



# Full wwPDB X-ray Structure Validation Report ⓘ

May 29, 2024 – 06:01 PM EDT

PDB ID : 1ELE  
Title : STRUCTURAL ANALYSIS OF THE ACTIVE SITE OF PORCINE PANCREATIC ELASTASE BASED ON THE X-RAY CRYSTAL STRUCTURES OF COMPLEXES WITH TRIFLUOROACETYL-DIPEPTIDE-ANILIDE INHIBITORS  
Authors : Mattos, C.; Petsko, G.A.; Ringe, D.  
Deposited on : 1994-10-24  
Resolution : 2.00 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

<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>.

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

MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtrriage (Phenix)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

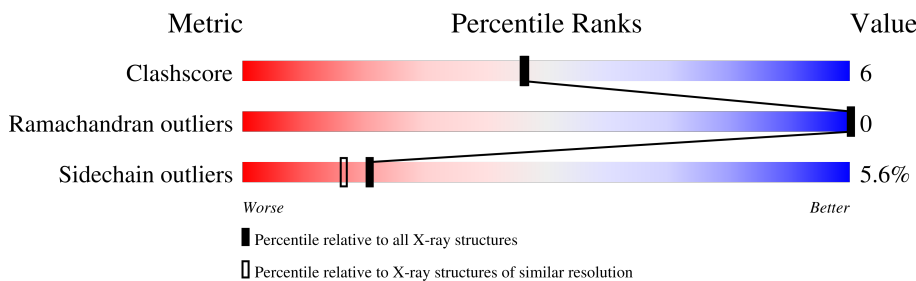
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.00 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	141614	9178 (2.00-2.00)
Ramachandran outliers	138981	9054 (2.00-2.00)
Sidechain outliers	138945	9053 (2.00-2.00)

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  $\geq 3$ , 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	E	240	 81% 15% . .

## 2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 2001 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.

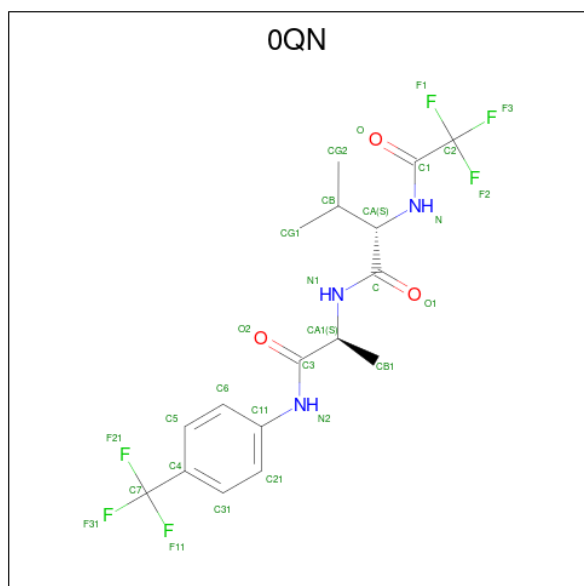
- Molecule 1 is a protein called ELASTASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	E	240	Total	C	N	O	S	0	1	0
			1829	1139	333	347	10			

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	81	ASN	ASP	conflict	UNP P00772

- Molecule 2 is N-(trifluoroacetyl)-L-valyl-N-[4-(trifluoromethyl)phenyl]-L-alaninamide (three-letter code: 0QN) (formula: C<sub>17</sub>H<sub>19</sub>F<sub>6</sub>N<sub>3</sub>O<sub>3</sub>).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	E	1	Total	C	F	N	O	0	0
			29	17	6	3	3		

- Molecule 3 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	E	1	Total	Ca	0	0
			1	1		

- Molecule 4 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	E	1	Total	O	S	0	0
			5	4	1		

- Molecule 5 is water.

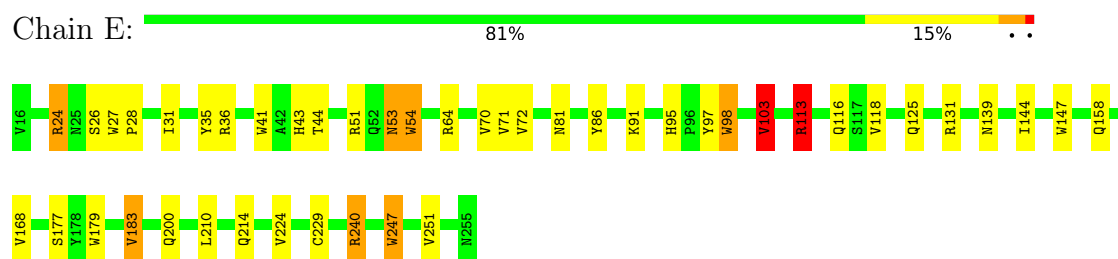
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	E	137	Total	O	0	0
			137	137		

### 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: ELASTASE



## 4 Data and refinement statistics

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, $\alpha$ , $\beta$ , $\gamma$	52.40 Å 57.60 Å 75.30 Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	10.00 – 2.00	Depositor
% Data completeness (in resolution range)	(Not available) (10.00-2.00)	Depositor
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
Refinement program	X-PLOR	Depositor
R, $R_{free}$	0.171 , (Not available)	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	2001	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	17.0	wwPDB-VP

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: SO4, 0QN, CA

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	E	0.88	0/1873	1.70	37/2557 (1.4%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	E	0	1

There are no bond length outliers.

All (37) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	240	ARG	NE-CZ-NH2	-24.20	108.20	120.30
1	E	240	ARG	NE-CZ-NH1	16.04	128.32	120.30
1	E	41	TRP	CD1-CG-CD2	10.03	114.33	106.30
1	E	240	ARG	CG-CD-NE	-10.00	90.80	111.80
1	E	27	TRP	CD1-CG-CD2	8.13	112.80	106.30
1	E	147	TRP	CD1-CG-CD2	8.09	112.78	106.30
1	E	41	TRP	CE2-CD2-CG	-7.83	101.03	107.30
1	E	27	TRP	CE2-CD2-CG	-7.56	101.25	107.30
1	E	24	ARG	NE-CZ-NH2	-7.25	116.67	120.30
1	E	147	TRP	CE2-CD2-CG	-6.87	101.81	107.30
1	E	103	VAL	CB-CA-C	-6.72	98.64	111.40
1	E	98	TRP	CE2-CD2-CG	-6.70	101.94	107.30
1	E	41	TRP	CG-CD1-NE1	-6.53	103.57	110.10
1	E	54	TRP	CD1-CG-CD2	6.50	111.50	106.30
1	E	27	TRP	CG-CD2-CE3	6.44	139.69	133.90
1	E	247	TRP	CE2-CD2-CG	-6.39	102.19	107.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	54	TRP	CE2-CD2-CG	-6.38	102.20	107.30
1	E	98	TRP	CD1-CG-CD2	6.37	111.39	106.30
1	E	247	TRP	CD1-CG-CD2	6.37	111.39	106.30
1	E	24	ARG	NE-CZ-NH1	6.28	123.44	120.30
1	E	247	TRP	CG-CD2-CE3	6.22	139.50	133.90
1	E	27	TRP	CB-CG-CD1	-6.16	118.99	127.00
1	E	179	TRP	CD1-CG-CD2	6.02	111.12	106.30
1	E	147	TRP	CG-CD1-NE1	-5.98	104.12	110.10
1	E	183	VAL	CA-CB-CG2	-5.63	102.46	110.90
1	E	51	ARG	NE-CZ-NH1	5.61	123.10	120.30
1	E	179	TRP	CE2-CD2-CG	-5.59	102.83	107.30
1	E	158	GLN	CA-CB-CG	5.54	125.59	113.40
1	E	131	ARG	NE-CZ-NH1	5.50	123.05	120.30
1	E	98	TRP	CB-CG-CD1	-5.44	119.93	127.00
1	E	64	ARG	CB-CG-CD	5.40	125.65	111.60
1	E	247	TRP	CG-CD1-NE1	-5.34	104.76	110.10
1	E	98	TRP	CG-CD2-CE3	5.30	138.67	133.90
1	E	147	TRP	CG-CD2-CE3	5.28	138.65	133.90
1	E	229	CYS	CA-CB-SG	-5.22	104.60	114.00
1	E	168	VAL	N-CA-C	-5.16	97.07	111.00
1	E	113	ARG	NE-CZ-NH1	5.03	122.81	120.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	E	240	ARG	Sidechain

## 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	E	1829	0	1768	21	0
2	E	29	0	19	3	0
3	E	1	0	0	0	0
4	E	5	0	0	0	0
5	E	137	0	0	6	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	2001	0	1787	23	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 6.

All (23) 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:E:95:HIS:HD2	1:E:97:TYR:H	1.37	0.70
1:E:24:ARG:HH22	1:E:81:ASN:HD22	1.47	0.62
1:E:54:TRP:CZ2	1:E:113:ARG:HG3	2.36	0.61
1:E:247:TRP:O	1:E:251:VAL:HG23	2.01	0.60
1:E:31:ILE:HD13	1:E:70:VAL:HG22	1.93	0.51
2:E:256:0QN:HA	5:E:666:HOH:O	2.10	0.49
1:E:54:TRP:CH2	1:E:113:ARG:HG3	2.47	0.49
1:E:118:VAL:HG12	5:E:538:HOH:O	2.12	0.49
2:E:256:0QN:H6	2:E:256:0QN:O2	2.13	0.48
1:E:53:ASN:HD22	1:E:53:ASN:H	1.62	0.47
1:E:28:PRO:HG2	1:E:125:GLN:HB2	1.97	0.47
1:E:31:ILE:HG22	1:E:72:VAL:HG12	1.97	0.47
1:E:43:HIS:HE1	5:E:315:HOH:O	1.99	0.45
1:E:35:TYR:CD1	1:E:44:THR:HB	2.53	0.44
1:E:144:ILE:HG12	5:E:621:HOH:O	2.17	0.44
1:E:53:ASN:HB2	5:E:623:HOH:O	2.18	0.43
1:E:224:VAL:O	2:E:256:0QN:H2	2.18	0.43
1:E:24:ARG:HH22	1:E:81:ASN:ND2	2.13	0.42
1:E:91:LYS:HB3	1:E:113:ARG:HB2	2.02	0.42
1:E:98:TRP:HH2	1:E:103:VAL:HG13	1.84	0.42
1:E:116:GLN:HG3	5:E:627:HOH:O	2.19	0.41
1:E:24:ARG:NH2	1:E:81:ASN:HB3	2.36	0.41
1:E:71:VAL:HG22	1:E:86:TYR:CD1	2.56	0.40

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	E	239/240 (100%)	228 (95%)	11 (5%)	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	E	199/198 (100%)	188 (94%)	11 (6%)	21	17

All (11) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	E	26	SER
1	E	36	ARG
1	E	53	ASN
1	E	103	VAL
1	E	113	ARG
1	E	139	ASN
1	E	177	SER
1	E	183	VAL
1	E	200	GLN
1	E	210	LEU
1	E	214	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	E	53	ASN
1	E	81	ASN
1	E	95	HIS
1	E	214	GLN

### 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 ⓘ

There are no monosaccharides in this entry.

## 5.6 Ligand geometry ⓘ

Of 3 ligands modelled in this entry, 1 is monoatomic - leaving 2 for Mogul analysis.

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	0QN	E	256	-	29,29,29	1.18	2 (6%)	43,43,43	1.41	8 (18%)
4	SO4	E	290	-	4,4,4	0.44	0	6,6,6	0.29	0

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	0QN	E	256	-	-	6/36/36/36	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	E	256	0QN	C7-C4	4.00	1.58	1.49
2	E	256	0QN	C11-N2	-2.82	1.35	1.41

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	256	0QN	CA1-C3-N2	-3.87	107.57	115.00
2	E	256	0QN	CB-CA-N	-3.25	103.39	111.43
2	E	256	0QN	O2-C3-N2	2.95	130.26	123.93
2	E	256	0QN	F11-C7-C4	2.93	119.37	112.93
2	E	256	0QN	CB-CA-C	2.92	118.66	111.38
2	E	256	0QN	C3-CA1-N1	-2.44	105.56	111.60
2	E	256	0QN	O-C1-C2	2.04	122.27	118.31
2	E	256	0QN	F21-C7-C4	-2.02	108.49	112.93

There are no chirality outliers.

All (6) torsion outliers are listed below:

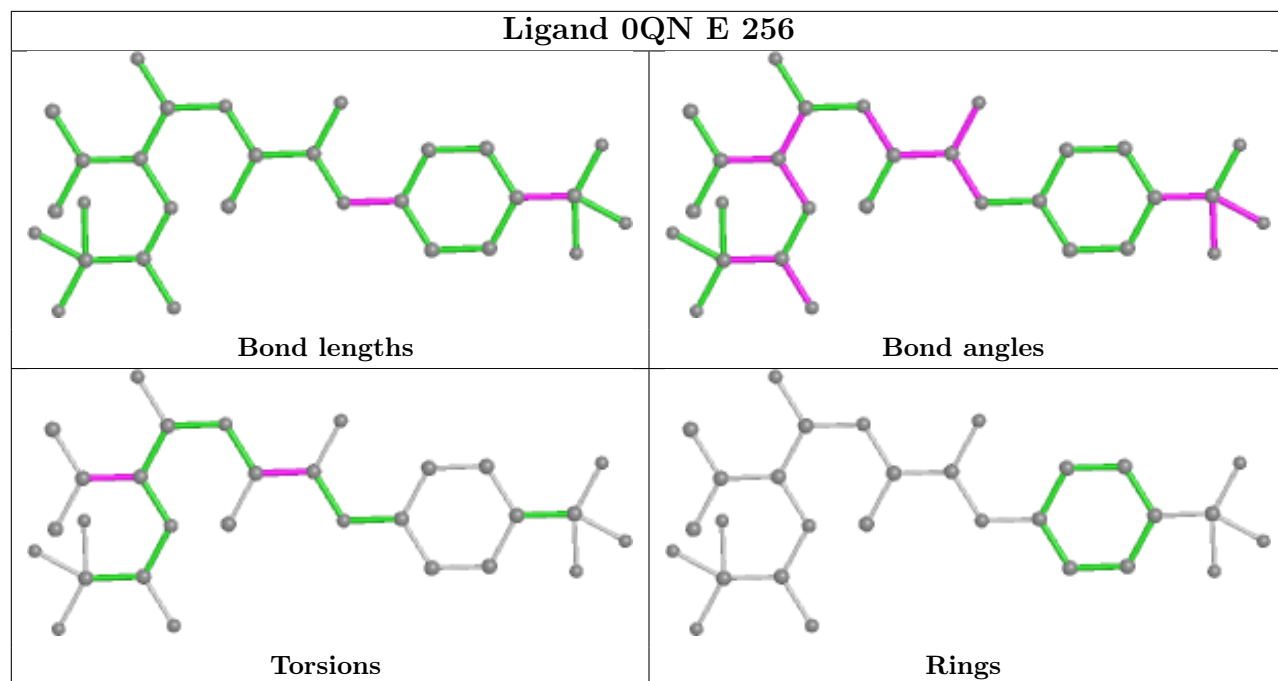
Mol	Chain	Res	Type	Atoms
2	E	256	0QN	C-CA-CB-CG2
2	E	256	0QN	N2-C3-CA1-N1
2	E	256	0QN	N-CA-CB-CG2
2	E	256	0QN	O2-C3-CA1-N1
2	E	256	0QN	N-CA-CB-CG1
2	E	256	0QN	C-CA-CB-CG1

There are no ring outliers.

1 monomer is involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	E	256	0QN	3	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 than 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.



## 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.