Full wwPDB X-ray Structure Validation Report ⓘ

May 3, 2025 – 11:07 AM EDT

PDB ID	:	3VUD / pdb_00003vud
Title	:	Crystal structure of a cysteine-deficient mutant M1 in MAP kinase JNK1
Authors	:	Nakaniwa, T.; Kinoshita, T.; Inoue, T.
Deposited on	:	2012-06-28
Resolution	:	3.50 Å(reported)

The following versions of software and data (see references ⓘ) were used in the production of this report:

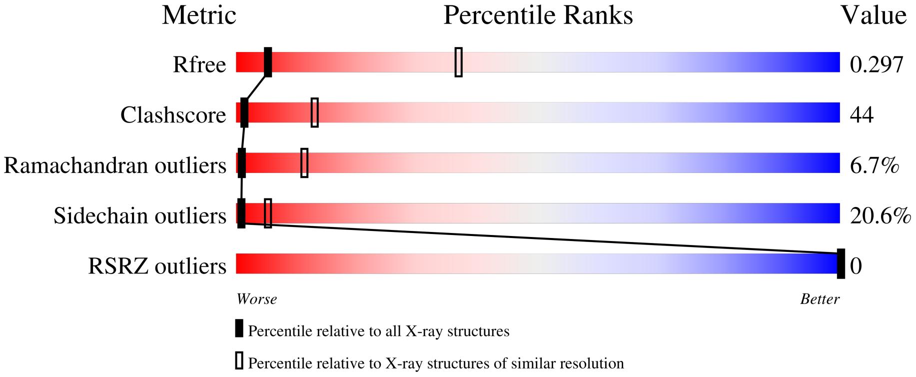
MolProbity	:	4-5-2 with Phenix2.0rc1
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0rc1
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.006 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.43.1

1 Overall quality at a glance

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

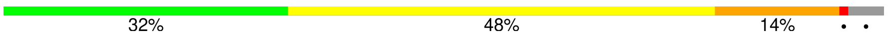
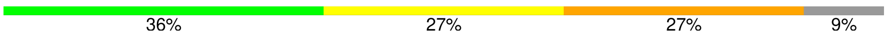
The reported resolution of this entry is 3.50 Å.

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}	164625	1094 (3.56-3.44)
Clashscore	180529	1045 (3.54-3.46)
Ramachandran outliers	177936	1032 (3.54-3.46)
Sidechain outliers	177891	1033 (3.54-3.46)
RSRZ outliers	164620	1093 (3.56-3.44)

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	370	
2	F	11	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	SO4	A	401	-	X	X	-

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 2947 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 Mitogen-activated protein kinase 8.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	355	2849	1824	480	527	18	0	0	0

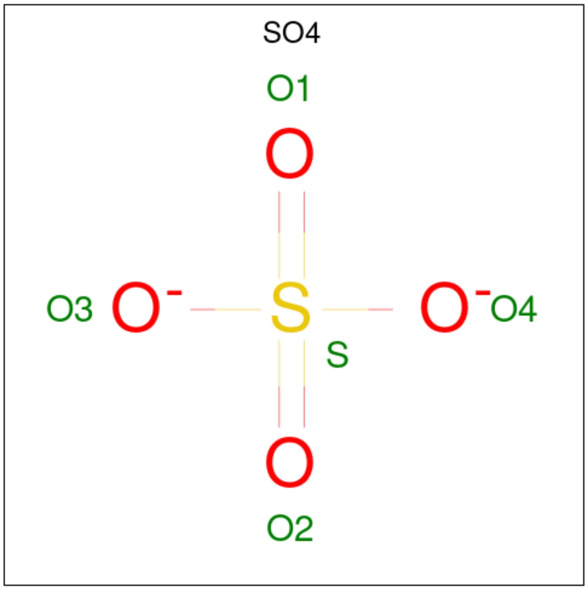
There are 7 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	245	SER	CYS	engineered mutation	UNP A1L4K2
A	365	HIS	-	expression tag	UNP A1L4K2
A	366	HIS	-	expression tag	UNP A1L4K2
A	367	HIS	-	expression tag	UNP A1L4K2
A	368	HIS	-	expression tag	UNP A1L4K2
A	369	HIS	-	expression tag	UNP A1L4K2
A	370	HIS	-	expression tag	UNP A1L4K2

- Molecule 2 is a protein called Peptide from C-Jun-amino-terminal kinase-interacting protein 1.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
2	F	10	84	55	15	14	0	0	0

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



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

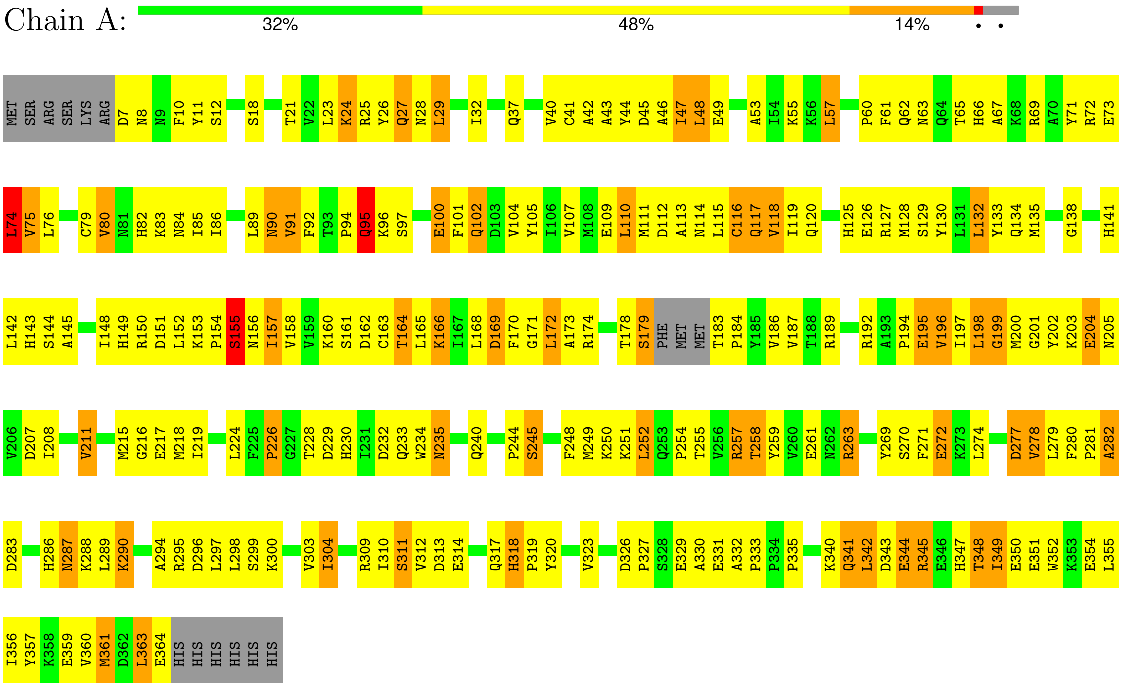
- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	9	Total O 9 9	0	0

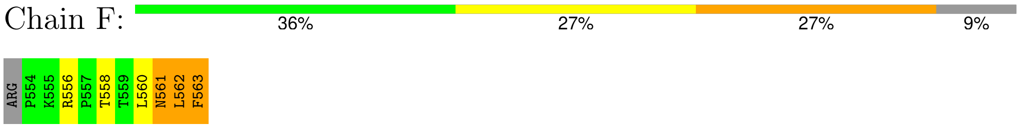
3 Residue-property plots ⓘ

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: Mitogen-activated protein kinase 8



- Molecule 2: Peptide from C-Jun-amino-terminal kinase-interacting protein 1



4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	I 4 2 2	Depositor
Cell constants a, b, c, α, β, γ	170.10Å 170.10Å 87.98Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	31.73 – 3.50 31.73 – 3.50	Depositor EDS
% Data completeness (in resolution range)	99.5 (31.73-3.50) 99.5 (31.73-3.50)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	4.62 (at 3.47Å)	Xtriage
Refinement program	REFMAC 5.6.0117	Depositor
R, R_{free}	0.200 , 0.293 0.203 , 0.297	Depositor DCC
R_{free} test set	389 reflections (4.63%)	wwPDB-VP
Wilson B-factor (Å^2)	62.6	Xtriage
Anisotropy	0.115	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 66.8	EDS
L-test for twinning[2]	$< \|L\| > = 0.31$, $< L^2 > = 0.15$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.89	EDS
Total number of atoms	2947	wwPDB-VP
Average B, all atoms (Å^2)	59.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.97% of the height of the origin peak. No significant pseudotranslation is detected.*

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[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	0.89	0/2912	1.18	12/3942 (0.3%)
2	F	0.85	0/86	1.30	1/114 (0.9%)
All	All	0.89	0/2998	1.19	13/4056 (0.3%)

There are no bond length outliers.

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	318	HIS	CA-C-N	9.63	131.88	119.84
1	A	318	HIS	C-N-CA	9.63	131.88	119.84
1	A	118	VAL	N-CA-C	-7.76	103.29	110.82
1	A	196	VAL	N-CA-C	-6.30	106.65	111.62
2	F	561	ASN	N-CA-C	5.85	118.26	108.96
1	A	101	PHE	N-CA-C	5.82	117.80	110.24
1	A	283	ASP	N-CA-C	5.61	118.64	110.17
1	A	166	LYS	N-CA-C	5.38	117.59	109.41
1	A	63	ASN	N-CA-C	5.38	117.95	108.75
1	A	245	SER	CA-C-N	5.31	126.48	119.84
1	A	245	SER	C-N-CA	5.31	126.48	119.84
1	A	113	ALA	N-CA-C	5.23	114.94	108.19
1	A	204	GLU	N-CA-C	5.19	119.08	112.34

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	2849	0	2853	255	0
2	F	84	0	91	6	0
3	A	5	0	0	3	0
4	A	9	0	0	4	0
All	All	2947	0	2944	260	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 44.

All (260) 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:71:TYR:HE2	1:A:341:GLN:HG3	1.05	1.12
1:A:361:MET:HE2	1:A:361:MET:HA	1.34	1.05
1:A:71:TYR:CE2	1:A:341:GLN:HG3	1.92	1.03
1:A:125:HIS:CD2	1:A:281:PRO:HG2	1.97	0.99
1:A:304:ILE:HD12	1:A:304:ILE:H	1.34	0.92
1:A:125:HIS:HD2	1:A:281:PRO:HG2	1.32	0.90
1:A:361:MET:HA	1:A:361:MET:CE	1.99	0.90
1:A:318:HIS:HD2	1:A:320:TYR:H	1.21	0.88
1:A:149:HIS:HD2	1:A:151:ASP:H	1.23	0.85
1:A:69:ARG:HH21	1:A:72:ARG:HH12	1.25	0.84
1:A:348:THR:HG22	1:A:351:GLU:H	1.43	0.83
1:A:344:GLU:OE2	1:A:345:ARG:HG3	1.80	0.82
1:A:272:GLU:CD	1:A:272:GLU:H	1.88	0.80
1:A:172:LEU:HD13	1:A:172:LEU:H	1.45	0.80
1:A:348:THR:CG2	1:A:351:GLU:H	1.95	0.80
1:A:128:MET:O	1:A:132:LEU:HD22	1.82	0.79
1:A:114:ASN:HB2	1:A:157:ILE:O	1.83	0.79
1:A:25:ARG:CZ	1:A:47:ILE:HD12	2.13	0.77
1:A:82:HIS:HD2	1:A:84:ASN:H	1.30	0.77
1:A:94:PRO:HD2	1:A:95:GLN:HE22	1.50	0.77
1:A:348:THR:HG23	1:A:350:GLU:H	1.51	0.75
1:A:82:HIS:HD2	1:A:84:ASN:N	1.83	0.75
1:A:89:LEU:O	1:A:90:ASN:HB2	1.88	0.74
1:A:149:HIS:CD2	1:A:151:ASP:H	2.05	0.74
1:A:32:ILE:HD11	1:A:40:VAL:HG12	1.70	0.73
1:A:178:THR:HA	1:A:179:SER:C	2.13	0.73
1:A:115:LEU:O	1:A:117:GLN:N	2.22	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:198:LEU:O	1:A:200:MET:HG3	1.87	0.73
1:A:61:PHE:HE2	1:A:102:GLN:HA	1.52	0.72
1:A:172:LEU:HD22	1:A:173:ALA:H	1.54	0.72
1:A:71:TYR:O	1:A:75:VAL:HG23	1.90	0.72
1:A:162:ASP:OD1	1:A:164:THR:OG1	2.07	0.71
1:A:287:ASN:ND2	1:A:290:LYS:HE2	2.06	0.70
1:A:198:LEU:HD12	1:A:200:MET:CE	2.22	0.70
1:A:46:ALA:O	1:A:49:GLU:HG3	1.93	0.69
1:A:263:ARG:HH11	1:A:263:ARG:HA	1.57	0.69
1:A:149:HIS:HD2	1:A:151:ASP:N	1.90	0.68
1:A:172:LEU:HD13	1:A:172:LEU:N	2.08	0.68
1:A:215:MET:O	1:A:218:MET:HB2	1.94	0.67
1:A:270:SER:HB2	1:A:272:GLU:OE2	1.94	0.67
2:F:560:LEU:HD12	2:F:561:ASN:H	1.60	0.65
1:A:29:LEU:HD22	1:A:43:ALA:HB2	1.77	0.65
1:A:132:LEU:O	1:A:133:TYR:C	2.40	0.65
1:A:318:HIS:CD2	1:A:320:TYR:H	2.09	0.65
1:A:114:ASN:ND2	1:A:155:SER:HA	2.12	0.64
1:A:115:LEU:HB2	1:A:154:PRO:HA	1.79	0.64
1:A:71:TYR:HE2	1:A:341:GLN:CG	1.95	0.64
1:A:310:ILE:HG13	1:A:314:GLU:HB3	1.79	0.64
1:A:272:GLU:HA	1:A:295:ARG:NE	2.14	0.63
1:A:348:THR:HG22	1:A:351:GLU:CB	2.28	0.63
1:A:26:TYR:HA	1:A:44:TYR:O	1.99	0.63
1:A:347:HIS:HB2	1:A:352:TRP:CE2	2.34	0.63
1:A:60:PRO:O	1:A:66:HIS:HB3	1.98	0.62
1:A:71:TYR:O	1:A:74:LEU:HB2	1.99	0.62
1:A:287:ASN:HD22	1:A:290:LYS:HE2	1.64	0.62
1:A:61:PHE:CE2	1:A:102:GLN:HA	2.34	0.62
1:A:153:LYS:O	1:A:157:ILE:HD12	1.98	0.62
1:A:341:GLN:HE21	1:A:341:GLN:C	2.06	0.62
1:A:249:MET:O	1:A:251:LYS:N	2.33	0.62
1:A:148:ILE:O	1:A:173:ALA:HA	2.00	0.61
1:A:134:GLN:O	1:A:135:MET:C	2.39	0.61
1:A:304:ILE:HD12	1:A:304:ILE:N	2.10	0.61
1:A:76:LEU:O	1:A:80:VAL:HB	2.01	0.61
1:A:97:SER:HA	1:A:357:TYR:OH	2.00	0.60
1:A:82:HIS:CD2	1:A:84:ASN:N	2.69	0.60
1:A:277:ASP:O	1:A:280:PHE:N	2.35	0.60
1:A:82:HIS:CD2	1:A:84:ASN:H	2.16	0.59
1:A:94:PRO:HD2	1:A:95:GLN:NE2	2.14	0.59

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Atom-1	**Atom-2**	**Interatomic distance (Å)**	**Clash overlap (Å)**
1:A:352:TRP:O	1:A:356:ILE:HG12	2.03	0.58
1:A:172:LEU:HD22	1:A:173:ALA:N	2.18	0.58
1:A:95:GLN:NE2	1:A:95:GLN:H	2.01	0.58
1:A:287:ASN:O	1:A:289:LEU:N	2.33	0.58
1:A:271:PHE:CZ	1:A:299:SER:HA	2.39	0.58
1:A:259:TYR:CE1	1:A:263:ARG:HD3	2.38	0.57
1:A:348:THR:HG22	1:A:351:GLU:HB2	1.87	0.57
1:A:153:LYS:HG2	1:A:156:ASN:HB2	1.86	0.57
1:A:342:LEU:O	1:A:345:ARG:HD2	2.04	0.57
1:A:232:ASP:HA	1:A:235:ASN:ND2	2.19	0.57
1:A:294:ALA:HB2	1:A:320:TYR:CE1	2.39	0.57
1:A:149:HIS:HE1	1:A:168:LEU:O	1.86	0.57
1:A:257:ARG:HD3	1:A:261:GLU:OE2	2.04	0.57
1:A:57:LEU:HD12	1:A:57:LEU:H	1.69	0.57
1:A:57:LEU:HD12	1:A:57:LEU:N	2.20	0.57
1:A:263:ARG:HD2	1:A:263:ARG:N	2.20	0.56
1:A:114:ASN:HD21	1:A:155:SER:HA	1.71	0.56
1:A:171:GLY:N	1:A:172:LEU:HD13	2.19	0.56
1:A:189:ARG:HD3	3:A:401:SO4:O1	2.06	0.56
1:A:348:THR:H	1:A:351:GLU:HB2	1.71	0.56
1:A:90:ASN:HB3	1:A:107:VAL:HB	1.88	0.56
1:A:349:ILE:HG13	1:A:350:GLU:HG2	1.87	0.55
2:F:560:LEU:HD12	2:F:561:ASN:N	2.21	0.55
1:A:90:ASN:HD22	1:A:91:VAL:N	2.04	0.55
1:A:326:ASP:HB3	1:A:329:GLU:OE1	2.05	0.55
1:A:132:LEU:O	1:A:135:MET:HB2	2.07	0.55
1:A:162:ASP:O	1:A:163:CYS:CB	2.53	0.55
1:A:154:PRO:C	1:A:156:ASN:H	2.15	0.55
1:A:194:PRO:C	1:A:196:VAL:H	2.15	0.55
1:A:357:TYR:O	1:A:361:MET:HG2	2.07	0.55
1:A:297:LEU:O	1:A:298:LEU:C	2.50	0.54
1:A:287:ASN:C	1:A:289:LEU:H	2.15	0.54
1:A:69:ARG:HH21	1:A:72:ARG:NH1	2.02	0.54
1:A:178:THR:HG23	1:A:201:GLY:HA2	1.90	0.54
1:A:71:TYR:HA	1:A:74:LEU:HD23	1.89	0.54
1:A:341:GLN:C	1:A:342:LEU:HG	2.32	0.54
1:A:149:HIS:O	1:A:172:LEU:HD23	2.07	0.54
1:A:249:MET:C	1:A:251:LYS:H	2.16	0.54
1:A:277:ASP:HA	1:A:280:PHE:HD2	1.73	0.54
1:A:286:HIS:O	1:A:287:ASN:O	2.26	0.54
1:A:254:PRO:HG2	1:A:255:THR:H	1.73	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:277:ASP:C	1:A:279:LEU:N	2.66	0.54
1:A:204:GLU:CD	1:A:204:GLU:H	2.14	0.53
1:A:348:THR:HG22	1:A:351:GLU:N	2.18	0.53
1:A:174:ARG:HD3	1:A:202:TYR:OH	2.08	0.53
1:A:341:GLN:HE21	1:A:342:LEU:N	2.06	0.53
1:A:129:SER:HB2	1:A:320:TYR:CE2	2.43	0.53
1:A:271:PHE:HA	1:A:274:LEU:HB2	1.90	0.52
1:A:310:ILE:CG1	1:A:314:GLU:HB3	2.39	0.52
1:A:32:ILE:HG21	1:A:42:ALA:HB2	1.91	0.52
1:A:115:LEU:O	1:A:116:CYS:C	2.53	0.52
1:A:69:ARG:NH2	1:A:150:ARG:NH2	2.58	0.51
1:A:95:GLN:N	1:A:95:GLN:HE21	2.08	0.51
1:A:25:ARG:HH22	1:A:48:LEU:HD22	1.75	0.51
1:A:204:GLU:OE1	1:A:204:GLU:N	2.37	0.51
1:A:215:MET:HG2	1:A:219:ILE:HD11	1.91	0.51
1:A:91:VAL:CG2	1:A:363:LEU:HB3	2.40	0.51
1:A:95:GLN:NE2	1:A:95:GLN:N	2.58	0.51
1:A:118:VAL:C	1:A:120:GLN:N	2.66	0.51
1:A:25:ARG:NH2	1:A:48:LEU:HD22	2.26	0.51
1:A:27:GLN:HB2	1:A:28:ASN:ND2	2.26	0.51
1:A:311:SER:HA	4:A:506:HOH:O	2.11	0.51
1:A:89:LEU:O	1:A:90:ASN:CB	2.59	0.50
1:A:329:GLU:CD	2:F:556:ARG:HH22	2.18	0.50
1:A:287:ASN:C	1:A:289:LEU:N	2.68	0.50
1:A:198:LEU:HD12	1:A:200:MET:HE2	1.93	0.50
1:A:205:ASN:HD22	1:A:309:ARG:HB3	1.77	0.50
1:A:85:ILE:O	1:A:166:LYS:HD2	2.11	0.50
1:A:69:ARG:NH1	1:A:183:THR:OG1	2.45	0.50
1:A:114:ASN:O	1:A:115:LEU:C	2.55	0.50
1:A:198:LEU:HD11	1:A:234:TRP:CH2	2.47	0.50
1:A:10:PHE:O	1:A:11:TYR:HB3	2.12	0.49
1:A:194:PRO:HA	1:A:197:ILE:HD12	1.93	0.49
1:A:207:ASP:O	1:A:211:VAL:HG23	2.11	0.49
1:A:348:THR:HG22	1:A:351:GLU:HG3	1.94	0.49
1:A:90:ASN:HB3	1:A:107:VAL:CG2	2.42	0.49
1:A:154:PRO:O	1:A:156:ASN:N	2.46	0.49
1:A:60:PRO:O	1:A:66:HIS:CB	2.60	0.48
1:A:84:ASN:O	1:A:166:LYS:HA	2.13	0.48
1:A:240:GLN:HB3	1:A:274:LEU:HD21	1.95	0.48
1:A:160:LYS:HA	4:A:504:HOH:O	2.13	0.48
1:A:303:VAL:HB	1:A:309:ARG:HG3	1.95	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:145:ALA:HB2	1:A:335:PRO:HD2	1.96	0.48
1:A:245:SER:O	1:A:249:MET:HG2	2.14	0.48
1:A:277:ASP:O	1:A:279:LEU:N	2.46	0.47
1:A:249:MET:C	1:A:251:LYS:N	2.73	0.47
1:A:91:VAL:HG21	1:A:363:LEU:CB	2.45	0.47
1:A:57:LEU:HD13	1:A:104:VAL:HB	1.96	0.47
1:A:135:MET:HB3	1:A:135:MET:HE2	1.49	0.47
1:A:257:ARG:O	1:A:258:THR:C	2.58	0.47
1:A:118:VAL:C	1:A:120:GLN:H	2.23	0.47
1:A:195:GLU:HA	1:A:200:MET:SD	2.54	0.46
1:A:111:MET:HG3	1:A:158:VAL:CG2	2.45	0.46
1:A:69:ARG:HB3	1:A:171:GLY:O	2.14	0.46
1:A:233:GLN:O	1:A:234:TRP:C	2.56	0.46
1:A:277:ASP:C	1:A:279:LEU:H	2.22	0.46
1:A:23:LEU:O	1:A:24:LYS:C	2.59	0.46
1:A:198:LEU:HD13	1:A:252:LEU:HD21	1.97	0.46
1:A:332:ALA:HB1	1:A:333:PRO:CD	2.46	0.46
1:A:10:PHE:CZ	1:A:94:PRO:HA	2.51	0.46
1:A:224:LEU:O	1:A:226:PRO:HD3	2.15	0.46
1:A:154:PRO:C	1:A:156:ASN:N	2.74	0.46
1:A:263:ARG:HA	1:A:263:ARG:NH1	2.29	0.46
2:F:561:ASN:C	2:F:562:LEU:HG	2.38	0.46
2:F:561:ASN:HD21	2:F:563:PHE:HB3	1.81	0.46
1:A:85:ILE:HG23	1:A:170:PHE:HZ	1.81	0.46
1:A:29:LEU:N	1:A:29:LEU:HD23	2.31	0.45
1:A:198:LEU:O	1:A:199:GLY:C	2.58	0.45
1:A:281:PRO:C	1:A:282:ALA:O	2.59	0.45
1:A:91:VAL:HG21	1:A:363:LEU:HB3	1.99	0.45
1:A:95:GLN:HB3	1:A:100:GLU:HB3	1.99	0.45
1:A:40:VAL:HG22	1:A:55:LYS:HG3	1.98	0.45
1:A:326:ASP:OD1	1:A:326:ASP:C	2.59	0.45
1:A:23:LEU:HB3	1:A:25:ARG:HG2	1.98	0.45
1:A:25:ARG:HB2	1:A:47:ILE:HG13	1.99	0.45
1:A:356:ILE:O	1:A:360:VAL:HG23	2.17	0.45
1:A:61:PHE:HA	1:A:67:ALA:HB2	1.99	0.45
1:A:117:GLN:HA	1:A:120:GLN:HB2	1.98	0.44
1:A:143:HIS:C	1:A:145:ALA:H	2.25	0.44
1:A:149:HIS:CD2	1:A:151:ASP:C	2.94	0.44
1:A:232:ASP:HA	1:A:235:ASN:HD21	1.81	0.44
1:A:286:HIS:O	1:A:287:ASN:C	2.59	0.44
1:A:71:TYR:O	1:A:72:ARG:C	2.59	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:171:GLY:H	1:A:172:LEU:HD13	1.81	0.44
1:A:296:ASP:O	1:A:299:SER:OG	2.29	0.44
1:A:69:ARG:O	1:A:171:GLY:HA2	2.18	0.44
1:A:348:THR:HG22	1:A:351:GLU:CG	2.48	0.44
1:A:320:TYR:O	1:A:320:TYR:CD2	2.71	0.44
1:A:71:TYR:HE1	1:A:359:GLU:HB2	1.83	0.44
1:A:198:LEU:HD21	1:A:234:TRP:CE3	2.52	0.44
1:A:120:GLN:OE1	1:A:120:GLN:HA	2.18	0.43
1:A:297:LEU:O	1:A:300:LYS:N	2.41	0.43
1:A:138:GLY:O	1:A:141:HIS:HB3	2.19	0.43
1:A:111:MET:HE3	1:A:158:VAL:O	2.19	0.43
1:A:216:GLY:O	1:A:217:GLU:C	2.61	0.43
1:A:172:LEU:CD2	1:A:173:ALA:N	2.81	0.43
1:A:354:GLU:O	1:A:355:LEU:C	2.61	0.43
1:A:194:PRO:C	1:A:196:VAL:N	2.75	0.43
1:A:281:PRO:O	1:A:282:ALA:C	2.62	0.43
1:A:53:ALA:HB2	1:A:110:LEU:HD12	2.01	0.43
1:A:269:TYR:HB2	1:A:274:LEU:HG	2.01	0.43
1:A:82:HIS:CD2	1:A:84:ASN:HB2	2.54	0.43
1:A:169:ASP:O	1:A:172:LEU:HD21	2.19	0.43
1:A:92:PHE:CE1	1:A:105:TYR:CD1	3.07	0.43
1:A:271:PHE:CE1	1:A:299:SER:HA	2.54	0.43
1:A:130:TYR:O	1:A:133:TYR:HB3	2.19	0.42
1:A:189:ARG:HA	1:A:192:ARG:NE	2.34	0.42
1:A:219:ILE:HD13	1:A:298:LEU:HD11	2.00	0.42
1:A:229:ASP:O	1:A:230:HIS:C	2.60	0.42
1:A:272:GLU:HA	1:A:295:ARG:HE	1.82	0.42
1:A:327:PRO:HA	1:A:330:ALA:HB3	2.01	0.42
1:A:189:ARG:NH1	3:A:401:SO4:O4	2.52	0.42
1:A:118:VAL:O	1:A:120:GLN:N	2.52	0.42
1:A:304:ILE:H	1:A:304:ILE:CD1	2.00	0.42
1:A:66:HIS:CE1	4:A:501:HOH:O	2.73	0.42
1:A:112:ASP:N	4:A:504:HOH:O	2.34	0.42
1:A:29:LEU:HA	1:A:42:ALA:O	2.19	0.42
1:A:45:ASP:O	1:A:49:GLU:HA	2.20	0.42
1:A:62:GLN:HE21	1:A:66:HIS:CE1	2.38	0.42
1:A:272:GLU:HA	1:A:295:ARG:CD	2.50	0.42
1:A:117:GLN:HE21	1:A:117:GLN:HB2	1.43	0.41
1:A:226:PRO:O	1:A:233:GLN:NE2	2.53	0.41
1:A:300:LYS:O	1:A:310:ILE:HG22	2.20	0.41
1:A:149:HIS:C	1:A:151:ASP:H	2.29	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:172:LEU:N	1:A:172:LEU:CD1	2.74	0.41
1:A:73:GLU:O	1:A:74:LEU:C	2.63	0.41
1:A:82:HIS:HB2	1:A:141:HIS:ND1	2.35	0.41
1:A:127:ARG:O	1:A:128:MET:C	2.62	0.41
1:A:192:ARG:NH2	3:A:401:SO4:O1	2.54	0.41
1:A:203:LYS:HB3	1:A:204:GLU:OE1	2.21	0.41
1:A:86:ILE:HD12	1:A:86:ILE:HA	1.84	0.41
1:A:244:PRO:HB2	1:A:248:PHE:CD2	2.56	0.41
1:A:26:TYR:HE1	1:A:45:ASP:OD2	2.04	0.41
1:A:72:ARG:O	1:A:73:GLU:C	2.64	0.41
1:A:263:ARG:HA	1:A:263:ARG:HD2	1.80	0.41
1:A:326:ASP:O	1:A:329:GLU:N	2.45	0.41
1:A:348:THR:HG23	1:A:351:GLU:H	1.79	0.41
1:A:82:HIS:C	1:A:84:ASN:H	2.29	0.41
1:A:97:SER:O	1:A:100:GLU:N	2.53	0.41
1:A:32:ILE:CG2	1:A:42:ALA:HB2	2.51	0.40
1:A:115:LEU:O	1:A:118:VAL:N	2.31	0.40
2:F:561:ASN:ND2	2:F:563:PHE:HB3	2.37	0.40
1:A:82:HIS:O	1:A:84:ASN:N	2.54	0.40
1:A:205:ASN:O	1:A:309:ARG:NH1	2.55	0.40
1:A:272:GLU:CD	1:A:272:GLU:N	2.66	0.40
1:A:44:TYR:CE2	1:A:46:ALA:HA	2.57	0.40
1:A:75:VAL:O	1:A:76:LEU:C	2.65	0.40
1:A:318:HIS:CD2	1:A:318:HIS:C	3.00	0.40
1:A:318:HIS:HA	1:A:319:PRO:HD2	1.56	0.40
1:A:44:TYR:OH	1:A:49:GLU:HG2	2.21	0.40
1:A:149:HIS:O	1:A:150:ARG:HB2	2.21	0.40
1:A:274:LEU:HA	1:A:274:LEU:HD23	1.69	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	351/370 (95%)	263 (75%)	64 (18%)	24 (7%)	1	11
2	F	8/11 (73%)	8 (100%)	0	0	100	100
All	All	359/381 (94%)	271 (76%)	64 (18%)	24 (7%)	1	11

All (24) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	83	LYS
1	A	116	CYS
1	A	169	ASP
1	A	184	PRO
1	A	199	GLY
1	A	250	LYS
1	A	287	ASN
1	A	349	ILE
1	A	90	ASN
1	A	155	SER
1	A	226	PRO
1	A	252	LEU
1	A	278	VAL
1	A	282	ALA
1	A	288	LYS
1	A	65	THR
1	A	74	LEU
1	A	195	GLU
1	A	119	ILE
1	A	144	SER
1	A	343	ASP
1	A	47	ILE
1	A	95	GLN
1	A	102	GLN

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	315/332 (95%)	251 (80%)	64 (20%)	1	5
2	F	10/11 (91%)	7 (70%)	3 (30%)	0	2
All	All	325/343 (95%)	258 (79%)	67 (21%)	1	5

All (67) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	7	ASP
1	A	8	ASN
1	A	12	SER
1	A	18	SER
1	A	21	THR
1	A	24	LYS
1	A	27	GLN
1	A	29	LEU
1	A	37	GLN
1	A	41	CYS
1	A	48	LEU
1	A	57	LEU
1	A	74	LEU
1	A	75	VAL
1	A	79	CYS
1	A	80	VAL
1	A	91	VAL
1	A	95	GLN
1	A	96	LYS
1	A	100	GLU
1	A	109	GLU
1	A	110	LEU
1	A	117	GLN
1	A	126	GLU
1	A	132	LEU
1	A	142	LEU
1	A	152	LEU
1	A	155	SER
1	A	157	ILE
1	A	161	SER
1	A	164	THR
1	A	165	LEU
1	A	172	LEU
1	A	179	SER
1	A	186	VAL

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Mol	Chain	Res	Type
1	A	187	VAL
1	A	198	LEU
1	A	208	ILE
1	A	211	VAL
1	A	228	THR
1	A	235	ASN
1	A	257	ARG
1	A	258	THR
1	A	263	ARG
1	A	272	GLU
1	A	277	ASP
1	A	278	VAL
1	A	290	LYS
1	A	304	ILE
1	A	311	SER
1	A	312	VAL
1	A	313	ASP
1	A	317	GLN
1	A	323	VAL
1	A	331	GLU
1	A	340	LYS
1	A	341	GLN
1	A	342	LEU
1	A	344	GLU
1	A	345	ARG
1	A	348	THR
1	A	361	MET
1	A	363	LEU
1	A	364	GLU
2	F	558	THR
2	F	562	LEU
2	F	563	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (17) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	9	ASN
1	A	28	ASN
1	A	62	GLN
1	A	82	HIS
1	A	84	ASN
1	A	90	ASN

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Mol	Chain	Res	Type
1	A	114	ASN
1	A	117	GLN
1	A	125	HIS
1	A	143	HIS
1	A	149	HIS
1	A	233	GLN
1	A	286	HIS
1	A	287	ASN
1	A	317	GLN
1	A	318	HIS
1	A	341	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

1 ligand is 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	401	-	4,4,4	0.50	0	6,6,6	3.18	4 (66%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	401	SO4	O4-S-O1	-4.28	87.19	109.56
3	A	401	SO4	O4-S-O2	-4.20	87.59	109.56
3	A	401	SO4	O4-S-O3	-3.83	87.40	108.54
3	A	401	SO4	O3-S-O2	2.00	120.02	109.56

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	401	SO4	3	0

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

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, 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	355/370 (95%)	-0.68	0	100	100	29, 55, 100, 124	0
2	F	10/11 (90%)	-0.55	0	100	100	44, 49, 59, 87	0
All	All	365/381 (95%)	-0.68	0	100	100	29, 55, 99, 124	0

There are no RSRZ outliers to report.

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 monosaccharides 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, 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**
3	SO4	A	401	5/5	0.98	0.05	64,67,70,71	0

6.5 Other polymers

There are no such residues in this entry.