



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 28, 2014 – 07:51 AM GMT

PDB ID : 1WC5  
Title : SOLUBLE ADENYLYL CYCLASE CYAC FROM S. PLATENSIS IN COMPLEX WITH ALPHA,BETA-METHYLENE-ATPIN PRESENCE OF BICARBONATE  
Authors : Steegborn, C.; Litvin, T.N.; Levin, L.R.; Buck, J.; Wu, H.  
Deposited on : 2004-11-08  
Resolution : 2.30 Å(reported)

This is a full wwPDB 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/ValidationPDFNotes.html>

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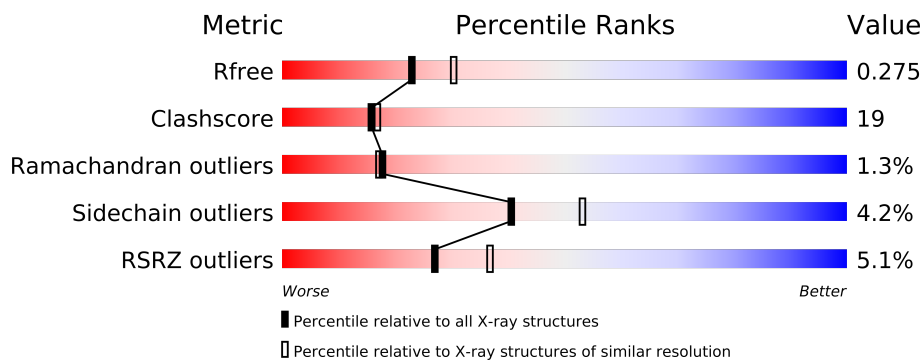
The following versions of software and data (see [references](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.15 2013  
Xtriage (Phenix) : dev-1323  
EDS : stable22639  
Percentile statistics : 21963  
Refmac : 5.8.0049  
CCP4 : 6.3.0 (Settle)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)  
Validation Pipeline (wwPDB-VP) : stable22683

# 1 Overall quality at a glance

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))
$R_{free}$	66092	2929 (2.30-2.30)
Clashscore	79885	3679 (2.30-2.30)
Ramachandran outliers	78287	3642 (2.30-2.30)
Sidechain outliers	78261	3641 (2.30-2.30)
RSRZ outliers	66119	2930 (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 on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density.

Mol	Chain	Length	Quality of chain
1	A	219	
1	B	219	
1	C	219	
1	D	219	

## 2 Entry composition i

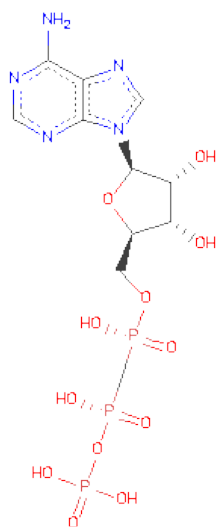
There are 5 unique types of molecules in this entry. The entry contains 6226 atoms, of which 0 are hydrogen and 0 are deuterium.

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 ADENYLATE CYCLASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	193	Total	C	N	O	S	0	0	0
			1487	935	261	279	12			
1	B	194	Total	C	N	O	S	0	0	0
			1495	940	262	280	13			
1	C	198	Total	C	N	O	S	0	0	0
			1528	958	269	288	13			
1	D	193	Total	C	N	O	S	4	0	0
			1485	934	258	281	12			

- Molecule 2 is DIPHOSPHOMETHYLPHOSPHONICACID ADENOSYL ESTER (three-letter code: APC) (formula:  $C_{11}H_{18}N_5O_{12}P_3$ ).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			31	11	5	12	3		
2	B	1	Total	C	N	O	P	0	0
			31	11	5	12	3		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	C	1	Total	C	N	O	P	0	0
			31	11	5	12	3		
2	D	1	Total	C	N	O	P	0	0
			31	11	5	12	3		

- Molecule 3 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	1	Total	Mg	0	0
			1	1		
3	A	1	Total	Mg	0	0
			1	1		
3	D	1	Total	Mg	0	0
			1	1		
3	C	1	Total	Mg	0	0
			1	1		

- Molecule 4 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	1	Total	Ca	0	0
			1	1		
4	A	1	Total	Ca	0	0
			1	1		
4	D	1	Total	Ca	0	0
			1	1		
4	C	1	Total	Ca	0	0
			1	1		

- Molecule 5 is water.

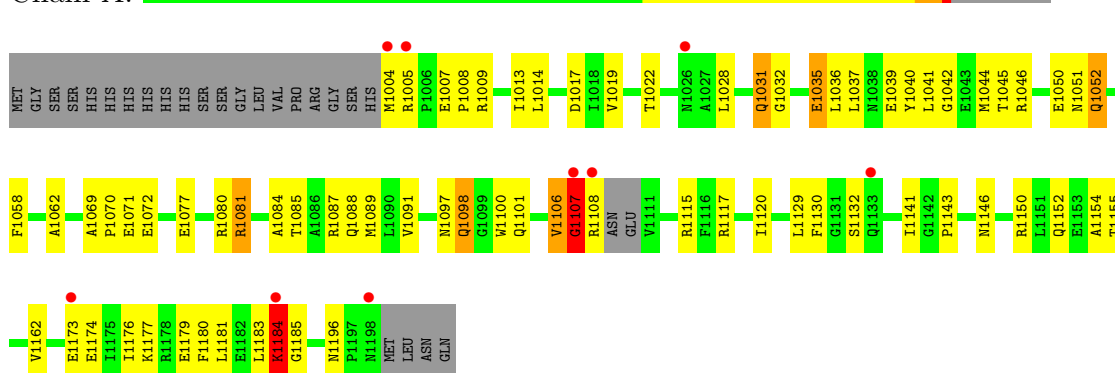
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	21	Total	O	0	0
			21	21		
5	B	36	Total	O	0	0
			36	36		
5	C	29	Total	O	0	0
			29	29		
5	D	13	Total	O	0	0
			13	13		

### 3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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.

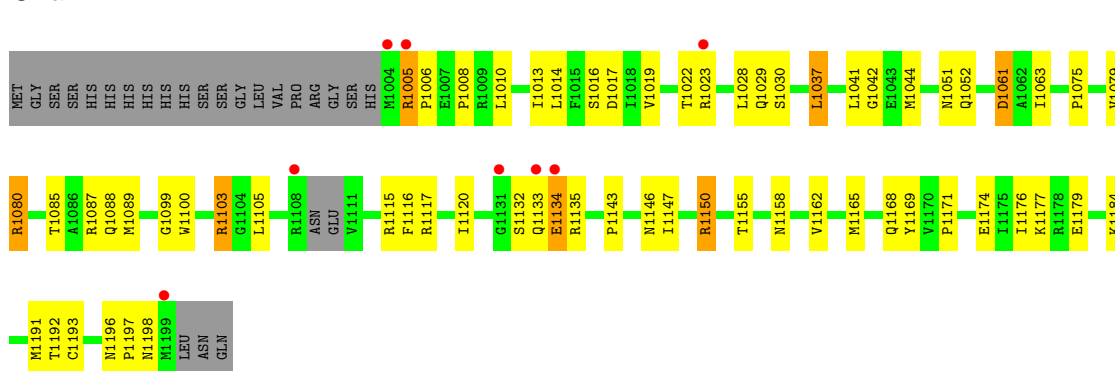
#### • Molecule 1: ADENYLATE CYCLASE

Chain A:



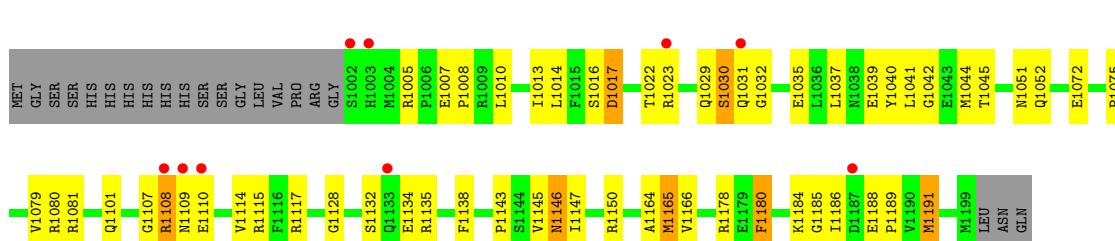
#### • Molecule 1: ADENYLATE CYCLASE

Chain B:



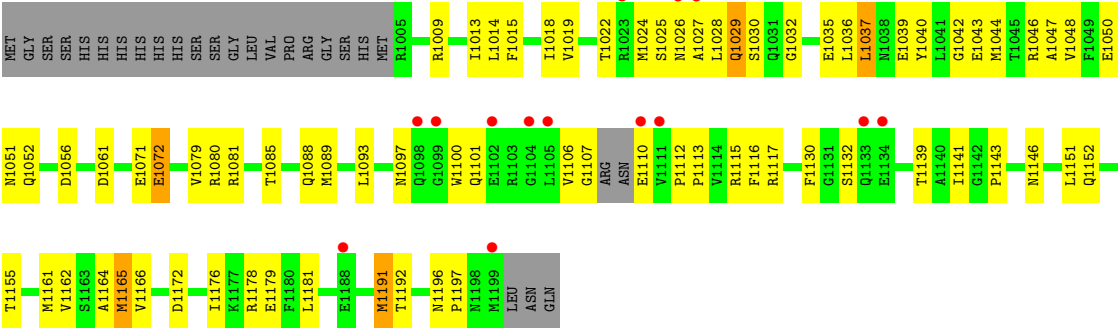
#### • Molecule 1: ADENYLATE CYCLASE

Chain C:



#### • Molecule 1: ADENYLATE CYCLASE

Chain D: 



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	53.30Å 71.19Å 106.73Å 90.00° 95.81° 90.00°	Depositor
Resolution (Å)	14.99 – 2.30 19.79 – 2.29	Depositor EDS
% Data completeness (in resolution range)	75.7 (14.99-2.30) 88.5 (19.79-2.29)	Depositor EDS
$R_{merge}$	0.07	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	0.50 (at 2.28Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, $R_{free}$	0.202 , 0.262 0.217 , 0.275	Depositor DCC
$R_{free}$ test set	1883 reflections (5.93%)	DCC
Wilson B-factor (Å <sup>2</sup> )	31.3	Xtriage
Anisotropy	0.481	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 24.4	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtriage
Outliers	0 of 33953 reflections	Xtriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	6226	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	39.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.25% of the height of the origin peak. No significant pseudotranslation is detected.*

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

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: APC, CA, MG

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	0.36	0/1510	0.62	1/2041 (0.0%)
1	B	0.38	0/1518	0.62	0/2051
1	C	0.40	0/1553	0.61	1/2100 (0.0%)
1	D	0.33	0/1508	0.55	0/2039
All	All	0.37	0/6089	0.60	2/8231 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	1107	GLY	N-CA-C	8.69	134.81	113.10
1	C	1017	ASP	N-CA-CB	-5.37	100.94	110.60

There are no chirality outliers.

There are no planarity outliers.

### 5.2 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 hydrogens added by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, and the number in parentheses is this value normalized per 1000 atoms of the molecule in the chain. The Symm-Clashes column gives symmetry related clashes, in the same way as for the Clashes column.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1487	0	1498	76	0
1	B	1495	0	1507	60	0
1	C	1528	0	1532	47	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	D	1485	0	1491	58	0
2	A	31	0	14	3	0
2	B	31	0	14	0	0
2	C	31	0	14	0	0
2	D	31	0	14	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
5	A	21	0	0	2	0
5	B	36	0	0	2	0
5	C	29	0	0	2	0
5	D	13	0	0	1	0
All	All	6226	0	6084	226	0

Clashscore is defined as the number of clashes calculated for the entry per 1000 atoms (including hydrogens) of the entry. The overall clashscore for this entry is 19.

All (226) close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:1184:LYS:H	1:A:1184:LYS:HD3	1.07	1.18
1:A:1184:LYS:H	1:A:1184:LYS:CD	1.80	0.94
1:B:1134:GLU:HG3	1:B:1135:ARG:H	1.32	0.93
1:B:1005:ARG:HD2	1:B:1006:PRO:HD2	1.51	0.93
1:A:1031:GLN:NE2	1:A:1031:GLN:H	1.73	0.87
1:D:1018:ILE:HD12	1:D:1061:ASP:HB2	1.55	0.86
1:A:1150:ARG:NH1	1:A:1185:GLY:HA3	1.90	0.85
1:A:1184:LYS:N	1:A:1184:LYS:HD3	1.90	0.85
1:A:1154:ALA:HB2	1:A:1184:LYS:HE3	1.59	0.84
1:A:1008:PRO:O	1:A:1009:ARG:HG3	1.78	0.82
1:A:1101:GLN:OE1	1:A:1107:GLY:HA3	1.80	0.81
1:B:1150:ARG:HD3	1:B:1184:LYS:O	1.84	0.77
1:A:1005:ARG:HH12	1:A:1007:GLU:HB3	1.50	0.76
1:A:1150:ARG:HH11	1:A:1185:GLY:HA3	1.50	0.76
1:C:1134:GLU:HG2	1:C:1135:ARG:H	1.50	0.75
1:B:1042:GLY:HA2	1:C:1132:SER:HB3	1.69	0.75
1:A:1146:ASN:ND2	1:A:1150:ARG:HG2	2.03	0.73
1:D:1019:VAL:HG12	1:D:1115:ARG:O	1.87	0.73

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:1031:GLN:HE21	1:A:1031:GLN:H	1.38	0.72
1:B:1080:ARG:HG2	1:B:1080:ARG:HH11	1.55	0.72
1:A:1042:GLY:HA2	1:D:1132:SER:HB3	1.72	0.71
1:A:1044:MET:HA	5:A:2004:HOH:O	1.90	0.71
1:D:1052:GLN:HB2	1:D:1081:ARG:HD3	1.73	0.70
1:B:1132:SER:HB3	1:C:1042:GLY:HA2	1.72	0.70
1:A:1132:SER:OG	1:D:1042:GLY:HA2	1.93	0.69
1:A:1037:LEU:HD12	1:D:1130:PHE:HD2	1.55	0.69
1:B:1134:GLU:HG3	1:B:1135:ARG:N	2.07	0.68
1:C:1014:LEU:C	1:C:1014:LEU:HD23	2.14	0.68
1:B:1019:VAL:HG11	1:B:1115:ARG:HB2	1.76	0.67
1:C:1180:PHE:CE1	1:C:1191:MET:HG2	2.30	0.67
1:C:1134:GLU:HG2	1:C:1135:ARG:N	2.10	0.66
1:B:1022:THR:HG23	1:C:1143:PRO:HG3	1.78	0.65
1:A:1005:ARG:NH1	1:A:1007:GLU:HB3	2.11	0.65
1:A:1141:ILE:HD13	1:D:1037:LEU:HD12	1.78	0.64
1:A:1085:THR:O	1:A:1089:MET:HG3	1.98	0.64
1:A:1087:ARG:O	1:A:1091:VAL:HG23	1.98	0.64
1:A:1146:ASN:HD21	1:A:1150:ARG:HG2	1.62	0.63
1:D:1093:LEU:HD21	1:D:1115:ARG:HA	1.81	0.63
1:D:1117:ARG:HB2	1:D:1152:GLN:HE21	1.63	0.63
1:D:1047:ALA:HA	1:D:1088:GLN:NE2	2.14	0.63
1:C:1165:MET:HB3	5:C:2025:HOH:O	1.98	0.63
1:B:1115:ARG:HB3	1:B:1158:ASN:ND2	2.13	0.62
1:A:1081:ARG:HH12	1:A:1084:ALA:HB3	1.63	0.62
1:D:1014:LEU:HD23	1:D:1014:LEU:C	2.20	0.62
1:D:1085:THR:O	1:D:1089:MET:HG3	1.99	0.61
1:A:1183:LEU:O	1:A:1185:GLY:N	2.34	0.61
1:A:1081:ARG:HA	1:A:1081:ARG:NH1	2.16	0.61
1:A:1019:VAL:HG12	1:A:1115:ARG:O	2.01	0.61
1:B:1117:ARG:HD3	1:B:1155:THR:O	2.00	0.60
1:B:1165:MET:O	1:B:1168:GLN:HG2	2.01	0.60
1:A:1177:LYS:HE3	1:A:1179:GLU:OE1	2.01	0.60
1:B:1087:ARG:HG2	1:B:1197:PRO:O	2.01	0.60
1:B:1099:GLY:O	1:B:1103:ARG:HB2	2.02	0.60
1:A:1117:ARG:HB2	1:A:1152:GLN:HE21	1.66	0.60
1:B:1085:THR:O	1:B:1089:MET:HG3	2.02	0.59
1:B:1116:PHE:H	1:B:1158:ASN:ND2	2.00	0.59
1:A:1035:GLU:O	1:A:1039:GLU:HG3	2.03	0.59
1:A:1037:LEU:HD12	1:D:1130:PHE:CD2	2.36	0.59
1:B:1005:ARG:HD2	1:B:1006:PRO:CD	2.31	0.59
1:D:1018:ILE:HB	1:D:1061:ASP:OD2	2.02	0.59

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:D:1143:PRO:HD2	5:D:2007:HOH:O	2.03	0.58
1:B:1019:VAL:HG12	1:B:1115:ARG:O	2.03	0.58
1:A:1019:VAL:HG11	1:A:1115:ARG:HB2	1.86	0.58
1:D:1097:ASN:O	1:D:1101:GLN:HB2	2.02	0.58
1:C:1165:MET:SD	1:C:1165:MET:N	2.76	0.58
1:B:1010:LEU:CD2	1:B:1075:PRO:HG3	2.33	0.58
1:C:1035:GLU:O	1:C:1039:GLU:HG3	2.04	0.58
1:A:1041:LEU:HD22	1:A:1058:PHE:CE2	2.40	0.57
1:A:1040:TYR:O	1:A:1044:MET:HG2	2.05	0.57
1:D:1106:VAL:HG11	1:D:1113:PRO:HA	1.85	0.57
1:C:1052:GLN:HG3	1:C:1081:ARG:NE	2.20	0.57
1:C:1184:LYS:HG2	1:C:1185:GLY:N	2.18	0.57
1:C:1180:PHE:CD1	1:C:1191:MET:HG2	2.40	0.56
1:A:1007:GLU:HB2	1:A:1008:PRO:HD2	1.86	0.56
1:B:1150:ARG:HD2	5:B:2032:HOH:O	2.04	0.56
1:A:1031:GLN:HE21	1:A:1031:GLN:N	2.02	0.56
1:A:1143:PRO:HG3	1:D:1022:THR:HG23	1.87	0.56
1:B:1019:VAL:CG1	1:B:1115:ARG:HB2	2.35	0.56
1:D:1043:GLU:O	1:D:1046:ARG:HB3	2.06	0.56
1:B:1080:ARG:NH1	1:B:1080:ARG:HG2	2.21	0.55
1:B:1022:THR:CG2	1:C:1143:PRO:HG3	2.35	0.55
1:C:1134:GLU:N	1:C:1134:GLU:OE1	2.38	0.55
1:A:1081:ARG:HH12	1:A:1084:ALA:CB	2.20	0.55
1:B:1014:LEU:HD23	1:B:1014:LEU:C	2.27	0.54
1:A:1101:GLN:HE22	1:A:1108:ARG:N	2.05	0.54
1:A:1117:ARG:HD3	1:A:1155:THR:O	2.07	0.54
1:B:1030:SER:HB3	1:C:1008:PRO:HG3	1.90	0.54
1:C:1023:ARG:HH11	1:C:1023:ARG:HG3	1.73	0.54
1:A:1115:ARG:HH11	1:A:1115:ARG:HG3	1.73	0.54
1:D:1164:ALA:HB2	1:D:1191:MET:HG2	1.90	0.54
1:A:1019:VAL:CG1	1:A:1115:ARG:HB2	2.38	0.54
1:A:1028:LEU:O	1:A:1032:GLY:HA3	2.07	0.53
1:C:1052:GLN:HG3	1:C:1081:ARG:CZ	2.38	0.53
1:D:1026:ASN:O	1:D:1027:ALA:HB3	2.08	0.53
1:A:1004:MET:N	1:A:1129:LEU:HD12	2.24	0.53
1:B:1120:ILE:HB	1:B:1162:VAL:HG12	1.90	0.53
1:B:1017:ASP:O	1:B:1116:PHE:HB2	2.09	0.53
1:A:1150:ARG:HD2	1:A:1184:LYS:O	2.10	0.52
1:A:1184:LYS:N	1:A:1184:LYS:CD	2.57	0.52
1:A:1051:ASN:OD1	1:A:1081:ARG:NH1	2.43	0.52
1:C:1128:GLY:HA2	1:C:1138:PHE:CE1	2.45	0.52
1:A:1141:ILE:HD13	1:D:1037:LEU:CD1	2.39	0.51

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:D:1040:TYR:O	1:D:1044:MET:HG2	2.10	0.51
1:C:1080:ARG:HG2	1:C:1080:ARG:HH11	1.75	0.51
1:B:1028:LEU:O	1:B:1029:GLN:HB2	2.11	0.51
1:D:1079:VAL:HG13	1:D:1166:VAL:HG13	1.91	0.51
1:A:1045:THR:HG21	1:A:1058:PHE:HZ	1.75	0.51
1:A:1081:ARG:NH1	1:A:1084:ALA:HB3	2.25	0.51
1:D:1014:LEU:HD23	1:D:1015:PHE:N	2.25	0.51
1:C:1013:ILE:HD13	1:C:1145:VAL:HA	1.92	0.51
1:B:1115:ARG:HA	1:B:1158:ASN:HD21	1.76	0.51
1:B:1005:ARG:HG3	1:B:1005:ARG:HH11	1.77	0.50
1:A:1017:ASP:OD1	1:A:1062:ALA:HB2	2.12	0.50
1:A:1071:GLU:OE2	1:A:1071:GLU:HA	2.12	0.50
1:A:1046:ARG:HD3	1:A:1050:GLU:OE2	2.12	0.50
1:C:1010:LEU:CD2	1:C:1075:PRO:HG3	2.42	0.50
1:B:1179:GLU:N	1:B:1191:MET:HE1	2.26	0.50
1:D:1035:GLU:O	1:D:1039:GLU:HG3	2.12	0.49
1:D:1036:LEU:HD23	1:D:1036:LEU:C	2.32	0.49
1:B:1051:ASN:C	1:B:1052:GLN:HG2	2.33	0.49
1:A:1098:GLN:O	1:A:1101:GLN:HB3	2.13	0.49
1:C:1164:ALA:HB2	1:C:1191:MET:HB3	1.95	0.49
1:C:1147:ILE:HG12	1:C:1186:ILE:HD13	1.95	0.49
1:B:1079:VAL:HG21	1:B:1169:TYR:HD1	1.78	0.49
1:C:1101:GLN:HE21	1:C:1107:GLY:HA3	1.78	0.49
1:A:1120:ILE:HB	1:A:1162:VAL:HG12	1.95	0.48
1:D:1151:LEU:HD22	1:D:1161:MET:HG2	1.95	0.48
1:B:1191:MET:HA	1:B:1191:MET:HE3	1.96	0.48
1:B:1191:MET:HE2	1:B:1192:THR:O	2.13	0.48
1:C:1178:ARG:NH1	1:C:1178:ARG:HG2	2.28	0.48
1:B:1088:GLN:HB2	5:B:2014:HOH:O	2.14	0.48
1:B:1150:ARG:CD	1:B:1184:LYS:O	2.59	0.48
1:A:1130:PHE:CZ	1:A:1141:ILE:HD12	2.49	0.47
1:D:1046:ARG:HG3	1:D:1050:GLU:OE2	2.14	0.47
1:B:1016:SER:HA	1:B:1117:ARG:O	2.15	0.47
1:B:1196:ASN:HD22	1:B:1197:PRO:HD2	1.78	0.47
1:A:1146:ASN:HD21	1:A:1150:ARG:CG	2.28	0.47
1:D:1107:GLY:O	1:D:1110:GLU:N	2.47	0.47
1:A:1176:ILE:CD1	1:A:1196:ASN:HA	2.45	0.47
1:C:1180:PHE:HE1	1:C:1191:MET:HG2	1.79	0.46
1:A:1176:ILE:HD11	1:A:1196:ASN:HA	1.98	0.46
1:C:1146:ASN:HD21	1:C:1150:ARG:NH1	2.13	0.46
1:A:1150:ARG:HD3	1:A:1150:ARG:HA	1.79	0.46
1:B:1017:ASP:OD1	1:B:1061:ASP:OD2	2.34	0.46

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:D:1116:PHE:CD1	1:D:1116:PHE:C	2.89	0.46
1:A:1022:THR:HG22	2:A:1500:APC:O1B	2.15	0.46
1:B:1023:ARG:HH21	1:B:1023:ARG:HG3	1.80	0.46
1:C:1029:GLN:O	1:C:1032:GLY:N	2.42	0.46
1:D:1196:ASN:OD1	1:D:1197:PRO:HD2	2.16	0.45
1:D:1176:ILE:HD11	1:D:1196:ASN:HA	1.98	0.45
1:D:1018:ILE:HD11	1:D:1040:TYR:CD2	2.51	0.45
1:A:1084:ALA:O	1:A:1088:GLN:HG3	2.16	0.45
1:A:1044:MET:HE2	5:A:2004:HOH:O	2.15	0.45
1:C:1041:LEU:O	1:C:1045:THR:HG23	2.16	0.45
1:D:1009:ARG:NH2	1:D:1072:GLU:OE1	2.50	0.45
1:D:1028:LEU:C	1:D:1029:GLN:HG2	2.37	0.45
1:D:1115:ARG:HH11	1:D:1115:ARG:HG3	1.81	0.45
1:A:1179:GLU:OE2	1:A:1181:LEU:HD21	2.17	0.45
1:A:1014:LEU:C	1:A:1014:LEU:HD23	2.37	0.45
1:D:1164:ALA:HB3	1:D:1165:MET:CE	2.46	0.45
1:C:1010:LEU:HD23	1:C:1075:PRO:HG3	1.98	0.45
1:B:1019:VAL:O	1:B:1019:VAL:HG13	2.16	0.45
1:A:1130:PHE:CE2	1:A:1141:ILE:HD12	2.52	0.44
1:B:1100:TRP:CD1	1:B:1105:LEU:HD12	2.52	0.44
1:B:1177:LYS:O	1:B:1193:CYS:HA	2.17	0.44
1:B:1176:ILE:CD1	1:B:1196:ASN:HA	2.47	0.44
1:B:1146:ASN:O	1:B:1150:ARG:HG2	2.17	0.44
1:B:1115:ARG:CA	1:B:1158:ASN:HD21	2.31	0.44
1:D:1152:GLN:O	1:D:1155:THR:HG22	2.18	0.44
1:D:1044:MET:O	1:D:1048:VAL:HG23	2.18	0.44
2:A:1500:APC:H3A2	1:D:1146:ASN:ND2	2.33	0.44
1:D:1181:LEU:HD12	1:D:1192:THR:HG21	1.99	0.44
1:C:1040:TYR:O	1:C:1044:MET:HG2	2.17	0.44
1:D:1051:ASN:ND2	1:D:1085:THR:HA	2.33	0.44
1:C:1080:ARG:HG2	1:C:1080:ARG:NH1	2.33	0.44
1:A:1005:ARG:HH11	1:A:1005:ARG:HG2	1.83	0.43
1:A:1013:ILE:O	1:A:1120:ILE:HA	2.18	0.43
1:D:1022:THR:O	1:D:1025:SER:HB3	2.17	0.43
1:C:1178:ARG:HH11	1:C:1178:ARG:HG2	1.84	0.43
1:A:1072:GLU:HA	1:A:1072:GLU:OE1	2.17	0.43
1:B:1191:MET:HE2	1:B:1192:THR:N	2.34	0.43
1:B:1008:PRO:HG3	1:C:1030:SER:HB2	2.01	0.43
1:D:1112:PRO:HB2	1:D:1113:PRO:HD2	2.01	0.43
1:C:1016:SER:HA	1:C:1117:ARG:O	2.18	0.43
1:C:1007:GLU:HB3	5:C:2002:HOH:O	2.19	0.42
1:A:1077:GLU:OE2	1:A:1080:ARG:HD2	2.19	0.42

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:D:1080:ARG:HG2	1:D:1080:ARG:HH11	1.84	0.42
1:C:1029:GLN:O	1:C:1030:SER:C	2.58	0.42
1:B:1171:PRO:HB2	1:B:1174:GLU:HG3	2.02	0.42
1:A:1100:TRP:HB3	1:A:1106:VAL:HG22	2.02	0.42
1:A:1037:LEU:O	1:A:1041:LEU:HG	2.19	0.42
1:D:1056:ASP:OD2	1:D:1139:THR:HA	2.19	0.42
1:B:1132:SER:O	1:B:1134:GLU:N	2.52	0.42
1:C:1014:LEU:C	1:C:1014:LEU:CD2	2.85	0.42
1:C:1108:ARG:HG3	1:C:1109:ASN:N	2.35	0.42
1:D:1101:GLN:NE2	1:D:1106:VAL:O	2.52	0.42
1:C:1051:ASN:C	1:C:1052:GLN:HG2	2.40	0.42
1:D:1028:LEU:O	1:D:1032:GLY:HA3	2.20	0.42
1:C:1188:GLU:HA	1:C:1189:PRO:HD3	1.95	0.42
1:C:1017:ASP:C	1:C:1017:ASP:OD2	2.57	0.42
1:B:1143:PRO:O	1:B:1147:ILE:HG13	2.20	0.42
1:D:1024:MET:O	1:D:1028:LEU:HB2	2.20	0.41
2:A:1500:APC:HN61	1:D:1141:ILE:HD13	1.85	0.41
1:A:1069:ALA:HA	1:A:1070:PRO:C	2.40	0.41
1:B:1116:PHE:H	1:B:1158:ASN:HD22	1.68	0.41
1:A:1097:ASN:O	1:A:1101:GLN:HB2	2.20	0.41
1:B:1143:PRO:HB3	1:C:1022:THR:HG23	2.02	0.41
1:D:1100:TRP:HB3	1:D:1106:VAL:HG23	2.02	0.41
1:B:1171:PRO:HD2	1:B:1174:GLU:OE1	2.20	0.41
1:A:1051:ASN:C	1:A:1052:GLN:HG2	2.41	0.41
1:B:1013:ILE:N	1:B:1013:ILE:HD12	2.36	0.41
1:B:1008:PRO:HG3	1:C:1030:SER:CB	2.50	0.41
1:D:1071:GLU:OE2	1:D:1071:GLU:HA	2.21	0.41
1:C:1114:VAL:HG12	1:C:1115:ARG:N	2.36	0.41
1:D:1176:ILE:CD1	1:D:1196:ASN:HA	2.51	0.41
1:A:1036:LEU:HD23	1:A:1036:LEU:C	2.41	0.41
1:B:1044:MET:CB	1:B:1063:ILE:CD1	2.98	0.41
1:A:1173:GLU:HG2	1:A:1174:GLU:N	2.35	0.41
1:A:1005:ARG:HG2	1:A:1005:ARG:NH1	2.36	0.40
1:D:1162:VAL:HB	1:D:1166:VAL:HB	2.03	0.40
1:D:1013:ILE:HD12	1:D:1013:ILE:N	2.35	0.40
1:C:1079:VAL:HG13	1:C:1166:VAL:HG13	2.03	0.40
1:D:1106:VAL:HG13	1:D:1112:PRO:O	2.22	0.40
1:B:1044:MET:HB3	1:B:1063:ILE:CD1	2.51	0.40
1:D:1172:ASP:OD1	1:D:1178:ARG:NH2	2.54	0.40
1:B:1037:LEU:HD22	1:B:1041:LEU:CD1	2.51	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles

### 5.3.1 Protein backbone ⓘ

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	189/219 (86%)	177 (94%)	9 (5%)	3 (2%)	14	12
1	B	190/219 (87%)	179 (94%)	7 (4%)	4 (2%)	11	8
1	C	196/219 (90%)	189 (96%)	6 (3%)	1 (0%)	38	45
1	D	189/219 (86%)	173 (92%)	14 (7%)	2 (1%)	21	21
All	All	764/876 (87%)	718 (94%)	36 (5%)	10 (1%)	18	17

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	1184	LYS
1	B	1134	GLU
1	C	1030	SER
1	D	1029	GLN
1	A	1107	GLY
1	D	1030	SER
1	B	1103	ARG
1	B	1198	ASN
1	B	1133	GLN
1	A	1106	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	160/183 (87%)	153 (96%)	7 (4%)	39	51
1	B	161/183 (88%)	156 (97%)	5 (3%)	52	68
1	C	165/183 (90%)	155 (94%)	10 (6%)	26	34

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	D	160/183 (87%)	155 (97%)	5 (3%)	52 68
All	All	646/732 (88%)	619 (96%)	27 (4%)	40 53

All (27) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1031	GLN
1	A	1035	GLU
1	A	1052	GLN
1	A	1081	ARG
1	A	1098	GLN
1	A	1180	PHE
1	A	1184	LYS
1	B	1005	ARG
1	B	1037	LEU
1	B	1061	ASP
1	B	1080	ARG
1	B	1150	ARG
1	C	1005	ARG
1	C	1031	GLN
1	C	1037	LEU
1	C	1072	GLU
1	C	1108	ARG
1	C	1110	GLU
1	C	1146	ASN
1	C	1165	MET
1	C	1180	PHE
1	C	1191	MET
1	D	1037	LEU
1	D	1072	GLU
1	D	1165	MET
1	D	1179	GLU
1	D	1191	MET

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

Mol	Chain	Res	Type
1	A	1031	GLN
1	A	1052	GLN
1	A	1122	GLN
1	A	1146	ASN

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Mol	Chain	Res	Type
1	A	1152	GLN
1	A	1158	ASN
1	B	1052	GLN
1	B	1122	GLN
1	B	1152	GLN
1	B	1158	ASN
1	B	1196	ASN
1	C	1098	GLN
1	C	1101	GLN
1	C	1146	ASN
1	C	1152	GLN
1	C	1158	ASN
1	D	1088	GLN
1	D	1101	GLN
1	D	1152	GLN
1	D	1158	ASN

### 5.3.3 RNA ⓘ

There are no RNA chains in this entry.

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

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

## 5.5 Carbohydrates ⓘ

There are no carbohydrates in this entry.

## 5.6 Ligand geometry ⓘ

Of 12 ligands modelled in this entry, 8 are monoatomic - leaving 4 for Mogul analysis.

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	APC	A	1500	3,4	33,33,33	1.09	3 (9%)	52,52,52	1.29	6 (11%)
2	APC	B	1500	3,4	33,33,33	1.14	4 (12%)	52,52,52	1.31	4 (7%)
2	APC	C	1500	3,4	33,33,33	1.16	2 (6%)	52,52,52	1.36	8 (15%)
2	APC	D	1500	3,4	33,33,33	1.09	3 (9%)	52,52,52	1.19	5 (9%)

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	APC	A	1500	3,4	-	0/20/38/38	0/1/3/3
2	APC	B	1500	3,4	-	0/20/38/38	0/1/3/3
2	APC	C	1500	3,4	-	0/20/38/38	0/1/3/3
2	APC	D	1500	3,4	-	0/20/38/38	0/1/3/3

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	1500	APC	O4'-C1'	4.05	1.47	1.41
2	B	1500	APC	O4'-C1'	3.20	1.46	1.41
2	D	1500	APC	O4'-C1'	3.18	1.46	1.41
2	A	1500	APC	O4'-C1'	2.67	1.45	1.41
2	D	1500	APC	C2-N1	2.44	1.38	1.33
2	B	1500	APC	C2-N1	2.26	1.38	1.33
2	B	1500	APC	PB-C3A	2.23	1.81	1.79
2	A	1500	APC	C2-N1	2.14	1.38	1.33
2	B	1500	APC	C8-N7	-2.14	1.30	1.34
2	C	1500	APC	C2-N1	2.10	1.38	1.33
2	A	1500	APC	C8-N7	-2.09	1.30	1.34
2	D	1500	APC	C8-N7	-2.00	1.30	1.34

All (23) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	1500	APC	PA-C3A-PB	-5.27	110.03	117.62
2	A	1500	APC	PA-C3A-PB	-3.67	112.34	117.62
2	C	1500	APC	O4'-C1'-N9	3.40	111.60	108.44
2	C	1500	APC	PA-C3A-PB	-3.07	113.20	117.62
2	C	1500	APC	O5'-PA-O1A	-2.89	107.00	114.21
2	A	1500	APC	PG-O3B-PB	-2.67	122.68	131.81

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	1500	APC	C4-C5-N7	2.67	111.81	109.52
2	B	1500	APC	C4-C5-N7	2.66	111.80	109.52
2	D	1500	APC	PA-C3A-PB	-2.62	113.85	117.62
2	D	1500	APC	PG-O3B-PB	-2.58	122.99	131.81
2	D	1500	APC	O5'-PA-O1A	-2.57	107.79	114.21
2	A	1500	APC	C4-C5-N7	2.53	111.69	109.52
2	C	1500	APC	PG-O3B-PB	-2.53	123.17	131.81
2	D	1500	APC	C4-C5-N7	2.39	111.57	109.52
2	A	1500	APC	O5'-PA-O1A	-2.27	108.54	114.21
2	B	1500	APC	PG-O3B-PB	-2.27	124.06	131.81
2	C	1500	APC	C8-N9-C1'	2.23	130.78	126.38
2	C	1500	APC	C8-N9-C4	-2.23	105.20	106.90
2	C	1500	APC	C3'-C2'-C1'	2.22	104.38	100.91
2	B	1500	APC	O5'-PA-C3A	2.14	109.28	103.97
2	D	1500	APC	O2B-PB-C3A	2.11	111.47	106.61
2	A	1500	APC	O5'-PA-C3A	2.09	109.16	103.97
2	A	1500	APC	C8-N9-C1'	2.07	130.45	126.38

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

## 5.7 Other polymers ⓘ

There are no such residues in this entry.

## 5.8 Polymer linkage issues

There are no chain breaks in this entry.

## 6 Fit of model and data ⓘ

### 6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	193/219 (88%)	0.43	9 (4%)	30 40	23, 39, 65, 92	0
1	B	194/219 (88%)	0.11	8 (4%)	35 46	13, 29, 60, 77	0
1	C	198/219 (90%)	0.19	9 (4%)	32 42	14, 31, 62, 67	0
1	D	193/219 (88%)	0.48	14 (7%)	15 22	20, 43, 81, 89	1 (0%)
All	All	778/876 (88%)	0.30	40 (5%)	27 37	13, 35, 67, 92	1 (0%)

All (40) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	1004	MET	7.0
1	B	1004	MET	5.6
1	A	1108	ARG	5.5
1	B	1199	MET	4.4
1	B	1133	GLN	4.1
1	B	1108	ARG	4.0
1	D	1027	ALA	3.9
1	A	1133	GLN	3.9
1	C	1187	ASP	3.8
1	D	1098	GLN	3.7
1	D	1105	LEU	3.6
1	D	1133	GLN	3.4
1	A	1198	ASN	3.2
1	D	1111	VAL	3.2
1	A	1005	ARG	3.1
1	C	1133	GLN	3.1
1	A	1107	GLY	3.0
1	C	1109	ASN	2.9
1	D	1102	GLU	2.9
1	A	1026	ASN	2.9
1	D	1104	GLY	2.9

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Mol	Chain	Res	Type	RSRZ
1	C	1002	SER	2.8
1	A	1173	GLU	2.8
1	C	1110	GLU	2.7
1	B	1005	ARG	2.7
1	D	1026	ASN	2.7
1	D	1199	MET	2.7
1	D	1023	ARG	2.6
1	D	1188	GLU	2.6
1	D	1110	GLU	2.5
1	B	1131	GLY	2.4
1	B	1134	GLU	2.4
1	C	1023	ARG	2.4
1	B	1023	ARG	2.3
1	C	1108	ARG	2.3
1	D	1134	GLU	2.2
1	C	1003	HIS	2.2
1	C	1031	GLN	2.1
1	D	1099	GLY	2.1
1	A	1184	LYS	2.1

## 6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

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

## 6.3 Carbohydrates ⓘ

There are no carbohydrates in this entry.

## 6.4 Ligands ⓘ

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	RSR	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
2	APC	A	1500	31/31	0.13	-0.48	39,41,44,46	0
2	APC	B	1500	31/31	0.09	-0.74	20,25,34,35	0

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Mol	Type	Chain	Res	Atoms	RSR	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
2	APC	D	1500	31/31	0.11	-0.83	34,38,43,47	0
2	APC	C	1500	31/31	0.09	-0.96	16,25,30,31	0
3	MG	A	2000	1/1	0.09	-1.62	42,42,42,42	0
3	MG	B	2000	1/1	0.08	-2.24	27,27,27,27	0
4	CA	C	2100	1/1	0.06	-2.32	24,24,24,24	0
4	CA	B	2100	1/1	0.06	-2.97	29,29,29,29	0
3	MG	D	2000	1/1	0.08	-3.68	40,40,40,40	0
4	CA	A	2100	1/1	0.04	-3.69	32,32,32,32	0
3	MG	C	2000	1/1	0.09	-3.87	18,18,18,18	0
4	CA	D	2100	1/1	0.02	-8.93	32,32,32,32	0

## 6.5 Other polymers ⓘ

There are no such residues in this entry.