



Full wwPDB EM Validation Report ⓘ

Sep 14, 2025 – 12:23 AM JST

PDB ID : 9J7L / pdb_00009j7l
EMDB ID : EMD-61206
Title : Structure of AAV8 capsid in complex with receptor
Authors : Xu, H.; Wang, G.P.; Su, X.D.
Deposited on : 2024-08-19
Resolution : 2.89 Å(reported)

This is a Full wwPDB EM 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/EMValidationReportHelp>

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:

EMDB validation analysis : **FAILED**
MolProbity : 4-5-2 with Phenix2.0rc1
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : **FAILED**
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.45.1

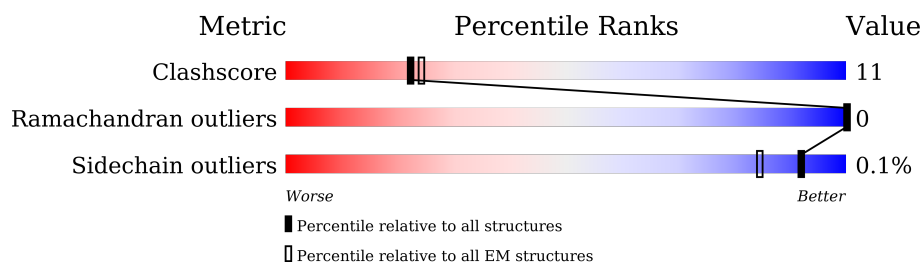
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 2.89 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)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the 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 $\leq 5\%$.

Mol	Chain	Length	Quality of chain
1	5	738	9% . 88%
1	6	738	40% 16% 44%
1	7	738	36% 12% 53%
1	c	738	12% 5% 83%
1	o	738	47% 18% 35%
1	p	738	18% 5% 77%
2	A	470	52% 21% 27%

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 15720 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 Capsid protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	5	88	Total	C	N	O	S	0	0
			681	423	119	136	3		
1	6	410	Total	C	N	O	S	0	0
			3336	2129	566	629	12		
1	7	347	Total	C	N	O	S	0	0
			2769	1768	472	519	10		
1	c	126	Total	C	N	O	S	0	0
			986	610	168	203	5		
1	o	481	Total	C	N	O	S	0	0
			3861	2449	664	735	13		
1	p	171	Total	C	N	O	S	0	0
			1352	862	239	246	5		

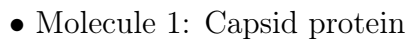
- Molecule 2 is a protein called Carboxypeptidase D.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	A	345	Total	C	N	O	S	0	0
			2735	1729	482	516	8		

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	494	HIS	-	expression tag	UNP O75976
A	495	HIS	-	expression tag	UNP O75976
A	496	HIS	-	expression tag	UNP O75976
A	497	HIS	-	expression tag	UNP O75976
A	498	HIS	-	expression tag	UNP O75976
A	499	HIS	-	expression tag	UNP O75976
A	500	HIS	-	expression tag	UNP O75976
A	501	HIS	-	expression tag	UNP O75976

WORLD WIDE
PDB
PROTEIN DATA BANK



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	43040	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	60	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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	5	0.17	0/693	0.29	0/941
1	6	0.18	0/3439	0.27	0/4679
1	7	0.18	0/2847	0.30	0/3870
1	c	0.18	0/1006	0.32	0/1369
1	o	0.19	0/3975	0.28	0/5413
1	p	0.17	0/1388	0.28	0/1873
2	A	0.13	0/2794	0.31	0/3781
All	All	0.17	0/16142	0.29	0/21926

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 [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	5	681	0	641	17	0
1	6	3336	0	3102	91	0
1	7	2769	0	2615	72	0
1	c	986	0	916	31	0
1	o	3861	0	3635	104	0
1	p	1352	0	1251	31	0
2	A	2735	0	2643	67	0
All	All	15720	0	14803	343	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 (343) 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)
2:A:92:ARG:NH1	2:A:185:ASP:OD1	2.16	0.79
1:6:232:ASP:H	1:6:243:THR:HG23	1.47	0.79
1:7:405:MET:SD	1:6:320:ASN:ND2	2.56	0.78
1:5:483:GLY:HA3	1:5:609:TRP:HB3	1.69	0.73
1:6:479:ASN:ND2	1:7:358:GLY:O	2.22	0.73
1:6:250:LEU:HB2	1:6:375:ILE:HD12	1.69	0.72
1:6:700:GLU:N	1:6:700:GLU:OE1	2.24	0.71
2:A:135:VAL:HG13	2:A:179:LEU:HD22	1.73	0.71
1:7:405:MET:HE1	1:6:680:GLN:HG2	1.73	0.70
1:7:405:MET:HE3	1:6:229:TRP:HB2	1.73	0.70
1:6:589:GLN:NE2	1:6:496:GLY:O	2.25	0.69
2:A:255:ASN:HD21	2:A:334:MET:HE2	1.58	0.68
1:6:526:MET:HE2	1:6:575:ALA:HA	1.75	0.68
2:A:285:ASP:OD2	2:A:289:LYS:NZ	2.27	0.67
1:7:382:THR:HG21	1:7:394:SER:H	1.60	0.67
1:6:382:THR:HG21	1:6:394:SER:H	1.60	0.67
1:6:435:ARG:NH2	1:6:272:ASP:O	2.29	0.66
1:6:338:ASN:ND2	1:6:675:GLN:OE1	2.28	0.65
1:6:443:GLN:NE2	1:7:359:SER:O	2.29	0.65
1:6:383:LEU:HD12	1:6:392:ARG:HB3	1.79	0.65
1:6:263:ASN:O	1:6:274:THR:HA	1.96	0.65
1:6:601:GLN:OE1	1:6:600:SER:OG	2.15	0.64
1:6:510:LYS:HB3	1:6:519:LEU:HD23	1.79	0.64
1:7:660:PRO:HG2	1:6:251:PRO:HB3	1.80	0.64
1:6:291:HIS:HD2	1:6:617:GLN:HA	1.62	0.64
1:6:315:SER:HB2	1:6:684:GLU:HG2	1.79	0.63
1:7:338:ASN:ND2	1:7:675:GLN:OE1	2.31	0.63
1:7:342:THR:HG22	1:7:407:ARG:HG2	1.79	0.63
1:5:587:GLN:NE2	1:6:490:ARG:O	2.26	0.63
2:A:62:GLU:OE1	1:6:590:ASN:ND2	2.30	0.63
1:6:289:ARG:HH21	1:6:617:GLN:HB3	1.64	0.63
1:6:487:ARG:NH1	1:6:599:ASN:OD1	2.26	0.62
1:7:247:THR:HB	1:7:372:VAL:HG22	1.79	0.62
1:5:601:GLN:OE1	1:6:600:SER:OG	2.17	0.62
1:7:416:TYR:OH	1:7:644:HIS:O	2.16	0.61
1:7:400:TYR:OH	1:6:298:ASP:OD2	2.18	0.60
2:A:98:ARG:NH1	2:A:122:ALA:O	2.34	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:6:707:TYR:OH	1:o:566:GLU:OE1	2.18	0.60
2:A:369:ASN:HB3	2:A:373:LEU:HD23	1.84	0.60
1:o:306:ASN:O	1:o:426:SER:OG	2.19	0.60
1:7:657:PRO:HG3	1:o:372:VAL:HG11	1.83	0.59
1:o:479:ASN:ND2	1:p:358:GLY:O	2.35	0.59
2:A:312:ASP:OD1	2:A:313:GLU:N	2.32	0.59
2:A:137:ASN:HB3	2:A:181:SER:HA	1.82	0.59
2:A:255:ASN:O	2:A:349:LEU:N	2.35	0.59
1:o:601:GLN:OE1	1:p:600:SER:OG	2.18	0.59
2:A:166:ARG:NH2	2:A:371:GLU:OE1	2.30	0.59
1:o:505:TRP:O	1:o:510:LYS:NZ	2.35	0.59
1:o:584:ASP:OD1	1:p:599:ASN:ND2	2.36	0.59
1:7:272:ASP:HA	1:7:516:ARG:HG3	1.85	0.59
2:A:215:ASP:HB3	2:A:218:ARG:HB2	1.84	0.58
1:6:452:GLN:HA	1:6:461:GLN:HA	1.84	0.58
2:A:149:LEU:HD21	2:A:256:LEU:HD13	1.86	0.58
1:o:382:THR:HG22	1:o:383:LEU:H	1.69	0.58
1:5:587:GLN:HB3	1:5:593:PRO:HB3	1.84	0.58
1:6:421:VAL:HG21	1:6:640:PHE:HB3	1.84	0.58
1:c:479:ASN:ND2	1:o:358:GLY:O	2.37	0.58
1:7:288:ASN:O	1:7:620:ILE:N	2.37	0.58
2:A:265:TYR:HB2	2:A:288:PHE:HB3	1.85	0.57
1:p:519:LEU:HG	1:p:540:ASN:HD22	1.68	0.57
2:A:142:GLU:OE1	2:A:257:HIS:ND1	2.38	0.57
1:o:272:ASP:HA	1:o:516:ARG:HG3	1.85	0.57
1:o:435:ARG:HD2	1:p:381:LEU:HD13	1.86	0.57
1:6:366:PRO:HG3	1:6:373:PHE:HB3	1.86	0.57
2:A:137:ASN:HD21	2:A:187:PHE:HB2	1.69	0.57
1:c:572:ASN:HD21	1:c:609:TRP:HB2	1.69	0.57
1:6:698:ASN:HD22	1:o:713:VAL:HG11	1.70	0.57
1:7:338:ASN:OD1	1:o:337:ASN:ND2	2.35	0.56
2:A:159:GLY:HA3	2:A:167:LEU:HD12	1.87	0.56
1:6:300:GLN:NE2	1:6:703:TYR:O	2.32	0.56
1:7:382:THR:HG22	1:7:383:LEU:H	1.71	0.56
2:A:350:GLU:OE2	2:A:350:GLU:N	2.38	0.56
2:A:413:THR:HG22	2:A:419:PHE:HB3	1.87	0.56
1:o:470:PRO:HA	1:o:473:MET:HE3	1.86	0.56
1:7:320:ASN:HB2	1:7:680:GLN:HG2	1.87	0.56
1:5:589:GLN:HA	1:6:499:ASN:HA	1.86	0.56
1:6:695:LYS:NZ	1:7:400:TYR:O	2.25	0.56
1:o:421:VAL:HG21	1:o:640:PHE:HB3	1.87	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:6:298:ASP:OD2	1:p:400:TYR:OH	2.24	0.55
1:6:698:ASN:HD22	1:o:713:VAL:CG1	2.19	0.55
1:5:443:GLN:NE2	1:6:359:SER:O	2.39	0.55
1:6:437:MET:HE1	1:6:478:LYS:HE3	1.89	0.55
1:o:481:LEU:HB2	1:o:607:MET:HG2	1.87	0.55
1:c:443:GLN:NE2	1:o:359:SER:O	2.36	0.55
2:A:90:GLU:OE2	2:A:90:GLU:N	2.40	0.55
2:A:280:SER:O	2:A:323:ASN:ND2	2.36	0.55
1:c:485:CYS:HB2	1:c:579:TYR:HB2	1.89	0.55
2:A:80:ALA:HB1	2:A:97:LEU:HD11	1.90	0.55
1:c:583:ALA:HB3	1:o:487:ARG:HG2	1.89	0.54
1:o:623:LYS:HB2	1:o:645:PRO:HG3	1.89	0.54
1:6:528:THR:HG23	1:6:538:PRO:HD2	1.90	0.54
1:7:324:LYS:NZ	1:7:337:ASN:OD1	2.40	0.54
1:c:581:ILE:HB	1:o:510:LYS:HB2	1.90	0.54
1:6:416:TYR:OH	1:6:644:HIS:O	2.22	0.54
1:7:419:GLU:OE1	1:7:643:LYS:N	2.41	0.54
1:c:483:GLY:HA3	1:c:609:TRP:HB3	1.90	0.54
2:A:418:ASP:OD1	2:A:418:ASP:N	2.40	0.54
1:6:696:ARG:NE	1:6:698:ASN:OD1	2.40	0.54
1:6:604:LEU:HD22	1:7:524:ILE:HD13	1.90	0.53
1:6:714:ASP:OD2	1:6:727:ARG:NH2	2.41	0.53
1:c:425:SER:HB2	1:c:427:TYR:CE2	2.44	0.53
1:6:483:GLY:HA3	1:6:609:TRP:HB3	1.90	0.53
2:A:261:VAL:HA	2:A:350:GLU:O	2.08	0.53
1:p:603:ALA:HA	1:p:607:MET:HE1	1.90	0.53
1:7:282:TRP:NE1	1:7:399:GLU:OE1	2.40	0.53
1:c:604:LEU:HD22	1:o:524:ILE:HD13	1.90	0.53
1:5:479:ASN:ND2	1:6:358:GLY:O	2.40	0.53
1:6:432:SER:HA	1:6:570:THR:HB	1.90	0.53
1:7:617:GLN:HE22	1:7:728:PRO:HA	1.74	0.53
1:o:561:MET:HB3	1:o:728:PRO:HD3	1.90	0.53
1:p:623:LYS:HB2	1:p:645:PRO:HG3	1.91	0.53
1:c:463:LEU:HG	1:o:495:THR:HG22	1.91	0.53
1:6:623:LYS:HB2	1:6:645:PRO:HG3	1.91	0.53
1:7:505:TRP:O	1:7:510:LYS:NZ	2.37	0.53
1:6:231:CYS:HA	1:6:244:SER:HA	1.90	0.53
1:6:608:VAL:HG12	1:7:630:ASN:HB3	1.91	0.52
1:7:321:ILE:HD13	1:7:343:ILE:HD11	1.91	0.52
1:7:280:THR:OG1	1:7:378:TYR:O	2.23	0.52
2:A:70:GLU:OE2	2:A:154:ARG:NH2	2.42	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:6:426:SER:HB2	1:6:731:THR:HG22	1.91	0.52
1:5:462:THR:HA	2:A:274:LYS:HE3	1.92	0.51
1:6:232:ASP:OD1	1:6:233:SER:N	2.38	0.51
1:o:565:GLU:O	1:o:568:ILE:HG12	2.11	0.51
1:o:738:LEU:HD22	1:p:625:PRO:HB3	1.92	0.51
1:o:576:THR:OG1	1:o:577:GLU:OE1	2.27	0.51
2:A:295:TYR:CE2	2:A:302:MET:HE1	2.45	0.51
1:o:416:TYR:OH	1:o:644:HIS:O	2.20	0.51
1:5:600:SER:OG	1:7:601:GLN:OE1	2.28	0.51
1:6:510:LYS:HA	1:6:519:LEU:HA	1.93	0.51
1:o:424:HIS:CE1	1:o:614:VAL:HG13	2.46	0.51
1:o:317:LYS:NZ	1:o:413:GLN:OE1	2.44	0.51
2:A:251:VAL:HG11	2:A:420:TYR:HB2	1.93	0.50
1:7:355:TYR:CE2	1:7:357:LEU:HB2	2.47	0.50
1:o:604:LEU:H	1:o:607:MET:HE2	1.75	0.50
1:p:254:ASN:O	1:p:259:LYS:NZ	2.45	0.50
1:5:477:ALA:HA	1:6:521:ASN:HB3	1.92	0.50
1:7:524:ILE:HA	1:7:636:LEU:HD22	1.94	0.50
1:6:613:ASP:OD1	1:6:731:THR:HB	2.11	0.50
1:7:366:PRO:HG3	1:7:373:PHE:HB3	1.92	0.50
2:A:125:LEU:HD21	2:A:131:GLN:HE21	1.76	0.50
1:o:431:GLN:HE22	1:p:354:PRO:HB3	1.76	0.50
1:5:608:VAL:HG12	1:6:630:ASN:HB3	1.94	0.50
1:c:574:VAL:HG12	1:c:576:THR:H	1.77	0.50
1:7:320:ASN:O	1:7:322:GLN:NE2	2.44	0.50
1:7:382:THR:HG22	1:7:383:LEU:N	2.27	0.50
1:p:280:THR:OG1	1:p:378:TYR:O	2.22	0.50
1:5:473:MET:HA	1:5:476:GLN:HG3	1.94	0.49
1:7:348:ASP:OD2	1:7:353:LEU:N	2.44	0.49
1:6:254:ASN:ND2	1:6:279:SER:O	2.46	0.49
1:6:561:MET:HB3	1:6:728:PRO:HD3	1.94	0.49
2:A:249:LYS:HZ1	2:A:414:GLY:HA2	1.77	0.49
2:A:266:PRO:HD2	2:A:288:PHE:CG	2.48	0.49
1:7:291:HIS:HD2	1:7:617:GLN:HA	1.77	0.49
1:7:503:PHE:HB2	1:7:507:ALA:HB3	1.94	0.49
2:A:67:ALA:O	2:A:70:GLU:HG3	2.13	0.49
2:A:295:TYR:CZ	2:A:349:LEU:HD13	2.48	0.48
1:o:613:ASP:OD1	1:o:731:THR:HB	2.13	0.48
1:6:289:ARG:HH21	1:6:617:GLN:HB3	1.78	0.48
2:A:284:ASP:OD1	2:A:421:ARG:NH2	2.46	0.48
1:o:617:GLN:HE22	1:o:728:PRO:HA	1.78	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:o:492:SER:HB2	1:o:536:PHE:CE1	2.48	0.48
1:c:448:LEU:HD11	1:c:463:LEU:HD22	1.96	0.48
1:o:318:LEU:HD21	1:o:651:ILE:HD12	1.94	0.48
2:A:194:ASP:OD1	2:A:195:CYS:N	2.47	0.48
1:7:519:LEU:CD1	1:7:540:ASN:HD22	2.26	0.48
1:o:431:GLN:NE2	1:p:354:PRO:HB3	2.29	0.48
1:6:346:PHE:HB3	1:6:403:SER:HA	1.96	0.48
1:6:530:LYS:HB3	1:6:574:VAL:HG21	1.96	0.48
1:o:525:ALA:O	1:o:572:ASN:ND2	2.47	0.48
1:o:706:ASN:HB3	1:o:708:TYR:CE1	2.49	0.48
2:A:273:HIS:CE1	2:A:331:GLU:HG3	2.49	0.48
1:o:604:LEU:HD22	1:p:524:ILE:HD13	1.96	0.48
1:6:253:TYR:OH	1:6:375:ILE:O	2.21	0.47
1:o:527:ALA:HB3	1:o:574:VAL:HA	1.94	0.47
1:c:527:ALA:HB3	1:c:574:VAL:HA	1.95	0.47
1:o:250:LEU:HD22	1:o:651:ILE:HG12	1.95	0.47
1:7:399:GLU:O	1:o:229:TRP:NE1	2.41	0.47
2:A:375:THR:HA	2:A:378:GLU:HG2	1.95	0.47
1:5:439:PRO:HB3	1:6:381:LEU:HD21	1.97	0.47
1:6:439:PRO:HB3	1:7:381:LEU:HD21	1.97	0.47
1:7:291:HIS:CD2	1:7:617:GLN:HA	2.50	0.47
2:A:264:SER:HA	2:A:322:THR:O	2.14	0.47
1:6:233:SER:HA	1:6:241:ILE:O	2.14	0.47
1:o:366:PRO:HG3	1:o:373:PHE:HB3	1.97	0.47
1:o:483:GLY:HA3	1:o:609:TRP:HB3	1.97	0.47
1:o:382:THR:HG22	1:o:383:LEU:N	2.30	0.47
1:o:509:THR:H	1:o:540:ASN:HD21	1.63	0.47
1:6:565:GLU:O	1:6:568:ILE:HG12	2.14	0.47
1:c:485:CYS:CB	1:c:579:TYR:HB2	2.43	0.47
1:o:314:LEU:HD21	1:o:646:PRO:HB3	1.97	0.47
1:o:226:SER:HB3	1:o:320:ASN:H	1.81	0.46
1:7:657:PRO:HG2	1:o:249:ALA:HB2	1.97	0.46
1:c:435:ARG:HD2	1:o:381:LEU:HD13	1.97	0.46
1:o:419:GLU:OE2	1:o:643:LYS:N	2.47	0.46
1:6:510:LYS:HD3	1:6:517:ASN:HB3	1.98	0.46
2:A:159:GLY:HA2	2:A:162:ARG:HG2	1.97	0.46
2:A:275:ALA:O	2:A:329:ASP:N	2.45	0.46
1:c:581:ILE:HG22	1:c:595:ILE:HD11	1.97	0.46
1:o:443:GLN:NE2	1:p:359:SER:O	2.47	0.46
1:6:585:ASN:OD1	1:6:594:GLN:N	2.43	0.46
1:6:314:LEU:HA	1:6:684:GLU:O	2.16	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:6:570:THR:HG22	1:7:383:LEU:HD21	1.97	0.46
1:7:258:TYR:O	1:7:721:GLY:HA2	2.15	0.46
2:A:192:GLU:HA	2:A:356:TYR:CE1	2.51	0.46
1:7:226:SER:OG	1:7:411:ASN:HB3	2.15	0.46
1:6:448:LEU:HD11	1:6:463:LEU:HD22	1.96	0.46
1:6:263:ASN:HB2	1:6:275:TYR:CE2	2.50	0.46
1:7:312:LYS:HD2	1:7:312:LYS:HA	1.70	0.46
1:7:254:ASN:ND2	1:7:259:LYS:HD2	2.30	0.46
2:A:160:TYR:HA	2:A:168:VAL:HG22	1.98	0.46
2:A:347:ILE:HD12	2:A:349:LEU:HD21	1.98	0.46
2:A:388:VAL:HG12	2:A:457:PHE:HD2	1.80	0.46
1:7:603:ALA:HA	1:7:607:MET:HE2	1.97	0.46
2:A:306:GLU:H	2:A:306:GLU:CD	2.25	0.45
1:7:432:SER:HA	1:7:570:THR:HB	1.99	0.45
1:7:624:ILE:HD12	1:7:643:LYS:HG2	1.98	0.45
1:6:565:GLU:OE2	1:6:615:TYR:OH	2.21	0.45
2:A:295:TYR:HE2	2:A:302:MET:HE1	1.82	0.45
2:A:400:ALA:HB2	2:A:434:LEU:HD22	1.99	0.45
1:7:291:HIS:CD2	1:7:617:GLN:HA	2.51	0.45
1:7:528:THR:HG23	1:7:538:PRO:HD2	1.97	0.45
1:6:305:ASN:HA	1:6:734:LEU:HD11	1.98	0.45
1:6:437:MET:HB2	1:7:361:HIS:NE2	2.32	0.45
1:7:254:ASN:HB3	1:7:259:LYS:NZ	2.30	0.45
1:6:447:TYR:OH	1:6:472:THR:HG21	2.17	0.45
1:6:601:GLN:OE1	1:7:600:SER:OG	2.31	0.45
1:7:527:ALA:O	1:7:575:ALA:N	2.37	0.45
1:7:276:PHE:HB3	1:7:384:ASN:HB3	1.99	0.45
1:7:623:LYS:HB2	1:7:645:PRO:HG3	1.97	0.45
1:7:318:LEU:HB3	1:7:412:PHE:HB3	1.99	0.45
1:7:519:LEU:HD11	1:7:540:ASN:HD22	1.81	0.45
1:7:477:ALA:HA	1:7:521:ASN:HB3	1.99	0.45
1:7:565:GLU:OE2	1:7:615:TYR:OH	2.24	0.45
1:7:512:HIS:NE2	1:7:515:GLY:HA2	2.32	0.44
1:6:271:ASN:OD1	1:6:271:ASN:N	2.50	0.44
2:A:421:ARG:NH1	2:A:422:LEU:O	2.49	0.44
1:7:529:HIS:CE1	1:7:534:GLU:HG3	2.52	0.44
1:6:553:ASP:N	1:6:553:ASP:OD1	2.49	0.44
1:7:346:PHE:HB3	1:7:403:SER:HA	1.99	0.44
1:6:262:SER:OG	1:6:263:ASN:N	2.51	0.44
1:6:357:LEU:HD13	1:6:648:GLN:HB3	2.00	0.44
1:6:453:THR:OG1	1:6:460:THR:N	2.50	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:o:608:VAL:HG12	1:p:630:ASN:HB3	1.97	0.44
1:6:696:ARG:NH1	1:7:394:SER:OG	2.50	0.44
1:c:572:ASN:ND2	1:c:609:TRP:HB2	2.32	0.44
1:p:258:TYR:OH	1:p:399:GLU:OE1	2.31	0.44
1:p:519:LEU:HG	1:p:540:ASN:ND2	2.32	0.44
1:o:696:ARG:NH1	1:p:394:SER:OG	2.50	0.44
1:p:421:VAL:HG11	1:p:642:LEU:HD23	1.99	0.44
1:7:406:LEU:HD21	1:7:412:PHE:HB2	1.99	0.44
2:A:61:GLU:OE2	2:A:92:ARG:NH2	2.47	0.44
1:5:466:SER:HA	1:6:553:ASP:HA	2.00	0.44
1:7:254:ASN:HD22	1:7:259:LYS:HD2	1.83	0.44
2:A:64:LEU:HB2	2:A:146:ARG:HH21	1.83	0.44
1:6:721:GLY:HA2	1:p:258:TYR:O	2.18	0.43
1:7:528:THR:HG23	1:7:538:PRO:HD2	1.99	0.43
1:o:247:THR:HB	1:o:372:VAL:HG22	1.99	0.43
1:o:435:ARG:HA	1:o:435:ARG:HD3	1.76	0.43
1:c:604:LEU:HB3	1:o:524:ILE:HG21	1.98	0.43
1:6:617:GLN:HE22	1:6:728:PRO:HA	1.83	0.43
1:7:553:ASP:OD1	1:7:553:ASP:N	2.52	0.43
2:A:267:PHE:CG	2:A:282:THR:HG22	2.52	0.43
2:A:359:ALA:HA	2:A:362:LEU:HG	2.01	0.43
1:p:522:PRO:HA	1:p:540:ASN:O	2.18	0.43
1:7:659:ASP:OD1	1:7:659:ASP:N	2.51	0.43
2:A:170:LEU:HD21	2:A:377:ILE:HB	1.99	0.43
1:6:472:THR:HG22	1:6:475:ASN:HB2	2.00	0.43
1:o:701:ILE:HG22	1:o:733:TYR:HD1	1.84	0.43
1:6:259:LYS:HB3	1:6:259:LYS:HE3	1.82	0.43
1:o:342:THR:HA	1:o:406:LEU:O	2.18	0.43
1:5:451:THR:HG21	1:6:503:PHE:CE2	2.54	0.43
1:6:471:ASN:OD1	1:7:263:ASN:ND2	2.53	0.42
1:6:692:GLU:HG2	1:6:734:LEU:HD13	2.01	0.42
1:c:470:PRO:HA	1:c:473:MET:HE3	2.01	0.42
1:6:312:LYS:HB3	1:6:312:LYS:HE3	1.76	0.42
1:6:529:HIS:CE1	1:6:534:GLU:HG3	2.54	0.42
1:o:604:LEU:HB2	1:o:607:MET:HG3	2.01	0.42
2:A:125:LEU:CD2	2:A:131:GLN:HE21	2.30	0.42
1:c:451:THR:OG1	1:o:501:SER:O	2.37	0.42
1:o:338:ASN:ND2	1:o:341:SER:OG	2.53	0.42
1:o:530:LYS:HB3	1:o:574:VAL:HG21	2.01	0.42
1:7:325:GLU:HG3	1:7:338:ASN:HB2	2.00	0.42
1:7:424:HIS:CE1	1:7:614:VAL:HG13	2.55	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:o:544:ILE:HG23	1:o:562:LEU:HD23	2.01	0.42
1:6:239:ARG:NE	1:6:686:GLU:OE2	2.36	0.42
2:A:75:GLY:C	2:A:161:ARG:HH21	2.28	0.42
1:6:291:HIS:N	1:6:616:LEU:O	2.53	0.42
1:6:495:THR:HA	1:6:498:ASN:HD22	1.85	0.42
2:A:61:GLU:OE2	2:A:92:ARG:NE	2.43	0.42
1:o:321:ILE:HD13	1:o:343:ILE:HD11	2.02	0.42
1:o:469:GLY:H	1:o:472:THR:HG23	1.83	0.42
1:o:609:TRP:HE1	1:o:632:HIS:CD2	2.36	0.42
1:6:486:TYR:O	1:6:526:MET:HE1	2.20	0.42
1:o:579:TYR:HB3	1:o:598:VAL:HG23	2.02	0.42
1:6:288:ASN:O	1:6:619:PRO:HA	2.20	0.42
1:o:314:LEU:HA	1:o:684:GLU:O	2.19	0.42
1:o:479:ASN:OD1	1:p:637:MET:HB2	2.19	0.42
1:7:263:ASN:O	1:7:274:THR:HA	2.19	0.41
2:A:61:GLU:C	2:A:63:GLU:H	2.27	0.41
2:A:300:PRO:HA	2:A:303:LYS:NZ	2.35	0.41
1:6:291:HIS:CD2	1:6:617:GLN:HA	2.49	0.41
1:7:311:PRO:HA	1:7:687:TRP:HA	2.01	0.41
2:A:145:SER:O	2:A:149:LEU:HD23	2.20	0.41
1:c:567:GLU:OE2	1:c:567:GLU:N	2.44	0.41
1:o:356:VAL:HG11	1:o:379:GLY:O	2.20	0.41
1:6:461:GLN:H	1:6:461:GLN:HG3	1.71	0.41
2:A:312:ASP:OD2	2:A:315:GLU:HB2	2.20	0.41
1:o:346:PHE:HB3	1:o:403:SER:HA	2.01	0.41
1:o:509:THR:N	1:o:540:ASN:HD21	2.18	0.41
1:p:272:ASP:HA	1:p:516:ARG:HG2	2.02	0.41
1:p:290:PHE:CE2	1:p:620:ILE:HA	2.55	0.41
1:6:244:SER:HB2	1:6:246:ARG:NH1	2.36	0.41
1:6:453:THR:HG1	1:6:460:THR:N	2.18	0.41
2:A:216:LEU:HD22	2:A:238:VAL:HG23	2.01	0.41
2:A:305:GLY:HA3	2:A:317:PHE:O	2.20	0.41
1:6:374:MET:HB3	1:p:669:LEU:HD11	2.02	0.41
1:6:466:SER:HA	1:7:553:ASP:HA	2.02	0.41
1:7:717:VAL:HB	1:7:721:GLY:HA2	2.03	0.41
1:o:288:ASN:O	1:o:619:PRO:HA	2.20	0.41
1:o:632:HIS:O	1:o:634:SER:N	2.49	0.41
1:p:632:HIS:O	1:p:634:SER:N	2.51	0.41
1:5:473:MET:HE3	1:5:473:MET:HB2	1.91	0.41
1:6:258:TYR:HA	1:6:279:SER:O	2.21	0.41
2:A:193:GLY:H	2:A:356:TYR:HD1	1.69	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:379:LYS:HD3	2:A:379:LYS:HA	1.88	0.41
1:c:580:GLY:C	1:c:581:ILE:HD13	2.46	0.41
1:o:486:TYR:O	1:o:526:MET:HE1	2.20	0.41
1:6:479:ASN:ND2	1:7:637:MET:HE2	2.36	0.41
1:7:643:LYS:HE3	1:7:643:LYS:HB2	1.82	0.41
1:c:468:GLY:HA3	1:c:476:GLN:HG2	2.02	0.41
1:6:615:TYR:CD1	1:6:730:GLY:HA2	2.57	0.40
1:7:657:PRO:O	1:o:676:TYR:OH	2.29	0.40
1:o:611:ASN:OD1	1:o:632:HIS:NE2	2.47	0.40
1:7:263:ASN:HB2	1:7:275:TYR:CE2	2.56	0.40
1:7:522:PRO:HA	1:7:540:ASN:O	2.21	0.40
1:o:611:ASN:O	1:o:732:ARG:NH2	2.47	0.40
1:p:260:GLN:NE2	1:p:276:PHE:HE2	2.19	0.40
2:A:64:LEU:HB2	2:A:146:ARG:NH2	2.37	0.40
2:A:260:SER:O	2:A:350:GLU:HB3	2.21	0.40
1:5:604:LEU:HD22	1:6:524:ILE:HD13	2.03	0.40
1:6:580:GLY:HA3	1:7:511:TYR:HA	2.02	0.40
1:7:511:TYR:CE1	1:7:518:SER:HB3	2.57	0.40
2:A:166:ARG:NH2	2:A:378:GLU:OE2	2.55	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 PDB entries followed by that with respect to all EM entries.

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	5	80/738 (11%)	78 (98%)	2 (2%)	0	100	100
1	6	388/738 (53%)	376 (97%)	12 (3%)	0	100	100
1	7	325/738 (44%)	314 (97%)	11 (3%)	0	100	100
1	c	118/738 (16%)	112 (95%)	6 (5%)	0	100	100
1	o	469/738 (64%)	455 (97%)	14 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	p	145/738 (20%)	142 (98%)	3 (2%)	0	100	100
2	A	329/470 (70%)	307 (93%)	22 (7%)	0	100	100
All	All	1854/4898 (38%)	1784 (96%)	70 (4%)	0	100	100

There are no Ramachandran outliers to report.

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 PDB entries followed by that with respect to all EM entries.

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	5	74/618 (12%)	74 (100%)	0	100	100
1	6	362/618 (59%)	362 (100%)	0	100	100
1	7	304/618 (49%)	304 (100%)	0	100	100
1	c	109/618 (18%)	109 (100%)	0	100	100
1	o	423/618 (68%)	422 (100%)	1 (0%)	92	98
1	p	143/618 (23%)	143 (100%)	0	100	100
2	A	291/382 (76%)	291 (100%)	0	100	100
All	All	1706/4090 (42%)	1705 (100%)	1 (0%)	92	98

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	o	554	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (21) such sidechains are listed below:

Mol	Chain	Res	Type
1	5	452	GLN
1	5	590	ASN
1	6	377	GLN
1	6	521	ASN

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Mol	Chain	Res	Type
1	6	611	ASN
1	6	644	HIS
1	7	362	GLN
1	7	548	GLN
1	7	549	ASN
1	7	630	ASN
1	7	632	HIS
2	A	299	HIS
1	o	322	GLN
1	o	338	ASN
1	o	344	GLN
1	o	431	GLN
1	o	497	GLN
1	o	500	ASN
1	o	540	ASN
1	o	702	GLN
1	p	488	GLN

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](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.