



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2026 – 08:11 AM UTC

PDB ID : 4YU5 / pdb_00004yu5
Title : Crystal structure of selenomethionine variant of Bacillus anthracis immune inhibitor A2 peptidase zymogen
Authors : Arolas, J.L.; Goulas, T.; Gomis-Ruth, F.X.
Deposited on : 2015-03-18
Resolution : 2.90 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

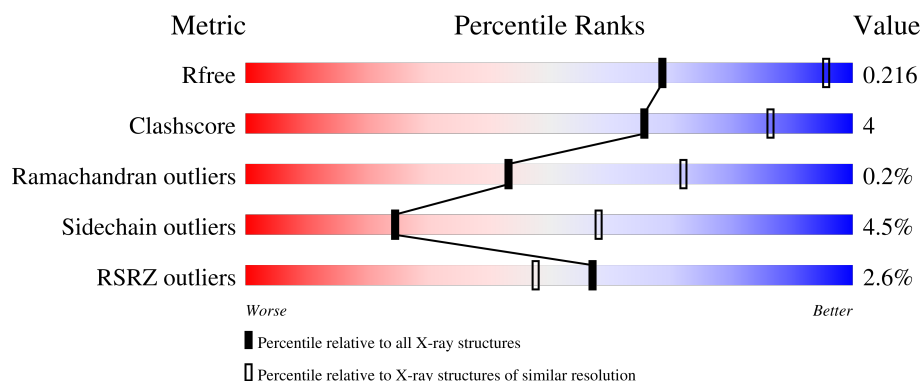
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

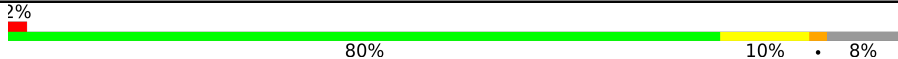
The reported resolution of this entry is 2.90 Å.

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	2481 (2.90-2.90)
Clashscore	190562	2690 (2.90-2.90)
Ramachandran outliers	187476	2623 (2.90-2.90)
Sidechain outliers	187428	2625 (2.90-2.90)
RSRZ outliers	180081	2481 (2.90-2.90)

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	756	
1	B	756	

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
4	KH2	A	1006	-	-	X	-
4	KH2	A	1007	-	-	X	-

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 10942 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 Immune inhibitor A, metalloprotease.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	695	Total	C	N	O	S	Se	0	0	0
			5406	3409	916	1071	1	9			
1	B	689	Total	C	N	O	S	Se	0	0	0
			5357	3381	905	1061	1	9			

There are 22 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	275	HIS	TYR	conflict	UNP D8H130
A	380	ALA	GLU	engineered mutation	UNP D8H130
A	630	LEU	VAL	conflict	UNP D8H130
A	746	ASN	LYS	conflict	UNP D8H130
A	776	LYS	ASN	conflict	UNP D8H130
A	901	HIS	-	expression tag	UNP D8H130
A	902	HIS	-	expression tag	UNP D8H130
A	903	HIS	-	expression tag	UNP D8H130
A	904	HIS	-	expression tag	UNP D8H130
A	905	HIS	-	expression tag	UNP D8H130
A	906	HIS	-	expression tag	UNP D8H130
B	275	HIS	TYR	conflict	UNP D8H130
B	380	ALA	GLU	engineered mutation	UNP D8H130
B	630	LEU	VAL	conflict	UNP D8H130
B	746	ASN	LYS	conflict	UNP D8H130
B	776	LYS	ASN	conflict	UNP D8H130
B	901	HIS	-	expression tag	UNP D8H130
B	902	HIS	-	expression tag	UNP D8H130
B	903	HIS	-	expression tag	UNP D8H130
B	904	HIS	-	expression tag	UNP D8H130
B	905	HIS	-	expression tag	UNP D8H130
B	906	HIS	-	expression tag	UNP D8H130

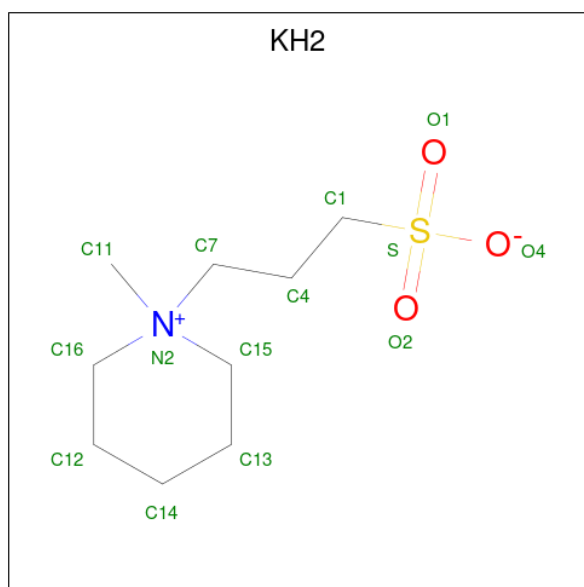
- Molecule 2 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Zn	0	0
			1	1		
2	B	1	Total	Zn	0	0
			1	1		

- Molecule 3 is CALCIUM ION (CCD ID: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	4	Total	Ca	0	0
			4	4		
3	B	4	Total	Ca	0	0
			4	4		

- Molecule 4 is 3-(1-methylpiperidinium-1-yl)propane-1-sulfonate (CCD ID: KH2) (formula: C₉H₁₉NO₃S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	N	O	S	0	0
			14	9	1	3	1		
4	A	1	Total	C	N	O	S	0	0
			14	9	1	3	1		

- Molecule 5 is GLYCEROL (CCD ID: GOL) (formula: C₃H₈O₃).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C O 6 3 3	0	0
5	A	1	Total C O 6 3 3	0	0
5	A	1	Total C O 6 3 3	0	0
5	A	1	Total C O 6 3 3	0	0
5	A	1	Total C O 6 3 3	0	0
5	A	1	Total C O 6 3 3	0	0

- Molecule 6 is POTASSIUM ION (CCD ID: K) (formula: K).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	B	1	Total K 1 1	0	0

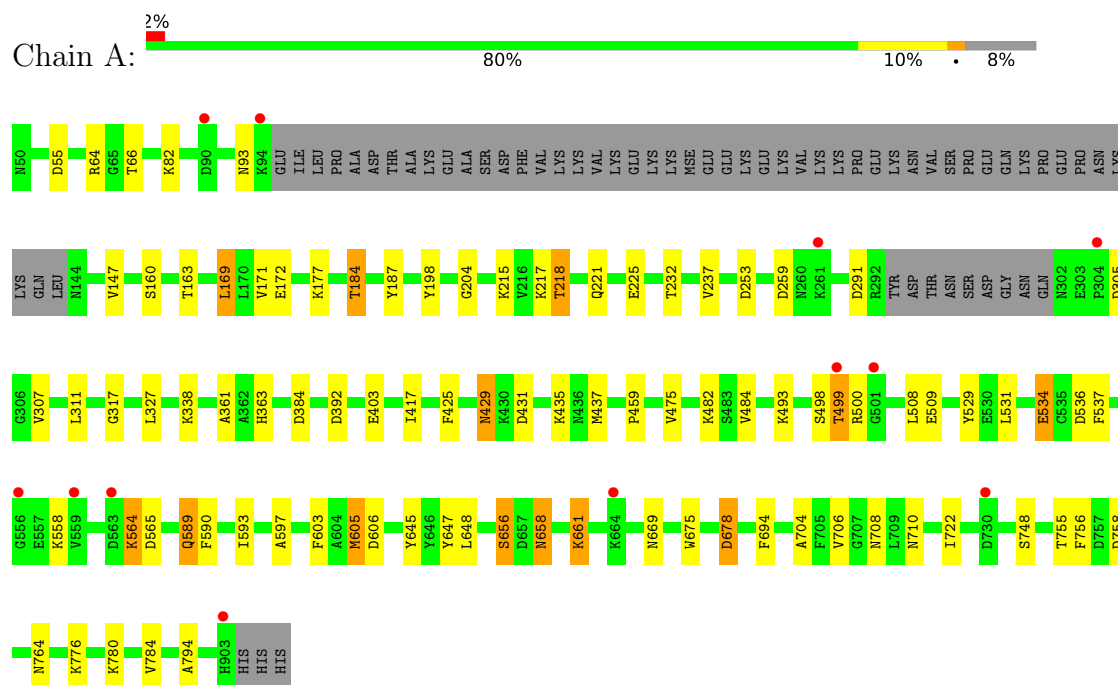
- Molecule 7 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	72	Total O 72 72	0	0
7	B	32	Total O 32 32	0	0

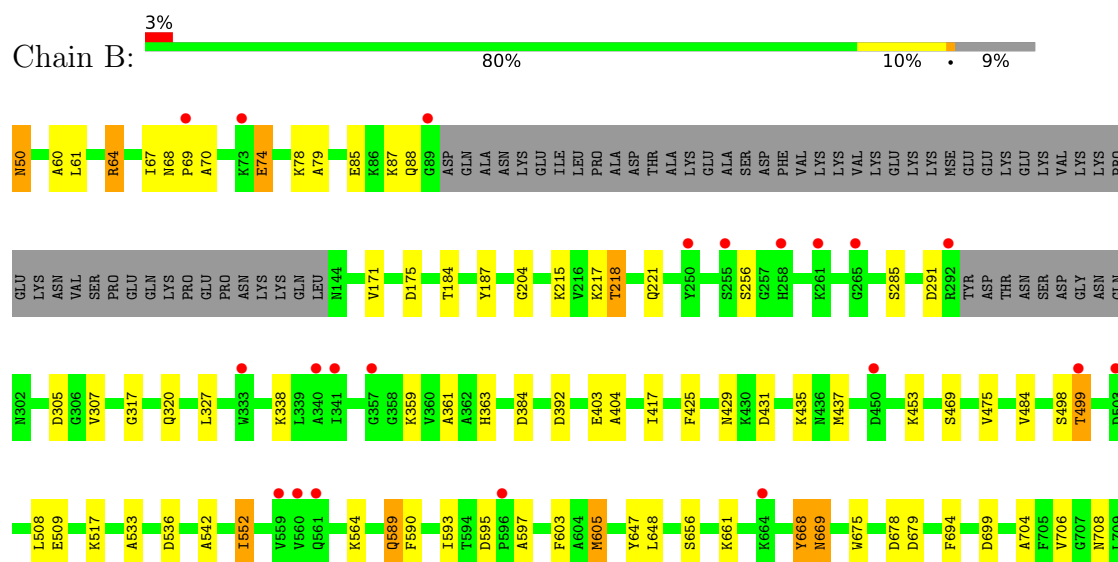
3 Residue-property plots [i](#)

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: Immune inhibitor A, metalloprotease



- Molecule 1: Immune inhibitor A, metalloprotease





4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	97.61Å 102.41Å 242.88Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	42.46 – 2.90 42.46 – 2.90	Depositor EDS
% Data completeness (in resolution range)	99.9 (42.46-2.90) 99.8 (42.46-2.90)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.63 (at 2.91Å)	Xtriage
Refinement program	BUSTER 2.11.5	Depositor
R, R_{free}	0.182 , 0.207 0.188 , 0.216	Depositor DCC
R_{free} test set	706 reflections (1.29%)	wwPDB-VP
Wilson B-factor (Å ²)	60.1	Xtriage
Anisotropy	0.721	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 81.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.011 for k,h,-l	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	10942	wwPDB-VP
Average B, all atoms (Å ²)	71.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.34% of the height of the origin peak. No significant pseudotranslation is detected.*

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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: KH2, ZN, GOL, K, CA

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	0.85	1/5526 (0.0%)	1.24	24/7458 (0.3%)
1	B	0.85	1/5476 (0.0%)	1.25	27/7391 (0.4%)
All	All	0.85	2/11002 (0.0%)	1.25	51/14849 (0.3%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	605	MSE	SE-CE	-6.96	1.74	1.95
1	A	605	MSE	SE-CE	-6.65	1.75	1.95

All (51) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	291	ASP	CA-CB-CG	7.79	120.39	112.60
1	B	392	ASP	CA-CB-CG	7.56	120.16	112.60
1	A	758	ASP	CA-CB-CG	7.41	120.01	112.60
1	B	758	ASP	CA-CB-CG	7.38	119.98	112.60
1	B	678	ASP	CA-CB-CG	7.30	119.90	112.60
1	A	384	ASP	CA-CB-CG	6.98	119.58	112.60
1	A	253	ASP	CA-CB-CG	6.86	119.46	112.60
1	B	669	ASN	N-CA-CB	-6.79	101.05	110.29
1	B	668	TYR	CA-C-N	6.76	132.99	120.95
1	B	668	TYR	C-N-CA	6.76	132.99	120.95
1	A	678	ASP	CA-CB-CG	6.66	119.26	112.60
1	B	291	ASP	CA-CB-CG	6.46	119.06	112.60
1	A	606	ASP	CA-CB-CG	6.06	118.66	112.60
1	B	694	PHE	CA-CB-CG	5.99	119.79	113.80
1	B	499	THR	CA-C-N	5.97	129.24	120.82
1	B	499	THR	C-N-CA	5.97	129.24	120.82
1	B	669	ASN	CA-CB-CG	5.89	118.49	112.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	285	SER	CA-C-N	5.87	128.42	120.38
1	B	285	SER	C-N-CA	5.87	128.42	120.38
1	B	384	ASP	CA-CB-CG	5.80	118.40	112.60
1	A	536	ASP	CA-CB-CG	5.78	118.38	112.60
1	A	259	ASP	CA-CB-CG	5.76	118.36	112.60
1	B	679	ASP	CA-CB-CG	5.73	118.33	112.60
1	A	564	LYS	CA-C-N	5.72	131.23	123.11
1	A	564	LYS	C-N-CA	5.72	131.23	123.11
1	A	317	GLY	CA-C-N	5.56	130.05	121.71
1	A	317	GLY	C-N-CA	5.56	130.05	121.71
1	A	429	ASN	CA-C-N	5.55	127.72	120.28
1	A	429	ASN	C-N-CA	5.55	127.72	120.28
1	A	392	ASP	CA-CB-CG	5.50	118.09	112.60
1	A	658	ASN	N-CA-C	-5.46	105.88	112.54
1	B	85	GLU	CB-CG-CD	5.45	121.86	112.60
1	A	534	GLU	CB-CG-CD	5.44	121.85	112.60
1	B	536	ASP	CA-CB-CG	5.44	118.04	112.60
1	A	755	THR	N-CA-C	5.44	117.76	108.90
1	A	669	ASN	CA-CB-CG	5.34	117.94	112.60
1	A	305	ASP	CA-CB-CG	5.33	117.93	112.60
1	B	317	GLY	CA-C-N	5.30	129.66	121.71
1	B	317	GLY	C-N-CA	5.30	129.66	121.71
1	B	699	ASP	CA-CB-CG	5.29	117.89	112.60
1	A	93	ASN	N-CA-C	5.28	118.18	111.69
1	B	305	ASP	CA-CB-CG	5.25	117.85	112.60
1	B	175	ASP	CA-CB-CG	5.22	117.82	112.60
1	B	533	ALA	CA-C-N	5.11	129.59	122.08
1	B	533	ALA	C-N-CA	5.11	129.59	122.08
1	B	50	ASN	CA-C-N	5.11	127.96	120.71
1	B	50	ASN	C-N-CA	5.11	127.96	120.71
1	B	595	ASP	CA-CB-CG	5.10	117.70	112.60
1	A	529	TYR	CA-C-N	5.04	128.38	121.33
1	A	529	TYR	C-N-CA	5.04	128.38	121.33
1	A	184	THR	CB-CA-C	5.02	116.20	109.42

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	5406	0	5160	42	0
1	B	5357	0	5117	31	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
3	A	4	0	0	0	0
3	B	4	0	0	0	0
4	A	28	0	38	16	0
5	A	36	0	48	1	0
6	B	1	0	0	0	0
7	A	72	0	0	1	0
7	B	32	0	0	1	0
All	All	10942	0	10363	80	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 4.

All (80) 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:218:THR:HG22	1:A:221:GLN:H	1.24	1.02
1:B:218:THR:HG22	1:B:221:GLN:H	1.34	0.90
1:A:431:ASP:OD1	1:A:435:LYS:HE3	1.76	0.85
1:A:204:GLY:O	1:A:218:THR:HG21	1.82	0.79
1:B:204:GLY:O	1:B:218:THR:HG21	1.83	0.78
1:B:61:LEU:HB3	1:B:67:ILE:HG12	1.72	0.70
4:A:1006:KH2:H1	4:A:1007:KH2:O2	1.93	0.69
1:A:147:VAL:HG21	4:A:1006:KH2:H7A	1.74	0.68
4:A:1007:KH2:H15A	4:A:1007:KH2:C1	2.27	0.65
1:B:67:ILE:HD12	1:B:79:ALA:HB1	1.80	0.64
1:A:459:PRO:HB3	4:A:1006:KH2:C11	2.30	0.62
4:A:1006:KH2:O2	4:A:1007:KH2:H4	2.01	0.61
1:A:459:PRO:HA	4:A:1006:KH2:H11	1.83	0.60
1:B:87:LYS:HD2	1:B:320:GLN:HE22	1.67	0.60
1:A:225:GLU:OE2	1:A:656:SER:HB2	2.03	0.59
1:A:459:PRO:CB	4:A:1006:KH2:H11	2.32	0.59
1:A:459:PRO:HB3	4:A:1006:KH2:H11	1.86	0.57
4:A:1006:KH2:C1	4:A:1007:KH2:O2	2.52	0.57
1:B:69:PRO:O	1:B:70:ALA:HB3	2.05	0.56
4:A:1007:KH2:H15A	4:A:1007:KH2:H1A	1.88	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:647:TYR:HB2	1:A:675:TRP:HB2	1.87	0.55
1:B:647:TYR:HB2	1:B:675:TRP:HB2	1.88	0.55
1:A:459:PRO:CA	4:A:1006:KH2:H11	2.36	0.55
1:A:534:GLU:HA	1:A:537:PHE:CZ	2.41	0.54
1:A:498:SER:O	1:A:499:THR:C	2.50	0.53
1:A:603:PHE:HE2	1:A:605:MSE:HE2	1.72	0.53
1:A:184:THR:HG22	1:A:187:TYR:HD2	1.73	0.53
4:A:1006:KH2:O4	4:A:1007:KH2:H4	2.08	0.53
1:B:184:THR:HG22	1:B:187:TYR:HD2	1.74	0.52
1:A:64:ARG:HD2	1:A:66:THR:OG1	2.10	0.52
1:A:403:GLU:HB2	1:A:722:ILE:HD11	1.92	0.51
1:B:542:ALA:HB2	1:B:552:ILE:CD1	2.41	0.51
1:B:603:PHE:HE2	1:B:605:MSE:HE2	1.75	0.51
1:A:784:VAL:HG21	4:A:1006:KH2:C7	2.41	0.50
1:B:403:GLU:HB2	1:B:722:ILE:HD11	1.92	0.50
1:A:558:LYS:O	1:A:565:ASP:HB2	2.12	0.49
1:A:307:VAL:HA	1:A:361:ALA:O	2.13	0.48
1:A:425:PHE:HB3	1:A:429:ASN:HB2	1.95	0.48
1:A:172:GLU:HB2	1:A:177:LYS:HA	1.95	0.48
1:A:218:THR:HG22	1:A:221:GLN:N	2.09	0.48
1:B:60:ALA:O	1:B:64:ARG:HB2	2.14	0.48
1:B:425:PHE:HB3	1:B:429:ASN:HB2	1.95	0.47
1:B:669:ASN:HB2	1:B:724:ASP:HA	1.96	0.47
1:A:508:LEU:HD13	1:A:605:MSE:HE3	1.96	0.47
1:B:307:VAL:HA	1:B:361:ALA:O	2.13	0.47
1:B:469:SER:HB2	7:B:1111:HOH:O	2.14	0.47
1:B:498:SER:O	1:B:499:THR:C	2.58	0.47
1:A:794:ALA:HB1	4:A:1006:KH2:H16	1.97	0.46
1:A:678:ASP:O	1:A:694:PHE:HA	2.15	0.46
1:B:542:ALA:HB2	1:B:552:ILE:HD12	1.97	0.46
1:A:475:VAL:HB	1:A:648:LEU:HB2	1.99	0.45
1:B:74:GLU:O	1:B:78:LYS:HG2	2.16	0.45
1:B:508:LEU:HD13	1:B:605:MSE:HE3	1.97	0.45
4:A:1006:KH2:S	4:A:1007:KH2:H4	2.58	0.44
1:B:61:LEU:CB	1:B:67:ILE:HG12	2.44	0.44
1:A:437:MSE:HE3	1:A:437:MSE:HB2	1.97	0.44
1:A:658:ASN:O	1:A:661:LYS:HG3	2.17	0.44
1:A:55:ASP:HB2	7:A:1130:HOH:O	2.18	0.44
1:B:509:GLU:HB3	1:B:589:GLN:HG3	2.00	0.43
1:A:338:LYS:HD3	1:A:363:HIS:CE1	2.53	0.43
1:A:431:ASP:O	1:A:435:LYS:HG3	2.19	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:590:PHE:CG	1:A:605:MSE:HE1	2.54	0.43
1:A:509:GLU:HB3	1:A:589:GLN:HG3	2.00	0.43
1:A:784:VAL:HG21	4:A:1006:KH2:H7A	2.01	0.43
1:A:163:THR:HG23	1:A:232:THR:HG23	2.02	0.42
1:B:590:PHE:CG	1:B:605:MSE:HE1	2.55	0.42
1:B:475:VAL:HB	1:B:648:LEU:HB2	2.00	0.42
1:A:169:LEU:HD22	1:A:311:LEU:HD11	2.01	0.42
1:A:645:TYR:OH	5:A:1012:GOL:H32	2.20	0.42
1:B:338:LYS:HD3	1:B:363:HIS:CE1	2.55	0.41
1:B:437:MSE:HE3	1:B:437:MSE:HB2	1.96	0.41
1:B:69:PRO:O	1:B:70:ALA:CB	2.66	0.41
1:A:184:THR:HG22	1:A:187:TYR:CD2	2.54	0.41
1:A:704:ALA:HB2	1:A:764:ASN:HD21	1.85	0.41
1:B:404:ALA:HB3	1:B:668:TYR:CZ	2.55	0.41
1:B:431:ASP:O	1:B:435:LYS:HG3	2.20	0.41
1:A:198:TYR:HB2	1:A:237:VAL:HG11	2.03	0.41
1:B:184:THR:HG22	1:B:187:TYR:CD2	2.55	0.40
1:A:756:PHE:O	1:A:780:LYS:HA	2.22	0.40
1:B:704:ALA:HB2	1:B:764:ASN:HD21	1.87	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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	689/756 (91%)	662 (96%)	25 (4%)	2 (0%)	36	65
1	B	683/756 (90%)	652 (96%)	30 (4%)	1 (0%)	48	77
All	All	1372/1512 (91%)	1314 (96%)	55 (4%)	3 (0%)	43	72

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	597	ALA
1	A	597	ALA
1	A	499	THR

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	570/617 (92%)	546 (96%)	24 (4%)	26	60
1	B	565/617 (92%)	538 (95%)	27 (5%)	23	55
All	All	1135/1234 (92%)	1084 (96%)	51 (4%)	24	58

All (51) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	82	LYS
1	A	160	SER
1	A	169	LEU
1	A	171	VAL
1	A	215	LYS
1	A	217	LYS
1	A	218	THR
1	A	327	LEU
1	A	417	ILE
1	A	482	LYS
1	A	484	VAL
1	A	493	LYS
1	A	500	ARG
1	A	531	LEU
1	A	564	LYS
1	A	589	GLN
1	A	593	ILE
1	A	656	SER
1	A	661	LYS
1	A	706	VAL
1	A	708	ASN

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Mol	Chain	Res	Type
1	A	710	ASN
1	A	748	SER
1	A	776	LYS
1	B	50	ASN
1	B	64	ARG
1	B	68	ASN
1	B	74	GLU
1	B	88	GLN
1	B	171	VAL
1	B	215	LYS
1	B	217	LYS
1	B	218	THR
1	B	256	SER
1	B	327	LEU
1	B	359	LYS
1	B	417	ILE
1	B	453	LYS
1	B	484	VAL
1	B	517	LYS
1	B	552	ILE
1	B	564	LYS
1	B	589	GLN
1	B	593	ILE
1	B	656	SER
1	B	661	LYS
1	B	706	VAL
1	B	708	ASN
1	B	710	ASN
1	B	748	SER
1	B	776	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (18) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	50	ASN
1	A	199	GLN
1	A	363	HIS
1	A	436	ASN
1	A	541	HIS
1	A	615	GLN
1	A	658	ASN
1	A	717	ASN

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Mol	Chain	Res	Type
1	B	50	ASN
1	B	53	GLN
1	B	146	GLN
1	B	199	GLN
1	B	436	ASN
1	B	541	HIS
1	B	615	GLN
1	B	669	ASN
1	B	717	ASN
1	B	738	ASN

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 ⓘ

Of 19 ligands modelled in this entry, 11 are monoatomic - leaving 8 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	KH2	A	1007	-	14,14,14	1.74	3 (21%)	20,20,20	2.17	8 (40%)
5	GOL	A	1013	-	5,5,5	0.36	0	5,5,5	0.45	0
5	GOL	A	1010	-	5,5,5	0.08	0	5,5,5	0.39	0
5	GOL	A	1009	-	5,5,5	0.15	0	5,5,5	0.42	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	GOL	A	1012	-	5,5,5	0.15	0	5,5,5	0.35	0
5	GOL	A	1008	-	5,5,5	0.21	0	5,5,5	0.36	0
5	GOL	A	1011	-	5,5,5	0.07	0	5,5,5	0.15	0
4	KH2	A	1006	-	14,14,14	1.69	3 (21%)	20,20,20	2.76	9 (45%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	KH2	A	1007	-	-	4/8/18/18	0/1/1/1
5	GOL	A	1013	-	-	1/4/4/4	-
5	GOL	A	1010	-	-	4/4/4/4	-
5	GOL	A	1009	-	-	0/4/4/4	-
5	GOL	A	1012	-	-	0/4/4/4	-
5	GOL	A	1008	-	-	2/4/4/4	-
5	GOL	A	1011	-	-	2/4/4/4	-
4	KH2	A	1006	-	-	7/8/18/18	0/1/1/1

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	1006	KH2	O1-S	4.33	1.57	1.45
4	A	1007	KH2	O1-S	3.89	1.56	1.45
4	A	1007	KH2	C1-S	3.56	1.82	1.77
4	A	1007	KH2	O2-S	2.62	1.52	1.45
4	A	1006	KH2	O2-S	2.41	1.51	1.45
4	A	1006	KH2	C14-C12	2.35	1.60	1.51

All (17) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	1006	KH2	C4-C1-S	-7.54	101.69	113.25
4	A	1006	KH2	C11-N2-C7	-5.21	94.04	109.59
4	A	1007	KH2	C11-N2-C16	-5.13	93.61	110.02
4	A	1006	KH2	C11-N2-C15	4.03	122.92	110.02
4	A	1007	KH2	C11-N2-C15	3.84	122.30	110.02
4	A	1007	KH2	O4-S-C1	3.63	113.10	106.00
4	A	1006	KH2	C11-N2-C16	-3.17	99.88	110.02
4	A	1007	KH2	O4-S-O1	-2.75	104.53	111.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	1006	KH2	C7-N2-C16	2.69	121.31	109.53
4	A	1006	KH2	O1-S-C1	2.63	110.70	106.73
4	A	1006	KH2	O4-S-O2	-2.59	104.91	111.40
4	A	1007	KH2	C7-N2-C16	2.47	120.39	109.53
4	A	1007	KH2	O1-S-C1	2.40	110.36	106.73
4	A	1006	KH2	C16-N2-C15	2.33	114.94	108.67
4	A	1007	KH2	C4-C1-S	-2.17	109.92	113.25
4	A	1007	KH2	O2-S-C1	-2.15	103.47	106.73
4	A	1006	KH2	C13-C14-C12	2.05	117.27	111.19

There are no chirality outliers.

All (20) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	1006	KH2	C4-C1-S-O1
4	A	1006	KH2	C4-C7-N2-C11
4	A	1006	KH2	C1-C4-C7-N2
5	A	1008	GOL	O1-C1-C2-C3
5	A	1010	GOL	O1-C1-C2-C3
4	A	1006	KH2	C4-C1-S-O4
5	A	1010	GOL	C1-C2-C3-O3
5	A	1011	GOL	O1-C1-C2-C3
4	A	1007	KH2	C4-C7-N2-C16
5	A	1008	GOL	O1-C1-C2-O2
4	A	1006	KH2	C4-C1-S-O2
4	A	1007	KH2	C4-C1-S-O1
4	A	1006	KH2	C4-C7-N2-C15
4	A	1006	KH2	C4-C7-N2-C16
5	A	1010	GOL	O1-C1-C2-O2
4	A	1007	KH2	C1-C4-C7-N2
4	A	1007	KH2	C4-C7-N2-C15
5	A	1011	GOL	O1-C1-C2-O2
5	A	1010	GOL	O2-C2-C3-O3
5	A	1013	GOL	O2-C2-C3-O3

There are no ring outliers.

3 monomers are involved in 17 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	1007	KH2	7	0
5	A	1012	GOL	1	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	1006	KH2	14	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

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	686/756 (90%)	-0.07	12 (1%) 69 61	34, 62, 102, 143	0
1	B	680/756 (89%)	0.17	23 (3%) 48 39	36, 74, 120, 147	0
All	All	1366/1512 (90%)	0.05	35 (2%) 57 48	34, 67, 116, 147	0

All (35) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	561	GLN	4.0
1	B	741	THR	3.7
1	B	69	PRO	3.5
1	B	503	ASP	3.5
1	B	341	ILE	3.4
1	B	261	LYS	3.3
1	B	73	LYS	3.3
1	B	740	LEU	3.1
1	A	94	LYS	3.0
1	B	499	THR	3.0
1	A	559	VAL	2.9
1	B	255	SER	2.9
1	B	89	GLY	2.9
1	A	563	ASP	2.7
1	B	250	TYR	2.7
1	A	499	THR	2.7
1	B	560	VAL	2.6
1	B	292	ARG	2.6
1	B	357	GLY	2.5
1	B	559	VAL	2.5
1	A	90	ASP	2.5
1	B	664	LYS	2.5
1	A	664	LYS	2.4
1	B	340	ALA	2.4

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Mol	Chain	Res	Type	RSRZ
1	A	730	ASP	2.4
1	A	261	LYS	2.4
1	A	501	GLY	2.3
1	B	258	HIS	2.3
1	B	265	GLY	2.3
1	B	333	TRP	2.2
1	A	304	PRO	2.2
1	A	556	GLY	2.1
1	A	903	HIS	2.0
1	B	596	PRO	2.0
1	B	450	ASP	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 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(Å ²)	Q<0.9
5	GOL	A	1008	6/6	0.64	0.28	102,103,105,105	0
5	GOL	A	1009	6/6	0.73	0.23	101,102,105,106	0
5	GOL	A	1013	6/6	0.77	0.20	79,85,88,89	0
5	GOL	A	1011	6/6	0.79	0.19	88,90,95,98	0
5	GOL	A	1012	6/6	0.86	0.21	94,97,99,101	0
3	CA	B	1005	1/1	0.86	0.10	130,130,130,130	0
5	GOL	A	1010	6/6	0.89	0.19	69,73,75,77	0
4	KH2	A	1007	14/14	0.90	0.16	39,52,89,90	0
6	K	B	1006	1/1	0.91	0.12	78,78,78,78	0
4	KH2	A	1006	14/14	0.93	0.14	32,45,80,81	0
3	CA	A	1005	1/1	0.95	0.09	115,115,115,115	0
3	CA	B	1003	1/1	0.98	0.07	112,112,112,112	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	ZN	B	1001	1/1	0.99	0.09	72,72,72,72	0
3	CA	B	1004	1/1	0.99	0.06	103,103,103,103	0
3	CA	A	1002	1/1	0.99	0.07	52,52,52,52	0
3	CA	A	1003	1/1	0.99	0.06	87,87,87,87	0
2	ZN	A	1001	1/1	0.99	0.06	54,54,54,54	0
3	CA	B	1002	1/1	0.99	0.05	61,61,61,61	0
3	CA	A	1004	1/1	1.00	0.02	67,67,67,67	0

6.5 Other polymers [i](#)

There are no such residues in this entry.