Full wwPDB X-ray Structure Validation Report (i)

Mar 6, 2026 – 04:16 AM UTC

PDB ID	:	9QBQ / pdb_00009qbq
Title	:	Crystal structure of apo SPARDA complex from Xanthobacter autotrophicus
Authors	:	Manakova, E.N.; Grazulis, S.; Zaremba, M.
Deposited on	:	2025-03-03
Resolution	:	3.00 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 (1)) were used in the production of this report:

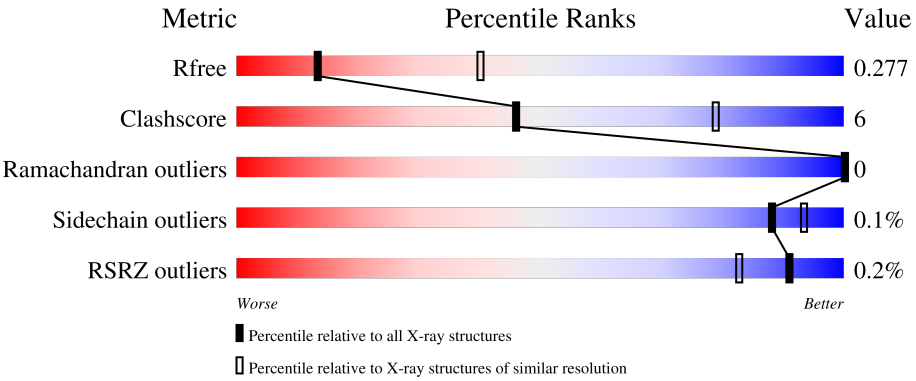
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

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 3.00 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}	180053	2672 (3.00-3.00)
Clashscore	190562	2977 (3.00-3.00)
Ramachandran outliers	187476	2877 (3.00-3.00)
Sidechain outliers	187428	2880 (3.00-3.00)
RSRZ outliers	180081	2671 (3.00-3.00)

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	458	% 69% 13% 18%
1	C	458	75% 17% 8%
2	B	482	83% 13% .
2	D	482	84% 12% .

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 13859 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 DUF4365 domain-containing protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	377	Total	C	N	O	S	58	0	0
			3041	1924	551	561	5			
1	C	423	Total	C	N	O	S	41	0	0
			3435	2175	617	638	5			

There are 28 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-13	MET	-	initiating methionine	UNP A7ICE8
A	-12	GLY	-	expression tag	UNP A7ICE8
A	-11	GLY	-	expression tag	UNP A7ICE8
A	-10	SER	-	expression tag	UNP A7ICE8
A	-9	HIS	-	expression tag	UNP A7ICE8
A	-8	HIS	-	expression tag	UNP A7ICE8
A	-7	HIS	-	expression tag	UNP A7ICE8
A	-6	HIS	-	expression tag	UNP A7ICE8
A	-5	HIS	-	expression tag	UNP A7ICE8
A	-4	HIS	-	expression tag	UNP A7ICE8
A	-3	GLY	-	expression tag	UNP A7ICE8
A	-2	MET	-	expression tag	UNP A7ICE8
A	-1	ALA	-	expression tag	UNP A7ICE8
A	0	SER	-	expression tag	UNP A7ICE8
C	-13	MET	-	initiating methionine	UNP A7ICE8
C	-12	GLY	-	expression tag	UNP A7ICE8
C	-11	GLY	-	expression tag	UNP A7ICE8
C	-10	SER	-	expression tag	UNP A7ICE8
C	-9	HIS	-	expression tag	UNP A7ICE8
C	-8	HIS	-	expression tag	UNP A7ICE8
C	-7	HIS	-	expression tag	UNP A7ICE8
C	-6	HIS	-	expression tag	UNP A7ICE8
C	-5	HIS	-	expression tag	UNP A7ICE8
C	-4	HIS	-	expression tag	UNP A7ICE8
C	-3	GLY	-	expression tag	UNP A7ICE8

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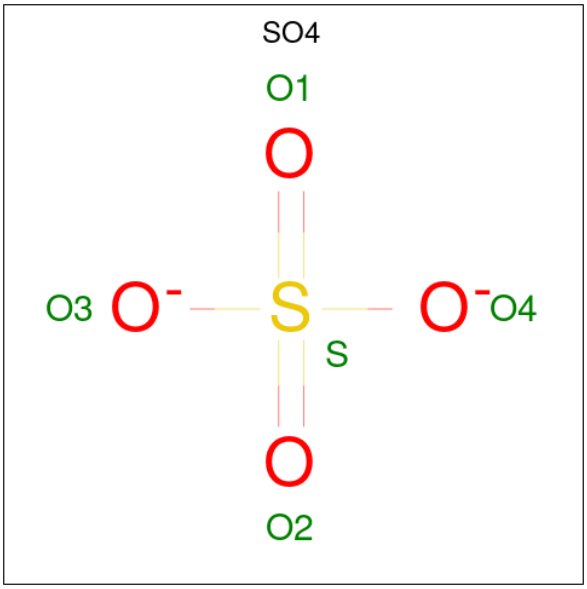
Chain	Residue	Modelled	Actual	Comment	Reference
C	-2	MET	-	expression tag	UNP A7ICE8
C	-1	ALA	-	expression tag	UNP A7ICE8
C	0	SER	-	expression tag	UNP A7ICE8

- Molecule 2 is a protein called Protein argonaute.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	464	Total	C	N	O	S	10	0	0
			3643	2313	658	666	6			
2	D	465	Total	C	N	O	S	31	0	0
			3652	2319	660	666	7			

- Molecule 3 is SULFATE ION (CCD ID: SO4) (formula: O_4S).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
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	B	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			

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

- Molecule 4 is water.

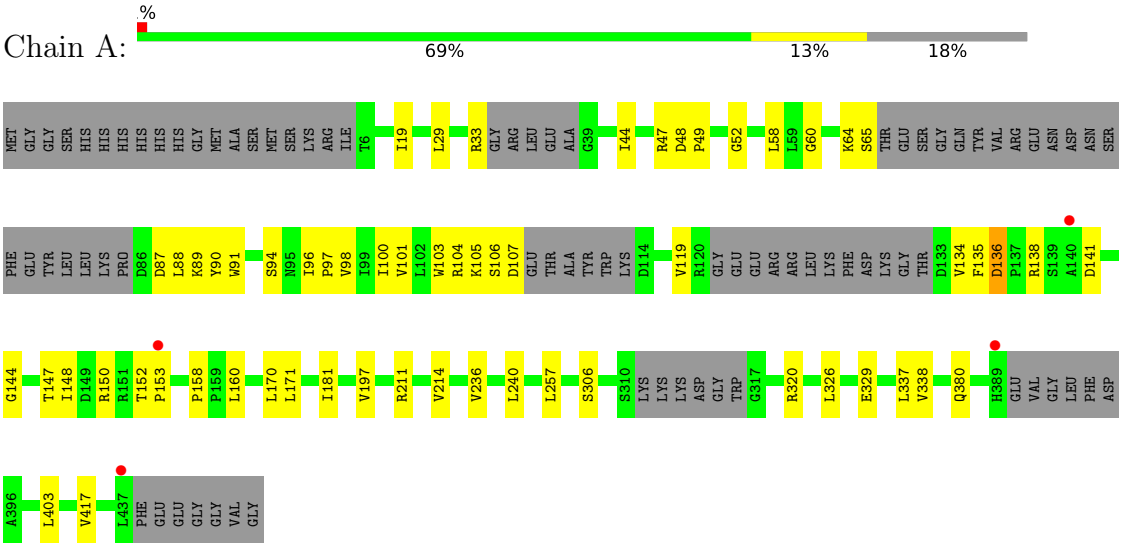
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total O 1 1	0	0
4	B	4	Total O 4 4	0	0
4	C	3	Total O 3 3	0	0

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.

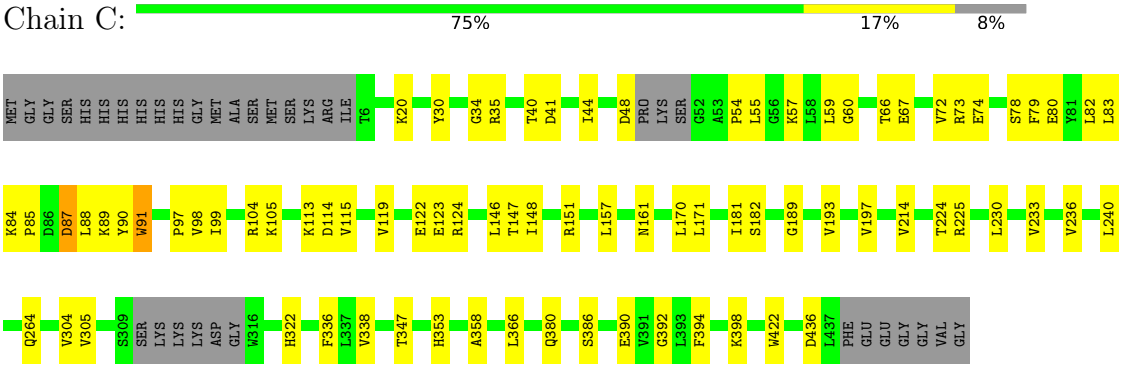
• Molecule 1: DUF4365 domain-containing protein

Chain A:



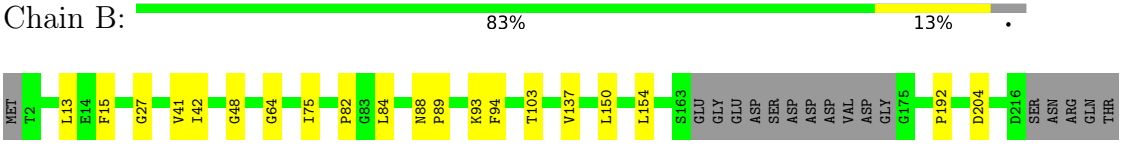
• Molecule 1: DUF4365 domain-containing protein

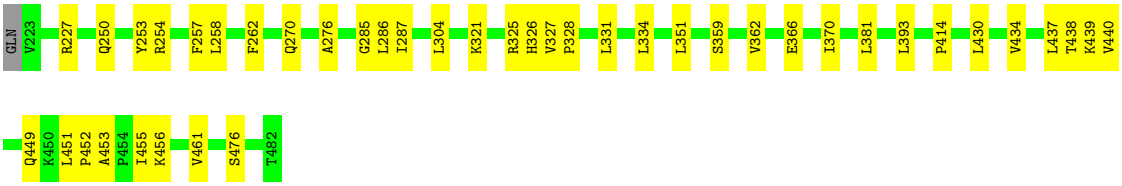
Chain C:



• Molecule 2: Protein argonaute

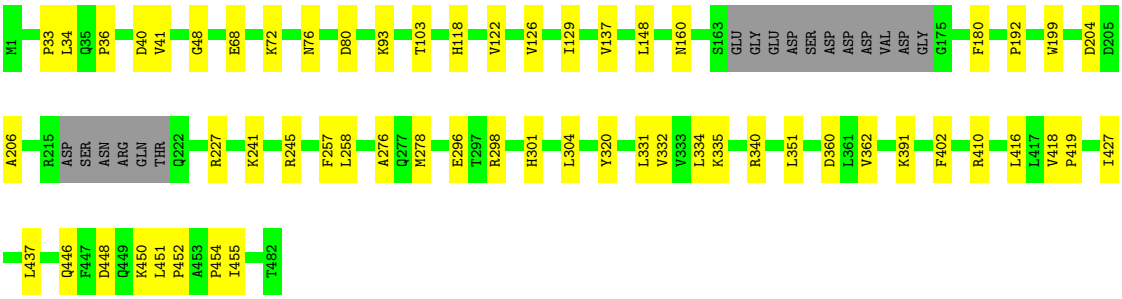
Chain B:





• Molecule 2: Protein argonaute

Chain D:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	127.73Å 73.29Å 128.00Å 90.00° 115.17° 90.00°	Depositor
Resolution (Å)	68.55 – 3.00 68.55 – 3.00	Depositor EDS
% Data completeness (in resolution range)	93.2 (68.55-3.00) 95.0 (68.55-3.00)	Depositor EDS
R_{merge}	0.30	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.34 (at 3.01Å)	Xtriage
Refinement program	PHENIX (1.18.2_3874: ???)	Depositor
R, R_{free}	0.230 , 0.282 0.225 , 0.277	Depositor DCC
R_{free} test set	4184 reflections (9.65%)	wwPDB-VP
Wilson B-factor (Å^2)	93.3	Xtriage
Anisotropy	0.056	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.30 , 41.7	EDS
L-test for twinning[2]	$< \|L\| > = 0.44$, $< L^2 > = 0.27$	Xtriage
Estimated twinning fraction	0.039 for l,-k,h	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	13859	wwPDB-VP
Average B, all atoms (Å^2)	94.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.54% 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

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	0.31	0/3100	0.60	8/4186 (0.2%)
1	C	0.36	0/3508	0.68	7/4742 (0.1%)
2	B	0.26	0/3724	0.45	0/5049
2	D	0.18	0/3733	0.36	0/5060
All	All	0.28	0/14065	0.53	15/19037 (0.1%)

There are no bond length outliers.

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	150	ARG	CB-CA-C	-9.04	106.14	116.63
1	C	123	GLU	N-CA-C	-9.01	101.84	112.92
1	C	90	TYR	N-CA-C	-8.03	103.05	113.17
1	C	224	THR	N-CA-C	-7.57	104.09	112.72
1	A	158	PRO	N-CA-C	6.48	117.51	110.58
1	A	152	THR	CB-CA-C	6.10	117.47	108.87
1	C	87	ASP	N-CA-C	-6.01	105.93	113.20
1	C	54	PRO	N-CA-C	-5.21	103.02	111.14
1	C	91	TRP	N-CA-C	-5.21	106.95	113.15
1	A	141	ASP	N-CA-C	-5.21	105.61	111.28
1	A	87	ASP	N-CA-C	-5.13	102.75	110.70
1	A	136	ASP	N-CA-C	-5.09	103.17	109.64
1	C	146	LEU	CA-C-O	-5.09	116.28	122.64
1	A	90	TYR	N-CA-C	-5.06	106.89	113.16
1	A	138	ARG	N-CA-C	-5.06	105.89	111.71

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	3041	0	3035	40	0
1	C	3435	0	3403	50	0
2	B	3643	0	3662	39	0
2	D	3652	0	3678	37	0
3	A	5	0	0	0	0
3	B	25	0	0	0	0
3	C	15	0	0	0	0
3	D	35	0	0	0	0
4	A	1	0	0	0	0
4	B	4	0	0	0	0
4	C	3	0	0	0	0
All	All	13859	0	13778	159	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 6.

All (159) 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:58:LEU:HB2	1:A:148:ILE:CD1	1.69	1.23
1:A:58:LEU:HB2	1:A:148:ILE:HD13	1.34	1.08
1:A:97:PRO:HD2	1:A:148:ILE:HG22	1.17	1.05
1:A:58:LEU:HB2	1:A:148:ILE:HD11	1.52	0.92
1:C:59:LEU:HD12	1:C:97:PRO:O	1.70	0.90
1:A:97:PRO:CD	1:A:148:ILE:HG22	2.03	0.86
2:D:419:PRO:HG2	2:D:427:ILE:HG13	1.57	0.84
1:C:60:GLY:HA3	1:C:98:VAL:HG12	1.70	0.74
1:C:85:PRO:HA	1:C:88:LEU:HD12	1.73	0.71
1:A:326:LEU:HD22	1:A:337:LEU:HD21	1.72	0.71
1:C:85:PRO:O	1:C:88:LEU:HB2	1.91	0.70
1:A:181:ILE:HG22	1:A:214:VAL:HG12	1.74	0.70
2:D:419:PRO:HG2	2:D:427:ILE:CG1	2.21	0.69
1:C:59:LEU:HD21	1:C:99:ILE:HG23	1.74	0.69
2:D:258:LEU:HD13	2:D:278:MET:HE3	1.75	0.67
1:C:151:ARG:HD2	2:D:72:LYS:HB3	1.79	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:325:ARG:HD2	2:B:326:HIS:CE1	2.33	0.64
2:B:82:PRO:HG2	2:B:89:PRO:HD3	1.80	0.63
1:A:91:TRP:HE3	1:A:98:VAL:HG22	1.64	0.62
2:D:41:VAL:HG12	2:D:93:LYS:HB2	1.81	0.61
1:A:94:SER:HB3	1:A:96:ILE:HG23	1.82	0.61
1:C:44:ILE:HD11	1:C:59:LEU:HD23	1.82	0.61
1:C:97:PRO:HD3	1:C:148:ILE:HD12	1.82	0.61
1:A:64:LYS:HD3	1:A:100:ILE:HD11	1.82	0.60
1:A:58:LEU:O	1:A:148:ILE:HG23	2.01	0.60
2:B:254:ARG:HB2	2:B:328:PRO:HA	1.83	0.60
1:C:57:LYS:HB3	1:C:147:THR:HG21	1.85	0.59
1:A:329:GLU:HG2	2:B:370:ILE:HD11	1.84	0.59
1:C:181:ILE:HG22	1:C:214:VAL:HG12	1.84	0.59
2:D:296:GLU:OE1	2:D:301:HIS:HB3	2.04	0.57
2:D:68:GLU:HA	2:D:80:ASP:HB2	1.86	0.57
2:B:287:ILE:HD12	2:B:461:VAL:HG11	1.87	0.57
1:C:182:SER:HB2	1:C:233:VAL:HA	1.86	0.57
1:A:58:LEU:CB	1:A:148:ILE:HD13	2.22	0.56
2:B:250:GLN:HB3	2:B:253:TYR:HB2	1.87	0.56
1:A:47:ARG:HD3	1:A:52:GLY:HA2	1.87	0.56
2:B:452:PRO:HG2	2:B:455:ILE:HG12	1.88	0.56
2:D:331:LEU:HD23	2:D:351:LEU:HD21	1.87	0.56
2:B:270:GLN:HG2	2:D:298:ARG:H	1.71	0.56
1:C:59:LEU:HD21	1:C:99:ILE:CG2	2.35	0.56
2:B:285:GLY:C	2:B:286:LEU:HD12	2.31	0.55
1:A:19:ILE:HG23	1:A:135:PHE:CE2	2.42	0.55
1:C:34:GLY:HA3	1:C:161:ASN:HB2	1.89	0.55
2:D:334:LEU:HD23	2:D:362:VAL:HB	1.90	0.54
2:D:129:ILE:HD13	2:D:148:LEU:HD21	1.88	0.54
2:B:351:LEU:HD13	2:B:359:SER:HB2	1.90	0.54
2:B:440:VAL:HB	2:B:453:ALA:HB2	1.90	0.53
2:B:84:LEU:HA	2:B:88:ASN:HB3	1.91	0.53
1:C:73:ARG:HB3	1:C:79:PHE:HA	1.91	0.53
1:C:113:LYS:HG2	1:C:114:ASP:N	2.24	0.53
1:A:104:ARG:NH2	1:A:105:LYS:HB3	2.24	0.53
1:A:58:LEU:H	1:A:148:ILE:HG12	1.74	0.52
1:C:82:LEU:HA	1:C:124:ARG:O	2.11	0.52
2:B:64:GLY:HA2	2:B:84:LEU:H	1.74	0.51
1:A:134:VAL:HG23	1:A:136:ASP:H	1.75	0.51
1:C:113:LYS:HG2	1:C:114:ASP:H	1.75	0.51
1:A:236:VAL:HB	1:A:240:LEU:HD12	1.92	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:257:PHE:CD1	2:D:437:LEU:HD11	2.46	0.51
1:C:67:GLU:HA	1:C:105:LYS:HB3	1.93	0.51
1:A:104:ARG:HB3	1:A:107:ASP:CG	2.35	0.51
2:B:334:LEU:HD23	2:B:362:VAL:HB	1.91	0.51
2:B:262:PHE:HE1	2:B:304:LEU:HG	1.74	0.50
1:A:60:GLY:HA3	1:A:91:TRP:CZ3	2.45	0.50
1:C:57:LYS:HB3	1:C:147:THR:CG2	2.41	0.50
2:B:204:ASP:HB3	2:B:227:ARG:HD3	1.93	0.50
1:C:366:LEU:HD21	1:C:436:ASP:HA	1.92	0.50
1:C:44:ILE:HG13	1:C:59:LEU:HB3	1.94	0.50
1:C:189:GLY:O	1:C:193:VAL:HG23	2.12	0.50
1:C:347:THR:HG23	1:C:353:HIS:HA	1.94	0.50
2:D:137:VAL:HG11	2:D:192:PRO:HD2	1.93	0.50
2:B:41:VAL:HG23	2:B:93:LYS:HB2	1.93	0.50
1:C:236:VAL:HG22	1:C:240:LEU:HD12	1.95	0.49
1:C:20:LYS:HG3	1:C:30:TYR:HB3	1.94	0.49
2:D:391:LYS:HG2	2:D:418:VAL:HG22	1.95	0.49
2:D:48:GLY:O	2:D:103:THR:HA	2.12	0.49
2:B:258:LEU:HD11	2:B:276:ALA:HB1	1.94	0.48
1:C:225:ARG:HG3	1:C:230:LEU:HD11	1.95	0.48
1:A:29:LEU:O	1:A:44:ILE:HA	2.14	0.48
2:D:76:ASN:HB3	2:D:402:PHE:CE2	2.49	0.48
2:D:391:LYS:HB3	2:D:416:LEU:HD11	1.95	0.48
2:D:450:LYS:HG2	2:D:451:LEU:HG	1.94	0.47
1:A:65:SER:HB3	1:A:103:TRP:HB3	1.95	0.47
2:B:393:LEU:HD11	2:B:414:PRO:HG2	1.96	0.47
2:D:278:MET:SD	2:D:320:TYR:HB2	2.55	0.47
2:D:118:HIS:O	2:D:122:VAL:HG23	2.15	0.47
1:A:171:LEU:HD11	1:A:380:GLN:HG2	1.96	0.46
1:A:88:LEU:HD11	1:A:119:VAL:O	2.15	0.46
2:D:204:ASP:HB3	2:D:227:ARG:HD2	1.98	0.46
1:C:41:ASP:HB2	1:C:91:TRP:CH2	2.50	0.46
1:C:394:PHE:O	1:C:398:LYS:HB3	2.16	0.46
2:B:257:PHE:CD1	2:B:437:LEU:HD11	2.51	0.46
1:A:144:GLY:O	1:A:147:THR:HG23	2.16	0.45
2:B:48:GLY:O	2:B:103:THR:HA	2.16	0.45
1:C:264:GLN:HB3	1:C:386:SER:HB2	1.99	0.45
1:A:104:ARG:HG3	1:A:106:SER:H	1.81	0.45
2:B:285:GLY:O	2:B:286:LEU:HD12	2.17	0.45
2:B:456:LYS:HB3	2:B:456:LYS:HE2	1.65	0.45
2:D:332:VAL:HG22	2:D:360:ASP:HB2	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:122:GLU:HA	1:C:124:ARG:HG3	1.99	0.45
2:D:296:GLU:OE2	2:D:340:ARG:HD2	2.17	0.45
1:A:153:PRO:HD3	2:B:75:ILE:HG12	1.98	0.44
1:C:170:LEU:HD23	1:C:338:VAL:HG22	1.99	0.44
1:A:19:ILE:HG12	1:A:101:VAL:HG11	1.99	0.44
1:A:197:VAL:HG21	1:C:358:ALA:HB1	1.98	0.44
2:D:34:LEU:HD21	2:D:245:ARG:HD3	1.99	0.44
2:B:438:THR:O	2:B:449:GLN:HB2	2.18	0.44
2:D:452:PRO:HG2	2:D:455:ILE:HG12	1.99	0.44
1:A:417:VAL:HG22	2:B:381:LEU:HG	1.99	0.44
2:D:334:LEU:HD12	2:D:454:PRO:HG2	2.00	0.44
2:B:362:VAL:HG22	2:B:430:LEU:HD13	2.00	0.44
1:C:225:ARG:HG3	1:C:230:LEU:HD21	1.99	0.44
1:A:58:LEU:CB	1:A:148:ILE:HD11	2.36	0.44
1:C:66:THR:HG23	1:C:104:ARG:HG3	2.00	0.44
2:D:129:ILE:HD12	2:D:180:PHE:HZ	1.82	0.44
1:C:171:LEU:HD11	1:C:380:GLN:HA	2.01	0.43
1:C:390:GLU:HG3	1:C:392:GLY:N	2.33	0.43
2:B:366:GLU:HG2	2:B:451:LEU:HD21	2.00	0.43
1:C:304:VAL:HA	1:C:322:HIS:ND1	2.33	0.43
1:A:211:ARG:HD2	2:D:160:ASN:OD1	2.18	0.43
2:B:42:ILE:HD12	2:B:94:PHE:CE2	2.54	0.43
1:C:390:GLU:HG3	1:C:392:GLY:H	1.84	0.43
2:D:33:PRO:HG2	2:D:36:PRO:HB3	2.01	0.43
2:D:335:LYS:HB3	2:D:335:LYS:HE2	1.84	0.43
2:D:446:GLN:HG2	2:D:448:ASP:OD1	2.19	0.43
1:C:304:VAL:HG23	1:C:305:VAL:HG23	2.00	0.43
1:A:48:ASP:OD1	1:A:49:PRO:HD2	2.19	0.42
2:B:321:LYS:HE2	2:B:327:VAL:HG22	2.01	0.42
2:B:150:LEU:HD22	2:B:154:LEU:HD23	2.00	0.42
2:D:258:LEU:HD11	2:D:276:ALA:HB1	2.01	0.42
2:B:370:ILE:HG22	2:B:393:LEU:HD22	2.01	0.42
2:D:199:TRP:CD1	2:D:206:ALA:HB2	2.55	0.42
2:B:137:VAL:HG11	2:B:192:PRO:HD2	2.01	0.42
2:B:13:LEU:HD21	2:B:439:LYS:HE2	2.02	0.42
2:D:40:ASP:HB3	2:D:241:LYS:HE2	2.01	0.42
1:A:89:LYS:HE2	1:A:89:LYS:HB2	1.88	0.42
1:A:257:LEU:HD22	1:A:403:LEU:HD11	2.00	0.42
1:A:170:LEU:HD23	1:A:338:VAL:HG22	2.02	0.41
1:C:98:VAL:HG23	1:C:115:VAL:HG13	2.02	0.41
2:D:122:VAL:O	2:D:126:VAL:HG23	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:410:ARG:HD3	2:D:410:ARG:H	1.85	0.41
1:A:44:ILE:O	1:A:58:LEU:HA	2.21	0.41
2:B:331:LEU:HD23	2:B:351:LEU:HD21	2.02	0.41
1:C:73:ARG:HG2	1:C:74:GLU:N	2.35	0.41
1:C:73:ARG:NH1	1:C:78:SER:HB2	2.35	0.41
1:C:157:LEU:HD22	1:C:422:TRP:HE1	1.86	0.41
1:C:83:LEU:HD23	1:C:83:LEU:HA	1.86	0.41
1:A:33:ARG:HD3	1:A:160:LEU:HD23	2.03	0.41
1:A:306:SER:HB3	1:A:320:ARG:HB3	2.03	0.41
2:B:434:VAL:O	2:B:438:THR:HG23	2.20	0.41
1:C:84:LYS:HB2	1:C:87:ASP:HB2	2.03	0.41
2:B:257:PHE:CG	2:B:437:LEU:HD11	2.55	0.40
1:C:48:ASP:HB2	1:C:55:LEU:HD11	2.03	0.40
2:B:286:LEU:HA	2:B:476:SER:O	2.21	0.40
2:D:304:LEU:HD23	2:D:304:LEU:HA	1.90	0.40
1:C:35:ARG:HA	1:C:40:THR:HG22	2.02	0.40
2:B:15:PHE:CZ	2:B:27:GLY:HA3	2.57	0.40
1:C:72:VAL:HB	1:C:80:GLU:HB2	2.03	0.40
1:C:170:LEU:HB3	1:C:336:PHE:HB3	2.03	0.40
1:C:193:VAL:O	1:C:197:VAL:HG13	2.21	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	363/458 (79%)	352 (97%)	11 (3%)	0	100	100
1	C	417/458 (91%)	406 (97%)	11 (3%)	0	100	100
2	B	458/482 (95%)	447 (98%)	11 (2%)	0	100	100
2	D	459/482 (95%)	442 (96%)	17 (4%)	0	100	100
All	All	1697/1880 (90%)	1647 (97%)	50 (3%)	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	330/396 (83%)	330 (100%)	0	100 100
1	C	369/396 (93%)	367 (100%)	2 (0%)	81 89
2	B	388/404 (96%)	388 (100%)	0	100 100
2	D	389/404 (96%)	389 (100%)	0	100 100
All	All	1476/1600 (92%)	1474 (100%)	2 (0%)	88 93

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	89	LYS
1	C	119	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (15) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	62	GLN
1	A	247	GLN
1	A	298	ASN
1	A	375	GLN
2	B	323	HIS
2	B	326	HIS
2	B	377	ASN
1	C	264	GLN
1	C	279	HIS
1	C	375	GLN
1	C	423	ASN
2	D	71	ASN
2	D	277	GLN
2	D	365	GLN
2	D	377	ASN

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 oligosaccharides in this entry.

5.6 Ligand geometry (i)

16 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	D	503	-	4,4,4	0.23	0	6,6,6	0.08	0
3	SO4	C	503	-	4,4,4	0.23	0	6,6,6	0.08	0
3	SO4	B	505	-	4,4,4	0.21	0	6,6,6	0.15	0
3	SO4	D	501	-	4,4,4	0.24	0	6,6,6	0.08	0
3	SO4	D	505	-	4,4,4	0.44	0	6,6,6	0.10	0
3	SO4	D	507	-	4,4,4	0.23	0	6,6,6	0.07	0
3	SO4	B	501	-	4,4,4	0.24	0	6,6,6	0.05	0
3	SO4	C	501	-	4,4,4	0.23	0	6,6,6	0.08	0
3	SO4	D	502	-	4,4,4	0.23	0	6,6,6	0.09	0
3	SO4	B	504	-	4,4,4	0.24	0	6,6,6	0.07	0
3	SO4	A	501	-	4,4,4	0.54	0	6,6,6	0.09	0
3	SO4	B	502	-	4,4,4	0.23	0	6,6,6	0.08	0
3	SO4	B	503	-	4,4,4	0.24	0	6,6,6	0.07	0
3	SO4	D	506	-	4,4,4	0.24	0	6,6,6	0.05	0
3	SO4	C	502	-	4,4,4	0.24	0	6,6,6	0.08	0
3	SO4	D	504	-	4,4,4	0.42	0	6,6,6	0.07	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.

No monomer is involved in short contacts.

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	377/458 (82%)	-0.37	4 (1%) 78 57	53, 97, 160, 293	13 (3%)
1	C	423/458 (92%)	-0.47	0 100 100	49, 95, 144, 181	11 (2%)
2	B	464/482 (96%)	-0.58	0 100 100	37, 85, 119, 163	2 (0%)
2	D	465/482 (96%)	-0.57	0 100 100	38, 82, 116, 156	6 (1%)
All	All	1729/1880 (91%)	-0.50	4 (0%) 91 83	37, 88, 146, 293	32 (1%)

All (4) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	153	PRO	2.9
1	A	140	ALA	2.5
1	A	389	HIS	2.2
1	A	437	LEU	2.1

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 oligosaccharides in this entry.

6.4 Ligands

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
3	SO4	C	503	5/5	0.40	0.08	163,168,181,251	0
3	SO4	D	503	5/5	0.59	0.09	117,123,157,170	0
3	SO4	D	505	5/5	0.61	0.09	127,130,157,159	0
3	SO4	B	502	5/5	0.62	0.08	97,147,167,188	0
3	SO4	D	506	5/5	0.62	0.06	166,170,185,200	0
3	SO4	D	507	5/5	0.67	0.06	144,154,158,229	0
3	SO4	B	505	5/5	0.68	0.08	116,118,152,164	0
3	SO4	D	501	5/5	0.70	0.05	156,171,192,208	0
3	SO4	B	504	5/5	0.71	0.06	126,130,144,148	0
3	SO4	D	504	5/5	0.73	0.08	112,123,143,144	0
3	SO4	D	502	5/5	0.84	0.11	77,98,112,120	0
3	SO4	B	501	5/5	0.85	0.11	88,103,115,122	0
3	SO4	C	501	5/5	0.85	0.09	107,108,115,126	0
3	SO4	A	501	5/5	0.87	0.10	93,95,119,125	0
3	SO4	B	503	5/5	0.88	0.07	101,107,134,172	0
3	SO4	C	502	5/5	0.90	0.06	76,80,111,112	0

6.5 Other polymers (i)

There are no such residues in this entry.