Full wwPDB X-ray Structure Validation Report (i)

Mar 9, 2026 – 03:17 AM UTC

PDB ID	:	6XDD / pdb_00006xdd
Title	:	Crystal structure of IRE1 in complex with G-3053
Authors	:	Ackerly-Wallweber, H.; Wang, W.
Deposited on	:	2020-06-10
Resolution	:	2.40 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 (i) 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 (i)) were used in the production of this report:

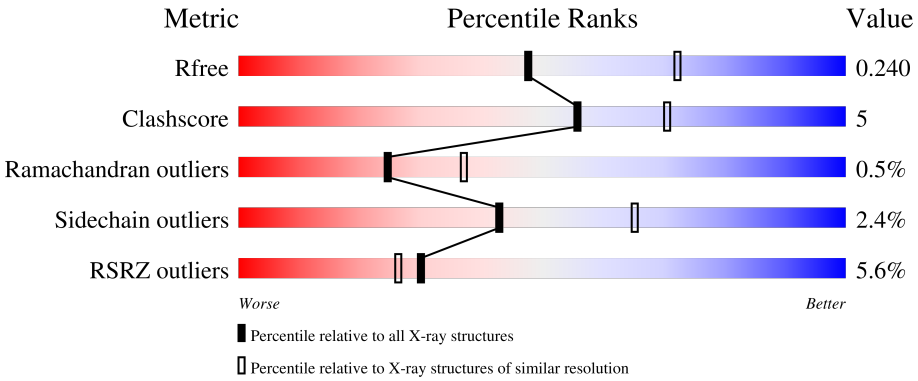
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal 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 2.40 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}	180053	4912 (2.40-2.40)
Clashscore	190562	5391 (2.40-2.40)
Ramachandran outliers	187476	5320 (2.40-2.40)
Sidechain outliers	187428	5321 (2.40-2.40)
RSRZ outliers	180081	4916 (2.40-2.40)

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% 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	434	6% 78% 14% • 7%
1	B	434	4% 81% 11% • 7%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 6671 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.

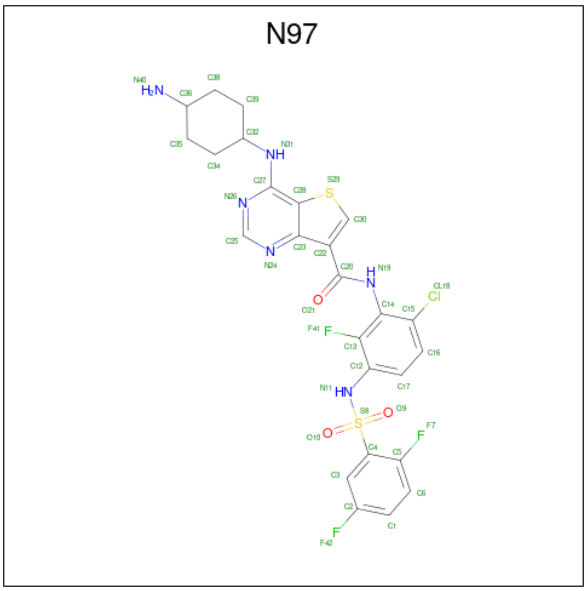
- Molecule 1 is a protein called Serine/threonine-protein kinase/endoribonuclease IRE1.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	404	Total	C	N	O	P	S	0	0	0
			3280	2080	581	596	3	20			
1	B	404	Total	C	N	O	P	S	0	0	0
			3280	2080	581	596	3	20			

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	978	GLY	-	expression tag	UNP O75460
A	979	ASN	-	expression tag	UNP O75460
A	980	SER	-	expression tag	UNP O75460
B	978	GLY	-	expression tag	UNP O75460
B	979	ASN	-	expression tag	UNP O75460
B	980	SER	-	expression tag	UNP O75460

- Molecule 2 is 4-[(trans-4-aminocyclohexyl)amino]-N-(6-chloro-3-{[(2,5-difluorophenyl)sulfonyl]amino}-2-fluorophenyl)thieno[3,2-d]pyrimidine-7-carboxamide (CCD ID: N97) (formula: $C_{25}H_{22}ClF_3N_6O_3S_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms							ZeroOcc	AltConf
2	A	1	Total	C	Cl	F	N	O	S	0	0
			40	25	1	3	6	3	2		
2	B	1	Total	C	Cl	F	N	O	S	0	0
			40	25	1	3	6	3	2		

- Molecule 3 is water.

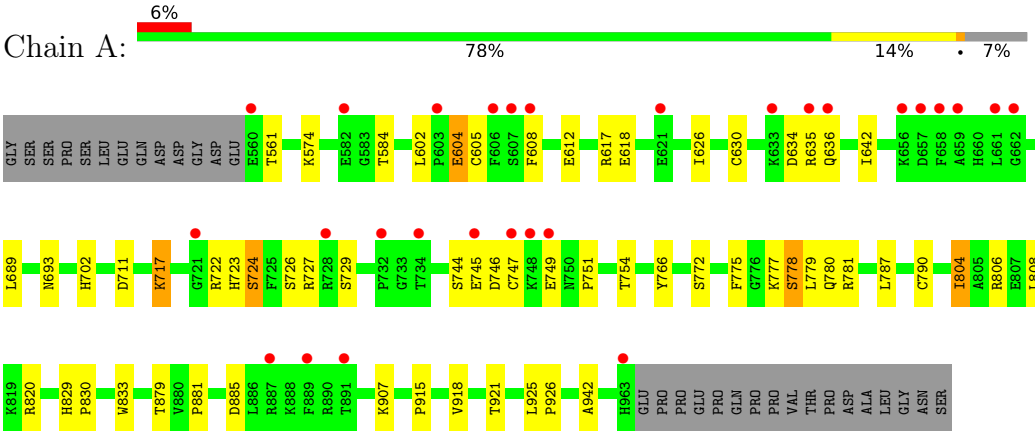
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	17	Total	O	0	0
			17	17		
3	B	14	Total	O	0	0
			14	14		

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 and electron density. 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. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). 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.

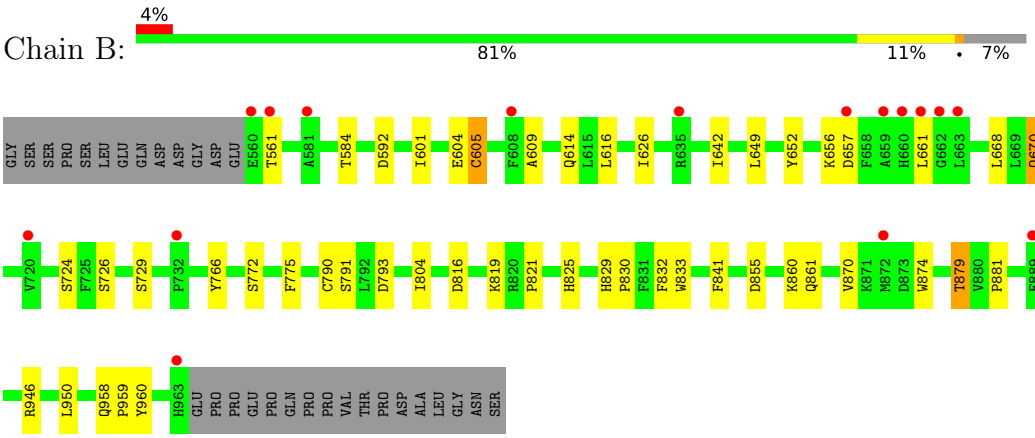
• Molecule 1: Serine/threonine-protein kinase/endoribonuclease IRE1

Chain A:



• Molecule 1: Serine/threonine-protein kinase/endoribonuclease IRE1

Chain B:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	47.20Å 156.82Å 157.77Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.62 – 2.40 49.62 – 2.40	Depositor EDS
% Data completeness (in resolution range)	97.3 (49.62-2.40) 97.6 (49.62-2.40)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.61 (at 2.39Å)	Xtriage
Refinement program	PHENIX 1.12-2829_final	Depositor
R, R_{free}	0.198 , 0.238 0.202 , 0.240	Depositor DCC
R_{free} test set	2154 reflections (4.59%)	wwPDB-VP
Wilson B-factor (Å^2)	55.2	Xtriage
Anisotropy	0.486	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 33.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.011 for -h,l,k	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	6671	wwPDB-VP
Average B, all atoms (Å^2)	63.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.38% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: N97, SEP

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	0.28	1/3327 (0.0%)	0.47	2/4486 (0.0%)
1	B	0.25	0/3327	0.44	0/4486
All	All	0.26	1/6654 (0.0%)	0.46	2/8972 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	702	HIS	ND1-CE1	5.23	1.37	1.32

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	702	HIS	CB-CG-CD2	-6.59	122.64	131.20
1	A	702	HIS	CB-CG-ND1	5.67	131.21	122.70

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	3280	0	3242	31	0
1	B	3280	0	3243	31	0
2	A	40	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	40	0	0	2	0
3	A	17	0	0	0	0
3	B	14	0	0	0	0
All	All	6671	0	6485	62	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 5.

All (62) 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:626:ILE:HG12	1:B:642:ILE:HD12	1.64	0.79
1:B:656:LYS:HG2	1:B:661:LEU:HD11	1.72	0.71
1:A:617:ARG:NH1	1:B:592:ASP:O	2.25	0.68
1:A:778:SER:OG	1:A:779:LEU:N	2.27	0.66
1:A:626:ILE:HG12	1:A:642:ILE:HD12	1.78	0.64
1:B:861:GLN:HG3	1:B:950:LEU:HD11	1.82	0.61
1:B:657:ASP:OD2	1:B:657:ASP:N	2.33	0.60
1:B:879:THR:HG23	1:B:881:PRO:HD2	1.83	0.60
1:A:618:GLU:OE2	1:A:717:LYS:NZ	2.36	0.58
1:A:830:PRO:HA	1:A:833:TRP:CG	2.44	0.53
1:B:816:ASP:HB3	1:B:819:LYS:HG3	1.92	0.52
1:A:830:PRO:HA	1:A:833:TRP:CD1	2.45	0.52
1:A:749:GLU:OE1	1:A:818:GLN:NE2	2.44	0.51
1:A:885:ASP:OD2	1:A:907:LYS:NZ	2.44	0.50
1:B:601:ILE:HD12	1:B:605:CYS:HB3	1.93	0.49
1:B:652:TYR:O	1:B:656:LYS:HB2	2.12	0.49
1:B:830:PRO:HA	1:B:833:TRP:CG	2.48	0.49
1:B:775:PHE:CE1	1:B:790:CYS:HB3	2.48	0.48
1:A:693:ASN:HB2	1:A:711:ASP:HB2	1.94	0.48
1:A:808:LEU:HB2	1:A:829:HIS:CE1	2.49	0.48
1:B:616:LEU:HD22	2:B:1001:N97:C6	2.45	0.47
1:B:584:THR:HG22	1:B:601:ILE:HA	1.97	0.47
1:A:634:ASP:C	1:A:636:GLN:H	2.22	0.47
1:A:727:ARG:NH2	1:A:744:SER:O	2.47	0.47
1:B:649:LEU:HD13	1:B:668:LEU:HD21	1.96	0.46
1:A:745:GLU:O	1:A:747:CYS:N	2.49	0.46
1:B:881:PRO:HG2	1:B:921:THR:HG21	1.96	0.46
1:A:915:PRO:HG2	1:A:918:VAL:HG23	1.96	0.46
1:A:777:LYS:O	1:A:780:GLN:HG2	2.16	0.45
1:A:689:LEU:HD12	1:A:689:LEU:HA	1.84	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:958:GLN:N	1:B:959:PRO:HD2	2.32	0.45
1:A:879:THR:HG23	1:A:881:PRO:HD2	1.98	0.44
1:B:766:TYR:HA	1:B:772:SER:O	2.17	0.44
1:B:855:ASP:HA	1:B:860:LYS:HE3	1.99	0.44
1:B:616:LEU:HD22	2:B:1001:N97:C1	2.47	0.44
2:A:1001:N97:N11	2:A:1001:N97:F7	2.41	0.44
1:B:830:PRO:HA	1:B:833:TRP:CD1	2.54	0.43
1:B:841:PHE:HB2	1:B:960:TYR:CE1	2.53	0.43
1:B:791:SER:OG	1:B:793:ASP:OD1	2.37	0.43
1:B:879:THR:HG21	1:B:921:THR:CB	2.49	0.43
1:B:616:LEU:HD21	1:B:712:PHE:CE2	2.53	0.43
1:A:806:ARG:O	1:A:810:GLU:HB2	2.19	0.42
1:A:804:ILE:HD12	1:A:942:ALA:HB2	2.01	0.42
1:A:608:PHE:O	1:A:612:GLU:HG2	2.20	0.42
1:A:722:ARG:HH21	1:A:724:SEP:P	2.41	0.42
1:A:602:LEU:HB2	1:A:604:GLU:HG2	2.01	0.42
1:A:605:CYS:HA	1:A:608:PHE:HD1	1.84	0.42
1:B:670:GLN:HB2	1:B:832:PHE:CE1	2.55	0.42
1:B:601:ILE:HD13	1:B:609:ALA:HB2	2.02	0.42
1:A:634:ASP:C	1:A:636:GLN:N	2.77	0.42
1:A:727:ARG:HG2	1:A:751:PRO:HG3	2.02	0.41
1:B:870:VAL:HB	1:B:874:TRP:HB3	2.02	0.41
1:A:879:THR:HG21	1:A:921:THR:CB	2.51	0.41
1:A:754:THR:HB	1:A:820:ARG:HD2	2.01	0.41
1:A:766:TYR:HA	1:A:772:SER:O	2.21	0.41
1:B:821:PRO:HB2	1:B:825:HIS:HB3	2.02	0.41
1:A:561:THR:HG21	1:A:574:LYS:HE2	2.03	0.41
1:A:925:LEU:HA	1:A:926:PRO:HA	1.76	0.41
1:B:708:MET:HE3	1:B:708:MET:HB2	1.96	0.41
1:A:775:PHE:CE1	1:A:790:CYS:HB3	2.56	0.40
1:B:829:HIS:CG	1:B:830:PRO:HD2	2.56	0.40
1:B:879:THR:HG21	1:B:921:THR:HB	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	399/434 (92%)	384 (96%)	11 (3%)	4 (1%)	12 20
1	B	399/434 (92%)	385 (96%)	14 (4%)	0	100 100
All	All	798/868 (92%)	769 (96%)	25 (3%)	4 (0%)	24 37

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	746	ASP
1	A	778	SER
1	A	635	ARG
1	A	604	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	355/381 (93%)	346 (98%)	9 (2%)	42 64
1	B	355/381 (93%)	347 (98%)	8 (2%)	44 66
All	All	710/762 (93%)	693 (98%)	17 (2%)	43 65

All (17) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	584	THR
1	A	630	CYS
1	A	666	ILE
1	A	670	GLN
1	A	717	LYS
1	A	723	HIS
1	A	781	ARG
1	A	787	LEU

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Mol	Chain	Res	Type
1	A	804	ILE
1	B	561	THR
1	B	604	GLU
1	B	605	CYS
1	B	614	GLN
1	B	670	GLN
1	B	804	ILE
1	B	879	THR
1	B	946	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	683	ASN
1	A	906	ASN
1	A	953	HIS
1	B	692	HIS
1	B	800	HIS
1	B	883	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)

6 non-standard protein/DNA/RNA residues are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
1	SEP	B	729	1	8,9,10	1.69	2 (25%)	7,12,14	1.50	1 (14%)
1	SEP	B	726	1	8,9,10	1.68	1 (12%)	7,12,14	1.82	1 (14%)
1	SEP	A	724	1	8,9,10	1.62	1 (12%)	7,12,14	1.07	1 (14%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
1	SEP	A	726	1	8,9,10	1.70	1 (12%)	7,12,14	1.70	1 (14%)
1	SEP	A	729	1	8,9,10	1.68	1 (12%)	7,12,14	1.48	1 (14%)
1	SEP	B	724	1	8,9,10	1.59	1 (12%)	7,12,14	1.43	1 (14%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	SEP	B	729	1	-	0/6/8/10	-
1	SEP	B	726	1	-	0/6/8/10	-
1	SEP	A	724	1	-	5/6/8/10	-
1	SEP	A	726	1	-	0/6/8/10	-
1	SEP	A	729	1	-	3/6/8/10	-
1	SEP	B	724	1	-	3/6/8/10	-

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	726	SEP	P-O1P	3.68	1.61	1.50
1	B	726	SEP	P-O1P	3.67	1.61	1.50
1	A	729	SEP	P-O1P	3.64	1.61	1.50
1	A	724	SEP	P-O1P	3.55	1.61	1.50
1	B	729	SEP	P-O1P	3.55	1.61	1.50
1	B	724	SEP	P-O1P	3.50	1.61	1.50
1	B	729	SEP	P-O2P	2.01	1.62	1.54

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	726	SEP	OG-CB-CA	4.28	112.31	108.14
1	A	726	SEP	OG-CB-CA	3.95	111.99	108.14
1	B	724	SEP	OG-CB-CA	3.29	111.35	108.14
1	A	729	SEP	OG-CB-CA	3.22	111.28	108.14
1	B	729	SEP	OG-CB-CA	3.11	111.18	108.14
1	A	724	SEP	OG-CB-CA	2.12	110.21	108.14

There are no chirality outliers.

All (11) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	724	SEP	C-CA-CB-OG
1	A	724	SEP	CB-OG-P-O1P
1	A	724	SEP	CB-OG-P-O2P
1	A	724	SEP	CB-OG-P-O3P
1	A	729	SEP	N-CA-CB-OG
1	A	729	SEP	C-CA-CB-OG
1	B	724	SEP	N-CA-CB-OG
1	B	724	SEP	C-CA-CB-OG
1	A	729	SEP	CA-CB-OG-P
1	B	724	SEP	CA-CB-OG-P
1	A	724	SEP	N-CA-CB-OG

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	724	SEP	1	0

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

2 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
2	N97	A	1001	-	42,44,44	0.95	3 (7%)	56,65,65	2.10	18 (32%)
2	N97	B	1001	-	42,44,44	1.01	2 (4%)	56,65,65	2.24	13 (23%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns.

'-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	N97	A	1001	-	-	11/23/33/33	0/5/5/5
2	N97	B	1001	-	-	7/23/33/33	0/5/5/5

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	1001	N97	C27-N31	3.13	1.40	1.35
2	A	1001	N97	C27-N31	2.99	1.39	1.35
2	B	1001	N97	S8-N11	2.30	1.67	1.63
2	A	1001	N97	C30-S29	-2.13	1.69	1.72
2	A	1001	N97	C12-N11	-2.08	1.39	1.42

All (31) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	1001	N97	C5-C4-S8	-7.49	116.41	121.21
2	A	1001	N97	C28-S29-C30	6.41	94.05	91.21
2	B	1001	N97	C28-S29-C30	5.92	93.83	91.21
2	B	1001	N97	C6-C5-C4	-5.11	119.74	122.22
2	A	1001	N97	C28-C23-N24	-4.83	119.10	123.24
2	B	1001	N97	C28-C23-N24	-4.77	119.15	123.24
2	B	1001	N97	C15-C14-N19	-4.17	116.19	121.12
2	A	1001	N97	C6-C5-C4	-3.95	120.30	122.22
2	A	1001	N97	N26-C25-N24	-3.94	122.61	128.58
2	B	1001	N97	N26-C25-N24	-3.93	122.64	128.58
2	A	1001	N97	C22-C30-S29	-3.71	111.67	114.16
2	A	1001	N97	C15-C14-N19	-3.57	116.89	121.12
2	B	1001	N97	C22-C30-S29	-3.53	111.79	114.16
2	A	1001	N97	C2-C3-C4	3.48	119.00	116.92
2	B	1001	N97	O9-S8-O10	3.27	123.49	119.52
2	A	1001	N97	C5-C4-S8	-3.25	119.12	121.21
2	A	1001	N97	C4-S8-N11	-3.02	103.74	107.30
2	B	1001	N97	C22-C20-N19	3.00	118.39	114.89
2	A	1001	N97	C22-C20-N19	2.99	118.39	114.89
2	B	1001	N97	C2-C3-C4	2.84	118.62	116.92
2	A	1001	N97	C39-C38-C36	-2.79	108.34	111.53
2	A	1001	N97	C12-C13-C14	-2.65	119.09	124.22
2	A	1001	N97	C17-C12-C13	2.50	121.19	117.72
2	A	1001	N97	O9-S8-O10	2.46	122.50	119.52
2	B	1001	N97	C12-C13-C14	-2.30	119.78	124.22
2	A	1001	N97	C1-C2-C3	-2.23	120.28	123.23

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	1001	N97	C6-C1-C2	2.22	120.66	118.38
2	A	1001	N97	C14-C15-CL18	-2.18	116.80	119.28
2	B	1001	N97	C3-C4-S8	2.18	122.59	118.59
2	B	1001	N97	C25-N26-C27	2.07	122.08	115.24
2	A	1001	N97	C25-N26-C27	2.03	121.97	115.24

There are no chirality outliers.

All (18) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1001	N97	C5-C4-S8-O10
2	A	1001	N97	C5-C4-S8-O9
2	A	1001	N97	C3-C4-S8-N11
2	A	1001	N97	C5-C4-S8-N11
2	A	1001	N97	C3-C4-S8-O9
2	A	1001	N97	C3-C4-S8-O10
2	A	1001	N97	N26-C27-N31-C32
2	B	1001	N97	N26-C27-N31-C32
2	A	1001	N97	C12-N11-S8-O10
2	B	1001	N97	C5-C4-S8-O9
2	A	1001	N97	C28-C27-N31-C32
2	B	1001	N97	C28-C27-N31-C32
2	A	1001	N97	C12-N11-S8-O9
2	B	1001	N97	C5-C4-S8-O10
2	A	1001	N97	C12-N11-S8-C4
2	B	1001	N97	C5-C4-S8-N11
2	B	1001	N97	C3-C4-S8-N11
2	B	1001	N97	C3-C4-S8-O9

There are no ring outliers.

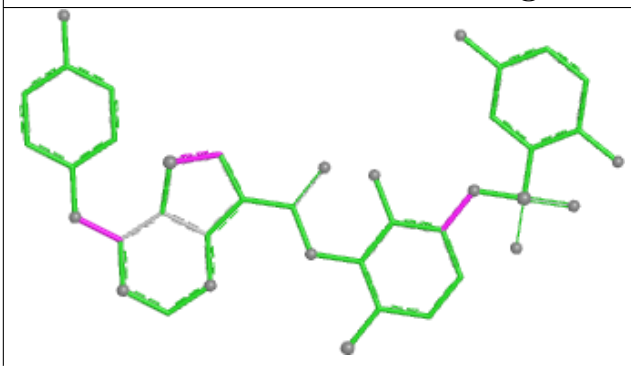
2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1001	N97	1	0
2	B	1001	N97	2	0

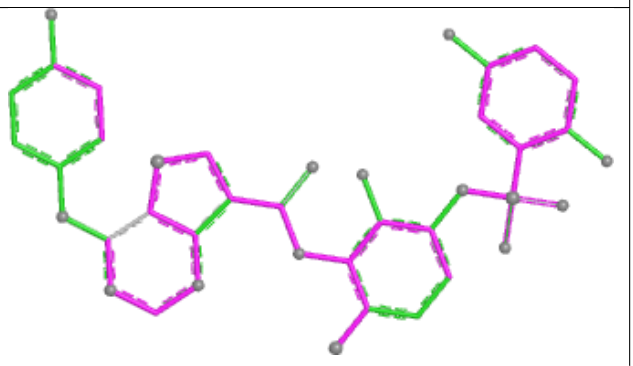
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be

highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

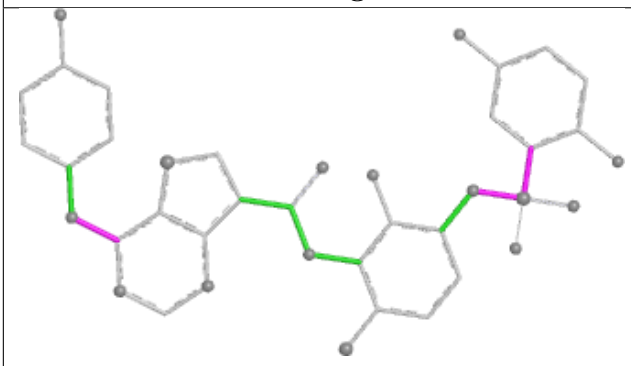
Ligand N97 A 1001



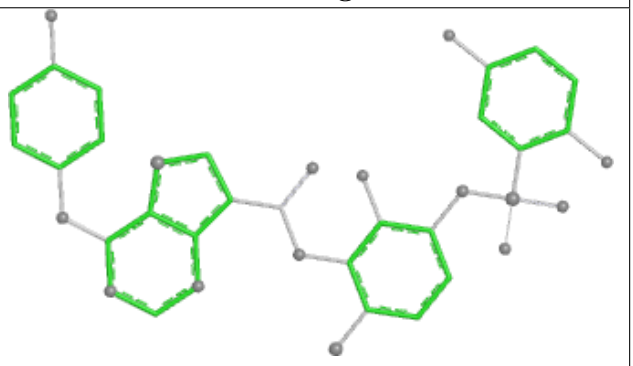
Bond lengths



Bond angles

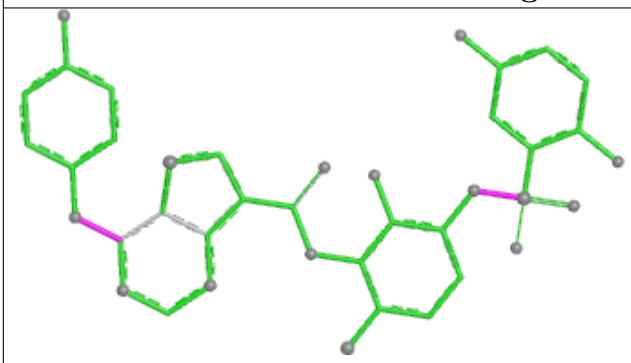


Torsions

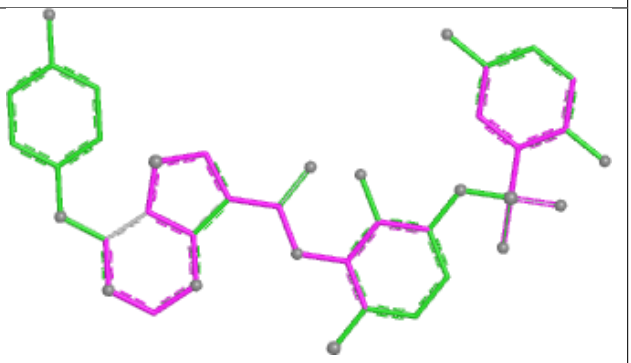


Rings

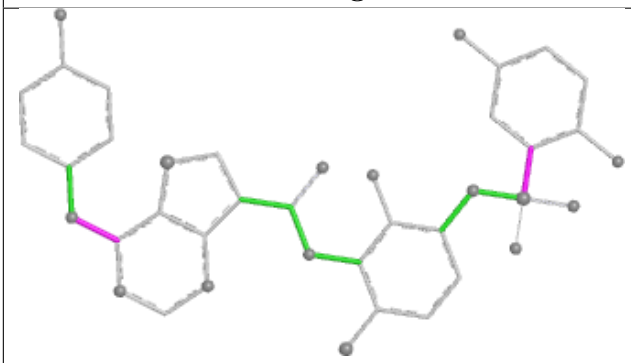
Ligand N97 B 1001



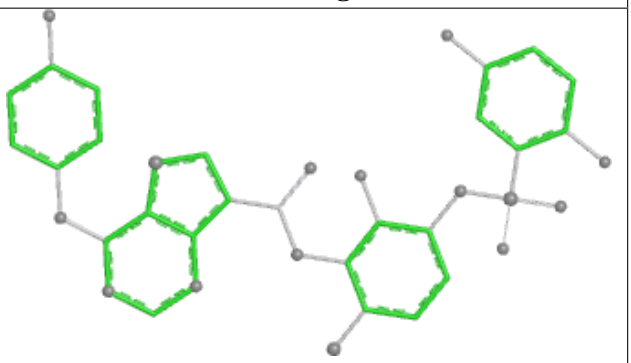
Bond lengths



Bond angles



Torsions



Rings

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

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	401/434 (92%)	0.28	28 (6%)	22	19	41, 60, 105, 136	0
1	B	401/434 (92%)	0.16	17 (4%)	40	36	36, 57, 99, 137	0
All	All	802/868 (92%)	0.22	45 (5%)	30	26	36, 59, 101, 137	0

All (45) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	963	HIS	4.9
1	A	608	PHE	4.4
1	A	606	PHE	4.1
1	B	661	LEU	4.0
1	A	963	HIS	3.6
1	B	660	HIS	3.6
1	B	581	ALA	3.6
1	B	663	LEU	3.6
1	A	657	ASP	3.6
1	B	720	VAL	3.5
1	B	659	ALA	3.4
1	A	747	CYS	3.3
1	A	582	GLU	3.3
1	B	608	PHE	3.2
1	B	662	GLY	3.0
1	A	734	THR	2.9
1	A	607	SER	2.9
1	B	889	PHE	2.8
1	A	603	PRO	2.7
1	A	635	ARG	2.7
1	A	633	LYS	2.6
1	A	745	GLU	2.5
1	A	659	ALA	2.4
1	A	887	ARG	2.4

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Mol	Chain	Res	Type	RSRZ
1	B	635	ARG	2.4
1	A	560	GLU	2.4
1	B	561	THR	2.4
1	A	721	GLY	2.4
1	B	560	GLU	2.4
1	B	872	MET	2.3
1	A	661	LEU	2.3
1	A	891	THR	2.2
1	A	636	GLN	2.2
1	A	728	ARG	2.2
1	A	662	GLY	2.2
1	A	621	GLU	2.2
1	A	749	GLU	2.2
1	A	658	PHE	2.2
1	B	892	TYR	2.1
1	A	748	LYS	2.1
1	B	732	PRO	2.1
1	B	657	ASP	2.1
1	A	732	PRO	2.1
1	A	889	PHE	2.1
1	A	656	LYS	2.1

6.2 Non-standard residues in protein, DNA, RNA chains (i)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
1	SEP	A	729	10/11	0.69	0.15	106,128,135,139	0
1	SEP	A	726	10/11	0.87	0.09	77,94,107,110	0
1	SEP	B	726	10/11	0.87	0.11	53,71,89,89	0
1	SEP	B	729	10/11	0.90	0.10	61,63,71,77	0
1	SEP	A	724	10/11	0.92	0.08	81,88,91,91	0
1	SEP	B	724	10/11	0.95	0.07	61,65,82,85	0

6.3 Carbohydrates (i)

There are no oligosaccharides in this entry.

6.4 Ligands (i)

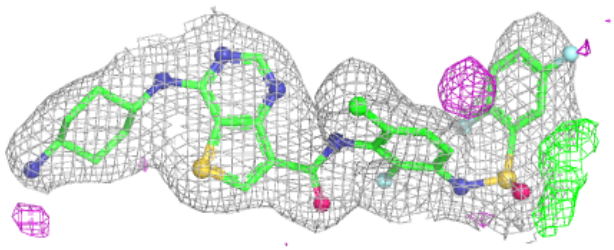
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

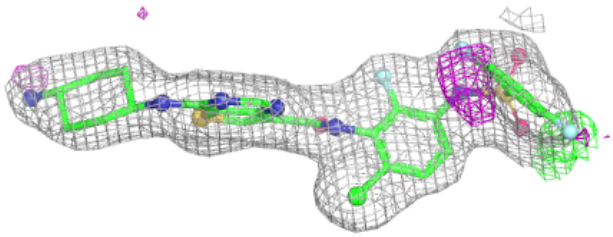
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	N97	B	1001	40/40	0.94	0.10	45,54,86,88	0
2	N97	A	1001	40/40	0.95	0.08	51,59,78,81	0

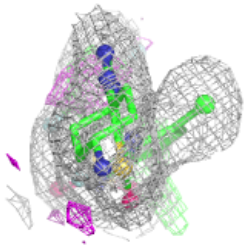
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around N97 B 1001:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

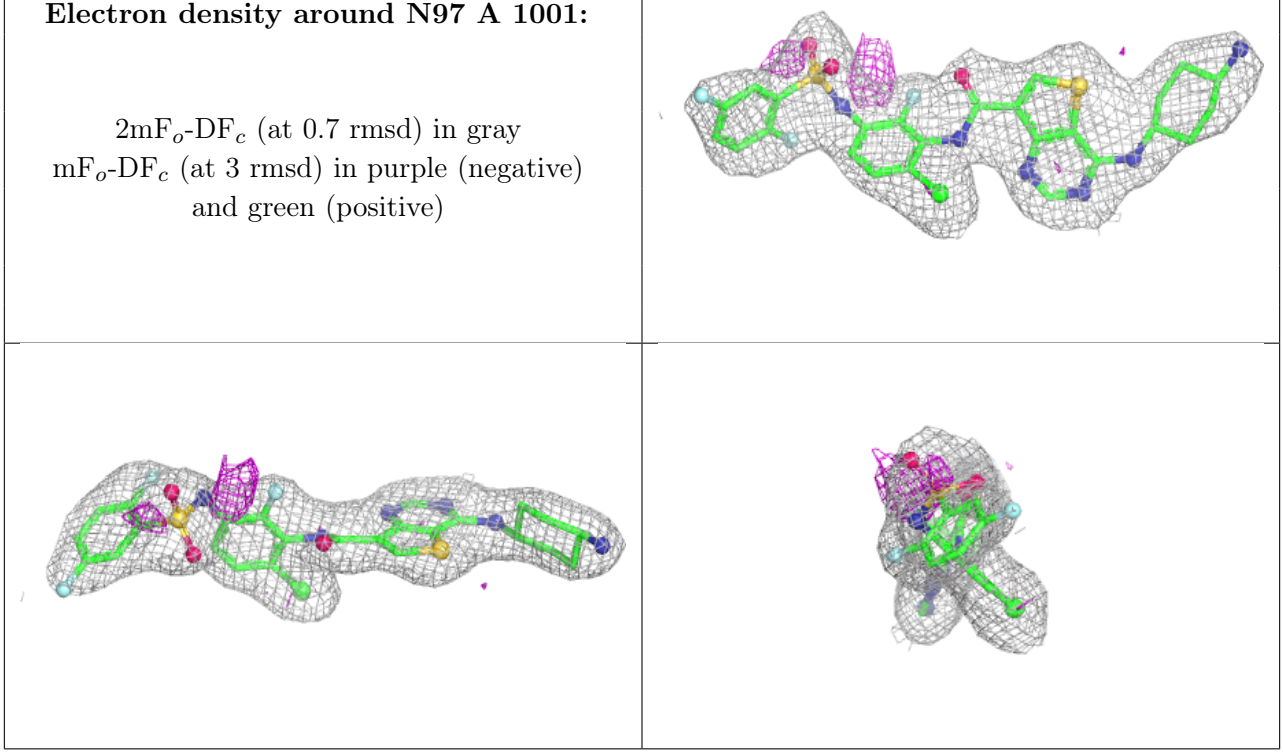






Electron density around N97 A 1001:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



6.5 Other polymers (i)

There are no such residues in this entry.