



Full wwPDB X-ray Structure Validation Report ⓘ

Sep 7, 2023 – 01:32 pm BST

PDB ID : 8BUH
Title : Structure of DDB1 bound to WX3-engaged CDK12-cyclin K
Authors : Kozicka, Z.; Kempf, G.; Focht, V.; Thoma, N.H.
Deposited on : 2022-11-30
Resolution : 3.79 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

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)
Xtriage (Phenix) : 1.13
EDS : 2.35
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) : 2.35

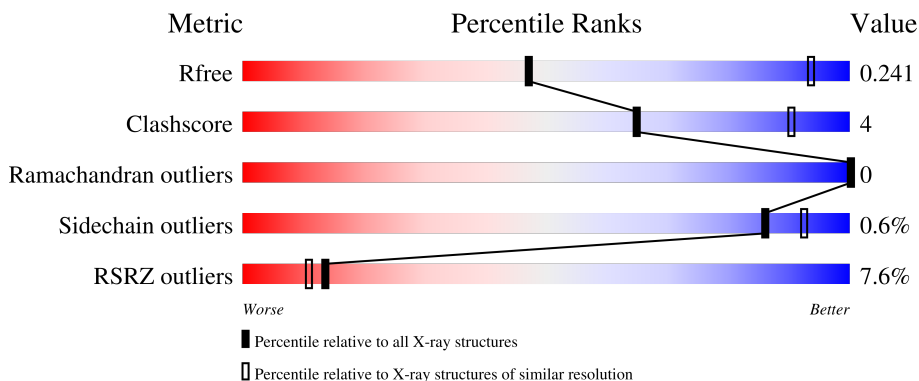
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.79 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.



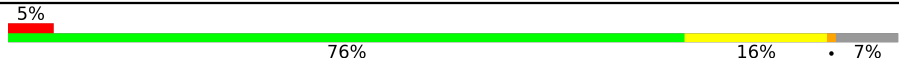

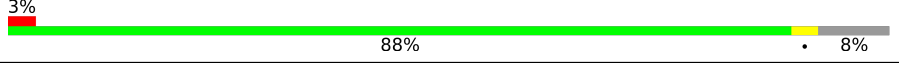
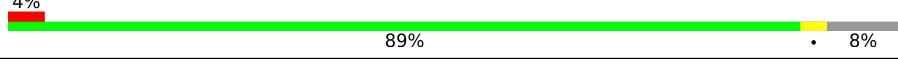
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1212 (4.00-3.60)
Clashscore	141614	1288 (4.00-3.60)
Ramachandran outliers	138981	1243 (4.00-3.60)
Sidechain outliers	138945	1237 (4.00-3.60)
RSRZ outliers	127900	1121 (4.00-3.60)

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 ≥ 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	840	 9% 89% 9%
1	D	840	 7% 90% 9%
1	G	840	 9% 84% 14%
2	B	344	 10% 76% 18% 6%
2	E	344	 10% 74% 19% 7%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
2	H	344	
3	C	271	
3	F	271	
3	I	271	

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 67160 atoms, of which 33507 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 DNA damage-binding protein 1.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
1	A	826	12936	4105	6449	1094	1252	36	6449	0	0
1	D	827	12957	4111	6462	1095	1253	36	6462	0	0
1	G	826	12940	4106	6454	1093	1251	36	6454	0	0

There are 39 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-3	GLY	-	expression tag	UNP Q16531
A	-2	GLY	-	expression tag	UNP Q16531
A	-1	GLY	-	expression tag	UNP Q16531
A	0	ARG	-	expression tag	UNP Q16531
A	700	GLY	-	linker	UNP Q16531
A	701	ASN	-	linker	UNP Q16531
A	702	GLY	-	linker	UNP Q16531
A	703	ASN	-	linker	UNP Q16531
A	704	SER	-	linker	UNP Q16531
A	705	GLY	-	linker	UNP Q16531
A	706	GLU	-	linker	UNP Q16531
A	707	ILE	-	linker	UNP Q16531
A	708	GLN	-	linker	UNP Q16531
D	-3	GLY	-	expression tag	UNP Q16531
D	-2	GLY	-	expression tag	UNP Q16531
D	-1	GLY	-	expression tag	UNP Q16531
D	0	ARG	-	expression tag	UNP Q16531
D	700	GLY	-	linker	UNP Q16531
D	701	ASN	-	linker	UNP Q16531
D	702	GLY	-	linker	UNP Q16531
D	703	ASN	-	linker	UNP Q16531
D	704	SER	-	linker	UNP Q16531
D	705	GLY	-	linker	UNP Q16531

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
D	706	GLU	-	linker	UNP Q16531
D	707	ILE	-	linker	UNP Q16531
D	708	GLN	-	linker	UNP Q16531
G	-3	GLY	-	expression tag	UNP Q16531
G	-2	GLY	-	expression tag	UNP Q16531
G	-1	GLY	-	expression tag	UNP Q16531
G	0	ARG	-	expression tag	UNP Q16531
G	700	GLY	-	linker	UNP Q16531
G	701	ASN	-	linker	UNP Q16531
G	702	GLY	-	linker	UNP Q16531
G	703	ASN	-	linker	UNP Q16531
G	704	SER	-	linker	UNP Q16531
G	705	GLY	-	linker	UNP Q16531
G	706	GLU	-	linker	UNP Q16531
G	707	ILE	-	linker	UNP Q16531
G	708	GLN	-	linker	UNP Q16531

- Molecule 2 is a protein called Cyclin-dependent kinase 12.

Mol	Chain	Residues	Atoms							ZeroOcc	AltConf	Trace
			Total	C	H	N	O	P	S			
2	B	325	5309	1695	2663	447	486	1	17	2663	0	0
2	E	320	5228	1666	2629	438	478	1	16	2629	0	0
2	H	319	5214	1661	2622	437	477	1	16	2622	0	0

There are 15 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	709	GLY	-	expression tag	UNP Q9NYV4
B	710	GLY	-	expression tag	UNP Q9NYV4
B	711	GLY	-	expression tag	UNP Q9NYV4
B	965	ARG	LYS	engineered mutation	UNP Q9NYV4
B	1052	GLN	-	expression tag	UNP Q9NYV4
E	709	GLY	-	expression tag	UNP Q9NYV4
E	710	GLY	-	expression tag	UNP Q9NYV4
E	711	GLY	-	expression tag	UNP Q9NYV4
E	965	ARG	LYS	engineered mutation	UNP Q9NYV4
E	1052	GLN	-	expression tag	UNP Q9NYV4
H	709	GLY	-	expression tag	UNP Q9NYV4
H	710	GLY	-	expression tag	UNP Q9NYV4

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
H	711	GLY	-	expression tag	UNP Q9NYV4
H	965	ARG	LYS	engineered mutation	UNP Q9NYV4
H	1052	GLN	-	expression tag	UNP Q9NYV4

- Molecule 3 is a protein called Cyclin-K.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
3	C	248	Total	C	H	N	O	S	2048	0	0
			4111	1341	2048	346	363	13			
3	F	248	Total	C	H	N	O	S	2048	0	0
			4111	1341	2048	346	363	13			
3	I	248	Total	C	H	N	O	S	2048	0	0
			4111	1341	2048	346	363	13			

There are 12 discrepancies between the modelled and reference sequences:

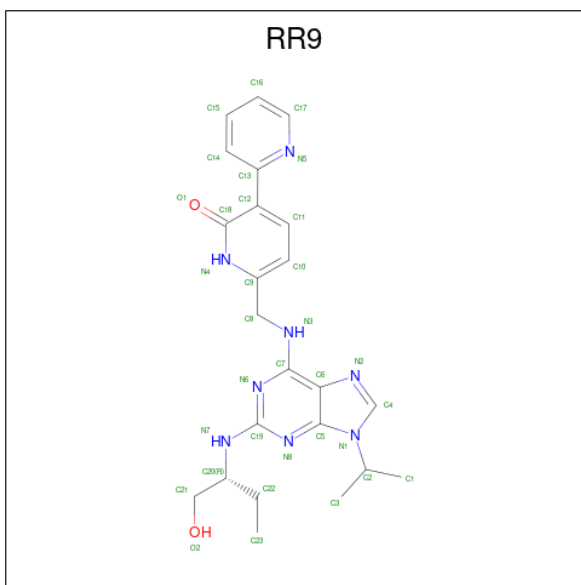
Chain	Residue	Modelled	Actual	Comment	Reference
C	-3	GLY	-	expression tag	UNP O75909
C	-2	GLY	-	expression tag	UNP O75909
C	-1	GLY	-	expression tag	UNP O75909
C	0	ARG	-	expression tag	UNP O75909
F	-3	GLY	-	expression tag	UNP O75909
F	-2	GLY	-	expression tag	UNP O75909
F	-1	GLY	-	expression tag	UNP O75909
F	0	ARG	-	expression tag	UNP O75909
I	-3	GLY	-	expression tag	UNP O75909
I	-2	GLY	-	expression tag	UNP O75909
I	-1	GLY	-	expression tag	UNP O75909
I	0	ARG	-	expression tag	UNP O75909

- Molecule 4 is SULFATE ION (three-letter code: SO4) (formula: O₄S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	O	S	0	0
			5	4	1		
4	A	1	Total	O	S	0	0
			5	4	1		
4	A	1	Total	O	S	0	0
			5	4	1		
4	A	1	Total	O	S	0	0
			5	4	1		
4	C	1	Total	O	S	0	0
			5	4	1		
4	D	1	Total	O	S	0	0
			5	4	1		
4	D	1	Total	O	S	0	0
			5	4	1		
4	F	1	Total	O	S	0	0
			5	4	1		
4	G	1	Total	O	S	0	0
			5	4	1		
4	G	1	Total	O	S	0	0
			5	4	1		
4	G	1	Total	O	S	0	0
			5	4	1		
4	I	1	Total	O	S	0	0
			5	4	1		

- Molecule 5 is 6-[[[2-[[[2 {R}]-1-oxidanylbutan-2-yl]amino]-9-propan-2-yl-purin-6-yl]amino]methyl]-3-pyridin-2-yl-1 {H}-pyridin-2-one (three-letter code: RR9) (formula: C₂₃H₂₈N₈O₂) (labeled as "Ligand of Interest" by depositor).

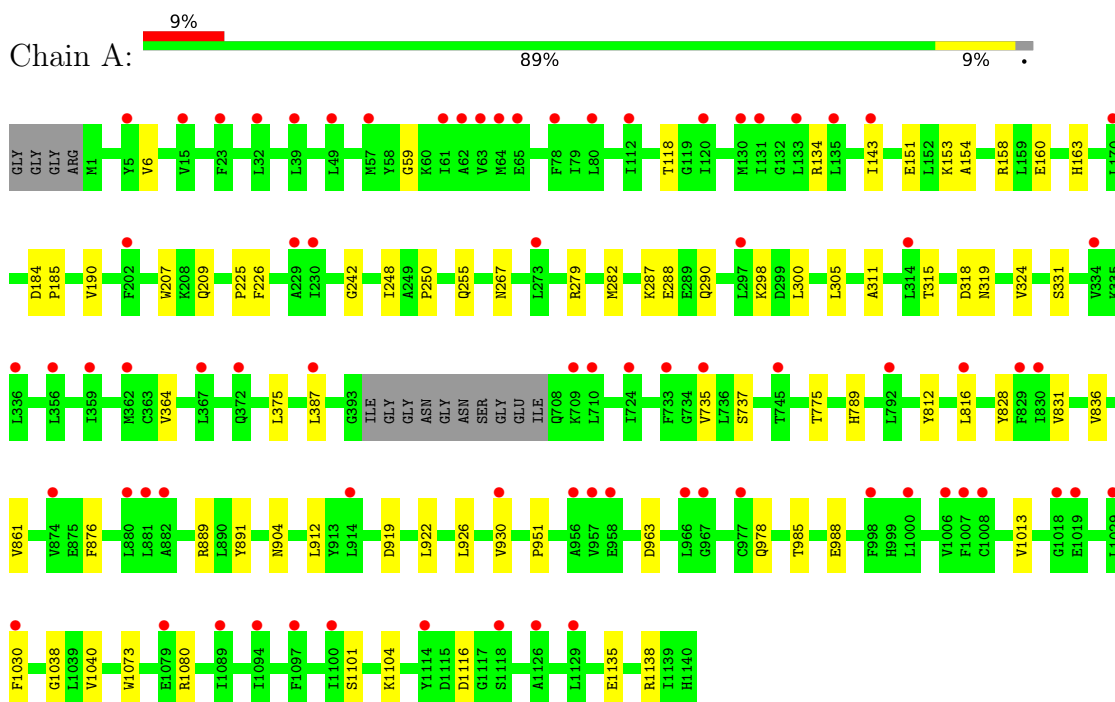


Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	H	N	O			
5	B	1	Total	61	23	28	8	2	28	0
5	E	1	Total	61	23	28	8	2	28	0
5	H	1	Total	61	23	28	8	2	28	0

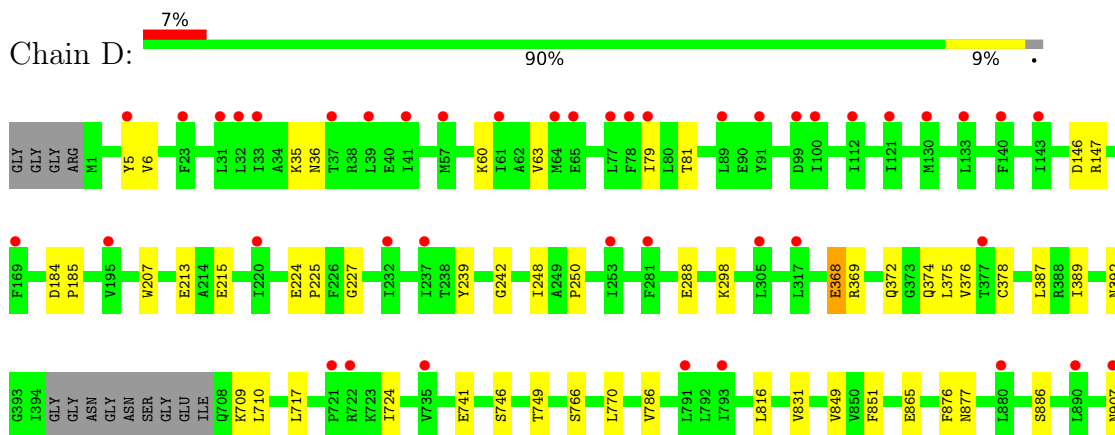
3 Residue-property plots [i](#)

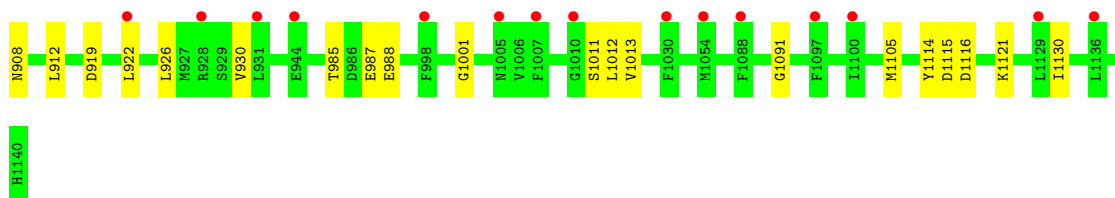
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: DNA damage-binding protein 1

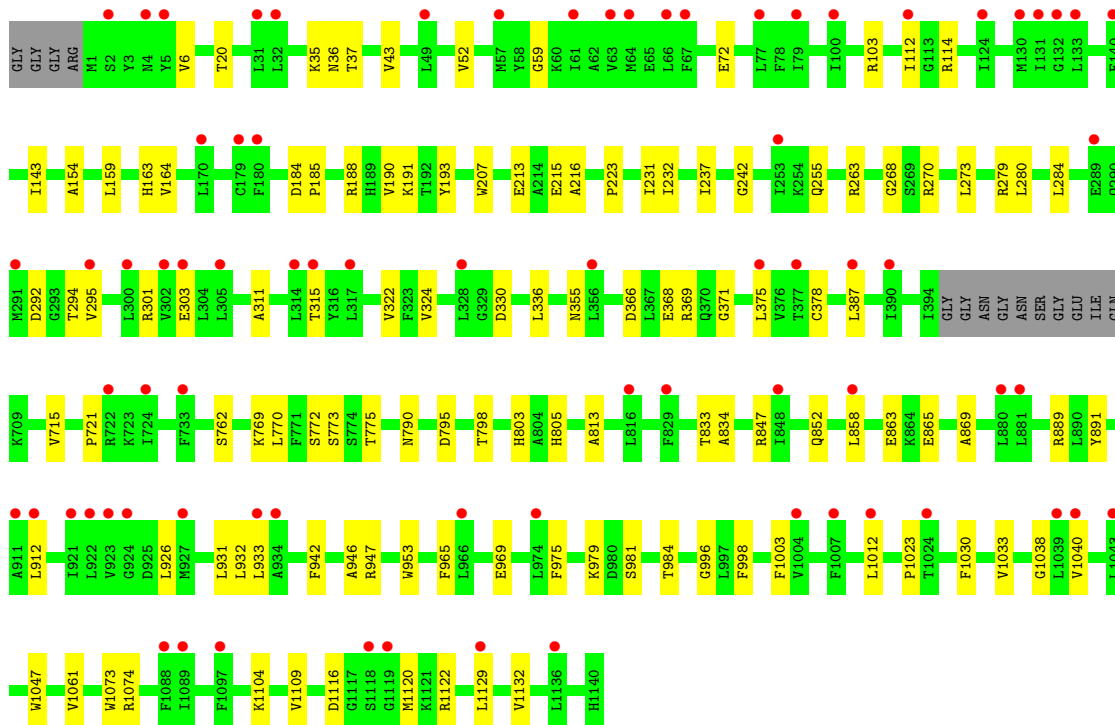
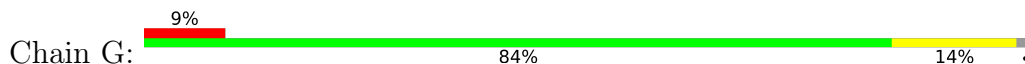


- Molecule 1: DNA damage-binding protein 1

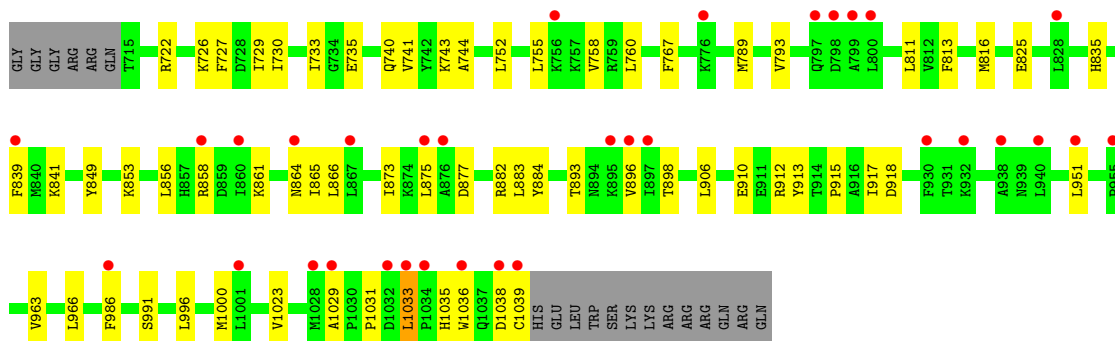
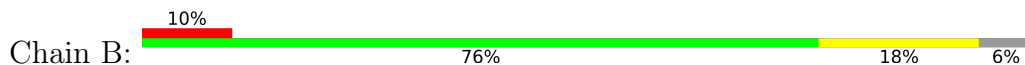




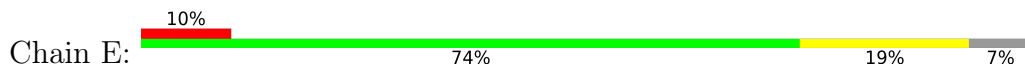
• Molecule 1: DNA damage-binding protein 1

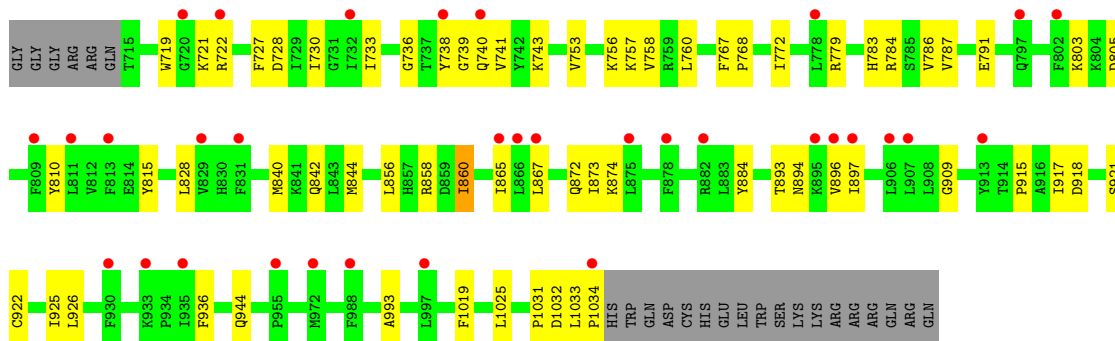


• Molecule 2: Cyclin-dependent kinase 12

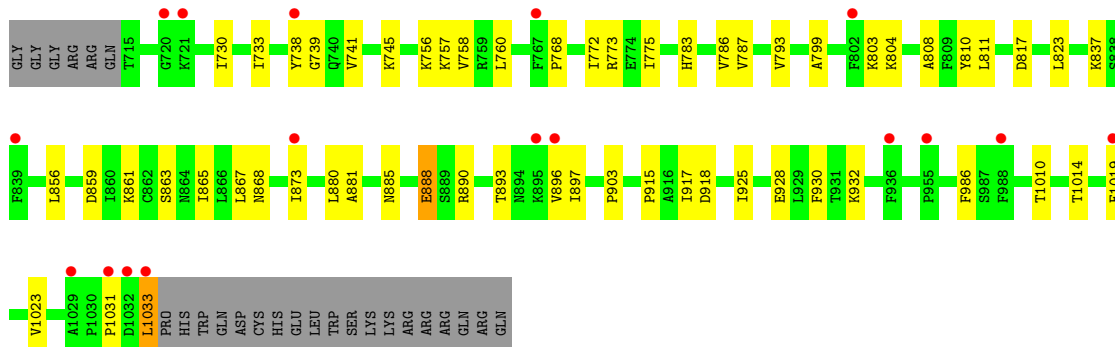
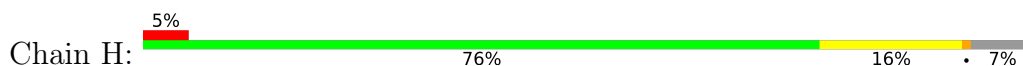


• Molecule 2: Cyclin-dependent kinase 12

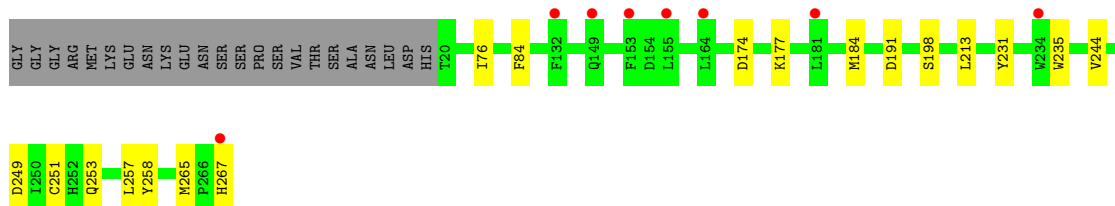
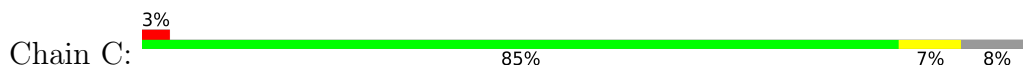




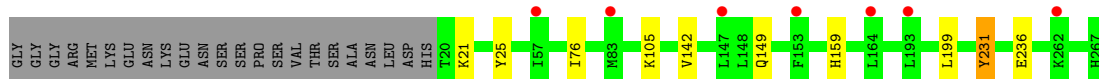
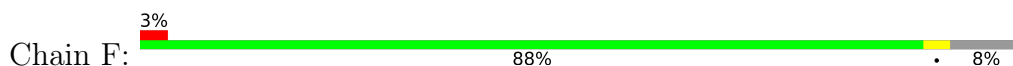
- Molecule 2: Cyclin-dependent kinase 12



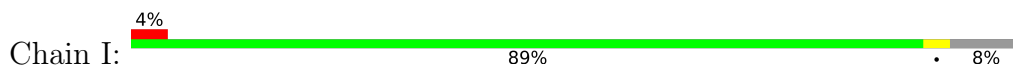
- Molecule 3: Cyclin-K

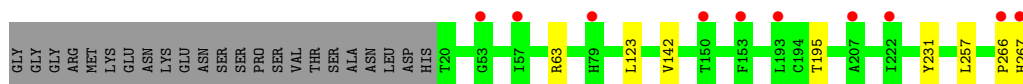


- Molecule 3: Cyclin-K



- Molecule 3: Cyclin-K





4 Data and refinement statistics i

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, α , β , γ	249.14Å 249.14Å 217.39Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	37.21 – 3.79 215.76 – 3.79	Depositor EDS
% Data completeness (in resolution range)	82.5 (37.21-3.79) 82.5 (215.76-3.79)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.48 (at 3.78Å)	Xtrriage
Refinement program	PHENIX 1.20.1_4487	Depositor
R, R_{free}	0.187 , 0.232 0.202 , 0.241	Depositor DCC
R_{free} test set	3167 reflections (4.95%)	wwPDB-VP
Wilson B-factor (Å ²)	138.7	Xtrriage
Anisotropy	0.009	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 112.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.40$, $\langle L^2 \rangle = 0.23$	Xtrriage
Estimated twinning fraction	0.090 for -h,-k,l	Xtrriage
F_o, F_c correlation	0.90	EDS
Total number of atoms	67160	wwPDB-VP
Average B, all atoms (Å ²)	166.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.64% 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: SO4, RR9, TPO

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	0.34	0/6604	0.60	0/8931
1	D	0.36	1/6612 (0.0%)	0.61	0/8942
1	G	0.35	0/6603	0.61	0/8930
2	B	0.35	0/2693	0.60	0/3630
2	E	0.34	0/2643	0.58	0/3561
2	H	0.42	3/2635 (0.1%)	0.62	1/3549 (0.0%)
3	C	0.35	0/2120	0.55	0/2868
3	F	0.35	0/2120	0.56	0/2868
3	I	0.34	0/2120	0.55	0/2868
All	All	0.35	4/34150 (0.0%)	0.60	1/46147 (0.0%)

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	H	888	GLU	CD-OE1	-5.92	1.19	1.25
1	D	368	GLU	CB-CG	5.80	1.63	1.52
2	H	890	ARG	CZ-NH1	-5.43	1.25	1.33
2	H	888	GLU	CG-CD	-5.10	1.44	1.51

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	888	GLU	CG-CD-OE1	-5.46	107.39	118.30

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	6487	6449	6451	40	0
1	D	6495	6462	6464	43	0
1	G	6486	6454	6454	72	0
2	B	2646	2663	2663	34	0
2	E	2599	2629	2629	39	0
2	H	2592	2622	2622	36	0
3	C	2063	2048	2048	10	0
3	F	2063	2048	2048	7	0
3	I	2063	2048	2048	5	0
4	A	20	0	0	0	0
4	C	5	0	0	0	0
4	D	10	0	0	0	0
4	F	5	0	0	0	0
4	G	15	0	0	0	0
4	I	5	0	0	0	0
5	B	33	28	0	0	0
5	E	33	28	0	1	0
5	H	33	28	0	2	0
All	All	33653	33507	33427	274	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 4.

All (274) 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:F:231:TYR:OH	3:F:236:GLU:OE1	1.89	0.91
2:E:867:LEU:HD13	2:E:873:ILE:HD13	1.69	0.73
1:D:368:GLU:OE1	1:D:374:GLN:NE2	2.21	0.73
2:E:867:LEU:HD13	2:E:873:ILE:CD1	2.23	0.69
1:G:1109:VAL:HG12	1:G:1129:LEU:HD12	1.76	0.68
2:H:803:LYS:HA	3:I:142:VAL:HG11	1.75	0.68
2:E:739:GLY:HA3	2:E:757:LYS:O	1.94	0.68
2:H:861:LYS:HE3	2:H:863:SER:HB3	1.77	0.66
1:G:6:VAL:HG22	1:G:1040:VAL:HG22	1.79	0.65

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:867:LEU:HD21	2:E:1031:PRO:HG3	1.79	0.64
2:H:859:ASP:HB2	2:H:880:LEU:HD12	1.79	0.63
1:A:6:VAL:HG22	1:A:1040:VAL:HG22	1.81	0.63
1:D:985:THR:HB	1:D:988:GLU:HG2	1.82	0.62
1:D:1115:ASP:OD2	1:D:1121:LYS:NZ	2.33	0.62
1:D:207:TRP:HB3	1:D:242:GLY:HA2	1.82	0.61
1:A:912:LEU:HD11	1:A:926:LEU:HD13	1.82	0.61
2:H:817:ASP:HB2	2:H:868:ASN:HA	1.83	0.60
1:G:284:LEU:HD12	1:G:303:GLU:OE2	2.00	0.60
1:A:816:LEU:HD13	1:A:831:VAL:HG22	1.83	0.60
2:B:729:ILE:HD13	2:B:744:ALA:HB2	1.84	0.60
1:G:292:ASP:OD2	1:G:294:THR:HG23	2.02	0.60
2:H:799:ALA:HB1	2:H:804:LYS:HB2	1.85	0.59
1:G:773:SER:C	1:G:775:THR:H	2.06	0.58
2:B:963:VAL:HA	2:B:966:LEU:HD12	1.85	0.58
1:G:1023:PRO:HB3	1:G:1047:TRP:CE2	2.39	0.58
1:G:375:LEU:HB2	1:G:1012:LEU:HD21	1.84	0.57
2:E:856:LEU:HD11	2:E:915:PRO:HG3	1.87	0.57
2:B:951:LEU:HD21	2:B:986:PHE:HE2	1.70	0.57
1:D:770:LEU:HD13	1:D:865:GLU:HB2	1.86	0.57
1:G:43:VAL:HG23	1:G:52:VAL:HG21	1.86	0.56
2:H:1031:PRO:O	2:H:1033:LEU:HD22	2.04	0.56
1:A:775:THR:HG22	1:A:775:THR:O	2.06	0.56
2:H:867:LEU:HD13	2:H:873:ILE:HD11	1.87	0.56
1:A:207:TRP:HB3	1:A:242:GLY:HA2	1.88	0.55
1:G:1047:TRP:HZ3	1:G:1132:VAL:HG13	1.69	0.55
2:B:1031:PRO:O	2:B:1033:LEU:HD22	2.07	0.55
1:G:378:CYS:HB3	1:G:721:PRO:HB2	1.89	0.55
1:D:213:GLU:HG2	1:D:215:GLU:H	1.72	0.55
1:A:387:LEU:HD11	1:A:735:VAL:HG21	1.89	0.54
1:D:816:LEU:HD13	1:D:831:VAL:HG22	1.89	0.54
1:G:368:GLU:O	1:G:369:ARG:HB2	2.07	0.54
1:D:60:LYS:O	1:D:81:THR:HA	2.08	0.54
2:H:867:LEU:HD21	2:H:1031:PRO:HG2	1.88	0.54
1:D:387:LEU:HG	1:D:717:LEU:HD11	1.90	0.54
2:B:733:ILE:HD11	2:B:741:VAL:HG12	1.89	0.54
1:G:114:ARG:HD3	2:H:930:PHE:O	2.08	0.54
1:G:1061:VAL:HG11	1:G:1104:LYS:HB3	1.90	0.53
1:D:372:GLN:NE2	1:D:392:ASN:O	2.41	0.53
1:G:213:GLU:HG2	1:G:215:GLU:H	1.73	0.53
1:A:248:ILE:HG12	1:A:250:PRO:HD3	1.89	0.53

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:839:PHE:HA	2:B:873:ILE:HD13	1.90	0.53
1:A:922:LEU:HD11	1:A:930:VAL:HB	1.91	0.53
3:C:76:ILE:CD1	3:C:198:SER:HB3	2.39	0.53
2:E:738:TYR:OH	2:E:756:LYS:HD3	2.08	0.53
2:B:735:GLU:HG2	2:B:740:GLN:HG2	1.90	0.52
1:D:6:VAL:O	1:D:1091:GLY:N	2.40	0.52
1:G:773:SER:O	1:G:775:THR:N	2.38	0.52
2:H:787:VAL:HG21	5:H:1101:RR9:C1	2.38	0.52
2:B:760:LEU:HD21	2:B:767:PHE:CD2	2.45	0.52
2:H:775:ILE:HD11	2:H:811:LEU:HD21	1.92	0.52
2:E:722:ARG:NH1	2:E:791:GLU:OE2	2.43	0.52
1:A:118:THR:OG1	1:A:134:ARG:NH2	2.29	0.51
1:G:36:ASN:O	1:G:37:THR:OG1	2.21	0.51
2:H:738:TYR:OH	2:H:756:LYS:HD3	2.10	0.51
2:H:730:ILE:HD11	2:H:745:LYS:HB2	1.92	0.51
2:H:856:LEU:O	2:H:881:ALA:HA	2.11	0.51
1:A:255:GLN:HB2	1:A:279:ARG:HH22	1.75	0.51
1:A:364:VAL:HG22	1:A:375:LEU:HD13	1.91	0.51
3:I:63:ARG:HE	3:I:123:LEU:HD21	1.76	0.51
2:H:856:LEU:HD22	2:H:915:PRO:HA	1.93	0.51
1:D:849:VAL:HG11	1:D:851:PHE:CZ	2.46	0.51
1:D:709:LYS:HG2	1:D:710:LEU:N	2.26	0.50
1:D:886:SER:HB2	1:D:908:ASN:O	2.12	0.50
1:D:907:ASN:HB2	2:E:730:ILE:HG22	1.92	0.50
1:G:255:GLN:OE1	1:G:279:ARG:NH1	2.44	0.50
3:C:76:ILE:HD12	3:C:198:SER:HB3	1.92	0.50
1:D:912:LEU:HD11	1:D:926:LEU:HD13	1.93	0.50
1:A:184:ASP:HB2	1:A:185:PRO:CD	2.42	0.50
2:B:722:ARG:HE	2:B:726:LYS:HG3	1.76	0.50
3:C:174:ASP:OD2	3:C:177:LYS:HG3	2.12	0.50
1:G:387:LEU:HB2	1:G:715:VAL:HB	1.93	0.50
1:G:889:ARG:HD2	1:G:891:TYR:CZ	2.47	0.49
1:G:933:LEU:HD22	1:G:942:PHE:HB3	1.94	0.49
1:G:1047:TRP:CZ3	1:G:1132:VAL:HG13	2.45	0.49
1:D:368:GLU:O	1:D:369:ARG:HB2	2.12	0.49
1:G:770:LEU:HD21	1:G:865:GLU:HB2	1.95	0.49
1:A:318:ASP:OD1	1:A:319:ASN:N	2.46	0.49
1:D:877:ASN:ND2	1:D:919:ASP:OD1	2.44	0.49
1:G:852:GLN:O	1:G:858:LEU:HA	2.12	0.49
2:H:897:ILE:HD12	2:H:903:PRO:HD3	1.94	0.49
1:A:889:ARG:HG3	1:A:904:ASN:OD1	2.12	0.49

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:876:PHE:CZ	1:A:919:ASP:HA	2.47	0.48
1:A:1030:PHE:CZ	1:A:1038:GLY:HA3	2.48	0.48
2:E:844:MET:HE3	2:E:922:CYS:HB3	1.95	0.48
1:A:1080:ARG:HD3	2:B:825:GLU:HA	1.95	0.48
1:G:301:ARG:HD2	1:G:303:GLU:OE2	2.14	0.48
1:G:72:GLU:OE2	1:G:103:ARG:NH2	2.47	0.48
1:D:876:PHE:CZ	1:D:919:ASP:HA	2.49	0.48
1:A:1135:GLU:HA	1:A:1138:ARG:HD2	1.94	0.48
1:G:184:ASP:HB2	1:G:185:PRO:CD	2.43	0.48
1:D:987:GLU:HG2	2:E:740:GLN:CD	2.34	0.48
2:H:768:PRO:O	2:H:772:ILE:HG13	2.12	0.48
2:B:856:LEU:HD22	2:B:915:PRO:HA	1.96	0.47
1:G:112:ILE:HD13	2:H:986:PHE:CE2	2.50	0.47
2:H:1010:THR:O	2:H:1014:THR:HG23	2.14	0.47
2:E:733:ILE:HD11	2:E:741:VAL:HG12	1.96	0.47
2:H:739:GLY:HA3	2:H:757:LYS:O	2.14	0.47
2:H:741:VAL:HG21	5:H:1101:RR9:C23	2.45	0.47
2:H:917:ILE:HG13	2:H:918:ASP:N	2.29	0.47
1:D:1105:MET:SD	1:D:1130:ILE:HD11	2.54	0.47
1:A:828:TYR:CE1	1:A:861:VAL:HG21	2.50	0.47
2:B:910:GLU:C	2:B:912:ARG:H	2.18	0.47
3:C:84:PHE:HA	1:D:746:SER:HB3	1.96	0.47
3:C:191:ASP:OD2	3:C:258:TYR:OH	2.31	0.47
1:D:224:GLU:N	1:D:225:PRO:HD2	2.30	0.47
1:D:1116:ASP:OD1	1:D:1116:ASP:O	2.33	0.47
1:G:762:SER:O	1:G:803:HIS:HA	2.15	0.47
2:H:741:VAL:HG22	2:H:756:LYS:HG2	1.97	0.47
1:A:311:ALA:HB2	1:A:324:VAL:HG13	1.96	0.46
2:E:936:PHE:HB2	2:E:944:GLN:HE22	1.79	0.46
2:B:816:MET:HG3	2:B:866:LEU:HB3	1.97	0.46
2:E:803:LYS:HA	3:F:142:VAL:CG1	2.45	0.46
2:E:856:LEU:HD13	2:E:884:TYR:HB2	1.98	0.46
1:G:858:LEU:HD12	1:G:858:LEU:O	2.15	0.46
1:G:223:PRO:HD2	1:G:268:GLY:HA3	1.96	0.46
1:D:146:ASP:OD1	1:D:147:ARG:N	2.49	0.46
2:E:784:ARG:O	2:E:874:LYS:HE2	2.15	0.46
2:B:816:MET:HG3	2:B:866:LEU:HD13	1.97	0.46
1:G:143:ILE:HG12	1:G:154:ALA:HB2	1.98	0.46
1:A:151:GLU:OE1	1:A:153:LYS:HE2	2.16	0.46
1:A:288:GLU:HB2	1:A:298:LYS:HB2	1.98	0.46
1:A:737:SER:O	1:A:789:HIS:HA	2.16	0.46

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:248:ILE:HD12	1:A:300:LEU:O	2.16	0.45
1:D:376:VAL:HG22	1:D:389:ILE:HG23	1.97	0.45
1:D:1011:SER:OG	1:D:1013:VAL:HG12	2.16	0.45
1:G:311:ALA:HB2	1:G:324:VAL:HG13	1.98	0.45
1:A:226:PHE:CE2	1:A:287:LYS:HG2	2.51	0.45
2:E:787:VAL:HG21	5:E:1101:RR9:C1	2.46	0.45
1:D:375:LEU:HB2	1:D:1012:LEU:HD21	1.98	0.45
2:B:917:ILE:HG13	2:B:918:ASP:N	2.32	0.45
3:C:235:TRP:CH2	3:C:244:VAL:HG22	2.51	0.45
1:G:59:GLY:HA2	1:G:1073:TRP:CE3	2.51	0.45
1:A:225:PRO:HG2	1:A:267:ASN:HB2	1.98	0.45
2:H:758:VAL:O	2:H:808:ALA:HB1	2.17	0.45
1:D:378:CYS:SG	1:D:724:ILE:HB	2.57	0.45
1:G:43:VAL:HG23	1:G:52:VAL:CG2	2.47	0.45
1:G:59:GLY:HA2	1:G:1073:TRP:CZ3	2.52	0.45
1:G:931:LEU:HD22	1:G:947:ARG:NH2	2.32	0.45
2:H:867:LEU:HD13	2:H:873:ILE:CD1	2.47	0.45
1:A:1116:ASP:OD1	1:A:1116:ASP:O	2.34	0.45
2:B:858:ARG:NH1	2:B:882:ARG:HB2	2.31	0.45
2:E:727:PHE:CE1	2:E:753:VAL:HG21	2.52	0.45
1:G:984:THR:O	1:G:984:THR:HG22	2.16	0.45
2:B:841:LYS:HD2	2:B:1023:VAL:HB	1.99	0.44
2:E:772:ILE:CD1	3:F:105:LYS:HB3	2.47	0.44
2:B:730:ILE:HD12	2:B:743:LYS:HG2	1.99	0.44
1:D:749:THR:HG21	1:D:786:VAL:HG11	2.00	0.44
1:G:159:LEU:HD21	1:G:164:VAL:HG21	2.00	0.44
1:G:790:ASN:HA	1:G:805:HIS:O	2.16	0.44
2:H:760:LEU:HD12	2:H:760:LEU:N	2.32	0.44
2:B:755:LEU:HA	2:B:811:LEU:O	2.18	0.44
2:B:835:HIS:HD2	2:B:1029:ALA:HB1	1.81	0.44
1:G:366:ASP:OD2	1:G:371:GLY:N	2.51	0.44
2:B:789:MET:HE2	2:B:813:PHE:CZ	2.52	0.44
2:B:906:LEU:HD21	2:B:913:TYR:CD2	2.53	0.44
2:B:849:TYR:O	2:B:853:LYS:HG2	2.17	0.44
1:G:953:TRP:O	1:G:969:GLU:HA	2.18	0.44
3:C:213:LEU:HB2	3:C:251:CYS:SG	2.58	0.43
1:D:36:ASN:ND2	1:D:1001:GLY:O	2.52	0.43
1:G:847:ARG:HD2	1:G:863:GLU:OE2	2.18	0.43
3:I:195:THR:CG2	3:I:257:LEU:HD11	2.48	0.43
3:F:76:ILE:HD12	3:F:159:HIS:CE1	2.53	0.43
2:B:856:LEU:HD11	2:B:884:TYR:HB2	2.00	0.43

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:1114:TYR:O	1:D:1121:LYS:HA	2.18	0.43
2:E:779:ARG:HB3	3:F:21:LYS:HE2	2.00	0.43
1:G:1023:PRO:HB3	1:G:1047:TRP:CZ2	2.54	0.43
3:I:195:THR:HG21	3:I:257:LEU:HD11	2.01	0.43
2:H:885:ASN:HB3	2:H:888:GLU:O	2.19	0.43
3:C:265:MET:SD	3:C:265:MET:N	2.91	0.43
1:G:207:TRP:HB3	1:G:242:GLY:HA2	2.01	0.43
1:A:889:ARG:HD2	1:A:891:TYR:CZ	2.54	0.42
1:A:963:ASP:O	1:A:978:GLN:HA	2.19	0.42
1:D:184:ASP:HB2	1:D:185:PRO:CD	2.49	0.42
2:H:773:ARG:HD3	2:H:881:ALA:O	2.18	0.42
2:H:865:ILE:CD1	2:H:925:ILE:HD13	2.49	0.42
1:G:223:PRO:HG3	1:G:263:ARG:HH11	1.84	0.42
1:G:932:LEU:HD22	1:G:965:PHE:CZ	2.55	0.42
1:A:985:THR:OG1	1:A:988:GLU:HG3	2.20	0.42
2:E:721:LYS:HE3	3:F:149:GLN:O	2.19	0.42
2:E:756:LYS:O	2:E:810:TYR:HA	2.19	0.42
1:G:773:SER:C	1:G:775:THR:N	2.72	0.42
1:A:951:PRO:HG2	2:B:825:GLU:HG3	2.02	0.42
3:C:184:MET:CE	3:C:267:HIS:HA	2.49	0.42
2:E:1025:LEU:HD22	2:E:1025:LEU:H	1.85	0.42
2:E:738:TYR:CE2	2:E:758:VAL:HG22	2.55	0.42
2:E:840:MET:HG3	2:E:926:LEU:HD13	2.01	0.42
1:G:188:ARG:NH1	1:G:216:ALA:O	2.49	0.42
1:G:191:LYS:HE2	1:G:193:TYR:CE1	2.53	0.42
2:E:760:LEU:HD21	2:E:767:PHE:HD2	1.85	0.42
2:H:733:ILE:HD11	2:H:741:VAL:HG12	2.02	0.42
1:D:886:SER:O	1:D:908:ASN:HB2	2.20	0.42
2:E:860:ILE:HB	2:E:921:SER:CB	2.50	0.42
1:G:912:LEU:HD11	1:G:926:LEU:HD13	2.01	0.42
2:H:783:HIS:HB3	2:H:786:VAL:HG23	2.01	0.42
2:E:828:LEU:O	2:E:1034:PRO:HD2	2.20	0.42
1:G:833:THR:OG1	1:G:847:ARG:HB2	2.20	0.42
3:I:266:PRO:O	3:I:267:HIS:C	2.58	0.42
2:E:719:TRP:CD1	2:E:719:TRP:N	2.87	0.42
2:E:768:PRO:O	2:E:772:ILE:HG13	2.19	0.42
1:G:270:ARG:HG2	1:G:284:LEU:CD2	2.50	0.42
1:G:813:ALA:HA	1:G:833:THR:HG22	2.02	0.42
1:G:975:PHE:HA	1:G:996:GLY:O	2.20	0.42
2:H:837:LYS:HB3	2:H:1023:VAL:HG21	2.02	0.42
1:A:59:GLY:HA2	1:A:1073:TRP:CZ3	2.55	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:158:ARG:HH12	1:A:160:GLU:HG2	1.85	0.41
1:A:912:LEU:HD11	1:A:926:LEU:CD1	2.48	0.41
2:B:1035:HIS:CD2	2:B:1038:ASP:HB2	2.55	0.41
1:G:35:LYS:O	1:G:36:ASN:C	2.59	0.41
2:H:837:LYS:HE2	2:H:1019:PHE:CE1	2.55	0.41
2:B:865:ILE:HD13	2:B:875:LEU:HD13	2.01	0.41
2:E:865:ILE:HD12	2:E:925:ILE:HD13	2.02	0.41
1:G:834:ALA:HB2	1:G:869:ALA:HA	2.02	0.41
1:G:322:VAL:HG21	1:G:336:LEU:HD11	2.01	0.41
1:G:931:LEU:HD12	1:G:946:ALA:O	2.21	0.41
1:G:998:PHE:CZ	1:G:1074:ARG:HD2	2.55	0.41
1:A:143:ILE:HG12	1:A:154:ALA:HB2	2.03	0.41
1:A:190:VAL:O	1:A:209:GLN:HA	2.21	0.41
1:D:741:GLU:HB3	1:D:749:THR:HB	2.01	0.41
2:B:996:LEU:O	2:B:1000:MET:HG3	2.20	0.41
1:G:232:ILE:HD13	1:G:237:ILE:HG23	2.01	0.41
1:G:1116:ASP:OD2	1:G:1122:ARG:HB2	2.20	0.41
3:C:249:ASP:O	3:C:253:GLN:HG3	2.21	0.41
2:E:783:HIS:HB3	2:E:786:VAL:HG23	2.02	0.41
1:D:288:GLU:HB2	1:D:298:LYS:HB2	2.03	0.41
2:E:917:ILE:HG13	2:E:918:ASP:N	2.35	0.41
1:G:769:LYS:O	1:G:772:SER:HB3	2.21	0.41
1:G:1003:PHE:HB3	1:G:1033:VAL:HG23	2.01	0.41
2:H:793:VAL:HG23	2:H:810:TYR:HB2	2.02	0.41
1:A:1101:SER:OG	1:A:1104:LYS:HG2	2.21	0.41
2:B:758:VAL:HG11	2:B:767:PHE:CZ	2.55	0.41
2:E:858:ARG:O	2:E:897:ILE:HG12	2.20	0.41
1:A:812:TYR:CG	1:A:836:VAL:HG21	2.56	0.41
1:D:35:LYS:O	1:D:36:ASN:C	2.59	0.41
1:D:922:LEU:HD11	1:D:930:VAL:HB	2.03	0.41
2:E:842:GLN:OE1	2:E:872:GLN:HA	2.21	0.41
1:G:190:VAL:HG21	1:G:231:ILE:HD11	2.03	0.41
1:G:1003:PHE:HB3	1:G:1033:VAL:CG2	2.50	0.41
2:H:823:LEU:CD1	2:H:867:LEU:HD23	2.50	0.41
1:D:63:VAL:O	1:D:79:ILE:HA	2.21	0.41
1:G:795:ASP:HB3	1:G:798:THR:OG1	2.21	0.41
2:B:861:LYS:HG2	2:B:898:THR:HG22	2.02	0.40
2:E:993:ALA:HB2	2:E:1019:PHE:CE1	2.55	0.40
1:G:330:ASP:HA	1:G:355:ASN:HB3	2.02	0.40
1:G:926:LEU:O	1:G:953:TRP:HA	2.21	0.40
2:B:727:PHE:HE2	2:B:793:VAL:HG11	1.86	0.40

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:736:GLY:HA3	2:E:739:GLY:O	2.21	0.40
2:E:894:ASN:HD21	2:E:909:GLY:HA2	1.86	0.40
3:F:25:TYR:HA	3:F:199:LEU:O	2.20	0.40
1:A:282:MET:HB2	1:A:305:LEU:HD11	2.03	0.40
1:D:227:GLY:O	1:D:239:TYR:OH	2.32	0.40
1:D:248:ILE:HG12	1:D:250:PRO:HD3	2.03	0.40
2:B:743:LYS:CE	2:B:752:LEU:HD13	2.51	0.40
2:B:864:ASN:ND2	2:B:877:ASP:HB3	2.36	0.40
2:E:1032:ASP:C	2:E:1033:LEU:HD22	2.42	0.40
1:G:20:THR:HG23	1:G:315:THR:OG1	2.21	0.40
1:G:273:LEU:O	1:G:280:LEU:HD12	2.21	0.40
1:G:979:LYS:O	1:G:981:SER:N	2.45	0.40
1:G:1030:PHE:CZ	1:G:1038:GLY:HA3	2.56	0.40
1:A:315:THR:HG23	1:A:315:THR:O	2.21	0.40
2:B:856:LEU:HD21	2:B:915:PRO:HG3	2.04	0.40
1:D:5:TYR:CZ	1:D:1091:GLY:HA2	2.56	0.40
1:D:184:ASP:HB2	1:D:185:PRO:HD2	2.04	0.40
2:E:743:LYS:HD2	2:E:815:TYR:CE1	2.56	0.40
2:H:928:GLU:O	2:H:932:LYS:N	2.50	0.40

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	822/840 (98%)	803 (98%)	19 (2%)	0	100	100
1	D	823/840 (98%)	806 (98%)	17 (2%)	0	100	100
1	G	822/840 (98%)	801 (97%)	21 (3%)	0	100	100
2	B	322/344 (94%)	311 (97%)	11 (3%)	0	100	100
2	E	317/344 (92%)	313 (99%)	4 (1%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	H	316/344 (92%)	309 (98%)	7 (2%)	0	100	100
3	C	246/271 (91%)	243 (99%)	3 (1%)	0	100	100
3	F	246/271 (91%)	243 (99%)	3 (1%)	0	100	100
3	I	246/271 (91%)	241 (98%)	5 (2%)	0	100	100
All	All	4160/4365 (95%)	4070 (98%)	90 (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	721/728 (99%)	717 (99%)	4 (1%)	86	92
1	D	722/728 (99%)	721 (100%)	1 (0%)	93	97
1	G	721/728 (99%)	718 (100%)	3 (0%)	91	95
2	B	292/308 (95%)	286 (98%)	6 (2%)	53	74
2	E	287/308 (93%)	283 (99%)	4 (1%)	67	81
2	H	286/308 (93%)	284 (99%)	2 (1%)	84	91
3	C	223/242 (92%)	221 (99%)	2 (1%)	78	88
3	F	223/242 (92%)	222 (100%)	1 (0%)	91	95
3	I	223/242 (92%)	222 (100%)	1 (0%)	91	95
All	All	3698/3834 (96%)	3674 (99%)	24 (1%)	86	92

All (24) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	163	HIS
1	A	290	GLN
1	A	331	SER
1	A	1013	VAL
2	B	883	LEU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
2	B	896	VAL
2	B	991	SER
2	B	1033	LEU
2	B	1036	TRP
2	B	1039	CYS
3	C	231	TYR
3	C	257	LEU
1	D	766	SER
2	E	728	ASP
2	E	805	ASP
2	E	860	ILE
2	E	896	VAL
3	F	231	TYR
1	G	163	HIS
1	G	295	VAL
1	G	1120	MET
2	H	896	VAL
2	H	1033	LEU
3	I	231	TYR

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

Mol	Chain	Res	Type
1	A	727	GLN
2	E	851	HIS
2	E	944	GLN
2	H	740	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

3 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	E	893	2	8,10,11	1.83	1 (12%)	10,14,16	1.15	0
2	TPO	B	893	2	8,10,11	1.25	0	10,14,16	1.30	1 (10%)
2	TPO	H	893	2	8,10,11	1.26	0	10,14,16	1.32	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	E	893	2	-	5/9/11/13	-
2	TPO	B	893	2	-	3/9/11/13	-
2	TPO	H	893	2	-	5/9/11/13	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	E	893	TPO	P-O1P	3.52	1.61	1.50

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	893	TPO	P-OG1-CB	-2.82	114.69	123.21
2	H	893	TPO	CG2-CB-CA	-2.14	108.94	113.16

There are no chirality outliers.

All (13) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	893	TPO	CG2-CB-OG1-P
2	E	893	TPO	N-CA-CB-CG2
2	E	893	TPO	N-CA-CB-OG1
2	E	893	TPO	C-CA-CB-CG2
2	E	893	TPO	CG2-CB-OG1-P
2	E	893	TPO	CB-OG1-P-O3P
2	H	893	TPO	N-CA-CB-CG2
2	H	893	TPO	N-CA-CB-OG1

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
2	H	893	TPO	C-CA-CB-CG2
2	H	893	TPO	CG2-CB-OG1-P
2	H	893	TPO	CB-OG1-P-O3P
2	B	893	TPO	CB-OG1-P-O3P
2	B	893	TPO	C-CA-CB-CG2

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

15 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	SO4	F	301	-	4,4,4	0.20	0	6,6,6	0.17	0
5	RR9	H	1101	-	33,36,36	0.62	1 (3%)	31,50,50	1.14	3 (9%)
5	RR9	E	1101	-	33,36,36	0.60	0	31,50,50	1.10	4 (12%)
4	SO4	D	1201	-	4,4,4	0.27	0	6,6,6	0.10	0
4	SO4	G	1203	-	4,4,4	0.34	0	6,6,6	0.11	0
4	SO4	C	301	-	4,4,4	0.26	0	6,6,6	0.17	0
4	SO4	G	1202	-	4,4,4	0.32	0	6,6,6	0.22	0
4	SO4	A	1203	-	4,4,4	0.37	0	6,6,6	0.23	0
5	RR9	B	1101	-	33,36,36	0.63	0	31,50,50	1.10	3 (9%)
4	SO4	A	1202	-	4,4,4	0.32	0	6,6,6	0.10	0
4	SO4	I	301	-	4,4,4	0.21	0	6,6,6	0.21	0
4	SO4	D	1202	-	4,4,4	0.29	0	6,6,6	0.10	0
4	SO4	G	1201	-	4,4,4	0.21	0	6,6,6	0.08	0
4	SO4	A	1201	-	4,4,4	0.27	0	6,6,6	0.04	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	SO4	A	1204	-	4,4,4	0.33	0	6,6,6	0.18	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
5	RR9	B	1101	-	-	4/19/21/21	0/4/4/4
5	RR9	H	1101	-	-	6/19/21/21	0/4/4/4
5	RR9	E	1101	-	-	4/19/21/21	0/4/4/4

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	H	1101	RR9	C7-N6	2.06	1.35	1.32

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	1101	RR9	C4-N1-C2	3.41	128.76	125.42
5	H	1101	RR9	C4-N1-C2	3.12	128.48	125.42
5	H	1101	RR9	C6-C7-N6	-2.68	118.58	120.81
5	E	1101	RR9	C6-C7-N6	-2.59	118.66	120.81
5	E	1101	RR9	C4-N1-C2	2.45	127.82	125.42
5	B	1101	RR9	C10-C11-C12	-2.38	120.64	123.27
5	B	1101	RR9	C6-C7-N6	-2.27	118.92	120.81
5	H	1101	RR9	C10-C11-C12	-2.20	120.83	123.27
5	E	1101	RR9	C22-C20-C21	2.15	115.18	111.72
5	E	1101	RR9	C10-C11-C12	-2.15	120.89	123.27

There are no chirality outliers.

All (14) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	B	1101	RR9	N6-C19-N7-C20
5	B	1101	RR9	N8-C19-N7-C20
5	E	1101	RR9	N6-C19-N7-C20
5	E	1101	RR9	N8-C19-N7-C20
5	H	1101	RR9	C21-C20-C22-C23

Continued on next page...

Continued from previous page...

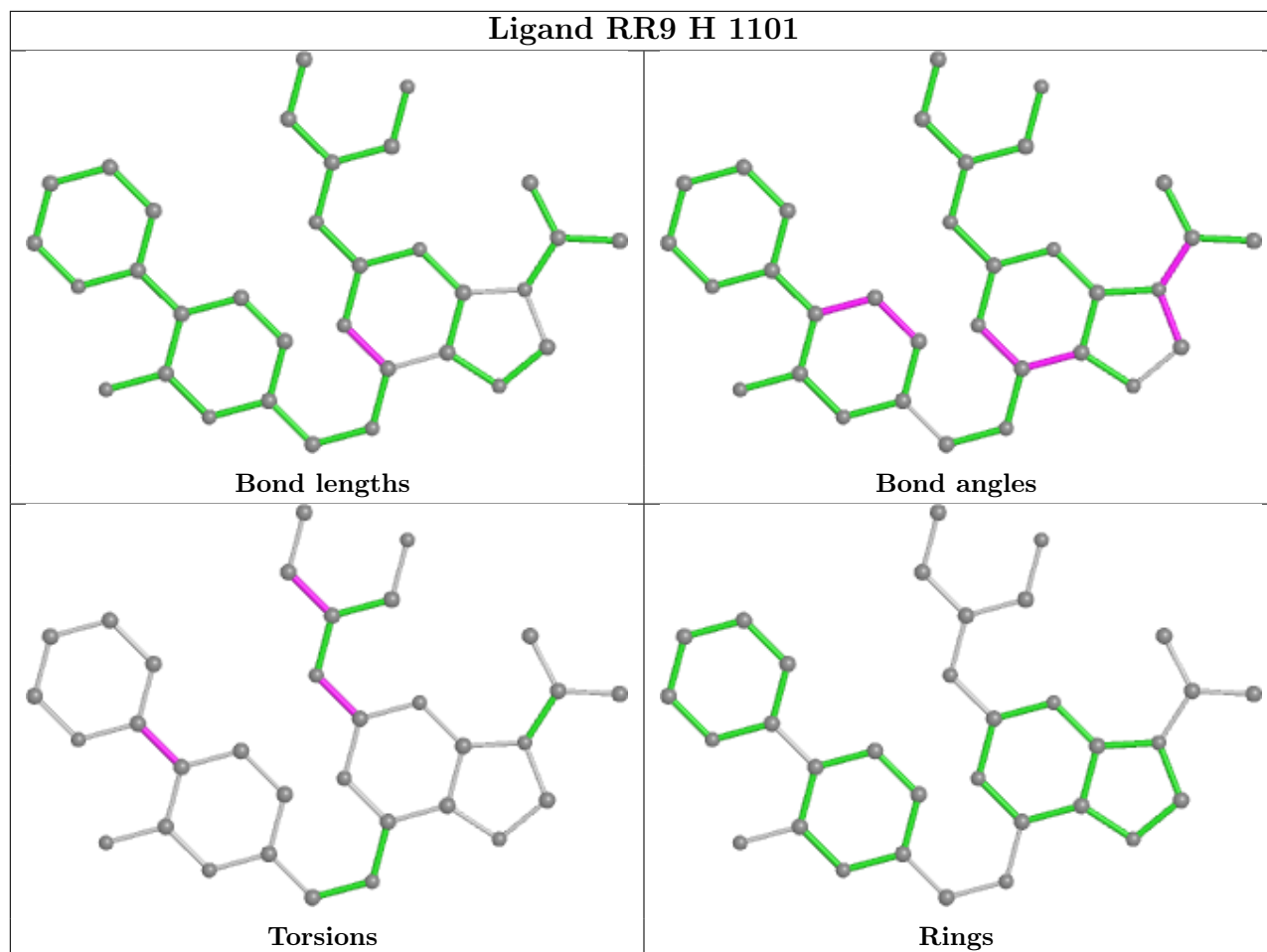
Mol	Chain	Res	Type	Atoms
5	H	1101	RR9	N7-C20-C22-C23
5	H	1101	RR9	N6-C19-N7-C20
5	H	1101	RR9	N8-C19-N7-C20
5	B	1101	RR9	C18-C12-C13-N5
5	E	1101	RR9	C18-C12-C13-N5
5	H	1101	RR9	C18-C12-C13-N5
5	B	1101	RR9	C18-C12-C13-C14
5	E	1101	RR9	C18-C12-C13-C14
5	H	1101	RR9	C18-C12-C13-C14

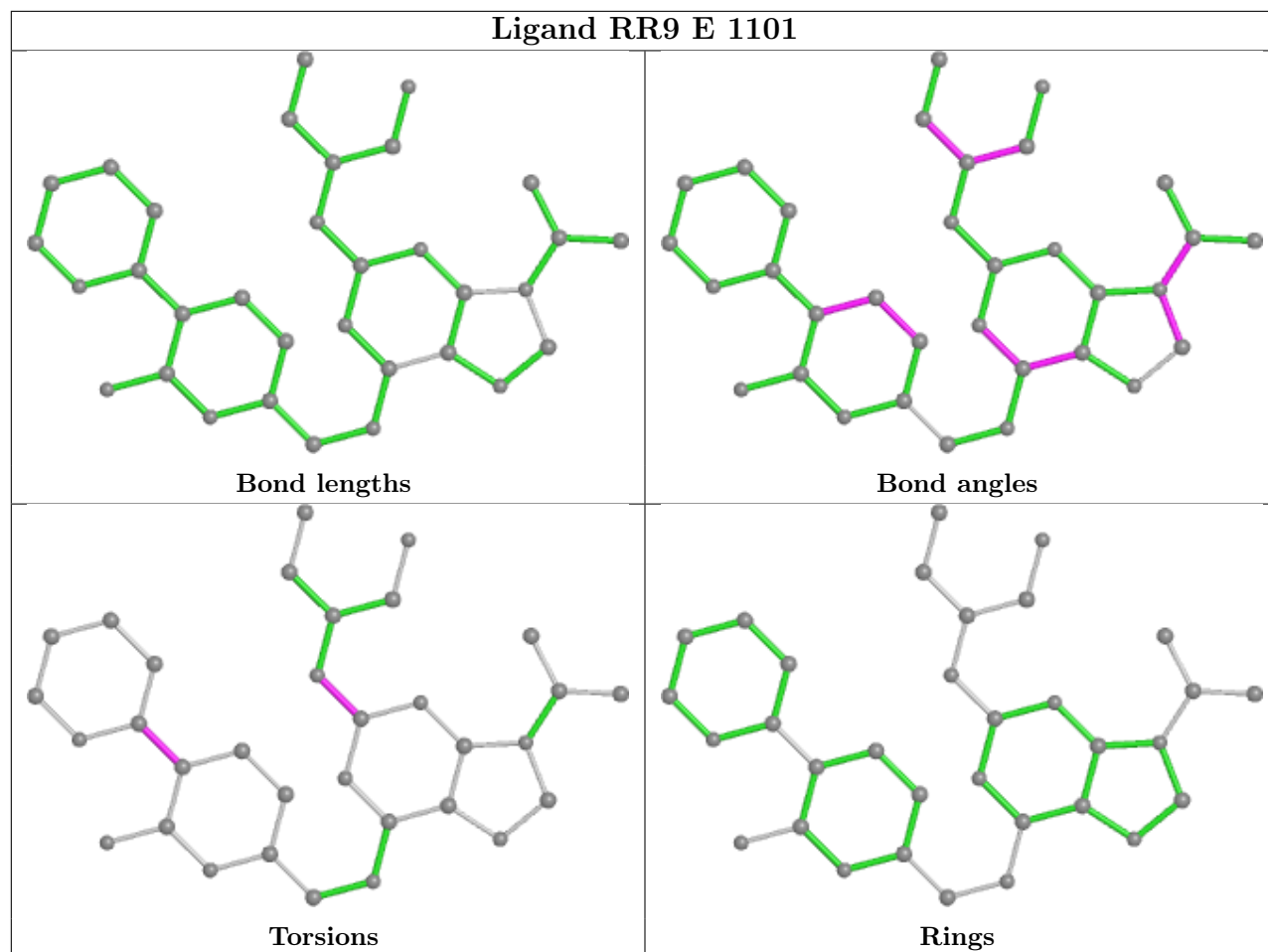
There are no ring outliers.

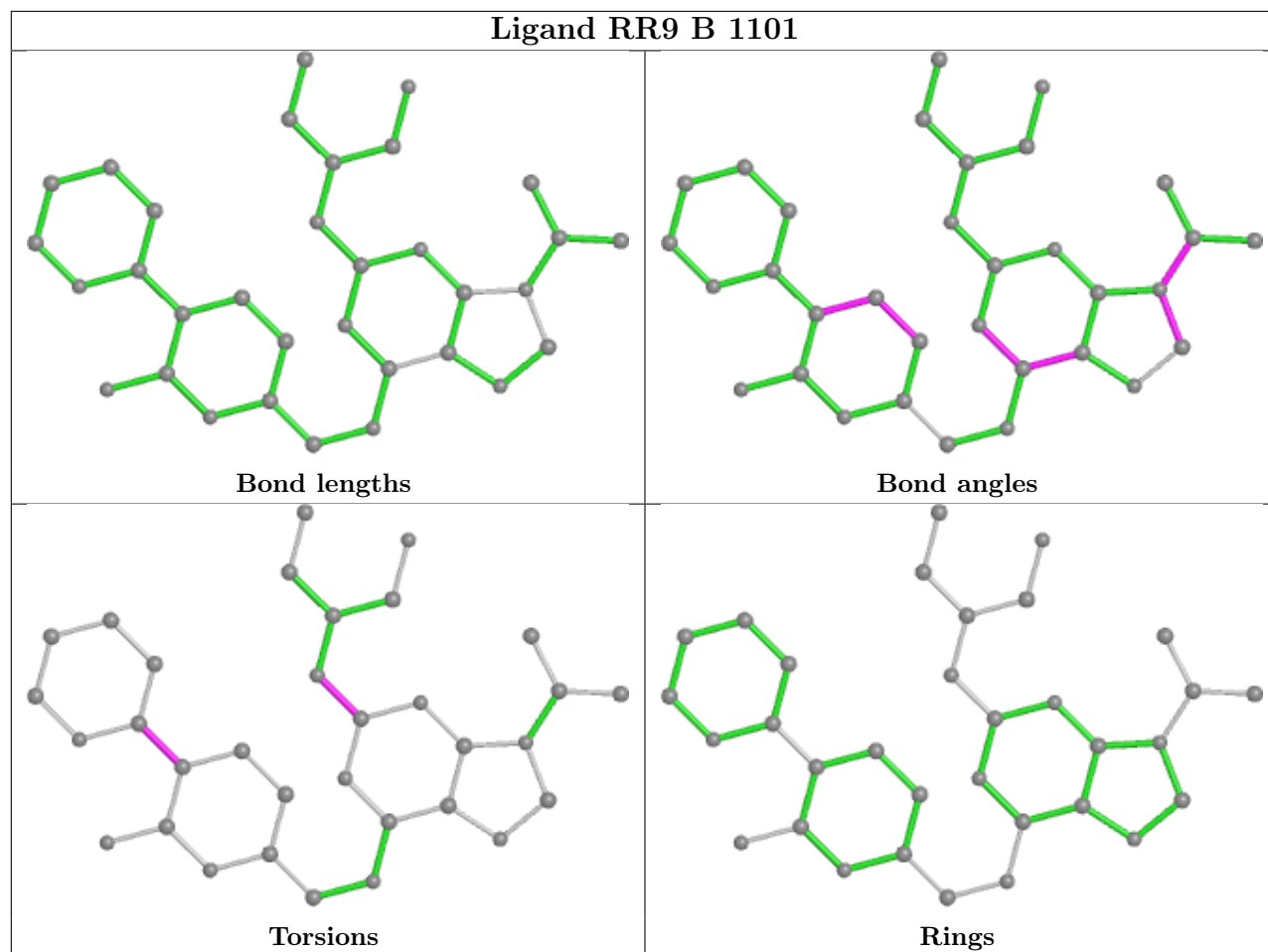
2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	H	1101	RR9	2	0
5	E	1101	RR9	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, 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	826/840 (98%)	0.61	76 (9%) 9 7	105, 149, 224, 320	0
1	D	827/840 (98%)	0.54	58 (7%) 16 12	98, 145, 217, 290	0
1	G	826/840 (98%)	0.59	76 (9%) 9 7	111, 152, 229, 295	0
2	B	324/344 (94%)	0.85	33 (10%) 6 6	115, 154, 236, 289	0
2	E	319/344 (92%)	0.77	33 (10%) 6 6	109, 149, 220, 284	0
2	H	318/344 (92%)	0.68	17 (5%) 26 23	99, 131, 206, 295	0
3	C	248/271 (91%)	0.53	8 (3%) 47 38	108, 144, 196, 267	0
3	F	248/271 (91%)	0.57	7 (2%) 53 43	95, 127, 171, 238	0
3	I	248/271 (91%)	0.57	10 (4%) 38 32	97, 129, 181, 255	0
All	All	4184/4365 (95%)	0.62	318 (7%) 13 11	95, 145, 221, 320	0

All (318) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	1034	PRO	7.5
2	H	738	TYR	5.2
2	B	799	ALA	5.0
2	E	738	TYR	4.8
2	B	896	VAL	4.7
1	D	89	LEU	4.4
2	B	828	LEU	4.3
1	G	131	ILE	4.3
2	H	720	GLY	4.1
2	H	1031	PRO	4.1
1	G	295	VAL	4.1
2	B	800	LEU	4.1
1	G	5	TYR	4.1
3	C	267	HIS	4.0
2	B	895	LYS	4.0

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
2	B	798	ASP	4.0
1	G	132	GLY	4.0
2	H	1032	ASP	3.9
1	D	91	TYR	3.9
1	G	133	LEU	3.9
2	B	860	ILE	3.8
1	D	39	LEU	3.7
2	E	720	GLY	3.7
1	A	359	ILE	3.7
1	A	967	GLY	3.6
2	B	876	ALA	3.6
1	D	1129	LEU	3.6
1	G	1136	LEU	3.6
1	A	1019	GLU	3.6
1	D	64	MET	3.5
1	A	1029	LEU	3.5
1	G	289	GLU	3.5
1	A	1114	TYR	3.4
2	B	1036	TRP	3.4
1	G	922	LEU	3.4
1	G	170	LEU	3.4
1	G	1118	SER	3.3
2	E	732	ILE	3.3
1	D	37	THR	3.3
1	D	32	LEU	3.3
1	A	131	ILE	3.3
1	G	816	LEU	3.3
2	B	875	LEU	3.2
1	D	31	LEU	3.1
2	E	797	GLN	3.1
1	A	816	LEU	3.1
1	G	966	LEU	3.1
2	E	831	PHE	3.1
1	G	1039	LEU	3.1
2	E	955	PRO	3.0
1	D	1097	PHE	3.0
2	H	1033	LEU	3.0
1	D	33	ILE	3.0
1	D	133	LEU	3.0
1	A	356	LEU	3.0
2	E	896	VAL	3.0
1	G	124	ILE	2.9

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
2	E	882	ARG	2.9
1	D	922	LEU	2.9
1	D	78	PHE	2.9
2	B	839	PHE	2.9
1	A	23	PHE	2.9
2	H	1029	ALA	2.9
3	I	267	HIS	2.9
1	A	367	LEU	2.9
1	G	100	ILE	2.9
1	G	829	PHE	2.9
1	D	99	ASP	2.9
1	D	140	PHE	2.9
1	A	914	LEU	2.8
1	G	1007	PHE	2.8
1	A	1126	ALA	2.8
1	G	1088	PHE	2.8
3	I	79	HIS	2.8
1	G	933	LEU	2.8
1	G	1040	VAL	2.8
2	H	955	PRO	2.8
3	F	262	LYS	2.8
2	B	932	LYS	2.8
1	G	724	ILE	2.8
1	A	297	LEU	2.8
1	G	64	MET	2.8
1	A	1129	LEU	2.8
1	G	317	LEU	2.8
1	D	232	ILE	2.8
2	E	829	VAL	2.7
1	A	387	LEU	2.7
2	B	955	PRO	2.7
1	A	5	TYR	2.7
2	E	778	LEU	2.7
1	G	32	LEU	2.7
2	E	930	PHE	2.7
1	D	195	VAL	2.7
1	A	170	LEU	2.7
3	F	153	PHE	2.7
2	E	865	ILE	2.7
1	D	77	LEU	2.7
2	E	933	LYS	2.7
3	F	83	MET	2.7

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	930	VAL	2.7
1	A	61	ILE	2.7
1	A	362	MET	2.6
1	G	179	CYS	2.6
3	I	153	PHE	2.6
1	G	328	LEU	2.6
2	B	756	LYS	2.6
1	G	722	ARG	2.6
1	A	1018	GLY	2.6
2	B	1038	ASP	2.6
2	B	951	LEU	2.6
2	E	997	LEU	2.6
1	A	1097	PHE	2.6
2	H	895	LYS	2.6
1	A	372	GLN	2.6
1	G	4	ASN	2.6
2	E	875	LEU	2.6
2	E	897	ILE	2.6
1	A	336	LEU	2.5
1	A	1094	ILE	2.5
1	G	112	ILE	2.5
1	A	735	VAL	2.5
1	D	1010	GLY	2.5
1	A	112	ILE	2.5
1	A	65	GLU	2.5
1	G	911	ALA	2.5
2	B	986	PHE	2.5
1	G	314	LEU	2.5
1	G	303	GLU	2.5
1	A	710	LEU	2.5
1	G	31	LEU	2.5
2	E	935	ILE	2.5
1	A	1030	PHE	2.5
1	A	64	MET	2.5
2	H	936	PHE	2.5
1	A	709	LYS	2.5
1	A	1079	GLU	2.5
2	H	721	LYS	2.5
1	A	39	LEU	2.5
2	B	930	PHE	2.5
1	A	130	MET	2.5
2	B	1028	MET	2.5

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	G	934	ALA	2.5
1	G	2	SER	2.4
1	A	792	LEU	2.4
1	A	958	GLU	2.4
2	B	1029	ALA	2.4
1	G	61	ILE	2.4
1	D	793	ILE	2.4
1	D	907	ASN	2.4
2	E	907	LEU	2.4
2	B	864	ASN	2.4
1	G	375	LEU	2.4
2	E	913	TYR	2.4
1	D	1030	PHE	2.4
1	D	143	ILE	2.4
2	E	813	PHE	2.4
2	B	1039	CYS	2.4
1	D	100	ILE	2.4
1	A	62	ALA	2.4
1	G	49	LEU	2.4
1	G	66	LEU	2.4
1	G	302	VAL	2.4
1	D	23	PHE	2.4
1	G	1097	PHE	2.4
1	A	1007	PHE	2.3
1	D	130	MET	2.3
2	E	972	MET	2.3
2	H	802	PHE	2.3
1	A	133	LEU	2.3
1	G	924	GLY	2.3
1	A	882	ALA	2.3
2	E	802	PHE	2.3
1	A	880	LEU	2.3
1	D	1100	ILE	2.3
1	G	921	ILE	2.3
1	G	733	PHE	2.3
2	H	1019	PHE	2.3
1	G	67	PHE	2.3
1	G	180	PHE	2.3
1	A	49	LEU	2.3
1	A	977	CYS	2.3
1	A	15	VAL	2.3
1	G	377	THR	2.3

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
2	H	896	VAL	2.3
1	A	881	LEU	2.3
3	I	207	ALA	2.3
1	A	874	VAL	2.3
1	D	121	ILE	2.3
1	A	314	LEU	2.3
1	D	880	LEU	2.3
1	D	1007	PHE	2.3
2	E	878	PHE	2.3
1	G	927	MET	2.3
1	D	735	VAL	2.3
1	A	229	ALA	2.3
1	D	57	MET	2.3
3	C	155	LEU	2.3
3	F	57	ILE	2.3
1	A	1118	SER	2.2
1	G	57	MET	2.2
2	E	867	LEU	2.2
1	D	928	ARG	2.2
1	A	57	MET	2.2
1	A	143	ILE	2.2
1	D	317	LEU	2.2
1	G	291	MET	2.2
1	G	387	LEU	2.2
3	C	132	PHE	2.2
1	A	1100	ILE	2.2
1	D	931	LEU	2.2
1	G	77	LEU	2.2
3	I	150	THR	2.2
1	D	65	GLU	2.2
1	G	1089	ILE	2.2
3	C	164	LEU	2.2
1	A	830	ILE	2.2
2	B	1033	LEU	2.2
1	A	956	ALA	2.2
3	C	234	TRP	2.2
1	A	63	VAL	2.2
1	G	1043	LEU	2.2
2	H	839	PHE	2.2
3	F	147	LEU	2.2
1	G	1024	THR	2.2
1	G	140	PHE	2.2

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	1006	VAL	2.2
1	G	848	ILE	2.2
1	A	966	LEU	2.2
1	G	63	VAL	2.2
1	G	880	LEU	2.2
1	D	112	ILE	2.2
2	E	988	PHE	2.2
1	D	1136	LEU	2.2
1	D	377	THR	2.2
1	A	80	LEU	2.2
2	B	797	GLN	2.2
2	E	906	LEU	2.2
1	A	1089	ILE	2.2
1	G	253	ILE	2.2
2	H	988	PHE	2.2
1	A	1008	CYS	2.2
3	C	153	PHE	2.2
1	D	1054	MET	2.1
1	A	745	THR	2.1
1	D	722	ARG	2.1
1	D	890	LEU	2.1
1	G	300	LEU	2.1
1	G	356	LEU	2.1
1	G	912	LEU	2.1
2	E	895	LYS	2.1
3	I	193	LEU	2.1
1	A	78	PHE	2.1
3	F	193	LEU	2.1
1	G	315	THR	2.1
2	E	740	GLN	2.1
1	G	130	MET	2.1
2	E	1034	PRO	2.1
2	E	722	ARG	2.1
1	D	281	PHE	2.1
2	H	873	ILE	2.1
2	B	938	ALA	2.1
3	F	164	LEU	2.1
2	E	809	PHE	2.1
1	G	858	LEU	2.1
1	D	220	ILE	2.1
1	G	923	VAL	2.1
1	G	1012	LEU	2.1

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
3	C	181	LEU	2.1
1	A	733	PHE	2.1
1	A	230	ILE	2.1
3	I	57	ILE	2.1
2	B	776	LYS	2.1
1	G	305	LEU	2.1
1	G	974	LEU	2.1
1	D	1088	PHE	2.1
1	A	120	ILE	2.1
1	D	5	TYR	2.1
1	D	237	ILE	2.1
1	G	1004	VAL	2.1
1	D	998	PHE	2.1
1	G	390	ILE	2.1
1	D	721	PRO	2.1
1	D	791	LEU	2.1
2	B	1032	ASP	2.1
1	D	1005	ASN	2.1
3	I	222	ILE	2.1
1	A	998	PHE	2.1
1	D	305	LEU	2.1
1	G	1129	LEU	2.1
2	B	867	LEU	2.1
1	D	41	ILE	2.1
2	B	940	LEU	2.1
1	A	202	PHE	2.1
3	I	266	PRO	2.0
2	B	897	ILE	2.0
2	E	811	LEU	2.0
2	E	866	LEU	2.0
1	D	61	ILE	2.0
1	D	79	ILE	2.0
1	A	334	VAL	2.0
1	A	957	VAL	2.0
1	A	1000	LEU	2.0
3	C	149	GLN	2.0
1	D	253	ILE	2.0
1	A	135	LEU	2.0
1	D	169	PHE	2.0
1	D	944	GLU	2.0
1	A	724	ILE	2.0
1	G	79	ILE	2.0

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	273	LEU	2.0
1	G	881	LEU	2.0
3	I	53	GLY	2.0
2	B	1001	LEU	2.0
2	H	767	PHE	2.0
1	A	32	LEU	2.0
1	A	829	PHE	2.0
1	G	1119	GLY	2.0
2	B	858	ARG	2.0

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	E	893	11/12	0.68	0.24	198,212,259,260	6
2	TPO	B	893	11/12	0.71	0.24	198,215,255,256	6
2	TPO	H	893	11/12	0.81	0.32	183,199,239,242	6

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, 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.

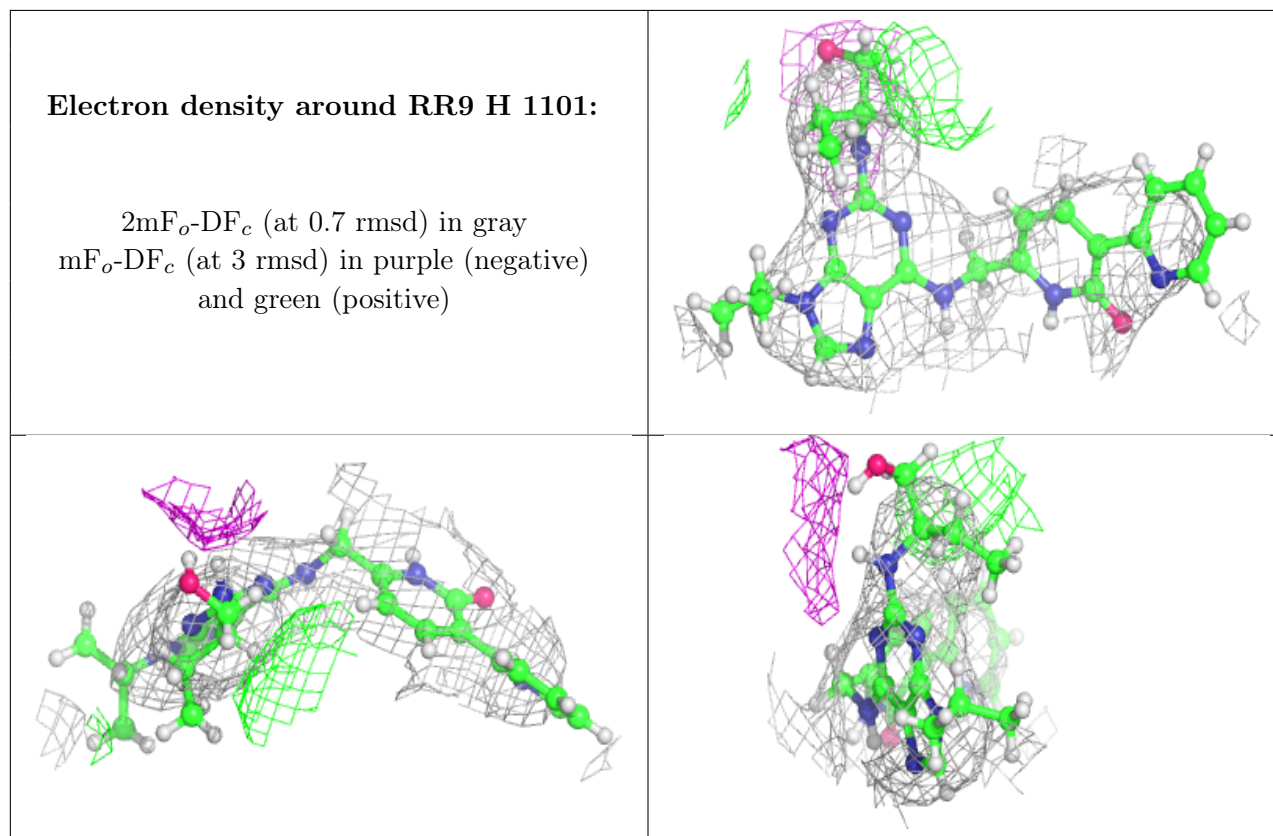
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	SO4	G	1202	5/5	0.74	0.18	152,168,186,200	0
4	SO4	A	1204	5/5	0.76	0.23	160,167,173,183	0
4	SO4	G	1201	5/5	0.78	0.27	137,138,157,166	0
4	SO4	A	1202	5/5	0.81	0.18	163,165,172,195	0
4	SO4	D	1202	5/5	0.81	0.18	153,167,179,196	0
4	SO4	D	1201	5/5	0.84	0.22	138,147,158,166	0

Continued on next page...

Continued from previous page...

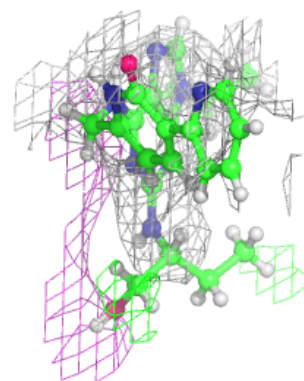
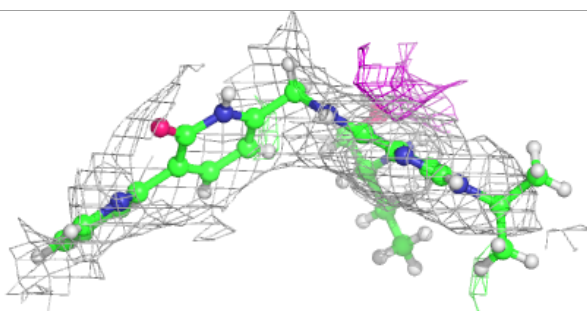
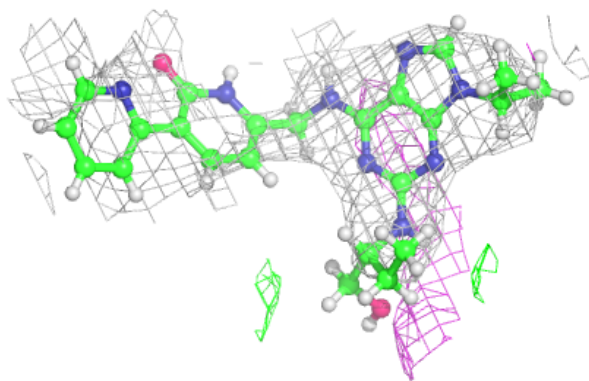
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	SO4	I	301	5/5	0.84	0.23	135,137,157,158	0
4	SO4	A	1203	5/5	0.88	0.33	144,159,191,197	0
4	SO4	C	301	5/5	0.90	0.19	156,156,167,172	0
5	RR9	H	1101	33/33	0.90	0.56	103,138,170,180	28
4	SO4	A	1201	5/5	0.92	0.21	142,146,168,170	0
5	RR9	B	1101	33/33	0.92	0.62	108,146,181,192	28
5	RR9	E	1101	33/33	0.92	0.55	104,139,165,182	28
4	SO4	F	301	5/5	0.92	0.21	135,139,153,160	0
4	SO4	G	1203	5/5	0.95	0.20	159,185,191,201	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.

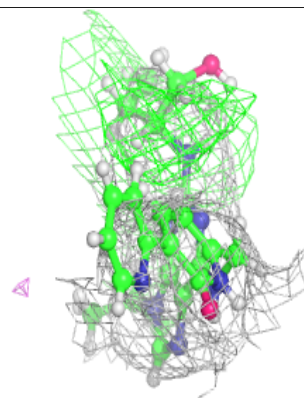
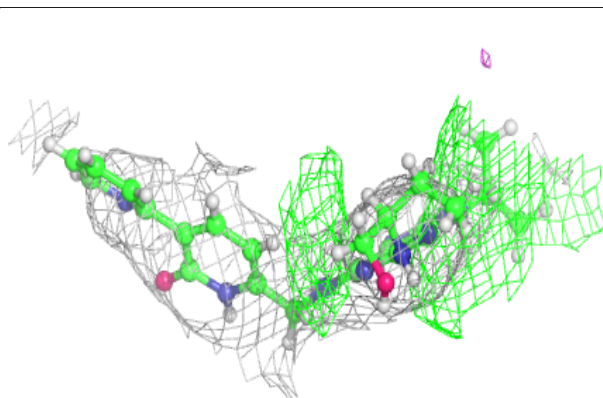
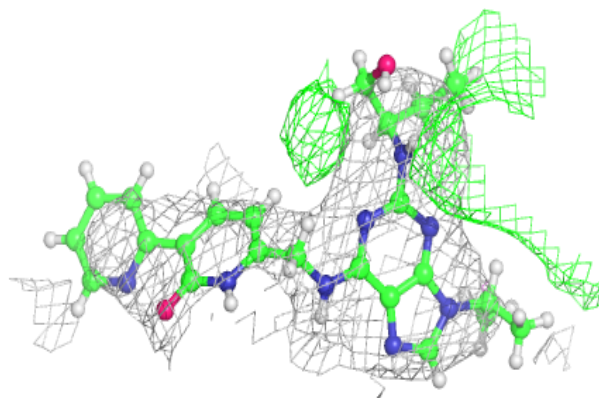


Electron density around RR9 B 1101:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

**Electron density around RR9 E 1101:**

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



6.5 Other polymers [i](#)

There are no such residues in this entry.