Full wwPDB X-ray Structure Validation Report (i)

Jun 17, 2024 – 11:19 AM EDT

PDB ID	:	8FQJ
Title	:	LSD1-CoREST in complex with T14, short soaking
Authors	:	Caroli, J.; Mattevi, A.
Deposited on	:	2023-01-06
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 (i) 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 (i)) were used in the production of this report:

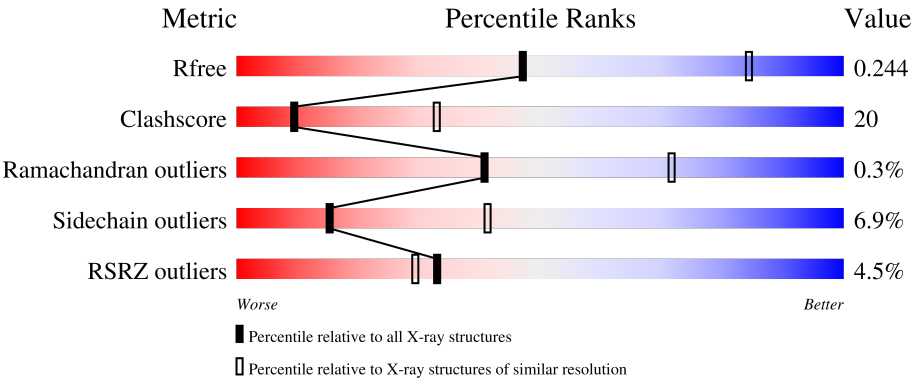
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.37.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

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 2.90 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}	130704	1957 (2.90-2.90)
Clashscore	141614	2172 (2.90-2.90)
Ramachandran outliers	138981	2115 (2.90-2.90)
Sidechain outliers	138945	2117 (2.90-2.90)
RSRZ outliers	127900	1906 (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 <=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	871	2% 52% 22% 24%
2	B	144	11% 56% 31% 5% 8%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 6365 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 Lysine-specific histone demethylase 1A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	666	Total	C	N	O	S	0	0	0
			5217	3324	906	967	20			

There are 19 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-18	GLY	-	expression tag	UNP O60341
A	-17	SER	-	expression tag	UNP O60341
A	-16	SER	-	expression tag	UNP O60341
A	-15	HIS	-	expression tag	UNP O60341
A	-14	HIS	-	expression tag	UNP O60341
A	-13	HIS	-	expression tag	UNP O60341
A	-12	HIS	-	expression tag	UNP O60341
A	-11	HIS	-	expression tag	UNP O60341
A	-10	HIS	-	expression tag	UNP O60341
A	-9	SER	-	expression tag	UNP O60341
A	-8	SER	-	expression tag	UNP O60341
A	-7	GLY	-	expression tag	UNP O60341
A	-6	LEU	-	expression tag	UNP O60341
A	-5	VAL	-	expression tag	UNP O60341
A	-4	PRO	-	expression tag	UNP O60341
A	-3	ARG	-	expression tag	UNP O60341
A	-2	GLY	-	expression tag	UNP O60341
A	-1	SER	-	expression tag	UNP O60341
A	0	HIS	-	expression tag	UNP O60341

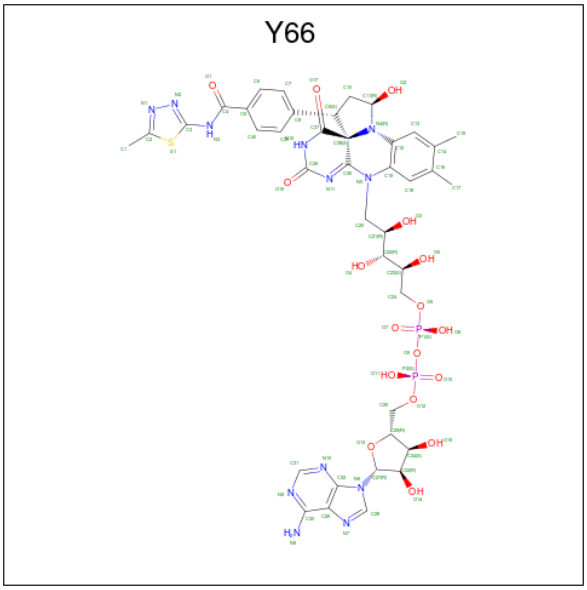
- Molecule 2 is a protein called REST corepressor 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	133	Total	C	N	O	S	0	0	0
			1076	676	194	203	3			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	297	GLY	-	expression tag	UNP Q9UKL0
B	298	PRO	-	expression tag	UNP Q9UKL0
B	299	LEU	-	expression tag	UNP Q9UKL0
B	300	GLY	-	expression tag	UNP Q9UKL0
B	301	SER	-	expression tag	UNP Q9UKL0
B	302	PRO	-	expression tag	UNP Q9UKL0
B	303	GLU	-	expression tag	UNP Q9UKL0
B	304	PHE	-	expression tag	UNP Q9UKL0

- Molecule 3 is [(2R,3S,4R,5R)-5-(6-amino-9H-purin-9-yl)-3,4-dihydroxyoxolan-2-yl]methyl (2S,3R,4R)-2,3,4-trihydroxy-5-[(1R,3S,3aS,13R)-1-hydroxy-10,11-dimethyl-3-{4-[(5-methyl-1,3,4-thiadiazol-2-yl)carbamoyl]phenyl}-4,6-dioxo-2,3,5,6-tetrahydro-1H-benzo[g]pyrrolo[2,1-e]pteridin-8(4H)-yl]pentyl dihydrogen diphosphate (three-letter code: Y66) (formula: $C_{40}H_{46}N_{12}O_{17}P_2S$) (labeled as "Ligand of Interest" by depositor).



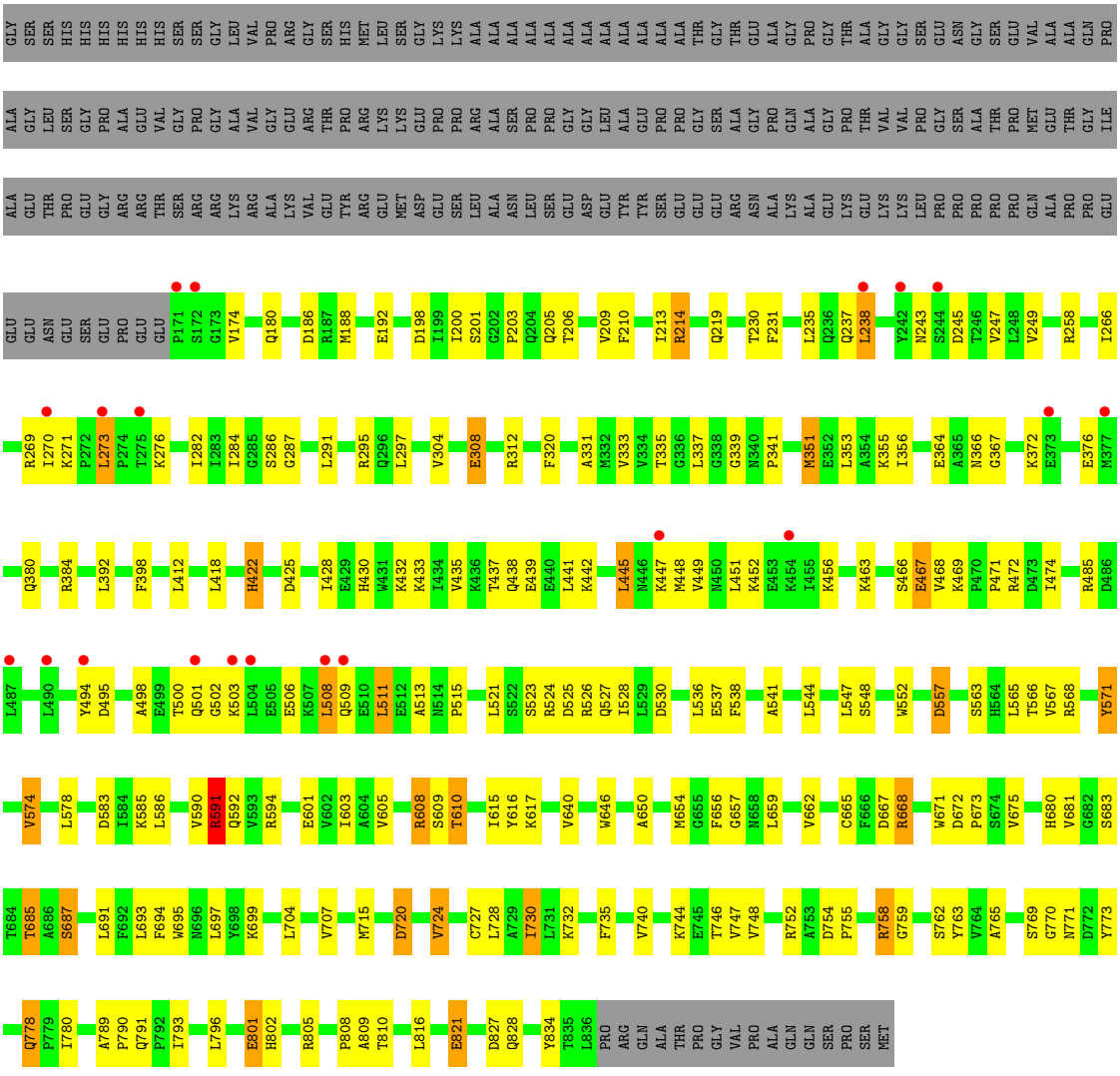
Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	S	0	0
			72	40	12	17	2	1		

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.

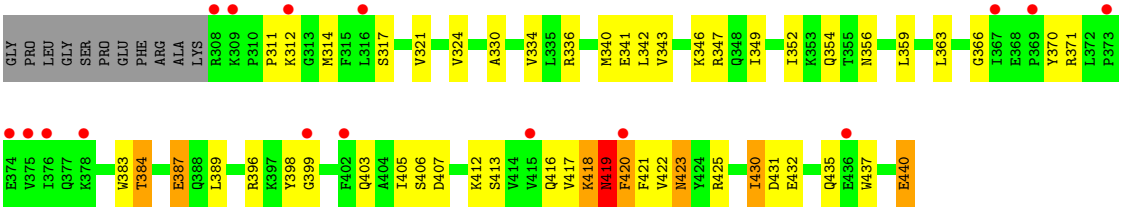
• Molecule 1: Lysine-specific histone demethylase 1A

Chain A:



• Molecule 2: REST corepressor 1

Chain B:


GLY PRO LEU GLY SER PRO GLU PHE ARG ALA LYS R308 K309 P310 P311 K312 G313 M314 F315 L316 S317 V321 V324 A330 V334 L335 R336 M340 E341 L342 V343 K346 R347 Q348 I349 I352 K353 Q354 T355 N356 L359 L363 G366 I367 E368 P369 Y370 R371 L372 P373
E374 V375 I376 Q377 K378 W383 T384 E387 Q388 L389 R396 K397 Y398 G399 F402 Q403 A404 I405 S406 D407 K412 S413 V414 V415 Q416 V417 K418 M419 F420 F421 V422 N423 Y424 R425 I430 D431 E432 Q435 E436 W437 E440

4 Data and refinement statistics (i)

Property	Value	Source
Space group	I 2 2 2	Depositor
Cell constants a, b, c, α, β, γ	118.88Å 179.34Å 233.39Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.40 – 2.90 47.40 – 2.90	Depositor EDS
% Data completeness (in resolution range)	97.2 (47.40-2.90) 97.2 (47.40-2.90)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.36 (at 2.91Å)	Xtriage
Refinement program	PHENIX 1.18.2	Depositor
R, R_{free}	0.218 , 0.246 0.220 , 0.244	Depositor DCC
R_{free} test set	1993 reflections (3.69%)	wwPDB-VP
Wilson B-factor (Å^2)	79.3	Xtriage
Anisotropy	0.487	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 60.7	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	6365	wwPDB-VP
Average B, all atoms (Å^2)	87.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.37% 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: Y66

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	3/5331 (0.1%)	0.78	5/7232 (0.1%)
2	B	0.59	0/1091	0.76	0/1471
All	All	0.64	3/6422 (0.0%)	0.78	5/8703 (0.1%)

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
2	B	0	1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	821	GLU	CD-OE1	-6.15	1.18	1.25
1	A	574	VAL	CB-CG2	-5.21	1.42	1.52
1	A	821	GLU	CD-OE2	-5.04	1.20	1.25

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	668	ARG	NE-CZ-NH1	6.06	123.33	120.30
1	A	591	ARG	CB-CG-CD	5.43	125.72	111.60
1	A	308	GLU	N-CA-CB	-5.34	100.99	110.60
1	A	591	ARG	CG-CD-NE	5.21	122.73	111.80
1	A	668	ARG	NE-CZ-NH2	-5.15	117.73	120.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	B	419	ASN	Mainchain

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	5217	0	5252	209	0
2	B	1076	0	1091	66	0
3	A	72	0	0	4	0
All	All	6365	0	6343	249	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 20.

All (249) 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:438:GLN:OE1	1:A:508:LEU:HD11	1.43	1.17
1:A:591:ARG:HH22	1:A:610:THR:HB	1.08	1.14
1:A:438:GLN:OE1	1:A:508:LEU:CD1	1.96	1.11
1:A:441:LEU:HD23	2:B:356:ASN:HD22	1.14	1.09
2:B:425:ARG:HA	2:B:430:ILE:HG13	1.50	0.92
1:A:680:HIS:CD2	1:A:730:ILE:HD13	2.06	0.90
1:A:530:ASP:OD2	1:A:685:THR:OG1	1.89	0.89
1:A:754:ASP:OD1	1:A:755:PRO:HD2	1.73	0.88
1:A:214:ARG:HG2	1:A:214:ARG:HH11	1.37	0.88
1:A:801:GLU:HG3	1:A:809:ALA:HA	1.55	0.87
1:A:720:ASP:O	1:A:724:VAL:HG23	1.75	0.86
1:A:591:ARG:CZ	1:A:605:VAL:HG21	2.07	0.83
1:A:680:HIS:CE1	1:A:730:ILE:HD11	2.14	0.82
1:A:308:GLU:HG2	1:A:586:LEU:HD23	1.61	0.81
2:B:425:ARG:HH11	2:B:425:ARG:HG2	1.45	0.79
1:A:463:LYS:O	1:A:467:GLU:HG2	1.83	0.77
1:A:449:VAL:HA	2:B:363:LEU:HD21	1.65	0.76
1:A:724:VAL:HG11	1:A:746:THR:HG21	1.68	0.76
1:A:755:PRO:HA	1:A:758:ARG:HD3	1.68	0.76
1:A:667:ASP:OD2	1:A:668:ARG:NH1	2.19	0.75

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:511:LEU:N	1:A:511:LEU:HD23	2.01	0.75
1:A:801:GLU:HG3	1:A:809:ALA:CA	2.17	0.74
1:A:308:GLU:HG2	1:A:586:LEU:CD2	2.18	0.74
2:B:416:GLN:HA	2:B:419:ASN:HB2	1.68	0.74
1:A:312:ARG:NH1	1:A:312:ARG:HG3	2.01	0.73
1:A:380:GLN:O	1:A:384:ARG:HG3	1.88	0.73
1:A:441:LEU:CD2	2:B:356:ASN:HD22	1.96	0.73
1:A:680:HIS:CG	1:A:730:ILE:CD1	2.70	0.73
1:A:591:ARG:NH2	1:A:610:THR:HB	1.94	0.73
2:B:425:ARG:HG2	2:B:425:ARG:NH1	1.99	0.72
2:B:311:PRO:HG2	2:B:314:MET:HG3	1.71	0.72
2:B:419:ASN:O	2:B:421:PHE:N	2.23	0.72
1:A:680:HIS:CD2	1:A:730:ILE:CD1	2.73	0.71
1:A:762:SER:OG	1:A:801:GLU:OE2	2.06	0.71
1:A:448:MET:HE3	2:B:363:LEU:HD13	1.72	0.70
1:A:273:LEU:HD12	1:A:273:LEU:N	2.06	0.70
2:B:343:VAL:HA	2:B:346:LYS:HG2	1.73	0.70
1:A:608:ARG:HD3	1:A:608:ARG:N	2.07	0.70
1:A:312:ARG:HG3	1:A:312:ARG:HH11	1.56	0.69
1:A:214:ARG:HG2	1:A:214:ARG:NH1	2.01	0.69
1:A:337:LEU:HD23	1:A:337:LEU:N	2.06	0.69
1:A:353:LEU:HB3	1:A:565:LEU:HD23	1.74	0.68
1:A:801:GLU:CG	1:A:809:ALA:H	2.07	0.67
1:A:448:MET:CE	2:B:363:LEU:CD1	2.73	0.67
1:A:583:ASP:OD1	1:A:585:LYS:NZ	2.28	0.66
1:A:231:PHE:HE1	1:A:249:VAL:HG12	1.60	0.66
1:A:438:GLN:OE1	1:A:508:LEU:HD12	1.90	0.66
1:A:351:MET:HE1	1:A:574:VAL:HG21	1.79	0.65
1:A:691:LEU:CD2	1:A:727:CYS:SG	2.85	0.65
1:A:214:ARG:HH11	1:A:214:ARG:CG	2.08	0.65
2:B:423:ASN:OD1	2:B:423:ASN:N	2.30	0.65
1:A:680:HIS:CE1	1:A:730:ILE:CD1	2.80	0.64
1:A:566:THR:HG21	1:A:697:LEU:HD22	1.80	0.64
1:A:418:LEU:HD21	2:B:324:VAL:HG21	1.79	0.63
1:A:353:LEU:HD13	1:A:565:LEU:HD22	1.80	0.63
1:A:762:SER:CB	1:A:801:GLU:OE2	2.44	0.63
1:A:320:PHE:CE2	1:A:747:VAL:HG21	2.34	0.63
1:A:441:LEU:HD23	2:B:356:ASN:ND2	1.99	0.63
1:A:608:ARG:HD3	1:A:608:ARG:H	1.63	0.63
1:A:188:MET:HE3	1:A:210:PHE:CG	2.33	0.62
2:B:418:LYS:HE3	2:B:418:LYS:O	1.99	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:901:Y66:O2	3:A:901:Y66:O17	2.16	0.62
1:A:754:ASP:OD1	1:A:755:PRO:CD	2.47	0.62
1:A:821:GLU:HA	1:A:821:GLU:OE1	1.98	0.62
1:A:646:TRP:CH2	1:A:778:GLN:HG2	2.34	0.62
1:A:671:TRP:HA	1:A:735:PHE:CE2	2.35	0.62
1:A:720:ASP:O	1:A:724:VAL:CG2	2.47	0.62
1:A:503:LYS:HA	1:A:506:GLU:OE2	1.99	0.62
1:A:437:THR:HB	1:A:508:LEU:HD21	1.82	0.61
1:A:557:ASP:N	1:A:557:ASP:OD1	2.32	0.61
1:A:188:MET:HB2	1:A:200:ILE:HD13	1.83	0.61
1:A:230:THR:HG23	1:A:270:ILE:HD12	1.83	0.61
1:A:501:GLN:HG3	1:A:502:GLY:N	2.15	0.60
2:B:343:VAL:HG13	2:B:346:LYS:HE2	1.82	0.60
1:A:231:PHE:CE1	1:A:249:VAL:HG12	2.37	0.60
1:A:592:GLN:HG2	1:A:603:ILE:HD13	1.84	0.59
1:A:744:LYS:HA	1:A:744:LYS:HE2	1.84	0.59
2:B:346:LYS:HG3	2:B:347:ARG:N	2.17	0.59
1:A:485:ARG:HG3	2:B:407:ASP:HB2	1.85	0.59
1:A:341:PRO:HG3	1:A:816:LEU:CD1	2.32	0.59
1:A:448:MET:HE3	2:B:363:LEU:CD1	2.33	0.58
1:A:801:GLU:HG2	1:A:809:ALA:H	1.65	0.58
1:A:308:GLU:CG	1:A:586:LEU:HD23	2.32	0.58
1:A:356:ILE:HG22	1:A:356:ILE:O	2.02	0.57
1:A:801:GLU:HG3	1:A:809:ALA:N	2.18	0.57
1:A:245:ASP:OD1	1:A:247:VAL:HG22	2.03	0.57
1:A:601:GLU:HB3	1:A:617:LYS:HD3	1.85	0.57
1:A:286:SER:O	1:A:291:LEU:HD11	2.04	0.57
2:B:384:THR:H	2:B:387:GLU:HG3	1.69	0.57
1:A:366:ASN:OD1	1:A:367:GLY:N	2.37	0.57
1:A:456:LYS:HA	2:B:370:TYR:CE2	2.40	0.57
1:A:468:VAL:HG12	1:A:468:VAL:O	2.02	0.57
1:A:601:GLU:HA	1:A:616:TYR:O	2.05	0.57
1:A:521:LEU:HD23	1:A:525:ASP:HB3	1.87	0.57
1:A:672:ASP:HB3	1:A:675:VAL:HG12	1.85	0.56
1:A:392:LEU:HD23	1:A:398:PHE:CD2	2.41	0.56
1:A:422:HIS:HA	1:A:425:ASP:HB2	1.89	0.55
1:A:198:ASP:OD1	1:A:198:ASP:N	2.40	0.55
1:A:665:CYS:O	1:A:744:LYS:N	2.40	0.55
1:A:591:ARG:HH22	1:A:610:THR:CB	1.99	0.55
2:B:405:ILE:HD12	2:B:405:ILE:N	2.21	0.54
1:A:445:LEU:N	1:A:445:LEU:HD23	2.22	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:295:ARG:HD3	1:A:578:LEU:O	2.08	0.54
1:A:827:ASP:OD2	1:A:834:TYR:OH	2.26	0.54
1:A:331:ALA:HA	3:A:901:Y66:N4	2.22	0.54
1:A:671:TRP:O	1:A:673:PRO:HD3	2.08	0.54
1:A:448:MET:HE2	2:B:363:LEU:CD1	2.37	0.54
1:A:506:GLU:OE1	1:A:506:GLU:N	2.40	0.54
2:B:317:SER:O	2:B:321:VAL:HG23	2.08	0.54
1:A:287:GLY:O	1:A:291:LEU:HD12	2.08	0.53
1:A:235:LEU:HD11	1:A:243:ASN:HB2	1.91	0.53
3:A:901:Y66:C21	3:A:901:Y66:C18	2.86	0.53
1:A:203:PRO:O	1:A:206:THR:OG1	2.27	0.53
1:A:418:LEU:CD2	2:B:324:VAL:HG21	2.38	0.53
1:A:695:TRP:CE3	1:A:697:LEU:HD11	2.44	0.53
1:A:432:LYS:HA	1:A:435:VAL:HG22	1.91	0.52
1:A:511:LEU:N	1:A:511:LEU:CD2	2.72	0.52
1:A:341:PRO:HG3	1:A:816:LEU:HD11	1.91	0.52
1:A:603:ILE:HG13	1:A:615:ILE:HD13	1.90	0.52
1:A:320:PHE:CD2	1:A:747:VAL:HG21	2.45	0.52
1:A:808:PRO:O	1:A:810:THR:HG23	2.09	0.52
1:A:801:GLU:HG3	1:A:809:ALA:H	1.73	0.52
2:B:405:ILE:N	2:B:405:ILE:CD1	2.72	0.52
1:A:439:GLU:HG2	2:B:352:ILE:HD13	1.92	0.52
1:A:732:LYS:HG2	1:A:740:VAL:HG11	1.90	0.52
1:A:442:LYS:N	2:B:356:ASN:HD21	2.08	0.51
1:A:650:ALA:O	1:A:654:MET:HG3	2.11	0.51
1:A:691:LEU:HD23	1:A:727:CYS:SG	2.50	0.51
1:A:567:VAL:HG21	1:A:571:TYR:CD1	2.46	0.51
2:B:425:ARG:HH11	2:B:425:ARG:CG	2.17	0.51
2:B:398:TYR:HB2	2:B:405:ILE:HD11	1.94	0.50
1:A:526:ARG:NH1	1:A:530:ASP:OD1	2.45	0.50
1:A:205:GLN:HA	1:A:205:GLN:NE2	2.24	0.50
1:A:680:HIS:CG	1:A:730:ILE:HD12	2.46	0.50
1:A:437:THR:HG21	1:A:508:LEU:HD23	1.93	0.50
1:A:456:LYS:HA	2:B:370:TYR:HE2	1.76	0.50
1:A:372:LYS:O	1:A:376:GLU:HG3	2.11	0.50
1:A:209:VAL:HG12	1:A:213:ILE:HD11	1.94	0.49
1:A:284:ILE:HG12	1:A:590:VAL:HG21	1.94	0.49
1:A:448:MET:CE	2:B:363:LEU:HD12	2.43	0.49
1:A:498:ALA:HA	1:A:501:GLN:HG2	1.93	0.49
1:A:523:SER:O	1:A:527:GLN:HG3	2.13	0.49
1:A:547:LEU:HD22	1:A:552:TRP:HB2	1.95	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:500:THR:HA	1:A:503:LYS:HB2	1.95	0.48
1:A:802:HIS:ND1	1:A:802:HIS:N	2.60	0.48
2:B:419:ASN:C	2:B:421:PHE:N	2.67	0.48
1:A:463:LYS:O	1:A:467:GLU:CG	2.59	0.48
1:A:384:ARG:NH1	2:B:312:LYS:O	2.43	0.48
1:A:789:ALA:HB1	1:A:790:PRO:HD2	1.96	0.48
2:B:383:TRP:CD2	2:B:412:LYS:HE3	2.48	0.48
1:A:780:ILE:HB	1:A:796:LEU:HB3	1.95	0.48
1:A:537:GLU:HG2	1:A:544:LEU:CD2	2.44	0.48
1:A:538:PHE:HD1	1:A:659:LEU:HD22	1.78	0.48
1:A:448:MET:HE2	2:B:363:LEU:HD12	1.96	0.47
2:B:384:THR:N	2:B:387:GLU:HG3	2.29	0.47
1:A:495:ASP:OD1	2:B:371:ARG:NH2	2.48	0.47
1:A:430:HIS:O	1:A:433:LYS:HB2	2.13	0.47
1:A:680:HIS:NE2	1:A:730:ILE:CD1	2.77	0.47
2:B:383:TRP:CZ2	2:B:420:PHE:HB2	2.50	0.47
1:A:428:ILE:HD13	2:B:341:GLU:CG	2.44	0.47
1:A:594:ARG:HG2	1:A:640:VAL:HB	1.95	0.47
1:A:312:ARG:HH11	1:A:312:ARG:CG	2.25	0.47
1:A:662:VAL:HG13	1:A:748:VAL:HG22	1.95	0.47
1:A:680:HIS:ND1	1:A:730:ILE:CD1	2.78	0.47
1:A:537:GLU:HG2	1:A:544:LEU:HD21	1.97	0.47
1:A:291:LEU:HD12	1:A:291:LEU:H	1.79	0.46
1:A:793:ILE:HD12	1:A:793:ILE:H	1.80	0.46
2:B:405:ILE:CD1	2:B:405:ILE:H	2.28	0.46
1:A:335:THR:O	1:A:335:THR:OG1	2.22	0.46
1:A:364:GLU:OE1	1:A:524:ARG:NH2	2.48	0.46
2:B:432:GLU:O	2:B:435:GLN:HB3	2.16	0.46
1:A:308:GLU:O	1:A:308:GLU:HG3	2.14	0.46
2:B:396:ARG:O	2:B:437:TRP:HD1	1.99	0.46
2:B:437:TRP:O	2:B:437:TRP:CE3	2.69	0.46
1:A:451:LEU:HD23	1:A:494:TYR:HB2	1.98	0.46
1:A:351:MET:CE	1:A:574:VAL:HG21	2.46	0.46
1:A:384:ARG:NH2	2:B:312:LYS:O	2.47	0.46
1:A:364:GLU:HA	1:A:681:VAL:HB	1.98	0.46
1:A:672:ASP:HB3	1:A:675:VAL:CG1	2.45	0.45
1:A:728:LEU:O	1:A:732:LYS:HG3	2.16	0.45
1:A:770:GLY:O	1:A:805:ARG:HG3	2.16	0.45
1:A:656:PHE:CE2	1:A:759:GLY:HA3	2.51	0.45
1:A:445:LEU:HB2	2:B:359:LEU:HD23	1.98	0.45
1:A:503:LYS:HB3	1:A:503:LYS:HE2	1.75	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:541:ALA:O	1:A:657:GLY:HA3	2.15	0.45
1:A:536:LEU:HD23	1:A:536:LEU:HA	1.74	0.45
2:B:405:ILE:HG21	2:B:417:VAL:HG13	1.99	0.45
1:A:210:PHE:CD1	1:A:210:PHE:C	2.89	0.45
1:A:513:ALA:C	1:A:515:PRO:HD3	2.36	0.45
1:A:695:TRP:HE3	1:A:697:LEU:HD11	1.81	0.45
2:B:437:TRP:O	2:B:437:TRP:CD2	2.70	0.44
1:A:609:SER:O	1:A:609:SER:OG	2.30	0.44
1:A:428:ILE:HG12	2:B:342:LEU:HD13	2.00	0.44
1:A:524:ARG:O	1:A:528:ILE:HG13	2.17	0.44
1:A:801:GLU:HG2	1:A:801:GLU:O	2.15	0.44
2:B:336:ARG:HH21	2:B:340:MET:HE1	1.82	0.44
1:A:485:ARG:HD3	1:A:485:ARG:C	2.38	0.44
2:B:431:ASP:O	2:B:435:GLN:HB2	2.17	0.44
1:A:435:VAL:CG1	2:B:349:ILE:HG13	2.48	0.44
1:A:694:PHE:HA	1:A:704:LEU:O	2.18	0.43
1:A:755:PRO:HA	1:A:758:ARG:HH11	1.82	0.43
1:A:186:ASP:OD1	1:A:186:ASP:N	2.33	0.43
1:A:445:LEU:HB3	2:B:359:LEU:HB3	2.00	0.43
1:A:687:SER:O	1:A:687:SER:OG	2.23	0.43
1:A:793:ILE:HG23	1:A:828:GLN:OE1	2.19	0.43
1:A:527:GLN:NE2	1:A:683:SER:O	2.51	0.43
1:A:238:LEU:HA	1:A:238:LEU:HD23	1.63	0.43
2:B:330:ALA:O	2:B:334:VAL:HG22	2.19	0.43
1:A:192:GLU:OE2	1:A:214:ARG:CD	2.65	0.43
1:A:341:PRO:HG3	1:A:816:LEU:HD13	1.99	0.43
1:A:693:LEU:HD12	1:A:694:PHE:H	1.84	0.43
1:A:448:MET:HE3	1:A:448:MET:HB3	1.81	0.43
1:A:769:SER:OG	1:A:771:ASN:HB3	2.19	0.42
2:B:406:SER:OG	2:B:412:LYS:O	2.25	0.42
1:A:174:VAL:HG12	1:A:219:GLN:OE1	2.20	0.42
1:A:297:LEU:HB2	1:A:304:VAL:HG11	2.00	0.42
1:A:697:LEU:HD23	1:A:697:LEU:HA	1.83	0.42
2:B:417:VAL:O	2:B:421:PHE:HD2	2.03	0.42
1:A:437:THR:CB	1:A:508:LEU:HD21	2.50	0.42
1:A:282:ILE:HD13	1:A:282:ILE:HA	1.93	0.42
1:A:548:SER:O	1:A:552:TRP:HB3	2.19	0.42
2:B:399:GLY:N	2:B:437:TRP:NE1	2.68	0.42
1:A:438:GLN:HB3	2:B:352:ILE:HG22	2.01	0.42
1:A:333:VAL:HA	1:A:565:LEU:O	2.20	0.41
1:A:356:ILE:HG13	1:A:566:THR:HG23	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:440:GLU:O	2:B:440:GLU:HG3	2.20	0.41
1:A:180:GLN:HA	1:A:339:GLY:HA2	2.02	0.41
1:A:287:GLY:HA3	3:A:901:Y66:O12	2.20	0.41
1:A:566:THR:HG21	1:A:697:LEU:CD2	2.49	0.41
1:A:463:LYS:NZ	1:A:467:GLU:OE2	2.48	0.41
2:B:389:LEU:HD23	2:B:389:LEU:HA	1.85	0.41
2:B:419:ASN:C	2:B:421:PHE:H	2.24	0.41
1:A:235:LEU:CD1	1:A:243:ASN:HB2	2.50	0.41
1:A:273:LEU:HD12	1:A:273:LEU:H	1.85	0.41
1:A:412:LEU:HD23	1:A:412:LEU:HA	1.89	0.41
1:A:452:LYS:HE3	2:B:366:GLY:O	2.20	0.41
1:A:773:TYR:CE1	1:A:808:PRO:HB3	2.55	0.41
1:A:266:ILE:HA	1:A:295:ARG:NH1	2.36	0.41
1:A:707:VAL:HG11	1:A:715:MET:HG3	2.03	0.41
1:A:258:ARG:NH1	1:A:827:ASP:OD1	2.42	0.40
1:A:449:VAL:HG22	2:B:363:LEU:HD21	2.03	0.40
2:B:418:LYS:O	2:B:418:LYS:CD	2.70	0.40
1:A:188:MET:CB	1:A:200:ILE:HD13	2.49	0.40
1:A:762:SER:HB3	1:A:801:GLU:OE2	2.20	0.40
1:A:568:ARG:HD3	1:A:699:LYS:HB2	2.02	0.40
1:A:763:TYR:HE1	1:A:765:ALA:HA	1.86	0.40
1:A:821:GLU:OE1	1:A:821:GLU:CA	2.68	0.40
2:B:399:GLY:N	2:B:437:TRP:CE2	2.90	0.40
1:A:474:ILE:HD12	1:A:474:ILE:HA	1.90	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	664/871 (76%)	637 (96%)	27 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
2	B	131/144 (91%)	122 (93%)	7 (5%)	2 (2%)	10 34
All	All	795/1015 (78%)	759 (96%)	34 (4%)	2 (0%)	41 71

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	420	PHE
2	B	419	ASN

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	566/715 (79%)	529 (94%)	37 (6%)	17 45
2	B	117/125 (94%)	107 (92%)	10 (8%)	10 31
All	All	683/840 (81%)	636 (93%)	47 (7%)	15 41

All (47) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	201	SER
1	A	214	ARG
1	A	237	GLN
1	A	238	LEU
1	A	269	ARG
1	A	271	LYS
1	A	273	LEU
1	A	276	LYS
1	A	351	MET
1	A	355	LYS
1	A	422	HIS
1	A	445	LEU
1	A	447	LYS
1	A	466	SER

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Mol	Chain	Res	Type
1	A	467	GLU
1	A	469	LYS
1	A	471	PRO
1	A	472	ARG
1	A	508	LEU
1	A	509	GLN
1	A	511	LEU
1	A	557	ASP
1	A	563	SER
1	A	571	TYR
1	A	591	ARG
1	A	608	ARG
1	A	610	THR
1	A	685	THR
1	A	687	SER
1	A	720	ASP
1	A	724	VAL
1	A	730	ILE
1	A	752	ARG
1	A	758	ARG
1	A	778	GLN
1	A	791	GLN
1	A	801	GLU
2	B	354	GLN
2	B	384	THR
2	B	387	GLU
2	B	403	GLN
2	B	413	SER
2	B	418	LYS
2	B	422	VAL
2	B	423	ASN
2	B	430	ILE
2	B	440	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	205	GLN
1	A	394	HIS
2	B	354	GLN
2	B	356	ASN
2	B	388	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 monosaccharides 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	Y66	A	901	-	68,80,80	1.34	10 (14%)	78,124,124	1.14	9 (11%)

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
3	Y66	A	901	-	-	15/40/114/114	0/8/9/9

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	901	Y66	C38-C37	-3.53	1.50	1.54
3	A	901	Y66	C36-N11	-3.06	1.29	1.36
3	A	901	Y66	O3-C21	-2.98	1.37	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	901	Y66	C37-N12	-2.66	1.33	1.37
3	A	901	Y66	C28-N7	-2.59	1.30	1.34
3	A	901	Y66	C19-C12	-2.40	1.36	1.40
3	A	901	Y66	O4-C22	-2.31	1.37	1.43
3	A	901	Y66	O16-C36	-2.24	1.20	1.24
3	A	901	Y66	C3-N3	-2.24	1.33	1.36
3	A	901	Y66	P2-O11	-2.06	1.45	1.55

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	901	Y66	C9-C10-C11	-3.41	97.59	103.88
3	A	901	Y66	C34-C33-C27	-3.09	96.33	100.98
3	A	901	Y66	O13-C27-C33	-2.83	102.79	106.93
3	A	901	Y66	C37-N12-C36	-2.76	121.26	125.42
3	A	901	Y66	C38-N4-C11	-2.45	107.08	109.54
3	A	901	Y66	C29-C30-N8	2.09	123.53	120.35
3	A	901	Y66	O11-P2-O10	2.07	122.50	112.24
3	A	901	Y66	C1-C2-S1	2.06	122.89	120.12
3	A	901	Y66	C1-C2-N1	2.04	124.13	119.65

There are no chirality outliers.

All (15) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	901	Y66	C5-C4-N3-C3
3	A	901	Y66	O1-C4-N3-C3
3	A	901	Y66	C21-C20-N5-C35
3	A	901	Y66	C25-O12-P2-O10
3	A	901	Y66	C24-O6-P1-O7
3	A	901	Y66	C21-C20-N5-C19
3	A	901	Y66	P2-O9-P1-O6
3	A	901	Y66	C25-O12-P2-O9
3	A	901	Y66	C24-O6-P1-O9
3	A	901	Y66	O12-C25-C26-O13
3	A	901	Y66	P1-O9-P2-O11
3	A	901	Y66	C24-O6-P1-O8
3	A	901	Y66	P2-O9-P1-O7
3	A	901	Y66	P1-O9-P2-O10
3	A	901	Y66	O12-C25-C26-C34

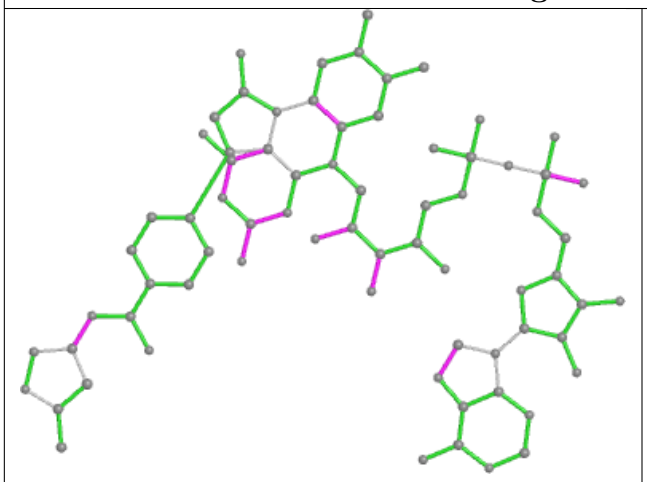
There are no ring outliers.

1 monomer is involved in 4 short contacts:

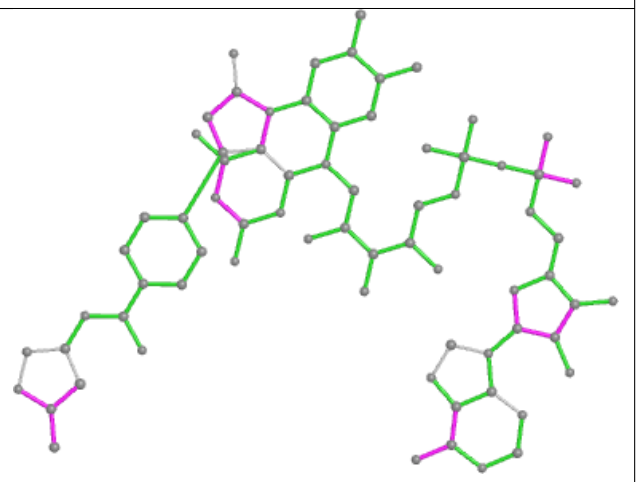
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	901	Y66	4	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

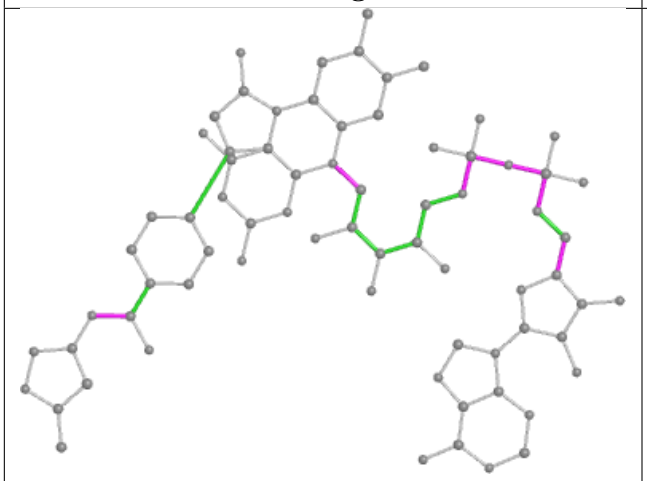
Ligand Y66 A 901



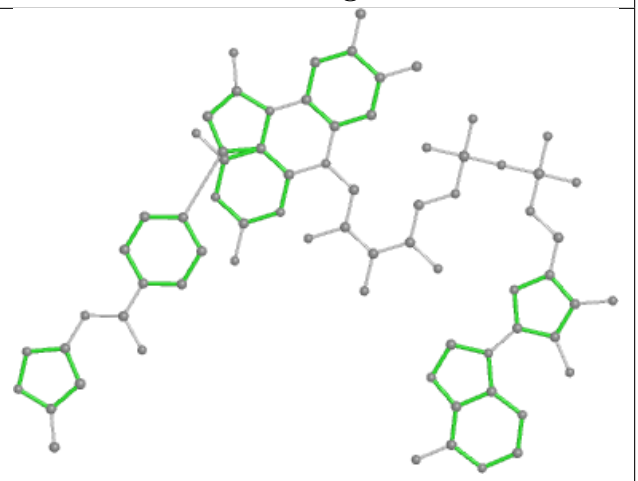
Bond lengths



Bond angles



Torsions



Rings

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	666/871 (76%)	0.37	20 (3%) 50 45	52, 80, 114, 133	0
2	B	133/144 (92%)	0.71	16 (12%) 4 3	78, 108, 130, 142	0
All	All	799/1015 (78%)	0.43	36 (4%) 33 29	52, 86, 120, 142	0

All (36) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	171	PRO	4.7
2	B	376	ILE	4.2
2	B	309	LYS	3.8
1	A	494	TYR	3.7
2	B	378	LYS	3.4
1	A	275	THR	3.2
2	B	374	GLU	3.2
2	B	308	ARG	3.0
1	A	504	LEU	3.0
1	A	270	ILE	2.8
2	B	312	LYS	2.7
1	A	508	LEU	2.7
1	A	509	GLN	2.6
1	A	447	LYS	2.6
2	B	375	VAL	2.4
1	A	238	LEU	2.4
1	A	244	SER	2.4
2	B	369	PRO	2.4
1	A	172	SER	2.4
2	B	436	GLU	2.4
1	A	273	LEU	2.3
1	A	373	GLU	2.3
2	B	399	GLY	2.3
1	A	377	MET	2.3

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Mol	Chain	Res	Type	RSRZ
2	B	367	ILE	2.3
2	B	316	LEU	2.3
1	A	242	TYR	2.3
1	A	487	LEU	2.2
1	A	503	LYS	2.2
2	B	402	PHE	2.2
1	A	490	LEU	2.1
1	A	454	LYS	2.1
1	A	501	GLN	2.1
2	B	420	PHE	2.1
2	B	373	PRO	2.1
2	B	415	VAL	2.1

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 monosaccharides in this entry.

6.4 Ligands (i)

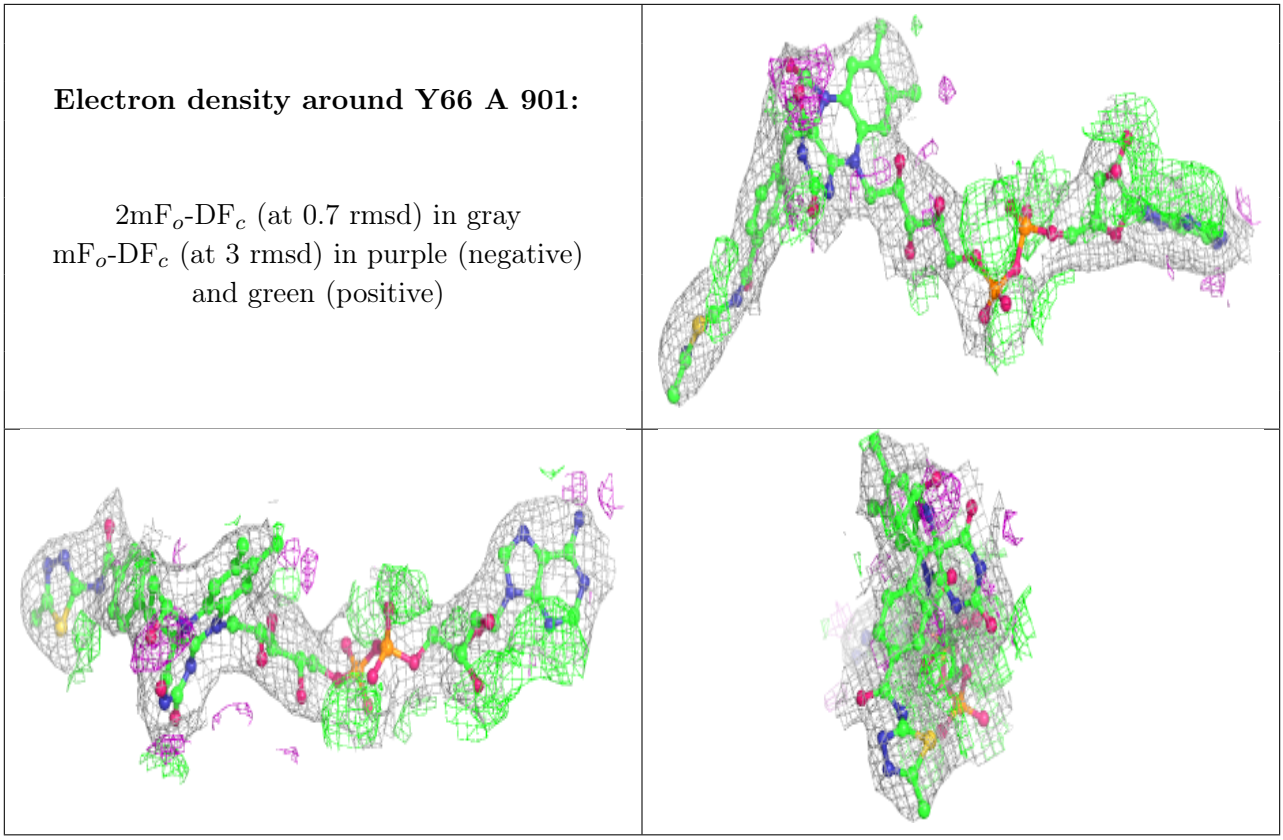
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' 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
3	Y66	A	901	72/72	0.96	0.22	50,67,103,109	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around Y66 A 901:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



6.5 Other polymers (i)

There are no such residues in this entry.