Full wwPDB X-ray Structure Validation Report ⓘ

Sep 24, 2023 – 08:26 AM EDT

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PDB ID	:	5UDG
Title	:	Mutant E97Q crystal structure of Bacillus subtilis QueF with a disulfide Cys 55-99
Authors	:	Mohammad, A.; Kiani, M.K.; Iwata-Reuyl, D.; Stec, B.; Swairjo, M.
Deposited on	:	2016-12-27
Resolution	:	2.50 Å(reported)

1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION
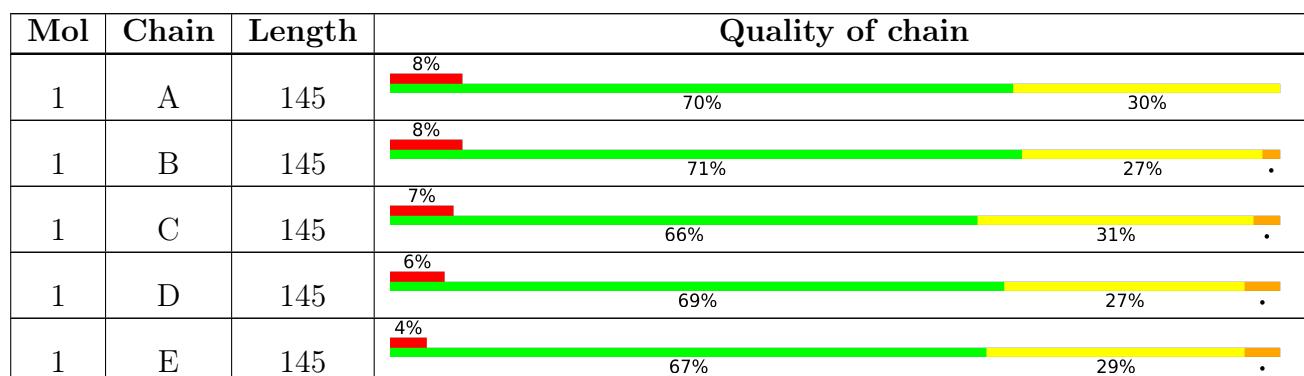
The reported resolution of this entry is 2.50 Å.

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	Percentile Ranks	Value
Rfree		0.292
Clashscore		16
Ramachandran outliers		0.4%
Sidechain outliers		6.2%
RSRZ outliers		6.6%

Worse ... *Better*

■ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (2.50-2.50)

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 <=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	145	8% — 70% / 30%
1	B	145	8% — 71% / 27% / •
1	C	145	7% — 66% / 31% / •
1	D	145	6% — 69% / 27% / •
1	E	145	4% — 67% / 29% / •

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
2	MG	D	202	-	-	-	X

2 Entry composition ⓘ

There are 4 unique types of molecules in this entry. The entry contains 6417 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 NADPH-dependent 7-cyano-7-deazaguanine reductase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	145	Total 1236	C 800	N 195	O 231	S 10	0	2	0
1	B	145	Total 1213	C 783	N 194	O 226	S 10	0	0	0
1	C	145	Total 1213	C 783	N 194	O 226	S 10	0	0	0
1	D	145	Total 1213	C 783	N 194	O 226	S 10	0	0	0
1	E	145	Total 1213	C 783	N 194	O 226	S 10	0	0	0
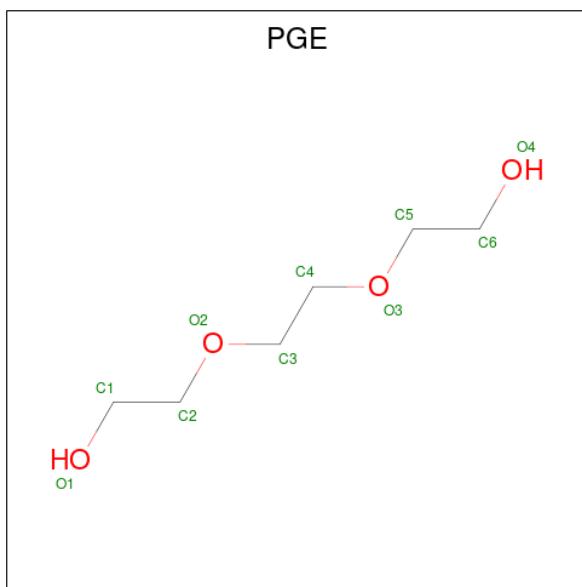
There are 5 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	97	GLN	GLU	engineered mutation	UNP A0A063X9I2
B	97	GLN	GLU	engineered mutation	UNP A0A063X9I2
C	97	GLN	GLU	engineered mutation	UNP A0A063X9I2
D	97	GLN	GLU	engineered mutation	UNP A0A063X9I2
E	97	GLN	GLU	engineered mutation	UNP A0A063X9I2

- Molecule 2 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	2	Total 2	Mg 2	0	0
2	B	1	Total 1	Mg 1	0	0
2	D	2	Total 2	Mg 2	0	0
2	E	2	Total 2	Mg 2	0	0

- Molecule 3 is TRIETHYLENE GLYCOL (three-letter code: PGE) (formula: $C_6H_{14}O_4$).

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total 10	C 6	O 4	0	0
3	B	1	Total 10	C 6	O 4	0	0
3	C	1	Total 10	C 6	O 4	0	0
3	D	1	Total 7	C 4	O 3	0	0
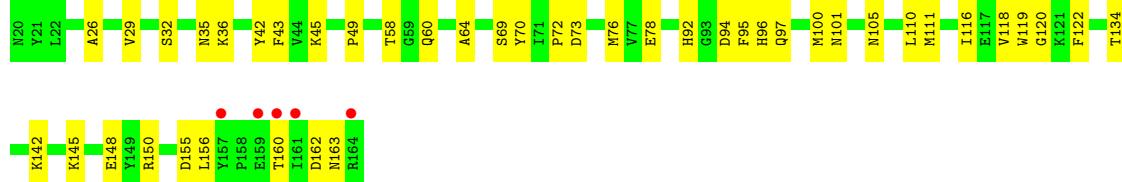
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	63	Total 63	O 63	0	0
4	B	65	Total 65	O 65	0	0
4	C	45	Total 45	O 45	0	0
4	D	53	Total 53	O 53	0	0
4	E	59	Total 59	O 59	0	0
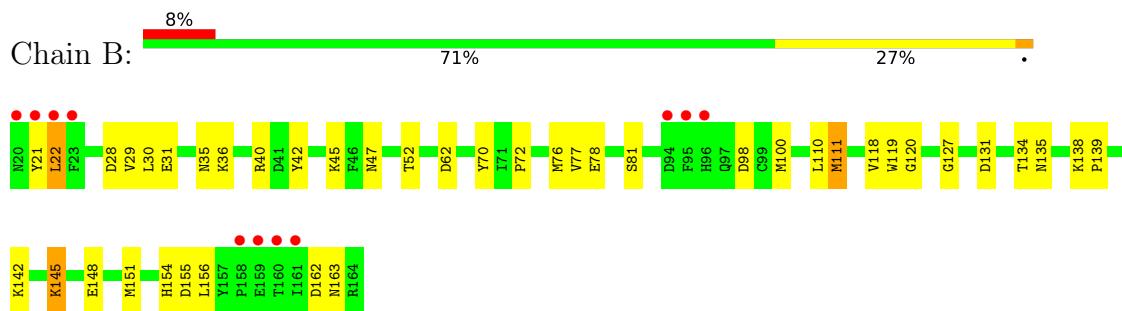
3 Residue-property plots ⓘ

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: NADPH-dependent 7-cyano-7-deazaguanine reductase

Chain A:

- Molecule 1: NADPH-dependent 7-cyano-7-deazaguanine reductase

Chain B:

- Molecule 1: NADPH-dependent 7-cyano-7-deazaguanine reductase

Chain C:

- Molecule 1: NADPH-dependent 7-cyano-7-deazaguanine reductase

Chain D:

N20 Y21 L22 F23 E24 D28 V29 N35 K36 H37 V38 N39 Y42 K45 F46 P49 C55 P56 Q60 T65 Y70 I71 P72 D73 E74 K75 F87 R90 N91 H92 G93 D94 F95 H96 M100 N105 M111 R114 G120 K121 F122 G126 G127

I128 S129 Y133 T134 K138 K142 Y143 E144 K145 M152 N153 H154 D155 L156 Y157 P158 E159 T160 R164

• Molecule 1: NADPH-dependent 7-cyano-7-deazaguanine reductase

Chain E:

4%

67% 29%

N20 Y21 L22 F23 E24 Y25 A26 V29 N35 K36 H37 V38 N39 R40 D41 Y42 F43 V44 K45 C55 P56 K57 Q60 Y70 I71 P72 K75 M76 L84 N91 H92 F95 H96 Q97 D98 C99 M100 N101 I102 M111 R114 V118 P124 R125 I130

T134 N135 Y136 K142 Y143 E144 K145 R150 D155 P158 E159 T160 I161 D162 N163 R164

4　Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 32 2 1	Depositor
Cell constants a, b, c, α, β, γ	87.31Å　　87.31Å　　196.73Å 90.00°　　90.00°　　120.00°	Depositor
Resolution (Å)	45.61　–　2.50 49.54　–　2.50	Depositor EDS
% Data completeness (in resolution range)	97.9 (45.61-2.50) 97.9 (49.54-2.50)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.66 (at 2.51Å)	Xtriage
Refinement program	REFMAC 5.6.0117	Depositor
R, R_{free}	0.194　,　0.293 0.192　,　0.292	Depositor DCC
R_{free} test set	1516 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å^2)	43.8	Xtriage
Anisotropy	0.220	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 55.1	EDS
L-test for twinning[2]	$< |L| > = 0.50, < L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.030 for -h,-k,l	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	6417	wwPDB-VP
Average B, all atoms (Å^2)	47.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.36% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ 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: PGE, MG

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	0.70	1/1281 (0.1%)	0.79	0/1732
1	B	0.66	1/1251 (0.1%)	0.73	0/1692
1	C	0.70	1/1251 (0.1%)	0.80	0/1692
1	D	0.73	0/1251	0.78	0/1692
1	E	0.67	0/1251	0.80	0/1692
All	All	0.69	3/6285 (0.0%)	0.78	0/8500

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	E	0	1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	119	TRP	CD2-CE2	6.81	1.49	1.41
1	C	119	TRP	CD2-CE2	6.48	1.49	1.41
1	A	119	TRP	CD2-CE2	5.48	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	E	95	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	1236	0	1168	44	0
1	B	1213	0	1150	39	0
1	C	1213	0	1150	48	0
1	D	1213	0	1150	50	0
1	E	1213	0	1150	46	0
2	A	2	0	0	0	0
2	B	1	0	0	0	0
2	D	2	0	0	0	0
2	E	2	0	0	0	0
3	A	10	0	14	0	0
3	B	10	0	14	0	0
3	C	10	0	14	1	0
3	D	7	0	9	0	0
4	A	63	0	0	2	0
4	B	65	0	0	4	0
4	C	45	0	0	4	0
4	D	53	0	0	3	0
4	E	59	0	0	2	0
All	All	6417	0	5819	187	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 16.

All (187) 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:D:70:TYR:CE2	1:D:111:MET:CE	2.39	1.04
1:D:70:TYR:CE2	1:D:111:MET:HE3	1.90	1.04
1:A:70:TYR:CE2	1:A:111:MET:CE	2.46	0.98
4:C:307:HOH:O	1:D:134:THR:HG22	1.61	0.98
1:A:142:LYS:HE3	1:B:148:GLU:OE2	1.62	0.97
1:A:70:TYR:CE2	1:A:111:MET:HE1	2.03	0.93
1:E:70:TYR:CE2	1:E:111:MET:HE1	2.05	0.91
1:D:42:TYR:HD2	1:E:134:THR:HG23	1.36	0.91
1:A:70:TYR:CE2	1:A:111:MET:HE3	2.09	0.88

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:70:TYR:CE2	1:E:111:MET:CE	2.57	0.87
1:D:70:TYR:CE2	1:D:111:MET:HE1	2.09	0.86
1:D:70:TYR:CZ	1:D:111:MET:HE3	2.11	0.85
1:D:28:ASP:HB3	4:D:343:HOH:O	1.74	0.85
1:D:37:HIS:HA	1:D:39:ASN:HD21	1.44	0.82
1:A:148:GLU:OE2	1:E:142:LYS:NZ	2.11	0.82
1:D:42:TYR:CD2	1:E:134:THR:HG23	2.16	0.80
1:B:22:LEU:HD22	1:B:22:LEU:H	1.46	0.79
1:A:70:TYR:CZ	1:A:111:MET:HE3	2.18	0.78
1:C:45:LYS:NZ	1:D:158:PRO:HB3	1.98	0.78
1:D:92:HIS:ND1	4:D:302:HOH:O	2.16	0.77
4:B:353:HOH:O	1:C:158:PRO:HG2	1.85	0.76
1:B:42:TYR:O	1:B:72:PRO:HD2	1.86	0.74
1:D:45:LYS:HE2	1:E:155:ASP:OD2	1.88	0.73
1:D:35:ASN:ND2	1:D:37:HIS:H	1.89	0.70
1:D:37:HIS:HA	1:D:39:ASN:ND2	2.07	0.70
1:C:28:ASP:HA	4:C:334:HOH:O	1.91	0.68
3:C:201:PGE:H22	1:D:126:GLY:HA2	1.74	0.68
1:D:70:TYR:HE2	1:D:111:MET:CE	2.06	0.68
1:E:70:TYR:CE2	1:E:111:MET:HE2	2.28	0.67
1:E:26:ALA:O	1:E:29:VAL:HG22	1.94	0.67
1:B:70:TYR:CE2	1:B:111:MET:HE2	2.30	0.67
1:C:70:TYR:CE2	1:C:111:MET:CE	2.79	0.66
1:E:55:CYS:HB3	1:E:95:PHE:HE1	1.61	0.66
4:B:304:HOH:O	1:C:134:THR:HG22	1.96	0.66
1:A:134:THR:HG23	1:E:42:TYR:HD1	1.60	0.65
1:D:42:TYR:HD2	1:E:134:THR:CG2	2.09	0.64
1:D:100:MET:HE2	1:D:120:GLY:HA3	1.78	0.64
1:A:70:TYR:HE2	1:A:111:MET:CE	2.10	0.64
1:A:36:LYS:HE3	4:A:354:HOH:O	1.97	0.63
1:D:114:ARG:HA	1:D:138:LYS:HD2	1.81	0.62
1:D:42:TYR:O	1:D:72:PRO:HD2	1.99	0.62
1:B:100:MET:HE3	1:B:118:VAL:HG12	1.80	0.62
1:D:75:LYS:O	1:D:111:MET:HE2	2.00	0.62
1:A:105:ASN:OD1	1:E:40:ARG:NH2	2.33	0.61
1:B:70:TYR:CE2	1:B:111:MET:CE	2.84	0.61
1:C:100:MET:CE	1:C:118:VAL:HG12	2.28	0.61
1:B:100:MET:CE	1:B:118:VAL:HG12	2.31	0.61
1:D:142:LYS:HA	1:D:145:LYS:HD2	1.82	0.61
1:A:155:ASP:OD2	1:E:45:LYS:HE2	2.00	0.61
1:D:74:GLU:OE2	4:D:301:HOH:O	2.16	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:35:ASN:ND2	1:E:37:HIS:H	1.98	0.61
1:A:45:LYS:NZ	1:B:155:ASP:OD2	2.27	0.60
1:A:162:ASP:O	1:A:163:ASN:HB2	2.02	0.60
1:B:30:LEU:HA	1:B:81:SER:HB2	1.83	0.60
1:B:77:VAL:H	1:B:111:MET:HE1	1.67	0.59
1:C:100:MET:HE3	1:C:118:VAL:HG12	1.82	0.59
1:E:70:TYR:CZ	1:E:111:MET:HE1	2.37	0.59
1:A:150:ARG:HG2	1:B:156:LEU:HD21	1.85	0.59
1:E:95:PHE:CZ	1:E:98:ASP:HA	2.38	0.59
1:E:25:TYR:HB2	1:E:92:HIS:CG	2.38	0.59
1:E:100:MET:HE2	1:E:118:VAL:HG12	1.85	0.59
1:D:55:CYS:HB3	1:D:95:PHE:CD2	2.38	0.58
1:E:23:PHE:HA	1:E:91:ASN:HD22	1.69	0.58
1:E:21:TYR:OH	1:E:84:LEU:HD22	2.04	0.58
1:C:45:LYS:HZ3	1:D:158:PRO:HB3	1.66	0.57
1:D:55:CYS:N	1:D:56:PRO:CD	2.67	0.57
1:E:98:ASP:O	1:E:102:ILE:HG13	2.04	0.57
1:E:60:GLN:HB2	4:E:301:HOH:O	2.04	0.57
1:E:100:MET:CE	1:E:118:VAL:HG12	2.34	0.57
1:B:142:LYS:HA	1:B:145:LYS:HE2	1.88	0.56
1:E:95:PHE:CE2	1:E:98:ASP:HA	2.40	0.56
1:C:45:LYS:HZ1	1:D:158:PRO:HB3	1.68	0.56
1:A:26:ALA:HB1	1:A:29:VAL:HG23	1.87	0.56
1:C:70:TYR:CE2	1:C:111:MET:HE1	2.39	0.56
1:A:73:ASP:HB3	4:A:318:HOH:O	2.05	0.55
1:E:162:ASP:O	1:E:163:ASN:HB2	2.06	0.55
1:A:70:TYR:HE2	1:A:111:MET:HE1	1.62	0.55
1:E:35:ASN:HD22	1:E:36:LYS:N	2.05	0.55
1:D:92:HIS:CE1	1:D:94:ASP:HB2	2.41	0.55
1:E:124:PRO:O	1:E:125:ARG:HD3	2.06	0.54
1:A:35:ASN:HA	1:A:76:MET:HE2	1.89	0.54
1:E:55:CYS:HB3	1:E:95:PHE:CE1	2.41	0.54
1:C:55:CYS:O	1:C:94:ASP:HB2	2.07	0.54
1:A:100:MET:CE	1:A:118:VAL:HG12	2.38	0.54
1:C:70:TYR:CE2	1:C:111:MET:HE2	2.42	0.53
1:E:70:TYR:HE2	1:E:111:MET:CE	2.18	0.53
1:C:25:TYR:CZ	1:C:27:PRO:HG3	2.44	0.52
1:A:78[C]:GLU:CA	1:A:78[C]:GLU:OE1	2.55	0.52
1:B:100:MET:HE3	1:B:118:VAL:CG1	2.39	0.51
1:A:142:LYS:O	1:A:145:LYS:HB3	2.09	0.51
1:C:20:ASN:N	1:C:20:ASN:OD1	2.44	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:101:ASN:OD1	1:E:134:THR:HG21	2.11	0.51
1:A:45:LYS:HB3	1:B:131:ASP:HB2	1.92	0.51
1:E:40:ARG:O	1:E:114:ARG:NH1	2.43	0.51
1:C:100:MET:HE3	1:C:118:VAL:CG1	2.40	0.51
1:A:155:ASP:OD2	1:E:45:LYS:CE	2.59	0.50
1:A:142:LYS:CE	1:B:148:GLU:OE2	2.48	0.50
1:C:70:TYR:CZ	1:C:111:MET:HE1	2.46	0.50
1:C:120:GLY:O	1:C:131:ASP:HA	2.11	0.50
1:B:100:MET:HE1	1:B:120:GLY:CA	2.41	0.50
1:C:56:PRO:HD3	1:C:62:ASP:OD2	2.12	0.49
1:C:42:TYR:O	1:C:72:PRO:HD2	2.12	0.49
4:C:319:HOH:O	1:D:157:TYR:CD2	2.55	0.49
1:C:58:THR:OG1	1:C:60:GLN:HG2	2.13	0.49
1:C:100:MET:HG3	1:C:132:PRO:HG2	1.93	0.49
1:C:43:PHE:CD2	1:D:154:HIS:HD2	2.30	0.48
1:D:45:LYS:CE	1:E:155:ASP:OD2	2.60	0.48
1:C:42:TYR:CD2	1:D:134:THR:HG23	2.47	0.48
1:B:77:VAL:N	1:B:111:MET:HE1	2.27	0.48
1:E:42:TYR:O	1:E:72:PRO:HD2	2.13	0.48
1:B:22:LEU:H	1:B:22:LEU:CD2	2.22	0.48
1:D:45:LYS:NZ	1:E:158:PRO:HB3	2.29	0.48
1:C:40:ARG:NH2	1:D:105:ASN:OD1	2.47	0.47
1:A:49:PRO:HD2	1:B:127:GLY:O	2.14	0.47
1:E:75:LYS:O	1:E:111:MET:HE3	2.14	0.47
1:D:49:PRO:HA	1:D:65:THR:HA	1.95	0.47
1:C:41:ASP:OD1	1:C:114:ARG:NH1	2.47	0.47
1:B:45:LYS:HD2	1:C:155:ASP:OD2	2.14	0.47
1:A:100:MET:HE3	1:A:118:VAL:HG12	1.97	0.46
1:B:100:MET:HE1	1:B:120:GLY:HA3	1.96	0.46
1:C:75:LYS:NZ	4:C:304:HOH:O	2.48	0.46
1:B:70:TYR:HE2	1:B:111:MET:HE2	1.78	0.46
1:C:133:TYR:CG	1:C:154:HIS:CE1	3.04	0.46
1:A:43:PHE:CE2	1:B:154:HIS:HD2	2.34	0.46
1:A:97:GLN:HG3	1:E:37:HIS:NE2	2.31	0.46
1:C:49:PRO:HA	1:C:65:THR:HA	1.98	0.46
1:B:45:LYS:NZ	1:C:158:PRO:HB3	2.30	0.46
1:B:70:TYR:CZ	1:B:111:MET:HE1	2.51	0.46
1:B:145:LYS:NZ	4:B:301:HOH:O	2.49	0.45
1:D:46:PHE:CD2	1:E:130:ILE:HG12	2.51	0.45
1:D:114:ARG:HD3	1:D:143:TYR:CZ	2.51	0.45
1:D:45:LYS:HG3	1:D:46:PHE:N	2.27	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:42:TYR:O	1:A:72:PRO:HD2	2.15	0.45
1:C:49:PRO:HD2	1:D:127:GLY:O	2.17	0.45
1:D:39:ASN:H	1:D:39:ASN:HD22	1.64	0.45
1:A:70:TYR:OH	1:A:111:MET:HE3	2.15	0.45
1:C:43:PHE:HB3	1:D:133:TYR:HB3	1.98	0.45
1:D:46:PHE:CE2	1:E:130:ILE:HG12	2.52	0.44
1:B:47:ASN:HB2	1:C:129:SER:OG	2.17	0.44
1:C:142:LYS:HE3	1:C:143:TYR:CZ	2.51	0.44
1:B:77:VAL:HG23	1:B:110:LEU:CD2	2.48	0.44
1:C:35:ASN:ND2	1:C:37:HIS:H	2.15	0.44
1:C:157:TYR:HD1	1:D:157:TYR:CE1	2.35	0.44
1:B:142:LYS:HA	1:B:145:LYS:CE	2.47	0.44
1:A:92:HIS:CE1	1:A:94:ASP:HB2	2.53	0.44
1:A:70:TYR:HB3	1:A:116:ILE:HG13	2.00	0.44
1:A:32:SER:HA	1:A:76:MET:O	2.17	0.44
1:A:100:MET:HE3	1:A:118:VAL:CG1	2.48	0.44
1:C:115:TYR:CZ	1:C:150:ARG:HD3	2.52	0.44
1:B:40:ARG:HB2	4:B:318:HOH:O	2.17	0.43
1:D:122:PHE:O	1:D:129:SER:HB2	2.18	0.43
1:A:155:ASP:OD2	1:E:45:LYS:NZ	2.52	0.43
1:E:96:HIS:HB2	4:E:322:HOH:O	2.18	0.43
1:A:100:MET:HE1	1:A:120:GLY:CA	2.49	0.42
1:C:39:ASN:O	1:C:40:ARG:HB3	2.18	0.42
1:D:70:TYR:OH	1:D:111:MET:HE3	2.19	0.42
1:A:100:MET:HE2	1:A:118:VAL:HG12	2.00	0.42
1:B:52:THR:HA	1:B:62:ASP:O	2.19	0.42
1:B:78:GLU:HB3	1:B:81:SER:OG	2.19	0.42
1:B:42:TYR:HD1	1:C:134:THR:HG23	1.84	0.42
1:A:94:ASP:HB3	1:A:96:HIS:CE1	2.55	0.42
1:B:77:VAL:N	1:B:111:MET:CE	2.82	0.42
1:A:101:ASN:OD1	1:A:134:THR:HG21	2.19	0.42
1:C:146:MET:HG3	1:D:152:MET:HG3	2.02	0.42
1:C:30:LEU:HD23	1:C:30:LEU:HA	1.83	0.41
1:E:23:PHE:HA	1:E:91:ASN:ND2	2.32	0.41
1:A:43:PHE:HB2	1:B:151:MET:SD	2.60	0.41
1:A:64:ALA:HB2	1:A:122:PHE:CD2	2.55	0.41
1:C:20:ASN:ND2	1:C:28:ASP:OD2	2.53	0.41
1:A:110:LEU:O	1:A:110:LEU:HG	2.20	0.41
1:B:138:LYS:HA	1:B:139:PRO:HD3	1.94	0.41
1:C:115:TYR:OH	1:C:117:GLU:OE1	2.24	0.41
1:D:87:PHE:O	1:D:90:ARG:HB2	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:136:TYR:CD1	1:E:136:TYR:C	2.92	0.41
1:C:43:PHE:CD2	1:D:154:HIS:CD2	3.07	0.41
1:C:60:GLN:HE21	1:C:60:GLN:HB3	1.61	0.41
1:C:138:LYS:HA	1:C:139:PRO:HD3	1.93	0.41
1:D:39:ASN:ND2	1:D:39:ASN:H	2.19	0.41
1:E:76:MET:HE2	1:E:76:MET:HB3	2.02	0.41
1:A:43:PHE:CE2	1:A:69:SER:HB3	2.56	0.41
1:A:156:LEU:HD21	1:E:150:ARG:HG2	2.04	0.40
1:C:101:ASN:OD1	1:C:134:THR:HG21	2.21	0.40
1:B:135:ASN:C	1:B:135:ASN:OD1	2.59	0.40
1:C:45:LYS:HD2	1:D:155:ASP:OD2	2.21	0.40
1:E:114:ARG:HD3	1:E:143:TYR:CZ	2.56	0.40
1:B:76:MET:HA	1:B:111:MET:CE	2.52	0.40
1:B:162:ASP:O	1:B:163:ASN:HB2	2.22	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	146/145 (101%)	135 (92%)	11 (8%)	0	100	100
1	B	143/145 (99%)	133 (93%)	9 (6%)	1 (1%)	22	39
1	C	143/145 (99%)	131 (92%)	11 (8%)	1 (1%)	22	39
1	D	143/145 (99%)	136 (95%)	6 (4%)	1 (1%)	22	39
1	E	143/145 (99%)	136 (95%)	7 (5%)	0	100	100
All	All	718/725 (99%)	671 (94%)	44 (6%)	3 (0%)	34	54

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	21	TYR
1	D	95	PHE
1	C	136	TYR

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	138/135 (102%)	134 (97%)	4 (3%)	42	69
1	B	135/135 (100%)	125 (93%)	10 (7%)	13	27
1	C	135/135 (100%)	129 (96%)	6 (4%)	28	52
1	D	135/135 (100%)	125 (93%)	10 (7%)	13	27
1	E	135/135 (100%)	123 (91%)	12 (9%)	9	19
All	All	678/675 (100%)	636 (94%)	42 (6%)	18	35

All (42) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	58	THR
1	A	60	GLN
1	A	95	PHE
1	A	160	THR
1	B	22	LEU
1	B	28	ASP
1	B	29	VAL
1	B	31	GLU
1	B	35	ASN
1	B	36	LYS
1	B	98	ASP
1	B	111	MET
1	B	134	THR
1	B	145	LYS
1	C	20	ASN
1	C	35	ASN
1	C	40	ARG

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Mol	Chain	Res	Type
1	C	60	GLN
1	C	95	PHE
1	C	134	THR
1	D	24	GLU
1	D	29	VAL
1	D	35	ASN
1	D	38	VAL
1	D	39	ASN
1	D	45	LYS
1	D	60	GLN
1	D	74	GLU
1	D	134	THR
1	D	159	GLU
1	E	20	ASN
1	E	29	VAL
1	E	35	ASN
1	E	38	VAL
1	E	43	PHE
1	E	45	LYS
1	E	57	LYS
1	E	96	HIS
1	E	97	GLN
1	E	134	THR
1	E	145	LYS
1	E	164	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	20	ASN
1	A	35	ASN
1	A	60	GLN
1	A	91	ASN
1	B	20	ASN
1	B	35	ASN
1	B	154	HIS
1	C	20	ASN
1	C	35	ASN
1	C	60	GLN
1	D	35	ASN
1	D	39	ASN
1	D	92	HIS

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Mol	Chain	Res	Type
1	E	35	ASN
1	E	47	ASN
1	E	91	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 11 ligands modelled in this entry, 7 are monoatomic - leaving 4 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	PGE	C	201	-	9,9,9	0.69	0	8,8,8	0.41	0
3	PGE	D	203	-	6,6,9	0.47	0	5,5,8	0.53	0
3	PGE	A	203	-	9,9,9	0.50	0	8,8,8	0.41	0
3	PGE	B	202	-	9,9,9	0.64	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	PGE	C	201	-	-	3/7/7/7	-
3	PGE	D	203	-	-	2/4/4/7	-
3	PGE	A	203	-	-	4/7/7/7	-
3	PGE	B	202	-	-	3/7/7/7	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (12) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	C	201	PGE	O1-C1-C2-O2
3	C	201	PGE	O2-C3-C4-O3
3	D	203	PGE	C6-C5-O3-C4
3	A	203	PGE	C4-C3-O2-C2
3	B	202	PGE	C6-C5-O3-C4
3	A	203	PGE	O3-C5-C6-O4
3	B	202	PGE	O3-C5-C6-O4
3	B	202	PGE	C4-C3-O2-C2
3	C	201	PGE	C3-C4-O3-C5
3	A	203	PGE	O2-C3-C4-O3
3	D	203	PGE	C3-C4-O3-C5
3	A	203	PGE	C1-C2-O2-C3

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	201	PGE	1	0

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

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	145/145 (100%)	-0.03	12 (8%)	11	11	24, 38, 83, 133	0
1	B	145/145 (100%)	-0.01	11 (7%)	13	14	29, 44, 93, 134	0
1	C	145/145 (100%)	-0.00	10 (6%)	16	17	28, 42, 79, 116	0
1	D	145/145 (100%)	-0.10	9 (6%)	20	21	24, 36, 88, 108	0
1	E	145/145 (100%)	-0.07	6 (4%)	37	40	25, 41, 80, 109	0
All	All	725/725 (100%)	-0.04	48 (6%)	18	19	24, 41, 87, 134	0

All (48) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	96	HIS	7.1
1	A	95	PHE	6.7
1	D	93	GLY	6.4
1	A	21	TYR	6.3
1	B	160	THR	5.3
1	E	96	HIS	5.0
1	C	96	HIS	4.9
1	B	21	TYR	4.9
1	C	94	ASP	4.6
1	E	21	TYR	4.5
1	E	160	THR	4.5
1	A	93	GLY	4.4
1	C	160	THR	4.1
1	B	23	PHE	4.0
1	B	95	PHE	3.8
1	D	95	PHE	3.6
1	B	20	ASN	3.6
1	D	23	PHE	3.5
1	A	20	ASN	3.5
1	C	95	PHE	3.4

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Mol	Chain	Res	Type	RSRZ
1	D	21	TYR	3.4
1	E	95	PHE	3.4
1	D	94	ASP	3.3
1	A	157	TYR	3.2
1	A	96	HIS	3.0
1	B	22	LEU	3.0
1	D	160	THR	2.9
1	C	162	ASP	2.8
1	D	20	ASN	2.8
1	B	94	ASP	2.8
1	B	158	PRO	2.7
1	E	23	PHE	2.6
1	D	22	LEU	2.6
1	A	22	LEU	2.6
1	E	20	ASN	2.5
1	B	159	GLU	2.5
1	B	161	ILE	2.4
1	C	93	GLY	2.3
1	C	21	TYR	2.3
1	D	96	HIS	2.3
1	A	164	ARG	2.2
1	A	94	ASP	2.2
1	C	23	PHE	2.2
1	A	159	GLU	2.2
1	C	164	ARG	2.1
1	C	163	ASN	2.1
1	A	161	ILE	2.1
1	A	160	THR	2.0

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

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

6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4 Ligands ⓘ

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
2	MG	D	202	1/1	0.66	0.49	73,73,73,73	0
3	PGE	C	201	10/10	0.80	0.19	47,62,73,76	0
2	MG	A	202	1/1	0.81	0.11	64,64,64,64	0
3	PGE	A	203	10/10	0.85	0.18	50,66,74,77	0
2	MG	A	201	1/1	0.86	0.47	94,94,94,94	0
3	PGE	B	202	10/10	0.89	0.17	52,61,71,74	0
2	MG	E	201	1/1	0.90	0.30	64,64,64,64	0
2	MG	B	201	1/1	0.93	0.73	102,102,102,102	0
3	PGE	D	203	7/10	0.94	0.12	44,47,51,51	0
2	MG	E	202	1/1	0.96	0.07	29,29,29,29	0
2	MG	D	201	1/1	0.99	0.06	20,20,20,20	0

6.5 Other polymers ⓘ

There are no such residues in this entry.