



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 02:03 PM UTC

PDB ID : 3ZMP / pdb_00003zmp
Title : Src-derived peptide inhibitor complex of PTP1B
Authors : Temmerman, K.; Pogenberg, V.; Meyer, C.; Koehn, M.; Wilmanns, M.
Deposited on : 2013-02-12
Resolution : 2.62 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 ⓘ 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 ⓘ](#)) were used in the production of this report:

MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

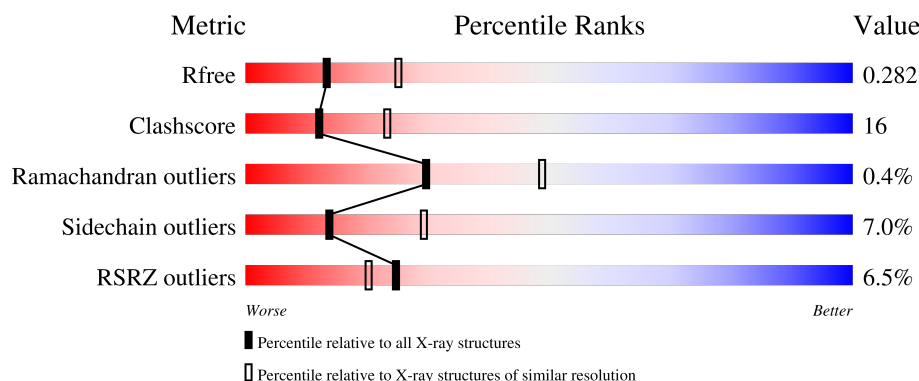
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.62 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}	180053	4951 (2.64-2.60)
Clashscore	190562	5303 (2.64-2.60)
Ramachandran outliers	187476	5217 (2.64-2.60)
Sidechain outliers	187428	5217 (2.64-2.60)
RSRZ outliers	180081	4950 (2.64-2.60)

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 $\leq 5\%$. 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	329	5% 57% 25% 16%
1	B	329	5% 54% 24% 19%
2	C	10	20% 30% 30% 30% 10%
2	D	10	10% 20% 10% 70%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 4376 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 TYROSINE-PROTEIN PHOSPHATASE NON-RECEPTOR TYPE 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	276	Total	C	N	O	S	0	0	0
			2134	1363	369	390	12			
1	B	266	Total	C	N	O	S	0	0	0
			2091	1334	362	383	12			

There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-7	MET	-	expression tag	UNP P18031
A	-6	HIS	-	expression tag	UNP P18031
A	-5	HIS	-	expression tag	UNP P18031
A	-4	HIS	-	expression tag	UNP P18031
A	-3	HIS	-	expression tag	UNP P18031
A	-2	HIS	-	expression tag	UNP P18031
A	-1	HIS	-	expression tag	UNP P18031
A	0	HIS	-	expression tag	UNP P18031
A	215	SER	CYS	engineered mutation	UNP P18031
B	-7	MET	-	expression tag	UNP P18031
B	-6	HIS	-	expression tag	UNP P18031
B	-5	HIS	-	expression tag	UNP P18031
B	-4	HIS	-	expression tag	UNP P18031
B	-3	HIS	-	expression tag	UNP P18031
B	-2	HIS	-	expression tag	UNP P18031
B	-1	HIS	-	expression tag	UNP P18031
B	0	HIS	-	expression tag	UNP P18031
B	215	SER	CYS	engineered mutation	UNP P18031

- Molecule 2 is a protein called PROTO-ONCOGENE TYROSINE-PROTEIN KINASE SRC.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
2	C	9	Total	C	F	N	O	P	0	0	0
			80	46	2	12	19	1			

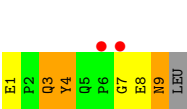
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Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
2	D	3	Total	C	F	N	O	P	0	0	0
			28	16	2	3	6	1			

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	25	Total	O	0	0
			25	25		
3	B	17	Total	O	0	0
			17	17		
3	C	1	Total	O	0	0
			1	1		



● Molecule 2: PROTO-ONCOGENE TYROSINE-PROTEIN KINASE SRC



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	70.82Å 88.07Å 91.99Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	63.62 – 2.62 63.62 – 2.62	Depositor EDS
% Data completeness (in resolution range)	99.3 (63.62-2.62) 99.9 (63.62-2.62)	Depositor EDS
R_{merge}	0.19	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	4.20 (at 2.61Å)	Xtriage
Refinement program	PHENIX (PHENIX.REFINE)	Depositor
R, R_{free}	0.220 , 0.271 0.224 , 0.282	Depositor DCC
R_{free} test set	919 reflections (5.14%)	wwPDB-VP
Wilson B-factor (Å ²)	37.7	Xtriage
Anisotropy	0.772	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 75.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	0.000 for -h,l,k	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	4376	wwPDB-VP
Average B, all atoms (Å ²)	59.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 46.26 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.1743e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹Intensities estimated from amplitudes.

²Theoretical 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: FTY

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	0.65	0/2183	1.06	8/2965 (0.3%)
1	B	0.62	0/2140	0.98	2/2901 (0.1%)
2	C	0.44	0/62	0.89	0/82
2	D	0.41	0/8	0.53	0/8
All	All	0.63	0/4393	1.02	10/5956 (0.2%)

There are no bond length outliers.

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	187	SER	CA-C-N	9.20	129.26	119.05
1	A	187	SER	C-N-CA	9.20	129.26	119.05
1	A	220	GLY	N-CA-C	8.16	122.36	112.49
1	A	215	SER	N-CA-C	-6.65	100.08	108.45
1	A	279	LYS	N-CA-C	-6.29	104.50	111.36
1	A	14	GLY	N-CA-C	-6.22	101.73	114.16
1	B	90	ASN	N-CA-C	6.08	118.87	111.82
1	A	62	GLU	N-CA-C	5.48	117.25	111.28
1	B	219	ILE	N-CA-C	5.37	115.86	111.62
1	A	256	PHE	N-CA-C	5.26	118.17	111.69

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	2134	0	2010	52	0
1	B	2091	0	1998	78	0
2	C	80	0	60	10	0
2	D	28	0	10	1	0
3	A	25	0	0	6	0
3	B	17	0	0	4	0
3	C	1	0	0	0	0
All	All	4376	0	4078	131	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 16.

All (131) 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:14:GLY:N	1:B:15:SER:HB2	1.44	1.29
1:B:13:SER:C	1:B:15:SER:HB2	1.63	1.23
1:B:13:SER:CB	1:B:15:SER:CB	2.30	1.10
1:B:13:SER:C	1:B:15:SER:CB	2.29	1.04
1:A:45:ARG:H	1:A:85:GLN:HE22	1.06	0.96
1:B:14:GLY:N	1:B:15:SER:CB	2.30	0.93
1:B:13:SER:CB	1:B:15:SER:HB3	1.98	0.93
1:A:50:SER:O	3:A:2009:HOH:O	1.91	0.87
2:C:7:GLY:O	2:C:8:GLU:HB2	1.79	0.83
1:A:45:ARG:H	1:A:85:GLN:NE2	1.80	0.79
1:B:21:GLN:HG3	1:B:22:ASP:N	1.99	0.77
1:B:85:GLN:O	3:B:2005:HOH:O	2.04	0.75
1:B:13:SER:C	1:B:15:SER:HG	1.94	0.75
1:B:13:SER:C	1:B:15:SER:OG	2.30	0.75
1:A:262:GLN:HG3	2:D:4:FTY:HE1	1.67	0.74
1:B:13:SER:CB	1:B:15:SER:HB2	2.18	0.73
1:A:92:CYS:HB3	1:A:135:PHE:HE2	1.54	0.72
1:B:72:ILE:HG13	1:B:256:PHE:HB2	1.70	0.72
2:C:8:GLU:O	2:C:9:ASN:C	2.32	0.72
1:B:13:SER:CA	1:B:15:SER:HB2	2.18	0.72
1:A:73:LYS:O	3:A:2012:HOH:O	2.08	0.72
1:B:209:GLY:O	3:B:2006:HOH:O	2.07	0.71
1:B:18:ALA:O	1:B:21:GLN:CG	2.40	0.70
1:B:162:ASN:HB3	1:B:165:THR:HG23	1.73	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:20:TYR:HE2	1:B:24:ARG:NH1	1.92	0.68
1:B:18:ALA:O	1:B:21:GLN:HG2	1.93	0.68
1:A:213:VAL:HG12	1:A:222:SER:HB3	1.79	0.65
1:A:105:ARG:HG3	1:A:105:ARG:O	1.96	0.64
2:C:9:ASN:N	2:C:9:ASN:OD1	2.30	0.64
1:B:19:ILE:O	1:B:23:ILE:HG13	1.97	0.64
1:B:179:TRP:CE2	1:B:185:PRO:HD3	2.33	0.64
1:B:265:ASP:OD2	3:B:2016:HOH:O	2.15	0.64
1:B:14:GLY:H	1:B:15:SER:HB2	1.57	0.62
1:B:20:TYR:CE2	1:B:24:ARG:NH1	2.67	0.62
1:B:217:ALA:HB3	2:C:4:FTY:O1P	1.99	0.62
1:B:13:SER:CA	1:B:15:SER:CB	2.77	0.61
1:B:165:THR:OG1	1:B:167:GLU:HB2	1.99	0.61
1:B:13:SER:CB	1:B:15:SER:OG	2.49	0.61
1:B:162:ASN:ND2	1:B:165:THR:HG22	2.14	0.61
1:A:83:LEU:HD11	1:A:226:CYS:SG	2.41	0.61
1:A:185:PRO:HG2	1:A:269:PHE:CZ	2.37	0.60
1:A:45:ARG:N	1:A:85:GLN:HE22	1.90	0.59
1:B:16:TRP:CD1	1:B:268:ARG:HD2	2.37	0.59
1:A:200:GLU:OE2	1:B:199:ARG:NH1	2.30	0.59
1:B:129:GLU:O	3:B:2009:HOH:O	2.17	0.59
1:A:113:VAL:O	1:A:114:MET:C	2.47	0.57
1:B:61:GLN:HE22	1:B:138:THR:HA	1.69	0.56
1:B:90:ASN:OD1	1:B:90:ASN:N	2.26	0.56
1:A:254:ARG:NH1	3:A:2025:HOH:O	2.39	0.56
1:A:144:LEU:HA	1:A:158:LEU:HD12	1.88	0.55
1:B:21:GLN:HG3	1:B:22:ASP:H	1.71	0.55
1:B:46:TYR:CD2	2:C:4:FTY:HB3	2.42	0.55
1:A:28:SER:N	3:A:2002:HOH:O	2.35	0.54
1:A:179:TRP:HZ3	1:A:191:PHE:CE1	2.26	0.53
1:A:92:CYS:HB3	1:A:135:PHE:CE2	2.40	0.53
1:A:179:TRP:NE1	1:A:183:GLY:O	2.22	0.53
1:A:245:ASP:O	1:A:249:VAL:HG23	2.09	0.53
1:B:18:ALA:O	1:B:21:GLN:HG3	2.09	0.53
1:B:80:SER:HB3	1:B:210:PRO:HB3	1.91	0.53
1:A:79:ARG:CZ	1:A:233:LEU:HD11	2.39	0.52
1:B:16:TRP:HH2	1:B:271:TYR:CG	2.28	0.51
1:B:147:GLU:HB2	1:B:156:ARG:HG2	1.91	0.51
1:A:40:ASN:O	1:A:44:ASN:ND2	2.44	0.51
1:B:18:ALA:HA	1:B:21:GLN:HG2	1.93	0.51
1:A:194:PHE:O	1:A:198:VAL:HG23	2.11	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:176:TYR:CD2	1:A:179:TRP:HB2	2.46	0.50
1:B:57:ILE:HB	1:B:69:ALA:HB3	1.94	0.50
1:B:162:ASN:ND2	1:B:165:THR:CG2	2.75	0.50
1:B:130:GLU:HG2	1:B:131:LYS:HG2	1.94	0.50
1:B:165:THR:O	1:B:166:GLN:HB2	2.11	0.50
1:A:72:ILE:HG13	1:A:256:PHE:HB2	1.93	0.49
1:B:217:ALA:HB2	2:C:4:FTY:CG	2.41	0.49
1:B:194:PHE:O	1:B:198:VAL:HG23	2.13	0.49
1:B:109:MET:HG3	1:B:214:HIS:CE1	2.48	0.49
1:A:176:TYR:HD2	1:A:179:TRP:HB2	1.78	0.48
1:B:144:LEU:HA	1:B:158:LEU:HD23	1.96	0.48
1:B:123:GLN:NE2	1:B:127:GLN:HG3	2.29	0.48
1:B:42:ASN:O	1:B:90:ASN:ND2	2.45	0.47
1:A:10:ILE:HG23	1:A:19:ILE:HD13	1.95	0.47
1:A:153:TYR:OH	1:A:197:LYS:HG3	2.15	0.47
1:A:178:THR:O	1:A:180:PRO:HD3	2.14	0.47
1:B:97:GLU:HB2	1:B:138:THR:HG21	1.96	0.47
1:A:179:TRP:CE2	1:A:185:PRO:HD3	2.50	0.47
1:B:192:LEU:O	1:B:196:PHE:HD1	1.97	0.47
1:A:130:GLU:HG2	1:A:131:LYS:HG2	1.96	0.47
1:A:109:MET:HG3	1:A:214:HIS:CE1	2.50	0.46
1:B:70:SER:OG	1:B:257:ARG:HD2	2.16	0.46
2:C:3:GLN:H	2:C:3:GLN:HG2	1.35	0.46
1:B:176:TYR:OH	1:B:185:PRO:HB3	2.14	0.46
1:A:191:PHE:HZ	1:A:225:PHE:HA	1.81	0.46
1:B:178:THR:O	1:B:180:PRO:HD3	2.16	0.46
1:A:4:GLU:O	1:A:7:PHE:HB3	2.16	0.45
1:B:52:PHE:O	1:B:56:ARG:HB3	2.16	0.45
1:B:20:TYR:HE2	1:B:24:ARG:HH12	1.62	0.45
1:B:45:ARG:NH2	1:B:88:LEU:HD23	2.31	0.45
1:B:250:LEU:HD22	1:B:261:ILE:HD12	1.99	0.45
1:A:17:ALA:O	1:A:21:GLN:HG2	2.17	0.44
1:A:74:MET:HA	3:A:2012:HOH:O	2.17	0.44
1:B:137:ASP:OD1	1:B:137:ASP:N	2.50	0.44
1:B:87:PRO:HG3	1:B:95:PHE:CD2	2.53	0.44
1:A:36:LYS:NZ	1:A:47:ARG:O	2.51	0.44
1:B:79:ARG:HG2	1:B:81:TYR:CZ	2.52	0.44
1:A:50:SER:O	1:A:258:MET:HE3	2.18	0.44
1:B:92:CYS:HB3	1:B:135:PHE:HE2	1.83	0.44
1:B:162:ASN:HB3	1:B:165:THR:CG2	2.44	0.43
1:B:103:LYS:HA	1:B:169:ARG:NH1	2.33	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:110:LEU:HD12	1:A:222:SER:HA	1.99	0.43
1:B:133:MET:HE2	1:B:135:PHE:CZ	2.53	0.43
1:A:6:GLU:O	1:A:10:ILE:HG13	2.19	0.43
1:B:46:TYR:CE2	2:C:4:FTY:HB3	2.54	0.43
1:A:147:GLU:HB2	1:A:156:ARG:HG2	2.00	0.42
1:A:129:GLU:OE1	1:A:129:GLU:N	2.43	0.42
1:A:200:GLU:HG3	1:B:199:ARG:HB3	2.01	0.42
1:B:245:ASP:O	1:B:249:VAL:HG23	2.19	0.42
1:A:231:CYS:O	1:A:235:MET:HG3	2.19	0.42
1:B:179:TRP:CE2	1:B:221:ARG:HG2	2.54	0.42
1:A:36:LYS:HD2	1:A:36:LYS:HA	1.80	0.41
1:A:72:ILE:HD13	1:A:83:LEU:HD13	2.02	0.41
1:A:86:GLY:HA2	1:A:87:PRO:HD3	1.92	0.41
1:A:197:LYS:HD3	1:A:197:LYS:HA	1.78	0.41
1:A:200:GLU:OE2	1:B:199:ARG:HD3	2.20	0.41
1:B:129:GLU:HG3	1:B:144:LEU:O	2.19	0.41
1:B:148:ASP:O	1:B:154:THR:HG23	2.20	0.41
1:A:196:PHE:CD1	1:A:199:ARG:HD2	2.55	0.41
1:B:36:LYS:HD2	1:B:36:LYS:HA	1.81	0.41
1:B:83:LEU:HD11	1:B:226:CYS:SG	2.61	0.41
1:B:79:ARG:HG2	1:B:81:TYR:OH	2.21	0.41
1:B:215:SER:OG	2:C:4:FTY:P	2.80	0.40
1:B:217:ALA:HB2	2:C:4:FTY:CD2	2.51	0.40
1:A:253:MET:HB3	1:A:260:LEU:HD12	2.03	0.40
1:A:67:ILE:HG13	3:A:2006:HOH:O	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	272/329 (83%)	267 (98%)	4 (2%)	1 (0%)	30	49

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	262/329 (80%)	257 (98%)	4 (2%)	1 (0%)	30	49
2	C	6/10 (60%)	4 (67%)	2 (33%)	0	100	100
All	All	540/668 (81%)	528 (98%)	10 (2%)	2 (0%)	30	49

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	261	ILE
1	A	261	ILE

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	217/302 (72%)	200 (92%)	17 (8%)	11	25
1	B	218/302 (72%)	207 (95%)	11 (5%)	22	44
2	C	7/8 (88%)	4 (57%)	3 (43%)	0	0
All	All	442/612 (72%)	411 (93%)	31 (7%)	14	29

All (31) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	22	ASP
1	A	24	ARG
1	A	78	GLN
1	A	79	ARG
1	A	103	LYS
1	A	105	ARG
1	A	121	CYS
1	A	123	GLN
1	A	134	ILE
1	A	151	SER
1	A	158	LEU
1	A	159	GLU

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Mol	Chain	Res	Type
1	A	168	THR
1	A	205	SER
1	A	221	ARG
1	A	222	SER
1	A	246	ILE
1	B	21	GLN
1	B	23	ILE
1	B	50	SER
1	B	80	SER
1	B	90	ASN
1	B	123	GLN
1	B	151	SER
1	B	165	THR
1	B	168	THR
1	B	246	ILE
1	B	275	ILE
2	C	1	GLU
2	C	3	GLN
2	C	9	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	54	HIS
1	A	85	GLN
1	A	193	ASN
1	B	61	GLN
1	B	193	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

2 non-standard protein/DNA/RNA residues 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	$\# Z > 2$
2	FTY	D	4	2	16,18,19	1.63	3 (18%)	17,27,29	1.20	1 (5%)
2	FTY	C	4	2	16,18,19	1.70	3 (18%)	17,27,29	0.66	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	FTY	D	4	2	-	0/15/21/23	0/1/1/1
2	FTY	C	4	2	-	2/15/21/23	0/1/1/1

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	4	FTY	F1-C1	-4.31	1.31	1.37
2	D	4	FTY	P-O1P	3.95	1.56	1.50
2	C	4	FTY	F2-C1	-3.74	1.32	1.37
2	D	4	FTY	F1-C1	-2.95	1.33	1.37
2	D	4	FTY	F2-C1	-2.65	1.33	1.37
2	C	4	FTY	CB-CA	-2.12	1.49	1.53

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	4	FTY	O1P-P-C1	-4.07	102.96	111.78

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	C	4	FTY	F2-C1-P-O1P
2	C	4	FTY	F1-C1-P-O1P

There are no ring outliers.

2 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	4	FTY	1	0
2	C	4	FTY	6	0

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

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, 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	276/329 (83%)	0.47	16 (5%)	29 24	29, 54, 90, 112	0
1	B	266/329 (80%)	0.53	17 (6%)	25 21	34, 60, 94, 124	0
2	C	8/10 (80%)	1.31	2 (25%)	2 1	100, 102, 112, 112	0
2	D	2/10 (20%)	2.02	1 (50%)	0 0	89, 89, 89, 90	0
All	All	552/678 (81%)	0.52	36 (6%)	25 20	29, 57, 96, 124	0

All (36) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	11	ASP	4.3
1	B	10	ILE	4.1
1	A	187	SER	4.0
1	A	3	MET	3.5
1	B	271	TYR	3.1
1	B	63	ASP	3.0
1	A	127	GLN	2.8
1	B	278	ALA	2.8
1	B	280	PHE	2.8
1	A	13	SER	2.7
1	A	121	CYS	2.6
2	C	7	GLY	2.6
1	A	42	ASN	2.6
1	A	191	PHE	2.5
1	B	13	SER	2.5
1	A	4	GLU	2.5
1	A	186	GLU	2.4
1	B	61	GLN	2.4
1	A	185	PRO	2.4
2	D	5	GLN	2.3
1	A	15	SER	2.3

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Mol	Chain	Res	Type	RSRZ
1	A	182	PHE	2.3
1	A	181	ASP	2.2
1	B	191	PHE	2.2
1	B	196	PHE	2.2
1	A	282	MET	2.2
1	B	240	ASP	2.2
1	B	16	TRP	2.2
1	A	180	PRO	2.1
1	B	12	LYS	2.1
1	B	237	LYS	2.1
1	B	18	ALA	2.1
1	B	275	ILE	2.1
1	B	122	ALA	2.0
2	C	6	PRO	2.0
1	A	183	GLY	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [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
2	FTY	C	4	18/19	0.92	0.14	45,98,100,100	0
2	FTY	D	4	18/19	0.93	0.12	30,88,89,89	0

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.