W O R L D W I D E

wwPDB

P R O T E I N   D A T A   B A N K

wwPDB X-ray Structure Validation Summary Report ⓘ

May 22, 2020 – 01:47 am BST

PDB ID	:	5SV0
Title	:	Structure of the ExbB/ExbD complex from E. coli at pH 7.0
Authors	:	Celia, H.; Botos, I.; Lloubes, R.; Buchanan, S.K.; Noinaj, N.
Deposited on	:	2016-08-04
Resolution	:	2.60 Å(reported)

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

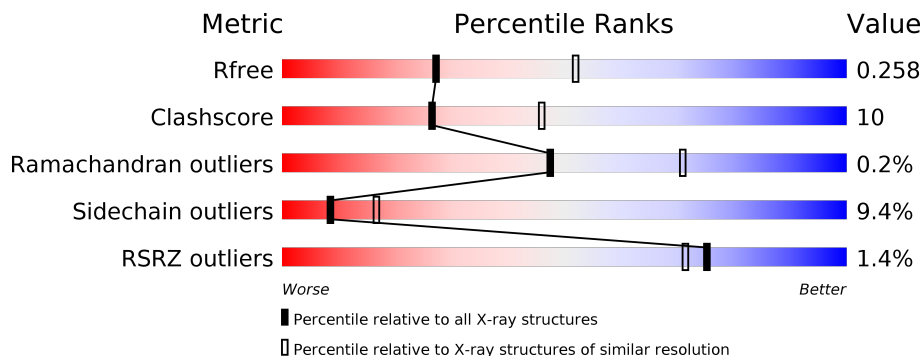|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.11
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.11

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 2.60 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.
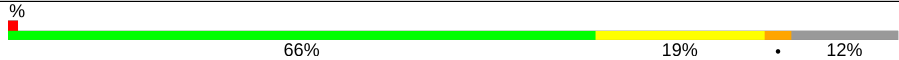
Metric	Percentile Ranks	Value
Rfree		0.258
Clashscore		10
Ramachandran outliers		0.2%
Sidechain outliers		9.4%
RSRZ outliers		1.4%

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	3163 (2.60-2.60)
Clashscore	141614	3518 (2.60-2.60)
Ramachandran outliers	138981	3455 (2.60-2.60)
Sidechain outliers	138945	3455 (2.60-2.60)
RSRZ outliers	127900	3104 (2.60-2.60)

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 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	244	2% 69% 23% • 5%
1	B	244	70% 18% • 8%
1	C	244	70% 17% • 9%
1	D	244	% 65% 18% 5% 12%
1	E	244	2% 65% 20% •• 11%
1	F	244	3% 71% 18% • 9%

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| Mol	Chain	Length	Quality of chain
1	G	244	% 70% 20% 6%
1	H	244	% 70% 20% 8%
1	I	244	64% 24% 9%
1	J	244	% 66% 19% 12%

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 16861 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 Biopolymer transport protein ExbB.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	B	225	Total 1692	C 1080	N 295	O 311	S 6	0	0	0
1	C	222	Total 1651	C 1050	N 289	O 306	S 6	0	0	0
1	D	215	Total 1615	C 1028	N 282	O 300	S 5	0	0	0
1	E	216	Total 1609	C 1025	N 279	O 300	S 5	0	0	0
1	F	223	Total 1651	C 1050	N 290	O 306	S 5	0	0	0
1	G	229	Total 1731	C 1104	N 301	O 320	S 6	0	2	0
1	H	225	Total 1700	C 1085	N 296	O 313	S 6	0	0	0
1	I	223	Total 1678	C 1068	N 294	O 310	S 6	0	0	0
1	J	214	Total 1596	C 1017	N 279	O 295	S 5	0	0	0
1	A	233	Total 1749	C 1111	N 308	O 324	S 6	0	0	0

- Molecule 2 is 4-(2-HYDROXYETHYL)-1-PIPERAZINE ETHANESULFONIC ACID (three-letter code: EPE) (formula: $C_8H_{18}N_2O_4S$).
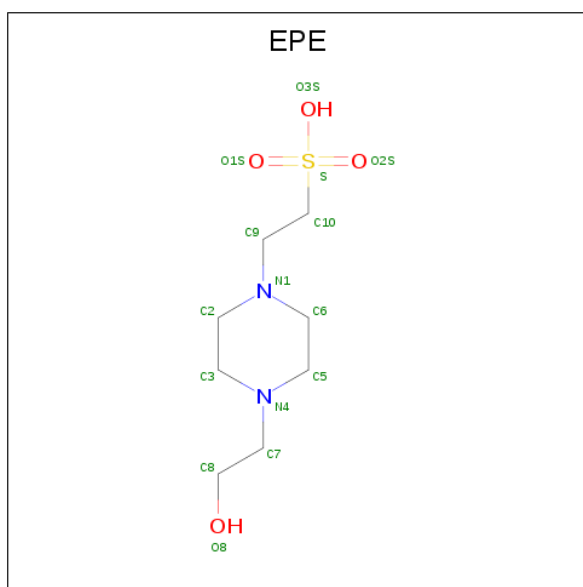
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	D	1	Total	C	N	O	S	0	0
			15	8	2	4	1		
2	F	1	Total	C	N	O	S	0	0
			15	8	2	4	1		
2	I	1	Total	C	N	O	S	0	0
			15	8	2	4	1		

- Molecule 3 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Ca	0	0
			1	1		
3	I	1	Total	Ca	0	0
			1	1		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	14	Total	O	0	0
			14	14		
4	C	11	Total	O	0	0
			11	11		
4	D	12	Total	O	0	0
			12	12		
4	E	16	Total	O	0	0
			16	16		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	F	16	Total 16	O 16	0	0
4	G	15	Total 15	O 15	0	0
4	H	13	Total 13	O 13	0	0
4	I	15	Total 15	O 15	0	0
4	J	20	Total 20	O 20	0	0
4	A	10	Total 10	O 10	0	0

3 Residue-property plots ⓘ

These plots are drawn for all protein, RNA and DNA 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.
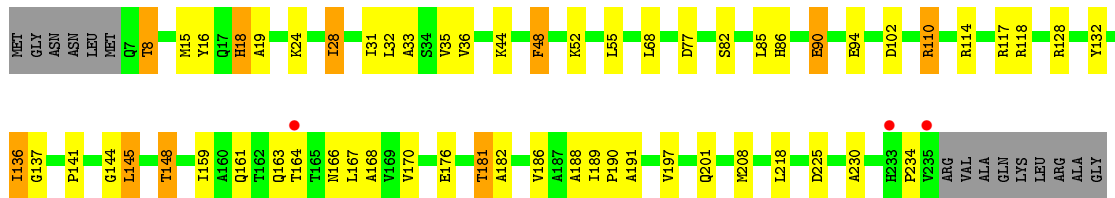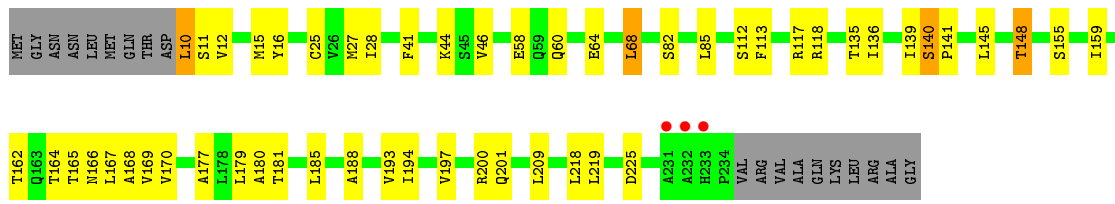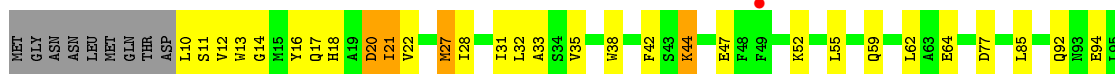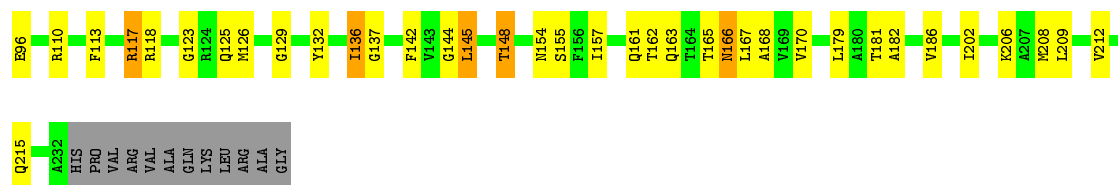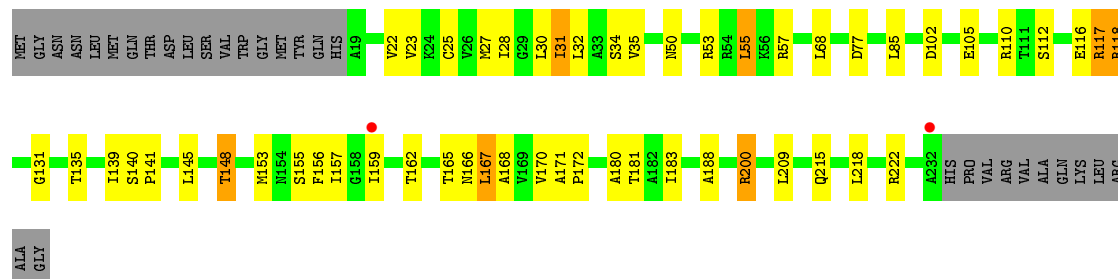
- Molecule 1: Biopolymer transport protein ExbB

Chain B:

- Molecule 1: Biopolymer transport protein ExbB

Chain C:

- Molecule 1: Biopolymer transport protein ExbB

Chain D:

- Molecule 1: Biopolymer transport protein ExbB

Chain E:

MET GLY ASN ASN LEU MET GLN THR ASP LEU SER VAL TRP GLY MET TYR GLN HIS A19 D20 I21 V22 V23 M27 I28 I31 L32 A33 S34 V35 V36 T37 F41 S45 L55 K56 R57 D73 D77 S80 L85 H86 R110 T111 S112 N130 I139

L145 T148 S155 I159 A160 Q161 T162 Q163 T164 T165 N166 L167 A168 V169 V170 A171 P172 G173 I174 A175 E176 A177 L178 L179 A180 T181 I189 P190 Y195 R200 K206 A207 M208 L209 G210 D211 Q215 L218 D225 L226 E227 A232 H233 P234 VAL ARG VAL ALA GLN

LYS LEU ARG ALA GLY

• Molecule 1: Biopolymer transport protein ExbB

Chain F:
3%
71%   18%   •   9%

MET GLY ASN ASN LEU MET GLN THR ASP SER LEU V12 W13 G14 M15 Y16 Q17 H18 A19 D20 I21 V22 V23 K24 C25 V26 M27 I28 I31 L32 A33 S34 V35 V36 T37 E47 Q51 K52 R53 R54 R66 K81 E99 R110 R117 R118 G127 R128 G129 Y132

L133 A134 G137 A138 I139 F142 V143 G144 T148 V149 W150 S155 I159 A160 T165 N166 L167 A168 V169 V170 A171 P172 G173 L179 A188 V192 V193 I194 Y195 D211 L218 R222 D225 P234 VAL ARG VAL ALA GLN LYS LEU ARG ALA GLY

• Molecule 1: Biopolymer transport protein ExbB

Chain G:
%
70%   20%   •   6%

MET GLY ASN ASN LEU MET Q7 T8 M15 Y16 Q17 H18 A19 K24 I28 I31 L32 A33 S34 V35 V36 K44 F48 K52 L55 L68 D77 S82 L85 H86 E90 E94 D102 R110 R114 R117 R118 R128 Y132

I136 G137 P141 G144 L145 T148 I159 A160 Q161 T162 Q163 T164 T165 N166 L167 A168 V169 V170 E176 T181 A182 V186 A187 A188 I189 P190 A191 V197 Q201 M208 L218 D225 A230 H233 P234 V235 ARG VAL ALA GLN LYS LEU ARG ALA GLY

• Molecule 1: Biopolymer transport protein ExbB

Chain H:
%
70%   20%   •   8%

MET GLY ASN ASN LEU MET GLN THR ASP L10 S11 V12 M15 Y16 C25 V26 M27 I28 F41 K44 S45 V46 E58 Q59 Q60 E64 L68 S82 L85 S112 F113 R117 R118 T135 I136 I139 S140 P141 L145 T148 S155 I159

T162 Q163 T164 T165 N166 L167 A168 V169 V170 A177 L178 L179 A180 T181 L185 A188 V193 I194 V197 R200 Q201 L209 L218 L219 D225 A231 A232 H233 P234 VAL ARG VAL ALA GLN LYS LEU ARG ALA GLY

• Molecule 1: Biopolymer transport protein ExbB

Chain I:
64%   24%   •   9%

MET GLY ASN ASN LEU MET GLN THR ASP L10 S11 V12 W13 G14 M15 Y16 Q17 H18 A19 D20 I21 V22 M27 I28 I31 L32 A33 S34 V35 W38 F42 S43 K44 E47 F48 F49 K52 L55 Q59 L62 A63 E64 D77 L85 Q92 N93 E94 L95
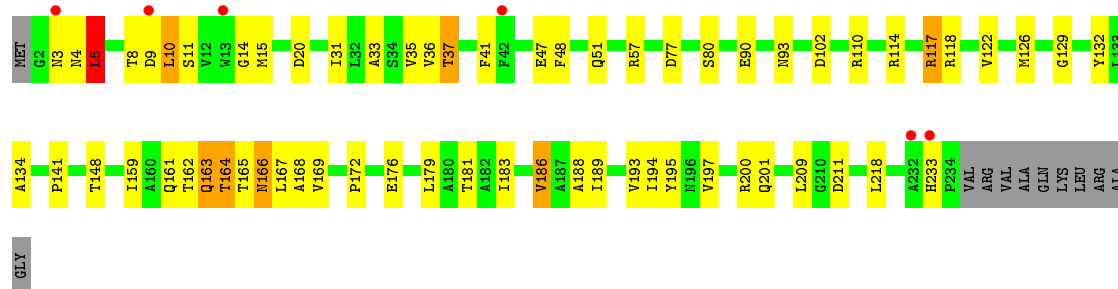
- Molecule 1: Biopolymer transport protein ExbB

- Molecule 1: Biopolymer transport protein ExbB

4   Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	137.17Å 104.78Å 149.36Å 90.00° 91.77° 90.00°	Depositor
Resolution (Å)	46.00 – 2.60 49.76 – 2.58	Depositor EDS
% Data completeness (in resolution range)	94.4 (46.00-2.60) 89.3 (49.76-2.58)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.12	Depositor
$<I/\sigma(I)>$ [1]	1.08 (at 2.58Å)	Xtriage
Refinement program	PHENIX (1.10_2142: ???)	Depositor
R, R_{free}	0.211 , 0.258 0.210 , 0.258	Depositor DCC
R_{free} test set	2008 reflections (1.59%)	wwPDB-VP
Wilson B-factor (Å^2)	55.7	Xtriage
Anisotropy	0.185	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.30 , 59.7	EDS
L-test for twinning[2]	$<|L|> = 0.49, <L^2> = 0.32$	Xtriage
Estimated twinning fraction	0.000 for h,-k,-l	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	16861	wwPDB-VP
Average B, all atoms (Å^2)	79.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.96% 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 (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: CA, EPE, MLY

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	0.47	0/1764	0.63	0/2392
1	B	0.44	0/1707	0.68	0/2315
1	C	0.44	0/1661	0.61	0/2249
1	D	0.50	0/1625	0.62	0/2200
1	E	0.44	0/1619	0.64	2/2195 (0.1%)
1	F	0.48	0/1662	0.62	1/2253 (0.0%)
1	G	0.46	0/1747	0.66	1/2370 (0.0%)
1	H	0.46	0/1715	0.63	0/2324
1	I	0.48	0/1690	0.64	0/2289
1	J	0.52	0/1605	0.68	0/2174
All	All	0.47	0/16795	0.64	4/22761 (0.0%)

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
1	C	0	2
1	D	0	1
1	E	0	1
1	G	0	3
All	All	0	8

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	E	167	LEU	C-N-CA	6.74	138.55	121.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	E	77	ASP	C-N-CA	6.27	137.37	121.70
1	F	110	ARG	NE-CZ-NH2	-5.74	117.43	120.30
1	G	110	ARG	NE-CZ-NH2	-5.45	117.58	120.30

There are no chirality outliers.

5 of 8 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	C	17	GLN	Peptide
1	C	18	HIS	Peptide
1	D	162	THR	Peptide
1	E	167	LEU	Peptide
1	G	161	GLN	Peptide

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	1749	0	1759	45	0
1	B	1692	0	1714	40	0
1	C	1651	0	1679	28	0
1	D	1615	0	1651	36	0
1	E	1609	0	1636	40	0
1	F	1651	0	1663	41	0
1	G	1731	0	1734	41	0
1	H	1700	0	1729	30	0
1	I	1678	0	1708	53	0
1	J	1596	0	1630	42	0
2	D	15	0	17	0	0
2	F	15	0	17	1	0
2	I	15	0	17	1	0
3	A	1	0	0	0	0
3	I	1	0	0	0	0
4	A	10	0	0	0	0
4	B	14	0	0	4	0
4	C	11	0	0	0	0
4	D	12	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	E	16	0	0	0	0
4	F	16	0	0	1	0
4	G	15	0	0	1	0
4	H	13	0	0	1	0
4	I	15	0	0	1	0
4	J	20	0	0	0	0
All	All	16861	0	16954	348	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.

The worst 5 of 348 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:B:117:ARG:NH1	1:C:211:ASP:OD1	1.88	1.06
1:H:136:ILE:O	1:H:140:SER:HB3	1.68	0.93
1:B:90:GLU:HG3	1:B:118:ARG:HH22	1.33	0.92
1:C:196:ASN:HB3	1:C:200:ARG:HH11	1.39	0.87
1:A:141:PRO:HD3	1:A:188:ALA:HB2	1.54	0.87

There are no symmetry-related clashes.

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	230/244 (94%)	216 (94%)	12 (5%)	2 (1%)	17	35
1	B	222/244 (91%)	215 (97%)	7 (3%)	0	100	100
1	C	219/244 (90%)	217 (99%)	2 (1%)	0	100	100
1	D	212/244 (87%)	206 (97%)	6 (3%)	0	100	100
1	E	213/244 (87%)	206 (97%)	7 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	F	220/244 (90%)	214 (97%)	6 (3%)	0	100	100
1	G	228/244 (93%)	222 (97%)	6 (3%)	0	100	100
1	H	222/244 (91%)	214 (96%)	7 (3%)	1 (0%)	29	52
1	I	220/244 (90%)	215 (98%)	3 (1%)	2 (1%)	17	35
1	J	211/244 (86%)	207 (98%)	4 (2%)	0	100	100
All	All	2197/2440 (90%)	2132 (97%)	60 (3%)	5 (0%)	47	71

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	I	12	VAL
1	A	168	ALA
1	H	68	LEU
1	I	21	ILE
1	A	166	ASN

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	176/189 (93%)	161 (92%)	15 (8%)	10	21
1	B	171/189 (90%)	156 (91%)	15 (9%)	10	19
1	C	166/189 (88%)	149 (90%)	17 (10%)	7	14
1	D	164/189 (87%)	147 (90%)	17 (10%)	7	13
1	E	162/189 (86%)	140 (86%)	22 (14%)	3	6
1	F	163/189 (86%)	155 (95%)	8 (5%)	25	48
1	G	173/189 (92%)	159 (92%)	14 (8%)	11	23
1	H	173/189 (92%)	156 (90%)	17 (10%)	8	15
1	I	170/189 (90%)	156 (92%)	14 (8%)	11	22
1	J	160/189 (85%)	142 (89%)	18 (11%)	6	10

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	1678/1890 (89%)	1521 (91%)	157 (9%)	8 17

5 of 157 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	F	22	VAL
1	G	102	ASP
1	A	37	THR
1	F	37	THR
1	G	8	THR

Some 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)

10 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	MLY	F	108	1	9,10,11	0.66	0	6,11,13	0.82	0
1	MLY	D	108	1	9,10,11	0.81	0	6,11,13	0.77	0
1	MLY	I	108	1	9,10,11	0.77	0	6,11,13	0.66	0
1	MLY	G	108	1	9,10,11	0.81	0	6,11,13	0.79	0
1	MLY	A	108	1	9,10,11	0.60	0	6,11,13	0.82	0
1	MLY	E	108	1	9,10,11	0.82	0	6,11,13	0.81	0
1	MLY	C	108	1	9,10,11	0.88	0	6,11,13	0.80	0
1	MLY	J	108	1	9,10,11	0.68	0	6,11,13	0.74	0
1	MLY	H	108	1	9,10,11	0.94	0	6,11,13	0.97	0
1	MLY	B	108	1	9,10,11	0.79	0	6,11,13	0.83	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	MLY	F	108	1	-	1/8/9/11	-
1	MLY	D	108	1	-	<mark>2/8/9/11</mark>	-
1	MLY	I	108	1	-	0/8/9/11	-
1	MLY	G	108	1	-	0/8/9/11	-
1	MLY	A	108	1	-	0/8/9/11	-
1	MLY	E	108	1	-	1/8/9/11	-
1	MLY	C	108	1	-	1/8/9/11	-
1	MLY	J	108	1	-	0/8/9/11	-
1	MLY	H	108	1	-	1/8/9/11	-
1	MLY	B	108	1	-	1/8/9/11	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

5 of 7 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	D	108	MLY	CD-CE-NZ-CH2
1	E	108	MLY	CD-CE-NZ-CH2
1	F	108	MLY	CD-CE-NZ-CH2
1	C	108	MLY	CD-CE-NZ-CH2
1	D	108	MLY	CD-CE-NZ-CH1

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates (i)

There are no carbohydrates in this entry.

5.6 Ligand geometry (i)

Of 5 ligands modelled in this entry, 2 are monoatomic - leaving 3 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	#$|Z| > 2$
2	EPE	D	301	-	15,15,15	0.95	1 (6%)	18,20,20	1.86	7 (38%)
2	EPE	F	301	-	15,15,15	0.93	1 (6%)	18,20,20	2.17	5 (27%)
2	EPE	I	302	-	15,15,15	0.91	1 (6%)	18,20,20	2.03	7 (38%)

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
2	EPE	D	301	-	-	3/9/19/19	0/1/1/1
2	EPE	F	301	-	-	4/9/19/19	0/1/1/1
2	EPE	I	302	-	-	4/9/19/19	0/1/1/1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	F	301	EPE	C10-S	3.27	1.82	1.77
2	I	302	EPE	C10-S	3.11	1.81	1.77
2	D	301	EPE	C10-S	2.89	1.81	1.77

The worst 5 of 19 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	F	301	EPE	C5-N4-C3	5.67	121.58	108.83
2	I	302	EPE	C7-N4-C5	4.09	121.69	111.23
2	I	302	EPE	C5-N4-C3	4.08	118.01	108.83
2	F	301	EPE	O1S-S-C10	3.93	111.64	106.92
2	D	301	EPE	C5-N4-C3	3.69	117.13	108.83

There are no chirality outliers.

5 of 11 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	D	301	EPE	C9-C10-S-O2S
2	D	301	EPE	C9-C10-S-O3S
2	F	301	EPE	C8-C7-N4-C5
2	F	301	EPE	C9-C10-S-O2S
2	F	301	EPE	C9-C10-S-O3S

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	F	301	EPE	1	0
2	I	302	EPE	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 (i)

6.1 Protein, DNA and RNA chains (i)

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	232/244 (95%)	-0.11	6 (2%)	56	50	42, 74, 134, 191	0
1	B	224/244 (91%)	-0.31	1 (0%)	92	91	46, 76, 121, 164	0
1	C	221/244 (90%)	-0.26	1 (0%)	91	89	42, 77, 115, 160	0
1	D	214/244 (87%)	-0.21	2 (0%)	84	82	41, 68, 128, 200	0
1	E	215/244 (88%)	-0.12	5 (2%)	60	54	42, 76, 134, 164	0
1	F	222/244 (90%)	-0.13	7 (3%)	47	40	43, 73, 147, 218	0
1	G	228/244 (93%)	-0.27	3 (1%)	77	73	44, 76, 132, 214	0
1	H	224/244 (91%)	-0.36	3 (1%)	77	73	46, 75, 116, 197	0
1	I	222/244 (90%)	-0.32	1 (0%)	91	89	45, 77, 123, 155	0
1	J	213/244 (87%)	-0.32	2 (0%)	84	82	40, 70, 142, 181	0
All	All	2215/2440 (90%)	-0.24	31 (1%)	75	71	40, 75, 132, 218	0

The worst 5 of 31 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	13	TRP	5.8
1	J	232	ALA	5.8
1	A	3	ASN	4.8
1	F	12	VAL	4.2
1	E	234	PRO	4.1

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	MLY	C	108	11/12	0.97	0.14	38,44,60,61	0
1	MLY	B	108	11/12	0.97	0.17	38,43,50,53	0
1	MLY	I	108	11/12	0.98	0.11	33,39,65,67	0
1	MLY	G	108	11/12	0.98	0.12	32,43,52,53	0
1	MLY	E	108	11/12	0.98	0.19	52,56,68,73	0
1	MLY	F	108	11/12	0.98	0.16	44,49,62,66	0
1	MLY	J	108	11/12	0.98	0.13	31,40,59,65	0
1	MLY	D	108	11/12	0.98	0.14	36,40,49,56	0
1	MLY	H	108	11/12	0.99	0.11	35,45,57,60	0
1	MLY	A	108	11/12	0.99	0.13	33,37,55,65	0

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. 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	EPE	D	301	15/15	0.76	0.15	95,119,159,163	0
3	CA	I	301	1/1	0.81	0.16	104,104,104,104	0
2	EPE	I	302	15/15	0.82	0.14	85,127,167,169	0
2	EPE	F	301	15/15	0.86	0.29	88,114,157,161	0
3	CA	A	301	1/1	0.97	0.16	97,97,97,97	0

6.5 Other polymers (i)

There are no such residues in this entry.