



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 05:55 AM UTC

PDB ID : 2P2J / pdb_00002p2j
Title : Acetyl-CoA Synthetase, K609A mutation
Authors : Reger, A.S.; Gulick, A.M.
Deposited on : 2007-03-07
Resolution : 2.30 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4-5-2 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

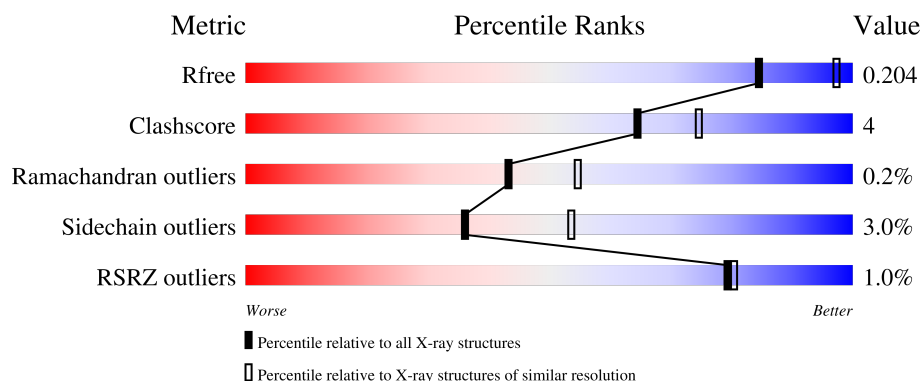
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	6319 (2.30-2.30)
Clashscore	190562	6919 (2.30-2.30)
Ramachandran outliers	187476	6854 (2.30-2.30)
Sidechain outliers	187428	6854 (2.30-2.30)
RSRZ outliers	180081	6325 (2.30-2.30)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	652	% 88% 9% ..
1	B	652	% 87% 9% ..

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 10363 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.

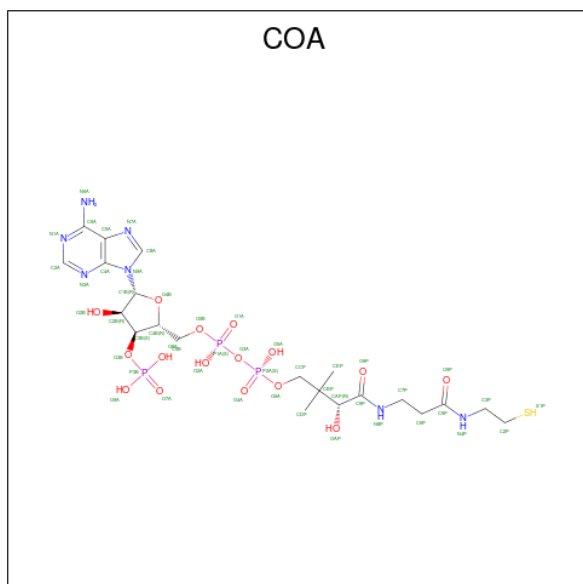
- Molecule 1 is a protein called Acetyl-coenzyme A synthetase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	633	Total	C	N	O	S	0	0	0
			4923	3133	845	928	17			
1	B	634	Total	C	N	O	S	0	0	0
			4913	3130	844	921	18			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	609	ALA	LYS	engineered mutation	UNP Q8ZKF6
B	609	ALA	LYS	engineered mutation	UNP Q8ZKF6

- Molecule 2 is COENZYME A (CCD ID: COA) (formula: $C_{21}H_{36}N_7O_{16}P_3S$).



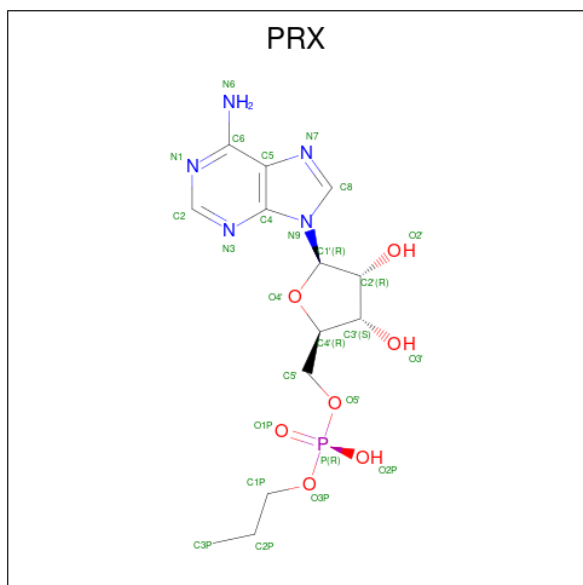
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P S	0	0
			48	21	7	16	3 1		

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Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
2	B	1	Total	C	N	O	P	S	0	0
			48	21	7	16	3	1		

- Molecule 3 is ADENOSINE-5'-MONOPHOSPHATE-PROPYL ESTER (CCD ID: PRX) (formula: $C_{13}H_{20}N_5O_7P$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	0
			26	13	5	7	1		
3	B	1	Total	C	N	O	P	0	0
			26	13	5	7	1		

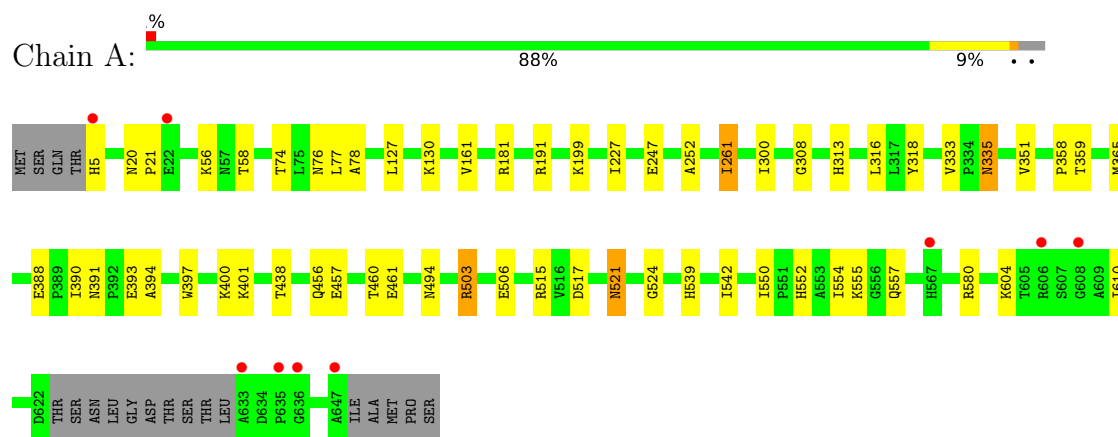
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	208	Total	O	0	0
			208	208		
4	B	171	Total	O	0	0
			171	171		

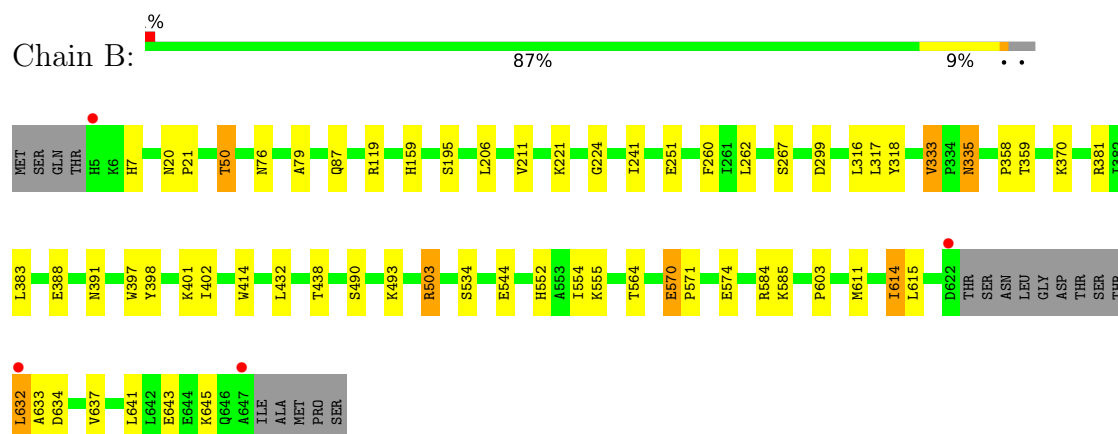
3 Residue-property plots [i](#)

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-coenzyme A synthetase



- Molecule 1: Acetyl-coenzyme A synthetase



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	91.67Å 94.50Å 167.51Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	35.00 – 2.30 35.00 – 2.30	Depositor EDS
% Data completeness (in resolution range)	95.3 (35.00-2.30) 95.2 (35.00-2.30)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.01 (at 2.29Å)	Xtriage
Refinement program	REFMAC	Depositor
R, R_{free}	0.185 , 0.235 (Not available) , 0.204	Depositor DCC
R_{free} test set	3147 reflections (4.80%)	wwPDB-VP
Wilson B-factor (Å ²)	22.8	Xtriage
Anisotropy	0.298	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 27.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.018 for k,h,-l	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	10363	wwPDB-VP
Average B, all atoms (Å ²)	24.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.10% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: PRX, COA

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	0.72	0/5055	0.86	2/6893 (0.0%)
1	B	0.68	0/5045	0.88	3/6881 (0.0%)
All	All	0.70	0/10100	0.87	5/13774 (0.0%)

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	318	TYR	N-CA-C	5.84	117.44	111.14
1	B	318	TYR	N-CA-C	5.59	117.18	111.14
1	B	333	VAL	CA-C-N	5.32	125.04	119.82
1	B	333	VAL	C-N-CA	5.32	125.04	119.82
1	A	261	ILE	CB-CA-C	-5.16	102.97	110.81

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	4923	0	4762	35	0
1	B	4913	0	4754	42	0
2	A	48	0	32	2	0
2	B	48	0	32	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	A	26	0	19	0	0
3	B	26	0	19	1	0
4	A	208	0	0	2	0
4	B	171	0	0	8	0
All	All	10363	0	9618	76	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 (76) 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:383:LEU:CD1	4:B:1055:HOH:O	2.16	0.93
1:B:402:ILE:HB	4:B:1055:HOH:O	1.71	0.91
1:B:383:LEU:HD13	4:B:1055:HOH:O	1.77	0.78
1:B:383:LEU:HD11	4:B:1055:HOH:O	1.81	0.76
1:A:191:ARG:NH1	2:A:990:COA:O4A	2.17	0.74
1:A:461:GLU:HB3	1:A:503:ARG:HB3	1.71	0.72
1:B:574:GLU:HB2	4:B:1164:HOH:O	1.93	0.67
1:B:398:TYR:O	4:B:1055:HOH:O	2.15	0.63
1:A:391:ASN:HD21	1:A:393:GLU:HG3	1.65	0.60
1:A:521:ASN:HD21	1:A:524:GLY:HA2	1.68	0.59
1:A:552:HIS:CD2	1:A:555:LYS:H	2.22	0.58
1:A:199:LYS:HG2	1:A:227:ILE:HD12	1.86	0.57
1:B:570:GLU:HG3	1:B:571:PRO:HD2	1.86	0.56
1:B:552:HIS:HD2	1:B:555:LYS:H	1.53	0.55
1:A:456:GLN:HB3	1:A:460:THR:HG21	1.89	0.55
1:B:221:LYS:HE3	1:B:224:GLY:HA2	1.88	0.54
1:A:391:ASN:HD21	1:A:393:GLU:CG	2.20	0.54
1:A:550:ILE:O	1:A:557:GLN:HA	2.09	0.53
1:A:313:HIS:HE1	4:A:1016:HOH:O	1.92	0.52
1:B:584:ARG:HH12	2:B:991:COA:P3B	2.32	0.52
1:B:611:MET:HE1	1:B:632:LEU:N	2.25	0.52
1:B:611:MET:O	1:B:614:ILE:HG22	2.11	0.51
1:A:552:HIS:HD2	1:A:554:ILE:H	1.59	0.51
1:B:20:ASN:HB2	1:B:21:PRO:CD	2.40	0.51
1:B:544:GLU:HB3	1:B:564:THR:HB	1.93	0.49
1:B:76:ASN:HD22	1:B:79:ALA:H	1.59	0.49
1:B:397:TRP:CE2	1:B:401:LYS:HG3	2.48	0.48
1:A:391:ASN:ND2	1:A:393:GLU:CG	2.77	0.48
1:B:603:PRO:CD	1:B:615:LEU:HD21	2.44	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:584:ARG:NH1	2:B:991:COA:O7A	2.47	0.48
1:B:299:ASP:OD1	1:B:381:ARG:NH2	2.46	0.47
1:B:397:TRP:NE1	1:B:401:LYS:HG3	2.30	0.47
1:B:119:ARG:HD2	1:B:241:ILE:O	2.14	0.47
1:A:335:ASN:H	1:A:335:ASN:HD22	1.63	0.46
1:B:335:ASN:H	1:B:335:ASN:HD22	1.62	0.46
1:B:20:ASN:HB2	1:B:21:PRO:HD2	1.97	0.46
1:B:358:PRO:HG2	1:B:388:GLU:HG3	1.98	0.46
1:A:400:LYS:NZ	1:B:574:GLU:OE1	2.42	0.45
1:B:7:HIS:HB2	1:B:432:LEU:HB2	1.98	0.45
1:A:397:TRP:NE1	1:A:401:LYS:HG3	2.31	0.45
1:B:503:ARG:NH2	4:B:1128:HOH:O	2.49	0.45
1:B:359:THR:HG22	2:B:991:COA:H143	1.99	0.45
1:A:77:LEU:C	1:A:77:LEU:HD23	2.43	0.44
1:A:580:ARG:NH2	4:A:1064:HOH:O	2.49	0.44
1:A:20:ASN:HB2	1:A:21:PRO:CD	2.48	0.44
1:A:359:THR:HG22	2:A:990:COA:H143	2.00	0.43
1:B:552:HIS:CD2	1:B:555:LYS:H	2.32	0.43
1:A:604:LYS:HG2	1:A:610:ILE:HD13	2.00	0.43
1:B:611:MET:O	1:B:614:ILE:CG2	2.67	0.43
1:A:358:PRO:HG2	1:A:388:GLU:HG3	2.00	0.43
1:A:552:HIS:HD2	1:A:555:LYS:H	1.64	0.43
1:B:414:TRP:O	3:B:998:PRX:H3P3	2.19	0.42
1:A:552:HIS:CD2	1:A:554:ILE:H	2.38	0.42
1:B:552:HIS:CD2	1:B:554:ILE:H	2.38	0.42
1:A:365:MET:HE1	1:A:394:ALA:HA	2.02	0.42
1:A:76:ASN:HD21	1:A:78:ALA:HB3	1.85	0.42
1:A:161:VAL:HG12	1:A:308:GLY:HA2	2.02	0.42
1:B:603:PRO:HD3	1:B:615:LEU:HD21	2.02	0.42
1:B:370:LYS:HA	1:B:370:LYS:HD2	1.90	0.41
1:A:181:ARG:HA	1:A:181:ARG:HD3	1.90	0.41
1:A:539:HIS:HB3	1:A:542:ILE:HD12	2.02	0.41
1:B:50:THR:HG23	4:B:1001:HOH:O	2.20	0.41
1:B:159:HIS:CE1	1:B:260:PHE:HB3	2.55	0.41
1:B:552:HIS:HD2	1:B:554:ILE:H	1.68	0.41
1:B:603:PRO:HB2	1:B:611:MET:HE3	2.02	0.41
1:A:74:THR:HB	1:A:252:ALA:HB1	2.02	0.41
1:B:490:SER:O	1:B:493:LYS:HE3	2.19	0.41
1:A:56:LYS:NZ	1:A:58:THR:OG1	2.45	0.41
1:B:206:LEU:HD22	1:B:211:VAL:HG11	2.03	0.41
1:A:390:ILE:O	1:A:390:ILE:HG23	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:603:PRO:HD3	1:B:641:LEU:HD11	2.03	0.41
1:A:515:ARG:HB3	1:A:517:ASP:OD2	2.20	0.40
1:A:391:ASN:ND2	1:A:393:GLU:HG2	2.35	0.40
1:A:300:ILE:HB	1:A:351:VAL:HA	2.03	0.40
1:B:634:ASP:O	1:B:637:VAL:HG22	2.20	0.40
1:A:261:ILE:HD13	1:A:261:ILE:HG21	1.92	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	629/652 (96%)	608 (97%)	20 (3%)	1 (0%)	43	55
1	B	630/652 (97%)	608 (96%)	20 (3%)	2 (0%)	36	46
All	All	1259/1304 (96%)	1216 (97%)	40 (3%)	3 (0%)	43	55

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	633	ALA
1	A	438	THR
1	B	438	THR

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	512/537 (95%)	500 (98%)	12 (2%)	44	63
1	B	509/537 (95%)	490 (96%)	19 (4%)	30	45
All	All	1021/1074 (95%)	990 (97%)	31 (3%)	36	53

All (31) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	5	HIS
1	A	127	LEU
1	A	130	LYS
1	A	247	GLU
1	A	316	LEU
1	A	333	VAL
1	A	335	ASN
1	A	457	GLU
1	A	494	ASN
1	A	503	ARG
1	A	506	GLU
1	A	521	ASN
1	B	50	THR
1	B	87	GLN
1	B	195	SER
1	B	251	GLU
1	B	262	LEU
1	B	267	SER
1	B	316	LEU
1	B	317	LEU
1	B	333	VAL
1	B	335	ASN
1	B	391	ASN
1	B	503	ARG
1	B	534	SER
1	B	570	GLU
1	B	585	LYS
1	B	614	ILE
1	B	632	LEU
1	B	643	GLU
1	B	645	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (20) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	33	ASN
1	A	76	ASN
1	A	104	GLN
1	A	216	HIS
1	A	313	HIS
1	A	335	ASN
1	A	344	GLN
1	A	391	ASN
1	A	454	HIS
1	A	521	ASN
1	A	552	HIS
1	A	581	ASN
1	A	646	GLN
1	B	53	GLN
1	B	76	ASN
1	B	201	ASN
1	B	249	GLN
1	B	335	ASN
1	B	350	GLN
1	B	552	HIS

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

4 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	COA	B	991	-	47,50,50	1.66	4 (8%)	69,75,75	1.48	8 (11%)
2	COA	A	990	-	47,50,50	1.64	4 (8%)	69,75,75	1.44	11 (15%)
3	PRX	B	998	-	28,28,28	0.72	0	40,41,41	1.87	7 (17%)
3	PRX	A	999	-	28,28,28	0.90	1 (3%)	40,41,41	1.76	8 (20%)

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	COA	B	991	-	-	8/48/64/64	0/3/3/3
2	COA	A	990	-	-	7/48/64/64	0/3/3/3
3	PRX	B	998	-	-	1/15/31/31	0/3/3/3
3	PRX	A	999	-	-	0/15/31/31	0/3/3/3

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	991	COA	O9P-C9P	9.46	1.41	1.23
2	A	990	COA	O9P-C9P	9.30	1.41	1.23
2	A	990	COA	C2A-N1A	2.87	1.39	1.33
2	B	991	COA	C2A-N3A	2.83	1.39	1.33
2	A	990	COA	C2A-N3A	2.76	1.38	1.33
2	B	991	COA	C2A-N1A	2.63	1.38	1.33
3	A	999	PRX	C5-N7	-2.24	1.35	1.39
2	A	990	COA	C8A-N7A	2.03	1.35	1.31
2	B	991	COA	C5A-N7A	-2.00	1.35	1.39

All (34) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	998	PRX	N1-C2-N3	-5.63	120.06	128.58
3	B	998	PRX	C5-C4-N3	-5.24	119.51	126.72
2	B	991	COA	N3A-C2A-N1A	-5.17	120.76	128.58
3	A	999	PRX	C5-C4-N3	-4.97	119.87	126.72
2	A	990	COA	N3A-C2A-N1A	-4.73	121.42	128.58

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	991	COA	C5A-C4A-N3A	-4.62	120.36	126.72
3	A	999	PRX	N1-C2-N3	-4.46	121.83	128.58
2	A	990	COA	C5A-C4A-N3A	-4.34	120.74	126.72
3	B	998	PRX	N3-C4-N9	4.19	134.29	127.17
2	A	990	COA	N9A-C8A-N7A	-3.98	108.29	113.94
2	B	991	COA	N9A-C8A-N7A	-3.98	108.29	113.94
3	A	999	PRX	N9-C8-N7	-3.79	108.56	113.94
3	B	998	PRX	C2-N3-C4	3.77	121.04	111.83
2	B	991	COA	C5A-N7A-C8A	3.56	109.04	103.45
2	A	990	COA	C5A-N7A-C8A	3.53	109.00	103.45
2	B	991	COA	C2A-N3A-C4A	3.42	120.18	111.83
3	A	999	PRX	N3-C4-N9	3.38	132.92	127.17
2	B	991	COA	N3A-C4A-N9A	3.17	132.55	127.17
3	A	999	PRX	C2-N3-C4	3.15	119.52	111.83
2	A	990	COA	C2A-N3A-C4A	3.09	119.37	111.83
3	B	998	PRX	N9-C8-N7	-3.01	109.67	113.94
3	A	999	PRX	C4-N9-C8	2.92	108.80	105.74
2	A	990	COA	N3A-C4A-N9A	2.89	132.08	127.17
3	A	999	PRX	C5-N7-C8	2.72	107.73	103.45
3	B	998	PRX	C4-N9-C8	2.70	108.57	105.74
2	A	990	COA	C4A-C5A-N7A	-2.69	107.50	110.58
3	A	999	PRX	C4-C5-N7	-2.52	107.70	110.58
2	B	991	COA	CEP-CBP-CAP	2.46	112.95	108.77
2	B	991	COA	C4A-C5A-N7A	-2.33	107.92	110.58
2	A	990	COA	C4A-N9A-C8A	2.17	108.02	105.74
2	A	990	COA	CDP-CBP-CAP	2.15	112.43	108.77
3	B	998	PRX	C5-N7-C8	2.10	106.74	103.45
2	A	990	COA	C6A-C5A-C4A	2.09	120.04	117.18
2	A	990	COA	O2A-P1A-O3A	2.07	112.86	107.27

There are no chirality outliers.

All (16) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	990	COA	P1A-O3A-P2A-O6A
2	A	990	COA	C5P-C6P-C7P-N8P
2	A	990	COA	C2P-C3P-N4P-C5P
2	A	990	COA	S1P-C2P-C3P-N4P
2	B	991	COA	C5B-O5B-P1A-O1A
2	B	991	COA	C5B-O5B-P1A-O3A
2	B	991	COA	CDP-CBP-CCP-O6A
2	B	991	COA	CEP-CBP-CCP-O6A

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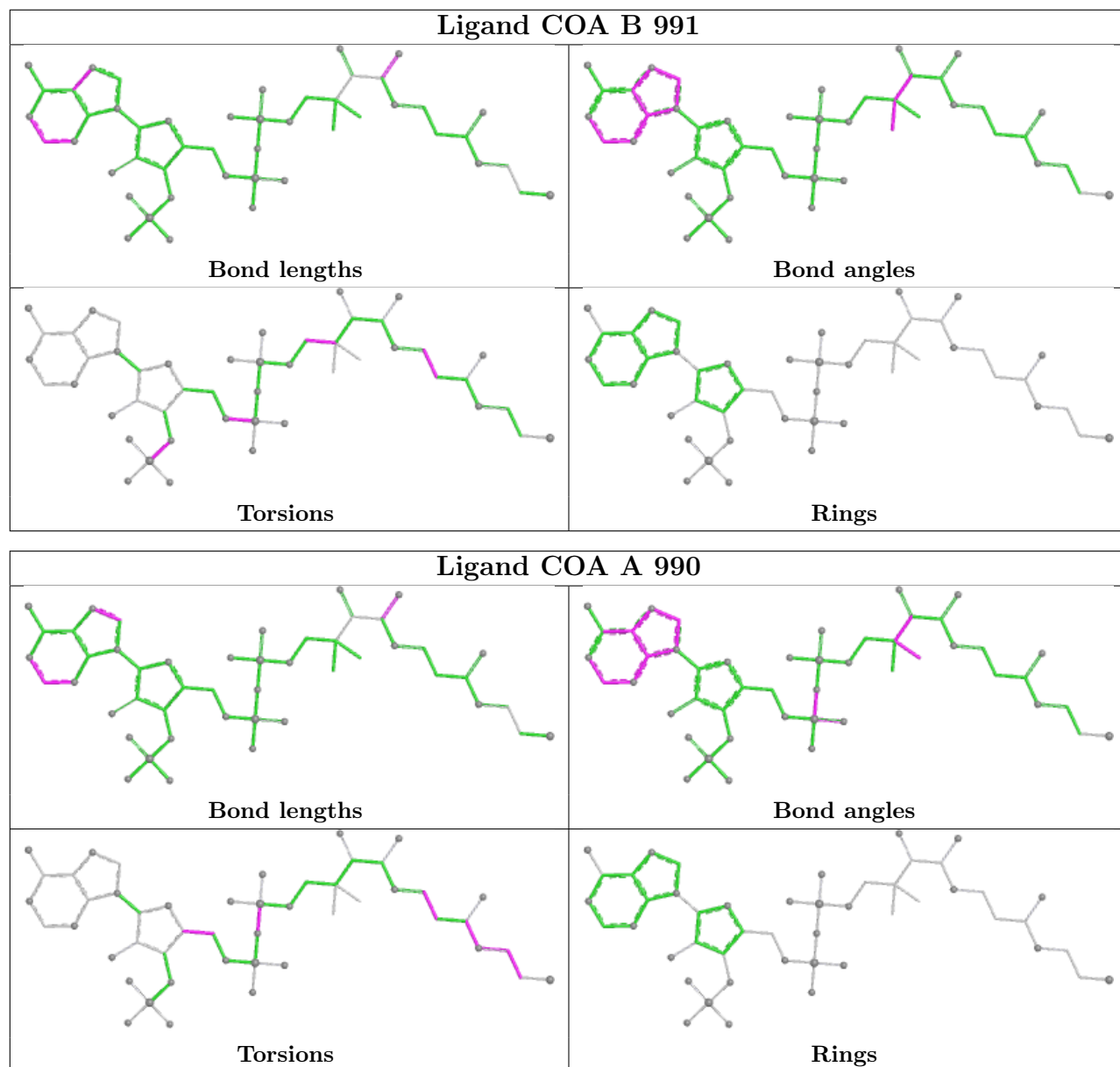
Mol	Chain	Res	Type	Atoms
2	B	991	COA	CAP-CBP-CCP-O6A
2	A	990	COA	C6P-C5P-N4P-C3P
2	A	990	COA	O5P-C5P-N4P-C3P
2	B	991	COA	C5P-C6P-C7P-N8P
2	B	991	COA	C5B-O5B-P1A-O2A
2	B	991	COA	C3B-O3B-P3B-O8A
3	B	998	PRX	O3P-C1P-C2P-C3P
2	A	990	COA	O4B-C4B-C5B-O5B

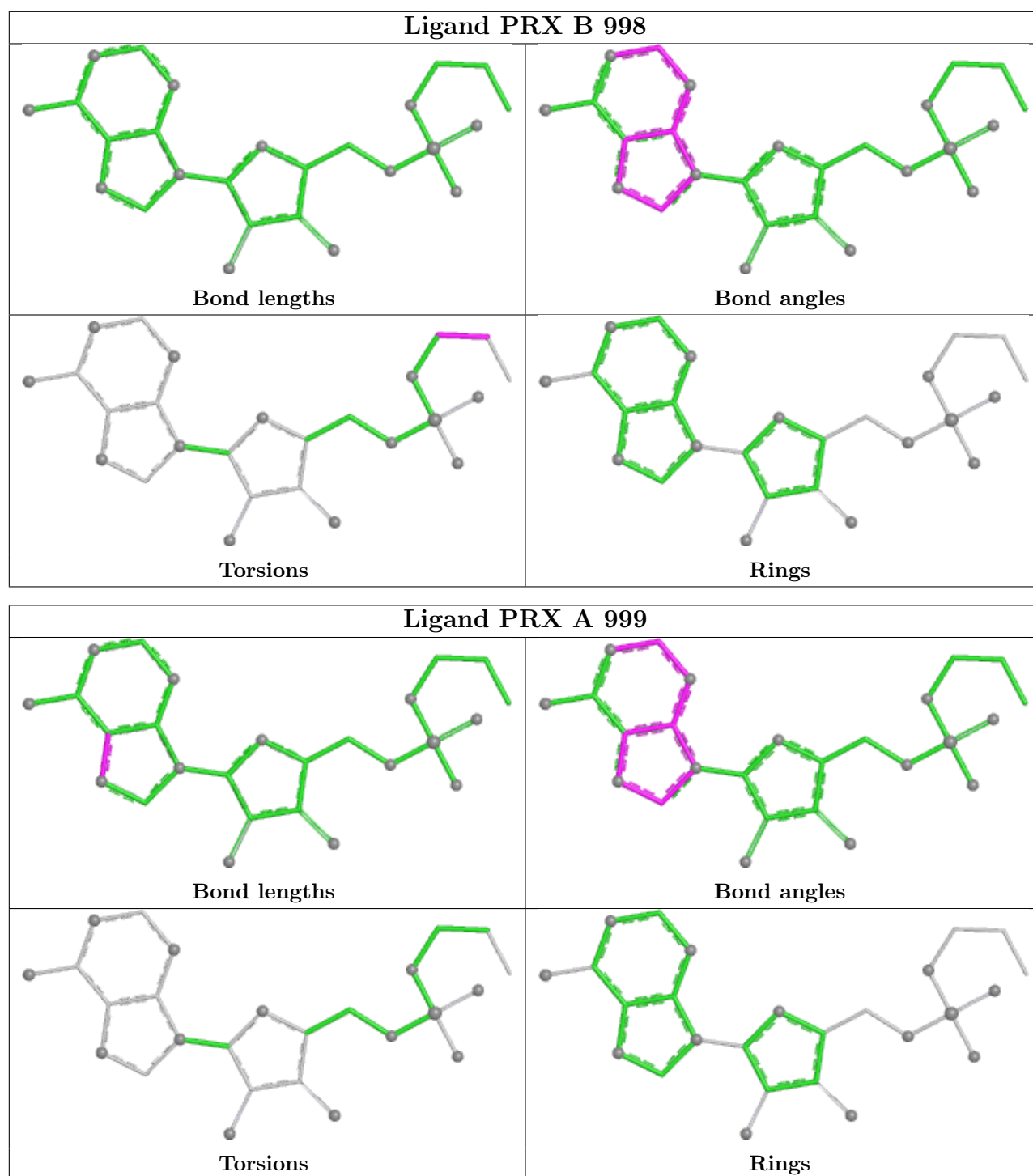
There are no ring outliers.

3 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	991	COA	3	0
2	A	990	COA	2	0
3	B	998	PRX	1	0

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





5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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	633/652 (97%)	-0.33	9 (1%) 73 75	14, 21, 37, 55	0
1	B	634/652 (97%)	-0.20	4 (0%) 85 86	16, 25, 36, 55	0
All	All	1267/1304 (97%)	-0.26	13 (1%) 79 80	14, 23, 36, 55	0

All (13) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	632	LEU	4.8
1	A	633	ALA	4.1
1	A	647	ALA	3.4
1	B	622	ASP	3.4
1	B	5	HIS	3.2
1	B	647	ALA	3.1
1	A	635	PRO	2.8
1	A	567	HIS	2.6
1	A	608	GLY	2.5
1	A	606	ARG	2.3
1	A	22	GLU	2.2
1	A	5	HIS	2.1
1	A	636	GLY	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](#)

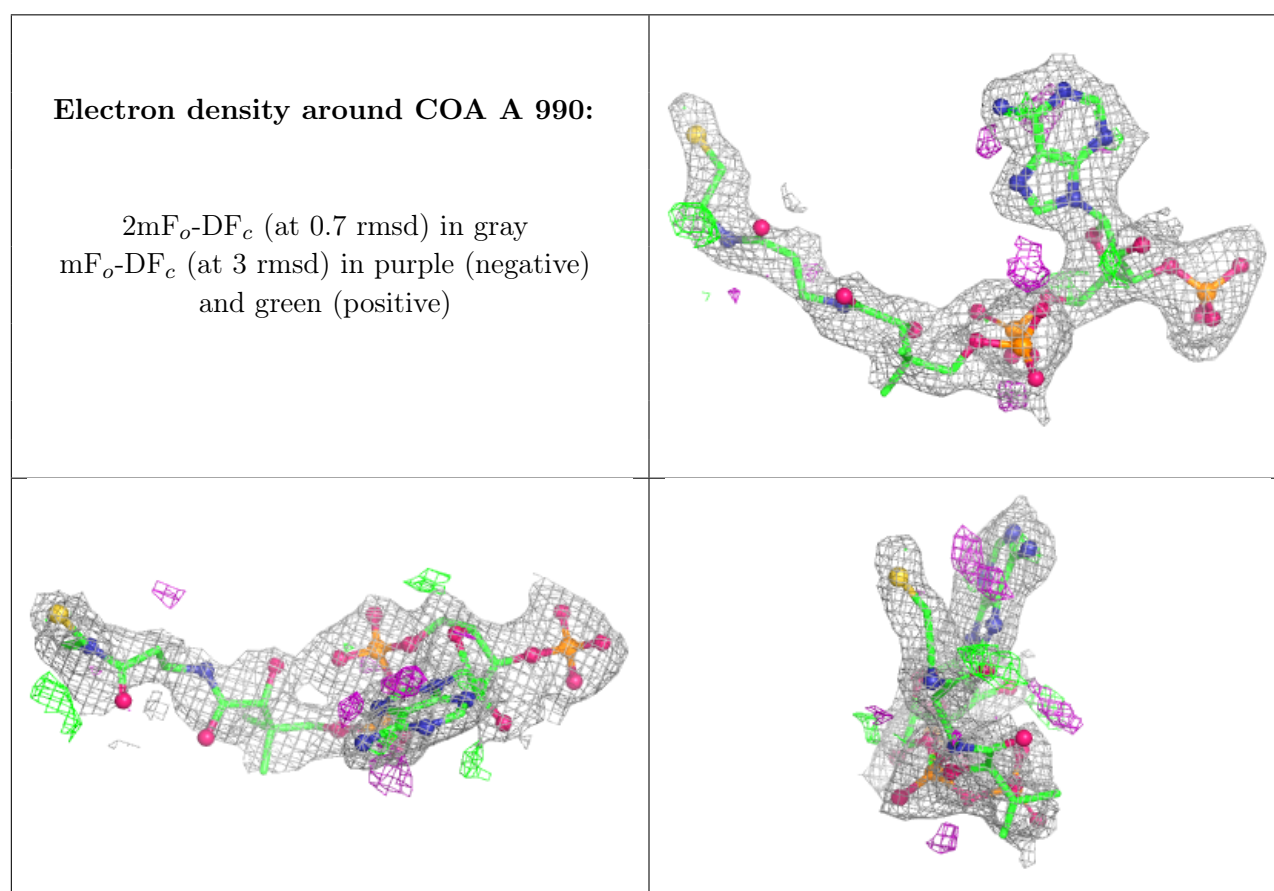
There are no oligosaccharides in this entry.

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.

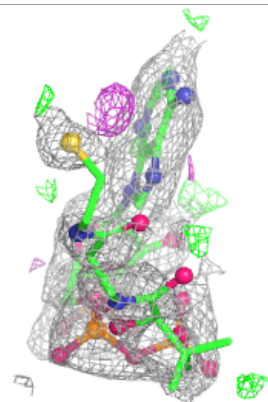
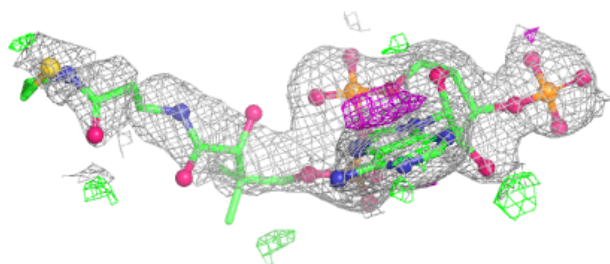
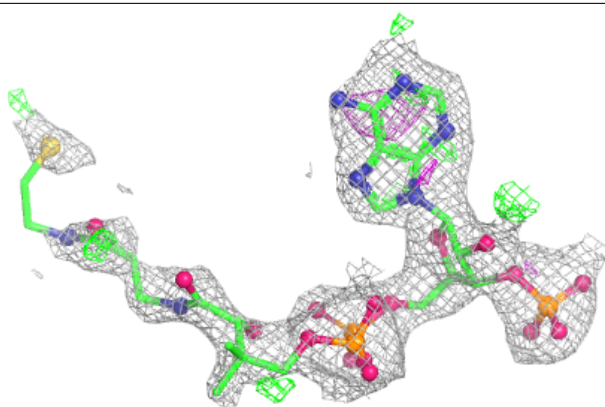
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	COA	A	990	48/48	0.86	0.16	27,48,64,66	0
2	COA	B	991	48/48	0.86	0.17	38,57,66,67	0
3	PRX	B	998	26/26	0.97	0.06	16,18,21,22	0
3	PRX	A	999	26/26	0.98	0.05	12,15,16,16	0

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.

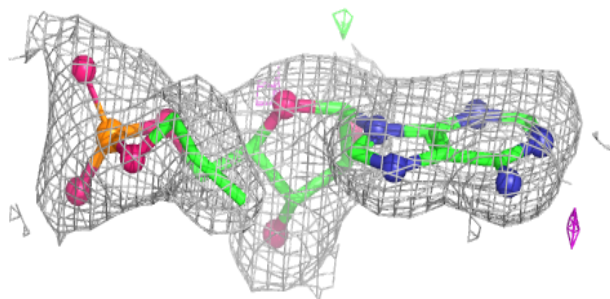
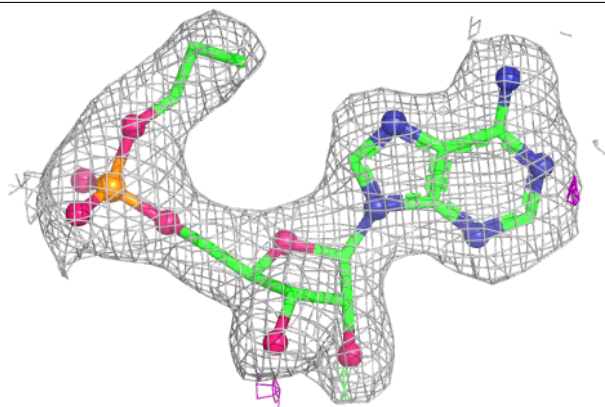


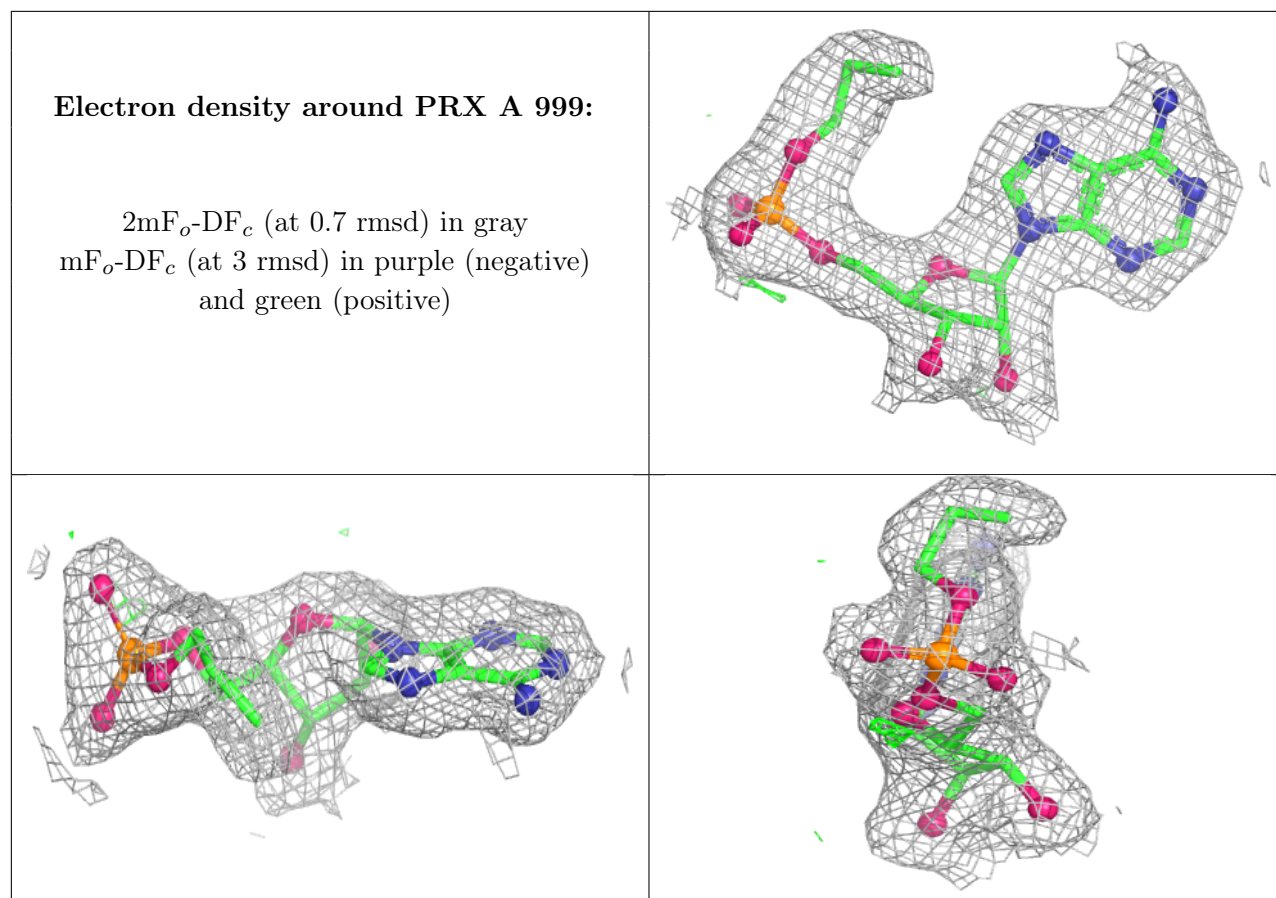
Electron density around COA B 991:

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

**Electron density around PRX B 998:**

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





6.5 Other polymers ⓘ

There are no such residues in this entry.