



# wwPDB X-ray Structure Validation Summary Report ⓘ

Nov 8, 2023 – 12:57 pm GMT

PDB ID : 8QTT  
Title : Crystal structure of a C-terminally truncated version of Arabidopsis thaliana 14-3-3 omega in complex with a phosphopeptide from the inhibitor protein BKI1.  
Authors : Hothorn, M.; Obergfell, E.  
Deposited on : 2023-10-13  
Resolution : 2.35 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](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>.

---

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)  
Xtrriage (Phenix) : 1.13  
EDS : 2.36  
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

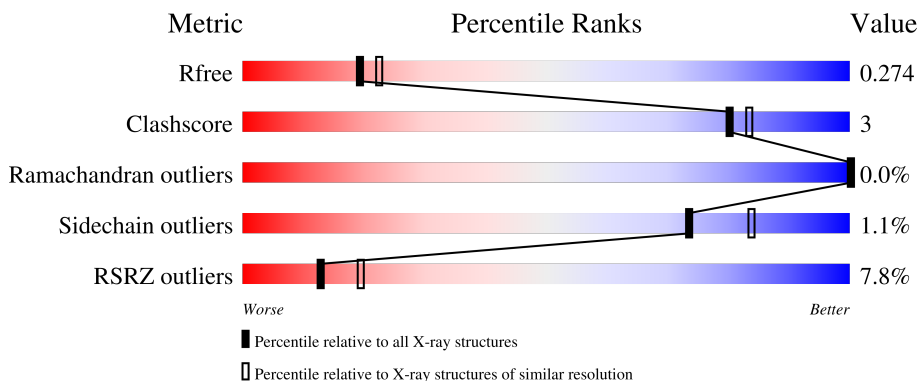
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

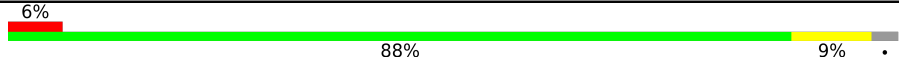
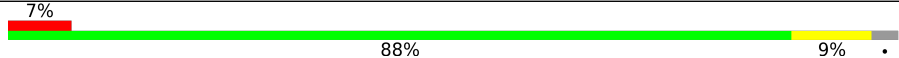
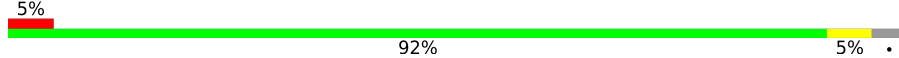
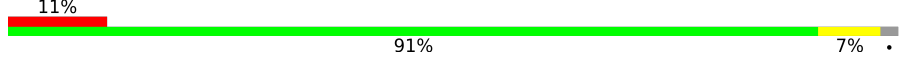
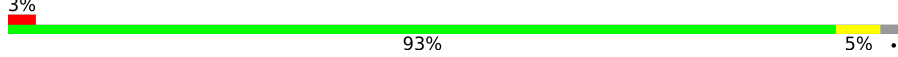
The reported resolution of this entry is 2.35 Å.

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	1164 (2.36-2.36)
Clashscore	141614	1232 (2.36-2.36)
Ramachandran outliers	138981	1211 (2.36-2.36)
Sidechain outliers	138945	1212 (2.36-2.36)
RSRZ outliers	127900	1150 (2.36-2.36)

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	241	 6% 88% 9%
1	B	241	 7% 88% 9%
1	C	241	 5% 92% 5%
1	D	241	 11% 91% 7%
1	E	241	 3% 93% 5%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
1	F	241	
1	G	241	
1	H	241	
1	I	241	
1	J	241	
2	K	6	
2	L	6	
2	M	6	
2	N	6	
2	O	6	
2	P	6	
2	Q	6	
2	R	6	
2	S	6	
2	T	6	

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	FMT	J	1301	-	-	-	X
3	FMT	J	1302	-	-	-	X

## 2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 38323 atoms, of which 18751 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-like protein GF14 omega.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	C	H	N	O				S
1	A	234	3702	1172	1832	319	372	7	0	2	0
1	B	234	3684	1167	1823	317	370	7	0	0	0
1	C	232	3661	1160	1814	315	365	7	0	0	0
1	D	236	3741	1183	1854	321	375	8	0	3	0
1	E	234	3704	1173	1834	317	373	7	0	2	0
1	F	237	3762	1188	1865	325	376	8	0	3	0
1	G	236	3726	1178	1846	322	373	7	0	1	0
1	H	227	3609	1143	1790	312	357	7	0	2	0
1	I	234	3705	1172	1836	320	370	7	0	1	0
1	J	234	3723	1177	1845	322	372	7	0	3	0

There are 40 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	ALA	-	expression tag	UNP Q01525
A	0	GLY	-	expression tag	UNP Q01525
A	238	ARG	-	expression tag	UNP Q01525
A	239	GLY	-	expression tag	UNP Q01525
B	-1	ALA	-	expression tag	UNP Q01525
B	0	GLY	-	expression tag	UNP Q01525
B	238	ARG	-	expression tag	UNP Q01525
B	239	GLY	-	expression tag	UNP Q01525
C	-1	ALA	-	expression tag	UNP Q01525

*Continued on next page...*

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
C	0	GLY	-	expression tag	UNP Q01525
C	238	ARG	-	expression tag	UNP Q01525
C	239	GLY	-	expression tag	UNP Q01525
D	-1	ALA	-	expression tag	UNP Q01525
D	0	GLY	-	expression tag	UNP Q01525
D	238	ARG	-	expression tag	UNP Q01525
D	239	GLY	-	expression tag	UNP Q01525
E	-1	ALA	-	expression tag	UNP Q01525
E	0	GLY	-	expression tag	UNP Q01525
E	238	ARG	-	expression tag	UNP Q01525
E	239	GLY	-	expression tag	UNP Q01525
F	-1	ALA	-	expression tag	UNP Q01525
F	0	GLY	-	expression tag	UNP Q01525
F	238	ARG	-	expression tag	UNP Q01525
F	239	GLY	-	expression tag	UNP Q01525
G	-1	ALA	-	expression tag	UNP Q01525
G	0	GLY	-	expression tag	UNP Q01525
G	238	ARG	-	expression tag	UNP Q01525
G	239	GLY	-	expression tag	UNP Q01525
H	-1	ALA	-	expression tag	UNP Q01525
H	0	GLY	-	expression tag	UNP Q01525
H	238	ARG	-	expression tag	UNP Q01525
H	239	GLY	-	expression tag	UNP Q01525
I	-1	ALA	-	expression tag	UNP Q01525
I	0	GLY	-	expression tag	UNP Q01525
I	238	ARG	-	expression tag	UNP Q01525
I	239	GLY	-	expression tag	UNP Q01525
J	-1	ALA	-	expression tag	UNP Q01525
J	0	GLY	-	expression tag	UNP Q01525
J	238	ARG	-	expression tag	UNP Q01525
J	239	GLY	-	expression tag	UNP Q01525

- Molecule 2 is a protein called BRI1 kinase inhibitor 1.

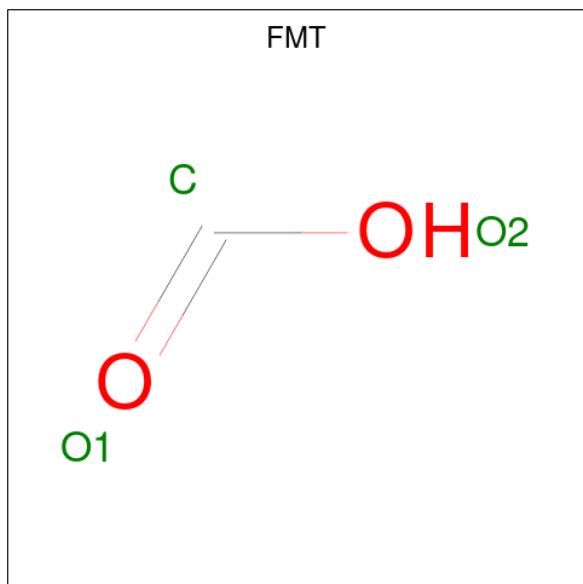
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
2	K	6	Total	C	H	N	O	P	0	0	0
			90	31	40	6	12	1			
2	L	6	Total	C	H	N	O	P	0	0	0
			90	31	40	6	12	1			
2	M	6	Total	C	H	N	O	P	0	0	0
			90	31	40	6	12	1			
2	N	5	Total	C	H	N	O	P	0	0	0
			75	26	34	5	9	1			

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	C	H	N	O				P
2	O	6	Total 90	C 31	H 40	N 6	O 12	P 1	0	0	0
2	P	6	Total 90	C 31	H 40	N 6	O 12	P 1	0	0	0
2	Q	6	Total 90	C 31	H 40	N 6	O 12	P 1	0	0	0
2	R	6	Total 90	C 31	H 40	N 6	O 12	P 1	0	0	0
2	S	6	Total 90	C 31	H 40	N 6	O 12	P 1	0	0	0
2	T	6	Total 90	C 31	H 40	N 6	O 12	P 1	0	0	0

- Molecule 3 is FORMIC ACID (three-letter code: FMT) (formula: CH<sub>2</sub>O<sub>2</sub>).



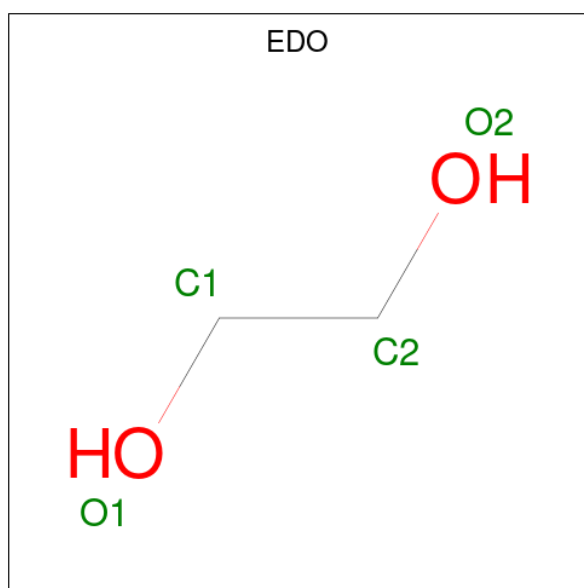
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	
			Total	C	H			O
3	K	1	Total 4	C 1	H 1	O 2	0	0
3	B	1	Total 4	C 1	H 1	O 2	0	0
3	C	1	Total 4	C 1	H 1	O 2	0	0
3	D	1	Total 4	C 1	H 1	O 2	0	0
3	E	1	Total 4	C 1	H 1	O 2	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	H	O		
3	Q	1	Total 4	C 1	H 1	O 2	0	0
3	H	1	Total 4	C 1	H 1	O 2	0	0
3	S	1	Total 4	C 1	H 1	O 2	0	0
3	J	1	Total 5	C 1	H 2	O 2	0	0
3	J	1	Total 5	C 1	H 2	O 2	0	0

- Molecule 4 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C<sub>2</sub>H<sub>6</sub>O<sub>2</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	H	O		
4	E	1	Total 10	C 2	H 6	O 2	0	0

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	35	Total 35	O 35	0	0
5	K	1	Total 1	O 1	0	0
5	B	35	Total 35	O 35	0	0

Continued on next page...

*Continued from previous page...*

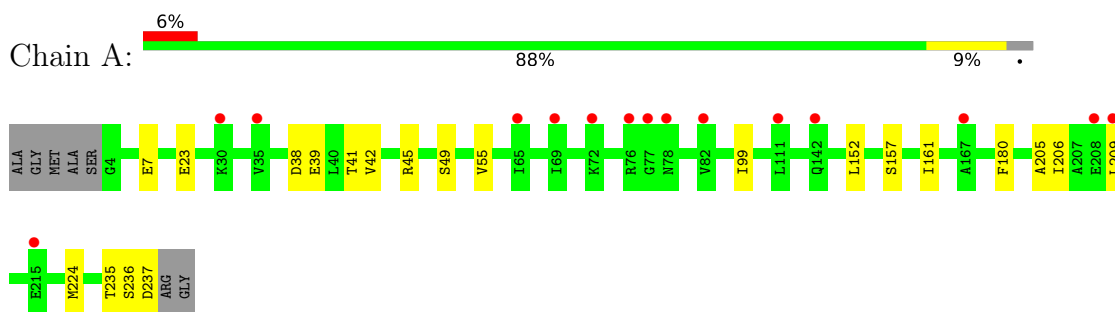
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	L	3	Total 3	O 3	0	0
5	C	43	Total 43	O 43	0	0
5	D	31	Total 31	O 31	0	0
5	N	1	Total 1	O 1	0	0
5	E	35	Total 35	O 35	0	0
5	O	2	Total 2	O 2	0	0
5	F	29	Total 29	O 29	0	0
5	P	5	Total 5	O 5	0	0
5	G	24	Total 24	O 24	0	0
5	Q	1	Total 1	O 1	0	0
5	H	33	Total 33	O 33	0	0
5	R	3	Total 3	O 3	0	0
5	I	44	Total 44	O 44	0	0
5	S	3	Total 3	O 3	0	0
5	J	38	Total 38	O 38	0	0
5	T	3	Total 3	O 3	0	0



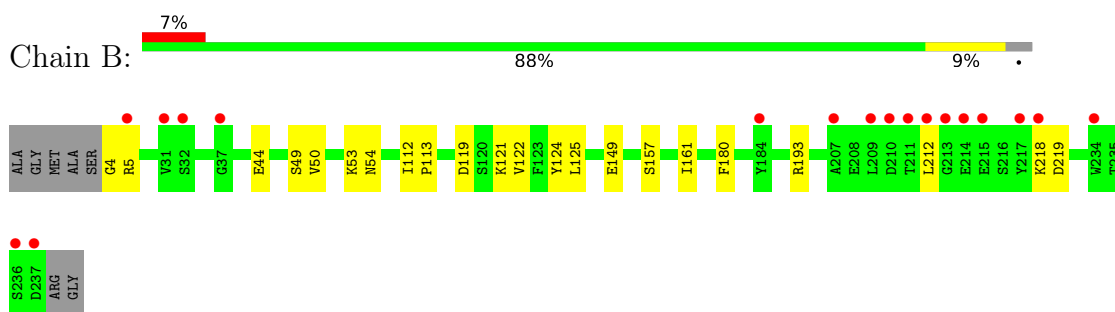
### 3 Residue-property plots [i](#)

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 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.

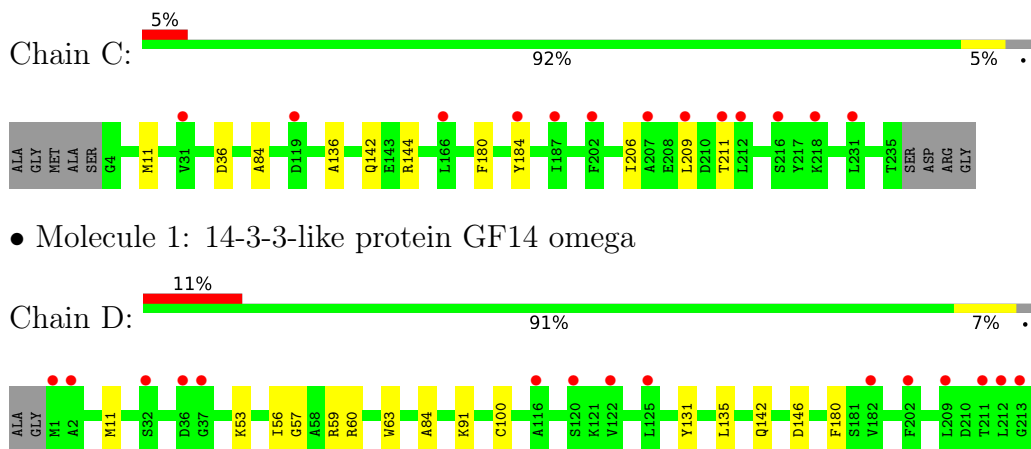
- Molecule 1: 14-3-3-like protein GF14 omega



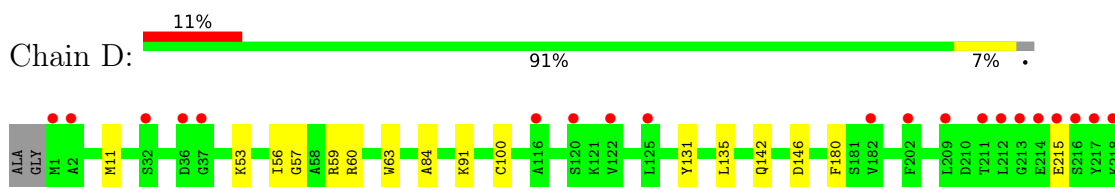
- Molecule 1: 14-3-3-like protein GF14 omega

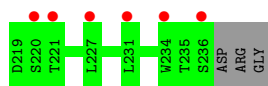


- Molecule 1: 14-3-3-like protein GF14 omega

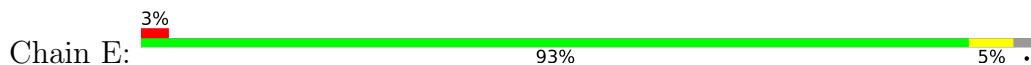


- Molecule 1: 14-3-3-like protein GF14 omega





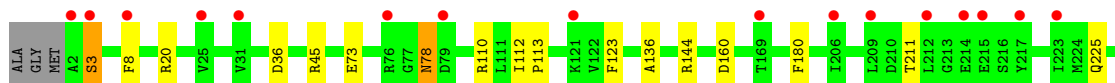
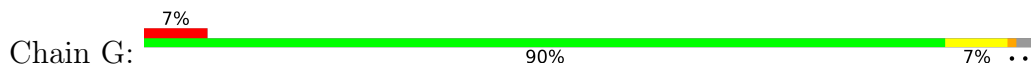
- Molecule 1: 14-3-3-like protein GF14 omega



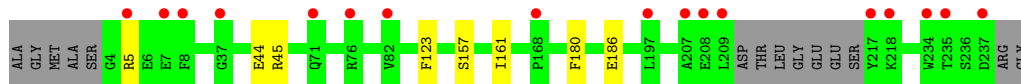
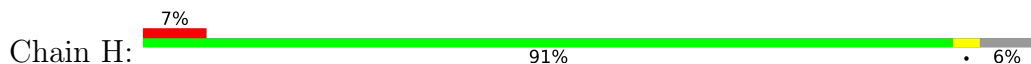
- Molecule 1: 14-3-3-like protein GF14 omega



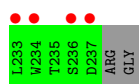
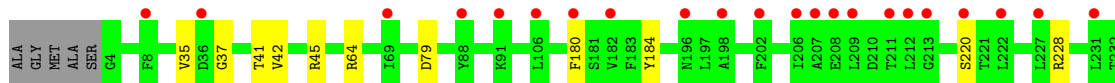
- Molecule 1: 14-3-3-like protein GF14 omega



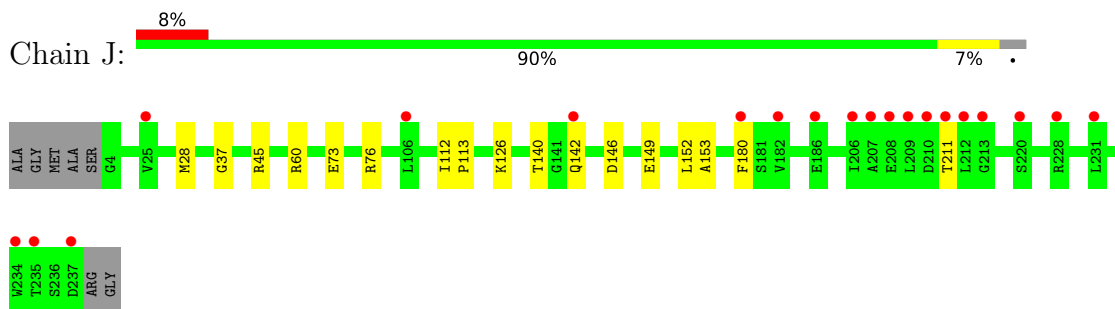
- Molecule 1: 14-3-3-like protein GF14 omega



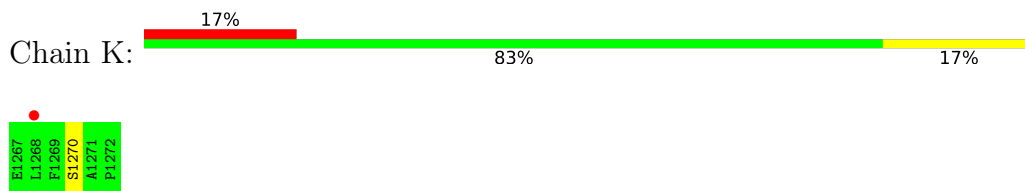
- Molecule 1: 14-3-3-like protein GF14 omega



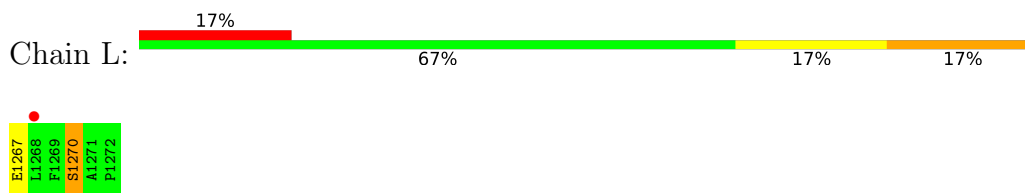
- Molecule 1: 14-3-3-like protein GF14 omega



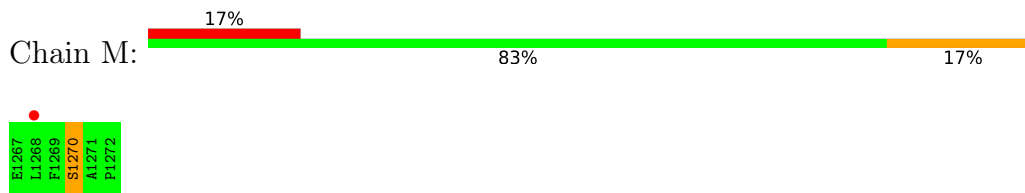
- Molecule 2: BRI1 kinase inhibitor 1



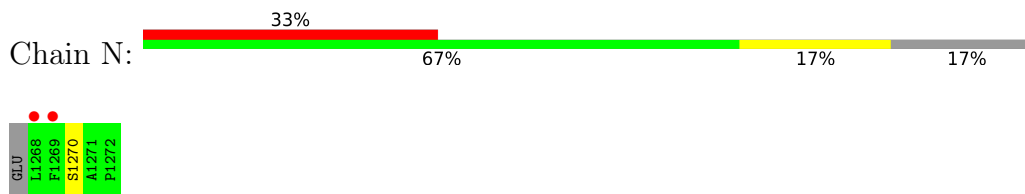
- Molecule 2: BRI1 kinase inhibitor 1



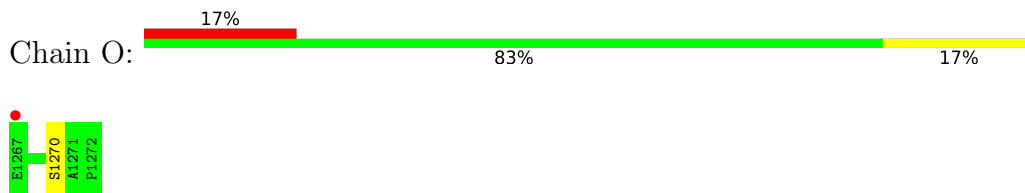
- Molecule 2: BRI1 kinase inhibitor 1



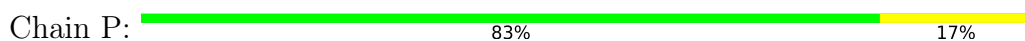
- Molecule 2: BRI1 kinase inhibitor 1



- Molecule 2: BRI1 kinase inhibitor 1

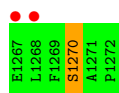
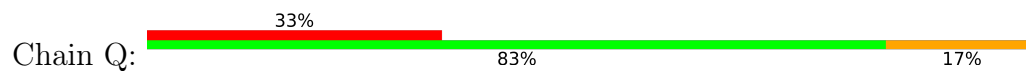


- Molecule 2: BRI1 kinase inhibitor 1

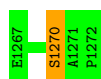
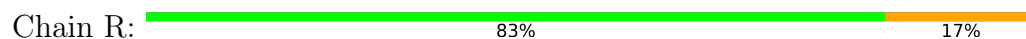




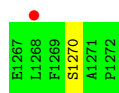
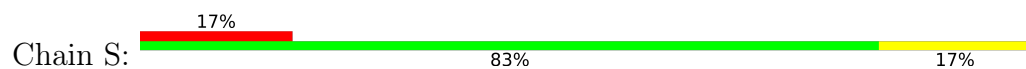
- Molecule 2: BRI1 kinase inhibitor 1



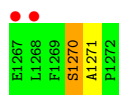
- Molecule 2: BRI1 kinase inhibitor 1



- Molecule 2: BRI1 kinase inhibitor 1



- Molecule 2: BRI1 kinase inhibitor 1



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	71.22Å 71.08Å 150.99Å 100.47° 95.53° 88.74°	Depositor
Resolution (Å)	50.33 – 2.35 69.90 – 2.35	Depositor EDS
% Data completeness (in resolution range)	97.9 (50.33-2.35) 98.0 (69.90-2.35)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.38 (at 2.34Å)	Xtrriage
Refinement program	PHENIX 1.20.1_4487	Depositor
R, $R_{free}$	0.234 , 0.276 0.236 , 0.274	Depositor DCC
$R_{free}$ test set	5917 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	39.3	Xtrriage
Anisotropy	0.226	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.37 , 30.1	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	38323	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	69.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 8.03% 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

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: SEP, EDO, FMT

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	0.24	0/1908	0.46	0/2572
1	B	0.24	0/1890	0.45	0/2548
1	C	0.23	0/1876	0.45	0/2529
1	D	0.24	0/1928	0.45	0/2598
1	E	0.24	0/1905	0.45	0/2568
1	F	0.23	0/1938	0.45	0/2611
1	G	0.24	0/1912	0.46	0/2577
1	H	0.24	0/1856	0.45	0/2500
1	I	0.24	0/1901	0.46	0/2562
1	J	0.24	0/1919	0.46	0/2586
2	K	0.24	0/40	0.34	0/52
2	L	0.25	0/40	0.34	0/52
2	M	0.26	0/40	0.33	0/52
2	N	0.22	0/31	0.29	0/40
2	O	0.25	0/40	0.35	0/52
2	P	0.24	0/40	0.40	0/52
2	Q	0.25	0/40	0.35	0/52
2	R	0.24	0/40	0.33	0/52
2	S	0.25	0/40	0.35	0/52
2	T	0.25	0/40	0.34	0/52
All	All	0.24	0/19424	0.45	0/26159

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

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	1870	1832	1829	18	0
1	B	1861	1823	1827	12	1
1	C	1847	1814	1818	7	1
1	D	1887	1854	1853	16	0
1	E	1870	1834	1838	9	1
1	F	1897	1865	1864	6	1
1	G	1880	1846	1850	13	0
1	H	1819	1790	1786	4	0
1	I	1869	1836	1840	6	2
1	J	1878	1845	1842	11	0
2	K	50	40	40	0	0
2	L	50	40	40	2	0
2	M	50	40	40	1	0
2	N	41	34	34	0	0
2	O	50	40	40	0	0
2	P	50	40	40	0	0
2	Q	50	40	40	1	0
2	R	50	40	40	1	0
2	S	50	40	40	0	0
2	T	50	40	40	2	0
3	B	3	1	1	0	0
3	C	3	1	1	1	0
3	D	3	1	1	0	0
3	E	3	1	1	0	0
3	H	3	1	1	1	0
3	J	6	4	2	0	0
3	K	3	1	1	0	0
3	Q	3	1	1	0	0
3	S	3	1	1	0	0
4	E	4	6	6	0	0
5	A	35	0	0	4	0
5	B	35	0	0	8	0
5	C	43	0	0	1	0
5	D	31	0	0	8	0
5	E	35	0	0	1	0
5	F	29	0	0	0	0
5	G	24	0	0	1	0

*Continued on next page...*

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	H	33	0	0	0	0
5	I	44	0	0	5	0
5	J	38	0	0	6	0
5	K	1	0	0	0	0
5	L	3	0	0	2	0
5	N	1	0	0	0	0
5	O	2	0	0	0	0
5	P	5	0	0	0	0
5	Q	1	0	0	1	0
5	R	3	0	0	1	0
5	S	3	0	0	0	0
5	T	3	0	0	1	0
All	All	19572	18751	18757	101	3

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 101 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:45:ARG:O	5:A:1401:HOH:O	1.75	1.03
1:D:56:ILE:N	5:D:1401:HOH:O	1.99	0.96
1:D:63:TRP:N	5:D:1402:HOH:O	1.99	0.95
1:B:125:LEU:N	5:B:1402:HOH:O	1.98	0.95
1:B:50:VAL:O	5:B:1401:HOH:O	1.89	0.89

All (3) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:149:GLU:OE2	1:I:184:TYR:OH[1_556]	2.15	0.05
1:B:149:GLU:OE2	1:C:184:TYR:OH[1_665]	2.16	0.04
1:E:143:GLU:H	1:I:79:ASP:OD2[1_666]	1.60	0.00



## 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	234/241 (97%)	230 (98%)	4 (2%)	0	100	100
1	B	232/241 (96%)	226 (97%)	6 (3%)	0	100	100
1	C	230/241 (95%)	226 (98%)	4 (2%)	0	100	100
1	D	237/241 (98%)	233 (98%)	4 (2%)	0	100	100
1	E	234/241 (97%)	229 (98%)	5 (2%)	0	100	100
1	F	238/241 (99%)	234 (98%)	4 (2%)	0	100	100
1	G	235/241 (98%)	229 (97%)	5 (2%)	1 (0%)	34	38
1	H	225/241 (93%)	222 (99%)	3 (1%)	0	100	100
1	I	233/241 (97%)	228 (98%)	5 (2%)	0	100	100
1	J	235/241 (98%)	231 (98%)	4 (2%)	0	100	100
2	K	3/6 (50%)	3 (100%)	0	0	100	100
2	L	3/6 (50%)	3 (100%)	0	0	100	100
2	M	3/6 (50%)	3 (100%)	0	0	100	100
2	N	2/6 (33%)	2 (100%)	0	0	100	100
2	O	3/6 (50%)	3 (100%)	0	0	100	100
2	P	3/6 (50%)	3 (100%)	0	0	100	100
2	Q	3/6 (50%)	3 (100%)	0	0	100	100
2	R	3/6 (50%)	3 (100%)	0	0	100	100
2	S	3/6 (50%)	3 (100%)	0	0	100	100
2	T	3/6 (50%)	3 (100%)	0	0	100	100
All	All	2362/2470 (96%)	2317 (98%)	44 (2%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	G	3	SER

### 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	198/199 (100%)	197 (100%)	1 (0%)	88	94
1	B	196/199 (98%)	191 (97%)	5 (3%)	46	56
1	C	194/199 (98%)	192 (99%)	2 (1%)	76	85
1	D	200/199 (100%)	199 (100%)	1 (0%)	88	94
1	E	198/199 (100%)	196 (99%)	2 (1%)	76	85
1	F	201/199 (101%)	198 (98%)	3 (2%)	65	76
1	G	198/199 (100%)	196 (99%)	2 (1%)	76	85
1	H	192/199 (96%)	191 (100%)	1 (0%)	88	94
1	I	197/199 (99%)	194 (98%)	3 (2%)	65	76
1	J	199/199 (100%)	196 (98%)	3 (2%)	65	76
2	K	4/4 (100%)	4 (100%)	0	100	100
2	L	4/4 (100%)	4 (100%)	0	100	100
2	M	4/4 (100%)	4 (100%)	0	100	100
2	N	3/4 (75%)	3 (100%)	0	100	100
2	O	4/4 (100%)	4 (100%)	0	100	100
2	P	4/4 (100%)	4 (100%)	0	100	100
2	Q	4/4 (100%)	4 (100%)	0	100	100
2	R	4/4 (100%)	4 (100%)	0	100	100
2	S	4/4 (100%)	4 (100%)	0	100	100
2	T	4/4 (100%)	4 (100%)	0	100	100
All	All	2012/2030 (99%)	1989 (99%)	23 (1%)	73	84

5 of 23 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	G	78	ASN
1	I	45[A]	ARG
1	H	180	PHE

*Continued on next page...*

Continued from previous page...

Mol	Chain	Res	Type
1	I	45[B]	ARG
1	C	142	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	C	142	GLN
1	H	78	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

10 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	SEP	N	1270	2	8,9,10	1.55	1 (12%)	8,12,14	1.93	2 (25%)
2	SEP	M	1270	2	8,9,10	1.55	1 (12%)	8,12,14	1.78	2 (25%)
2	SEP	S	1270	2	8,9,10	1.57	1 (12%)	8,12,14	1.82	2 (25%)
2	SEP	L	1270	2	8,9,10	1.57	1 (12%)	8,12,14	1.67	2 (25%)
2	SEP	T	1270	2	8,9,10	1.54	1 (12%)	8,12,14	1.92	2 (25%)
2	SEP	O	1270	2	8,9,10	1.56	1 (12%)	8,12,14	1.51	2 (25%)
2	SEP	K	1270	2	8,9,10	1.56	1 (12%)	8,12,14	1.75	2 (25%)
2	SEP	P	1270	2	8,9,10	1.58	1 (12%)	8,12,14	1.78	2 (25%)
2	SEP	R	1270	2	8,9,10	1.55	1 (12%)	8,12,14	1.68	2 (25%)
2	SEP	Q	1270	2	8,9,10	1.57	1 (12%)	8,12,14	1.76	2 (25%)

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	SEP	N	1270	2	-	0/5/8/10	-
2	SEP	M	1270	2	-	0/5/8/10	-
2	SEP	S	1270	2	-	0/5/8/10	-
2	SEP	L	1270	2	-	0/5/8/10	-
2	SEP	T	1270	2	-	0/5/8/10	-
2	SEP	O	1270	2	-	0/5/8/10	-
2	SEP	K	1270	2	-	0/5/8/10	-
2	SEP	P	1270	2	-	0/5/8/10	-
2	SEP	R	1270	2	-	0/5/8/10	-
2	SEP	Q	1270	2	-	0/5/8/10	-

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	S	1270	SEP	P-O1P	3.42	1.61	1.50
2	P	1270	SEP	P-O1P	3.38	1.61	1.50
2	Q	1270	SEP	P-O1P	3.38	1.61	1.50
2	O	1270	SEP	P-O1P	3.37	1.61	1.50
2	L	1270	SEP	P-O1P	3.37	1.61	1.50

The worst 5 of 20 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	N	1270	SEP	OG-CB-CA	3.99	112.03	108.14
2	T	1270	SEP	OG-CB-CA	3.89	111.94	108.14
2	Q	1270	SEP	OG-CB-CA	3.67	111.72	108.14
2	M	1270	SEP	OG-CB-CA	3.60	111.65	108.14
2	S	1270	SEP	OG-CB-CA	3.59	111.64	108.14

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

5 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	M	1270	SEP	1	0
2	L	1270	SEP	1	0
2	T	1270	SEP	1	0

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	R	1270	SEP	1	0
2	Q	1270	SEP	1	0

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

11 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
3	FMT	E	1302	-	2,2,2	0.72	0	1,1,1	0.46	0
3	FMT	C	1301	-	2,2,2	0.71	0	1,1,1	0.45	0
3	FMT	D	1301	-	2,2,2	0.72	0	1,1,1	0.45	0
3	FMT	J	1302	-	2,2,2	0.70	0	1,1,1	0.45	0
3	FMT	Q	1301	-	2,2,2	0.68	0	1,1,1	0.47	0
3	FMT	S	1301	-	2,2,2	0.68	0	1,1,1	0.46	0
3	FMT	J	1301	-	2,2,2	0.70	0	1,1,1	0.44	0
4	EDO	E	1301	-	3,3,3	0.45	0	2,2,2	0.52	0
3	FMT	H	1301	-	2,2,2	0.72	0	1,1,1	0.46	0
3	FMT	K	1301	-	2,2,2	0.67	0	1,1,1	0.46	0
3	FMT	B	1301	-	2,2,2	0.68	0	1,1,1	0.46	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	EDO	E	1301	-	-	1/1/1/1	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	E	1301	EDO	O1-C1-C2-O2

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	1301	FMT	1	0
3	H	1301	FMT	1	0

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data [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, 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	234/241 (97%)	0.71	15 (6%) 19 28	32, 57, 103, 154	0
1	B	234/241 (97%)	0.80	18 (7%) 13 20	30, 57, 123, 171	0
1	C	232/241 (96%)	0.67	13 (5%) 24 35	34, 58, 103, 125	0
1	D	236/241 (97%)	0.82	26 (11%) 5 8	37, 62, 117, 168	0
1	E	234/241 (97%)	0.68	8 (3%) 45 57	35, 53, 100, 127	0
1	F	237/241 (98%)	0.63	14 (5%) 22 33	39, 60, 116, 152	0
1	G	236/241 (97%)	0.77	17 (7%) 15 23	35, 64, 114, 145	0
1	H	227/241 (94%)	0.78	17 (7%) 14 21	31, 58, 103, 159	0
1	I	234/241 (97%)	0.76	26 (11%) 5 8	39, 57, 106, 147	0
1	J	234/241 (97%)	0.72	20 (8%) 10 16	39, 56, 112, 150	0
2	K	5/6 (83%)	0.82	1 (20%) 1 2	50, 56, 71, 84	0
2	L	5/6 (83%)	1.36	1 (20%) 1 2	45, 52, 76, 109	0
2	M	5/6 (83%)	1.48	1 (20%) 1 2	52, 57, 81, 99	0
2	N	4/6 (66%)	1.51	2 (50%) 0 0	56, 60, 78, 92	0
2	O	5/6 (83%)	1.11	1 (20%) 1 2	48, 54, 77, 112	0
2	P	5/6 (83%)	0.72	0 100 100	52, 58, 93, 106	0
2	Q	5/6 (83%)	1.12	2 (40%) 0 0	56, 62, 70, 90	0
2	R	5/6 (83%)	1.14	0 100 100	60, 72, 77, 91	0
2	S	5/6 (83%)	1.19	1 (20%) 1 2	55, 61, 77, 101	0
2	T	5/6 (83%)	2.00	2 (40%) 0 0	61, 62, 84, 115	0
All	All	2387/2470 (96%)	0.75	185 (7%) 13 19	30, 58, 110, 171	0

The worst 5 of 185 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	H	209	LEU	11.2
1	B	213	GLY	9.2
1	I	209	LEU	8.9
1	I	237	ASP	8.6
1	B	210	ASP	8.0

## 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, 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
2	SEP	M	1270	10/11	0.96	0.17	42,48,58,59	0
2	SEP	S	1270	10/11	0.96	0.18	44,49,57,67	0
2	SEP	N	1270	10/11	0.97	0.17	47,48,65,72	0
2	SEP	O	1270	10/11	0.97	0.17	39,43,54,54	0
2	SEP	Q	1270	10/11	0.97	0.17	40,46,56,58	0
2	SEP	R	1270	10/11	0.97	0.21	54,57,67,68	0
2	SEP	L	1270	10/11	0.97	0.17	39,43,47,49	0
2	SEP	P	1270	10/11	0.98	0.19	38,47,59,66	0
2	SEP	K	1270	10/11	0.98	0.15	37,45,53,57	0
2	SEP	T	1270	10/11	0.98	0.18	45,53,61,63	0

## 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
3	FMT	J	1301	3/3	0.46	0.67	92,94,111,113	0
3	FMT	J	1302	3/3	0.68	0.68	75,91,110,123	0
4	EDO	E	1301	4/4	0.84	0.36	51,83,103,103	0
3	FMT	S	1301	3/3	0.87	0.27	73,76,76,87	0

*Continued on next page...*



*Continued from previous page...*

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
3	FMT	D	1301	3/3	0.88	0.17	58,60,60,72	0
3	FMT	C	1301	3/3	0.93	0.14	58,60,79,95	0
3	FMT	B	1301	3/3	0.93	0.15	54,57,59,71	0
3	FMT	Q	1301	3/3	0.94	0.24	65,69,71,86	0
3	FMT	H	1301	3/3	0.95	0.16	50,53,53,64	0
3	FMT	K	1301	3/3	0.96	0.14	50,54,62,65	0
3	FMT	E	1302	3/3	0.96	0.17	43,53,57,64	0

## 6.5 Other polymers [\(i\)](#)

There are no such residues in this entry.