	0	0	0
6	F	5	0	0	0	0
6	G	1	0	0	0	0
6	H	2	0	0	0	0
6	J	1	0	0	0	0
6	K	2	0	0	0	0
All	All	10562	0	10176	83	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 (83) 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)
2:I:388:PRO:HD3	2:L:386:ARG:HH22	1.54	0.72
1:A:776:ARG:HH12	1:A:780:THR:H	1.38	0.72
1:E:776:ARG:HH12	1:E:780:THR:H	1.38	0.70
1:F:623:ARG:O	1:F:627:ASN:ND2	2.30	0.64
1:E:726:THR:OG1	1:F:639:GLY:O	2.16	0.63
1:F:662:GLU:OE2	2:G:389:ARG:NH1	2.32	0.62
1:A:679:SER:HB2	2:H:390:THR:HG21	1.80	0.62
2:I:386:ARG:O	2:L:386:ARG:NH2	2.32	0.62
1:F:719:THR:HB	1:F:805:ARG:HB2	1.82	0.61
1:E:719:THR:HB	1:E:805:ARG:HB2	1.84	0.60
1:D:719:THR:HB	1:D:805:ARG:HB2	1.84	0.60
1:B:725:LYS:NZ	1:B:763:GLN:O	2.34	0.59
1:A:726:THR:OG1	1:B:639:GLY:O	2.19	0.59
1:E:652:ILE:HG21	1:E:682:PRO:HB2	1.85	0.59
2:H:387:ILE:HA	2:K:386:ARG:HH12	1.69	0.58
1:A:725:LYS:NZ	1:A:763:GLN:O	2.37	0.58
1:B:719:THR:HB	1:B:805:ARG:HB2	1.86	0.57
1:A:681:SER:O	1:A:684:VAL:HG12	2.05	0.56
1:B:788:ARG:NH2	6:B:1001:HOH:O	2.37	0.56
1:E:776:ARG:NH1	1:E:778:ASP:O	2.38	0.56
1:A:719:THR:HB	1:A:805:ARG:HB2	1.88	0.56
1:D:656[B]:ARG:NH2	1:D:748:GLU:O	2.40	0.54
1:F:681:SER:O	1:F:684:VAL:HG12	2.06	0.54
1:E:776:ARG:NH2	1:E:780:THR:O	2.41	0.54
1:F:679:SER:HB2	2:G:390:THR:HG21	1.90	0.53
1:A:785:VAL:HG21	1:A:806:VAL:HG21	1.90	0.53
2:I:387:ILE:HA	2:L:386:ARG:HH22	1.74	0.52
1:B:683:ARG:HH12	4:B:901:EDO:H21	1.75	0.52
1:D:623:ARG:O	1:D:627:ASN:ND2	2.43	0.52
1:C:656:ARG:NH2	1:C:750:GLN:O	2.40	0.51
1:D:652:ILE:HD12	1:D:705:LEU:HD11	1.92	0.51
1:A:762:ASP:O	1:A:769:GLN:NE2	2.45	0.49
1:C:719:THR:HB	1:C:805:ARG:HB2	1.94	0.48
1:F:646:GLU:HB2	1:F:686:ILE:HG13	1.95	0.48
1:D:729:PRO:HA	1:E:641:VAL:HG11	1.96	0.47
1:B:656:ARG:NH1	1:B:750:GLN:O	2.43	0.47
1:F:640:MET:HB2	1:F:640:MET:HE3	1.73	0.47
1:F:776:ARG:HH12	1:F:780:THR:H	1.63	0.47
1:A:677:TYR:O	2:H:390:THR:HG22	2.14	0.47
1:C:652:ILE:HG21	1:C:682:PRO:HB2	1.97	0.47
1:D:745:LEU:HD22	1:D:750:GLN:HB3	1.97	0.47
2:H:382:CYS:HB3	2:K:384:HIS:CE1	2.49	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:724:PRO:HG3	1:E:635:GLN:HG2	1.98	0.46
1:C:759:PHE:CD1	1:C:771:PHE:HB3	2.50	0.46
1:F:652:ILE:HD12	1:F:705:LEU:HD11	1.97	0.46
1:E:646:GLU:HB2	1:E:686:ILE:HG13	1.98	0.46
1:D:677:TYR:OH	2:L:383:SER:O	2.24	0.45
1:D:655[A]:THR:HB	1:D:658[A]:SER:HB2	1.97	0.45
1:B:646:GLU:HB2	1:B:686:ILE:HG13	1.98	0.45
1:D:683:ARG:HH12	4:D:901:EDO:H12	1.81	0.45
2:I:382:CYS:HB3	2:L:384:HIS:CE1	2.52	0.44
1:B:720:LEU:HD23	1:B:720:LEU:HA	1.86	0.44
1:A:640:MET:HB2	1:A:640:MET:HE3	1.80	0.44
1:D:658[A]:SER:OG	1:D:704:TYR:N	2.36	0.44
1:B:762:ASP:O	1:B:769:GLN:NE2	2.43	0.44
1:F:652:ILE:HG21	1:F:682:PRO:HB2	2.00	0.44
1:F:786:GLU:OE2	1:F:788:ARG:NE	2.44	0.43
1:F:663:THR:HG21	2:L:403:PRO:HD3	1.99	0.43
1:C:640:MET:HE3	1:C:640:MET:HB2	1.81	0.43
1:C:646:GLU:HB2	1:C:686:ILE:HG13	2.00	0.43
1:E:665:THR:HB	2:G:399:ASN:HB3	2.01	0.43
1:C:740:PHE:CZ	1:C:759:PHE:HB2	2.54	0.43
1:E:729:PRO:HA	1:F:641:VAL:HG11	2.00	0.43
1:A:776:ARG:NH1	1:A:780:THR:H	2.12	0.43
1:B:682:PRO:HG3	1:B:696:TRP:CE2	2.54	0.42
1:F:750:GLN:NE2	1:F:753:GLY:HA2	2.34	0.42
1:B:712:MET:HG3	1:B:781:ALA:HB1	2.01	0.42
1:F:677:TYR:O	2:G:390:THR:HG22	2.19	0.42
1:B:623:ARG:O	1:B:627:ASN:ND2	2.52	0.42
1:D:646:GLU:HB2	1:D:686:ILE:HG13	2.01	0.42
1:F:776:ARG:NH1	1:F:780:THR:H	2.18	0.42
1:B:786:GLU:OE2	1:B:788:ARG:NE	2.46	0.41
1:C:677:TYR:OH	2:J:383:SER:O	2.25	0.41
1:D:740:PHE:CZ	1:D:759:PHE:HB2	2.54	0.41
2:I:387:ILE:HA	2:L:386:ARG:NH2	2.34	0.41
1:B:722:HIS:O	1:B:767:SER:OG	2.30	0.41
1:A:657:CYS:SG	1:A:705:LEU:HD12	2.60	0.41
1:B:652:ILE:HD12	1:B:705:LEU:HD11	2.03	0.41
1:A:682:PRO:HG3	1:A:696:TRP:CE2	2.56	0.40
1:B:729:PRO:HA	1:C:641:VAL:HG11	2.03	0.40
1:D:682:PRO:HG3	1:D:696:TRP:CE2	2.56	0.40
1:F:682:PRO:HG3	1:F:696:TRP:CE2	2.57	0.40
1:F:762:ASP:O	1:F:769:GLN:NE2	2.51	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	193/203 (95%)	189 (98%)	4 (2%)	0	100	100
1	B	192/203 (95%)	189 (98%)	3 (2%)	0	100	100
1	C	192/203 (95%)	189 (98%)	3 (2%)	0	100	100
1	D	201/203 (99%)	198 (98%)	3 (2%)	0	100	100
1	E	192/203 (95%)	189 (98%)	3 (2%)	0	100	100
1	F	192/203 (95%)	189 (98%)	3 (2%)	0	100	100
2	G	24/32 (75%)	23 (96%)	1 (4%)	0	100	100
2	H	24/32 (75%)	23 (96%)	1 (4%)	0	100	100
2	I	23/32 (72%)	22 (96%)	1 (4%)	0	100	100
2	J	25/32 (78%)	24 (96%)	1 (4%)	0	100	100
2	K	21/32 (66%)	21 (100%)	0	0	100	100
2	L	21/32 (66%)	21 (100%)	0	0	100	100
All	All	1300/1410 (92%)	1277 (98%)	23 (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	167/170 (98%)	167 (100%)	0	100	100
1	B	166/170 (98%)	166 (100%)	0	100	100
1	C	166/170 (98%)	166 (100%)	0	100	100
1	D	175/170 (103%)	175 (100%)	0	100	100
1	E	166/170 (98%)	166 (100%)	0	100	100
1	F	166/170 (98%)	166 (100%)	0	100	100
2	G	23/26 (88%)	23 (100%)	0	100	100
2	H	23/26 (88%)	23 (100%)	0	100	100
2	I	23/26 (88%)	23 (100%)	0	100	100
2	J	23/26 (88%)	23 (100%)	0	100	100
2	K	21/26 (81%)	21 (100%)	0	100	100
2	L	21/26 (81%)	21 (100%)	0	100	100
All	All	1140/1176 (97%)	1140 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

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

Mol	Chain	Res	Type
1	E	763	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 12 ligands modelled in this entry, 9 are monoatomic - leaving 3 for Mogul analysis.

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	EDO	B	901	-	3,3,3	0.47	0	2,2,2	0.29	0
4	EDO	E	901	-	3,3,3	0.46	0	2,2,2	0.33	0
4	EDO	D	901	-	3,3,3	0.46	0	2,2,2	0.34	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	EDO	B	901	-	-	0/1/1/1	-
4	EDO	E	901	-	-	0/1/1/1	-
4	EDO	D	901	-	-	0/1/1/1	-

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
4	B	901	EDO	1	0
4	D	901	EDO	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 (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	195/203 (96%)	0.03	4 (2%)	63	72	46, 73, 119, 172	0
1	B	194/203 (95%)	-0.02	1 (0%)	91	94	46, 67, 117, 146	0
1	C	194/203 (95%)	-0.03	1 (0%)	91	94	39, 54, 100, 146	0
1	D	195/203 (96%)	0.27	6 (3%)	49	58	43, 62, 113, 164	0
1	E	194/203 (95%)	0.57	10 (5%)	27	33	54, 91, 129, 181	0
1	F	194/203 (95%)	0.37	9 (4%)	32	39	57, 89, 141, 188	0
2	G	26/32 (81%)	0.66	4 (15%)	2	2	81, 91, 130, 172	0
2	H	26/32 (81%)	1.04	5 (19%)	1	1	48, 89, 174, 192	0
2	I	25/32 (78%)	0.97	3 (12%)	4	4	65, 88, 164, 176	0
2	J	27/32 (84%)	-0.11	0	100	100	49, 76, 137, 165	0
2	K	23/32 (71%)	0.78	4 (17%)	1	1	51, 79, 157, 164	0
2	L	23/32 (71%)	0.69	2 (8%)	10	12	59, 85, 163, 175	0
All	All	1316/1410 (93%)	0.25	49 (3%)	41	49	39, 74, 139, 192	0

All (49) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	H	384	HIS	6.5
2	I	383	SER	5.0
1	D	620	ALA	4.8
2	H	383	SER	4.5
1	E	777	PRO	4.3
2	H	386	ARG	4.3
2	G	389	ARG	4.0
1	E	751	GLU	3.8
2	I	380	PRO	3.6
2	K	386	ARG	3.6
1	F	743	TYR	3.4

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Mol	Chain	Res	Type	RSRZ
1	D	622	ALA	3.3
1	F	790	PHE	3.3
1	E	794	GLY	3.2
1	E	717	ALA	3.2
2	L	384	HIS	3.1
1	E	793	TRP	3.0
2	K	398	VAL	3.0
1	F	749	TYR	3.0
1	D	619	GLU	3.0
1	A	777	PRO	3.0
2	G	386	ARG	3.0
1	E	775	LYS	2.9
1	A	812	LYS	2.8
1	F	751	GLU	2.8
2	G	392	TYR	2.8
1	C	749	TYR	2.8
1	F	704	TYR	2.7
2	K	385	ALA	2.7
1	E	718	PHE	2.6
1	B	622	ALA	2.6
1	E	753	GLY	2.6
2	I	386	ARG	2.5
1	F	662	GLU	2.5
2	G	390	THR	2.4
2	H	379	GLY	2.4
1	A	677	TYR	2.2
1	F	643	PHE	2.2
1	A	664	LYS	2.2
1	D	625	ILE	2.2
1	F	758	GLN	2.1
1	E	747	ASN	2.1
1	D	623	ARG	2.1
1	E	765	GLY	2.1
1	D	624	ALA	2.1
2	K	390	THR	2.1
2	H	387	ILE	2.0
2	L	392	TYR	2.0
1	F	779	ASP	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(Å^2)	Q<0.9
5	ZN	H	501	1/1	0.72	0.07	72,72,72,72	1
4	EDO	D	901	4/4	0.84	0.67	74,74,78,79	0
3	K	F	901	1/1	0.85	0.11	66,66,66,66	0
4	EDO	B	901	4/4	0.89	0.27	60,61,64,64	0
5	ZN	I	501	1/1	0.90	0.09	86,86,86,86	1
4	EDO	E	901	4/4	0.93	0.64	74,75,75,78	0
5	ZN	G	501	1/1	0.97	0.08	55,55,55,55	1
3	K	D	902	1/1	0.97	0.14	50,50,50,50	0
3	K	E	902	1/1	0.97	0.16	66,66,66,66	0
3	K	A	901	1/1	0.98	0.14	61,61,61,61	0
3	K	C	901	1/1	0.99	0.17	51,51,51,51	0
3	K	B	902	1/1	0.99	0.11	55,55,55,55	0

6.5 Other polymers (i)

There are no such residues in this entry.