Full wwPDB X-ray Structure Validation Report ⓘ

May 15, 2020 – 11:29 am BST

PDB ID	:	5LYO
Title	:	Crystal structure of the zymogen matriptase catalytic domain
Authors	:	Hong, Z.; Jensen, J.K.
Deposited on	:	2016-09-28
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 following versions of software and data (see references ⓘ) were used in the production of this report:

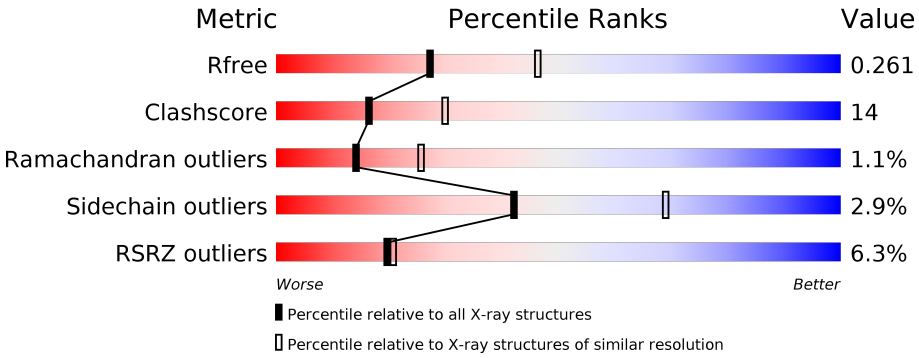
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.11
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.11

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.50 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}	130704	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (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 on 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	265	5% 71% 20% • • 5%
1	B	265	5% 71% 22% • 5%
1	C	265	9% 69% 23% • •

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
2	SO4	B	904	-	-	X	-

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 6136 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 Suppressor of tumorigenicity 14 protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	253	Total	C	N	O	S	0	0	0
			1951	1233	347	360	11			
1	B	252	Total	C	N	O	S	0	0	0
			1943	1226	346	360	11			
1	C	255	Total	C	N	O	S	0	1	0
			1970	1243	350	366	11			

There are 48 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	591	SER	-	expression tag	UNP Q9Y5Y6
A	592	MET	-	expression tag	UNP Q9Y5Y6
A	593	ASN	-	expression tag	UNP Q9Y5Y6
A	594	SER	-	expression tag	UNP Q9Y5Y6
A	595	HIS	-	expression tag	UNP Q9Y5Y6
A	596	HIS	-	expression tag	UNP Q9Y5Y6
A	597	HIS	-	expression tag	UNP Q9Y5Y6
A	598	HIS	-	expression tag	UNP Q9Y5Y6
A	599	HIS	-	expression tag	UNP Q9Y5Y6
A	600	HIS	-	expression tag	UNP Q9Y5Y6
A	601	GLY	-	expression tag	UNP Q9Y5Y6
A	602	THR	-	expression tag	UNP Q9Y5Y6
A	603	ALA	-	expression tag	UNP Q9Y5Y6
A	614	ALA	ARG	engineered mutation	UNP Q9Y5Y6
A	772	GLN	ASN	engineered mutation	UNP Q9Y5Y6
A	805	ALA	SER	engineered mutation	UNP Q9Y5Y6
B	591	SER	-	expression tag	UNP Q9Y5Y6
B	592	MET	-	expression tag	UNP Q9Y5Y6
B	593	ASN	-	expression tag	UNP Q9Y5Y6
B	594	SER	-	expression tag	UNP Q9Y5Y6
B	595	HIS	-	expression tag	UNP Q9Y5Y6
B	596	HIS	-	expression tag	UNP Q9Y5Y6
B	597	HIS	-	expression tag	UNP Q9Y5Y6

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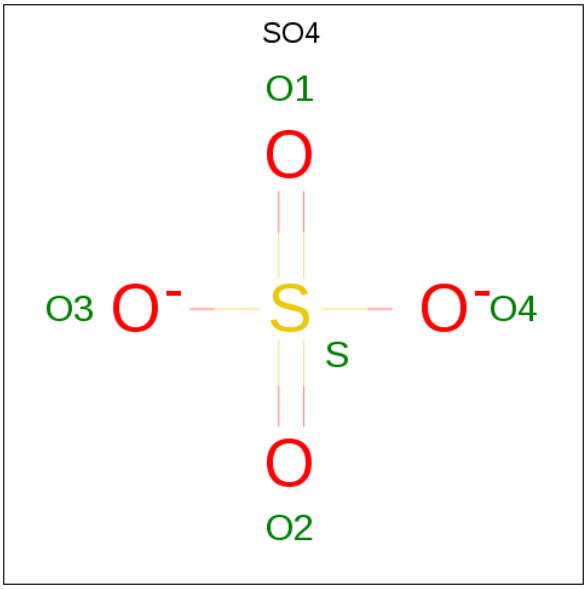
Chain	Residue	Modelled	Actual	Comment	Reference
B	598	HIS	-	expression tag	UNP Q9Y5Y6
B	599	HIS	-	expression tag	UNP Q9Y5Y6
B	600	HIS	-	expression tag	UNP Q9Y5Y6
B	601	GLY	-	expression tag	UNP Q9Y5Y6
B	602	THR	-	expression tag	UNP Q9Y5Y6
B	603	ALA	-	expression tag	UNP Q9Y5Y6
B	614	ALA	ARG	engineered mutation	UNP Q9Y5Y6
B	772	GLN	ASN	engineered mutation	UNP Q9Y5Y6
B	805	ALA	SER	engineered mutation	UNP Q9Y5Y6
C	591	SER	-	expression tag	UNP Q9Y5Y6
C	592	MET	-	expression tag	UNP Q9Y5Y6
C	593	ASN	-	expression tag	UNP Q9Y5Y6
C	594	SER	-	expression tag	UNP Q9Y5Y6
C	595	HIS	-	expression tag	UNP Q9Y5Y6
C	596	HIS	-	expression tag	UNP Q9Y5Y6
C	597	HIS	-	expression tag	UNP Q9Y5Y6
C	598	HIS	-	expression tag	UNP Q9Y5Y6
C	599	HIS	-	expression tag	UNP Q9Y5Y6
C	600	HIS	-	expression tag	UNP Q9Y5Y6
C	601	GLY	-	expression tag	UNP Q9Y5Y6
C	602	THR	-	expression tag	UNP Q9Y5Y6
C	603	ALA	-	expression tag	UNP Q9Y5Y6
C	614	ALA	ARG	engineered mutation	UNP Q9Y5Y6
C	772	GLN	ASN	engineered mutation	UNP Q9Y5Y6
C	805	ALA	SER	engineered mutation	UNP Q9Y5Y6

- Molecule 2 is SULFATE ION (three-letter code: SO4) (formula: O_4S).



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

- Molecule 3 is water.

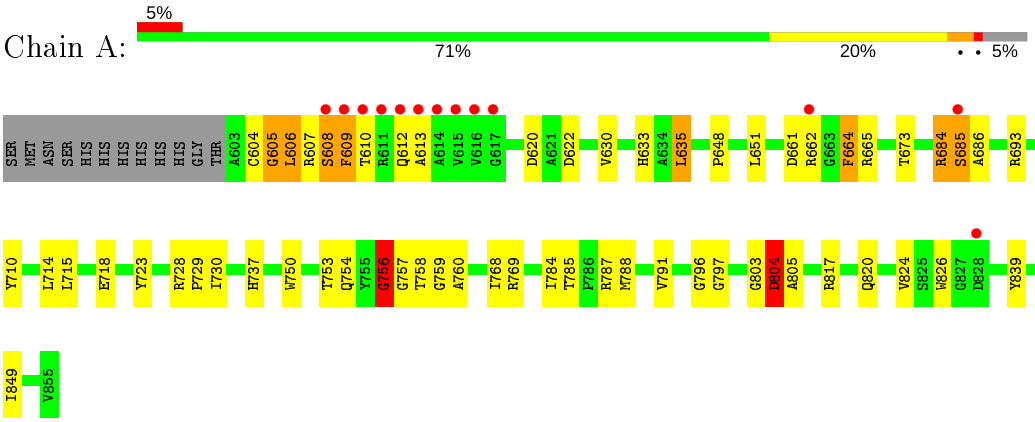
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	55	Total O 55 55	0	0
3	B	60	Total O 60 60	0	0
3	C	52	Total O 52 52	0	0

3 Residue-property plots (i)

These plots are drawn for all protein, RNA and DNA 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.

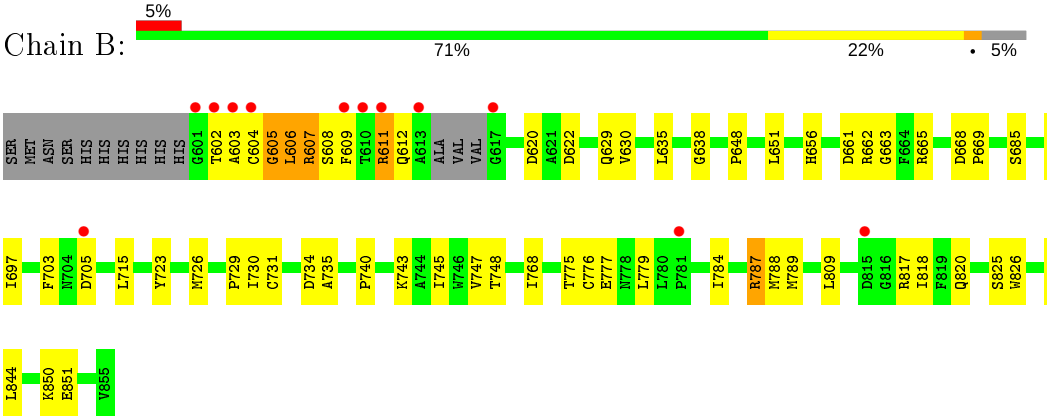
- Molecule 1: Suppressor of tumorigenicity 14 protein

Chain A:



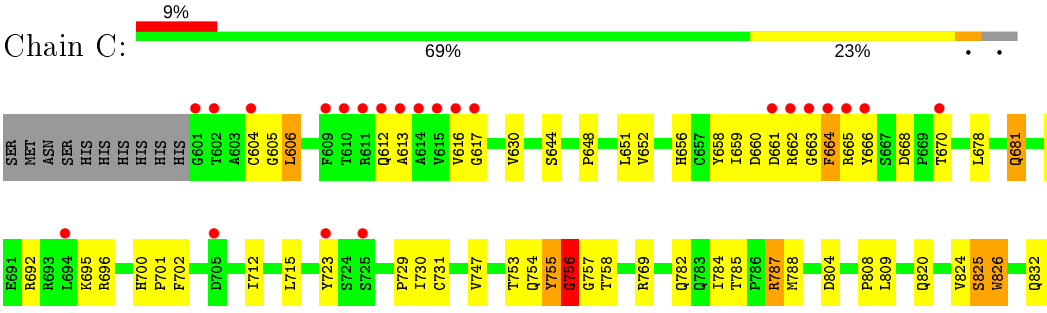
- Molecule 1: Suppressor of tumorigenicity 14 protein

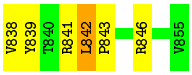
Chain B:



- Molecule 1: Suppressor of tumorigenicity 14 protein

Chain C:




V838
V839
T840
R841
L842
P843
R846
V855

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, α, β, γ	109.17Å 109.17Å 124.47Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	47.27 – 2.50 47.27 – 2.50	Depositor EDS
% Data completeness (in resolution range)	97.6 (47.27-2.50) 98.8 (47.27-2.50)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.61 (at 2.51Å)	Xtriage
Refinement program	PHENIX (1.10.1_2155: ???)	Depositor
R, R_{free}	0.214 , 0.263 0.215 , 0.261	Depositor DCC
R_{free} test set	1494 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å^2)	40.3	Xtriage
Anisotropy	0.093	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 46.1	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	0.000 for -h,-k,l	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	6136	wwPDB-VP
Average B, all atoms (Å^2)	50.0	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 33.90 % 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 7.4349e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

[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	0.55	1/2004 (0.0%)	1.02	13/2725 (0.5%)
1	B	0.50	0/1995	0.71	4/2710 (0.1%)
1	C	0.57	0/2023	0.91	12/2751 (0.4%)
All	All	0.54	1/6022 (0.0%)	0.89	29/8186 (0.4%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	3
1	B	0	1
All	All	0	4

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	685	SER	C-N	-5.07	1.22	1.34

All (29) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	685	SER	C-N-CA	20.88	173.91	121.70
1	A	685	SER	CB-CA-C	-14.96	81.68	110.10
1	C	612	GLN	CB-CA-C	-13.26	83.88	110.40
1	C	613	ALA	N-CA-CB	-13.02	91.87	110.10
1	A	804	ASP	CB-CA-C	12.87	136.13	110.40
1	C	612	GLN	N-CA-C	12.83	145.65	111.00
1	A	685	SER	N-CA-C	11.45	141.92	111.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	613	ALA	N-CA-C	9.98	137.94	111.00
1	A	804	ASP	N-CA-C	-9.22	86.09	111.00
1	C	826	TRP	N-CA-C	-8.88	87.02	111.00
1	B	776	CYS	CA-CB-SG	-8.25	99.15	114.00
1	C	825	SER	N-CA-C	8.10	132.87	111.00
1	C	825	SER	CB-CA-C	-7.41	96.02	110.10
1	A	817	ARG	CG-CD-NE	7.27	127.07	111.80
1	A	756	GLY	N-CA-C	7.04	130.70	113.10
1	C	756	GLY	N-CA-C	7.00	130.61	113.10
1	C	606	LEU	CA-CB-CG	6.96	131.31	115.30
1	A	605	GLY	N-CA-C	6.95	130.47	113.10
1	A	606	LEU	N-CA-CB	-6.92	96.55	110.40
1	A	685	SER	O-C-N	-6.88	111.70	122.70
1	B	825	SER	CB-CA-C	-6.52	97.71	110.10
1	A	686	ALA	N-CA-CB	6.36	119.00	110.10
1	C	616	VAL	CB-CA-C	-6.15	99.72	111.40
1	B	826	TRP	N-CA-C	-6.14	94.43	111.00
1	C	617	GLY	N-CA-C	6.13	128.43	113.10
1	A	805	ALA	N-CA-C	-6.03	94.71	111.00
1	B	825	SER	N-CA-C	5.73	126.48	111.00
1	C	826	TRP	N-CA-CB	5.67	120.80	110.60
1	A	635	LEU	CA-CB-CG	-5.06	103.65	115.30

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	604	CYS	Mainchain
1	A	685	SER	Mainchain
1	A	756	GLY	Peptide
1	B	605	GLY	Peptide

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	1951	0	1869	46	2

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	1943	0	1858	60	0
1	C	1970	0	1883	62	2
2	A	35	0	0	2	0
2	B	25	0	0	4	0
2	C	45	0	0	1	0
3	A	55	0	0	0	0
3	B	60	0	0	6	0
3	C	52	0	0	1	0
All	All	6136	0	5610	165	2

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 14.

All (165) 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:B:604:CYS:SG	1:B:731:CYS:SG	1.48	1.46
1:B:606:LEU:O	3:B:1001:HOH:O	1.67	1.08
1:B:606:LEU:O	1:B:607:ARG:HG3	1.59	1.03
1:B:851:GLU:OE2	3:B:1002:HOH:O	1.79	0.99
1:B:602:THR:HG21	3:B:1050:HOH:O	1.63	0.98
1:A:787:ARG:HG2	1:A:844:LEU:HD11	1.44	0.97
1:C:784:ILE:HA	1:C:788:MET:CE	1.95	0.96
1:C:784:ILE:HA	1:C:788:MET:HE1	1.54	0.89
1:B:611:ARG:NH1	3:B:1003:HOH:O	1.89	0.89
1:C:785:THR:H	1:C:788:MET:CE	1.86	0.88
1:A:803:GLY:HA2	1:A:804:ASP:HB2	1.57	0.85
1:C:785:THR:H	1:C:788:MET:HE2	1.42	0.85
1:C:604:CYS:O	1:C:731:CYS:SG	2.35	0.84
1:B:605:GLY:HA3	1:B:606:LEU:HD13	1.64	0.79
1:A:784:ILE:HA	1:A:788:MET:CE	2.13	0.78
1:B:606:LEU:O	1:B:607:ARG:CG	2.32	0.77
1:A:804:ASP:O	1:A:824:VAL:HG11	1.86	0.75
1:C:656:HIS:CE1	1:C:825:SER:O	2.41	0.73
1:C:782:GLN:NE2	3:C:1001:HOH:O	2.21	0.72
1:B:603:ALA:CB	1:B:723:TYR:CE2	2.73	0.72
1:A:784:ILE:HA	1:A:788:MET:HE3	1.72	0.71
1:B:784:ILE:HA	1:B:788:MET:HE2	1.72	0.71
1:B:603:ALA:C	1:B:729:PRO:HG2	2.11	0.70
1:C:662:ARG:HD2	1:C:663:GLY:H	1.59	0.68
1:B:604:CYS:SG	1:B:605:GLY:N	2.62	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:685:SER:OG	3:B:1005:HOH:O	2.11	0.67
2:B:904:SO4:O2	3:B:1004:HOH:O	2.11	0.67
1:C:754:GLN:C	1:C:756:GLY:H	1.98	0.67
1:B:611:ARG:O	1:B:612:GLN:HG2	1.96	0.66
1:B:669:PRO:HB3	1:B:697:ILE:HG13	1.78	0.66
1:B:694:LEU:HD21	1:B:715:LEU:HD13	1.76	0.66
1:B:604:CYS:O	1:B:606:LEU:HB2	1.97	0.65
1:C:605:GLY:N	1:C:729:PRO:O	2.25	0.65
1:A:693:ARG:NH2	1:B:668:ASP:OD2	2.30	0.64
1:C:700:HIS:HE1	1:C:702:PHE:HD2	1.46	0.64
1:B:662:ARG:HG3	1:B:663:GLY:H	1.63	0.62
1:A:635:LEU:HB3	1:B:635:LEU:HB3	1.82	0.62
1:C:804[B]:ASP:N	1:C:804[B]:ASP:OD1	2.21	0.62
1:B:603:ALA:O	1:B:729:PRO:HG2	2.00	0.61
1:C:785:THR:H	1:C:788:MET:HE1	1.65	0.61
1:C:754:GLN:O	1:C:756:GLY:N	2.33	0.61
1:C:820:GLN:HG2	1:C:842:LEU:HD22	1.85	0.59
1:C:754:GLN:C	1:C:756:GLY:N	2.54	0.58
1:B:605:GLY:O	1:B:818:ILE:N	2.24	0.58
1:A:737:HIS:ND1	2:A:903:SO4:O3	2.32	0.58
1:B:611:ARG:C	1:B:612:GLN:HG2	2.23	0.58
1:C:700:HIS:CE1	1:C:702:PHE:HD2	2.21	0.57
1:B:606:LEU:O	1:B:607:ARG:CB	2.52	0.57
1:C:661:ASP:O	1:C:662:ARG:HG3	2.05	0.57
1:C:747:VAL:HG22	1:C:809:LEU:HD22	1.87	0.57
1:C:730:ILE:HD13	1:C:820:GLN:HB2	1.88	0.56
1:B:661:ASP:O	1:B:662:ARG:HG2	2.05	0.56
1:B:603:ALA:CB	1:B:723:TYR:HE2	2.17	0.56
1:A:718:GLU:OE1	1:B:665:ARG:NH2	2.39	0.56
1:B:656:HIS:HE1	2:B:901:SO4:O3	1.88	0.56
1:C:785:THR:N	1:C:788:MET:CE	2.64	0.55
1:B:608:SER:OG	1:B:609:PHE:N	2.38	0.55
1:C:695:LYS:HG2	1:C:696:ARG:HG3	1.87	0.55
1:A:820:GLN:HG2	1:A:842:LEU:HD22	1.88	0.55
1:A:608:SER:OG	1:A:728:ARG:NH1	2.40	0.55
1:B:777:GLU:HA	1:B:784:ILE:HG21	1.89	0.55
1:B:648:PRO:HD3	1:B:723:TYR:OH	2.07	0.54
1:C:754:GLN:O	1:C:755:TYR:CG	2.60	0.54
1:A:609:PHE:HE2	1:A:612:GLN:OE1	1.89	0.54
1:A:697:ILE:HD13	1:A:715:LEU:HG	1.89	0.54
1:C:785:THR:N	1:C:788:MET:HE2	2.16	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:730:ILE:HD13	1:A:820:GLN:HB2	1.91	0.54
1:B:662:ARG:HG3	1:B:663:GLY:N	2.22	0.53
1:B:638:GLY:N	2:B:902:SO4:O1	2.39	0.53
1:B:629:GLN:OE1	1:B:748:THR:HG23	2.09	0.53
1:C:832:GLN:HE21	1:C:834:ASN:HB2	1.72	0.53
1:B:612:GLN:OE1	1:B:622:ASP:HB2	2.09	0.52
1:C:665:ARG:O	1:C:665:ARG:HG3	2.10	0.52
1:B:820:GLN:HG2	1:B:842:LEU:HD22	1.92	0.52
1:C:700:HIS:HB2	1:C:712:ILE:HG23	1.89	0.52
1:A:710:TYR:CZ	1:A:787:ARG:CD	2.93	0.52
1:A:633:HIS:CE1	1:A:684:ARG:HH12	2.28	0.52
1:C:668:ASP:OD2	1:C:670:THR:OG1	2.27	0.52
1:A:708:PHE:HD2	1:A:826:TRP:CD1	2.28	0.51
1:B:606:LEU:C	1:B:607:ARG:CG	2.78	0.51
1:A:633:HIS:CE1	1:A:684:ARG:NH1	2.78	0.51
1:C:784:ILE:HA	1:C:788:MET:HE3	1.90	0.51
1:B:603:ALA:HB3	1:B:723:TYR:CE2	2.46	0.51
1:A:648:PRO:HD3	1:A:723:TYR:OH	2.10	0.51
1:A:605:GLY:N	1:A:729:PRO:O	2.42	0.51
1:C:630:VAL:HG21	1:C:651:LEU:HD22	1.93	0.51
1:B:606:LEU:C	1:B:607:ARG:HG3	2.29	0.51
1:B:747:VAL:HG22	1:B:809:LEU:HD22	1.93	0.50
1:A:758:THR:HG22	1:A:759:GLY:O	2.13	0.49
1:C:769:ARG:O	1:C:769:ARG:HG3	2.13	0.48
1:B:603:ALA:HB3	1:B:723:TYR:HE2	1.78	0.48
1:B:661:ASP:OD1	1:B:662:ARG:N	2.47	0.48
1:B:605:GLY:HA2	1:B:817:ARG:HB3	1.96	0.48
1:C:755:TYR:C	1:C:755:TYR:CD1	2.86	0.48
1:A:609:PHE:CG	1:A:609:PHE:O	2.66	0.48
1:A:661:ASP:OD1	1:A:662:ARG:N	2.46	0.48
1:C:692:ARG:NH1	2:C:908:SO4:O4	2.47	0.48
1:C:659:ILE:HG13	1:C:659:ILE:O	2.14	0.47
1:B:688:GLY:HA3	1:B:726:MET:SD	2.55	0.47
1:A:750:TRP:HD1	1:A:760:ALA:O	1.97	0.47
1:A:842:LEU:H	1:A:843:PRO:CD	2.28	0.47
1:B:703:PHE:CE2	1:B:705:ASP:HB2	2.49	0.47
1:C:644:SER:HB3	1:C:808:PRO:HB3	1.95	0.47
1:C:648:PRO:HD3	1:C:723:TYR:OH	2.15	0.46
1:C:846:ARG:O	1:C:846:ARG:HD2	2.15	0.46
1:B:734:ASP:OD1	1:B:735:ALA:N	2.49	0.46
1:C:824:VAL:HA	1:C:839:TYR:HD2	1.81	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:784:ILE:HD12	1:C:838:VAL:HG11	1.96	0.46
1:C:785:THR:N	1:C:788:MET:HE1	2.29	0.46
1:A:609:PHE:CE2	1:A:612:GLN:OE1	2.69	0.45
1:A:710:TYR:CE2	1:A:787:ARG:NE	2.85	0.45
1:A:630:VAL:HG21	1:A:651:LEU:HD22	1.98	0.45
1:C:723:TYR:OH	1:C:729:PRO:HG3	2.17	0.45
1:A:804:ASP:O	1:A:824:VAL:CG1	2.62	0.45
1:A:803:GLY:CA	1:A:804:ASP:HB2	2.38	0.45
1:C:784:ILE:CA	1:C:788:MET:CE	2.83	0.45
1:C:658:TYR:OH	1:C:715:LEU:HD11	2.17	0.45
1:C:678:LEU:HD21	1:C:681:GLN:NE2	2.32	0.45
1:A:718:GLU:CD	1:B:665:ARG:HH22	2.19	0.44
1:C:784:ILE:CA	1:C:788:MET:HE1	2.36	0.44
1:A:753:THR:OG1	1:A:757:GLY:HA3	2.17	0.44
1:A:824:VAL:HA	1:A:839:TYR:HD2	1.82	0.44
1:C:753:THR:OG1	1:C:757:GLY:HA3	2.17	0.44
1:A:635:LEU:HA	2:A:902:SO4:O4	2.17	0.44
1:C:755:TYR:CD1	1:C:755:TYR:O	2.70	0.44
1:A:664:PHE:HD1	1:A:665:ARG:N	2.16	0.44
1:B:740:PRO:HD2	1:B:743:LYS:HB2	2.00	0.44
1:C:700:HIS:CE1	1:C:702:PHE:CD2	3.04	0.44
1:B:730:ILE:HG12	1:B:731:CYS:N	2.33	0.44
1:C:755:TYR:HD1	1:C:755:TYR:O	2.01	0.44
1:C:656:HIS:HE1	1:C:825:SER:O	1.96	0.44
1:B:833:ARG:NH1	2:B:904:SO4:O4	2.48	0.44
1:C:842:LEU:H	1:C:843:PRO:CD	2.31	0.43
1:C:686:ALA:HB3	1:C:689:VAL:HG23	2.00	0.43
1:A:609:PHE:CD1	1:A:609:PHE:O	2.70	0.43
1:A:785:THR:H	1:A:788:MET:CE	2.31	0.43
1:B:775:THR:O	1:B:779:LEU:HD13	2.18	0.43
1:C:787:ARG:O	1:C:841:ARG:HG3	2.18	0.43
1:A:785:THR:H	1:A:788:MET:HE3	1.83	0.43
1:B:784:ILE:HD12	1:B:788:MET:HE3	2.01	0.43
1:B:787:ARG:HG3	1:B:844:LEU:HD11	1.99	0.43
1:A:769:ARG:HG3	1:A:769:ARG:O	2.16	0.43
1:C:753:THR:OG1	1:C:754:GLN:O	2.30	0.43
1:A:796:GLY:HA3	1:A:797:GLY:HA3	1.73	0.42
1:B:606:LEU:HA	1:B:606:LEU:HD12	1.87	0.42
1:C:701:PRO:HG2	1:C:702:PHE:CE2	2.54	0.42
1:C:652:VAL:HG13	1:C:712:ILE:HD11	2.01	0.42
1:A:768:ILE:HD13	1:A:791:VAL:HB	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:664:PHE:HD1	1:C:665:ARG:N	2.18	0.42
1:A:633:HIS:HE1	1:A:684:ARG:NH1	2.16	0.42
1:C:835:LYS:HE3	1:C:835:LYS:HB2	1.86	0.42
1:A:714:LEU:HD21	1:A:849:ILE:HG12	2.01	0.41
1:B:789:MET:HE1	1:B:809:LEU:HD12	2.02	0.41
1:B:630:VAL:HG21	1:B:651:LEU:HD22	2.03	0.41
1:A:785:THR:HG23	1:A:788:MET:HE2	2.03	0.41
1:B:611:ARG:HA	1:B:611:ARG:HD3	1.73	0.41
1:C:756:GLY:HA2	1:C:757:GLY:HA3	1.58	0.41
1:B:620:ASP:N	1:B:620:ASP:OD1	2.54	0.41
1:B:745:ILE:HB	1:B:768:ILE:HD11	2.03	0.41
1:B:730:ILE:HD13	1:B:820:GLN:HB2	2.04	0.40
1:A:613:ALA:HB3	1:A:622:ASP:OD2	2.20	0.40
1:A:635:LEU:HD11	1:A:673:THR:OG1	2.22	0.40
1:C:660:ASP:OD1	1:C:666:TYR:N	2.54	0.40
1:C:690:GLN:OE1	1:C:692:ARG:NH2	2.54	0.40
1:C:662:ARG:CD	1:C:663:GLY:H	2.32	0.40

All (2) 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:754:GLN:OE1	1:C:833:ARG:NH1[3_544]	2.18	0.02
1:A:758:THR:O	1:C:769:ARG:NH1[3_544]	2.19	0.01

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	251/265 (95%)	238 (95%)	10 (4%)	3 (1%)	13	24
1	B	248/265 (94%)	235 (95%)	11 (4%)	2 (1%)	19	35

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	C	254/265 (96%)	238 (94%)	13 (5%)	3 (1%)	13 24
All	All	753/795 (95%)	711 (94%)	34 (4%)	8 (1%)	14 26

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	755	TYR
1	B	607	ARG
1	C	756	GLY
1	A	804	ASP
1	A	756	GLY
1	A	842	LEU
1	B	842	LEU
1	C	842	LEU

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	204/215 (95%)	196 (96%)	8 (4%)	32 57
1	B	203/215 (94%)	199 (98%)	4 (2%)	55 79
1	C	206/215 (96%)	200 (97%)	6 (3%)	42 69
All	All	613/645 (95%)	595 (97%)	18 (3%)	42 69

All (18) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	606	LEU
1	A	607	ARG
1	A	608	SER
1	A	609	PHE
1	A	610	THR
1	A	620	ASP
1	A	664	PHE

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Mol	Chain	Res	Type
1	A	684	ARG
1	B	606	LEU
1	B	611	ARG
1	B	787	ARG
1	B	850	LYS
1	C	606	LEU
1	C	664	PHE
1	C	681	GLN
1	C	758	THR
1	C	787	ARG
1	C	826	TRP

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	656	HIS
1	B	752	HIS
1	C	754	GLN
1	C	832	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 carbohydrates in this entry.

5.6 Ligand geometry

21 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	$\#\|Z\| > 2$
2	SO4	A	902	-	4,4,4	0.15	0	6,6,6	0.06	0
2	SO4	B	902	-	4,4,4	0.13	0	6,6,6	0.11	0
2	SO4	C	906	-	4,4,4	0.14	0	6,6,6	0.05	0
2	SO4	C	901	-	4,4,4	0.13	0	6,6,6	0.05	0
2	SO4	A	906	-	4,4,4	0.14	0	6,6,6	0.05	0
2	SO4	A	907	-	4,4,4	0.15	0	6,6,6	0.04	0
2	SO4	B	901	-	4,4,4	0.15	0	6,6,6	0.11	0
2	SO4	C	903	-	4,4,4	0.14	0	6,6,6	0.05	0
2	SO4	C	909	-	4,4,4	0.14	0	6,6,6	0.05	0
2	SO4	B	905	-	4,4,4	0.13	0	6,6,6	0.05	0
2	SO4	C	907	-	4,4,4	0.14	0	6,6,6	0.05	0
2	SO4	B	904	-	4,4,4	0.14	0	6,6,6	0.06	0
2	SO4	A	904	-	4,4,4	0.16	0	6,6,6	0.09	0
2	SO4	A	903	-	4,4,4	0.14	0	6,6,6	0.05	0
2	SO4	C	904	-	4,4,4	0.13	0	6,6,6	0.06	0
2	SO4	B	903	-	4,4,4	0.14	0	6,6,6	0.05	0
2	SO4	C	905	-	4,4,4	0.16	0	6,6,6	0.05	0
2	SO4	C	908	-	4,4,4	0.14	0	6,6,6	0.05	0
2	SO4	A	901	-	4,4,4	0.14	0	6,6,6	0.06	0
2	SO4	A	905	-	4,4,4	0.14	0	6,6,6	0.08	0
2	SO4	C	902	-	4,4,4	0.14	0	6,6,6	0.05	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.

6 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	902	SO4	1	0
2	B	902	SO4	1	0
2	B	901	SO4	1	0
2	B	904	SO4	2	0
2	A	903	SO4	1	0
2	C	908	SO4	1	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, 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	253/265 (95%)	0.35	13 (5%)	28	29	24, 41, 89, 163	0
1	B	252/265 (95%)	0.31	12 (4%)	30	32	26, 42, 85, 124	0
1	C	255/265 (96%)	0.50	23 (9%)	9	9	27, 47, 93, 189	0
All	All	760/795 (95%)	0.39	48 (6%)	20	21	24, 43, 89, 189	0

All (48) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	614	ALA	19.7
1	B	603	ALA	18.3
1	A	615	VAL	12.4
1	A	610	THR	10.3
1	C	613	ALA	9.7
1	A	614	ALA	7.2
1	A	612	GLN	6.9
1	C	616	VAL	6.5
1	C	615	VAL	6.3
1	A	609	PHE	6.2
1	A	616	VAL	5.8
1	B	613	ALA	5.3
1	B	602	THR	5.2
1	C	611	ARG	5.1
1	B	609	PHE	5.0
1	A	611	ARG	5.0
1	C	663	GLY	4.7
1	C	662	ARG	4.4
1	A	617	GLY	4.2
1	B	705	ASP	3.9
1	A	613	ALA	3.9
1	B	610	THR	3.8
1	C	612	GLN	3.7

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Mol	Chain	Res	Type	RSRZ
1	C	610	THR	3.7
1	B	617	GLY	3.7
1	B	604	CYS	3.5
1	C	661	ASP	3.4
1	C	602	THR	3.2
1	A	608	SER	3.2
1	C	670	THR	3.1
1	B	601	GLY	2.9
1	C	617	GLY	2.8
1	C	666	TYR	2.7
1	A	828	ASP	2.7
1	B	611	ARG	2.6
1	B	781	PRO	2.6
1	C	665	ARG	2.5
1	C	725	SER	2.5
1	C	705	ASP	2.4
1	C	609	PHE	2.4
1	B	815	ASP	2.1
1	A	662	ARG	2.1
1	C	664	PHE	2.1
1	C	723	TYR	2.1
1	C	601	GLY	2.0
1	A	685	SER	2.0
1	C	604	CYS	2.0
1	C	694	LEU	2.0

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

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

6.3 Carbohydrates (i)

There are no carbohydrates 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, 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
2	SO4	C	908	5/5	0.75	0.21	119,119,120,120	0
2	SO4	A	904	5/5	0.76	0.36	134,135,136,137	0
2	SO4	A	906	5/5	0.77	0.19	100,103,107,109	0
2	SO4	C	903	5/5	0.79	0.20	112,115,116,116	0
2	SO4	C	906	5/5	0.81	0.26	106,108,110,114	0
2	SO4	C	907	5/5	0.83	0.24	125,127,129,130	0
2	SO4	C	909	5/5	0.84	0.27	145,146,146,148	0
2	SO4	A	903	5/5	0.85	0.19	104,108,109,113	0
2	SO4	B	903	5/5	0.86	0.18	93,99,101,105	0
2	SO4	A	907	5/5	0.88	0.35	119,120,123,124	0
2	SO4	B	904	5/5	0.88	0.20	88,90,93,100	0
2	SO4	A	901	5/5	0.89	0.15	92,95,99,99	0
2	SO4	C	902	5/5	0.89	0.41	126,127,128,128	0
2	SO4	C	904	5/5	0.90	0.16	106,109,110,112	0
2	SO4	C	901	5/5	0.93	0.21	101,104,108,109	0
2	SO4	B	901	5/5	0.94	0.17	88,93,95,99	0
2	SO4	B	902	5/5	0.94	0.15	80,87,89,93	0
2	SO4	B	905	5/5	0.95	0.16	86,93,97,97	0
2	SO4	A	902	5/5	0.95	0.19	91,99,101,102	0
2	SO4	A	905	5/5	0.96	0.10	82,86,87,91	0
2	SO4	C	905	5/5	0.99	0.14	26,28,36,48	0

6.5 Other polymers (i)

There are no such residues in this entry.