



Full wwPDB X-ray Structure Validation Report ⓘ

Dec 10, 2023 – 05:30 am GMT

PDB ID : 1W88
Title : The crystal structure of pyruvate dehydrogenase E1(D180N,E183Q) bound to the peripheral subunit binding domain of E2
Authors : Frank, R.A.W.; Pratap, J.V.; Pei, X.Y.; Perham, R.N.; Luisi, B.F.
Deposited on : 2004-09-16
Resolution : 2.30 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 : 2.36
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

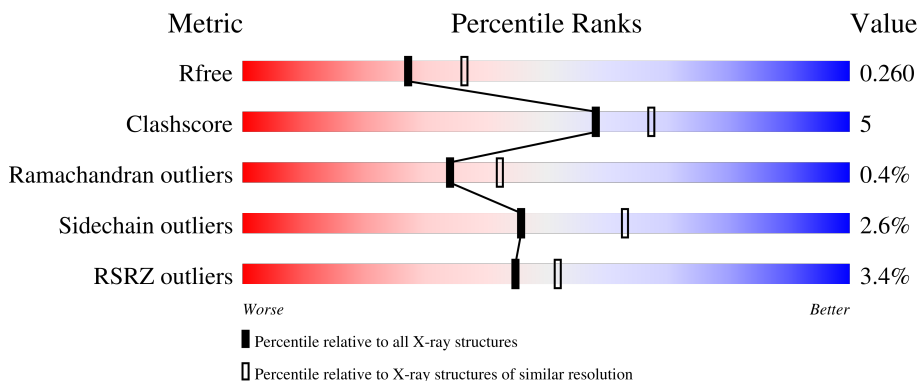
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 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	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (2.30-2.30)

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	368	<div style="display: flex; align-items: center;"> <div style="width: 5%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 83%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 10%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 7%; height: 10px; background-color: grey;"></div> </div> <p style="margin-left: 20px;">83% 10% 7%</p>
1	C	368	<div style="display: flex; align-items: center;"> <div style="width: 2%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 85%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 7%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 7%; height: 10px; background-color: grey;"></div> </div> <p style="margin-left: 20px;">85% 7% 7%</p>
1	E	368	<div style="display: flex; align-items: center;"> <div style="width: 6%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 76%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 12%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 11%; height: 10px; background-color: grey;"></div> </div> <p style="margin-left: 20px;">76% 12% 11%</p>
1	G	368	<div style="display: flex; align-items: center;"> <div style="width: 3%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 84%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 5%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 10%; height: 10px; background-color: grey;"></div> </div> <p style="margin-left: 20px;">84% 5% 10%</p>
2	B	324	<div style="display: flex; align-items: center;"> <div style="width: 2%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 86%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 13%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 9%; height: 10px; background-color: grey;"></div> </div> <p style="margin-left: 20px;">86% 13%</p>

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Mol	Chain	Length	Quality of chain
2	D	324	
2	F	324	
2	H	324	
3	I	49	
3	J	49	

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
5	TPP	E	1370	-	-	-	X
5	TPP	G	1370	-	-	-	X

2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 21934 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called PYRUVATE DEHYDROGENASE E1 COMPONENT, ALPHA SUBUNIT.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	341	Total 2592	C 1666	N 444	O 475	S 7	0	0	1
1	C	343	Total 2659	C 1705	N 451	O 496	S 7	0	0	0
1	E	328	Total 2521	C 1614	N 431	O 469	S 7	0	1	0
1	G	331	Total 2565	C 1645	N 434	O 479	S 7	0	1	0

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	180	ASN	ASP	engineered mutation	UNP P21873
A	183	GLN	GLU	engineered mutation	UNP P21873
C	180	ASN	ASP	engineered mutation	UNP P21873
C	183	GLN	GLU	engineered mutation	UNP P21873
E	180	ASN	ASP	engineered mutation	UNP P21873
E	183	GLN	GLU	engineered mutation	UNP P21873
G	180	ASN	ASP	engineered mutation	UNP P21873
G	183	GLN	GLU	engineered mutation	UNP P21873

- Molecule 2 is a protein called PYRUVATE DEHYDROGENASE E1 COMPONENT, BETA SUBUNIT.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	324	Total 2428	C 1546	N 417	O 457	S 8	0	1	0
2	D	324	Total 2489	C 1586	N 424	O 471	S 8	0	0	0
2	F	310	Total 2369	C 1507	N 407	O 447	S 8	0	1	0

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	H	317	Total 2416	C 1537	N 411	O 460	S 8	0	0	0

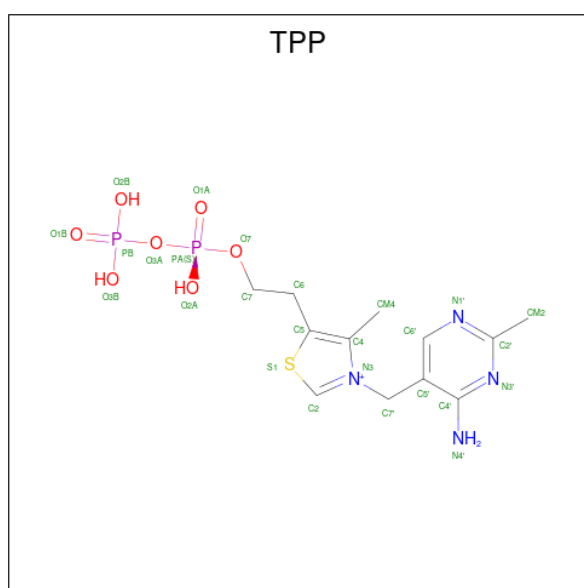
- Molecule 3 is a protein called DIHYDROLIPOYLLYSINE-RESIDUE ACETYLTRANSFERASE COMPONENT OF PYRUVATE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	I	40	Total 303	C 192	N 55	O 55	S 1	0	0	0
3	J	43	Total 311	C 195	N 59	O 56	S 1	0	0	1

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

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Mg		
4	A	1	Total 1	Mg 1	0	0
4	C	1	Total 1	Mg 1	0	0
4	E	1	Total 1	Mg 1	0	0
4	G	1	Total 1	Mg 1	0	0

- Molecule 5 is THIAMINE DIPHOSPHATE (three-letter code: TPP) (formula: C₁₂H₁₉N₄O₇P₂S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
5	A	1	Total	C	N	O	P	S	0	0
			26	12	4	7	2	1		
5	C	1	Total	C	N	O	P	S	0	0
			26	12	4	7	2	1		
5	E	1	Total	C	N	O	P	S	0	0
			26	12	4	7	2	1		
5	G	1	Total	C	N	O	P	S	0	0
			26	12	4	7	2	1		

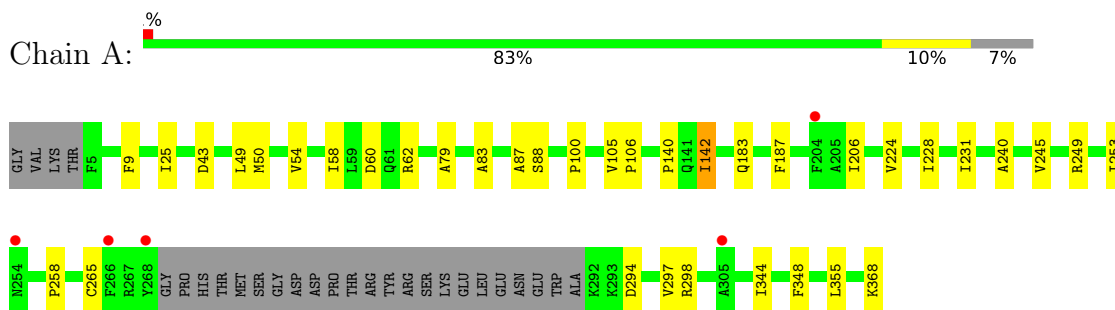
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	96	Total	O	0	0
			96	96		
6	B	124	Total	O	0	0
			124	124		
6	C	168	Total	O	0	0
			168	168		
6	D	209	Total	O	0	0
			209	209		
6	E	78	Total	O	0	0
			78	78		
6	F	194	Total	O	0	0
			194	194		
6	G	88	Total	O	0	0
			88	88		
6	H	161	Total	O	0	0
			161	161		
6	I	24	Total	O	0	0
			24	24		
6	J	31	Total	O	0	0
			31	31		

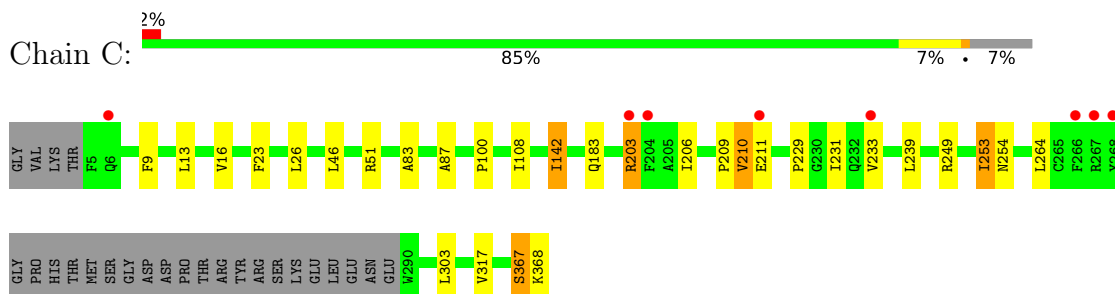
3 Residue-property plots [i](#)

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.

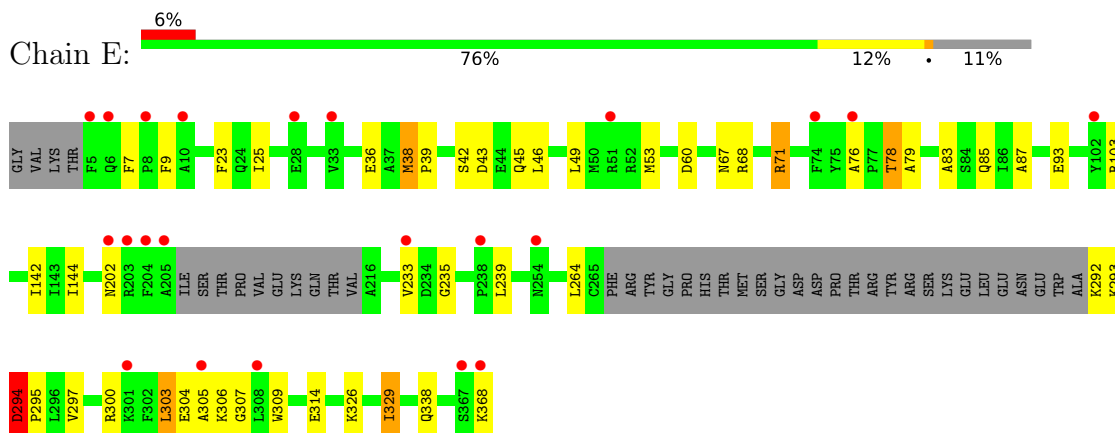
- Molecule 1: PYRUVATE DEHYDROGENASE E1 COMPONENT, ALPHA SUBUNIT



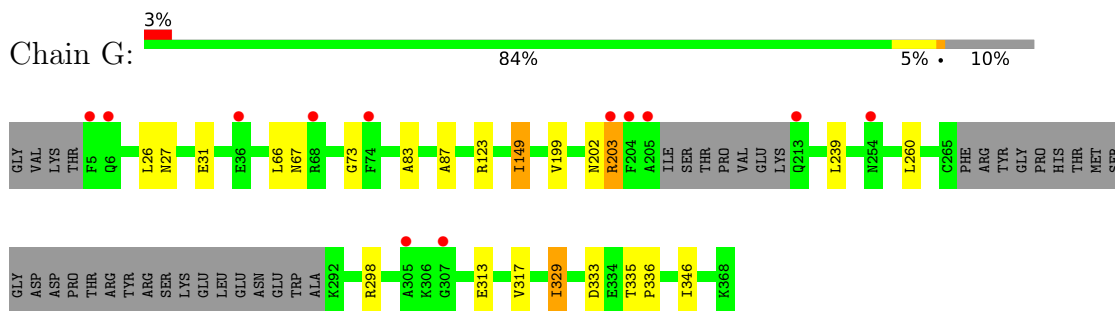
- Molecule 1: PYRUVATE DEHYDROGENASE E1 COMPONENT, ALPHA SUBUNIT



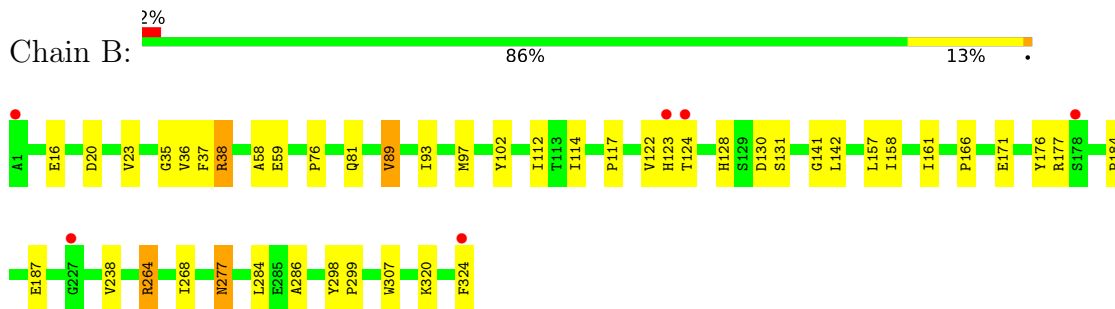
- Molecule 1: PYRUVATE DEHYDROGENASE E1 COMPONENT, ALPHA SUBUNIT



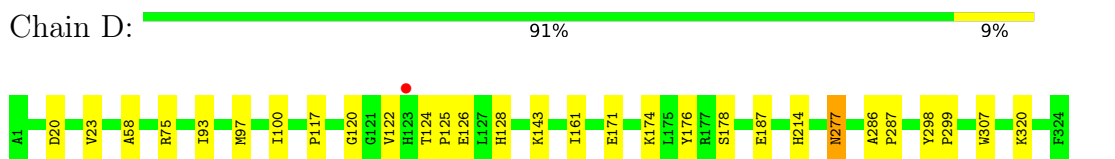
- Molecule 1: PYRUVATE DEHYDROGENASE E1 COMPONENT, ALPHA SUBUNIT



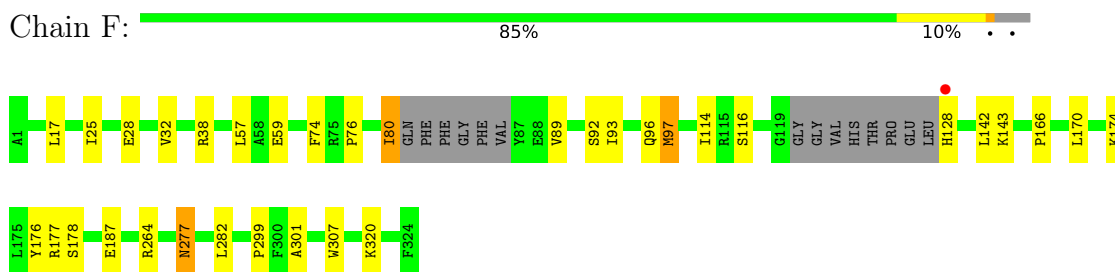
- Molecule 2: PYRUVATE DEHYDROGENASE E1 COMPONENT, BETA SUBUNIT



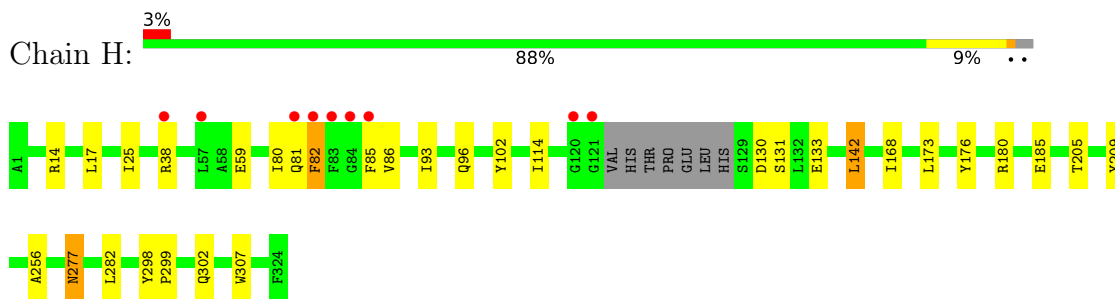
- Molecule 2: PYRUVATE DEHYDROGENASE E1 COMPONENT, BETA SUBUNIT



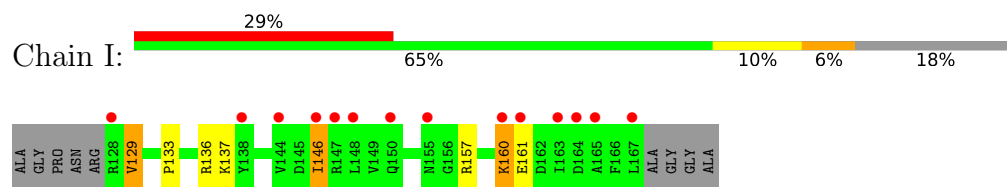
- Molecule 2: PYRUVATE DEHYDROGENASE E1 COMPONENT, BETA SUBUNIT



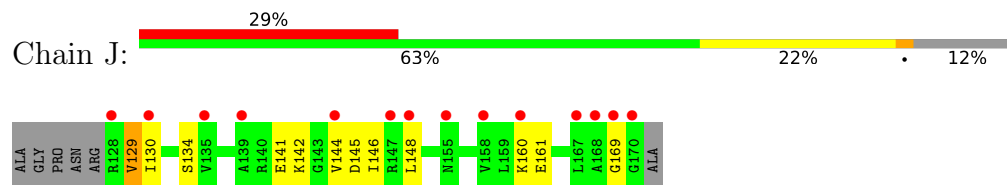
- Molecule 2: PYRUVATE DEHYDROGENASE E1 COMPONENT, BETA SUBUNIT



● Molecule 3: DIHYDROLIPOYLLYSINE-RESIDUE ACETYLTRANSFERASE COMPONENT OF PYRUVATE



● Molecule 3: DIHYDROLIPOYLLYSINE-RESIDUE ACETYLTRANSFERASE COMPONENT OF PYRUVATE



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	92.18Å 133.69Å 245.61Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.98 – 2.30 19.99 – 2.10	Depositor EDS
% Data completeness (in resolution range)	100.0 (19.98-2.30) 99.8 (19.99-2.10)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.06 (at 2.09Å)	Xtrriage
Refinement program	REFMAC 5.2.0005	Depositor
R, R_{free}	0.199 , 0.262 0.200 , 0.260	Depositor DCC
R_{free} test set	6706 reflections (3.80%)	wwPDB-VP
Wilson B-factor (Å ²)	33.5	Xtrriage
Anisotropy	0.564	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 52.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	21934	wwPDB-VP
Average B, all atoms (Å ²)	41.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.15% 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: MG, TPP

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	0.50	0/2647	0.54	0/3592
1	C	0.52	0/2715	0.56	0/3677
1	E	0.48	0/2571	0.55	1/3482 (0.0%)
1	G	0.46	0/2617	0.56	0/3541
2	B	0.54	0/2476	0.64	1/3369 (0.0%)
2	D	0.55	0/2535	0.63	0/3437
2	F	0.54	0/2411	0.64	0/3267
2	H	0.52	0/2458	0.62	0/3330
3	I	0.46	0/305	0.58	0/408
3	J	0.57	1/313 (0.3%)	0.62	0/420
All	All	0.51	1/21048 (0.0%)	0.59	2/28523 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	C	0	1
1	E	0	1
All	All	0	2

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	J	169	GLY	C-N	-5.12	1.23	1.33

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	294	ASP	CB-CG-OD2	5.18	122.97	118.30
2	B	264	ARG	NE-CZ-NH2	-5.10	117.75	120.30

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	C	367	SER	Peptide
1	E	292	LYS	Peptide

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	2592	0	2520	25	0
1	C	2659	0	2595	23	0
1	E	2521	0	2455	39	0
1	G	2565	0	2504	15	0
2	B	2428	0	2401	31	0
2	D	2489	0	2515	19	0
2	F	2369	0	2401	23	0
2	H	2416	0	2420	26	0
3	I	303	0	316	10	0
3	J	311	0	318	9	0
4	A	1	0	0	0	0
4	C	1	0	0	0	0
4	E	1	0	0	0	0
4	G	1	0	0	0	0
5	A	26	0	16	0	0
5	C	26	0	16	0	0
5	E	26	0	16	1	0
5	G	26	0	16	0	0
6	A	96	0	0	2	0
6	B	124	0	0	3	0
6	C	168	0	0	0	0
6	D	209	0	0	2	0
6	E	78	0	0	4	0
6	F	194	0	0	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	G	88	0	0	2	0
6	H	161	0	0	4	0
6	I	24	0	0	4	0
6	J	31	0	0	3	0
All	All	21934	0	20509	197	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 5.

All (197) 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:303:LEU:CD1	1:E:309:TRP:HB2	1.73	1.18
1:E:303:LEU:HD11	1:E:309:TRP:HB2	1.30	1.09
1:E:71:ARG:HG2	1:E:71:ARG:HH11	1.19	1.04
3:J:142:LYS:HB2	6:J:2012:HOH:O	1.71	0.91
6:B:2105:HOH:O	3:I:133:PRO:HB3	1.76	0.85
2:F:143:LYS:HE3	6:F:2095:HOH:O	1.78	0.82
1:E:303:LEU:CD1	1:E:309:TRP:CB	2.59	0.80
1:C:367:SER:N	1:C:368:LYS:HA	1.97	0.79
1:E:303:LEU:HD11	1:E:309:TRP:CB	2.12	0.79
3:I:129:VAL:HG21	3:I:146:ILE:CG2	2.13	0.78
1:C:203:ARG:HA	1:C:210:VAL:HG22	1.64	0.78
2:D:143:LYS:HE2	6:D:2110:HOH:O	1.86	0.75
1:A:9:PHE:HZ	1:C:231:ILE:HD11	1.53	0.73
1:E:93:GLU:HB3	6:E:2022:HOH:O	1.88	0.73
3:J:144:VAL:HG23	6:J:2012:HOH:O	1.88	0.71
2:F:80:ILE:HG13	2:F:114:ILE:HG23	1.73	0.71
1:A:294:ASP:HB3	1:A:297:VAL:HG23	1.73	0.69
1:E:304:GLU:C	1:E:306:LYS:H	1.98	0.67
2:B:157:LEU:O	2:B:161:ILE:HG13	1.95	0.66
2:B:93:ILE:HA	2:B:97:MET:HG2	1.77	0.66
1:E:71:ARG:HG2	1:E:71:ARG:NH1	1.98	0.66
2:H:82:PHE:HB2	2:H:85:PHE:CZ	2.31	0.66
2:B:59:GLU:HB3	2:B:89:VAL:HG22	1.77	0.66
1:E:76:ALA:HB1	1:E:103:ARG:HG2	1.77	0.66
1:E:303:LEU:HD12	1:E:309:TRP:HB2	1.72	0.65
3:I:129:VAL:HG21	3:I:146:ILE:HG22	1.78	0.65
2:B:142:LEU:HD23	2:B:166:PRO:HB2	1.78	0.64
2:F:277[B]:ASN:HD21	2:H:277:ASN:HB2	1.64	0.63
2:B:324:PHE:O	3:I:137:LYS:NZ	2.24	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:71:ARG:HH11	1:E:71:ARG:CG	2.06	0.63
2:F:277[B]:ASN:ND2	2:H:277:ASN:HB2	2.14	0.62
1:E:83:ALA:O	1:E:87:ALA:HB3	2.00	0.62
1:C:249:ARG:O	1:C:253:ILE:HG23	1.99	0.61
1:E:293:LYS:O	1:E:294:ASP:C	2.38	0.61
2:D:214:HIS:HD2	6:D:2147:HOH:O	1.83	0.61
2:B:277[B]:ASN:ND2	2:D:277:ASN:HB2	2.15	0.60
2:F:80:ILE:HG21	2:F:89:VAL:HG11	1.81	0.60
3:I:161:GLU:HB3	6:I:2018:HOH:O	2.01	0.60
2:B:264:ARG:NH2	6:B:2096:HOH:O	2.34	0.59
1:E:43:ASP:HA	1:E:46:LEU:HD12	1.85	0.58
1:A:344:ILE:HG23	1:A:355:LEU:HD22	1.85	0.58
3:I:160:LYS:HB3	6:I:2017:HOH:O	2.03	0.58
1:A:142:ILE:HG21	2:D:126:GLU:O	2.05	0.57
1:A:228:ILE:HG21	1:A:258:PRO:HG2	1.86	0.56
1:G:83:ALA:O	1:G:87:ALA:HB3	2.05	0.56
1:G:313:GLU:O	1:G:317:VAL:HG23	2.06	0.56
1:A:249:ARG:O	1:A:253:ILE:HG12	2.06	0.56
1:G:202:ASN:O	1:G:203:ARG:HB2	2.06	0.56
1:E:304:GLU:C	1:E:306:LYS:N	2.59	0.55
2:F:299:PRO:HD3	2:F:307:TRP:CD2	2.40	0.55
3:J:129:VAL:HG21	3:J:146:ILE:CG2	2.37	0.55
3:J:145:ASP:HB3	3:J:148:LEU:HD22	1.88	0.55
2:H:93:ILE:HG21	2:H:168:ILE:HD11	1.89	0.55
1:C:367:SER:H	1:C:368:LYS:HA	1.72	0.54
2:D:122:VAL:HG23	2:D:124:THR:HG23	1.89	0.54
2:H:282:LEU:HA	3:J:134:SER:HB3	1.89	0.53
2:F:128:HIS:N	6:F:2072:HOH:O	2.42	0.53
2:H:82:PHE:CZ	2:H:173:LEU:HD11	2.43	0.53
2:F:80:ILE:HG13	2:F:114:ILE:CG2	2.38	0.53
2:D:298:TYR:CG	2:D:299:PRO:HD2	2.44	0.53
1:C:23:PHE:HB3	1:C:233:VAL:HG12	1.89	0.53
3:I:129:VAL:HG21	3:I:146:ILE:HG21	1.90	0.53
1:G:66:LEU:HD13	1:G:329:ILE:HD11	1.92	0.52
1:A:294:ASP:HB3	1:A:297:VAL:CG2	2.38	0.52
1:C:46:LEU:HB3	1:C:303:LEU:HD21	1.90	0.52
2:H:17:LEU:HD11	2:H:25:ILE:HD12	1.92	0.52
1:A:60:ASP:OD2	1:A:79:ALA:HB2	2.08	0.52
2:H:299:PRO:HD3	2:H:307:TRP:CD2	2.44	0.52
1:A:9:PHE:CZ	1:C:231:ILE:HD11	2.40	0.52
1:E:49:LEU:O	1:E:53:MET:HG3	2.10	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:183:GLN:OE1	2:B:58:ALA:HB1	2.10	0.52
2:F:299:PRO:HA	2:H:102:TYR:OH	2.10	0.52
2:B:284:LEU:HD22	2:B:286:ALA:O	2.10	0.52
2:B:299:PRO:HD3	2:B:307:TRP:CD2	2.45	0.52
1:A:25:ILE:HD12	1:A:240:ALA:HA	1.91	0.52
1:E:304:GLU:O	1:E:307:GLY:N	2.39	0.51
1:A:49:LEU:HD11	1:A:87:ALA:HA	1.93	0.51
1:C:183:GLN:OE1	2:D:58:ALA:HB1	2.10	0.51
2:B:298:TYR:CG	2:B:299:PRO:HD2	2.45	0.51
1:E:23:PHE:HB3	1:E:233:VAL:HG12	1.93	0.51
2:D:93:ILE:HA	2:D:97:MET:HG2	1.92	0.50
1:E:78:THR:HG21	1:E:85:GLN:OE1	2.10	0.50
2:F:28:GLU:HG2	2:F:57:LEU:HD23	1.94	0.50
2:B:35:GLY:HA3	6:B:2014:HOH:O	2.11	0.50
1:G:67:ASN:ND2	1:G:73:GLY:O	2.44	0.50
2:D:75:ARG:HD3	2:D:161:ILE:O	2.11	0.49
1:G:66:LEU:HD22	1:G:329:ILE:CD1	2.42	0.49
1:A:58:ILE:O	1:A:62:ARG:HG2	2.13	0.49
2:D:174:LYS:O	2:D:178:SER:HB3	2.12	0.49
2:H:82:PHE:CB	2:H:85:PHE:CZ	2.96	0.49
1:C:100:PRO:HG3	1:C:108:ILE:HG21	1.94	0.48
1:E:303:LEU:HD12	1:E:309:TRP:CB	2.33	0.48
2:F:174:LYS:O	2:F:178:SER:HB3	2.13	0.48
1:E:36:GLU:HG2	6:E:2005:HOH:O	2.13	0.48
2:B:142:LEU:CD2	2:B:166:PRO:HB2	2.43	0.48
2:D:117:PRO:HA	2:D:171:GLU:O	2.13	0.48
1:E:25:ILE:HD13	1:E:39:PRO:HD3	1.95	0.48
2:H:298:TYR:CG	2:H:299:PRO:HD2	2.48	0.48
2:F:38:ARG:HB2	2:F:177:ARG:HH22	1.79	0.47
1:A:348:PHE:CZ	2:B:141:GLY:HA2	2.49	0.47
1:A:231:ILE:HD11	1:C:9:PHE:HZ	1.79	0.47
2:B:16:GLU:OE2	2:B:158:ILE:HG23	2.14	0.47
1:E:300:ARG:NH2	1:E:314:GLU:OE2	2.44	0.47
1:G:27:ASN:HD21	1:G:31:GLU:HB2	1.80	0.47
3:J:141:GLU:HG3	3:J:142:LYS:HG3	1.96	0.47
2:F:116:SER:HB3	2:F:170:LEU:HD23	1.97	0.47
2:B:102:TYR:OH	2:D:299:PRO:HA	2.15	0.47
2:B:81:GLN:O	2:B:117:PRO:HG2	2.15	0.47
1:A:88:SER:HB2	1:A:245:VAL:HG21	1.97	0.46
2:B:122:VAL:HG23	2:B:124:THR:HG23	1.96	0.46
2:B:238:VAL:HB	2:B:268:ILE:HG12	1.96	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:83:ALA:O	1:C:87:ALA:HB3	2.16	0.46
1:C:367:SER:N	1:C:368:LYS:CA	2.71	0.46
1:G:149:ILE:H	1:G:149:ILE:HG13	1.41	0.46
3:J:129:VAL:HG21	3:J:146:ILE:HG22	1.97	0.46
1:G:298:ARG:HB3	6:G:2060:HOH:O	2.15	0.46
1:A:9:PHE:CD1	1:C:229:PRO:HB3	2.52	0.46
1:A:368:LYS:N	6:A:2095:HOH:O	2.48	0.45
1:E:294:ASP:C	1:E:294:ASP:OD1	2.54	0.45
2:F:74:PHE:O	2:F:76:PRO:HD3	2.15	0.45
2:H:82:PHE:HZ	2:H:173:LEU:HD11	1.81	0.45
2:H:185:GLU:HG3	6:H:2078:HOH:O	2.15	0.45
2:B:20:ASP:HB3	2:B:23:VAL:HG23	1.97	0.45
6:E:2037:HOH:O	2:F:96:GLN:HG3	2.16	0.45
1:E:38:MET:HE3	1:E:239:LEU:HD13	1.98	0.45
1:E:60:ASP:OD2	1:E:79:ALA:HB2	2.16	0.45
1:E:144:ILE:HD12	5:E:1370:TPP:C2'	2.47	0.45
1:C:51:ARG:HG2	1:C:317:VAL:HG21	1.98	0.45
2:B:128:HIS:HE1	1:C:142:ILE:HD12	1.82	0.44
1:E:42:SER:H	1:E:45[B]:GLN:HE21	1.64	0.44
2:B:36:VAL:HG13	2:B:37:PHE:CD2	2.53	0.44
2:H:133:GLU:OE2	2:H:209:TYR:OH	2.26	0.44
1:A:187:PHE:HE1	2:B:58:ALA:HB3	1.81	0.44
2:B:128:HIS:HE1	1:C:142:ILE:CD1	2.31	0.44
2:H:38:ARG:HG2	6:H:2015:HOH:O	2.16	0.44
1:E:293:LYS:O	1:E:294:ASP:O	2.35	0.44
2:H:114:ILE:HD13	2:H:168:ILE:HD13	1.99	0.44
1:C:203:ARG:NH2	1:C:264:LEU:HD22	2.33	0.43
2:D:299:PRO:HD3	2:D:307:TRP:CD2	2.53	0.43
1:G:26:LEU:HG	1:G:239:LEU:HD12	2.00	0.43
1:A:100:PRO:HG2	1:A:140:PRO:HA	2.00	0.43
1:A:224:VAL:HG13	1:C:16:VAL:HG11	2.00	0.43
2:D:120:GLY:HA3	2:D:298:TYR:OH	2.18	0.43
1:E:326:LYS:O	1:E:329:ILE:HG22	2.18	0.43
2:H:205:THR:O	2:H:256:ALA:HA	2.19	0.43
2:B:59:GLU:HB3	2:B:89:VAL:CG2	2.47	0.43
2:F:264:ARG:NH1	6:F:2156:HOH:O	2.33	0.43
2:H:180:ARG:HD2	6:H:2004:HOH:O	2.19	0.43
2:D:125:PRO:HG2	2:D:128:HIS:CE1	2.53	0.43
3:I:129:VAL:HG13	6:I:2008:HOH:O	2.19	0.42
1:A:83:ALA:O	1:A:87:ALA:HB3	2.19	0.42
2:B:76:PRO:HD2	2:B:112:ILE:HG12	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:93:ILE:CG2	2:H:168:ILE:HD11	2.49	0.42
1:C:26:LEU:HG	1:C:239:LEU:HD12	2.00	0.42
3:J:144:VAL:HG12	6:J:2020:HOH:O	2.19	0.42
2:B:284:LEU:O	3:I:136:ARG:HD2	2.19	0.42
1:C:203:ARG:O	1:C:209:PRO:HA	2.19	0.42
2:D:286:ALA:HB1	2:D:287:PRO:HD2	2.00	0.42
1:G:123:ARG:NH2	1:G:333:ASP:OD1	2.46	0.42
6:G:2039:HOH:O	2:H:96:GLN:HG3	2.19	0.42
2:H:14:ARG:HD3	6:H:2018:HOH:O	2.19	0.42
1:E:304:GLU:O	1:E:306:LYS:N	2.53	0.42
2:F:282:LEU:HD13	3:J:130:ILE:HB	2.02	0.42
1:A:298:ARG:HB3	6:A:2071:HOH:O	2.19	0.42
2:F:93:ILE:HA	2:F:97:MET:CG	2.48	0.42
2:H:80:ILE:O	2:H:80:ILE:HG22	2.18	0.42
2:D:20:ASP:HB3	2:D:23:VAL:HG23	2.02	0.42
1:G:66:LEU:HD22	1:G:329:ILE:HD11	2.02	0.42
2:B:117:PRO:HA	2:B:171:GLU:O	2.19	0.42
1:A:105:VAL:N	1:A:106:PRO:CD	2.82	0.41
2:F:17:LEU:HD11	2:F:25:ILE:HD12	2.02	0.41
2:B:299:PRO:HD3	2:B:307:TRP:CE3	2.54	0.41
1:E:78:THR:HG21	1:E:85:GLN:CD	2.40	0.41
2:H:59:GLU:H	2:H:59:GLU:CD	2.24	0.41
2:D:298:TYR:CD2	2:D:299:PRO:HD2	2.56	0.41
2:F:97:MET:SD	2:F:114:ILE:HD11	2.60	0.41
2:F:142:LEU:HD23	2:F:166:PRO:HB2	2.01	0.41
1:E:294:ASP:HA	1:E:295:PRO:HD2	1.91	0.41
1:C:203:ARG:HH21	1:C:264:LEU:HD22	1.85	0.41
2:D:97:MET:HA	2:D:100:ILE:HD12	2.02	0.41
1:E:235:GLY:N	1:E:264:LEU:O	2.49	0.41
1:E:338:GLN:HE21	2:H:302:GLN:HB3	1.85	0.41
1:G:335:THR:HA	1:G:336:PRO:HD3	1.97	0.41
2:F:59:GLU:CD	2:F:59:GLU:H	2.25	0.41
1:E:76:ALA:CB	1:E:103:ARG:HG2	2.47	0.40
1:E:83:ALA:HB3	1:E:235:GLY:O	2.21	0.40
1:A:50:MET:O	1:A:54:VAL:HG23	2.21	0.40
2:B:38:ARG:HG3	2:B:177:ARG:NH2	2.36	0.40
1:E:142:ILE:HG13	6:E:2036:HOH:O	2.22	0.40
2:F:92:SER:O	2:F:97:MET:HG2	2.22	0.40
2:H:142:LEU:HD22	2:H:168:ILE:HG12	2.03	0.40
1:E:7:PHE:O	1:E:9:PHE:N	2.54	0.40
1:G:346:ILE:HD12	2:H:102:TYR:O	2.21	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:I:161:GLU:HB2	6:I:2021:HOH:O	2.21	0.40
2:B:97:MET:SD	2:B:114:ILE:HD11	2.61	0.40
1:C:51:ARG:HG2	1:C:317:VAL:CG2	2.52	0.40
1:G:199:VAL:HG23	1:G:260:LEU:HD11	2.02	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	337/368 (92%)	327 (97%)	9 (3%)	1 (0%)	41	50
1	C	339/368 (92%)	329 (97%)	9 (3%)	1 (0%)	41	50
1	E	323/368 (88%)	304 (94%)	16 (5%)	3 (1%)	17	20
1	G	326/368 (89%)	316 (97%)	9 (3%)	1 (0%)	41	50
2	B	323/324 (100%)	309 (96%)	13 (4%)	1 (0%)	41	50
2	D	322/324 (99%)	311 (97%)	11 (3%)	0	100	100
2	F	305/324 (94%)	298 (98%)	6 (2%)	1 (0%)	41	50
2	H	313/324 (97%)	303 (97%)	8 (3%)	2 (1%)	25	31
3	I	38/49 (78%)	38 (100%)	0	0	100	100
3	J	41/49 (84%)	40 (98%)	1 (2%)	0	100	100
All	All	2667/2866 (93%)	2575 (97%)	82 (3%)	10 (0%)	34	42

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	206	ILE
1	C	206	ILE
1	E	305	ALA

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Mol	Chain	Res	Type
1	G	203	ARG
2	H	81	GLN
2	F	301	ALA
1	E	297	VAL
2	B	184	PRO
2	H	86	VAL
1	E	294	ASP

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	255/304 (84%)	252 (99%)	3 (1%)	71	84
1	C	267/304 (88%)	260 (97%)	7 (3%)	46	63
1	E	250/304 (82%)	241 (96%)	9 (4%)	35	49
1	G	257/304 (84%)	255 (99%)	2 (1%)	81	91
2	B	247/263 (94%)	237 (96%)	10 (4%)	31	44
2	D	263/263 (100%)	259 (98%)	4 (2%)	65	79
2	F	249/263 (95%)	241 (97%)	8 (3%)	39	54
2	H	251/263 (95%)	245 (98%)	6 (2%)	49	66
3	I	31/36 (86%)	27 (87%)	4 (13%)	4	4
3	J	30/36 (83%)	27 (90%)	3 (10%)	7	9
All	All	2100/2340 (90%)	2044 (97%)	56 (3%)	46	61

All (56) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	43	ASP
1	A	142	ILE
1	A	265	CYS
2	B	38	ARG
2	B	89	VAL
2	B	123	HIS

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Mol	Chain	Res	Type
2	B	130	ASP
2	B	131	SER
2	B	176	TYR
2	B	187	GLU
2	B	277[A]	ASN
2	B	277[B]	ASN
2	B	320	LYS
1	C	13	LEU
1	C	142	ILE
1	C	203	ARG
1	C	210	VAL
1	C	211	GLU
1	C	253	ILE
1	C	254	ASN
2	D	176	TYR
2	D	187	GLU
2	D	277	ASN
2	D	320	LYS
1	E	38	MET
1	E	67	ASN
1	E	68	ARG
1	E	71	ARG
1	E	78	THR
1	E	202	ASN
1	E	303	LEU
1	E	329	ILE
1	E	368	LYS
2	F	32	VAL
2	F	80	ILE
2	F	97	MET
2	F	176	TYR
2	F	187	GLU
2	F	277[A]	ASN
2	F	277[B]	ASN
2	F	320	LYS
1	G	149	ILE
1	G	329	ILE
2	H	82	PHE
2	H	130	ASP
2	H	131	SER
2	H	142	LEU
2	H	176	TYR

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Mol	Chain	Res	Type
2	H	277	ASN
3	I	129	VAL
3	I	146	ILE
3	I	157	ARG
3	I	160	LYS
3	J	129	VAL
3	J	160	LYS
3	J	161	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	69	GLN
1	E	320	GLN
1	G	67	ASN
1	G	186	ASN
2	H	302	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](#)

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 8 ligands modelled in this entry, 4 are monoatomic - leaving 4 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the

expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# $ Z > 2$	Counts	RMSZ	# $ Z > 2$
5	TPP	G	1370	4	22,27,27	1.69	4 (18%)	29,40,40	1.83	7 (24%)
5	TPP	A	1370	4	22,27,27	1.79	4 (18%)	29,40,40	2.05	9 (31%)
5	TPP	E	1370	4	22,27,27	1.64	4 (18%)	29,40,40	2.13	8 (27%)
5	TPP	C	1370	4	22,27,27	1.51	4 (18%)	29,40,40	2.36	12 (41%)

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	TPP	G	1370	4	-	7/16/17/17	0/2/2/2
5	TPP	A	1370	4	-	1/16/17/17	0/2/2/2
5	TPP	E	1370	4	-	2/16/17/17	0/2/2/2
5	TPP	C	1370	4	-	1/16/17/17	0/2/2/2

All (16) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	E	1370	TPP	C4-N3	-4.71	1.35	1.39
5	A	1370	TPP	C4-N3	-4.54	1.35	1.39
5	A	1370	TPP	C5'-C4'	4.54	1.50	1.42
5	G	1370	TPP	C4-N3	-4.34	1.35	1.39
5	C	1370	TPP	C5'-C4'	4.03	1.49	1.42
5	E	1370	TPP	C5'-C4'	3.92	1.49	1.42
5	G	1370	TPP	C5'-C4'	3.91	1.49	1.42
5	G	1370	TPP	C6-C5	3.53	1.52	1.50
5	A	1370	TPP	C4'-N4'	2.91	1.41	1.34
5	C	1370	TPP	C6-C5	2.87	1.52	1.50
5	C	1370	TPP	C4-N3	-2.83	1.37	1.39
5	A	1370	TPP	C6-C5	2.67	1.52	1.50
5	E	1370	TPP	C4'-N4'	2.62	1.40	1.34
5	G	1370	TPP	C4'-N4'	2.57	1.40	1.34
5	C	1370	TPP	C4'-N4'	2.55	1.40	1.34
5	E	1370	TPP	C6-C5	2.19	1.51	1.50

All (36) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	C	1370	TPP	C6-C5-C4	8.91	134.58	127.43
5	A	1370	TPP	C6-C5-C4	7.20	133.22	127.43
5	E	1370	TPP	C6-C5-C4	7.20	133.21	127.43
5	G	1370	TPP	C6-C5-C4	5.25	131.64	127.43
5	E	1370	TPP	C6'-N1'-C2'	3.77	122.38	115.96
5	C	1370	TPP	CM4-C4-N3	3.65	127.19	122.53
5	A	1370	TPP	C6'-N1'-C2'	3.54	121.98	115.96
5	G	1370	TPP	C6'-N1'-C2'	3.53	121.97	115.96
5	C	1370	TPP	C6'-N1'-C2'	3.53	121.96	115.96
5	G	1370	TPP	CM4-C4-N3	3.18	126.59	122.53
5	E	1370	TPP	PA-O3A-PB	-2.97	122.63	132.83
5	E	1370	TPP	CM4-C4-N3	2.87	126.19	122.53
5	E	1370	TPP	C5'-C6'-N1'	-2.64	119.43	123.82
5	A	1370	TPP	O2B-PB-O3A	2.61	113.40	104.64
5	G	1370	TPP	C5'-C6'-N1'	-2.59	119.51	123.82
5	E	1370	TPP	C5'-C7'-N3	-2.54	109.05	113.28
5	A	1370	TPP	CM4-C4-N3	2.47	125.68	122.53
5	A	1370	TPP	N1'-C2'-N3'	-2.40	121.40	125.54
5	C	1370	TPP	N1'-C2'-N3'	-2.40	121.41	125.54
5	E	1370	TPP	N1'-C2'-N3'	-2.37	121.46	125.54
5	C	1370	TPP	C5'-C7'-N3	-2.30	109.44	113.28
5	G	1370	TPP	C7'-N3-C2	-2.26	121.27	125.35
5	E	1370	TPP	N4'-C4'-N3'	2.26	120.22	117.03
5	A	1370	TPP	C5'-C6'-N1'	-2.20	120.15	123.82
5	A	1370	TPP	PA-O3A-PB	-2.19	125.30	132.83
5	C	1370	TPP	CM2-C2'-N1'	2.17	119.52	117.14
5	A	1370	TPP	C7'-N3-C2	-2.15	121.46	125.35
5	C	1370	TPP	C5'-C6'-N1'	-2.14	120.25	123.82
5	C	1370	TPP	PA-O3A-PB	-2.13	125.53	132.83
5	C	1370	TPP	C7'-N3-C2	-2.12	121.52	125.35
5	G	1370	TPP	N4'-C4'-N3'	2.12	120.02	117.03
5	C	1370	TPP	CM4-C4-C5	-2.10	123.01	127.60
5	C	1370	TPP	O2B-PB-O3A	2.06	111.56	104.64
5	G	1370	TPP	N1'-C2'-N3'	-2.06	122.00	125.54
5	A	1370	TPP	C2'-N3'-C4'	2.05	121.28	118.08
5	C	1370	TPP	C2'-N3'-C4'	2.02	121.23	118.08

There are no chirality outliers.

All (11) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	C	1370	TPP	PB-O3A-PA-O7
5	E	1370	TPP	C5-C6-C7-O7

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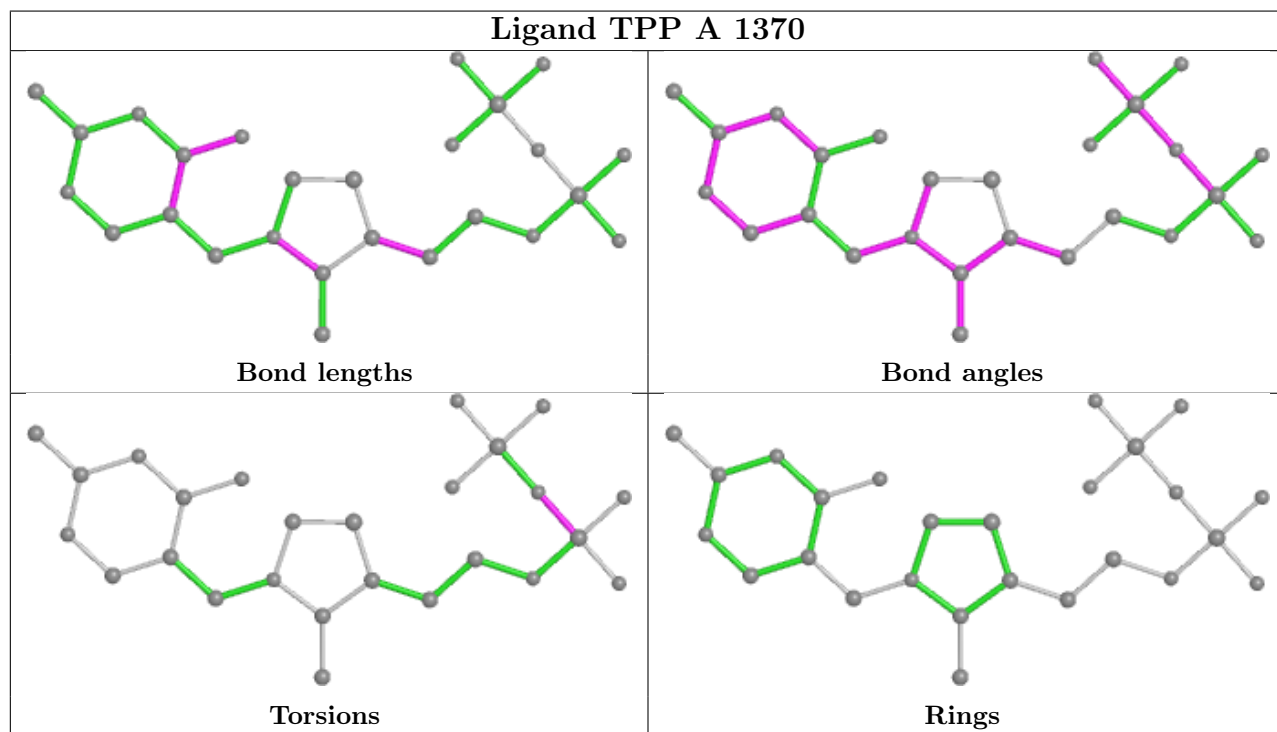
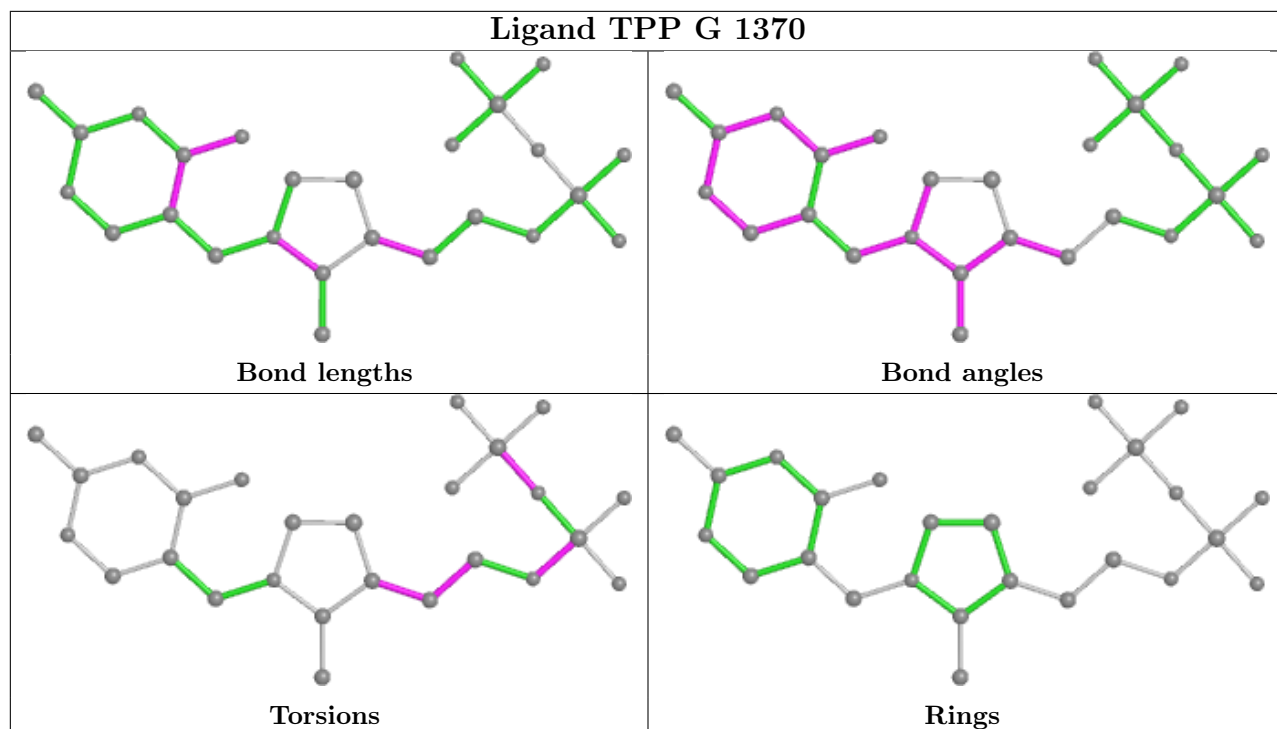
Mol	Chain	Res	Type	Atoms
5	E	1370	TPP	PB-O3A-PA-O7
5	G	1370	TPP	C5-C6-C7-O7
5	G	1370	TPP	C7-O7-PA-O1A
5	G	1370	TPP	C7-O7-PA-O2A
5	G	1370	TPP	C7-O7-PA-O3A
5	A	1370	TPP	PB-O3A-PA-O7
5	G	1370	TPP	PA-O3A-PB-O3B
5	G	1370	TPP	PA-O3A-PB-O1B
5	G	1370	TPP	C4-C5-C6-C7

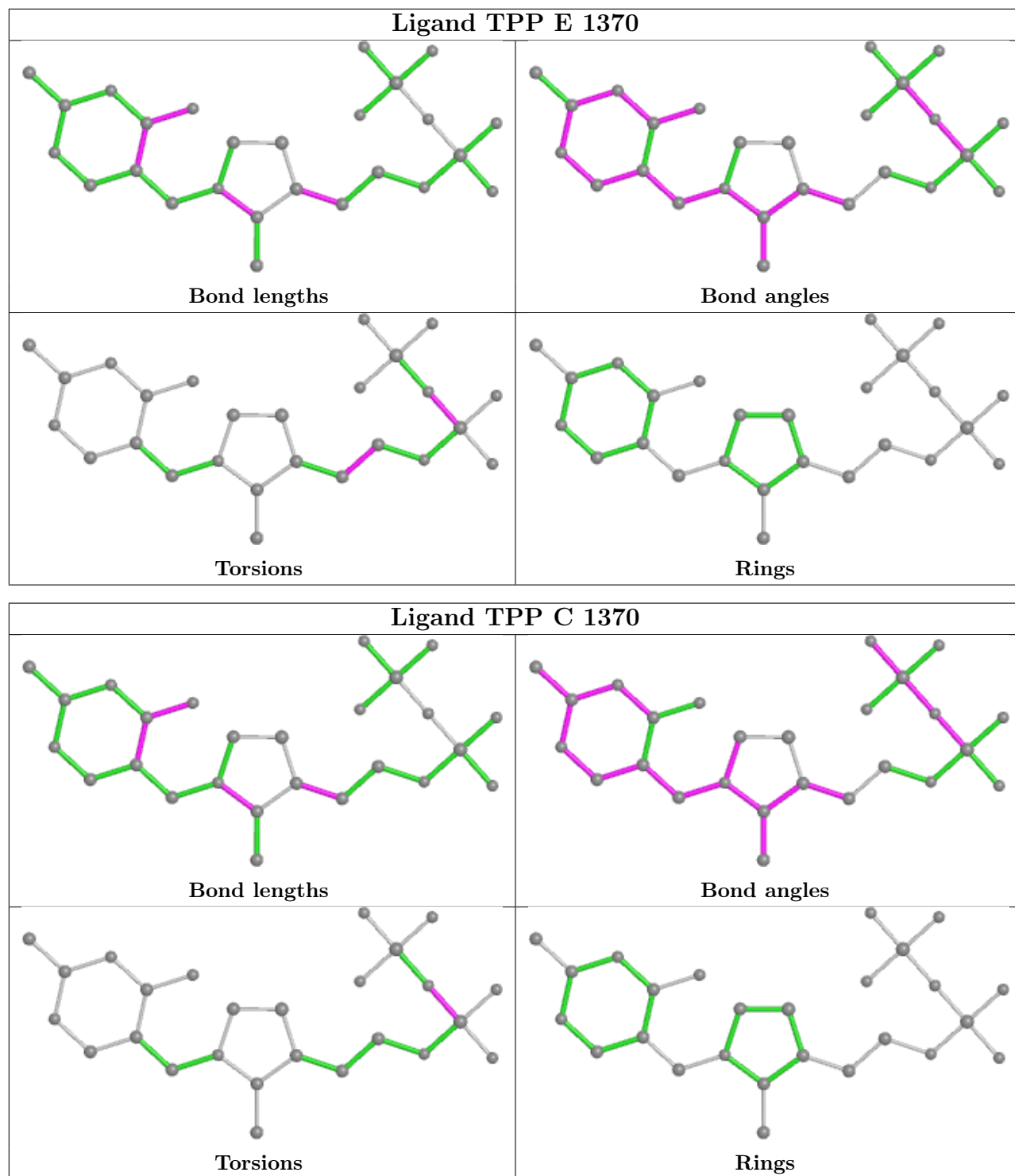
There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	E	1370	TPP	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

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	341/368 (92%)	-0.26	5 (1%) 73 79	24, 42, 62, 79	2 (0%)
1	C	343/368 (93%)	-0.30	8 (2%) 60 67	22, 38, 60, 88	2 (0%)
1	E	328/368 (89%)	0.15	22 (6%) 17 23	20, 47, 68, 85	3 (0%)
1	G	331/368 (89%)	-0.06	12 (3%) 42 49	25, 45, 68, 88	1 (0%)
2	B	324/324 (100%)	-0.36	6 (1%) 66 73	20, 37, 53, 67	0
2	D	324/324 (100%)	-0.48	1 (0%) 94 96	20, 30, 45, 61	0
2	F	310/324 (95%)	-0.49	1 (0%) 94 96	17, 30, 47, 67	0
2	H	317/324 (97%)	-0.37	9 (2%) 53 60	18, 33, 54, 93	0
3	I	40/49 (81%)	1.56	14 (35%) 0 0	50, 66, 76, 82	0
3	J	43/49 (87%)	1.69	14 (32%) 0 0	46, 66, 80, 87	0
All	All	2701/2866 (94%)	-0.21	92 (3%) 45 52	17, 38, 65, 93	8 (0%)

All (92) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	204	PHE	9.7
1	E	204	PHE	7.2
1	G	205	ALA	6.7
2	H	82	PHE	6.0
1	E	205	ALA	5.9
1	E	74	PHE	5.7
3	J	168	ALA	5.6
1	A	268	TYR	5.3
3	I	163	ILE	5.1
1	E	6	GLN	4.7
3	J	148	LEU	4.7
3	J	169	GLY	4.3
1	E	5	PHE	4.3

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Mol	Chain	Res	Type	RSRZ
1	E	51	ARG	4.1
1	A	254	ASN	4.1
3	I	165	ALA	4.0
1	C	266	PHE	4.0
1	G	5	PHE	4.0
3	I	167	LEU	3.8
2	H	57	LEU	3.8
2	H	120	GLY	3.7
1	E	33	VAL	3.6
1	E	76	ALA	3.6
3	J	155	ASN	3.6
3	J	167	LEU	3.6
2	F	128	HIS	3.5
1	C	268	TYR	3.4
3	J	160	LYS	3.2
1	E	8	PRO	3.2
2	H	84	GLY	3.2
1	E	203	ARG	3.1
3	J	128	ARG	3.1
3	I	150	GLN	3.1
3	I	164	ASP	3.0
1	G	74	PHE	3.0
3	I	128	ARG	2.9
2	H	121	GLY	2.7
2	B	123	HIS	2.7
1	E	301	LYS	2.7
1	G	68	ARG	2.7
3	J	130	ILE	2.7
2	B	178	SER	2.7
1	C	204	PHE	2.7
1	G	254	ASN	2.7
1	G	6	GLN	2.7
1	E	102	TYR	2.7
2	H	85	PHE	2.7
1	C	267	ARG	2.6
2	B	1	ALA	2.6
1	E	368	LYS	2.6
2	H	83	PHE	2.6
2	D	123	HIS	2.5
3	J	139	ALA	2.5
3	I	161	GLU	2.5
1	A	266	PHE	2.5

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Mol	Chain	Res	Type	RSRZ
3	I	144	VAL	2.5
1	E	305	ALA	2.5
2	H	81	GLN	2.5
3	I	160	LYS	2.4
1	E	10	ALA	2.4
3	I	147	ARG	2.4
1	E	254	ASN	2.4
1	G	307	GLY	2.4
1	E	233	VAL	2.4
1	E	367	SER	2.4
3	I	148	LEU	2.3
1	E	308	LEU	2.3
1	C	6	GLN	2.3
3	J	158	VAL	2.2
3	J	135	VAL	2.2
3	I	146	ILE	2.2
1	G	203	ARG	2.2
1	G	213	GLN	2.2
2	B	227	GLY	2.2
1	E	238	PRO	2.2
3	J	144	VAL	2.2
1	A	204	PHE	2.2
3	I	155	ASN	2.1
2	B	324	PHE	2.1
3	J	170	GLY	2.1
1	A	305	ALA	2.1
2	B	124	THR	2.1
1	E	202	ASN	2.1
1	C	211	GLU	2.1
1	G	36	GLU	2.1
1	G	305	ALA	2.1
1	C	203	ARG	2.1
2	H	38	ARG	2.1
3	I	138	TYR	2.1
1	E	28	GLU	2.0
3	J	147	ARG	2.0
1	C	233	VAL	2.0

6.2 Non-standard residues in protein, DNA, RNA chains

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates

There are no monosaccharides in this entry.

6.4 Ligands

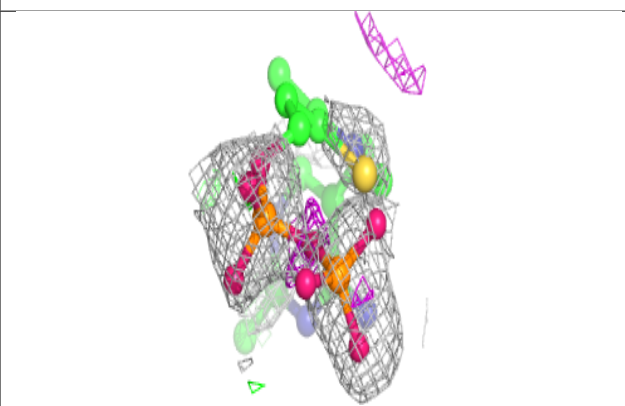
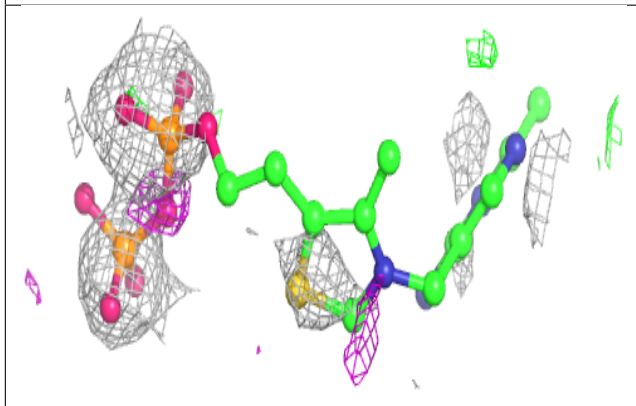
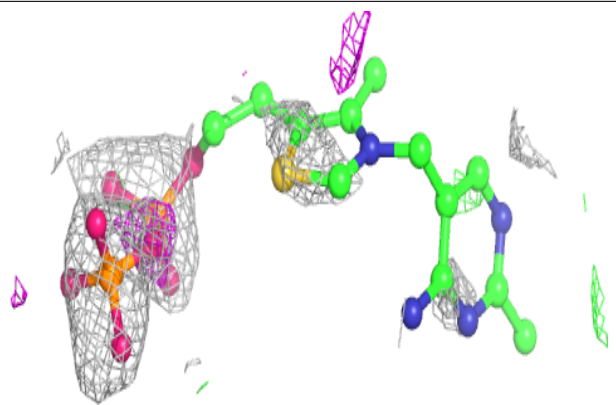
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists 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	MG	E	1368	1/1	0.48	0.25	78,78,78,78	0
5	TPP	G	1370	26/26	0.57	0.51	143,149,155,155	0
5	TPP	E	1370	26/26	0.61	0.53	172,176,177,178	0
4	MG	G	1368	1/1	0.87	0.07	66,66,66,66	0
4	MG	A	1368	1/1	0.93	0.07	28,28,28,28	0
5	TPP	C	1370	26/26	0.95	0.14	34,47,51,53	0
5	TPP	A	1370	26/26	0.96	0.10	29,37,40,42	0
4	MG	C	1368	1/1	0.98	0.05	28,28,28,28	0

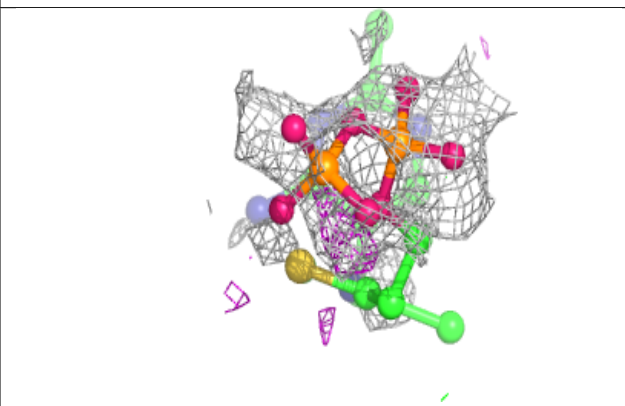
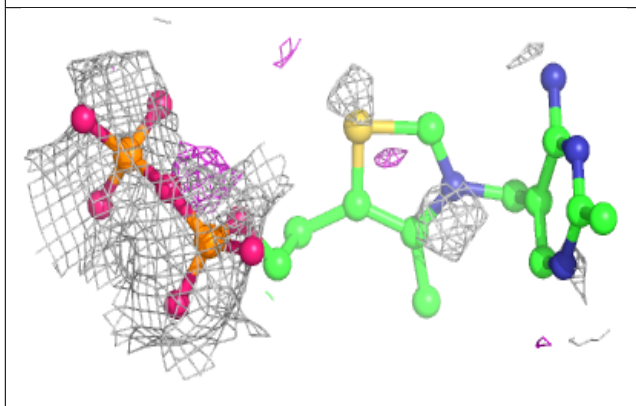
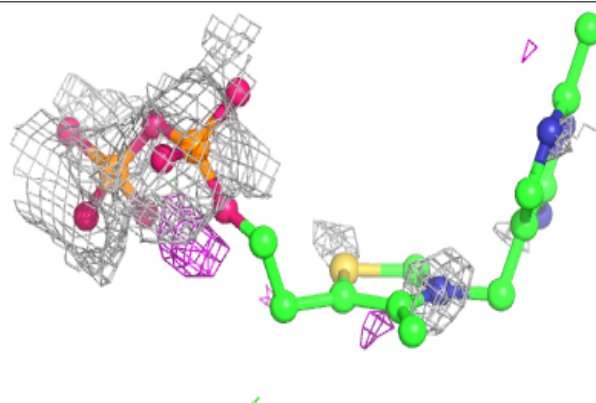
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around TPP G 1370:

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

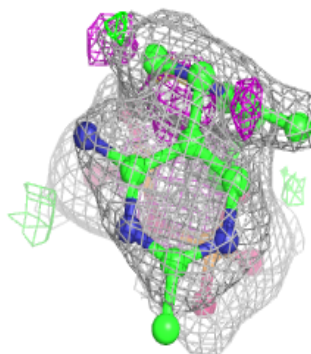
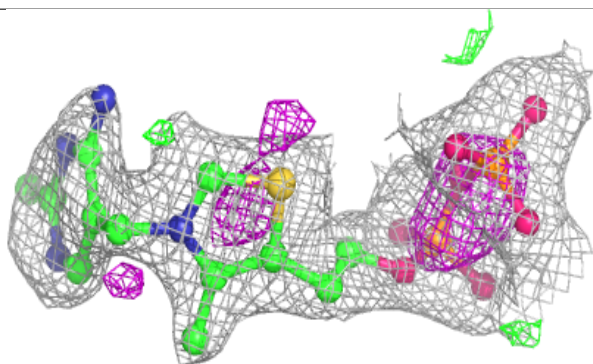
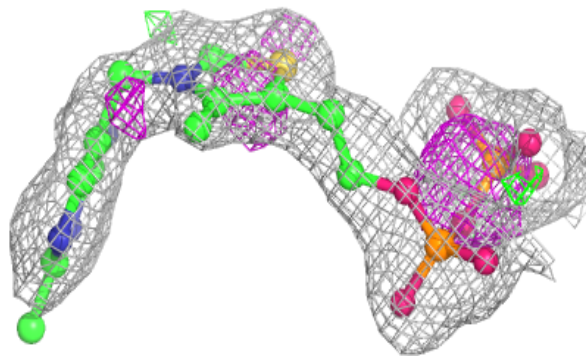
**Electron density around TPP E 1370:**

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

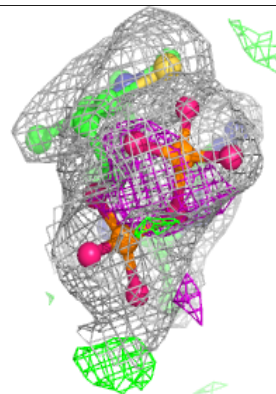
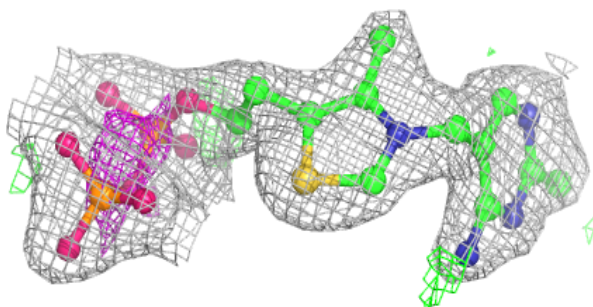
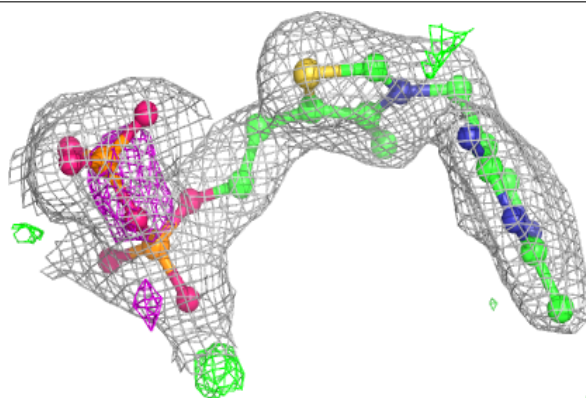


Electron density around TPP C 1370:

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

**Electron density around TPP A 1370:**

$2mF_o-DF_c$ (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.