



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 11:26 AM GMT

PDB ID : 3OZG
Title : Crystal Structure of Plasmodium falciparum Hypoxanthine-Guanine-Xanthine Phosphoribosyltransferase in complex with S-SerMe-ImmH phosphonate
Authors : Ho, M.; Hazleton, K.Z.; Almo, S.C.; Schramm, V.L.
Deposited on : 2010-09-24
Resolution : 1.99 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
<http://wwpdb.org/validation/2016/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 : 1.7 (RC4), CSD as536be (2015)
Xtriage (Phenix) : 1.9-1692
EDS : rb-20026688
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)
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) : trunk26865

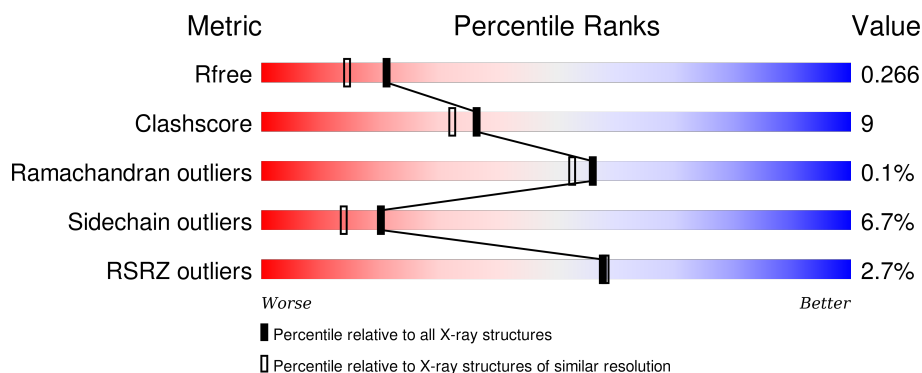
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.99 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}	91344	6249 (2.00-2.00)
Clashscore	102246	7340 (2.00-2.00)
Ramachandran outliers	100387	7248 (2.00-2.00)
Sidechain outliers	100360	7247 (2.00-2.00)
RSRZ outliers	91569	6262 (2.00-2.00)

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 ≥ 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	250	 2% 73% 17% • 9%
1	B	250	 2% 70% 18% • 9%
1	C	250	 3% 75% 14% • 8%
1	D	250	 3% 73% 17% • 9%

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 7725 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 Hypoxanthine-guanine-xanthine phosphoribosyltransferase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	227	Total	C	N	O	S	0	1	0
			1832	1190	300	334	8			
1	B	228	Total	C	N	O	S	0	5	0
			1859	1210	301	339	9			
1	C	230	Total	C	N	O	S	0	2	0
			1858	1207	303	340	8			
1	D	228	Total	C	N	O	S	0	1	0
			1841	1196	301	335	9			

There are 76 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-18	MET	-	EXPRESSION TAG	UNP P20035
A	-17	GLY	-	EXPRESSION TAG	UNP P20035
A	-16	GLY	-	EXPRESSION TAG	UNP P20035
A	-15	SER	-	EXPRESSION TAG	UNP P20035
A	-14	HIS	-	EXPRESSION TAG	UNP P20035
A	-13	HIS	-	EXPRESSION TAG	UNP P20035
A	-12	HIS	-	EXPRESSION TAG	UNP P20035
A	-11	HIS	-	EXPRESSION TAG	UNP P20035
A	-10	HIS	-	EXPRESSION TAG	UNP P20035
A	-9	HIS	-	EXPRESSION TAG	UNP P20035
A	-8	GLY	-	EXPRESSION TAG	UNP P20035
A	-7	GLY	-	EXPRESSION TAG	UNP P20035
A	-6	LEU	-	EXPRESSION TAG	UNP P20035
A	-5	VAL	-	EXPRESSION TAG	UNP P20035
A	-4	PRO	-	EXPRESSION TAG	UNP P20035
A	-3	ARG	-	EXPRESSION TAG	UNP P20035
A	-2	GLY	-	EXPRESSION TAG	UNP P20035
A	-1	SER	-	EXPRESSION TAG	UNP P20035
A	0	HIS	-	EXPRESSION TAG	UNP P20035
B	-18	MET	-	EXPRESSION TAG	UNP P20035
B	-17	GLY	-	EXPRESSION TAG	UNP P20035

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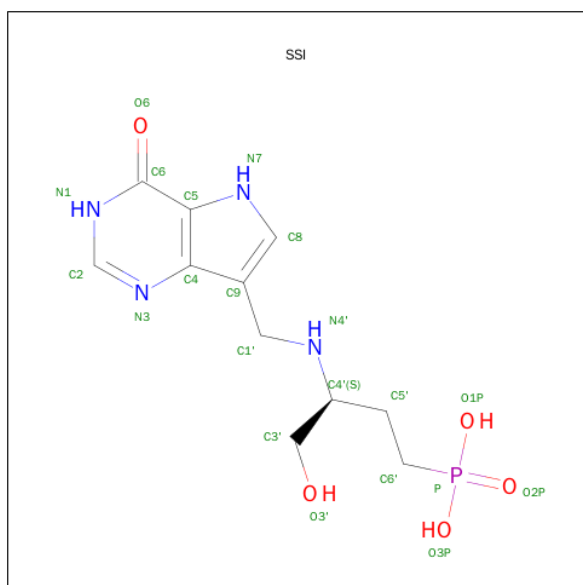
Chain	Residue	Modelled	Actual	Comment	Reference
B	-16	GLY	-	EXPRESSION TAG	UNP P20035
B	-15	SER	-	EXPRESSION TAG	UNP P20035
B	-14	HIS	-	EXPRESSION TAG	UNP P20035
B	-13	HIS	-	EXPRESSION TAG	UNP P20035
B	-12	HIS	-	EXPRESSION TAG	UNP P20035
B	-11	HIS	-	EXPRESSION TAG	UNP P20035
B	-10	HIS	-	EXPRESSION TAG	UNP P20035
B	-9	HIS	-	EXPRESSION TAG	UNP P20035
B	-8	GLY	-	EXPRESSION TAG	UNP P20035
B	-7	GLY	-	EXPRESSION TAG	UNP P20035
B	-6	LEU	-	EXPRESSION TAG	UNP P20035
B	-5	VAL	-	EXPRESSION TAG	UNP P20035
B	-4	PRO	-	EXPRESSION TAG	UNP P20035
B	-3	ARG	-	EXPRESSION TAG	UNP P20035
B	-2	GLY	-	EXPRESSION TAG	UNP P20035
B	-1	SER	-	EXPRESSION TAG	UNP P20035
B	0	HIS	-	EXPRESSION TAG	UNP P20035
C	-18	MET	-	EXPRESSION TAG	UNP P20035
C	-17	GLY	-	EXPRESSION TAG	UNP P20035
C	-16	GLY	-	EXPRESSION TAG	UNP P20035
C	-15	SER	-	EXPRESSION TAG	UNP P20035
C	-14	HIS	-	EXPRESSION TAG	UNP P20035
C	-13	HIS	-	EXPRESSION TAG	UNP P20035
C	-12	HIS	-	EXPRESSION TAG	UNP P20035
C	-11	HIS	-	EXPRESSION TAG	UNP P20035
C	-10	HIS	-	EXPRESSION TAG	UNP P20035
C	-9	HIS	-	EXPRESSION TAG	UNP P20035
C	-8	GLY	-	EXPRESSION TAG	UNP P20035
C	-7	GLY	-	EXPRESSION TAG	UNP P20035
C	-6	LEU	-	EXPRESSION TAG	UNP P20035
C	-5	VAL	-	EXPRESSION TAG	UNP P20035
C	-4	PRO	-	EXPRESSION TAG	UNP P20035
C	-3	ARG	-	EXPRESSION TAG	UNP P20035
C	-2	GLY	-	EXPRESSION TAG	UNP P20035
C	-1	SER	-	EXPRESSION TAG	UNP P20035
C	0	HIS	-	EXPRESSION TAG	UNP P20035
D	-18	MET	-	EXPRESSION TAG	UNP P20035
D	-17	GLY	-	EXPRESSION TAG	UNP P20035
D	-16	GLY	-	EXPRESSION TAG	UNP P20035
D	-15	SER	-	EXPRESSION TAG	UNP P20035
D	-14	HIS	-	EXPRESSION TAG	UNP P20035
D	-13	HIS	-	EXPRESSION TAG	UNP P20035

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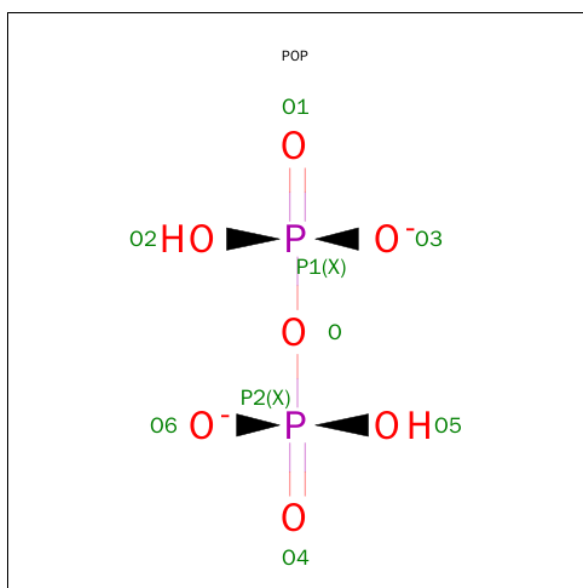
Chain	Residue	Modelled	Actual	Comment	Reference
D	-12	HIS	-	EXPRESSION TAG	UNP P20035
D	-11	HIS	-	EXPRESSION TAG	UNP P20035
D	-10	HIS	-	EXPRESSION TAG	UNP P20035
D	-9	HIS	-	EXPRESSION TAG	UNP P20035
D	-8	GLY	-	EXPRESSION TAG	UNP P20035
D	-7	GLY	-	EXPRESSION TAG	UNP P20035
D	-6	LEU	-	EXPRESSION TAG	UNP P20035
D	-5	VAL	-	EXPRESSION TAG	UNP P20035
D	-4	PRO	-	EXPRESSION TAG	UNP P20035
D	-3	ARG	-	EXPRESSION TAG	UNP P20035
D	-2	GLY	-	EXPRESSION TAG	UNP P20035
D	-1	SER	-	EXPRESSION TAG	UNP P20035
D	0	HIS	-	EXPRESSION TAG	UNP P20035

- Molecule 2 is [(3S)-4-HYDROXY-3-{{[(4-OXO-4,5-DIHYDRO-3H-PYRROLO[3,2-D]PYRIMIDIN-7-YL)METHYL]AMINO}BUTYL]PHOSPHONIC ACID (three-letter code: SSI) (formula: C₁₁H₁₇N₄O₅P).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			21	11	4	5	1		
2	B	1	Total	C	N	O	P	0	0
			21	11	4	5	1		
2	C	1	Total	C	N	O	P	0	0
			21	11	4	5	1		
2	D	1	Total	C	N	O	P	0	0
			21	11	4	5	1		

- Molecule 3 is PYROPHOSPHATE 2- (three-letter code: POP) (formula: $\text{H}_2\text{O}_7\text{P}_2$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total O P 9 7 2	0	0
3	B	1	Total O P 9 7 2	0	0
3	C	1	Total O P 9 7 2	0	0
3	D	1	Total O P 9 7 2	0	0

- Molecule 4 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

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

- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	67	Total O 67 67	0	0

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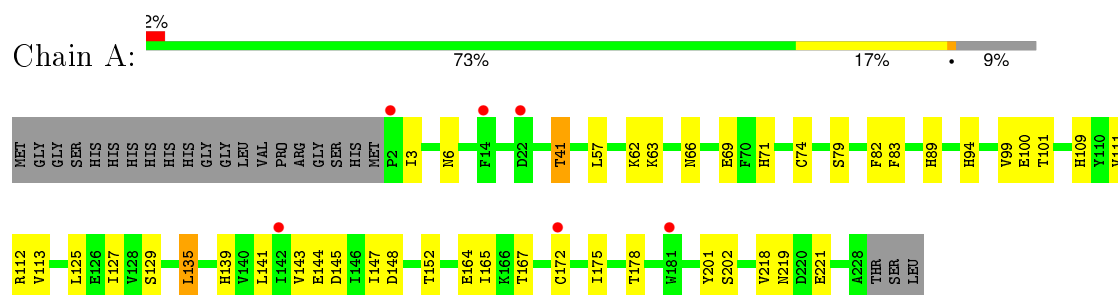
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	B	61	Total 61	O 61	0	0
5	C	42	Total 42	O 42	0	0
5	D	41	Total 41	O 41	0	0

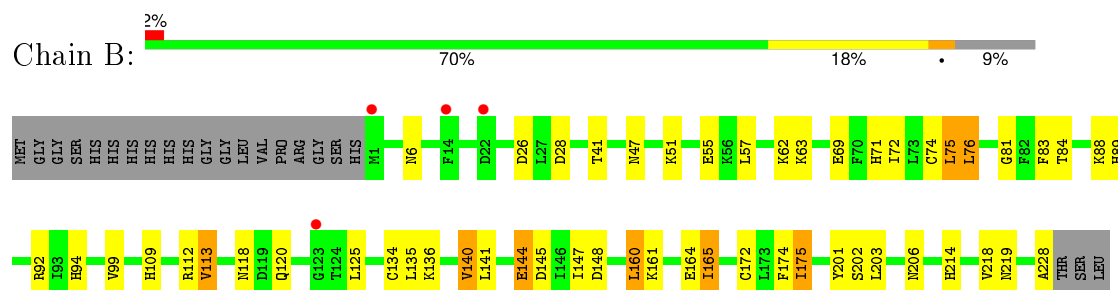
3 Residue-property plots [i](#)

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

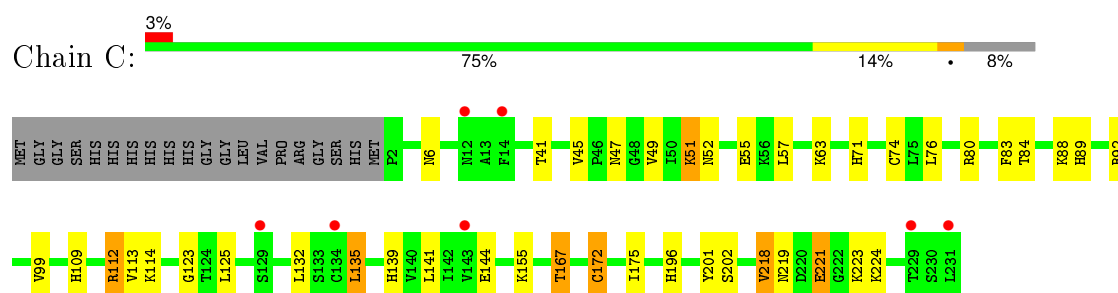
- Molecule 1: Hypoxanthine-guanine-xanthine phosphoribosyltransferase



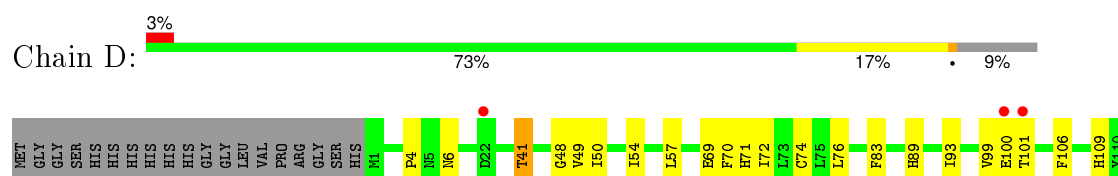
- Molecule 1: Hypoxanthine-guanine-xanthine phosphoribosyltransferase

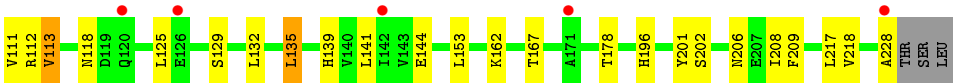


- Molecule 1: Hypoxanthine-guanine-xanthine phosphoribosyltransferase



- Molecule 1: Hypoxanthine-guanine-xanthine phosphoribosyltransferase





4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α , β , γ	105.09Å 110.63Å 173.34Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.98 – 1.99 19.98 – 1.99	Depositor EDS
% Data completeness (in resolution range)	97.7 (19.98-1.99) 97.8 (19.98-1.99)	Depositor EDS
R_{merge}	0.15	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.38 (at 1.99Å)	Xtriage
Refinement program	REFMAC 5.5.0109	Depositor
R, R_{free}	0.219 , 0.264 0.221 , 0.266	Depositor DCC
R_{free} test set	3417 reflections (5.34%)	DCC
Wilson B-factor (Å ²)	27.9	Xtriage
Anisotropy	0.108	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.38 , 37.2	EDS
Estimated twinning fraction	0.028 for -k,-h,-l	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Outliers	1 of 67383 reflections (0.001%)	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	7725	wwPDB-VP
Average B, all atoms (Å ²)	28.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.02% 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, 0.375 respectively for untwinned datasets, and 0.333, 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: MG, SSI, POP

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	0/1880	0.70	0/2539
1	B	0.66	0/1919	0.73	0/2593
1	C	0.59	0/1909	0.71	1/2578 (0.0%)
1	D	0.57	0/1889	0.67	0/2552
All	All	0.60	0/7597	0.70	1/10262 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	218	VAL	CB-CA-C	-5.57	100.82	111.40

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	1832	0	1833	32	0
1	B	1859	0	1875	45	0
1	C	1858	0	1865	31	0
1	D	1841	0	1846	37	0
2	A	21	0	15	1	0
2	B	21	0	15	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	C	21	0	15	1	0
2	D	21	0	15	0	0
3	A	9	0	0	0	0
3	B	9	0	0	0	0
3	C	9	0	0	0	0
3	D	9	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	67	0	0	4	0
5	B	61	0	0	3	0
5	C	42	0	0	5	0
5	D	41	0	0	3	0
All	All	7725	0	7479	142	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 9.

All (142) 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:71:HIS:HD2	1:A:109:HIS:HE1	1.06	0.98
1:A:139:HIS:HD2	1:A:167:THR:CG2	1.79	0.96
1:D:71:HIS:HD2	1:D:109:HIS:HE1	1.09	0.95
1:B:118:ASN:ND2	1:B:206:ASN:HD21	1.67	0.93
1:B:118:ASN:HD22	1:B:206:ASN:HD21	0.98	0.93
1:B:71:HIS:CD2	1:B:109:HIS:HE1	1.86	0.93
1:B:47:ASN:H	1:B:214:HIS:HD2	1.16	0.92
1:B:71:HIS:HD2	1:B:109:HIS:HE1	1.10	0.92
1:D:71:HIS:CD2	1:D:109:HIS:HE1	1.89	0.90
1:A:139:HIS:HD2	1:A:167:THR:HG21	1.39	0.87
1:C:41:THR:HG22	1:C:219:ASN:HB3	1.57	0.86
1:A:71:HIS:CD2	1:A:109:HIS:HE1	1.92	0.86
1:A:41:THR:HG22	1:A:219:ASN:HB3	1.59	0.83
1:B:113:VAL:HG13	1:B:125:LEU:HD11	1.61	0.83
1:A:139:HIS:CD2	1:A:167:THR:CG2	2.62	0.82
1:A:71:HIS:HD2	1:A:109:HIS:CE1	1.97	0.82
1:B:118:ASN:HD21	1:B:228:ALA:H	1.28	0.80
1:D:139:HIS:HA	1:D:167[A]:THR:HG22	1.64	0.79
1:B:71:HIS:HD2	1:B:109:HIS:CE1	1.99	0.79

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:139:HIS:HA	1:A:167:THR:HG22	1.65	0.78
1:D:118:ASN:HD21	1:D:228:ALA:H	1.32	0.77
1:D:118:ASN:ND2	1:D:206:ASN:HD21	1.81	0.77
1:A:139:HIS:CD2	1:A:167:THR:HG21	2.20	0.77
1:C:52:ASN:HD21	1:D:48:GLY:H	1.29	0.77
1:D:113:VAL:HG13	1:D:125:LEU:HD11	1.67	0.76
1:D:118:ASN:HD22	1:D:206:ASN:HD21	1.33	0.76
1:C:71:HIS:CD2	1:C:109:HIS:HE1	2.04	0.75
1:D:167[A]:THR:HG23	5:D:236:HOH:O	1.86	0.75
1:A:113:VAL:HG13	1:A:125:LEU:HD11	1.68	0.74
1:B:47:ASN:H	1:B:214:HIS:CD2	2.04	0.73
1:D:71:HIS:HD2	1:D:109:HIS:CE1	1.99	0.73
1:C:221:GLU:HG2	5:C:255:HOH:O	1.88	0.73
1:B:41[A]:THR:HG21	5:B:243:HOH:O	1.87	0.71
1:A:167:THR:HG23	5:A:235:HOH:O	1.90	0.71
1:A:139:HIS:CD2	1:A:167:THR:HG22	2.26	0.71
1:C:71:HIS:HD2	1:C:109:HIS:HE1	1.38	0.70
1:B:118:ASN:HD22	1:B:206:ASN:ND2	1.82	0.69
1:B:71:HIS:CD2	1:B:109:HIS:CE1	2.77	0.67
1:C:80:ARG:O	1:C:84:THR:HG23	1.93	0.67
1:D:71:HIS:CD2	1:D:109:HIS:CE1	2.79	0.67
1:C:113:VAL:HG13	1:C:125:LEU:HD11	1.79	0.65
1:C:49[B]:VAL:CG2	1:D:49:VAL:HG22	2.28	0.64
1:C:167:THR:HG22	5:C:235:HOH:O	1.97	0.63
2:B:233:SSI:H5'A	2:B:233:SSI:H8	1.81	0.63
1:D:139:HIS:HD2	1:D:167[A]:THR:CG2	2.11	0.63
1:D:74:CYS:HB2	1:D:83:PHE:CD1	2.34	0.63
1:B:147:ILE:HB	1:B:175:ILE:HG12	1.80	0.62
1:C:74:CYS:HB2	1:C:83:PHE:CD1	2.34	0.62
1:A:82:PHE:CE2	1:A:143:VAL:HG13	2.36	0.61
1:A:113:VAL:HG22	1:A:127:ILE:HG12	1.82	0.61
1:A:113:VAL:HG11	1:A:152:THR:HG23	1.83	0.61
1:B:148:ASP:HB3	2:B:233:SSI:O1P	2.01	0.60
1:C:52:ASN:ND2	1:D:48:GLY:H	1.98	0.60
1:C:139:HIS:HD2	1:C:167:THR:HB	1.68	0.59
1:B:55:GLU:HG3	1:B:89:HIS:CD2	2.37	0.59
1:D:69:GLU:OE2	1:D:71:HIS:HE1	1.86	0.58
1:B:74:CYS:HB2	1:B:83:PHE:CD1	2.38	0.58
1:D:72:ILE:HG22	1:D:83:PHE:HE1	1.69	0.58
1:B:140:VAL:CG1	1:B:165[A]:ILE:HG12	2.34	0.58
1:D:41:THR:HG23	1:D:217:LEU:HB2	1.87	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:196:HIS:HD2	5:D:253:HOH:O	1.87	0.57
1:A:3:ILE:HG21	1:A:167:THR:HG21	1.87	0.56
1:C:88:LYS:HE2	1:C:92:ARG:NH1	2.21	0.56
1:A:89:HIS:HD2	5:A:242:HOH:O	1.88	0.54
1:C:41:THR:CG2	1:C:219:ASN:HB3	2.33	0.54
1:C:49[B]:VAL:HG22	1:D:49:VAL:CG2	2.38	0.54
1:A:62:LYS:NZ	1:A:94:HIS:HD2	2.06	0.54
1:A:113:VAL:HG11	1:A:152:THR:CG2	2.37	0.53
1:A:111:VAL:HG13	1:A:129:SER:HB3	1.90	0.53
1:C:196:HIS:HE1	5:C:239:HOH:O	1.91	0.53
1:C:55:GLU:HG3	1:C:89:HIS:CD2	2.44	0.53
1:B:72:ILE:HG22	1:B:83:PHE:HE1	1.73	0.53
1:D:4:PRO:O	1:D:167[A]:THR:OG1	2.28	0.52
1:D:99:VAL:HG12	1:D:100:GLU:N	2.25	0.52
1:B:62:LYS:NZ	1:B:94:HIS:ND1	2.58	0.52
1:C:88:LYS:HE2	1:C:92:ARG:HH12	1.74	0.52
1:B:81:GLY:O	1:B:84[B]:THR:HG22	2.09	0.52
1:A:99:VAL:HG13	1:A:101:THR:H	1.75	0.51
1:D:139:HIS:CD2	1:D:167[A]:THR:CG2	2.92	0.51
1:D:201:TYR:O	1:D:202:SER:HB2	2.11	0.51
1:C:112:ARG:NH2	1:C:114:LYS:HD2	2.25	0.51
1:C:41:THR:HG22	1:C:219:ASN:CB	2.36	0.51
1:B:135:LEU:HB3	1:B:165[A]:ILE:HD11	1.93	0.50
1:B:26:ASP:OD2	1:B:28:ASP:HB2	2.11	0.50
1:B:47:ASN:HD21	1:B:51:LYS:NZ	2.10	0.50
1:D:139:HIS:CD2	1:D:167[A]:THR:HG22	2.47	0.49
1:D:208:ILE:O	1:D:209:PHE:HB2	2.12	0.49
1:B:69:GLU:OE2	1:B:71:HIS:HE1	1.96	0.49
1:C:223:LYS:HE3	5:C:247:HOH:O	2.13	0.49
1:A:74:CYS:HB2	1:A:83:PHE:CD1	2.48	0.48
1:B:140:VAL:HG11	1:B:165[A]:ILE:HG12	1.95	0.48
1:B:135:LEU:O	1:B:165[A]:ILE:HG13	2.14	0.48
1:D:70:PHE:O	1:D:106:PHE:HA	2.12	0.48
1:C:123:GLY:O	1:C:155:LYS:NZ	2.47	0.47
1:A:135:LEU:HB3	1:A:165:ILE:HG12	1.96	0.46
1:A:147:ILE:HG13	1:A:172:CYS:SG	2.55	0.46
1:B:172:CYS:SG	1:B:174:PHE:O	2.74	0.46
1:C:144:GLU:O	1:C:172:CYS:HA	2.15	0.46
1:D:167[A]:THR:CG2	5:D:236:HOH:O	2.53	0.46
1:A:71:HIS:CD2	1:A:109:HIS:CE1	2.84	0.46
1:D:139:HIS:HD2	1:D:167[A]:THR:HG22	1.78	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:201:TYR:O	1:C:202:SER:HB2	2.15	0.46
1:B:41[A]:THR:HG23	1:B:219:ASN:HB3	1.98	0.46
1:D:111:VAL:HG13	1:D:129:SER:HB2	1.98	0.46
1:D:74:CYS:HB2	1:D:83:PHE:CE1	2.50	0.46
1:A:164:GLU:HG2	5:A:245:HOH:O	2.15	0.46
1:B:160:LEU:HD22	1:B:165[A]:ILE:HD13	1.98	0.45
1:B:47:ASN:N	1:B:214:HIS:HD2	1.98	0.45
1:A:41:THR:HG22	1:A:219:ASN:CB	2.39	0.45
1:C:47:ASN:HD21	1:C:51:LYS:NZ	2.13	0.45
1:C:45:VAL:HG12	1:C:49[A]:VAL:CG1	2.47	0.45
1:C:167:THR:CG2	5:C:235:HOH:O	2.61	0.45
1:B:165[B]:ILE:H	1:B:165[B]:ILE:HD13	1.81	0.44
1:B:136:LYS:HE3	1:B:164:GLU:HB2	1.99	0.44
1:B:118:ASN:ND2	1:B:228:ALA:H	2.06	0.44
1:B:88:LYS:NZ	1:B:92:ARG:HH22	2.15	0.44
1:D:153:LEU:HD23	1:D:153:LEU:HA	1.85	0.44
1:D:50:ILE:O	1:D:54:ILE:HG13	2.17	0.44
1:B:134:CYS:SG	1:B:135:LEU:HD13	2.58	0.43
1:B:63:LYS:HD3	1:B:63:LYS:HA	1.83	0.43
1:B:109:HIS:HD2	5:B:248:HOH:O	2.00	0.43
1:B:41[A]:THR:CG2	1:B:219:ASN:HB3	2.48	0.43
1:B:74:CYS:SG	1:B:76:LEU:HD13	2.59	0.43
1:B:161:LYS:HB3	1:B:161:LYS:HE2	1.77	0.43
1:C:49[B]:VAL:CG2	1:D:49:VAL:CG2	2.93	0.43
1:B:201:TYR:O	1:B:202:SER:HB2	2.19	0.43
1:C:139:HIS:CD2	1:C:167:THR:HB	2.52	0.42
1:A:148:ASP:HB3	2:A:232:SSI:O3P	2.19	0.42
1:B:74:CYS:HB2	1:B:83:PHE:CE1	2.53	0.42
1:A:79[A]:SER:HA	1:A:145:ASP:HB3	2.01	0.42
1:D:89:HIS:O	1:D:93:ILE:HG13	2.19	0.42
1:B:99:VAL:HG22	5:B:271:HOH:O	2.19	0.41
1:A:201:TYR:O	1:A:202:SER:HB2	2.20	0.41
2:C:232:SSI:H5'A	2:C:232:SSI:H8	2.02	0.41
1:B:145:ASP:HB2	1:B:203:LEU:HD11	2.02	0.41
1:D:69:GLU:OE2	1:D:71:HIS:CE1	2.71	0.40
1:C:139:HIS:HD2	1:C:167:THR:CB	2.33	0.40
1:A:164:GLU:CG	5:A:245:HOH:O	2.70	0.40
1:C:132:LEU:HB3	1:C:135:LEU:HD22	2.04	0.40
1:D:132:LEU:O	1:D:135:LEU:HB2	2.21	0.40
1:A:69:GLU:OE2	1:A:71:HIS:HE1	2.04	0.40
1:B:75:LEU:HD23	1:B:144:GLU:OE1	2.20	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	226/250 (90%)	221 (98%)	4 (2%)	1 (0%)	39	33
1	B	231/250 (92%)	223 (96%)	8 (4%)	0	100	100
1	C	230/250 (92%)	223 (97%)	7 (3%)	0	100	100
1	D	227/250 (91%)	218 (96%)	9 (4%)	0	100	100
All	All	914/1000 (91%)	885 (97%)	28 (3%)	1 (0%)	56	53

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	66	ASN

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	204/221 (92%)	191 (94%)	13 (6%)	22	15
1	B	209/221 (95%)	194 (93%)	15 (7%)	18	12
1	C	208/221 (94%)	193 (93%)	15 (7%)	18	12
1	D	205/221 (93%)	192 (94%)	13 (6%)	22	16
All	All	826/884 (93%)	770 (93%)	56 (7%)	20	13

All (56) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	6	ASN
1	A	41	THR
1	A	57	LEU
1	A	63	LYS
1	A	100	GLU
1	A	112	ARG
1	A	135	LEU
1	A	141	LEU
1	A	144	GLU
1	A	175	ILE
1	A	178	THR
1	A	218	VAL
1	A	221	GLU
1	B	6	ASN
1	B	57	LEU
1	B	75	LEU
1	B	76	LEU
1	B	112	ARG
1	B	113	VAL
1	B	120	GLN
1	B	140	VAL
1	B	141	LEU
1	B	144	GLU
1	B	160	LEU
1	B	165[A]	ILE
1	B	165[B]	ILE
1	B	175	ILE
1	B	218	VAL
1	C	6	ASN
1	C	51	LYS
1	C	57	LEU
1	C	63	LYS
1	C	76	LEU
1	C	99	VAL
1	C	112	ARG
1	C	135	LEU
1	C	141	LEU
1	C	167	THR
1	C	172	CYS
1	C	175	ILE
1	C	218	VAL
1	C	221	GLU

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Mol	Chain	Res	Type
1	C	224	LYS
1	D	6	ASN
1	D	41	THR
1	D	57	LEU
1	D	76	LEU
1	D	101	THR
1	D	112	ARG
1	D	113	VAL
1	D	135	LEU
1	D	141	LEU
1	D	144	GLU
1	D	162	LYS
1	D	178	THR
1	D	218	VAL

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (36) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	6	ASN
1	A	20	ASN
1	A	35	HIS
1	A	47	ASN
1	A	71	HIS
1	A	89	HIS
1	A	94	HIS
1	A	109	HIS
1	A	139	HIS
1	A	196	HIS
1	B	6	ASN
1	B	20	ASN
1	B	47	ASN
1	B	71	HIS
1	B	89	HIS
1	B	109	HIS
1	B	118	ASN
1	B	120	GLN
1	B	214	HIS
1	C	6	ASN
1	C	47	ASN
1	C	52	ASN
1	C	71	HIS
1	C	89	HIS

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Mol	Chain	Res	Type
1	C	109	HIS
1	C	139	HIS
1	C	196	HIS
1	D	6	ASN
1	D	35	HIS
1	D	47	ASN
1	D	71	HIS
1	D	94	HIS
1	D	109	HIS
1	D	118	ASN
1	D	139	HIS
1	D	196	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 carbohydrates in this entry.

5.6 Ligand geometry [i](#)

Of 12 ligands modelled in this entry, 4 are monoatomic - leaving 8 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	SSI	A	232	-	20,22,22	1.38	2 (10%)	15,31,31	3.22	6 (40%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	POP	A	233	4	8,8,8	0.90	0	13,13,13	1.36	2 (15%)
2	SSI	B	233	-	20,22,22	1.40	3 (15%)	15,31,31	3.30	6 (40%)
3	POP	B	234	4	8,8,8	0.83	0	13,13,13	1.44	1 (7%)
2	SSI	C	232	-	20,22,22	1.24	1 (5%)	15,31,31	3.58	7 (46%)
3	POP	C	233	4	8,8,8	0.65	0	13,13,13	1.29	1 (7%)
2	SSI	D	232	-	20,22,22	1.47	2 (10%)	15,31,31	3.33	7 (46%)
3	POP	D	233	4	8,8,8	0.54	0	13,13,13	0.99	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
2	SSI	A	232	-	-	0/11/13/13	0/2/2/2
3	POP	A	233	4	-	0/6/6/6	0/0/0/0
2	SSI	B	233	-	-	0/11/13/13	0/2/2/2
3	POP	B	234	4	-	0/6/6/6	0/0/0/0
2	SSI	C	232	-	-	0/11/13/13	0/2/2/2
3	POP	C	233	4	-	0/6/6/6	0/0/0/0
2	SSI	D	232	-	-	0/11/13/13	0/2/2/2
3	POP	D	233	4	-	0/6/6/6	0/0/0/0

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	233	SSI	P-O1P	-2.37	1.49	1.54
2	B	233	SSI	C2-N1	2.04	1.37	1.33
2	C	232	SSI	C6-C5	3.32	1.47	1.41
2	A	232	SSI	C6-C5	3.46	1.48	1.41
2	B	233	SSI	C6-C5	3.61	1.48	1.41
2	D	232	SSI	P-C6'	3.66	1.82	1.79
2	A	232	SSI	P-C6'	3.66	1.82	1.79
2	D	232	SSI	C6-C5	3.82	1.48	1.41

All (30) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	232	SSI	N3-C2-N1	-8.98	122.02	128.89
2	D	232	SSI	N3-C2-N1	-7.93	122.83	128.89
2	B	233	SSI	N3-C2-N1	-7.79	122.93	128.89

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	232	SSI	N3-C2-N1	-7.78	122.93	128.89
2	C	232	SSI	C6-C5-C4	-4.99	114.93	120.90
2	B	233	SSI	O2P-P-C6'	-4.81	100.48	111.22
2	A	232	SSI	C6-C5-C4	-4.55	115.46	120.90
2	B	233	SSI	C6-C5-C4	-4.41	115.63	120.90
2	D	232	SSI	C6-C5-C4	-4.40	115.64	120.90
3	A	233	POP	P2-O-P1	-3.58	122.69	132.73
2	C	232	SSI	O3'-C3'-C4'	-3.56	102.62	112.19
3	B	234	POP	P2-O-P1	-3.56	122.74	132.73
2	D	232	SSI	O2P-P-C6'	-3.26	103.93	111.22
3	C	233	POP	P2-O-P1	-3.04	124.19	132.73
2	A	232	SSI	O2P-P-C6'	-3.02	104.48	111.22
2	D	232	SSI	C5'-C4'-C3'	-2.81	107.43	111.75
2	C	232	SSI	C9-C4-C5	-2.47	104.75	109.95
2	B	233	SSI	O1P-P-O3P	2.14	114.41	108.13
3	A	233	POP	O2-P1-O	2.25	115.00	104.65
2	D	232	SSI	O1P-P-O3P	2.35	115.01	108.13
2	B	233	SSI	C2-N3-C4	2.55	117.06	114.78
2	A	232	SSI	O1P-P-O3P	2.66	115.93	108.13
2	D	232	SSI	C2-N3-C4	2.75	117.24	114.78
2	C	232	SSI	O1P-P-O3P	3.51	118.42	108.13
2	A	232	SSI	C2-N3-C4	3.53	117.93	114.78
2	C	232	SSI	C2-N3-C4	3.81	118.19	114.78
2	C	232	SSI	C2-N1-C6	5.58	124.49	116.04
2	B	233	SSI	C2-N1-C6	5.66	124.61	116.04
2	A	232	SSI	C2-N1-C6	5.87	124.94	116.04
2	D	232	SSI	C2-N1-C6	6.23	125.48	116.04

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

3 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	232	SSI	1	0
2	B	233	SSI	2	0
2	C	232	SSI	1	0

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, 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	227/250 (90%)	0.34	6 (2%) 59 60	19, 27, 34, 41	0
1	B	228/250 (91%)	0.28	4 (1%) 71 72	19, 25, 36, 42	0
1	C	230/250 (92%)	0.44	7 (3%) 54 55	21, 29, 41, 49	0
1	D	228/250 (91%)	0.48	8 (3%) 48 49	22, 29, 43, 50	0
All	All	913/1000 (91%)	0.38	25 (2%) 58 58	19, 28, 40, 50	0

All (25) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	22	ASP	4.2
1	D	101	THR	4.2
1	C	12	ASN	2.7
1	A	142	ILE	2.6
1	C	231	LEU	2.6
1	D	228	ALA	2.6
1	C	14	PHE	2.6
1	C	229	THR	2.6
1	B	1	MET	2.4
1	A	172	CYS	2.4
1	D	171	ALA	2.3
1	A	22	ASP	2.3
1	D	142	ILE	2.3
1	A	2	PRO	2.3
1	C	129	SER	2.3
1	B	14	PHE	2.3
1	D	100	GLU	2.3
1	B	123	GLY	2.2
1	D	22	ASP	2.2
1	D	120	GLN	2.2
1	A	181	TRP	2.2

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Mol	Chain	Res	Type	RSRZ
1	D	126	GLU	2.2
1	C	143	VAL	2.1
1	C	134	CYS	2.1
1	A	14	PHE	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 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, 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	LLDF	B-factors(Å ²)	Q<0.9
2	SSI	D	232	21/21	0.96	0.15	0.54	19,24,26,29	0
2	SSI	A	232	21/21	0.96	0.13	0.41	19,25,30,32	0
2	SSI	B	233	21/21	0.97	0.12	-0.03	18,21,23,25	0
2	SSI	C	232	21/21	0.95	0.11	-0.50	20,22,26,31	0
3	POP	A	233	9/9	0.96	0.10	-1.51	27,28,29,30	0
3	POP	B	234	9/9	0.98	0.08	-1.80	21,22,23,23	0
3	POP	D	233	9/9	0.98	0.06	-2.41	25,26,27,28	0
3	POP	C	233	9/9	0.98	0.06	-2.82	23,24,26,26	0
4	MG	C	234	1/1	0.96	0.06	-	26,26,26,26	0
4	MG	B	232	1/1	0.99	0.05	-	21,21,21,21	0
4	MG	A	234	1/1	0.94	0.09	-	27,27,27,27	0
4	MG	D	234	1/1	0.98	0.03	-	32,32,32,32	0

6.5 Other polymers [i](#)

There are no such residues in this entry.