



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 28, 2024 – 07:58 am GMT

PDB ID : 8C4A
Title : Structural and interactional insights into the glideosome-associated connector from *Toxoplasma gondii*
Authors : Kumar, A.; Morgan, R.M.L.; Matthews, S.J.
Deposited on : 2023-01-03
Resolution : 2.67 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 : 4.02b-467
Mogul : 1.8.4, CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 3.0
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4 : 9.0.003 (Gargrove)
Density-Fitness : 1.0.11
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.39

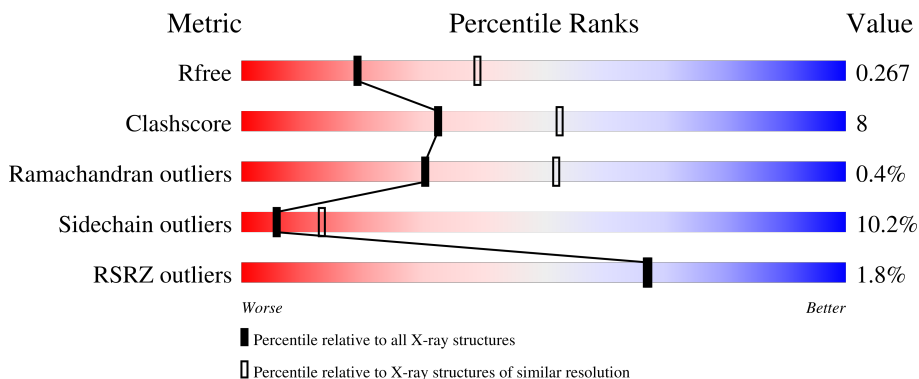
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.67 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}	164625	4708 (2.70-2.66)
Clashscore	180529	5138 (2.70-2.66)
Ramachandran outliers	177936	5071 (2.70-2.66)
Sidechain outliers	177891	5071 (2.70-2.66)
RSRZ outliers	164620	4708 (2.70-2.66)

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	2498	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 37731 atoms, of which 18940 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 Putative anonymous antigen-1.

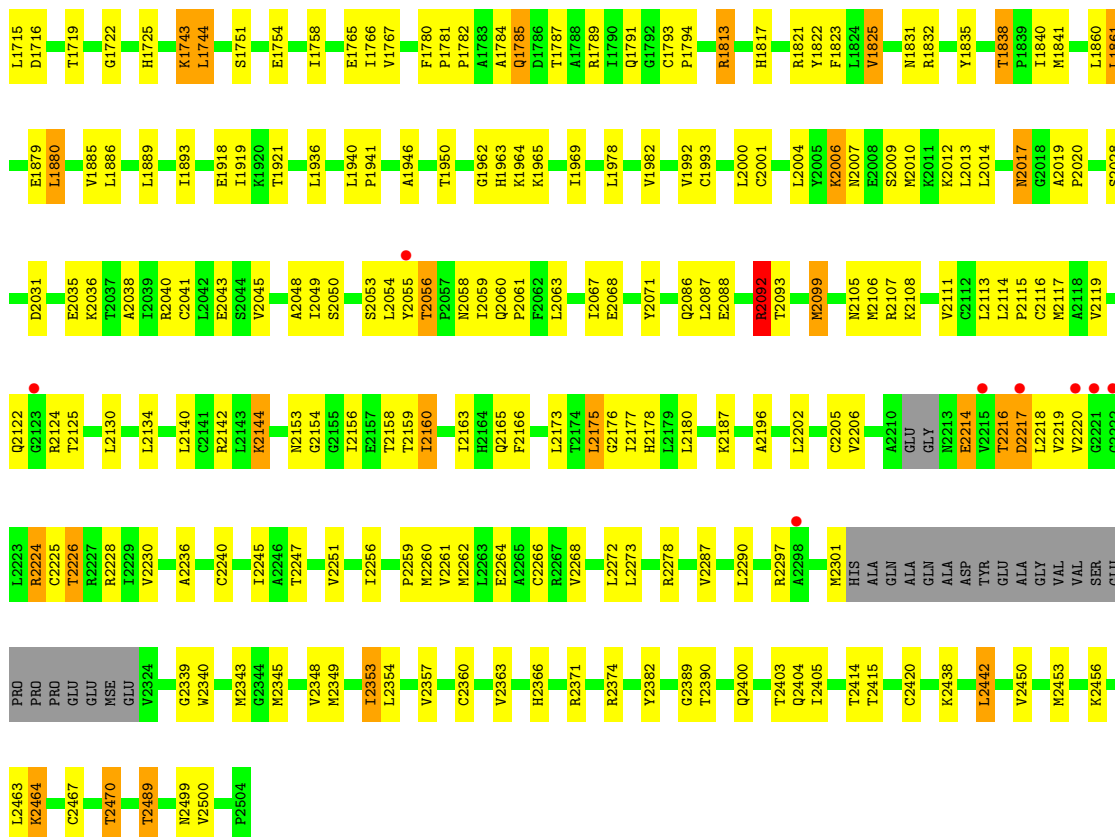
Mol	Chain	Residues	Atoms							ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S	Se			
1	A	2474	37395	11670	18716	3181	3671	73	84	0	2	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	564	GLU	ALA	conflict	UNP A0A7J6JYP1

- Molecule 2 is water.

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	H	O		
2	A	112	336	224	112	0	0



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	119.08Å 123.61Å 221.51Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	110.75 – 2.67 110.75 – 2.67	Depositor EDS
% Data completeness (in resolution range)	100.0 (110.75-2.67) 99.9 (110.75-2.67)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.53 (at 2.69Å)	Xtrriage
Refinement program	REFMAC v5.0	Depositor
R, R_{free}	0.209 , 0.268 0.232 , 0.267	Depositor DCC
R_{free} test set	4519 reflections (4.87%)	wwPDB-VP
Wilson B-factor (Å ²)	85.0	Xtrriage
Anisotropy	0.013	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 35.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.000 for k,h,-l	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	37731	wwPDB-VP
Average B, all atoms (Å ²)	75.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.54% 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 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	0.38	0/18847	0.66	7/25412 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	24

There are no bond length outliers.

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	726	ARG	NE-CZ-NH2	-6.59	117.01	120.30
1	A	139	ARG	NE-CZ-NH1	-6.51	117.04	120.30
1	A	582	ARG	NE-CZ-NH2	-6.29	117.16	120.30
1	A	726	ARG	NE-CZ-NH1	6.08	123.34	120.30
1	A	1285	ARG	NE-CZ-NH2	-6.08	117.26	120.30
1	A	808	ARG	NE-CZ-NH1	-5.92	117.34	120.30
1	A	560	ARG	NE-CZ-NH1	-5.69	117.45	120.30

There are no chirality outliers.

All (24) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1118	ARG	Sidechain
1	A	1162	ARG	Sidechain
1	A	1245	ARG	Sidechain
1	A	139	ARG	Sidechain
1	A	1681	ARG	Sidechain
1	A	1813	ARG	Sidechain

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Group
1	A	1832	ARG	Sidechain
1	A	2040	ARG	Sidechain
1	A	2092	ARG	Sidechain
1	A	2224	ARG	Sidechain
1	A	2228	ARG	Sidechain
1	A	2278	ARG	Sidechain
1	A	345	ARG	Sidechain
1	A	560	ARG	Sidechain
1	A	582	ARG	Sidechain
1	A	59	ARG	Sidechain
1	A	693	ARG	Sidechain
1	A	725	ARG	Sidechain
1	A	726	ARG	Sidechain
1	A	752	ARG	Sidechain
1	A	795	ARG	Sidechain
1	A	808	ARG	Sidechain
1	A	818	ARG	Sidechain
1	A	989	ARG	Sidechain

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	18679	18716	18693	290	0
2	A	112	224	0	3	0
All	All	18791	18940	18693	290	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 8.

All (290) 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:807:MSE:SE	1:A:868:ILE:HD13	1.85	1.27
1:A:1307:GLN:HG3	1:A:1311:MSE:HE2	1.18	1.07
1:A:885:MSE:HE1	1:A:920:CYS:SG	2.13	0.89

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:955:ALA:HB1	1:A:956:PRO:HD2	1.55	0.87
1:A:885:MSE:HE2	1:A:924:MSE:HE2	1.58	0.85
1:A:1408:MSE:HE2	1:A:1455:LEU:HD13	1.59	0.84
1:A:1707:MSE:HE1	1:A:1725:HIS:O	1.76	0.84
1:A:2420:CYS:HB3	1:A:2470:THR:HG21	1.60	0.82
1:A:1175:ALA:HA	1:A:1178:MSE:CE	2.12	0.80
1:A:1408:MSE:HE3	1:A:1418:VAL:HG13	1.65	0.78
1:A:1308:PHE:HD1	1:A:1311:MSE:HE3	1.46	0.78
1:A:2453:MSE:HE1	1:A:2467:CYS:HB2	1.65	0.77
1:A:1175:ALA:HA	1:A:1178:MSE:HE2	1.66	0.76
1:A:807:MSE:SE	1:A:868:ILE:CD1	2.78	0.74
1:A:1835:TYR:O	1:A:1838:THR:HG22	1.87	0.74
1:A:1307:GLN:HG3	1:A:1311:MSE:CE	2.08	0.73
1:A:1307:GLN:CG	1:A:1311:MSE:HE2	2.10	0.73
1:A:2259:PRO:HG3	1:A:2366:HIS:CE1	2.24	0.73
1:A:1578:ARG:HD2	1:A:1582:GLU:OE2	1.89	0.72
1:A:1171:MSE:HE1	1:A:1194:LEU:HB3	1.72	0.71
1:A:505:GLU:OE2	1:A:544:HIS:ND1	2.23	0.71
1:A:1541:PHE:HD1	1:A:1575:MSE:HE3	1.55	0.70
1:A:396:ALA:HB1	1:A:438:ILE:HD11	1.74	0.70
1:A:153:MSE:HE3	1:A:174:LEU:HD23	1.74	0.68
1:A:1158:THR:HG23	1:A:1160:GLU:H	1.59	0.67
1:A:2272:LEU:HD22	1:A:2343:MSE:HE1	1.76	0.67
1:A:1065:LEU:O	1:A:1069:THR:HB	1.94	0.67
1:A:1793:CYS:HB3	1:A:1794:PRO:HD3	1.76	0.67
1:A:2144:LYS:H	1:A:2144:LYS:HD2	1.60	0.66
1:A:2154:GLY:O	1:A:2158:THR:HG23	1.96	0.66
1:A:2240:CYS:SG	1:A:2343:MSE:HE2	2.36	0.65
1:A:999:ILE:HD11	1:A:1038:LEU:HD13	1.79	0.64
1:A:1758:ILE:HA	1:A:1767:VAL:HG23	1.80	0.64
1:A:1208:MSE:HG3	1:A:1254:CYS:SG	2.37	0.64
1:A:2262:MSE:HE1	1:A:2266:CYS:SG	2.38	0.63
1:A:885:MSE:CE	1:A:920:CYS:SG	2.85	0.63
1:A:2453:MSE:HE3	1:A:2464:LYS:HG2	1.81	0.63
1:A:1921:THR:HG22	1:A:1963:HIS:NE2	2.15	0.62
1:A:2489:THR:HG23	1:A:2489:THR:O	2.00	0.62
1:A:885:MSE:HE2	1:A:924:MSE:CE	2.30	0.61
1:A:1341:MSE:N	1:A:1342:PRO:HD2	2.14	0.61
1:A:163:ASP:HB3	1:A:166:THR:HG23	1.82	0.61
1:A:730:ASN:O	1:A:734:THR:OG1	2.19	0.61
1:A:235:LEU:HB3	1:A:236:PRO:HD3	1.82	0.60

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:885:MSE:CE	1:A:924:MSE:HE2	2.30	0.59
1:A:1962:GLY:HA2	1:A:2006:LYS:HD2	1.83	0.59
1:A:80:LEU:HD12	1:A:126:THR:HG22	1.85	0.59
1:A:1495:THR:HG23	1:A:1519:MSE:HE2	1.84	0.59
1:A:1652:GLU:O	1:A:1656:MSE:HG3	2.03	0.59
1:A:2163:ILE:HG23	1:A:2173:LEU:HD12	1.85	0.59
1:A:504:ASN:HB3	1:A:507:VAL:HG22	1.84	0.58
1:A:2374:ARG:NH1	1:A:2414:THR:OG1	2.35	0.58
1:A:1262:LEU:HD13	1:A:1311:MSE:HE1	1.86	0.58
1:A:1950:THR:HG22	1:A:1992:VAL:HA	1.86	0.57
1:A:2259:PRO:HG3	1:A:2366:HIS:NE2	2.20	0.57
1:A:2405:ILE:HD13	1:A:2415:THR:HB	1.86	0.57
1:A:763:LEU:CD2	1:A:773:GLN:HA	2.35	0.57
1:A:1171:MSE:HE2	1:A:1195:PHE:HA	1.86	0.57
1:A:1568:LEU:HB3	1:A:1575:MSE:HG2	1.86	0.56
1:A:2354:LEU:HD12	1:A:2389:GLY:HA3	1.87	0.56
1:A:1886:LEU:HD11	1:A:1919:ILE:HG23	1.87	0.56
1:A:606:GLN:O	1:A:610:GLU:HG2	2.06	0.56
1:A:1822:TYR:HA	1:A:1825:VAL:HG13	1.88	0.55
1:A:2240:CYS:SG	1:A:2245:ILE:HG12	2.45	0.55
1:A:2340:TRP:HA	1:A:2345:MSE:HE3	1.87	0.55
1:A:268:LEU:HA	1:A:295:MSE:HE2	1.88	0.55
1:A:1572:ASP:HB3	1:A:1575:MSE:HB2	1.88	0.55
1:A:662:MSE:HE3	1:A:692:PHE:HB3	1.89	0.55
1:A:1208:MSE:HE3	1:A:1250:HIS:HB2	1.89	0.55
1:A:2262:MSE:CE	1:A:2266:CYS:SG	2.95	0.55
1:A:538:LEU:HD13	1:A:594:ALA:HA	1.89	0.54
1:A:2159:THR:O	1:A:2163:ILE:HG13	2.08	0.54
1:A:1408:MSE:HG2	1:A:1418:VAL:HA	1.89	0.54
1:A:2450:VAL:HA	1:A:2453:MSE:HE2	1.88	0.54
1:A:1880:LEU:HD22	1:A:1885:VAL:HG21	1.90	0.54
1:A:2114:LEU:N	1:A:2115:PRO:HD2	2.22	0.54
1:A:1422:MSE:CE	1:A:1467:ALA:HB3	2.38	0.53
1:A:2262:MSE:HE1	1:A:2357:VAL:HG12	1.90	0.53
1:A:853:PHE:HB3	1:A:854:PRO:HD3	1.91	0.53
1:A:782:THR:O	1:A:786:ILE:HG13	2.08	0.53
1:A:1993:CYS:HB3	1:A:2041:CYS:SG	2.49	0.53
1:A:318:ILE:HA	1:A:322:LEU:HG	1.90	0.53
1:A:443:LEU:O	1:A:447:ALA:HB2	2.09	0.53
1:A:1358:LEU:HA	1:A:1361:MSE:HE3	1.91	0.53
1:A:699:MSE:HG3	1:A:1409:GLN:HB3	1.91	0.52

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:366:CYS:SG	1:A:404:THR:HG21	2.50	0.52
1:A:1817:HIS:O	1:A:1821:ARG:HD3	2.10	0.52
1:A:1388:LEU:O	1:A:1392:ASN:HB2	2.10	0.52
1:A:2262:MSE:HG3	1:A:2360:CYS:SG	2.50	0.51
1:A:2230:VAL:HG13	1:A:2230:VAL:O	2.10	0.51
1:A:2403:THR:HG22	1:A:2442:LEU:HA	1.92	0.51
1:A:1307:GLN:O	1:A:1311:MSE:HG3	2.10	0.51
1:A:931:ARG:NH1	1:A:1502:ASP:OD2	2.44	0.51
1:A:311:VAL:N	1:A:312:PRO:HD2	2.26	0.51
1:A:999:ILE:CD1	1:A:1038:LEU:HD13	2.41	0.51
1:A:1408:MSE:HE1	1:A:1422:MSE:HG3	1.94	0.50
1:A:2349:MSE:O	1:A:2353:ILE:HG23	2.11	0.50
1:A:2117:MSE:HE1	1:A:2153:ASN:HB2	1.94	0.50
1:A:314:LEU:O	1:A:318:ILE:HG13	2.12	0.50
1:A:1719:THR:HG23	1:A:1722:GLY:H	1.76	0.50
1:A:1208:MSE:HG2	1:A:1254:CYS:HB2	1.94	0.50
1:A:1716:ASP:HB3	1:A:1719:THR:HG22	1.94	0.50
1:A:1946:ALA:O	1:A:1950:THR:HG23	2.11	0.50
1:A:62:LEU:HD12	1:A:62:LEU:H	1.77	0.49
1:A:2236:ALA:HB1	1:A:2343:MSE:CE	2.41	0.49
1:A:1135:ALA:O	1:A:1139:GLN:HB2	2.13	0.49
1:A:314:LEU:HD11	1:A:359:ALA:HB1	1.93	0.49
1:A:387:VAL:N	1:A:388:PRO:HD2	2.28	0.48
1:A:708:GLU:HA	1:A:749:ILE:HG21	1.95	0.48
1:A:812:LYS:HB3	1:A:813:SER:H	1.51	0.48
1:A:138:LYS:HE2	1:A:138:LYS:HB3	1.51	0.48
1:A:575:ASP:N	1:A:575:ASP:OD1	2.46	0.48
1:A:2144:LYS:HD2	1:A:2144:LYS:N	2.25	0.48
1:A:2001:CYS:HA	1:A:2004:LEU:HD12	1.94	0.48
1:A:2014:LEU:HA	1:A:2017:ASN:HB2	1.95	0.48
1:A:2177:ILE:HG13	1:A:2178:HIS:N	2.27	0.48
1:A:1308:PHE:CD1	1:A:1311:MSE:HE3	2.38	0.48
1:A:1703:LEU:O	1:A:1707:MSE:HB2	2.14	0.48
1:A:2247:THR:HG23	2:A:2618:HOH:O	2.12	0.48
1:A:512:VAL:HG21	1:A:550:LEU:CD1	2.44	0.48
1:A:1541:PHE:CD1	1:A:1575:MSE:HE3	2.42	0.48
1:A:1592:THR:OG1	1:A:1631:THR:HG22	2.14	0.48
1:A:2117:MSE:HE1	1:A:2153:ASN:CB	2.43	0.47
1:A:814:LYS:HB3	1:A:814:LYS:HE2	1.44	0.47
1:A:1344:MSE:CE	1:A:1344:MSE:HA	2.45	0.47
1:A:450:ILE:HG13	1:A:451:CYS:N	2.28	0.47

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:817:LYS:HE2	1:A:817:LYS:HB3	1.63	0.47
1:A:2019:ALA:O	1:A:2020:PRO:C	2.53	0.47
1:A:295:MSE:HE3	1:A:301:PHE:HD2	1.80	0.47
1:A:1781:PRO:HB2	1:A:1782:PRO:HD3	1.96	0.47
1:A:1568:LEU:HB3	1:A:1575:MSE:CG	2.44	0.47
1:A:2007:ASN:HD22	1:A:2010:MSE:HG2	1.79	0.47
1:A:1578:ARG:O	1:A:1582:GLU:HB2	2.15	0.47
1:A:1627:GLY:O	1:A:1631:THR:HG23	2.15	0.47
1:A:2043:GLU:HG3	1:A:2086:GLN:HE21	1.80	0.46
1:A:2224:ARG:O	1:A:2225:CYS:C	2.52	0.46
1:A:512:VAL:HG21	1:A:550:LEU:HD12	1.96	0.46
1:A:826:LEU:O	1:A:828:MSE:N	2.49	0.46
1:A:2214:GLU:O	1:A:2218:LEU:HG	2.14	0.46
1:A:57:LEU:HB2	1:A:89:MSE:HE2	1.96	0.46
1:A:583:GLY:O	1:A:584:ASN:C	2.53	0.46
1:A:1466:LEU:HA	1:A:1469:MSE:HE3	1.98	0.46
1:A:1568:LEU:HD13	1:A:1575:MSE:HE2	1.98	0.46
1:A:2216:THR:C	1:A:2218:LEU:N	2.69	0.46
1:A:2236:ALA:HB1	1:A:2343:MSE:HE1	1.97	0.46
1:A:1566:GLN:O	1:A:1570:MSE:HG3	2.16	0.46
1:A:1978:LEU:O	1:A:1982:VAL:HG23	2.16	0.46
1:A:287:GLU:O	1:A:290:VAL:N	2.48	0.46
1:A:1178:MSE:HE1	1:A:1195:PHE:CE2	2.51	0.46
1:A:1841:MSE:SE	1:A:1880:LEU:HD21	2.66	0.46
1:A:57:LEU:HD12	1:A:62:LEU:HD11	1.97	0.46
1:A:812:LYS:HB3	1:A:812:LYS:HE3	1.52	0.46
1:A:1049:ASP:CG	1:A:1054:ASN:HD22	2.19	0.46
1:A:1204:ILE:O	1:A:1208:MSE:HB2	2.16	0.45
1:A:1861:LEU:HD23	1:A:1861:LEU:HA	1.74	0.45
1:A:2000:LEU:HD22	1:A:2014:LEU:HD13	1.97	0.45
1:A:2264:GLU:O	1:A:2268:VAL:HG23	2.16	0.45
1:A:279:GLU:HB3	1:A:283:ALA:CB	2.45	0.45
1:A:213:MSE:HE3	1:A:213:MSE:HB3	1.92	0.45
1:A:656:THR:HG21	1:A:706:ASN:CG	2.37	0.45
1:A:1936:LEU:HD23	1:A:1978:LEU:HD13	1.99	0.45
1:A:1175:ALA:HA	1:A:1178:MSE:HE3	1.97	0.45
1:A:295:MSE:HE3	1:A:301:PHE:CD2	2.51	0.45
1:A:1449:LEU:CD2	1:A:1475:MSE:HE1	2.46	0.45
1:A:2060:GLN:O	1:A:2061:PRO:C	2.55	0.45
1:A:316:GLU:HA	1:A:320:SER:HB2	1.98	0.45
1:A:525:LYS:H	1:A:525:LYS:HG2	1.48	0.45

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1469:MSE:HE1	1:A:1515:LEU:HA	1.98	0.45
1:A:804:LYS:HA	1:A:807:MSE:HE3	1.98	0.45
1:A:885:MSE:HE2	1:A:924:MSE:SE	2.67	0.45
1:A:802:ALA:O	1:A:803:LEU:C	2.55	0.45
1:A:1348:ALA:N	1:A:1349:PRO:HD2	2.32	0.45
1:A:1743:LYS:HB3	1:A:1743:LYS:HE2	1.66	0.45
1:A:1767:VAL:HG13	1:A:1821:ARG:NH2	2.32	0.45
1:A:1623:LEU:HG	1:A:1661:MSE:HB3	1.99	0.44
1:A:1965:LYS:O	1:A:1969:ILE:HG12	2.17	0.44
1:A:2056:THR:HA	1:A:2059:ILE:HG13	1.98	0.44
1:A:384:MSE:HE1	2:A:2622:HOH:O	2.15	0.44
1:A:768:MSE:HE3	1:A:768:MSE:HB3	1.94	0.44
1:A:1568:LEU:HD13	1:A:1575:MSE:CE	2.47	0.44
1:A:2048:ALA:O	1:A:2049:ILE:C	2.56	0.44
1:A:2106:MSE:SE	1:A:2142:ARG:HH21	2.51	0.44
1:A:1270:ARG:HA	1:A:1270:ARG:HD3	1.72	0.44
1:A:1322:LYS:HB3	1:A:1322:LYS:HE2	1.69	0.44
1:A:2106:MSE:HG3	1:A:2140:LEU:HA	1.98	0.44
1:A:2013:LEU:HG	1:A:2017:ASN:ND2	2.32	0.44
1:A:2114:LEU:N	1:A:2115:PRO:CD	2.80	0.44
1:A:725:ARG:HE	1:A:725:ARG:HB2	1.72	0.44
1:A:2122:GLN:OE1	1:A:2124:ARG:NH1	2.51	0.44
1:A:2499:ASN:OD1	1:A:2499:ASN:N	2.51	0.44
1:A:311:VAL:O	1:A:312:PRO:C	2.56	0.44
1:A:393:GLU:O	1:A:394:SER:C	2.56	0.44
1:A:1365:ASP:O	1:A:1369:VAL:HG23	2.18	0.44
1:A:282:SER:HA	1:A:286:ASP:HB2	2.00	0.44
1:A:438:ILE:O	1:A:439:GLN:C	2.56	0.44
1:A:996:CYS:O	1:A:999:ILE:HG12	2.17	0.44
1:A:1000:ASP:OD1	1:A:1041:LYS:HE3	2.18	0.44
1:A:699:MSE:HE1	1:A:740:GLN:HG3	1.99	0.43
1:A:225:ALA:HB1	1:A:262:MSE:HG3	2.00	0.43
1:A:234:THR:OG1	1:A:262:MSE:SE	2.86	0.43
1:A:1308:PHE:HD1	1:A:1311:MSE:CE	2.21	0.43
1:A:1940:LEU:N	1:A:1941:PRO:HD2	2.34	0.43
1:A:2036:LYS:HE3	1:A:2036:LYS:HB3	1.67	0.43
1:A:231:ASP:HB2	1:A:232:ALA:H	1.61	0.43
1:A:235:LEU:HD23	1:A:259:LEU:HD22	2.00	0.43
1:A:386:LEU:O	1:A:387:VAL:C	2.56	0.43
1:A:962:GLU:O	1:A:963:GLU:C	2.57	0.43
1:A:2019:ALA:HB3	1:A:2020:PRO:HD3	1.99	0.43

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:273:ASN:O	1:A:276:LYS:N	2.49	0.43
1:A:1422:MSE:HG2	1:A:1471:MSE:SE	2.67	0.43
1:A:2176:GLY:O	1:A:2180:LEU:HG	2.19	0.43
1:A:2339:GLY:O	1:A:2340:TRP:C	2.57	0.43
1:A:79:MSE:HE3	1:A:119:SER:HB3	2.01	0.43
1:A:662:MSE:HE2	1:A:695:LEU:HD22	2.00	0.43
1:A:2038:ALA:O	1:A:2041:CYS:HB3	2.19	0.43
1:A:2206:VAL:HG12	1:A:2251:VAL:HG21	2.01	0.43
1:A:1022:THR:HB	1:A:1023:PRO:HD2	1.99	0.43
1:A:789:ASN:O	1:A:792:GLU:HB2	2.19	0.43
1:A:999:ILE:HG22	1:A:1008:VAL:HG12	2.01	0.43
1:A:1255:LEU:O	1:A:1259:VAL:HG12	2.19	0.43
1:A:740:GLN:HA	1:A:744:GLY:HA2	2.00	0.43
1:A:2273:LEU:HD22	1:A:2382:TYR:CE2	2.54	0.43
1:A:2489:THR:O	1:A:2489:THR:CG2	2.65	0.43
1:A:312:PRO:O	1:A:315:ILE:HB	2.19	0.43
1:A:498:LEU:HD13	1:A:511:ALA:HB3	2.01	0.43
1:A:770:LEU:O	1:A:771:ASP:C	2.56	0.43
1:A:803:LEU:O	1:A:807:MSE:HG3	2.18	0.43
1:A:2092:ARG:HE	1:A:2092:ARG:HB2	1.61	0.43
1:A:2400:GLN:OE1	1:A:2400:GLN:N	2.51	0.43
1:A:955:ALA:O	1:A:956:PRO:C	2.58	0.42
1:A:1495:THR:HG22	1:A:1543:VAL:HG11	2.01	0.42
1:A:2217:ASP:O	1:A:2220:VAL:HG22	2.19	0.42
1:A:533:CYS:O	1:A:537:VAL:HG23	2.19	0.42
1:A:1690:ILE:HD13	1:A:1744:LEU:HD22	2.01	0.42
1:A:2202:LEU:HB3	1:A:2226:THR:HG22	2.01	0.42
1:A:193:THR:O	1:A:194:SER:C	2.57	0.42
1:A:29:ARG:HG3	1:A:29:ARG:HH11	1.84	0.42
1:A:804:LYS:O	1:A:808:ARG:HB2	2.20	0.42
1:A:821:ALA:HB3	1:A:822:PRO:HD3	2.02	0.42
1:A:318:ILE:HG13	1:A:318:ILE:H	1.45	0.42
1:A:364:THR:OG1	1:A:365:LEU:N	2.52	0.42
1:A:540:ALA:O	1:A:544:HIS:HD2	2.03	0.42
1:A:2134:LEU:HB2	1:A:2175:LEU:HD23	2.02	0.42
1:A:718:MSE:HE3	1:A:728:GLN:OE1	2.20	0.42
1:A:1006:ALA:N	1:A:1007:PRO:CD	2.83	0.42
1:A:1352:LEU:HD23	1:A:1352:LEU:HA	1.89	0.42
1:A:2290:LEU:HD23	1:A:2290:LEU:HA	1.90	0.42
1:A:645:LYS:O	1:A:649:ILE:HG12	2.20	0.41
1:A:1069:THR:HG21	1:A:1074:MSE:HB2	2.01	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1471:MSE:HG2	1:A:1475:MSE:HE2	2.01	0.41
1:A:445:ASN:C	1:A:447:ALA:H	2.23	0.41
1:A:942:ASN:HD22	1:A:942:ASN:HA	1.71	0.41
1:A:1142:ASN:O	1:A:1146:VAL:HG13	2.19	0.41
1:A:2450:VAL:HG22	1:A:2453:MSE:HE2	2.02	0.41
1:A:12:ALA:HB3	1:A:2256:ILE:HD13	2.03	0.41
1:A:2086:GLN:O	1:A:2087:LEU:C	2.59	0.41
1:A:1558:ILE:HD13	1:A:1558:ILE:HA	1.95	0.41
1:A:1118:ARG:NH2	1:A:1161:ASP:OD2	2.54	0.41
1:A:1751:SER:HB3	1:A:1787:THR:HG22	2.02	0.41
1:A:1838:THR:HG23	1:A:1840:ILE:H	1.86	0.41
1:A:2165:GLN:OE1	1:A:2166:PHE:CZ	2.74	0.41
1:A:73:SER:O	1:A:79:MSE:HE2	2.21	0.41
1:A:484:GLY:O	1:A:488:TYR:N	2.47	0.41
1:A:507:VAL:HA	1:A:510:LEU:HD12	2.02	0.41
1:A:2099:MSE:HE3	1:A:2099:MSE:HB3	1.97	0.41
1:A:2130:LEU:O	1:A:2134:LEU:HG	2.20	0.41
1:A:2160:ILE:HD11	1:A:2196:ALA:CB	2.50	0.41
1:A:648:LYS:O	1:A:700:ARG:NH2	2.41	0.41
1:A:763:LEU:HD22	1:A:773:GLN:HA	2.02	0.41
1:A:1352:LEU:N	1:A:1353:PRO:HD2	2.36	0.41
1:A:1715:LEU:HB2	1:A:1766:ILE:HD12	2.02	0.41
1:A:1889:LEU:O	1:A:1893:ILE:HG13	2.21	0.41
1:A:2260:MSE:HE3	1:A:2264:GLU:HG2	2.03	0.41
1:A:582:ARG:HH22	1:A:627:CYS:HB2	1.85	0.40
1:A:1784:ALA:O	1:A:1785:GLN:C	2.59	0.40
1:A:2113:LEU:C	1:A:2115:PRO:HD2	2.40	0.40
1:A:24:HIS:HE1	2:A:2642:HOH:O	2.04	0.40
1:A:30:MSE:HE3	1:A:30:MSE:HB3	1.92	0.40
1:A:2059:ILE:HG22	1:A:2063:LEU:HD11	2.02	0.40
1:A:2405:ILE:C	1:A:2405:ILE:HD12	2.41	0.40
1:A:278:ALA:O	1:A:279:GLU:HB2	2.21	0.40
1:A:550:LEU:HD12	1:A:550:LEU:O	2.22	0.40
1:A:1444:ALA:O	1:A:1484:ALA:HB2	2.21	0.40
1:A:49:TYR:HE1	1:A:768:MSE:HE2	1.87	0.40
1:A:1286:CYS:SG	1:A:1295:GLY:HA3	2.61	0.40
1:A:318:ILE:HG12	1:A:364:THR:HB	2.04	0.40
1:A:1171:MSE:HG3	1:A:1195:PHE:CE1	2.56	0.40
1:A:1780:PHE:HA	1:A:1781:PRO:HD3	1.98	0.40
1:A:2105:ASN:O	1:A:2108:LYS:HB3	2.21	0.40
1:A:2173:LEU:HD21	1:A:2205:CYS:HB2	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 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	2470/2498 (99%)	2312 (94%)	147 (6%)	11 (0%)	30 52

All (11) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	827	LEU
1	A	318	ILE
1	A	348	SER
1	A	956	PRO
1	A	329	PRO
1	A	828	MSE
1	A	955	ALA
1	A	813	SER
1	A	231	ASP
1	A	278	ALA
1	A	321	GLY

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	2007/1944 (103%)	1802 (90%)	205 (10%)	6 13

All (205) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	19	GLN
1	A	20	SER
1	A	30	MSE
1	A	32	LEU
1	A	45	SER
1	A	66	GLN
1	A	79	MSE
1	A	104	ARG
1	A	112	VAL
1	A	122	THR
1	A	125	GLN
1	A	126	THR
1	A	128[A]	GLU
1	A	128[B]	GLU
1	A	131	MSE
1	A	138	LYS
1	A	139	ARG
1	A	153	MSE
1	A	158	THR
1	A	159	LYS
1	A	165	LYS
1	A	168	LYS
1	A	230	THR
1	A	231	ASP
1	A	233	THR
1	A	234	THR
1	A	272	LEU
1	A	287	GLU
1	A	290	VAL
1	A	311	VAL
1	A	314	LEU
1	A	317	LEU
1	A	318	ILE
1	A	320	SER
1	A	322	LEU
1	A	324	GLN
1	A	325	MSE
1	A	326	GLU
1	A	328	ASN
1	A	331	LYS
1	A	335	MSE
1	A	349	ASN
1	A	353	VAL

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	362	VAL
1	A	373	THR
1	A	374	GLU
1	A	382	LEU
1	A	387	VAL
1	A	403	GLN
1	A	404	THR
1	A	420	GLU
1	A	437	GLU
1	A	445	ASN
1	A	446	GLN
1	A	450	ILE
1	A	463	SER
1	A	480	THR
1	A	483	HIS
1	A	486	SER
1	A	525	LYS
1	A	547	ASN
1	A	560	ARG
1	A	563	THR
1	A	575	ASP
1	A	576	THR
1	A	582	ARG
1	A	603	SER
1	A	606	GLN
1	A	628	SER
1	A	631	GLU
1	A	652	ASP
1	A	693	ARG
1	A	698	THR
1	A	718	MSE
1	A	723	ASP
1	A	726	ARG
1	A	736	ASN
1	A	747	VAL
1	A	749	ILE
1	A	751	SER
1	A	756	LEU
1	A	771	ASP
1	A	793	THR
1	A	794	LEU
1	A	795	ARG

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	798	ASN
1	A	800	LEU
1	A	804	LYS
1	A	807	MSE
1	A	808	ARG
1	A	809	THR
1	A	812	LYS
1	A	814	LYS
1	A	817	LYS
1	A	818	ARG
1	A	820	ILE
1	A	824	VAL
1	A	828	MSE
1	A	831	ASP
1	A	852	ASN
1	A	869	SER
1	A	870	SER
1	A	906	ASP
1	A	910	LYS
1	A	931	ARG
1	A	943	VAL
1	A	982	SER
1	A	989	ARG
1	A	999	ILE
1	A	1069	THR
1	A	1096	ASP
1	A	1125	VAL
1	A	1146	VAL
1	A	1171	MSE
1	A	1201	ASP
1	A	1221	ASP
1	A	1224	GLN
1	A	1259	VAL
1	A	1316	THR
1	A	1322	LYS
1	A	1344	MSE
1	A	1361	MSE
1	A	1384	THR
1	A	1422	MSE
1	A	1431	THR
1	A	1453	ASP
1	A	1459	ASN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	1502	ASP
1	A	1593	THR
1	A	1620	ARG
1	A	1631	THR
1	A	1636	GLU
1	A	1709	MSE
1	A	1743	LYS
1	A	1744	LEU
1	A	1754	GLU
1	A	1765	GLU
1	A	1785	GLN
1	A	1789	ARG
1	A	1791	GLN
1	A	1813	ARG
1	A	1823	PHE
1	A	1825	VAL
1	A	1831	ASN
1	A	1838	THR
1	A	1860	LEU
1	A	1861	LEU
1	A	1879	GLU
1	A	1880	LEU
1	A	1918	GLU
1	A	1964	LYS
1	A	2006	LYS
1	A	2009	SER
1	A	2012	LYS
1	A	2017	ASN
1	A	2028	SER
1	A	2031	ASP
1	A	2035	GLU
1	A	2045	VAL
1	A	2050	SER
1	A	2053	SER
1	A	2054	LEU
1	A	2055	TYR
1	A	2056	THR
1	A	2058	ASN
1	A	2067	ILE
1	A	2068	GLU
1	A	2071	TYR
1	A	2088	GLU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	2092	ARG
1	A	2093	THR
1	A	2099	MSE
1	A	2107	ARG
1	A	2111	VAL
1	A	2116	CYS
1	A	2119	VAL
1	A	2125	THR
1	A	2144	LYS
1	A	2156	ILE
1	A	2160	ILE
1	A	2175	LEU
1	A	2187	LYS
1	A	2214	GLU
1	A	2216	THR
1	A	2217	ASP
1	A	2219	VAL
1	A	2226	THR
1	A	2261	VAL
1	A	2287	VAL
1	A	2297	ARG
1	A	2301	MSE
1	A	2348	VAL
1	A	2353	ILE
1	A	2363	VAL
1	A	2371	ARG
1	A	2390	THR
1	A	2404	GLN
1	A	2438	LYS
1	A	2442	LEU
1	A	2456	LYS
1	A	2463	LEU
1	A	2464	LYS
1	A	2470	THR
1	A	2489	THR
1	A	2500	VAL

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

Mol	Chain	Res	Type
1	A	19	GLN
1	A	47	GLN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	189	ASN
1	A	324	GLN
1	A	414	GLN
1	A	446	GLN
1	A	517	ASN
1	A	789	ASN
1	A	798	ASN
1	A	959	GLN
1	A	1142	ASN
1	A	1224	GLN
1	A	1412	GLN
1	A	1596	GLN
1	A	1729	ASN
1	A	1785	GLN
1	A	2007	ASN
1	A	2029	ASN
1	A	2086	GLN
1	A	2096	ASN
1	A	2369	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.

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	2390/2498 (95%)	-0.11	43 (1%) 67 67	36, 74, 97, 121	2 (0%)

All (43) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	822	PRO	5.5
1	A	476	VAL	3.9
1	A	95	GLU	3.6
1	A	475	LEU	3.6
1	A	329	PRO	3.6
1	A	818	ARG	3.4
1	A	1458	SER	3.3
1	A	450	ILE	3.3
1	A	819	THR	3.2
1	A	278	ALA	3.2
1	A	447	ALA	3.1
1	A	1459	ASN	3.0
1	A	826	LEU	2.8
1	A	308	ALA	2.7
1	A	309	GLY	2.7
1	A	2298	ALA	2.6
1	A	231	ASP	2.6
1	A	824	VAL	2.6
1	A	655	LEU	2.5
1	A	2055	TYR	2.5
1	A	280	ALA	2.5
1	A	488	TYR	2.5
1	A	959	GLN	2.5
1	A	820	ILE	2.4
1	A	1465	GLN	2.4
1	A	695	LEU	2.4
1	A	1506	ARG	2.4

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	2220	VAL	2.3
1	A	1460	SER	2.3
1	A	2222	GLY	2.3
1	A	1358	LEU	2.2
1	A	823	LEU	2.2
1	A	192	GLY	2.2
1	A	310	GLY	2.2
1	A	759	VAL	2.2
1	A	793	THR	2.1
1	A	821	ALA	2.1
1	A	794	LEU	2.1
1	A	2221	GLY	2.1
1	A	49	TYR	2.0
1	A	2123	GLY	2.0
1	A	2215	VAL	2.0
1	A	2217	ASP	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 monosaccharides in this entry.

6.4 Ligands [i](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.