



Full wwPDB EM Validation Report ⓘ

Jul 16, 2025 – 01:33 AM JST

PDB ID : 8Y1O / pdb_00008y1o
EMDB ID : EMD-38841
Title : Cryo-EM structure of human ABCA7 in the apo state
Authors : Fang, S.C.
Deposited on : 2024-01-25
Resolution : 3.92 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) : 2.44

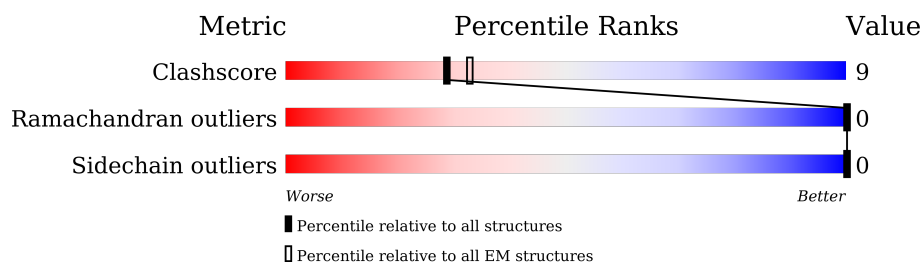
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.92 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	A	2146	

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 14226 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 Phospholipid-transporting ATPase ABCA7.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	1844	Total	C	N	O	S	0	0
			14226	9155	2511	2496	64		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	965	GLN	GLU	conflict	UNP Q8IZY2
A	1951	GLN	GLU	conflict	UNP Q8IZY2

SER	R2069	M1956	L1795	T1666	S1525	V1378
GLN	V2070	D1957	L1798	E1679	E1526	V1398
PHE	F2071	P1958			V1534	
LEU	G2072		D1811	R1682	V1538	V1408
ASP	E2073	R1961	R1812	I1683	V1542	R1413
ASP	L2074	R1962		L1684	E1560	Y1414
PRO	A2075		G1832	K1685	R1561	G1415
SER	V2076	V1965		Q1686		
THR	H2077	L1968	T1836	V1687		
ALA						
GLU	E2080	M1979	T1841	I1701		R1422
THR					Q1569	
VAL	E2084	H1983	V1852	N1706	L1570	S1428
LEU	D2085	S1984	L1853		M1571	G1429
	F2086	M1985	A1854	M1709	G1572	Q1430
		E1986			G1573	E1431
	S2089	E1987	S1857	R1715	L1574	L1432
	Q2090				S1575	G1433
	Q2091	L1991	H1866	R1726	P1576	
	M2092				T1577	V1436
	L2093	R1994	C1872	V1729	L1578	E1437
	E2094			V1730		E1438
	E2095	C2005	F1879	G1741	L1581	
	V2096	L2006	E1880	P1742	F1684	L1442
	F2097		L1881	L1743		
	L2098	P2009	L1882	F1744	D1587	G1449
	Y2099		T1883	L1745	M1588	D1452
	F2100	K2013	G1884	L1746		
	S2101	K2102	R1885	F1747	Y1591	K1456
	K2102	R2015		T1748	Q1606	T1459
	D2103	F2016	L1888	L1751	V1611	L1465
GLN		A2017	E1889	Q1752		D1466
GLY		A2018		H1753	L1622	A1467
LYS		G2019	R1893			Q1468
ASP		H2020	L1894	Q1756	Y1626	
ASP		T2021	R1895	LEU	G1627	W1474
THR		L2022		LEU	W1628	
GLU		T2023	Q1901	PRO	S1629	N1477
GLU		L2024	Q1904	PRO	I1630	K1478
GLN		R2025		PRO	T1631	
LYS			L1910	ARG	P1632	
GLU		S2031		VAL	Y1635	S1491
ALA		V2038	L1915	ARG	P1636	
GLY				SER		L1499
VAL		F2042	P1922	LEU		A1504
VAL				PRO	F1641	R1505
ASP		R2048	G1929	LEU		H1506
PRO				LEU		A1507
ALA		L2055	R1932	GLY	S1645	L1517
PRO		R2056		GLU	T1646	N1518
GLY		F2057	V1946	GLU	V1649	L1519
LEU		Q2058	V1947	ASP	L1656	T1520
GLN		L2059	F1948	E1774		
PRO		P2060	L1949			
HIS		P2061				
PRO			P1952	V1792		Q1523
LYS			T1953	L1793		L1524
ARG		A2066		V1794		
VAL						

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	44853	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TECNAI F30	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	55	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	2500	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	A	0.25	0/14567	0.57	8/19812 (0.0%)

There are no bond length outliers.

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	1979	MET	CB-CG-SD	9.48	141.16	112.70
1	A	898	VAL	N-CA-C	8.51	120.27	111.00
1	A	506	LEU	N-CA-C	-6.68	103.69	110.97
1	A	897	THR	CB-CA-C	6.08	122.52	110.42
1	A	70	LEU	N-CA-C	-5.96	104.47	110.97
1	A	1584	PHE	N-CA-CB	5.32	119.22	110.39
1	A	506	LEU	CB-CA-C	5.15	118.89	110.96
1	A	330	MET	CB-CG-SD	5.03	127.77	112.70

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	A	14226	0	14439	264	0
All	All	14226	0	14439	264	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 9.

All (264) 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:1245:LEU:O	1:A:1249:PHE:HB2	1.65	0.95
1:A:1280:VAL:HG12	1:A:1378:VAL:HB	1.69	0.73
1:A:897:THR:O	1:A:901:HIS:HB2	1.88	0.72
1:A:815:ARG:HD2	1:A:822:PRO:HA	1.72	0.72
1:A:1636:PRO:HB3	1:A:1751:LEU:HD21	1.72	0.71
1:A:1438:GLU:O	1:A:1442:LEU:HB2	1.90	0.70
1:A:1965:TRP:HA	1:A:1968:LEU:HG	1.77	0.67
1:A:1093:GLU:HB3	1:A:1100:VAL:HB	1.78	0.66
1:A:897:THR:O	1:A:938:ARG:NH2	2.31	0.64
1:A:561:SER:HB3	1:A:603:PHE:HE1	1.63	0.63
1:A:2013:LYS:HE2	1:A:2093:LEU:HD22	1.80	0.63
1:A:1290:ASP:OD1	1:A:1293:ARG:NH1	2.32	0.62
1:A:1449:GLY:HA2	1:A:1452:ASP:HB2	1.80	0.62
1:A:1628:TRP:HZ3	1:A:1741:GLY:HA3	1.66	0.61
1:A:1968:LEU:HD11	1:A:1991:LEU:HD22	1.82	0.61
1:A:2020:HIS:HB3	1:A:2090:GLN:HB2	1.82	0.61
1:A:293:GLY:HA3	1:A:435:TRP:HB2	1.84	0.60
1:A:319:THR:HB	1:A:407:LEU:HD11	1.82	0.60
1:A:322:ARG:O	1:A:325:ARG:HB3	2.01	0.60
1:A:1932:ARG:HH21	1:A:1956:MET:HG3	1.66	0.60
1:A:1571:MET:HE1	1:A:1841:THR:HG23	1.84	0.60
1:A:475:ARG:HE	1:A:477:ASN:HD21	1.47	0.60
1:A:2092:MET:N	1:A:2092:MET:SD	2.75	0.59
1:A:1314:SER:HA	1:A:1317:ARG:HB2	1.84	0.59
1:A:836:ILE:HD11	1:A:986:ARG:HB2	1.84	0.59
1:A:58:ASN:OD1	1:A:530:GLN:NE2	2.37	0.58
1:A:321:LEU:HD21	1:A:404:THR:HG21	1.84	0.58
1:A:2013:LYS:HA	1:A:2017:ALA:HB3	1.86	0.57
1:A:2096:VAL:O	1:A:2099:TYR:HB3	2.05	0.57
1:A:1793:LEU:HD21	1:A:1946:VAL:HG11	1.86	0.57
1:A:2021:THR:OG1	1:A:2089:SER:O	2.21	0.57
1:A:1253:ALA:O	1:A:1257:SER:HB3	2.04	0.57
1:A:1682:ARG:O	1:A:1686:GLN:HG2	2.05	0.57
1:A:2005:CYS:SG	1:A:2006:LEU:N	2.76	0.57
1:A:888:GLN:O	1:A:946:ARG:NH1	2.38	0.57
1:A:308:MET:HB3	1:A:412:LEU:HD21	1.85	0.56
1:A:485:ASP:O	1:A:1478:LYS:NZ	2.38	0.56
1:A:1949:LEU:H	1:A:1979:MET:HE3	1.68	0.56
1:A:1036:THR:HG22	1:A:1100:VAL:HG22	1.88	0.56
1:A:319:THR:O	1:A:322:ARG:HB2	2.06	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:863:GLY:O	1:A:873:ARG:NH2	2.38	0.56
1:A:1355:LEU:HD23	1:A:1356:LEU:HG	1.86	0.56
1:A:1234:ARG:HB3	1:A:1881:LEU:HB3	1.86	0.56
1:A:1504:ALA:HA	1:A:1507:ALA:HB3	1.88	0.56
1:A:474:THR:HG23	1:A:497:ARG:HB2	1.87	0.56
1:A:825:ARG:HH11	1:A:1015:ARG:HG3	1.71	0.56
1:A:490:ALA:HB2	1:A:531:GLN:HE22	1.70	0.55
1:A:807:VAL:HG12	1:A:867:ILE:HD12	1.88	0.55
1:A:1560:GLU:OE2	1:A:1569:GLN:NE2	2.38	0.55
1:A:496:LEU:O	1:A:500:TRP:NE1	2.38	0.55
1:A:206:LEU:HA	1:A:209:ARG:HD3	1.88	0.55
1:A:1228:ARG:HA	1:A:1231:LEU:HD12	1.87	0.55
1:A:1574:LEU:HD11	1:A:1894:LEU:HD22	1.87	0.55
1:A:1632:PRO:HG2	1:A:1744:PHE:HB2	1.88	0.55
1:A:308:MET:HA	1:A:311:VAL:HG12	1.88	0.54
1:A:1227:LYS:O	1:A:1231:LEU:HG	2.08	0.54
1:A:2021:THR:OG1	1:A:2095:GLU:OE2	2.25	0.54
1:A:492:PRO:HA	1:A:496:LEU:HB2	1.89	0.54
1:A:32:PRO:HB3	1:A:557:ALA:HB1	1.90	0.54
1:A:504:VAL:HA	1:A:507:GLN:HB3	1.89	0.54
1:A:921:ASP:N	1:A:921:ASP:OD1	2.40	0.54
1:A:1321:PRO:HG2	1:A:1367:PRO:HB2	1.90	0.54
1:A:1729:VAL:HG12	1:A:1730:VAL:HG13	1.89	0.54
1:A:1901:GLN:NE2	1:A:1904:GLN:OE1	2.41	0.53
1:A:109:ALA:O	1:A:113:LEU:HB2	2.09	0.53
1:A:1293:ARG:NH2	1:A:1468:GLN:O	2.41	0.53
1:A:1314:SER:OG	1:A:1317:ARG:NH2	2.41	0.53
1:A:1345:CYS:HA	1:A:1359:CYS:HB3	1.91	0.53
1:A:2048:ARG:HB3	1:A:2056:ARG:HE	1.73	0.53
1:A:1587:ASP:OD2	1:A:1635:TYR:OH	2.26	0.53
1:A:512:ARG:NH2	1:A:523:PRO:O	2.31	0.53
1:A:809:VAL:HG23	1:A:865:ALA:HA	1.90	0.53
1:A:815:ARG:NH1	1:A:821:GLN:O	2.41	0.53
1:A:872:VAL:HG13	1:A:876:MET:SD	2.49	0.53
1:A:1231:LEU:HD21	1:A:1879:PHE:CD2	2.44	0.53
1:A:1885:ARG:HA	1:A:1888:LEU:HD12	1.91	0.53
1:A:1398:LEU:HD11	1:A:1413:ARG:HH21	1.73	0.53
1:A:815:ARG:NH2	1:A:816:PHE:O	2.42	0.52
1:A:2103:ASP:N	1:A:2103:ASP:OD1	2.42	0.52
1:A:12:TRP:HH2	1:A:900:GLU:HG3	1.74	0.52
1:A:797:GLU:HB3	1:A:1026:ARG:HH12	1.75	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:900:GLU:HA	1:A:903:TRP:HB3	1.90	0.52
1:A:2085:ASP:OD1	1:A:2086:PHE:N	2.42	0.52
1:A:333:PRO:O	1:A:336:PHE:HB3	2.10	0.52
1:A:1520:THR:N	1:A:1523:GLN:OE1	2.43	0.52
1:A:489:ALA:O	1:A:1477:ASN:ND2	2.39	0.51
1:A:911:LEU:HG	1:A:915:VAL:HG23	1.93	0.51
1:A:2013:LYS:HB3	1:A:2018:ALA:HB2	1.93	0.51
1:A:1811:ASP:OD1	1:A:1812:ARG:NH1	2.44	0.51
1:A:495:ASP:OD1	1:A:495:ASP:N	2.44	0.51
1:A:963:LEU:HD23	1:A:966:PRO:HG3	1.92	0.51
1:A:1090:ARG:NH1	1:A:1091:LEU:O	2.44	0.51
1:A:1606:GLN:HA	1:A:1611:VAL:HG21	1.91	0.50
1:A:307:LEU:HG	1:A:440:PHE:CZ	2.46	0.50
1:A:838:ALA:HB3	1:A:1008:VAL:HG22	1.93	0.50
1:A:1082:VAL:O	1:A:1086:VAL:N	2.44	0.50
1:A:1949:LEU:N	1:A:1979:MET:HE3	2.26	0.50
1:A:565:THR:OG1	1:A:599:CYS:SG	2.60	0.50
1:A:1306:LEU:HB2	1:A:1373:THR:HG22	1.93	0.50
1:A:1984:SER:OG	1:A:1986:GLU:OE1	2.24	0.50
1:A:469:ASP:HB3	1:A:472:VAL:HG23	1.94	0.50
1:A:1591:TYR:CE2	1:A:1627:GLY:HA3	2.47	0.50
1:A:379:PRO:HD3	1:A:386:TRP:HE1	1.76	0.50
1:A:1254:LEU:HD13	1:A:1538:VAL:HG11	1.94	0.50
1:A:560:TYR:CZ	1:A:564:LEU:HD21	2.47	0.50
1:A:897:THR:C	1:A:938:ARG:NH2	2.70	0.50
1:A:1561:ARG:NH2	1:A:1641:PHE:O	2.45	0.50
1:A:1872:CYS:HB3	1:A:1949:LEU:HA	1.93	0.49
1:A:61:LEU:HD13	1:A:62:PRO:HD2	1.94	0.49
1:A:1020:GLY:HA3	1:A:1026:ARG:HH11	1.77	0.49
1:A:1035:LEU:O	1:A:1100:VAL:HA	2.13	0.49
1:A:494:THR:OG1	1:A:495:ASP:N	2.44	0.49
1:A:1311:VAL:HA	1:A:1314:SER:HB3	1.95	0.49
1:A:1519:LEU:HD13	1:A:1524:LEU:HA	1.95	0.49
1:A:615:LYS:HG3	1:A:625:PRO:HG3	1.94	0.49
1:A:658:ALA:HB1	1:A:1649:VAL:HG11	1.94	0.49
1:A:924:LEU:HD13	1:A:933:GLN:HG2	1.95	0.49
1:A:1852:VAL:HG12	1:A:1857:SER:HA	1.94	0.49
1:A:2022:LEU:O	1:A:2056:ARG:HA	2.13	0.49
1:A:1090:ARG:O	1:A:1102:VAL:N	2.40	0.49
1:A:2021:THR:HA	1:A:2057:PHE:O	2.13	0.49
1:A:898:VAL:O	1:A:902:VAL:HG12	2.13	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1684:LEU:HA	1:A:1687:VAL:HG12	1.95	0.48
1:A:97:PHE:O	1:A:103:SER:OG	2.28	0.48
1:A:498:TYR:HB3	1:A:504:VAL:HG13	1.96	0.48
1:A:1027:ARG:NH1	1:A:1137:THR:O	2.41	0.48
1:A:410:ASP:N	1:A:410:ASP:OD1	2.46	0.48
1:A:487:GLY:O	1:A:1478:LYS:NZ	2.32	0.48
1:A:815:ARG:NH2	1:A:819:SER:O	2.43	0.48
1:A:611:VAL:HG23	1:A:632:LEU:HD12	1.96	0.48
1:A:1023:LEU:HD12	1:A:2025:ARG:HD2	1.95	0.48
1:A:1889:GLU:O	1:A:1893:ARG:HG3	2.14	0.48
1:A:1114:ALA:HB2	1:A:2071:PHE:HB2	1.96	0.48
1:A:43:ARG:HH12	1:A:48:PRO:HD3	1.79	0.47
1:A:200:LEU:HA	1:A:203:LEU:HG	1.96	0.47
1:A:893:PHE:HB2	1:A:896:LEU:HB2	1.96	0.47
1:A:1081:LEU:HA	1:A:1084:HIS:HD1	1.79	0.47
1:A:582:ARG:HH21	1:A:857:LEU:HA	1.78	0.47
1:A:1523:GLN:HA	1:A:1526:GLU:HB3	1.96	0.47
1:A:290:LEU:O	1:A:411:LYS:NZ	2.35	0.47
1:A:809:VAL:HG22	1:A:812:LEU:HD21	1.96	0.47
1:A:324:VAL:O	1:A:327:VAL:HB	2.15	0.47
1:A:1456:LYS:O	1:A:1459:THR:OG1	2.25	0.47
1:A:1622:LEU:O	1:A:1626:TYR:HB3	2.15	0.47
1:A:654:ASN:OD1	1:A:1646:THR:OG1	2.31	0.46
1:A:807:VAL:HG12	1:A:867:ILE:HG23	1.97	0.46
1:A:436:ALA:HB2	1:A:468:MET:HE3	1.97	0.46
1:A:646:LEU:HD21	1:A:663:ALA:HB3	1.96	0.46
1:A:1284:SER:O	1:A:1284:SER:OG	2.34	0.46
1:A:1538:VAL:O	1:A:1542:VAL:HG13	2.16	0.46
1:A:377:LEU:O	1:A:385:SER:OG	2.27	0.46
1:A:1666:THR:HG23	1:A:1685:LYS:HE2	1.98	0.46
1:A:1832:GLY:O	1:A:1836:THR:OG1	2.31	0.46
1:A:1962:ARG:HD3	1:A:1965:TRP:CZ3	2.50	0.46
1:A:1422:ARG:NE	1:A:1466:ASP:OD1	2.45	0.46
1:A:334:ARG:O	1:A:337:THR:OG1	2.25	0.46
1:A:53:GLU:OE2	1:A:55:HIS:NE2	2.45	0.46
1:A:586:LEU:HD21	1:A:908:LEU:HD11	1.97	0.46
1:A:547:SER:O	1:A:671:TYR:OH	2.30	0.45
1:A:1994:ARG:HH22	1:A:2006:LEU:HG	1.80	0.45
1:A:1571:MET:HA	1:A:1866:HIS:HB3	1.99	0.45
1:A:511:GLU:OE1	1:A:1491:SER:OG	2.25	0.45
1:A:1576:PRO:HB2	1:A:1753:HIS:CE1	2.51	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:289:PRO:HB2	1:A:435:TRP:HD1	1.81	0.45
1:A:1961:ARG:HH12	1:A:1987:GLU:HB3	1.80	0.45
1:A:1949:LEU:HB3	1:A:1952:PRO:HG3	1.98	0.45
1:A:344:ASN:OD1	1:A:344:ASN:N	2.48	0.45
1:A:972:PRO:HD3	1:A:1983:HIS:HB2	1.98	0.45
1:A:1081:LEU:HA	1:A:1084:HIS:ND1	2.31	0.45
1:A:1518:ASN:OD1	1:A:1715:ARG:NH1	2.49	0.45
1:A:610:LEU:O	1:A:614:LEU:HG	2.17	0.45
1:A:1117:PHE:HA	1:A:1120:LEU:HB2	1.99	0.45
1:A:1253:ALA:O	1:A:1257:SER:CB	2.65	0.45
1:A:2031:SER:HB2	1:A:2055:LEU:HD22	1.97	0.45
1:A:512:ARG:HA	1:A:515:VAL:HG12	1.98	0.45
1:A:1499:LEU:HD23	1:A:1505:ARG:HA	1.99	0.45
1:A:1742:PRO:O	1:A:1746:LEU:HG	2.16	0.45
1:A:112:VAL:HG11	1:A:197:LEU:HD11	1.99	0.44
1:A:1433:GLY:HA2	1:A:1436:VAL:HG12	1.99	0.44
1:A:2059:LEU:HG	1:A:2060:PRO:HD2	1.99	0.44
1:A:819:SER:OG	1:A:821:GLN:O	2.33	0.44
1:A:2077:HIS:O	1:A:2080:GLU:HB2	2.18	0.44
1:A:876:MET:HA	1:A:879:ILE:HD11	1.99	0.44
1:A:1656:LEU:O	1:A:1660:ILE:HG22	2.17	0.44
1:A:26:LEU:HD23	1:A:26:LEU:HA	1.83	0.44
1:A:467:ARG:HH11	1:A:1517:LEU:HA	1.83	0.44
1:A:1428:SER:OG	1:A:1431:GLU:OE2	2.34	0.44
1:A:2038:VAL:HG12	1:A:2057:PHE:HE2	1.82	0.44
1:A:2059:LEU:HD23	1:A:2060:PRO:N	2.33	0.44
1:A:867:ILE:N	1:A:870:HIS:O	2.49	0.44
1:A:1123:ARG:HG3	1:A:1127:LEU:HG	2.00	0.44
1:A:1306:LEU:HD11	1:A:1317:ARG:HD3	2.00	0.44
1:A:600:LEU:HD12	1:A:600:LEU:HA	1.87	0.44
1:A:1883:THR:HG22	1:A:1922:PRO:HA	1.99	0.44
1:A:2025:ARG:O	1:A:2084:GLU:N	2.49	0.44
1:A:2070:VAL:O	1:A:2074:LEU:N	2.39	0.44
1:A:1301:LEU:HD12	1:A:1306:LEU:HD13	1.98	0.44
1:A:1575:SER:HB3	1:A:1578:LEU:HD23	2.00	0.44
1:A:2066:ALA:O	1:A:2069:ARG:NH1	2.44	0.44
1:A:488:PRO:HB3	1:A:534:TYR:HB2	1.99	0.43
1:A:961:VAL:HB	1:A:991:LEU:HD13	2.00	0.43
1:A:1956:MET:SD	1:A:1956:MET:N	2.91	0.43
1:A:2094:GLU:HA	1:A:2097:PHE:CE2	2.53	0.43
1:A:2097:PHE:O	1:A:2101:SER:N	2.51	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:289:PRO:HB2	1:A:435:TRP:CD1	2.53	0.43
1:A:1748:THR:HA	1:A:1751:LEU:HG	1.99	0.43
1:A:2038:VAL:HG12	1:A:2057:PHE:CE2	2.53	0.43
1:A:1581:LEU:HA	1:A:1584:PHE:CZ	2.53	0.43
1:A:1795:LEU:HB3	1:A:1798:LEU:HD13	2.00	0.43
1:A:654:ASN:OD1	1:A:1645:SER:OG	2.36	0.43
1:A:619:ILE:HG22	1:A:620:LEU:HD23	2.00	0.43
1:A:120:ARG:HH22	1:A:1438:GLU:HB3	1.84	0.43
1:A:1318:PHE:HA	1:A:1371:ALA:HB2	2.01	0.43
1:A:1792:VAL:O	1:A:1854:ALA:N	2.49	0.43
1:A:1953:THR:HA	1:A:1956:MET:HE1	2.01	0.43
1:A:402:ARG:HA	1:A:402:ARG:HD2	1.72	0.43
1:A:2042:PHE:HE1	1:A:2069:ARG:HG3	1.84	0.43
1:A:844:GLY:H	1:A:847:LYS:HG2	1.84	0.42
1:A:1961:ARG:NH2	1:A:1986:GLU:OE2	2.52	0.42
1:A:1534:VAL:O	1:A:1538:VAL:HG22	2.20	0.42
1:A:2060:PRO:HA	1:A:2061:PRO:HD3	1.87	0.42
1:A:2072:GLY:O	1:A:2075:ALA:HB3	2.19	0.42
1:A:9:LEU:HD11	1:A:904:PHE:HD1	1.85	0.42
1:A:997:HIS:NE2	1:A:1984:SER:OG	2.53	0.42
1:A:1947:VAL:O	1:A:1979:MET:N	2.39	0.42
1:A:1572:GLY:HA3	1:A:1895:ARG:NH2	2.34	0.42
1:A:307:LEU:O	1:A:311:VAL:HG12	2.20	0.42
1:A:1025:LEU:O	1:A:1026:ARG:NE	2.53	0.42
1:A:78:ASN:HB3	1:A:80:THR:HG23	2.02	0.42
1:A:1428:SER:OG	1:A:1428:SER:O	2.37	0.42
1:A:1465:LEU:HD12	1:A:1465:LEU:HA	1.94	0.42
1:A:1415:GLY:HA2	1:A:1474:TRP:O	2.20	0.42
1:A:308:MET:HA	1:A:311:VAL:CG1	2.49	0.41
1:A:388:ASP:OD1	1:A:388:ASP:N	2.51	0.41
1:A:482:ARG:HG3	1:A:1408:TRP:HE1	1.84	0.41
1:A:1628:TRP:CZ3	1:A:1741:GLY:HA3	2.51	0.41
1:A:1726:ARG:HD3	1:A:1726:ARG:HA	1.84	0.41
1:A:1588:MET:SD	1:A:1588:MET:N	2.93	0.41
1:A:2005:CYS:HA	1:A:2015:ARG:HH22	1.84	0.41
1:A:636:ALA:HA	1:A:639:THR:HG22	2.02	0.41
1:A:476:THR:O	1:A:476:THR:OG1	2.34	0.41
1:A:2024:LEU:HD21	1:A:2055:LEU:HD23	2.03	0.41
1:A:825:ARG:HD3	1:A:1015:ARG:HG3	2.03	0.41
1:A:509:LEU:HD23	1:A:509:LEU:HA	1.90	0.41
1:A:991:LEU:HD13	1:A:991:LEU:HA	1.96	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:999:ASP:OD1	1:A:999:ASP:N	2.45	0.41
1:A:1143:PHE:CE2	1:A:1958:PRO:HB2	2.56	0.41
1:A:56:PHE:HA	1:A:57:PRO:HD3	1.94	0.41
1:A:347:MET:SD	1:A:351:LEU:HB2	2.61	0.41
1:A:879:ILE:H	1:A:879:ILE:HG12	1.68	0.41
1:A:1679:GLU:HA	1:A:1682:ARG:HG2	2.03	0.41
1:A:1429:GLY:HA2	1:A:1432:LEU:HB2	2.03	0.40
1:A:1701:ILE:HD13	1:A:1701:ILE:HA	1.87	0.40
1:A:1742:PRO:HA	1:A:1745:LEU:HB2	2.03	0.40
1:A:1910:LEU:HA	1:A:1915:LEU:HD12	2.03	0.40
1:A:1929:GLY:HA2	1:A:1956:MET:HG2	2.02	0.40
1:A:1994:ARG:HA	1:A:2009:PRO:HD3	2.04	0.40
1:A:1626:TYR:CZ	1:A:1630:ILE:HD13	2.56	0.40
1:A:1706:ASN:HA	1:A:1709:MET:HG3	2.04	0.40
1:A:667:LEU:HB3	1:A:692:LEU:HD23	2.03	0.40
1:A:1283:PHE:CE2	1:A:1301:LEU:HD21	2.56	0.40
1:A:1683:ILE:HD13	1:A:1683:ILE:HA	1.94	0.40
1:A:339:MET:HE2	1:A:339:MET:HB3	2.01	0.40
1:A:1324:PRO:HG2	1:A:1327:VAL:HB	2.04	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 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	A	1826/2146 (85%)	1722 (94%)	104 (6%)	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	A	1505/1764 (85%)	1505 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	21	GLN
1	A	387	GLN
1	A	432	HIS
1	A	522	ASN
1	A	531	GLN
1	A	718	ASN
1	A	1279	GLN
1	A	1316	HIS
1	A	1488	ASN
1	A	1607	GLN
1	A	1661	ASN
1	A	1740	GLN
1	A	1785	GLN
1	A	1805	GLN
1	A	1901	GLN
1	A	1983	HIS

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 [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 [i](#)

There are no chain breaks in this entry.