



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 07:28 AM GMT

PDB ID : 3AYN
Title : Crystal structure of squid isorhodopsin
Authors : Murakami, M.; Kouyama, T.
Deposited on : 2011-05-09
Resolution : 2.70 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
<http://wwpdb.org/validation/2016/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 : 1.7 (RC4), CSD as536be (2015)
Xtriage (Phenix) : 1.9-1692
EDS : rb-20026688
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)
Refmac : 5.8.0135
CCP4 : 6.5.0
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk26865

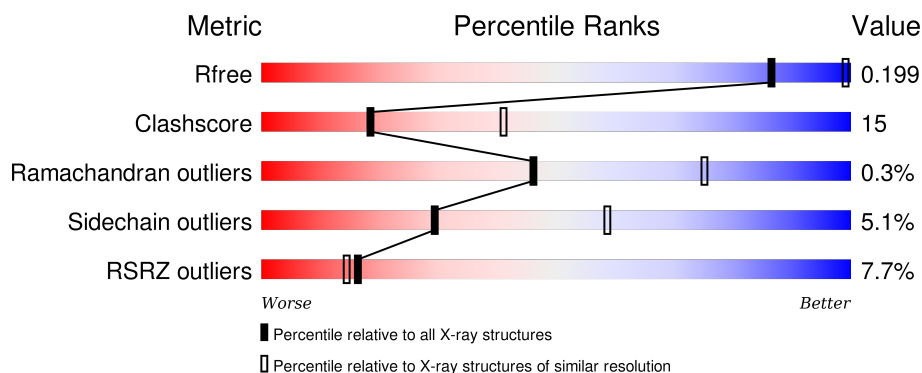
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.70 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}	91344	2103 (2.70-2.70)
Clashscore	102246	2422 (2.70-2.70)
Ramachandran outliers	100387	2382 (2.70-2.70)
Sidechain outliers	100360	2382 (2.70-2.70)
RSRZ outliers	91569	2107 (2.70-2.70)

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. 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	448	<div> <div>8%</div> <div> <div></div> <div>51%</div> <div>26%</div> <div>•</div> <div>22%</div> </div> </div>
1	B	448	<div> <div>4%</div> <div> <div></div> <div>51%</div> <div>23%</div> <div>•</div> <div>23%</div> </div> </div>

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	RET	A	1000	-	-	-	X
2	RET	B	1000	-	-	-	X
3	PLM	A	1001	-	-	-	X
3	PLM	A	1004	-	-	-	X
3	PLM	B	1001	-	-	-	X
5	PC1	B	1004	-	-	-	X
6	BOG	B	1005	-	-	-	X

2 Entry composition [i](#)

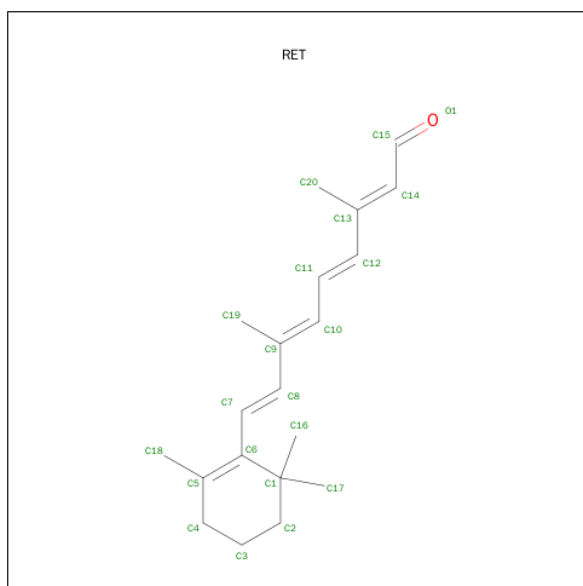
There are 7 unique types of molecules in this entry. The entry contains 5756 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Rhodopsin.

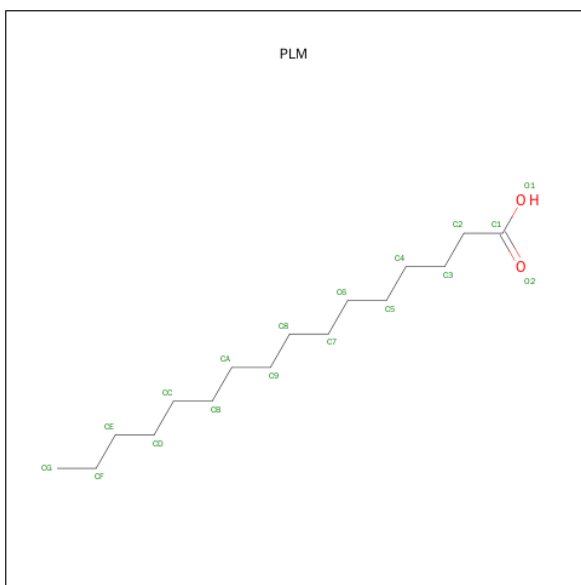
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	350	Total	C	N	O	S	0	0	0
			2780	1838	443	473	26			
1	B	347	Total	C	N	O	S	0	0	0
			2762	1828	440	468	26			

- Molecule 2 is RETINAL (three-letter code: RET) (formula: $C_{20}H_{28}O$).



Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	C	0	0
			20	20		
2	B	1	Total	C	0	0
			20	20		

- Molecule 3 is PALMITIC ACID (three-letter code: PLM) (formula: $C_{16}H_{32}O_2$).



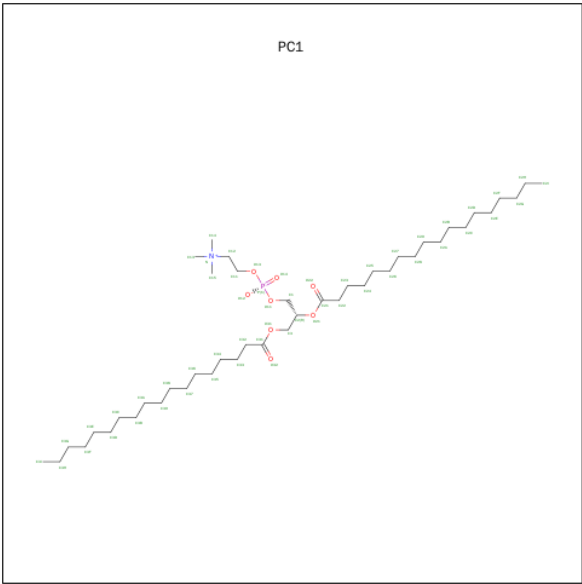
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			17	16	1		
3	A	1	Total	C	O	0	0
			17	16	1		
3	B	1	Total	C	O	0	0
			17	16	1		

- Molecule 4 is SULFATE ION (three-letter code: SO4) (formula: O₄S).



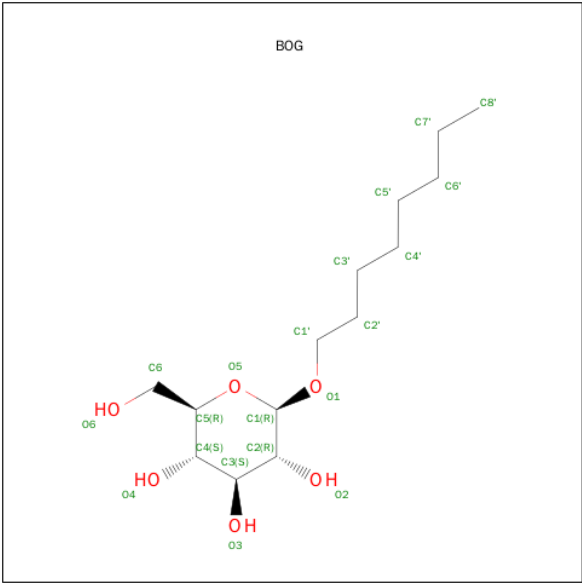
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	B	1	Total	O	S	0	0
			5	4	1		

- Molecule 5 is 1,2-DIACYL-SN-GLYCERO-3-PHOSPHOCHOLINE (three-letter code: PC1) (formula: C₄₄H₈₈NO₈P).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	O	P		
5	B	1	39	30	8	1	0	0

- Molecule 6 is SUGAR (B-OCTYLGLUCOSIDE) (three-letter code: BOG) (formula: C₁₄H₂₈O₆).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	O			
6	B	1	20	14	6		0	0

- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	29	Total 29	O 29	0	0
7	B	30	Total 30	O 30	0	0

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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 ($\text{RSRZ} > 2$). 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.

Chain A:

Position	Most Conserved Residue(s)	Information Content (bits)
1	Met	1.4
2	Gly	1.4
3	Val	1.4
4	Asp	1.4
5	Asn	1.4
6	Ala	1.4
7	Gln	1.4
8	Tyr	1.4
9	Gln	1.4
10	Ala	1.4
11	Tyr	1.4
12	Pro	1.4
13	Pro	1.4
14	Gln	1.4
15	Gly	1.4
16	Tyr	1.4
17	Ala	1.4
18	Pro	1.4
19	Pro	1.4
20	Pro	1.4

Chain B:

4% 51% 23% 23%

MET GLY ARG ASP LEU ARG ASP ASP ASN E9 T10 D81 Y35 I41 M82 V55 I56 F59 T60 K61 T62 K63 S64 S65 L65 Q66 T67 I73 I74 W75 L76 S79 F83 S84 L85 V86 N87 G88 K100 M101 I102 F105 K109 W110 Y111 F112 F113 I117 F119

M121 S122 I123 M124 M127 A127 C127 I128 I131 D132 R133 V136 I137 G138 M141 S148 H149 R150 L165 W166 T167 I168 A176 V182 F188 T197 T201 L202 C203 M204 L207 P212 T216 C219 Y220 T223 V224 M225 S228 M229 E230 E231 W232 F232 T236

F330 L334 L335 T335 C336 C337 Q338 K342 F343 T344 E345 D346 K347 K348 E351 P355 A354 GLY GLU SER SER ASP ALA ALA ALA PRO ALA ASP ALA GLN MET MET LYS GLN MET MET GLN LYS MET GLN GLN GLN ALA ALA TTR PRO PRO GLN TTR

PRO	PRO	PRO	GLN	GLY	TYR	PRO	PRO	GLN	GLY	TYR	PRO	PRO	GLN	GLY	TYR	PRO	PRO	GLN	GLY	TYR	PRO	PRO	GLN	GLY	TYR	PRO	PRO	GLN	GLY	ALA	ALA	PRO	PRO	GLN	GLY	VAL	ASP	ASN	GLN	ALA	TYR	GLN	ALA
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4 Data and refinement statistics

Property	Value	Source
Space group	P 62	Depositor
Cell constants a, b, c, α , β , γ	122.54Å 122.54Å 158.53Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	15.00 – 2.70 61.27 – 2.70	Depositor EDS
% Data completeness (in resolution range)	91.5 (15.00-2.70) 91.4 (61.27-2.70)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.84 (at 2.69Å)	Xtriage
Refinement program	CNS 1.2	Depositor
R, R_{free}	0.180 , 0.200 0.182 , 0.199	Depositor DCC
R_{free} test set	1674 reflections (4.97%)	DCC
Wilson B-factor (Å ²)	52.7	Xtriage
Anisotropy	0.179	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 87.4	EDS
Estimated twinning fraction	0.077 for h,-h-k,-l	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtriage
Outliers	0 of 33855 reflections	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	5756	wwPDB-VP
Average B, all atoms (Å ²)	55.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.09% 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, 0.375 respectively for untwinned datasets, and 0.333, 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: PLM, PC1, SO4, RET, BOG

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	0.39	0/2865	0.57	0/3889
1	B	0.41	0/2847	0.57	0/3865
All	All	0.40	0/5712	0.57	0/7754

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	2780	0	2766	95	0
1	B	2762	0	2752	82	0
2	A	20	0	27	0	0
2	B	20	0	27	1	0
3	A	34	0	62	0	0
3	B	17	0	31	0	0
4	B	5	0	0	0	0
5	B	39	0	49	1	0
6	B	20	0	28	3	0
7	A	29	0	0	3	0
7	B	30	0	0	2	0
All	All	5756	0	5742	177	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 15.

All (177) 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:354:ILE:H	1:B:354:ILE:HD13	1.29	0.98
1:B:150:ARG:HD2	1:B:150:ARG:H	1.29	0.96
1:A:284:ALA:HB2	1:A:292:VAL:HG21	1.47	0.94
1:A:21:PRO:HA	1:A:24:ARG:HD3	1.48	0.93
1:A:117:ILE:HD11	1:A:164:VAL:HG22	1.58	0.84
1:B:113:PHE:O	1:B:117:ILE:HG23	1.87	0.75
1:A:21:PRO:CA	1:A:24:ARG:HD3	2.17	0.73
1:B:237:MET:O	1:B:242:ASN:HB2	1.88	0.73
1:A:218:PHE:O	1:A:222:ASN:HB2	1.90	0.71
1:B:41:ILE:HG13	1:B:88:GLY:HA2	1.73	0.71
1:B:148:SER:HB2	1:B:150:ARG:HH21	1.57	0.69
1:A:298:GLN:O	1:A:301:VAL:HG12	1.93	0.68
1:A:137:ILE:HD11	1:A:256:GLU:HB2	1.76	0.68
1:B:319:HIS:HB3	1:B:322:PHE:HB3	1.76	0.66
1:B:298:GLN:O	1:B:301:VAL:HG12	1.95	0.66
1:B:306:ALA:O	1:B:309:ILE:HG12	1.95	0.65
1:B:73:ILE:HD11	6:B:1005:BOG:H7'2	1.78	0.64
1:A:241:LEU:N	1:A:241:LEU:HD12	2.12	0.64
1:A:306:ALA:O	1:A:309:ILE:HG12	1.98	0.64
1:A:340:ASP:OD2	1:A:342:LYS:HB2	1.98	0.63
1:B:150:ARG:CD	1:B:150:ARG:H	2.10	0.61
1:B:67:THR:HG21	6:B:1005:BOG:H5	1.80	0.61
1:B:242:ASN:ND2	1:B:245:GLU:HG3	2.16	0.60
1:A:320:PRO:HG2	7:A:521:HOH:O	2.02	0.60
1:B:354:ILE:H	1:B:354:ILE:CD1	2.07	0.60
1:B:102:ILE:HD13	1:B:102:ILE:H	1.66	0.60
1:A:139:ARG:HB3	1:A:140:PRO:HD2	1.83	0.58
1:B:123:ILE:HG12	1:B:270:PHE:CZ	2.38	0.58
1:A:133:ARG:NH2	1:A:136:VAL:HG11	2.19	0.57
1:B:117:ILE:HG13	1:B:118:PHE:N	2.19	0.57
1:A:122:SER:O	1:A:126:MET:HG3	2.05	0.57
1:B:52:ASN:HA	1:B:55:VAL:HG12	1.86	0.57
1:A:344:THR:O	1:A:348:LYS:HG3	2.05	0.56
1:A:279:VAL:O	1:A:283:LEU:HD13	2.05	0.56
1:B:301:VAL:O	1:B:305:LYS:HG3	2.05	0.56
1:B:52:ASN:HA	1:B:55:VAL:CG1	2.36	0.56
1:A:50:GLY:O	1:A:54:ILE:HG13	2.04	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:347:ASP:O	1:B:351:GLU:HG2	2.06	0.56
1:B:311:ASN:HB2	1:B:312:PRO:HD3	1.88	0.55
1:A:348:LYS:O	1:A:352:THR:HG23	2.07	0.55
1:B:238:ALA:HA	1:B:246:LEU:HD13	1.90	0.54
1:A:259:LEU:HD13	1:A:262:ILE:HD12	1.90	0.54
1:A:342:LYS:HA	1:A:345:GLU:HG3	1.90	0.54
1:B:60:THR:HG22	1:B:74:ILE:HD13	1.91	0.53
1:A:148:SER:HB2	1:A:150:ARG:HH11	1.73	0.53
1:A:345:GLU:HA	1:A:348:LYS:HD2	1.89	0.53
1:B:284:ALA:HB2	1:B:292:VAL:HG21	1.91	0.53
1:B:323:ARG:HH12	1:B:337:CYS:HB3	1.73	0.53
1:A:52:ASN:O	1:A:55:VAL:HG13	2.09	0.53
1:A:216:ILE:HG23	1:A:220:TYR:CE2	2.44	0.53
1:A:311:ASN:HB2	1:A:312:PRO:HD3	1.91	0.52
1:A:332:TRP:O	1:A:335:THR:HG23	2.09	0.52
1:B:182:VAL:HG22	1:B:298:GLN:OE1	2.09	0.52
1:B:79:SER:HB2	1:B:121:MET:CE	2.40	0.52
1:B:136:VAL:HG23	1:B:137:ILE:HG12	1.92	0.51
1:A:355:PRO:HG2	1:A:358:GLU:HA	1.93	0.51
1:B:63:LYS:HA	1:B:66:GLN:NE2	2.25	0.51
1:A:20:HIS:ND1	1:A:21:PRO:HD2	2.26	0.51
1:A:219:CYS:O	1:A:223:ILE:HG13	2.10	0.51
1:B:87:ASN:HA	1:B:111:TYR:CE1	2.45	0.50
1:A:276:PRO:HB2	7:A:510:HOH:O	2.10	0.50
1:A:206:ILE:HA	1:A:210:PHE:CD2	2.46	0.50
1:A:149:HIS:HB2	1:A:150:ARG:NH2	2.26	0.50
1:A:12:TRP:CD2	1:A:24:ARG:HG2	2.46	0.50
1:B:322:PHE:CE2	1:B:326:ILE:HD11	2.47	0.50
1:A:12:TRP:CE3	1:A:24:ARG:HG2	2.46	0.50
1:B:79:SER:HB2	1:B:121:MET:HE2	1.93	0.50
1:B:323:ARG:HH12	1:B:337:CYS:CB	2.25	0.50
1:B:212:PRO:O	1:B:216:ILE:HG13	2.12	0.50
1:A:237:MET:HA	1:A:240:ARG:HB2	1.93	0.50
1:B:229:ASN:O	1:B:233:GLU:HG3	2.11	0.50
1:A:236:ALA:O	1:A:240:ARG:HB2	2.11	0.50
1:B:197:THR:O	1:B:201:ILE:HG13	2.11	0.49
1:B:219:CYS:O	1:B:223:ILE:HG13	2.13	0.49
1:B:317:VAL:O	1:B:317:VAL:HG12	2.12	0.49
1:A:114:ILE:HA	1:A:117:ILE:HG22	1.95	0.48
1:A:176:ALA:O	1:A:188:PHE:HA	2.14	0.48
1:A:52:ASN:HA	1:A:55:VAL:CG1	2.44	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:299:LEU:HB2	1:B:300:PRO:HD3	1.96	0.48
1:A:68:PRO:HG3	1:A:149:HIS:CE1	2.49	0.47
1:B:296:ALA:O	1:B:300:PRO:HG2	2.14	0.47
1:A:242:ASN:OD1	1:A:246:LEU:HD13	2.14	0.47
1:A:207:LEU:HD22	1:A:207:LEU:N	2.29	0.47
1:B:294:PRO:O	1:B:298:GLN:HB2	2.14	0.47
1:B:138:GLY:HA2	1:B:223:ILE:HA	1.97	0.47
1:A:203:CYS:HA	1:A:207:LEU:HD23	1.97	0.47
1:A:284:ALA:CB	1:A:292:VAL:HG21	2.32	0.47
1:B:166:TRP:CZ2	1:B:207:LEU:HG	2.49	0.47
1:B:235:ALA:C	1:B:237:MET:H	2.18	0.47
1:B:243:ALA:N	1:B:245:GLU:OE2	2.47	0.47
1:A:241:LEU:N	1:A:241:LEU:CD1	2.76	0.47
1:A:258:ARG:O	1:A:262:ILE:HG13	2.15	0.47
1:B:247:ARG:O	1:B:251:ALA:HB2	2.15	0.47
1:A:150:ARG:NE	1:A:150:ARG:H	2.13	0.47
1:B:204:MET:SD	2:B:1000:RET:H192	2.55	0.47
1:B:124:MET:O	1:B:128:MET:HG2	2.15	0.47
1:B:176:ALA:O	1:B:188:PHE:HA	2.15	0.46
1:A:212:PRO:O	1:A:216:ILE:HG13	2.15	0.46
1:A:51:GLY:O	1:A:55:VAL:HG12	2.15	0.46
1:A:114:ILE:O	1:A:117:ILE:HG22	2.15	0.46
1:A:155:MET:O	1:A:159:VAL:HG23	2.15	0.46
1:A:177:TYR:HA	1:A:187:SER:O	2.16	0.46
1:B:127:ALA:O	1:B:131:ILE:HG13	2.16	0.46
1:A:76:LEU:HD13	1:A:311:ASN:HD22	1.80	0.46
1:B:293:THR:H	1:B:296:ALA:HB3	1.80	0.46
1:A:161:LEU:HA	1:A:161:LEU:HD13	1.82	0.46
1:A:285:GLN:HE21	1:A:285:GLN:HA	1.80	0.46
1:A:11:TRP:CD2	1:A:28:GLN:HB2	2.52	0.45
1:A:133:ARG:HA	1:A:133:ARG:NE	2.30	0.45
1:B:263:SER:O	1:B:266:ILE:HG12	2.16	0.45
1:A:133:ARG:CZ	1:A:136:VAL:HG11	2.46	0.45
1:A:293:THR:N	1:A:296:ALA:HB3	2.32	0.45
1:B:100:LYS:HB2	1:B:100:LYS:HE2	1.77	0.45
1:A:248:LYS:HG3	1:A:349:ASP:O	2.17	0.45
1:B:202:LEU:HD12	5:B:1004:PC1:H361	1.98	0.45
1:B:117:ILE:HG22	1:B:167:ALA:HB3	1.98	0.45
1:B:105:PHE:O	1:B:109:LYS:HG3	2.16	0.45
1:A:322:PHE:CE2	1:A:326:ILE:HD11	2.52	0.45
1:A:123:ILE:HG12	1:A:270:PHE:CZ	2.52	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:276:PRO:HB2	7:B:511:HOH:O	2.17	0.44
1:B:223:ILE:O	1:B:224:VAL:C	2.56	0.44
1:B:344:THR:O	1:B:348:LYS:HG3	2.17	0.44
1:B:298:GLN:O	1:B:302:MET:HG2	2.17	0.44
1:A:220:TYR:OH	1:A:263:SER:HB3	2.18	0.44
1:A:309:ILE:O	1:A:309:ILE:HG13	2.17	0.44
1:A:220:TYR:O	1:A:224:VAL:HG23	2.17	0.44
1:A:31:ASP:HB3	1:A:35:TYR:CE1	2.53	0.44
1:A:224:VAL:O	1:A:227:VAL:HG23	2.18	0.43
1:B:150:ARG:HD2	1:B:150:ARG:N	2.11	0.43
1:A:294:PRO:O	1:A:298:GLN:HB2	2.19	0.43
1:B:322:PHE:CZ	1:B:326:ILE:HD11	2.54	0.43
1:B:55:VAL:HG23	1:B:59:PHE:CD1	2.53	0.43
1:B:342:LYS:HA	1:B:345:GLU:OE1	2.19	0.43
1:A:255:ALA:O	1:A:259:LEU:HD23	2.18	0.43
1:A:134:TYR:O	1:A:139:ARG:HG3	2.19	0.43
1:A:206:ILE:HA	1:A:210:PHE:HD2	1.84	0.43
1:B:297:ALA:O	1:B:300:PRO:HD2	2.19	0.43
1:A:263:SER:O	1:A:266:ILE:HG12	2.19	0.42
1:A:243:ALA:HB3	1:A:245:GLU:OE2	2.19	0.42
1:A:216:ILE:HG23	1:A:220:TYR:HE2	1.83	0.42
1:A:242:ASN:ND2	1:A:245:GLU:HG3	2.34	0.42
1:B:326:ILE:O	1:B:330:PHE:N	2.46	0.42
1:A:209:PHE:O	1:A:213:ILE:HG13	2.19	0.42
1:A:29:VAL:HG22	7:A:523:HOH:O	2.18	0.42
1:A:170:PRO:HB2	1:A:177:TYR:CD2	2.55	0.42
1:B:165:LEU:O	1:B:168:ILE:HG22	2.19	0.42
1:B:73:ILE:HD11	6:B:1005:BOG:H5'2	2.02	0.42
1:B:136:VAL:HG11	7:B:528:HOH:O	2.19	0.42
1:A:233:GLU:O	1:A:237:MET:HG2	2.20	0.41
1:A:153:PHE:O	1:A:157:ILE:HG13	2.20	0.41
1:B:228:SER:O	1:B:231:GLU:HG2	2.19	0.41
1:A:100:LYS:HB2	1:A:100:LYS:HE2	1.93	0.41
1:A:342:LYS:HA	1:A:345:GLU:CG	2.50	0.41
1:B:83:PHE:O	1:B:87:ASN:HB2	2.19	0.41
1:B:117:ILE:HG22	1:B:167:ALA:CB	2.51	0.41
1:A:89:PHE:HA	1:A:90:PRO:HA	1.88	0.41
1:A:117:ILE:HG23	1:A:118:PHE:CD1	2.55	0.41
1:B:216:ILE:HG23	1:B:220:TYR:CE2	2.55	0.41
1:A:238:ALA:HA	1:A:246:LEU:HD22	2.03	0.41
1:A:293:THR:H	1:A:296:ALA:HB3	1.85	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:288:PRO:HB2	1:A:291:TRP:CD2	2.56	0.41
1:B:31:ASP:HB3	1:B:35:TYR:CZ	2.56	0.41
1:B:354:ILE:N	1:B:354:ILE:HD13	2.13	0.41
1:A:182:VAL:HG22	1:A:298:GLN:OE1	2.21	0.41
1:B:52:ASN:O	1:B:56:ILE:HG13	2.21	0.41
1:B:62:THR:HB	1:B:65:LEU:HD12	2.02	0.41
1:A:210:PHE:HA	1:A:213:ILE:HD12	2.02	0.41
1:A:319:HIS:HB3	1:A:322:PHE:HB3	2.02	0.41
1:A:180:GLU:OE1	1:A:277:TYR:OH	2.30	0.41
1:B:261:LYS:O	1:B:265:VAL:HG23	2.21	0.41
1:B:334:LEU:O	1:B:338:GLN:N	2.37	0.40
1:B:244:LYS:C	1:B:246:LEU:N	2.75	0.40
1:A:322:PHE:O	1:A:326:ILE:HG13	2.21	0.40
1:A:205:PHE:O	1:A:209:PHE:HB3	2.22	0.40
1:B:269:GLN:NE2	1:B:310:HIS:HD2	2.19	0.40
1:A:283:LEU:O	1:A:287:GLY:N	2.48	0.40
1:A:41:ILE:HG13	1:A:88:GLY:HA2	2.03	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	348/448 (78%)	316 (91%)	32 (9%)	0	100	100
1	B	345/448 (77%)	316 (92%)	27 (8%)	2 (1%)	30	59
All	All	693/896 (77%)	632 (91%)	59 (8%)	2 (0%)	46	75

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	338	GLN

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Mol	Chain	Res	Type
1	B	223	ILE

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	296/369 (80%)	283 (96%)	13 (4%)	35	65
1	B	295/369 (80%)	278 (94%)	17 (6%)	25	52
All	All	591/738 (80%)	561 (95%)	30 (5%)	29	59

All (30) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	55	VAL
1	A	66	GLN
1	A	76	LEU
1	A	85	LEU
1	A	90	PRO
1	A	105	PHE
1	A	123	ILE
1	A	150	ARG
1	A	234	MET
1	A	240	ARG
1	A	242	ASN
1	A	346	ASP
1	A	358	GLU
1	B	10	THR
1	B	66	GLN
1	B	76	LEU
1	B	85	LEU
1	B	102	ILE
1	B	105	PHE
1	B	117	ILE
1	B	123	ILE
1	B	133	ARG

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Mol	Chain	Res	Type
1	B	150	ARG
1	B	225	MET
1	B	242	ASN
1	B	245	GLU
1	B	247	ARG
1	B	303	PHE
1	B	335	THR
1	B	354	ILE

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	70	ASN
1	A	87	ASN
1	A	222	ASN
1	A	229	ASN
1	A	230	HIS
1	A	254	ASN
1	A	269	GLN
1	A	328	GLN
1	B	70	ASN
1	B	135	ASN
1	B	242	ASN
1	B	269	GLN
1	B	328	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

8 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	RET	A	1000	1	19,20,21	1.47	3 (15%)	27,27,28	1.20	4 (14%)
3	PLM	A	1001	-	16,16,17	0.38	0	14,15,17	0.63	0
3	PLM	A	1004	-	16,16,17	0.38	0	14,15,17	0.61	0
2	RET	B	1000	1	19,20,21	1.33	3 (15%)	27,27,28	1.14	4 (14%)
3	PLM	B	1001	-	16,16,17	0.45	0	14,15,17	0.59	0
5	PC1	B	1004	-	38,38,53	1.52	2 (5%)	39,43,61	0.95	1 (2%)
6	BOG	B	1005	-	20,20,20	1.78	7 (35%)	25,25,25	2.87	11 (44%)
4	SO4	B	449	-	4,4,4	0.22	0	6,6,6	0.10	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	RET	A	1000	1	-	0/13/30/31	0/1/1/1
3	PLM	A	1001	-	-	0/13/14/15	0/0/0/0
3	PLM	A	1004	-	-	0/13/14/15	0/0/0/0
2	RET	B	1000	1	-	0/13/30/31	0/1/1/1
3	PLM	B	1001	-	-	0/13/14/15	0/0/0/0
5	PC1	B	1004	-	-	0/42/42/57	0/0/0/0
6	BOG	B	1005	-	-	0/11/31/31	0/1/1/1
4	SO4	B	449	-	-	0/0/0/0	0/0/0/0

All (15) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	B	1005	BOG	C4-C5	-2.51	1.47	1.53
6	B	1005	BOG	C3-C2	-2.07	1.46	1.52
6	B	1005	BOG	O1-C1	-2.03	1.36	1.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	1000	RET	C7-C6	2.19	1.53	1.45
6	B	1005	BOG	O2-C2	2.27	1.48	1.43
2	A	1000	RET	C7-C6	2.31	1.54	1.45
6	B	1005	BOG	O6-C6	2.44	1.52	1.42
2	B	1000	RET	C5-C6	2.51	1.38	1.34
6	B	1005	BOG	C4-C3	2.59	1.59	1.52
2	A	1000	RET	C5-C6	2.80	1.38	1.34
2	B	1000	RET	C1-C6	3.73	1.59	1.53
6	B	1005	BOG	O5-C1	3.82	1.51	1.41
5	B	1004	PC1	O31-C31	3.90	1.45	1.33
2	A	1000	RET	C1-C6	4.51	1.60	1.53
5	B	1004	PC1	O21-C21	6.84	1.54	1.34

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	B	1005	BOG	C1'-O1-C1	-8.09	99.80	113.94
6	B	1005	BOG	O1-C1-C2	-5.71	100.83	108.04
6	B	1005	BOG	C1-C2-C3	-4.59	100.93	109.97
6	B	1005	BOG	O5-C5-C4	-4.10	101.98	109.68
6	B	1005	BOG	O3-C3-C2	-3.83	101.71	110.34
2	A	1000	RET	C19-C9-C10	-2.94	118.55	122.90
2	B	1000	RET	C19-C9-C10	-2.85	118.70	122.90
6	B	1005	BOG	C4'-C3'-C2'	-2.73	100.44	114.53
6	B	1005	BOG	O4-C4-C5	-2.59	102.37	109.24
6	B	1005	BOG	C3'-C2'-C1'	-2.57	101.97	113.47
6	B	1005	BOG	C6'-C5'-C4'	-2.55	101.36	114.53
6	B	1005	BOG	O1-C1'-C2'	-2.20	101.14	109.88
6	B	1005	BOG	C5'-C4'-C3'	-2.17	103.32	114.53
2	A	1000	RET	C18-C5-C6	2.17	126.74	124.61
2	B	1000	RET	C7-C8-C9	2.19	129.55	126.22
2	B	1000	RET	C18-C5-C6	2.22	126.78	124.61
2	A	1000	RET	C8-C9-C10	2.38	122.82	118.98
2	B	1000	RET	C8-C9-C10	2.51	123.02	118.98
2	A	1000	RET	C7-C8-C9	2.88	130.60	126.22
5	B	1004	PC1	O21-C21-C22	3.11	118.28	111.53

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

3 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	1000	RET	1	0
5	B	1004	PC1	1	0
6	B	1005	BOG	3	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	350/448 (78%)	0.63	38 (10%) 7 5	28, 51, 114, 136	0
1	B	347/448 (77%)	0.54	16 (4%) 36 35	27, 44, 96, 118	0
All	All	697/896 (77%)	0.59	54 (7%) 16 14	27, 48, 105, 136	0

All (54) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	239	LYS	7.3
1	A	237	MET	6.6
1	B	238	ALA	5.8
1	A	236	ALA	5.3
1	A	240	ARG	5.3
1	A	234	MET	5.3
1	A	241	LEU	5.1
1	A	238	ALA	4.9
1	A	246	LEU	4.6
1	B	241	LEU	4.3
1	A	141	MET	3.9
1	B	239	LYS	3.8
1	A	245	GLU	3.7
1	B	246	LEU	3.7
1	A	244	LYS	3.5
1	A	242	ASN	3.4
1	A	358	GLU	3.2
1	A	354	ILE	3.2
1	B	136	VAL	3.1
1	A	229	ASN	3.0
1	B	235	ALA	3.0
1	A	136	VAL	2.8
1	A	233	GLU	2.8
1	A	249	ALA	2.8

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Mol	Chain	Res	Type	RSRZ
1	A	349	ASP	2.7
1	A	235	ALA	2.7
1	A	250	GLN	2.7
1	A	248	LYS	2.6
1	B	230	HIS	2.6
1	B	355	PRO	2.6
1	A	348	LYS	2.6
1	B	237	MET	2.5
1	A	230	HIS	2.5
1	A	140	PRO	2.4
1	B	240	ARG	2.4
1	B	247	ARG	2.4
1	A	145	LYS	2.4
1	A	243	ALA	2.3
1	A	352	THR	2.3
1	A	346	ASP	2.3
1	A	221	PHE	2.3
1	A	232	LYS	2.2
1	A	247	ARG	2.2
1	A	228	SER	2.2
1	A	255	ALA	2.2
1	B	229	ASN	2.2
1	A	347	ASP	2.2
1	B	141	MET	2.1
1	B	242	ASN	2.1
1	B	251	ALA	2.1
1	B	234	MET	2.1
1	A	142	ALA	2.0
1	A	144	SER	2.0
1	A	353	GLU	2.0

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

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

6.3 Carbohydrates ⓘ

There are no 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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(Å ²)	Q<0.9
3	PLM	B	1001	17/18	0.84	0.39	6.67	45,65,68,69	0
6	BOG	B	1005	20/20	0.83	0.45	4.68	71,104,106,106	0
3	PLM	A	1001	17/18	0.91	0.28	4.02	49,58,64,65	0
2	RET	A	1000	20/21	0.94	0.32	3.76	43,51,57,57	0
5	PC1	B	1004	39/54	0.83	0.27	2.76	41,66,112,113	0
2	RET	B	1000	20/21	0.96	0.25	2.65	30,38,43,44	0
3	PLM	A	1004	17/18	0.88	0.26	2.37	67,72,76,76	0
4	SO4	B	449	5/5	0.96	0.17	-1.10	110,110,111,111	0

6.5 Other polymers [i](#)

There are no such residues in this entry.