



# Full wwPDB X-ray Structure Validation Report ⓘ

Aug 6, 2023 – 04:26 AM EDT

PDB ID : 1LKY  
Title : Structure of the wild-type TEL-SAM polymer  
Authors : Tran, H.H.; Kim, C.A.; Faham, S.; Bowie, J.U.  
Deposited on : 2002-04-26  
Resolution : 2.30 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](mailto: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>.

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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)  
Xtrriage (Phenix) : **NOT EXECUTED**  
EDS : **NOT EXECUTED**  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.35

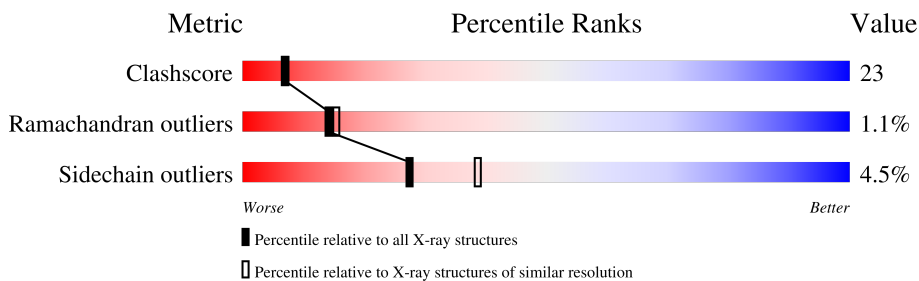
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.30 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))
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)

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  $\geq 3$ , 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  $\leq 5\%$

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	77	
1	C	77	
1	E	77	
2	B	77	
2	D	77	
2	F	77	

## 2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 4096 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 TRANSCRIPTION FACTOR ETV6.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	77	647	416	114	116	1	0	0	0
1	C	77	653	419	117	116	1	0	0	0
1	E	77	653	419	117	116	1	0	0	0

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	80	ARG	VAL	engineered mutation	UNP P41212
C	80	ARG	VAL	engineered mutation	UNP P41212
E	80	ARG	VAL	engineered mutation	UNP P41212

- Molecule 2 is a protein called TRANSCRIPTION FACTOR ETV6.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	77	652	419	114	118	1	0	0	0
2	D	77	652	419	114	118	1	0	0	0
2	F	77	652	419	114	118	1	0	0	0

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	61	ASP	ALA	engineered mutation	UNP P41212
D	61	ASP	ALA	engineered mutation	UNP P41212
F	61	ASP	ALA	engineered mutation	UNP P41212

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).



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

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	29	Total	O	0	0
			29	29		

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	18	Total O 18 18	0	0
4	C	25	Total O 25 25	0	0
4	D	14	Total O 14 14	0	0
4	E	22	Total O 22 22	0	0
4	F	24	Total O 24 24	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. 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. 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.

Note EDS was not executed.

- Molecule 1: TRANSCRIPTION FACTOR ETV6

Chain A:  79% 16%



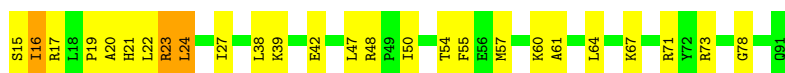
- Molecule 1: TRANSCRIPTION FACTOR ETV6

Chain C:  57% 39%



- Molecule 1: TRANSCRIPTION FACTOR ETV6

Chain E:  66% 30%



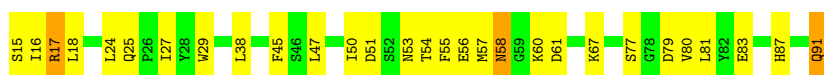
- Molecule 2: TRANSCRIPTION FACTOR ETV6

Chain B:  57% 39%



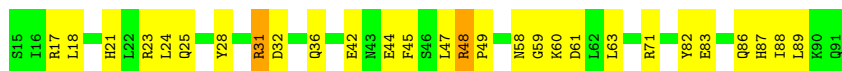
- Molecule 2: TRANSCRIPTION FACTOR ETV6

Chain D:  62% 34%



- Molecule 2: TRANSCRIPTION FACTOR ETV6

Chain F:  64% 34%



## 4 Data and refinement statistics

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	52.75Å 60.29Å 62.32Å 116.21° 98.89° 98.65°	Depositor
Resolution (Å)	30.00 – 2.30	Depositor
% Data completeness (in resolution range)	89.3 (30.00-2.30)	Depositor
$R_{merge}$	0.09	Depositor
$R_{sym}$	(Not available)	Depositor
Refinement program	CNS 1.1	Depositor
R, $R_{free}$	0.232 , 0.283	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	4096	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	53.0	wwPDB-VP



## 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: SO4

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	0.38	0/665	0.58	0/901
1	C	0.38	0/671	0.57	0/908
1	E	0.33	0/671	0.51	0/908
2	B	0.35	0/670	0.59	0/908
2	D	0.30	0/670	0.50	0/908
2	F	0.35	0/670	0.55	0/908
All	All	0.35	0/4017	0.55	0/5441

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	647	0	628	30	1
1	C	653	0	639	36	0
1	E	653	0	639	30	0
2	B	652	0	634	32	0
2	D	652	0	634	39	0
2	F	652	0	634	22	0
3	A	10	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	10	0	0	1	0
3	C	5	0	0	0	0
3	E	15	0	0	0	0
3	F	15	0	0	0	1
4	A	29	0	0	8	0
4	B	18	0	0	5	0
4	C	25	0	0	14	0
4	D	14	0	0	7	0
4	E	22	0	0	2	0
4	F	24	0	0	2	0
All	All	4096	0	3808	177	1

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 23.

All (177) 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:B:31:ARG:HG3	4:B:324:HOH:O	1.48	1.13
2:D:51:ASP:HB3	4:D:105:HOH:O	1.50	1.11
2:D:54:THR:HG23	4:D:105:HOH:O	1.51	1.08
1:C:68:GLU:HB3	4:C:328:HOH:O	1.53	1.07
1:A:16:ILE:HB	4:A:327:HOH:O	1.56	1.03
1:E:38:LEU:HD13	1:E:50:ILE:HD11	1.43	1.00
1:C:48:ARG:HD2	4:C:324:HOH:O	1.62	0.99
1:E:16:ILE:HG22	1:E:17:ARG:H	1.27	0.98
1:A:16:ILE:HD13	1:A:16:ILE:H	1.27	0.96
1:A:16:ILE:HG13	4:A:328:HOH:O	1.65	0.95
1:C:61:ALA:HB2	2:D:45:PHE:HB3	1.59	0.85
1:E:15:SER:OG	1:E:16:ILE:HD12	1.76	0.85
1:A:16:ILE:HG12	1:A:17:ARG:H	1.42	0.84
1:E:24:LEU:HD12	1:E:24:LEU:H	1.50	0.76
2:D:38:LEU:HD22	2:D:50:ILE:HD11	1.67	0.75
1:A:54:THR:HG22	1:A:73:ARG:HB3	1.68	0.74
1:E:38:LEU:O	1:E:42:GLU:HG2	1.88	0.73
2:B:68:GLU:H	2:B:68:GLU:CD	1.93	0.72
2:D:91:GLN:HE21	2:D:91:GLN:HA	1.54	0.72
1:E:19:PRO:HD2	1:E:22:LEU:HD12	1.70	0.71
1:E:16:ILE:HD12	1:E:16:ILE:H	1.54	0.71
2:F:31:ARG:HD3	2:F:58:ASN:HB3	1.73	0.71
2:D:47:LEU:HD13	2:D:77:SER:HB3	1.73	0.70

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:16:ILE:H	1:A:16:ILE:CD1	2.03	0.70
1:A:80:ARG:NH1	4:A:330:HOH:O	2.24	0.69
1:E:16:ILE:HG2	1:E:17:ARG:N	2.06	0.69
1:C:48:ARG:HD3	1:C:76:HIS:HB3	1.75	0.69
2:D:87:HIS:CD2	4:D:103:HOH:O	2.46	0.69
1:E:38:LEU:HD13	1:E:50:ILE:CD1	2.20	0.68
2:D:87:HIS:HB3	4:D:103:HOH:O	1.92	0.68
1:A:24:LEU:H	1:A:24:LEU:HD23	1.55	0.68
1:E:67:LYS:HG2	4:E:333:HOH:O	1.94	0.67
1:C:91:GLN:NE2	4:C:327:HOH:O	2.26	0.66
2:F:32:ASP:O	2:F:36:GLN:HG3	1.96	0.65
1:C:68:GLU:HG3	4:C:311:HOH:O	1.96	0.64
2:F:24:LEU:H	2:F:24:LEU:HD23	1.62	0.64
1:A:48:ARG:HB3	1:A:48:ARG:HH11	1.63	0.63
2:B:21:HIS:NE2	2:B:36:GLN:NE2	2.46	0.63
2:D:87:HIS:HD2	4:D:103:HOH:O	1.80	0.63
1:A:43:ASN:ND2	2:D:15:SER:HB3	2.13	0.63
2:D:79:ASP:O	2:D:83:GLU:HG2	1.99	0.62
1:A:48:ARG:HH11	1:A:48:ARG:CB	2.12	0.62
2:D:17:ARG:NH2	4:D:104:HOH:O	2.32	0.61
1:C:36:GLN:HA	1:C:39:LYS:HE2	1.82	0.61
2:D:17:ARG:O	2:D:17:ARG:HD3	2.01	0.61
1:C:36:GLN:HG2	4:C:326:HOH:O	2.00	0.61
2:D:18:LEU:N	2:D:18:LEU:HD12	2.16	0.60
1:E:16:ILE:HD12	1:E:16:ILE:N	2.16	0.60
1:A:16:ILE:HD13	1:A:16:ILE:N	2.09	0.60
2:B:57:MET:HE2	2:B:62:LEU:HA	1.83	0.59
1:A:24:LEU:H	1:A:24:LEU:CD2	2.17	0.58
1:C:18:LEU:HD21	1:C:88:ILE:HD11	1.86	0.58
2:F:31:ARG:HH11	2:F:58:ASN:HD22	1.49	0.58
1:C:18:LEU:HD21	1:C:88:ILE:CD1	2.33	0.58
1:E:20:ALA:HA	1:E:23:ARG:NH1	2.18	0.58
2:B:79:ASP:O	2:B:83:GLU:HG2	2.03	0.58
2:F:18:LEU:HD11	2:F:88:ILE:HD13	1.85	0.58
1:C:73:ARG:NH1	4:C:329:HOH:O	2.37	0.58
2:F:48:ARG:HG3	2:F:49:PRO:CD	2.34	0.57
1:C:42:GLU:OE2	1:C:49:PRO:HA	2.03	0.57
1:E:42:GLU:HA	1:E:47:LEU:HB2	1.86	0.56
1:A:43:ASN:HD21	2:D:15:SER:HB3	1.70	0.56
2:B:21:HIS:CE1	2:B:36:GLN:HE22	2.24	0.56
2:F:48:ARG:HG3	2:F:49:PRO:HD2	1.86	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:61:ALA:HB2	2:B:45:PHE:HB3	1.87	0.55
2:B:27:ILE:HG12	4:B:313:HOH:O	2.06	0.55
2:D:53:ASN:N	2:D:53:ASN:HD22	2.03	0.55
2:D:16:ILE:HG23	2:D:17:ARG:N	2.21	0.55
2:B:66:THR:OG1	2:B:68:GLU:HG2	2.07	0.55
1:C:48:ARG:CD	4:C:324:HOH:O	2.36	0.54
1:E:60:LYS:HE3	2:F:44:GLU:OE2	2.07	0.54
1:A:39:LYS:NZ	1:A:50:ILE:O	2.40	0.54
2:B:58:ASN:N	4:B:324:HOH:O	2.41	0.54
2:B:68:GLU:CD	2:B:68:GLU:N	2.60	0.54
2:D:60:LYS:HG3	4:D:93:HOH:O	2.07	0.54
2:B:31:ARG:HG3	2:B:31:ARG:HH11	1.73	0.53
1:C:38:LEU:HD21	1:C:50:ILE:HG21	1.90	0.53
1:C:58:ASN:HD21	2:D:45:PHE:HA	1.74	0.53
2:F:87:HIS:HB3	4:F:338:HOH:O	2.07	0.53
2:B:57:MET:HE3	2:B:62:LEU:N	2.23	0.53
2:B:20:ALA:HA	2:B:23:ARG:NH1	2.24	0.52
1:C:26:PRO:O	1:C:59:GLY:HA3	2.10	0.52
2:F:48:ARG:HG3	2:F:49:PRO:N	2.23	0.52
1:E:39:LYS:HA	1:E:42:GLU:CG	2.39	0.52
1:E:54:THR:HG1	1:E:55:PHE:HD1	1.57	0.52
2:D:87:HIS:O	2:D:91:GLN:HG2	2.10	0.51
2:B:57:MET:CE	2:B:62:LEU:HA	2.40	0.51
2:D:17:ARG:HD3	2:D:17:ARG:C	2.30	0.51
1:E:73:ARG:HG3	1:E:73:ARG:HH11	1.76	0.50
2:D:58:ASN:HD22	2:D:58:ASN:N	2.09	0.50
2:F:60:LYS:HG3	4:F:332:HOH:O	2.12	0.50
2:F:17:ARG:HG3	2:F:23:ARG:HH21	1.77	0.50
2:D:91:GLN:HA	2:D:91:GLN:NE2	2.23	0.50
1:A:54:THR:CG2	1:A:73:ARG:HB3	2.40	0.49
2:B:50:ILE:CD1	2:B:81:LEU:HD11	2.42	0.49
1:A:16:ILE:CB	4:A:327:HOH:O	2.33	0.49
2:F:63:LEU:CD1	2:F:89:LEU:HD11	2.43	0.49
2:F:83:GLU:OE2	2:F:83:GLU:HA	2.13	0.49
2:D:16:ILE:HG23	2:D:17:ARG:H	1.78	0.49
1:E:24:LEU:HD12	1:E:24:LEU:N	2.21	0.49
1:A:52:SER:C	1:A:54:THR:H	2.16	0.49
1:E:50:ILE:C	1:E:50:ILE:HD12	2.33	0.49
2:D:57:MET:SD	2:D:61:ASP:OD2	2.71	0.48
1:A:16:ILE:HG12	1:A:17:ARG:N	2.20	0.48
2:B:21:HIS:NE2	2:B:36:GLN:CD	2.68	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:39:LYS:CE	4:C:326:HOH:O	2.62	0.48
1:E:48:ARG:HB3	4:E:337:HOH:O	2.14	0.47
2:F:59:GLY:O	2:F:63:LEU:HD23	2.13	0.47
1:C:32:ASP:O	1:C:36:GLN:HG3	2.15	0.47
1:C:79:ASP:O	1:C:83:GLU:HG3	2.13	0.47
1:A:40:TRP:HA	1:C:28:TYR:CE2	2.50	0.47
1:C:36:GLN:CB	4:C:326:HOH:O	2.62	0.47
2:D:24:LEU:HD12	2:D:25:GLN:H	1.80	0.46
1:A:16:ILE:CG1	4:A:328:HOH:O	2.39	0.46
2:B:68:GLU:HB2	4:B:327:HOH:O	2.16	0.46
1:C:36:GLN:CG	4:C:326:HOH:O	2.59	0.46
1:A:43:ASN:HD21	2:D:15:SER:CB	2.27	0.46
2:B:38:LEU:O	2:B:42:GLU:HG3	2.15	0.46
1:C:36:GLN:HB3	4:C:326:HOH:O	2.13	0.46
1:C:45:PHE:CZ	1:C:84:LEU:HD13	2.50	0.46
1:E:71:ARG:HA	1:E:78:GLY:HA3	1.97	0.46
1:A:54:THR:HG22	1:A:73:ARG:CB	2.42	0.46
2:B:82:TYR:O	2:B:86:GLN:HG2	2.16	0.45
2:B:20:ALA:HA	2:B:23:ARG:HH11	1.82	0.45
2:B:31:ARG:HG3	2:B:31:ARG:NH1	2.31	0.45
1:C:87:HIS:ND1	4:C:325:HOH:O	2.36	0.45
2:D:38:LEU:HD11	2:D:55:PHE:HB2	1.97	0.45
2:B:57:MET:HE3	2:B:61:ASP:C	2.37	0.45
1:C:50:ILE:HG12	1:C:51:ASP:N	2.31	0.45
2:F:21:HIS:CE1	2:F:36:GLN:OE1	2.69	0.45
2:B:85:LEU:O	2:B:89:LEU:HB2	2.16	0.45
1:C:68:GLU:OE2	2:D:67:LYS:NZ	2.50	0.45
2:D:53:ASN:N	2:D:53:ASN:ND2	2.64	0.45
1:E:23:ARG:NH1	1:E:23:ARG:HG2	2.31	0.45
2:B:26:PRO:HA	2:B:29:TRP:CG	2.52	0.45
1:C:89:LEU:C	1:C:91:GLN:H	2.20	0.45
1:A:16:ILE:CD1	4:A:328:HOH:O	2.64	0.44
2:B:19:PRO:O	2:B:23:ARG:HG2	2.17	0.44
2:F:63:LEU:HD12	2:F:89:LEU:HD11	1.98	0.44
1:A:16:ILE:CA	4:A:327:HOH:O	2.64	0.44
2:D:57:MET:HB2	2:D:61:ASP:OD2	2.18	0.44
1:C:22:LEU:CD2	1:C:33:ASP:HB3	2.48	0.44
1:E:21:HIS:O	1:E:24:LEU:HD11	2.17	0.44
1:E:23:ARG:HG2	1:E:23:ARG:HH11	1.82	0.44
1:A:16:ILE:O	1:A:17:ARG:CB	2.65	0.44
2:D:29:TRP:O	2:D:58:ASN:HB2	2.17	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:27:ILE:CD1	1:E:60:LYS:HG2	2.48	0.43
2:F:82:TYR:O	2:F:86:GLN:HG2	2.18	0.43
2:F:42:GLU:HA	2:F:47:LEU:HB2	2.00	0.43
1:C:55:PHE:N	1:C:55:PHE:CD1	2.87	0.42
2:B:17:ARG:HH11	2:B:17:ARG:HG3	1.84	0.42
2:D:27:ILE:CD1	2:D:60:LYS:HG2	2.49	0.42
2:D:81:LEU:HD23	2:D:81:LEU:HA	1.92	0.42
1:E:15:SER:CB	1:E:16:ILE:HD12	2.49	0.42
2:B:18:LEU:O	2:B:23:ARG:HD3	2.20	0.42
1:A:24:LEU:HD23	1:A:24:LEU:N	2.28	0.42
2:D:56:GLU:O	2:D:57:MET:HB3	2.20	0.42
2:B:34:VAL:O	2:B:37:TRP:HB3	2.19	0.42
2:B:48:ARG:HD2	3:B:308:SO4:O4	2.20	0.42
2:D:18:LEU:N	2:D:18:LEU:CD1	2.82	0.42
1:E:61:ALA:HB2	2:F:45:PHE:HB3	2.02	0.42
1:A:54:THR:HB	1:A:55:PHE:CD1	2.55	0.42
1:C:68:GLU:CA	4:C:328:HOH:O	2.66	0.41
2:D:57:MET:HB2	2:D:61:ASP:OD1	2.20	0.41
1:C:21:HIS:CE1	1:C:22:LEU:HG	2.55	0.41
2:F:71:ARG:HG3	2:F:71:ARG:HH11	1.84	0.41
1:C:65:LEU:HD21	2:D:80:VAL:HG22	2.03	0.41
1:C:68:GLU:HG3	1:C:68:GLU:H	1.56	0.41
1:E:39:LYS:HA	1:E:42:GLU:HG2	2.03	0.41
2:F:25:GLN:HB2	2:F:28:TYR:CD1	2.56	0.40
1:C:58:ASN:ND2	2:D:45:PHE:HA	2.35	0.40
1:C:68:GLU:CB	4:C:328:HOH:O	2.34	0.40
1:E:57:MET:HB2	1:E:61:ALA:HB3	2.04	0.40
1:A:67:LYS:HE3	4:A:331:HOH:O	2.20	0.40
2:B:26:PRO:O	2:B:59:GLY:HA3	2.21	0.40
2:B:58:ASN:HB3	4:B:324:HOH:O	2.21	0.40
1:E:54:THR:OG1	1:E:55:PHE:HD1	2.03	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:15:SER:OG	3:F:306:SO4:O4[1_455]	2.11	0.09

## 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	75/77 (97%)	71 (95%)	2 (3%)	2 (3%)	5	3
1	C	75/77 (97%)	68 (91%)	6 (8%)	1 (1%)	12	12
1	E	75/77 (97%)	68 (91%)	6 (8%)	1 (1%)	12	12
2	B	75/77 (97%)	70 (93%)	5 (7%)	0	100	100
2	D	75/77 (97%)	68 (91%)	6 (8%)	1 (1%)	12	12
2	F	75/77 (97%)	74 (99%)	1 (1%)	0	100	100
All	All	450/462 (97%)	419 (93%)	26 (6%)	5 (1%)	14	15

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	D	17	ARG
1	A	16	ILE
1	A	17	ARG
1	C	52	SER
1	E	16	ILE

### 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	69/71 (97%)	66 (96%)	3 (4%)	29	40
1	C	70/71 (99%)	66 (94%)	4 (6%)	20	28
1	E	70/71 (99%)	67 (96%)	3 (4%)	29	40

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	B	71/72 (99%)	67 (94%)	4 (6%)	21	29
2	D	71/72 (99%)	69 (97%)	2 (3%)	43	60
2	F	71/72 (99%)	68 (96%)	3 (4%)	30	42
All	All	422/429 (98%)	403 (96%)	19 (4%)	27	39

All (19) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	16	ILE
1	A	24	LEU
1	A	48	ARG
2	B	21	HIS
2	B	31	ARG
2	B	68	GLU
2	B	72	TYR
1	C	32	ASP
1	C	38	LEU
1	C	68	GLU
1	C	72	TYR
2	D	58	ASN
2	D	91	GLN
1	E	23	ARG
1	E	24	LEU
1	E	64	LEU
2	F	31	ARG
2	F	48	ARG
2	F	61	ASP

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	36	GLN
1	A	43	ASN
1	A	53	ASN
2	B	36	GLN
2	B	91	GLN
1	C	25	GLN
2	D	43	ASN
2	D	53	ASN
2	D	58	ASN

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Mol	Chain	Res	Type
2	D	91	GLN
2	F	21	HIS
2	F	25	GLN
2	F	76	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](#)

11 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	$\# Z  > 2$
3	SO4	A	301	-	4,4,4	0.27	0	6,6,6	0.06	0
3	SO4	E	315	-	4,4,4	0.24	0	6,6,6	0.09	0
3	SO4	F	306	-	4,4,4	0.28	0	6,6,6	0.06	0
3	SO4	B	308	-	4,4,4	0.25	0	6,6,6	0.05	0
3	SO4	F	312	-	4,4,4	0.28	0	6,6,6	0.08	0
3	SO4	A	302	-	4,4,4	0.23	0	6,6,6	0.18	0
3	SO4	E	313	-	4,4,4	0.20	0	6,6,6	0.07	0
3	SO4	C	305	-	4,4,4	0.29	0	6,6,6	0.08	0
3	SO4	E	307	-	4,4,4	0.24	0	6,6,6	0.16	0
3	SO4	B	309	-	4,4,4	0.20	0	6,6,6	0.09	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	SO4	F	314	-	4,4,4	0.23	0	6,6,6	0.13	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
3	F	306	SO4	0	1
3	B	308	SO4	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](#)

EDS was not executed - this section is therefore empty.

### 6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

EDS was not executed - this section is therefore empty.

### 6.3 Carbohydrates [i](#)

EDS was not executed - this section is therefore empty.

### 6.4 Ligands [i](#)

EDS was not executed - this section is therefore empty.

### 6.5 Other polymers [i](#)

EDS was not executed - this section is therefore empty.