



# Full wwPDB X-ray Structure Validation Report ⓘ

Nov 13, 2024 – 01:34 PM EST

PDB ID : 4RTD  
Title : Escherichia coli alpha-2-macroglobulin activated by porcine elastase  
Authors : Fyfe, C.D.; Grinter, R.; Roszak, A.W.; Josts, I.; Cogdell, R.J.; Walker, D.  
Deposited on : 2014-11-14  
Resolution : 3.65 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](mailto: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>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 2022.3.0, CSD as543be (2022)  
Xtriage (Phenix) : 1.20.1  
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

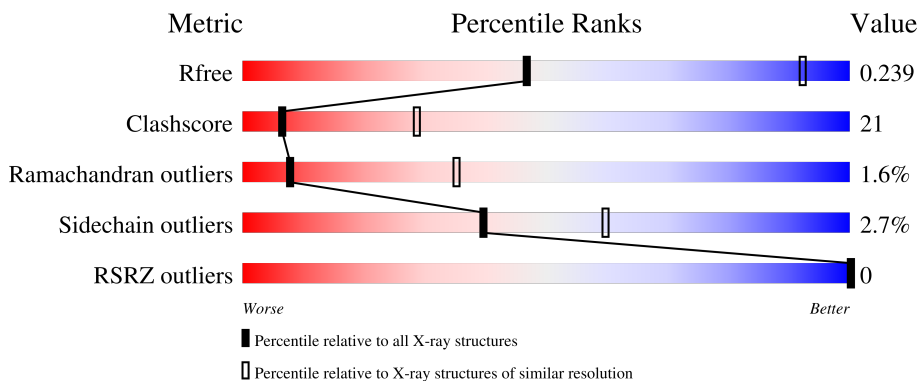
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.65 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	1261 (3.80-3.52)
Clashscore	180529	1328 (3.80-3.52)
Ramachandran outliers	177936	1306 (3.80-3.52)
Sidechain outliers	177891	1303 (3.80-3.52)
RSRZ outliers	164620	1260 (3.80-3.52)

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  $\geq 3$ , 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	1639	

## 2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 8699 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Uncharacterized lipoprotein YfhM.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	N	O	S	Se			
1	A	1122	8699	5497	1505	1677	1	19	0	0	0

There are 11 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	219	PRO	SER	engineered mutation	UNP P76578
A	606	ARG	GLN	engineered mutation	UNP P76578
A	1587	ASN	SER	engineered mutation	UNP P76578
A	1654	LEU	-	expression tag	UNP P76578
A	1655	GLU	-	expression tag	UNP P76578
A	1656	HIS	-	expression tag	UNP P76578
A	1657	HIS	-	expression tag	UNP P76578
A	1658	HIS	-	expression tag	UNP P76578
A	1659	HIS	-	expression tag	UNP P76578
A	1660	HIS	-	expression tag	UNP P76578
A	1661	HIS	-	expression tag	UNP P76578



M1634	V1548	S1428	L1301	P1184	R1088	T976	V892
Y1635	D1549	N1429	K1302	Y1185	A1089	L977	M893
V1636	L1550	F1432	A1303	L1188	P1091	Q980	V896
Q1637	L1551	G1443	S1304	L1195	E1097	G981	V899
W1638	E1556	K1444	K1305	L1198	I1098	V888	L904
W1639	L1557	W1445	Y1311	S1198	Q1099	F986	N905
R1640	E1558	Q1446	A1326	L1199	S1103	F987	I906
A1641	Q1560	T1457	L1327	Y1200	G1104	D991	T907
L1649	N1561	L1471	R1328	T1201	L1105	T1004	D908
I1650	L1562	K1460	E1329	M1202	A1106	T1004	Y909
V1651	ALA	A1461	I1330	Q1205	L1107	M1011	W915
R1652	ASN	Q1462	W1331	L1206	E1110	E1012	
P1653	GLY	S1464	D1336	L1209	T1111	V1015	Q921
LEU	M1463	L1471	A1337	G1210	V1112	V1015	K922
GLU	L1569	L1474	A1338	G1210	A1113	T1016	ARG
HIS	E1570	S1479	S1339	I1211	D1114	V1017	TYR
HIS	Q1571	L1477	G1340	K1212	K1120	A1018	GLY
HIS	S1572	S1477	L1341	K1218	I1121	V1021	ALA
HIS	E1575	N1478	L1343	S1222	R1124	I1022	ASP
HIS	V1576	S1479	L1344	V1223	P1125	M1027	ILE
HIS	Q1577	P1483	L1350	G1226	T1131	M1031	TYR
HIS	M1578	L1484	K1351	I1227	V1132	A1032	GLY
HIS	L1579	W1485	D1355	S1228	N1133	S1033	GLN
HIS	L1580	L1486	R1355	R1299	A1137	T1036	VAL
HIS	M1581	R1487	R1358	L1230	L1138	L1039	ILE
HIS	Q1582	R1488	R1358	L1231	Q1139	L1039	GLU
HIS	E1592	D1489	L1365	Q1232	P1140	I1043	GLN
HIS	F1593	A1490	R1371	M1233	E1142	T1044	GLY
HIS	R1594	S1491	L1377	A1241	I1146	M1045	ARG
HIS	D1595	M1503	W1378	M1258	P1147	L1046	LEU
HIS	D1596	V1504	L1379	V1262	S1155	T1047	A943
HIS	R1597	L1505	L1383	R1263	G1161	D1048	R946
HIS	F1598	Q1506	R1387	T1273	Q1162	Q1051	F947
HIS	V1599	R1509	N1387	D1274	G1167	T1058	G948
HIS	E1606	G1513	M1399	A1275	K1168	L1063	G949
HIS	Y1607	G1516	K1400	I1276	P1169	V1066	D950
HIS	Q1608	K1519	L1401	L1283	L1171	A1071	G951
HIS	T1611	L1524	L1410	L1284	M1172	A1076	R956
HIS	L1615	W1533	L1413	R1285	I1173	A1076	G957
HIS	A1616	L1534	L1416	Y1286	I1174	P1077	G958
HIS	R1617	Q1535	Q1416	L1287	A1174	V962	K959
HIS	A1618	S1541	A1417	M1292	R1175	G1078	P960
HIS	V1619	V1542	E1420	M1293	Y1176	V1079	N963
HIS	T1620	A1545	Y1297	P1296	I1177	R1080	Q971
HIS	P1621		E1420	Y1297	K1178	P1086	A972
HIS	P1627		E1420	Y1297	L1180	V1087	V975
HIS	M1630		E1420	Y1297	L1180	V1087	
HIS	V1631		E1420	Y1297	L1180	V1087	
HIS	E1632		E1420	Y1297	L1180	V1087	
HIS	S1633		E1420	Y1297	L1180	V1087	

## 4 Data and refinement statistics i

Property	Value	Source
Space group	H 3	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	176.06Å 176.06Å 161.13Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	46.87 – 3.65 46.87 – 3.65	Depositor EDS
% Data completeness (in resolution range)	99.9 (46.87-3.65) 99.9 (46.87-3.65)	Depositor EDS
$R_{merge}$	0.08	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.83 (at 3.66Å)	Xtrriage
Refinement program	REFMAC 5.8.0049	Depositor
R, $R_{free}$	0.177 , 0.238 0.183 , 0.239	Depositor DCC
$R_{free}$ test set	1033 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	126.2	Xtrriage
Anisotropy	0.162	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 118.2	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	0.037 for h,-h-k,-l	Xtrriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	8699	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	144.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.14% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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	0.50	0/8863	0.75	3/12024 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	460	MSE	CG-SE-CE	7.75	115.94	98.90
1	A	1105	LEU	CA-CB-CG	5.31	127.52	115.30
1	A	1488	MSE	CA-CB-CG	-5.20	104.46	113.30

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	8699	0	8589	370	0
All	All	8699	0	8589	370	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 21.

All (370) 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:639:ILE:HG21	1:A:738:TRP:O	1.73	0.89
1:A:396:LEU:HD22	1:A:906:ILE:HD11	1.56	0.87
1:A:1045:ASN:OD1	1:A:1047:THR:HG22	1.77	0.84
1:A:1504:VAL:HG21	1:A:1639:TRP:CD1	2.15	0.81
1:A:1106:ALA:HA	1:A:1113:ALA:HA	1.62	0.81
1:A:1578:ASN:HB2	1:A:1579:LEU:HD12	1.64	0.79
1:A:1417:ALA:HA	1:A:1420:GLU:HG3	1.65	0.78
1:A:661:ALA:HB1	1:A:704:LEU:O	1.83	0.78
1:A:1033:SER:HB2	1:A:1091:PRO:HA	1.65	0.78
1:A:411:ASP:HB3	1:A:417:LEU:HD11	1.66	0.78
1:A:1273:THR:O	1:A:1276:ILE:HG22	1.83	0.78
1:A:1488:MSE:HG3	1:A:1489:ASP:N	2.00	0.77
1:A:1509:ARG:NH1	1:A:1549:ASP:OD1	2.19	0.75
1:A:1170:PRO:HG2	1:A:1410:LEU:HD21	1.69	0.75
1:A:658:VAL:HG22	1:A:659:LYS:HG2	1.68	0.75
1:A:1562:LEU:HB2	1:A:1566:SER:OG	1.86	0.74
1:A:946:ARG:NH2	1:A:1545:ALA:O	2.21	0.74
1:A:893:ASN:OD1	1:A:976:THR:HG22	1.86	0.73
1:A:396:LEU:HD22	1:A:906:ILE:CD1	2.18	0.73
1:A:1383:GLY:HA2	1:A:1387:ARG:HD3	1.70	0.73
1:A:1460:LYS:HG3	1:A:1461:ALA:H	1.55	0.72
1:A:864:GLU:HB2	1:A:878:LYS:HB2	1.72	0.72
1:A:882:SER:O	1:A:883:THR:HG22	1.89	0.71
1:A:906:ILE:HD12	1:A:907:THR:N	2.06	0.71
1:A:1021:VAL:HG12	1:A:1045:ASN:HA	1.74	0.70
1:A:500:PRO:HD3	1:A:609:TRP:O	1.92	0.70
1:A:683:ASP:HB3	1:A:685:GLY:O	1.93	0.69
1:A:397:TYR:CE2	1:A:403:VAL:HA	2.28	0.69
1:A:487:MSE:HE2	1:A:512:TYR:CZ	2.29	0.68
1:A:565:ASP:HB3	1:A:568:ARG:O	1.93	0.68
1:A:1173:ILE:HB	1:A:1176:TYR:CD1	2.30	0.67
1:A:875:LEU:HD11	1:A:1015:VAL:HG11	1.76	0.67
1:A:859:LEU:HD13	1:A:888:LYS:HE2	1.77	0.66
1:A:1107:LEU:HD12	1:A:1110:GLU:HB2	1.76	0.66
1:A:1168:LYS:HB2	1:A:1443:GLY:HA2	1.77	0.66
1:A:1175:ARG:NH1	1:A:1210:GLY:O	2.28	0.66
1:A:480:GLU:OE2	1:A:1561:ASN:ND2	2.27	0.66
1:A:661:ALA:HB2	1:A:705:LYS:C	2.17	0.65
1:A:621:PHE:CD2	1:A:638:PRO:HB2	2.32	0.65
1:A:1178:LYS:HB3	1:A:1179:GLU:HA	1.79	0.64
1:A:1011:ASN:OD1	1:A:1012:GLU:N	2.30	0.64
1:A:1133:ASN:HB2	1:A:1637:PRO:HG3	1.78	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1582:GLN:OE1	1:A:1611:THR:OG1	2.11	0.64
1:A:1162:GLN:OE1	1:A:1162:GLN:N	2.32	0.63
1:A:1378:TRP:HA	1:A:1378:TRP:CE3	2.34	0.63
1:A:536:VAL:HG11	1:A:539:LEU:HD12	1.80	0.63
1:A:1378:TRP:HA	1:A:1378:TRP:HE3	1.64	0.63
1:A:741:TYR:HD1	1:A:742:SER:HB2	1.63	0.62
1:A:883:THR:HG21	1:A:887:GLU:C	2.19	0.62
1:A:1569:LEU:HD23	1:A:1570:GLU:N	2.14	0.62
1:A:661:ALA:HB2	1:A:706:ALA:N	2.14	0.62
1:A:1558:GLU:CD	1:A:1569:LEU:HD13	2.20	0.62
1:A:958:GLY:O	1:A:1597:ARG:NH1	2.31	0.62
1:A:1556:GLU:OE2	1:A:1619:VAL:HG21	2.00	0.62
1:A:1124:ARG:HG3	1:A:1125:PRO:O	1.99	0.62
1:A:679:ASN:HB3	1:A:687:GLN:HA	1.80	0.62
1:A:1509:ARG:NH2	1:A:1627:PRO:O	2.32	0.62
1:A:1170:PRO:HG2	1:A:1410:LEU:CD2	2.30	0.61
1:A:639:ILE:HG22	1:A:640:VAL:O	2.00	0.61
1:A:678:TRP:HE3	1:A:687:GLN:HB2	1.65	0.61
1:A:869:MSE:SE	1:A:875:LEU:HD12	2.50	0.60
1:A:1133:ASN:HB2	1:A:1637:PRO:CG	2.30	0.60
1:A:1200:TYR:OH	1:A:1263:ARG:HD3	2.01	0.60
1:A:1178:LYS:CD	1:A:1180:LEU:HB2	2.32	0.60
1:A:1178:LYS:HG3	1:A:1211:ILE:HD12	1.84	0.60
1:A:396:LEU:CD2	1:A:906:ILE:HD11	2.28	0.60
1:A:1478:ASN:OD1	1:A:1479:SER:N	2.35	0.60
1:A:1571:GLN:HA	1:A:1571:GLN:OE1	2.02	0.60
1:A:615:PRO:HG3	1:A:727:ALA:HB2	1.83	0.60
1:A:1535:GLN:OE1	1:A:1535:GLN:HA	2.00	0.60
1:A:639:ILE:HG22	1:A:640:VAL:N	2.16	0.60
1:A:1168:LYS:HB3	1:A:1169:PRO:HD3	1.82	0.59
1:A:1104:GLY:O	1:A:1105:LEU:HG	2.02	0.59
1:A:1445:TRP:NE1	1:A:1460:LYS:O	2.30	0.59
1:A:1558:GLU:OE2	1:A:1617:ARG:NE	2.30	0.59
1:A:1177:ILE:O	1:A:1178:LYS:CB	2.50	0.59
1:A:486:ARG:NH2	1:A:594:GLU:OE1	2.36	0.59
1:A:892:VAL:HG11	1:A:977:LEU:HD12	1.83	0.58
1:A:1619:VAL:HG23	1:A:1620:THR:N	2.18	0.58
1:A:1410:LEU:HD23	1:A:1410:LEU:C	2.23	0.58
1:A:1570:GLU:HG2	1:A:1571:GLN:N	2.19	0.58
1:A:1167:GLY:C	1:A:1485:TRP:HZ3	2.07	0.58
1:A:639:ILE:HG12	1:A:738:TRP:O	2.03	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:871:PRO:HD3	1:A:1018:ALA:O	2.03	0.57
1:A:1031:MSE:HE1	1:A:1063:LEU:HD11	1.85	0.57
1:A:1632:GLU:HG2	1:A:1640:ARG:HB3	1.85	0.57
1:A:483:MSE:HE2	1:A:963:ASN:HD21	1.70	0.57
1:A:1487:ARG:NH2	1:A:1635:TYR:O	2.33	0.57
1:A:1167:GLY:HA3	1:A:1445:TRP:HB3	1.85	0.57
1:A:638:PRO:O	1:A:639:ILE:HG13	2.04	0.57
1:A:1578:ASN:HB2	1:A:1579:LEU:CD1	2.35	0.56
1:A:1039:LEU:HD13	1:A:1087:VAL:HG21	1.86	0.56
1:A:398:ARG:O	1:A:399:PRO:C	2.44	0.56
1:A:532:LEU:HD12	1:A:585:GLN:HB3	1.87	0.56
1:A:1569:LEU:HD23	1:A:1569:LEU:C	2.26	0.56
1:A:718:TRP:CG	1:A:718:TRP:O	2.59	0.56
1:A:640:VAL:HG11	1:A:716:VAL:CG2	2.35	0.55
1:A:1131:THR:HG23	1:A:1491:SER:OG	2.06	0.55
1:A:1562:LEU:HB2	1:A:1566:SER:CB	2.36	0.55
1:A:1577:GLN:O	1:A:1578:ASN:C	2.45	0.55
1:A:460:MSE:CE	1:A:476:ASP:HB3	2.37	0.55
1:A:645:ASN:OD1	1:A:645:ASN:N	2.39	0.55
1:A:1076:ALA:HB3	1:A:1079:VAL:HG21	1.89	0.55
1:A:1503:ASN:ND2	1:A:1638:GLN:O	2.39	0.55
1:A:1146:ILE:HG13	1:A:1147:PRO:HD2	1.88	0.55
1:A:1177:ILE:O	1:A:1178:LYS:HB2	2.06	0.55
1:A:684:GLU:N	1:A:685:GLY:O	2.39	0.55
1:A:1506:GLN:HA	1:A:1641:ALA:CB	2.37	0.55
1:A:658:VAL:CG2	1:A:659:LYS:HG2	2.36	0.54
1:A:1076:ALA:HB1	1:A:1077:PRO:HD2	1.90	0.54
1:A:1195:LEU:HD22	1:A:1223:VAL:HA	1.88	0.54
1:A:394:ARG:HA	1:A:909:TYR:CE2	2.42	0.54
1:A:858:ARG:HB3	1:A:915:TRP:CD1	2.43	0.54
1:A:859:LEU:HD13	1:A:888:LYS:CE	2.36	0.54
1:A:1171:LEU:HG	1:A:1173:ILE:HG23	1.89	0.54
1:A:1615:LEU:HD12	1:A:1616:ALA:N	2.22	0.54
1:A:959:LYS:HD2	1:A:960:PRO:HD2	1.89	0.54
1:A:1619:VAL:HG23	1:A:1620:THR:H	1.72	0.54
1:A:590:GLY:O	1:A:601:THR:HG23	2.09	0.53
1:A:1139:GLN:HG2	1:A:1140:PRO:HD2	1.90	0.53
1:A:1036:THR:HG22	1:A:1088:ARG:HA	1.90	0.53
1:A:705:LYS:O	1:A:708:GLU:HB3	2.08	0.53
1:A:729:ASN:O	1:A:730:GLU:HB2	2.09	0.53
1:A:1172:ASN:O	1:A:1174:ALA:N	2.42	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1575:GLU:OE1	1:A:1576:VAL:HG13	2.08	0.53
1:A:718:TRP:O	1:A:718:TRP:CD1	2.61	0.53
1:A:1177:ILE:O	1:A:1178:LYS:CG	2.56	0.53
1:A:581:HIS:HB3	1:A:730:GLU:O	2.08	0.53
1:A:1350:LEU:O	1:A:1351:LYS:C	2.45	0.53
1:A:505:LYS:HB3	1:A:572:SER:CB	2.39	0.53
1:A:1205:GLN:O	1:A:1209:LEU:HB2	2.09	0.53
1:A:1524:LEU:HD12	1:A:1649:LEU:HD11	1.91	0.53
1:A:645:ASN:HA	1:A:715:PRO:HA	1.91	0.52
1:A:464:ARG:HD2	1:A:472:TYR:HD2	1.73	0.52
1:A:1562:LEU:CB	1:A:1566:SER:OG	2.56	0.52
1:A:639:ILE:CG2	1:A:640:VAL:N	2.73	0.52
1:A:1542:VAL:HG22	1:A:1639:TRP:CZ3	2.45	0.52
1:A:650:ILE:CD1	1:A:712:VAL:HG22	2.40	0.52
1:A:1607:TYR:CE1	1:A:1608:GLN:HG3	2.45	0.52
1:A:651:VAL:CG1	1:A:659:LYS:HE3	2.39	0.52
1:A:1090:LEU:HB3	1:A:1091:PRO:HD2	1.90	0.52
1:A:1339:SER:HB2	1:A:1371:ARG:HE	1.74	0.52
1:A:1569:LEU:HD21	1:A:1615:LEU:HD23	1.89	0.52
1:A:1413:LEU:HA	1:A:1416:GLN:HG2	1.92	0.51
1:A:1551:LEU:HD11	1:A:1557:LEU:HD13	1.92	0.51
1:A:1176:TYR:C	1:A:1177:ILE:HD12	2.30	0.51
1:A:1417:ALA:HA	1:A:1420:GLU:CG	2.39	0.51
1:A:1463:ASN:OD1	1:A:1464:SER:N	2.44	0.51
1:A:662:VAL:HG12	1:A:663:SER:O	2.10	0.51
1:A:883:THR:HG23	1:A:885:ASN:HB2	1.92	0.51
1:A:662:VAL:HG11	1:A:728:PRO:HG2	1.93	0.51
1:A:1103:SER:HA	1:A:1114:ASP:OD1	2.11	0.51
1:A:1446:GLN:HG2	1:A:1457:THR:HG23	1.91	0.51
1:A:1058:THR:HB	1:A:1099:GLN:HB2	1.93	0.51
1:A:888:LYS:NZ	1:A:892:VAL:HG13	2.25	0.51
1:A:1178:LYS:CD	1:A:1211:ILE:HD12	2.40	0.51
1:A:1228:SER:HA	1:A:1231:LEU:HD12	1.93	0.51
1:A:1341:LEU:O	1:A:1345:GLN:HG3	2.12	0.51
1:A:893:ASN:HA	1:A:975:VAL:O	2.10	0.50
1:A:1188:LEU:HD13	1:A:1233:MSE:SE	2.61	0.50
1:A:1341:LEU:HB3	1:A:1342:PRO:HD3	1.92	0.50
1:A:676:TYR:O	1:A:690:PHE:HA	2.11	0.50
1:A:678:TRP:CE3	1:A:687:GLN:HB2	2.44	0.50
1:A:671:ARG:NH1	1:A:721:TYR:OH	2.44	0.50
1:A:675:ASP:HA	1:A:690:PHE:HE1	1.75	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:580:THR:HG21	1:A:584:LEU:HD21	1.94	0.50
1:A:972:ALA:HB2	1:A:987:LEU:HD21	1.94	0.50
1:A:639:ILE:HG12	1:A:738:TRP:N	2.27	0.50
1:A:678:TRP:HZ3	1:A:687:GLN:HG3	1.77	0.50
1:A:1139:GLN:N	1:A:1142:GLU:OE2	2.45	0.50
1:A:1177:ILE:O	1:A:1178:LYS:HG2	2.12	0.50
1:A:500:PRO:O	1:A:575:SER:OG	2.15	0.50
1:A:661:ALA:HB1	1:A:705:LYS:HA	1.93	0.49
1:A:675:ASP:OD1	1:A:675:ASP:N	2.45	0.49
1:A:1579:LEU:HD12	1:A:1579:LEU:N	2.27	0.49
1:A:1331:TRP:CD1	1:A:1358:ARG:HD2	2.48	0.49
1:A:503:GLU:HG2	1:A:574:GLU:HA	1.94	0.49
1:A:588:PHE:O	1:A:603:ARG:HA	2.13	0.49
1:A:1161:GLY:C	1:A:1162:GLN:OE1	2.51	0.49
1:A:386:LYS:O	1:A:473:ARG:NH2	2.46	0.49
1:A:1188:LEU:HD22	1:A:1241:ALA:O	2.13	0.49
1:A:396:LEU:HD21	1:A:482:PHE:CG	2.47	0.49
1:A:980:GLN:N	1:A:980:GLN:OE1	2.46	0.49
1:A:1178:LYS:HD3	1:A:1180:LEU:HB2	1.95	0.49
1:A:1576:VAL:O	1:A:1576:VAL:HG23	2.13	0.49
1:A:411:ASP:OD1	1:A:415:LYS:N	2.45	0.48
1:A:651:VAL:HG11	1:A:659:LYS:HE3	1.94	0.48
1:A:1031:MSE:HE2	1:A:1121:ILE:HD13	1.93	0.48
1:A:1533:TRP:CD1	1:A:1579:LEU:HD23	2.47	0.48
1:A:472:TYR:CD1	1:A:472:TYR:N	2.81	0.48
1:A:1137:ALA:O	1:A:1138:LEU:HD23	2.12	0.48
1:A:1178:LYS:CG	1:A:1211:ILE:HD12	2.42	0.48
1:A:467:THR:C	1:A:469:ASP:H	2.17	0.48
1:A:639:ILE:HG12	1:A:738:TRP:H	1.79	0.48
1:A:1137:ALA:HB2	1:A:1485:TRP:CD1	2.48	0.48
1:A:906:ILE:HD12	1:A:906:ILE:C	2.35	0.47
1:A:1201:THR:HG21	1:A:1432:PHE:HZ	1.78	0.47
1:A:1569:LEU:HD21	1:A:1615:LEU:CD2	2.43	0.47
1:A:1106:ALA:CA	1:A:1113:ALA:HA	2.40	0.47
1:A:487:MSE:HE2	1:A:512:TYR:CE1	2.49	0.47
1:A:741:TYR:HD1	1:A:742:SER:CB	2.25	0.47
1:A:1471:LEU:HA	1:A:1474:LEU:HB2	1.96	0.47
1:A:1559:ASN:OD1	1:A:1561:ASN:N	2.46	0.47
1:A:472:TYR:N	1:A:472:TYR:HD1	2.13	0.47
1:A:532:LEU:HD21	1:A:535:ALA:HA	1.95	0.47
1:A:590:GLY:O	1:A:601:THR:HA	2.14	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1047:THR:HG21	1:A:1051:GLN:HE21	1.78	0.47
1:A:1292:MSE:CG	1:A:1293:MSE:N	2.77	0.47
1:A:460:MSE:HE2	1:A:476:ASP:HB3	1.95	0.47
1:A:1371:ARG:HH12	1:A:1383:GLY:HA3	1.80	0.47
1:A:1387:ARG:HB3	1:A:1427:GLU:HG2	1.97	0.47
1:A:1558:GLU:HB3	1:A:1569:LEU:HD22	1.97	0.47
1:A:1562:LEU:O	1:A:1566:SER:HA	2.15	0.47
1:A:599:PRO:HG2	1:A:1617:ARG:HD2	1.97	0.47
1:A:1303:ALA:HB1	1:A:1338:ALA:HB2	1.96	0.47
1:A:1596:ASP:C	1:A:1597:ARG:HG2	2.34	0.47
1:A:1173:ILE:HD11	1:A:1420:GLU:OE2	2.15	0.47
1:A:599:PRO:HG2	1:A:1617:ARG:CD	2.45	0.47
1:A:1326:ALA:O	1:A:1329:GLU:HG2	2.14	0.47
1:A:598:ARG:NH2	1:A:1027:MSE:O	2.45	0.46
1:A:1139:GLN:HA	1:A:1483:PRO:HB3	1.97	0.46
1:A:1039:LEU:HD13	1:A:1087:VAL:CG2	2.45	0.46
1:A:578:LYS:HG3	1:A:579:GLU:N	2.30	0.46
1:A:880:LYS:HA	1:A:981:GLY:O	2.14	0.46
1:A:535:ALA:HB1	1:A:609:TRP:CZ2	2.50	0.46
1:A:723:LEU:O	1:A:734:SER:HA	2.16	0.46
1:A:1505:LEU:O	1:A:1641:ALA:HB2	2.16	0.46
1:A:1630:MSE:HG3	1:A:1640:ARG:HH21	1.81	0.46
1:A:861:LEU:HD23	1:A:862:ALA:N	2.31	0.46
1:A:1168:LYS:CB	1:A:1169:PRO:HD3	2.46	0.46
1:A:1106:ALA:HA	1:A:1112:VAL:O	2.15	0.46
1:A:896:VAL:HG11	1:A:985:VAL:HG21	1.98	0.46
1:A:1047:THR:HG21	1:A:1051:GLN:HG3	1.98	0.46
1:A:1283:LEU:O	1:A:1286:TYR:HB2	2.16	0.46
1:A:1570:GLU:HG2	1:A:1571:GLN:H	1.81	0.46
1:A:1105:LEU:O	1:A:1105:LEU:HD12	2.16	0.46
1:A:888:LYS:CE	1:A:892:VAL:HG13	2.46	0.45
1:A:1577:GLN:HA	1:A:1580:LEU:HD12	1.98	0.45
1:A:1548:VAL:HG22	1:A:1599:VAL:HG22	1.98	0.45
1:A:637:GLN:O	1:A:639:ILE:HD12	2.16	0.45
1:A:892:VAL:HB	1:A:977:LEU:HB2	1.97	0.45
1:A:1226:GLY:O	1:A:1230:LEU:HG	2.16	0.45
1:A:390:MSE:HE1	1:A:473:ARG:O	2.17	0.45
1:A:1503:ASN:OD1	1:A:1504:VAL:HG23	2.16	0.45
1:A:617:ILE:HD11	1:A:725:VAL:HG23	1.99	0.45
1:A:1202:ASN:OD1	1:A:1202:ASN:N	2.49	0.45
1:A:659:LYS:CB	1:A:707:ASP:HA	2.46	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1410:LEU:HD23	1:A:1410:LEU:O	2.15	0.45
1:A:1558:GLU:O	1:A:1560:GLN:NE2	2.50	0.45
1:A:521:ASN:OD1	1:A:1080:ARG:NH2	2.50	0.44
1:A:1169:PRO:HA	1:A:1170:PRO:HD3	1.82	0.44
1:A:1227:ILE:HG22	1:A:1228:SER:N	2.32	0.44
1:A:1578:ASN:CB	1:A:1579:LEU:HD12	2.41	0.44
1:A:621:PHE:HD2	1:A:638:PRO:HB2	1.79	0.44
1:A:1218:LYS:O	1:A:1222:SER:HB2	2.17	0.44
1:A:661:ALA:CB	1:A:706:ALA:N	2.80	0.44
1:A:860:ASP:O	1:A:881:ALA:HA	2.17	0.44
1:A:1097:GLU:HB3	1:A:1120:LYS:HG2	2.00	0.44
1:A:1031:MSE:HE1	1:A:1063:LEU:CD1	2.46	0.44
1:A:1444:LYS:HD3	1:A:1444:LYS:N	2.33	0.44
1:A:613:ALA:HB1	1:A:653:SER:O	2.17	0.44
1:A:956:ARG:NH2	1:A:1634:MSE:O	2.51	0.44
1:A:1169:PRO:HB2	1:A:1172:ASN:HB3	1.99	0.44
1:A:882:SER:O	1:A:883:THR:CG2	2.62	0.44
1:A:1327:LEU:HB3	1:A:1350:LEU:CD2	2.47	0.44
1:A:546:ASP:HB3	1:A:549:ALA:HB2	1.99	0.44
1:A:1178:LYS:HG3	1:A:1211:ILE:CD1	2.46	0.44
1:A:385:SER:O	1:A:386:LYS:HB2	2.18	0.43
1:A:505:LYS:HB3	1:A:572:SER:HB2	2.00	0.43
1:A:460:MSE:HE2	1:A:476:ASP:CB	2.49	0.43
1:A:661:ALA:CB	1:A:705:LYS:C	2.86	0.43
1:A:1377:ILE:HD13	1:A:1377:ILE:N	2.32	0.43
1:A:1607:TYR:CD1	1:A:1608:GLN:HG3	2.53	0.43
1:A:397:TYR:CD2	1:A:403:VAL:HG22	2.53	0.43
1:A:464:ARG:CD	1:A:472:TYR:HD2	2.32	0.43
1:A:504:VAL:O	1:A:572:SER:HA	2.18	0.43
1:A:639:ILE:CG2	1:A:738:TRP:O	2.56	0.43
1:A:888:LYS:HZ3	1:A:1004:THR:CG2	2.31	0.43
1:A:1179:GLU:OE1	1:A:1212:LYS:N	2.52	0.43
1:A:1201:THR:HG22	1:A:1205:GLN:OE1	2.19	0.43
1:A:614:LEU:HD22	1:A:731:ALA:HB1	2.01	0.43
1:A:1177:ILE:C	1:A:1178:LYS:HG2	2.39	0.43
1:A:1178:LYS:HE2	1:A:1211:ILE:HD12	2.01	0.43
1:A:1592:GLU:OE1	1:A:1594:ARG:NH1	2.45	0.43
1:A:623:SER:HA	1:A:636:LYS:HE2	2.01	0.43
1:A:641:ASP:O	1:A:642:GLU:HB2	2.19	0.43
1:A:460:MSE:CE	1:A:476:ASP:CB	2.97	0.43
1:A:661:ALA:CB	1:A:705:LYS:HA	2.48	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:729:ASN:O	1:A:730:GLU:CB	2.67	0.43
1:A:1428:SER:O	1:A:1429:ASN:C	2.57	0.43
1:A:1550:LEU:CD2	1:A:1597:ARG:HD2	2.49	0.43
1:A:613:ALA:HB1	1:A:653:SER:C	2.40	0.42
1:A:732:VAL:HG12	1:A:733:SER:N	2.33	0.42
1:A:899:VAL:HG11	1:A:904:LEU:HD21	2.01	0.42
1:A:1549:ASP:HB3	1:A:1598:PHE:HB3	2.00	0.42
1:A:1571:GLN:OE1	1:A:1571:GLN:CA	2.67	0.42
1:A:1184:PRO:HG2	1:A:1185:TYR:CE2	2.54	0.42
1:A:859:LEU:HD22	1:A:888:LYS:HE2	2.01	0.42
1:A:950:ASP:HA	1:A:951:GLY:HA2	1.78	0.42
1:A:405:LEU:HD22	1:A:463:ILE:HG21	2.01	0.42
1:A:520:GLY:HA2	1:A:564:ASP:HA	2.01	0.42
1:A:640:VAL:HG21	1:A:644:SER:C	2.39	0.42
1:A:487:MSE:CE	1:A:512:TYR:CZ	3.02	0.42
1:A:487:MSE:HE1	1:A:594:GLU:HA	2.01	0.42
1:A:504:VAL:HB	1:A:573:THR:HG22	2.00	0.42
1:A:718:TRP:CD1	1:A:740:GLY:HA3	2.54	0.42
1:A:399:PRO:HA	1:A:452:LEU:CD2	2.49	0.42
1:A:680:TRP:NE1	1:A:683:ASP:HA	2.34	0.42
1:A:1175:ARG:HG3	1:A:1176:TYR:H	1.84	0.42
1:A:389:PHE:O	1:A:407:GLY:HA2	2.20	0.42
1:A:483:MSE:HA	1:A:484:PRO:HD2	1.93	0.42
1:A:875:LEU:CD1	1:A:1015:VAL:HG11	2.47	0.42
1:A:1066:VAL:CG1	1:A:1086:PRO:HB2	2.50	0.42
1:A:518:ALA:HB1	1:A:521:ASN:HB2	2.02	0.42
1:A:1063:LEU:HD12	1:A:1063:LEU:HA	1.83	0.42
1:A:1171:LEU:CD2	1:A:1417:ALA:CB	2.98	0.42
1:A:646:ALA:N	1:A:714:PHE:O	2.40	0.42
1:A:1138:LEU:HB3	1:A:1142:GLU:HB2	2.00	0.42
1:A:1378:TRP:CE3	1:A:1378:TRP:CA	3.03	0.42
1:A:1621:PRO:HA	1:A:1651:VAL:HB	2.01	0.42
1:A:677:TYR:CD1	1:A:690:PHE:CZ	3.08	0.42
1:A:1124:ARG:NH1	1:A:1125:PRO:O	2.46	0.42
1:A:1170:PRO:O	1:A:1172:ASN:ND2	2.48	0.42
1:A:532:LEU:HD23	1:A:532:LEU:C	2.40	0.41
1:A:591:SER:HB3	1:A:599:PRO:HB3	2.01	0.41
1:A:684:GLU:OE1	1:A:684:GLU:HA	2.20	0.41
1:A:1258:MSE:HE2	1:A:1258:MSE:HB2	1.91	0.41
1:A:582:SER:O	1:A:584:LEU:HD13	2.20	0.41
1:A:869:MSE:HG3	1:A:1017:VAL:HG22	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1137:ALA:HB2	1:A:1485:TRP:HD1	1.84	0.41
1:A:1505:LEU:CD1	1:A:1631:VAL:HG13	2.50	0.41
1:A:1516:GLY:HA3	1:A:1576:VAL:HG11	2.02	0.41
1:A:1206:LEU:HB3	1:A:1211:ILE:O	2.21	0.41
1:A:396:LEU:HD21	1:A:482:PHE:CD2	2.55	0.41
1:A:539:LEU:N	1:A:540:PRO:HD3	2.36	0.41
1:A:1298:ALA:HB1	1:A:1379:LEU:HA	2.02	0.41
1:A:1301:LEU:O	1:A:1305:LYS:HG2	2.21	0.41
1:A:1399:ASN:HB3	1:A:1401:LEU:HG	2.02	0.41
1:A:883:THR:HG21	1:A:887:GLU:O	2.21	0.41
1:A:1044:THR:HA	1:A:1080:ARG:HB3	2.03	0.41
1:A:623:SER:H	1:A:636:LYS:HD3	1.84	0.41
1:A:680:TRP:HE1	1:A:683:ASP:HA	1.85	0.41
1:A:991:ASP:C	1:A:991:ASP:OD1	2.59	0.41
1:A:1262:VAL:HG22	1:A:1276:ILE:HD11	2.03	0.41
1:A:1311:TYR:HA	1:A:1345:GLN:OE1	2.20	0.41
1:A:1606:GLU:O	1:A:1607:TYR:CG	2.73	0.41
1:A:610:PRO:HD2	1:A:614:LEU:HD21	2.03	0.41
1:A:547:ILE:HG22	1:A:734:SER:HB2	2.02	0.41
1:A:946:ARG:O	1:A:947:PHE:HB3	2.19	0.41
1:A:1107:LEU:N	1:A:1112:VAL:O	2.40	0.41
1:A:623:SER:N	1:A:636:LYS:HD3	2.36	0.41
1:A:888:LYS:HZ2	1:A:892:VAL:HG13	1.85	0.41
1:A:1022:ILE:O	1:A:1043:ILE:HA	2.21	0.41
1:A:1562:LEU:HB2	1:A:1566:SER:HB2	2.01	0.41
1:A:1178:LYS:HE3	1:A:1180:LEU:HD22	2.03	0.41
1:A:1284:LEU:O	1:A:1287:LEU:N	2.51	0.41
1:A:398:ARG:HB2	1:A:482:PHE:CE1	2.56	0.40
1:A:666:GLN:OE1	1:A:668:ARG:NH2	2.53	0.40
1:A:675:ASP:HA	1:A:690:PHE:CE1	2.55	0.40
1:A:1355:ASP:OD2	1:A:1358:ARG:HG3	2.21	0.40
1:A:1619:VAL:CG2	1:A:1620:THR:N	2.84	0.40
1:A:404:ILE:HG21	1:A:971:GLN:OE1	2.20	0.40
1:A:1045:ASN:CG	1:A:1047:THR:HG22	2.40	0.40
1:A:1343:LEU:HD13	1:A:1365:LEU:HD23	2.03	0.40
1:A:1548:VAL:O	1:A:1548:VAL:HG12	2.21	0.40
1:A:639:ILE:CG1	1:A:738:TRP:H	2.34	0.40
1:A:648:PHE:CD2	1:A:723:LEU:HD22	2.57	0.40
1:A:1513:GLY:CA	1:A:1519:LYS:HG3	2.52	0.40
1:A:1137:ALA:CB	1:A:1485:TRP:CD1	3.04	0.40
1:A:1413:LEU:HD12	1:A:1416:GLN:HG3	2.03	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	1112/1639 (68%)	989 (89%)	105 (9%)	18 (2%)	8 35

All (18) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	642	GLU
1	A	730	GLU
1	A	1169	PRO
1	A	1178	LYS
1	A	947	PHE
1	A	948	GLY
1	A	687	GLN
1	A	1170	PRO
1	A	386	LYS
1	A	610	PRO
1	A	1071	ALA
1	A	1173	ILE
1	A	1175	ARG
1	A	567	GLY
1	A	676	TYR
1	A	1048	ASP
1	A	1296	PRO
1	A	468	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	927/1340 (69%)	902 (97%)	25 (3%)	40 60

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	563	LEU
1	A	605	GLU
1	A	621	PHE
1	A	645	ASN
1	A	675	ASP
1	A	686	TRP
1	A	734	SER
1	A	882	SER
1	A	907	THR
1	A	921	GLN
1	A	962	VAL
1	A	1155	SER
1	A	1198	SER
1	A	1228	SER
1	A	1274	ASP
1	A	1292	MSE
1	A	1336	ASP
1	A	1378	TRP
1	A	1477	SER
1	A	1479	SER
1	A	1488	MSE
1	A	1541	SER
1	A	1572	SER
1	A	1607	TYR
1	A	1630	MSE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	1139	GLN
1	A	1172	ASN
1	A	1470	GLN
1	A	1590	HIS

### 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 [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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	1103/1639 (67%)	-0.90	0 <a href="#">100</a> <a href="#">100</a>	85, 139, 205, 267	0

There are no RSRZ outliers to report.

### 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.