



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 6, 2026 – 11:39 PM UTC

PDB ID : 4Y5W / pdb_00004y5w
Title : Transcription factor-DNA complex
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Deposited on : 2015-02-12
Resolution : 3.10 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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

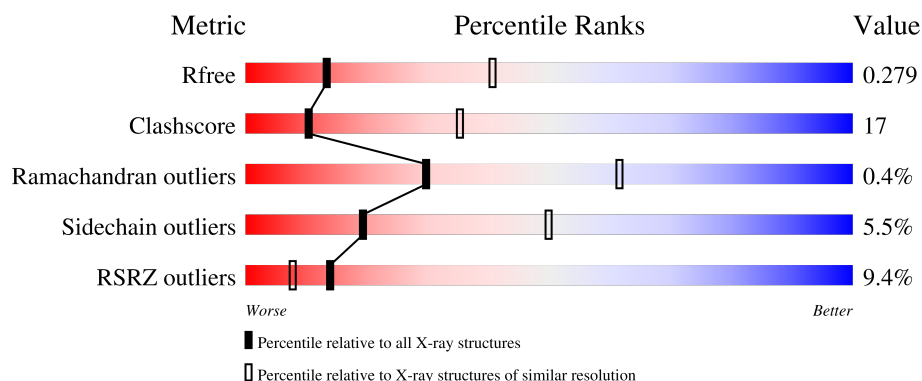
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.10 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	1456 (3.10-3.10)
Clashscore	190562	1539 (3.10-3.10)
Ramachandran outliers	187476	1467 (3.10-3.10)
Sidechain outliers	187428	1467 (3.10-3.10)
RSRZ outliers	180081	1456 (3.10-3.10)

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	549	6% 62% 21% • 13%
1	B	549	8% 59% 25% • 13%
1	C	549	9% 61% 20% • 15%
1	D	549	7% 60% 22% • 14%
2	E	22	18% 32% 68%

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Mol	Chain	Length	Quality of chain
2	M	22	
3	F	22	
3	N	22	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
1	PTR	A	641	-	-	X	-

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 17083 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 Signal transducer and activator of transcription 6.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	478	Total	C	N	O	P	S	0	0	0
			3802	2421	671	693	1	16			
1	B	477	Total	C	N	O	P	S	0	1	0
			3804	2425	671	691	1	16			
1	D	472	Total	C	N	O	P	S	0	0	0
			3745	2389	656	683	1	16			
1	C	465	Total	C	N	O	P	S	0	0	0
			3697	2361	649	670	1	16			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	110	SER	-	expression tag	UNP P42226
A	111	ASN	-	expression tag	UNP P42226
A	112	ALA	-	expression tag	UNP P42226
B	110	SER	-	expression tag	UNP P42226
B	111	ASN	-	expression tag	UNP P42226
B	112	ALA	-	expression tag	UNP P42226
D	110	SER	-	expression tag	UNP P42226
D	111	ASN	-	expression tag	UNP P42226
D	112	ALA	-	expression tag	UNP P42226
C	110	SER	-	expression tag	UNP P42226
C	111	ASN	-	expression tag	UNP P42226
C	112	ALA	-	expression tag	UNP P42226

- Molecule 2 is a DNA chain called DNA (5'-D(P*AP*TP*GP*GP*AP*TP*TP*TP*CP*CP*TP*AP*GP*GP*AP*AP*GP*AP*CP*AP*A)-3').

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
2	E	22	Total	C	N	O	P		0	0	0
			457	217	89	129	22				

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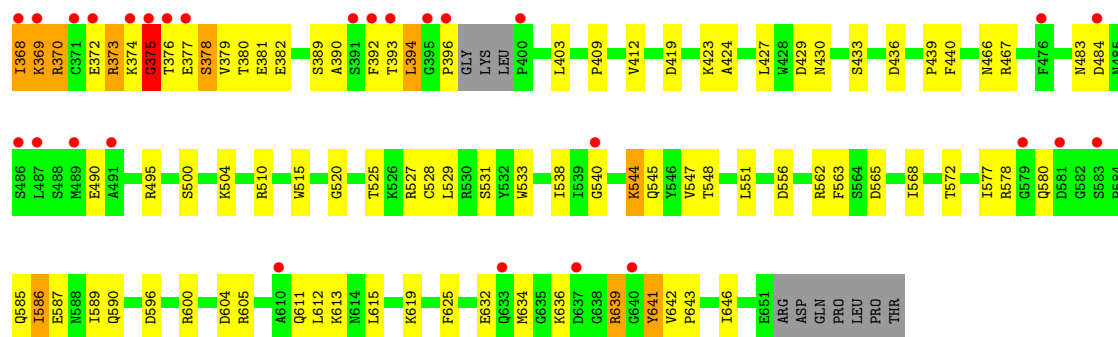
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	M	22	Total	C	N	O	P	0	0	0
			457	217	89	129	22			

- Molecule 3 is a DNA chain called DNA (5'-D(P*TP*TP*GP*TP*CP*TP*TP*CP*CP*TP*AP*GP*GP*AP*AP*AP*TP*CP*CP*AP*T)-3').

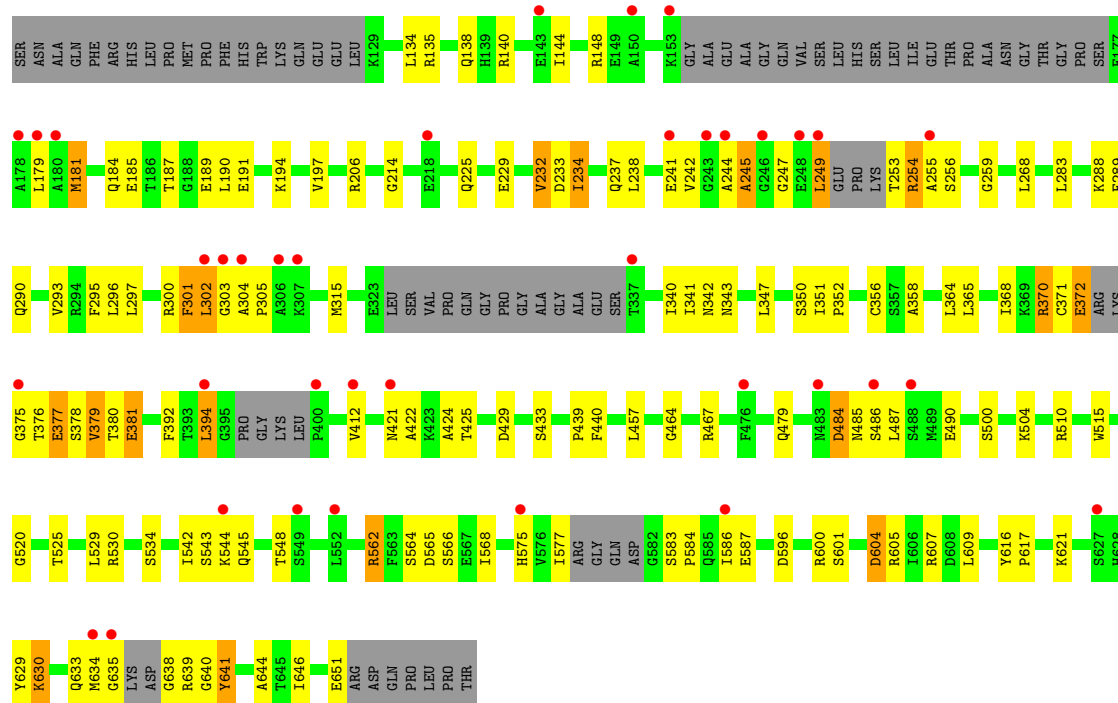
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	F	22	Total	C	N	O	P	0	0	0
			445	214	74	135	22			
3	N	22	Total	C	N	O	P	0	0	0
			445	214	74	135	22			

- Molecule 4 is water.

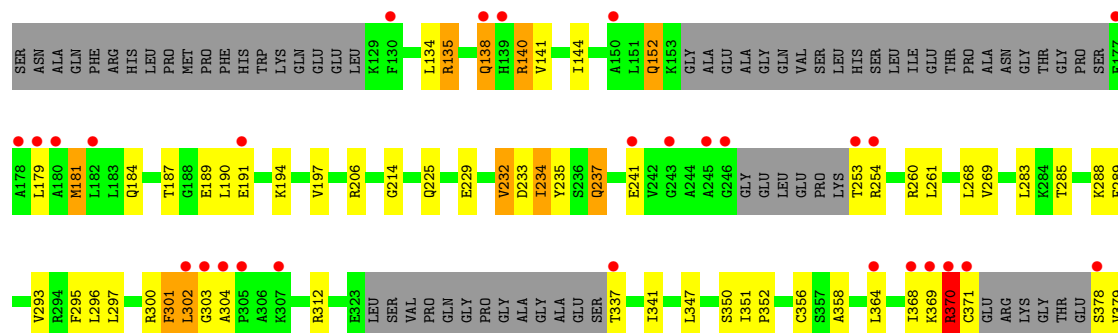
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	102	Total	O	0	0
			102	102		
4	B	54	Total	O	0	0
			54	54		
4	D	24	Total	O	0	0
			24	24		
4	F	2	Total	O	0	0
			2	2		
4	M	5	Total	O	0	0
			5	5		
4	N	2	Total	O	0	0
			2	2		
4	C	42	Total	O	0	0
			42	42		

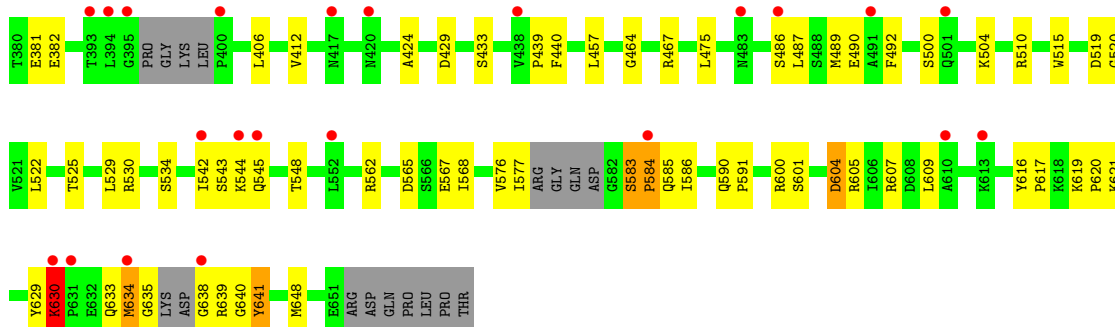


- Molecule 1: Signal transducer and activator of transcription 6



- Molecule 1: Signal transducer and activator of transcription 6





• Molecule 2: DNA (5'-D(P*AP*TP*GP*GP*AP*TP*TP*TP*CP*CP*TP*AP*GP*GP*AP*A P*GP*AP*CP*AP*A)-3')



• Molecule 2: DNA (5'-D(P*AP*TP*GP*GP*AP*TP*TP*TP*CP*CP*TP*AP*GP*GP*AP*A P*GP*AP*CP*AP*A)-3')



• Molecule 3: DNA (5'-D(P*TP*TP*GP*TP*CP*TP*TP*CP*CP*TP*AP*GP*GP*AP*AP*A P*TP*CP*CP*AP*T)-3')



• Molecule 3: DNA (5'-D(P*TP*TP*GP*TP*CP*TP*TP*CP*CP*TP*AP*GP*GP*AP*AP*A P*TP*CP*CP*AP*T)-3')



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	68.30Å 94.24Å 147.78Å 99.85° 101.73° 89.93°	Depositor
Resolution (Å)	38.81 – 3.10 38.81 – 3.10	Depositor EDS
% Data completeness (in resolution range)	89.5 (38.81-3.10) 85.1 (38.81-3.10)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.11	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.97 (at 3.12Å)	Xtriage
Refinement program	PHENIX 1.8.1 _1168	Depositor
R, R_{free}	0.250 , 0.278 0.250 , 0.279	Depositor DCC
R_{free} test set	2918 reflections (4.54%)	wwPDB-VP
Wilson B-factor (Å ²)	60.5	Xtriage
Anisotropy	0.090	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.29 , 49.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.095 for h,-k,-h-l	Xtriage
F_o, F_c correlation	0.88	EDS
Total number of atoms	17083	wwPDB-VP
Average B, all atoms (Å ²)	69.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 9.64% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 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: PTR

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	0.46	3/3851 (0.1%)	0.90	12/5186 (0.2%)
1	B	0.41	2/3856 (0.1%)	0.83	7/5196 (0.1%)
1	C	0.39	2/3744 (0.1%)	0.85	12/5043 (0.2%)
1	D	0.39	1/3792 (0.0%)	0.88	11/5107 (0.2%)
2	E	0.25	0/514	0.49	0/792
2	M	0.28	0/514	0.55	1/792 (0.1%)
3	F	0.24	0/496	0.44	0/762
3	N	0.26	0/496	0.47	0/762
All	All	0.40	8/17263 (0.0%)	0.83	43/23640 (0.2%)

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	A	0	2
1	B	0	1
1	C	0	1
1	D	0	1
All	All	0	5

The worst 5 of 8 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	382	GLU	C-N	-8.40	1.21	1.33
1	B	382	GLU	C-N	8.06	1.44	1.33
1	A	617	PRO	N-CD	5.46	1.55	1.47
1	C	382	GLU	C-N	5.41	1.41	1.33
1	B	396	PRO	N-CD	5.34	1.55	1.47

The worst 5 of 43 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	372	GLU	N-CA-C	10.58	124.21	109.18
1	D	377	GLU	N-CA-C	-10.00	97.63	110.53
1	A	369	LYS	O-C-N	9.71	134.73	123.27
1	D	302	LEU	N-CA-C	9.66	124.89	113.20
1	C	302	LEU	N-CA-C	9.60	124.82	113.20

There are no chirality outliers.

All (5) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	218	GLU	Peptide
1	A	638	GLY	Peptide
1	B	375	GLY	Peptide
1	C	301	PHE	Peptide
1	D	301	PHE	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	3802	0	3883	167	1
1	B	3804	0	3884	139	1
1	C	3697	0	3778	86	0
1	D	3745	0	3815	118	0
2	E	457	0	248	22	0
2	M	457	0	248	24	3
3	F	445	0	251	31	0
3	N	445	0	251	14	0
4	A	102	0	0	16	0
4	B	54	0	0	5	0
4	C	42	0	0	3	0
4	D	24	0	0	1	0
4	F	2	0	0	0	0
4	M	5	0	0	2	0
4	N	2	0	0	0	0
All	All	17083	0	16358	562	4

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 17.

The worst 5 of 562 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)
3:F:13:DG:H2''	3:F:14:DG:C8	1.30	1.61
3:F:13:DG:H2''	3:F:14:DG:N7	1.26	1.48
1:A:302:LEU:HD22	1:A:306:ALA:CB	1.54	1.36
1:A:302:LEU:CD2	1:A:306:ALA:HB3	1.56	1.34
1:A:302:LEU:CG	1:A:306:ALA:HB3	1.59	1.33

All (4) 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)
2:M:1:DA:OP2	2:M:22:DA:OP2[1_655]	1.50	0.70
2:M:1:DA:OP2	2:M:22:DA:P[1_655]	2.08	0.12
1:A:466:ASN:ND2	1:B:483:ASN:O[1_655]	2.13	0.07
2:M:1:DA:P	2:M:22:DA:OP2[1_655]	2.18	0.02

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	465/549 (85%)	448 (96%)	14 (3%)	3 (1%)	21	52
1	B	467/549 (85%)	448 (96%)	18 (4%)	1 (0%)	43	73
1	C	448/549 (82%)	436 (97%)	10 (2%)	2 (0%)	30	61
1	D	455/549 (83%)	438 (96%)	15 (3%)	2 (0%)	30	61
All	All	1835/2196 (84%)	1770 (96%)	57 (3%)	8 (0%)	30	61

5 of 8 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	246	GLY
1	B	338	GLY
1	D	371	CYS
1	A	637	ASP
1	C	583	SER

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	413/469 (88%)	393 (95%)	20 (5%)	23	54
1	B	413/469 (88%)	386 (94%)	27 (6%)	15	44
1	C	402/469 (86%)	381 (95%)	21 (5%)	21	51
1	D	406/469 (87%)	384 (95%)	22 (5%)	20	50
All	All	1634/1876 (87%)	1544 (94%)	90 (6%)	19	50

5 of 90 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	381	GLU
1	C	152	GLN
1	D	467	ARG
1	D	577	ILE
1	C	253	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 14 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	628	HIS
1	D	237	GLN
1	C	585	GLN
1	C	342	ASN
1	C	420	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

4 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	$\# Z > 2$
1	PTR	A	641	1	15,16,17	0.77	0	17,22,24	0.86	0
1	PTR	B	641	1	15,16,17	1.26	1 (6%)	17,22,24	0.63	0
1	PTR	D	641	1	15,16,17	1.24	1 (6%)	17,22,24	0.62	0
1	PTR	C	641	1	15,16,17	1.24	1 (6%)	17,22,24	0.60	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
1	PTR	A	641	1	-	2/10/11/13	0/1/1/1
1	PTR	B	641	1	-	0/10/11/13	0/1/1/1
1	PTR	D	641	1	-	0/10/11/13	0/1/1/1
1	PTR	C	641	1	-	1/10/11/13	0/1/1/1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	641	PTR	OH-CZ	-4.60	1.30	1.40
1	D	641	PTR	OH-CZ	-4.47	1.30	1.40
1	C	641	PTR	OH-CZ	-4.44	1.30	1.40

There are no bond angle outliers.

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	641	PTR	C-CA-CB-CG
1	C	641	PTR	O-C-CA-CB
1	A	641	PTR	N-CA-CB-CG

There are no ring outliers.

4 monomers are involved in 23 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	641	PTR	17	0
1	B	641	PTR	2	0
1	D	641	PTR	1	0
1	C	641	PTR	3	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 [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	477/549 (86%)	0.51	32 (6%) 24 13	25, 55, 102, 137	0
1	B	476/549 (86%)	0.58	43 (9%) 15 8	23, 55, 105, 140	1 (0%)
1	C	464/549 (84%)	0.81	50 (10%) 11 6	43, 72, 114, 146	0
1	D	471/549 (85%)	0.72	37 (7%) 18 10	46, 72, 112, 148	0
2	E	22/22 (100%)	1.68	4 (18%) 3 1	74, 86, 103, 142	0
2	M	22/22 (100%)	1.69	8 (36%) 1 0	74, 86, 111, 144	0
3	F	22/22 (100%)	1.40	6 (27%) 1 1	48, 89, 114, 129	0
3	N	22/22 (100%)	1.25	5 (22%) 2 1	50, 90, 114, 155	0
All	All	1976/2284 (86%)	0.69	185 (9%) 14 8	23, 66, 110, 155	1 (0%)

The worst 5 of 185 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	246	GLY	5.7
1	B	540	GLY	5.3
1	B	396	PRO	5.1
1	B	305	PRO	4.7
1	B	476[A]	PHE	4.6

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
1	PTR	A	641	16/17	0.71	0.22	70,75,78,85	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
1	PTR	B	641	16/17	0.86	0.17	65,68,75,77	0
1	PTR	D	641	16/17	0.93	0.12	45,50,52,52	0
1	PTR	C	641	16/17	0.94	0.11	43,46,49,49	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.