



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 08:20 PM UTC

PDB ID : 3ZVR / pdb_00003zvr
Title : Crystal structure of Dynamin
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Deposited on : 2011-07-27
Resolution : 3.10 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

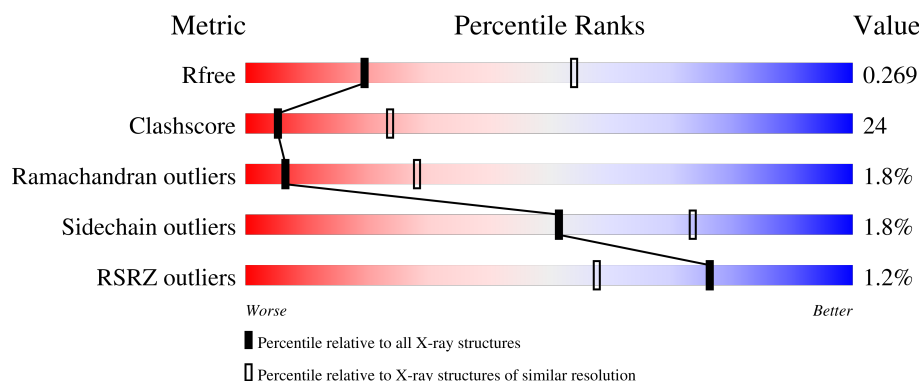
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.10 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	1456 (3.10-3.10)
Clashscore	190562	1539 (3.10-3.10)
Ramachandran outliers	187476	1467 (3.10-3.10)
Sidechain outliers	187428	1467 (3.10-3.10)
RSRZ outliers	180081	1456 (3.10-3.10)

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	772	

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	1PE	A	1745	-	-	X	-

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Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	1PE	A	1746	-	-	X	-

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 10950 atoms, of which 5490 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 DYNAMIN-1.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
1	A	669	10897	3419	5490	943	1018	27	5490	0	0

There are 21 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-19	MET	-	expression tag	UNP P21575
A	-18	GLY	-	expression tag	UNP P21575
A	-17	SER	-	expression tag	UNP P21575
A	-16	SER	-	expression tag	UNP P21575
A	-15	HIS	-	expression tag	UNP P21575
A	-14	HIS	-	expression tag	UNP P21575
A	-13	HIS	-	expression tag	UNP P21575
A	-12	HIS	-	expression tag	UNP P21575
A	-11	HIS	-	expression tag	UNP P21575
A	-10	HIS	-	expression tag	UNP P21575
A	-9	SER	-	expression tag	UNP P21575
A	-8	SER	-	expression tag	UNP P21575
A	-7	GLY	-	expression tag	UNP P21575
A	-6	LEU	-	expression tag	UNP P21575
A	-5	VAL	-	expression tag	UNP P21575
A	-4	PRO	-	expression tag	UNP P21575
A	-3	ARG	-	expression tag	UNP P21575
A	-2	GLY	-	expression tag	UNP P21575
A	-1	SER	-	expression tag	UNP P21575
A	0	HIS	-	expression tag	UNP P21575
A	397	ASP	GLY	engineered mutation	UNP P21575

- Molecule 2 is PENTAETHYLENE GLYCOL (CCD ID: 1PE) (formula: C₁₀H₂₂O₆).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			16	10	6		
2	A	1	Total	C	O	0	0
			16	10	6		
2	A	1	Total	C	O	0	0
			16	10	6		

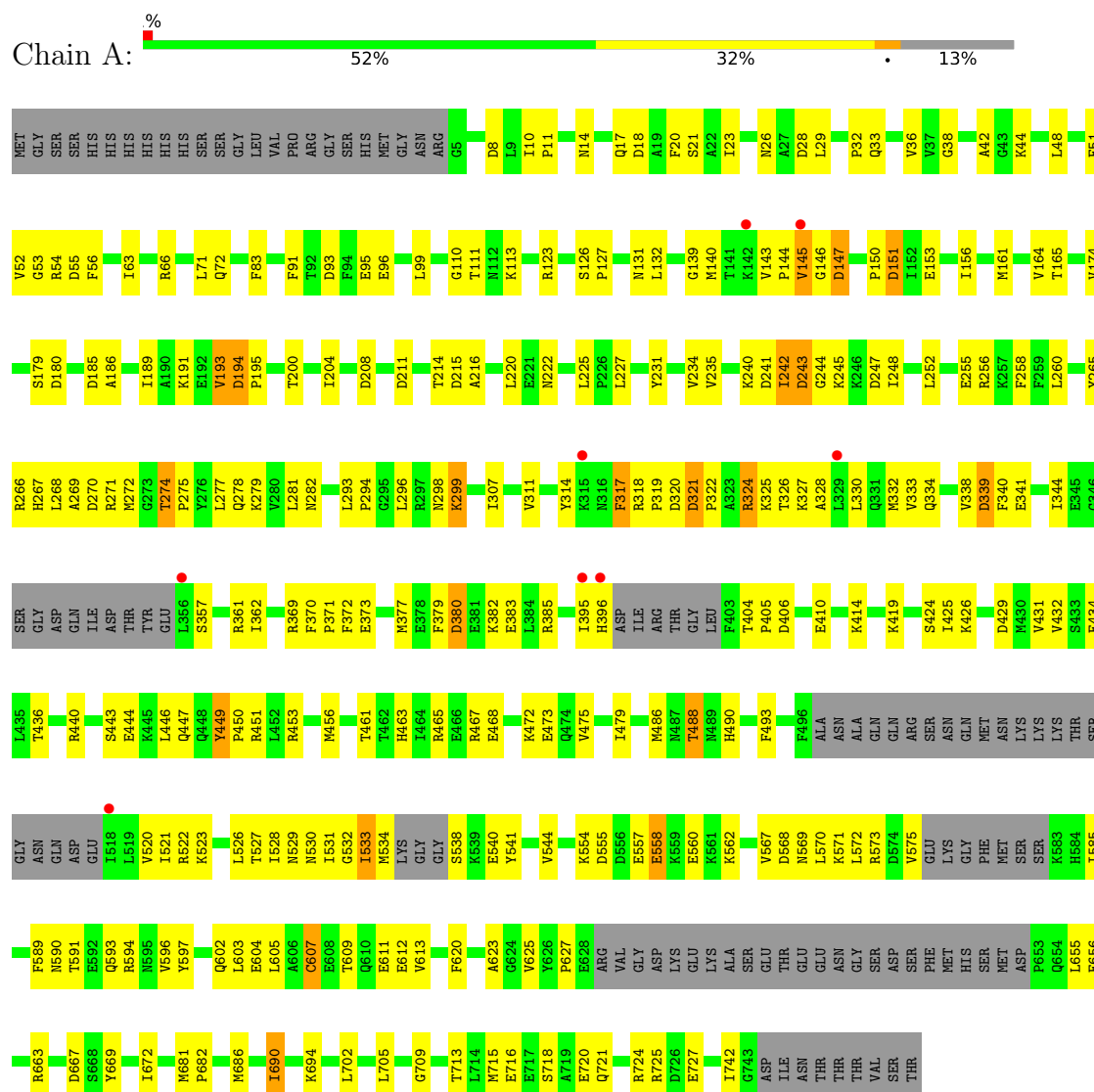
- Molecule 3 is water.

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

3 Residue-property plots

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: DYNAMIN-1



4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α , β , γ	178.45Å 191.61Å 60.52Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	95.81 – 3.10 95.81 – 3.10	Depositor EDS
% Data completeness (in resolution range)	96.7 (95.81-3.10) 96.7 (95.81-3.10)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.09 (at 3.13Å)	Xtriage
Refinement program	PHENIX (PHENIX.REFINE: 1.7.1_743)	Depositor
R, R_{free}	0.212 , 0.272 (Not available) , 0.269	Depositor DCC
R_{free} test set	956 reflections (5.10%)	wwPDB-VP
Wilson B-factor (Å ²)	101.7	Xtriage
Anisotropy	0.163	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 91.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	10950	wwPDB-VP
Average B, all atoms (Å ²)	113.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.26% 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: 1PE

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	0.51	0/5491	0.82	6/7395 (0.1%)

There are no bond length outliers.

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	299	LYS	N-CA-C	-5.67	104.31	111.11
1	A	193	VAL	N-CA-C	5.56	118.34	112.83
1	A	449	TYR	CA-C-N	5.13	124.31	118.97
1	A	449	TYR	C-N-CA	5.13	124.31	118.97
1	A	194	ASP	CA-C-N	5.13	124.85	119.82
1	A	194	ASP	C-N-CA	5.13	124.85	119.82

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	5407	5490	5479	265	0
2	A	48	0	66	35	0
3	A	5	0	0	2	0
All	All	5460	5490	5545	266	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 24.

All (266) 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:419:LYS:HE2	2:A:1745:1PE:H151	1.36	1.06
1:A:663:ARG:NH1	1:A:667:ASP:OD2	1.93	1.00
1:A:414:LYS:HE3	2:A:1746:1PE:H141	1.47	0.95
1:A:573:ARG:NH1	1:A:602:GLN:OE1	2.01	0.94
1:A:419:LYS:HE2	2:A:1745:1PE:C15	2.00	0.91
1:A:419:LYS:HE3	2:A:1745:1PE:H232	1.56	0.87
1:A:414:LYS:CE	2:A:1746:1PE:H141	2.07	0.83
1:A:414:LYS:HE2	2:A:1746:1PE:H131	1.58	0.83
1:A:379:PHE:CE1	2:A:1745:1PE:H162	2.13	0.83
1:A:414:LYS:HZ3	2:A:1746:1PE:H122	1.44	0.82
1:A:589:PHE:HA	1:A:596:VAL:HG11	1.71	0.72
1:A:530:ASN:HB2	1:A:604:GLU:HB3	1.71	0.72
1:A:379:PHE:HE1	2:A:1745:1PE:H162	1.53	0.72
1:A:451:ARG:NH1	1:A:716:GLU:OE1	2.22	0.72
1:A:414:LYS:HZ2	2:A:1746:1PE:H162	1.57	0.70
1:A:324:ARG:CZ	1:A:327:LYS:HD2	2.20	0.70
1:A:377:MET:HA	1:A:377:MET:HE2	1.73	0.69
1:A:373:GLU:HA	1:A:373:GLU:OE1	1.93	0.68
1:A:567:VAL:HA	1:A:570:LEU:HD12	1.74	0.68
1:A:318:ARG:HG3	1:A:449:TYR:OH	1.94	0.68
1:A:20:PHE:CE2	1:A:29:LEU:HD23	2.29	0.67
1:A:324:ARG:NE	1:A:327:LYS:HD2	2.08	0.67
1:A:275:PRO:O	1:A:279:LYS:HD3	1.96	0.66
1:A:200:THR:HB	1:A:227:LEU:HD22	1.79	0.65
1:A:369:ARG:O	1:A:372:PHE:N	2.29	0.65
1:A:414:LYS:NZ	2:A:1746:1PE:H141	2.13	0.64
1:A:333:VAL:HG12	2:A:1744:1PE:H151	1.80	0.64
1:A:334:GLN:HG2	2:A:1744:1PE:H152	1.78	0.64
1:A:554:LYS:HA	1:A:562:LYS:HZ2	1.63	0.63
1:A:318:ARG:CG	1:A:449:TYR:OH	2.47	0.63
1:A:414:LYS:NZ	2:A:1746:1PE:H251	2.13	0.63
1:A:419:LYS:NZ	2:A:1745:1PE:H262	2.13	0.62
1:A:532:GLY:C	1:A:534:MET:N	2.57	0.62
1:A:267:HIS:CD2	1:A:268:LEU:HG	2.35	0.62
1:A:414:LYS:NZ	2:A:1746:1PE:H162	2.15	0.62
1:A:414:LYS:HZ2	2:A:1746:1PE:H251	1.64	0.61
1:A:14:ASN:HA	1:A:17:GLN:HG3	1.82	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:557:GLU:O	1:A:558:GLU:HB2	2.00	0.61
1:A:220:LEU:HB3	1:A:272:MET:HE1	1.81	0.61
1:A:20:PHE:CD1	1:A:29:LEU:CD2	2.83	0.61
1:A:131:ASN:O	1:A:282:ASN:ND2	2.33	0.60
1:A:419:LYS:CE	2:A:1745:1PE:H262	2.31	0.60
1:A:528:ILE:HG22	1:A:531:ILE:H	1.65	0.60
1:A:14:ASN:HB2	1:A:72:GLN:NE2	2.16	0.60
1:A:596:VAL:HG23	1:A:597:TYR:N	2.17	0.59
1:A:20:PHE:CD1	1:A:29:LEU:HD21	2.38	0.59
1:A:42:ALA:HB1	1:A:174:VAL:HG12	1.84	0.59
1:A:330:LEU:C	1:A:330:LEU:HD23	2.26	0.59
1:A:532:GLY:O	1:A:534:MET:N	2.35	0.59
1:A:234:VAL:HG13	1:A:255:GLU:OE2	2.03	0.58
1:A:523:LYS:HE3	1:A:544:VAL:HG22	1.86	0.58
1:A:334:GLN:HG2	2:A:1744:1PE:H261	1.85	0.57
1:A:686:MET:HE2	1:A:686:MET:HA	1.86	0.57
1:A:20:PHE:CD2	1:A:29:LEU:HD23	2.40	0.57
1:A:20:PHE:CZ	1:A:29:LEU:HD23	2.40	0.57
1:A:361:ARG:HD3	1:A:434:GLU:OE1	2.05	0.56
1:A:720:GLU:HG3	1:A:721:GLN:N	2.20	0.56
1:A:328:ALA:CB	1:A:715:MET:HE1	2.36	0.56
1:A:377:MET:CE	2:A:1745:1PE:H242	2.36	0.56
1:A:32:PRO:HD3	1:A:296:LEU:HD22	1.88	0.55
1:A:270:ASP:HB3	1:A:271:ARG:NH1	2.21	0.55
1:A:419:LYS:CE	2:A:1745:1PE:H151	2.25	0.55
1:A:132:LEU:HD11	1:A:281:LEU:CB	2.36	0.55
1:A:575:VAL:CG2	1:A:585:ILE:HG22	2.36	0.55
1:A:321:ASP:HB2	1:A:322:PRO:CD	2.37	0.55
1:A:242:ILE:O	1:A:243:ASP:CB	2.54	0.55
1:A:436:THR:CG2	1:A:440:ARG:HE	2.20	0.55
1:A:314:TYR:CD1	1:A:725:ARG:HD3	2.42	0.54
1:A:20:PHE:CG	1:A:29:LEU:CD2	2.89	0.54
1:A:333:VAL:HG21	1:A:702:LEU:HD13	1.88	0.54
1:A:379:PHE:HD1	1:A:383:GLU:HG3	1.72	0.54
1:A:432:VAL:HG21	1:A:468:GLU:HG3	1.90	0.53
1:A:161:MET:O	1:A:165:THR:HG23	2.09	0.53
1:A:321:ASP:HB2	1:A:322:PRO:HD3	1.91	0.53
1:A:554:LYS:HB2	1:A:562:LYS:HE3	1.91	0.53
1:A:609:THR:OG1	1:A:612:GLU:HB2	2.08	0.53
1:A:686:MET:HE2	1:A:690:ILE:CG1	2.38	0.53
1:A:242:ILE:O	1:A:242:ILE:HG22	2.09	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:242:ILE:O	1:A:243:ASP:HB2	2.09	0.52
1:A:161:MET:HE2	1:A:189:ILE:HD12	1.91	0.52
1:A:333:VAL:HG22	1:A:456:MET:HE3	1.91	0.52
1:A:241:ASP:C	1:A:243:ASP:H	2.17	0.52
1:A:742:ILE:HG22	1:A:742:ILE:O	2.09	0.52
1:A:324:ARG:HG2	1:A:327:LYS:CE	2.39	0.52
1:A:220:LEU:C	1:A:222:ASN:H	2.17	0.52
1:A:541:TYR:CE1	1:A:562:LYS:HD3	2.45	0.52
1:A:575:VAL:HG23	1:A:585:ILE:HB	1.91	0.52
1:A:260:LEU:O	1:A:266:ARG:NH1	2.43	0.51
1:A:522:ARG:HG2	1:A:523:LYS:N	2.24	0.51
1:A:274:THR:HB	1:A:275:PRO:HD3	1.92	0.51
1:A:293:LEU:N	1:A:294:PRO:CD	2.74	0.51
1:A:328:ALA:HB1	1:A:715:MET:HE1	1.92	0.51
1:A:479:ILE:HD11	1:A:681:MET:HE3	1.91	0.51
1:A:523:LYS:HE3	1:A:544:VAL:CG2	2.41	0.51
1:A:324:ARG:O	1:A:326:THR:N	2.44	0.51
1:A:450:PRO:HG3	1:A:718:SER:HB3	1.93	0.50
1:A:55:ASP:HB2	1:A:245:LYS:HG2	1.93	0.50
1:A:603:LEU:HG	1:A:605:LEU:HD21	1.93	0.50
1:A:686:MET:CE	1:A:690:ILE:HG13	2.41	0.50
1:A:63:ILE:HD11	1:A:66:ARG:HG2	1.94	0.50
1:A:144:PRO:O	1:A:145:VAL:C	2.54	0.50
1:A:406:ASP:C	1:A:406:ASP:OD1	2.55	0.50
1:A:720:GLU:CG	1:A:721:GLN:H	2.25	0.50
1:A:208:ASP:HB3	1:A:258:PHE:CE1	2.48	0.49
1:A:414:LYS:NZ	2:A:1746:1PE:H122	2.22	0.49
1:A:720:GLU:CG	1:A:721:GLN:N	2.75	0.49
1:A:53:GLY:HA2	1:A:248:ILE:HD12	1.94	0.49
1:A:54:ARG:O	1:A:56:PHE:HD1	1.95	0.49
1:A:324:ARG:C	1:A:325:LYS:HG3	2.37	0.49
1:A:324:ARG:HG2	1:A:327:LYS:HD2	1.93	0.49
1:A:414:LYS:HZ1	2:A:1746:1PE:C14	2.25	0.49
1:A:395:ILE:O	1:A:396:HIS:C	2.56	0.49
1:A:456:MET:HG3	1:A:705:LEU:HD11	1.95	0.49
1:A:529:ASN:HA	1:A:538:SER:HB3	1.95	0.49
1:A:51:PHE:HA	1:A:278:GLN:NE2	2.27	0.49
1:A:419:LYS:HE2	2:A:1745:1PE:H262	1.95	0.49
1:A:132:LEU:HD11	1:A:281:LEU:HB2	1.95	0.49
1:A:150:PRO:O	1:A:153:GLU:N	2.44	0.49
1:A:720:GLU:HG3	1:A:721:GLN:H	1.77	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:20:PHE:CE1	1:A:29:LEU:HD21	2.48	0.48
1:A:379:PHE:CZ	2:A:1745:1PE:H162	2.47	0.48
1:A:533:ILE:C	1:A:534:MET:HG3	2.38	0.48
1:A:20:PHE:CE1	1:A:29:LEU:CD2	2.96	0.48
1:A:532:GLY:C	1:A:534:MET:H	2.20	0.48
1:A:36:VAL:HG12	1:A:44:LYS:HD2	1.96	0.48
1:A:164:VAL:HG23	1:A:193:VAL:HG21	1.95	0.48
1:A:414:LYS:HZ1	2:A:1746:1PE:H141	1.77	0.48
1:A:572:LEU:HD23	1:A:573:ARG:N	2.29	0.48
1:A:28:ASP:C	1:A:29:LEU:HD12	2.39	0.48
1:A:66:ARG:HH11	1:A:113:LYS:HA	1.77	0.48
1:A:479:ILE:CD1	1:A:681:MET:HE3	2.43	0.48
1:A:410:GLU:HG2	1:A:486:MET:HG3	1.96	0.47
1:A:414:LYS:HE2	2:A:1746:1PE:C13	2.37	0.47
1:A:132:LEU:HD11	1:A:281:LEU:HB3	1.95	0.47
1:A:240:LYS:HB2	1:A:247:ASP:HB3	1.95	0.47
1:A:333:VAL:HG22	1:A:456:MET:CE	2.43	0.47
1:A:490:HIS:CD2	1:A:672:ILE:HD13	2.49	0.47
1:A:260:LEU:HD23	1:A:269:ALA:CB	2.45	0.47
1:A:314:TYR:CE1	1:A:725:ARG:HD3	2.49	0.47
1:A:95:GLU:O	1:A:99:LEU:HG	2.15	0.47
1:A:225:LEU:O	1:A:231:TYR:OH	2.26	0.47
1:A:320:ASP:HA	1:A:325:LYS:HG2	1.97	0.47
1:A:611:GLU:O	1:A:612:GLU:C	2.56	0.47
1:A:93:ASP:OD1	1:A:93:ASP:C	2.58	0.47
1:A:380:ASP:OD1	1:A:383:GLU:HG2	2.15	0.47
1:A:220:LEU:C	1:A:222:ASN:N	2.73	0.46
1:A:204:ILE:HD12	1:A:220:LEU:CD2	2.45	0.46
1:A:324:ARG:CZ	1:A:327:LYS:CD	2.92	0.46
1:A:444:GLU:C	1:A:446:LEU:H	2.24	0.46
1:A:240:LYS:HB2	1:A:247:ASP:CB	2.45	0.46
1:A:424:SER:HB3	1:A:475:VAL:CG1	2.46	0.46
1:A:334:GLN:CG	2:A:1744:1PE:H152	2.44	0.46
1:A:362:ILE:HD12	1:A:431:VAL:HG22	1.97	0.46
1:A:341:GLU:HG3	1:A:694:LYS:CE	2.46	0.46
1:A:248:ILE:O	1:A:252:LEU:HG	2.15	0.46
1:A:742:ILE:O	1:A:742:ILE:CG2	2.63	0.46
1:A:33:GLN:NE2	3:A:2002:HOH:O	2.49	0.46
1:A:179:SER:O	1:A:180:ASP:C	2.58	0.46
1:A:10:ILE:N	1:A:11:PRO:HD2	2.30	0.46
1:A:338:VAL:O	1:A:339:ASP:C	2.60	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:523:LYS:NZ	1:A:558:GLU:OE2	2.39	0.45
1:A:620:PHE:HB3	1:A:625:VAL:HB	1.98	0.45
1:A:451:ARG:CZ	1:A:716:GLU:OE1	2.65	0.45
1:A:110:GLY:O	1:A:111:THR:HG23	2.17	0.45
1:A:527:THR:OG1	1:A:540:GLU:HB3	2.16	0.45
1:A:590:ASN:HB2	1:A:596:VAL:HG12	1.97	0.45
1:A:53:GLY:CA	1:A:248:ILE:HD12	2.47	0.45
1:A:528:ILE:HG21	1:A:531:ILE:HB	1.98	0.45
1:A:38:GLY:HA2	1:A:186:ALA:HB2	1.99	0.45
1:A:465:ARG:HA	1:A:465:ARG:HD2	1.80	0.45
1:A:705:LEU:O	1:A:709:GLY:HA3	2.16	0.45
1:A:451:ARG:HD2	1:A:713:THR:O	2.16	0.45
1:A:718:SER:HB2	1:A:720:GLU:HG2	1.98	0.44
1:A:589:PHE:CA	1:A:596:VAL:HG11	2.44	0.44
1:A:449:TYR:HA	1:A:450:PRO:HD2	1.81	0.44
1:A:721:GLN:HB3	1:A:725:ARG:HH11	1.81	0.44
1:A:44:LYS:HE2	3:A:2003:HOH:O	2.16	0.44
1:A:334:GLN:HE21	2:A:1744:1PE:H141	1.82	0.44
1:A:426:LYS:O	1:A:429:ASP:HB2	2.17	0.44
1:A:52:VAL:HG21	1:A:56:PHE:CE1	2.52	0.44
1:A:277:LEU:O	1:A:278:GLN:C	2.60	0.44
1:A:314:TYR:HA	1:A:317:PHE:HB2	1.98	0.44
1:A:332:MET:CE	1:A:446:LEU:HD23	2.47	0.44
1:A:235:VAL:HG11	1:A:258:PHE:CE2	2.53	0.44
1:A:211:ASP:HB2	1:A:214:THR:CG2	2.47	0.44
1:A:191:LYS:HE2	1:A:225:LEU:CD2	2.48	0.43
1:A:572:LEU:O	1:A:627:PRO:HA	2.19	0.43
1:A:541:TYR:CE1	1:A:562:LYS:CD	3.01	0.43
1:A:571:LYS:CD	1:A:591:THR:HG21	2.48	0.43
1:A:322:PRO:HG2	1:A:324:ARG:HB2	2.00	0.43
1:A:357:SER:O	1:A:361:ARG:HG3	2.18	0.43
1:A:472:LYS:O	1:A:473:GLU:C	2.62	0.43
1:A:268:LEU:HD13	1:A:272:MET:CE	2.48	0.43
1:A:298:ASN:O	1:A:299:LYS:C	2.62	0.43
1:A:404:THR:N	1:A:405:PRO:CD	2.81	0.43
2:A:1745:1PE:H141	2:A:1745:1PE:H152	1.71	0.43
1:A:146:GLY:O	1:A:147:ASP:O	2.36	0.43
1:A:332:MET:CE	1:A:446:LEU:CD2	2.97	0.43
1:A:443:SER:O	1:A:453:ARG:NE	2.52	0.43
1:A:715:MET:HE2	1:A:715:MET:HB3	1.90	0.43
1:A:718:SER:CB	1:A:720:GLU:HG2	2.49	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:318:ARG:NH2	1:A:725:ARG:NH1	2.67	0.43
1:A:533:ILE:O	1:A:534:MET:HG3	2.19	0.43
1:A:150:PRO:O	1:A:151:ASP:C	2.62	0.42
1:A:488:THR:CG2	1:A:488:THR:O	2.64	0.42
1:A:681:MET:HB2	1:A:682:PRO:HD3	2.01	0.42
1:A:83:PHE:HD2	1:A:91:PHE:CE1	2.37	0.42
1:A:554:LYS:NZ	1:A:555:ASP:OD2	2.52	0.42
1:A:17:GLN:O	1:A:21:SER:CB	2.67	0.42
1:A:140:MET:HE3	1:A:185:ASP:HB3	2.02	0.42
1:A:227:LEU:HD12	1:A:231:TYR:CZ	2.54	0.42
1:A:268:LEU:HD13	1:A:272:MET:HE3	2.01	0.42
1:A:370:PHE:HB3	1:A:371:PRO:HD3	2.01	0.42
1:A:590:ASN:CB	1:A:596:VAL:HG12	2.48	0.42
1:A:655:LEU:O	1:A:656:GLU:C	2.62	0.42
1:A:48:LEU:HD22	1:A:71:LEU:HD22	2.01	0.42
1:A:126:SER:HB2	1:A:127:PRO:HD2	2.02	0.42
1:A:328:ALA:HB3	1:A:715:MET:HE1	2.01	0.42
1:A:590:ASN:OD1	1:A:593:GLN:HG3	2.19	0.42
1:A:322:PRO:C	1:A:324:ARG:H	2.27	0.42
1:A:369:ARG:O	1:A:370:PHE:C	2.62	0.42
1:A:554:LYS:HE3	1:A:560:GLU:CD	2.44	0.42
1:A:382:LYS:O	1:A:385:ARG:HG3	2.19	0.42
1:A:686:MET:HE1	1:A:690:ILE:HG13	2.00	0.42
1:A:20:PHE:O	1:A:23:ILE:HG12	2.20	0.42
1:A:215:ASP:C	1:A:215:ASP:OD1	2.62	0.42
1:A:532:GLY:O	1:A:533:ILE:C	2.63	0.42
1:A:340:PHE:O	1:A:344:ILE:HG12	2.20	0.42
1:A:568:ASP:O	1:A:569:ASN:HB2	2.20	0.42
1:A:607:CYS:SG	1:A:613:VAL:HG22	2.59	0.42
1:A:379:PHE:CZ	2:A:1745:1PE:H261	2.54	0.42
1:A:596:VAL:CG2	1:A:597:TYR:N	2.82	0.42
1:A:377:MET:HE1	2:A:1745:1PE:C24	2.50	0.41
1:A:379:PHE:CE1	2:A:1745:1PE:C16	2.94	0.41
1:A:211:ASP:HB2	1:A:214:THR:HG21	2.02	0.41
1:A:493:PHE:CE1	1:A:669:TYR:HB2	2.56	0.41
1:A:541:TYR:HE1	1:A:562:LYS:HZ3	1.63	0.41
1:A:571:LYS:HD3	1:A:591:THR:CG2	2.50	0.41
1:A:216:ALA:O	1:A:220:LEU:HG	2.20	0.41
1:A:324:ARG:HG2	1:A:327:LYS:CD	2.50	0.41
1:A:590:ASN:OD1	1:A:593:GLN:CG	2.68	0.41
1:A:593:GLN:C	1:A:594:ARG:HG3	2.46	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:265:TYR:O	1:A:266:ARG:C	2.62	0.41
1:A:307:ILE:O	1:A:311:VAL:HG23	2.20	0.41
1:A:314:TYR:O	1:A:317:PHE:N	2.53	0.41
1:A:370:PHE:HB3	1:A:371:PRO:CD	2.51	0.41
1:A:479:ILE:CD1	1:A:681:MET:CE	2.98	0.41
1:A:51:PHE:CD1	1:A:274:THR:HG23	2.56	0.41
1:A:194:ASP:N	1:A:195:PRO:HD3	2.34	0.41
1:A:341:GLU:HG3	1:A:694:LYS:HE2	2.03	0.41
1:A:463:HIS:O	1:A:467:ARG:HG2	2.21	0.41
1:A:51:PHE:HA	1:A:278:GLN:HE21	1.86	0.41
1:A:143:VAL:O	1:A:143:VAL:HG23	2.21	0.41
1:A:419:LYS:HE2	2:A:1745:1PE:C26	2.51	0.41
1:A:93:ASP:HB3	1:A:96:GLU:CD	2.46	0.40
1:A:18:ASP:OD2	1:A:123:ARG:NH2	2.54	0.40
1:A:14:ASN:HB2	1:A:72:GLN:HG2	2.03	0.40
1:A:279:LYS:HD2	1:A:279:LYS:N	2.36	0.40
1:A:521:ILE:HD12	1:A:623:ALA:HB2	2.03	0.40
1:A:139:GLY:O	1:A:156:ILE:HG21	2.22	0.40
1:A:255:GLU:O	1:A:256:ARG:C	2.64	0.40
1:A:419:LYS:CE	2:A:1745:1PE:C26	3.00	0.40
1:A:447:GLN:C	1:A:449:TYR:N	2.77	0.40
1:A:724:ARG:O	1:A:727:GLU:HB2	2.22	0.40
1:A:8:ASP:HA	1:A:11:PRO:HG2	2.02	0.40
1:A:370:PHE:O	1:A:371:PRO:C	2.64	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	655/772 (85%)	579 (88%)	64 (10%)	12 (2%)	6	28

All (12) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	145	VAL
1	A	324	ARG
1	A	147	ASP
1	A	243	ASP
1	A	690	ILE
1	A	26	ASN
1	A	321	ASP
1	A	533	ILE
1	A	244	GLY
1	A	558	GLU
1	A	242	ILE
1	A	319	PRO

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	601/689 (87%)	590 (98%)	11 (2%)	51 73

All (11) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	151	ASP
1	A	274	THR
1	A	317	PHE
1	A	339	ASP
1	A	380	ASP
1	A	425	ILE
1	A	461	THR
1	A	488	THR
1	A	520	VAL
1	A	526	LEU
1	A	607	CYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such

sidechains are listed below:

Mol	Chain	Res	Type
1	A	17	GLN
1	A	26	ASN
1	A	33	GLN
1	A	72	GLN
1	A	282	ASN
1	A	334	GLN
1	A	474	GLN
1	A	490	HIS
1	A	529	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](#)

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

3 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	1PE	A	1746	-	15,15,15	0.54	0	14,14,14	1.90	6 (42%)
2	1PE	A	1745	-	15,15,15	0.56	0	14,14,14	1.85	5 (35%)
2	1PE	A	1744	-	15,15,15	0.63	0	14,14,14	1.62	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	1PE	A	1746	-	-	7/13/13/13	-
2	1PE	A	1745	-	-	8/13/13/13	-
2	1PE	A	1744	-	-	6/13/13/13	-

There are no bond length outliers.

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	1746	1PE	OH6-C26-C16	2.70	122.02	110.11
2	A	1745	1PE	OH3-C22-C12	2.55	121.34	110.11
2	A	1746	1PE	C26-OH6-C15	2.31	123.38	113.26
2	A	1745	1PE	OH6-C26-C16	2.26	120.08	110.11
2	A	1746	1PE	OH3-C22-C12	2.26	120.08	110.11
2	A	1746	1PE	C24-OH4-C13	2.21	122.94	113.26
2	A	1746	1PE	OH6-C15-C25	2.21	120.44	110.35
2	A	1745	1PE	OH5-C14-C24	2.12	120.03	110.35
2	A	1745	1PE	OH4-C24-C14	2.08	119.84	110.35
2	A	1745	1PE	OH3-C23-C13	2.02	119.57	110.35
2	A	1746	1PE	OH5-C14-C24	2.00	119.48	110.35

There are no chirality outliers.

All (21) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1745	1PE	C15-C25-OH5-C14
2	A	1744	1PE	C14-C24-OH4-C13
2	A	1745	1PE	OH6-C15-C25-OH5
2	A	1745	1PE	OH4-C13-C23-OH3
2	A	1746	1PE	OH4-C13-C23-OH3
2	A	1745	1PE	OH5-C14-C24-OH4
2	A	1744	1PE	OH4-C13-C23-OH3
2	A	1744	1PE	C13-C23-OH3-C22
2	A	1745	1PE	OH7-C16-C26-OH6
2	A	1744	1PE	C15-C25-OH5-C14
2	A	1746	1PE	C14-C24-OH4-C13
2	A	1745	1PE	C23-C13-OH4-C24
2	A	1746	1PE	OH7-C16-C26-OH6

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Mol	Chain	Res	Type	Atoms
2	A	1746	1PE	C12-C22-OH3-C23
2	A	1746	1PE	C24-C14-OH5-C25
2	A	1746	1PE	C15-C25-OH5-C14
2	A	1746	1PE	C13-C23-OH3-C22
2	A	1744	1PE	OH6-C15-C25-OH5
2	A	1745	1PE	C12-C22-OH3-C23
2	A	1744	1PE	OH5-C14-C24-OH4
2	A	1745	1PE	C14-C24-OH4-C13

There are no ring outliers.

3 monomers are involved in 35 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1746	1PE	13	0
2	A	1745	1PE	17	0
2	A	1744	1PE	5	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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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	669/772 (86%)	-0.21	8 (1%) 76 58	25, 54, 99, 147	0

All (8) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	356	LEU	3.7
1	A	395	ILE	2.7
1	A	396	HIS	2.6
1	A	315	LYS	2.2
1	A	145	VAL	2.1
1	A	329	LEU	2.1
1	A	518	ILE	2.1
1	A	142	LYS	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($\text{\AA}^2$)	Q<0.9
2	1PE	A	1746	16/16	0.82	0.13	85,88,91,91	0
2	1PE	A	1745	16/16	0.85	0.12	92,95,96,96	0
2	1PE	A	1744	16/16	0.95	0.10	75,76,77,77	16

6.5 Other polymers [i](#)

There are no such residues in this entry.