Full wwPDB X-ray Structure Validation Report ⓘ

Mar 18, 2025 – 10:08 AM JST

PDB ID	:	9M0Q
Title	:	The Structural Complex of Inactivated Lactobacillus delbrueckii Cystathionine beta-Lyase Mutant (LdPatB A34D) with Its Substrate L-(+)-Alliin
Authors	:	Liu, Y.; Yang, C.
Deposited on	:	2025-02-25
Resolution	:	2.18 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:

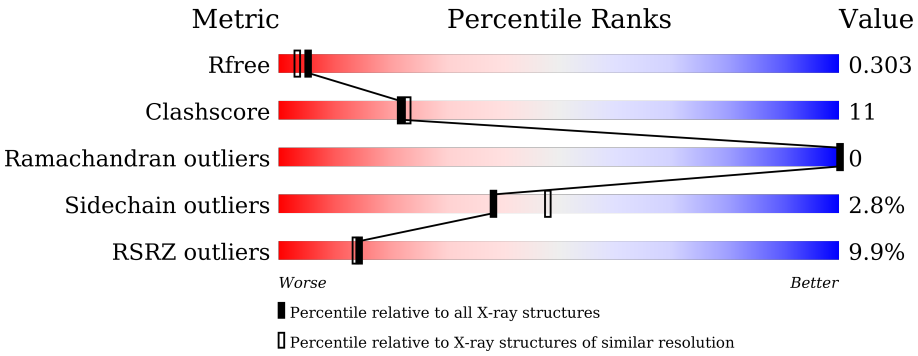
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.21
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.004 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.41.2

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 2.18 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	8336 (2.20-2.16)
Clashscore	180529	9404 (2.20-2.16)
Ramachandran outliers	177936	9297 (2.20-2.16)
Sidechain outliers	177891	9297 (2.20-2.16)
RSRZ outliers	164620	8337 (2.20-2.16)

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	390	10% 71% 26%
1	B	390	9% 76% 22%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 6200 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.

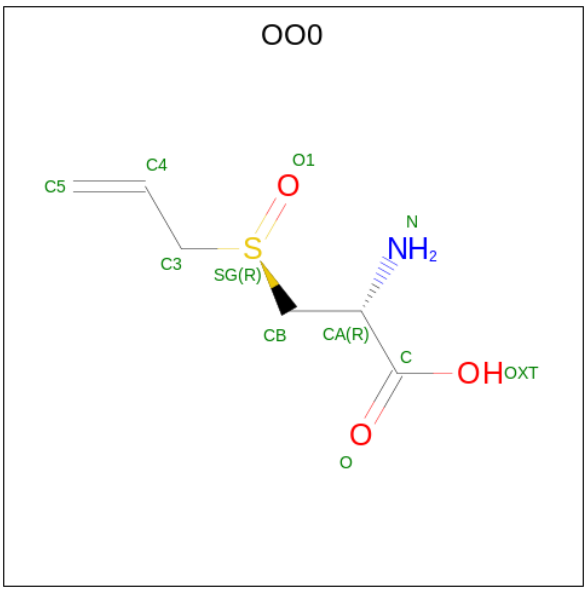
- Molecule 1 is a protein called cysteine-S-conjugate beta-lyase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	380	Total	C	N	O	P	S	0	0	0
			3035	1944	507	567	1	16			
1	B	383	Total	C	N	O	P	S	0	0	0
			3061	1958	510	575	1	17			

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	430	ASP	ALA	engineered mutation	UNP A0AAC9VP02
A	707	GLU	VAL	engineered mutation	UNP A0AAC9VP02
A	722	ASP	ASN	engineered mutation	UNP A0AAC9VP02
B	34	ASP	ALA	engineered mutation	UNP A0AAC9VP02
B	311	GLU	VAL	engineered mutation	UNP A0AAC9VP02
B	326	ASP	ASN	engineered mutation	UNP A0AAC9VP02

- Molecule 2 is ALLIIN (three-letter code: OO0) (formula: $C_6H_{11}NO_3S$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	B	1	Total	C	N	O	S	0	0
			11	6	1	3	1		

- Molecule 3 is water.

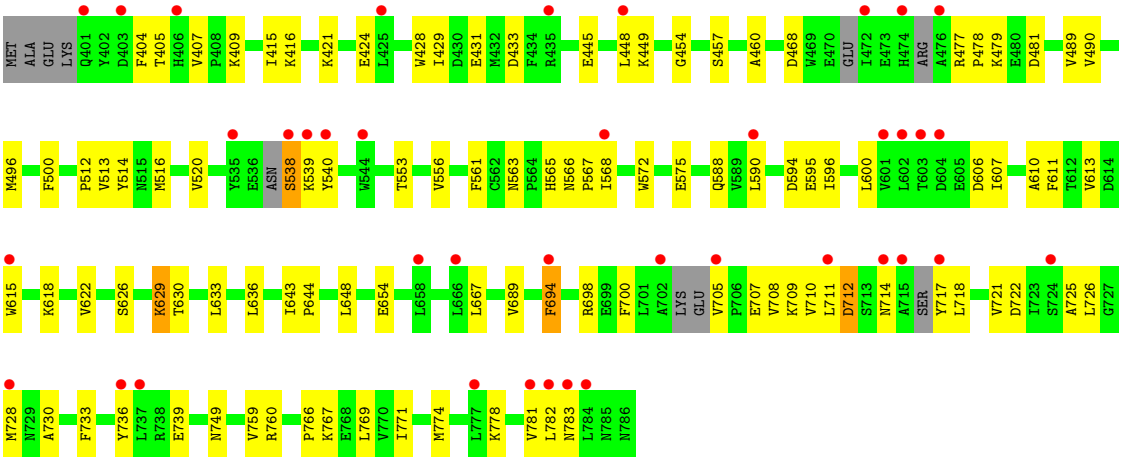
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	48	Total	O	0	0
			48	48		
3	B	45	Total	O	0	0
			45	45		

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.

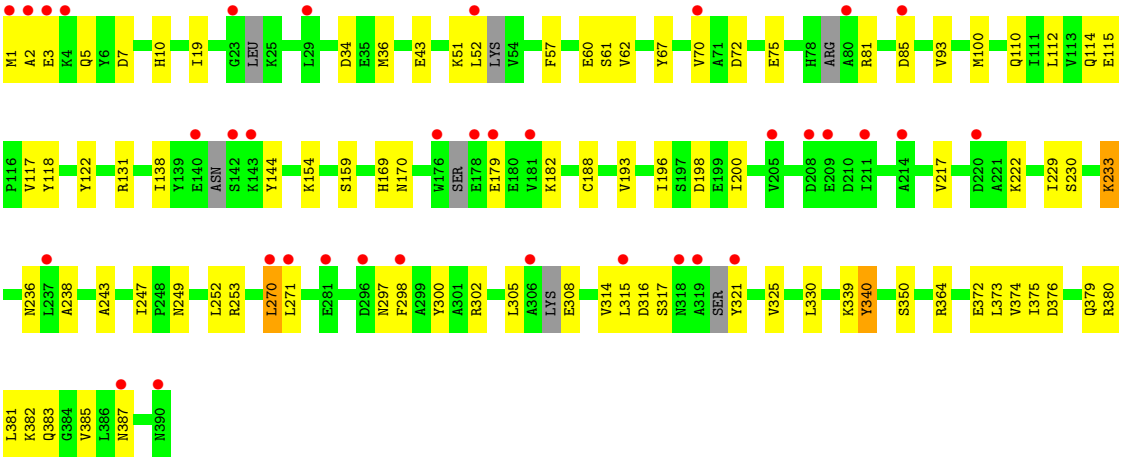
• Molecule 1: cysteine-S-conjugate beta-lyase

Chain A:



• Molecule 1: cysteine-S-conjugate beta-lyase

Chain B:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	111.83Å 91.68Å 80.87Å 90.00° 125.06° 90.00°	Depositor
Resolution (Å)	45.77 – 2.18 45.77 – 2.18	Depositor EDS
% Data completeness (in resolution range)	99.7 (45.77-2.18) 98.6 (45.77-2.18)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.50 (at 2.18Å)	Xtriage
Refinement program	PHENIX v1.16	Depositor
R, R_{free}	0.251 , 0.303 0.251 , 0.303	Depositor DCC
R_{free} test set	32754 reflections (5.84%)	wwPDB-VP
Wilson B-factor (Å^2)	39.5	Xtriage
Anisotropy	0.208	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.36 , 52.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	6200	wwPDB-VP
Average B, all atoms (Å^2)	46.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.36% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: OO0, LLP

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	0.65	0/3080	0.76	0/4175
1	B	0.70	0/3104	0.80	0/4203
All	All	0.67	0/6184	0.78	0/8378

There are no bond length outliers.

There are no bond angle outliers.

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	3035	0	2961	77	0
1	B	3061	0	2976	57	0
2	B	11	0	0	1	0
3	A	48	0	0	2	0
3	B	45	0	0	3	0
All	All	6200	0	5937	128	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 11.

All (128) 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:629:LLP:NZ	1:A:629:LLP:C4	1.72	1.49
1:A:629:LLP:C4'	1:A:629:LLP:CE	1.92	1.46
1:A:694:PHE:HE2	1:A:717:TYR:HA	1.08	1.08
1:A:629:LLP:NZ	1:A:629:LLP:H4'1	1.32	0.97
1:A:694:PHE:CE2	1:A:717:TYR:HA	1.99	0.97
1:A:489:VAL:HG21	1:A:596:ILE:HD12	1.64	0.79
1:A:539:LYS:HE3	1:A:540:TYR:H	1.48	0.77
1:B:298:PHE:CE2	1:B:321:TYR:HA	2.22	0.74
1:B:5:GLN:NE2	3:B:502:HOH:O	2.22	0.72
1:B:308:GLU:HB3	1:B:382:LYS:HE2	1.73	0.71
1:A:778:LYS:NZ	1:A:782:LEU:HD21	2.05	0.70
1:B:182:LYS:HG3	1:B:217:VAL:HG12	1.72	0.70
1:B:138:ILE:O	1:B:144:TYR:HA	1.93	0.68
1:A:726:LEU:HD21	1:A:781:VAL:HG13	1.75	0.68
1:B:372:GLU:HG3	1:B:373:LEU:HD12	1.75	0.68
1:A:694:PHE:HE2	1:A:717:TYR:CA	1.98	0.67
1:A:707:GLU:O	1:A:725:ALA:HB3	1.95	0.67
1:B:298:PHE:HE2	1:B:321:TYR:HA	1.60	0.67
1:A:705:VAL:HG22	1:A:778:LYS:HG2	1.77	0.66
1:A:698:ARG:HH11	1:A:698:ARG:HB2	1.61	0.66
1:A:629:LLP:NZ	1:A:629:LLP:C4'	0.50	0.65
1:B:1:MET:HG2	1:B:2:ALA:H	1.60	0.65
1:B:51:LYS:NZ	1:B:60:GLU:OE1	2.31	0.64
1:B:379:GLN:O	1:B:383:GLN:HG2	1.99	0.62
1:A:479:LYS:HE2	1:A:481:ASP:HB2	1.82	0.62
1:B:93:VAL:HG21	1:B:200:ILE:HD13	1.82	0.62
1:A:710:VAL:HG22	1:A:721:VAL:HG22	1.83	0.61
1:A:600:LEU:HD11	1:A:630:THR:HA	1.82	0.61
1:A:622:VAL:HG22	1:A:643:ILE:HG12	1.83	0.60
1:B:75:GLU:HB2	1:B:81:ARG:HB2	1.84	0.60
1:B:200:ILE:HG21	1:B:233:LLP:C3	2.32	0.59
1:A:698:ARG:HH11	1:A:698:ARG:CB	2.15	0.59
1:A:514:TYR:CE2	1:A:516:MET:HB2	2.37	0.59
1:A:778:LYS:HZ1	1:A:782:LEU:HD21	1.66	0.59
1:A:514:TYR:HB2	1:A:566:ASN:HD22	1.68	0.58
1:A:553:THR:HB	1:A:556:VAL:HG23	1.87	0.57
1:A:457:SER:HB3	1:B:19:ILE:HD11	1.87	0.56
1:B:200:ILE:HG13	1:B:233:LLP:HG2	1.87	0.56
1:A:513:VAL:HG22	1:A:514:TYR:H	1.71	0.56
1:A:512:PRO:HG2	1:A:568:ILE:HD11	1.87	0.55
1:A:698:ARG:CB	1:A:698:ARG:NH1	2.69	0.55
1:B:200:ILE:HG21	1:B:233:LLP:C2	2.36	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:115:GLU:HG2	1:B:122:TYR:OH	2.06	0.55
1:A:739:GLU:OE2	1:A:739:GLU:HA	2.07	0.55
1:A:709:LYS:HB2	1:A:722:ASP:HB3	1.88	0.55
1:A:698:ARG:NH1	1:A:698:ARG:HB3	2.23	0.54
1:A:611:PHE:O	1:A:618:LYS:NZ	2.41	0.53
1:B:315:LEU:HD23	1:B:316:ASP:N	2.25	0.52
1:A:778:LYS:HZ2	1:A:782:LEU:HD21	1.74	0.52
1:A:667:LEU:CD1	1:B:270:LEU:HD11	2.39	0.52
1:B:188:CYS:HB3	1:B:193:VAL:O	2.10	0.51
1:B:249:ASN:HB3	1:B:252:LEU:HB2	1.93	0.51
1:A:618:LYS:HG2	1:A:644:PRO:HG2	1.93	0.50
1:B:118:TYR:HB2	1:B:170:ASN:HD22	1.75	0.50
1:B:62:VAL:HG11	1:B:67:TYR:OH	2.11	0.50
1:A:563:ASN:O	1:A:595:GLU:HA	2.12	0.49
1:B:198:ASP:OD2	1:B:233:LLP:N1	2.45	0.49
1:A:615:TRP:O	3:A:801:HOH:O	2.20	0.49
1:B:330:LEU:HD21	1:B:385:VAL:HG13	1.94	0.49
1:A:489:VAL:CG2	1:A:596:ILE:HD12	2.38	0.49
1:A:633:LEU:HD13	1:A:636:LEU:HD22	1.94	0.49
1:B:43:GLU:OE2	1:B:43:GLU:N	2.36	0.49
1:B:110:GLN:NE2	1:B:159:SER:OG	2.45	0.48
1:B:112:LEU:HD12	1:B:154:LYS:HB3	1.96	0.48
1:A:538:SER:O	1:A:711:LEU:HB2	2.13	0.48
1:A:698:ARG:HG2	1:A:710:VAL:HG11	1.95	0.48
1:B:10:HIS:O	3:B:501:HOH:O	2.20	0.48
1:A:728:MET:SD	1:A:733:PHE:HD1	2.37	0.48
1:B:315:LEU:HD23	1:B:316:ASP:H	1.79	0.48
1:A:404:PHE:CG	1:A:689:VAL:HG21	2.49	0.48
1:B:72:ASP:OD1	1:B:81:ARG:NH1	2.42	0.47
1:B:100:MET:CE	1:B:196:ILE:HD12	2.45	0.47
1:A:407:VAL:HG13	1:A:433:ASP:HB3	1.96	0.47
1:B:340:TYR:OH	1:B:387:ASN:HB3	2.14	0.47
1:A:596:ILE:HG13	1:A:626:SER:HB3	1.97	0.47
1:A:767:LYS:O	1:A:771:ILE:HG13	2.16	0.46
1:B:179:GLU:H	1:B:182:LYS:HZ3	1.64	0.46
1:A:454:GLY:HA2	1:B:238:ALA:HB3	1.98	0.46
1:B:376:ASP:CG	1:B:380:ARG:HE	2.19	0.46
1:A:496:MET:HG2	1:A:500:PHE:HE2	1.80	0.45
1:A:457:SER:HB3	1:B:19:ILE:CD1	2.46	0.45
1:B:182:LYS:HB2	1:B:182:LYS:HE2	1.67	0.45
1:A:736:TYR:OH	1:A:783:ASN:HB2	2.16	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:490:VAL:HG13	1:A:520:VAL:HG11	1.99	0.45
1:A:594:ASP:OD2	1:A:629:LLP:N1	2.49	0.45
1:B:7:ASP:OD2	1:B:10:HIS:HB2	2.17	0.45
1:A:445:GLU:O	1:A:449:LYS:HG2	2.16	0.45
1:A:407:VAL:HG21	1:A:769:LEU:HD11	1.98	0.44
1:B:36:MET:HB2	1:B:236:ASN:CG	2.37	0.44
1:A:460:ALA:HB1	3:A:821:HOH:O	2.16	0.44
1:B:297:ASN:CG	1:B:374:VAL:HG21	2.38	0.44
1:A:712:ASP:N	1:A:712:ASP:OD1	2.50	0.44
1:B:350:SER:OG	1:B:364:ARG:HB3	2.17	0.44
1:A:421:LYS:HB2	1:A:424:GLU:HG3	2.00	0.44
1:B:314:VAL:HG22	1:B:325:VAL:HG22	1.99	0.44
1:A:415:ILE:HD13	1:B:61:SER:HB3	2.00	0.44
1:A:566:ASN:OD1	1:A:567:PRO:HA	2.18	0.43
1:B:247:ILE:O	1:B:253:ARG:HD3	2.18	0.43
1:A:468:ASP:HA	1:A:477:ARG:HH12	1.83	0.43
1:A:730:ALA:HB3	1:A:749:ASN:OD1	2.17	0.43
1:A:428:TRP:CE3	1:A:429:ILE:HB	2.54	0.43
1:A:496:MET:HG2	1:A:500:PHE:CE2	2.54	0.43
1:A:610:ALA:O	1:A:613:VAL:HG22	2.19	0.42
1:A:590:LEU:HD11	1:A:648:LEU:HD21	2.01	0.42
1:B:3:GLU:OE2	1:B:3:GLU:HA	2.20	0.42
1:B:131:ARG:HH11	1:B:131:ARG:HD3	1.69	0.42
1:A:405:THR:HA	1:A:766:PRO:HB3	2.01	0.42
1:B:230:SER:HB2	1:B:243:ALA:HA	2.02	0.42
1:A:416:LYS:HD2	1:A:431:GLU:HG3	2.00	0.41
1:A:700:PHE:CD1	1:A:774:MET:HB3	2.55	0.41
1:A:416:LYS:HD2	1:A:431:GLU:CG	2.50	0.41
1:A:565:HIS:HB2	1:A:572:TRP:HE1	1.85	0.41
1:A:667:LEU:HD11	1:B:271:LEU:HD11	2.01	0.41
1:B:114:GLN:HG2	3:B:526:HOH:O	2.20	0.41
1:A:705:VAL:O	1:A:708:VAL:HG22	2.20	0.41
1:B:34:ASP:HB2	2:B:401:OO0:O	2.19	0.41
1:A:561:PHE:CE2	1:A:563:ASN:HB2	2.56	0.41
1:A:718:LEU:HD13	1:A:760:ARG:NH1	2.35	0.41
1:A:478:PRO:HD3	1:A:611:PHE:CZ	2.56	0.41
1:A:721:VAL:HB	1:A:759:VAL:HG23	2.02	0.41
1:B:70:VAL:HG13	1:B:229:ILE:HD11	2.03	0.41
1:B:117:VAL:HG23	1:B:169:HIS:CE1	2.55	0.41
1:B:387:ASN:O	1:B:387:ASN:OD1	2.38	0.41
1:A:428:TRP:CZ3	1:A:429:ILE:HB	2.56	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:539:LYS:HD2	1:A:711:LEU:HD13	2.03	0.40
1:B:52:LEU:HD23	1:B:57:PHE:CZ	2.56	0.40
1:B:300:TYR:CZ	1:B:375:ILE:HG12	2.57	0.40
1:B:305:LEU:HD21	1:B:381:LEU:HD23	2.03	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	367/390 (94%)	355 (97%)	12 (3%)	0	100	100
1	B	366/390 (94%)	353 (96%)	13 (4%)	0	100	100
All	All	733/780 (94%)	708 (97%)	25 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	319/328 (97%)	308 (97%)	11 (3%)	32	39
1	B	321/328 (98%)	314 (98%)	7 (2%)	47	58
All	All	640/656 (98%)	622 (97%)	18 (3%)	38	48

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

Mol	Chain	Res	Type
1	A	409	LYS
1	A	448	LEU
1	A	538	SER
1	A	575	GLU
1	A	588	GLN
1	A	606	ASP
1	A	607	ILE
1	A	654	GLU
1	A	694	PHE
1	A	712	ASP
1	A	714	ASN
1	B	85	ASP
1	B	222	LYS
1	B	270	LEU
1	B	302	ARG
1	B	317	SER
1	B	339	LYS
1	B	340	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	110	GLN
1	B	387	ASN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

2 non-standard protein/DNA/RNA residues 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	$\#\|Z\|>2$
1	LLP	B	233	1	23,24,25	4.27	2 (8%)	25,32,34	4.44	4 (16%)
1	LLP	A	629	1	23,24,25	4.82	1 (4%)	25,32,34	2.04	4 (16%)

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
1	LLP	B	233	1	-	6/16/17/19	0/1/1/1
1	LLP	A	629	1	-	3/16/17/19	0/1/1/1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	629	LLP	C4'-NZ	-22.90	0.50	1.27
1	B	233	LLP	C4'-NZ	-19.88	0.60	1.27
1	B	233	LLP	CE-NZ	3.49	1.54	1.46

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	233	LLP	CE-NZ-C4'	-16.09	69.49	118.90
1	B	233	LLP	C4-C4'-NZ	-14.15	59.36	124.31
1	A	629	LLP	CE-NZ-C4'	8.47	144.92	118.90
1	B	233	LLP	CD-CE-NZ	4.33	121.54	110.93
1	A	629	LLP	CD-CE-NZ	3.11	118.56	110.93
1	A	629	LLP	OP4-C5'-C5	2.72	114.53	109.35
1	A	629	LLP	C4-C4'-NZ	-2.58	112.45	124.31
1	B	233	LLP	OP4-C5'-C5	2.58	114.27	109.35

There are no chirality outliers.

All (9) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	B	233	LLP	C5-C4-C4'-NZ
1	B	233	LLP	C5'-OP4-P-OP2
1	B	233	LLP	C5'-OP4-P-OP3
1	A	629	LLP	C3-C4-C4'-NZ
1	B	233	LLP	CA-CB-CG-CD

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Mol	Chain	Res	Type	Atoms
1	A	629	LLP	C4-C4'-NZ-CE
1	B	233	LLP	C3-C4-C4'-NZ
1	B	233	LLP	CD-CE-NZ-C4'
1	A	629	LLP	CD-CE-NZ-C4'

There are no ring outliers.

2 monomers are involved in 9 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	B	233	LLP	4	0
1	A	629	LLP	5	0

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

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	$\#\|Z\| > 2$
2	OO0	B	401	-	8,10,10	2.18	2 (25%)	7,12,12	1.00	0

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
2	OO0	B	401	-	-	4/11/11/11	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	401	OO0	O1-SG	4.39	1.66	1.50
2	B	401	OO0	C3-C4	3.60	1.55	1.49

There are no bond angle outliers.

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	401	OO0	N-CA-CB-SG
2	B	401	OO0	OXT-C-CA-CB
2	B	401	OO0	O-C-CA-CB
2	B	401	OO0	SG-C3-C4-C5

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	401	OO0	1	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, 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	379/390 (97%)	0.99	39 (10%)	13	12	27, 46, 68, 78	0
1	B	382/390 (97%)	0.93	36 (9%)	15	15	29, 43, 65, 96	0
All	All	761/780 (97%)	0.96	75 (9%)	14	14	27, 44, 66, 96	0

All (75) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	2	ALA	6.2
1	A	538	SER	4.4
1	B	306	ALA	4.3
1	B	1	MET	4.2
1	B	142	SER	4.2
1	A	535	TYR	4.0
1	A	715	ALA	4.0
1	B	23	GLY	3.9
1	B	178	GLU	3.8
1	A	714	ASN	3.7
1	A	476	ALA	3.4
1	B	80	ALA	3.3
1	B	319	ALA	3.3
1	A	705	VAL	3.3
1	B	211	ILE	3.3
1	A	604	ASP	3.3
1	A	702	ALA	3.2
1	B	29	LEU	3.2
1	B	3	GLU	3.1
1	A	658	LEU	3.1
1	B	296	ASP	3.1
1	B	318	ASN	3.0
1	B	208	ASP	2.9
1	B	176	TRP	2.9

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Mol	Chain	Res	Type	RSRZ
1	B	205	VAL	2.9
1	A	602	LEU	2.9
1	B	390	ASN	2.8
1	A	736	TYR	2.8
1	A	737	LEU	2.8
1	B	85	ASP	2.8
1	A	403	ASP	2.8
1	A	781	VAL	2.8
1	A	568	ILE	2.7
1	B	181	VAL	2.7
1	A	406	HIS	2.7
1	B	315	LEU	2.6
1	A	425	LEU	2.6
1	A	711	LEU	2.6
1	B	237	LEU	2.6
1	A	694	PHE	2.6
1	A	615	TRP	2.6
1	A	784	LEU	2.6
1	B	298	PHE	2.5
1	A	472	ILE	2.5
1	B	281	GLU	2.5
1	B	52	LEU	2.5
1	A	717	TYR	2.5
1	A	435	ARG	2.5
1	A	728	MET	2.4
1	B	220	ASP	2.4
1	B	70	VAL	2.4
1	B	140	GLU	2.4
1	B	214	ALA	2.4
1	A	539	LYS	2.4
1	A	540	TYR	2.4
1	A	777	LEU	2.3
1	B	387	ASN	2.3
1	B	179	GLU	2.3
1	B	4	LYS	2.3
1	A	783	ASN	2.2
1	B	271	LEU	2.2
1	A	448	LEU	2.2
1	A	603	THR	2.2
1	A	782	LEU	2.2
1	A	544	TRP	2.2
1	B	143	LYS	2.1

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Mol	Chain	Res	Type	RSRZ
1	B	321	TYR	2.1
1	B	270	LEU	2.1
1	A	724	SER	2.1
1	A	401	GLN	2.1
1	A	474	HIS	2.0
1	A	590	LEU	2.0
1	A	666	LEU	2.0
1	B	209	GLU	2.0
1	A	601	VAL	2.0

6.2 Non-standard residues in protein, DNA, RNA chains (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
1	LLP	A	629	24/25	0.85	0.21	0,0,46,49	0
1	LLP	B	233	24/25	0.86	0.23	0,0,46,48	0

6.3 Carbohydrates (i)

There are no monosaccharides 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	OO0	B	401	11/11	0.68	0.17	43,58,65,75	0

6.5 Other polymers (i)

There are no such residues in this entry.