



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 18, 2026 – 04:46 AM UTC

PDB ID : 3N7P / pdb_00003n7p
Title : Crystal structure of the ectodomain complex of the CGRP receptor, a Class-B GPCR, reveals the site of drug antagonism
Authors : Ter Haar, E.
Deposited on : 2010-05-27
Resolution : 2.80 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:

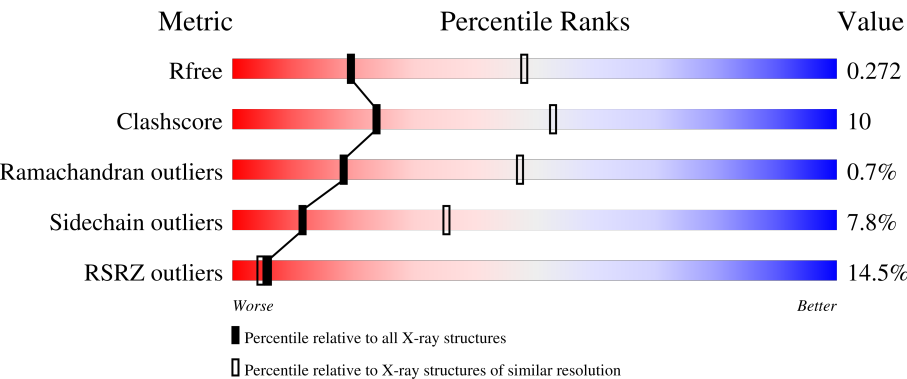
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry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

1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.80 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	3866 (2.80-2.80)
Clashscore	190562	4276 (2.80-2.80)
Ramachandran outliers	187476	4196 (2.80-2.80)
Sidechain outliers	187428	4198 (2.80-2.80)
RSRZ outliers	180081	3869 (2.80-2.80)

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	115	11% 65% 18% • 13%
1	B	115	10% 63% 17% 5% • 14%
1	C	115	27% 53% 6% 41%
1	J	115	5% 70% 12% • 16%
2	D	96	7% 71% 22% • 6%

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Mol	Chain	Length	Quality of chain
2	E	96	7% 53% 24% 5% 18%
2	F	96	24% 72% 9% • 18%
2	R	96	2% 72% 20% • 5%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 5529 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 Calcitonin gene-related peptide type 1 receptor.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	100	Total	C	N	O	S	Se	0	3	0
			781	484	133	153	8	3			
1	B	99	Total	C	N	O	S	Se	0	2	0
			778	484	136	147	8	3			
1	C	68	Total	C	N	O	S	Se	0	0	0
			438	272	83	79	2	2			
1	J	97	Total	C	N	O	S	Se	0	0	0
			762	472	133	148	6	3			

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	19	GLY	-	expression tag	UNP Q16602
A	20	SER	-	expression tag	UNP Q16602
A	21	HIS	-	expression tag	UNP Q16602
A	22	MET	-	expression tag	UNP Q16602
B	19	GLY	-	expression tag	UNP Q16602
B	20	SER	-	expression tag	UNP Q16602
B	21	HIS	-	expression tag	UNP Q16602
B	22	MET	-	expression tag	UNP Q16602
C	19	GLY	-	expression tag	UNP Q16602
C	20	SER	-	expression tag	UNP Q16602
C	21	HIS	-	expression tag	UNP Q16602
C	22	MET	-	expression tag	UNP Q16602
J	19	GLY	-	expression tag	UNP Q16602
J	20	SER	-	expression tag	UNP Q16602
J	21	HIS	-	expression tag	UNP Q16602
J	22	MET	-	expression tag	UNP Q16602

- Molecule 2 is a protein called Receptor activity-modifying protein 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	D	90	Total	C	N	O	S	0	4	0
			717	457	123	125	12			
2	E	79	Total	C	N	O	S	0	5	0
			628	403	106	107	12			
2	F	79	Total	C	N	O	S	0	2	0
			568	358	97	103	10			
2	R	91	Total	C	N	O	S	0	6	0
			724	462	123	125	14			

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	22	GLY	-	expression tag	UNP O60894
D	23	SER	-	expression tag	UNP O60894
D	24	HIS	-	expression tag	UNP O60894
D	25	MET	-	expression tag	UNP O60894
E	22	GLY	-	expression tag	UNP O60894
E	23	SER	-	expression tag	UNP O60894
E	24	HIS	-	expression tag	UNP O60894
E	25	MET	-	expression tag	UNP O60894
F	22	GLY	-	expression tag	UNP O60894
F	23	SER	-	expression tag	UNP O60894
F	24	HIS	-	expression tag	UNP O60894
F	25	MET	-	expression tag	UNP O60894
R	22	GLY	-	expression tag	UNP O60894
R	23	SER	-	expression tag	UNP O60894
R	24	HIS	-	expression tag	UNP O60894
R	25	MET	-	expression tag	UNP O60894

- Molecule 3 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	O	S	0	0
			5	4	1		
3	A	1	Total	O	S	0	0
			5	4	1		
3	A	1	Total	O	S	0	0
			5	4	1		
3	B	1	Total	O	S	0	0
			5	4	1		
3	B	1	Total	O	S	0	0
			5	4	1		
3	B	1	Total	O	S	0	0
			5	4	1		
3	D	1	Total	O	S	0	0
			5	4	1		
3	D	1	Total	O	S	0	0
			5	4	1		
3	D	1	Total	O	S	0	0
			5	4	1		
3	E	1	Total	O	S	0	0
			5	4	1		
3	E	1	Total	O	S	0	0
			5	4	1		
3	J	1	Total	O	S	0	0
			5	4	1		
3	J	1	Total	O	S	0	0
			5	4	1		
3	R	1	Total	O	S	0	0
			5	4	1		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	R	1	Total	O	S	0	0
			5	4	1		
3	R	1	Total	O	S	0	0
			5	4	1		

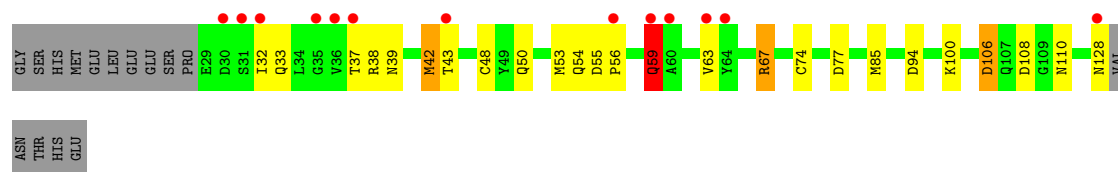
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	5	Total	O	0	0
			5	5		
4	B	6	Total	O	0	0
			6	6		
4	C	8	Total	O	0	0
			8	8		
4	D	9	Total	O	0	0
			9	9		
4	E	4	Total	O	0	0
			4	4		
4	F	2	Total	O	0	0
			2	2		
4	J	9	Total	O	0	0
			9	9		
4	R	10	Total	O	0	0
			10	10		

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.

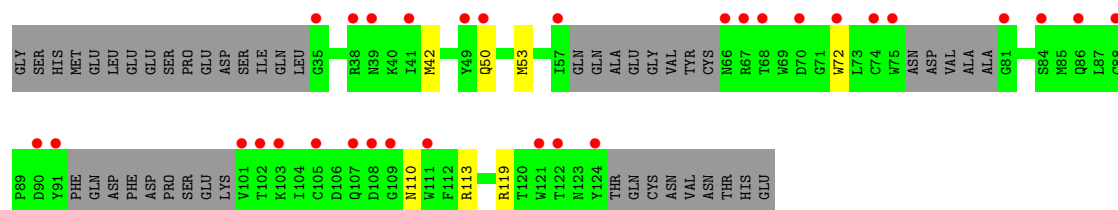
- Molecule 1: Calcitonin gene-related peptide type 1 receptor



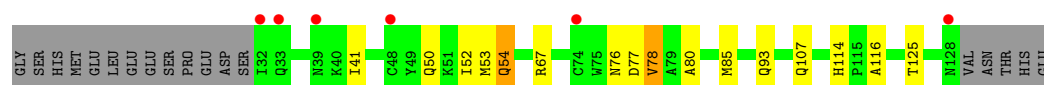
- Molecule 1: Calcitonin gene-related peptide type 1 receptor



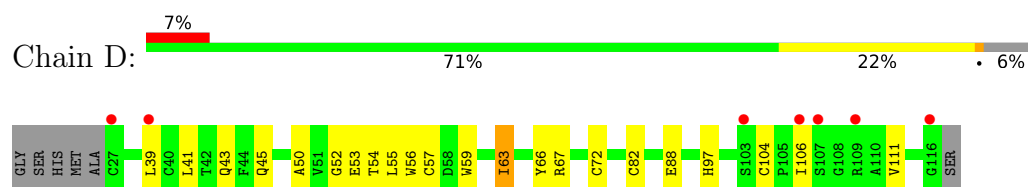
- Molecule 1: Calcitonin gene-related peptide type 1 receptor



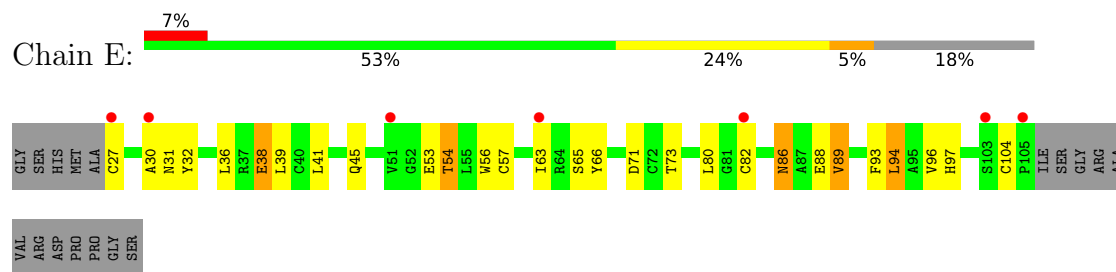
- Molecule 1: Calcitonin gene-related peptide type 1 receptor



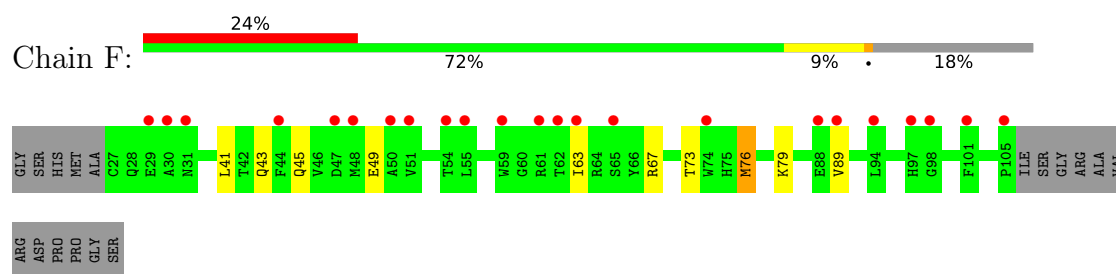
• Molecule 2: Receptor activity-modifying protein 1



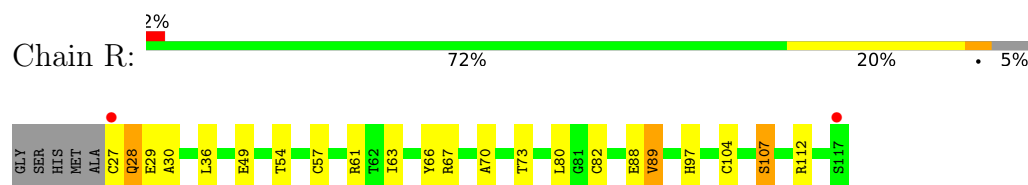
• Molecule 2: Receptor activity-modifying protein 1



• Molecule 2: Receptor activity-modifying protein 1



• Molecule 2: Receptor activity-modifying protein 1



4 Data and refinement statistics

Property	Value	Source
Space group	P 32 2 1	Depositor
Cell constants a, b, c, α , β , γ	118.00Å 118.00Å 225.40Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	27.12 – 2.80 27.12 – 2.80	Depositor EDS
% Data completeness (in resolution range)	(Not available) (27.12-2.80) 81.5 (27.12-2.80)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.32 (at 2.80Å)	Xtriage
Refinement program	BUSTER-TNT BUSTER 2.9.2, BUSTER 2.9.2	Depositor
R, R_{free}	0.214 , 0.241 0.249 , 0.272	Depositor DCC
R_{free} test set	1845 reflections (4.96%)	wwPDB-VP
Wilson B-factor (Å ²)	65.5	Xtriage
Anisotropy	0.657	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 76.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	0.018 for -h,-k,l	Xtriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	5529	wwPDB-VP
Average B, all atoms (Å ²)	95.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.06% 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 ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: SO4

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	1.03	4/809 (0.5%)	1.92	6/1098 (0.5%)
1	B	1.02	3/803 (0.4%)	2.04	12/1087 (1.1%)
1	C	0.82	0/444	1.35	0/603
1	J	0.73	0/781	1.25	2/1059 (0.2%)
2	D	0.69	0/750	1.35	5/1022 (0.5%)
2	E	0.71	0/663	1.48	5/903 (0.6%)
2	F	0.74	1/589 (0.2%)	1.51	5/804 (0.6%)
2	R	0.72	0/763	1.37	2/1040 (0.2%)
All	All	0.83	8/5602 (0.1%)	1.58	37/7616 (0.5%)

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	2
All	All	0	4

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	56	PRO	C-N	15.83	1.55	1.33
1	B	56	PRO	C-N	15.82	1.55	1.33
1	B	42	MSE	SE-CE	-9.86	1.65	1.95
1	A	42	MSE	SE-CE	-9.34	1.67	1.95
1	A	59	GLN	C-N	-7.87	1.22	1.33
1	B	59	GLN	C-N	-7.81	1.22	1.33
2	F	76	MET	SD-CE	-5.52	1.65	1.79
1	A	63	VAL	C-N	5.17	1.39	1.33

All (37) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	59	GLN	CA-C-N	27.98	172.06	121.70
1	A	59	GLN	C-N-CA	27.98	172.06	121.70
1	B	59	GLN	CA-C-N	27.97	172.04	121.70
1	B	59	GLN	C-N-CA	27.97	172.04	121.70
1	B	56	PRO	O-C-N	20.74	148.30	123.00
1	A	56	PRO	O-C-N	20.73	148.29	123.00
1	B	59	GLN	O-C-N	-17.38	99.48	122.59
1	A	59	GLN	O-C-N	-17.34	99.53	122.59
1	B	89	PRO	N-CA-C	12.65	130.28	113.84
2	E	31	ASN	N-CA-C	-10.87	99.86	113.55
2	E	30	ALA	CB-CA-C	-8.57	97.72	110.06
1	B	55	ASP	CA-CB-CG	7.97	120.57	112.60
1	A	55	ASP	CA-CB-CG	7.95	120.55	112.60
1	B	90	ASP	CA-CB-CG	7.42	120.03	112.60
1	B	32	ILE	N-CA-C	7.27	124.45	109.34
2	E	31	ASN	CA-CB-CG	6.78	119.38	112.60
2	R	63	ILE	N-CA-C	6.61	117.10	110.23
1	B	33	GLN	N-CA-C	-6.56	104.51	113.30
2	D	63	ILE	N-CA-C	6.32	116.99	110.36
2	E	63	ILE	N-CA-C	6.08	116.74	110.36
2	R	89	VAL	N-CA-CB	6.00	119.59	110.58
2	F	63	ILE	N-CA-C	5.88	116.53	110.36
2	E	89	VAL	N-CA-CB	5.68	119.10	110.58
2	D	72[A]	CYS	CA-C-N	5.61	128.07	120.38
2	D	72[A]	CYS	C-N-CA	5.61	128.07	120.38
2	D	72[B]	CYS	CA-C-N	5.61	128.07	120.38
2	D	72[B]	CYS	C-N-CA	5.61	128.07	120.38
2	F	89	VAL	CA-C-N	5.49	127.91	120.44
2	F	89	VAL	C-N-CA	5.49	127.91	120.44
1	B	92	PHE	CA-C-N	5.43	127.88	120.54
1	B	92	PHE	C-N-CA	5.43	127.88	120.54
1	B	106	ASP	CA-CB-CG	5.42	118.02	112.60
1	J	54	GLN	N-CA-C	5.37	117.21	111.36
2	F	73	THR	CA-C-N	5.36	127.41	120.44
2	F	73	THR	C-N-CA	5.36	127.41	120.44
1	A	32	ILE	N-CA-C	-5.26	105.92	113.07
1	J	76	ASN	CA-CB-CG	5.00	117.61	112.60

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	59	GLN	Mainchain,Peptide
1	B	59	GLN	Mainchain,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	781	0	654	30	0
1	B	778	0	667	23	0
1	C	438	0	275	3	0
1	J	762	0	650	17	0
2	D	717	0	656	22	0
2	E	628	0	551	11	0
2	F	568	0	453	8	0
2	R	724	0	661	21	0
3	A	15	0	0	0	0
3	B	15	0	0	0	0
3	D	15	0	0	0	0
3	E	10	0	0	0	0
3	J	10	0	0	0	0
3	R	15	0	0	0	0
4	A	5	0	0	0	0
4	B	6	0	0	0	0
4	C	8	0	0	0	0
4	D	9	0	0	0	0
4	E	4	0	0	0	0
4	F	2	0	0	0	0
4	J	9	0	0	0	0
4	R	10	0	0	0	0
All	All	5529	0	4567	99	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 10.

All (99) 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:A:53:MSE:O	1:A:53:MSE:HG2	1.47	1.15
1:A:85:MSE:SE	1:A:100:LYS:HD3	2.11	1.00
1:A:50:GLN:HE21	2:D:97:HIS:HD2	1.21	0.86
1:B:50:GLN:HE21	2:R:97:HIS:HD2	1.24	0.82
1:B:56:PRO:O	1:B:67:ARG:NH2	2.11	0.82
1:B:85:MSE:SE	1:B:100:LYS:HD2	2.31	0.80
1:A:106:ASP:HB2	1:A:110:ASN:O	1.88	0.73
1:B:42:MSE:HE3	2:R:66:TYR:CD2	2.23	0.72
1:B:42:MSE:HE3	2:R:66:TYR:HD2	1.55	0.71
2:R:27[B]:CYS:SG	2:R:82[B]:CYS:HB2	2.31	0.71
1:A:39:ASN:ND2	2:D:63:ILE:HD13	2.04	0.70
1:A:53:MSE:CE	1:A:54:GLN:HG2	2.23	0.69
1:A:50:GLN:HE21	2:D:97:HIS:CD2	2.08	0.69
1:B:50:GLN:HE21	2:R:97:HIS:CD2	2.11	0.67
1:A:53:MSE:O	1:A:53:MSE:CG	2.34	0.67
1:J:107:GLN:HE22	2:R:54:THR:H	1.43	0.66
1:J:53:MSE:HE3	1:J:54:GLN:HG3	1.76	0.66
1:B:52:ILE:HA	1:B:67:ARG:HD3	1.78	0.66
1:A:67:ARG:N	1:A:77:ASP:OD1	2.29	0.66
1:J:114:HIS:HD2	1:J:116:ALA:H	1.44	0.65
1:A:53:MSE:CE	1:A:54:GLN:HE21	2.10	0.65
1:A:53:MSE:HE2	1:A:54:GLN:HG2	1.79	0.64
2:F:76:MET:HA	2:F:76:MET:HE2	1.79	0.64
1:B:115:PRO:HG3	2:F:76:MET:HE3	1.80	0.64
1:A:53:MSE:HE2	1:A:54:GLN:CG	2.27	0.64
1:B:48[B]:CYS:HG	1:B:74[B]:CYS:HG	1.46	0.64
1:A:42:MSE:HE3	2:D:66:TYR:CD2	2.32	0.63
1:A:42:MSE:HE3	2:D:66:TYR:HD2	1.62	0.63
1:A:50:GLN:O	1:A:54:GLN:HG3	1.99	0.62
1:J:67:ARG:N	1:J:77:ASP:OD1	2.31	0.62
1:A:53:MSE:HE1	1:A:54:GLN:HE21	1.65	0.61
1:B:85:MSE:SE	1:B:100:LYS:CD	2.99	0.61
1:A:42:MSE:HE2	2:D:67:ARG:HA	1.82	0.61
1:C:113:ARG:HA	1:C:119:ARG:O	2.01	0.60
1:B:50:GLN:NE2	2:R:97:HIS:HD2	1.98	0.59
2:R:66:TYR:OH	2:R:97:HIS:HE1	1.85	0.58
1:A:50:GLN:NE2	2:D:97:HIS:HD2	1.98	0.58
2:D:66:TYR:OH	2:D:97:HIS:HE1	1.87	0.57
2:E:66:TYR:OH	2:E:97:HIS:HE1	1.87	0.57
2:D:52:GLY:HA3	1:J:85:MSE:HE3	1.86	0.57
1:B:42:MSE:CE	2:R:66:TYR:CD2	2.88	0.57
1:A:33:GLN:O	1:A:38:ARG:HD2	2.05	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:55:LEU:HD12	1:J:85:MSE:HE2	1.88	0.56
1:B:42:MSE:HE2	2:R:67:ARG:HA	1.87	0.55
1:B:48[B]:CYS:HG	1:B:74[B]:CYS:CB	2.19	0.55
1:J:52:ILE:HA	1:J:67:ARG:HD3	1.89	0.55
1:B:106:ASP:HB2	1:B:110:ASN:O	2.07	0.54
2:R:27[B]:CYS:SG	2:R:82[B]:CYS:CB	2.95	0.54
2:R:29:GLU:O	2:R:88:GLU:HG3	2.07	0.54
1:J:80:ALA:O	2:R:61:ARG:NH1	2.40	0.54
1:A:43:THR:HB	2:D:59:TRP:HE1	1.73	0.54
1:B:93:GLN:CD	1:B:93:GLN:H	2.16	0.53
1:J:107:GLN:NE2	2:R:54:THR:H	2.05	0.52
2:R:27[B]:CYS:HG	2:R:82[B]:CYS:CB	2.23	0.52
2:E:93:PHE:HA	2:E:96:VAL:HG22	1.91	0.52
2:E:38:GLU:HB3	2:E:39:LEU:HD12	1.93	0.51
1:A:53:MSE:HE3	1:A:54:GLN:HG2	1.92	0.50
1:A:42:MSE:CE	2:D:66:TYR:CD2	2.94	0.50
1:A:39:ASN:ND2	2:D:63:ILE:CD1	2.72	0.50
1:C:50:GLN:HA	1:C:53:MSE:HE2	1.93	0.50
1:A:67:ARG:HD3	1:A:77:ASP:OD2	2.13	0.49
1:B:112:PHE:CZ	2:F:76:MET:HE1	2.47	0.48
1:J:107:GLN:NE2	2:R:54:THR:OG1	2.43	0.48
1:A:48[B]:CYS:HB2	1:A:74[B]:CYS:HB2	1.95	0.48
2:D:57[B]:CYS:HA	2:D:104[B]:CYS:SG	2.55	0.47
2:R:57[B]:CYS:HA	2:R:104[B]:CYS:SG	2.55	0.47
2:E:57[B]:CYS:HA	2:E:104[B]:CYS:SG	2.55	0.47
1:B:115:PRO:CG	2:F:76:MET:HE3	2.44	0.47
1:A:37:THR:HG23	2:R:107:SER:HB2	1.96	0.46
2:D:50:ALA:HB1	1:J:78:VAL:CG1	2.46	0.46
1:B:65:CYS:HB3	1:B:111:TRP:CE2	2.51	0.46
2:R:28:GLN:OE1	2:R:30:ALA:HB3	2.16	0.46
1:B:48[B]:CYS:HB2	1:B:74[B]:CYS:HB2	1.98	0.46
1:A:85:MSE:SE	1:A:100:LYS:CD	3.01	0.45
2:D:53:GLU:HG2	2:D:56:TRP:CZ2	2.51	0.45
2:F:76:MET:HE2	2:F:79:LYS:HD2	1.99	0.45
1:B:106:ASP:HB3	1:B:108:ASP:H	1.81	0.45
2:E:41:LEU:O	2:E:45:GLN:HG3	2.17	0.45
2:D:41:LEU:O	2:D:45:GLN:HG3	2.17	0.45
2:D:53:GLU:HG2	2:D:56:TRP:CH2	2.52	0.44
1:B:112:PHE:HZ	2:F:76:MET:HE1	1.83	0.44
1:C:42:MSE:HE2	2:F:67:ARG:HA	1.98	0.44
1:A:48[B]:CYS:SG	1:A:74[B]:CYS:HB2	2.58	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:J:114:HIS:CD2	1:J:116:ALA:H	2.30	0.43
2:F:41:LEU:O	2:F:45:GLN:HG3	2.19	0.43
2:E:97:HIS:HD2	1:J:50:GLN:HE21	1.65	0.43
2:E:94:LEU:HD13	1:J:52:ILE:HG22	2.00	0.42
2:D:50:ALA:HB1	1:J:78:VAL:HG11	2.00	0.42
2:E:32:TYR:HD1	2:E:80:LEU:HD22	1.85	0.41
2:D:55:LEU:CD1	1:J:85:MSE:HE2	2.49	0.41
2:E:36:LEU:HD22	2:E:73:THR:HG22	2.01	0.41
1:A:106:ASP:HB3	1:A:108:ASP:H	1.85	0.41
2:D:50:ALA:CB	1:J:78:VAL:CG1	2.99	0.41
1:B:42:MSE:HE1	2:R:70:ALA:HB2	2.02	0.41
2:D:53:GLU:O	2:D:55:LEU:N	2.53	0.41
2:R:36:LEU:HD22	2:R:73:THR:HG22	2.02	0.41
2:E:86:ASN:HD22	2:E:88:GLU:H	1.69	0.40
1:A:67:ARG:HD3	1:A:77:ASP:OD1	2.22	0.40
2:E:53:GLU:HG2	2:E:56:TRP:CZ2	2.56	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	101/115 (88%)	93 (92%)	7 (7%)	1 (1%)	12	38
1	B	99/115 (86%)	93 (94%)	4 (4%)	2 (2%)	6	21
1	C	60/115 (52%)	54 (90%)	6 (10%)	0	100	100
1	J	95/115 (83%)	92 (97%)	3 (3%)	0	100	100
2	D	92/96 (96%)	90 (98%)	1 (1%)	1 (1%)	11	36
2	E	82/96 (85%)	79 (96%)	2 (2%)	1 (1%)	10	34
2	F	78/96 (81%)	77 (99%)	1 (1%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	R	94/96 (98%)	94 (100%)	0	0	100	100
All	All	701/844 (83%)	672 (96%)	24 (3%)	5 (1%)	18	47

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	32	ILE
2	D	54	THR
2	E	54	THR
1	A	59	GLN
1	B	59	GLN

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	79/101 (78%)	74 (94%)	5 (6%)	16	45
1	B	78/101 (77%)	73 (94%)	5 (6%)	16	44
1	C	23/101 (23%)	21 (91%)	2 (9%)	9	30
1	J	77/101 (76%)	73 (95%)	4 (5%)	21	53
2	D	73/79 (92%)	67 (92%)	6 (8%)	10	33
2	E	61/79 (77%)	52 (85%)	9 (15%)	3	10
2	F	47/79 (60%)	45 (96%)	2 (4%)	26	60
2	R	74/79 (94%)	68 (92%)	6 (8%)	11	33
All	All	512/720 (71%)	473 (92%)	39 (8%)	11	36

All (39) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	67	ARG
1	A	94[A]	ASP
1	A	94[B]	ASP

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Mol	Chain	Res	Type
1	A	106	ASP
1	A	128	ASN
1	B	51	LYS
1	B	78	VAL
1	B	90	ASP
1	B	93	GLN
1	B	102	THR
1	C	72	TRP
1	C	110	ASN
2	D	39	LEU
2	D	43	GLN
2	D	82	CYS
2	D	88	GLU
2	D	106	ILE
2	D	111	VAL
2	E	27	CYS
2	E	38	GLU
2	E	54	THR
2	E	65	SER
2	E	71	ASP
2	E	82	CYS
2	E	86	ASN
2	E	89	VAL
2	E	94	LEU
2	F	43	GLN
2	F	49	GLU
1	J	41	ILE
1	J	78	VAL
1	J	93	GLN
1	J	125	THR
2	R	28	GLN
2	R	49	GLU
2	R	80	LEU
2	R	89	VAL
2	R	107	SER
2	R	112	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (18) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	50	GLN
1	A	54	GLN

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Mol	Chain	Res	Type
1	A	86	GLN
1	B	33	GLN
1	B	39	ASN
1	B	50	GLN
1	B	86	GLN
2	D	97	HIS
2	E	86	ASN
2	E	97	HIS
2	F	86	ASN
1	J	45	GLN
1	J	50	GLN
1	J	66	ASN
1	J	86	GLN
1	J	107	GLN
1	J	114	HIS
2	R	97	HIS

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

16 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	$\# Z > 2$
3	SO4	A	5	-	4,4,4	0.34	0	6,6,6	0.18	0
3	SO4	E	4	-	4,4,4	0.42	0	6,6,6	0.24	0
3	SO4	B	15	-	4,4,4	0.18	0	6,6,6	0.11	0
3	SO4	D	2	-	4,4,4	0.27	0	6,6,6	0.27	0
3	SO4	D	11	-	4,4,4	0.31	0	6,6,6	0.23	0
3	SO4	R	18	-	4,4,4	0.28	0	6,6,6	0.08	0
3	SO4	B	12	-	4,4,4	0.31	0	6,6,6	0.12	0
3	SO4	E	20	-	4,4,4	0.29	0	6,6,6	0.14	0
3	SO4	B	3	-	4,4,4	0.30	0	6,6,6	0.08	0
3	SO4	J	1	-	4,4,4	0.41	0	6,6,6	0.25	0
3	SO4	R	1	-	4,4,4	0.45	0	6,6,6	0.13	0
3	SO4	A	17	-	4,4,4	0.29	0	6,6,6	0.11	0
3	SO4	D	19	-	4,4,4	0.35	0	6,6,6	0.08	0
3	SO4	R	13	-	4,4,4	0.37	0	6,6,6	0.19	0
3	SO4	A	16	-	4,4,4	0.28	0	6,6,6	0.15	0
3	SO4	J	14	-	4,4,4	0.22	0	6,6,6	0.18	0

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

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	97/115 (84%)	0.72	13 (13%) 7 5	44, 87, 129, 155	4 (4%)
1	B	96/115 (83%)	0.79	11 (11%) 9 7	43, 95, 129, 150	2 (2%)
1	C	65/115 (56%)	2.07	31 (47%) 0 0	99, 133, 160, 188	0
1	J	94/115 (81%)	0.27	6 (6%) 25 18	45, 77, 125, 148	2 (2%)
2	D	90/96 (93%)	0.43	7 (7%) 19 14	48, 81, 100, 122	4 (4%)
2	E	79/96 (82%)	0.77	7 (8%) 15 11	48, 93, 129, 134	7 (8%)
2	F	79/96 (82%)	1.56	23 (29%) 1 1	66, 130, 178, 188	2 (2%)
2	R	91/96 (94%)	0.13	2 (2%) 62 52	45, 71, 97, 112	9 (9%)
All	All	691/844 (81%)	0.78	100 (14%) 6 4	43, 90, 148, 188	30 (4%)

All (100) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	108	ASP	5.6
2	F	62	THR	5.4
2	F	54	THR	5.3
2	F	63	ILE	5.2
2	D	116	GLY	5.1
2	E	27	CYS	4.7
1	C	111	TRP	4.5
1	B	57	ILE	4.4
2	F	65	SER	4.3
1	C	75	TRP	4.3
1	C	67	ARG	4.3
1	J	74	CYS	4.2
2	F	44	PHE	4.0
1	A	32	ILE	3.9
1	C	109	GLY	3.9
2	D	27	CYS	3.9

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Mol	Chain	Res	Type	RSRZ
1	C	38	ARG	3.8
1	B	31	SER	3.8
1	B	98	SER	3.7
2	E	105	PRO	3.7
1	C	124	TYR	3.7
1	C	91	TYR	3.6
1	A	31	SER	3.6
1	C	88	CYS	3.6
1	B	32	ILE	3.5
2	F	51	VAL	3.5
1	J	48	CYS	3.4
1	C	101	VAL	3.4
2	D	109	ARG	3.3
1	A	60	ALA	3.3
2	F	94	LEU	3.3
1	C	72	TRP	3.3
1	B	33	GLN	3.3
1	C	107	GLN	3.2
2	F	30	ALA	3.1
1	A	43	THR	3.1
1	C	81	GLY	3.1
1	C	122	THR	3.1
1	C	35	GLY	3.1
2	D	106	ILE	3.1
2	F	50	ALA	3.0
1	A	36	VAL	3.0
1	J	33	GLN	3.0
2	F	59	TRP	3.0
1	A	35	GLY	3.0
1	C	90	ASP	3.0
2	E	82	CYS	3.0
2	F	74	TRP	2.9
1	C	121	TRP	2.9
2	F	105	PRO	2.8
1	C	49	TYR	2.8
2	F	101	PHE	2.8
2	F	61	ARG	2.8
2	F	48	MET	2.8
1	J	128	ASN	2.8
2	D	107	SER	2.8
1	A	59	GLN	2.7
1	J	32	ILE	2.7

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Mol	Chain	Res	Type	RSRZ
1	C	102	THR	2.7
2	F	55	LEU	2.7
2	F	98	GLY	2.7
1	C	70	ASP	2.6
2	F	29	GLU	2.6
1	B	36	VAL	2.6
2	R	27[A]	CYS	2.6
1	B	66	ASN	2.6
1	B	34	LEU	2.5
1	C	39	ASN	2.5
1	C	74	CYS	2.5
2	R	117	SER	2.4
1	B	58	GLN	2.4
2	E	30	ALA	2.4
1	A	37	THR	2.4
2	E	51	VAL	2.4
1	C	103	LYS	2.4
1	A	64	TYR	2.4
1	A	128	ASN	2.3
1	C	66	ASN	2.3
2	E	103	SER	2.3
2	D	103	SER	2.3
1	B	129	VAL	2.3
2	F	88	GLU	2.2
1	C	86	GLN	2.2
1	C	84	SER	2.2
1	C	41	ILE	2.2
1	C	50	GLN	2.2
2	F	47	ASP	2.2
1	A	63	VAL	2.2
2	F	89	VAL	2.2
2	E	63	ILE	2.2
1	A	56	PRO	2.2
1	C	68	THR	2.1
1	C	57	ILE	2.1
1	C	105	CYS	2.1
2	F	97	HIS	2.1
2	F	31	ASN	2.1
1	B	61	GLU	2.1
1	J	39	ASN	2.0
2	D	39	LEU	2.0
1	A	30	ASP	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
3	SO4	D	2	5/5	0.69	0.23	125,129,131,132	0
3	SO4	A	17	5/5	0.76	0.15	169,174,175,175	0
3	SO4	A	16	5/5	0.77	0.21	133,138,138,139	0
3	SO4	B	15	5/5	0.81	0.10	144,148,149,150	0
3	SO4	R	1	5/5	0.84	0.14	112,116,117,117	0
3	SO4	E	4	5/5	0.85	0.22	132,136,137,138	0
3	SO4	E	20	5/5	0.85	0.15	150,154,155,155	0
3	SO4	D	19	5/5	0.85	0.11	169,174,174,175	0
3	SO4	R	18	5/5	0.86	0.11	144,149,150,150	0
3	SO4	B	3	5/5	0.90	0.12	150,155,155,156	0
3	SO4	J	14	5/5	0.90	0.29	124,128,129,130	0
3	SO4	D	11	5/5	0.91	0.18	120,124,125,126	0
3	SO4	A	5	5/5	0.91	0.25	124,129,130,130	0
3	SO4	J	1	5/5	0.91	0.22	122,126,127,128	0
3	SO4	B	12	5/5	0.92	0.22	116,120,121,121	0
3	SO4	R	13	5/5	0.93	0.16	117,120,121,122	0

6.5 Other polymers [i](#)

There are no such residues in this entry.