



Full wwPDB X-ray Structure Validation Report ⓘ

Apr 18, 2026 – 02:12 PM UTC

PDB ID : 3FG8 / pdb_00003fg8
Title : Crystal structure of PAS domain of RHA05790
Authors : Chang, C.; Xu, X.; Cui, H.; Savchenko, A.; Edwards, A.; Joachimiak, A.;
Midwest Center for Structural Genomics (MCSG)
Deposited on : 2008-12-05
Resolution : 1.80 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

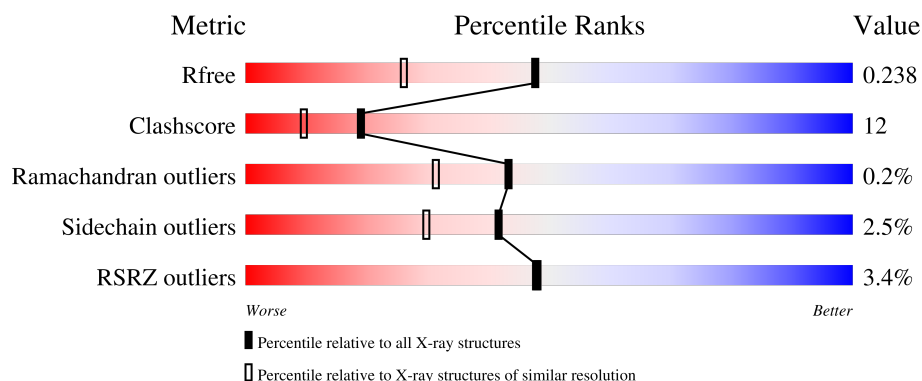
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.80 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.



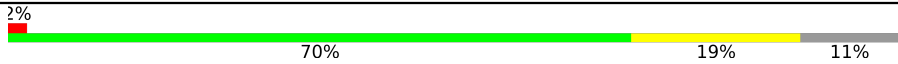
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	7662 (1.80-1.80)
Clashscore	190562	8479 (1.80-1.80)
Ramachandran outliers	187476	8391 (1.80-1.80)
Sidechain outliers	187428	8390 (1.80-1.80)
RSRZ outliers	180081	7663 (1.80-1.80)

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	118	2% 75% 14% • 10%
1	B	118	3% 74% 14% • 11%
1	C	118	4% 76% 12% • 11%
1	D	118	3% 76% 12% • 10%
1	E	118	5% 69% 17% • • 11%

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Mol	Chain	Length	Quality of chain
1	F	118	 A horizontal bar chart showing the quality of chain F. The bar is divided into four segments: a small red segment at the beginning labeled '2%', followed by a large green segment labeled '70%', a yellow segment labeled '19%', and a small grey segment at the end labeled '11%'.

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 6366 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 uncharacterized protein RHA05790.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	106	Total	C	N	O	S	Se	0	15	0
			950	588	181	177	2	2			
1	B	105	Total	C	N	O	S	Se	0	10	0
			881	548	161	167	3	2			
1	C	105	Total	C	N	O	S	Se	0	12	0
			900	562	170	164	2	2			
1	D	106	Total	C	N	O	S	Se	0	16	0
			974	601	193	176	2	2			
1	E	105	Total	C	N	O	S	Se	0	12	0
			907	561	174	168	2	2			
1	F	105	Total	C	N	O	S	Se	0	11	0
			916	564	179	168	3	2			

There are 126 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	107	MSE	-	expression tag	UNP Q0S7I6
A	108	GLY	-	expression tag	UNP Q0S7I6
A	109	SER	-	expression tag	UNP Q0S7I6
A	110	SER	-	expression tag	UNP Q0S7I6
A	111	HIS	-	expression tag	UNP Q0S7I6
A	112	HIS	-	expression tag	UNP Q0S7I6
A	113	HIS	-	expression tag	UNP Q0S7I6
A	114	HIS	-	expression tag	UNP Q0S7I6
A	115	HIS	-	expression tag	UNP Q0S7I6
A	116	HIS	-	expression tag	UNP Q0S7I6
A	117	SER	-	expression tag	UNP Q0S7I6
A	118	SER	-	expression tag	UNP Q0S7I6
A	119	GLY	-	expression tag	UNP Q0S7I6
A	120	ARG	-	expression tag	UNP Q0S7I6
A	121	GLU	-	expression tag	UNP Q0S7I6
A	122	ASN	-	expression tag	UNP Q0S7I6
A	123	LEU	-	expression tag	UNP Q0S7I6

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Chain	Residue	Modelled	Actual	Comment	Reference
A	124	TYR	-	expression tag	UNP Q0S7I6
A	125	PHE	-	expression tag	UNP Q0S7I6
A	126	GLN	-	expression tag	UNP Q0S7I6
A	127	GLY	-	expression tag	UNP Q0S7I6
B	107	MSE	-	expression tag	UNP Q0S7I6
B	108	GLY	-	expression tag	UNP Q0S7I6
B	109	SER	-	expression tag	UNP Q0S7I6
B	110	SER	-	expression tag	UNP Q0S7I6
B	111	HIS	-	expression tag	UNP Q0S7I6
B	112	HIS	-	expression tag	UNP Q0S7I6
B	113	HIS	-	expression tag	UNP Q0S7I6
B	114	HIS	-	expression tag	UNP Q0S7I6
B	115	HIS	-	expression tag	UNP Q0S7I6
B	116	HIS	-	expression tag	UNP Q0S7I6
B	117	SER	-	expression tag	UNP Q0S7I6
B	118	SER	-	expression tag	UNP Q0S7I6
B	119	GLY	-	expression tag	UNP Q0S7I6
B	120	ARG	-	expression tag	UNP Q0S7I6
B	121	GLU	-	expression tag	UNP Q0S7I6
B	122	ASN	-	expression tag	UNP Q0S7I6
B	123	LEU	-	expression tag	UNP Q0S7I6
B	124	TYR	-	expression tag	UNP Q0S7I6
B	125	PHE	-	expression tag	UNP Q0S7I6
B	126	GLN	-	expression tag	UNP Q0S7I6
B	127	GLY	-	expression tag	UNP Q0S7I6
C	107	MSE	-	expression tag	UNP Q0S7I6
C	108	GLY	-	expression tag	UNP Q0S7I6
C	109	SER	-	expression tag	UNP Q0S7I6
C	110	SER	-	expression tag	UNP Q0S7I6
C	111	HIS	-	expression tag	UNP Q0S7I6
C	112	HIS	-	expression tag	UNP Q0S7I6
C	113	HIS	-	expression tag	UNP Q0S7I6
C	114	HIS	-	expression tag	UNP Q0S7I6
C	115	HIS	-	expression tag	UNP Q0S7I6
C	116	HIS	-	expression tag	UNP Q0S7I6
C	117	SER	-	expression tag	UNP Q0S7I6
C	118	SER	-	expression tag	UNP Q0S7I6
C	119	GLY	-	expression tag	UNP Q0S7I6
C	120	ARG	-	expression tag	UNP Q0S7I6
C	121	GLU	-	expression tag	UNP Q0S7I6
C	122	ASN	-	expression tag	UNP Q0S7I6
C	123	LEU	-	expression tag	UNP Q0S7I6

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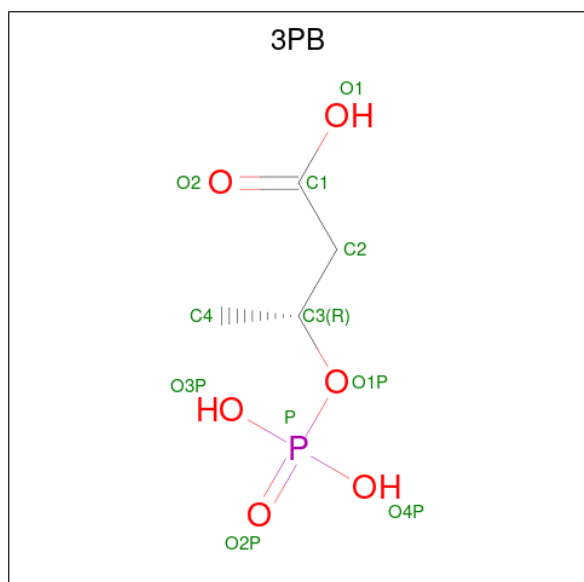
Chain	Residue	Modelled	Actual	Comment	Reference
C	124	TYR	-	expression tag	UNP Q0S7I6
C	125	PHE	-	expression tag	UNP Q0S7I6
C	126	GLN	-	expression tag	UNP Q0S7I6
C	127	GLY	-	expression tag	UNP Q0S7I6
D	107	MSE	-	expression tag	UNP Q0S7I6
D	108	GLY	-	expression tag	UNP Q0S7I6
D	109	SER	-	expression tag	UNP Q0S7I6
D	110	SER	-	expression tag	UNP Q0S7I6
D	111	HIS	-	expression tag	UNP Q0S7I6
D	112	HIS	-	expression tag	UNP Q0S7I6
D	113	HIS	-	expression tag	UNP Q0S7I6
D	114	HIS	-	expression tag	UNP Q0S7I6
D	115	HIS	-	expression tag	UNP Q0S7I6
D	116	HIS	-	expression tag	UNP Q0S7I6
D	117	SER	-	expression tag	UNP Q0S7I6
D	118	SER	-	expression tag	UNP Q0S7I6
D	119	GLY	-	expression tag	UNP Q0S7I6
D	120	ARG	-	expression tag	UNP Q0S7I6
D	121	GLU	-	expression tag	UNP Q0S7I6
D	122	ASN	-	expression tag	UNP Q0S7I6
D	123	LEU	-	expression tag	UNP Q0S7I6
D	124	TYR	-	expression tag	UNP Q0S7I6
D	125	PHE	-	expression tag	UNP Q0S7I6
D	126	GLN	-	expression tag	UNP Q0S7I6
D	127	GLY	-	expression tag	UNP Q0S7I6
E	107	MSE	-	expression tag	UNP Q0S7I6
E	108	GLY	-	expression tag	UNP Q0S7I6
E	109	SER	-	expression tag	UNP Q0S7I6
E	110	SER	-	expression tag	UNP Q0S7I6
E	111	HIS	-	expression tag	UNP Q0S7I6
E	112	HIS	-	expression tag	UNP Q0S7I6
E	113	HIS	-	expression tag	UNP Q0S7I6
E	114	HIS	-	expression tag	UNP Q0S7I6
E	115	HIS	-	expression tag	UNP Q0S7I6
E	116	HIS	-	expression tag	UNP Q0S7I6
E	117	SER	-	expression tag	UNP Q0S7I6
E	118	SER	-	expression tag	UNP Q0S7I6
E	119	GLY	-	expression tag	UNP Q0S7I6
E	120	ARG	-	expression tag	UNP Q0S7I6
E	121	GLU	-	expression tag	UNP Q0S7I6
E	122	ASN	-	expression tag	UNP Q0S7I6
E	123	LEU	-	expression tag	UNP Q0S7I6

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Chain	Residue	Modelled	Actual	Comment	Reference
E	124	TYR	-	expression tag	UNP Q0S7I6
E	125	PHE	-	expression tag	UNP Q0S7I6
E	126	GLN	-	expression tag	UNP Q0S7I6
E	127	GLY	-	expression tag	UNP Q0S7I6
F	107	MSE	-	expression tag	UNP Q0S7I6
F	108	GLY	-	expression tag	UNP Q0S7I6
F	109	SER	-	expression tag	UNP Q0S7I6
F	110	SER	-	expression tag	UNP Q0S7I6
F	111	HIS	-	expression tag	UNP Q0S7I6
F	112	HIS	-	expression tag	UNP Q0S7I6
F	113	HIS	-	expression tag	UNP Q0S7I6
F	114	HIS	-	expression tag	UNP Q0S7I6
F	115	HIS	-	expression tag	UNP Q0S7I6
F	116	HIS	-	expression tag	UNP Q0S7I6
F	117	SER	-	expression tag	UNP Q0S7I6
F	118	SER	-	expression tag	UNP Q0S7I6
F	119	GLY	-	expression tag	UNP Q0S7I6
F	120	ARG	-	expression tag	UNP Q0S7I6
F	121	GLU	-	expression tag	UNP Q0S7I6
F	122	ASN	-	expression tag	UNP Q0S7I6
F	123	LEU	-	expression tag	UNP Q0S7I6
F	124	TYR	-	expression tag	UNP Q0S7I6
F	125	PHE	-	expression tag	UNP Q0S7I6
F	126	GLN	-	expression tag	UNP Q0S7I6
F	127	GLY	-	expression tag	UNP Q0S7I6

- Molecule 2 is (3R)-3-(phosphonoxy)butanoic acid (CCD ID: 3PB) (formula: C₄H₉O₆P).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	O	P	0	0
			11	4	6	1		
2	B	1	Total	C	O	P	0	0
			11	4	6	1		
2	C	1	Total	C	O	P	0	0
			11	4	6	1		
2	D	1	Total	C	O	P	0	0
			11	4	6	1		
2	E	1	Total	C	O	P	0	0
			11	4	6	1		
2	F	1	Total	C	O	P	0	0
			11	4	6	1		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	125	Total	O	0	0
			125	125		
3	B	129	Total	O	0	0
			129	129		
3	C	139	Total	O	0	0
			139	139		
3	D	130	Total	O	0	0
			130	130		
3	E	118	Total	O	0	0
			118	118		
3	F	131	Total	O	0	0
			131	131		

- Molecule 1: uncharacterized protein RHA05790



- | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| MSE | GLY | SER | HIS | HIS | HIS | HIS | HIS | SER | SER | GLY | R120 | L123 | D135 | I141 | R155 | L159 | G160 | R161 | V162 | E165 | Y174 | F175 | V182 | T191 | T202 | D210 | S211 | G212 | A213 | L214 | V215 | V216 | T222 | A223 | F224 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|

- [illegible]

- [illegible]

- [illegible]

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- WORLD WIDE
PDB
PROTEIN DATA BANK



ASP	GLY	SER	SER	HIS	HIS	HIS	HIS	HIS	HIS	SER	SER	GLY	R120	E136	D137	L138	S145	R149	R155	D156	E157	R161	V162	E165	V166	G172	S173	Y174	F175	D176	R180	L183	R187	P199	D210	S211	V216	R219	D220	V221	T222	A223	E224
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4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	149.69Å 55.89Å 101.86Å 90.00° 132.61° 90.00°	Depositor
Resolution (Å)	50.00 – 1.80 50.00 – 1.80	Depositor EDS
% Data completeness (in resolution range)	99.3 (50.00-1.80) 99.2 (50.00-1.80)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.89 (at 1.80Å)	Xtriage
Refinement program	REFMAC 5.5.0054	Depositor
R, R_{free}	0.168 , 0.223 0.183 , 0.238	Depositor DCC
R_{free} test set	2907 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å ²)	20.2	Xtriage
Anisotropy	0.020	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 39.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	0.049 for -h-2*1,-k,l	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	6366	wwPDB-VP
Average B, all atoms (Å ²)	17.0	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 70.42 % 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 3.1340e-06. 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 3PB

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	0.83	1/977 (0.1%)	0.87	1/1309 (0.1%)
1	B	0.82	0/905	0.91	0/1217
1	C	0.81	0/939	0.91	0/1260
1	D	0.77	0/998	0.80	0/1336
1	E	0.81	0/925	0.93	2/1242 (0.2%)
1	F	0.76	0/931	0.88	0/1248
All	All	0.80	1/5675 (0.0%)	0.88	3/7612 (0.0%)

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	E	0	1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	132	MSE	SE-CE	-5.13	1.80	1.95

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	119	GLY	CA-C-N	5.61	132.25	121.54
1	E	119	GLY	C-N-CA	5.61	132.25	121.54
1	A	200	GLY	N-CA-C	-5.22	108.14	114.92

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	E	119	GLY	Peptide

5.2 Too-close contacts ⓘ

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of 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	950	0	958	25	0
1	B	881	0	881	18	0
1	C	900	0	920	26	0
1	D	974	0	984	22	0
1	E	907	0	906	31	1
1	F	916	0	914	37	0
2	A	11	0	6	0	0
2	B	11	0	6	0	0
2	C	11	0	6	0	0
2	D	11	0	6	0	0
2	E	11	0	6	0	0
2	F	11	0	6	0	0
3	A	125	0	0	4	1
3	B	129	0	0	6	0
3	C	139	0	0	0	0
3	D	130	0	0	7	0
3	E	118	0	0	10	0
3	F	131	0	0	3	0
All	All	6366	0	5599	133	1

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 12.

All (133) 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:C:153[A]:ARG:NH1	1:F:187[A]:ARG:HH21	1.45	1.13
1:F:161[A]:ARG:HD3	1:F:166:VAL:HG11	1.21	1.12
1:C:153[A]:ARG:HH12	1:F:187[A]:ARG:NH2	1.48	1.10
1:E:149[B]:ARG:HB2	1:E:149[B]:ARG:NH1	1.64	1.10
1:F:161[A]:ARG:HD3	1:F:166:VAL:CG1	1.88	1.04

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:145[B]:SER:O	1:F:149[B]:ARG:HG2	1.60	1.00
1:D:136[B]:GLU:HG3	1:F:155[B]:ARG:CZ	1.94	0.98
1:A:154[B]:SER:OG	1:C:156[B]:ASP:OD2	1.84	0.95
1:D:149[B]:ARG:HH12	1:D:152[B]:ARG:HG2	1.30	0.94
1:E:149[B]:ARG:HB2	1:E:149[B]:ARG:HH11	1.22	0.93
1:C:153[A]:ARG:HH12	1:F:187[A]:ARG:HH21	0.91	0.91
1:F:157:GLU:O	1:F:161[A]:ARG:HD2	1.69	0.91
1:F:161[A]:ARG:CD	1:F:166:VAL:HG11	2.02	0.89
1:A:154[B]:SER:OG	1:C:156[B]:ASP:CG	2.17	0.87
1:D:120[A]:ARG:NH1	3:D:764:HOH:O	2.03	0.86
1:E:149[B]:ARG:HH11	1:E:149[B]:ARG:CB	1.91	0.84
1:E:171[A]:GLN:NE2	3:E:753:HOH:O	2.11	0.84
1:A:154[B]:SER:OG	1:C:156[B]:ASP:OD1	1.98	0.81
1:B:202:THR:HG23	1:B:222:THR:HA	1.63	0.81
1:E:212[A]:GLY:HA3	3:E:727:HOH:O	1.81	0.79
1:C:120:ARG:N	1:C:120:ARG:HD2	1.98	0.78
1:A:211[B]:SER:O	1:A:211[B]:SER:OG	1.95	0.77
1:B:212[A]:GLY:HA2	3:B:359:HOH:O	1.84	0.77
3:B:623:HOH:O	1:F:136:GLU:HG3	1.82	0.77
1:C:153[A]:ARG:HH12	1:F:187[A]:ARG:CZ	1.99	0.76
1:F:149[B]:ARG:NH1	1:F:149[B]:ARG:HB3	2.02	0.75
1:A:154[B]:SER:HG	1:C:156[B]:ASP:CG	1.95	0.72
1:D:120[B]:ARG:HH11	1:D:120[B]:ARG:HG3	1.54	0.72
1:D:136[B]:GLU:HG3	1:F:155[B]:ARG:NH2	2.06	0.71
1:B:162:VAL:O	1:B:165[A]:GLU:HG2	1.91	0.70
1:A:156[A]:ASP:OD1	3:A:248:HOH:O	2.08	0.70
1:A:135:ASP:OD2	1:A:139[A]:ARG:NH1	2.26	0.69
1:C:120:ARG:HD2	1:C:120:ARG:H	1.58	0.68
1:A:175:PHE:HE1	1:A:216[A]:VAL:HG11	1.57	0.67
1:A:198:SER:OG	1:E:139[A]:ARG:NH1	2.28	0.67
1:C:118:SER:CB	1:C:120:ARG:HH11	2.09	0.66
1:E:212[A]:GLY:O	3:E:233:HOH:O	2.13	0.66
1:D:136[B]:GLU:HG3	1:F:155[B]:ARG:NH1	2.11	0.65
1:A:152[A]:ARG:HD3	3:E:413:HOH:O	1.99	0.62
1:B:211[A]:SER:OG	1:B:212[A]:GLY:N	2.30	0.61
1:B:175:PHE:HE1	1:B:216:VAL:HG11	1.66	0.60
3:B:65:HOH:O	1:C:152:ARG:HD2	2.02	0.60
1:D:152[A]:ARG:NH2	3:D:366:HOH:O	2.35	0.59
1:D:120[B]:ARG:HG3	1:D:120[B]:ARG:NH1	2.17	0.59
1:F:187[B]:ARG:NH1	3:F:270:HOH:O	2.24	0.58
1:F:149[B]:ARG:HB3	1:F:149[B]:ARG:CZ	2.32	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:171[B]:GLN:NE2	3:E:695:HOH:O	2.36	0.58
1:E:143[B]:VAL:HG13	1:E:143[B]:VAL:O	2.04	0.57
1:C:153[A]:ARG:NH1	1:F:187[A]:ARG:NH2	2.22	0.56
1:D:136[B]:GLU:HA	1:D:136[B]:GLU:OE1	2.05	0.56
1:F:162:VAL:HB	1:F:165:GLU:HG3	1.88	0.56
1:A:152[A]:ARG:HH11	1:C:155:ARG:NH1	2.04	0.56
1:C:135:ASP:OD2	1:C:139[A]:ARG:NH1	2.38	0.56
1:D:136[B]:GLU:HG2	3:D:719:HOH:O	2.06	0.55
1:F:149[B]:ARG:NH2	3:F:383:HOH:O	2.40	0.55
1:C:153[A]:ARG:HH12	1:F:187[A]:ARG:NE	2.04	0.55
1:B:155[A]:ARG:CZ	1:B:159[A]:LEU:CD1	2.85	0.55
1:A:175:PHE:CE1	1:A:216[A]:VAL:HG11	2.40	0.54
1:D:149[B]:ARG:NH1	3:D:633:HOH:O	2.40	0.54
1:F:149[B]:ARG:CZ	1:F:149[B]:ARG:HA	2.38	0.54
1:A:152[A]:ARG:NH1	1:C:155:ARG:NH1	2.56	0.54
1:A:201:MSE:HE3	1:E:139[A]:ARG:HH12	1.74	0.53
1:D:149[B]:ARG:NH1	1:D:152[B]:ARG:HG2	2.12	0.53
1:F:149[B]:ARG:CZ	1:F:149[B]:ARG:CB	2.88	0.52
1:E:139[A]:ARG:CZ	3:E:328:HOH:O	2.57	0.52
1:E:149[B]:ARG:NH1	1:E:149[B]:ARG:CB	2.52	0.52
1:D:187[B]:ARG:NE	1:D:187[B]:ARG:HA	2.25	0.51
1:E:143[B]:VAL:O	1:E:143[B]:VAL:CG1	2.59	0.51
1:C:175:PHE:HE1	1:C:216[A]:VAL:HG11	1.74	0.51
1:D:133:ALA:HB3	1:D:142:TYR:HB3	1.93	0.51
1:D:175:PHE:HE1	1:D:216[A]:VAL:HG11	1.77	0.50
1:E:161[B]:ARG:HD2	1:E:166:VAL:HG11	1.92	0.49
1:A:133:ALA:HB3	1:A:142:TYR:HB3	1.94	0.49
1:B:155[B]:ARG:HD2	3:B:623:HOH:O	2.11	0.49
1:C:207:ALA:CB	1:C:216[B]:VAL:HG12	2.43	0.49
1:B:161:ARG:NH1	3:B:735:HOH:O	2.46	0.49
1:D:120[B]:ARG:NH1	3:D:306:HOH:O	2.46	0.48
3:D:602:HOH:O	1:F:155[A]:ARG:HD3	2.14	0.48
1:B:155[A]:ARG:CZ	1:B:159[A]:LEU:HD11	2.43	0.48
1:A:211[A]:SER:OG	3:A:448:HOH:O	2.15	0.48
1:B:210:ASP:OD1	3:B:18:HOH:O	2.20	0.47
1:E:149[B]:ARG:HB2	1:E:149[B]:ARG:CZ	2.38	0.47
1:A:198:SER:OG	1:E:139[A]:ARG:CZ	2.62	0.47
1:F:157:GLU:O	1:F:161[A]:ARG:CD	2.54	0.47
1:C:176:ASP:OD1	1:C:180[A]:ARG:HD2	2.15	0.47
1:C:153[A]:ARG:NH1	1:F:187[A]:ARG:HE	2.13	0.47
1:A:181[B]:LYS:HD3	1:A:181[B]:LYS:HA	1.64	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:174:TYR:CD1	1:E:174:TYR:C	2.93	0.47
1:D:155[B]:ARG:NH1	3:D:98:HOH:O	2.46	0.46
1:E:139[A]:ARG:NH1	3:E:722:HOH:O	2.48	0.46
1:A:181[C]:LYS:HE2	1:A:181[C]:LYS:HB2	1.30	0.46
1:D:174:TYR:CD1	1:D:174:TYR:C	2.93	0.46
1:C:118:SER:CB	1:C:120:ARG:NH1	2.78	0.46
1:D:183:LEU:HD21	1:D:214[A]:LEU:HD12	1.98	0.46
1:B:155[A]:ARG:HG2	1:B:159[A]:LEU:HD12	1.97	0.45
1:E:175:PHE:HE1	1:E:216[A]:VAL:HG11	1.81	0.45
1:A:152[A]:ARG:NH1	1:C:155:ARG:HH12	2.14	0.45
1:A:152[A]:ARG:NH1	1:E:136:GLU:OE1	2.49	0.45
1:E:149[A]:ARG:HH12	1:E:152:ARG:CZ	2.30	0.45
1:F:149[B]:ARG:HB3	1:F:149[B]:ARG:HH11	1.81	0.45
1:F:175:PHE:HE1	1:F:216[A]:VAL:HG11	1.81	0.45
1:A:187[A]:ARG:HA	1:A:187[A]:ARG:HD2	1.84	0.44
1:D:181:LYS:HG2	1:F:211:SER:HB3	1.99	0.44
1:E:119:GLY:N	1:E:120:ARG:HG2	2.33	0.44
1:B:182:VAL:HG11	1:B:214:LEU:HD13	2.00	0.44
1:C:153[A]:ARG:HH12	1:F:187[A]:ARG:HE	1.64	0.44
1:F:176:ASP:OD1	1:F:180:ARG:HD3	2.17	0.44
1:E:139[B]:ARG:NH2	3:E:426:HOH:O	2.43	0.43
1:C:153[A]:ARG:HH22	1:F:187[A]:ARG:NE	2.17	0.43
1:E:143[B]:VAL:HG11	1:E:148:LEU:HD21	2.01	0.43
1:E:192[A]:ARG:HG3	3:E:509:HOH:O	2.18	0.43
1:B:123:LEU:HB2	1:F:180:ARG:HG2	2.00	0.43
1:B:174:TYR:CD1	1:B:174:TYR:C	2.97	0.43
1:A:198:SER:OG	1:E:139[A]:ARG:NH2	2.51	0.43
1:B:159[B]:LEU:HD12	1:B:159[B]:LEU:HA	1.82	0.42
1:F:172:GLY:HA2	3:F:547:HOH:O	2.19	0.42
1:E:164:THR:HG23	3:E:387:HOH:O	2.20	0.42
1:A:153[B]:ARG:NH2	3:A:471:HOH:O	2.44	0.42
1:E:149[B]:ARG:HH11	1:E:149[B]:ARG:CA	2.31	0.42
1:E:133:ALA:HB3	1:E:142:TYR:HB3	2.03	0.41
1:F:174:TYR:CD1	1:F:174:TYR:C	2.98	0.41
1:B:135:ASP:HB3	1:B:141:ILE:HD13	2.02	0.41
1:F:210:ASP:OD1	1:F:211:SER:OG	2.28	0.41
1:F:138:LEU:HD21	1:F:183:LEU:HD11	2.02	0.41
1:B:155[A]:ARG:NE	1:B:159[A]:LEU:HD11	2.36	0.41
1:D:143[B]:VAL:O	1:D:143[B]:VAL:HG13	2.20	0.41
1:A:152[A]:ARG:HG2	3:A:304:HOH:O	2.20	0.41
1:F:219:ARG:NH1	1:F:221:VAL:HG12	2.35	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:175:PHE:CE1	1:B:216:VAL:HG11	2.52	0.41
1:D:149[B]:ARG:NE	1:D:149[B]:ARG:HA	2.35	0.41
1:E:149[A]:ARG:O	1:E:149[A]:ARG:NH1	2.46	0.41
1:C:174:TYR:CD1	1:C:174:TYR:C	2.98	0.41
1:E:169:GLU:HB3	1:E:196:LEU:HD21	2.02	0.40

All (1) 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:E:210:ASP:OD1	3:A:225:HOH:O[4_646]	2.13	0.07

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	120/118 (102%)	115 (96%)	5 (4%)	0	100	100
1	B	113/118 (96%)	112 (99%)	1 (1%)	0	100	100
1	C	115/118 (98%)	114 (99%)	1 (1%)	0	100	100
1	D	121/118 (102%)	121 (100%)	0	0	100	100
1	E	115/118 (98%)	113 (98%)	1 (1%)	1 (1%)	14	5
1	F	114/118 (97%)	111 (97%)	3 (3%)	0	100	100
All	All	698/708 (99%)	686 (98%)	11 (2%)	1 (0%)	43	34

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	E	120	ARG

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	103/96 (107%)	99 (96%)	4 (4%)	28	16
1	B	95/96 (99%)	93 (98%)	2 (2%)	47	36
1	C	98/96 (102%)	96 (98%)	2 (2%)	48	38
1	D	104/96 (108%)	99 (95%)	5 (5%)	23	11
1	E	96/96 (100%)	90 (94%)	6 (6%)	16	6
1	F	98/96 (102%)	98 (100%)	0	100	100
All	All	594/576 (103%)	575 (97%)	19 (3%)	42	22

All (19) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	143[A]	VAL
1	A	143[B]	VAL
1	A	211[A]	SER
1	A	211[B]	SER
1	B	202	THR
1	B	214	LEU
1	C	120	ARG
1	C	211	SER
1	D	143[A]	VAL
1	D	143[B]	VAL
1	D	152[A]	ARG
1	D	152[B]	ARG
1	D	211	SER
1	E	143[A]	VAL
1	E	143[B]	VAL
1	E	165	GLU
1	E	192[A]	ARG
1	E	192[B]	ARG
1	E	199	PRO

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	217	HIS
1	D	190	GLN
1	E	190	GLN

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

6 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	$\# Z > 2$
2	3PB	B	301	-	10,10,10	0.86	0	14,14,14	1.51	4 (28%)
2	3PB	D	301	-	10,10,10	1.17	2 (20%)	14,14,14	1.26	2 (14%)
2	3PB	A	301	-	10,10,10	1.26	1 (10%)	14,14,14	1.14	1 (7%)
2	3PB	F	301	-	10,10,10	1.15	0	14,14,14	1.12	1 (7%)
2	3PB	C	301	-	10,10,10	1.08	0	14,14,14	1.26	3 (21%)
2	3PB	E	301	-	10,10,10	0.95	0	14,14,14	1.05	1 (7%)

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	3PB	B	301	-	-	2/9/9/9	-
2	3PB	D	301	-	-	1/9/9/9	-
2	3PB	A	301	-	-	3/9/9/9	-
2	3PB	F	301	-	-	0/9/9/9	-
2	3PB	C	301	-	-	2/9/9/9	-
2	3PB	E	301	-	-	0/9/9/9	-

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	301	3PB	P-O1P	2.38	1.63	1.59
2	D	301	3PB	O1-C1	-2.12	1.23	1.30
2	D	301	3PB	P-O1P	2.07	1.63	1.59

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	301	3PB	C4-C3-C2	-2.92	108.73	112.58
2	B	301	3PB	O3P-P-O4P	2.91	118.71	107.80
2	B	301	3PB	O2-C1-C2	-2.81	114.22	122.84
2	B	301	3PB	O1-C1-C2	2.77	122.61	114.00
2	E	301	3PB	C4-C3-C2	-2.45	109.35	112.58
2	B	301	3PB	C4-C3-C2	-2.35	109.48	112.58
2	C	301	3PB	C4-C3-C2	-2.28	109.58	112.58
2	D	301	3PB	O3P-P-O4P	2.26	116.29	107.80
2	A	301	3PB	O1-C1-C2	2.17	120.76	114.00
2	F	301	3PB	O1P-P-O2P	-2.11	101.83	109.33
2	C	301	3PB	O1P-P-O2P	-2.10	101.86	109.33
2	C	301	3PB	O1-C1-C2	2.01	120.24	114.00

There are no chirality outliers.

All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	301	3PB	C2-C3-O1P-P
2	B	301	3PB	C4-C3-O1P-P
2	C	301	3PB	C2-C3-O1P-P
2	C	301	3PB	C4-C3-O1P-P
2	A	301	3PB	C4-C3-O1P-P
2	A	301	3PB	C2-C3-O1P-P

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Mol	Chain	Res	Type	Atoms
2	A	301	3PB	C1-C2-C3-O1P
2	D	301	3PB	C1-C2-C3-O1P

There are no ring outliers.

No monomer is involved in short contacts.

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	104/118 (88%)	-0.22	2 (1%) 66 66	3, 11, 20, 48	15 (14%)
1	B	103/118 (87%)	0.30	3 (2%) 53 53	6, 14, 24, 49	10 (9%)
1	C	103/118 (87%)	0.18	5 (4%) 35 33	5, 12, 22, 46	12 (11%)
1	D	104/118 (88%)	-0.04	3 (2%) 53 53	5, 14, 23, 49	16 (15%)
1	E	103/118 (87%)	0.43	6 (5%) 29 27	5, 13, 23, 38	12 (11%)
1	F	103/118 (87%)	0.10	2 (1%) 66 66	5, 14, 25, 48	11 (10%)
All	All	620/708 (87%)	0.13	21 (3%) 48 48	3, 13, 24, 49	76 (12%)

All (21) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	212[A]	GLY	6.4
1	D	223	ALA	4.5
1	D	149[A]	ARG	4.1
1	C	119	GLY	3.9
1	C	118	SER	3.9
1	F	223	ALA	3.7
1	E	212[A]	GLY	3.6
1	A	223	ALA	3.5
1	E	119	GLY	3.3
1	C	200	GLY	3.2
1	E	223	ALA	3.2
1	D	119	GLY	3.1
1	A	119	GLY	2.8
1	E	221	VAL	2.7
1	B	223	ALA	2.7
1	E	211[A]	SER	2.4
1	C	221	VAL	2.4
1	C	120	ARG	2.2
1	E	152	ARG	2.2

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Mol	Chain	Res	Type	RSRZ
1	B	191	THR	2.2
1	F	199	PRO	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 oligosaccharides 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($\text{\AA}^2$)	Q<0.9
2	3PB	E	301	11/11	0.77	0.16	18,21,31,33	11
2	3PB	F	301	11/11	0.82	0.13	10,12,23,26	11
2	3PB	B	301	11/11	0.83	0.15	9,12,22,24	11
2	3PB	C	301	11/11	0.84	0.12	8,11,25,27	11
2	3PB	A	301	11/11	0.88	0.11	10,13,23,27	11
2	3PB	D	301	11/11	0.89	0.10	13,16,29,31	11

6.5 Other polymers [i](#)

There are no such residues in this entry.