



# Full wwPDB X-ray Structure Validation Report ⓘ

Jan 6, 2024 – 08:05 pm GMT

PDB ID : 5NO1  
Title : Crystal structure of the Prototype Foamy Virus (PFV) intasome in complex with magnesium and the INSTI XZ407 (compound 5g)  
Authors : Pye, V.E.; Cherepanov, P.  
Deposited on : 2017-04-10  
Resolution : 2.60 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 : 1.8.4, CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.36  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36

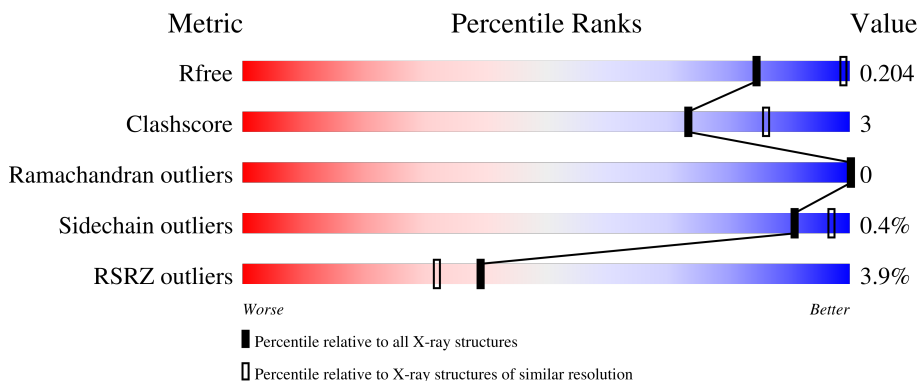
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.60 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))
$R_{free}$	130704	3163 (2.60-2.60)
Clashscore	141614	3518 (2.60-2.60)
Ramachandran outliers	138981	3455 (2.60-2.60)
Sidechain outliers	138945	3455 (2.60-2.60)
RSRZ outliers	127900	3104 (2.60-2.60)

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  $\leq 5\%$ . 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	395	<div style="display: flex; align-items: center;"> <div style="width: 2%; height: 10px; background-color: red; margin-right: 2px;"></div> <div style="width: 85%; height: 10px; background-color: green; margin-right: 2px;"></div> <div style="width: 8%; height: 10px; background-color: yellow; margin-right: 2px;"></div> <div style="width: 7%; height: 10px; background-color: grey;"></div> </div> <p style="margin-left: 20px;">2%      85%      8%      7%</p>
1	B	395	<div style="display: flex; align-items: center;"> <div style="width: 4%; height: 10px; background-color: red; margin-right: 2px;"></div> <div style="width: 39%; height: 10px; background-color: green; margin-right: 2px;"></div> <div style="width: 7%; height: 10px; background-color: yellow; margin-right: 2px;"></div> <div style="width: 54%; height: 10px; background-color: grey;"></div> </div> <p style="margin-left: 20px;">4%      39%      7%      54%</p>
2	C	19	<div style="display: flex; align-items: center;"> <div style="width: 84%; height: 10px; background-color: green; margin-right: 2px;"></div> <div style="width: 16%; height: 10px; background-color: yellow;"></div> </div> <p style="margin-left: 20px;">84%      16%</p>
3	D	17	<div style="display: flex; align-items: center;"> <div style="width: 94%; height: 10px; background-color: green; margin-right: 2px;"></div> <div style="width: 6%; height: 10px; background-color: yellow;"></div> </div> <p style="margin-left: 20px;">94%      6%</p>

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:

<b>Mol</b>	<b>Type</b>	<b>Chain</b>	<b>Res</b>	<b>Chirality</b>	<b>Geometry</b>	<b>Clashes</b>	<b>Electron density</b>
10	HEZ	A	416	-	-	-	X

## 2 Entry composition i

There are 11 unique types of molecules in this entry. The entry contains 5370 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 Integrase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	367	Total 2946	C 1888	N 521	O 533	S 4	0	2	0
1	B	182	Total 1451	C 942	N 237	O 271	S 1	0	0	0

There are 14 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	GLY	-	expression tag	UNP P14350
A	-1	PRO	-	expression tag	UNP P14350
A	0	GLY	-	expression tag	UNP P14350
A	1	CYS	-	expression tag	UNP P14350
A	2	ASN	-	expression tag	UNP P14350
A	217	SER	GLY	variant	UNP P14350
A	218	GLY	SER	variant	UNP P14350
B	-2	GLY	-	expression tag	UNP P14350
B	-1	PRO	-	expression tag	UNP P14350
B	0	GLY	-	expression tag	UNP P14350
B	1	CYS	-	expression tag	UNP P14350
B	2	ASN	-	expression tag	UNP P14350
B	217	SER	GLY	variant	UNP P14350
B	218	GLY	SER	variant	UNP P14350

- Molecule 2 is a DNA chain called DNA (5'-D(\*AP\*TP\*TP\*GP\*TP\*CP\*AP\*TP\*GP\*GP\*AP\*AP\*TP\*TP\*TP\*CP\*GP\*CP\*A)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
2	C	19	Total 387	C 187	N 68	O 114	P 18	0	0	0

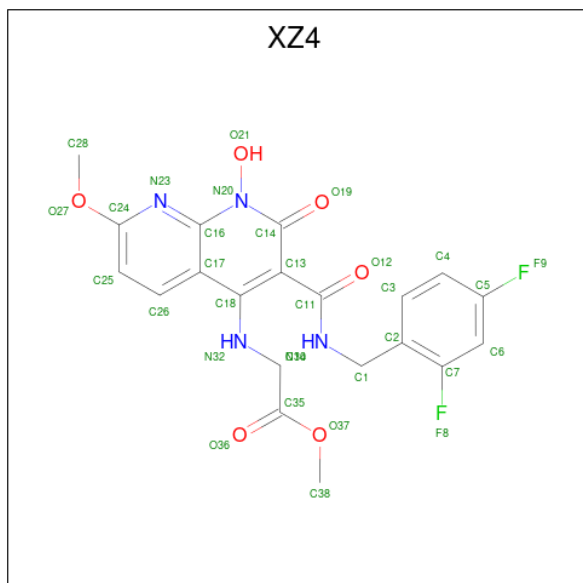
- Molecule 3 is a DNA chain called DNA (5'-D(\*TP\*GP\*CP\*GP\*AP\*AP\*AP\*TP\*TP\*CP\*CP\*AP\*TP\*GP\*AP\*CP\*A)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
3	D	17	345	166	65	98	16	0	0	0

- Molecule 4 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Mg		
4	A	2	2	2	0	0
4	B	1	1	1	0	0

- Molecule 5 is methyl 2-[[3-[[2,4-bis(fluoranyl)phenyl]methylcarbamoyl]-7-methoxy-1-oxidany-1-2-oxidanylidene-1,8-naphthyridin-4-yl]amino]ethanoate (three-letter code: XZ4) (formula: C<sub>20</sub>H<sub>18</sub>F<sub>2</sub>N<sub>4</sub>O<sub>6</sub>).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	F	N	O		
5	A	1	32	20	2	4	6	0	0

- Molecule 6 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Zn		
6	A	1	1	1	0	0

- Molecule 7 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	A	1	Total	O	S	0	0
			5	4	1		
7	A	1	Total	O	S	0	0
			5	4	1		
7	A	1	Total	O	S	0	0
			5	4	1		
7	A	1	Total	O	S	0	0
			5	4	1		
7	A	1	Total	O	S	0	0
			5	4	1		
7	B	1	Total	O	S	0	0
			5	4	1		
7	D	1	Total	O	S	0	0
			5	4	1		

- Molecule 8 is GLYCEROL (three-letter code: GOL) (formula: C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>).



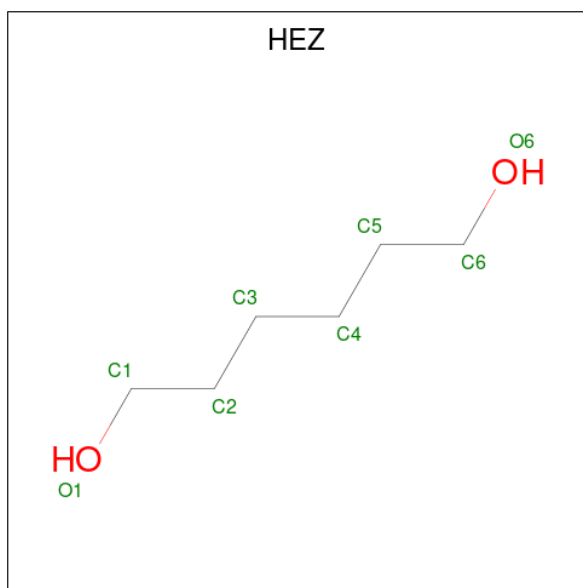
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	A	1	Total	C	O	0	0
			6	3	3		
8	A	1	Total	C	O	0	0
			6	3	3		
8	A	1	Total	C	O	0	0
			6	3	3		
8	A	1	Total	C	O	0	0
			6	3	3		
8	B	1	Total	C	O	0	0
			6	3	3		
8	C	1	Total	C	O	0	0
			6	3	3		

- Molecule 9 is 2-(N-MORPHOLINO)-ETHANESULFONIC ACID (three-letter code: MES) (formula: C<sub>6</sub>H<sub>13</sub>NO<sub>4</sub>S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	S		
9	A	1	12	6	1	4	1	0	0

- Molecule 10 is HEXANE-1,6-DIOL (three-letter code: HEZ) (formula: C<sub>6</sub>H<sub>14</sub>O<sub>2</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
10	A	1	8	6	2	0	0

- Molecule 11 is water.

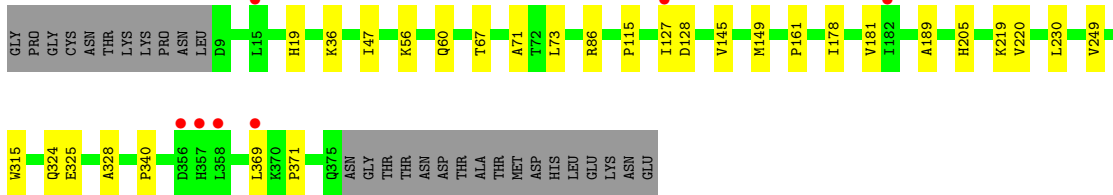
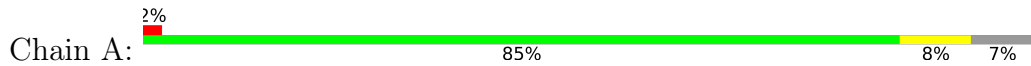


<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>		<b>ZeroOcc</b>	<b>AltConf</b>
11	A	63	Total 63	O 63	0	0
11	B	21	Total 21	O 21	0	0
11	C	16	Total 16	O 16	0	0
11	D	9	Total 9	O 9	0	0

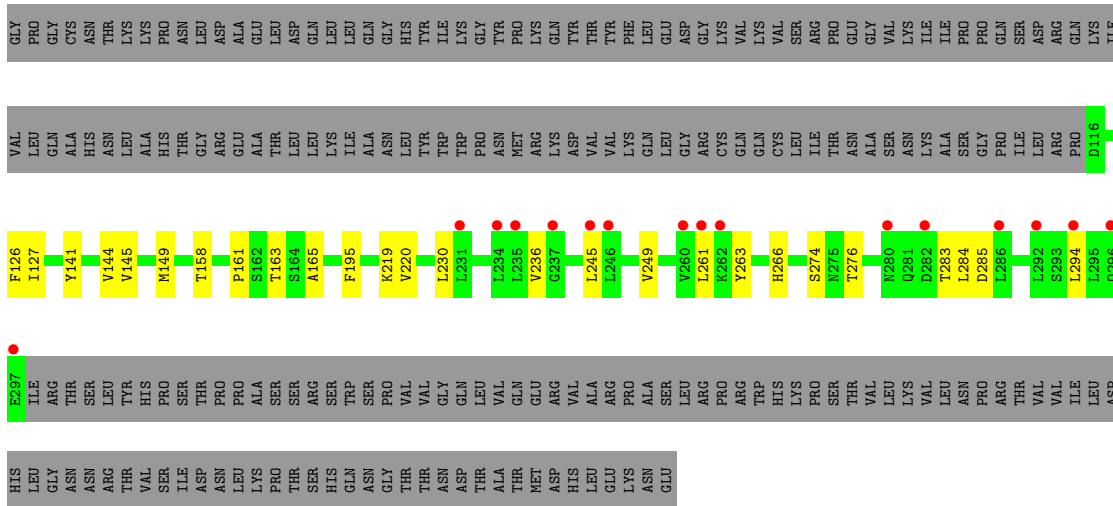
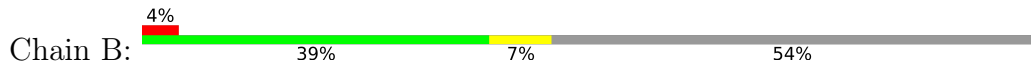
### 3 Residue-property plots

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.

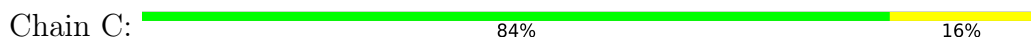
- Molecule 1: Integrase



- Molecule 1: Integrase



- Molecule 2: DNA (5'-D(\*AP\*TP\*TP\*GP\*TP\*CP\*AP\*TP\*GP\*GP\*AP\*AP\*TP\*TP\*TP\*CP\*GP\*CP\*A)-3')



- Molecule 3: DNA (5'-D(\*TP\*GP\*CP\*GP\*AP\*AP\*AP\*TP\*TP\*CP\*CP\*AP\*TP\*GP\*AP\*CP\*A)-3')

Chain D:  94% 6%



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	158.57Å 158.57Å 123.06Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	56.06 – 2.60 79.28 – 2.60	Depositor EDS
% Data completeness (in resolution range)	99.9 (56.06-2.60) 99.9 (79.28-2.60)	Depositor EDS
$R_{merge}$	0.03	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.57 (at 2.62Å)	Xtrriage
Refinement program	PHENIX (1.10.1_2155: ???)	Depositor
R, $R_{free}$	0.176 , 0.204 0.177 , 0.204	Depositor DCC
$R_{free}$ test set	2439 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	75.3	Xtrriage
Anisotropy	0.270	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 51.3	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	5370	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	84.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.43% 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: MG, XZ4, GOL, MES, HEZ, SO4, ZN

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	0.33	0/3028	0.49	0/4128
1	B	0.31	0/1492	0.45	0/2037
2	C	0.87	0/433	0.98	0/667
3	D	0.75	0/387	0.91	0/595
All	All	0.44	0/5340	0.58	0/7427

There are no bond length outliers.

There are no bond angle outliers.

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	2946	0	2996	17	0
1	B	1451	0	1454	15	0
2	C	387	0	218	2	0
3	D	345	0	193	1	0
4	A	2	0	0	0	0
4	B	1	0	0	0	0
5	A	32	0	0	1	0
6	A	1	0	0	0	0
7	A	30	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	B	5	0	0	0	0
7	D	5	0	0	0	0
8	A	24	0	32	2	0
8	B	6	0	8	0	0
8	C	6	0	8	0	0
9	A	12	0	12	0	0
10	A	8	0	14	1	0
11	A	63	0	0	1	0
11	B	21	0	0	0	0
11	C	16	0	0	0	0
11	D	9	0	0	0	0
All	All	5370	0	4935	34	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 3.

All (34) 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)
3:D:17:DA:H2'	3:D:17:DA:N3	2.15	0.62
1:A:19:HIS:HA	8:A:414:GOL:H31	1.84	0.59
1:A:67:THR:HB	1:A:71:ALA:HB3	1.87	0.55
1:A:219:LYS:NZ	11:A:507:HOH:O	2.40	0.55
1:A:328:ALA:H	10:A:416:HEZ:H12	1.70	0.55
1:A:36:LYS:HD3	1:A:47:ILE:HD13	1.91	0.53
1:B:127:ILE:HG22	1:B:145:VAL:HG22	1.91	0.53
1:B:127:ILE:HA	1:B:144:VAL:O	2.09	0.52
5:A:403:XZ4:N10	5:A:403:XZ4:O19	2.43	0.52
1:A:128:ASP:HB3	1:A:220:VAL:HG11	1.92	0.51
1:A:161:PRO:O	1:A:189:ALA:HB2	2.10	0.51
1:A:73:LEU:HD22	1:A:86:ARG:CZ	2.41	0.50
1:B:141:TYR:CE1	1:B:161:PRO:HD3	2.45	0.50
1:B:283:THR:C	1:B:285:ASP:H	2.16	0.48
2:C:16:DC:H2''	2:C:17:DG:C8	2.48	0.48
1:A:56:LYS:HE2	1:A:60:GLN:NE2	2.30	0.47
1:A:324:GLN:HG2	1:A:340:PRO:HA	1.96	0.47
1:A:178:ILE:HG13	1:B:276:THR:HG21	1.96	0.47
1:B:158:THR:HB	1:B:165:ALA:HB1	1.97	0.46
1:A:127:ILE:HG22	1:A:145:VAL:HG13	1.98	0.46
1:B:219:LYS:HE2	1:B:261:LEU:HD12	1.98	0.46
8:A:413:GOL:H32	1:B:263:TYR:CE1	2.51	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:236:VAL:HG12	1:B:294:LEU:HD13	1.97	0.45
1:B:126:PHE:CD1	1:B:220:VAL:HG21	2.52	0.45
1:A:315:TRP:CE2	1:A:371:PRO:HD3	2.54	0.43
1:B:230:LEU:HD23	1:B:249:VAL:HG13	2.00	0.43
1:A:115:PRO:HB3	2:C:3:DT:C2	2.54	0.43
1:A:325:GLU:HA	1:A:369:LEU:HD23	2.00	0.43
1:A:181:VAL:HG22	1:A:205:HIS:HB3	2.01	0.42
1:B:163:THR:HG23	1:B:195:PHE:HB2	2.02	0.42
1:B:266:HIS:CD2	1:B:274:SER:HB2	2.54	0.42
1:A:230:LEU:HD23	1:A:249:VAL:HG13	2.02	0.42
1:B:245:LEU:HD23	1:B:245:LEU:HA	1.91	0.41
1:B:284:LEU:HD12	1:B:284:LEU:HA	1.91	0.41

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	367/395 (93%)	359 (98%)	8 (2%)	0	100	100
1	B	180/395 (46%)	175 (97%)	5 (3%)	0	100	100
All	All	547/790 (69%)	534 (98%)	13 (2%)	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	332/354 (94%)	331 (100%)	1 (0%)	92	98
1	B	164/354 (46%)	163 (99%)	1 (1%)	86	95
All	All	496/708 (70%)	494 (100%)	2 (0%)	91	97

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	149	MET
1	B	149	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	266	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 monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 21 ligands modelled in this entry, 4 are monoatomic - leaving 17 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$
8	GOL	A	414	-	5,5,5	0.33	0	5,5,5	0.41	0
8	GOL	A	413	-	5,5,5	0.40	0	5,5,5	0.30	0
8	GOL	C	101	-	5,5,5	0.29	0	5,5,5	0.90	0
7	SO4	A	409	-	4,4,4	0.14	0	6,6,6	0.06	0
7	SO4	A	408	-	4,4,4	0.15	0	6,6,6	0.07	0
7	SO4	A	407	-	4,4,4	0.15	0	6,6,6	0.09	0
7	SO4	A	406	-	4,4,4	0.14	0	6,6,6	0.11	0
7	SO4	D	101	-	4,4,4	0.16	0	6,6,6	0.06	0
8	GOL	B	403	-	5,5,5	0.38	0	5,5,5	0.18	0
7	SO4	A	405	-	4,4,4	0.14	0	6,6,6	0.09	0
7	SO4	B	402	-	4,4,4	0.15	0	6,6,6	0.09	0
9	MES	A	415	-	12,12,12	2.25	1 (8%)	14,16,16	2.00	6 (42%)
8	GOL	A	411	-	5,5,5	0.37	0	5,5,5	0.29	0
10	HEZ	A	416	-	7,7,7	0.40	0	6,6,6	0.63	0
7	SO4	A	410	-	4,4,4	0.17	0	6,6,6	0.10	0
5	XZ4	A	403	4	34,34,34	0.92	1 (2%)	37,48,48	1.51	5 (13%)
8	GOL	A	412	-	5,5,5	0.38	0	5,5,5	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
8	GOL	A	414	-	-	2/4/4/4	-
8	GOL	A	413	-	-	2/4/4/4	-
8	GOL	C	101	-	-	2/4/4/4	-
8	GOL	B	403	-	-	1/4/4/4	-
9	MES	A	415	-	-	4/6/14/14	0/1/1/1
8	GOL	A	411	-	-	2/4/4/4	-
10	HEZ	A	416	-	-	2/5/5/5	-
5	XZ4	A	403	4	-	8/18/18/18	0/3/3/3
8	GOL	A	412	-	-	0/4/4/4	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	A	415	MES	C8-S	-7.51	1.66	1.77
5	A	403	XZ4	F8-C7	-3.56	1.26	1.35

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	403	XZ4	C16-N20-C14	-5.32	122.06	126.66
9	A	415	MES	C5-N4-C3	4.47	118.89	108.83
9	A	415	MES	C7-N4-C3	2.59	117.87	111.23
5	A	403	XZ4	C14-C13-C11	-2.55	118.57	121.51
5	A	403	XZ4	C1-N10-C11	-2.52	118.70	122.08
9	A	415	MES	O3S-S-C8	2.48	109.78	105.77
5	A	403	XZ4	C17-C16-N23	-2.29	121.94	124.08
9	A	415	MES	C7-N4-C5	2.17	116.78	111.23
9	A	415	MES	O1S-S-C8	2.16	109.52	106.92
5	A	403	XZ4	O37-C35-C34	2.05	114.86	110.60
9	A	415	MES	O2S-S-C8	2.01	109.34	106.92

There are no chirality outliers.

All (23) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	403	XZ4	C13-C18-N32-C34
5	A	403	XZ4	N32-C34-C35-O37
5	A	403	XZ4	C34-C35-O37-C38
8	A	411	GOL	O1-C1-C2-C3
8	A	413	GOL	O1-C1-C2-C3
8	A	414	GOL	O1-C1-C2-C3
8	C	101	GOL	O1-C1-C2-C3
9	A	415	MES	N4-C7-C8-S
9	A	415	MES	C7-C8-S-O2S
5	A	403	XZ4	O36-C35-O37-C38
5	A	403	XZ4	N32-C34-C35-O36
5	A	403	XZ4	N23-C24-O27-C28
5	A	403	XZ4	C25-C24-O27-C28
5	A	403	XZ4	C17-C18-N32-C34
8	A	413	GOL	O1-C1-C2-O2
8	A	414	GOL	O1-C1-C2-O2
8	C	101	GOL	O1-C1-C2-O2
10	A	416	HEZ	C3-C4-C5-C6
8	A	411	GOL	O1-C1-C2-O2
9	A	415	MES	C7-C8-S-O1S

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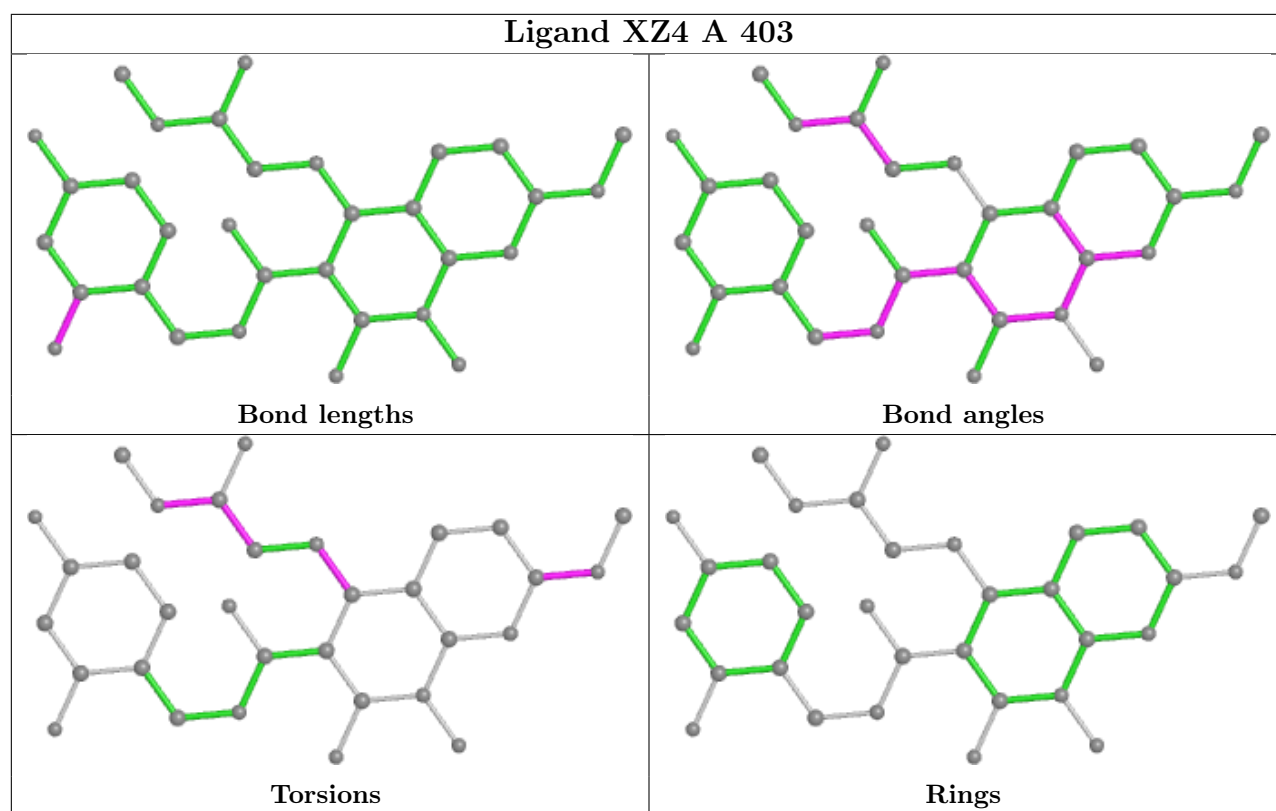
Mol	Chain	Res	Type	Atoms
9	A	415	MES	C8-C7-N4-C3
8	B	403	GOL	O1-C1-C2-C3
10	A	416	HEZ	C2-C3-C4-C5

There are no ring outliers.

4 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	A	414	GOL	1	0
8	A	413	GOL	1	0
10	A	416	HEZ	1	0
5	A	403	XZ4	1	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

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	367/395 (92%)	0.63	7 (1%) 66 62	58, 74, 114, 148	0
1	B	182/395 (46%)	0.85	16 (8%) 10 7	64, 83, 149, 177	0
2	C	19/19 (100%)	0.42	0 100 100	62, 79, 102, 130	0
3	D	17/17 (100%)	0.42	0 100 100	70, 74, 113, 140	0
All	All	585/826 (70%)	0.69	23 (3%) 39 32	58, 76, 130, 177	0

All (23) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	237	GLY	5.3
1	B	294	LEU	4.9
1	B	292	LEU	4.8
1	B	286	LEU	4.4
1	A	358	LEU	4.3
1	A	357	HIS	3.6
1	B	296	GLN	3.4
1	B	297	GLU	3.3
1	B	282	ASP	3.0
1	B	235	LEU	2.8
1	B	262	LYS	2.7
1	A	182	ILE	2.7
1	B	234	LEU	2.7
1	A	356	ASP	2.6
1	B	260	VAL	2.5
1	B	246	LEU	2.4
1	B	231	LEU	2.3
1	B	280	ASN	2.3
1	A	15	LEU	2.3
1	B	261	LEU	2.3
1	A	127	ILE	2.2

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Mol	Chain	Res	Type	RSRZ
1	A	369	LEU	2.1
1	B	245	LEU	2.1

## 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](#)

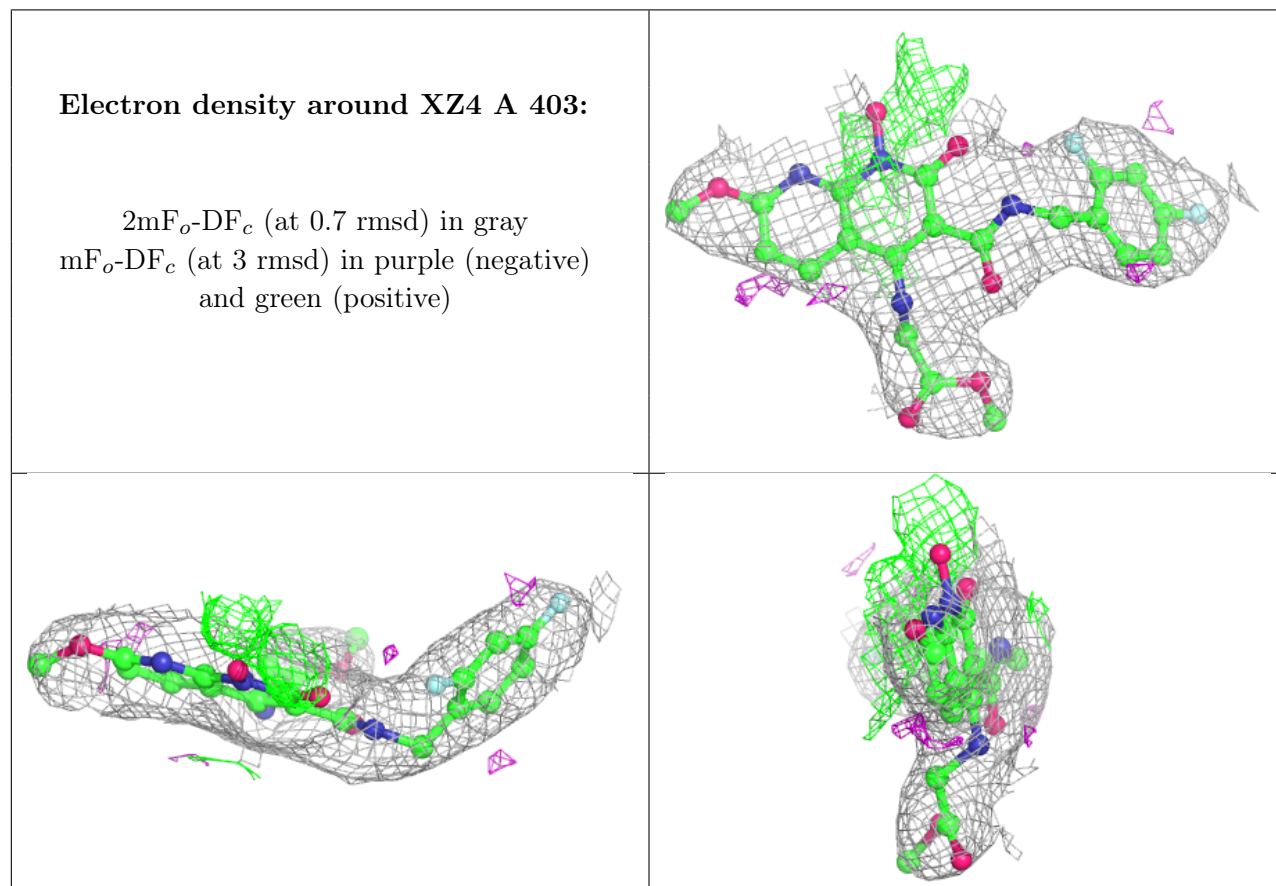
There are no monosaccharides in this entry.

## 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, 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	B-factors(Å <sup>2</sup> )	Q<0.9
10	HEZ	A	416	8/8	0.57	0.48	98,101,107,115	0
8	GOL	A	414	6/6	0.68	0.20	110,117,132,143	0
8	GOL	B	403	6/6	0.76	0.23	92,104,117,120	0
7	SO4	A	406	5/5	0.77	0.25	147,160,168,170	0
9	MES	A	415	12/12	0.81	0.47	123,139,177,187	0
8	GOL	A	412	6/6	0.83	0.27	98,100,118,118	0
7	SO4	A	409	5/5	0.84	0.30	161,163,168,171	0
7	SO4	A	405	5/5	0.87	0.31	136,138,149,152	0
8	GOL	A	411	6/6	0.88	0.44	95,103,106,113	0
7	SO4	A	408	5/5	0.88	0.47	177,178,183,188	0
7	SO4	D	101	5/5	0.89	0.44	164,179,182,185	0
4	MG	B	401	1/1	0.91	0.09	168,168,168,168	0
8	GOL	C	101	6/6	0.92	0.40	82,91,101,110	0
7	SO4	B	402	5/5	0.93	0.25	136,136,140,153	0
8	GOL	A	413	6/6	0.94	0.45	73,92,97,107	0
7	SO4	A	407	5/5	0.94	0.13	122,138,140,148	0
7	SO4	A	410	5/5	0.95	0.26	116,123,142,142	0
5	XZ4	A	403	32/32	0.97	0.24	58,78,91,114	0
4	MG	A	402	1/1	0.98	0.13	61,61,61,61	0
4	MG	A	401	1/1	0.99	0.19	58,58,58,58	0
6	ZN	A	404	1/1	1.00	0.29	76,76,76,76	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.



## 6.5 Other polymers [i](#)

There are no such residues in this entry.