



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 05:16 PM UTC

PDB ID : 2JD5 / pdb_00002jd5
Title : Sky1p bound to Npl3p-derived substrate peptide
Authors : Nolen, B.; Lukasiewicz, R.; Adams, J.A.; Huang, D.; Ghosh, G.
Deposited on : 2007-01-04
Resolution : 2.50 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 ⓘ 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 ⓘ](#)) 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

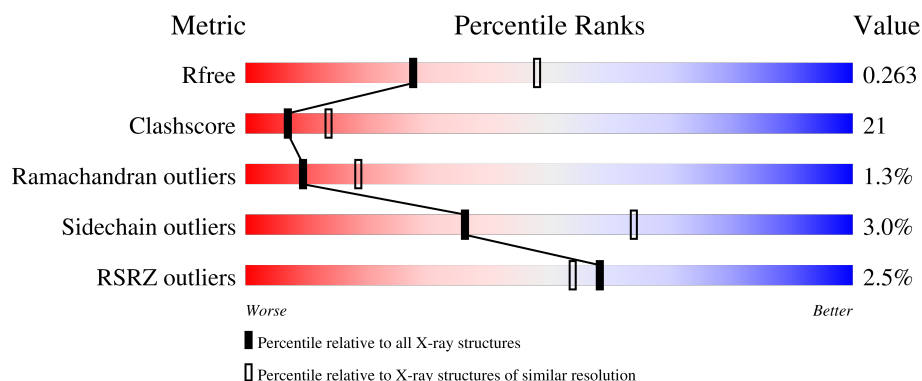
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 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	5829 (2.50-2.50)
Clashscore	190562	6492 (2.50-2.50)
Ramachandran outliers	187476	6378 (2.50-2.50)
Sidechain outliers	187428	6380 (2.50-2.50)
RSRZ outliers	180081	5833 (2.50-2.50)

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 $\leq 5\%$. 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	373	3% 54% 37% • 5%
1	B	373	2% 64% 29% • •
2	C	7	57% 14% 29%

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 5920 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 SERINE/THREONINE-PROTEIN KINASE SKY1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	353	Total	C	N	O	S	0	0	0
			2841	1824	482	523	12			
1	B	360	Total	C	N	O	S	0	0	0
			2896	1856	491	537	12			

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	144	PHE	TYR	conflict	UNP Q03656
A	305	VAL	ILE	conflict	UNP Q03656
A	306	ASP	ASN	conflict	UNP Q03656
B	144	PHE	TYR	conflict	UNP Q03656
B	305	VAL	ILE	conflict	UNP Q03656
B	306	ASP	ASN	conflict	UNP Q03656

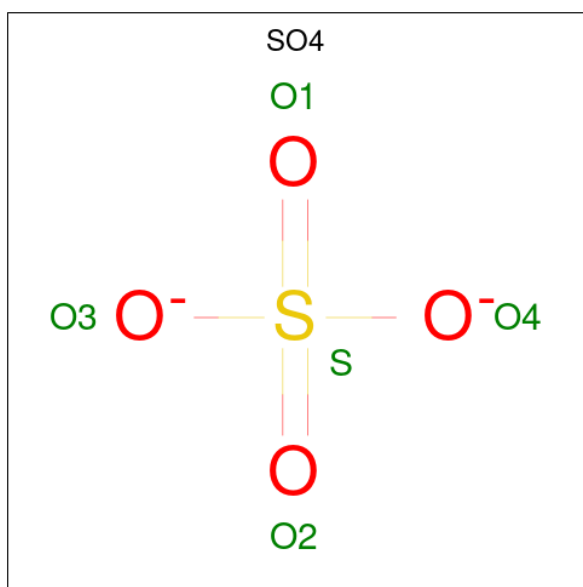
- Molecule 2 is a protein called NUCLEOLAR PROTEIN 3.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	C	5	Total	C	N	O	0	0	0
			38	22	8	8			

- Molecule 3 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Mg	0	0
			1	1		
3	B	1	Total	Mg	0	0
			1	1		

- Molecule 4 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



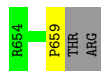
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	O	S	0	0
			5	4	1		
4	B	1	Total	O	S	0	0
			5	4	1		

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	55	Total	O	0	0
			55	55		
5	B	78	Total	O	0	0
			78	78		

- Molecule 2: NUCLEOLAR PROTEIN 3

Chain C:  57% 14% 29%



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	72.33Å 88.56Å 134.41Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.99 – 2.50 19.99 – 2.50	Depositor EDS
% Data completeness (in resolution range)	82.3 (19.99-2.50) 93.2 (19.99-2.50)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.52 (at 2.45Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.210 , 0.255 0.224 , 0.263	Depositor DCC
R_{free} test set	1507 reflections (4.68%)	wwPDB-VP
Wilson B-factor (Å ²)	34.1	Xtriage
Anisotropy	0.255	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 42.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	5920	wwPDB-VP
Average B, all atoms (Å ²)	34.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 41.06 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 2.4963e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ 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: MG, 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	0.43	0/2905	0.92	9/3928 (0.2%)
1	B	0.43	0/2964	0.92	6/4011 (0.1%)
2	C	0.44	0/38	0.68	0/50
All	All	0.43	0/5907	0.92	15/7989 (0.2%)

There are no bond length outliers.

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	717	VAL	CA-C-N	8.16	127.72	119.24
1	B	717	VAL	C-N-CA	8.16	127.72	119.24
1	A	659	TRP	CA-C-N	7.96	128.01	119.89
1	A	659	TRP	C-N-CA	7.96	128.01	119.89
1	B	651	ARG	N-CA-C	7.04	118.65	110.97
1	B	603	LEU	N-CA-C	-6.42	104.36	111.36
1	A	551	LEU	N-CA-C	-6.25	106.34	112.97
1	A	286	ARG	N-CA-C	6.11	117.74	111.14
1	B	600	GLY	N-CA-C	-5.96	106.42	115.00
1	A	667	GLU	N-CA-C	5.96	117.44	111.07
1	A	670	LYS	N-CA-C	5.63	119.34	111.74
1	B	286	ARG	N-CA-C	5.41	118.22	111.24
1	A	170	SER	N-CA-C	5.34	114.89	107.73
1	A	151	GLU	CA-C-N	5.07	125.46	119.99
1	A	151	GLU	C-N-CA	5.07	125.46	119.99

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	2841	0	2808	153	0
1	B	2896	0	2868	92	0
2	C	38	0	32	7	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
4	A	5	0	0	0	0
4	B	5	0	0	1	0
5	A	55	0	0	3	0
5	B	78	0	0	3	0
All	All	5920	0	5708	242	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 21.

All (242) 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:613:THR:HG21	1:A:621:GLN:HE22	1.14	1.10
1:A:568:ARG:HB3	1:A:569:GLU:N	1.80	0.96
1:A:688:GLN:HG2	1:A:693:LYS:HB2	1.52	0.91
1:B:254:LEU:HD12	1:B:298:GLU:HG3	1.58	0.85
1:A:673:LYS:HE2	1:A:677:LYS:NZ	1.92	0.84
1:B:249:LEU:HD11	1:B:547:LYS:HD2	1.58	0.84
1:A:568:ARG:O	1:A:569:GLU:N	2.12	0.82
1:A:192:ASP:HB3	1:A:195:TYR:HB2	1.63	0.80
1:A:297:PRO:HD3	1:A:593:LEU:HD13	1.64	0.79
1:A:613:THR:HG21	1:A:621:GLN:NE2	1.96	0.79
1:A:624:GLU:HG3	1:A:657:LYS:O	1.82	0.78
1:A:306:ASP:HB3	1:A:543:LEU:HB2	1.68	0.75
1:A:655:LYS:CE	2:C:659:PRO:HG3	2.17	0.75
1:A:655:LYS:NZ	2:C:659:PRO:HG3	2.02	0.75
1:A:191:GLY:O	1:A:192:ASP:HB2	1.86	0.74
1:A:176:LYS:HE3	1:A:178:MET:SD	2.28	0.73
1:A:688:GLN:CG	1:A:693:LYS:HB2	2.19	0.72
1:A:272:GLN:HE22	1:A:543:LEU:HA	1.52	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:568:ARG:C	1:A:571:ARG:HB2	2.14	0.72
1:A:645:ASN:HD22	1:A:651:ARG:NH2	1.87	0.72
1:A:615:ASP:HB3	1:A:643:PHE:HE2	1.55	0.71
1:B:272:GLN:HE22	1:B:544:ILE:H	1.38	0.71
1:B:203:ILE:O	1:B:207:GLN:HG3	1.92	0.70
1:A:562:THR:HG22	1:A:563:ASN:H	1.57	0.69
1:A:180:ASN:O	1:A:182:THR:HG23	1.92	0.69
1:A:655:LYS:HE3	2:C:659:PRO:HG3	1.75	0.69
1:A:629:LEU:HD12	1:A:689:LEU:HD13	1.73	0.69
1:B:305:VAL:CG2	1:B:545:GLN:HB2	2.23	0.69
1:B:272:GLN:NE2	1:B:544:ILE:H	1.91	0.68
1:A:249:LEU:HD23	1:A:301:LEU:HB2	1.75	0.68
1:A:623:ILE:HD13	1:A:629:LEU:HD13	1.75	0.68
1:A:645:ASN:HD22	1:A:651:ARG:HH21	1.39	0.68
1:A:157:ARG:HG3	1:A:179:VAL:HG23	1.76	0.66
1:A:655:LYS:HE2	1:B:659:TRP:CH2	2.30	0.66
1:B:282:ASP:OD1	1:B:286:ARG:HD3	1.96	0.66
1:B:157:ARG:HG3	1:B:179:VAL:HG23	1.76	0.66
1:B:641:ARG:HE	1:B:641:ARG:HA	1.61	0.66
1:A:568:ARG:HA	1:A:568:ARG:HE	1.60	0.65
1:A:568:ARG:HH21	1:A:571:ARG:HH22	1.43	0.65
1:A:645:ASN:HB2	1:A:651:ARG:HE	1.62	0.65
1:A:170:SER:HB3	1:A:189:VAL:HA	1.79	0.64
1:A:673:LYS:HE2	1:A:677:LYS:HZ3	1.60	0.64
1:A:170:SER:HB2	1:A:188:ILE:O	1.97	0.63
1:B:238:ASN:H	1:B:238:ASN:ND2	1.96	0.63
1:A:722:LEU:O	1:A:723:TYR:HB2	1.99	0.62
1:B:722:LEU:O	1:B:723:TYR:HB2	1.98	0.62
1:A:287:ARG:HA	1:A:287:ARG:CZ	2.29	0.62
1:A:623:ILE:CD1	1:A:629:LEU:HD13	2.30	0.62
1:B:200:GLU:OE1	1:B:203:ILE:HD12	2.00	0.62
1:A:655:LYS:NZ	1:A:657:LYS:HE3	2.14	0.62
1:B:712:MET:HB3	1:B:715:ILE:HD12	1.82	0.62
1:A:613:THR:HA	5:A:2026:HOH:O	1.98	0.61
1:A:660:PRO:O	1:A:664:VAL:HG23	2.00	0.61
1:B:208:ARG:HG3	1:B:208:ARG:HH11	1.65	0.61
1:B:302:MET:HB3	1:B:546:ILE:HG22	1.82	0.61
1:B:605:GLU:H	1:B:621:GLN:HE22	1.48	0.61
1:A:193:LYS:HE2	1:A:197:GLU:OE1	1.99	0.61
1:A:282:ASP:OD1	1:A:286:ARG:HD3	2.00	0.61
1:A:562:THR:HG22	1:A:564:SER:H	1.65	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:249:LEU:HD21	1:A:547:LYS:HD2	1.82	0.60
1:A:217:GLU:O	1:A:220:MET:HB2	2.01	0.60
1:B:559:GLU:HA	1:B:735:GLU:OE2	2.00	0.60
1:A:253:LEU:HD13	1:A:300:VAL:HB	1.83	0.60
1:A:249:LEU:HD21	1:A:547:LYS:HB2	1.82	0.60
1:A:615:ASP:O	1:A:619:ILE:HG13	2.02	0.60
1:A:253:LEU:O	1:A:257:ILE:HG13	2.02	0.59
1:A:254:LEU:CD2	1:A:258:LYS:HE2	2.31	0.59
1:A:594:ILE:O	1:A:598:ILE:HG13	2.03	0.58
1:A:546:ILE:HD12	1:A:546:ILE:C	2.28	0.58
1:B:296:LYS:HB2	1:B:297:PRO:HD2	1.85	0.58
1:B:737:ARG:HD3	1:B:737:ARG:N	2.18	0.58
1:A:238:ASN:ND2	1:A:238:ASN:H	2.01	0.58
1:B:272:GLN:HE22	1:B:543:LEU:HA	1.68	0.58
1:B:297:PRO:HG2	1:B:298:GLU:OE1	2.03	0.58
1:A:562:THR:HG22	1:A:563:ASN:N	2.18	0.58
1:B:164:LEU:HD21	1:B:174:LEU:HB2	1.86	0.58
1:B:297:PRO:HD3	1:B:593:LEU:HD13	1.85	0.58
1:A:655:LYS:HE3	2:C:659:PRO:CB	2.34	0.57
1:B:225:ILE:HD11	1:B:284:MET:HG3	1.85	0.57
1:B:256:LEU:HD22	1:B:265:ILE:HG12	1.86	0.57
1:B:256:LEU:HD22	1:B:265:ILE:CD1	2.35	0.57
1:A:655:LYS:HE3	2:C:659:PRO:HB3	1.87	0.57
1:B:196:THR:O	1:B:200:GLU:HG2	2.04	0.57
1:A:657:LYS:HE2	1:B:659:TRP:CE3	2.40	0.56
1:A:615:ASP:HB3	1:A:643:PHE:CE2	2.39	0.56
1:A:249:LEU:HD23	1:A:301:LEU:CB	2.36	0.56
1:A:655:LYS:HE3	2:C:659:PRO:CG	2.36	0.55
1:B:716:ARG:CZ	1:B:718:PRO:HG3	2.37	0.55
1:A:569:GLU:N	1:A:569:GLU:CD	2.64	0.55
1:A:655:LYS:HD3	1:A:657:LYS:HE3	1.89	0.54
1:A:254:LEU:HD21	1:A:258:LYS:HE2	1.88	0.54
1:A:202:GLU:HA	1:A:205:LEU:HD12	1.89	0.54
1:B:650:LEU:HD23	1:B:653:ILE:HB	1.89	0.53
1:B:671:PHE:HD2	1:B:675:GLU:HG2	1.74	0.53
1:A:645:ASN:HB2	1:A:651:ARG:HH21	1.74	0.53
1:A:722:LEU:HD12	1:A:723:TYR:N	2.24	0.53
1:A:616:ASP:HB3	1:A:653:ILE:HD13	1.90	0.53
1:A:297:PRO:CD	1:A:593:LEU:HD13	2.36	0.52
1:B:645:ASN:HB3	1:B:651:ARG:NH1	2.24	0.52
1:B:208:ARG:NH1	1:B:288:CYS:HA	2.25	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:254:LEU:HD12	1:B:298:GLU:CG	2.36	0.52
1:B:571:ARG:HG2	1:B:576:LEU:HD13	1.91	0.52
1:A:230:ASP:HB3	1:A:245:VAL:HG21	1.92	0.52
1:B:170:SER:HB2	1:B:188:ILE:O	2.10	0.52
1:A:144:PHE:CZ	1:A:238:ASN:HB3	2.45	0.52
1:A:179:VAL:HG12	1:A:179:VAL:O	2.09	0.52
1:B:306:ASP:OD1	1:B:540:PRO:HD2	2.09	0.52
1:B:569:GLU:HG2	1:B:602:PHE:CD2	2.45	0.52
1:B:584:GLY:HA3	5:B:2063:HOH:O	2.10	0.52
1:A:297:PRO:HD3	1:A:593:LEU:CD1	2.37	0.51
1:A:306:ASP:OD2	1:A:540:PRO:HD2	2.09	0.51
1:A:275:LYS:HD2	1:A:706:LEU:HB3	1.91	0.51
1:B:224:HIS:NE2	1:B:276:GLN:HG2	2.25	0.51
1:B:572:SER:HB2	1:B:574:GLU:OE2	2.11	0.51
1:B:712:MET:CB	1:B:715:ILE:HD12	2.41	0.51
1:B:546:ILE:C	1:B:546:ILE:HD12	2.35	0.51
1:A:253:LEU:HD13	1:A:300:VAL:O	2.10	0.50
1:A:655:LYS:HZ1	2:C:659:PRO:HG3	1.76	0.50
1:A:191:GLY:O	1:A:192:ASP:CB	2.59	0.50
1:A:298:GLU:H	1:A:298:GLU:CD	2.19	0.50
1:A:570:TYR:CD1	1:A:570:TYR:N	2.80	0.50
1:B:737:ARG:O	1:B:737:ARG:HG2	2.11	0.50
1:B:231:HIS:HA	1:B:243:VAL:O	2.11	0.50
1:A:144:PHE:C	1:A:144:PHE:CD2	2.88	0.50
1:A:541:GLU:O	1:A:542:ASN:HB2	2.12	0.50
1:A:224:HIS:CD2	1:A:276:GLN:HB3	2.47	0.49
1:B:180:ASN:O	1:B:182:THR:HG23	2.13	0.49
1:A:271:LYS:HE3	1:A:708:ASP:OD1	2.13	0.49
1:B:272:GLN:HE22	1:B:544:ILE:N	2.09	0.48
1:A:249:LEU:CD2	1:A:547:LYS:HB2	2.43	0.48
1:B:238:ASN:N	1:B:238:ASN:HD22	2.11	0.48
1:A:673:LYS:HE2	1:A:677:LYS:CE	2.43	0.48
1:B:183:HIS:O	1:B:184:VAL:HG13	2.14	0.48
1:B:702:ASN:OD1	1:B:716:ARG:HB2	2.12	0.48
1:A:202:GLU:O	1:A:203:ILE:C	2.56	0.48
1:B:566:GLN:NE2	1:B:585:ALA:HB1	2.29	0.48
1:A:230:ASP:HB3	1:A:245:VAL:CG2	2.43	0.48
1:B:287:ARG:CZ	1:B:287:ARG:HA	2.44	0.47
1:A:277:LEU:HD11	1:A:593:LEU:HD23	1.96	0.47
1:A:277:LEU:HD13	1:A:590:THR:HG23	1.96	0.47
1:A:719:ASP:O	1:A:720:ARG:HD2	2.14	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:722:LEU:HG	1:A:723:TYR:CD1	2.48	0.47
1:A:568:ARG:NH2	1:A:571:ARG:HH22	2.12	0.47
1:A:539:SER:N	1:A:540:PRO:CD	2.77	0.47
1:A:579:ALA:HB1	1:A:580:PRO:HD2	1.96	0.47
1:B:151:GLU:OE2	1:B:234:HIS:CE1	2.68	0.47
1:A:655:LYS:CD	1:A:657:LYS:HE3	2.44	0.47
1:A:675:GLU:HG3	1:A:679:ILE:HD12	1.95	0.47
1:B:199:ALA:O	1:B:203:ILE:HG13	2.15	0.47
1:A:189:VAL:HG12	1:A:190:ARG:N	2.31	0.46
1:A:301:LEU:O	1:A:546:ILE:HA	2.15	0.46
1:B:235:LYS:HG2	4:B:1738:SO4:O2	2.15	0.46
1:B:716:ARG:HG3	1:B:716:ARG:HH11	1.79	0.46
1:A:565:ILE:HD13	1:A:581:TRP:CZ2	2.50	0.46
1:A:559:GLU:HA	1:A:735:GLU:OE2	2.15	0.46
1:B:238:ASN:ND2	1:B:238:ASN:N	2.58	0.46
1:A:305:VAL:HG13	1:A:306:ASP:N	2.31	0.46
1:B:258:LYS:HG2	1:B:262:HIS:HE1	1.81	0.46
1:A:287:ARG:HA	1:A:287:ARG:NE	2.31	0.46
1:A:655:LYS:HZ3	1:A:657:LYS:HE3	1.79	0.46
1:B:256:LEU:HD22	1:B:265:ILE:CG1	2.45	0.46
1:A:737:ARG:HG2	1:A:737:ARG:HH11	1.81	0.46
1:A:144:PHE:CE1	1:A:238:ASN:HB3	2.51	0.45
1:A:285:HIS:HE1	1:A:586:ASP:OD2	2.00	0.45
1:B:200:GLU:OE1	1:B:200:GLU:HA	2.15	0.45
1:A:172:VAL:HA	1:A:186:MET:O	2.16	0.45
1:A:619:ILE:O	1:A:623:ILE:HG12	2.17	0.45
1:B:596:GLU:HA	1:B:601:ASP:O	2.16	0.45
1:A:238:ASN:ND2	1:A:238:ASN:N	2.63	0.45
1:A:696:ASP:HA	1:A:732:TRP:CH2	2.52	0.45
1:A:249:LEU:CD2	1:A:547:LYS:HD2	2.46	0.45
1:A:273:ILE:O	1:A:277:LEU:HB2	2.17	0.45
1:B:219:SER:HA	1:B:222:ALA:HB3	1.98	0.45
1:A:539:SER:HB3	1:A:540:PRO:HD3	1.98	0.45
1:B:698:GLY:O	1:B:701:VAL:HB	2.16	0.45
1:A:626:LEU:HD11	1:A:687:LEU:HB3	1.99	0.44
1:A:581:TRP:O	1:A:734:GLU:HA	2.17	0.44
1:A:596:GLU:HG3	1:A:601:ASP:O	2.17	0.44
1:B:688:GLN:HE21	1:B:690:ASP:H	1.65	0.44
1:A:713:GLU:CD	1:A:713:GLU:H	2.26	0.44
1:B:177:ASP:OD1	1:B:179:VAL:HB	2.18	0.44
1:A:639:TYR:O	1:A:640:THR:C	2.60	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:294:ASP:OD2	1:A:296:LYS:HE2	2.18	0.44
1:B:568:ARG:HH21	1:B:618:HIS:HD2	1.65	0.44
1:B:282:ASP:O	1:B:286:ARG:HB2	2.18	0.44
1:A:203:ILE:O	1:A:207:GLN:HG3	2.18	0.43
1:A:655:LYS:HZ3	1:A:657:LYS:CE	2.31	0.43
1:B:573:PRO:HD3	1:B:588:TRP:CZ2	2.54	0.43
1:A:205:LEU:HD13	1:A:554:ALA:HB3	2.00	0.43
1:B:261:GLU:O	1:B:263:ARG:HG3	2.18	0.43
1:B:593:LEU:O	1:B:597:LEU:HG	2.18	0.43
1:A:574:GLU:HG2	1:A:691:PRO:HG3	2.00	0.43
1:A:212:ALA:HB3	1:A:283:TYR:OH	2.19	0.43
1:B:258:LYS:HG2	1:B:262:HIS:CE1	2.54	0.43
1:B:707:LYS:HD2	1:B:707:LYS:HA	1.85	0.43
1:B:737:ARG:N	1:B:737:ARG:CD	2.80	0.43
1:A:254:LEU:HD12	1:A:298:GLU:HG3	2.01	0.43
1:A:272:GLN:NE2	1:A:544:ILE:H	2.17	0.43
1:A:619:ILE:HD12	1:A:643:PHE:CD2	2.54	0.42
1:B:224:HIS:CD2	1:B:276:GLN:HB3	2.54	0.42
1:A:296:LYS:HB2	1:A:297:PRO:HD2	2.01	0.42
1:A:203:ILE:HD13	1:A:231:HIS:CD2	2.54	0.42
1:A:624:GLU:HG2	5:A:2034:HOH:O	2.19	0.42
1:B:305:VAL:HG21	1:B:545:GLN:HB2	2.00	0.42
1:B:719:ASP:OD1	1:B:719:ASP:N	2.51	0.42
1:A:712:MET:HB3	1:A:715:ILE:HD12	2.00	0.42
1:A:271:LYS:CE	1:A:708:ASP:OD1	2.68	0.42
1:A:247:GLU:HG2	5:A:2008:HOH:O	2.18	0.42
1:A:722:LEU:HD12	1:A:723:TYR:H	1.85	0.42
1:B:184:VAL:HA	1:B:248:VAL:HG23	2.01	0.42
1:A:659:TRP:CE3	1:A:664:VAL:HG22	2.55	0.42
1:B:251:GLU:HA	5:B:2017:HOH:O	2.20	0.41
1:B:641:ARG:HE	1:B:641:ARG:CA	2.24	0.41
1:A:249:LEU:HD11	1:A:303:GLU:OE1	2.20	0.41
1:A:645:ASN:CB	1:A:651:ARG:HE	2.32	0.41
1:A:675:GLU:HG3	1:A:679:ILE:CD1	2.50	0.41
1:B:164:LEU:HD11	1:B:174:LEU:HB2	2.02	0.41
1:B:224:HIS:HD2	1:B:546:ILE:O	2.03	0.41
1:B:560:HIS:CD2	1:B:735:GLU:HB2	2.56	0.41
1:A:569:GLU:HB2	1:A:570:TYR:CE1	2.55	0.41
1:A:599:THR:HB	1:A:669:TYR:CE2	2.55	0.41
1:A:588:TRP:CD1	1:A:588:TRP:C	2.98	0.41
1:A:550:ASP:C	1:A:552:GLY:H	2.28	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:719:ASP:O	1:B:720:ARG:HD2	2.21	0.41
1:A:189:VAL:CG1	1:A:190:ARG:N	2.83	0.40
1:A:298:GLU:CD	1:A:298:GLU:N	2.79	0.40
1:A:567:THR:O	1:A:568:ARG:C	2.64	0.40
1:A:595:PHE:CG	1:A:603:LEU:HD13	2.56	0.40
1:A:677:LYS:O	1:A:681:ASP:OD1	2.39	0.40
1:B:275:LYS:HD2	1:B:706:LEU:HB3	2.01	0.40
1:A:634:LEU:HA	1:A:640:THR:OG1	2.21	0.40
1:B:285:HIS:HE1	1:B:586:ASP:OD2	2.05	0.40
1:B:292:HIS:C	1:B:293:THR:HG23	2.46	0.40
1:B:686:MET:HE2	1:B:700:LEU:HD13	2.03	0.40
1:A:657:LYS:HD3	1:B:657:LYS:HZ2	1.87	0.40
1:A:722:LEU:O	1:A:723:TYR:CB	2.65	0.40
1:B:193:LYS:O	1:B:197:GLU:HG3	2.21	0.40
1:A:224:HIS:NE2	1:A:276:GLN:HG2	2.35	0.40
1:A:155:ASP:O	1:A:156:ALA:HB3	2.22	0.40
1:A:238:ASN:HD22	1:A:239:GLY:N	2.19	0.40
1:B:161:VAL:HA	5:B:2003:HOH:O	2.20	0.40
1:B:170:SER:HB2	1:B:171:THR:H	1.57	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	345/373 (92%)	314 (91%)	25 (7%)	6 (2%)	7	13
1	B	358/373 (96%)	331 (92%)	24 (7%)	3 (1%)	16	31
2	C	3/7 (43%)	3 (100%)	0	0	100	100
All	All	706/753 (94%)	648 (92%)	49 (7%)	9 (1%)	9	18

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	614	LYS
1	B	568	ARG
1	A	192	ASP
1	A	645	ASN
1	B	250	GLY
1	A	566	GLN
1	A	154	LYS
1	B	566	GLN
1	A	727	SER

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	306/327 (94%)	297 (97%)	9 (3%)	37	65
1	B	313/327 (96%)	303 (97%)	10 (3%)	34	62
2	C	4/7 (57%)	4 (100%)	0	100	100
All	All	623/661 (94%)	604 (97%)	19 (3%)	36	64

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

Mol	Chain	Res	Type
1	A	220	MET
1	A	238	ASN
1	A	271	LYS
1	A	277	LEU
1	A	287	ARG
1	A	560	HIS
1	A	568	ARG
1	A	571	ARG
1	A	629	LEU
1	B	238	ASN
1	B	254	LEU
1	B	256	LEU
1	B	277	LEU
1	B	287	ARG

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Mol	Chain	Res	Type
1	B	576	LEU
1	B	641	ARG
1	B	714	GLU
1	B	716	ARG
1	B	737	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (20) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	183	HIS
1	A	231	HIS
1	A	234	HIS
1	A	238	ASN
1	A	272	GLN
1	A	285	HIS
1	A	560	HIS
1	A	621	GLN
1	A	636	ASN
1	A	645	ASN
1	B	207	GLN
1	B	214	ASN
1	B	234	HIS
1	B	262	HIS
1	B	272	GLN
1	B	285	HIS
1	B	618	HIS
1	B	621	GLN
1	B	636	ASN
1	B	688	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 [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 4 ligands modelled in this entry, 2 are monoatomic - leaving 2 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	SO4	A	1740	-	4,4,4	0.33	0	6,6,6	0.14	0
4	SO4	B	1738	-	4,4,4	0.37	0	6,6,6	0.10	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.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	1738	SO4	1	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	A	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	A	568:ARG	C	569:GLU	N	2.85

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, 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	353/373 (94%)	0.30	12 (3%) 48 43	18, 34, 59, 81	0
1	B	360/373 (96%)	0.03	6 (1%) 69 65	15, 29, 50, 64	0
2	C	5/7 (71%)	0.20	0 100 100	31, 38, 41, 43	0
All	All	718/753 (95%)	0.16	18 (2%) 58 54	15, 32, 57, 81	0

All (18) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	646	SER	4.7
1	A	613	THR	4.6
1	A	144	PHE	4.0
1	A	645	ASN	3.8
1	A	614	LYS	3.7
1	A	145	HIS	3.5
1	A	166	TRP	3.1
1	B	169	PHE	2.9
1	A	738	ASP	2.8
1	A	305	VAL	2.7
1	B	166	TRP	2.5
1	A	169	PHE	2.5
1	A	147	ALA	2.4
1	B	649	LEU	2.2
1	B	239	GLY	2.1
1	B	304	ILE	2.1
1	A	146	PRO	2.0
1	B	168	HIS	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 oligosaccharides 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($\text{\AA}^2$)	Q<0.9
3	MG	B	1739	1/1	0.51	0.21	66,66,66,66	0
4	SO4	B	1738	5/5	0.85	0.14	83,83,85,85	0
3	MG	A	1739	1/1	0.88	0.08	43,43,43,43	0
4	SO4	A	1740	5/5	0.93	0.10	52,52,53,54	0

6.5 Other polymers [i](#)

There are no such residues in this entry.