



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 11, 2021 – 12:44 PM EDT

PDB ID : 2NUA
Title : C123aV Mutant of E. coli Succinyl-CoA Synthetase
Authors : Fraser, M.E.
Deposited on : 2006-11-08
Resolution : 2.95 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.23.2
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) : 2.23.2

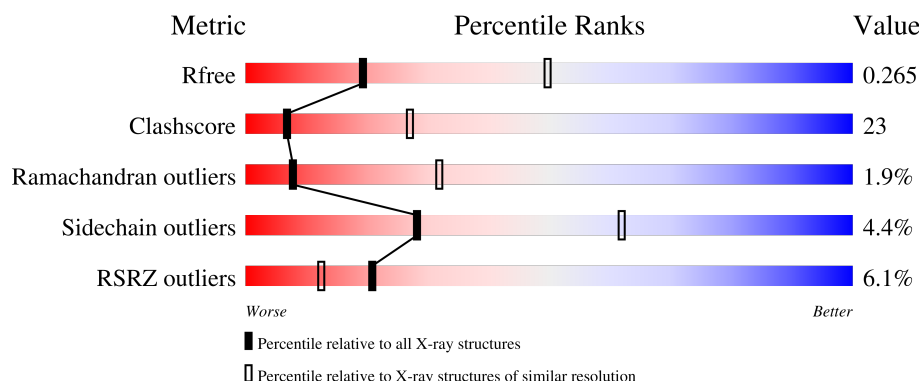
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.95 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	3104 (3.00-2.92)
Clashscore	141614	3462 (3.00-2.92)
Ramachandran outliers	138981	3340 (3.00-2.92)
Sidechain outliers	138945	3343 (3.00-2.92)
RSRZ outliers	127900	2986 (3.00-2.92)

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% 64% 34% .
1	D	288	 5% 65% 32% .
2	B	388	 6% 54% 41% .
2	E	388	 10% 57% 37% 5% .

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	E	1325	-	X	-	-

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 10105 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	1315	346	399	10			
1	D	287	Total	C	N	O	S	0	0	0
			2070	1315	346	399	10			

There are 2 discrepancies between the modelled and reference sequences:

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

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

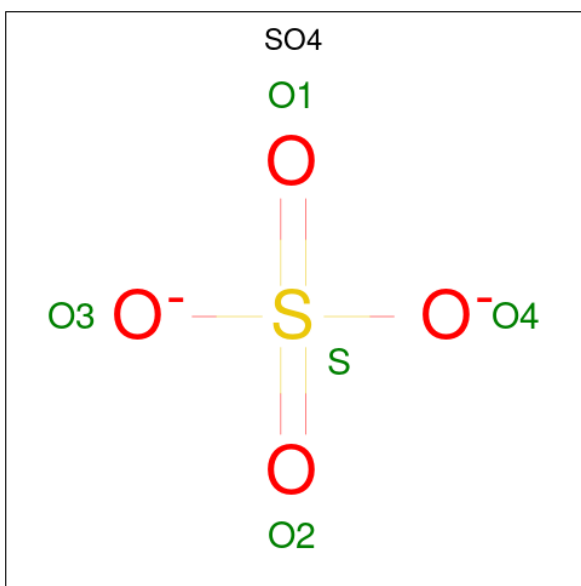
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	388	Total	C	N	O	S	0	0	0
			2908	1836	509	550	13			
2	E	385	Total	C	N	O	S	0	0	0
			2885	1823	505	544	13			

- Molecule 3 is PHOSPHATE ION (three-letter code: 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 (three-letter code: SO4) (formula: O₄S).



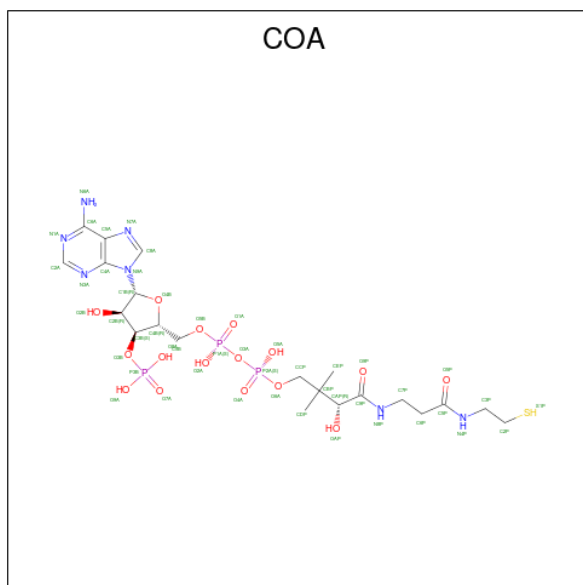
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	O	S	0	0
			5	4	1		
4	B	1	Total	O	S	0	0
			5	4	1		

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

- Molecule 5 is COENZYME A (three-letter code: 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 48 21 7 16 3 1	0	0
5	B	1	Total C N O S 18 11 2 4 1	0	0
5	D	1	Total C N O P S 48 21 7 16 3 1	0	0
5	E	1	Total C N O S 18 11 2 4 1	0	0

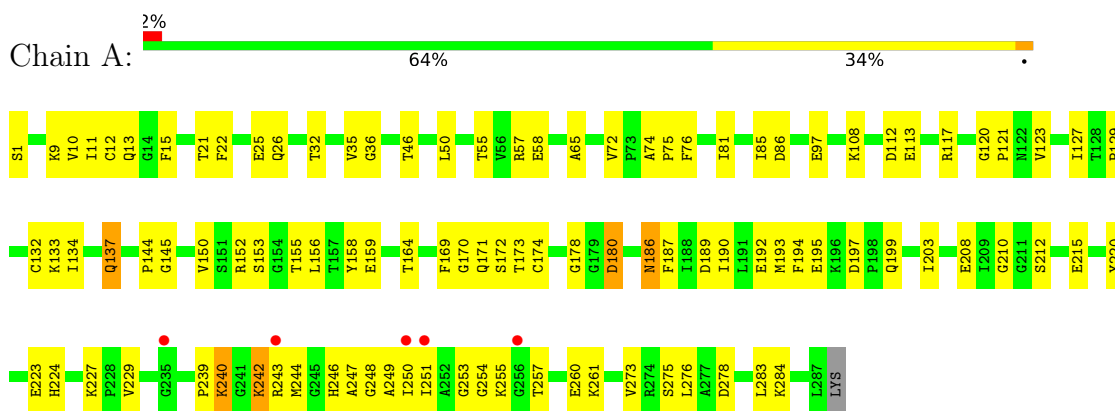
- Molecule 6 is water.

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

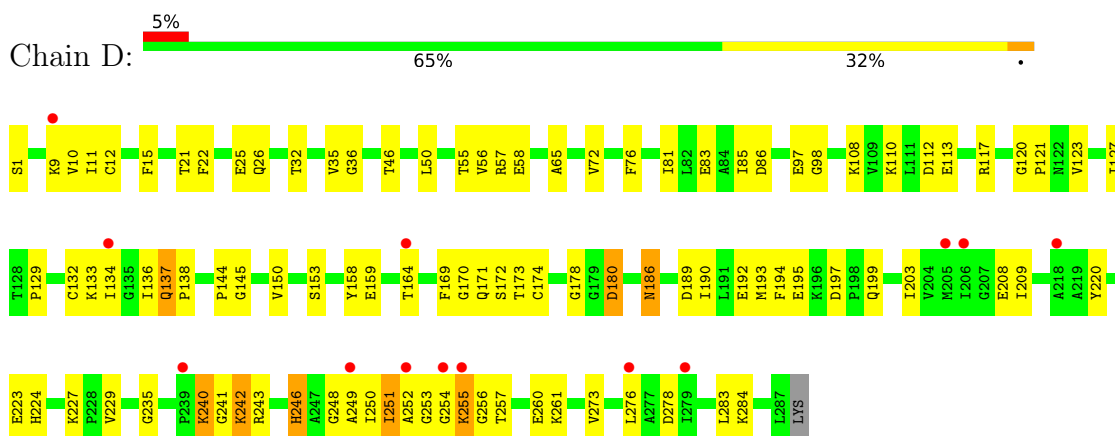
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

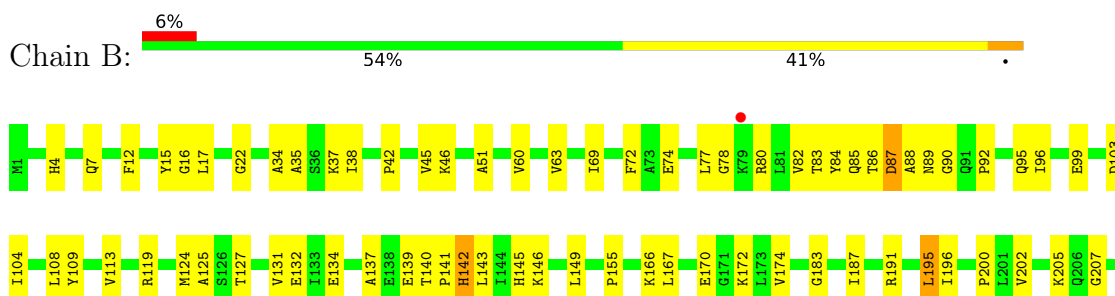
- Molecule 1: Succinyl-CoA ligase [ADP-forming] subunit alpha

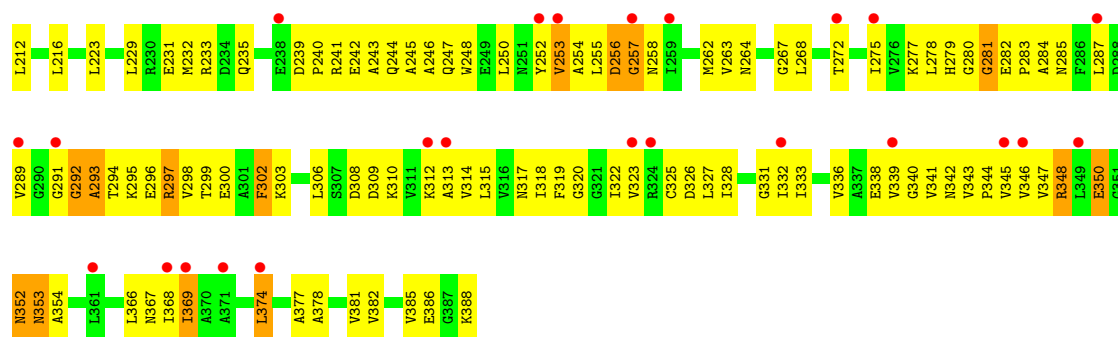


- Molecule 1: Succinyl-CoA ligase [ADP-forming] subunit alpha

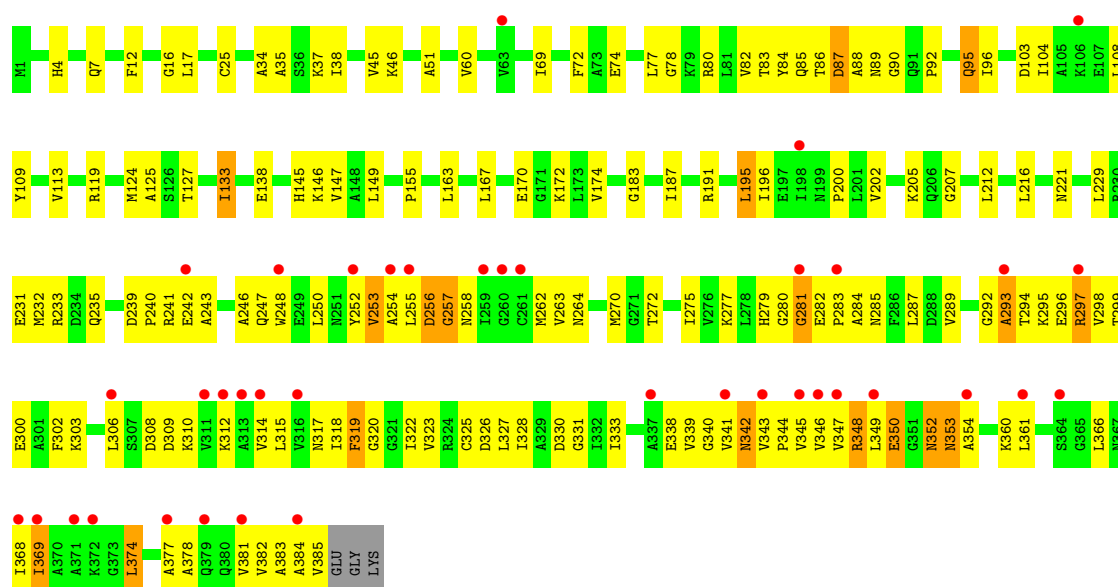


- Molecule 2: Succinyl-CoA synthetase beta chain





• 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	97.51Å 97.51Å 390.25Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	97.51 – 2.95 97.51 – 2.95	Depositor EDS
% Data completeness (in resolution range)	90.8 (97.51-2.95) 90.8 (97.51-2.95)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.50 (at 2.96Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.221 , 0.264 0.218 , 0.265	Depositor DCC
R_{free} test set	4191 reflections (11.28%)	wwPDB-VP
Wilson B-factor (Å ²)	75.3	Xtriage
Anisotropy	0.181	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 54.6	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	0.93	EDS
Total number of atoms	10105	wwPDB-VP
Average B, all atoms (Å ²)	66.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.29% 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: PO4, COA, SO4

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	0.39	0/2104	0.66	0/2851
1	D	0.37	0/2104	0.66	0/2851
2	B	0.41	0/2950	0.64	0/3989
2	E	0.39	0/2927	0.64	0/3961
All	All	0.39	0/10085	0.65	0/13652

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [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	2070	0	2133	84	1
1	D	2070	0	2133	88	1
2	B	2908	0	2962	162	0
2	E	2885	0	2940	157	0
3	A	5	0	0	0	0
3	D	5	0	0	0	0
4	A	5	0	0	0	0
4	B	10	0	0	0	0
4	E	10	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	A	48	0	32	4	0
5	B	18	0	20	4	0
5	D	48	0	32	3	0
5	E	18	0	20	6	0
6	A	4	0	0	1	0
6	B	1	0	0	0	0
All	All	10105	0	10272	473	2

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 23.

All (473) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:240:LYS:H	1:A:240:LYS:HD3	0.96	1.10
2:E:275:ILE:HD13	2:E:374:LEU:HD12	1.46	0.97
1:A:240:LYS:HD3	1:A:240:LYS:N	1.81	0.96
1:A:240:LYS:HA	1:A:251:ILE:HG23	1.48	0.96
2:B:275:ILE:HD13	2:B:374:LEU:HD12	1.49	0.95
2:E:233:ARG:HD3	2:E:235:GLN:HE21	1.35	0.91
1:A:240:LYS:H	1:A:240:LYS:CD	1.84	0.91
2:B:233:ARG:HD3	2:B:235:GLN:HE21	1.36	0.89
2:B:346:VAL:HB	2:B:381:VAL:HG12	1.58	0.85
2:E:257:GLY:HA2	2:E:282:GLU:HG3	1.57	0.85
2:B:257:GLY:HA2	2:B:282:GLU:HG3	1.58	0.85
2:B:348:ARG:HH21	2:B:374:LEU:HD23	1.44	0.82
1:D:240:LYS:HE2	1:D:254:GLY:H	1.43	0.81
2:E:346:VAL:HB	2:E:381:VAL:HG12	1.61	0.81
2:E:348:ARG:HH21	2:E:374:LEU:HD23	1.46	0.80
2:B:247:GLN:HE22	2:E:78:GLY:HA2	1.48	0.79
2:B:294:THR:O	2:B:298:VAL:HG23	1.82	0.78
2:E:233:ARG:HD3	2:E:235:GLN:NE2	1.97	0.78
2:B:233:ARG:HD3	2:B:235:GLN:NE2	1.98	0.78
1:D:240:LYS:NZ	1:D:251:ILE:HD11	2.00	0.76
2:B:82:VAL:HG22	2:B:90:GLY:HA3	1.68	0.76
2:E:294:THR:O	2:E:298:VAL:HG23	1.86	0.76
2:B:291:GLY:C	2:B:293:ALA:H	1.90	0.75
2:B:348:ARG:NH2	2:B:374:LEU:HD23	2.01	0.74
2:E:82:VAL:HG22	2:E:90:GLY:HA3	1.69	0.74
2:B:295:LYS:HG3	2:B:331:GLY:HA2	1.70	0.73
2:E:295:LYS:HG3	2:E:331:GLY:HA2	1.70	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:306:LEU:HD11	2:E:341:VAL:HG13	1.70	0.72
2:E:348:ARG:NH2	2:E:374:LEU:HD23	2.05	0.71
2:B:247:GLN:HE22	2:E:78:GLY:CA	2.02	0.71
1:A:55:THR:OG1	1:A:58:GLU:HG3	1.92	0.70
2:E:296:GLU:CD	2:E:296:GLU:H	1.94	0.70
2:E:377:ALA:O	2:E:381:VAL:HG13	1.91	0.70
2:B:296:GLU:CD	2:B:296:GLU:H	1.96	0.69
2:E:289:VAL:HG11	2:E:293:ALA:HB2	1.74	0.69
2:B:377:ALA:O	2:B:381:VAL:HG13	1.92	0.69
2:B:78:GLY:HA2	2:E:247:GLN:HE22	1.58	0.68
2:B:289:VAL:HG11	2:B:293:ALA:HB2	1.76	0.67
2:E:343:VAL:HB	2:E:344:PRO:HD2	1.75	0.67
2:B:78:GLY:CA	2:E:247:GLN:HE22	2.08	0.67
2:B:263:VAL:HG22	2:B:317:ASN:HB3	1.78	0.66
1:A:172:SER:HA	1:A:199:GLN:NE2	2.10	0.66
1:D:55:THR:OG1	1:D:58:GLU:HG3	1.94	0.66
2:B:378:ALA:O	2:B:381:VAL:HG22	1.95	0.66
2:B:77:LEU:HD21	2:B:96:ILE:HG12	1.78	0.66
1:D:240:LYS:HE2	1:D:254:GLY:N	2.09	0.66
2:E:342:ASN:HD22	2:E:343:VAL:N	1.92	0.66
2:B:333:ILE:HG23	2:B:366:LEU:HD11	1.78	0.66
2:E:252:TYR:O	2:E:253:VAL:HG23	1.95	0.66
1:D:240:LYS:HZ2	1:D:251:ILE:HD11	1.62	0.65
1:D:255:LYS:NZ	1:D:255:LYS:HA	2.11	0.65
1:D:257:THR:HG23	1:D:260:GLU:OE1	1.96	0.65
2:B:82:VAL:HG22	2:B:90:GLY:CA	2.27	0.65
2:B:252:TYR:O	2:B:253:VAL:HG23	1.96	0.65
1:A:257:THR:HG23	1:A:260:GLU:OE1	1.97	0.65
2:E:257:GLY:HA2	2:E:282:GLU:CG	2.27	0.65
2:B:257:GLY:HA2	2:B:282:GLU:CG	2.27	0.64
1:D:276:LEU:HD11	2:E:374:LEU:HG	1.77	0.64
1:A:145:GLY:HA3	1:A:170:GLY:HA3	1.79	0.64
1:A:251:ILE:HD11	1:A:257:THR:HG22	1.77	0.64
2:B:84:TYR:CE1	2:B:85:GLN:HG3	2.33	0.64
2:E:306:LEU:CD1	2:E:341:VAL:HG13	2.27	0.64
2:E:263:VAL:HG22	2:E:317:ASN:HB3	1.80	0.64
1:A:97:GLU:HB3	5:A:1300:COA:H71	1.79	0.64
1:D:159:GLU:OE2	2:E:319:PHE:HD2	1.81	0.64
2:E:77:LEU:HD21	2:E:96:ILE:HG12	1.80	0.64
2:E:84:TYR:CE1	2:E:85:GLN:HG3	2.33	0.64
2:E:378:ALA:O	2:E:381:VAL:HG22	1.97	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:145:GLY:HA3	1:D:170:GLY:HA3	1.80	0.63
1:A:127:ILE:HG22	1:A:174:CYS:HB2	1.81	0.63
2:E:292:GLY:O	2:E:294:THR:HG23	1.99	0.62
1:D:127:ILE:HG22	1:D:174:CYS:HB2	1.81	0.62
1:D:129:PRO:HG2	1:D:171:GLN:HB2	1.82	0.62
2:E:256:ASP:CG	2:E:257:GLY:H	2.03	0.62
1:D:186:ASN:ND2	1:D:189:ASP:H	1.98	0.62
2:E:350:GLU:HA	2:E:350:GLU:OE1	2.00	0.62
2:E:318:ILE:HG21	2:E:328:ILE:HD13	1.81	0.61
1:D:186:ASN:C	1:D:186:ASN:HD22	2.04	0.61
2:E:342:ASN:ND2	2:E:343:VAL:HG13	2.15	0.61
2:B:231:GLU:OE1	2:E:232:MET:HG2	2.00	0.61
1:D:172:SER:HA	1:D:199:GLN:NE2	2.14	0.61
1:A:186:ASN:C	1:A:186:ASN:HD22	2.02	0.61
2:B:312:LYS:O	2:B:344:PRO:HD2	2.01	0.61
1:A:239:PRO:HD2	1:A:244:MET:HE2	1.83	0.60
2:B:256:ASP:CG	2:B:257:GLY:H	2.04	0.60
2:E:330:ASP:OD1	2:E:360:LYS:NZ	2.34	0.60
2:B:318:ILE:HG21	2:B:328:ILE:HD13	1.82	0.60
1:A:129:PRO:HG2	1:A:171:GLN:HB2	1.82	0.60
1:D:203:ILE:HB	1:D:229:VAL:HG22	1.83	0.60
2:E:82:VAL:HG22	2:E:90:GLY:CA	2.30	0.60
2:B:315:LEU:HD13	2:B:381:VAL:HG11	1.83	0.59
1:A:186:ASN:ND2	1:A:189:ASP:H	1.99	0.59
2:E:254:ALA:C	2:E:255:LEU:HD12	2.23	0.59
2:B:366:LEU:HB2	2:B:368:ILE:HG13	1.84	0.59
2:B:336:VAL:HA	2:B:341:VAL:CG2	2.33	0.59
1:A:57:ARG:HH12	1:A:86:ASP:CG	2.05	0.59
2:E:312:LYS:O	2:E:344:PRO:HD2	2.02	0.59
2:B:369:ILE:HD13	2:B:369:ILE:N	2.19	0.58
1:A:123:VAL:C	5:A:1300:COA:H22	2.23	0.58
1:D:243:ARG:HB3	1:D:243:ARG:NH1	2.19	0.58
1:A:108:LYS:HE3	1:A:112:ASP:OD2	2.03	0.58
2:B:347:VAL:HG12	2:B:348:ARG:N	2.19	0.58
1:D:197:ASP:O	1:D:227:LYS:NZ	2.37	0.58
2:B:350:GLU:OE1	2:B:350:GLU:HA	2.03	0.57
2:B:292:GLY:O	2:B:294:THR:HG23	2.04	0.57
1:A:276:LEU:HD11	2:B:374:LEU:HG	1.85	0.57
2:E:306:LEU:HD12	2:E:341:VAL:HG22	1.85	0.57
2:B:277:LYS:HA	2:B:280:GLY:O	2.04	0.57
2:E:315:LEU:HD13	2:E:381:VAL:HG11	1.86	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:132:GLU:OE1	2:B:132:GLU:HA	2.05	0.57
2:B:333:ILE:HG23	2:B:366:LEU:CD1	2.34	0.57
1:A:153:SER:OG	2:B:267:GLY:HA3	2.05	0.57
1:A:120:GLY:HA2	1:A:123:VAL:HG13	1.87	0.57
1:A:197:ASP:O	1:A:227:LYS:NZ	2.37	0.57
2:B:137:ALA:O	2:B:141:PRO:HG3	2.05	0.57
1:A:164:THR:HG22	1:A:283:LEU:CD1	2.34	0.56
2:E:369:ILE:N	2:E:369:ILE:HD13	2.20	0.56
2:B:254:ALA:C	2:B:255:LEU:HD12	2.25	0.56
2:E:342:ASN:HD22	2:E:343:VAL:H	1.52	0.56
2:E:296:GLU:CD	2:E:296:GLU:N	2.58	0.56
2:E:146:LYS:O	2:E:147:VAL:HG13	2.05	0.56
1:A:186:ASN:C	1:A:186:ASN:ND2	2.59	0.56
1:A:242:LYS:HD3	1:A:243:ARG:H	1.71	0.56
1:D:108:LYS:HE3	1:D:112:ASP:OD2	2.06	0.56
1:D:164:THR:HG22	1:D:283:LEU:CD1	2.36	0.55
2:E:272:THR:O	2:E:275:ILE:HG22	2.05	0.55
1:D:120:GLY:HA2	1:D:123:VAL:HG13	1.87	0.55
2:E:103:ASP:HB3	2:E:205:LYS:HG3	1.87	0.55
2:B:272:THR:O	2:B:275:ILE:HG22	2.05	0.55
2:E:243:ALA:O	2:E:246:ALA:HB3	2.06	0.55
1:A:121:PRO:HG2	1:A:180:ASP:OD2	2.06	0.55
2:E:360:LYS:NZ	2:E:360:LYS:HB3	2.22	0.55
1:D:57:ARG:HH12	1:D:86:ASP:CG	2.09	0.55
2:E:277:LYS:HA	2:E:280:GLY:O	2.07	0.55
1:A:203:ILE:HB	1:A:229:VAL:HG22	1.88	0.54
2:B:336:VAL:HG13	2:B:341:VAL:HB	1.89	0.54
2:B:149:LEU:HD22	2:B:155:PRO:HB3	1.89	0.54
2:E:338:GLU:C	2:E:340:GLY:H	2.09	0.54
1:D:186:ASN:ND2	1:D:186:ASN:C	2.61	0.54
2:B:103:ASP:HB3	2:B:205:LYS:HG3	1.90	0.54
2:B:229:LEU:HA	2:B:232:MET:HE3	1.90	0.54
2:B:338:GLU:C	2:B:340:GLY:H	2.10	0.54
2:B:296:GLU:CD	2:B:296:GLU:N	2.60	0.54
2:B:323:VAL:HG12	2:B:327:LEU:HB2	1.89	0.54
1:D:252:ALA:O	1:D:255:LYS:HG2	2.08	0.54
2:E:202:VAL:HG21	2:E:212:LEU:HD22	1.90	0.53
2:E:315:LEU:HB2	2:E:381:VAL:HG11	1.90	0.53
2:E:347:VAL:HG12	2:E:348:ARG:N	2.23	0.53
1:A:254:GLY:C	1:A:255:LYS:HD2	2.28	0.53
2:E:229:LEU:HD23	2:E:232:MET:HE1	1.90	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:360:LYS:HB3	2:E:360:LYS:HZ2	1.73	0.53
2:B:183:GLY:O	2:B:187:ILE:HG13	2.09	0.53
1:D:240:LYS:HZ1	1:D:251:ILE:HD11	1.72	0.53
2:E:308:ASP:OD1	2:E:310:LYS:HG2	2.08	0.53
2:B:243:ALA:O	2:B:246:ALA:HB3	2.09	0.53
2:E:323:VAL:HG12	2:E:327:LEU:HB2	1.90	0.53
2:E:328:ILE:HD12	5:E:1325:COA:S1P	2.48	0.53
2:E:339:VAL:HG12	2:E:339:VAL:O	2.09	0.53
2:B:202:VAL:HG21	2:B:212:LEU:HD22	1.90	0.53
2:E:103:ASP:HB3	2:E:205:LYS:CG	2.38	0.53
2:B:336:VAL:HA	2:B:341:VAL:HG23	1.89	0.53
2:B:145:HIS:CD2	2:B:166:LYS:HB3	2.44	0.53
1:D:32:THR:HG23	1:D:132:CYS:SG	2.49	0.53
2:E:87:ASP:OD1	2:E:89:ASN:N	2.42	0.53
1:D:11:ILE:HA	1:D:36:GLY:O	2.09	0.52
1:D:145:GLY:HA3	1:D:170:GLY:CA	2.40	0.52
2:B:291:GLY:C	2:B:293:ALA:N	2.59	0.52
1:D:273:VAL:HG21	1:D:278:ASP:HB2	1.91	0.52
1:D:273:VAL:CG2	1:D:278:ASP:HB2	2.40	0.52
1:A:275:SER:HB2	2:B:278:LEU:CD2	2.40	0.52
2:E:263:VAL:HG12	2:E:264:ASN:N	2.24	0.52
2:B:103:ASP:HB3	2:B:205:LYS:CG	2.40	0.52
1:D:121:PRO:HG2	1:D:180:ASP:OD2	2.09	0.52
1:D:12:CYS:O	1:D:15:PHE:HB2	2.10	0.52
2:E:320:GLY:C	5:E:1325:COA:H32	2.31	0.52
1:D:255:LYS:HA	1:D:255:LYS:HZ3	1.74	0.51
2:B:35:ALA:HB2	2:B:69:ILE:CD1	2.41	0.51
1:A:145:GLY:HA3	1:A:170:GLY:C	2.31	0.51
2:E:183:GLY:O	2:E:187:ILE:HG13	2.11	0.51
2:E:34:ALA:HA	2:E:37:LYS:HG3	1.92	0.51
2:E:149:LEU:HD22	2:E:155:PRO:HB3	1.91	0.51
2:B:263:VAL:HG12	2:B:264:ASN:N	2.26	0.51
1:D:145:GLY:HA3	1:D:170:GLY:C	2.30	0.51
2:B:131:VAL:HG12	2:B:132:GLU:N	2.26	0.51
2:E:257:GLY:CA	2:E:282:GLU:HG3	2.37	0.51
2:E:312:LYS:O	2:E:343:VAL:HB	2.11	0.51
1:A:145:GLY:HA3	1:A:170:GLY:CA	2.40	0.51
1:A:239:PRO:HD2	1:A:244:MET:CE	2.40	0.51
1:A:273:VAL:HG21	1:A:278:ASP:HB2	1.93	0.51
2:B:315:LEU:HB2	2:B:381:VAL:HG11	1.92	0.51
2:B:328:ILE:HD12	5:B:1325:COA:H21	1.93	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:11:ILE:HA	1:A:36:GLY:O	2.11	0.51
1:D:81:ILE:O	1:D:85:ILE:HG13	2.10	0.51
1:D:241:GLY:H	1:D:251:ILE:HG23	1.75	0.51
1:D:223:GLU:HG3	1:D:224:HIS:CD2	2.46	0.51
1:D:9:LYS:HG2	1:D:35:VAL:HG11	1.93	0.50
2:E:35:ALA:HB2	2:E:69:ILE:CD1	2.42	0.50
1:A:22:PHE:O	1:A:26:GLN:HG2	2.11	0.50
1:A:276:LEU:HD12	1:A:276:LEU:C	2.30	0.50
2:E:275:ILE:CD1	2:E:374:LEU:HD12	2.32	0.50
2:E:342:ASN:ND2	2:E:342:ASN:H	2.09	0.50
1:A:254:GLY:O	1:A:255:LYS:HD2	2.12	0.50
1:A:120:GLY:HA2	1:A:123:VAL:CG1	2.42	0.50
1:A:57:ARG:NH1	1:A:86:ASP:OD2	2.45	0.50
2:B:87:ASP:OD1	2:B:89:ASN:HB3	2.11	0.50
2:B:255:LEU:HD13	2:B:285:ASN:HA	1.93	0.50
1:D:251:ILE:HG23	1:D:251:ILE:O	2.11	0.50
1:A:223:GLU:HG3	1:A:224:HIS:CD2	2.47	0.50
2:B:308:ASP:OD1	2:B:310:LYS:HG2	2.11	0.50
2:B:323:VAL:O	5:B:1325:COA:H21	2.12	0.50
2:B:339:VAL:HG12	2:B:339:VAL:O	2.12	0.50
1:D:97:GLU:HB3	5:D:1301:COA:H71	1.94	0.50
1:D:242:LYS:HD3	1:D:243:ARG:N	2.26	0.49
2:B:291:GLY:O	2:B:293:ALA:N	2.45	0.49
1:D:240:LYS:CE	1:D:251:ILE:HG12	2.42	0.49
2:E:109:TYR:CE2	2:E:133:ILE:HB	2.47	0.49
1:A:150:VAL:HG22	1:A:194:PHE:HE2	1.77	0.49
2:B:34:ALA:HA	2:B:37:LYS:HG3	1.94	0.49
2:B:83:THR:OG1	2:B:86:THR:HG23	2.12	0.49
1:D:22:PHE:O	1:D:26:GLN:HG2	2.13	0.49
1:D:120:GLY:HA2	1:D:123:VAL:CG1	2.42	0.49
1:D:243:ARG:NH1	1:D:243:ARG:CB	2.75	0.49
1:D:276:LEU:C	1:D:276:LEU:HD12	2.33	0.49
2:B:87:ASP:OD1	2:B:89:ASN:N	2.45	0.49
2:E:255:LEU:HD13	2:E:285:ASN:HA	1.94	0.49
1:A:253:GLY:HA2	2:B:134:GLU:OE2	2.12	0.49
2:E:119:ARG:HG3	2:E:119:ARG:HH11	1.77	0.49
1:A:273:VAL:CG2	1:A:278:ASP:HB2	2.42	0.49
2:B:348:ARG:C	2:B:348:ARG:HD2	2.33	0.49
1:D:159:GLU:OE2	2:E:319:PHE:CD2	2.63	0.49
1:D:195:GLU:OE1	1:D:227:LYS:HG3	2.12	0.49
2:E:172:LYS:HE3	2:E:207:GLY:O	2.12	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:366:LEU:O	2:B:368:ILE:N	2.40	0.49
2:B:34:ALA:O	2:B:38:ILE:HG13	2.13	0.48
2:B:113:VAL:HG12	2:B:195:LEU:HB2	1.94	0.48
2:B:346:VAL:CB	2:B:381:VAL:HG12	2.37	0.48
1:D:209:ILE:HD12	1:D:251:ILE:HB	1.95	0.48
1:D:243:ARG:HB3	1:D:243:ARG:CZ	2.43	0.48
2:E:345:VAL:O	2:E:369:ILE:HG12	2.13	0.48
2:B:302:PHE:CE1	2:B:314:VAL:HG11	2.48	0.48
2:E:191:ARG:HB3	2:E:229:LEU:HD11	1.96	0.48
2:E:248:TRP:CD2	2:E:300:GLU:HG3	2.48	0.48
1:D:235:GLY:HA2	2:E:270:MET:HB3	1.94	0.48
1:D:255:LYS:O	1:D:257:THR:N	2.45	0.48
2:B:80:ARG:NH1	2:B:92:PRO:HD3	2.29	0.48
2:E:34:ALA:O	2:E:38:ILE:HG13	2.14	0.48
1:D:150:VAL:HG22	1:D:194:PHE:HE2	1.78	0.48
2:B:140:THR:HG22	2:B:142:HIS:HE1	1.79	0.48
2:E:113:VAL:HG12	2:E:195:LEU:HB2	1.96	0.48
2:E:308:ASP:OD2	2:E:310:LYS:HG2	2.14	0.48
2:E:83:THR:OG1	2:E:86:THR:HG23	2.14	0.48
2:E:352:ASN:H	5:E:1325:COA:HN4	1.62	0.48
2:B:250:LEU:HD21	2:B:297:ARG:HG3	1.96	0.48
1:A:21:THR:O	1:A:25:GLU:HG3	2.13	0.48
2:B:35:ALA:HB2	2:B:69:ILE:HD12	1.96	0.48
2:E:51:ALA:HB3	2:E:86:THR:HG22	1.96	0.48
2:E:381:VAL:O	2:E:385:VAL:HG22	2.14	0.48
1:A:155:THR:HG21	2:B:264:ASN:O	2.14	0.47
2:B:338:GLU:C	2:B:340:GLY:N	2.67	0.47
2:E:338:GLU:C	2:E:340:GLY:N	2.66	0.47
1:D:190:ILE:HD13	1:D:193:MET:CE	2.44	0.47
2:E:325:CYS:HB3	2:E:349:LEU:HD13	1.96	0.47
1:A:9:LYS:HG2	1:A:35:VAL:HG11	1.96	0.47
2:B:308:ASP:OD2	2:B:310:LYS:HG2	2.14	0.47
1:A:199:GLN:O	1:A:199:GLN:HG2	2.14	0.47
2:B:172:LYS:HE3	2:B:207:GLY:O	2.15	0.47
2:B:248:TRP:CD2	2:B:300:GLU:HG3	2.49	0.47
2:B:312:LYS:HD2	2:B:388:LYS:HD3	1.97	0.47
2:E:125:ALA:HB1	2:E:167:LEU:HD11	1.95	0.47
2:E:383:ALA:C	2:E:385:VAL:H	2.18	0.47
2:B:84:TYR:CD1	2:B:85:GLN:HG3	2.50	0.47
2:B:279:HIS:O	2:B:382:VAL:HG11	2.14	0.47
2:B:345:VAL:O	2:B:369:ILE:HG12	2.14	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:254:GLY:C	1:D:255:LYS:HD2	2.34	0.47
1:D:35:VAL:HG21	1:D:65:ALA:HB2	1.97	0.47
2:E:84:TYR:CD1	2:E:85:GLN:HG3	2.49	0.47
1:D:240:LYS:HD3	1:D:251:ILE:HG12	1.97	0.47
2:E:279:HIS:O	2:E:382:VAL:HG11	2.15	0.47
2:B:313:ALA:CB	2:B:385:VAL:HG13	2.45	0.47
2:E:109:TYR:O	2:E:125:ALA:HA	2.14	0.47
2:E:348:ARG:HD2	2:E:348:ARG:C	2.34	0.47
2:B:125:ALA:HB1	2:B:167:LEU:HD11	1.97	0.46
2:B:139:GLU:O	2:B:141:PRO:HD3	2.14	0.46
1:D:248:GLY:C	1:D:250:ILE:H	2.18	0.46
2:E:229:LEU:HD23	2:E:232:MET:CE	2.45	0.46
2:E:87:ASP:OD1	2:E:89:ASN:HB3	2.15	0.46
2:B:195:LEU:HG	2:B:196:ILE:N	2.30	0.46
2:B:323:VAL:O	5:B:1325:COA:O5P	2.33	0.46
2:B:325:CYS:CB	2:B:354:ALA:HA	2.45	0.46
2:E:80:ARG:NH1	2:E:92:PRO:HD3	2.30	0.46
2:E:195:LEU:HG	2:E:196:ILE:N	2.30	0.46
1:D:10:VAL:HG21	1:D:134:ILE:HD11	1.96	0.46
1:D:195:GLU:O	1:D:227:LYS:HE3	2.15	0.46
1:A:153:SER:HB2	1:A:208:GLU:OE1	2.14	0.46
1:D:46:THR:HA	1:D:50:LEU:O	2.16	0.46
1:D:192:GLU:HB2	1:D:220:TYR:OH	2.16	0.46
2:E:109:TYR:CD1	2:E:109:TYR:C	2.88	0.46
1:A:81:ILE:O	1:A:85:ILE:HG13	2.16	0.46
2:E:287:LEU:HD13	2:E:287:LEU:C	2.36	0.46
2:B:239:ASP:HB3	2:B:242:GLU:HG3	1.97	0.46
2:B:287:LEU:HD13	2:B:287:LEU:C	2.36	0.46
1:A:12:CYS:O	1:A:15:PHE:HB2	2.16	0.46
1:A:195:GLU:O	1:A:227:LYS:HE3	2.16	0.46
2:B:16:GLY:O	2:B:17:LEU:HD23	2.16	0.46
2:B:51:ALA:HB3	2:B:86:THR:HG22	1.96	0.46
2:B:109:TYR:O	2:B:125:ALA:HA	2.15	0.46
2:B:229:LEU:HD23	2:B:232:MET:CE	2.46	0.46
2:B:240:PRO:O	2:B:243:ALA:HB3	2.16	0.46
2:B:275:ILE:CD1	2:B:374:LEU:HD12	2.33	0.46
2:B:277:LYS:HB2	2:B:283:PRO:HD3	1.97	0.46
1:D:255:LYS:HA	1:D:255:LYS:HZ2	1.81	0.46
2:E:12:PHE:CZ	2:E:216:LEU:HD21	2.51	0.46
2:E:35:ALA:HB2	2:E:69:ILE:HD12	1.97	0.46
1:A:195:GLU:OE1	1:A:227:LYS:HG3	2.16	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:15:TYR:OH	2:B:191:ARG:NH1	2.49	0.45
2:E:240:PRO:O	2:E:243:ALA:HB3	2.15	0.45
1:D:57:ARG:NH1	1:D:86:ASP:OD2	2.48	0.45
1:A:72:VAL:CG1	1:A:76:PHE:HB2	2.46	0.45
1:A:190:ILE:HD13	1:A:193:MET:CE	2.46	0.45
2:B:12:PHE:CZ	2:B:216:LEU:HD21	2.51	0.45
1:D:240:LYS:HE3	1:D:251:ILE:HG12	1.98	0.45
2:E:239:ASP:HB3	2:E:242:GLU:HG3	1.98	0.45
2:E:322:ILE:HG13	2:E:323:VAL:HG23	1.98	0.45
2:B:46:LYS:HG2	2:B:60:VAL:HG13	1.98	0.45
2:E:250:LEU:HD21	2:E:297:ARG:HG3	1.97	0.45
2:E:252:TYR:HE1	2:E:285:ASN:HD22	1.64	0.45
1:A:32:THR:HG23	1:A:132:CYS:SG	2.56	0.45
2:B:87:ASP:OD1	2:B:89:ASN:CB	2.64	0.45
2:E:326:ASP:OD2	2:E:353:ASN:ND2	2.50	0.45
2:E:333:ILE:HG23	2:E:366:LEU:CD1	2.46	0.45
1:A:243:ARG:HD2	1:A:247:ALA:HA	1.97	0.45
1:A:253:GLY:O	1:A:255:LYS:HG2	2.17	0.45
2:B:141:PRO:C	2:B:143:LEU:H	2.20	0.45
1:A:13:GLN:NE2	6:A:1701:HOH:O	2.36	0.45
1:A:97:GLU:CB	5:A:1300:COA:H71	2.44	0.45
1:D:21:THR:O	1:D:25:GLU:HG3	2.17	0.45
1:D:243:ARG:CB	1:D:243:ARG:HH11	2.30	0.45
2:B:257:GLY:CA	2:B:282:GLU:HG3	2.38	0.45
2:B:340:GLY:O	2:B:341:VAL:C	2.55	0.45
1:D:199:GLN:O	1:D:199:GLN:HG2	2.17	0.45
2:E:383:ALA:O	2:E:385:VAL:N	2.49	0.45
1:A:123:VAL:HG12	1:A:178:GLY:CA	2.46	0.44
1:A:123:VAL:O	5:A:1300:COA:H22	2.17	0.44
2:B:326:ASP:OD2	2:B:353:ASN:ND2	2.50	0.44
1:A:172:SER:HA	1:A:199:GLN:HE22	1.80	0.44
1:A:208:GLU:O	1:A:261:LYS:HE3	2.16	0.44
2:B:252:TYR:HE1	2:B:285:ASN:HD22	1.66	0.44
2:E:45:VAL:HG21	2:E:72:PHE:CG	2.52	0.44
2:E:340:GLY:O	2:E:341:VAL:C	2.54	0.44
1:A:129:PRO:HB2	1:A:144:PRO:HA	1.99	0.44
2:B:119:ARG:HH11	2:B:119:ARG:HG3	1.81	0.44
1:D:153:SER:HB2	1:D:208:GLU:OE1	2.16	0.44
2:E:124:MET:HA	2:E:145:HIS:O	2.17	0.44
2:B:347:VAL:CG1	2:B:348:ARG:N	2.81	0.44
2:B:322:ILE:HG13	2:B:323:VAL:HG23	2.00	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:72:VAL:CG1	1:D:76:PHE:HB2	2.48	0.44
1:D:136:ILE:HD11	5:D:1301:COA:H21	2.00	0.44
1:D:208:GLU:O	1:D:261:LYS:HE3	2.18	0.44
2:E:51:ALA:CB	2:E:86:THR:HG22	2.48	0.44
2:E:87:ASP:OD1	2:E:89:ASN:CB	2.66	0.44
2:B:280:GLY:O	2:B:281:GLY:O	2.35	0.44
2:E:280:GLY:O	2:E:281:GLY:O	2.35	0.44
2:E:108:LEU:HD22	2:E:127:THR:HA	2.00	0.44
2:E:229:LEU:HA	2:E:232:MET:HE3	2.00	0.44
2:B:51:ALA:CB	2:B:86:THR:HG22	2.47	0.44
2:E:25:CYS:O	2:E:95:GLN:HA	2.17	0.44
2:E:262:MET:HG3	2:E:287:LEU:HD12	2.00	0.44
1:A:10:VAL:HG21	1:A:134:ILE:HD11	2.00	0.44
2:B:124:MET:CG	2:B:146:LYS:HG2	2.48	0.43
2:E:277:LYS:HB2	2:E:283:PRO:HD3	1.99	0.43
1:A:212:SER:HA	1:A:215:GLU:OE1	2.18	0.43
2:E:325:CYS:N	5:E:1325:COA:H22	2.33	0.43
1:A:74:ALA:HB3	1:A:75:PRO:HD3	2.00	0.43
2:E:87:ASP:C	2:E:89:ASN:H	2.21	0.43
2:E:103:ASP:O	2:E:205:LYS:HG2	2.18	0.43
1:A:133:LYS:NZ	1:A:137:GLN:O	2.51	0.43
2:B:104:ILE:HD11	2:B:212:LEU:CD2	2.48	0.43
2:E:16:GLY:O	2:E:17:LEU:HD23	2.17	0.43
1:A:1:SER:HB2	1:A:173:THR:OG1	2.18	0.43
2:B:87:ASP:C	2:B:89:ASN:H	2.22	0.43
2:B:341:VAL:CG1	2:B:343:VAL:HG22	2.49	0.43
2:E:46:LYS:HG2	2:E:60:VAL:HG13	2.00	0.43
5:E:1325:COA:H141	5:E:1325:COA:O9P	2.19	0.43
5:D:1301:COA:O2B	5:D:1301:COA:P3B	2.77	0.43
2:E:346:VAL:HB	2:E:381:VAL:CG1	2.42	0.43
1:D:243:ARG:HB2	1:D:250:ILE:HB	2.01	0.43
2:E:4:HIS:HB2	2:E:7:GLN:HG3	2.00	0.43
2:B:223:LEU:HA	2:B:223:LEU:HD23	1.80	0.43
2:B:4:HIS:HB2	2:B:7:GLN:HG3	2.00	0.43
1:D:123:VAL:HG12	1:D:178:GLY:CA	2.49	0.43
1:D:133:LYS:NZ	1:D:137:GLN:O	2.52	0.43
1:D:190:ILE:HD13	1:D:193:MET:HE1	2.01	0.43
2:E:289:VAL:HG11	2:E:293:ALA:CB	2.46	0.43
2:B:315:LEU:HD13	2:B:381:VAL:CG1	2.48	0.42
2:E:241:ARG:HH12	2:E:308:ASP:HB2	1.84	0.42
2:E:346:VAL:CB	2:E:381:VAL:HG12	2.40	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:350:GLU:OE1	2:E:350:GLU:CA	2.65	0.42
2:B:247:GLN:NE2	2:E:78:GLY:CA	2.78	0.42
2:B:282:GLU:HA	2:B:283:PRO:HD2	1.93	0.42
2:B:315:LEU:HD12	2:B:346:VAL:O	2.19	0.42
2:B:262:MET:HG3	2:B:287:LEU:HD12	2.00	0.42
2:B:299:THR:O	2:B:303:LYS:HG3	2.19	0.42
1:D:248:GLY:O	1:D:250:ILE:N	2.51	0.42
2:E:170:GLU:HA	2:E:174:VAL:HG23	2.01	0.42
2:B:108:LEU:HD22	2:B:127:THR:HA	2.01	0.42
1:D:172:SER:HA	1:D:199:GLN:HE22	1.84	0.42
1:A:35:VAL:HG21	1:A:65:ALA:HB2	2.01	0.42
1:A:192:GLU:HB2	1:A:220:TYR:OH	2.19	0.42
1:A:255:LYS:HA	1:A:260:GLU:OE1	2.18	0.42
2:B:346:VAL:HB	2:B:381:VAL:CG1	2.40	0.42
2:B:284:ALA:O	2:B:285:ASN:HB3	2.19	0.42
2:B:348:ARG:HD2	2:B:348:ARG:O	2.20	0.42
2:E:308:ASP:CG	2:E:310:LYS:HG2	2.39	0.42
2:B:22:GLY:HA3	2:B:99:GLU:HB3	2.02	0.42
2:E:361:LEU:HD22	2:E:368:ILE:HG21	2.02	0.42
2:E:302:PHE:CE1	2:E:314:VAL:HG11	2.55	0.42
1:A:190:ILE:HD13	1:A:193:MET:HE3	2.02	0.42
1:D:127:ILE:CG2	1:D:174:CYS:HB2	2.49	0.42
1:A:156:LEU:HD23	1:A:156:LEU:HA	1.89	0.42
2:B:109:TYR:CD1	2:B:109:TYR:C	2.92	0.42
2:B:258:ASN:OD1	2:B:282:GLU:HB3	2.20	0.41
2:E:328:ILE:HD12	5:E:1325:COA:H21	2.01	0.41
1:A:155:THR:OG1	2:B:268:LEU:HB2	2.20	0.41
2:B:78:GLY:HA3	2:E:247:GLN:HE22	1.83	0.41
2:B:229:LEU:HD23	2:B:232:MET:HE3	2.02	0.41
2:E:282:GLU:HA	2:E:283:PRO:HD2	1.92	0.41
2:E:297:ARG:NH1	2:E:297:ARG:HB2	2.35	0.41
2:B:82:VAL:HG22	2:B:90:GLY:N	2.36	0.41
2:B:170:GLU:HA	2:B:174:VAL:HG23	2.03	0.41
1:D:1:SER:HB2	1:D:173:THR:OG1	2.20	0.41
1:D:169:PHE:HZ	1:D:284:LYS:HA	1.85	0.41
2:E:119:ARG:HG3	2:E:119:ARG:NH1	2.35	0.41
1:A:158:TYR:N	1:A:158:TYR:CD1	2.87	0.41
2:B:241:ARG:HH12	2:B:308:ASP:HB2	1.85	0.41
2:E:315:LEU:HD12	2:E:346:VAL:O	2.20	0.41
1:A:223:GLU:HG3	1:A:223:GLU:O	2.21	0.41
1:A:159:GLU:OE2	2:B:348:ARG:NH2	2.54	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:98:GLY:HA2	2:E:221:ASN:ND2	2.34	0.41
2:E:104:ILE:HD11	2:E:212:LEU:CD2	2.50	0.41
2:E:163:LEU:O	2:E:167:LEU:HG	2.21	0.41
2:B:232:MET:HG2	2:E:231:GLU:OE1	2.21	0.41
2:E:258:ASN:OD1	2:E:282:GLU:HB3	2.20	0.41
1:A:152:ARG:HG3	1:A:187:PHE:CZ	2.56	0.41
1:A:243:ARG:O	1:A:243:ARG:HG3	2.21	0.41
2:B:45:VAL:HG21	2:B:72:PHE:CG	2.56	0.41
2:B:320:GLY:O	5:B:1325:COA:H32	2.21	0.41
2:E:263:VAL:CG1	2:E:264:ASN:N	2.84	0.41
1:A:169:PHE:HZ	1:A:284:LYS:HA	1.86	0.41
1:A:210:GLY:HA3	1:A:248:GLY:O	2.20	0.41
2:B:306:LEU:HD23	2:B:306:LEU:HA	1.89	0.41
2:E:325:CYS:CB	2:E:354:ALA:HA	2.51	0.41
2:E:347:VAL:CG1	2:E:348:ARG:N	2.84	0.41
2:B:313:ALA:HB3	2:B:385:VAL:HG13	2.02	0.41
1:D:240:LYS:NZ	1:D:251:ILE:CD1	2.79	0.41
2:E:333:ILE:HG23	2:E:366:LEU:HD12	2.02	0.41
1:A:246:HIS:O	1:A:249:ALA:HB3	2.22	0.40
2:B:325:CYS:HB2	2:B:352:ASN:O	2.21	0.40
1:D:158:TYR:N	1:D:158:TYR:CD1	2.86	0.40
1:A:46:THR:HA	1:A:50:LEU:O	2.21	0.40
2:B:244:GLN:HG3	2:B:245:ALA:N	2.36	0.40
2:B:341:VAL:HG13	2:B:343:VAL:HG22	2.03	0.40
1:D:129:PRO:HB2	1:D:144:PRO:HA	2.02	0.40
2:E:284:ALA:O	2:E:285:ASN:HB3	2.20	0.40
2:B:42:PRO:HB2	2:B:63:VAL:O	2.21	0.40
2:B:191:ARG:HB3	2:B:229:LEU:HD11	2.03	0.40
2:B:332:ILE:O	2:B:336:VAL:HG23	2.22	0.40
1:D:137:GLN:HA	1:D:138:PRO:HD3	1.93	0.40
2:B:297:ARG:HB2	2:B:297:ARG:NH1	2.35	0.40
2:E:383:ALA:C	2:E:385:VAL:N	2.74	0.40
2:B:366:LEU:H	2:B:366:LEU:HG	1.65	0.40
1:D:56:VAL:HG23	1:D:83:GLU:CD	2.41	0.40
1:D:110:LYS:HA	1:D:110:LYS:HD2	1.92	0.40
2:E:299:THR:O	2:E:303:LYS:HG3	2.21	0.40

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

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:113:GLU:OE2	1:D:113:GLU:OE2[7_555]	2.06	0.14
1:A:113:GLU:OE2	1:A:113:GLU:OE2[7_555]	2.07	0.13

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%)	267 (94%)	17 (6%)	1 (0%)	34	69
1	D	285/288 (99%)	257 (90%)	22 (8%)	6 (2%)	7	29
2	B	386/388 (100%)	344 (89%)	32 (8%)	10 (3%)	5	24
2	E	383/388 (99%)	345 (90%)	30 (8%)	8 (2%)	7	29
All	All	1339/1352 (99%)	1213 (91%)	101 (8%)	25 (2%)	8	32

All (25) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	257	GLY
2	B	293	ALA
1	D	249	ALA
1	D	253	GLY
1	D	256	GLY
2	E	257	GLY
2	B	281	GLY
1	D	251	ILE
2	E	281	GLY
2	E	293	ALA
2	E	353	ASN
1	A	180	ASP
2	B	88	ALA
2	B	142	HIS
2	B	256	ASP
2	B	353	ASN

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Mol	Chain	Res	Type
1	D	180	ASP
2	E	256	ASP
2	E	384	ALA
1	D	246	HIS
2	E	88	ALA
2	B	367	ASN
2	B	292	GLY
2	B	253	VAL
2	E	253	VAL

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%)	43	74
1	D	217/218 (100%)	210 (97%)	7 (3%)	39	71
2	B	298/298 (100%)	282 (95%)	16 (5%)	22	54
2	E	296/298 (99%)	280 (95%)	16 (5%)	22	54
All	All	1028/1032 (100%)	983 (96%)	45 (4%)	28	62

All (45) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	117	ARG
1	A	137	GLN
1	A	186	ASN
1	A	240	LYS
1	A	242	LYS
1	A	250	ILE
2	B	74	GLU
2	B	87	ASP
2	B	95	GLN
2	B	195	LEU
2	B	200	PRO
2	B	297	ARG

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Mol	Chain	Res	Type
2	B	302	PHE
2	B	309	ASP
2	B	319	PHE
2	B	342	ASN
2	B	348	ARG
2	B	350	GLU
2	B	352	ASN
2	B	369	ILE
2	B	374	LEU
2	B	386	GLU
1	D	117	ARG
1	D	137	GLN
1	D	186	ASN
1	D	240	LYS
1	D	242	LYS
1	D	246	HIS
1	D	255	LYS
2	E	74	GLU
2	E	87	ASP
2	E	95	GLN
2	E	133	ILE
2	E	138	GLU
2	E	195	LEU
2	E	200	PRO
2	E	297	ARG
2	E	309	ASP
2	E	319	PHE
2	E	342	ASN
2	E	348	ARG
2	E	350	GLU
2	E	352	ASN
2	E	369	ILE
2	E	374	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (24) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	137	GLN
1	A	186	ASN
2	B	10	GLN
2	B	94	ASN
2	B	95	GLN

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Mol	Chain	Res	Type
2	B	142	HIS
2	B	221	ASN
2	B	235	GLN
2	B	244	GLN
2	B	247	GLN
2	B	279	HIS
2	B	352	ASN
1	D	137	GLN
1	D	186	ASN
2	E	10	GLN
2	E	94	ASN
2	E	95	GLN
2	E	221	ASN
2	E	235	GLN
2	E	244	GLN
2	E	247	GLN
2	E	279	HIS
2	E	342	ASN
2	E	352	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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](#)

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	$\# Z > 2$
4	SO4	B	1500	-	4,4,4	0.27	0	6,6,6	0.07	0
5	COA	D	1301	-	41,50,50	0.80	1 (2%)	52,75,75	1.50	7 (13%)
4	SO4	A	1700	-	4,4,4	0.50	0	6,6,6	0.09	0
4	SO4	B	1400	-	4,4,4	0.30	0	6,6,6	0.10	0
3	PO4	A	1600	-	4,4,4	1.58	0	6,6,6	0.41	0
4	SO4	E	1401	-	4,4,4	0.30	0	6,6,6	0.16	0
5	COA	A	1300	-	41,50,50	0.73	0	52,75,75	1.33	7 (13%)
3	PO4	D	1601	-	4,4,4	1.68	0	6,6,6	0.45	0
5	COA	E	1325	2	14,17,50	1.66	2 (14%)	19,22,75	2.75	9 (47%)
4	SO4	E	1501	-	4,4,4	0.27	0	6,6,6	0.13	0
5	COA	B	1325	2	14,17,50	1.77	2 (14%)	19,22,75	4.04	14 (73%)

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	D	1301	-	-	3/44/64/64	0/3/3/3
5	COA	A	1300	-	-	4/44/64/64	0/3/3/3
5	COA	E	1325	2	-	15/23/23/64	-
5	COA	B	1325	2	-	6/23/23/64	-

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	1325	COA	C6P-C5P	3.96	1.58	1.51
5	E	1325	COA	CCP-CBP	3.91	1.56	1.53
5	B	1325	COA	CCP-CBP	-3.57	1.51	1.53
5	E	1325	COA	C6P-C5P	2.68	1.56	1.51
5	D	1301	COA	OAP-CAP	2.01	1.46	1.42

All (37) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	1325	COA	CAP-C9P-N8P	7.67	131.85	116.58
5	B	1325	COA	CDP-CBP-CAP	7.40	121.65	108.82

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	1325	COA	CEP-CBP-CCP	-5.99	97.93	108.90
5	B	1325	COA	C6P-C5P-N4P	5.94	126.42	116.42
5	E	1325	COA	C6P-C5P-N4P	5.22	125.21	116.42
5	E	1325	COA	CEP-CBP-CAP	4.99	117.47	108.82
5	B	1325	COA	C2P-C3P-N4P	4.97	123.66	112.31
5	E	1325	COA	CAP-C9P-N8P	4.78	126.09	116.58
5	B	1325	COA	C6P-C7P-N8P	4.66	121.30	111.90
5	D	1301	COA	O5P-C5P-C6P	-4.50	113.78	122.02
5	D	1301	COA	C6P-C5P-N4P	4.14	123.39	116.42
5	B	1325	COA	O5P-C5P-N4P	-3.71	116.02	123.01
5	E	1325	COA	O5P-C5P-N4P	-3.62	116.19	123.01
5	B	1325	COA	O6A-CCP-CBP	-3.46	106.76	112.96
5	A	1300	COA	O5P-C5P-C6P	-3.45	115.70	122.02
5	E	1325	COA	C6P-C7P-N8P	3.37	118.70	111.90
5	D	1301	COA	P2A-O3A-P1A	-3.36	121.28	132.83
5	B	1325	COA	O9P-C9P-CAP	-3.28	111.06	121.06
5	A	1300	COA	P2A-O3A-P1A	-3.22	121.77	132.83
5	E	1325	COA	O9P-C9P-N8P	-3.19	116.15	122.99
5	B	1325	COA	OAP-CAP-CBP	-3.08	103.00	110.25
5	D	1301	COA	CDP-CBP-CAP	3.07	114.14	108.82
5	A	1300	COA	CDP-CBP-CCP	-3.00	103.33	108.23
5	A	1300	COA	C6P-C5P-N4P	2.97	121.43	116.42
5	B	1325	COA	O9P-C9P-N8P	-2.75	117.09	122.99
5	E	1325	COA	C2P-C3P-N4P	2.70	118.48	112.31
5	D	1301	COA	CDP-CBP-CCP	-2.55	104.07	108.23
5	D	1301	COA	C1B-N9A-C4A	-2.50	122.25	126.64
5	A	1300	COA	C1B-N9A-C4A	-2.49	122.27	126.64
5	B	1325	COA	O5P-C5P-C6P	-2.45	117.53	122.02
5	B	1325	COA	CEP-CBP-CAP	2.43	113.04	108.82
5	D	1301	COA	C5A-C6A-N6A	2.39	123.99	120.35
5	E	1325	COA	CDP-CBP-CCP	-2.28	104.72	108.90
5	A	1300	COA	C5A-C6A-N6A	2.27	123.80	120.35
5	E	1325	COA	C7P-N8P-C9P	-2.25	118.58	122.59
5	A	1300	COA	CDP-CBP-CAP	2.23	112.69	108.82
5	B	1325	COA	C7P-N8P-C9P	-2.06	118.91	122.59

There are no chirality outliers.

All (28) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	B	1325	COA	O9P-C9P-CAP-CBP
5	B	1325	COA	N8P-C9P-CAP-CBP

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Mol	Chain	Res	Type	Atoms
5	B	1325	COA	N8P-C9P-CAP-OAP
5	B	1325	COA	S1P-C2P-C3P-N4P
5	E	1325	COA	CDP-CBP-CCP-O6A
5	E	1325	COA	CEP-CBP-CCP-O6A
5	E	1325	COA	CAP-CBP-CCP-O6A
5	E	1325	COA	OAP-CAP-CBP-CCP
5	E	1325	COA	C9P-CAP-CBP-CCP
5	E	1325	COA	OAP-CAP-CBP-CDP
5	E	1325	COA	C9P-CAP-CBP-CDP
5	E	1325	COA	OAP-CAP-CBP-CEP
5	E	1325	COA	C9P-CAP-CBP-CEP
5	E	1325	COA	O9P-C9P-CAP-CBP
5	E	1325	COA	N8P-C9P-CAP-CBP
5	E	1325	COA	N8P-C9P-CAP-OAP
5	E	1325	COA	S1P-C2P-C3P-N4P
5	A	1300	COA	C2B-C3B-O3B-P3B
5	D	1301	COA	C2B-C3B-O3B-P3B
5	B	1325	COA	O9P-C9P-CAP-OAP
5	E	1325	COA	O9P-C9P-CAP-OAP
5	A	1300	COA	S1P-C2P-C3P-N4P
5	B	1325	COA	CDP-CBP-CCP-O6A
5	E	1325	COA	C5P-C6P-C7P-N8P
5	D	1301	COA	S1P-C2P-C3P-N4P
5	A	1300	COA	O4B-C4B-C5B-O5B
5	D	1301	COA	O4B-C4B-C5B-O5B
5	A	1300	COA	C4B-C3B-O3B-P3B

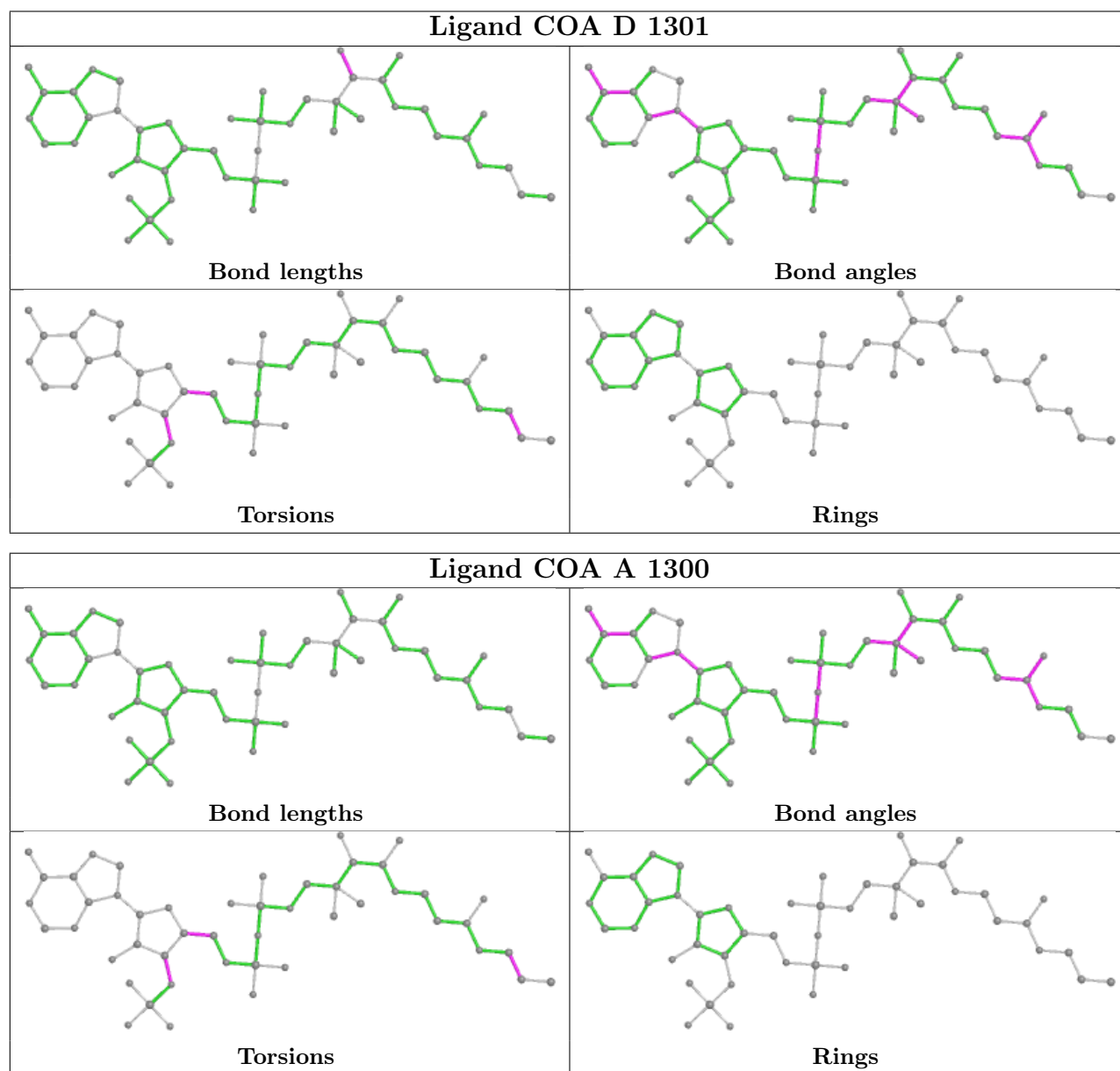
There are no ring outliers.

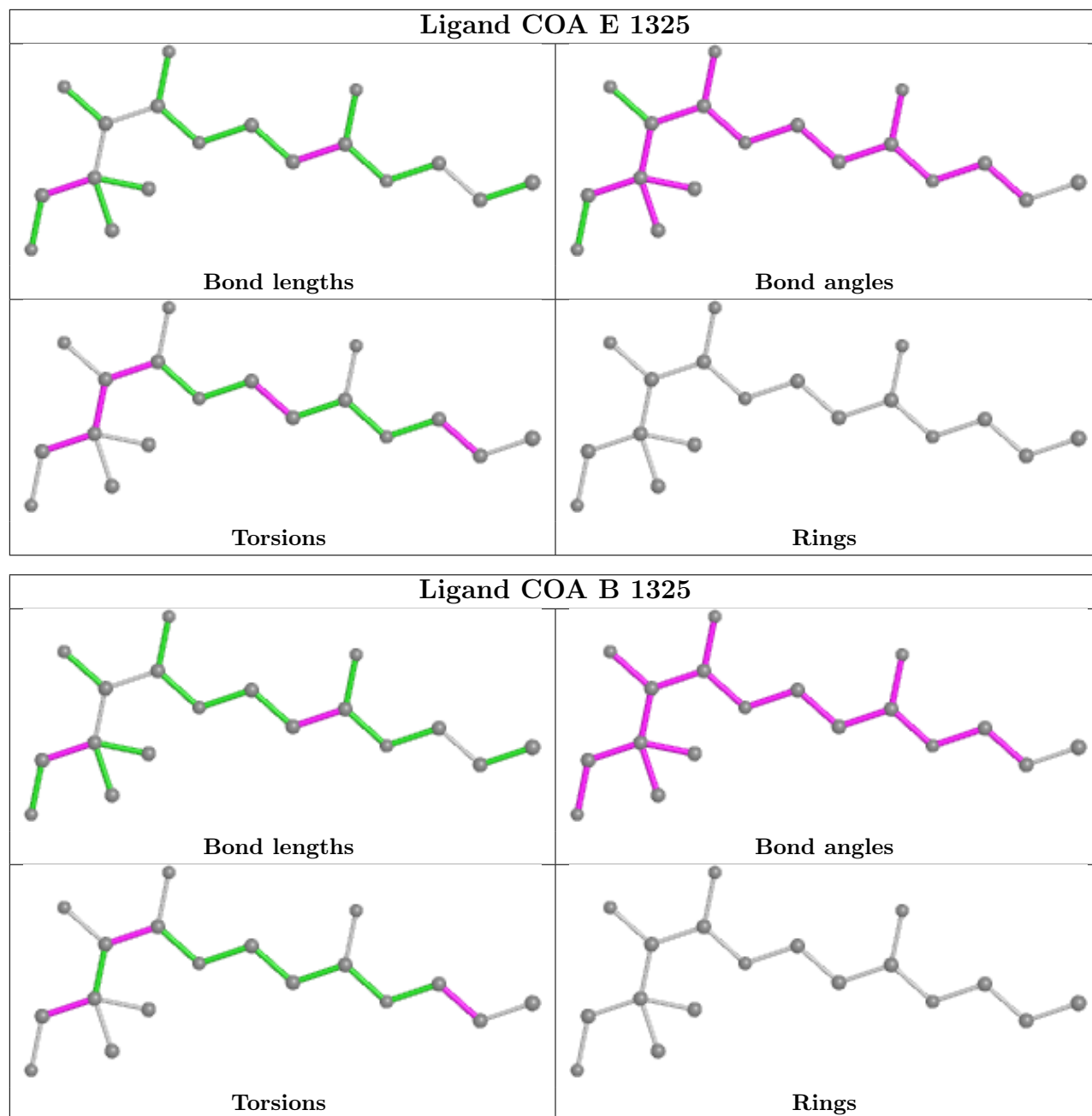
4 monomers are involved in 17 short contacts:

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

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be

highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.





5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	287/288 (99%)	0.45	5 (1%) 70 53	35, 54, 91, 99	0
1	D	287/288 (99%)	0.67	13 (4%) 33 21	44, 69, 95, 100	0
2	B	388/388 (100%)	0.72	25 (6%) 19 11	35, 65, 93, 100	0
2	E	385/388 (99%)	0.77	39 (10%) 7 4	41, 70, 99, 100	0
All	All	1347/1352 (99%)	0.67	82 (6%) 21 12	35, 65, 97, 100	0

All (82) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	E	384	ALA	5.5
2	E	347	VAL	4.8
2	E	369	ILE	4.6
2	B	259	ILE	4.2
2	E	371	ALA	3.6
2	E	354	ALA	3.6
2	E	293	ALA	3.6
2	E	381	VAL	3.5
1	A	235	GLY	3.5
2	B	252	TYR	3.5
2	E	312	LYS	3.4
2	E	314	VAL	3.4
2	E	281	GLY	3.3
1	D	249	ALA	3.3
2	E	313	ALA	3.3
1	D	254	GLY	3.3
2	E	349	LEU	3.2
2	E	372	LYS	3.2
2	E	252	TYR	3.2
2	B	339	VAL	3.1
2	E	361	LEU	3.1

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Mol	Chain	Res	Type	RSRZ
2	B	313	ALA	3.0
2	E	316	VAL	3.0
2	B	332	ILE	2.9
1	D	279	ILE	2.9
2	E	368	ILE	2.8
1	A	251	ILE	2.8
2	E	255	LEU	2.8
1	A	256	GLY	2.8
2	E	259	ILE	2.7
1	A	250	ILE	2.6
1	D	276	LEU	2.6
2	B	346	VAL	2.6
2	B	257	GLY	2.5
2	B	323	VAL	2.5
2	B	349	LEU	2.5
2	E	297	ARG	2.5
1	D	239	PRO	2.5
2	B	345	VAL	2.4
1	A	243	ARG	2.4
1	D	206	ILE	2.4
2	E	311	VAL	2.4
2	B	238	GLU	2.4
2	E	261	CYS	2.4
2	E	379	GLN	2.4
2	E	260	GLY	2.4
1	D	9	LYS	2.3
2	B	371	ALA	2.3
1	D	134	ILE	2.3
2	E	248	TRP	2.3
2	B	291	GLY	2.3
2	E	341	VAL	2.3
1	D	252	ALA	2.3
2	B	368	ILE	2.3
2	B	369	ILE	2.2
2	E	198	ILE	2.2
2	E	106	LYS	2.2
2	E	377	ALA	2.2
2	E	343	VAL	2.2
1	D	218	ALA	2.2
2	B	374	LEU	2.2
2	E	346	VAL	2.1
2	E	364	SER	2.1

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Mol	Chain	Res	Type	RSRZ
1	D	164	THR	2.1
2	B	289	VAL	2.1
2	E	254	ALA	2.1
2	B	272	THR	2.1
2	B	275	ILE	2.1
2	B	79	LYS	2.1
2	B	253	VAL	2.1
2	B	312	LYS	2.1
2	E	63	VAL	2.1
2	E	345	VAL	2.1
2	E	283	PRO	2.1
2	B	324	ARG	2.1
2	E	337	ALA	2.0
2	E	242	GLU	2.0
2	B	287	LEU	2.0
2	B	361	LEU	2.0
2	E	306	LEU	2.0
1	D	205	MET	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 monosaccharides in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
5	COA	B	1325	18/48	0.58	0.31	74,84,89,89	0
5	COA	E	1325	18/48	0.58	0.25	85,92,94,94	0
4	SO4	E	1501	5/5	0.91	0.23	98,99,100,100	0
4	SO4	E	1401	5/5	0.92	0.16	90,90,91,91	0

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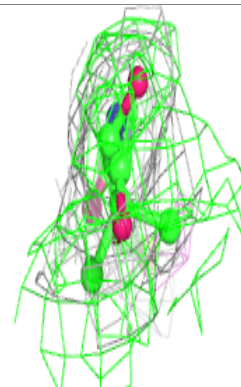
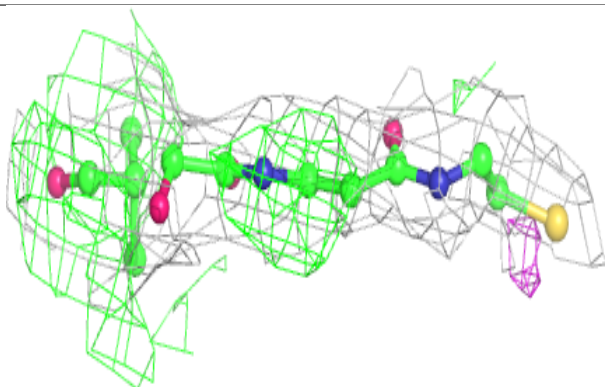
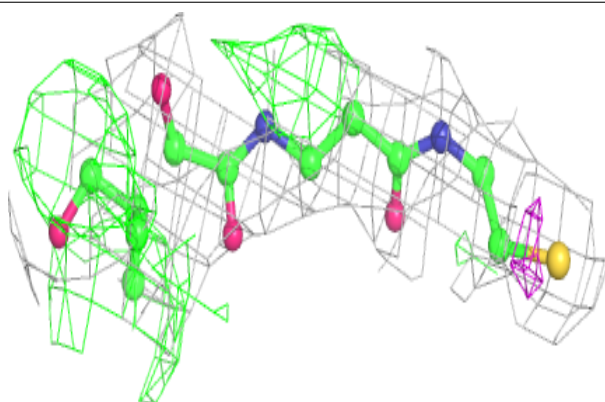
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	SO4	A	1700	5/5	0.92	0.18	98,100,100,100	0
4	SO4	B	1500	5/5	0.94	0.15	99,99,100,100	0
5	COA	D	1301	48/48	0.95	0.23	49,59,65,73	0
5	COA	A	1300	48/48	0.96	0.23	51,57,65,69	0
4	SO4	B	1400	5/5	0.96	0.13	83,84,84,85	0
3	PO4	D	1601	5/5	0.97	0.14	78,79,79,80	0
3	PO4	A	1600	5/5	0.97	0.15	71,71,72,73	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.

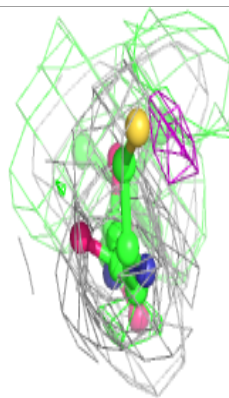
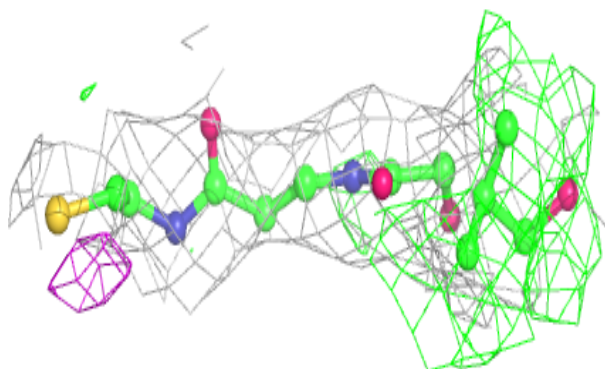
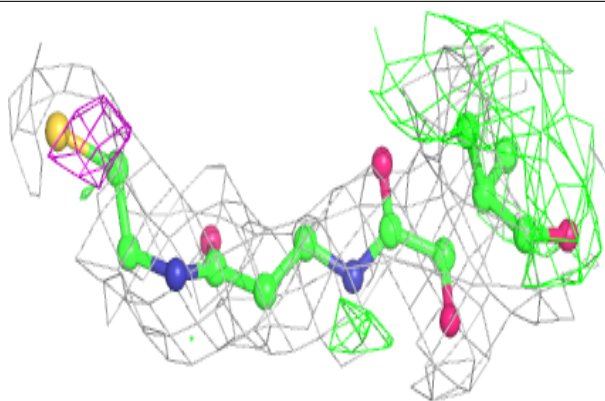
Electron density around COA B 1325:

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

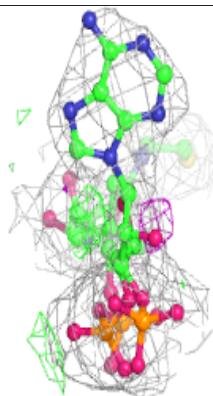
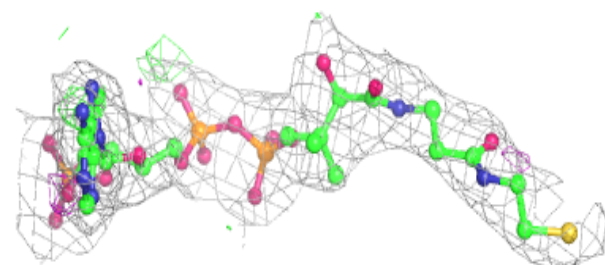
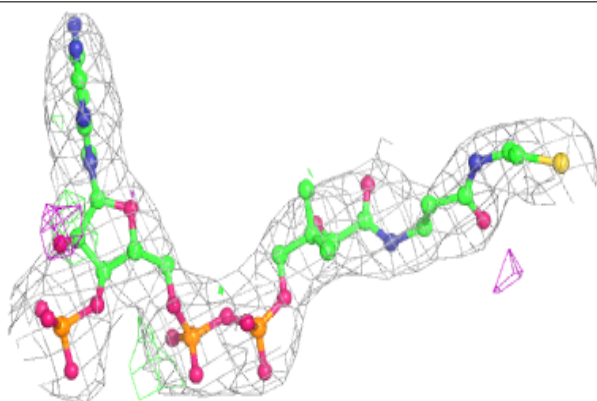


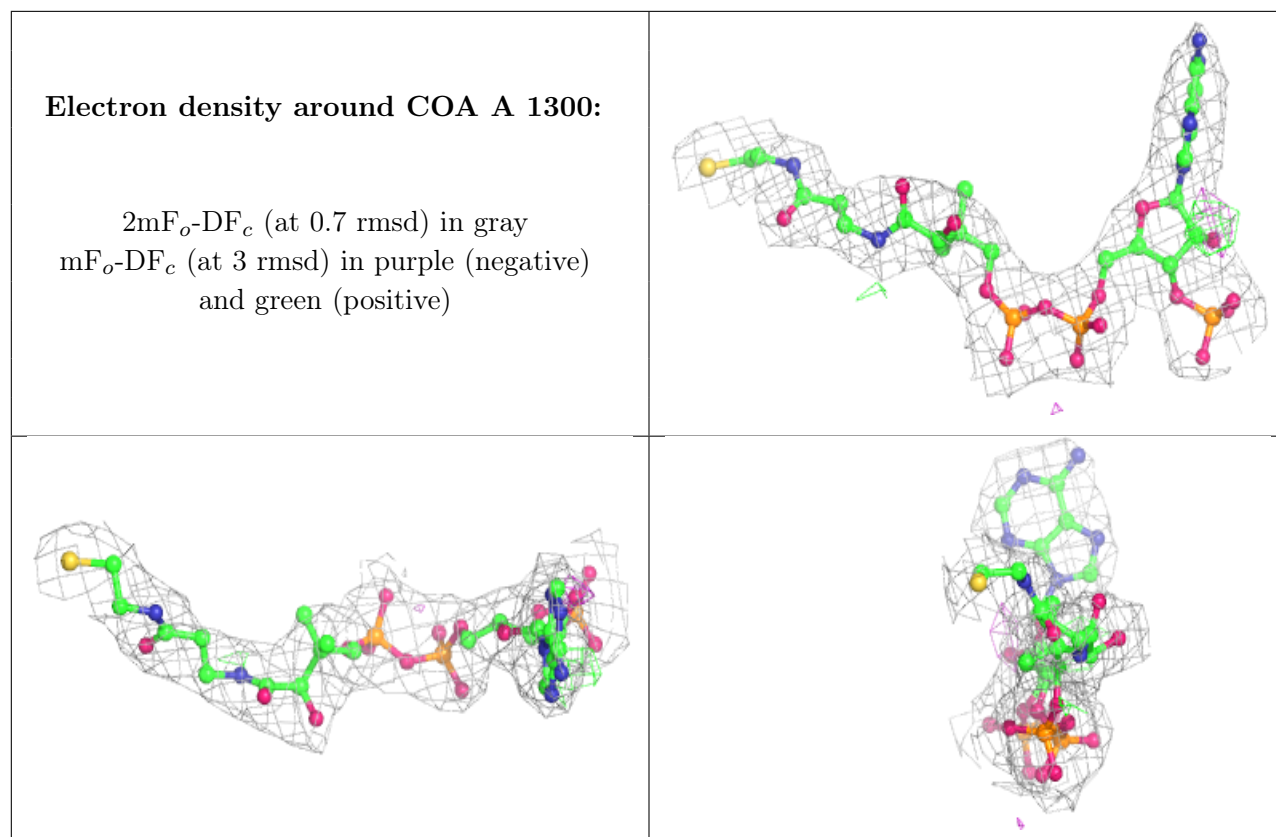
Electron density around COA E 1325:

$2mF_o-DF_c$ (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)





6.5 Other polymers [i](#)

There are no such residues in this entry.