



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 10, 2022 – 12:13 pm GMT

PDB ID : 7PD0
Title : Functional and structural characterization of redox sensitive superfolder green fluorescent protein and variants
Authors : Fritz-Wolf, K.; Heimsch, K.C.; Schuh, A.K.; Becker, K.
Deposited on : 2021-08-04
Resolution : 2.00 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.8.4, CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.26
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0267
CCP4 : 7.1.010 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.26

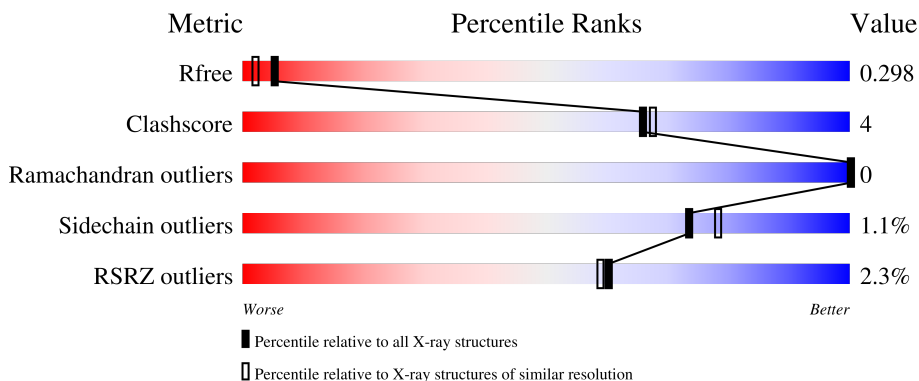
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION


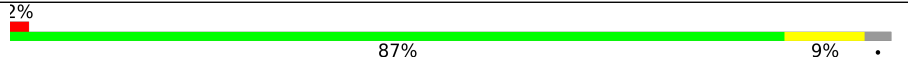
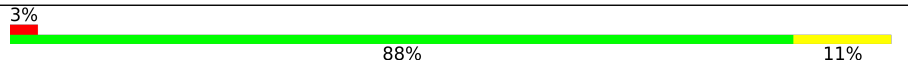

The reported resolution of this entry is 2.00 Å.

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}	130704	8085 (2.00-2.00)
Clashscore	141614	9178 (2.00-2.00)
Ramachandran outliers	138981	9054 (2.00-2.00)
Sidechain outliers	138945	9053 (2.00-2.00)
RSRZ outliers	127900	7900 (2.00-2.00)

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	236	 2% 88% 9%
1	B	236	 2% 87% 9%
1	C	236	 3% 88% 11%
1	D	236	 2% 88% 11%

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 8017 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 Green fluorescent protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	228	1822	1153	314	348	7	0	1	0
1	B	228	1823	1156	313	348	6	0	1	0
1	C	235	1878	1190	322	359	7	0	1	0
1	D	236	1888	1198	324	359	7	0	1	0

There are 72 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	VAL	MET	engineered mutation	UNP P42212
A	30	ARG	SER	engineered mutation	UNP P42212
A	48	SER	CYS	engineered mutation	UNP P42212
A	64	LEU	PHE	engineered mutation	UNP P42212
A	66	CRO	SER	chromophore	UNP P42212
A	66	CRO	TYR	chromophore	UNP P42212
A	66	CRO	GLY	chromophore	UNP P42212
A	80	ARG	GLN	engineered mutation	UNP P42212
A	99	SER	PHE	engineered mutation	UNP P42212
A	105	THR	ASN	engineered mutation	UNP P42212
A	145	PHE	TYR	engineered mutation	UNP P42212
A	147	CYS	SER	engineered mutation	UNP P42212
A	153	THR	MET	engineered mutation	UNP P42212
A	163	ALA	VAL	engineered mutation	UNP P42212
A	171	VAL	ILE	engineered mutation	UNP P42212
A	204	CYS	GLN	engineered mutation	UNP P42212
A	206	VAL	ALA	engineered mutation	UNP P42212
A	223	ARG	PHE	engineered mutation	UNP P42212
B	1	VAL	MET	engineered mutation	UNP P42212
B	30	ARG	SER	engineered mutation	UNP P42212
B	48	SER	CYS	engineered mutation	UNP P42212

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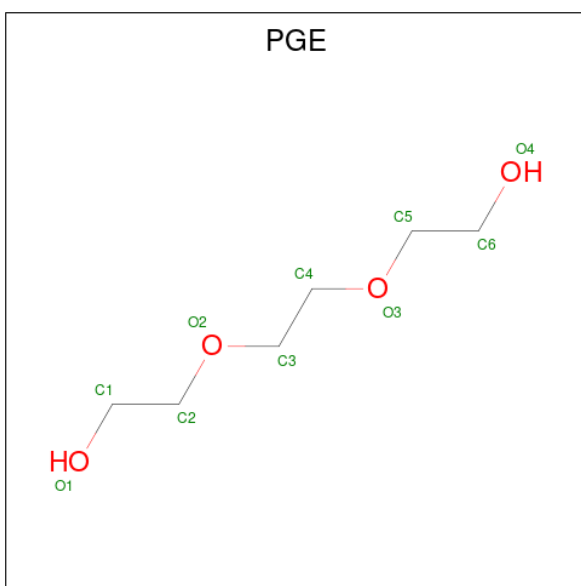
Chain	Residue	Modelled	Actual	Comment	Reference
B	64	LEU	PHE	engineered mutation	UNP P42212
B	66	CRO	SER	chromophore	UNP P42212
B	66	CRO	TYR	chromophore	UNP P42212
B	66	CRO	GLY	chromophore	UNP P42212
B	80	ARG	GLN	engineered mutation	UNP P42212
B	99	SER	PHE	engineered mutation	UNP P42212
B	105	THR	ASN	engineered mutation	UNP P42212
B	145	PHE	TYR	engineered mutation	UNP P42212
B	147	CYS	SER	engineered mutation	UNP P42212
B	153	THR	MET	engineered mutation	UNP P42212
B	163	ALA	VAL	engineered mutation	UNP P42212
B	171	VAL	ILE	engineered mutation	UNP P42212
B	204	CYS	GLN	engineered mutation	UNP P42212
B	206	VAL	ALA	engineered mutation	UNP P42212
B	223	ARG	PHE	engineered mutation	UNP P42212
C	1	VAL	MET	engineered mutation	UNP P42212
C	30	ARG	SER	engineered mutation	UNP P42212
C	48	SER	CYS	engineered mutation	UNP P42212
C	64	LEU	PHE	engineered mutation	UNP P42212
C	66	CRO	SER	chromophore	UNP P42212
C	66	CRO	TYR	chromophore	UNP P42212
C	66	CRO	GLY	chromophore	UNP P42212
C	80	ARG	GLN	engineered mutation	UNP P42212
C	99	SER	PHE	engineered mutation	UNP P42212
C	105	THR	ASN	engineered mutation	UNP P42212
C	145	PHE	TYR	engineered mutation	UNP P42212
C	147	CYS	SER	engineered mutation	UNP P42212
C	153	THR	MET	engineered mutation	UNP P42212
C	163	ALA	VAL	engineered mutation	UNP P42212
C	171	VAL	ILE	engineered mutation	UNP P42212
C	204	CYS	GLN	engineered mutation	UNP P42212
C	206	VAL	ALA	engineered mutation	UNP P42212
C	223	ARG	PHE	engineered mutation	UNP P42212
D	1	VAL	MET	engineered mutation	UNP P42212
D	30	ARG	SER	engineered mutation	UNP P42212
D	48	SER	CYS	engineered mutation	UNP P42212
D	64	LEU	PHE	engineered mutation	UNP P42212
D	66	CRO	SER	chromophore	UNP P42212
D	66	CRO	TYR	chromophore	UNP P42212
D	66	CRO	GLY	chromophore	UNP P42212
D	80	ARG	GLN	engineered mutation	UNP P42212
D	99	SER	PHE	engineered mutation	UNP P42212

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Chain	Residue	Modelled	Actual	Comment	Reference
D	105	THR	ASN	engineered mutation	UNP P42212
D	145	PHE	TYR	engineered mutation	UNP P42212
D	147	CYS	SER	engineered mutation	UNP P42212
D	153	THR	MET	engineered mutation	UNP P42212
D	163	ALA	VAL	engineered mutation	UNP P42212
D	171	VAL	ILE	engineered mutation	UNP P42212
D	204	CYS	GLN	engineered mutation	UNP P42212
D	206	VAL	ALA	engineered mutation	UNP P42212
D	223	ARG	PHE	engineered mutation	UNP P42212

- Molecule 2 is TRIETHYLENE GLYCOL (three-letter code: PGE) (formula: C₆H₁₄O₄).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			10	6	4		
2	A	1	Total	C	O	0	0
			10	6	4		
2	C	1	Total	C	O	0	0
			10	6	4		

- Molecule 3 is DI(HYDROXYETHYL)ETHER (three-letter code: PEG) (formula: C₄H₁₀O₃).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 7 4 3	0	0
3	B	1	Total C O 7 4 3	0	0
3	B	1	Total C O 7 4 3	0	0
3	C	1	Total C O 7 4 3	0	0
3	C	1	Total C O 7 4 3	0	0
3	C	1	Total C O 7 4 3	0	0
3	D	1	Total C O 7 4 3	0	0

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	D	1	Total C O 6 3 3	0	0

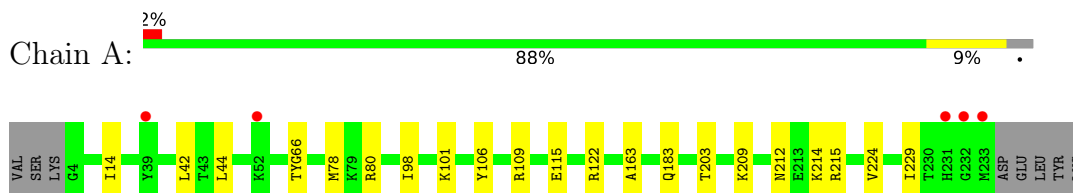
- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	107	Total O 107 107	0	0
5	B	110	Total O 110 110	0	0
5	C	148	Total O 148 148	0	0
5	D	156	Total O 156 156	0	0

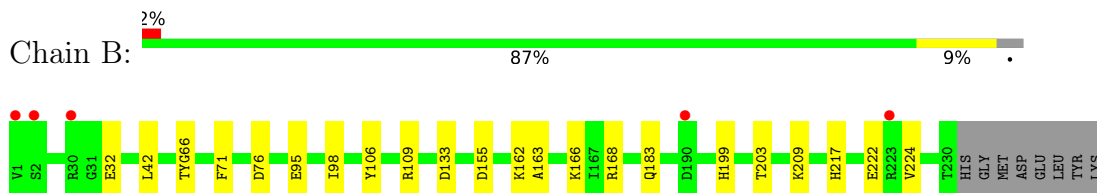
3 Residue-property plots [i](#)

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.

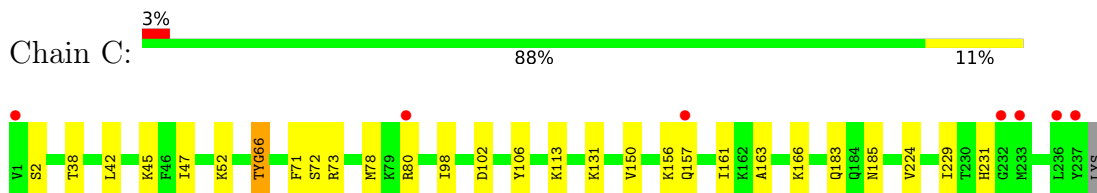
- Molecule 1: Green fluorescent protein



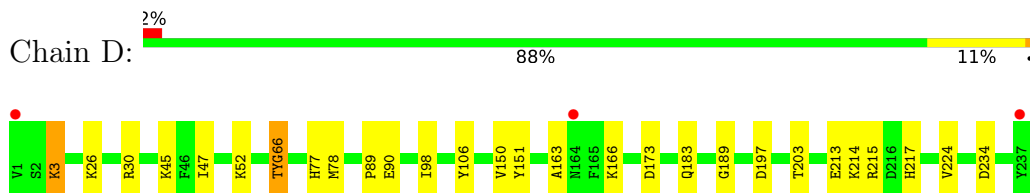
- Molecule 1: Green fluorescent protein



- Molecule 1: Green fluorescent protein



- Molecule 1: Green fluorescent protein



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	91.85Å 51.29Å 101.46Å 90.00° 102.28° 90.00°	Depositor
Resolution (Å)	47.92 – 2.00 47.92 – 1.80	Depositor EDS
% Data completeness (in resolution range)	94.6 (47.92-2.00) 88.7 (47.92-1.80)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.33 (at 1.79Å)	Xtrriage
Refinement program	PHENIX (1.15.2_3472: ???)	Depositor
R, R_{free}	0.250 , 0.298 0.250 , 0.298	Depositor DCC
R_{free} test set	4596 reflections (6.00%)	wwPDB-VP
Wilson B-factor (Å ²)	24.9	Xtrriage
Anisotropy	0.366	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	(Not available) , (Not available)	EDS
L-test for twinning ²	$\langle L \rangle = 0.59$, $\langle L^2 \rangle = 0.44$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	8017	wwPDB-VP
Average B, all atoms (Å ²)	31.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 58.86 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.9225e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: CRO, PEG, PGE, GOL

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	0.24	0/1842	0.46	0/2489
1	B	0.26	0/1842	0.47	0/2489
1	C	0.25	0/1899	0.48	0/2566
1	D	0.26	0/1909	0.47	0/2578
All	All	0.25	0/7492	0.47	0/10122

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1822	0	1778	13	1
1	B	1823	0	1793	13	1
1	C	1878	0	1836	18	0
1	D	1888	0	1853	18	0
2	A	20	0	28	1	0
2	C	10	0	14	1	0
3	A	7	0	10	1	0
3	B	14	0	20	0	0
3	C	21	0	30	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	D	7	0	10	0	0
4	D	6	0	8	0	0
5	A	107	0	0	1	0
5	B	110	0	0	1	0
5	C	148	0	0	4	0
5	D	156	0	0	4	0
All	All	8017	0	7380	60	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 4.

All (60) 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:163:ALA:HB3	1:C:183:GLN:HB3	1.72	0.71
1:B:163:ALA:HB3	1:B:183:GLN:HB3	1.77	0.67
1:C:45:LYS:HE2	1:C:47:ILE:HD11	1.76	0.67
1:A:215:ARG:NH1	5:A:401:HOH:O	2.27	0.66
1:D:163:ALA:HB3	1:D:183:GLN:HB3	1.78	0.65
1:D:98:ILE:HB	1:D:106:TYR:HB2	1.79	0.64
1:A:163:ALA:HB3	1:A:183:GLN:HB3	1.80	0.63
1:B:203:THR:HG23	1:B:224:VAL:HG22	1.82	0.61
1:B:168:ARG:NH1	5:B:401:HOH:O	2.34	0.61
1:A:203:THR:HG23	1:A:224:VAL:HG22	1.83	0.61
1:A:98:ILE:HB	1:A:106:TYR:HB2	1.83	0.60
1:C:73:ARG:NH2	5:C:506:HOH:O	2.35	0.60
1:A:101:LYS:NZ	1:D:173:ASP:OD2	2.29	0.59
1:B:98:ILE:HB	1:B:106:TYR:HB2	1.84	0.58
1:C:98:ILE:HB	1:C:106:TYR:HB2	1.85	0.58
1:C:80:ARG:NH1	5:C:504:HOH:O	2.38	0.56
1:D:3:LYS:NZ	1:D:89:PRO:HD2	2.19	0.56
1:D:203:THR:HG23	1:D:224:VAL:HG22	1.87	0.55
1:C:42:LEU:HD11	1:C:71:PHE:CB	2.37	0.55
1:C:80:ARG:CZ	1:C:80:ARG:HB2	2.37	0.55
1:C:73:ARG:NH1	5:C:510:HOH:O	2.39	0.54
1:A:115:GLU:OE2	1:A:122:ARG:NH1	2.37	0.53
1:C:72:SER:HA	1:C:224:VAL:HG13	1.91	0.53
1:B:155:ASP:OD2	1:B:162:LYS:NZ	2.42	0.53
1:A:109:ARG:HH11	1:A:109:ARG:HG2	1.74	0.52
1:D:26:LYS:NZ	5:D:410:HOH:O	2.37	0.51
1:D:77:HIS:CE1	1:D:78:MET:HG3	2.46	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:3:LYS:HZ2	1:D:89:PRO:HD2	1.74	0.50
1:B:42[B]:LEU:HD21	1:B:71:PHE:CG	2.47	0.50
1:A:209:LYS:HB2	2:A:301:PGE:H5	1.95	0.49
1:C:42:LEU:HD11	1:C:71:PHE:HB2	1.93	0.49
1:A:42:LEU:HD13	1:A:44:LEU:HD12	1.94	0.49
1:D:66:CRO:HD2	1:D:150:VAL:HG21	1.95	0.48
1:A:78:MET:HG2	1:A:229:ILE:HB	1.94	0.48
1:C:102:ASP:O	1:C:131:LYS:HE2	2.13	0.48
1:B:42[A]:LEU:HG	1:B:222:GLU:HB3	1.94	0.48
1:A:14:ILE:HB	1:A:44:LEU:HD21	1.94	0.47
1:C:166:LYS:NZ	5:C:518:HOH:O	2.49	0.46
1:B:95:GLU:HG2	1:B:109:ARG:HG3	1.97	0.46
1:B:166:LYS:NZ	5:D:418:HOH:O	2.48	0.46
1:B:209:LYS:NZ	1:B:217:HIS:O	2.41	0.46
1:C:78:MET:HE3	1:C:229:ILE:HG13	1.97	0.46
1:C:38:THR:HA	3:C:404:PEG:H31	1.97	0.45
1:D:90:GLU:HG3	1:D:189:GLY:HA3	1.99	0.43
1:B:199:HIS:HA	1:D:151:TYR:OH	2.19	0.43
1:C:66:CRO:HD2	1:C:150:VAL:HG21	2.01	0.43
1:C:161:ILE:HG13	1:C:185:ASN:HB2	2.01	0.43
1:D:45:LYS:HE2	1:D:47:ILE:HD11	2.00	0.43
1:B:166:LYS:HZ1	1:D:197:ASP:HB3	1.84	0.42
1:D:214:LYS:HE2	1:D:214:LYS:HB2	1.81	0.42
1:D:30:ARG:NH1	5:D:413:HOH:O	2.52	0.42
1:D:166:LYS:NZ	5:D:417:HOH:O	2.46	0.42
1:A:78:MET:HE3	1:A:229:ILE:HG13	2.02	0.42
1:A:212:ASN:O	1:A:214:LYS:NZ	2.46	0.41
1:D:213:GLU:HG2	1:D:217:HIS:CG	2.55	0.41
1:D:213:GLU:OE2	1:D:215:ARG:NE	2.44	0.41
1:B:42[B]:LEU:HD21	1:B:71:PHE:CB	2.51	0.41
1:C:231:HIS:NE2	2:C:401:PGE:O4	2.50	0.41
1:C:156:LYS:HE2	1:C:156:LYS:HB2	1.81	0.41
3:A:302:PEG:H11	3:A:302:PEG:H32	1.96	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:A:80:ARG:NH1	1:B:133:ASP:OD1[1_554]	1.65	0.55

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	224/236 (95%)	220 (98%)	4 (2%)	0	100	100
1	B	224/236 (95%)	221 (99%)	3 (1%)	0	100	100
1	C	231/236 (98%)	227 (98%)	4 (2%)	0	100	100
1	D	232/236 (98%)	227 (98%)	5 (2%)	0	100	100
All	All	911/944 (96%)	895 (98%)	16 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

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	199/206 (97%)	199 (100%)	0	100	100
1	B	200/206 (97%)	198 (99%)	2 (1%)	76	81
1	C	205/206 (100%)	201 (98%)	4 (2%)	55	58
1	D	206/206 (100%)	203 (98%)	3 (2%)	65	69
All	All	810/824 (98%)	801 (99%)	9 (1%)	73	78

All (9) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	32	GLU
1	B	76	ASP

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Mol	Chain	Res	Type
1	C	2	SER
1	C	52	LYS
1	C	113	LYS
1	C	157	GLN
1	D	3	LYS
1	D	52	LYS
1	D	234	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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	CRO	A	66	1	23,23,24	3.00	8 (34%)	30,32,34	2.66	7 (23%)
1	CRO	D	66	1	23,23,24	3.00	8 (34%)	30,32,34	2.67	7 (23%)
1	CRO	B	66	1	23,23,24	3.03	8 (34%)	30,32,34	2.78	7 (23%)
1	CRO	C	66	1	23,23,24	3.00	7 (30%)	30,32,34	2.67	7 (23%)

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	CRO	A	66	1	-	2/12/31/32	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	CRO	D	66	1	-	3/12/31/32	0/2/2/2
1	CRO	B	66	1	-	3/12/31/32	0/2/2/2
1	CRO	C	66	1	-	3/12/31/32	0/2/2/2

All (31) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	66	CRO	C1-N2	7.14	1.42	1.32
1	D	66	CRO	C1-N2	7.06	1.42	1.32
1	C	66	CRO	C1-N2	7.02	1.42	1.32
1	A	66	CRO	C1-N2	7.02	1.42	1.32
1	C	66	CRO	CA2-C2	6.64	1.55	1.48
1	D	66	CRO	CA2-C2	6.63	1.55	1.48
1	B	66	CRO	CA2-C2	6.60	1.55	1.48
1	A	66	CRO	CA2-C2	6.56	1.55	1.48
1	C	66	CRO	C1-N3	6.03	1.47	1.37
1	B	66	CRO	C1-N3	6.02	1.47	1.37
1	D	66	CRO	C1-N3	5.99	1.47	1.37
1	A	66	CRO	C1-N3	5.97	1.47	1.37
1	B	66	CRO	CG2-CB2	5.87	1.58	1.46
1	C	66	CRO	CG2-CB2	5.86	1.58	1.46
1	A	66	CRO	CG2-CB2	5.82	1.58	1.46
1	D	66	CRO	CG2-CB2	5.81	1.58	1.46
1	C	66	CRO	C2-N3	3.93	1.49	1.39
1	B	66	CRO	C2-N3	3.90	1.49	1.39
1	D	66	CRO	C2-N3	3.87	1.49	1.39
1	A	66	CRO	C2-N3	3.87	1.49	1.39
1	C	66	CRO	CA2-N2	2.67	1.44	1.38
1	A	66	CRO	CA2-N2	2.67	1.44	1.38
1	B	66	CRO	CA2-N2	2.64	1.44	1.38
1	D	66	CRO	CA2-N2	2.62	1.44	1.38
1	D	66	CRO	CA1-C1	2.53	1.54	1.51
1	B	66	CRO	CA1-C1	2.52	1.54	1.51
1	A	66	CRO	CA1-C1	2.44	1.54	1.51
1	C	66	CRO	CA1-C1	2.35	1.54	1.51
1	B	66	CRO	CB2-CA2	2.24	1.37	1.35
1	A	66	CRO	CB2-CA2	2.20	1.37	1.35
1	D	66	CRO	CB2-CA2	2.02	1.36	1.35

All (28) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	66	CRO	O2-C2-CA2	-8.97	125.92	130.96
1	D	66	CRO	O2-C2-CA2	-8.88	125.97	130.96
1	C	66	CRO	O2-C2-CA2	-8.79	126.03	130.96
1	A	66	CRO	O2-C2-CA2	-8.52	126.17	130.96
1	B	66	CRO	CA2-C2-N3	7.77	107.05	103.37
1	A	66	CRO	CA2-C2-N3	7.30	106.82	103.37
1	D	66	CRO	CA2-C2-N3	7.09	106.72	103.37
1	C	66	CRO	CA2-C2-N3	7.03	106.69	103.37
1	B	66	CRO	C2-N3-C1	-5.23	105.32	107.97
1	A	66	CRO	C2-N3-C1	-4.91	105.48	107.97
1	C	66	CRO	C2-N3-C1	-4.90	105.48	107.97
1	D	66	CRO	C2-N3-C1	-4.74	105.56	107.97
1	B	66	CRO	CA2-N2-C1	4.35	108.98	105.77
1	D	66	CRO	CA2-N2-C1	4.19	108.86	105.77
1	A	66	CRO	CA2-N2-C1	4.18	108.86	105.77
1	C	66	CRO	CA2-N2-C1	4.06	108.76	105.77
1	C	66	CRO	CG2-CB2-CA2	-3.92	125.14	129.94
1	D	66	CRO	CG2-CB2-CA2	-3.81	125.27	129.94
1	B	66	CRO	CG2-CB2-CA2	-3.80	125.29	129.94
1	A	66	CRO	CG2-CB2-CA2	-3.69	125.42	129.94
1	B	66	CRO	C2-CA2-N2	-3.14	106.73	108.93
1	A	66	CRO	C2-CA2-N2	-2.91	106.90	108.93
1	D	66	CRO	C2-CA2-N2	-2.79	106.98	108.93
1	C	66	CRO	C2-CA2-N2	-2.70	107.04	108.93
1	A	66	CRO	O3-C3-CA3	-2.33	119.35	126.39
1	D	66	CRO	O3-C3-CA3	-2.30	119.44	126.39
1	C	66	CRO	O3-C3-CA3	-2.27	119.55	126.39
1	B	66	CRO	O3-C3-CA3	-2.04	120.23	126.39

There are no chirality outliers.

All (11) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	C	66	CRO	C2-CA2-CB2-CG2
1	D	66	CRO	C2-CA2-CB2-CG2
1	C	66	CRO	N2-CA2-CB2-CG2
1	D	66	CRO	N2-CA2-CB2-CG2
1	A	66	CRO	N2-CA2-CB2-CG2
1	B	66	CRO	N2-CA2-CB2-CG2
1	C	66	CRO	C3-CA3-N3-C2
1	D	66	CRO	C3-CA3-N3-C2
1	B	66	CRO	C2-CA2-CB2-CG2
1	A	66	CRO	C2-CA2-CB2-CG2

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Mol	Chain	Res	Type	Atoms
1	B	66	CRO	C3-CA3-N3-C2

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	D	66	CRO	1	0
1	C	66	CRO	1	0

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

11 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	PEG	C	403	-	6,6,6	0.75	0	5,5,5	0.28	0
3	PEG	C	402	-	6,6,6	0.74	0	5,5,5	0.27	0
2	PGE	A	301	-	9,9,9	0.77	0	8,8,8	0.26	0
3	PEG	C	404	-	6,6,6	0.76	0	5,5,5	0.30	0
2	PGE	C	401	-	9,9,9	0.77	0	8,8,8	0.25	0
3	PEG	B	301	-	6,6,6	0.74	0	5,5,5	0.30	0
3	PEG	D	301	-	6,6,6	0.74	0	5,5,5	0.28	0
3	PEG	A	302	-	6,6,6	0.74	0	5,5,5	0.31	0
3	PEG	B	302	-	6,6,6	0.74	0	5,5,5	0.29	0
4	GOL	D	302	-	5,5,5	0.89	0	5,5,5	1.00	0
2	PGE	A	303	-	9,9,9	0.76	0	8,8,8	0.28	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	PEG	C	403	-	-	2/4/4/4	-
3	PEG	C	402	-	-	1/4/4/4	-
2	PGE	A	301	-	-	2/7/7/7	-
3	PEG	C	404	-	-	3/4/4/4	-
2	PGE	C	401	-	-	3/7/7/7	-
3	PEG	B	301	-	-	1/4/4/4	-
3	PEG	D	301	-	-	1/4/4/4	-
3	PEG	A	302	-	-	3/4/4/4	-
3	PEG	B	302	-	-	0/4/4/4	-
4	GOL	D	302	-	-	2/4/4/4	-
2	PGE	A	303	-	-	5/7/7/7	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (23) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	D	302	GOL	C1-C2-C3-O3
2	A	303	PGE	O3-C5-C6-O4
3	C	403	PEG	O1-C1-C2-O2
4	D	302	GOL	O2-C2-C3-O3
3	B	301	PEG	O1-C1-C2-O2
3	A	302	PEG	C1-C2-O2-C3
2	A	301	PGE	C4-C3-O2-C2
2	C	401	PGE	C1-C2-O2-C3
3	C	404	PEG	C4-C3-O2-C2
2	A	303	PGE	O2-C3-C4-O3
3	A	302	PEG	O1-C1-C2-O2
3	C	403	PEG	C4-C3-O2-C2
2	A	303	PGE	C1-C2-O2-C3
3	C	404	PEG	O1-C1-C2-O2
3	D	301	PEG	O2-C3-C4-O4
3	C	402	PEG	C1-C2-O2-C3
2	C	401	PGE	O2-C3-C4-O3
2	C	401	PGE	C6-C5-O3-C4
3	A	302	PEG	C4-C3-O2-C2
2	A	303	PGE	O1-C1-C2-O2

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Mol	Chain	Res	Type	Atoms
2	A	303	PGE	C6-C5-O3-C4
3	C	404	PEG	O2-C3-C4-O4
2	A	301	PGE	O2-C3-C4-O3

There are no ring outliers.

4 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	301	PGE	1	0
3	C	404	PEG	1	0
2	C	401	PGE	1	0
3	A	302	PEG	1	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	227/236 (96%)	0.12	5 (2%) 62 60	19, 30, 46, 104	0
1	B	227/236 (96%)	0.18	5 (2%) 62 60	22, 31, 48, 62	0
1	C	234/236 (99%)	0.22	7 (2%) 50 49	19, 27, 48, 60	0
1	D	235/236 (99%)	0.13	4 (1%) 70 68	19, 26, 45, 67	0
All	All	923/944 (97%)	0.16	21 (2%) 60 59	19, 29, 48, 104	0

All (21) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	233	MET	5.1
1	C	237	TYR	4.9
1	C	157	GLN	4.8
1	A	231	HIS	4.6
1	B	1	VAL	4.2
1	D	238	LYS	4.0
1	A	232	GLY	3.8
1	C	233	MET	3.4
1	C	232	GLY	3.4
1	D	1	VAL	3.2
1	C	1	VAL	3.2
1	B	30	ARG	2.9
1	D	237	TYR	2.6
1	A	52	LYS	2.6
1	B	223	ARG	2.5
1	B	2	SER	2.4
1	D	164	ASN	2.1
1	C	236	LEU	2.0
1	C	80	ARG	2.0
1	B	190	ASP	2.0
1	A	39	TYR	2.0

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

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
1	CRO	A	66	22/23	0.87	0.13	18,23,27,29	0
1	CRO	C	66	22/23	0.87	0.15	17,19,22,23	0
1	CRO	B	66	22/23	0.89	0.13	21,24,27,28	0
1	CRO	D	66	22/23	0.91	0.12	16,20,24,28	0

6.3 Carbohydrates [i](#)

There are no monosaccharides 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(Å ²)	Q<0.9
3	PEG	D	301	7/7	0.46	0.33	57,62,65,65	0
2	PGE	A	303	10/10	0.53	0.23	58,62,62,63	0
2	PGE	A	301	10/10	0.53	0.24	44,52,55,58	0
4	GOL	D	302	6/6	0.59	0.37	57,59,59,59	0
3	PEG	B	301	7/7	0.61	0.25	61,61,63,64	0
3	PEG	C	403	7/7	0.61	0.26	56,59,61,61	0
3	PEG	A	302	7/7	0.63	0.23	50,56,58,61	0
2	PGE	C	401	10/10	0.64	0.26	60,64,65,66	0
3	PEG	C	404	7/7	0.68	0.25	29,40,43,45	0
3	PEG	B	302	7/7	0.76	0.25	48,52,54,55	0
3	PEG	C	402	7/7	0.78	0.27	39,45,50,51	0

6.5 Other polymers [i](#)

There are no such residues in this entry.