



Full wwPDB X-ray Structure Validation Report ⓘ

Apr 18, 2026 – 12:52 PM UTC

PDB ID : 2NU8 / pdb_00002nu8
Title : C123aT Mutant of E. coli Succinyl-CoA Synthetase
Authors : Fraser, M.E.
Deposited on : 2006-11-08
Resolution : 2.15 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

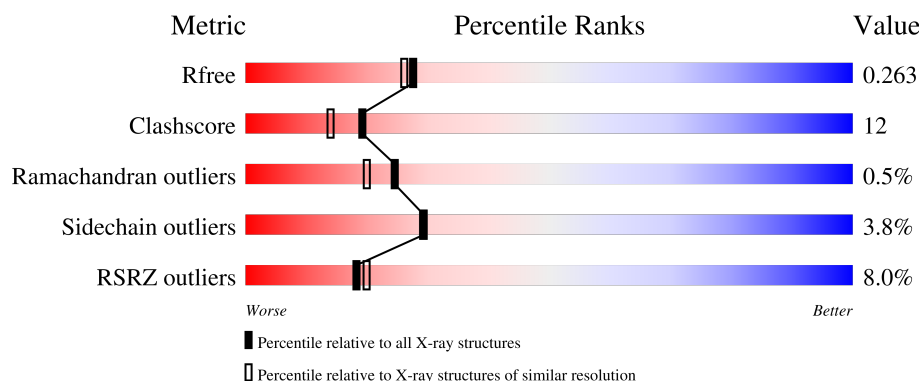
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.15 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	2057 (2.16-2.16)
Clashscore	190562	2159 (2.16-2.16)
Ramachandran outliers	187476	2134 (2.16-2.16)
Sidechain outliers	187428	2133 (2.16-2.16)
RSRZ outliers	180081	2059 (2.16-2.16)

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	288	2% 76% 22% .
1	D	288	6% 74% 24% .
2	B	388	6% 73% 24% .
2	E	388	15% 70% 26% ..

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	COA	B	1325	-	X	-	-

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 10602 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 Succinyl-CoA ligase [ADP-forming] subunit alpha.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	287	Total	C	N	O	S	0	0	0
			2070	1314	346	400	10			
1	D	287	Total	C	N	O	S	0	0	0
			2070	1314	346	400	10			

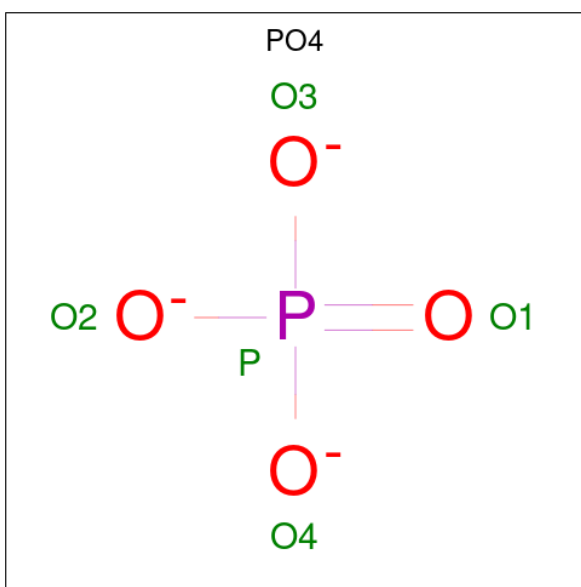
There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	123	THR	CYS	engineered mutation	UNP P0AGE9
D	123	THR	CYS	engineered mutation	UNP P0AGE9

- Molecule 2 is a protein called Succinyl-CoA synthetase beta chain.

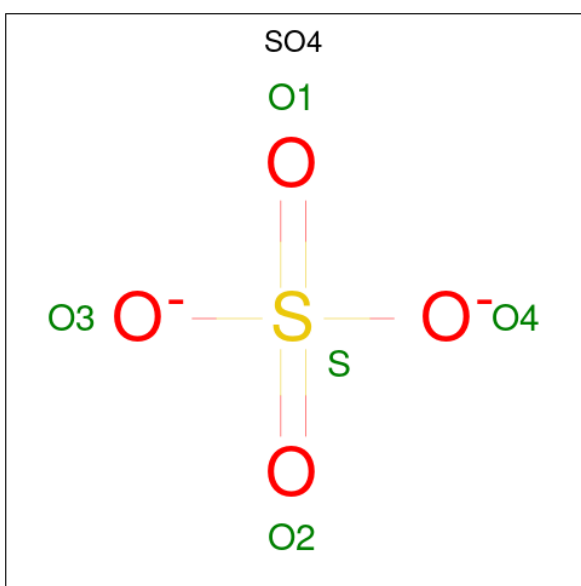
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	388	Total	C	N	O	S	0	0	0
			2908	1836	509	550	13			
2	E	385	Total	C	N	O	S	0	0	0
			2885	1823	505	544	13			

- Molecule 3 is PHOSPHATE ION (CCD ID: PO4) (formula: O₄P).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	O	P	0	0
			5	4	1		
3	D	1	Total	O	P	0	0
			5	4	1		

- Molecule 4 is SULFATE ION (CCD ID: SO₄) (formula: O₄S).



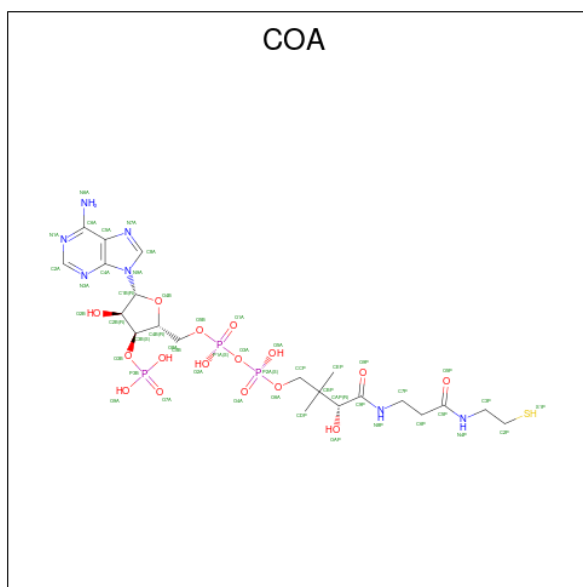
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	O	S	0	0
			5	4	1		
4	B	1	Total	O	S	0	0
			5	4	1		

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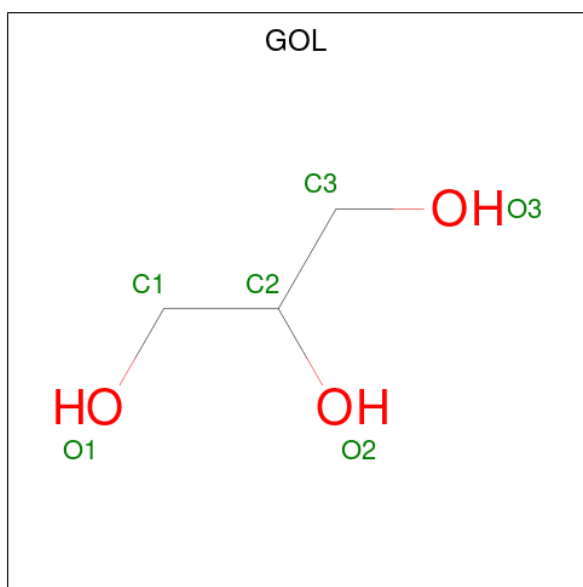
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	E	1	Total	O	S	0	0
			5	4	1		
4	E	1	Total	O	S	0	0
			5	4	1		

- Molecule 5 is COENZYME A (CCD ID: COA) (formula: $C_{21}H_{36}N_7O_{16}P_3S$).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
5	A	1	Total	C	N	O	P	S	0	0
			48	21	7	16	3	1		
5	B	1	Total	C	N	O	S		0	0
			18	11	2	4	1			
5	D	1	Total	C	N	O	P	S	0	0
			48	21	7	16	3	1		
5	E	1	Total	C	N	O	S		0	0
			9	5	2	1	1			

- Molecule 6 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			6	3	3		

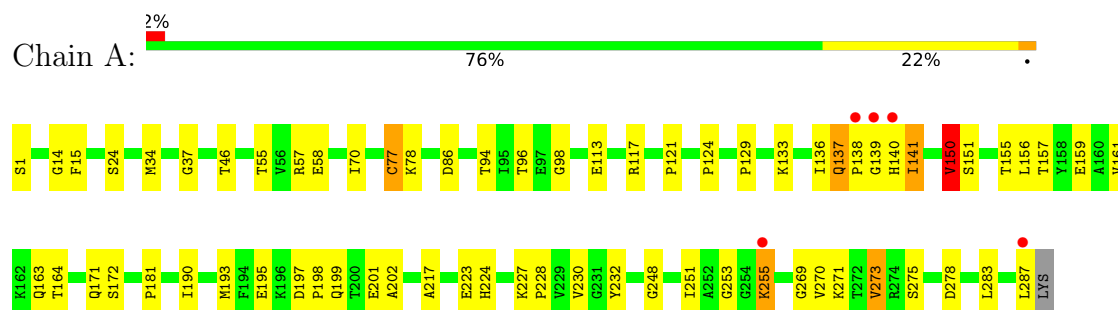
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	127	Total	O	0	0
			127	127		
7	B	156	Total	O	0	0
			156	156		
7	D	92	Total	O	0	0
			92	92		
7	E	135	Total	O	0	0
			135	135		

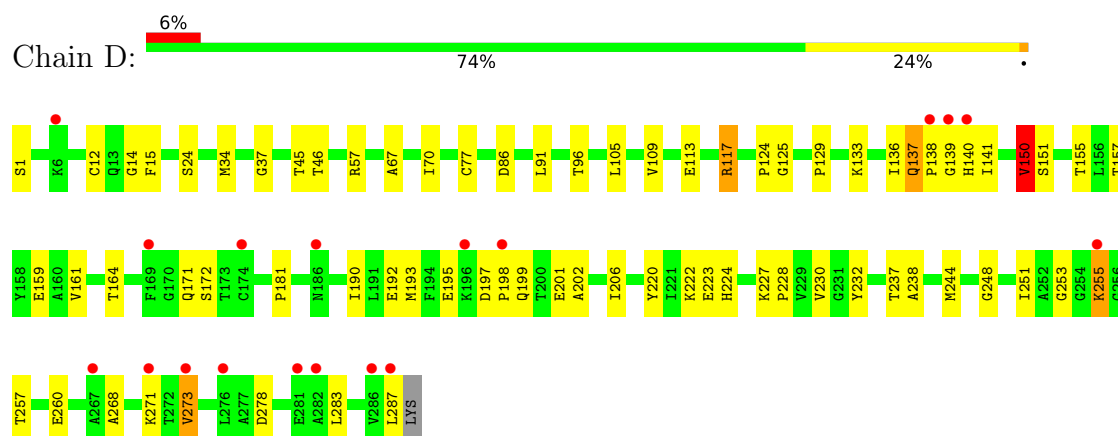
3 Residue-property plots [i](#)

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.

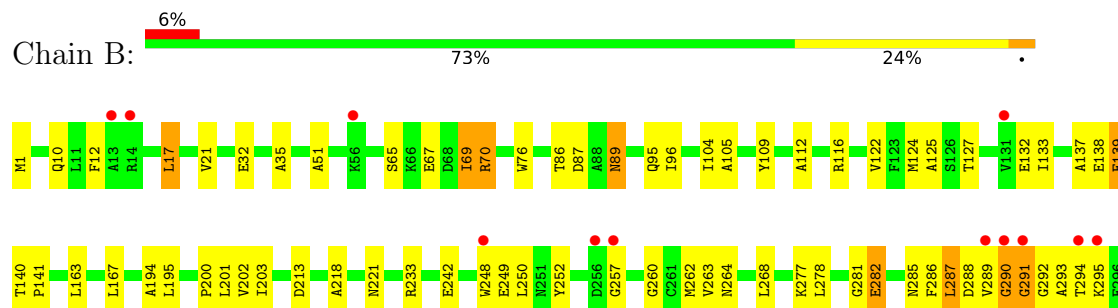
- Molecule 1: Succinyl-CoA ligase [ADP-forming] subunit alpha

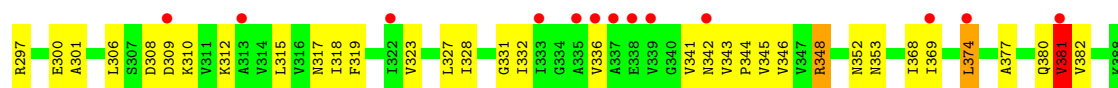


- Molecule 1: Succinyl-CoA ligase [ADP-forming] subunit alpha

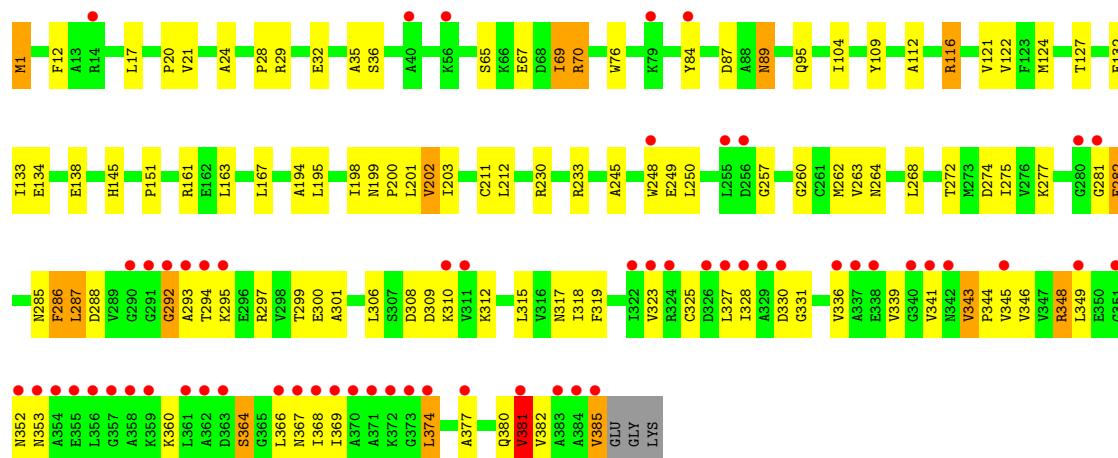


- Molecule 2: Succinyl-CoA synthetase beta chain





• Molecule 2: Succinyl-CoA synthetase beta chain



4 Data and refinement statistics

Property	Value	Source
Space group	P 43 2 2	Depositor
Cell constants a, b, c, α , β , γ	96.69Å 96.69Å 385.94Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	41.97 – 2.15 41.97 – 2.15	Depositor EDS
% Data completeness (in resolution range)	91.6 (41.97-2.15) 91.6 (41.97-2.15)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.30 (at 2.10Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.210 , 0.255 0.220 , 0.263	Depositor DCC
R_{free} test set	10573 reflections (11.15%)	wwPDB-VP
Wilson B-factor (Å ²)	33.0	Xtriage
Anisotropy	0.089	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 29.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	10602	wwPDB-VP
Average B, all atoms (Å ²)	35.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.27% 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, GOL, COA, PO4

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	1.04	0/2104	1.25	13/2851 (0.5%)
1	D	0.97	0/2104	1.28	19/2851 (0.7%)
2	B	0.99	2/2950 (0.1%)	1.20	21/3989 (0.5%)
2	E	0.94	0/2927	1.23	20/3961 (0.5%)
All	All	0.98	2/10085 (0.0%)	1.24	73/13652 (0.5%)

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	A	0	1
1	D	0	1
All	All	0	2

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	124	MET	SD-CE	6.38	1.95	1.79
2	B	218	ALA	CA-CB	-5.12	1.45	1.53

All (73) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	194	ALA	N-CA-C	-9.46	101.86	113.97
1	A	141	ILE	N-CA-C	-9.41	103.97	113.47
2	E	194	ALA	N-CA-C	-9.12	102.73	114.04
1	D	150	VAL	CB-CA-C	-8.97	97.23	110.33
2	E	201	LEU	N-CA-C	-8.86	94.15	108.41

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	150	VAL	CB-CA-C	-8.68	97.66	110.33
2	E	203	ILE	N-CA-C	-8.30	95.87	107.99
2	E	364	SER	N-CA-C	8.29	123.62	113.17
1	A	139	GLY	N-CA-C	8.09	123.57	114.67
2	B	139	GLU	N-CA-C	8.04	121.58	111.69
2	E	127	THR	N-CA-C	-7.90	103.62	113.18
1	D	141	ILE	N-CA-C	-7.59	105.80	113.47
2	B	201	LEU	N-CA-C	-7.49	96.35	108.41
2	E	121	VAL	N-CA-C	-7.43	99.08	108.89
1	D	139	GLY	N-CA-C	7.29	122.69	114.67
2	E	76	TRP	N-CA-C	6.93	121.86	113.41
2	B	76	TRP	N-CA-C	6.89	121.82	113.41
1	A	172	SER	N-CA-C	-6.68	102.62	111.24
1	A	24	SER	N-CA-C	-6.66	103.84	112.23
1	D	70	ILE	N-CA-C	6.64	117.43	107.80
2	B	286	PHE	N-CA-C	-6.63	98.39	109.07
1	A	124	PRO	N-CA-C	-6.56	105.06	114.18
1	A	34	MET	N-CA-C	-6.47	100.25	109.96
1	D	77	CYS	N-CA-C	6.40	118.05	111.14
2	B	202	VAL	N-CA-C	6.39	118.23	108.71
1	A	77	CYS	N-CA-C	6.38	118.03	111.14
2	E	374	LEU	N-CA-C	6.37	118.80	111.02
2	B	343	VAL	CA-C-N	-6.36	113.40	119.76
2	B	343	VAL	C-N-CA	-6.36	113.40	119.76
2	E	104	ILE	N-CA-C	6.35	117.94	108.54
2	B	374	LEU	N-CA-C	6.25	118.65	111.02
2	E	198	ILE	N-CA-C	-6.16	98.26	107.37
1	D	45	THR	N-CA-C	-6.09	101.17	109.95
2	E	343	VAL	CA-C-N	6.07	125.98	119.85
2	E	343	VAL	C-N-CA	6.07	125.98	119.85
1	D	124	PRO	N-CA-C	-6.05	105.77	114.18
1	A	14	GLY	N-CA-C	-6.04	106.38	115.32
2	E	69	ILE	N-CA-C	-5.99	104.67	110.42
1	D	14	GLY	N-CA-C	-5.94	106.53	115.32
2	B	382	VAL	N-CA-C	-5.87	105.01	110.53
2	B	21	VAL	N-CA-C	-5.79	102.06	109.30
2	B	69	ILE	N-CA-C	-5.78	104.87	110.42
2	E	286	PHE	N-CA-C	-5.77	99.78	109.07
1	D	125	GLY	N-CA-C	5.76	117.38	111.56
2	E	381	VAL	CB-CA-C	-5.76	102.93	112.26
2	E	21	VAL	N-CA-C	-5.72	102.15	109.30
2	B	105	ALA	N-CA-C	-5.67	106.03	113.12

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	238	ALA	CA-C-N	-5.66	114.77	120.21
1	D	238	ALA	C-N-CA	-5.66	114.77	120.21
2	B	381	VAL	CB-CA-C	-5.64	103.13	112.26
1	D	96	THR	N-CA-C	5.62	118.62	110.42
2	E	24	ALA	N-CA-C	-5.58	100.19	109.46
2	B	96	ILE	N-CA-C	-5.54	100.35	108.11
1	D	34	MET	N-CA-C	-5.53	101.67	109.96
1	D	105	LEU	N-CA-C	-5.48	105.31	111.28
1	D	172	SER	N-CA-C	-5.46	102.57	111.04
1	A	96	THR	N-CA-C	5.42	118.34	110.42
1	D	161	VAL	N-CA-C	-5.42	105.43	110.53
1	A	70	ILE	N-CA-C	5.40	115.64	107.75
2	E	161	ARG	N-CA-C	-5.39	105.49	111.36
1	D	117	ARG	CA-C-N	-5.37	114.88	122.94
1	D	117	ARG	C-N-CA	-5.37	114.88	122.94
1	A	161	VAL	N-CA-C	-5.31	105.54	110.53
2	B	104	ILE	N-CA-C	5.29	116.38	108.54
2	B	203	ILE	N-CA-C	-5.28	100.16	108.23
2	B	309	ASP	N-CA-C	5.23	118.44	111.75
1	A	217	ALA	N-CA-C	-5.23	105.66	111.36
2	E	116	ARG	CB-CG-CD	-5.18	99.39	111.30
2	E	202	VAL	N-CA-C	5.17	116.42	108.71
1	D	24	SER	N-CA-C	-5.16	105.73	111.36
2	B	17	LEU	N-CA-C	-5.11	103.51	110.36
2	B	10	GLN	N-CA-C	-5.04	105.68	111.07
2	B	127	THR	N-CA-C	-5.02	106.66	112.89

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	232	TYR	Sidechain
1	D	232	TYR	Sidechain

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	2070	0	2131	48	0
1	D	2070	0	2131	44	0
2	B	2908	0	2962	77	0
2	E	2885	0	2940	92	0
3	A	5	0	0	0	0
3	D	5	0	0	0	0
4	A	5	0	0	0	0
4	B	5	0	0	0	0
4	E	10	0	0	0	0
5	A	48	0	32	1	0
5	B	18	0	20	4	0
5	D	48	0	32	3	0
5	E	9	0	9	2	0
6	A	6	0	7	3	0
7	A	127	0	0	3	0
7	B	156	0	0	2	0
7	D	92	0	0	0	0
7	E	135	0	0	3	0
All	All	10602	0	10264	239	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 12.

All (239) 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)
5:B:1325:COA:CBP	5:B:1325:COA:CAP	1.80	1.58
2:E:292:GLY:O	2:E:294:THR:HG23	1.79	0.82
1:D:223:GLU:HG2	1:D:224:HIS:CD2	2.16	0.79
1:A:202:ALA:HB2	1:A:287:LEU:HD11	1.67	0.75
1:A:181:PRO:O	2:B:116:ARG:HD3	1.87	0.75
1:A:150:VAL:HG13	1:A:190:ILE:HG21	1.70	0.74
2:B:32:GLU:OE1	2:B:70:ARG:HD2	1.88	0.74
1:A:223:GLU:HG2	1:A:224:HIS:CD2	2.23	0.73
1:A:133:LYS:NZ	1:A:137:GLN:O	2.22	0.73
2:B:137:ALA:O	2:B:141:PRO:HG3	1.87	0.73
1:D:150:VAL:HG13	1:D:190:ILE:HG21	1.70	0.73
2:E:32:GLU:OE1	2:E:70:ARG:HD2	1.89	0.73
1:D:202:ALA:HB2	1:D:287:LEU:HD11	1.69	0.72
1:A:198:PRO:HG2	7:A:1799:HOH:O	1.91	0.71
1:D:133:LYS:NZ	1:D:137:GLN:O	2.24	0.71
2:E:306:LEU:CD1	2:E:341:VAL:HG22	2.21	0.70

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:117:ARG:HD3	1:D:193:MET:HE1	1.71	0.70
2:E:330:ASP:OD1	2:E:360:LYS:HD3	1.93	0.69
2:E:315:LEU:HB2	2:E:381:VAL:HG11	1.74	0.68
5:B:1325:COA:CBP	5:B:1325:COA:OAP	2.41	0.68
1:A:155:THR:HB	2:B:268:LEU:HB2	1.77	0.67
2:E:312:LYS:O	2:E:343:VAL:HB	1.94	0.67
2:B:315:LEU:HB2	2:B:381:VAL:HG11	1.77	0.65
2:B:262:MET:HE2	2:B:301:ALA:HB1	1.78	0.64
2:E:287:LEU:HD12	2:E:287:LEU:C	2.22	0.64
2:E:292:GLY:O	2:E:294:THR:N	2.30	0.64
2:E:248:TRP:CD2	2:E:300:GLU:HG3	2.33	0.64
2:B:248:TRP:CD2	2:B:300:GLU:HG3	2.33	0.64
2:B:292:GLY:O	2:B:294:THR:N	2.30	0.64
2:E:248:TRP:CE2	2:E:300:GLU:HG3	2.33	0.64
2:E:352:ASN:O	2:E:353:ASN:HB2	1.99	0.63
1:A:117:ARG:HD3	1:A:193:MET:HE1	1.81	0.63
2:B:70:ARG:NH2	2:E:249:GLU:OE2	2.32	0.63
2:E:287:LEU:HD12	2:E:288:ASP:N	2.14	0.62
2:B:287:LEU:C	2:B:287:LEU:HD12	2.24	0.62
2:B:249:GLU:OE2	2:E:70:ARG:NH2	2.33	0.61
2:B:346:VAL:HB	2:B:381:VAL:HG13	1.81	0.61
2:E:346:VAL:HB	2:E:381:VAL:HG13	1.82	0.61
1:A:155:THR:HG21	2:B:264:ASN:O	2.01	0.61
2:B:248:TRP:CE2	2:B:300:GLU:HG3	2.36	0.61
2:B:352:ASN:O	2:B:353:ASN:HB2	2.01	0.60
2:E:377:ALA:O	2:E:381:VAL:HG22	2.01	0.60
2:E:325:CYS:N	5:E:1325:COA:H22	2.17	0.59
2:B:262:MET:HE2	2:B:301:ALA:CB	2.32	0.59
1:D:181:PRO:O	2:E:116:ARG:HD3	2.01	0.59
2:E:352:ASN:HD22	5:E:1325:COA:H71	1.67	0.59
2:B:289:VAL:O	2:B:290:GLY:C	2.46	0.59
2:E:310:LYS:HE2	2:E:310:LYS:N	2.18	0.59
1:A:202:ALA:CB	1:A:287:LEU:HD11	2.33	0.58
2:E:325:CYS:HB3	2:E:349:LEU:HD13	1.85	0.58
2:E:262:MET:HE2	2:E:301:ALA:HB1	1.84	0.58
2:B:289:VAL:O	2:B:291:GLY:N	2.37	0.58
2:B:348:ARG:C	2:B:348:ARG:HD2	2.28	0.58
1:A:15:PHE:CD2	1:A:37:GLY:HA3	2.41	0.56
2:B:287:LEU:HD12	2:B:288:ASP:N	2.19	0.56
1:D:251:ILE:HG23	1:D:255:LYS:O	2.05	0.56
2:B:249:GLU:CD	2:E:70:ARG:HH22	2.14	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:306:LEU:HD11	2:E:341:VAL:HG22	1.88	0.56
2:E:312:LYS:O	2:E:344:PRO:HD2	2.05	0.56
1:A:137:GLN:H	1:A:137:GLN:CD	2.13	0.56
2:B:295:LYS:HG3	2:B:331:GLY:HA2	1.88	0.56
1:A:270:VAL:HA	6:A:1700:GOL:H12	1.86	0.56
2:B:312:LYS:O	2:B:344:PRO:HD2	2.05	0.56
2:E:348:ARG:HD2	2:E:348:ARG:C	2.31	0.56
2:B:87:ASP:OD1	2:B:89:ASN:N	2.31	0.55
1:D:202:ALA:CB	1:D:287:LEU:HD11	2.35	0.55
2:E:250:LEU:HD21	2:E:297:ARG:CG	2.37	0.55
2:B:336:VAL:HA	2:B:341:VAL:CG2	2.37	0.55
2:B:310:LYS:HE2	2:B:310:LYS:N	2.21	0.54
1:A:269:GLY:O	6:A:1700:GOL:H12	2.06	0.54
1:D:197:ASP:O	1:D:227:LYS:NZ	2.41	0.54
1:A:253:GLY:O	1:A:255:LYS:HD2	2.07	0.54
1:D:136:ILE:CD1	5:D:1301:COA:H22	2.38	0.54
2:E:260:GLY:HA2	2:E:285:ASN:OD1	2.09	0.54
2:E:262:MET:HE2	2:E:301:ALA:CB	2.37	0.54
1:D:253:GLY:O	1:D:255:LYS:HD2	2.08	0.53
1:A:195:GLU:O	1:A:227:LYS:HE3	2.09	0.53
1:A:155:THR:CB	2:B:268:LEU:HB2	2.39	0.53
2:B:250:LEU:HD21	2:B:297:ARG:CG	2.39	0.53
2:B:308:ASP:OD1	2:B:308:ASP:C	2.50	0.53
2:E:381:VAL:O	2:E:385:VAL:HG22	2.08	0.53
2:B:336:VAL:HG13	2:B:341:VAL:HB	1.91	0.53
2:E:369:ILE:HG21	2:E:380:GLN:OE1	2.09	0.53
1:D:137:GLN:CD	1:D:137:GLN:H	2.17	0.53
1:D:199:GLN:O	1:D:199:GLN:HG2	2.09	0.53
2:E:382:VAL:O	2:E:385:VAL:HG23	2.08	0.53
1:D:248:GLY:O	2:E:116:ARG:NH2	2.38	0.52
1:A:251:ILE:HG23	1:A:255:LYS:O	2.09	0.52
2:B:377:ALA:O	2:B:381:VAL:HG22	2.09	0.52
2:E:230:ARG:HD2	7:E:1585:HOH:O	2.09	0.52
2:E:12:PHE:HB3	2:E:17:LEU:HB2	1.92	0.51
2:E:318:ILE:HG21	2:E:328:ILE:HD13	1.92	0.51
1:A:199:GLN:O	1:A:199:GLN:HG2	2.08	0.51
2:E:67:GLU:CD	2:E:67:GLU:H	2.18	0.51
1:A:138:PRO:HB2	1:A:140:HIS:CE1	2.45	0.51
2:E:202:VAL:HG21	2:E:212:LEU:HD22	1.93	0.51
2:E:308:ASP:C	2:E:308:ASP:OD1	2.53	0.51
2:B:277:LYS:HA	2:B:281:GLY:O	2.11	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:332:ILE:O	2:B:336:VAL:HG23	2.11	0.50
1:A:181:PRO:C	2:B:116:ARG:HD3	2.35	0.50
1:A:275:SER:HB2	2:B:278:LEU:CD2	2.41	0.50
2:B:242:GLU:HG2	2:B:252:TYR:O	2.10	0.50
1:D:195:GLU:O	1:D:227:LYS:HE3	2.11	0.50
2:E:87:ASP:OD1	2:E:89:ASN:N	2.31	0.50
2:E:295:LYS:HG3	2:E:331:GLY:HA2	1.93	0.50
2:B:70:ARG:HH22	2:E:249:GLU:CD	2.18	0.50
2:E:134:GLU:HB2	7:E:1616:HOH:O	2.11	0.50
2:B:12:PHE:HB3	2:B:17:LEU:HB2	1.94	0.50
1:D:151:SER:HB3	1:D:157:THR:OG1	2.11	0.49
2:E:306:LEU:C	2:E:308:ASP:N	2.70	0.49
1:D:237:THR:HG23	2:E:274:ASP:OD1	2.12	0.49
2:E:312:LYS:HB2	2:E:385:VAL:HG12	1.95	0.49
2:B:323:VAL:HA	7:B:1534:HOH:O	2.11	0.49
1:A:159:GLU:OE1	2:B:348:ARG:NH2	2.46	0.49
1:A:197:ASP:O	1:A:227:LYS:NZ	2.45	0.49
2:E:36:SER:HB2	7:E:1543:HOH:O	2.13	0.49
2:B:318:ILE:HG21	2:B:328:ILE:CD1	2.43	0.49
1:D:223:GLU:HG2	1:D:224:HIS:NE2	2.27	0.49
2:E:343:VAL:HB	2:E:344:PRO:HD2	1.95	0.48
2:B:346:VAL:CG2	2:B:381:VAL:HG13	2.43	0.48
2:E:346:VAL:CG2	2:E:381:VAL:HG13	2.42	0.48
2:E:245:ALA:HB1	2:E:250:LEU:HB2	1.94	0.48
2:E:124:MET:HA	2:E:145:HIS:O	2.14	0.48
2:B:139:GLU:C	2:B:141:PRO:HD3	2.39	0.48
2:B:318:ILE:HG21	2:B:328:ILE:HD13	1.96	0.48
1:A:57:ARG:NH1	1:A:86:ASP:OD2	2.46	0.48
1:A:129:PRO:HG2	1:A:171:GLN:HB2	1.94	0.48
2:E:84:TYR:OH	2:E:132:GLU:HG3	2.14	0.48
2:B:213:ASP:HB3	7:B:1408:HOH:O	2.13	0.48
2:B:109:TYR:CE2	2:B:133:ILE:HB	2.49	0.47
2:B:260:GLY:HA2	2:B:285:ASN:OD1	2.13	0.47
1:D:192:GLU:HB2	1:D:220:TYR:OH	2.14	0.47
2:B:263:VAL:HG22	2:B:317:ASN:HB3	1.96	0.47
1:D:57:ARG:NH1	1:D:86:ASP:OD2	2.47	0.47
1:D:201:GLU:O	1:D:228:PRO:HD2	2.14	0.47
2:E:263:VAL:HG22	2:E:317:ASN:HB3	1.94	0.47
2:E:277:LYS:HA	2:E:281:GLY:O	2.13	0.47
1:D:109:VAL:HG21	2:E:151:PRO:HG2	1.97	0.47
1:D:136:ILE:HD11	5:D:1301:COA:H22	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:318:ILE:HG21	2:E:328:ILE:CD1	2.45	0.47
1:D:222:LYS:HB2	1:D:268:ALA:HB1	1.97	0.47
2:B:67:GLU:H	2:B:67:GLU:CD	2.23	0.46
1:A:230:VAL:HA	1:A:271:LYS:O	2.15	0.46
2:B:35:ALA:HB2	2:B:69:ILE:HD12	1.98	0.46
2:E:272:THR:O	2:E:275:ILE:HG22	2.15	0.46
1:A:151:SER:HB3	1:A:157:THR:OG1	2.14	0.46
2:E:1:MET:SD	2:E:233:ARG:HB2	2.56	0.46
2:E:312:LYS:HA	2:E:343:VAL:HG11	1.98	0.46
1:D:1:SER:N	1:D:197:ASP:OD2	2.48	0.46
2:E:29:ARG:O	2:E:32:GLU:HG2	2.16	0.46
2:B:277:LYS:NZ	2:B:282:GLU:OE2	2.43	0.45
2:E:352:ASN:O	2:E:353:ASN:CB	2.64	0.45
5:B:1325:COA:CAP	5:B:1325:COA:CCP	2.85	0.45
2:E:199:ASN:HA	2:E:200:PRO:HA	1.76	0.45
1:A:15:PHE:CG	1:A:37:GLY:HA3	2.52	0.45
1:A:181:PRO:CA	2:B:116:ARG:HD3	2.46	0.45
2:B:109:TYR:CD1	2:B:109:TYR:C	2.94	0.45
1:A:136:ILE:CD1	5:A:1300:COA:H22	2.47	0.45
2:B:345:VAL:O	2:B:368:ILE:HA	2.17	0.45
2:B:346:VAL:CB	2:B:381:VAL:HG13	2.46	0.45
1:D:138:PRO:HB2	1:D:140:HIS:CE1	2.52	0.45
2:E:312:LYS:HB2	2:E:385:VAL:CG1	2.46	0.45
1:A:1:SER:N	1:A:197:ASP:OD2	2.45	0.44
1:D:155:THR:HG21	2:E:264:ASN:O	2.17	0.44
1:D:159:GLU:OE1	2:E:348:ARG:NH2	2.50	0.44
1:D:15:PHE:CD2	1:D:37:GLY:HA3	2.52	0.44
2:E:297:ARG:NH1	2:E:297:ARG:HB2	2.32	0.44
2:B:87:ASP:OD1	2:B:87:ASP:C	2.60	0.44
2:B:249:GLU:OE2	2:E:28:PRO:HD2	2.17	0.44
2:B:348:ARG:C	2:B:348:ARG:CD	2.91	0.44
1:D:230:VAL:HA	1:D:271:LYS:O	2.16	0.44
2:E:35:ALA:HB2	2:E:69:ILE:HD12	1.98	0.44
2:E:163:LEU:O	2:E:167:LEU:HG	2.17	0.44
1:A:223:GLU:O	1:A:223:GLU:HG3	2.17	0.44
1:A:223:GLU:HG2	1:A:224:HIS:NE2	2.31	0.44
1:D:12:CYS:O	1:D:15:PHE:HB2	2.17	0.44
2:B:65:SER:HB2	2:B:67:GLU:OE1	2.17	0.44
2:B:369:ILE:HG21	2:B:380:GLN:OE1	2.18	0.44
1:D:67:ALA:HA	1:D:91:LEU:O	2.18	0.44
2:E:344:PRO:HB3	2:E:367:ASN:HD21	1.82	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:273:VAL:CG2	1:D:278:ASP:HB2	2.48	0.43
2:E:297:ARG:HB2	2:E:297:ARG:CZ	2.47	0.43
2:B:292:GLY:O	2:B:294:THR:HG23	2.18	0.43
2:B:323:VAL:HG12	2:B:327:LEU:HB2	2.00	0.43
2:B:1:MET:SD	2:B:233:ARG:HB2	2.58	0.43
1:D:255:LYS:HD2	1:D:255:LYS:N	2.34	0.43
1:A:117:ARG:NH2	7:A:1752:HOH:O	2.49	0.43
2:E:312:LYS:CB	2:E:385:VAL:HG12	2.48	0.43
2:E:344:PRO:HB3	2:E:367:ASN:ND2	2.34	0.43
2:B:133:ILE:HD12	2:B:133:ILE:HA	1.85	0.43
2:B:306:LEU:C	2:B:308:ASP:N	2.76	0.43
2:E:323:VAL:HG12	2:E:327:LEU:HB2	2.00	0.43
2:E:306:LEU:C	2:E:308:ASP:H	2.26	0.43
1:A:138:PRO:O	1:A:141:ILE:HG12	2.19	0.43
1:D:1:SER:H2	1:D:199:GLN:HB3	1.84	0.43
1:D:257:THR:OG1	1:D:260:GLU:HG3	2.18	0.42
1:D:159:GLU:CD	2:E:319:PHE:CD2	2.97	0.42
1:A:55:THR:OG1	1:A:58:GLU:HG3	2.19	0.42
2:B:140:THR:O	2:B:141:PRO:C	2.61	0.42
1:D:129:PRO:HG2	1:D:171:GLN:HB2	2.00	0.42
1:D:197:ASP:HA	1:D:198:PRO:HD2	1.87	0.42
2:E:109:TYR:CD1	2:E:109:TYR:C	2.98	0.42
2:E:348:ARG:C	2:E:348:ARG:CD	2.92	0.42
2:E:20:PRO:HD3	2:E:211:CYS:O	2.19	0.42
2:E:312:LYS:C	2:E:343:VAL:HB	2.44	0.42
1:A:77:CYS:O	1:A:78:LYS:C	2.63	0.42
2:B:297:ARG:CZ	2:B:297:ARG:HB2	2.49	0.42
1:D:164:THR:HG22	1:D:283:LEU:CD1	2.49	0.42
2:E:112:ALA:HA	2:E:122:VAL:O	2.20	0.42
1:A:164:THR:HG22	1:A:283:LEU:CD1	2.50	0.41
2:E:309:ASP:HB3	2:E:310:LYS:NZ	2.35	0.41
2:E:345:VAL:O	2:E:368:ILE:HA	2.20	0.41
2:B:51:ALA:HB2	2:B:86:THR:HG22	2.03	0.41
2:E:65:SER:HB2	2:E:67:GLU:OE1	2.20	0.41
1:D:136:ILE:HD11	5:D:1301:COA:C2P	2.50	0.41
1:A:201:GLU:O	1:A:228:PRO:HD2	2.20	0.41
2:B:319:PHE:CD1	2:B:319:PHE:C	2.98	0.41
2:B:112:ALA:HA	2:B:122:VAL:O	2.21	0.41
2:E:268:LEU:HD12	2:E:268:LEU:HA	1.89	0.41
2:E:336:VAL:HG12	2:E:366:LEU:HD22	2.02	0.41
1:A:159:GLU:CD	2:B:348:ARG:HH21	2.27	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:352:ASN:HD22	5:B:1325:COA:C7P	2.34	0.41
1:D:159:GLU:CD	2:E:319:PHE:HD2	2.28	0.41
2:E:346:VAL:CB	2:E:381:VAL:HG13	2.47	0.41
1:A:98:GLY:O	2:B:221:ASN:HB3	2.21	0.41
1:A:248:GLY:O	2:B:116:ARG:NH2	2.48	0.41
2:B:163:LEU:O	2:B:167:LEU:HG	2.21	0.41
2:B:290:GLY:O	2:B:291:GLY:O	2.39	0.41
1:A:163:GLN:HG3	7:A:1760:HOH:O	2.21	0.41
1:A:270:VAL:HA	6:A:1700:GOL:C1	2.50	0.40
1:D:244:MET:HE3	2:E:286:PHE:CD2	2.55	0.40
2:E:277:LYS:NZ	2:E:282:GLU:OE2	2.50	0.40
1:A:273:VAL:CG2	1:A:278:ASP:HB2	2.51	0.40
1:A:94:THR:O	1:A:121:PRO:HA	2.21	0.40
1:A:156:LEU:HD23	1:A:156:LEU:HA	1.91	0.40
1:D:151:SER:HA	1:D:206:ILE:O	2.22	0.40
2:E:299:THR:HG23	2:E:339:VAL:HG23	2.03	0.40
2:B:109:TYR:O	2:B:125:ALA:HA	2.22	0.40
2:E:32:GLU:CD	2:E:70:ARG:HH11	2.30	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	285/288 (99%)	280 (98%)	5 (2%)	0	100	100
1	D	285/288 (99%)	276 (97%)	9 (3%)	0	100	100
2	B	386/388 (100%)	376 (97%)	6 (2%)	4 (1%)	12	8
2	E	383/388 (99%)	372 (97%)	8 (2%)	3 (1%)	16	10
All	All	1339/1352 (99%)	1304 (97%)	28 (2%)	7 (0%)	24	20

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	E	293	ALA
2	B	257	GLY
2	B	290	GLY
2	B	291	GLY
2	B	293	ALA
2	E	257	GLY
2	E	292	GLY

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	217/218 (100%)	211 (97%)	6 (3%)	38	40
1	D	217/218 (100%)	211 (97%)	6 (3%)	38	40
2	B	298/298 (100%)	285 (96%)	13 (4%)	25	23
2	E	296/298 (99%)	282 (95%)	14 (5%)	23	21
All	All	1028/1032 (100%)	989 (96%)	39 (4%)	29	29

All (39) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	46	THR
1	A	113	GLU
1	A	137	GLN
1	A	150	VAL
1	A	255	LYS
1	A	273	VAL
2	B	70	ARG
2	B	89	ASN
2	B	95	GLN
2	B	132	GLU
2	B	138	GLU
2	B	195	LEU
2	B	200	PRO
2	B	282	GLU
2	B	287	LEU

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Mol	Chain	Res	Type
2	B	342	ASN
2	B	348	ARG
2	B	374	LEU
2	B	381	VAL
1	D	46	THR
1	D	113	GLU
1	D	137	GLN
1	D	150	VAL
1	D	255	LYS
1	D	273	VAL
2	E	1	MET
2	E	70	ARG
2	E	89	ASN
2	E	95	GLN
2	E	133	ILE
2	E	138	GLU
2	E	195	LEU
2	E	282	GLU
2	E	287	LEU
2	E	348	ARG
2	E	364	SER
2	E	374	LEU
2	E	381	VAL
2	E	385	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	224	HIS
2	B	2	ASN
2	B	95	GLN
2	B	244	GLN
2	B	342	ASN
2	B	352	ASN
1	D	7	ASN
1	D	224	HIS
2	E	95	GLN
2	E	244	GLN
2	E	342	ASN
2	E	352	ASN
2	E	367	ASN

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 ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

11 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
5	COA	A	1300	-	47,50,50	0.84	1 (2%)	69,75,75	1.84	10 (14%)
5	COA	B	1325	2	14,17,50	3.52	6 (42%)	19,22,75	4.58	15 (78%)
6	GOL	A	1700	-	5,5,5	0.61	0	5,5,5	1.99	2 (40%)
4	SO4	B	1400	-	4,4,4	0.38	0	6,6,6	0.28	0
5	COA	E	1325	2	7,8,50	1.90	3 (42%)	7,8,75	1.77	1 (14%)
5	COA	D	1301	-	47,50,50	1.03	2 (4%)	69,75,75	1.77	13 (18%)
3	PO4	D	1601	-	4,4,4	1.76	1 (25%)	6,6,6	0.54	0
3	PO4	A	1600	-	4,4,4	1.93	1 (25%)	6,6,6	0.48	0
4	SO4	A	1500	-	4,4,4	0.63	0	6,6,6	0.25	0
4	SO4	E	1401	-	4,4,4	0.41	0	6,6,6	0.36	0
4	SO4	E	1501	-	4,4,4	0.54	0	6,6,6	0.26	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	COA	A	1300	-	-	2/48/64/64	0/3/3/3
5	COA	B	1325	2	-	5/23/23/64	-
6	GOL	A	1700	-	-	3/4/4/4	-
5	COA	E	1325	2	-	0/7/7/64	-
5	COA	D	1301	-	-	3/48/64/64	0/3/3/3

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	1325	COA	CCP-CBP	10.85	1.60	1.53
5	B	1325	COA	C3P-N4P	4.44	1.56	1.46
5	D	1301	COA	CCP-CBP	-4.21	1.45	1.52
5	E	1325	COA	C6P-C5P	3.58	1.58	1.51
5	B	1325	COA	CEP-CBP	2.90	1.59	1.53
5	B	1325	COA	C6P-C5P	2.82	1.57	1.51
5	B	1325	COA	C2P-S1P	2.59	1.90	1.80
3	A	1600	PO4	P-O4	-2.54	1.47	1.54
5	E	1325	COA	C3P-N4P	2.47	1.51	1.46
5	A	1300	COA	CCP-CBP	-2.31	1.48	1.52
3	D	1601	PO4	P-O3	-2.31	1.47	1.54
5	E	1325	COA	C2P-S1P	2.14	1.89	1.80
5	D	1301	COA	O6A-CCP	-2.07	1.37	1.43
5	B	1325	COA	C7P-N8P	2.00	1.50	1.46

All (41) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	1325	COA	C6P-C5P-N4P	9.05	132.83	116.34
5	B	1325	COA	O5P-C5P-C6P	-6.82	109.67	122.02
5	B	1325	COA	C3P-N4P-C5P	6.70	135.29	122.82
5	A	1300	COA	CEP-CBP-CCP	-6.64	97.27	108.22
5	A	1300	COA	C7P-C6P-C5P	-6.59	101.42	112.39
5	B	1325	COA	OAP-CAP-CBP	-6.10	96.05	110.18
5	D	1301	COA	C7P-C6P-C5P	-6.09	102.25	112.39
5	B	1325	COA	CEP-CBP-CAP	5.91	118.84	108.77
5	B	1325	COA	CEP-CBP-CCP	-5.81	96.77	108.77
5	B	1325	COA	CDP-CBP-CAP	4.93	117.18	108.77
5	D	1301	COA	O5P-C5P-C6P	-4.90	113.14	122.02
5	D	1301	COA	CEP-CBP-CCP	-4.90	100.14	108.22
5	D	1301	COA	C6P-C5P-N4P	4.88	125.23	116.34
5	A	1300	COA	O5P-C5P-C6P	-4.56	113.76	122.02
5	B	1325	COA	CDP-CBP-CCP	-4.52	99.43	108.77

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	1325	COA	O9P-C9P-N8P	-4.34	113.79	122.98
5	A	1300	COA	CEP-CBP-CAP	4.25	116.02	108.77
5	A	1300	COA	C6P-C7P-N8P	-4.24	102.97	112.00
5	A	1300	COA	C6P-C5P-N4P	4.06	123.74	116.34
5	B	1325	COA	C7P-N8P-C9P	3.73	129.24	122.55
5	E	1325	COA	C7P-C6P-C5P	3.59	119.15	112.37
5	B	1325	COA	C2P-C3P-N4P	3.52	120.29	112.31
5	D	1301	COA	O3B-P3B-O7A	-3.50	96.86	109.33
5	D	1301	COA	C6P-C7P-N8P	-3.41	104.75	112.00
5	B	1325	COA	CAP-C9P-N8P	3.33	122.81	116.48
5	D	1301	COA	C2P-C3P-N4P	-3.21	105.03	112.31
6	A	1700	GOL	O2-C2-C1	2.90	121.19	109.18
5	A	1300	COA	C2P-C3P-N4P	-2.88	105.78	112.31
5	B	1325	COA	O5P-C5P-N4P	-2.82	117.49	123.03
6	A	1700	GOL	O2-C2-C3	2.73	120.47	109.18
5	D	1301	COA	C3P-N4P-C5P	2.69	127.83	122.82
5	D	1301	COA	CEP-CBP-CAP	2.56	113.13	108.77
5	D	1301	COA	O5A-P2A-O3A	-2.48	100.56	107.27
5	A	1300	COA	O3B-P3B-O7A	-2.32	101.07	109.33
5	A	1300	COA	C2B-C1B-N9A	2.25	118.90	113.30
5	B	1325	COA	C6P-C7P-N8P	2.25	116.78	112.00
5	D	1301	COA	C2B-C1B-N9A	2.21	118.80	113.30
5	A	1300	COA	O8A-P3B-O3B	2.09	113.99	105.85
5	D	1301	COA	C7P-N8P-C9P	2.08	126.29	122.55
5	D	1301	COA	O8A-P3B-O3B	2.03	113.76	105.85
5	B	1325	COA	OAP-CAP-C9P	-2.02	100.95	109.38

There are no chirality outliers.

All (13) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	B	1325	COA	CEP-CBP-CCP-O6A
5	B	1325	COA	O9P-C9P-CAP-OAP
6	A	1700	GOL	O1-C1-C2-C3
6	A	1700	GOL	O2-C2-C3-O3
5	B	1325	COA	O9P-C9P-CAP-CBP
5	B	1325	COA	N8P-C9P-CAP-CBP
5	B	1325	COA	N8P-C9P-CAP-OAP
5	D	1301	COA	C2B-C1B-N9A-C8A
6	A	1700	GOL	O1-C1-C2-O2
5	D	1301	COA	O4B-C1B-N9A-C8A
5	A	1300	COA	C2B-C1B-N9A-C8A

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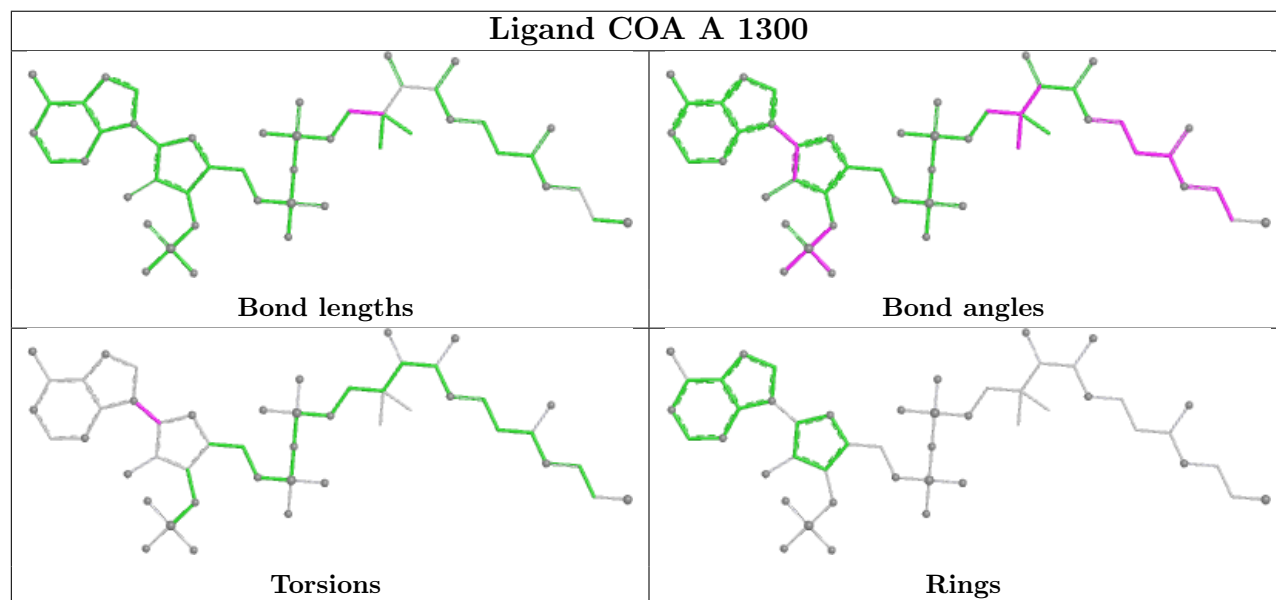
Mol	Chain	Res	Type	Atoms
5	A	1300	COA	O4B-C1B-N9A-C8A
5	D	1301	COA	N8P-C9P-CAP-OAP

There are no ring outliers.

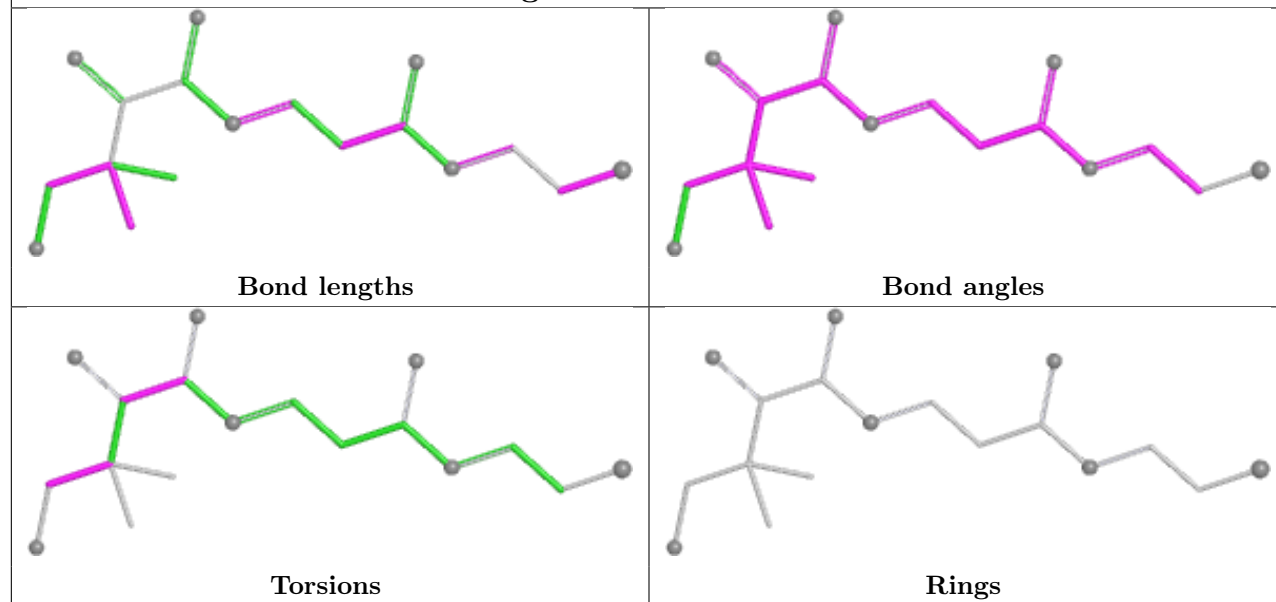
5 monomers are involved in 13 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	1300	COA	1	0
5	B	1325	COA	4	0
6	A	1700	GOL	3	0
5	E	1325	COA	2	0
5	D	1301	COA	3	0

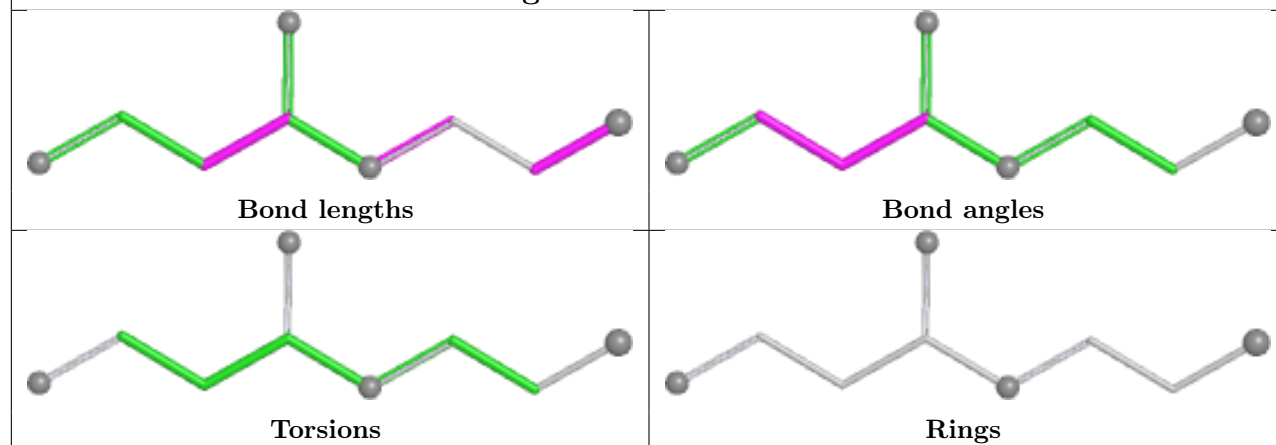
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



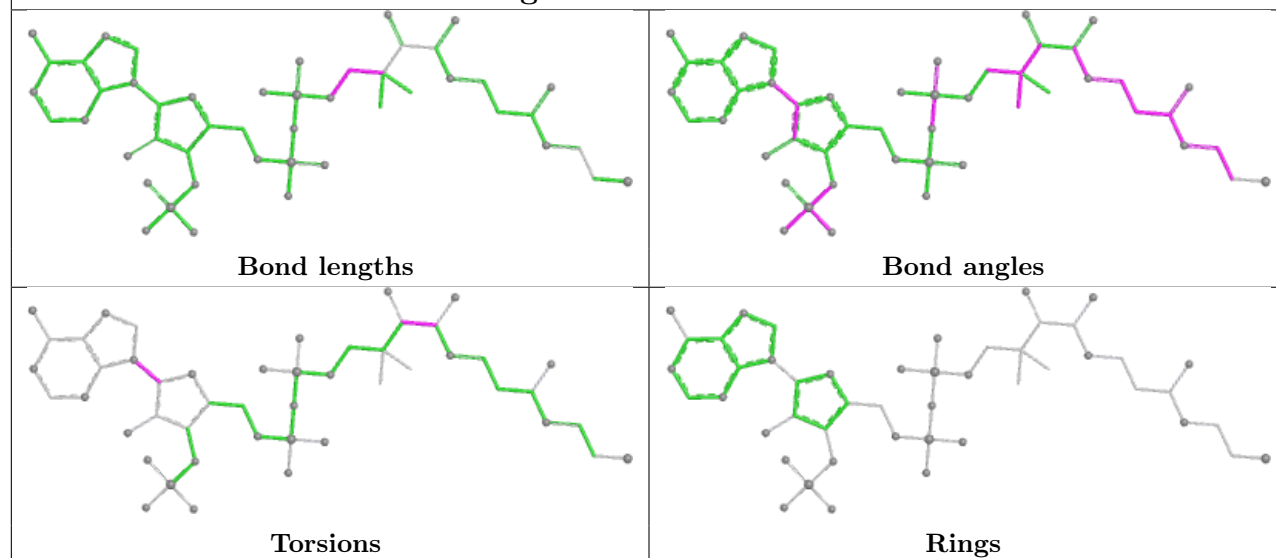
Ligand COA B 1325



Ligand COA E 1325



Ligand COA D 1301



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	287/288 (99%)	-0.09	5 (1%) 69 73	17, 27, 44, 58	0
1	D	287/288 (99%)	0.55	18 (6%) 26 29	20, 36, 52, 64	0
2	B	388/388 (100%)	0.33	25 (6%) 25 28	16, 34, 53, 64	0
2	E	385/388 (99%)	0.71	60 (15%) 5 5	19, 36, 66, 90	0
All	All	1347/1352 (99%)	0.40	108 (8%) 18 20	16, 34, 57, 90	0

All (108) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	E	293	ALA	9.4
1	A	139	GLY	6.7
2	E	356	LEU	6.1
2	E	354	ALA	6.0
2	E	327	LEU	5.3
2	B	336	VAL	4.9
2	E	352	ASN	4.8
2	E	358	ALA	4.6
2	E	353	ASN	4.5
1	D	139	GLY	4.5
1	A	140	HIS	4.4
2	E	330	ASP	4.3
2	E	326	ASP	4.3
2	E	351	GLY	4.3
2	E	385	VAL	4.2
2	E	324	ARG	4.1
2	E	357	GLY	4.1
1	A	287	LEU	4.1
2	B	291	GLY	4.0
2	E	79	LYS	4.0
2	E	363	ASP	3.9

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Mol	Chain	Res	Type	RSRZ
1	D	140	HIS	3.9
2	E	362	ALA	3.7
2	E	295	LYS	3.7
2	E	361	LEU	3.7
2	E	291	GLY	3.7
2	E	84	TYR	3.7
2	E	328	ILE	3.5
2	B	290	GLY	3.5
2	E	384	ALA	3.5
2	E	369	ILE	3.4
2	E	355	GLU	3.4
2	E	368	ILE	3.4
2	E	256	ASP	3.4
2	E	281	GLY	3.4
2	B	337	ALA	3.3
1	D	287	LEU	3.3
2	B	289	VAL	3.3
2	B	313	ALA	3.3
2	B	56	LYS	3.2
1	D	196	LYS	3.2
2	E	372	LYS	3.1
2	E	371	ALA	3.1
2	E	336	VAL	3.1
2	E	381	VAL	3.1
2	E	329	ALA	3.0
2	B	374	LEU	3.0
1	D	186	ASN	3.0
2	E	367	ASN	3.0
2	B	256	ASP	3.0
2	B	342	ASN	2.9
2	E	374	LEU	2.9
2	E	322	ILE	2.9
2	E	383	ALA	2.9
2	E	323	VAL	2.8
2	E	370	ALA	2.8
2	E	292	GLY	2.7
2	E	377	ALA	2.6
1	D	6	LYS	2.6
1	D	138	PRO	2.6
2	E	337	ALA	2.6
2	E	248	TRP	2.6
2	B	322	ILE	2.5

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Mol	Chain	Res	Type	RSRZ
2	E	338	GLU	2.5
1	D	169	PHE	2.5
2	E	310	LYS	2.5
1	D	198	PRO	2.5
2	E	311	VAL	2.5
2	B	14	ARG	2.5
2	E	294	THR	2.4
2	B	333	ILE	2.4
2	B	369	ILE	2.4
2	B	257	GLY	2.3
1	D	267	ALA	2.3
2	E	373	GLY	2.3
2	E	359	LYS	2.3
2	E	280	GLY	2.3
2	E	56	LYS	2.3
2	E	341	VAL	2.3
2	B	13	ALA	2.3
1	D	174	CYS	2.2
1	A	255	LYS	2.2
2	E	290	GLY	2.2
2	E	340	GLY	2.2
2	B	335	ALA	2.2
2	B	338	GLU	2.2
2	B	131	VAL	2.2
2	B	339	VAL	2.2
2	E	40	ALA	2.2
2	B	248	TRP	2.2
1	A	138	PRO	2.1
2	E	14	ARG	2.1
2	B	309	ASP	2.1
1	D	286	VAL	2.1
1	D	271	LYS	2.1
2	B	295	LYS	2.1
2	B	381	VAL	2.1
1	D	282	ALA	2.1
2	B	294	THR	2.1
2	E	349	LEU	2.0
2	E	342	ASN	2.0
1	D	273	VAL	2.0
1	D	281	GLU	2.0
2	E	345	VAL	2.0
1	D	276	LEU	2.0

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Mol	Chain	Res	Type	RSRZ
2	E	255	LEU	2.0
2	E	366	LEU	2.0
1	D	255	LYS	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](#)

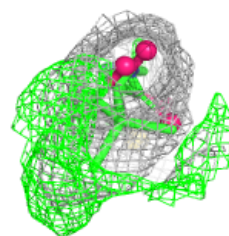
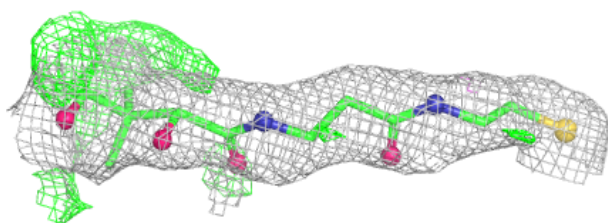
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists 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
6	GOL	A	1700	6/6	0.71	0.20	72,72,72,72	0
5	COA	B	1325	18/48	0.76	0.23	56,64,68,69	0
5	COA	E	1325	9/48	0.77	0.21	70,72,73,73	0
4	SO4	E	1501	5/5	0.80	0.16	76,77,78,79	0
4	SO4	E	1401	5/5	0.90	0.23	23,25,27,28	5
4	SO4	A	1500	5/5	0.91	0.13	56,56,58,59	0
4	SO4	B	1400	5/5	0.92	0.21	21,24,25,25	5
5	COA	D	1301	48/48	0.96	0.07	25,29,49,55	0
5	COA	A	1300	48/48	0.97	0.07	26,29,50,53	0
3	PO4	D	1601	5/5	0.98	0.05	30,30,30,32	0
3	PO4	A	1600	5/5	0.98	0.07	26,28,31,31	0

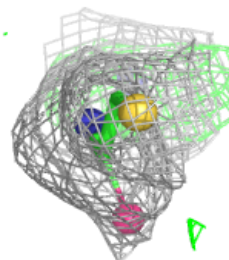
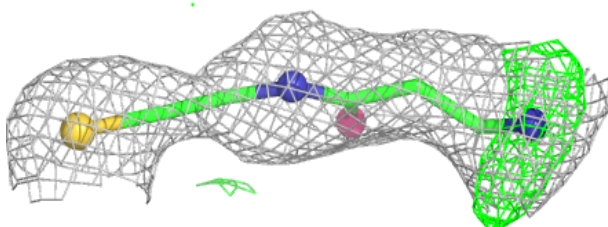
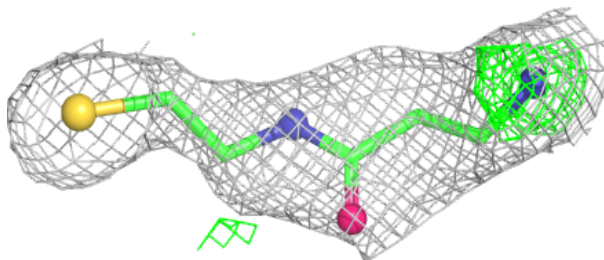
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around COA B 1325:

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

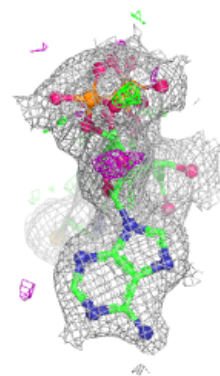
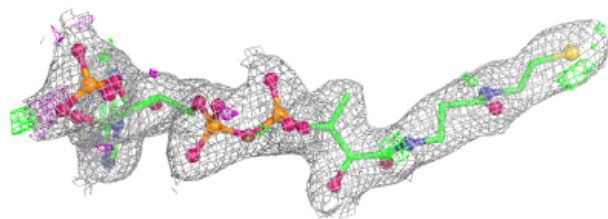
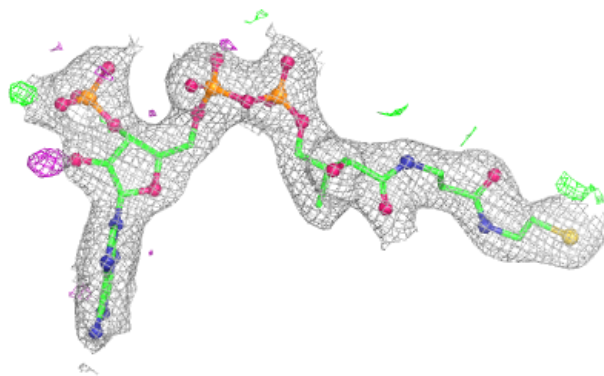
**Electron density around COA E 1325:**

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

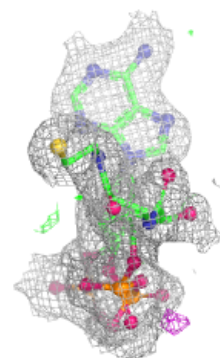
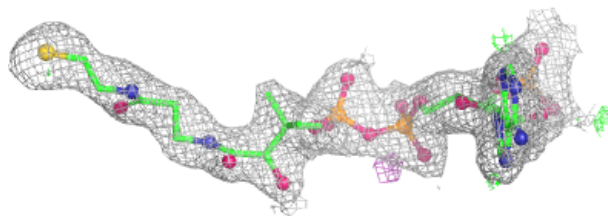
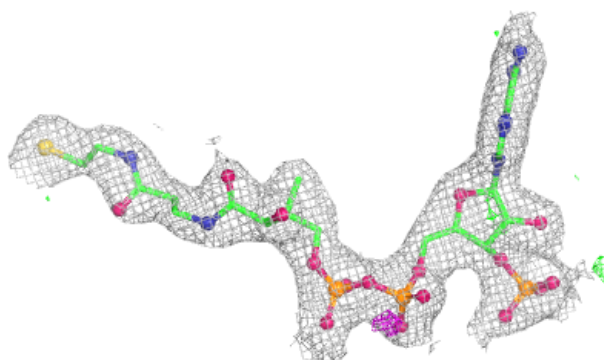


Electron density around COA D 1301:

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

**Electron density around COA A 1300:**

$2mF_o-DF_c$ (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.