



# Full wwPDB X-ray Structure Validation Report ⓘ

Sep 22, 2016 – 03:36 PM EDT

PDB ID : 5FS6  
Title : Crystal structure of the V243L mutant of human apoptosis inducing factor  
Authors : Sevrioukova, I.  
Deposited on : 2015-12-30  
Resolution : 1.90 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

<http://wwpdb.org/validation/2016/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

---

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

MolProbity : 4.02b-467  
Mogul : 1.7.1 (RC1), CSD as537be (2016)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20027939  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
Refmac : 5.8.0135  
CCP4 : 6.5.0  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : rb-20027939

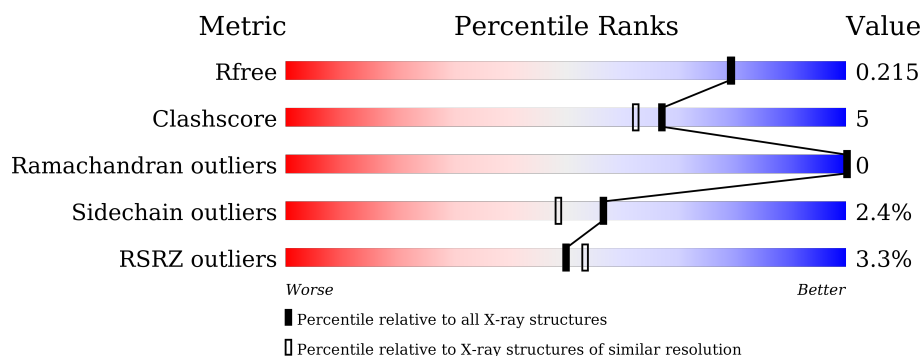
# 1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 1.90 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))
$R_{free}$	91344	4755 (1.90-1.90)
Clashscore	102246	5398 (1.90-1.90)
Ramachandran outliers	100387	5338 (1.90-1.90)
Sidechain outliers	100360	5339 (1.90-1.90)
RSRZ outliers	91569	4766 (1.90-1.90)

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 on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. 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	515	<div> <div>3%</div> <div> <div></div> <div>81%</div> <div>7% • 12%</div> </div> </div>
1	B	515	<div> <div>2%</div> <div> <div></div> <div>78%</div> <div>9% 12%</div> </div> </div>

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	TRS	B	7000	-	-	-	X
3	TRS	B	7001	-	-	-	X

## 2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 8186 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 APOPTOSIS-INDUCING FACTOR 1, MITOCHONDRIAL.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	454	Total	C	N	O	S	0	14	0
			3593	2286	640	655	12			
1	B	451	Total	C	N	O	S	0	16	0
			3564	2270	627	654	13			

There are 10 discrepancies between the modelled and reference sequences:

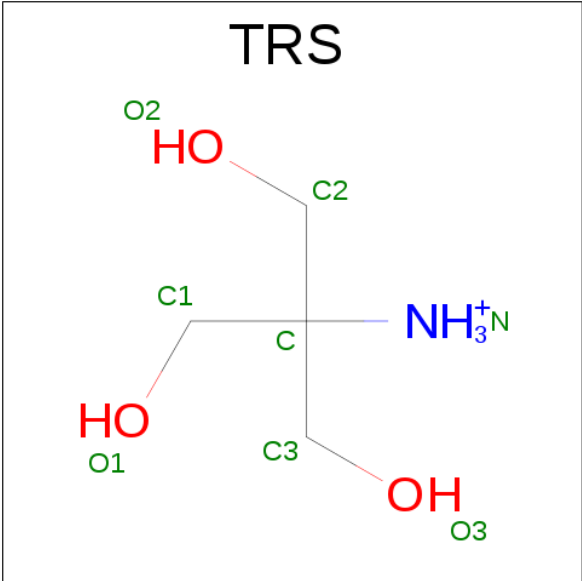
Chain	Residue	Modelled	Actual	Comment	Reference
A	614	LEU	-	EXPRESSION TAG	UNP O95831
A	615	VAL	-	EXPRESSION TAG	UNP O95831
A	616	PRO	-	EXPRESSION TAG	UNP O95831
A	617	ARG	-	EXPRESSION TAG	UNP O95831
A	243	LEU	VAL	ENGINEERED MUTATION	UNP O95831
B	614	LEU	-	EXPRESSION TAG	UNP O95831
B	615	VAL	-	EXPRESSION TAG	UNP O95831
B	616	PRO	-	EXPRESSION TAG	UNP O95831
B	617	ARG	-	EXPRESSION TAG	UNP O95831
B	243	LEU	VAL	ENGINEERED MUTATION	UNP O95831

- Molecule 2 is FLAVIN-ADENINE DINUCLEOTIDE (three-letter code: FAD) (formula:  $C_{27}H_{33}N_9O_{15}P_2$ ).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total 53	C 27	N 9	O 15	P 2	0	0
2	B	1	Total 53	C 27	N 9	O 15	P 2	0	0

- Molecule 3 is 2-AMINO-2-HYDROXYMETHYL-PROPANE-1,3-DIOL (three-letter code: TRS) (formula: C<sub>4</sub>H<sub>12</sub>NO<sub>3</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	B	1	Total	C	N	O	0	0
			8	4	1	3		

Continued on next page...

*Continued from previous page...*

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	B	1	Total	C	N	O	0	0
			8	4	1	3		

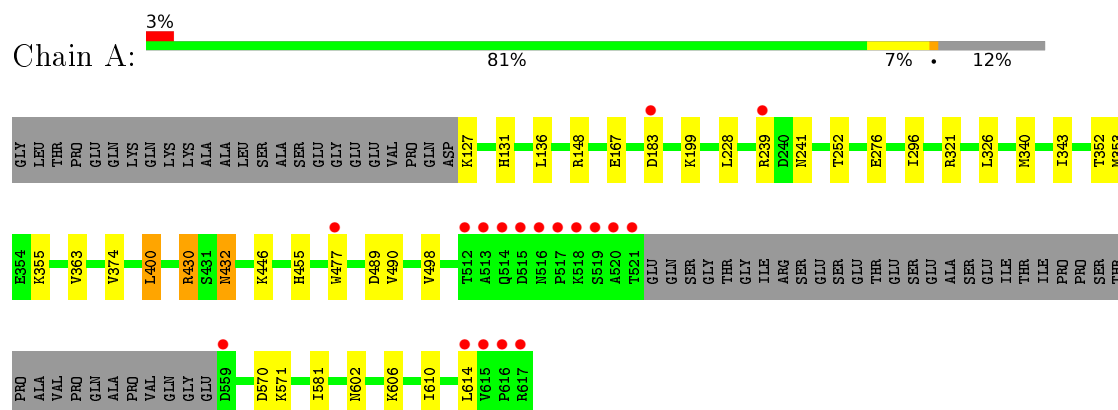
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	460	Total	O	0	0
			460	460		
4	B	447	Total	O	0	0
			447	447		

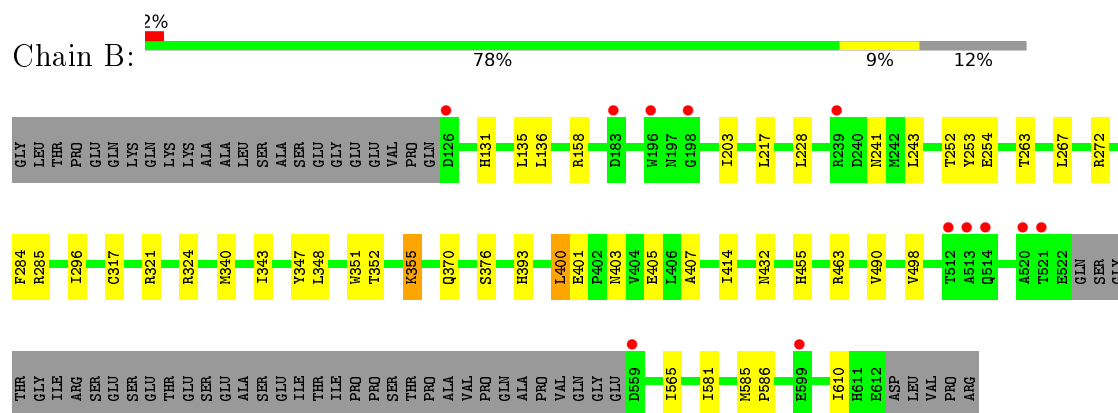
### 3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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: APOPTOSIS-INDUCING FACTOR 1, MITOCHONDRIAL



#### • Molecule 1: APOPTOSIS-INDUCING FACTOR 1, MITOCHONDRIAL



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	90.84Å 114.38Å 121.26Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	121.26 – 1.90 83.20 – 1.90	Depositor EDS
% Data completeness (in resolution range)	99.2 (121.26-1.90) 99.2 (83.20-1.90)	Depositor EDS
$R_{merge}$	0.12	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.60 (at 1.90Å)	Xtriage
Refinement program	REFMAC 5.8.0049	Depositor
R, $R_{free}$	0.172 , 0.207 0.182 , 0.215	Depositor DCC
$R_{free}$ test set	4956 reflections (5.26%)	DCC
Wilson B-factor (Å <sup>2</sup> )	24.5	Xtriage
Anisotropy	0.024	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 47.4	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	8186	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	30.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.87% 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](#)

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

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	0.58	0/3700	0.73	1/4995 (0.0%)
1	B	0.60	0/3679	0.74	3/4970 (0.1%)
All	All	0.59	0/7379	0.74	4/9965 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	400	LEU	CA-CB-CG	5.84	128.72	115.30
1	B	463	ARG	NE-CZ-NH1	5.46	123.03	120.30
1	A	400	LEU	CA-CB-CG	5.30	127.49	115.30
1	B	400	LEU	CB-CA-C	-5.13	100.45	110.20

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	3593	0	3681	32	0
1	B	3564	0	3653	38	0
2	A	53	0	31	0	0
2	B	53	0	31	0	0
3	B	16	0	24	2	0

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	A	460	0	0	10	0
4	B	447	0	0	12	1
All	All	8186	0	7420	71	1

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 (71) 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:148[B]:ARG:HG3	1:A:148[B]:ARG:HH11	1.14	1.08
1:A:148[B]:ARG:CG	1:A:148[B]:ARG:HH11	1.79	0.95
1:A:148[B]:ARG:HG3	1:A:148[B]:ARG:NH1	1.79	0.90
1:A:239:ARG:HG3	1:A:239:ARG:HH11	1.40	0.85
1:B:407:ALA:CB	1:B:414:ILE:HD11	2.10	0.82
1:A:296:ILE:HD11	4:A:2098:HOH:O	1.83	0.78
1:B:284:PHE:O	1:B:285:ARG:HG2	1.83	0.78
1:B:285:ARG:HD2	4:B:2185:HOH:O	1.87	0.74
1:A:167[A]:GLU:OE2	4:A:2037:HOH:O	2.08	0.72
1:B:131:HIS:HD2	1:B:252:THR:OG1	1.74	0.69
1:B:321[B]:ARG:NH1	4:B:2226:HOH:O	2.10	0.69
3:B:7000:TRS:H32	4:B:2445:HOH:O	1.93	0.68
1:B:263[B]:THR:HG23	1:B:403:ASN:OD1	1.94	0.68
1:B:407:ALA:HB3	1:B:414:ILE:HD11	1.77	0.66
1:A:321:ARG:NH1	4:A:2050:HOH:O	2.32	0.63
1:B:284:PHE:C	1:B:285:ARG:HG2	2.20	0.62
1:A:343:ILE:HG23	1:A:498:VAL:HG12	1.82	0.61
1:A:489:ASP:HB2	4:A:2382:HOH:O	2.01	0.61
1:B:285:ARG:NH1	1:B:400:LEU:HD21	2.15	0.61
1:B:351:TRP:CH2	1:B:355[A]:LYS:HG3	2.36	0.60
1:A:239:ARG:HH11	1:A:239:ARG:CG	2.14	0.59
1:B:241:ASN:OD1	1:B:432[A]:ASN:ND2	2.26	0.59
1:B:296:ILE:HD13	1:B:393:HIS:CE1	2.38	0.59
1:B:263[B]:THR:HG21	3:B:7000:TRS:O2	2.03	0.58
1:B:317:CYS:HB3	1:B:321[B]:ARG:HH21	1.69	0.58
1:B:490:VAL:HG22	4:B:2372:HOH:O	2.04	0.57
1:B:370[A]:GLN:OE1	1:B:370[A]:GLN:HA	2.05	0.57
1:A:276:GLU:CG	1:A:374:VAL:HG21	2.34	0.57
1:B:455:HIS:HD2	4:B:2014:HOH:O	1.87	0.56
1:B:131:HIS:CD2	1:B:252:THR:OG1	2.58	0.55
1:B:272:ARG:NH1	4:B:2162:HOH:O	2.36	0.55

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:581:ILE:HD11	1:A:610[A]:ILE:HD11	1.89	0.54
1:A:148[B]:ARG:CB	1:A:148[B]:ARG:HH11	2.21	0.53
1:A:239:ARG:HG3	1:A:239:ARG:NH1	2.15	0.53
1:B:347:TYR:HB3	4:B:2256:HOH:O	2.08	0.53
1:B:321[B]:ARG:HG3	4:B:2225:HOH:O	2.08	0.53
1:B:581:ILE:HD11	1:B:610:ILE:HD11	1.91	0.53
1:A:241:ASN:ND2	1:A:432[A]:ASN:OD1	2.43	0.52
1:A:446:LYS:HE3	1:A:477:TRP:CH2	2.45	0.52
1:A:581:ILE:CD1	1:A:610[A]:ILE:HD11	2.40	0.51
1:B:343:ILE:HG23	1:B:498[B]:VAL:HG12	1.91	0.51
1:B:407:ALA:HB1	1:B:414:ILE:HD11	1.93	0.51
1:A:490:VAL:HG22	4:A:2384:HOH:O	2.11	0.51
1:A:276:GLU:HG3	1:A:374:VAL:HG21	1.93	0.51
1:A:239:ARG:NH1	1:A:239:ARG:CG	2.73	0.50
1:B:405:GLU:HG3	4:B:2126:HOH:O	2.10	0.50
1:B:455:HIS:HE1	4:B:2343:HOH:O	1.94	0.49
1:B:340:MET:CE	1:B:352:THR:HG21	2.42	0.49
1:B:296:ILE:HD11	4:B:2112:HOH:O	2.13	0.47
1:A:570:ASP:C	1:A:571:LYS:HG2	2.36	0.46
1:A:430:ARG:NH2	4:A:2116:HOH:O	2.50	0.45
1:A:276:GLU:HG2	1:A:374:VAL:HG21	1.97	0.45
1:B:405:GLU:HG2	4:B:2284:HOH:O	2.17	0.45
1:A:340:MET:CE	1:A:352:THR:HG21	2.47	0.45
1:A:446:LYS:HE3	1:A:477:TRP:CZ2	2.51	0.44
1:B:243:LEU:HD12	1:B:243:LEU:C	2.37	0.44
1:A:602[B]:ASN:CG	1:A:614:LEU:HD23	2.37	0.44
1:B:158:ARG:NH1	1:B:217:LEU:O	2.51	0.44
1:A:353:MET:HG3	1:A:363:VAL:HG11	2.00	0.44
1:A:606:LYS:HE2	4:A:2453:HOH:O	2.17	0.44
1:B:131:HIS:HE1	1:B:254:GLU:OE2	1.99	0.44
1:B:348:LEU:HD22	1:B:565:ILE:HD11	2.00	0.44
1:A:455:HIS:HE1	4:A:2364:HOH:O	2.01	0.44
1:A:148[A]:ARG:NH2	4:A:2018:HOH:O	2.52	0.43
1:B:340:MET:HE1	1:B:352:THR:HG21	2.02	0.42
1:B:348:LEU:CD2	1:B:565:ILE:HD11	2.50	0.41
1:A:455:HIS:HD2	4:A:2015:HOH:O	2.03	0.41
1:A:131:HIS:HD2	1:A:252:THR:OG1	2.03	0.40
1:B:203:ILE:HG21	1:B:203:ILE:HD13	1.83	0.40
1:B:585:MET:N	1:B:586:PRO:CD	2.84	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:B:2029:HOH:O	4:B:2273:HOH:O[3_454]	2.19	0.01

## 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	464/515 (90%)	447 (96%)	17 (4%)	0	100	100
1	B	463/515 (90%)	445 (96%)	18 (4%)	0	100	100
All	All	927/1030 (90%)	892 (96%)	35 (4%)	0	100	100

There are no Ramachandran outliers to report.

### 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	387/423 (92%)	376 (97%)	11 (3%)	51	41
1	B	386/423 (91%)	377 (98%)	9 (2%)	58	51
All	All	773/846 (91%)	753 (97%)	20 (3%)	57	45

All (20) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	127	LYS
1	A	136	LEU
1	A	183	ASP

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
1	A	199	LYS
1	A	228	LEU
1	A	326	LEU
1	A	355	LYS
1	A	400	LEU
1	A	430	ARG
1	A	432[A]	ASN
1	A	432[B]	ASN
1	B	135	LEU
1	B	136	LEU
1	B	228	LEU
1	B	267	LEU
1	B	324	ARG
1	B	355[A]	LYS
1	B	355[B]	LYS
1	B	376	SER
1	B	401	GLU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	131	HIS
1	A	215	GLN
1	A	219	HIS
1	A	250	GLN
1	A	370	GLN
1	A	455	HIS
1	A	457	HIS
1	B	131	HIS
1	B	455	HIS
1	B	457	HIS

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

## 5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

4 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	FAD	A	1000	-	52,58,58	1.26	8 (15%)	52,89,89	2.23	12 (23%)
2	FAD	B	1000	-	52,58,58	1.24	7 (13%)	52,89,89	2.31	8 (15%)
3	TRS	B	7000	-	7,7,7	1.37	1 (14%)	9,9,9	7.10	6 (66%)
3	TRS	B	7001	-	7,7,7	1.12	1 (14%)	9,9,9	6.21	7 (77%)

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	FAD	A	1000	-	-	0/30/50/50	0/6/6/6
2	FAD	B	1000	-	-	0/30/50/50	0/6/6/6
3	TRS	B	7000	-	-	0/9/9/9	0/0/0/0
3	TRS	B	7001	-	-	0/9/9/9	0/0/0/0

All (17) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	1000	FAD	C6-C5X	-2.85	1.37	1.41
2	B	1000	FAD	C4-C4X	2.02	1.45	1.41
2	A	1000	FAD	C4-C4X	2.03	1.45	1.41
2	A	1000	FAD	C5A-C4A	2.08	1.45	1.40
2	B	1000	FAD	C8-C7	2.15	1.46	1.41
2	A	1000	FAD	C2A-N3A	2.24	1.36	1.32

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	1000	FAD	C9A-N10	2.28	1.42	1.38
2	A	1000	FAD	C8-C7	2.29	1.47	1.41
2	B	1000	FAD	O4B-C1B	2.42	1.44	1.41
3	B	7001	TRS	C-N	2.46	1.53	1.50
2	B	1000	FAD	C9A-C5X	2.61	1.48	1.42
3	B	7000	TRS	C-N	2.64	1.54	1.50
2	B	1000	FAD	C5A-C4A	2.83	1.46	1.40
2	A	1000	FAD	C9A-C5X	2.88	1.48	1.42
2	A	1000	FAD	C4X-N5	2.98	1.37	1.33
2	B	1000	FAD	C4X-C10	3.26	1.46	1.40
2	A	1000	FAD	C4X-C10	3.82	1.47	1.40

All (33) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	7000	TRS	C1-C-N	-12.82	86.10	107.88
3	B	7000	TRS	C2-C-N	-10.96	89.26	107.88
3	B	7001	TRS	C3-C-N	-10.52	90.00	107.88
3	B	7000	TRS	C3-C-N	-10.22	90.51	107.88
3	B	7001	TRS	C2-C-N	-9.26	92.15	107.88
3	B	7001	TRS	C1-C-N	-9.15	92.34	107.88
2	B	1000	FAD	N3A-C2A-N1A	-8.36	122.30	128.87
2	A	1000	FAD	C4-C4X-C10	-6.84	115.56	119.94
2	A	1000	FAD	N3A-C2A-N1A	-6.18	124.02	128.87
2	B	1000	FAD	C4-C4X-C10	-5.97	116.12	119.94
2	B	1000	FAD	C4X-C4-N3	-3.90	118.42	123.52
2	A	1000	FAD	C4X-C4-N3	-3.75	118.62	123.52
2	A	1000	FAD	N3-C2-N1	-3.31	122.12	127.69
2	B	1000	FAD	N3-C2-N1	-3.30	122.13	127.69
3	B	7001	TRS	O2-C2-C	-2.75	104.39	110.92
2	A	1000	FAD	C4X-C10-N10	-2.13	118.97	120.52
2	A	1000	FAD	O2A-PA-O1A	2.05	123.23	112.56
2	B	1000	FAD	O2'-C2'-C1'	2.08	115.06	109.93
2	A	1000	FAD	O2'-C2'-C1'	2.13	115.18	109.93
2	B	1000	FAD	C2A-N1A-C6A	2.16	122.62	118.77
2	A	1000	FAD	C1'-N10-C9A	2.20	121.38	118.83
2	A	1000	FAD	N6A-C6A-N1A	2.31	122.39	118.52
2	A	1000	FAD	C4-C4X-N5	2.37	121.59	118.70
3	B	7000	TRS	C3-C-C2	2.54	116.00	110.65
2	B	1000	FAD	C1'-N10-C9A	3.81	123.25	118.83
2	A	1000	FAD	C5X-C9A-N10	4.01	120.58	117.58
3	B	7001	TRS	C3-C-C2	4.16	119.41	110.65

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	7001	TRS	C2-C-C1	4.46	120.05	110.65
3	B	7001	TRS	C3-C-C1	4.60	120.33	110.65
3	B	7000	TRS	C3-C-C1	5.33	121.88	110.65
3	B	7000	TRS	C2-C-C1	5.36	121.94	110.65
2	A	1000	FAD	C4-N3-C2	8.61	122.34	115.16
2	B	1000	FAD	C4-N3-C2	9.37	122.97	115.16

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	7000	TRS	2	0

## 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, 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	454/515 (88%)	-0.07	18 (3%) 42 46	15, 27, 52, 75	0
1	B	451/515 (87%)	-0.07	12 (2%) 58 61	14, 27, 52, 69	0
All	All	905/1030 (87%)	-0.07	30 (3%) 50 53	14, 27, 52, 75	0

All (30) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	559	ASP	4.6
1	A	514	GLN	4.0
1	A	616	PRO	3.9
1	A	513	ALA	3.8
1	B	521	THR	3.6
1	A	477	TRP	3.6
1	B	559	ASP	3.6
1	A	520	ALA	3.5
1	A	239	ARG	3.4
1	B	183	ASP	3.4
1	B	599	GLU	3.2
1	B	514	GLN	3.2
1	B	512	THR	3.0
1	B	513	ALA	3.0
1	A	516	ASN	3.0
1	A	183	ASP	3.0
1	B	196	TRP	2.9
1	B	126	ASP	2.8
1	B	520	ALA	2.7
1	A	615	VAL	2.6
1	A	519	SER	2.5
1	A	517	PRO	2.5
1	A	614	LEU	2.3
1	A	521	THR	2.3

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	RSRZ
1	A	515	ASP	2.3
1	A	512	THR	2.1
1	A	617	ARG	2.1
1	A	518	LYS	2.1
1	B	198	GLY	2.1
1	B	239	ARG	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 carbohydrates 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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 95<sup>th</sup> 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	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
3	TRS	B	7001	8/8	0.82	0.23	5.31	41,48,51,53	0
3	TRS	B	7000	8/8	0.72	0.22	3.92	45,58,62,64	0
2	FAD	B	1000	53/53	0.98	0.09	0.05	15,17,20,23	0
2	FAD	A	1000	53/53	0.98	0.09	-0.18	14,17,22,25	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.