



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 13, 2017 – 09:23 pm GMT

PDB ID : 1U80  
Title : Phosphopantothenoylcysteine synthetase from E. coli, CMP complex  
Authors : Stanitzek, S.; Augustin, M.A.; Huber, R.; Kupke, T.; Steinbacher, S.  
Deposited on : 2004-08-04  
Resolution : 2.85 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](mailto:validation@mail.wwpdb.org)

A user guide is available at

<http://wwpdb.org/validation/2016/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467  
Mogul : 1.7.2 (RC1), CSD as538be (2017)  
Xtriage (Phenix) : 1.9-1692  
EDS : trunk28620  
Percentile statistics : 20161228.v01 (using entries in the PDB archive December 28th 2016)  
Refmac : 5.8.0135  
CCP4 : 6.5.0  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : recalc28949

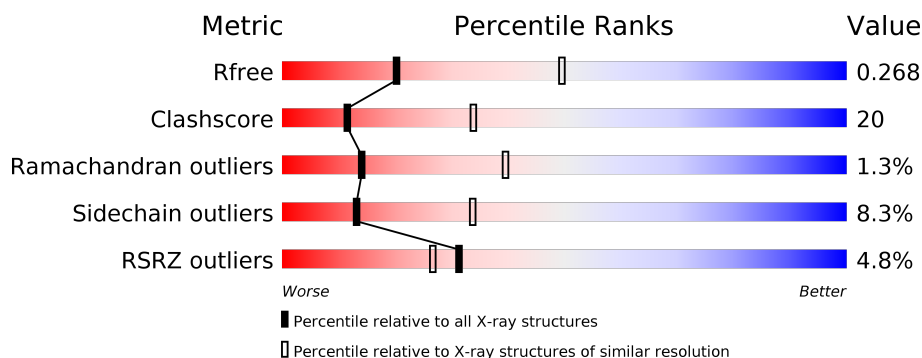
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.85 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))
$R_{free}$	100719	2469 (2.90-2.82)
Clashscore	112137	2749 (2.90-2.82)
Ramachandran outliers	110173	2687 (2.90-2.82)
Sidechain outliers	110143	2690 (2.90-2.82)
RSRZ outliers	101464	2487 (2.90-2.82)

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 on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. 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	226	<div> <div>4%</div> <div> <div></div> <div>65%</div> <div>27%</div> <div>• •</div> </div> </div>
1	B	226	<div> <div>6%</div> <div> <div></div> <div>64%</div> <div>28%</div> <div>• •</div> </div> </div>
1	C	226	<div> <div>4%</div> <div> <div></div> <div>62%</div> <div>31%</div> <div>• •</div> </div> </div>

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 5209 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.

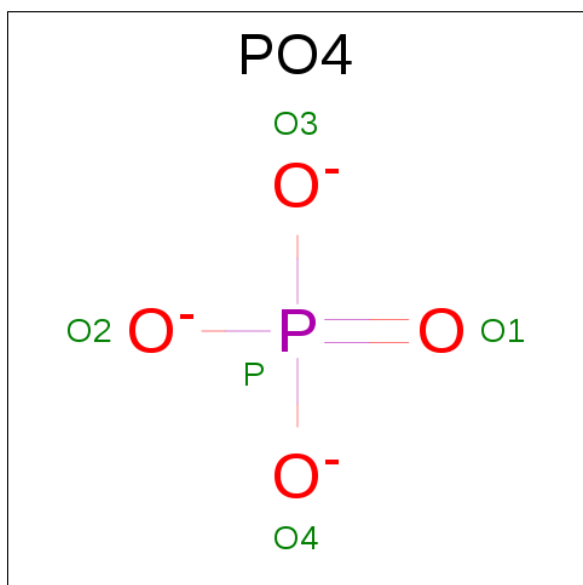
- Molecule 1 is a protein called Coenzyme A biosynthesis bifunctional protein coaBC.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	217	Total	C	N	O	S	0	0	0
			1676	1054	301	314	7			
1	B	218	Total	C	N	O	S	0	0	0
			1683	1056	303	317	7			
1	C	216	Total	C	N	O	S	0	0	0
			1666	1046	298	315	7			

There are 3 discrepancies between the modelled and reference sequences:

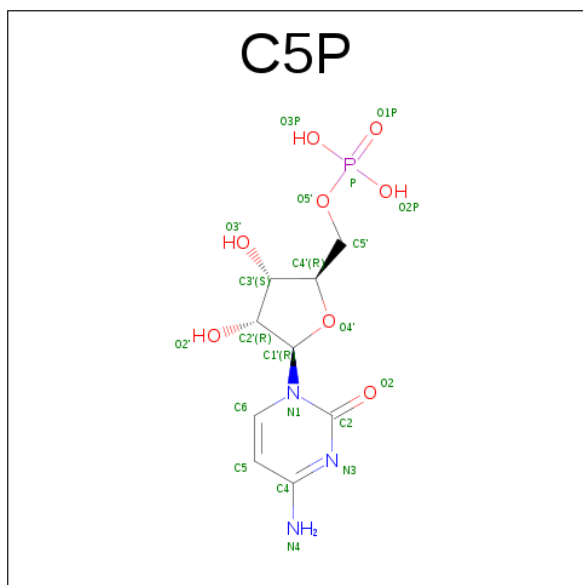
Chain	Residue	Modelled	Actual	Comment	Reference
A	210	ASP	ASN	ENGINEERED	UNP P0ABQ0
B	210	ASP	ASN	ENGINEERED	UNP P0ABQ0
C	210	ASP	ASN	ENGINEERED	UNP P0ABQ0

- Molecule 2 is PHOSPHATE ION (three-letter code: PO4) (formula: O<sub>4</sub>P).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	O	P	0	0
			5	4	1		
2	B	1	Total	O	P	0	0
			5	4	1		
2	C	1	Total	O	P	0	0
			5	4	1		

- Molecule 3 is CYTIDINE-5'-MONOPHOSPHATE (three-letter code: C5P) (formula:  $C_9H_{14}N_3O_8P$ ).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	0
			21	9	3	8	1		
3	B	1	Total	C	N	O	P	0	0
			21	9	3	8	1		
3	C	1	Total	C	N	O	P	0	0
			21	9	3	8	1		

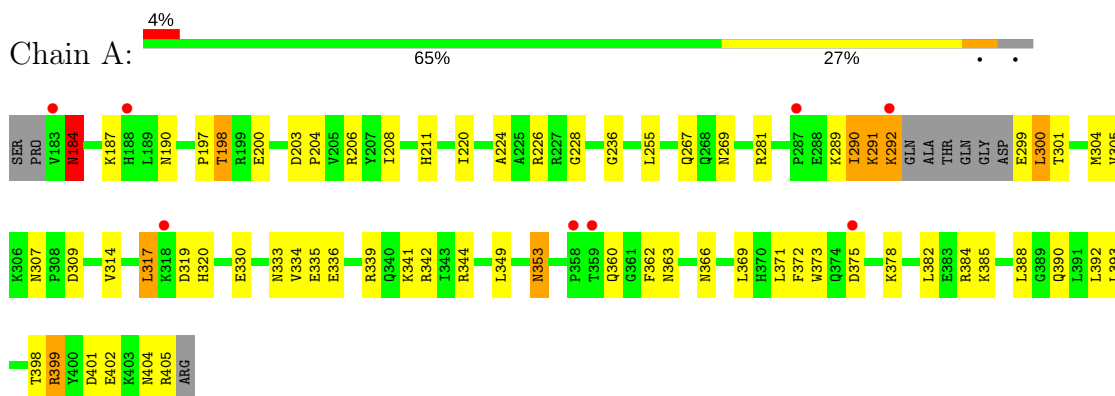
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	30	Total	O	0	0
			30	30		
4	B	46	Total	O	0	0
			46	46		
4	C	30	Total	O	0	0
			30	30		

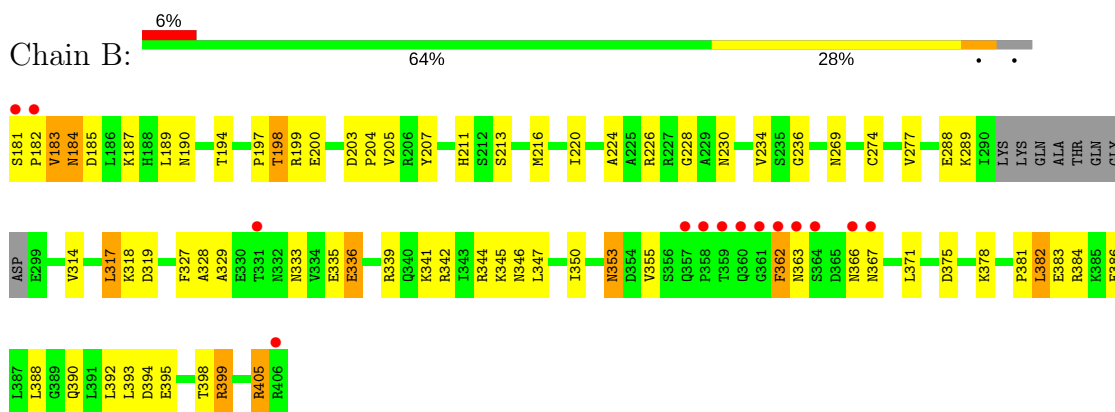
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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.

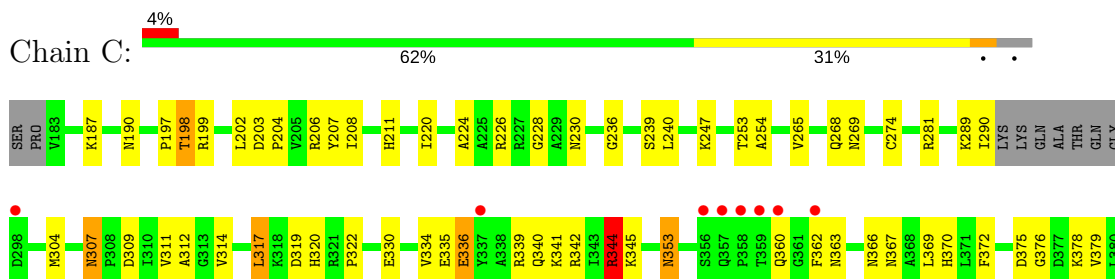
- Molecule 1: Coenzyme A biosynthesis bifunctional protein coaBC



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## 4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	45.80Å 144.29Å 245.04Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 2.85 19.97 – 2.84	Depositor EDS
% Data completeness (in resolution range)	(Not available) (20.00-2.85) 98.2 (19.97-2.84)	Depositor EDS
$R_{merge}$	0.04	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	6.22 (at 2.83Å)	Xtriage
Refinement program	CNS	Depositor
R, $R_{free}$	0.212 , 0.275 0.208 , 0.268	Depositor DCC
$R_{free}$ test set	936 reflections (4.86%)	DCC
Wilson B-factor (Å <sup>2</sup> )	66.5	Xtriage
Anisotropy	0.374	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.29 , 58.3	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	5209	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	64.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.85% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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, C5P

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	0.59	0/1703	0.77	0/2309
1	B	0.64	0/1711	0.82	0/2321
1	C	0.58	1/1693 (0.1%)	0.79	2/2298 (0.1%)
All	All	0.61	1/5107 (0.0%)	0.79	2/6928 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	274	CYS	CB-SG	-5.86	1.72	1.81

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	344	ARG	NE-CZ-NH1	-5.74	117.43	120.30
1	C	344	ARG	NE-CZ-NH2	5.27	122.94	120.30

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	1676	0	1704	70	0
1	B	1683	0	1703	65	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	1666	0	1682	71	0
2	A	5	0	0	0	0
2	B	5	0	0	0	0
2	C	5	0	0	0	0
3	A	21	0	12	2	0
3	B	21	0	12	3	0
3	C	21	0	12	2	0
4	A	30	0	0	4	0
4	B	46	0	0	4	0
4	C	30	0	0	1	0
All	All	5209	0	5125	200	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 20.

All (200) 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:C:190:ASN:H	1:C:269:ASN:ND2	1.37	1.21
1:B:190:ASN:H	1:B:269:ASN:ND2	1.44	1.14
1:A:190:ASN:H	1:A:269:ASN:ND2	1.44	1.14
1:C:190:ASN:N	1:C:269:ASN:HD22	1.52	1.06
1:B:190:ASN:H	1:B:269:ASN:HD22	1.03	0.97
1:A:190:ASN:N	1:A:269:ASN:HD22	1.66	0.92
1:A:206:ARG:HH11	1:A:290:ILE:HD12	1.41	0.84
1:A:398:THR:HG22	1:A:399:ARG:HH12	1.41	0.83
1:C:340:GLN:O	1:C:344:ARG:HG2	1.78	0.83
1:A:184:ASN:N	1:A:184:ASN:HD22	1.78	0.80
1:A:190:ASN:H	1:A:269:ASN:HD22	0.84	0.79
1:B:384:ARG:HG3	4:B:13:HOH:O	1.82	0.79
1:B:336:GLU:OE1	1:B:336:GLU:HA	1.82	0.79
1:B:190:ASN:N	1:B:269:ASN:HD22	1.80	0.77
1:A:190:ASN:N	1:A:269:ASN:ND2	2.28	0.75
1:B:190:ASN:N	1:B:269:ASN:ND2	2.28	0.75
1:C:336:GLU:HA	1:C:336:GLU:OE1	1.84	0.75
1:B:342:ARG:HH11	1:B:342:ARG:HG2	1.53	0.73
1:C:203:ASP:HB3	1:C:290:ILE:HD11	1.69	0.72
1:C:190:ASN:N	1:C:269:ASN:ND2	2.22	0.72
1:A:292:LYS:HD2	1:A:292:LYS:H	1.53	0.72
1:A:335:GLU:HG3	1:A:372:PHE:CZ	2.25	0.72
1:B:366:ASN:HB3	1:B:382:LEU:HD11	1.72	0.71

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:335:GLU:HB2	4:A:51:HOH:O	1.89	0.71
4:B:18:HOH:O	1:C:405:ARG:HD2	1.91	0.70
1:A:198:THR:CG2	1:A:200:GLU:OE2	2.40	0.70
1:C:366:ASN:HB3	1:C:382:LEU:HD11	1.75	0.68
1:B:226:ARG:NH2	1:B:390:GLN:HE21	1.91	0.67
1:C:190:ASN:H	1:C:269:ASN:HD22	0.70	0.67
1:A:184:ASN:ND2	1:A:184:ASN:N	2.43	0.67
1:C:206:ARG:HH11	1:C:290:ILE:HD12	1.60	0.67
1:B:328:ALA:HB2	1:B:350:ILE:HD11	1.79	0.65
1:A:187:LYS:HA	1:A:228:GLY:O	1.97	0.64
1:B:386:GLU:HB3	4:B:15:HOH:O	1.98	0.64
1:A:366:ASN:HB3	1:A:382:LEU:HD11	1.79	0.64
1:B:342:ARG:HG2	1:B:342:ARG:NH1	2.12	0.64
1:B:335:GLU:O	1:B:339:ARG:HG3	1.98	0.63
1:A:289:LYS:HZ3	1:A:292:LYS:HE3	1.64	0.62
1:C:399:ARG:HG2	1:C:399:ARG:HH11	1.61	0.62
1:A:336:GLU:OE1	1:A:336:GLU:HA	1.99	0.62
1:C:211:HIS:HB3	1:C:363:ASN:HD21	1.64	0.62
1:A:289:LYS:HZ3	1:A:292:LYS:CE	2.13	0.61
1:B:277:VAL:HB	3:B:1500:C5P:C4	2.32	0.60
1:C:247:LYS:HE3	4:C:63:HOH:O	2.01	0.60
1:A:206:ARG:NH1	1:A:290:ILE:HD12	2.15	0.59
1:A:206:ARG:HH11	1:A:290:ILE:CD1	2.12	0.58
1:C:224:ALA:HA	1:C:393:LEU:HD21	1.86	0.58
1:B:353:ASN:H	1:B:353:ASN:HD22	1.51	0.58
1:B:277:VAL:HB	3:B:1500:C5P:C5	2.34	0.58
1:C:226:ARG:NH2	1:C:390:GLN:HE21	2.01	0.58
1:C:220:ILE:HD11	1:C:392:LEU:HD23	1.86	0.58
1:A:291:LYS:NZ	1:C:405:ARG:HH12	2.02	0.57
1:C:399:ARG:CA	1:C:399:ARG:HH11	2.16	0.57
1:C:399:ARG:CG	1:C:399:ARG:HH11	2.18	0.57
1:B:198:THR:CG2	1:B:200:GLU:OE2	2.53	0.56
1:B:353:ASN:H	1:B:353:ASN:ND2	2.04	0.56
1:C:314:VAL:O	1:C:317:LEU:HB2	2.05	0.56
1:A:341:LYS:HE3	3:A:500:C5P:O2P	2.06	0.56
1:C:208:ILE:HD12	1:C:304:MET:CE	2.35	0.56
1:A:281:ARG:NH1	1:A:305:VAL:HG21	2.20	0.56
1:A:211:HIS:HB3	1:A:363:ASN:HD21	1.70	0.56
1:A:353:ASN:HB3	1:A:369:LEU:HD23	1.87	0.55
1:C:198:THR:HG21	1:C:254:ALA:N	2.22	0.55
1:A:398:THR:HA	4:A:9:HOH:O	2.06	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:398:THR:CG2	1:A:399:ARG:HH12	2.18	0.55
1:C:202:LEU:HD21	1:C:208:ILE:HG13	1.87	0.54
1:A:309:ASP:HA	3:A:500:C5P:N4	2.22	0.54
1:C:208:ILE:HD12	1:C:304:MET:HE2	1.90	0.54
1:C:398:THR:HG22	1:C:399:ARG:HH12	1.72	0.54
1:A:342:ARG:HH11	1:A:342:ARG:HG2	1.72	0.54
1:C:335:GLU:HG3	1:C:372:PHE:CZ	2.43	0.54
1:A:402:GLU:O	1:A:405:ARG:HB2	2.07	0.53
1:A:398:THR:HG22	1:A:399:ARG:NH1	2.17	0.53
1:A:203:ASP:HB2	1:A:204:PRO:CD	2.38	0.53
1:C:341:LYS:HE3	3:C:2500:C5P:O1P	2.08	0.53
1:A:203:ASP:HB3	1:A:290:ILE:HG13	1.90	0.53
1:A:292:LYS:HD2	1:A:292:LYS:N	2.23	0.53
1:C:203:ASP:HB2	1:C:204:PRO:CD	2.38	0.53
1:A:184:ASN:ND2	1:A:184:ASN:H	2.06	0.53
1:C:399:ARG:NH1	1:C:399:ARG:HG2	2.20	0.52
1:B:345:LYS:O	1:B:346:ASN:HB3	2.08	0.52
1:C:206:ARG:HH11	1:C:290:ILE:CD1	2.22	0.52
1:A:208:ILE:HD12	1:A:304:MET:HE1	1.90	0.52
1:C:330:GLU:HB2	1:C:334:VAL:HG22	1.92	0.52
1:A:401:ASP:O	1:A:405:ARG:HD3	2.10	0.52
1:B:342:ARG:NH1	1:B:347:LEU:O	2.42	0.52
1:C:198:THR:HG21	1:C:254:ALA:CA	2.40	0.51
1:C:335:GLU:O	1:C:339:ARG:HG3	2.10	0.51
1:A:208:ILE:HD12	1:A:304:MET:CE	2.41	0.51
1:C:383:GLU:CG	1:C:387:LEU:HD23	2.41	0.51
1:B:187:LYS:HA	1:B:228:GLY:O	2.11	0.50
1:A:335:GLU:OE1	1:A:339:ARG:HD2	2.12	0.50
1:B:183:VAL:O	1:B:184:ASN:HB3	2.12	0.50
1:A:342:ARG:HD2	1:A:373:TRP:HA	1.94	0.50
1:C:226:ARG:HH21	1:C:390:GLN:HE21	1.60	0.50
1:A:330:GLU:HB2	1:A:334:VAL:HG22	1.95	0.49
1:A:224:ALA:HA	1:A:393:LEU:HD21	1.95	0.49
1:C:199:ARG:HD3	1:C:207:TYR:CE1	2.48	0.48
1:C:342:ARG:HG2	1:C:342:ARG:HH11	1.78	0.48
1:A:290:ILE:HG22	1:A:290:ILE:O	2.12	0.48
1:A:291:LYS:HZ2	1:C:405:ARG:NH1	2.10	0.48
1:C:370:HIS:CD2	1:C:379:VAL:HG22	2.49	0.48
1:C:265:VAL:HG21	1:C:314:VAL:HG13	1.95	0.48
1:C:309:ASP:OD2	1:C:345:LYS:HE2	2.14	0.48
1:A:299:GLU:O	1:A:300:LEU:HB2	2.14	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:353:ASN:HD22	1:A:353:ASN:H	1.62	0.48
1:A:342:ARG:HG2	1:A:342:ARG:NH1	2.29	0.48
1:C:353:ASN:HB3	1:C:369:LEU:HD23	1.96	0.48
1:C:353:ASN:H	1:C:353:ASN:ND2	2.12	0.48
1:A:335:GLU:O	1:A:339:ARG:HG3	2.13	0.48
1:B:405:ARG:HD3	1:B:405:ARG:HA	1.74	0.48
1:C:399:ARG:HA	1:C:399:ARG:HH11	1.79	0.47
1:A:353:ASN:ND2	1:A:353:ASN:H	2.12	0.47
1:C:198:THR:HG21	1:C:254:ALA:HA	1.97	0.47
1:B:216:MET:O	1:B:220:ILE:HG13	2.14	0.47
1:C:353:ASN:H	1:C:353:ASN:HD22	1.61	0.47
1:B:226:ARG:HH21	1:B:390:GLN:HE21	1.61	0.47
1:A:220:ILE:HD11	1:A:392:LEU:HD23	1.97	0.47
1:A:314:VAL:O	1:A:317:LEU:HB2	2.15	0.47
1:C:187:LYS:HA	1:C:228:GLY:O	2.14	0.47
1:C:208:ILE:CD1	1:C:304:MET:HE2	2.45	0.47
1:C:311:VAL:CG1	1:C:312:ALA:N	2.78	0.46
1:B:353:ASN:N	1:B:353:ASN:ND2	2.61	0.46
1:A:319:ASP:O	1:A:320:HIS:HB2	2.15	0.46
1:B:197:PRO:O	1:B:236:GLY:HA3	2.15	0.46
1:C:311:VAL:HG13	1:C:312:ALA:N	2.31	0.46
1:A:299:GLU:HA	1:A:299:GLU:OE1	2.15	0.46
1:B:224:ALA:HA	1:B:393:LEU:HD21	1.97	0.45
1:B:190:ASN:OD1	1:B:230:ASN:HB3	2.16	0.45
1:B:381:PRO:O	1:B:383:GLU:HG2	2.16	0.45
1:B:327:PHE:O	3:B:1500:C5P:H5'2	2.16	0.45
1:A:353:ASN:ND2	1:A:353:ASN:N	2.64	0.45
1:B:382:LEU:O	1:B:383:GLU:HG2	2.17	0.45
1:B:328:ALA:O	1:B:353:ASN:ND2	2.50	0.45
1:B:185:ASP:OD2	1:B:185:ASP:N	2.50	0.45
1:B:318:LYS:CE	1:C:376:GLY:HA2	2.47	0.45
1:B:342:ARG:CG	1:B:342:ARG:HH11	2.25	0.45
1:B:398:THR:HG22	1:B:399:ARG:HH12	1.79	0.45
1:A:291:LYS:HZ1	1:C:405:ARG:HH12	1.65	0.45
1:A:291:LYS:NZ	1:C:405:ARG:NH1	2.64	0.44
1:A:290:ILE:O	1:A:291:LYS:O	2.36	0.44
1:C:309:ASP:HA	3:C:2500:C5P:N4	2.33	0.44
1:B:288:GLU:O	1:B:289:LYS:C	2.55	0.44
1:B:366:ASN:HA	1:B:383:GLU:O	2.18	0.44
1:B:199:ARG:HD3	1:B:207:TYR:CE1	2.54	0.43
1:B:211:HIS:HB3	1:B:363:ASN:HD21	1.84	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:220:ILE:CD1	1:B:392:LEU:HD23	2.47	0.43
1:A:255:LEU:HA	1:A:255:LEU:HD23	1.77	0.43
1:A:385:LYS:HA	1:A:388:LEU:HB3	1.99	0.43
1:B:213:SER:HB3	1:B:363:ASN:HA	2.01	0.43
1:B:314:VAL:O	1:B:317:LEU:HB2	2.19	0.43
1:C:239:SER:O	1:C:240:LEU:HD23	2.19	0.43
1:B:182:PRO:O	1:B:183:VAL:O	2.36	0.43
1:C:319:ASP:O	1:C:320:HIS:HB2	2.19	0.43
1:B:367:ASN:N	1:B:382:LEU:HD12	2.34	0.43
1:C:341:LYS:HA	1:C:344:ARG:HG3	2.00	0.43
1:C:353:ASN:N	1:C:353:ASN:ND2	2.66	0.43
1:A:289:LYS:O	1:A:291:LYS:N	2.52	0.42
1:A:349:LEU:HD11	1:A:371:LEU:HB3	2.01	0.42
1:B:362:PHE:O	1:B:363:ASN:HB2	2.20	0.42
1:C:281:ARG:HD3	1:C:307:ASN:HD21	1.83	0.42
1:B:199:ARG:HD3	1:B:207:TYR:CD1	2.55	0.42
1:B:336:GLU:OE1	1:B:336:GLU:CA	2.61	0.42
1:B:194:THR:HA	1:B:234:VAL:O	2.20	0.42
1:C:203:ASP:OD2	1:C:203:ASP:C	2.58	0.42
1:C:399:ARG:HA	1:C:399:ARG:NH1	2.35	0.42
1:B:341:LYS:O	1:B:342:ARG:C	2.58	0.42
1:A:267:GLN:HG2	4:A:99:HOH:O	2.20	0.42
1:B:203:ASP:HB2	1:B:204:PRO:CD	2.50	0.42
1:B:381:PRO:O	1:B:382:LEU:C	2.58	0.42
1:B:181:SER:HB2	1:B:182:PRO:HD2	2.02	0.41
1:B:371:LEU:HD12	1:B:395:GLU:HG2	2.01	0.41
1:B:367:ASN:C	1:B:382:LEU:HD12	2.40	0.41
1:C:385:LYS:HA	1:C:388:LEU:HB3	2.02	0.41
1:A:335:GLU:CB	4:A:51:HOH:O	2.57	0.41
1:A:292:LYS:HB2	1:C:405:ARG:HE	1.84	0.41
1:A:289:LYS:NZ	1:A:292:LYS:CE	2.80	0.41
1:B:386:GLU:CB	4:B:15:HOH:O	2.64	0.41
1:C:198:THR:HG22	1:C:253:THR:C	2.41	0.41
1:A:184:ASN:O	1:A:187:LYS:HG2	2.21	0.41
1:B:388:LEU:HD12	1:B:388:LEU:HA	1.85	0.41
1:C:203:ASP:HB2	1:C:204:PRO:HD2	2.03	0.41
1:C:190:ASN:OD1	1:C:230:ASN:HB3	2.21	0.41
1:C:268:GLN:O	1:C:322:PRO:HB3	2.21	0.41
1:B:383:GLU:HA	1:B:383:GLU:OE1	2.20	0.40
1:C:197:PRO:O	1:C:236:GLY:HA3	2.21	0.40
1:C:381:PRO:O	1:C:382:LEU:C	2.59	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:203:ASP:OD2	1:A:203:ASP:C	2.59	0.40
1:A:307:ASN:HA	1:A:307:ASN:HD22	1.66	0.40
1:C:342:ARG:HG2	1:C:342:ARG:NH1	2.36	0.40
1:A:197:PRO:O	1:A:236:GLY:HA3	2.22	0.40
1:A:226:ARG:NH2	1:A:390:GLN:HE21	2.20	0.40
1:B:190:ASN:HB2	1:B:269:ASN:ND2	2.36	0.40
1:B:353:ASN:HD22	1:B:353:ASN:N	2.15	0.40
1:C:367:ASN:O	1:C:388:LEU:HD22	2.20	0.40
1:A:353:ASN:HD22	1:A:353:ASN:C	2.20	0.40
1:B:203:ASP:C	1:B:203:ASP:OD2	2.60	0.40
1:B:220:ILE:HD11	1:B:392:LEU:HD23	2.04	0.40
1:B:329:ALA:HA	1:B:353:ASN:ND2	2.36	0.40
1:B:329:ALA:HB1	1:B:355:VAL:HG21	2.02	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	213/226 (94%)	189 (89%)	20 (9%)	4 (2%)	9	29
1	B	214/226 (95%)	191 (89%)	20 (9%)	3 (1%)	13	37
1	C	212/226 (94%)	195 (92%)	16 (8%)	1 (0%)	32	64
All	All	639/678 (94%)	575 (90%)	56 (9%)	8 (1%)	14	39

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	291	LYS
1	B	183	VAL
1	B	184	ASN
1	A	184	ASN

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Mol	Chain	Res	Type
1	A	290	ILE
1	B	382	LEU
1	C	289	LYS
1	A	300	LEU

### 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	180/187 (96%)	165 (92%)	15 (8%)	13	34
1	B	181/187 (97%)	165 (91%)	16 (9%)	12	31
1	C	179/187 (96%)	165 (92%)	14 (8%)	15	36
All	All	540/561 (96%)	495 (92%)	45 (8%)	13	34

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

Mol	Chain	Res	Type
1	A	184	ASN
1	A	198	THR
1	A	292	LYS
1	A	301	THR
1	A	317	LEU
1	A	333	ASN
1	A	344	ARG
1	A	353	ASN
1	A	360	GLN
1	A	362	PHE
1	A	375	ASP
1	A	378	LYS
1	A	384	ARG
1	A	399	ARG
1	A	404	ASN
1	B	189	LEU
1	B	198	THR
1	B	205	VAL

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Mol	Chain	Res	Type
1	B	274	CYS
1	B	317	LEU
1	B	319	ASP
1	B	333	ASN
1	B	336	GLU
1	B	344	ARG
1	B	353	ASN
1	B	362	PHE
1	B	375	ASP
1	B	378	LYS
1	B	394	ASP
1	B	399	ARG
1	B	405	ARG
1	C	198	THR
1	C	307	ASN
1	C	317	LEU
1	C	336	GLU
1	C	344	ARG
1	C	353	ASN
1	C	360	GLN
1	C	362	PHE
1	C	375	ASP
1	C	378	LYS
1	C	384	ARG
1	C	399	ARG
1	C	404	ASN
1	C	405	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (27) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	184	ASN
1	A	230	ASN
1	A	262	ASN
1	A	269	ASN
1	A	307	ASN
1	A	333	ASN
1	A	346	ASN
1	A	353	ASN
1	A	363	ASN
1	A	390	GLN
1	B	230	ASN

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Mol	Chain	Res	Type
1	B	269	ASN
1	B	307	ASN
1	B	333	ASN
1	B	346	ASN
1	B	353	ASN
1	B	360	GLN
1	B	363	ASN
1	B	390	GLN
1	C	230	ASN
1	C	269	ASN
1	C	307	ASN
1	C	333	ASN
1	C	346	ASN
1	C	353	ASN
1	C	363	ASN
1	C	390	GLN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

6 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
3	C5P	A	500	-	19,22,22	1.39	3 (15%)	23,33,33	1.00	1 (4%)
2	PO4	A	501	-	4,4,4	1.11	0	6,6,6	0.45	0
3	C5P	B	1500	-	19,22,22	1.44	4 (21%)	23,33,33	1.01	1 (4%)
2	PO4	B	1501	-	4,4,4	1.30	0	6,6,6	0.41	0
3	C5P	C	2500	-	19,22,22	1.43	4 (21%)	23,33,33	1.00	1 (4%)
2	PO4	C	2501	-	4,4,4	1.40	0	6,6,6	0.35	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
3	C5P	A	500	-	-	0/6/26/26	0/2/2/2
2	PO4	A	501	-	-	0/0/0/0	0/0/0/0
3	C5P	B	1500	-	-	0/6/26/26	0/2/2/2
2	PO4	B	1501	-	-	0/0/0/0	0/0/0/0
3	C5P	C	2500	-	-	0/6/26/26	0/2/2/2
2	PO4	C	2501	-	-	0/0/0/0	0/0/0/0

All (11) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	1500	C5P	C2-N3	-2.20	1.33	1.38
3	C	2500	C5P	C2-N3	-2.01	1.34	1.38
3	B	1500	C5P	O4'-C1'	2.04	1.44	1.41
3	A	500	C5P	O4'-C1'	2.07	1.44	1.41
3	C	2500	C5P	O4'-C1'	2.25	1.44	1.41
3	B	1500	C5P	P-O1P	3.15	1.61	1.50
3	C	2500	C5P	P-O1P	3.17	1.61	1.50
3	A	500	C5P	P-O1P	3.19	1.61	1.50
3	A	500	C5P	C6-N1	3.47	1.40	1.35
3	C	2500	C5P	C6-N1	3.49	1.40	1.35
3	B	1500	C5P	C6-N1	3.62	1.40	1.35

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	500	C5P	O2P-P-O5'	2.15	112.45	106.73
3	B	1500	C5P	O2P-P-O5'	2.30	112.86	106.73
3	C	2500	C5P	O2P-P-O5'	2.36	113.00	106.73

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

3 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	500	C5P	2	0
3	B	1500	C5P	3	0
3	C	2500	C5P	2	0

## 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, 95<sup>th</sup> 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 <sup>2</sup> )	Q < 0.9
1	A	217/226 (96%)	-0.11	8 (3%)	42 36	29, 63, 107, 148	0
1	B	218/226 (96%)	-0.17	14 (6%)	20 15	24, 46, 124, 150	0
1	C	216/226 (95%)	-0.17	9 (4%)	37 31	33, 61, 120, 141	0
All	All	651/678 (96%)	-0.15	31 (4%)	31 27	24, 57, 116, 150	0

All (31) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	292	LYS	9.1
1	B	361	GLY	6.3
1	B	366	ASN	6.1
1	B	360	GLN	5.5
1	B	406	ARG	5.1
1	A	188	HIS	4.6
1	B	358	PRO	4.5
1	C	358	PRO	4.4
1	C	357	GLN	4.2
1	B	363	ASN	4.1
1	C	359	THR	3.9
1	A	359	THR	3.9
1	A	183	VAL	3.8
1	B	182	PRO	3.8
1	B	362	PHE	3.7
1	B	181	SER	3.6
1	C	360	GLN	3.6
1	B	359	THR	3.2
1	C	362	PHE	3.2
1	C	298	ASP	3.0
1	B	357	GLN	2.9
1	A	375	ASP	2.8
1	C	337	TYR	2.8

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Mol	Chain	Res	Type	RSRZ
1	A	358	PRO	2.7
1	C	356	SER	2.5
1	A	287	PRO	2.5
1	B	367	ASN	2.4
1	B	331	THR	2.2
1	C	405	ARG	2.1
1	B	364	SER	2.1
1	A	318	LYS	2.1

## 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 carbohydrates 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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 95<sup>th</sup> 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	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
3	C5P	A	500	21/21	0.92	0.18	0.31	66,89,111,112	0
2	PO4	A	501	5/5	0.96	0.18	0.05	38,55,65,68	0
3	C5P	B	1500	21/21	0.96	0.12	-0.37	49,66,81,86	0
3	C5P	C	2500	21/21	0.95	0.14	-0.40	48,68,82,85	0
2	PO4	C	2501	5/5	0.95	0.15	-0.43	66,68,74,77	0
2	PO4	B	1501	5/5	0.93	0.15	-0.58	99,104,106,106	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.