Full wwPDB X-ray Structure Validation Report (i)

Aug 20, 2023 – 08:51 AM EDT

PDB ID	:	2ISV
Title	:	Structure of Giardia fructose-1,6-biphosphate aldolase in complex with phosphoglycolohydroxamate
Authors	:	Galkin, A.; Herzberg, O.
Deposited on	:	2006-10-18
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 (i) 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 (i)) were used in the production of this report:

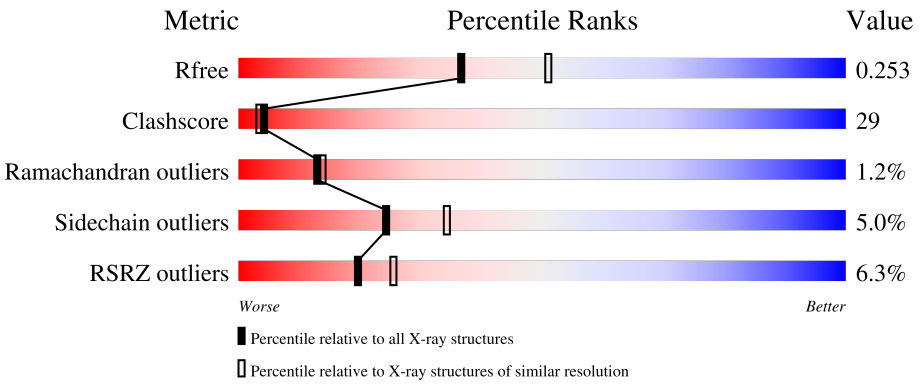
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35

1 Overall quality at a glance (i)

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}	130704	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (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 <=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	323	7% 54% 35% • 8%
1	B	323	5% 54% 35% 6% 5%

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 5002 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.

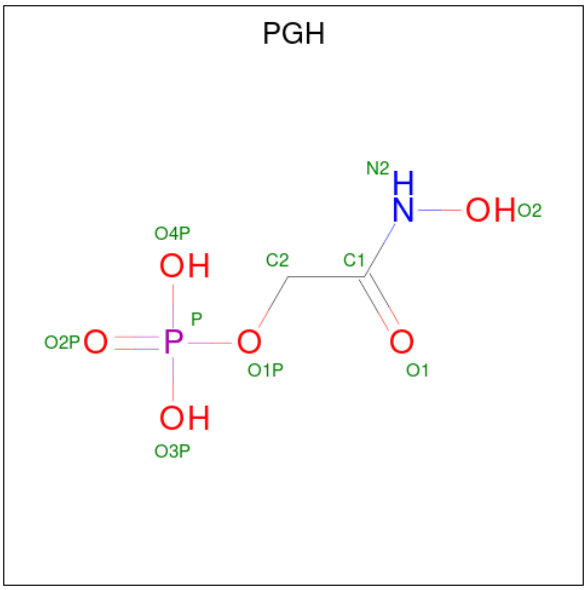
- Molecule 1 is a protein called Putative fructose-1,6-bisphosphate aldolase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	298	2266	1435	392	422	17	0	0	0
1	B	307	2346	1488	405	436	17	0	0	0

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Zn		
2	A	1	1	1	0	0
2	B	1	1	1	0	0

- Molecule 3 is PHOSPHOGLYCOLOHYDROXAMIC ACID (three-letter code: PGH) (formula: $C_2H_6NO_6P$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
3	A	1	10	2	1	6	1	0	0
3	B	1	10	2	1	6	1	0	0

- Molecule 4 is water.

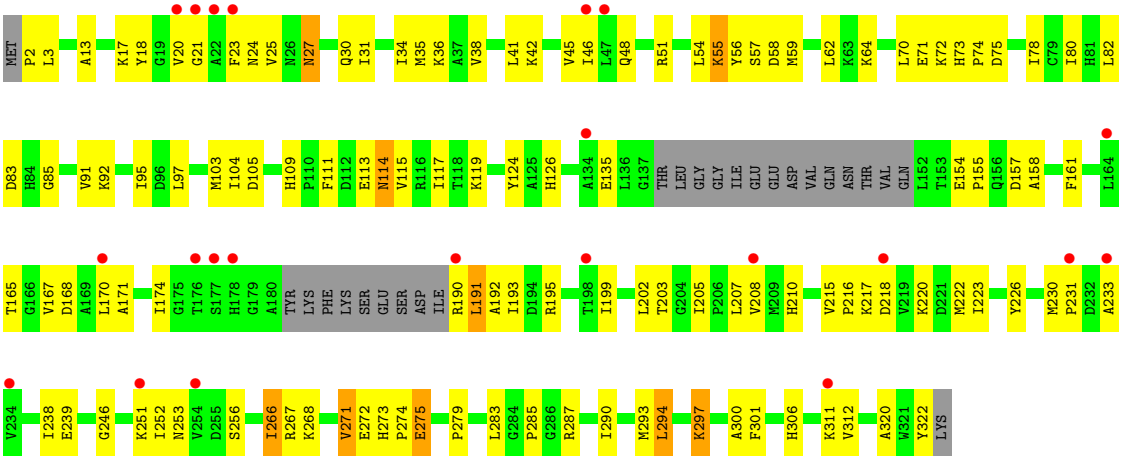
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
4	A	186	186	186	0	0
4	B	182	182	182	0	0

3 Residue-property plots (i)

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

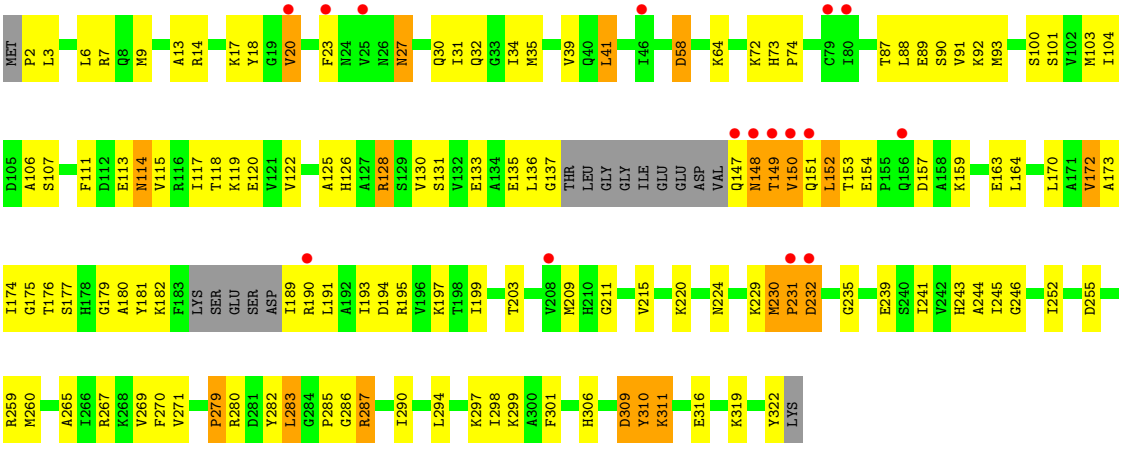
• Molecule 1: Putative fructose-1,6-bisphosphate aldolase

Chain A:



• Molecule 1: Putative fructose-1,6-bisphosphate aldolase

Chain B:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 61	Depositor
Cell constants a, b, c, α, β, γ	62.36Å 62.36Å 319.86Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	30.00 – 2.30 27.52 – 2.30	Depositor EDS
% Data completeness (in resolution range)	91.6 (30.00-2.30) 91.6 (27.52-2.30)	Depositor EDS
R_{merge}	0.04	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	6.69 (at 2.31Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.199 , 0.261 0.192 , 0.253	Depositor DCC
R_{free} test set	1382 reflections (4.86%)	wwPDB-VP
Wilson B-factor (Å^2)	43.5	Xtriage
Anisotropy	0.388	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 58.3	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	0.085 for h,-h-k,-l	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	5002	wwPDB-VP
Average B, all atoms (Å^2)	50.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.85% of the height of the origin peak. No significant pseudotranslation is detected.*

[1]Intensities estimated from amplitudes.

[2]Theoretical values of $< |L| >$, $< L^2 >$ 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: ZN, PGH

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	0.80	0/2306	0.93	1/3109 (0.0%)
1	B	0.79	0/2388	0.94	5/3220 (0.2%)
All	All	0.79	0/4694	0.93	6/6329 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	B	0	1

There are no bond length outliers.

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	150	VAL	N-CA-C	6.35	128.15	111.00
1	B	149	THR	C-N-CA	5.68	135.90	121.70
1	B	20	VAL	C-N-CA	-5.41	110.94	122.30
1	A	266	ILE	CG1-CB-CG2	-5.37	99.58	111.40
1	B	287	ARG	NE-CZ-NH2	-5.32	117.64	120.30
1	B	58	ASP	CB-CG-OD1	5.23	123.00	118.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	310	TYR	Sidechain

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	2266	0	2305	137	0
1	B	2346	0	2385	147	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
3	A	10	0	4	2	0
3	B	10	0	4	3	0
4	A	186	0	0	36	0
4	B	182	0	0	22	0
All	All	5002	0	4698	275	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 29.

All (275) 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:269:VAL:HG21	1:B:282:TYR:HB3	1.34	1.10
1:A:30:GLN:HG2	4:A:449:HOH:O	1.55	1.07
1:A:54:LEU:HD22	4:A:450:HOH:O	1.57	1.02
1:B:34:ILE:HG13	4:B:502:HOH:O	1.68	0.93
1:A:223:ILE:HG21	1:A:230:MET:CE	2.00	0.92
1:A:223:ILE:HG21	1:A:230:MET:HE3	1.51	0.91
1:B:152:LEU:HD13	1:B:195:ARG:HG3	1.52	0.91
1:B:230:MET:HE3	4:B:463:HOH:O	1.72	0.90
1:B:195:ARG:HD2	4:B:476:HOH:O	1.72	0.88
1:A:191:LEU:HD23	1:A:191:LEU:H	1.39	0.88
1:B:290:ILE:HG21	4:B:502:HOH:O	1.74	0.88
1:B:311:LYS:H	1:B:311:LYS:HD2	1.37	0.87
1:A:203:THR:CG2	1:A:205:ILE:HG12	2.04	0.87
1:B:159:LYS:O	1:B:163:GLU:HG3	1.76	0.85
1:B:153:THR:HG23	1:B:173:ALA:HB3	1.59	0.85
1:A:297:LYS:HA	4:A:472:HOH:O	1.77	0.83
1:A:27:ASN:ND2	1:A:30:GLN:HG3	1.95	0.81
1:B:150:VAL:O	1:B:151:GLN:HB2	1.81	0.81
1:A:192:ALA:HB1	1:A:195:ARG:HG3	1.63	0.81

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:128:ARG:HA	1:B:319:LYS:HE2	1.63	0.80
1:B:150:VAL:CG2	1:B:175:GLY:HA2	2.12	0.80
1:A:272:GLU:HB3	4:A:463:HOH:O	1.81	0.80
1:B:150:VAL:HB	1:B:152:LEU:HD23	1.64	0.80
1:B:195:ARG:O	1:B:199:ILE:HG13	1.82	0.80
1:A:97:LEU:HD12	4:A:506:HOH:O	1.81	0.79
1:B:150:VAL:HG21	1:B:175:GLY:N	1.97	0.79
1:A:300:ALA:HB3	4:A:472:HOH:O	1.83	0.79
1:B:27:ASN:HD22	1:B:27:ASN:C	1.86	0.79
1:B:189:ILE:HA	4:B:405:HOH:O	1.83	0.78
1:A:3:LEU:HD13	1:A:80:ILE:HD12	1.65	0.77
1:B:7:ARG:HD2	1:B:322:TYR:OH	1.88	0.74
1:A:27:ASN:HD21	1:A:30:GLN:HG3	1.52	0.73
1:B:14:ARG:HD2	4:B:343:HOH:O	1.88	0.73
1:B:150:VAL:O	1:B:151:GLN:CB	2.35	0.73
1:B:269:VAL:HG21	1:B:282:TYR:CB	2.16	0.72
1:B:170:LEU:CD1	1:B:172:VAL:HG13	2.21	0.70
1:B:111:PHE:O	1:B:115:VAL:HG23	1.91	0.70
1:A:51:ARG:HG3	4:A:403:HOH:O	1.90	0.70
1:B:113:GLU:O	1:B:117:ILE:HG12	1.92	0.70
1:B:311:LYS:H	1:B:311:LYS:CD	2.05	0.69
1:A:274:PRO:HA	1:B:267:ARG:HH22	1.55	0.69
1:B:13:ALA:HB1	1:B:18:TYR:O	1.92	0.69
1:B:150:VAL:HG21	1:B:175:GLY:H	1.56	0.69
1:B:150:VAL:HG11	1:B:173:ALA:HB1	1.74	0.69
1:B:159:LYS:HG2	1:B:163:GLU:OE2	1.92	0.69
1:B:239:GLU:HG3	4:B:489:HOH:O	1.93	0.69
1:B:2:PRO:HD3	1:B:74:PRO:O	1.93	0.68
1:A:82:LEU:HD12	1:A:82:LEU:O	1.94	0.67
1:B:113:GLU:OE2	1:B:113:GLU:HA	1.95	0.67
1:A:92:LYS:HG3	1:A:124:TYR:CZ	2.30	0.67
1:B:197:LYS:NZ	1:B:197:LYS:HB3	2.10	0.67
1:A:82:LEU:HD23	1:A:91:VAL:HG12	1.77	0.66
1:B:128:ARG:HD2	1:B:319:LYS:HE2	1.76	0.65
1:A:203:THR:HG22	1:A:205:ILE:HG12	1.76	0.65
1:A:126:HIS:HE1	1:A:168:ASP:OD1	1.79	0.64
1:A:3:LEU:CD1	1:A:80:ILE:HD12	2.27	0.64
1:A:57:SER:OG	1:A:62:LEU:HB2	1.99	0.63
1:A:191:LEU:H	1:A:191:LEU:CD2	2.10	0.63
1:B:150:VAL:CB	1:B:152:LEU:HD23	2.29	0.63
1:A:203:THR:HG21	1:A:205:ILE:HG12	1.79	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:150:VAL:HG23	1:B:175:GLY:HA2	1.80	0.62
1:A:59:MET:HG2	4:A:450:HOH:O	1.99	0.62
1:A:113:GLU:O	1:A:117:ILE:HG12	2.00	0.61
1:B:147:GLN:HB2	1:B:177:SER:HB2	1.83	0.61
1:B:34:ILE:CG1	4:B:502:HOH:O	2.37	0.61
1:A:104:ILE:HG23	1:A:104:ILE:O	2.01	0.61
1:A:35:MET:CE	1:A:78:ILE:HD11	2.31	0.61
1:B:181:TYR:CE1	1:B:232:ASP:O	2.54	0.61
1:A:2:PRO:HG2	1:A:312:VAL:HG21	1.83	0.60
1:B:137:GLY:HA2	4:B:493:HOH:O	2.00	0.60
1:A:103:MET:HE1	4:A:480:HOH:O	2.02	0.59
1:B:150:VAL:CG2	1:B:175:GLY:CA	2.80	0.58
1:B:153:THR:CG2	1:B:173:ALA:H	2.16	0.58
1:B:282:TYR:C	1:B:285:PRO:HD2	2.23	0.58
1:A:195:ARG:HD3	4:A:510:HOH:O	2.02	0.58
1:A:74:PRO:O	1:A:75:ASP:HB2	2.03	0.58
1:A:287:ARG:NH2	4:A:457:HOH:O	2.31	0.57
1:B:23:PHE:HB2	1:B:34:ILE:HD13	1.86	0.57
1:A:301:PHE:HB2	4:A:507:HOH:O	2.05	0.57
1:A:203:THR:HG22	1:A:205:ILE:H	1.70	0.57
1:B:220:LYS:HZ2	1:B:224:ASN:ND2	2.02	0.57
1:A:279:PRO:O	1:A:283:LEU:HB2	2.04	0.57
1:B:179:GLY:HA3	4:B:372:HOH:O	2.04	0.56
1:B:230:MET:N	1:B:231:PRO:HD3	2.19	0.56
1:B:152:LEU:HD22	1:B:174:ILE:HA	1.86	0.56
1:B:229:LYS:C	1:B:231:PRO:HD3	2.24	0.56
1:B:103:MET:HE3	1:B:133:GLU:OE2	2.05	0.56
1:A:275:GLU:OE1	1:A:275:GLU:N	2.26	0.56
1:A:114:ASN:C	1:A:114:ASN:HD22	2.09	0.56
1:B:181:TYR:HE1	1:B:232:ASP:O	1.88	0.56
1:A:222:MET:CE	1:A:268:LYS:HD2	2.36	0.56
1:A:171:ALA:HA	1:A:208:VAL:HB	1.88	0.56
1:B:88:LEU:HD22	1:B:120:GLU:HG2	1.88	0.56
1:B:311:LYS:CD	1:B:311:LYS:N	2.69	0.56
1:A:267:ARG:O	1:A:271:VAL:HG13	2.05	0.55
1:A:191:LEU:HD23	1:A:191:LEU:N	2.17	0.55
1:A:27:ASN:C	1:A:27:ASN:HD22	2.09	0.55
1:B:269:VAL:CG2	1:B:282:TYR:HB3	2.24	0.55
1:A:17:LYS:HD3	4:A:407:HOH:O	2.05	0.55
1:B:279:PRO:HA	1:B:282:TYR:CZ	2.42	0.55
1:B:306:HIS:HD2	1:B:309:ASP:OD2	1.90	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:215:VAL:HG12	1:A:215:VAL:O	2.05	0.55
1:A:70:LEU:HD11	1:A:80:ILE:CD1	2.37	0.55
1:A:220:LYS:HD2	1:A:233:ALA:HB3	1.89	0.55
1:A:111:PHE:HD2	4:A:459:HOH:O	1.90	0.54
1:A:35:MET:HE1	1:A:78:ILE:HD11	1.87	0.54
1:A:275:GLU:H	1:A:275:GLU:CD	2.08	0.54
1:A:279:PRO:HD2	4:B:452:HOH:O	2.06	0.54
1:B:27:ASN:C	1:B:27:ASN:ND2	2.56	0.54
1:B:239:GLU:CG	4:B:489:HOH:O	2.54	0.54
1:A:25:VAL:HG11	1:A:31:ILE:HG12	1.89	0.53
1:A:70:LEU:HD11	1:A:80:ILE:HD11	1.91	0.53
1:B:220:LYS:NZ	1:B:230:MET:O	2.41	0.53
1:B:182:LYS:HD2	1:B:235:GLY:HA2	1.89	0.53
1:B:241:ILE:O	1:B:245:ILE:HG13	2.08	0.53
1:A:71:GLU:O	1:A:74:PRO:HD3	2.08	0.53
1:A:274:PRO:HA	1:B:267:ARG:NH2	2.23	0.53
1:B:136:LEU:O	1:B:153:THR:HG21	2.08	0.53
1:A:126:HIS:CE1	1:A:168:ASP:OD1	2.60	0.53
1:B:199:ILE:O	1:B:203:THR:HG23	2.09	0.52
1:A:91:VAL:HG23	4:A:508:HOH:O	2.10	0.52
1:A:199:ILE:HG22	1:A:207:LEU:HD11	1.91	0.52
1:A:18:TYR:CE2	1:A:306:HIS:CD2	2.98	0.52
1:B:88:LEU:O	1:B:92:LYS:HG3	2.08	0.52
1:B:150:VAL:CG1	1:B:173:ALA:HB1	2.40	0.52
1:A:135:GLU:CD	4:A:480:HOH:O	2.48	0.52
1:A:191:LEU:CD2	1:A:191:LEU:N	2.73	0.52
1:B:126:HIS:C	1:B:128:ARG:H	2.12	0.52
1:A:24:ASN:HA	1:A:48:GLN:O	2.11	0.51
1:A:287:ARG:NE	4:A:457:HOH:O	2.26	0.51
1:B:118:THR:O	1:B:122:VAL:HG23	2.11	0.51
1:B:41:LEU:HD23	1:B:298:ILE:CG2	2.40	0.51
1:B:32:GLN:HB2	1:B:287:ARG:HD2	1.91	0.51
1:B:170:LEU:HD12	1:B:172:VAL:HG13	1.91	0.51
1:A:95:ILE:CD1	4:A:508:HOH:O	2.58	0.51
1:A:311:LYS:HB2	4:A:485:HOH:O	2.10	0.51
1:B:35:MET:O	1:B:39:VAL:HG22	2.11	0.51
1:B:107:SER:HB3	1:B:135:GLU:HB3	1.93	0.51
1:B:154:GLU:O	1:B:157:ASP:HB2	2.10	0.51
1:B:215:VAL:HG22	1:B:260:MET:CE	2.41	0.50
1:B:193:ILE:HG21	1:B:243:HIS:CD2	2.46	0.50
1:B:259:ARG:NH1	4:B:505:HOH:O	2.45	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:273:HIS:C	1:A:275:GLU:OE1	2.49	0.50
1:B:153:THR:HG23	1:B:173:ALA:CB	2.35	0.50
1:A:252:ILE:HG21	1:A:301:PHE:CZ	2.46	0.50
1:B:193:ILE:CD1	1:B:244:ALA:HB2	2.42	0.50
1:A:239:GLU:CD	1:A:239:GLU:H	2.15	0.50
1:A:290:ILE:HD11	4:A:449:HOH:O	2.12	0.50
1:B:72:LYS:C	1:B:74:PRO:HD3	2.32	0.49
1:B:246:GLY:HA3	4:B:466:HOH:O	2.10	0.49
1:A:38:VAL:HG11	1:A:45:VAL:HB	1.94	0.49
1:A:210:HIS:HA	1:A:253:ASN:HB2	1.94	0.49
1:A:218:ASP:HB2	4:A:500:HOH:O	2.11	0.49
1:A:267:ARG:NH2	4:A:438:HOH:O	2.36	0.49
1:B:119:LYS:HE2	1:B:164:LEU:O	2.12	0.49
1:B:125:ALA:HB1	1:B:130:VAL:HB	1.94	0.49
1:A:293:MET:CE	1:A:294:LEU:HD13	2.43	0.49
1:A:290:ILE:CD1	4:A:449:HOH:O	2.60	0.49
1:B:153:THR:CG2	1:B:173:ALA:HB3	2.38	0.49
1:A:55:LYS:NZ	4:A:473:HOH:O	2.45	0.49
1:A:238:ILE:HG12	4:A:472:HOH:O	2.13	0.49
1:B:7:ARG:HD2	1:B:322:TYR:HH	1.76	0.49
1:B:189:ILE:CD1	4:B:500:HOH:O	2.61	0.49
1:A:51:ARG:HG3	1:A:51:ARG:HH11	1.78	0.48
1:A:2:PRO:HG2	1:A:312:VAL:CG2	2.43	0.48
1:B:252:ILE:HG21	1:B:301:PHE:CZ	2.48	0.48
1:B:147:GLN:O	1:B:150:VAL:HA	2.14	0.48
1:B:150:VAL:C	1:B:152:LEU:H	2.14	0.48
1:B:153:THR:HG23	1:B:173:ALA:H	1.79	0.48
1:B:193:ILE:HD12	1:B:244:ALA:HB2	1.93	0.48
1:A:199:ILE:O	1:A:203:THR:HB	2.12	0.48
1:A:73:HIS:C	1:A:74:PRO:O	2.49	0.48
1:A:111:PHE:HB2	4:A:410:HOH:O	2.13	0.48
1:A:266:ILE:HG13	1:B:270:PHE:CZ	2.49	0.48
1:B:197:LYS:HB3	1:B:197:LYS:HZ3	1.77	0.47
1:B:306:HIS:CD2	1:B:309:ASP:OD2	2.67	0.47
1:B:2:PRO:N	4:B:389:HOH:O	2.48	0.47
1:A:217:LYS:HD2	4:A:351:HOH:O	2.13	0.47
1:A:20:VAL:HG23	1:A:21:GLY:N	2.29	0.47
1:A:215:VAL:N	1:A:216:PRO:HD3	2.30	0.47
1:A:230:MET:N	1:A:231:PRO:HD3	2.30	0.47
1:A:161:PHE:O	1:A:165:THR:HG23	2.14	0.47
1:A:266:ILE:HG13	1:B:270:PHE:HZ	1.79	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:23:PHE:CB	1:B:34:ILE:HD13	2.46	0.46
1:A:64:LYS:HB3	1:B:64:LYS:HB3	1.96	0.46
1:B:211:GLY:HA2	3:B:325:PGH:O4P	2.16	0.46
1:B:153:THR:HG21	1:B:173:ALA:H	1.80	0.46
1:B:290:ILE:CG2	4:B:502:HOH:O	2.50	0.46
1:A:13:ALA:HB1	1:A:18:TYR:O	2.16	0.45
1:A:246:GLY:HA3	4:A:381:HOH:O	2.15	0.45
1:A:293:MET:HE3	1:A:294:LEU:HD13	1.97	0.45
1:B:41:LEU:HD23	1:B:298:ILE:HG22	1.98	0.45
1:B:150:VAL:HB	1:B:152:LEU:H	1.82	0.45
1:A:111:PHE:O	1:A:115:VAL:HG23	2.16	0.45
1:B:6:LEU:HB3	1:B:131:SER:CB	2.47	0.45
1:B:87:THR:O	1:B:90:SER:HB2	2.17	0.45
1:B:106:ALA:HB3	1:B:114:ASN:ND2	2.31	0.45
1:B:316:GLU:OE2	1:B:316:GLU:HA	2.16	0.45
1:A:2:PRO:N	4:A:339:HOH:O	2.49	0.45
1:A:72:LYS:HE3	1:B:58:ASP:CB	2.47	0.45
1:A:155:PRO:HB2	1:A:202:LEU:CD2	2.47	0.45
1:A:195:ARG:CB	4:A:510:HOH:O	2.65	0.45
1:B:194:ASP:OD2	1:B:195:ARG:NH1	2.49	0.45
1:A:103:MET:SD	1:A:210:HIS:HE1	2.40	0.45
1:B:170:LEU:C	1:B:170:LEU:HD13	2.37	0.45
1:B:180:ALA:HB3	4:B:463:HOH:O	2.16	0.45
1:B:220:LYS:NZ	1:B:224:ASN:HD21	2.14	0.45
1:A:193:ILE:CD1	4:A:482:HOH:O	2.65	0.45
1:B:147:GLN:HG2	1:B:148:ASN:OD1	2.17	0.45
1:B:269:VAL:HG23	1:B:270:PHE:N	2.31	0.44
1:A:20:VAL:HG21	1:A:46:ILE:CD1	2.47	0.44
1:A:208:VAL:HG13	1:A:251:LYS:HG2	1.99	0.44
1:B:31:ILE:O	1:B:35:MET:HG2	2.17	0.44
1:B:114:ASN:C	1:B:114:ASN:HD22	2.20	0.44
1:A:218:ASP:CB	4:A:500:HOH:O	2.66	0.44
1:A:320:ALA:HB1	4:A:456:HOH:O	2.17	0.44
1:A:165:THR:OG1	1:A:167:VAL:HG13	2.18	0.44
1:A:35:MET:HE2	1:A:78:ILE:HD11	2.00	0.44
1:B:6:LEU:HB2	1:B:101:SER:OG	2.17	0.44
1:A:253:ASN:HB3	3:A:325:PGH:C1	2.48	0.44
1:B:89:GLU:O	1:B:93:MET:HG3	2.18	0.44
1:A:109:HIS:CD2	1:A:113:GLU:HG2	2.53	0.43
1:B:311:LYS:HD2	1:B:311:LYS:N	2.16	0.43
1:B:104:ILE:HG23	1:B:104:ILE:O	2.18	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:72:LYS:HE3	1:B:58:ASP:HB3	2.00	0.43
1:A:82:LEU:O	1:A:82:LEU:CD1	2.63	0.43
1:B:174:ILE:HD12	1:B:174:ILE:O	2.19	0.43
1:B:3:LEU:HD11	1:B:100:SER:HB3	2.01	0.43
1:A:223:ILE:HD13	1:A:230:MET:HE1	2.00	0.43
1:A:266:ILE:HD13	1:A:266:ILE:HG21	1.63	0.43
1:B:215:VAL:HG22	1:B:260:MET:HE2	2.00	0.43
1:A:23:PHE:HB2	1:A:34:ILE:HD13	2.01	0.43
1:A:226:TYR:CD1	1:A:271:VAL:HG21	2.53	0.43
1:B:128:ARG:HD2	1:B:319:LYS:CE	2.46	0.42
1:B:197:LYS:NZ	1:B:197:LYS:CB	2.81	0.42
1:A:256:SER:OG	3:A:325:PGH:O2P	2.34	0.42
1:B:27:ASN:ND2	1:B:30:GLN:H	2.17	0.42
1:B:271:VAL:HG23	4:B:349:HOH:O	2.17	0.42
1:A:56:TYR:CZ	1:B:280:ARG:HG2	2.54	0.42
1:B:255:ASP:CB	3:B:325:PGH:H21	2.49	0.42
1:B:9:MET:HG2	1:B:20:VAL:HG21	2.01	0.42
1:B:190:ARG:N	4:B:405:HOH:O	2.45	0.42
1:A:154:GLU:HB2	1:A:157:ASP:OD2	2.20	0.42
1:B:113:GLU:OE2	1:B:113:GLU:CA	2.65	0.42
1:B:299:LYS:HA	4:B:497:HOH:O	2.20	0.42
1:A:41:LEU:O	1:A:42:LYS:C	2.59	0.42
1:A:59:MET:HA	4:A:450:HOH:O	2.20	0.42
1:B:103:MET:HA	1:B:133:GLU:O	2.20	0.42
1:A:126:HIS:CE1	1:A:322:TYR:CZ	3.08	0.41
1:A:170:LEU:O	1:A:208:VAL:N	2.41	0.41
1:A:58:ASP:O	1:A:59:MET:HB2	2.19	0.41
1:A:226:TYR:HD1	1:A:271:VAL:HG21	1.85	0.41
1:B:297:LYS:HE2	1:B:297:LYS:HB2	1.87	0.41
1:A:294:LEU:HD12	1:A:294:LEU:HA	1.83	0.41
1:B:174:ILE:HD13	1:B:191:LEU:HB3	2.03	0.41
1:B:189:ILE:HG22	4:B:469:HOH:O	2.20	0.41
1:A:119:LYS:HB3	1:A:119:LYS:HE2	1.77	0.41
1:A:174:ILE:HG13	1:A:174:ILE:O	2.21	0.41
1:B:255:ASP:HB3	3:B:325:PGH:H21	2.01	0.41
1:B:151:GLN:O	1:B:152:LEU:O	2.39	0.41
1:A:51:ARG:HD3	1:A:85:GLY:HA2	2.02	0.41
1:A:56:TYR:CE1	1:B:280:ARG:HG2	2.56	0.41
1:A:174:ILE:O	1:A:191:LEU:HB2	2.20	0.41
1:A:174:ILE:CD1	1:A:191:LEU:HD12	2.50	0.41
1:A:193:ILE:HD13	4:A:482:HOH:O	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:148:ASN:O	1:B:149:THR:C	2.59	0.41
1:B:39:VAL:HG11	1:B:73:HIS:CE1	2.56	0.40
1:B:73:HIS:N	1:B:74:PRO:HD3	2.35	0.40
1:B:265:ALA:HB3	1:B:286:GLY:HA2	2.03	0.40
1:B:279:PRO:O	1:B:283:LEU:HB2	2.21	0.40
1:A:155:PRO:O	1:A:158:ALA:HB3	2.22	0.40
1:A:293:MET:SD	1:A:297:LYS:HE2	2.61	0.40
1:A:95:ILE:HD12	4:A:508:HOH:O	2.20	0.40
1:A:105:ASP:OD1	1:A:105:ASP:C	2.59	0.40
1:A:161:PHE:CE1	1:A:165:THR:HG21	2.56	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	292/323 (90%)	274 (94%)	17 (6%)	1 (0%)	41 50
1	B	301/323 (93%)	277 (92%)	18 (6%)	6 (2%)	7 6
All	All	593/646 (92%)	551 (93%)	35 (6%)	7 (1%)	13 14

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	83	ASP
1	B	148	ASN
1	B	152	LEU
1	B	309	ASP
1	B	310	TYR
1	B	128	ARG
1	B	231	PRO

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	245/269 (91%)	234 (96%)	11 (4%)	27	39
1	B	254/269 (94%)	240 (94%)	14 (6%)	21	30
All	All	499/538 (93%)	474 (95%)	25 (5%)	24	34

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	27	ASN
1	A	36	LYS
1	A	55	LYS
1	A	114	ASN
1	A	190	ARG
1	A	191	LEU
1	A	271	VAL
1	A	275	GLU
1	A	285	PRO
1	A	294	LEU
1	A	297	LYS
1	B	17	LYS
1	B	27	ASN
1	B	41	LEU
1	B	91	VAL
1	B	114	ASN
1	B	172	VAL
1	B	176	THR
1	B	209	MET
1	B	230	MET
1	B	232	ASP
1	B	279	PRO
1	B	283	LEU
1	B	294	LEU
1	B	311	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (11)

such sidechains are listed below:

Mol	Chain	Res	Type
1	A	27	ASN
1	A	109	HIS
1	A	114	ASN
1	A	126	HIS
1	A	306	HIS
1	B	27	ASN
1	B	40	GLN
1	B	114	ASN
1	B	224	ASN
1	B	243	HIS
1	B	306	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 monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 4 ligands modelled in this entry, 2 are monoatomic - leaving 2 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	$\#\|Z\| > 2$
3	PGH	B	325	2	9,9,9	5.48	3 (33%)	10,12,12	3.56	3 (30%)
3	PGH	A	325	2	9,9,9	5.35	3 (33%)	10,12,12	3.97	3 (30%)

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	PGH	B	325	2	-	4/8/8/8	-
3	PGH	A	325	2	-	2/8/8/8	-

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	325	PGH	O1P-C2	12.98	1.52	1.43
3	A	325	PGH	O1P-C2	12.27	1.51	1.43
3	A	325	PGH	C2-C1	9.69	1.70	1.51
3	B	325	PGH	C2-C1	9.43	1.70	1.51
3	B	325	PGH	O2-N2	2.99	1.47	1.40
3	A	325	PGH	O2-N2	2.33	1.46	1.40

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	325	PGH	O1-C1-N2	8.43	133.62	123.27
3	B	325	PGH	O1-C1-N2	8.03	133.13	123.27
3	A	325	PGH	C2-C1-N2	-7.35	103.61	116.37
3	B	325	PGH	C2-C1-N2	-5.62	106.61	116.37
3	B	325	PGH	O2-N2-C1	-5.27	112.01	119.79
3	A	325	PGH	O2-N2-C1	-5.21	112.09	119.79

There are no chirality outliers.

All (6) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	325	PGH	N2-C1-C2-O1P
3	B	325	PGH	C2-O1P-P-O2P
3	B	325	PGH	C2-O1P-P-O3P
3	B	325	PGH	C2-O1P-P-O4P
3	A	325	PGH	O1-C1-C2-O1P
3	B	325	PGH	O1-C1-C2-O1P

There are no ring outliers.

2 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	325	PGH	3	0
3	A	325	PGH	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 (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	298/323 (92%)	0.11	22 (7%)	14	19	29, 46, 78, 93	0
1	B	307/323 (95%)	0.04	16 (5%)	27	34	27, 46, 72, 99	0
All	All	605/646 (93%)	0.07	38 (6%)	20	25	27, 46, 76, 99	0

All (38) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	148	ASN	5.6
1	A	177	SER	4.8
1	B	150	VAL	4.4
1	A	176	THR	3.6
1	A	231	PRO	3.5
1	A	46	ILE	3.4
1	A	208	VAL	3.4
1	B	147	GLN	3.4
1	B	149	THR	3.3
1	A	21	GLY	3.3
1	B	156	GLN	3.3
1	A	47	LEU	3.2
1	B	151	GLN	3.2
1	B	46	ILE	3.1
1	B	25	VAL	3.1
1	A	218	ASP	3.1
1	A	22	ALA	3.0
1	A	190	ARG	3.0
1	B	231	PRO	2.9
1	A	234	VAL	2.9
1	A	134	ALA	2.9
1	A	23	PHE	2.9
1	A	251	LYS	2.7
1	B	208	VAL	2.7

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Mol	Chain	Res	Type	RSRZ
1	A	178	HIS	2.6
1	A	233	ALA	2.5
1	B	79	CYS	2.4
1	A	20	VAL	2.4
1	A	254	VAL	2.3
1	B	80	ILE	2.3
1	A	170	LEU	2.2
1	B	20	VAL	2.2
1	A	311	LYS	2.2
1	B	232	ASP	2.2
1	A	164	LEU	2.1
1	B	23	PHE	2.1
1	B	190	ARG	2.0
1	A	198	THR	2.0

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

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

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	PGH	A	325	10/10	0.97	0.09	39,49,61,62	0
3	PGH	B	325	10/10	0.98	0.11	33,39,59,62	0
2	ZN	A	326	1/1	0.99	0.07	68,68,68,68	0
2	ZN	B	326	1/1	0.99	0.05	62,62,62,62	0

6.5 Other polymers (i)

There are no such residues in this entry.