



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2026 – 08:00 AM UTC

PDB ID : 3TV5 / pdb_00003tv5
Title : Crystal Structure of the humanized carboxyltransferase domain of yeast Acetyl-coA carboxylase in complex with compound 1
Authors : Rajamohan, F.; Marr, E.; Reyes, A.; Landro, J.A.; Anderson, M.D.; Corbett, J.W.; Dirico, K.J.; Harwood, J.H.; Tu, M.; Vajdos, F.F.
Deposited on : 2011-09-19
Resolution : 2.80 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	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

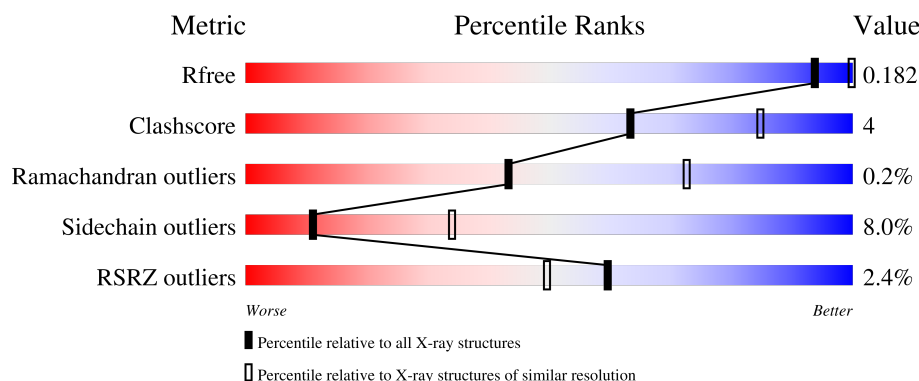
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

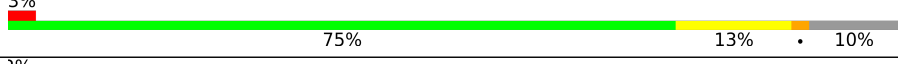
The reported resolution of this entry is 2.80 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	3866 (2.80-2.80)
Clashscore	190562	4276 (2.80-2.80)
Ramachandran outliers	187476	4196 (2.80-2.80)
Sidechain outliers	187428	4198 (2.80-2.80)
RSRZ outliers	180081	3869 (2.80-2.80)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments 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	769	
1	B	769	
1	C	769	

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 17580 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 Acetyl-CoA carboxylase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	696	Total	C	N	O	S	0	1	0
			5561	3539	960	1045	17			
1	B	690	Total	C	N	O	S	0	0	0
			5513	3510	949	1037	17			
1	C	684	Total	C	N	O	S	0	0	0
			5468	3476	944	1031	17			

There are 60 discrepancies between the modelled and reference sequences:

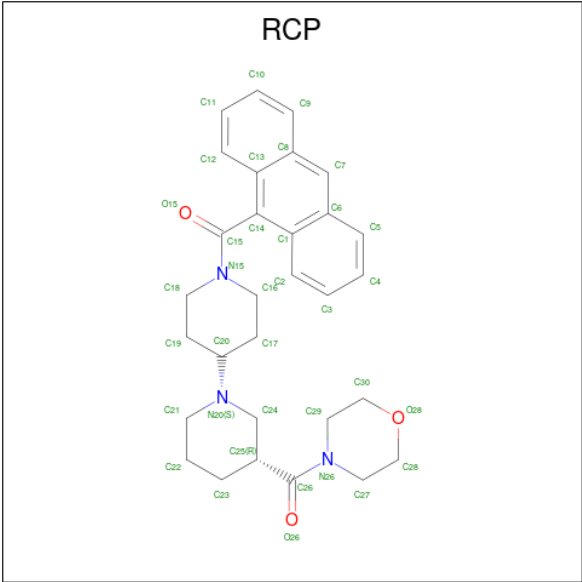
Chain	Residue	Modelled	Actual	Comment	Reference
A	1473	MET	-	expression tag	UNP Q00955
A	1474	ALA	-	expression tag	UNP Q00955
A	1475	SER	-	expression tag	UNP Q00955
A	1760	SER	PRO	engineered mutation	UNP Q00955
A	1762	LEU	ILE	engineered mutation	UNP Q00955
A	1765	VAL	MET	engineered mutation	UNP Q00955
A	1919	GLN	GLU	engineered mutation	UNP Q00955
A	1920	ALA	PRO	engineered mutation	UNP Q00955
A	1925	PHE	HIS	engineered mutation	UNP Q00955
A	2028	GLU	GLN	engineered mutation	UNP Q00955
A	2030	THR	MET	engineered mutation	UNP Q00955
A	2032	GLU	GLY	engineered mutation	UNP Q00955
A	2234	LEU	-	expression tag	UNP Q00955
A	2235	GLU	-	expression tag	UNP Q00955
A	2236	HIS	-	expression tag	UNP Q00955
A	2237	HIS	-	expression tag	UNP Q00955
A	2238	HIS	-	expression tag	UNP Q00955
A	2239	HIS	-	expression tag	UNP Q00955
A	2240	HIS	-	expression tag	UNP Q00955
A	2241	HIS	-	expression tag	UNP Q00955
B	1473	MET	-	expression tag	UNP Q00955
B	1474	ALA	-	expression tag	UNP Q00955
B	1475	SER	-	expression tag	UNP Q00955

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Chain	Residue	Modelled	Actual	Comment	Reference
B	1760	SER	PRO	engineered mutation	UNP Q00955
B	1762	LEU	ILE	engineered mutation	UNP Q00955
B	1765	VAL	MET	engineered mutation	UNP Q00955
B	1919	GLN	GLU	engineered mutation	UNP Q00955
B	1920	ALA	PRO	engineered mutation	UNP Q00955
B	1925	PHE	HIS	engineered mutation	UNP Q00955
B	2028	GLU	GLN	engineered mutation	UNP Q00955
B	2030	THR	MET	engineered mutation	UNP Q00955
B	2032	GLU	GLY	engineered mutation	UNP Q00955
B	2234	LEU	-	expression tag	UNP Q00955
B	2235	GLU	-	expression tag	UNP Q00955
B	2236	HIS	-	expression tag	UNP Q00955
B	2237	HIS	-	expression tag	UNP Q00955
B	2238	HIS	-	expression tag	UNP Q00955
B	2239	HIS	-	expression tag	UNP Q00955
B	2240	HIS	-	expression tag	UNP Q00955
B	2241	HIS	-	expression tag	UNP Q00955
C	1473	MET	-	expression tag	UNP Q00955
C	1474	ALA	-	expression tag	UNP Q00955
C	1475	SER	-	expression tag	UNP Q00955
C	1760	SER	PRO	engineered mutation	UNP Q00955
C	1762	LEU	ILE	engineered mutation	UNP Q00955
C	1765	VAL	MET	engineered mutation	UNP Q00955
C	1919	GLN	GLU	engineered mutation	UNP Q00955
C	1920	ALA	PRO	engineered mutation	UNP Q00955
C	1925	PHE	HIS	engineered mutation	UNP Q00955
C	2028	GLU	GLN	engineered mutation	UNP Q00955
C	2030	THR	MET	engineered mutation	UNP Q00955
C	2032	GLU	GLY	engineered mutation	UNP Q00955
C	2234	LEU	-	expression tag	UNP Q00955
C	2235	GLU	-	expression tag	UNP Q00955
C	2236	HIS	-	expression tag	UNP Q00955
C	2237	HIS	-	expression tag	UNP Q00955
C	2238	HIS	-	expression tag	UNP Q00955
C	2239	HIS	-	expression tag	UNP Q00955
C	2240	HIS	-	expression tag	UNP Q00955
C	2241	HIS	-	expression tag	UNP Q00955

- Molecule 2 is (3R)-1'-(9-ANTHRYLCARBONYL)-3-(MORPHOLIN-4-YLCARBONYL)-1, 4'-BIPIPERIDINE (CCD ID: RCP) (formula: C₃₀H₃₅N₃O₃).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			36	30	3	3		
2	B	1	Total	C	N	O	0	0
			36	30	3	3		
2	C	1	Total	C	N	O	0	0
			36	30	3	3		

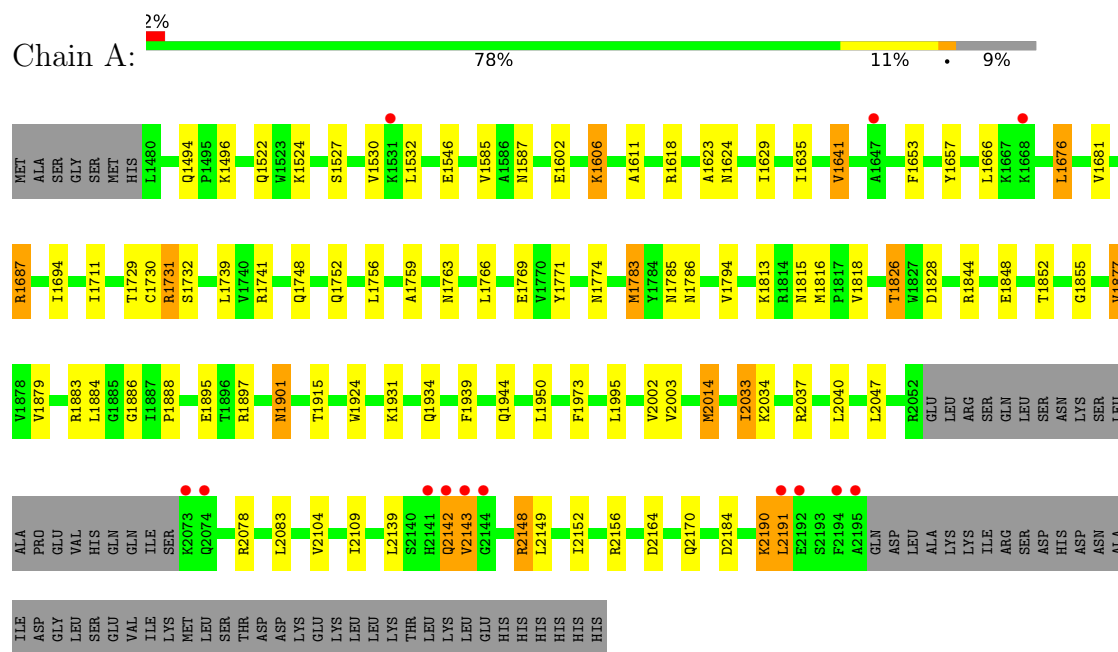
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	334	Total	O	0	0
			334	334		
3	B	297	Total	O	0	0
			297	297		
3	C	299	Total	O	0	0
			299	299		

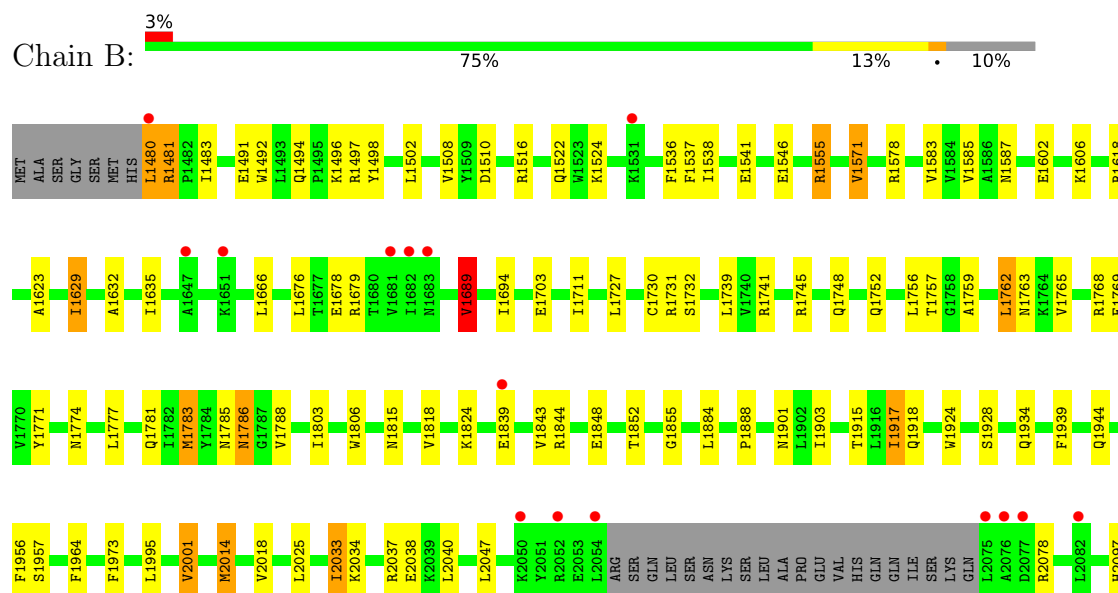
3 Residue-property plots [i](#)

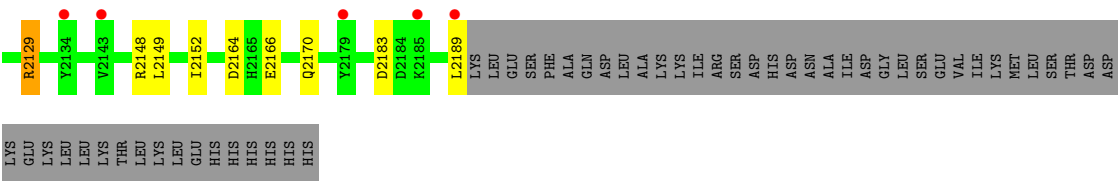
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density.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

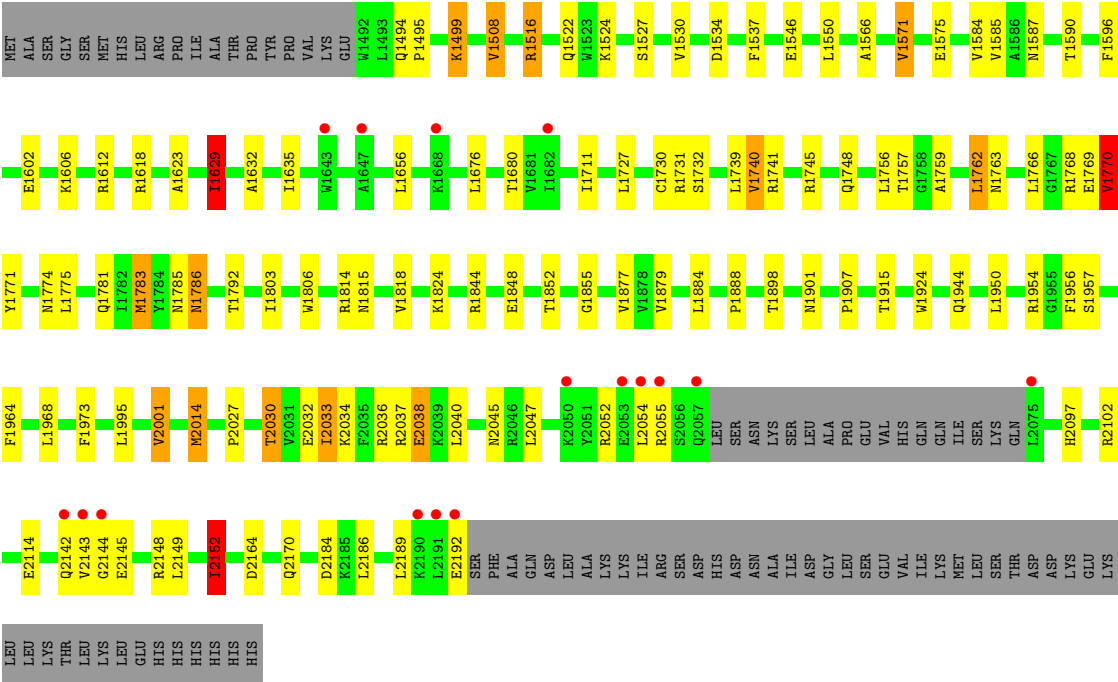


• Molecule 1: Acetyl-CoA carboxylase





● Molecule 1: Acetyl-CoA carboxylase



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	246.50Å 123.11Å 146.44Å 90.00° 94.24° 90.00°	Depositor
Resolution (Å)	47.06 – 2.80 47.06 – 2.80	Depositor EDS
% Data completeness (in resolution range)	99.3 (47.06-2.80) 99.3 (47.06-2.80)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.24 (at 2.81Å)	Xtriage
Refinement program	BUSTER 2.9.2	Depositor
R, R_{free}	0.171 , 0.203 (Not available) , 0.182	Depositor DCC
R_{free} test set	10701 reflections (10.02%)	wwPDB-VP
Wilson B-factor (Å ²)	47.5	Xtriage
Anisotropy	0.395	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 70.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.52$, $\langle L^2 \rangle = 0.36$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	17580	wwPDB-VP
Average B, all atoms (Å ²)	56.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.82% 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: RCP

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	0.83	1/5689 (0.0%)	1.30	14/7704 (0.2%)
1	B	0.83	2/5633 (0.0%)	1.31	16/7631 (0.2%)
1	C	0.83	2/5584 (0.0%)	1.32	22/7559 (0.3%)
All	All	0.83	5/16906 (0.0%)	1.31	52/22894 (0.2%)

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	2014	MET	SD-CE	-6.46	1.63	1.79
1	B	1917	ILE	CG1-CD1	-6.08	1.28	1.51
1	C	2014	MET	SD-CE	-6.06	1.64	1.79
1	A	2014	MET	SD-CE	-5.77	1.65	1.79
1	C	1629	ILE	CG1-CD1	5.38	1.72	1.51

All (52) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	2145	GLU	N-CA-C	7.84	121.65	109.96
1	C	1783	MET	N-CA-C	7.12	119.12	111.36
1	B	1769	GLU	CA-C-N	7.09	129.64	120.56
1	B	1769	GLU	C-N-CA	7.09	129.64	120.56
1	B	1783	MET	N-CA-C	6.96	118.95	111.36
1	B	2001	VAL	N-CA-CB	6.87	118.14	110.51
1	C	2001	VAL	N-CA-CB	6.87	118.13	110.51
1	A	1783	MET	N-CA-C	6.86	118.83	111.36
1	C	1740	VAL	N-CA-CB	6.56	119.46	110.54
1	C	1769	GLU	CA-C-N	6.24	128.54	120.56
1	C	1769	GLU	C-N-CA	6.24	128.54	120.56
1	B	1973	PHE	CA-CB-CG	6.23	120.03	113.80
1	A	1973	PHE	CA-CB-CG	6.17	119.97	113.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	1769	GLU	CA-C-N	6.09	128.35	120.56
1	A	1769	GLU	C-N-CA	6.09	128.35	120.56
1	A	2191	LEU	N-CA-C	-6.01	98.01	110.80
1	A	1624	ASN	N-CA-C	5.99	117.89	108.96
1	C	2052	ARG	CA-C-N	5.98	128.57	120.38
1	C	2052	ARG	C-N-CA	5.98	128.57	120.38
1	C	1973	PHE	CA-CB-CG	5.91	119.70	113.80
1	C	2038	GLU	CB-CG-CD	5.80	122.47	112.60
1	A	1785	ASN	CA-C-N	5.63	130.26	120.68
1	A	1785	ASN	C-N-CA	5.63	130.26	120.68
1	C	1785	ASN	CA-C-N	5.63	130.25	120.68
1	C	1785	ASN	C-N-CA	5.63	130.25	120.68
1	C	1534	ASP	N-CA-C	5.59	118.10	111.33
1	C	2184	ASP	CA-CB-CG	5.54	118.14	112.60
1	C	2144	GLY	CA-C-N	5.54	129.22	121.02
1	C	2144	GLY	C-N-CA	5.54	129.22	121.02
1	B	1785	ASN	CA-C-N	5.46	129.95	120.68
1	B	1785	ASN	C-N-CA	5.46	129.95	120.68
1	A	2037	ARG	N-CA-C	5.44	117.92	111.33
1	B	2037	ARG	N-CA-C	5.42	117.89	111.33
1	C	2152	ILE	N-CA-CB	5.36	118.61	110.58
1	B	2078	ARG	CA-C-N	5.35	127.70	120.38
1	B	2078	ARG	C-N-CA	5.35	127.70	120.38
1	B	1788	VAL	N-CA-C	-5.33	105.19	111.00
1	B	1635	ILE	CA-C-N	5.31	124.58	120.33
1	B	1635	ILE	C-N-CA	5.31	124.58	120.33
1	A	1635	ILE	CA-C-N	5.25	124.53	120.33
1	A	1635	ILE	C-N-CA	5.25	124.53	120.33
1	B	1939	PHE	CA-CB-CG	5.22	119.02	113.80
1	B	2166	GLU	CB-CG-CD	5.21	121.46	112.60
1	C	1635	ILE	CA-C-N	5.21	124.50	120.33
1	C	1635	ILE	C-N-CA	5.21	124.50	120.33
1	C	2037	ARG	N-CA-C	5.20	117.63	111.33
1	C	1770	VAL	N-CA-C	5.14	115.36	110.53
1	B	1689	VAL	N-CA-CB	5.12	116.50	110.82
1	A	1611	ALA	CA-C-N	5.04	126.99	120.44
1	A	1611	ALA	C-N-CA	5.04	126.99	120.44
1	C	1596	PHE	CA-CB-CG	5.02	118.82	113.80
1	A	1939	PHE	CA-CB-CG	5.02	118.82	113.80

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	5561	0	5492	38	0
1	B	5513	0	5450	52	0
1	C	5468	0	5401	51	0
2	A	36	0	35	1	0
2	B	36	0	35	2	0
2	C	36	0	35	2	0
3	A	334	0	0	2	0
3	B	297	0	0	3	0
3	C	299	0	0	4	0
All	All	17580	0	16448	131	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 (131) 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:B:1730:CYS:HA	1:B:1752:GLN:HE21	1.44	0.82
1:C:1763:ASN:HD21	1:C:1771:TYR:H	1.25	0.81
1:A:1763:ASN:HD21	1:A:1771:TYR:H	1.27	0.81
1:B:1763:ASN:HD21	1:B:1771:TYR:H	1.30	0.78
1:B:1815:ASN:H	1:B:1944:GLN:HE22	1.31	0.77
1:B:2164:ASP:H	1:B:2170:GLN:NE2	1.85	0.75
1:A:1815:ASN:H	1:A:1944:GLN:HE22	1.34	0.74
1:A:2148:ARG:HH21	1:A:2148:ARG:CG	2.01	0.74
1:B:1694:ILE:O	1:C:2102:ARG:NH1	2.21	0.74
1:B:1632:ALA:H	1:C:2097:HIS:HE1	1.36	0.73
1:C:1815:ASN:H	1:C:1944:GLN:HE22	1.36	0.71
1:B:1629:ILE:HD11	1:C:2033:ILE:CG2	2.21	0.70
1:A:1730:CYS:HA	1:A:1752:GLN:HE21	1.55	0.70
1:C:1612:ARG:O	1:C:1814:ARG:NH2	2.24	0.70
1:B:2033:ILE:HD11	1:C:1629:ILE:HD11	1.74	0.69
1:A:1759:ALA:H	1:A:1774:ASN:ND2	1.91	0.68
1:B:2097:HIS:HE1	1:C:1632:ALA:H	1.42	0.67
1:B:1759:ALA:H	1:B:1774:ASN:ND2	1.92	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1813:LYS:HE2	1:A:1816:MET:HE3	1.77	0.66
1:C:1759:ALA:H	1:C:1774:ASN:ND2	1.92	0.66
1:A:2148:ARG:HH21	1:A:2148:ARG:HG2	1.61	0.66
1:A:1494:GLN:HE21	1:A:1496:LYS:H	1.45	0.65
1:B:1537:PHE:CD2	1:B:1571:VAL:HG13	2.32	0.64
1:B:2129:ARG:HD3	3:B:474:HOH:O	1.97	0.64
1:B:2164:ASP:H	1:B:2170:GLN:HE22	1.45	0.63
1:C:1537:PHE:CD2	1:C:1571:VAL:HG13	2.34	0.62
1:A:2033:ILE:HG22	1:A:2034:LYS:HG2	1.83	0.61
1:A:1895:GLU:OE1	1:A:1897:ARG:HD3	2.01	0.61
1:B:1494:GLN:HE21	1:B:1496:LYS:H	1.47	0.60
1:B:1903:ILE:CD1	1:B:1917:ILE:HD11	2.35	0.57
1:C:1954:ARG:HD2	3:C:42:HOH:O	2.05	0.57
1:B:1587:ASN:HD22	1:B:1623:ALA:H	1.53	0.56
1:C:1957:SER:OG	2:C:1:RCP:H281	2.05	0.56
1:B:1537:PHE:HD2	1:B:1571:VAL:HG13	1.70	0.55
1:B:1903:ILE:HD11	1:B:1917:ILE:HD11	1.88	0.55
1:C:1527:SER:O	1:C:1530:VAL:HG22	2.07	0.55
1:A:1527:SER:O	1:A:1530:VAL:HG22	2.06	0.55
1:A:1587:ASN:HD22	1:A:1623:ALA:H	1.54	0.54
1:B:1762:LEU:HA	1:B:1765:VAL:HG22	1.89	0.54
1:C:2027:PRO:HA	1:C:2030:THR:HG23	1.90	0.54
1:C:2164:ASP:H	1:C:2170:GLN:NE2	2.08	0.52
1:C:1727:LEU:HB2	1:C:1803:ILE:HD11	1.91	0.52
1:C:2142:GLN:HB2	3:C:396:HOH:O	2.09	0.52
1:C:1516:ARG:HD3	3:C:270:HOH:O	2.10	0.52
1:C:1494:GLN:OE1	1:C:1495:PRO:HD3	2.10	0.52
1:C:2032:GLU:O	1:C:2036:ARG:NH1	2.41	0.52
1:C:1587:ASN:HD22	1:C:1623:ALA:H	1.57	0.51
1:B:1629:ILE:HD11	1:C:2033:ILE:HG21	1.91	0.51
1:A:1826:THR:HG22	1:A:1828:ASP:H	1.75	0.51
1:B:1957:SER:OG	2:B:1:RCP:H302	2.10	0.51
1:C:1537:PHE:HD2	1:C:1571:VAL:HG13	1.72	0.51
1:A:1759:ALA:H	1:A:1774:ASN:HD21	1.59	0.51
1:A:1877:VAL:HG23	1:A:1931:LYS:HD3	1.95	0.49
1:B:2033:ILE:HG13	1:B:2034:LYS:HG2	1.94	0.49
1:A:2148:ARG:CG	1:A:2148:ARG:NH2	2.69	0.49
1:C:1748:GLN:HE22	1:C:1783:MET:HB2	1.77	0.49
1:B:1727:LEU:HB2	1:B:1803:ILE:HD11	1.94	0.48
1:B:1497:ARG:HD3	1:B:1510:ASP:OD1	2.12	0.48
1:B:1748:GLN:HE22	1:B:1783:MET:HB2	1.78	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1852:THR:HB	1:A:1855:GLY:O	2.14	0.48
1:C:1711:ILE:HD12	1:C:1739:LEU:HD11	1.96	0.48
1:A:1748:GLN:HE22	1:A:1783:MET:HB2	1.78	0.48
1:B:2033:ILE:CD1	1:C:1629:ILE:HD11	2.43	0.48
1:A:2142:GLN:HG2	1:A:2190:LYS:HD3	1.95	0.47
1:A:2164:ASP:H	1:A:2170:GLN:NE2	2.13	0.47
1:C:1852:THR:HB	1:C:1855:GLY:O	2.15	0.47
1:C:1623:ALA:HA	1:C:1730:CYS:HB3	1.97	0.47
1:C:1763:ASN:HD22	1:C:1770:VAL:HG13	1.79	0.47
1:C:1745:ARG:HG2	1:C:1806:TRP:CZ2	2.51	0.47
1:B:1745:ARG:HG2	1:B:1806:TRP:CZ2	2.50	0.46
1:B:1759:ALA:H	1:B:1774:ASN:HD21	1.59	0.46
1:B:1995:LEU:HD23	1:B:2014:MET:HE1	1.98	0.46
1:C:1759:ALA:H	1:C:1774:ASN:HD21	1.60	0.46
1:B:1818:VAL:HB	1:B:1888:PRO:HG2	1.98	0.46
1:B:1852:THR:HB	1:B:1855:GLY:O	2.15	0.46
1:A:1711:ILE:HD12	1:A:1739:LEU:HD11	1.98	0.45
1:C:1508:VAL:HG22	3:C:266:HOH:O	2.15	0.45
1:B:1480:LEU:HA	1:B:1492:TRP:CD1	2.51	0.45
1:C:1818:VAL:HB	1:C:1888:PRO:HG2	1.98	0.45
1:A:1606:LYS:HD2	3:A:386:HOH:O	2.15	0.45
1:A:1901:ASN:ND2	3:A:4:HOH:O	2.49	0.45
1:A:1995:LEU:HD23	1:A:2014:MET:HE1	1.98	0.45
1:C:1770:VAL:HG23	1:C:1907:PRO:HB2	1.97	0.45
1:A:1818:VAL:HB	1:A:1888:PRO:HG2	1.99	0.44
1:B:1541:GLU:OE1	1:B:1555:ARG:HD3	2.16	0.44
1:B:1964:PHE:O	1:C:1786:ASN:ND2	2.48	0.44
1:C:1763:ASN:ND2	1:C:1770:VAL:HG13	2.33	0.44
1:B:1538:ILE:HD12	3:B:20:HOH:O	2.16	0.44
1:C:1757:THR:CG2	1:C:1762:LEU:HD13	2.47	0.44
1:B:1711:ILE:HD12	1:B:1739:LEU:HD11	2.00	0.44
1:B:1762:LEU:O	1:B:1765:VAL:HG22	2.17	0.44
1:A:1657:TYR:CE2	1:A:1687:ARG:HD2	2.53	0.43
1:A:1763:ASN:ND2	1:A:1771:TYR:H	2.06	0.43
1:A:1883[B]:ARG:NH1	1:A:1886:GLY:O	2.51	0.43
1:B:1730:CYS:HA	1:B:1752:GLN:NE2	2.23	0.43
1:A:1730:CYS:HA	1:A:1752:GLN:NE2	2.30	0.43
1:B:1578:ARG:HD2	3:B:94:HOH:O	2.17	0.43
1:B:1678:GLU:O	1:B:1689:VAL:HG13	2.17	0.43
1:B:1703:GLU:OE1	1:C:2102:ARG:NH2	2.52	0.43
2:B:1:RCP:H25	2:B:1:RCP:H272	1.78	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:2033:ILE:HG23	1:C:2034:LYS:HG2	1.99	0.43
1:B:1903:ILE:HD11	1:B:1917:ILE:CD1	2.48	0.43
1:C:1537:PHE:HD2	1:C:1571:VAL:CG1	2.31	0.43
1:A:2152:ILE:O	1:A:2156:ARG:HG3	2.19	0.43
1:B:1537:PHE:HD2	1:B:1571:VAL:CG1	2.31	0.43
1:C:2045:ASN:HB2	1:C:2055:ARG:HH11	1.84	0.43
1:B:1741:ARG:HH22	1:B:1934:GLN:NE2	2.17	0.43
1:B:1757:THR:CG2	1:B:1762:LEU:HD13	2.49	0.43
1:C:1995:LEU:HD23	1:C:2014:MET:HE1	2.00	0.42
1:A:2142:GLN:O	1:A:2143:VAL:HB	2.19	0.42
1:B:1956:PHE:HB2	1:C:1756:LEU:HD13	2.00	0.42
1:A:1730:CYS:O	1:A:1731:ARG:HB3	2.19	0.42
1:B:1786:ASN:ND2	1:C:1964:PHE:O	2.48	0.42
1:B:1844:ARG:O	1:B:1848:GLU:HG2	2.19	0.42
1:B:1491:GLU:HB3	1:B:1498:TYR:HB2	2.02	0.41
2:A:1:RCP:H292	2:A:1:RCP:H25	1.57	0.41
1:C:1763:ASN:ND2	1:C:1771:TYR:H	2.05	0.41
2:C:1:RCP:H25	2:C:1:RCP:H292	1.75	0.41
1:C:2148:ARG:O	1:C:2152:ILE:HG13	2.21	0.41
1:C:1844:ARG:O	1:C:1848:GLU:HG2	2.20	0.41
1:A:1741:ARG:HH22	1:A:1934:GLN:NE2	2.18	0.41
1:A:1844:ARG:O	1:A:1848:GLU:HG2	2.20	0.41
1:A:2184:ASP:OD2	1:B:1481:ARG:NH2	2.53	0.41
1:C:1566:ALA:HA	1:C:1584:VAL:O	2.21	0.41
1:B:1756:LEU:HD13	1:C:1956:PHE:HB2	2.02	0.41
1:A:1676:LEU:HD22	1:A:1694:ILE:HD11	2.03	0.40
1:A:1641:VAL:HG23	1:A:1653:PHE:HB2	2.03	0.40
1:C:1575:GLU:CD	1:C:1575:GLU:H	2.28	0.40
1:C:1499:LYS:HB3	1:C:1590:THR:HG22	2.04	0.40
1:A:2104:VAL:HG23	1:A:2109:ILE:HD11	2.03	0.40
1:B:1762:LEU:HA	1:B:1762:LEU:HD12	1.97	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	693/769 (90%)	663 (96%)	28 (4%)	2 (0%)	36	66
1	B	686/769 (89%)	656 (96%)	28 (4%)	2 (0%)	36	66
1	C	680/769 (88%)	653 (96%)	26 (4%)	1 (0%)	48	77
All	All	2059/2307 (89%)	1972 (96%)	82 (4%)	5 (0%)	43	72

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	2143	VAL
1	C	2143	VAL
1	A	1731	ARG
1	B	1481	ARG
1	B	1731	ARG

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	591/658 (90%)	550 (93%)	41 (7%)	14	41
1	B	586/658 (89%)	537 (92%)	49 (8%)	10	32
1	C	581/658 (88%)	530 (91%)	51 (9%)	9	29
All	All	1758/1974 (89%)	1617 (92%)	141 (8%)	11	34

All (141) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1522	GLN
1	A	1524	LYS
1	A	1532	LEU
1	A	1546	GLU
1	A	1585	VAL

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Mol	Chain	Res	Type
1	A	1602	GLU
1	A	1606	LYS
1	A	1618	ARG
1	A	1629	ILE
1	A	1641	VAL
1	A	1666	LEU
1	A	1676	LEU
1	A	1681	VAL
1	A	1687	ARG
1	A	1729	THR
1	A	1732	SER
1	A	1756	LEU
1	A	1766	LEU
1	A	1786	ASN
1	A	1794	VAL
1	A	1826	THR
1	A	1877	VAL
1	A	1879	VAL
1	A	1884	LEU
1	A	1901	ASN
1	A	1915	THR
1	A	1924	TRP
1	A	1950	LEU
1	A	2002	VAL
1	A	2003	VAL
1	A	2033	ILE
1	A	2040	LEU
1	A	2047	LEU
1	A	2078	ARG
1	A	2083	LEU
1	A	2139	LEU
1	A	2142	GLN
1	A	2148	ARG
1	A	2149	LEU
1	A	2190	LYS
1	A	2191	LEU
1	B	1480	LEU
1	B	1483	ILE
1	B	1502	LEU
1	B	1508	VAL
1	B	1516	ARG
1	B	1522	GLN

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Mol	Chain	Res	Type
1	B	1524	LYS
1	B	1536	PHE
1	B	1546	GLU
1	B	1555	ARG
1	B	1571	VAL
1	B	1583	VAL
1	B	1585	VAL
1	B	1602	GLU
1	B	1606	LYS
1	B	1618	ARG
1	B	1629	ILE
1	B	1666	LEU
1	B	1676	LEU
1	B	1679	ARG
1	B	1689	VAL
1	B	1732	SER
1	B	1762	LEU
1	B	1768	ARG
1	B	1777	LEU
1	B	1781	GLN
1	B	1786	ASN
1	B	1824	LYS
1	B	1839	GLU
1	B	1843	VAL
1	B	1884	LEU
1	B	1901	ASN
1	B	1915	THR
1	B	1918	GLN
1	B	1924	TRP
1	B	1928	SER
1	B	2001	VAL
1	B	2018	VAL
1	B	2025	LEU
1	B	2033	ILE
1	B	2038	GLU
1	B	2040	LEU
1	B	2047	LEU
1	B	2129	ARG
1	B	2148	ARG
1	B	2149	LEU
1	B	2152	ILE
1	B	2183	ASP

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Mol	Chain	Res	Type
1	B	2189	LEU
1	C	1499	LYS
1	C	1508	VAL
1	C	1516	ARG
1	C	1522	GLN
1	C	1524	LYS
1	C	1546	GLU
1	C	1550	LEU
1	C	1571	VAL
1	C	1585	VAL
1	C	1602	GLU
1	C	1606	LYS
1	C	1618	ARG
1	C	1629	ILE
1	C	1656	LEU
1	C	1676	LEU
1	C	1680	THR
1	C	1731	ARG
1	C	1732	SER
1	C	1740	VAL
1	C	1741	ARG
1	C	1762	LEU
1	C	1766	LEU
1	C	1768	ARG
1	C	1770	VAL
1	C	1775	LEU
1	C	1781	GLN
1	C	1786	ASN
1	C	1792	THR
1	C	1824	LYS
1	C	1877	VAL
1	C	1879	VAL
1	C	1884	LEU
1	C	1898	THR
1	C	1901	ASN
1	C	1915	THR
1	C	1924	TRP
1	C	1950	LEU
1	C	1968	LEU
1	C	2001	VAL
1	C	2030	THR
1	C	2033	ILE

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Mol	Chain	Res	Type
1	C	2038	GLU
1	C	2040	LEU
1	C	2047	LEU
1	C	2054	LEU
1	C	2114	GLU
1	C	2149	LEU
1	C	2152	ILE
1	C	2186	LEU
1	C	2189	LEU
1	C	2192	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (59) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	1494	GLN
1	A	1517	GLN
1	A	1587	ASN
1	A	1605	ASN
1	A	1640	GLN
1	A	1683	ASN
1	A	1748	GLN
1	A	1752	GLN
1	A	1763	ASN
1	A	1774	ASN
1	A	1786	ASN
1	A	1815	ASN
1	A	1934	GLN
1	A	1937	ASN
1	A	1944	GLN
1	A	2045	ASN
1	A	2097	HIS
1	A	2165	HIS
1	A	2170	GLN
1	B	1494	GLN
1	B	1517	GLN
1	B	1587	ASN
1	B	1599	GLN
1	B	1605	ASN
1	B	1673	ASN
1	B	1683	ASN
1	B	1748	GLN
1	B	1752	GLN

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Mol	Chain	Res	Type
1	B	1763	ASN
1	B	1774	ASN
1	B	1781	GLN
1	B	1786	ASN
1	B	1815	ASN
1	B	1911	ASN
1	B	1922	GLN
1	B	1934	GLN
1	B	1937	ASN
1	B	1944	GLN
1	B	2092	GLN
1	B	2097	HIS
1	B	2170	GLN
1	C	1517	GLN
1	C	1587	ASN
1	C	1640	GLN
1	C	1683	ASN
1	C	1748	GLN
1	C	1752	GLN
1	C	1763	ASN
1	C	1774	ASN
1	C	1781	GLN
1	C	1786	ASN
1	C	1815	ASN
1	C	1934	GLN
1	C	1941	ASN
1	C	1944	GLN
1	C	2011	GLN
1	C	2092	GLN
1	C	2097	HIS
1	C	2170	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

3 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	$\# Z > 2$
2	RCP	B	1	-	41,41,41	0.80	0	58,58,58	2.72	10 (17%)
2	RCP	C	1	-	41,41,41	0.76	0	58,58,58	2.59	11 (18%)
2	RCP	A	1	-	41,41,41	0.78	0	58,58,58	3.08	13 (22%)

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	RCP	B	1	-	-	2/20/48/48	1/6/6/6
2	RCP	C	1	-	-	2/20/48/48	0/6/6/6
2	RCP	A	1	-	-	3/20/48/48	0/6/6/6

There are no bond length outliers.

All (34) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	1	RCP	C21-N20-C24	20.10	127.95	108.17
2	B	1	RCP	C21-N20-C24	17.23	125.13	108.17
2	C	1	RCP	C21-N20-C24	16.50	124.40	108.17
2	B	1	RCP	C13-C14-C15	4.26	123.20	119.27
2	A	1	RCP	O15-C15-C14	-3.59	116.89	121.50
2	A	1	RCP	C23-C25-C24	3.44	116.06	110.02
2	B	1	RCP	O15-C15-C14	-3.33	117.23	121.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	1	RCP	O15-C15-C14	-3.31	117.24	121.50
2	A	1	RCP	C2-C1-C14	-3.21	119.53	122.82
2	A	1	RCP	C12-C13-C14	-3.21	119.53	122.82
2	C	1	RCP	C21-N20-C20	3.03	120.50	112.79
2	B	1	RCP	C23-C25-C24	2.99	115.28	110.02
2	A	1	RCP	C25-C26-N26	-2.98	116.00	118.80
2	C	1	RCP	C18-C19-C20	-2.94	105.40	110.78
2	C	1	RCP	C25-C26-N26	-2.88	116.09	118.80
2	B	1	RCP	C2-C1-C14	-2.81	119.93	122.82
2	A	1	RCP	C14-C15-N15	2.79	120.85	117.76
2	B	1	RCP	C21-N20-C20	2.75	119.78	112.79
2	C	1	RCP	C30-C29-N26	-2.58	104.39	109.82
2	C	1	RCP	C23-C22-C21	2.57	114.13	110.75
2	B	1	RCP	C23-C22-C21	2.56	114.12	110.75
2	A	1	RCP	C19-C18-N15	-2.53	105.71	110.66
2	B	1	RCP	C14-C15-N15	2.52	120.55	117.76
2	B	1	RCP	C19-C18-N15	-2.45	105.86	110.66
2	C	1	RCP	C14-C15-N15	2.37	120.39	117.76
2	A	1	RCP	C25-C24-N20	2.34	114.39	111.14
2	A	1	RCP	C8-C7-C6	-2.28	118.63	121.93
2	C	1	RCP	C19-C18-N15	-2.26	106.24	110.66
2	A	1	RCP	C23-C22-C21	2.16	113.59	110.75
2	C	1	RCP	C23-C25-C24	2.15	113.81	110.02
2	B	1	RCP	C25-C26-N26	-2.09	116.83	118.80
2	C	1	RCP	C12-C13-C14	-2.07	120.70	122.82
2	A	1	RCP	C5-C6-C7	-2.03	118.78	122.00
2	A	1	RCP	C21-N20-C20	2.01	117.91	112.79

There are no chirality outliers.

All (7) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	1	RCP	C19-C20-N20-C21
2	C	1	RCP	C19-C20-N20-C21
2	A	1	RCP	C17-C20-N20-C24
2	B	1	RCP	C17-C20-N20-C21
2	A	1	RCP	C19-C20-N20-C21
2	C	1	RCP	C17-C20-N20-C21
2	A	1	RCP	C19-C20-N20-C24

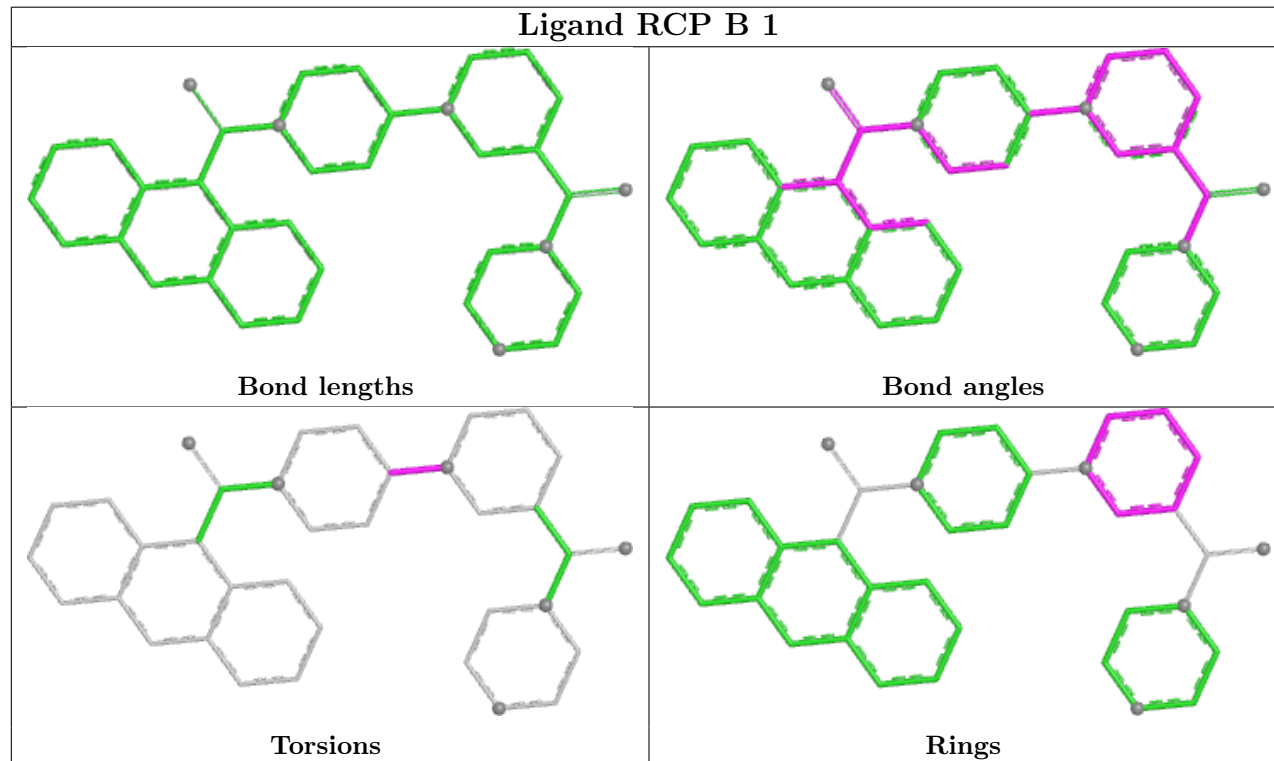
All (1) ring outliers are listed below:

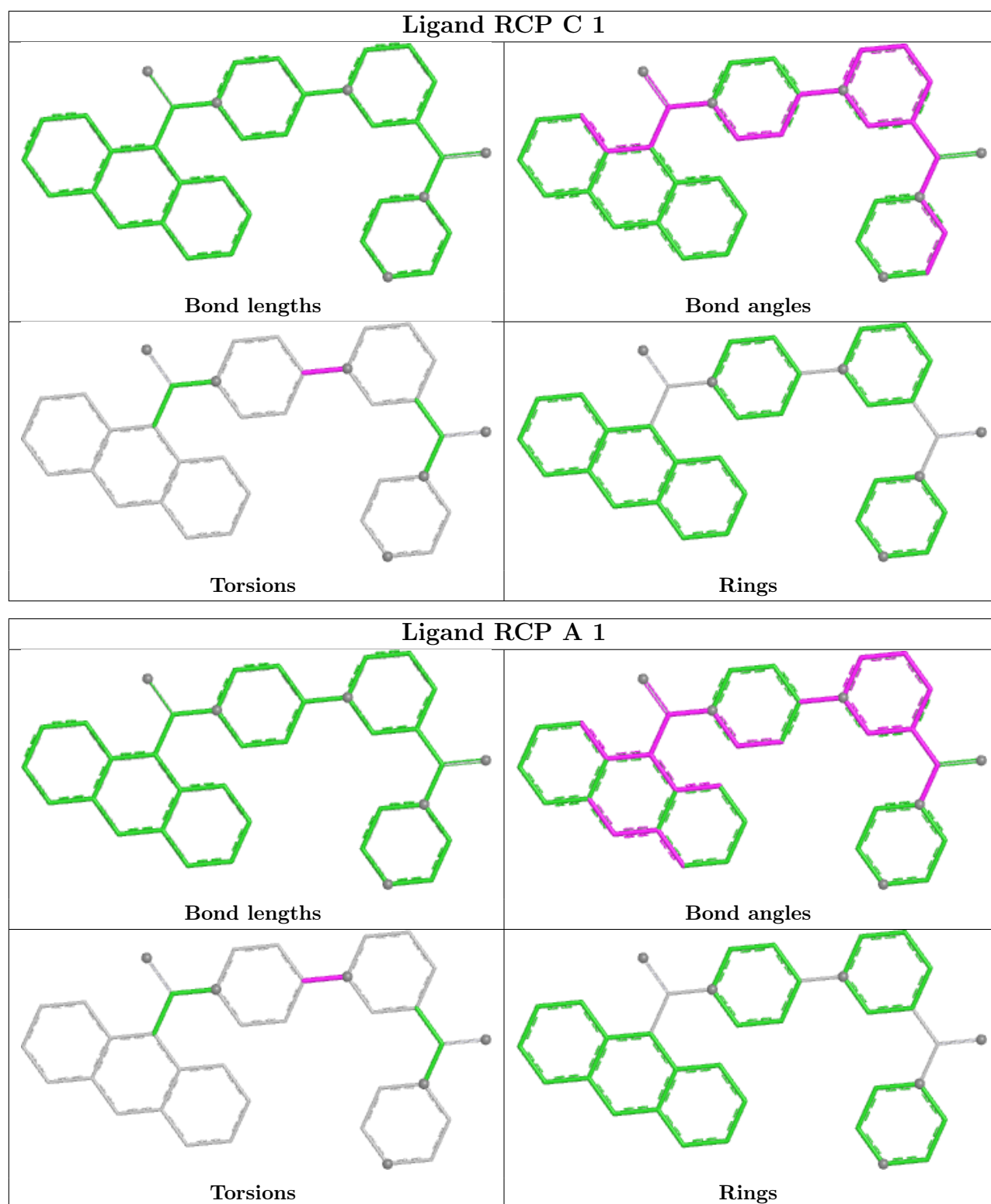
Mol	Chain	Res	Type	Atoms
2	B	1	RCP	C21-C22-C23-C24-C25-N20

3 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	1	RCP	2	0
2	C	1	RCP	2	0
2	A	1	RCP	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 ⓘ

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	696/769 (90%)	-0.38	13 (1%) 66 57	23, 44, 106, 143	1 (0%)
1	B	690/769 (89%)	-0.28	20 (2%) 53 43	27, 49, 111, 153	0
1	C	684/769 (88%)	-0.28	16 (2%) 61 51	25, 47, 115, 152	0
All	All	2070/2307 (89%)	-0.31	49 (2%) 59 49	23, 47, 111, 153	1 (0%)

All (49) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	2195	ALA	6.5
1	B	2189	LEU	6.2
1	A	2143	VAL	5.6
1	C	2143	VAL	5.2
1	A	2144	GLY	4.4
1	B	2054	LEU	4.2
1	A	2073	LYS	4.1
1	A	2194	PHE	3.8
1	A	2191	LEU	3.8
1	B	2075	LEU	3.6
1	B	2134	TYR	3.6
1	B	2179	TYR	3.4
1	C	2075	LEU	3.3
1	C	2144	GLY	3.2
1	C	2190	LYS	3.2
1	C	2191	LEU	3.1
1	A	2142	GLN	3.0
1	A	2074	GLN	3.0
1	C	1682	ILE	2.9
1	C	2142	GLN	2.8
1	B	1681	VAL	2.8
1	C	2192	GLU	2.8
1	C	2057	GLN	2.7

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Mol	Chain	Res	Type	RSRZ
1	B	2082	LEU	2.6
1	C	2054	LEU	2.6
1	A	1647	ALA	2.6
1	C	2053	GLU	2.6
1	A	1668	LYS	2.5
1	B	2077	ASP	2.5
1	B	2050	LYS	2.5
1	B	1647	ALA	2.4
1	B	2076	ALA	2.4
1	B	1651	LYS	2.4
1	B	2185	LYS	2.3
1	A	2141	HIS	2.3
1	B	1531	LYS	2.2
1	B	1480	LEU	2.2
1	A	1531	LYS	2.2
1	B	1683	ASN	2.1
1	C	2055	ARG	2.1
1	B	1839	GLU	2.1
1	B	2143	VAL	2.1
1	C	1643	TRP	2.1
1	A	2192	GLU	2.1
1	C	2050	LYS	2.0
1	B	2052	ARG	2.0
1	C	1647	ALA	2.0
1	C	1668	LYS	2.0
1	B	1682	ILE	2.0

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

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

6.3 Carbohydrates [i](#)

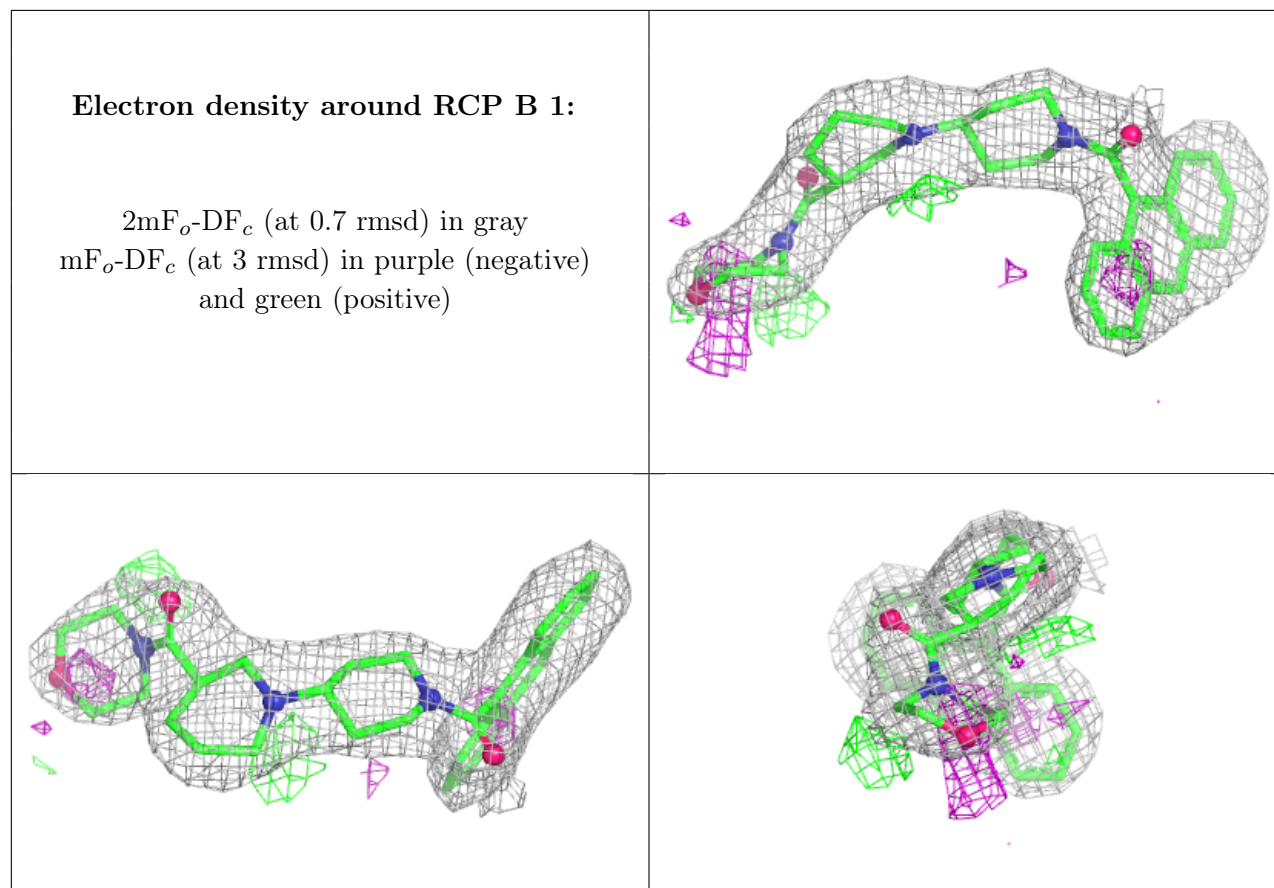
There are no oligosaccharides in this entry.

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.

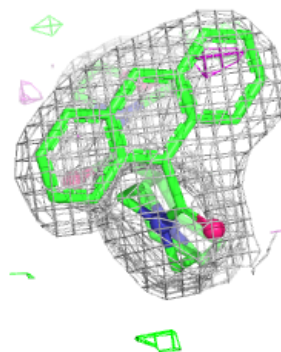
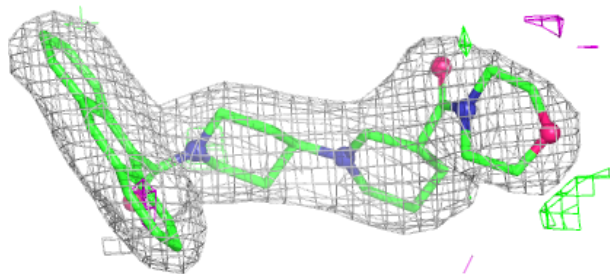
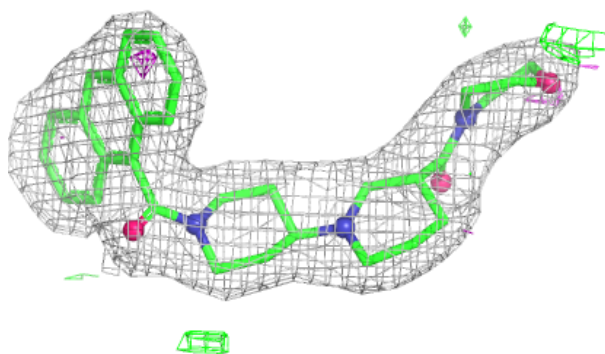
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	RCP	B	1	36/36	0.94	0.12	41,60,64,65	0
2	RCP	A	1	36/36	0.96	0.09	36,47,56,57	0
2	RCP	C	1	36/36	0.96	0.08	48,54,62,63	0

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.

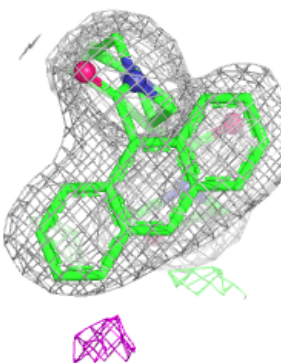
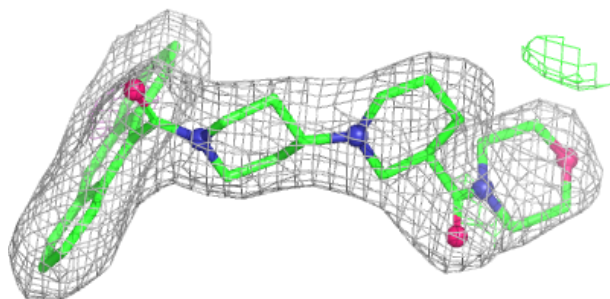
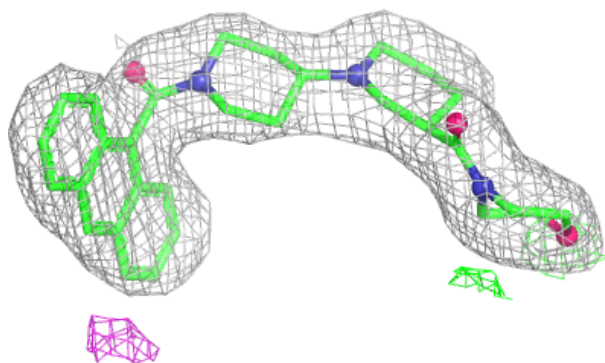


Electron density around RCP A 1:

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

**Electron density around RCP C 1:**

$2mF_o-DF_c$ (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.