



wwPDB X-ray Structure Validation Summary Report

Feb 27, 2014 – 08:11 PM GMT

PDB ID : 3V3K
Title : Human caspase 9 in complex with bacterial effector protein
Authors : Moertl, M.; Maskos, K.; Steuber, H.
Deposited on : 2011-12-13
Resolution : 3.49 Å(reported)

This is a wwPDB validation summary report for a publicly released PDB entry.

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

A user guide is available at <http://wwpdb.org/ValidationPDFNotes.html>

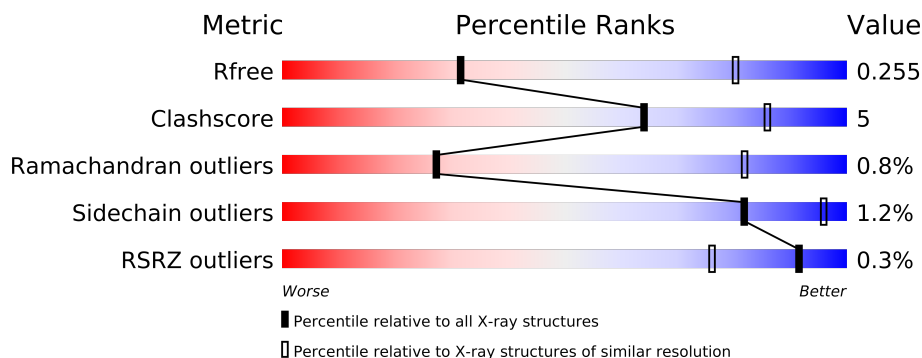
The following versions of software and data (see [references](#)) were used in the production of this report:

MolProbity	:	4.02b-467
Mogul	:	1.15 2013
Xtriage (Phenix)	:	dev-1323
EDS	:	stable22639
Percentile statistics	:	21963
Refmac	:	5.8.0049
CCP4	:	6.3.0 (Settle)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et. al. (1996)
Validation Pipeline (wwPDB-VP)	:	stable22683

1 Overall quality at a glance

The reported resolution of this entry is 3.49 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}	66092	1243 (3.70-3.30)
Clashscore	79885	1039 (3.66-3.34)
Ramachandran outliers	78287	1000 (3.66-3.34)
Sidechain outliers	78261	1000 (3.66-3.34)
RSRZ outliers	66119	1243 (3.70-3.30)

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 ≥ 3 , 2, 1 and 0 types of geometric quality criteria. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density.

Mol	Chain	Length	Quality of chain
1	A	276	
1	C	276	
1	E	276	
1	G	276	
1	I	276	
1	K	276	
1	M	276	
1	O	276	
2	B	165	
2	D	165	
2	F	165	
2	H	165	
2	J	165	
2	L	165	

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Mol	Chain	Length	Quality of chain
2	N	165	
2	P	165	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 25428 atoms, of which 0 are hydrogen and 0 are deuterium.

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 Caspase-9.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	245	Total	C	N	O	S	29	0	0
			1898	1209	326	348	15			
1	C	237	Total	C	N	O	S	34	0	0
			1839	1172	315	337	15			
1	E	243	Total	C	N	O	S	43	0	0
			1885	1200	324	346	15			
1	G	235	Total	C	N	O	S	26	0	0
			1828	1166	313	334	15			
1	I	244	Total	C	N	O	S	44	0	0
			1890	1203	325	347	15			
1	K	237	Total	C	N	O	S	16	0	0
			1839	1172	315	337	15			
1	M	245	Total	C	N	O	S	37	0	0
			1898	1209	326	348	15			
1	O	237	Total	C	N	O	S	34	0	0
			1839	1172	315	337	15			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	220	ARG	GLN	SEE REMARK 999	UNP P55211
C	220	ARG	GLN	SEE REMARK 999	UNP P55211
E	220	ARG	GLN	SEE REMARK 999	UNP P55211
G	220	ARG	GLN	SEE REMARK 999	UNP P55211
I	220	ARG	GLN	SEE REMARK 999	UNP P55211
K	220	ARG	GLN	SEE REMARK 999	UNP P55211
M	220	ARG	GLN	SEE REMARK 999	UNP P55211
O	220	ARG	GLN	SEE REMARK 999	UNP P55211

- Molecule 2 is a protein called Putative uncharacterized protein ECs1815.

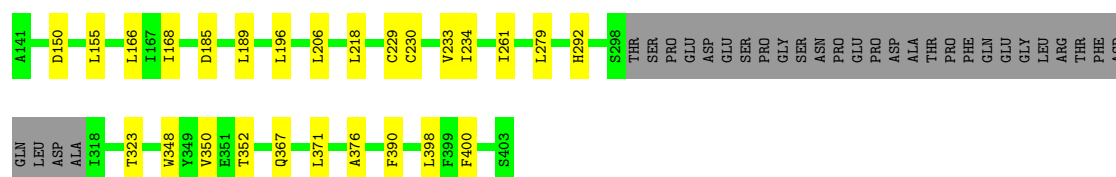
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	165	Total	C	N	O	S	54	0	0
			1319	819	226	264	10			
2	D	164	Total	C	N	O	S	114	0	0
			1312	815	225	262	10			
2	F	165	Total	C	N	O	S	56	0	0
			1319	819	226	264	10			
2	H	165	Total	C	N	O	S	58	0	0
			1319	819	226	264	10			
2	J	165	Total	C	N	O	S	78	0	0
			1319	819	226	264	10			
2	L	161	Total	C	N	O	S	112	0	0
			1286	799	222	255	10			
2	N	165	Total	C	N	O	S	95	0	0
			1319	819	226	264	10			
2	P	165	Total	C	N	O	S	112	0	0
			1319	819	226	264	10			

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: Caspase-9

Chain A:



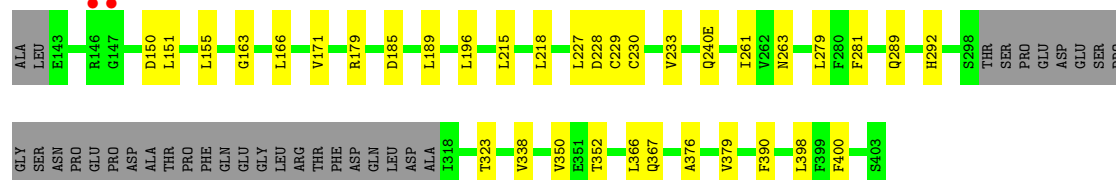
• Molecule 1: Caspase-9

Chain C:



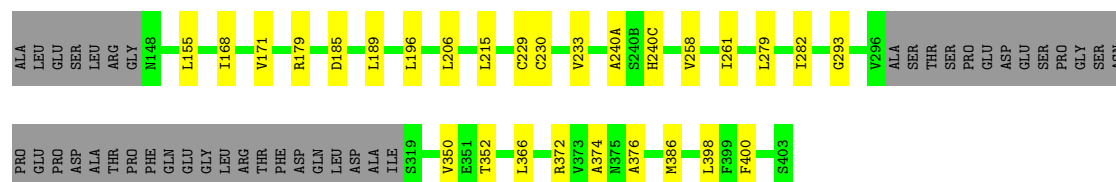
• Molecule 1: Caspase-9

Chain E:



• Molecule 1: Caspase-9

Chain G:



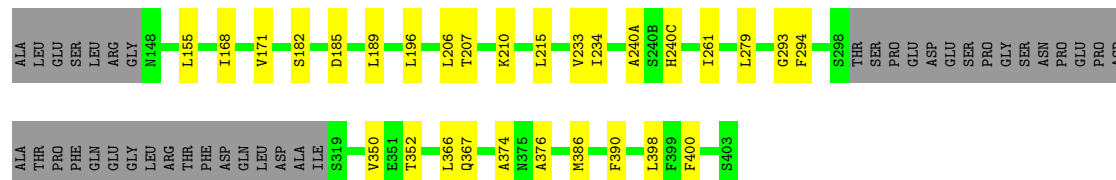
• Molecule 1: Caspase-9

Chain I:



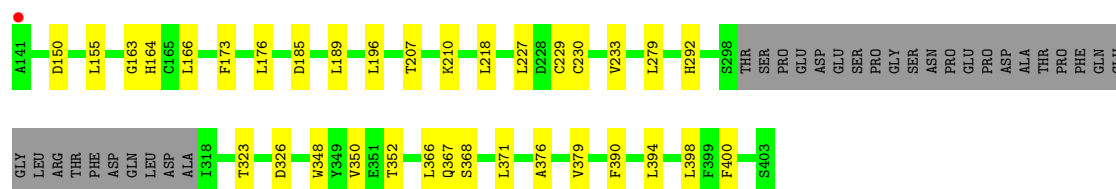
- Molecule 1: Caspase-9

Chain K:



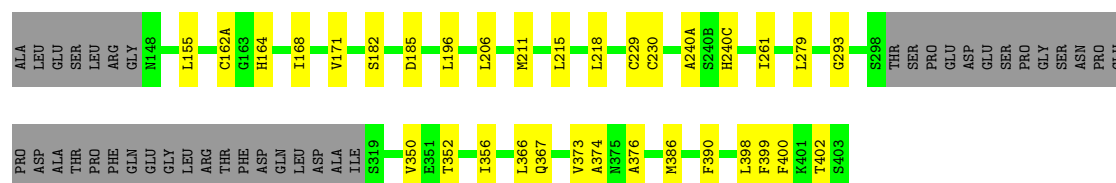
- Molecule 1: Caspase-9

Chain M:



- Molecule 1: Caspase-9

Chain O:



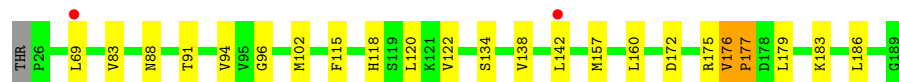
- Molecule 2: Putative uncharacterized protein ECs1815

Chain B:



- Molecule 2: Putative uncharacterized protein ECs1815

Chain D:



- Molecule 2: Putative uncharacterized protein ECs1815

Chain F: 



- Molecule 2: Putative uncharacterized protein ECs1815

Chain H: 



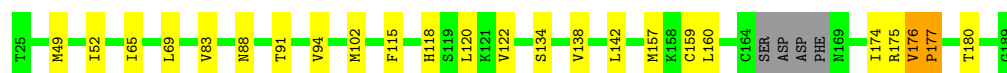
- Molecule 2: Putative uncharacterized protein ECs1815

Chain J: 



- Molecule 2: Putative uncharacterized protein ECs1815

Chain L: 



- Molecule 2: Putative uncharacterized protein ECs1815

Chain N: 



- Molecule 2: Putative uncharacterized protein ECs1815

Chain P: 



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	100.70Å 209.91Å 317.23Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	174.08 – 3.49 48.39 – 3.49	Depositor EDS
% Data completeness (in resolution range)	98.4 (174.08-3.49) 98.4 (48.39-3.49)	Depositor EDS
R_{merge}	0.13	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.92 (at 3.48Å)	Xtriage
Refinement program	REFMAC 5.5.0109	Depositor
R, R_{free}	0.239 , 0.259 0.237 , 0.255	Depositor DCC
R_{free} test set	1689 reflections (2.03%)	DCC
Wilson B-factor (Å ²)	91.1	Xtriage
Anisotropy	0.282	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.27 , 23.0	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning	$\langle L \rangle = 0.42$, $\langle L^2 \rangle = 0.25$	Xtriage
Outliers	0 of 84730 reflections	Xtriage
F_o, F_c correlation	0.90	EDS
Total number of atoms	25428	wwPDB-VP
Average B, all atoms (Å ²)	82.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.09% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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	0.39	0/1940	0.52	0/2619
1	C	0.40	1/1881 (0.1%)	0.52	0/2540
1	E	0.40	0/1927	0.52	0/2601
1	G	0.42	0/1870	0.54	0/2525
1	I	0.41	0/1932	0.52	0/2608
1	K	0.40	0/1881	0.52	0/2540
1	M	0.40	0/1940	0.52	0/2619
1	O	0.43	0/1881	0.53	0/2540
2	B	0.45	0/1341	0.52	0/1805
2	D	0.43	0/1334	0.51	0/1794
2	F	0.43	0/1341	0.52	0/1805
2	H	0.45	1/1341 (0.1%)	0.52	0/1805
2	J	0.42	0/1341	0.52	0/1805
2	L	0.43	0/1306	0.50	0/1756
2	N	0.45	0/1341	0.50	0/1805
2	P	0.46	0/1341	0.53	0/1805
All	All	0.42	2/25938 (0.0%)	0.52	0/34972

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	217	GLU	CG-CD	-5.48	1.43	1.51
2	H	93	GLU	CD-OE1	-5.41	1.19	1.25

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 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 hydrogens

added by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, and the number in parentheses is this value normalized per 1000 atoms of the molecule in the chain. The Symm-Clashes column gives symmetry related clashes, in the same way as for the Clashes column.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1898	0	1883	17	0
1	C	1839	0	1818	18	0
1	E	1885	0	1867	19	0
1	G	1828	0	1808	18	0
1	I	1890	0	1872	20	0
1	K	1839	0	1818	18	0
1	M	1898	0	1883	21	0
1	O	1839	0	1818	21	0
2	B	1319	0	1272	16	0
2	D	1312	0	1266	14	0
2	F	1319	0	1272	15	0
2	H	1319	0	1272	15	0
2	J	1319	0	1272	14	0
2	L	1286	0	1249	15	0
2	N	1319	0	1272	16	0
2	P	1319	0	1272	15	0
All	All	25428	0	24914	259	0

Clashscore is defined as the number of clashes calculated for the entry per 1000 atoms (including hydrogens) of the entry. The overall clashscore for this entry is 5.

The worst 5 of 259 close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:O:366:LEU:HD22	1:O:398:LEU:HD23	1.62	0.82
2:H:120:LEU:HD22	2:H:142:LEU:HD11	1.67	0.75
2:D:120:LEU:HD22	2:D:142:LEU:HD11	1.70	0.73
1:K:366:LEU:HD22	1:K:398:LEU:HD23	1.72	0.70
2:L:176:VAL:HG12	2:L:177:PRO:HD3	1.77	0.66

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone ⓘ

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	241/276 (87%)	231 (96%)	10 (4%)	0	100	100
1	C	233/276 (84%)	229 (98%)	4 (2%)	0	100	100
1	E	239/276 (87%)	230 (96%)	9 (4%)	0	100	100
1	G	231/276 (84%)	224 (97%)	7 (3%)	0	100	100
1	I	240/276 (87%)	232 (97%)	8 (3%)	0	100	100
1	K	233/276 (84%)	225 (97%)	8 (3%)	0	100	100
1	M	241/276 (87%)	231 (96%)	10 (4%)	0	100	100
1	O	233/276 (84%)	227 (97%)	6 (3%)	0	100	100
2	B	163/165 (99%)	144 (88%)	15 (9%)	4 (2%)	9	57
2	D	162/165 (98%)	147 (91%)	13 (8%)	2 (1%)	19	75
2	F	163/165 (99%)	146 (90%)	13 (8%)	4 (2%)	9	57
2	H	163/165 (99%)	148 (91%)	12 (7%)	3 (2%)	13	65
2	J	163/165 (99%)	145 (89%)	15 (9%)	3 (2%)	13	65
2	L	157/165 (95%)	146 (93%)	9 (6%)	2 (1%)	18	72
2	N	163/165 (99%)	148 (91%)	12 (7%)	3 (2%)	13	65
2	P	163/165 (99%)	148 (91%)	12 (7%)	3 (2%)	13	65
All	All	3188/3528 (90%)	3001 (94%)	163 (5%)	24 (1%)	27	82

5 of 24 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	D	177	PRO
2	F	177	PRO
2	H	177	PRO
2	P	177	PRO
2	B	177	PRO

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	211/238 (89%)	207 (98%)	4 (2%)	69	93
1	C	205/238 (86%)	203 (99%)	2 (1%)	85	96
1	E	210/238 (88%)	206 (98%)	4 (2%)	69	93
1	G	204/238 (86%)	204 (100%)	0	100	100
1	I	210/238 (88%)	207 (99%)	3 (1%)	78	95
1	K	205/238 (86%)	204 (100%)	1 (0%)	94	98
1	M	211/238 (89%)	207 (98%)	4 (2%)	69	93
1	O	205/238 (86%)	204 (100%)	1 (0%)	94	98
2	B	152/152 (100%)	151 (99%)	1 (1%)	91	98
2	D	151/152 (99%)	148 (98%)	3 (2%)	68	93
2	F	152/152 (100%)	150 (99%)	2 (1%)	80	96
2	H	152/152 (100%)	151 (99%)	1 (1%)	91	98
2	J	152/152 (100%)	149 (98%)	3 (2%)	68	93
2	L	148/152 (97%)	146 (99%)	2 (1%)	78	95
2	N	152/152 (100%)	150 (99%)	2 (1%)	80	96
2	P	152/152 (100%)	150 (99%)	2 (1%)	80	96
All	All	2872/3120 (92%)	2837 (99%)	35 (1%)	82	96

5 of 35 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	F	175	ARG
1	I	390	PHE
1	O	390	PHE
2	H	175	ARG
1	I	292	HIS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 16 such sidechains are listed below:

Mol	Chain	Res	Type
1	I	240(E)	GLN
1	I	263	ASN
1	M	240(E)	GLN
2	H	59	ASN
1	M	263	ASN

5.3.3 RNA ⓘ

There are no RNA chains 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 ⓘ

There are no carbohydrates 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 ⓘ

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	245/276 (88%)	0.04	0 100 100	47, 69, 102, 147	11 (4%)
1	C	237/276 (85%)	-0.04	0 100 100	51, 70, 95, 115	12 (5%)
1	E	243/276 (88%)	-0.00	2 (0%) 83 53	47, 69, 102, 140	15 (6%)
1	G	235/276 (85%)	-0.07	0 100 100	51, 71, 93, 118	9 (3%)
1	I	244/276 (88%)	-0.02	2 (0%) 83 53	47, 70, 103, 151	16 (6%)
1	K	237/276 (85%)	-0.06	0 100 100	51, 71, 95, 115	8 (3%)
1	M	245/276 (88%)	-0.05	1 (0%) 90 71	47, 69, 103, 146	14 (5%)
1	O	237/276 (85%)	-0.08	0 100 100	51, 72, 95, 116	13 (5%)
2	B	165/165 (100%)	0.01	0 100 100	60, 90, 125, 139	16 (9%)
2	D	164/165 (99%)	0.28	2 (1%) 75 42	71, 98, 131, 137	31 (18%)
2	F	165/165 (100%)	0.11	0 100 100	62, 90, 124, 136	17 (10%)
2	H	165/165 (100%)	0.08	0 100 100	70, 98, 134, 140	21 (12%)
2	J	165/165 (100%)	-0.04	0 100 100	62, 90, 124, 141	24 (14%)
2	L	161/165 (97%)	0.33	0 100 100	71, 98, 130, 137	32 (19%)
2	N	165/165 (100%)	-0.00	0 100 100	62, 90, 124, 141	27 (16%)
2	P	165/165 (100%)	0.23	3 (1%) 65 33	71, 98, 134, 139	33 (20%)
All	All	3238/3528 (91%)	0.03	10 (0%) 91 76	47, 78, 124, 151	299 (9%)

The worst 5 of 10 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	I	141	ALA	3.8
1	M	141	ALA	2.8
1	E	147	GLY	2.6
2	P	69	LEU	2.5
2	D	142	LEU	2.5

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

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

6.3 Carbohydrates ⓘ

There are no carbohydrates in this entry.

6.4 Ligands ⓘ

There are no ligands in this entry.

6.5 Other polymers ⓘ

There are no such residues in this entry.