Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2026 – 05:46 AM UTC

PDB ID	:	1EJL / pdb_00001ejl
Title	:	MOUSE IMPORTIN ALPHA-SV40 LARGE T ANTIGEN NLS PEPTIDE COMPLEX
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Deposited on	:	2000-03-03
Resolution	:	2.80 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:

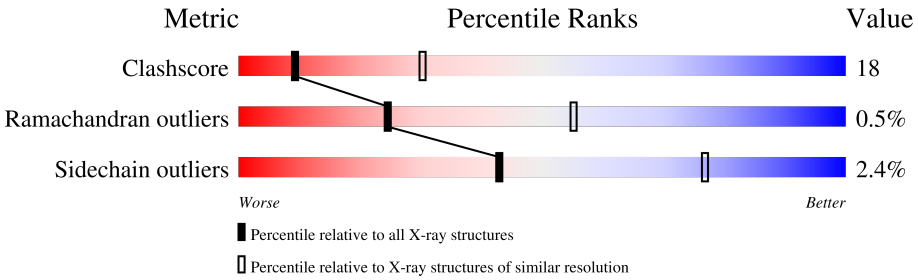
MolProbity	:	4-5-2 with Phenix2.0
Xtriage (Phenix)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)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

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.80 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	4276 (2.80-2.80)
Ramachandran outliers	187476	4196 (2.80-2.80)
Sidechain outliers	187428	4198 (2.80-2.80)

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 <=5%

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	7	43% 43% 14%
1	B	7	71% 29%
2	I	460	61% 30% • 7%

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 3368 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 SV40 LARGE T ANTIGEN NLS PEPTIDE.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
1	A	7	Total	C	N	O	0	0	0
			62	40	14	8			
1	B	7	Total	C	N	O	0	0	0
			62	40	14	8			

- Molecule 2 is a protein called IMPORTIN ALPHA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	I	426	Total	C	N	O	S	0	0	0
			3244	2066	550	618	10			

3 Residue-property plots (i)

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.

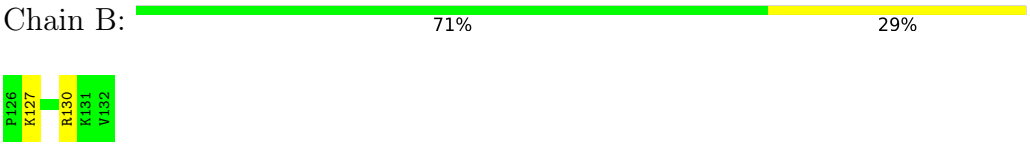
Note EDS was not executed.

• Molecule 1: SV40 LARGE T ANTIGEN NLS PEPTIDE

Chain A:

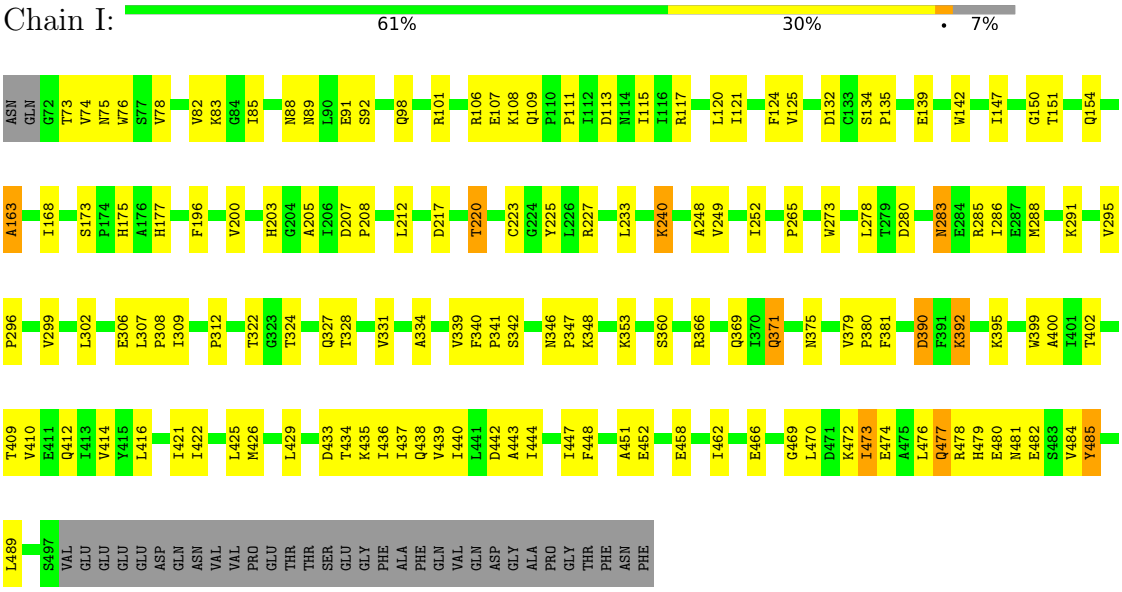
• Molecule 1: SV40 LARGE T ANTIGEN NLS PEPTIDE

Chain B:



• Molecule 2: IMPORTIN ALPHA

Chain I:



4 Data and refinement statistics (i)

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

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	78.23Å 89.86Å 99.49Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.00 – 2.80	Depositor
% Data completeness (in resolution range)	93.1 (30.00-2.80)	Depositor
R_{merge}	0.16	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	CNS 0.4	Depositor
R, R_{free}	0.215 , 0.254	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	3368	wwPDB-VP
Average B, all atoms (Å^2)	41.0	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	0.51	0/62	1.07	0/76
1	B	0.43	0/62	1.39	1/76 (1.3%)
2	I	0.46	0/3302	1.00	13/4500 (0.3%)
All	All	0.46	0/3426	1.01	14/4652 (0.3%)

There are no bond length outliers.

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	127	LYS	N-CA-C	-9.35	101.77	113.55
2	I	477	GLN	N-CA-C	-7.76	102.45	112.23
2	I	163	ALA	N-CA-C	7.06	118.97	111.28
2	I	422	ILE	N-CA-C	6.68	116.78	110.30
2	I	322	THR	N-CA-C	-6.49	105.00	113.17
2	I	147	ILE	N-CA-C	-5.77	105.10	110.53
2	I	473	ILE	N-CA-C	-5.57	105.09	110.72
2	I	240	LYS	N-CA-C	5.33	120.79	113.97
2	I	173	SER	CA-C-N	5.15	125.22	119.87
2	I	173	SER	C-N-CA	5.15	125.22	119.87
2	I	429	LEU	N-CA-C	-5.08	107.05	113.20
2	I	121	ILE	CB-CA-C	-5.08	108.97	114.35
2	I	340	PHE	N-CA-C	5.05	120.98	109.81
2	I	390	ASP	N-CA-C	-5.02	103.16	110.24

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	62	0	81	10	0
1	B	62	0	81	1	0
2	I	3244	0	3320	119	0
All	All	3368	0	3482	124	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 18.

All (124) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:I:477:GLN:HE21	2:I:489:LEU:HA	1.16	1.05
2:I:101:ARG:HD3	2:I:139:GLU:OE1	1.77	0.85
2:I:477:GLN:NE2	2:I:489:LEU:HA	1.94	0.83
1:A:130:ARG:C	1:A:132:VAL:H	1.88	0.80
2:I:328:THR:O	2:I:331:VAL:HG22	1.84	0.78
1:A:130:ARG:HH21	2:I:283:ASN:ND2	1.82	0.77
2:I:78:VAL:O	2:I:82:VAL:HG23	1.83	0.77
2:I:207:ASP:HB2	2:I:208:PRO:HD3	1.67	0.76
2:I:285:ARG:HD3	2:I:288:MET:CE	2.18	0.74
2:I:107:GLU:HG3	2:I:108:LYS:HG3	1.72	0.72
2:I:217:ASP:O	2:I:220:THR:HG23	1.91	0.71
2:I:283:ASN:HD22	2:I:283:ASN:N	1.89	0.70
2:I:472:LYS:O	2:I:476:LEU:HG	1.94	0.67
2:I:426:MET:HE3	2:I:444:ILE:HD11	1.76	0.67
2:I:151:THR:OG1	2:I:154:GLN:HG3	1.96	0.66
1:A:130:ARG:O	1:A:132:VAL:N	2.30	0.65
1:A:130:ARG:C	1:A:132:VAL:N	2.53	0.64
2:I:485:TYR:HD2	2:I:485:TYR:C	2.05	0.63
2:I:485:TYR:C	2:I:485:TYR:CD2	2.77	0.62
2:I:410:VAL:O	2:I:414:VAL:HG23	1.99	0.62
2:I:285:ARG:HA	2:I:288:MET:HE3	1.82	0.61
2:I:402:THR:HG21	2:I:439:VAL:HG13	1.82	0.61
2:I:433:ASP:HB3	2:I:436:ILE:HG22	1.82	0.61
2:I:89:ASN:HB3	2:I:92:SER:HB2	1.81	0.60
2:I:285:ARG:HD3	2:I:288:MET:HE1	1.84	0.60
2:I:285:ARG:HA	2:I:288:MET:CE	2.31	0.60
2:I:479:HIS:CD2	2:I:484:VAL:HG11	2.37	0.60
2:I:196:PHE:O	2:I:200:VAL:HG23	2.01	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:I:101:ARG:HD2	2:I:142:TRP:CE3	2.37	0.59
2:I:425:LEU:HG	2:I:440:ILE:HG23	1.84	0.59
2:I:462:ILE:O	2:I:466:GLU:HG2	2.03	0.59
1:A:128:LYS:NZ	2:I:328:THR:OG1	2.35	0.59
2:I:299:VAL:O	2:I:302:LEU:HB3	2.02	0.59
1:B:130:ARG:NH2	2:I:106:ARG:O	2.38	0.57
2:I:74:VAL:HG12	2:I:75:ASN:ND2	2.19	0.57
2:I:295:VAL:HB	2:I:296:PRO:HD3	1.86	0.57
2:I:399:TRP:O	2:I:402:THR:HG22	2.05	0.57
2:I:479:HIS:HD2	2:I:484:VAL:HG21	1.68	0.57
1:A:130:ARG:O	1:A:132:VAL:HG13	2.04	0.57
2:I:438:GLN:O	2:I:442:ASP:HB2	2.05	0.56
2:I:395:LYS:HG3	2:I:436:ILE:HD12	1.86	0.56
2:I:434:THR:O	2:I:438:GLN:HG3	2.05	0.56
2:I:371:GLN:HE22	2:I:375:ASN:HD21	1.54	0.56
2:I:371:GLN:HG2	2:I:412:GLN:OE1	2.06	0.56
2:I:433:ASP:O	2:I:436:ILE:HG22	2.06	0.56
1:A:130:ARG:HH22	2:I:286:ILE:HD11	1.71	0.55
2:I:399:TRP:HA	2:I:402:THR:HG22	1.87	0.55
2:I:324:THR:OG1	2:I:327:GLN:HG3	2.06	0.55
2:I:273:TRP:CE2	2:I:312:PRO:HB3	2.42	0.55
2:I:306:GLU:N	2:I:306:GLU:OE1	2.38	0.55
1:A:130:ARG:HH22	2:I:286:ILE:CD1	2.19	0.55
2:I:458:GLU:H	2:I:458:GLU:CD	2.15	0.55
1:A:130:ARG:HH21	2:I:283:ASN:HD21	1.57	0.53
2:I:273:TRP:CD2	2:I:312:PRO:HB3	2.43	0.53
2:I:307:LEU:HB3	2:I:308:PRO:HD3	1.90	0.53
2:I:249:VAL:HG13	2:I:278:LEU:HD13	1.91	0.53
2:I:89:ASN:HB3	2:I:92:SER:CB	2.39	0.52
2:I:360:SER:HA	2:I:400:ALA:HA	1.90	0.52
2:I:212:LEU:HD22	2:I:225:TYR:OH	2.10	0.51
2:I:426:MET:HA	2:I:426:MET:HE2	1.91	0.51
2:I:299:VAL:HG21	2:I:334:ALA:CB	2.41	0.51
2:I:85:ILE:HD12	2:I:120:LEU:HD22	1.93	0.50
2:I:409:THR:H	2:I:412:GLN:HE21	1.58	0.50
2:I:205:ALA:O	2:I:208:PRO:HD2	2.12	0.50
2:I:134:SER:OG	2:I:135:PRO:HD3	2.11	0.50
1:A:131:LYS:HG2	1:A:131:LYS:O	2.11	0.50
2:I:111:PRO:O	2:I:115:ILE:HG12	2.12	0.49
2:I:299:VAL:HG21	2:I:334:ALA:HB3	1.95	0.49
2:I:150:GLY:HA3	2:I:154:GLN:OE1	2.13	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:I:307:LEU:N	2:I:308:PRO:CD	2.76	0.48
2:I:416:LEU:HG	2:I:421:ILE:HG21	1.95	0.48
2:I:433:ASP:HB3	2:I:436:ILE:CG2	2.42	0.48
2:I:478:ARG:HG3	2:I:478:ARG:HH11	1.76	0.48
2:I:379:VAL:HB	2:I:380:PRO:HD3	1.94	0.48
2:I:205:ALA:C	2:I:208:PRO:HD2	2.38	0.48
2:I:409:THR:H	2:I:412:GLN:NE2	2.12	0.48
2:I:443:ALA:O	2:I:447:ILE:HG13	2.13	0.47
2:I:73:THR:HA	2:I:76:TRP:NE1	2.30	0.47
2:I:470:LEU:C	2:I:472:LYS:H	2.23	0.47
2:I:478:ARG:HG3	2:I:478:ARG:NH1	2.27	0.46
2:I:469:GLY:O	2:I:473:ILE:HG13	2.16	0.46
2:I:98:GLN:HA	2:I:139:GLU:OE1	2.15	0.46
2:I:339:VAL:O	2:I:339:VAL:HG12	2.16	0.45
2:I:283:ASN:ND2	2:I:283:ASN:N	2.59	0.45
2:I:125:VAL:HG22	2:I:163:ALA:HB2	1.98	0.45
2:I:435:LYS:O	2:I:439:VAL:HG23	2.18	0.44
2:I:124:PHE:O	2:I:125:VAL:C	2.60	0.44
2:I:223:CYS:O	2:I:227:ARG:HG3	2.18	0.44
2:I:285:ARG:HD3	2:I:288:MET:HE3	1.97	0.43
2:I:346:ASN:HA	2:I:347:PRO:HD3	1.86	0.43
2:I:390:ASP:OD2	2:I:392:LYS:HB2	2.19	0.43
2:I:371:GLN:NE2	2:I:375:ASN:HD21	2.17	0.43
2:I:113:ASP:HB3	2:I:117:ARG:NH2	2.34	0.43
2:I:479:HIS:CD2	2:I:484:VAL:HG21	2.50	0.43
2:I:341:PRO:HB3	2:I:381:PHE:CZ	2.54	0.43
2:I:436:ILE:O	2:I:440:ILE:HG13	2.18	0.43
2:I:175:HIS:HB3	2:I:177:HIS:CE1	2.54	0.42
2:I:379:VAL:N	2:I:380:PRO:CD	2.83	0.42
2:I:89:ASN:OD1	2:I:91:GLU:HB2	2.19	0.42
2:I:240:LYS:HD2	2:I:280:ASP:OD1	2.20	0.42
2:I:240:LYS:HD2	2:I:280:ASP:CG	2.45	0.42
2:I:249:VAL:CG1	2:I:278:LEU:HD13	2.49	0.42
2:I:265:PRO:HA	2:I:309:ILE:HD11	2.02	0.42
2:I:134:SER:N	2:I:135:PRO:CD	2.83	0.42
2:I:426:MET:CE	2:I:444:ILE:HD11	2.48	0.42
2:I:435:LYS:HD2	2:I:438:GLN:NE2	2.35	0.42
2:I:108:LYS:O	2:I:109:GLN:C	2.63	0.42
2:I:366:ARG:HB2	2:I:369:GLN:HG3	2.02	0.42
2:I:458:GLU:CD	2:I:458:GLU:N	2.77	0.42
2:I:233:LEU:HD23	2:I:233:LEU:HA	1.94	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:I:474:GLU:O	2:I:478:ARG:NH1	2.51	0.41
2:I:481:ASN:OD1	2:I:482:GLU:N	2.53	0.41
2:I:448:PHE:O	2:I:451:ALA:N	2.51	0.41
2:I:291:LYS:HA	2:I:291:LYS:HD2	1.85	0.41
2:I:481:ASN:O	2:I:485:TYR:HB2	2.20	0.41
2:I:248:ALA:O	2:I:252:ILE:HG13	2.20	0.41
2:I:409:THR:HG23	2:I:412:GLN:NE2	2.34	0.41
2:I:88:ASN:HD22	2:I:88:ASN:N	2.19	0.40
2:I:168:ILE:HD12	2:I:203:HIS:HB3	2.03	0.40
2:I:207:ASP:CB	2:I:208:PRO:HD3	2.46	0.40
2:I:440:ILE:O	2:I:443:ALA:HB3	2.20	0.40
2:I:448:PHE:O	2:I:452:GLU:HG3	2.22	0.40
2:I:433:ASP:O	2:I:437:ILE:HG13	2.22	0.40
2:I:346:ASN:HD22	2:I:348:LYS:H	1.69	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	5/7 (71%)	3 (60%)	1 (20%)	1 (20%)	0 0
1	B	5/7 (71%)	5 (100%)	0	0	100 100
2	I	424/460 (92%)	400 (94%)	23 (5%)	1 (0%)	43 72
All	All	434/474 (92%)	408 (94%)	24 (6%)	2 (0%)	24 55

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	131	LYS
2	I	480	GLU

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	7/7 (100%)	7 (100%)	0	100	100
1	B	7/7 (100%)	7 (100%)	0	100	100
2	I	357/386 (92%)	348 (98%)	9 (2%)	42	76
All	All	371/400 (93%)	362 (98%)	9 (2%)	43	77

All (9) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	I	83	LYS
2	I	132	ASP
2	I	220	THR
2	I	283	ASN
2	I	342	SER
2	I	353	LYS
2	I	371	GLN
2	I	392	LYS
2	I	485	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (17) such sidechains are listed below:

Mol	Chain	Res	Type
2	I	75	ASN
2	I	86	ASN
2	I	88	ASN
2	I	98	GLN
2	I	239	ASN
2	I	251	GLN
2	I	283	ASN
2	I	329	GLN
2	I	346	ASN
2	I	350	ASN
2	I	369	GLN
2	I	371	GLN

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Mol	Chain	Res	Type
2	I	375	ASN
2	I	412	GLN
2	I	438	GLN
2	I	477	GLN
2	I	479	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

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.