



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 12, 2026 – 08:53 PM UTC

PDB ID : 1UG3 / pdb_00001ug3
Title : C-terminal portion of human eIF4GI
Authors : Bellolell, L.; Cho-Park, P.F.; Poulin, F.; Sonenberg, N.; Burley, S.K.
Deposited on : 2003-06-11
Resolution : 2.24 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4-5-2 with Phenix2.0
Xtriage (Phenix) : **NOT EXECUTED**
EDS : **NOT EXECUTED**
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

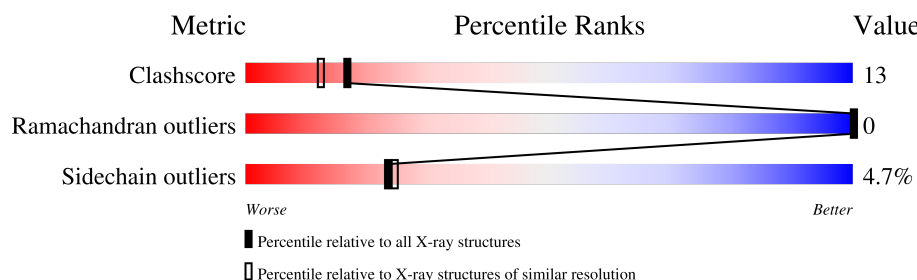
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.24 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))
Clashscore	190562	3556 (2.26-2.22)
Ramachandran outliers	187476	3500 (2.26-2.22)
Sidechain outliers	187428	3501 (2.26-2.22)

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 $\leq 5\%$.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	339	
1	B	339	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 5370 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 eukaryotic protein synthesis initiation factor 4G.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	323	Total	C	N	O	S	0	0	0
			2573	1657	419	485	12			
1	B	323	Total	C	N	O	S	0	0	0
			2573	1657	419	485	12			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1234	SER	LEU	engineered mutation	UNP Q04637
B	1234	SER	LEU	engineered mutation	UNP Q04637

- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	112	Total	O	0	0
			112	112		
2	B	112	Total	O	0	0
			112	112		

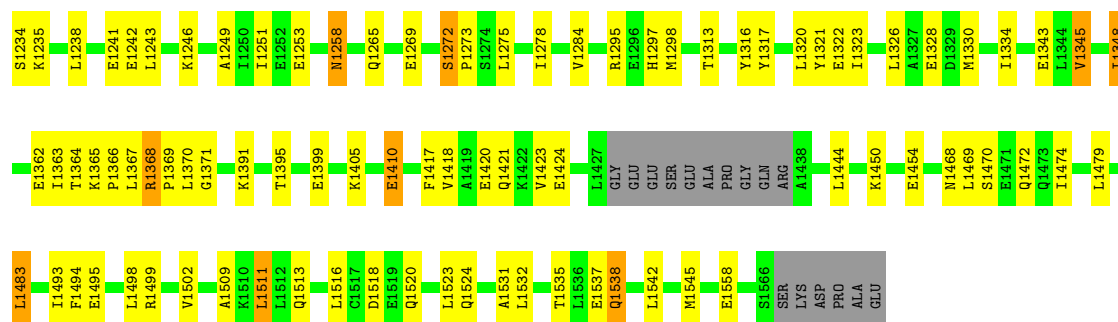
3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

Note EDS was not executed.

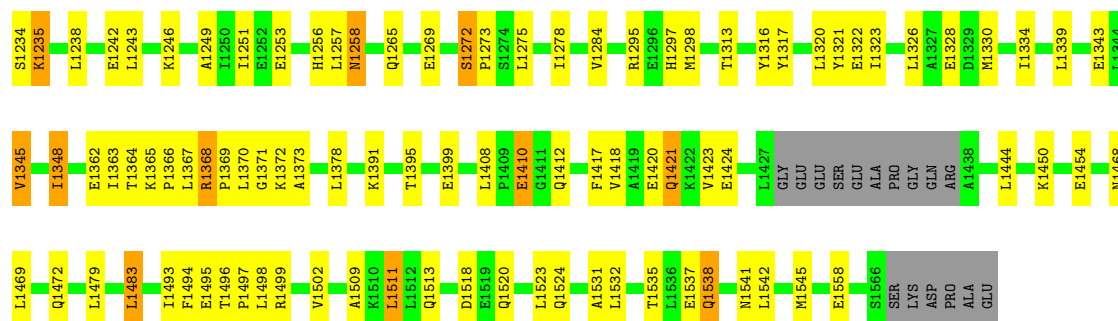
- Molecule 1: eukaryotic protein synthesis initiation factor 4G

Chain A: 



- Molecule 1: eukaryotic protein synthesis initiation factor 4G

Chain B: 



4 Data and refinement statistics

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	78.62Å 50.57Å 99.89Å 90.00° 101.59° 90.00°	Depositor
Resolution (Å)	30.00 – 2.24	Depositor
% Data completeness (in resolution range)	100.0 (30.00-2.24)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	0.08	Depositor
Refinement program	CNS	Depositor
R, R_{free}	0.244 , 0.292	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	5370	wwPDB-VP
Average B, all atoms (Å ²)	32.0	wwPDB-VP

5 Model quality

5.1 Standard geometry

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	0.45	0/2620	0.90	11/3546 (0.3%)
1	B	0.45	0/2620	0.90	10/3546 (0.3%)
All	All	0.45	0/5240	0.90	21/7092 (0.3%)

There are no bond length outliers.

All (21) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	1368	ARG	N-CA-C	-7.38	102.72	112.75
1	A	1371	GLY	N-CA-C	-7.33	103.78	115.08
1	B	1334	ILE	CA-C-N	7.14	127.47	119.32
1	B	1334	ILE	C-N-CA	7.14	127.47	119.32
1	B	1371	GLY	N-CA-C	-7.01	102.83	114.48
1	A	1334	ILE	CA-C-N	6.89	127.18	119.32
1	A	1334	ILE	C-N-CA	6.89	127.18	119.32
1	B	1345	VAL	N-CA-C	6.27	117.83	111.00
1	A	1345	VAL	N-CA-C	6.08	117.63	111.00
1	B	1368	ARG	N-CA-C	-6.04	104.59	113.16
1	A	1468	ASN	N-CA-C	5.56	121.08	113.97
1	B	1468	ASN	N-CA-C	5.47	120.98	113.97
1	B	1272	SER	CA-C-N	5.37	125.44	119.32
1	B	1272	SER	C-N-CA	5.37	125.44	119.32
1	A	1558	GLU	N-CA-C	5.23	117.39	111.11
1	B	1364	THR	N-CA-C	5.20	119.62	113.28
1	B	1558	GLU	N-CA-C	5.20	117.35	111.11
1	A	1516	LEU	N-CA-C	-5.13	103.55	110.68
1	A	1272	SER	CA-C-N	5.04	125.07	119.32
1	A	1272	SER	C-N-CA	5.04	125.07	119.32
1	A	1405	LYS	N-CA-C	-5.03	105.24	111.33

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2573	0	2609	65	0
1	B	2573	0	2609	68	0
2	A	112	0	0	4	0
2	B	112	0	0	3	0
All	All	5370	0	5218	133	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 13.

All (133) 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:B:1542:LEU:HA	1:B:1545:MET:HE3	1.46	0.98
1:A:1542:LEU:HA	1:A:1545:MET:HE3	1.46	0.95
1:A:1368:ARG:HB3	1:A:1369:PRO:HD3	1.57	0.87
1:B:1251:ILE:HG23	1:B:1298:MET:HE1	1.67	0.77
1:B:1368:ARG:HB3	1:B:1369:PRO:HD3	1.67	0.76
1:A:1251:ILE:HG23	1:A:1298:MET:HE1	1.68	0.75
1:A:1509:ALA:O	1:A:1513:GLN:HG3	1.91	0.71
1:B:1509:ALA:O	1:B:1513:GLN:HG3	1.92	0.69
1:A:1317:TYR:CE2	1:A:1362:GLU:HG2	2.31	0.66
1:B:1317:TYR:CE2	1:B:1362:GLU:HG2	2.31	0.66
1:A:1417:PHE:O	1:A:1420:GLU:HG2	1.95	0.65
1:B:1417:PHE:O	1:B:1420:GLU:HG2	1.97	0.64
1:B:1493:ILE:HD12	1:B:1499:ARG:HG3	1.80	0.63
1:A:1493:ILE:HD12	1:A:1499:ARG:HG3	1.81	0.62
1:A:1366:PRO:O	1:A:1369:PRO:HD2	2.00	0.62
1:B:1313:THR:HG22	1:B:1317:TYR:CE2	2.35	0.61
1:A:1313:THR:HG22	1:A:1317:TYR:CE2	2.36	0.61
1:A:1251:ILE:CG2	1:A:1298:MET:HE1	2.31	0.60
1:A:1365:LYS:HB2	1:A:1366:PRO:HD3	1.83	0.60
1:B:1479:LEU:C	1:B:1479:LEU:HD23	2.26	0.60
1:A:1479:LEU:C	1:A:1479:LEU:HD23	2.27	0.59
1:B:1251:ILE:CG2	1:B:1298:MET:HE1	2.31	0.59
1:A:1249:ALA:O	1:A:1253:GLU:HG3	2.03	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1249:ALA:O	1:B:1253:GLU:HG3	2.02	0.59
1:A:1243:LEU:HD22	1:A:1278:ILE:HB	1.84	0.59
1:B:1243:LEU:HD22	1:B:1278:ILE:HB	1.85	0.59
1:A:1364:THR:HA	1:A:1367:LEU:HD13	1.86	0.58
1:B:1284:VAL:HB	1:B:1323:ILE:HD13	1.85	0.58
1:A:1367:LEU:HG	1:A:1370:LEU:HD12	1.85	0.58
1:B:1418:VAL:HG13	1:B:1423:VAL:HG23	1.85	0.58
1:B:1365:LYS:HB2	1:B:1366:PRO:HD3	1.86	0.57
1:A:1418:VAL:HG13	1:A:1423:VAL:HG23	1.85	0.57
1:B:1258:ASN:HD21	1:B:1297:HIS:CE1	2.23	0.56
1:A:1258:ASN:HD21	1:A:1297:HIS:CE1	2.23	0.56
1:B:1370:LEU:HB2	1:B:1372:LYS:HB2	1.87	0.56
1:A:1284:VAL:HB	1:A:1323:ILE:HD13	1.86	0.56
1:A:1321:TYR:OH	1:A:1362:GLU:HG3	2.06	0.56
1:A:1395:THR:O	1:A:1399:GLU:HG3	2.06	0.56
1:B:1395:THR:O	1:B:1399:GLU:HG3	2.06	0.55
1:A:1417:PHE:HA	1:A:1420:GLU:CD	2.31	0.55
1:B:1321:TYR:OH	1:B:1362:GLU:HG3	2.07	0.55
1:B:1417:PHE:HA	1:B:1420:GLU:CD	2.31	0.55
1:A:1316:TYR:CZ	1:A:1348:ILE:HG13	2.42	0.55
1:B:1408:LEU:HD13	1:B:1412:GLN:HG2	1.89	0.54
1:B:1368:ARG:N	1:B:1369:PRO:CD	2.71	0.54
1:B:1235:LYS:HA	1:B:1235:LYS:HE3	1.90	0.54
1:B:1320:LEU:HD13	1:B:1363:ILE:HD11	1.89	0.53
1:A:1320:LEU:HD13	1:A:1363:ILE:HD11	1.89	0.53
1:B:1316:TYR:CZ	1:B:1348:ILE:HG13	2.43	0.53
1:B:1531:ALA:O	1:B:1535:THR:HG23	2.08	0.52
1:A:1328:GLU:OE1	1:A:1370:LEU:HD22	2.08	0.52
1:B:1242:GLU:HG3	1:B:1246:LYS:HE3	1.91	0.52
1:A:1531:ALA:O	1:A:1535:THR:HG23	2.10	0.52
1:A:1242:GLU:HG3	1:A:1246:LYS:HE3	1.92	0.51
1:A:1391:LYS:O	1:A:1395:THR:HG23	2.12	0.50
1:B:1502:VAL:HG22	2:B:126:HOH:O	2.11	0.50
1:A:1367:LEU:HD12	1:A:1367:LEU:N	2.25	0.50
1:B:1494:PHE:HA	1:B:1498:LEU:HD23	1.93	0.50
1:B:1295:ARG:HD2	1:B:1343:GLU:OE1	2.12	0.50
1:B:1391:LYS:O	1:B:1395:THR:HG23	2.12	0.50
1:A:1494:PHE:HA	1:A:1498:LEU:HD23	1.93	0.49
1:B:1234:SER:O	1:B:1238:LEU:HD13	2.12	0.49
1:A:1368:ARG:N	1:A:1369:PRO:CD	2.75	0.49
1:B:1367:LEU:HD12	1:B:1373:ALA:HA	1.93	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1472:GLN:NE2	1:B:1472:GLN:HA	2.27	0.49
1:B:1345:VAL:O	1:B:1348:ILE:HB	2.12	0.49
1:A:1345:VAL:O	1:A:1348:ILE:HB	2.13	0.49
1:A:1472:GLN:NE2	1:A:1472:GLN:HA	2.27	0.49
1:A:1284:VAL:CG1	1:A:1323:ILE:HD13	2.43	0.49
1:A:1418:VAL:CG1	1:A:1424:GLU:HA	2.43	0.49
1:A:1472:GLN:HG2	2:A:188:HOH:O	2.12	0.48
1:B:1410:GLU:OE1	1:B:1410:GLU:N	2.46	0.48
1:A:1321:TYR:CD1	1:A:1366:PRO:HG2	2.49	0.48
1:B:1328:GLU:HB2	1:B:1370:LEU:HD13	1.95	0.48
1:A:1502:VAL:HG22	2:A:157:HOH:O	2.14	0.48
1:B:1418:VAL:CG1	1:B:1424:GLU:HA	2.43	0.48
1:A:1295:ARG:HD2	1:A:1343:GLU:OE1	2.14	0.47
1:B:1284:VAL:CG1	1:B:1323:ILE:HD13	2.44	0.47
1:B:1313:THR:CG2	1:B:1317:TYR:CE2	2.97	0.47
1:A:1317:TYR:CD2	1:A:1362:GLU:HG2	2.49	0.47
1:B:1265:GLN:O	1:B:1269:GLU:HG3	2.15	0.47
1:B:1493:ILE:HG22	1:B:1495:GLU:HG3	1.97	0.47
1:A:1313:THR:CG2	1:A:1317:TYR:CE2	2.98	0.46
1:B:1317:TYR:CD2	1:B:1362:GLU:HG2	2.50	0.46
1:A:1251:ILE:HG23	1:A:1298:MET:CE	2.43	0.46
1:B:1378:LEU:CD1	1:B:1421:GLN:HG3	2.45	0.46
1:A:1234:SER:O	1:A:1238:LEU:HD13	2.16	0.46
1:B:1450:LYS:O	1:B:1454:GLU:HG2	2.16	0.45
1:B:1541:ASN:OD1	1:B:1545:MET:HE2	2.17	0.45
1:A:1493:ILE:HG22	1:A:1495:GLU:HG3	1.98	0.45
1:A:1367:LEU:HD12	1:A:1367:LEU:H	1.80	0.45
1:A:1494:PHE:HA	1:A:1498:LEU:CD2	2.46	0.45
1:A:1518:ASP:OD1	1:A:1520:GLN:HB2	2.16	0.45
1:A:1450:LYS:O	1:A:1454:GLU:HG2	2.16	0.45
1:A:1348:ILE:HD13	1:A:1348:ILE:HA	1.86	0.45
1:A:1265:GLN:O	1:A:1269:GLU:HG3	2.17	0.44
1:A:1273:PRO:HD2	2:A:11:HOH:O	2.15	0.44
1:B:1251:ILE:HG23	1:B:1298:MET:CE	2.43	0.44
1:B:1494:PHE:HA	1:B:1498:LEU:CD2	2.46	0.44
1:B:1518:ASP:OD1	1:B:1520:GLN:HB2	2.17	0.44
1:B:1243:LEU:HD13	1:B:1275:LEU:HB3	2.00	0.44
1:B:1295:ARG:NH2	2:B:26:HOH:O	2.41	0.43
1:B:1410:GLU:H	1:B:1410:GLU:CD	2.25	0.43
1:B:1326:LEU:O	1:B:1330:MET:HG3	2.19	0.43
1:A:1243:LEU:HD13	1:A:1275:LEU:HB3	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1410:GLU:H	1:A:1410:GLU:CD	2.27	0.43
1:B:1410:GLU:N	1:B:1410:GLU:CD	2.77	0.43
1:A:1272:SER:N	1:A:1273:PRO:HD3	2.34	0.42
1:A:1326:LEU:O	1:A:1330:MET:HG3	2.19	0.42
1:A:1537:GLU:O	1:A:1538:GLN:C	2.62	0.42
1:B:1362:GLU:O	1:B:1365:LYS:HG3	2.20	0.42
1:B:1483:LEU:HD11	1:B:1511:LEU:HD22	2.02	0.42
1:A:1483:LEU:HD11	1:A:1511:LEU:HD22	2.02	0.42
1:B:1339:LEU:O	1:B:1343:GLU:HG3	2.20	0.42
1:A:1241:GLU:HG3	2:A:196:HOH:O	2.19	0.41
1:B:1328:GLU:OE1	1:B:1370:LEU:HD22	2.19	0.41
1:A:1410:GLU:CD	1:A:1410:GLU:N	2.79	0.41
1:B:1348:ILE:HD13	1:B:1348:ILE:HA	1.85	0.41
1:A:1469:LEU:HD12	1:A:1479:LEU:HD12	2.03	0.41
1:A:1424:GLU:OE1	1:A:1424:GLU:N	2.35	0.41
1:A:1470:SER:O	1:A:1474:ILE:HG13	2.20	0.41
1:B:1537:GLU:O	1:B:1538:GLN:C	2.64	0.41
1:B:1284:VAL:CB	1:B:1323:ILE:HD13	2.50	0.41
1:A:1362:GLU:OE2	1:A:1365:LYS:HD2	2.21	0.41
1:B:1243:LEU:HD13	1:B:1275:LEU:CB	2.51	0.40
1:B:1469:LEU:HD12	1:B:1479:LEU:HD12	2.02	0.40
1:A:1243:LEU:HD13	1:A:1275:LEU:CB	2.51	0.40
1:B:1272:SER:N	1:B:1273:PRO:HD3	2.35	0.40
1:A:1284:VAL:CB	1:A:1323:ILE:HD13	2.50	0.40
1:B:1235:LYS:HE3	1:B:1235:LYS:CA	2.51	0.40
1:B:1273:PRO:HD2	2:B:122:HOH:O	2.21	0.40
1:B:1496:THR:HA	1:B:1497:PRO:HA	1.85	0.40
1:B:1256:HIS:CD2	1:B:1257:LEU:HG	2.56	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	319/339 (94%)	310 (97%)	9 (3%)	0	100	100
1	B	319/339 (94%)	310 (97%)	9 (3%)	0	100	100
All	All	638/678 (94%)	620 (97%)	18 (3%)	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 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	279/291 (96%)	266 (95%)	13 (5%)	23	24
1	B	279/291 (96%)	266 (95%)	13 (5%)	23	24
All	All	558/582 (96%)	532 (95%)	26 (5%)	23	24

All (26) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1235	LYS
1	A	1258	ASN
1	A	1322	GLU
1	A	1348	ILE
1	A	1410	GLU
1	A	1421	GLN
1	A	1444	LEU
1	A	1483	LEU
1	A	1511	LEU
1	A	1523	LEU
1	A	1524	GLN
1	A	1532	LEU
1	A	1538	GLN
1	B	1235	LYS
1	B	1258	ASN
1	B	1322	GLU
1	B	1348	ILE
1	B	1410	GLU

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Mol	Chain	Res	Type
1	B	1421	GLN
1	B	1444	LEU
1	B	1483	LEU
1	B	1511	LEU
1	B	1523	LEU
1	B	1524	GLN
1	B	1532	LEU
1	B	1538	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	1258	ASN
1	A	1282	HIS
1	A	1350	GLN
1	A	1472	GLN
1	A	1530	GLN
1	A	1538	GLN
1	B	1256	HIS
1	B	1258	ASN
1	B	1350	GLN
1	B	1472	GLN
1	B	1530	GLN
1	B	1538	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

There are no ligands in this entry.

5.7 Other polymers

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

EDS was not executed - this section is therefore empty.

6.2 Non-standard residues in protein, DNA, RNA chains

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

6.4 Ligands

EDS was not executed - this section is therefore empty.

6.5 Other polymers

EDS was not executed - this section is therefore empty.