



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 02:57 PM GMT

PDB ID : 4B30
Title : Structure of the mutant V44A of the fluorescent protein KillerRed
Authors : Carpentier, P.; De Rosny, E.
Deposited on : 2012-07-19
Resolution : 2.10 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
<http://wwpdb.org/validation/2016/XrayValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.7 (RC4), CSD as536be (2015)
Xtriage (Phenix) : 1.9-1692
EDS : rb-20026688
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)
Refmac : 5.8.0135
CCP4 : 6.5.0
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk26865

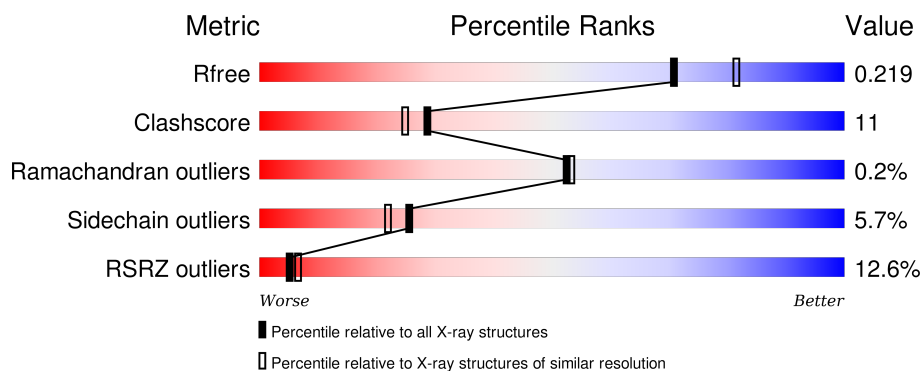
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.10 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}	91344	3939 (2.10-2.10)
Clashscore	102246	4460 (2.10-2.10)
Ramachandran outliers	100387	4413 (2.10-2.10)
Sidechain outliers	100360	4414 (2.10-2.10)
RSRZ outliers	91569	3948 (2.10-2.10)

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 on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. 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	235	 6% 76% 19% . .
2	B	235	 19% 75% 20% . .

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
4	CL	A	1234	-	-	-	X
5	NA	A	1237	-	-	-	X
6	GOL	A	1239	-	-	-	X
6	GOL	A	1241	-	-	-	X
6	GOL	B	1236	-	-	-	X

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 4164 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 KILLERRED.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	227	1916	1210	332	358	16	0	17	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	44	ALA	VAL	ENGINEERED MUTATION	UNP Q2TCH5
A	65	CRQ	GLN	CHROMOPHORE	UNP Q60I24
A	65	CRQ	TYR	CHROMOPHORE	UNP Q60I24
A	65	CRQ	GLY	CHROMOPHORE	UNP Q60I24

- Molecule 2 is a protein called KILLERRED.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	229	1937	1219	335	365	18	0	19	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	44	ALA	VAL	ENGINEERED MUTATION	UNP Q2TCH5
B	65	CRQ	GLN	CHROMOPHORE	UNP Q60I24
B	65	CRQ	TYR	CHROMOPHORE	UNP Q60I24
B	65	CRQ	GLY	CHROMOPHORE	UNP Q60I24

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O₄S).



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

- Molecule 4 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	3	Total	Cl	0	0
			3	3		
4	A	5	Total	Cl	0	0
			5	5		

- Molecule 5 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	2	Total	Na	0	0
			2	2		

- Molecule 6 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			6	3	3		
6	A	1	Total	C	O	0	0
			6	3	3		
6	A	1	Total	C	O	0	0
			6	3	3		
6	A	1	Total	C	O	0	0
			6	3	3		
6	B	1	Total	C	O	0	0
			6	3	3		
6	B	1	Total	C	O	0	0
			6	3	3		

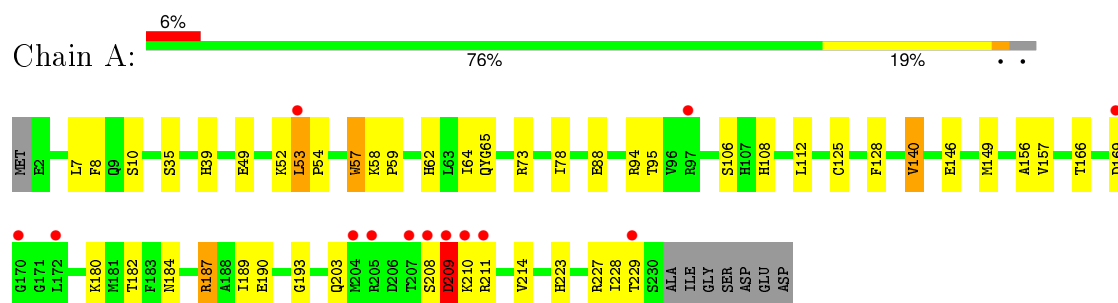
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	164	Total	O	0	0
			164	164		
7	B	96	Total	O	0	0
			96	96		

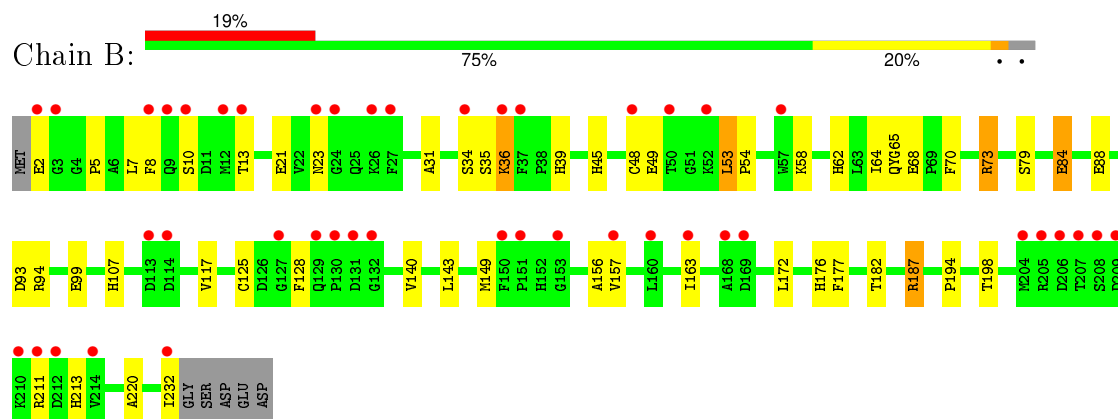
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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: KILLERRED



• Molecule 2: KILLERRED



4 Data and refinement statistics

Property	Value	Source
Space group	P 62	Depositor
Cell constants a, b, c, α , β , γ	134.31 Å 134.31 Å 76.22 Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	116.32 – 2.10 46.24 – 2.10	Depositor EDS
% Data completeness (in resolution range)	99.9 (116.32-2.10) 99.9 (46.24-2.10)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.21 (at 2.10 Å)	Xtriage
Refinement program	REFMAC 5.6.0116	Depositor
R, R_{free}	0.165 , 0.199 0.175 , 0.219	Depositor DCC
R_{free} test set	1007 reflections (2.20%)	DCC
Wilson B-factor (Å ²)	35.3	Xtriage
Anisotropy	0.252	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.40 , 63.8	EDS
Estimated twinning fraction	0.048 for h,-h-k,-l	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.29$	Xtriage
Outliers	0 of 179062 reflections	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	4164	wwPDB-VP
Average B, all atoms (Å ²)	39.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.43% of the height of the origin peak. No significant pseudotranslation is detected.*

¹ Intensities estimated from amplitudes.

² Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.375 respectively for untwinned datasets, and 0.333, 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: GOL, CSO, CRQ, CL, NA, 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	0.79	1/1930 (0.1%)	0.84	0/2610
2	B	0.64	0/1961	0.68	0/2653
All	All	0.72	1/3891 (0.0%)	0.77	0/5263

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	1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	57	TRP	CD2-CE2	5.85	1.48	1.41

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	208	SER	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	1916	0	1830	44	1
2	B	1937	0	1834	41	0
3	A	5	0	0	0	0
4	A	5	0	0	0	0
4	B	3	0	0	1	0
5	A	2	0	0	0	0
6	A	24	0	32	4	0
6	B	12	0	16	4	0
7	A	164	0	0	9	2
7	B	96	0	0	8	0
All	All	4164	0	3712	88	3

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 11.

All (88) 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)
2:B:73[A]:ARG:HG3	2:B:73[A]:ARG:HH11	1.15	1.03
1:A:187[B]:ARG:NH1	1:A:189[B]:ILE:HG22	1.80	0.96
1:A:209:ASP:HB3	1:A:211:ARG:H	1.33	0.92
2:B:93:ASP:OD1	2:B:107[A]:HIS:HD2	1.51	0.91
2:B:73[A]:ARG:HH11	2:B:73[A]:ARG:CG	1.86	0.88
2:B:35:SER:OG	2:B:39:HIS:HD2	1.55	0.86
1:A:187[B]:ARG:NH1	1:A:189[B]:ILE:CG2	2.38	0.86
2:B:187[B]:ARG:NH2	7:B:2041:HOH:O	2.13	0.80
1:A:187[B]:ARG:HH12	1:A:189[B]:ILE:HG22	1.46	0.80
2:B:73[A]:ARG:NH1	7:B:2026:HOH:O	2.18	0.76
2:B:35:SER:OG	2:B:39:HIS:CD2	2.39	0.75
1:A:53[B]:LEU:HD12	1:A:54:PRO:HD2	1.69	0.74
2:B:88:GLU:OE2	2:B:187[B]:ARG:HD3	1.87	0.73
1:A:190:GLU:O	7:A:2068:HOH:O	2.08	0.72
2:B:73[A]:ARG:HG3	2:B:73[A]:ARG:NH1	1.98	0.71
1:A:228:ILE:HG23	1:A:229:THR:HA	1.71	0.71
6:B:1235:GOL:H32	7:B:2089:HOH:O	1.90	0.70
2:B:88:GLU:OE2	2:B:187[A]:ARG:NH1	2.23	0.70
1:A:62:HIS:HD2	1:A:94:ARG:HH11	1.38	0.70
1:A:78:ILE:HA	6:A:1239:GOL:H31	1.74	0.69
2:B:93:ASP:OD1	2:B:107[A]:HIS:CD2	2.42	0.69
7:A:2150:HOH:O	2:B:232:ILE:O	2.11	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:99:GLU:OE2	2:B:176:HIS:HE1	1.76	0.68
1:A:187[B]:ARG:HH12	1:A:189[B]:ILE:CG2	2.06	0.67
4:B:1233:CL:CL	7:B:2088:HOH:O	2.51	0.66
2:B:84[A]:GLU:HA	2:B:84[A]:GLU:OE1	1.94	0.65
2:B:5:PRO:HD3	2:B:84[A]:GLU:OE1	1.98	0.64
2:B:62:HIS:HD2	2:B:94:ARG:HH11	1.46	0.63
6:B:1236:GOL:H12	7:B:2094:HOH:O	1.97	0.63
1:A:228:ILE:CG2	1:A:229:THR:HA	2.29	0.61
1:A:187[A]:ARG:HG2	7:A:2078:HOH:O	2.01	0.59
1:A:106:SER:OG	1:A:108:HIS:HE1	1.86	0.58
2:B:149:MET:HE1	2:B:157[A]:VAL:HG11	1.85	0.58
6:B:1236:GOL:C1	7:B:2094:HOH:O	2.51	0.58
1:A:35:SER:OG	1:A:39:HIS:HD2	1.87	0.58
2:B:53:LEU:HD22	2:B:54:PRO:HD2	1.87	0.56
1:A:73[B]:ARG:NE	7:A:2031:HOH:O	2.26	0.56
1:A:8:PHE:O	1:A:39:HIS:HE1	1.89	0.55
2:B:194:PRO:HD2	6:B:1236:GOL:H12	1.89	0.55
2:B:211:ARG:O	2:B:213:HIS:HD2	1.91	0.54
1:A:227:ARG:NH2	2:B:143:LEU:HD23	2.23	0.54
1:A:73[B]:ARG:NH2	7:A:2031:HOH:O	2.32	0.53
2:B:73[A]:ARG:NH1	2:B:73[A]:ARG:CG	2.55	0.53
1:A:57:TRP:CD2	1:A:214[A]:VAL:HG21	2.44	0.53
1:A:149:MET:HE1	1:A:157[A]:VAL:HG11	1.90	0.52
1:A:125:CYS:HB3	1:A:128:PHE:CE1	2.43	0.52
1:A:180:LYS:HD3	7:A:2082:HOH:O	2.09	0.52
1:A:146:GLU:OE1	1:A:223:HIS:HE1	1.93	0.51
1:A:62:HIS:CD2	1:A:94:ARG:HH11	2.25	0.51
2:B:65:CRQ:N2	2:B:65:CRQ:HD2	2.27	0.50
2:B:31:ALA:HA	2:B:45:HIS:O	2.12	0.50
1:A:193:GLY:H	6:A:1239:GOL:H2	1.76	0.49
2:B:73[A]:ARG:CZ	7:B:2026:HOH:O	2.58	0.49
2:B:99:GLU:OE2	2:B:176:HIS:CE1	2.62	0.49
1:A:180:LYS:HE2	6:A:1242:GOL:H32	1.95	0.48
1:A:156:ALA:HB2	1:A:182[B]:THR:HG22	1.95	0.48
2:B:8:PHE:O	2:B:39:HIS:HE1	1.95	0.48
2:B:23:ASN:HA	7:B:2005:HOH:O	2.14	0.48
1:A:203:GLN:HG2	1:A:214[A]:VAL:CG1	2.44	0.47
2:B:48:CYS:O	2:B:211:ARG:HB3	2.14	0.47
1:A:95[A]:THR:HG23	7:A:2083:HOH:O	2.13	0.47
2:B:163[A]:ILE:O	2:B:163[A]:ILE:HG13	2.15	0.47
2:B:143:LEU:HD11	2:B:172:LEU:HD21	1.96	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:88:GLU:OE2	1:A:187[A]:ARG:HD3	2.15	0.46
1:A:140[A]:VAL:HG13	1:A:166:THR:OG1	2.15	0.46
2:B:125:CYS:HB3	2:B:128:PHE:CE1	2.50	0.46
2:B:156:ALA:HB2	2:B:182[B]:THR:HG22	1.97	0.46
1:A:169[B]:ASP:OD1	1:A:169[B]:ASP:C	2.54	0.46
2:B:62:HIS:CD2	2:B:94:ARG:HH11	2.30	0.46
1:A:187[B]:ARG:HH11	1:A:189[B]:ILE:HG22	1.75	0.45
2:B:70:PHE:CZ	2:B:117:VAL:HG11	2.52	0.45
1:A:193:GLY:H	6:A:1239:GOL:C2	2.29	0.44
1:A:35:SER:OG	1:A:39:HIS:CD2	2.69	0.44
1:A:53[B]:LEU:CD1	1:A:54:PRO:HD2	2.44	0.44
2:B:64[A]:ILE:O	2:B:68[A]:GLU:OE1	2.35	0.43
1:A:203:GLN:HG2	1:A:214[A]:VAL:HG11	1.99	0.43
2:B:36:LYS:H	2:B:36:LYS:CE	2.31	0.42
2:B:49:GLU:HA	2:B:49:GLU:OE1	2.19	0.42
2:B:187[B]:ARG:H	2:B:187[B]:ARG:HG2	1.66	0.42
2:B:198:THR:O	2:B:220:ALA:HA	2.19	0.42
1:A:58:LYS:HB2	1:A:59:PRO:HD3	2.02	0.42
1:A:53[B]:LEU:HD12	1:A:54:PRO:CD	2.46	0.42
1:A:58:LYS:CB	1:A:59:PRO:HD3	2.49	0.42
2:B:13:THR:HA	2:B:34:SER:HA	2.01	0.42
1:A:65:CRQ:HD2	1:A:65:CRQ:N2	2.36	0.41
1:A:52:LYS:NZ	7:A:2041:HOH:O	2.43	0.41
1:A:73[B]:ARG:CZ	7:A:2031:HOH:O	2.64	0.41
1:A:49:GLU:OE1	1:A:211:ARG:NH1	2.55	0.40

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

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:A:2026:HOH:O	7:A:2158:HOH:O[2_544]	1.87	0.33
7:A:2026:HOH:O	7:A:2157:HOH:O[2_544]	2.01	0.19
1:A:73[A]:ARG:NH2	1:A:184:ASN:OD1[3_655]	2.11	0.09

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	238/235 (101%)	230 (97%)	7 (3%)	1 (0%)	39	37
2	B	243/235 (103%)	236 (97%)	7 (3%)	0	100	100
All	All	481/470 (102%)	466 (97%)	14 (3%)	1 (0%)	52	53

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	209	ASP

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	208/199 (104%)	195 (94%)	13 (6%)	22	18
2	B	211/200 (106%)	194 (92%)	17 (8%)	15	10
All	All	419/399 (105%)	389 (93%)	30 (7%)	25	14

All (30) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	7	LEU
1	A	10	SER
1	A	53[A]	LEU
1	A	53[B]	LEU
1	A	64[A]	ILE
1	A	64[B]	ILE
1	A	112	LEU
1	A	140[A]	VAL
1	A	140[B]	VAL
1	A	187[A]	ARG
1	A	187[B]	ARG

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Mol	Chain	Res	Type
1	A	209	ASP
1	A	210	LYS
2	B	2	GLU
2	B	7	LEU
2	B	10	SER
2	B	21	GLU
2	B	36	LYS
2	B	53	LEU
2	B	58	LYS
2	B	73[A]	ARG
2	B	73[B]	ARG
2	B	79[A]	SER
2	B	79[B]	SER
2	B	84[A]	GLU
2	B	84[B]	GLU
2	B	140	VAL
2	B	177	PHE
2	B	187[A]	ARG
2	B	187[B]	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	39	HIS
1	A	62	HIS
1	A	80	HIS
1	A	108	HIS
2	B	39	HIS
2	B	62	HIS
2	B	80	HIS
2	B	176	HIS
2	B	213	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

7 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	CSO	A	116[A]	1	3,6,7	0.60	0	1,6,8	1.58	0
1	CSO	A	116[B]	1	3,6,7	0.56	0	1,6,8	1.87	0
1	CSO	A	215	1	3,6,7	0.50	0	1,6,8	2.03	1 (100%)
1	CRQ	A	65	1	24,25,26	2.87	9 (37%)	25,34,36	4.46	7 (28%)
2	CSO	B	116[A]	2	3,6,7	0.75	0	1,6,8	1.79	0
2	CSO	B	116[B]	2	3,6,7	0.70	0	1,6,8	1.82	0
2	CRQ	B	65	2	24,25,26	2.83	10 (41%)	25,34,36	4.66	7 (28%)

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	CSO	A	116[A]	1	-	0/1/5/7	0/0/0/0
1	CSO	A	116[B]	1	-	0/1/5/7	0/0/0/0
1	CSO	A	215	1	-	0/1/5/7	0/0/0/0
1	CRQ	A	65	1	-	0/10/32/33	0/2/2/2
2	CSO	B	116[A]	2	-	0/1/5/7	0/0/0/0
2	CSO	B	116[B]	2	-	0/1/5/7	0/0/0/0
2	CRQ	B	65	2	-	0/10/32/33	0/2/2/2

All (19) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	65	CRQ	CA2-C2	-4.62	1.43	1.48
2	B	65	CRQ	CA2-C2	-3.89	1.44	1.48
2	B	65	CRQ	OH-CZ	-3.56	1.28	1.37
1	A	65	CRQ	CG2-CB2	-2.60	1.41	1.46
1	A	65	CRQ	OH-CZ	-2.39	1.31	1.37
2	B	65	CRQ	CG2-CB2	-2.25	1.42	1.46
1	A	65	CRQ	CD2-CG2	2.18	1.43	1.39
2	B	65	CRQ	CA2-N2	2.46	1.43	1.38
1	A	65	CRQ	CD1-CG2	2.57	1.44	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	65	CRQ	CD2-CG2	3.31	1.45	1.39
2	B	65	CRQ	CD1-CG2	3.41	1.45	1.39
1	A	65	CRQ	CE2-CZ	4.00	1.47	1.38
2	B	65	CRQ	CE1-CZ	4.19	1.47	1.38
2	B	65	CRQ	CE2-CZ	4.61	1.48	1.38
1	A	65	CRQ	CE1-CZ	4.62	1.48	1.38
2	B	65	CRQ	CA1-N	5.72	1.45	1.28
1	A	65	CRQ	CB2-CA2	7.14	1.41	1.35
2	B	65	CRQ	CB2-CA2	7.19	1.41	1.35
1	A	65	CRQ	CA1-N	7.38	1.51	1.28

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	65	CRQ	O2-C2-CA2	-11.97	124.48	130.95
2	B	65	CRQ	O2-C2-CA2	-11.92	124.51	130.95
2	B	65	CRQ	C2-CA2-N2	-8.39	102.22	108.91
2	B	65	CRQ	CG2-CB2-CA2	-7.90	119.96	130.22
1	A	65	CRQ	C2-CA2-N2	-7.13	103.22	108.91
1	A	65	CRQ	CG2-CB2-CA2	-6.24	122.12	130.22
2	B	65	CRQ	N3-C1-N2	-3.54	109.25	113.26
1	A	65	CRQ	N3-C1-N2	-2.91	109.96	113.26
1	A	215	CSO	O-C-CA	-2.03	120.21	125.49
2	B	65	CRQ	C-CA3-N3	2.18	117.78	113.00
1	A	65	CRQ	C-CA3-N3	2.64	118.79	113.00
1	A	65	CRQ	CB2-CA2-N2	2.69	133.48	128.67
2	B	65	CRQ	CB2-CA2-N2	2.79	133.66	128.67
1	A	65	CRQ	CA2-C2-N3	14.96	110.90	103.40
2	B	65	CRQ	CA2-C2-N3	15.28	111.06	103.40

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	65	CRQ	1	0
2	B	65	CRQ	1	0

5.5 Carbohydrates

There are no carbohydrates in this entry.

5.6 Ligand geometry

Of 17 ligands modelled in this entry, 10 are monoatomic - leaving 7 for Mogul analysis.

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	1231	1,5	4,4,4	0.24	0	6,6,6	0.08	0
6	GOL	A	1239	-	5,5,5	0.40	0	5,5,5	0.82	0
6	GOL	A	1240	-	5,5,5	0.20	0	5,5,5	0.47	0
6	GOL	A	1241	-	5,5,5	0.45	0	5,5,5	0.40	0
6	GOL	A	1242	-	5,5,5	0.28	0	5,5,5	0.31	0
6	GOL	B	1235	-	5,5,5	0.13	0	5,5,5	0.58	0
6	GOL	B	1236	-	5,5,5	0.57	0	5,5,5	0.80	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
3	SO4	A	1231	1,5	-	0/0/0/0	0/0/0/0
6	GOL	A	1239	-	-	0/4/4/4	0/0/0/0
6	GOL	A	1240	-	-	0/4/4/4	0/0/0/0
6	GOL	A	1241	-	-	0/4/4/4	0/0/0/0
6	GOL	A	1242	-	-	0/4/4/4	0/0/0/0
6	GOL	B	1235	-	-	0/4/4/4	0/0/0/0
6	GOL	B	1236	-	-	0/4/4/4	0/0/0/0

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.

4 monomers are involved in 8 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	1239	GOL	3	0
6	A	1242	GOL	1	0
6	B	1235	GOL	1	0
6	B	1236	GOL	3	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	224/235 (95%)	0.40	13 (5%) 26 34	21, 29, 54, 91	0
2	B	227/235 (96%)	1.04	44 (19%) 1 2	22, 43, 73, 120	1 (0%)
All	All	451/470 (95%)	0.72	57 (12%) 5 6	21, 34, 71, 120	1 (0%)

All (57) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	207	THR	8.9
2	B	210	LYS	7.5
2	B	208	SER	7.3
2	B	24	GLY	6.5
2	B	2	GLU	5.9
2	B	204	MET	5.2
1	A	210	LYS	4.6
2	B	209	ASP	4.5
1	A	205	ARG	4.4
1	A	208	SER	4.3
1	A	207	THR	4.2
1	A	211	ARG	4.0
2	B	206	ASP	3.9
2	B	211	ARG	3.9
2	B	205	ARG	3.6
2	B	52	LYS	3.5
1	A	169[A]	ASP	3.5
2	B	50	THR	3.3
2	B	168	ALA	3.3
1	A	229	THR	3.3
2	B	130	PRO	3.2
2	B	23	ASN	3.0
1	A	172[A]	LEU	3.0
2	B	9	GLN	2.9

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Mol	Chain	Res	Type	RSRZ
1	A	209	ASP	2.8
2	B	131	ASP	2.8
2	B	3	GLY	2.8
2	B	127	GLY	2.8
2	B	36	LYS	2.8
2	B	232	ILE	2.8
2	B	212	ASP	2.8
2	B	37	PHE	2.8
2	B	10	SER	2.8
2	B	57	TRP	2.8
2	B	150	PHE	2.7
2	B	34	SER	2.5
2	B	27	PHE	2.5
2	B	113	ASP	2.4
2	B	163[A]	ILE	2.4
1	A	97[A]	ARG	2.3
1	A	170	GLY	2.3
2	B	214	VAL	2.3
2	B	26	LYS	2.3
2	B	153	GLY	2.3
2	B	151	PRO	2.3
2	B	8	PHE	2.3
1	A	204	MET	2.3
2	B	160	LEU	2.2
2	B	13	THR	2.2
2	B	132	GLY	2.1
2	B	12	MET	2.1
2	B	169	ASP	2.1
2	B	114	ASP	2.1
2	B	48	CYS	2.1
2	B	157[A]	VAL	2.1
1	A	53[A]	LEU	2.0
2	B	129	GLN	2.0

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

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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(\AA^2)	Q<0.9
2	CRQ	B	65	24/25	0.89	0.13	-	37,41,44,44	0
1	CSO	A	215	7/8	0.88	0.13	-	28,29,55,60	0
1	CSO	A	116[B]	7/8	0.93	0.10	-	26,27,29,32	7
2	CSO	B	116[A]	7/8	0.85	0.17	-	40,44,47,50	7
1	CSO	A	116[A]	7/8	0.93	0.10	-	26,28,29,30	7
1	CRQ	A	65	24/25	0.94	0.11	-	23,27,31,31	0
2	CSO	B	116[B]	7/8	0.85	0.17	-	46,47,49,51	7

6.3 Carbohydrates [i](#)

There are no carbohydrates 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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(\AA^2)	Q<0.9
6	GOL	A	1239	6/6	0.63	0.29	7.56	41,57,69,74	0
6	GOL	B	1236	6/6	0.78	0.29	4.58	42,56,57,61	0
4	CL	A	1234	1/1	0.35	0.34	4.52	90,90,90,90	0
5	NA	A	1237	1/1	0.94	0.21	4.50	40,40,40,40	0
6	GOL	A	1241	6/6	0.90	0.17	2.66	35,66,71,78	0
6	GOL	A	1240	6/6	0.82	0.20	0.32	50,65,69,80	0
4	CL	B	1233	1/1	0.97	0.07	-2.36	59,59,59,59	0
4	CL	A	1238	1/1	0.73	0.30	-	86,86,86,86	0
4	CL	A	1233	1/1	0.81	0.17	-	69,69,69,69	0
4	CL	B	1237	1/1	0.20	0.23	-	84,84,84,84	1
4	CL	A	1235	1/1	0.73	0.49	-	71,71,71,71	0
5	NA	A	1236	1/1	0.92	0.11	-	35,35,35,35	0
6	GOL	B	1235	6/6	0.84	0.15	-	43,55,61,62	0
6	GOL	A	1242	6/6	0.61	0.21	-	64,73,77,77	0
4	CL	A	1232	1/1	0.97	0.10	-	66,66,66,66	0
4	CL	B	1234	1/1	0.94	0.15	-	61,61,61,61	0
3	SO4	A	1231	5/5	0.79	0.19	-	26,28,30,35	5

6.5 Other polymers [i](#)

There are no such residues in this entry.