



# Full wwPDB X-ray Structure Validation Report ⓘ

Dec 10, 2023 – 10:19 am GMT

PDB ID : 1OHV  
Title : 4-AMINO BUTYRATE-AMINOTRANSFERASE FROM PIG  
Authors : Storici, P.; Schirmer, T.  
Deposited on : 2003-06-02  
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](mailto:validation@mail.wwpdb.org)

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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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 : 1.8.4, CSD as541be (2020)  
Xtrriage (Phenix) : 1.13  
EDS : 2.36  
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) : 2.36

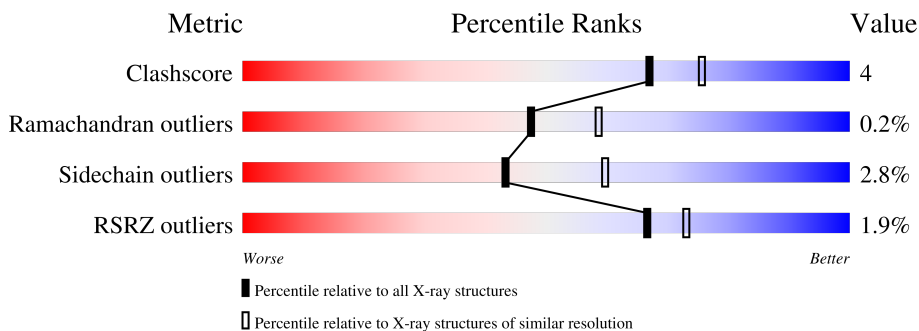
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.30 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
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  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	472	 2% 86% 10% ..
1	B	472	 3% 85% 11% ..
1	C	472	 2% 86% 10% ..
1	D	472	 % 86% 11% ..

## 2 Entry composition [i](#)

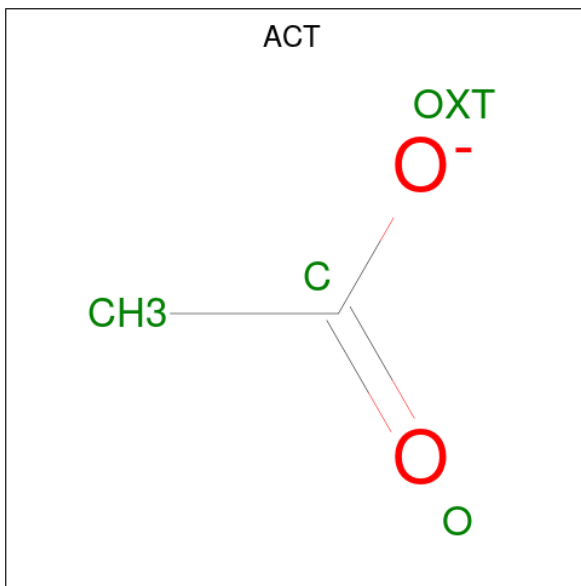
There are 5 unique types of molecules in this entry. The entry contains 15080 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 4-AMINO BUTYRATE AMINOTRANSFERASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	461	Total 3590	C 2291	N 620	O 656	S 23	0	0	0
1	B	461	Total 3591	C 2291	N 621	O 656	S 23	0	0	0
1	C	461	Total 3591	C 2291	N 621	O 656	S 23	0	0	0
1	D	461	Total 3591	C 2291	N 621	O 656	S 23	0	0	0

- Molecule 2 is ACETATE ION (three-letter code: ACT) (formula: C<sub>2</sub>H<sub>3</sub>O<sub>2</sub>).



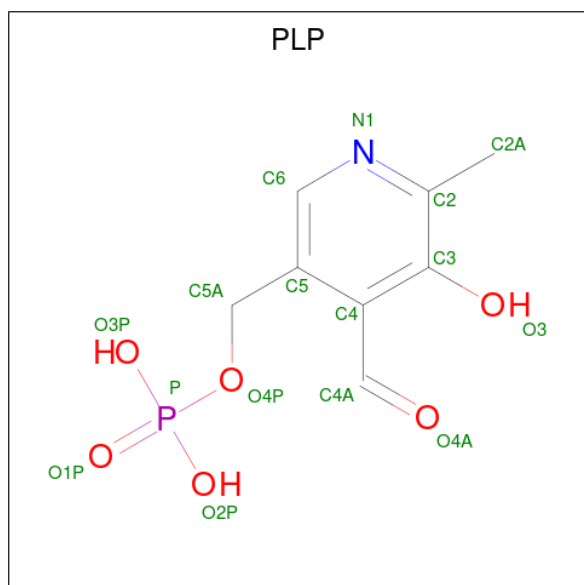
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
2	A	1	Total 4	C 2	O 2	0	0
2	B	1	Total 4	C 2	O 2	0	0

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	C	1	Total	C	O	0	0
			4	2	2		
2	D	1	Total	C	O	0	0
			4	2	2		

- Molecule 3 is PYRIDOXAL-5'-PHOSPHATE (three-letter code: PLP) (formula: C<sub>8</sub>H<sub>10</sub>NO<sub>6</sub>P).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	0
			15	8	1	5	1		
3	B	1	Total	C	N	O	P	0	0
			15	8	1	5	1		
3	C	1	Total	C	N	O	P	0	0
			15	8	1	5	1		
3	D	1	Total	C	N	O	P	0	0
			15	8	1	5	1		

- Molecule 4 is FE2/S2 (INORGANIC) CLUSTER (three-letter code: FES) (formula: Fe<sub>2</sub>S<sub>2</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	Fe	S	0	0
			4	2	2		
4	C	1	Total	Fe	S	0	0
			4	2	2		

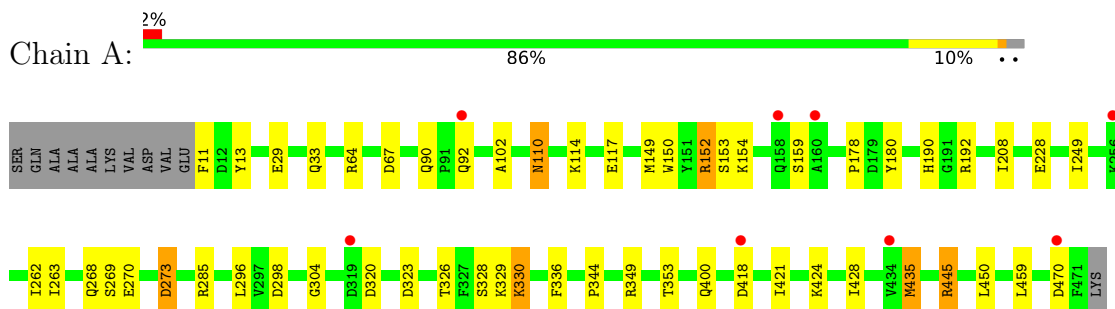
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	167	Total	O	0	0
			167	167		
5	B	147	Total	O	0	0
			147	147		
5	C	147	Total	O	0	0
			147	147		
5	D	172	Total	O	0	0
			172	172		

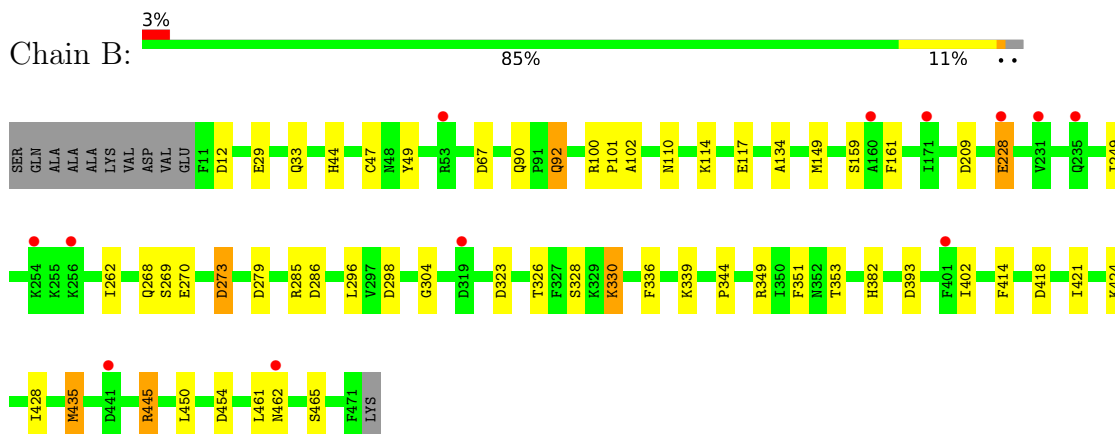
### 3 Residue-property plots [i](#)

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.

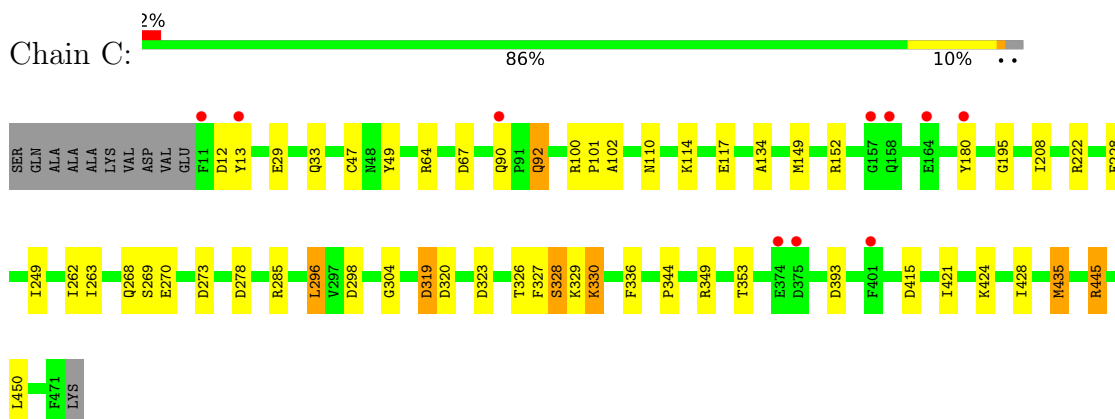
- Molecule 1: 4-AMINO BUTYRATE AMINOTRANSFERASE




- Molecule 1: 4-AMINO BUTYRATE AMINOTRANSFERASE

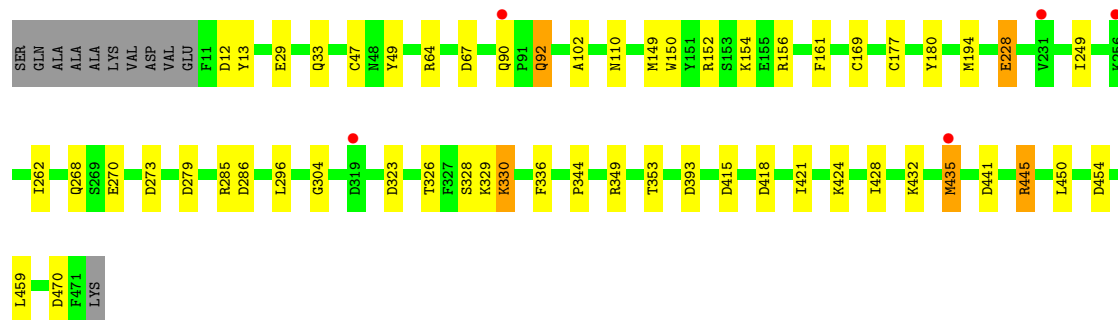


- Molecule 1: 4-AMINO BUTYRATE AMINOTRANSFERASE



- Molecule 1: 4-AMINO BUTYRATE AMINOTRANSFERASE

Chain D:  %



## 4 Data and refinement statistics i

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	68.60Å 225.04Å 70.35Å 90.00° 108.39° 90.00°	Depositor
Resolution (Å)	30.00 – 2.30 27.00 – 2.30	Depositor EDS
% Data completeness (in resolution range)	89.8 (30.00-2.30) 89.8 (27.00-2.30)	Depositor EDS
$R_{merge}$	0.09	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.46 (at 2.31Å)	Xtrriage
Refinement program	REFMAC 5.1.24	Depositor
R, $R_{free}$	0.188 , 0.221 0.196 , (Not available)	Depositor DCC
$R_{free}$ test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	21.1	Xtrriage
Anisotropy	0.712	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 38.4	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	0.033 for l,-k,h	Xtrriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	15080	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	20.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.33% 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: PLP, ACT, FES

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	0.42	0/3678	0.70	5/4976 (0.1%)
1	B	0.41	0/3679	0.70	9/4978 (0.2%)
1	C	0.42	0/3679	0.70	8/4978 (0.2%)
1	D	0.43	0/3679	0.71	10/4978 (0.2%)
All	All	0.42	0/14715	0.70	32/19910 (0.2%)

There are no bond length outliers.

All (32) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	12	ASP	CB-CG-OD2	6.46	124.12	118.30
1	C	320	ASP	CB-CG-OD2	6.37	124.04	118.30
1	C	319	ASP	CB-CG-OD2	6.24	123.92	118.30
1	D	12	ASP	CB-CG-OD2	5.99	123.69	118.30
1	D	393	ASP	CB-CG-OD2	5.78	123.50	118.30
1	B	393	ASP	CB-CG-OD2	5.75	123.47	118.30
1	B	298	ASP	CB-CG-OD2	5.73	123.46	118.30
1	A	320	ASP	CB-CG-OD2	5.63	123.36	118.30
1	C	393	ASP	CB-CG-OD2	5.58	123.32	118.30
1	A	470	ASP	CB-CG-OD2	5.54	123.29	118.30
1	A	418	ASP	CB-CG-OD2	5.52	123.27	118.30
1	D	415	ASP	CB-CG-OD2	5.47	123.23	118.30
1	D	470	ASP	CB-CG-OD2	5.47	123.22	118.30
1	B	323	ASP	CB-CG-OD2	5.44	123.20	118.30
1	D	279	ASP	CB-CG-OD2	5.44	123.19	118.30
1	C	323	ASP	CB-CG-OD2	5.38	123.15	118.30
1	C	298	ASP	CB-CG-OD2	5.35	123.11	118.30
1	B	12	ASP	CB-CG-OD2	5.34	123.11	118.30
1	C	415	ASP	CB-CG-OD2	5.34	123.11	118.30
1	B	286	ASP	CB-CG-OD2	5.34	123.10	118.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	418	ASP	CB-CG-OD2	5.33	123.09	118.30
1	D	441	ASP	CB-CG-OD2	5.33	123.09	118.30
1	A	298	ASP	CB-CG-OD2	5.32	123.09	118.30
1	D	323	ASP	CB-CG-OD2	5.24	123.02	118.30
1	D	454	ASP	CB-CG-OD2	5.23	123.01	118.30
1	B	209	ASP	CB-CG-OD2	5.23	123.00	118.30
1	D	418	ASP	CB-CG-OD2	5.21	122.99	118.30
1	B	279	ASP	CB-CG-OD2	5.18	122.97	118.30
1	D	286	ASP	CB-CG-OD2	5.17	122.96	118.30
1	B	273	ASP	CB-CG-OD2	5.13	122.92	118.30
1	A	323	ASP	CB-CG-OD2	5.02	122.82	118.30
1	C	278	ASP	CB-CG-OD2	5.00	122.80	118.30

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	3590	0	3486	28	1
1	B	3591	0	3488	30	1
1	C	3591	0	3488	34	0
1	D	3591	0	3488	25	1
2	A	4	0	3	0	0
2	B	4	0	3	0	0
2	C	4	0	3	0	0
2	D	4	0	3	0	0
3	A	15	0	7	0	0
3	B	15	0	7	0	0
3	C	15	0	6	1	0
3	D	15	0	6	1	0
4	A	4	0	0	1	0
4	C	4	0	0	1	0
5	A	167	0	0	4	1
5	B	147	0	0	5	1
5	C	147	0	0	8	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	D	172	0	0	2	0
All	All	15080	0	13988	111	3

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 4.

All (111) 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:D:228:GLU:HG3	5:D:2088:HOH:O	1.72	0.90
1:A:269:SER:HB2	5:A:2095:HOH:O	1.83	0.77
1:B:462:ASN:OD1	5:B:2137:HOH:O	2.03	0.77
1:B:269:SER:HB2	5:B:2076:HOH:O	1.91	0.70
1:C:180:TYR:HE2	5:C:2073:HOH:O	1.75	0.70
1:C:269:SER:HB2	5:C:2076:HOH:O	1.98	0.62
1:A:11:PHE:N	5:A:2001:HOH:O	2.31	0.62
1:B:424:LYS:O	1:B:428:ILE:HG12	2.02	0.60
1:D:326:THR:HG22	1:D:336:PHE:HB3	1.83	0.60
1:A:152:ARG:HD2	1:A:180:TYR:CE1	2.38	0.59
1:A:268:GLN:O	1:A:273:ASP:HA	2.03	0.59
1:B:339:LYS:HE2	5:B:2039:HOH:O	2.03	0.59
1:C:268:GLN:O	1:C:273:ASP:HA	2.03	0.58
1:C:222:ARG:NE	5:C:2064:HOH:O	2.38	0.57
1:C:90:GLN:HB3	1:C:92:GLN:NE2	2.19	0.56
1:C:149:MET:HG2	1:C:349:ARG:NH2	2.20	0.56
1:A:90:GLN:HB3	1:A:92:GLN:NE2	2.21	0.56
1:D:90:GLN:HB3	1:D:92:GLN:NE2	2.21	0.56
1:B:268:GLN:O	1:B:273:ASP:HA	2.05	0.56
1:D:330:LYS:HB2	5:D:2106:HOH:O	2.05	0.56
1:C:180:TYR:CE2	5:C:2073:HOH:O	2.53	0.55
1:B:90:GLN:HB3	1:B:92:GLN:NE2	2.21	0.55
1:C:424:LYS:O	1:C:428:ILE:HG12	2.05	0.55
1:B:326:THR:HG22	1:B:336:PHE:HB3	1.88	0.55
1:A:424:LYS:O	1:A:428:ILE:HG12	2.07	0.55
1:C:208:ILE:HD13	1:D:161:PHE:CD2	2.42	0.54
1:D:268:GLN:O	1:D:273:ASP:HA	2.08	0.54
1:C:326:THR:HG22	1:C:336:PHE:HB3	1.88	0.54
1:A:208:ILE:HD13	1:B:161:PHE:CD2	2.43	0.53
1:B:149:MET:HG2	1:B:349:ARG:NH2	2.22	0.53
1:A:152:ARG:HD3	1:A:178:PRO:HG3	1.91	0.53
1:A:149:MET:HE1	1:A:344:PRO:HB3	1.90	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:149:MET:HG2	1:D:349:ARG:NH2	2.24	0.53
1:A:149:MET:HG2	1:A:349:ARG:NH2	2.24	0.52
1:B:382:HIS:NE2	1:B:454:ASP:OD2	2.43	0.52
1:D:149:MET:HE1	1:D:344:PRO:HB3	1.92	0.52
1:D:424:LYS:O	1:D:428:ILE:HG12	2.08	0.52
1:D:152:ARG:HD2	1:D:180:TYR:CE1	2.45	0.51
1:A:29:GLU:OE2	1:A:33:GLN:NE2	2.44	0.50
1:A:326:THR:HG22	1:A:336:PHE:HB3	1.93	0.50
1:D:150:TRP:CZ2	1:D:154:LYS:HD2	2.46	0.49
1:C:222:ARG:CZ	5:C:2064:HOH:O	2.61	0.49
1:B:149:MET:HE1	1:B:344:PRO:HB3	1.95	0.49
1:C:149:MET:HE1	1:C:344:PRO:HB3	1.94	0.49
1:C:67:ASP:HA	1:C:435:MET:HB2	1.95	0.49
1:B:462:ASN:CG	5:B:2137:HOH:O	2.51	0.48
1:C:134:ALA:HB3	4:C:800:FES:S2	2.54	0.48
1:C:330:LYS:NZ	5:C:2110:HOH:O	2.46	0.48
1:A:150:TRP:CE2	1:A:154:LYS:HD2	2.49	0.48
1:D:329:LYS:NZ	3:D:600:PLP:O3	2.45	0.48
1:D:102:ALA:HA	1:D:353:THR:O	2.15	0.47
1:A:330:LYS:HB2	5:A:2109:HOH:O	2.14	0.47
1:C:304:GLY:O	1:C:450:LEU:HD11	2.14	0.47
1:B:67:ASP:HA	1:B:435:MET:HB2	1.97	0.47
1:B:102:ALA:HA	1:B:353:THR:O	2.15	0.47
1:B:29:GLU:OE2	1:B:33:GLN:NE2	2.48	0.46
4:A:800:FES:S1	1:B:134:ALA:HB3	2.55	0.46
1:C:90:GLN:HB3	1:C:92:GLN:HE22	1.81	0.46
1:B:304:GLY:O	1:B:450:LEU:HD11	2.16	0.46
1:C:319:ASP:OD2	5:C:2105:HOH:O	2.21	0.46
1:A:67:ASP:HA	1:A:435:MET:HB2	1.96	0.46
1:A:190:HIS:CE1	1:A:263:ILE:HG12	2.52	0.45
1:D:169:CYS:HA	1:D:177:CYS:SG	2.56	0.45
1:C:102:ALA:HA	1:C:353:THR:O	2.16	0.45
1:A:192:ARG:HD2	1:B:351:PHE:O	2.16	0.45
1:A:110:ASN:HD22	1:A:110:ASN:C	2.20	0.45
1:C:249:ILE:HD11	1:C:262:ILE:HD11	1.99	0.45
1:A:90:GLN:HB3	1:A:92:GLN:HE22	1.82	0.45
1:B:100:ARG:HA	1:B:101:PRO:HD3	1.82	0.45
1:C:152:ARG:HD2	1:C:180:TYR:CE1	2.52	0.45
1:B:270:GLU:OE2	1:B:445:ARG:NH1	2.44	0.44
1:B:249:ILE:HD11	1:B:262:ILE:HD11	1.99	0.44
1:D:249:ILE:HD11	1:D:262:ILE:HD11	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:90:GLN:HB3	1:D:92:GLN:HE22	1.82	0.44
1:A:304:GLY:O	1:A:450:LEU:HD11	2.18	0.44
1:A:102:ALA:HA	1:A:353:THR:O	2.18	0.43
1:B:330:LYS:HB2	5:B:2093:HOH:O	2.18	0.43
1:B:461:LEU:O	1:B:465:SER:HB2	2.18	0.43
1:C:263:ILE:HD12	1:C:296:LEU:HD13	2.00	0.43
1:D:29:GLU:OE2	1:D:33:GLN:NE2	2.51	0.43
1:A:249:ILE:HD11	1:A:262:ILE:HD11	2.00	0.43
1:D:304:GLY:O	1:D:450:LEU:HD11	2.18	0.43
1:A:110:ASN:C	1:A:110:ASN:ND2	2.72	0.42
5:A:2012:HOH:O	1:B:344:PRO:HD2	2.19	0.42
1:B:90:GLN:HB3	1:B:92:GLN:HE22	1.83	0.42
1:C:149:MET:HG2	1:C:349:ARG:CZ	2.49	0.42
1:A:270:GLU:OE2	1:A:445:ARG:NH1	2.45	0.42
1:C:29:GLU:OE2	1:C:33:GLN:NE2	2.53	0.42
1:B:114:LYS:HA	1:B:117:GLU:HG2	2.01	0.42
1:C:270:GLU:OE2	1:C:445:ARG:NH1	2.44	0.42
1:A:114:LYS:HA	1:A:117:GLU:HG2	2.01	0.42
1:D:47:CYS:HB2	1:D:49:TYR:CE2	2.54	0.42
1:C:13:TYR:CD1	1:C:64:ARG:HD2	2.54	0.41
1:D:67:ASP:HA	1:D:435:MET:HB2	2.00	0.41
1:D:270:GLU:OE2	1:D:445:ARG:NH1	2.43	0.41
1:C:114:LYS:HB3	5:C:2029:HOH:O	2.21	0.41
1:C:195:GLY:HA3	1:D:194:MET:HE2	2.02	0.41
1:C:114:LYS:HA	1:C:117:GLU:HG2	2.00	0.41
1:B:228:GLU:H	1:B:228:GLU:HG3	1.72	0.41
1:C:195:GLY:HA3	1:D:194:MET:CE	2.51	0.41
1:A:149:MET:HG2	1:A:349:ARG:CZ	2.51	0.41
1:A:13:TYR:CD1	1:A:64:ARG:HD2	2.56	0.41
1:C:100:ARG:HA	1:C:101:PRO:HD3	1.84	0.41
1:A:329:LYS:HE3	1:B:353:THR:OG1	2.20	0.41
1:B:47:CYS:HB2	1:B:49:TYR:CE2	2.55	0.41
1:D:13:TYR:CD1	1:D:64:ARG:HD2	2.56	0.41
1:B:402:ILE:HD12	1:B:414:PHE:CE1	2.56	0.40
1:C:329:LYS:NZ	3:C:600:PLP:O3	2.54	0.40
1:D:228:GLU:HG3	1:D:228:GLU:H	1.74	0.40
1:C:47:CYS:HB2	1:C:49:TYR:CE2	2.56	0.40
1:C:327:PHE:O	1:C:328:SER:HB2	2.21	0.40

All (3) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:156:ARG:O	1:D:432:LYS:NZ[1_455]	1.87	0.33
1:A:400:GLN:O	1:B:462:ASN:ND2[1_454]	1.89	0.31
5:A:2138:HOH:O	5:B:2137:HOH:O[1_454]	2.05	0.15

### 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	459/472 (97%)	440 (96%)	18 (4%)	1 (0%)	47 58
1	B	459/472 (97%)	440 (96%)	18 (4%)	1 (0%)	47 58
1	C	459/472 (97%)	443 (96%)	15 (3%)	1 (0%)	47 58
1	D	459/472 (97%)	441 (96%)	17 (4%)	1 (0%)	47 58
All	All	1836/1888 (97%)	1764 (96%)	68 (4%)	4 (0%)	47 58

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	328	SER
1	B	328	SER
1	C	328	SER
1	D	328	SER

#### 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	381/408 (93%)	368 (97%)	13 (3%)	37	51
1	B	381/408 (93%)	370 (97%)	11 (3%)	42	58
1	C	381/408 (93%)	372 (98%)	9 (2%)	49	66
1	D	381/408 (93%)	371 (97%)	10 (3%)	46	63
All	All	1524/1632 (93%)	1481 (97%)	43 (3%)	43	60

All (43) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	110	ASN
1	A	152	ARG
1	A	153	SER
1	A	159	SER
1	A	228	GLU
1	A	273	ASP
1	A	285	ARG
1	A	296	LEU
1	A	330	LYS
1	A	421	ILE
1	A	435	MET
1	A	445	ARG
1	A	459	LEU
1	B	44	HIS
1	B	92	GLN
1	B	110	ASN
1	B	159	SER
1	B	228	GLU
1	B	285	ARG
1	B	296	LEU
1	B	330	LYS
1	B	421	ILE
1	B	435	MET
1	B	445	ARG
1	C	92	GLN
1	C	110	ASN
1	C	228	GLU
1	C	285	ARG
1	C	296	LEU
1	C	330	LYS
1	C	421	ILE
1	C	435	MET
1	C	445	ARG

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Mol	Chain	Res	Type
1	D	92	GLN
1	D	110	ASN
1	D	228	GLU
1	D	285	ARG
1	D	296	LEU
1	D	330	LYS
1	D	421	ILE
1	D	435	MET
1	D	445	ARG
1	D	459	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	92	GLN
1	A	110	ASN
1	B	92	GLN
1	B	110	ASN
1	B	338	HIS
1	C	92	GLN
1	C	110	ASN
1	C	338	HIS
1	D	92	GLN
1	D	110	ASN

### 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](#)

10 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
4	FES	C	800	1	0,4,4	-	-	-		
2	ACT	A	500	-	3,3,3	0.76	0	3,3,3	1.30	0
3	PLP	A	600	1	15,15,16	0.87	0	20,22,23	1.28	2 (10%)
2	ACT	D	500	-	3,3,3	0.85	0	3,3,3	1.10	0
4	FES	A	800	1	0,4,4	-	-	-		
3	PLP	D	600	1	15,15,16	0.89	1 (6%)	20,22,23	1.62	2 (10%)
3	PLP	C	600	1	15,15,16	1.04	1 (6%)	20,22,23	1.44	4 (20%)
3	PLP	B	600	1	15,15,16	0.79	0	20,22,23	1.45	3 (15%)
2	ACT	C	500	-	3,3,3	0.74	0	3,3,3	1.07	0
2	ACT	B	500	-	3,3,3	0.76	0	3,3,3	1.18	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
4	FES	C	800	1	-	-	0/1/1/1
3	PLP	A	600	1	-	0/6/6/8	0/1/1/1
4	FES	A	800	1	-	-	0/1/1/1
3	PLP	D	600	1	-	0/6/6/8	0/1/1/1
3	PLP	C	600	1	-	0/6/6/8	0/1/1/1
3	PLP	B	600	1	-	0/6/6/8	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	600	PLP	C2-N1	2.51	1.38	1.33
3	D	600	PLP	C6-N1	2.04	1.38	1.34

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	600	PLP	C4A-C4-C5	4.55	125.62	120.94
3	B	600	PLP	C4A-C4-C5	3.85	124.90	120.94
3	C	600	PLP	C4A-C4-C5	3.68	124.73	120.94
3	D	600	PLP	C4A-C4-C3	-3.11	115.22	120.50
3	A	600	PLP	C4A-C4-C5	2.96	123.99	120.94
3	B	600	PLP	O4P-C5A-C5	2.63	114.36	109.35
3	C	600	PLP	O4P-C5A-C5	2.44	114.01	109.35
3	B	600	PLP	C4A-C4-C3	-2.27	116.65	120.50
3	C	600	PLP	C4A-C4-C3	-2.19	116.79	120.50
3	A	600	PLP	C5-C6-N1	-2.14	120.26	123.82
3	C	600	PLP	C5-C6-N1	-2.07	120.37	123.82

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	C	800	FES	1	0
4	A	800	FES	1	0
3	D	600	PLP	1	0
3	C	600	PLP	1	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	461/472 (97%)	-0.07	8 (1%) 70 76	12, 19, 30, 38	0
1	B	461/472 (97%)	0.00	12 (2%) 56 63	12, 19, 28, 38	0
1	C	461/472 (97%)	-0.01	10 (2%) 62 69	12, 19, 29, 38	0
1	D	461/472 (97%)	-0.08	5 (1%) 80 85	11, 19, 28, 38	0
All	All	1844/1888 (97%)	-0.04	35 (1%) 66 73	11, 19, 29, 38	0

All (35) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	231	VAL	3.7
1	B	441	ASP	3.5
1	C	158	GLN	3.3
1	A	158	GLN	3.2
1	B	401	PHE	2.9
1	B	160	ALA	2.8
1	B	319	ASP	2.8
1	C	13	TYR	2.6
1	A	319	ASP	2.6
1	D	90	GLN	2.6
1	C	11	PHE	2.5
1	B	228	GLU	2.5
1	D	231	VAL	2.5
1	B	235	GLN	2.5
1	C	164	GLU	2.5
1	D	319	ASP	2.4
1	C	375	ASP	2.4
1	B	171	ILE	2.4
1	A	470	ASP	2.4
1	B	53	ARG	2.3
1	C	157	GLY	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	254	LYS	2.2
1	D	435	MET	2.2
1	C	401	PHE	2.2
1	A	92	GLN	2.2
1	C	374	GLU	2.2
1	B	256	LYS	2.1
1	C	180	TYR	2.1
1	A	160	ALA	2.1
1	B	462	ASN	2.1
1	A	434	VAL	2.1
1	A	256	LYS	2.1
1	D	256	LYS	2.0
1	A	418	ASP	2.0
1	C	90	GLN	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, 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	B-factors(Å <sup>2</sup> )	Q<0.9
2	ACT	D	500	4/4	0.94	0.14	23,23,23,23	0
2	ACT	C	500	4/4	0.96	0.12	23,23,23,23	0
2	ACT	A	500	4/4	0.96	0.14	23,23,23,23	0
3	PLP	D	600	15/16	0.96	0.12	10,14,16,16	0
3	PLP	A	600	15/16	0.97	0.14	11,17,20,21	0
3	PLP	B	600	15/16	0.98	0.10	12,14,17,17	0
3	PLP	C	600	15/16	0.98	0.11	12,13,16,16	0
2	ACT	B	500	4/4	0.98	0.14	23,23,23,23	0
4	FES	A	800	4/4	0.99	0.08	13,14,14,14	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
4	FES	C	800	4/4	0.99	0.07	10,13,14,15	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.