



wwPDB X-ray Structure Validation Summary Report ⓘ

May 15, 2020 – 11:11 am BST

PDB ID : 6BQT
Title : Complex of 14-3-3 theta with an IRSp53 peptide doubly-phosphorylated at T340 and T360
Authors : Kast, D.J.; Dominguez, R.
Deposited on : 2017-11-28
Resolution : 2.80 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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 ⓘ symbol.

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)
Xtriage (Phenix) : 1.13
EDS : 2.11
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) : 2.11

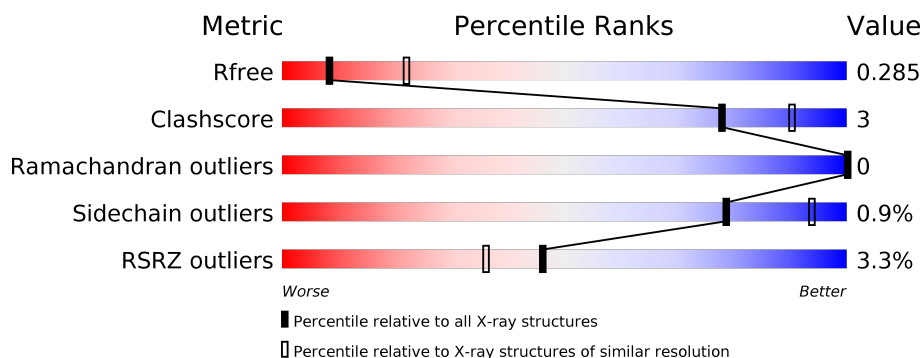
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.80 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	3140 (2.80-2.80)
Clashscore	141614	3569 (2.80-2.80)
Ramachandran outliers	138981	3498 (2.80-2.80)
Sidechain outliers	138945	3500 (2.80-2.80)
RSRZ outliers	127900	3078 (2.80-2.80)

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 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	245	<div> <div>0%</div> <div> <div></div> <div>88%</div> <div>6%</div> <div>6%</div> </div> </div>
1	B	245	<div> <div></div> <div> <div></div> <div>87%</div> <div>6%</div> <div>7%</div> </div> </div>
1	D	245	<div> <div>3%</div> <div> <div></div> <div>89%</div> <div>5%</div> <div>6%</div> </div> </div>
1	E	245	<div> <div>3%</div> <div> <div></div> <div>87%</div> <div>7%</div> <div>6%</div> </div> </div>
1	G	245	<div> <div>2%</div> <div> <div></div> <div>86%</div> <div>8%</div> <div>6%</div> </div> </div>
1	H	245	<div> <div>7%</div> <div> <div></div> <div>85%</div> <div>7%</div> <div>8%</div> </div> </div>

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
1	J	245	
1	K	245	
2	C	32	
2	F	32	
2	I	32	
2	L	32	

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
9	PEG	E	302	-	-	-	X

2 Entry composition

There are 10 unique types of molecules in this entry. The entry contains 31276 atoms, of which 15611 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.

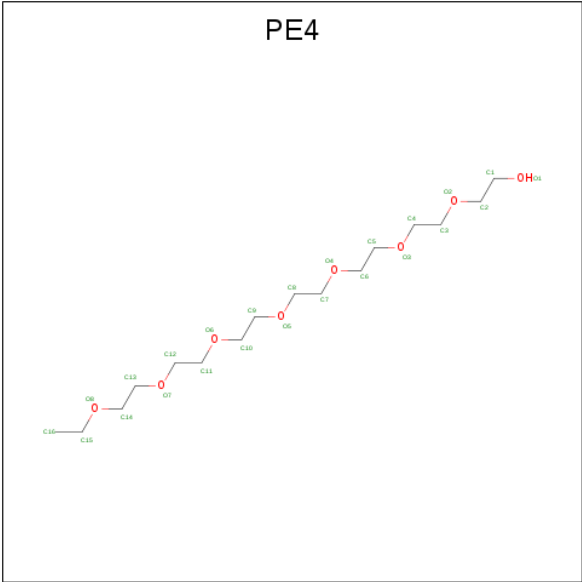
- Molecule 1 is a protein called 14-3-3 protein theta.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	230	Total	C	H	N	O	S	0	2	0
			3711	1166	1855	307	373	10			
1	B	227	Total	C	H	N	O	S	0	3	0
			3679	1156	1839	307	367	10			
1	D	230	Total	C	H	N	O	S	0	1	0
			3708	1163	1856	310	369	10			
1	E	230	Total	C	H	N	O	S	0	2	0
			3702	1162	1850	309	371	10			
1	G	230	Total	C	H	N	O	S	0	5	0
			3746	1174	1873	314	375	10			
1	H	225	Total	C	H	N	O	S	0	0	0
			3614	1136	1809	301	358	10			
1	J	230	Total	C	H	N	O	S	0	0	0
			3687	1158	1843	307	369	10			
1	K	227	Total	C	H	N	O	S	0	1	0
			3662	1152	1828	306	368	8			

- Molecule 2 is a protein called Insulin receptor substrate protein of 53 kDa, peptide (IRSp53).

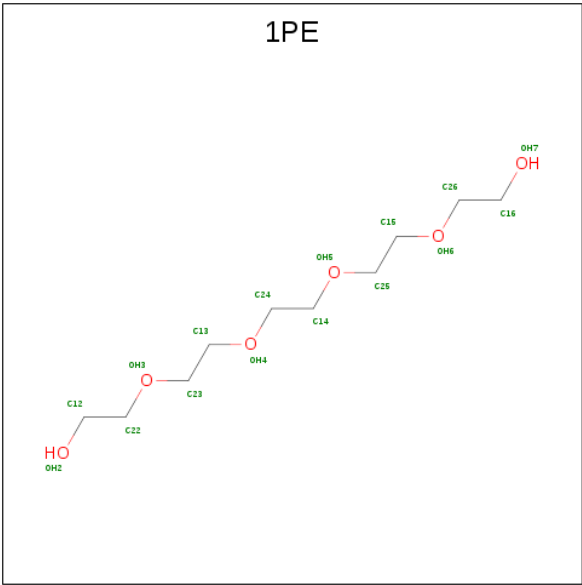
Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
2	C	18	Total	C	H	N	O	P	0	0	0
			301	90	147	28	34	2			
2	F	18	Total	C	H	N	O	P	0	0	0
			301	90	147	28	34	2			
2	I	17	Total	C	H	N	O	P	0	0	0
			290	87	142	27	32	2			
2	L	17	Total	C	H	N	O	P	0	0	0
			290	87	142	27	32	2			

- Molecule 3 is 2-{2-[2-(2-{2-[2-(2-ETHOXY-ETHOXY)-ETHOXY]-ETHOXY}-ETHOXY)-ETHOXY]-ETHOXY}-ETHANOL (three-letter code: PE4) (formula: C₁₆H₃₄O₈).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	H	O	0	0
			58	16	34	8		

- Molecule 4 is PENTAETHYLENE GLYCOL (three-letter code: 1PE) (formula: C₁₀H₂₂O₆).



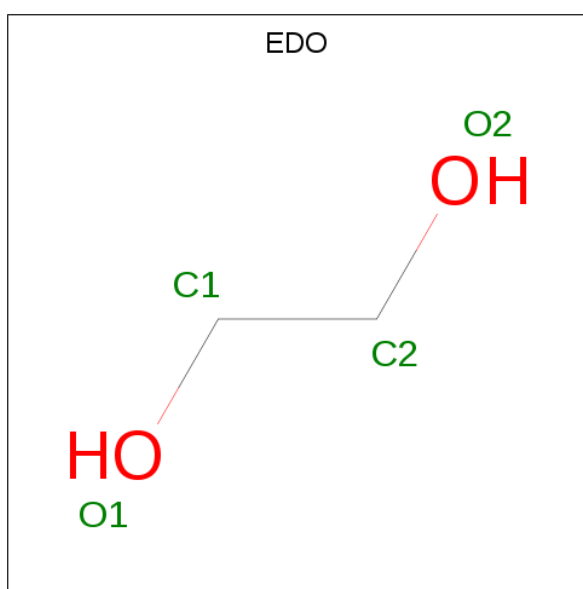
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	H	O	0	0
			37	10	21	6		
4	A	1	Total	C	H	O	0	0
			37	10	21	6		
4	B	1	Total	C	H	O	0	0
			37	10	21	6		

Continued on next page...

Continued from previous page...

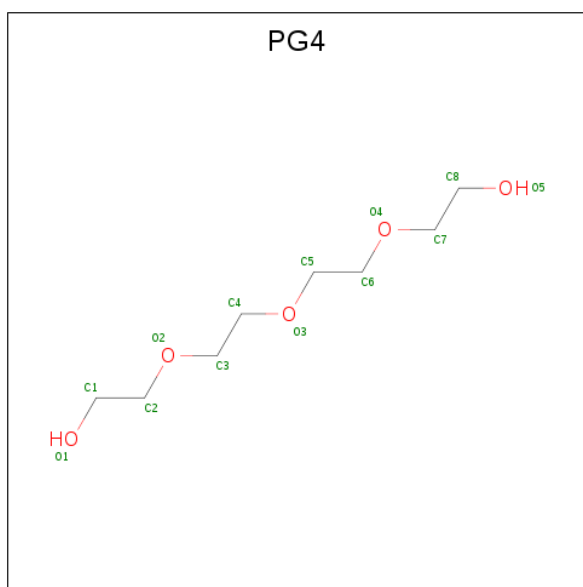
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	G	1	Total	C	H	O	0	0
			37	10	21	6		
4	H	1	Total	C	H	O	0	0
			37	10	21	6		
4	J	1	Total	C	H	O	0	0
			37	10	21	6		
4	J	1	Total	C	H	O	0	0
			37	10	21	6		

- Molecule 5 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: $C_2H_6O_2$).



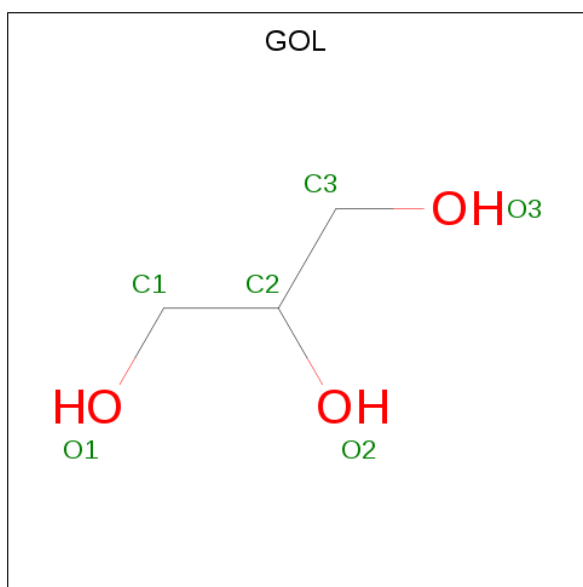
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	B	1	Total	C	H	O	0	0
			9	2	5	2		
5	D	1	Total	C	H	O	0	0
			9	2	5	2		

- Molecule 6 is TETRAETHYLENE GLYCOL (three-letter code: PG4) (formula: $C_8H_{18}O_5$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	B	1	Total	C	H	O	0	0
			30	8	17	5		
6	D	1	Total	C	H	O	0	0
			30	8	17	5		
6	E	1	Total	C	H	O	0	0
			30	8	17	5		

- Molecule 7 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



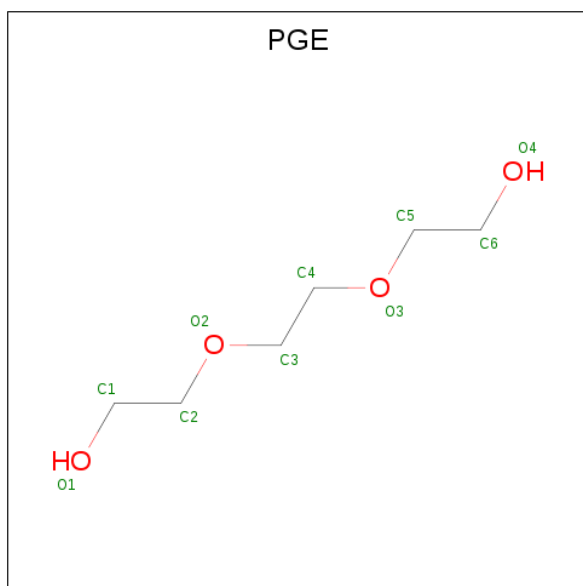
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
7	B	1	Total	C	H	O	0	0
			14	3	8	3		

Continued on next page...

Continued from previous page...

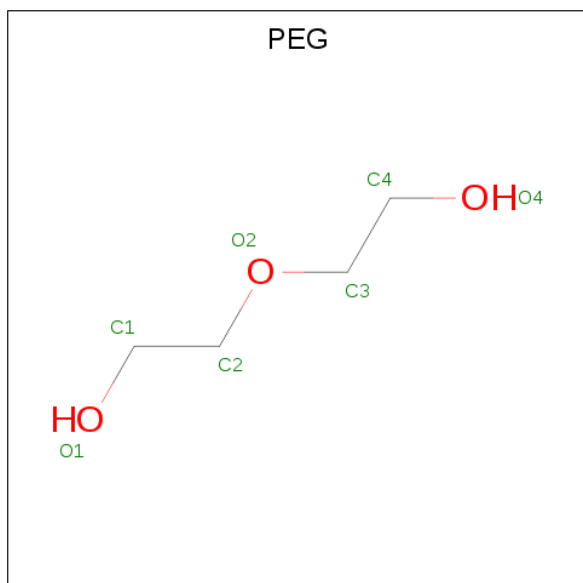
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
7	I	1	Total	C	H	O	0	0
			14	3	8	3		

- Molecule 8 is TRIETHYLENE GLYCOL (three-letter code: PGE) (formula: $C_6H_{14}O_4$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
8	E	1	Total	C	H	O	0	0
			23	6	13	4		

- Molecule 9 is DI(HYDROXYETHYL)ETHER (three-letter code: PEG) (formula: $C_4H_{10}O_3$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
9	E	1	Total	C	H	O	0	0
			16	4	9	3		

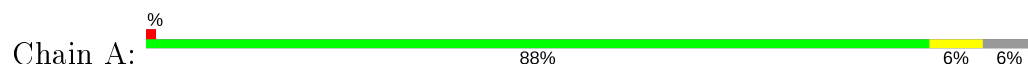
- Molecule 10 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	A	17	Total	O	0	0
			17	17		
10	B	21	Total	O	0	0
			21	21		
10	C	5	Total	O	0	0
			5	5		
10	D	10	Total	O	0	0
			10	10		
10	E	12	Total	O	0	0
			12	12		
10	F	8	Total	O	0	0
			8	8		
10	G	7	Total	O	0	0
			7	7		
10	H	4	Total	O	0	0
			4	4		
10	I	3	Total	O	0	0
			3	3		
10	J	6	Total	O	0	0
			6	6		

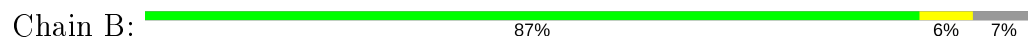
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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.

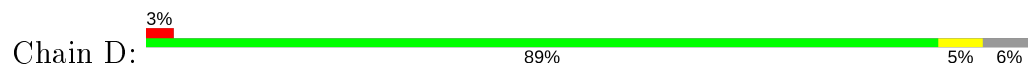
- Molecule 1: 14-3-3 protein theta



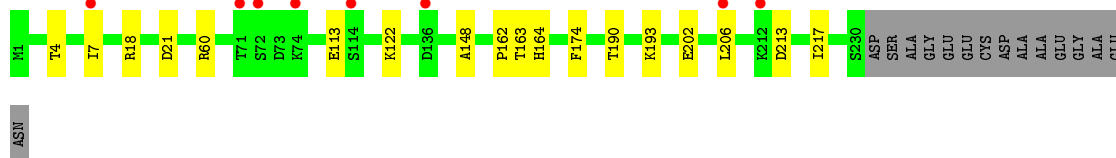
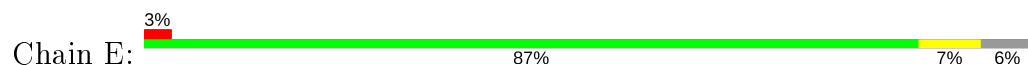
- Molecule 1: 14-3-3 protein theta



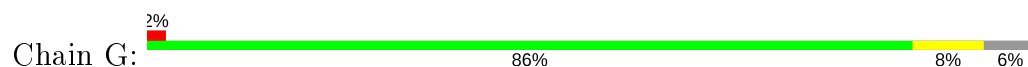
- Molecule 1: 14-3-3 protein theta



- Molecule 1: 14-3-3 protein theta

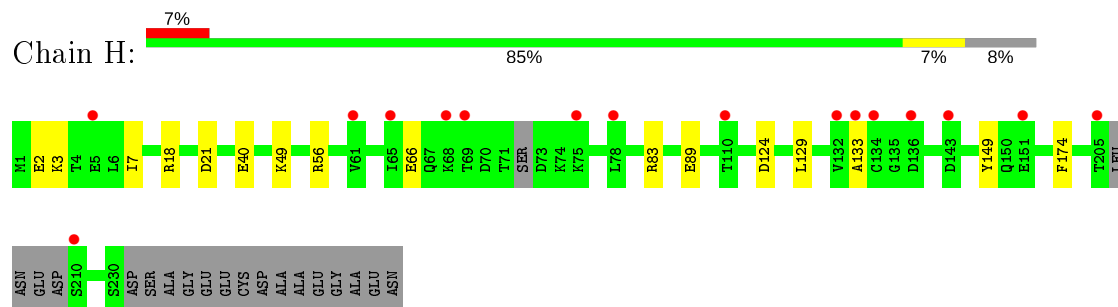


- Molecule 1: 14-3-3 protein theta

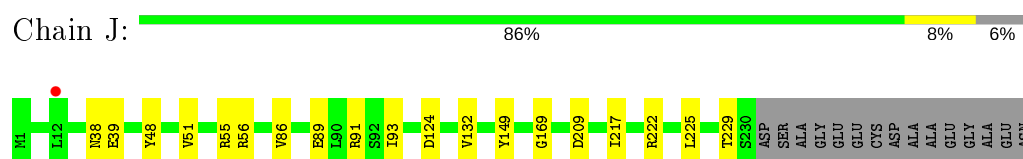


ASN

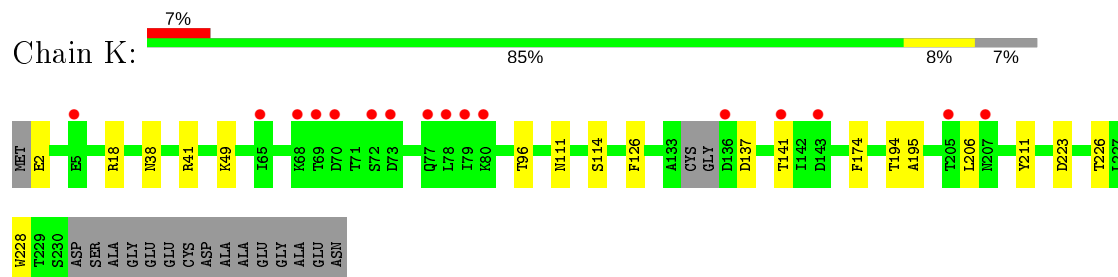
- Molecule 1: 14-3-3 protein theta



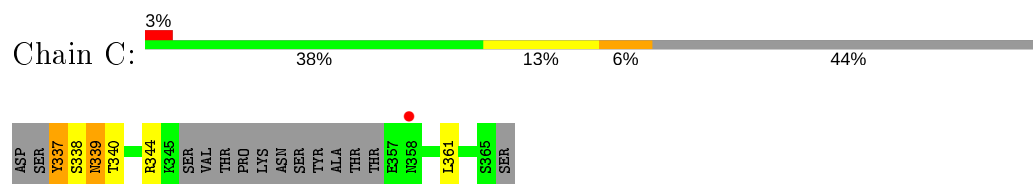
- Molecule 1: 14-3-3 protein theta



- Molecule 1: 14-3-3 protein theta



- Molecule 2: Insulin receptor substrate protein of 53 kDa, peptide (IRSp53)

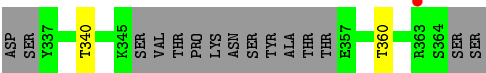


- Molecule 2: Insulin receptor substrate protein of 53 kDa, peptide (IRSp53)

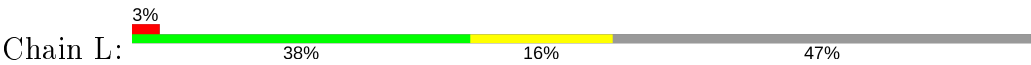


- Molecule 2: Insulin receptor substrate protein of 53 kDa, peptide (IRSp53)





● Molecule 2: Insulin receptor substrate protein of 53 kDa, peptide (IRSp53)



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	61.10Å 69.57Å 150.47Å 99.16° 92.98° 115.98°	Depositor
Resolution (Å)	42.98 – 2.80 49.05 – 2.80	Depositor EDS
% Data completeness (in resolution range)	96.0 (42.98-2.80) 96.0 (49.05-2.80)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.55 (at 2.81Å)	Xtriage
Refinement program	PHENIX 1.12_2829	Depositor
R, R_{free}	0.234 , 0.287 0.235 , 0.285	Depositor DCC
R_{free} test set	2001 reflections (3.88%)	wwPDB-VP
Wilson B-factor (Å ²)	30.9	Xtriage
Anisotropy	0.439	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.39 , 53.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.004 for -h,-k,h+k+l	Xtriage
F_o, F_c correlation	0.88	EDS
Total number of atoms	31276	wwPDB-VP
Average B, all atoms (Å ²)	41.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.47% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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: GOL, PGE, TPO, EDO, 1PE, PE4, PG4, PEG

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	0/1887	0.41	0/2544
1	B	0.27	0/1872	0.41	0/2523
1	D	0.28	0/1880	0.42	0/2534
1	E	0.28	0/1885	0.43	0/2542
1	G	0.48	0/1912	0.48	0/2579
1	H	0.26	0/1828	0.40	0/2461
1	J	0.27	0/1869	0.40	0/2520
1	K	0.40	0/1858	0.47	0/2506
2	C	0.27	0/131	0.53	0/170
2	F	0.25	0/131	0.42	0/170
2	I	0.23	0/125	0.41	0/162
2	L	0.26	0/125	0.50	0/162
All	All	0.32	0/15503	0.43	0/20873

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	1856	1855	1855	9	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	1840	1839	1827	12	0
1	D	1852	1856	1856	6	0
1	E	1852	1850	1838	14	0
1	G	1873	1873	1868	13	0
1	H	1805	1809	1809	11	0
1	J	1844	1843	1843	12	0
1	K	1834	1828	1828	13	0
2	C	154	147	147	7	0
2	F	154	147	147	3	0
2	I	148	142	142	3	0
2	L	148	142	142	4	0
3	A	24	34	34	0	0
4	A	32	42	44	0	0
4	B	16	21	22	1	0
4	G	16	21	22	3	0
4	H	16	21	22	0	0
4	J	32	42	44	0	0
5	B	4	5	6	0	0
5	D	4	5	6	0	0
6	B	13	17	18	0	0
6	D	13	17	18	0	0
6	E	13	17	18	0	0
7	B	6	8	8	0	0
7	I	6	8	8	0	0
8	E	10	13	14	0	0
9	E	7	9	10	0	0
10	A	17	0	0	0	0
10	B	21	0	0	1	0
10	C	5	0	0	0	0
10	D	10	0	0	0	0
10	E	12	0	0	0	0
10	F	8	0	0	0	0
10	G	7	0	0	0	0
10	H	4	0	0	0	0
10	I	3	0	0	0	0
10	J	6	0	0	0	0
All	All	15665	15611	15596	89	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.

The worst 5 of 89 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:162:PRO:HD2	1:E:202:GLU:OE1	1.61	0.99
1:E:60:ARG:HD2	2:F:357:GLU:OE2	1.71	0.90
1:E:60:ARG:CD	2:F:357:GLU:OE2	2.25	0.85
1:H:66:GLU:OE1	1:H:83:ARG:NE	2.23	0.72
1:K:137:ASP:O	1:K:141:THR:HG22	1.93	0.69

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	230/245 (94%)	226 (98%)	4 (2%)	0	100	100
1	B	226/245 (92%)	215 (95%)	11 (5%)	0	100	100
1	D	229/245 (94%)	223 (97%)	6 (3%)	0	100	100
1	E	230/245 (94%)	225 (98%)	5 (2%)	0	100	100
1	G	233/245 (95%)	228 (98%)	5 (2%)	0	100	100
1	H	219/245 (89%)	214 (98%)	5 (2%)	0	100	100
1	J	228/245 (93%)	222 (97%)	6 (3%)	0	100	100
1	K	224/245 (91%)	213 (95%)	11 (5%)	0	100	100
2	C	12/32 (38%)	12 (100%)	0	0	100	100
2	F	12/32 (38%)	12 (100%)	0	0	100	100
2	I	11/32 (34%)	11 (100%)	0	0	100	100
2	L	11/32 (34%)	11 (100%)	0	0	100	100
All	All	1865/2088 (89%)	1812 (97%)	53 (3%)	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	A	205/212 (97%)	203 (99%)	2 (1%)	76	93
1	B	203/212 (96%)	203 (100%)	0	100	100
1	D	204/212 (96%)	201 (98%)	3 (2%)	65	89
1	E	205/212 (97%)	204 (100%)	1 (0%)	88	96
1	G	208/212 (98%)	205 (99%)	3 (1%)	67	90
1	H	198/212 (93%)	197 (100%)	1 (0%)	88	96
1	J	203/212 (96%)	202 (100%)	1 (0%)	88	96
1	K	202/212 (95%)	201 (100%)	1 (0%)	88	96
2	C	16/29 (55%)	13 (81%)	3 (19%)	1	5
2	F	16/29 (55%)	16 (100%)	0	100	100
2	I	15/29 (52%)	15 (100%)	0	100	100
2	L	15/29 (52%)	15 (100%)	0	100	100
All	All	1690/1812 (93%)	1675 (99%)	15 (1%)	78	94

5 of 15 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	184	ASN
1	D	220	LEU
1	H	174	PHE
1	D	174	PHE
1	G	174	PHE

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	E	161	GLN
2	F	358	ASN
1	J	8	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

8 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	$\# Z > 2$
2	TPO	C	360	2	8,10,11	1.60	1 (12%)	10,14,16	1.61	1 (10%)
2	TPO	F	360	2	8,10,11	1.61	1 (12%)	10,14,16	1.51	1 (10%)
2	TPO	C	340	2	8,10,11	0.92	0	10,14,16	1.82	1 (10%)
2	TPO	I	340	2	8,10,11	1.08	0	10,14,16	1.61	1 (10%)
2	TPO	I	360	2	8,10,11	1.12	0	10,14,16	1.49	2 (20%)
2	TPO	F	340	2	8,10,11	1.15	0	10,14,16	1.61	2 (20%)
2	TPO	L	340	2	8,10,11	1.04	0	10,14,16	1.56	1 (10%)
2	TPO	L	360	2	8,10,11	1.11	0	10,14,16	1.56	1 (10%)

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	TPO	C	360	2	-	4/9/11/13	-
2	TPO	F	360	2	-	3/9/11/13	-
2	TPO	C	340	2	-	1/9/11/13	-
2	TPO	I	340	2	-	1/9/11/13	-
2	TPO	I	360	2	-	1/9/11/13	-
2	TPO	F	340	2	-	2/9/11/13	-
2	TPO	L	340	2	-	3/9/11/13	-
2	TPO	L	360	2	-	1/9/11/13	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	F	360	TPO	P-O1P	3.41	1.61	1.50
2	C	360	TPO	P-O1P	3.34	1.61	1.50

The worst 5 of 10 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
2	C	340	TPO	P-OG1-CB	-5.23	107.40	123.21
2	C	360	TPO	P-OG1-CB	-4.36	110.04	123.21
2	I	340	TPO	P-OG1-CB	-4.32	110.17	123.21
2	L	360	TPO	P-OG1-CB	-4.13	110.75	123.21
2	L	340	TPO	P-OG1-CB	-4.07	110.90	123.21

There are no chirality outliers.

5 of 16 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	C	340	TPO	O-C-CA-CB
2	L	360	TPO	O-C-CA-CB
2	F	360	TPO	CB-OG1-P-O1P
2	C	360	TPO	CB-OG1-P-O3P
2	C	360	TPO	C-CA-CB-CG2

There are no ring outliers.

4 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	340	TPO	1	0
2	I	340	TPO	1	0
2	I	360	TPO	2	0
2	L	340	TPO	1	0

5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

5.6 Ligand geometry [i](#)

17 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	$\# Z > 2$
4	1PE	B	302	-	15,15,15	0.53	0	14,14,14	0.25	0
7	GOL	B	304	-	5,5,5	1.03	0	5,5,5	0.89	0
4	1PE	J	301	-	15,15,15	0.52	0	14,14,14	0.33	0
4	1PE	G	300	-	15,15,15	0.53	0	14,14,14	0.36	0
4	1PE	H	300	-	15,15,15	0.52	0	14,14,14	0.31	0
3	PE4	A	301	-	23,23,23	0.54	0	22,22,22	0.27	0
4	1PE	J	300	-	15,15,15	0.52	0	14,14,14	0.49	0
9	PEG	E	302	-	6,6,6	0.49	0	5,5,5	0.29	0
6	PG4	B	303	-	12,12,12	0.52	0	11,11,11	0.29	0
5	EDO	D	301	-	3,3,3	0.48	0	2,2,2	0.27	0
5	EDO	B	301	-	3,3,3	0.49	0	2,2,2	0.25	0
6	PG4	E	300	-	12,12,12	0.53	0	11,11,11	0.26	0
4	1PE	A	302	-	15,15,15	0.53	0	14,14,14	0.27	0
8	PGE	E	301	-	9,9,9	0.51	0	8,8,8	0.29	0
6	PG4	D	300	-	12,12,12	0.55	0	11,11,11	0.28	0
7	GOL	I	401	-	5,5,5	0.87	0	5,5,5	1.02	0
4	1PE	A	303	-	15,15,15	0.51	0	14,14,14	0.42	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
4	1PE	B	302	-	-	4/13/13/13	-
7	GOL	B	304	-	-	0/4/4/4	-
4	1PE	J	301	-	-	5/13/13/13	-
4	1PE	G	300	-	-	6/13/13/13	-
4	1PE	H	300	-	-	2/13/13/13	-
3	PE4	A	301	-	-	6/21/21/21	-
4	1PE	J	300	-	-	7/13/13/13	-
9	PEG	E	302	-	-	0/4/4/4	-
6	PG4	B	303	-	-	3/10/10/10	-

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	EDO	D	301	-	-	0/1/1/1	-
5	EDO	B	301	-	-	1/1/1/1	-
6	PG4	E	300	-	-	2/10/10/10	-
4	1PE	A	302	-	-	3/13/13/13	-
8	PGE	E	301	-	-	2/7/7/7	-
6	PG4	D	300	-	-	2/10/10/10	-
7	GOL	I	401	-	-	0/4/4/4	-
4	1PE	A	303	-	-	8/13/13/13	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

5 of 51 torsion outliers are listed below:

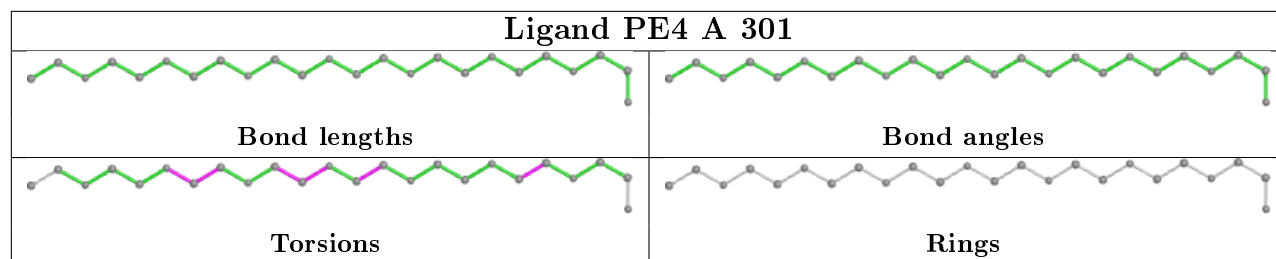
Mol	Chain	Res	Type	Atoms
8	E	301	PGE	O2-C3-C4-O3
3	A	301	PE4	O6-C11-C12-O7
4	H	300	1PE	OH7-C16-C26-OH6
3	A	301	PE4	O6-C10-C9-O5
6	B	303	PG4	O4-C7-C8-O5

There are no ring outliers.

2 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	302	1PE	1	0
4	G	300	1PE	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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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	230/245 (93%)	0.05	3 (1%) 77 72	9, 25, 62, 79	0
1	B	227/245 (92%)	-0.02	0 100 100	9, 23, 55, 75	0
1	D	230/245 (93%)	0.16	8 (3%) 44 34	10, 26, 66, 88	0
1	E	230/245 (93%)	0.27	8 (3%) 44 34	14, 32, 72, 97	0
1	G	230/245 (93%)	0.17	5 (2%) 62 52	13, 35, 67, 91	0
1	H	225/245 (91%)	0.49	16 (7%) 16 9	24, 46, 77, 89	0
1	J	230/245 (93%)	0.25	1 (0%) 92 91	14, 37, 69, 88	0
1	K	227/245 (92%)	0.53	16 (7%) 16 9	22, 49, 79, 98	0
2	C	16/32 (50%)	0.70	1 (6%) 20 12	23, 46, 62, 62	0
2	F	16/32 (50%)	0.75	2 (12%) 3 2	24, 49, 71, 76	0
2	I	15/32 (46%)	0.65	1 (6%) 17 10	23, 42, 76, 84	0
2	L	15/32 (46%)	0.68	1 (6%) 17 10	32, 45, 67, 72	0
All	All	1891/2088 (90%)	0.25	62 (3%) 46 36	9, 35, 71, 98	0

The worst 5 of 62 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	134	CYS	4.6
1	K	70	ASP	4.2
1	K	69	THR	4.1
1	H	136	ASP	4.1
1	H	210	SER	4.0

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
2	TPO	L	340	11/12	0.95	0.18	26,26,31,31	0
2	TPO	L	360	11/12	0.95	0.14	35,36,43,43	0
2	TPO	I	360	11/12	0.96	0.18	32,33,41,41	0
2	TPO	F	340	11/12	0.96	0.18	20,22,25,25	0
2	TPO	C	360	11/12	0.97	0.19	24,26,30,30	0
2	TPO	F	360	11/12	0.97	0.18	32,33,39,40	0
2	TPO	C	340	11/12	0.97	0.15	16,23,28,28	0
2	TPO	I	340	11/12	0.97	0.19	22,23,28,28	0

6.3 Carbohydrates [i](#)

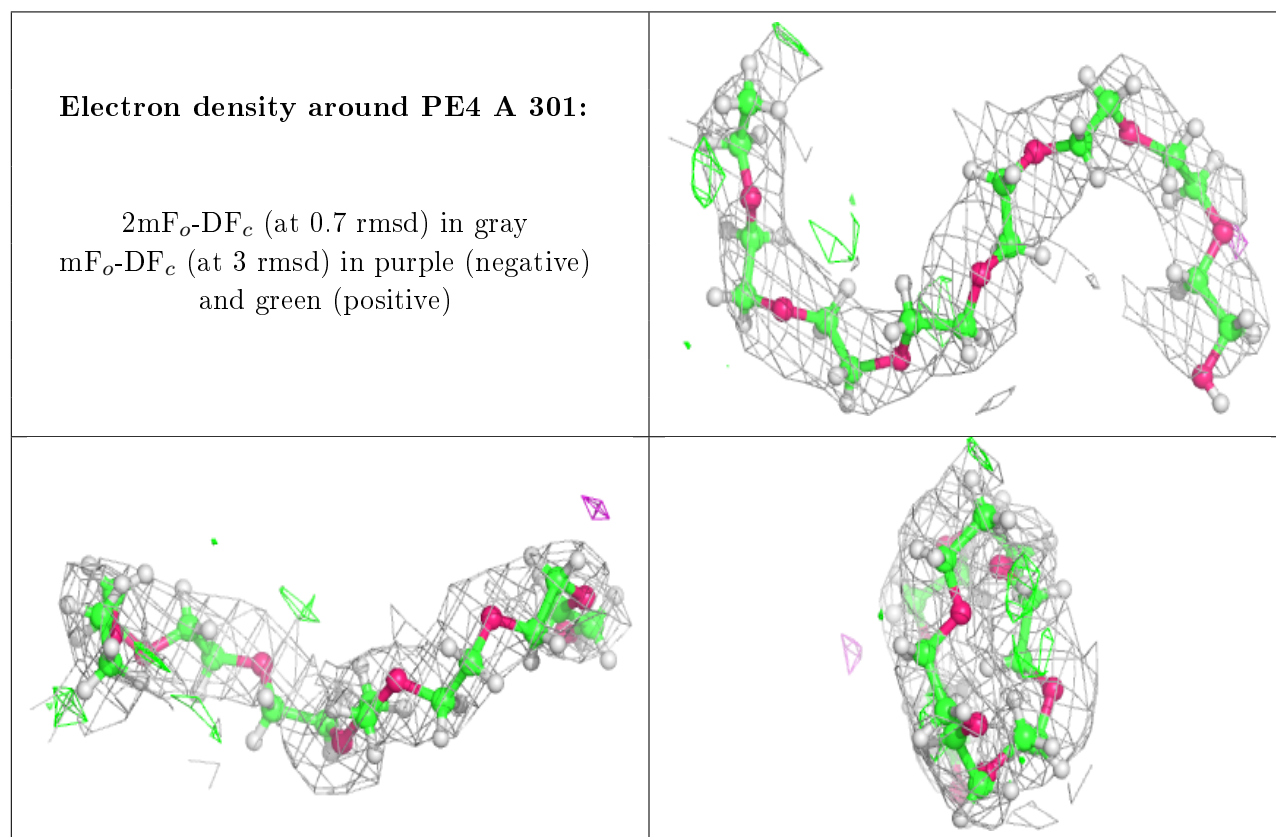
There are no carbohydrates in this entry.

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. 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
5	EDO	B	301	4/4	0.68	0.25	33,41,49,49	0
4	1PE	H	300	16/16	0.71	0.31	59,74,91,96	0
9	PEG	E	302	7/7	0.74	0.44	48,58,67,72	0
4	1PE	J	300	16/16	0.76	0.27	33,51,72,73	0
7	GOL	I	401	6/6	0.76	0.28	41,56,67,68	0
4	1PE	A	303	16/16	0.77	0.29	44,62,86,87	0
4	1PE	G	300	16/16	0.80	0.27	30,60,86,88	0
4	1PE	J	301	16/16	0.81	0.21	49,62,76,78	0
8	PGE	E	301	10/10	0.81	0.22	48,57,67,68	0
7	GOL	B	304	6/6	0.84	0.23	39,51,61,64	0
4	1PE	A	302	16/16	0.85	0.24	31,45,67,73	0
4	1PE	B	302	16/16	0.85	0.23	19,40,53,53	0
6	PG4	D	300	13/13	0.86	0.24	17,37,47,50	0
3	PE4	A	301	24/24	0.87	0.20	17,46,58,58	0
6	PG4	B	303	13/13	0.87	0.19	35,47,58,59	0
6	PG4	E	300	13/13	0.92	0.21	22,33,49,49	0
5	EDO	D	301	4/4	0.92	0.23	16,19,23,23	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.