



Full wwPDB X-ray Structure Validation Report ⓘ

Jun 23, 2024 – 07:16 AM EDT

PDB ID : 6GWJ
Title : Human OSGEP / LAGE3 / GON7 complex
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Deposited on : 2018-06-25
Resolution : 1.95 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	2.37.1
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)	:	2.37.1

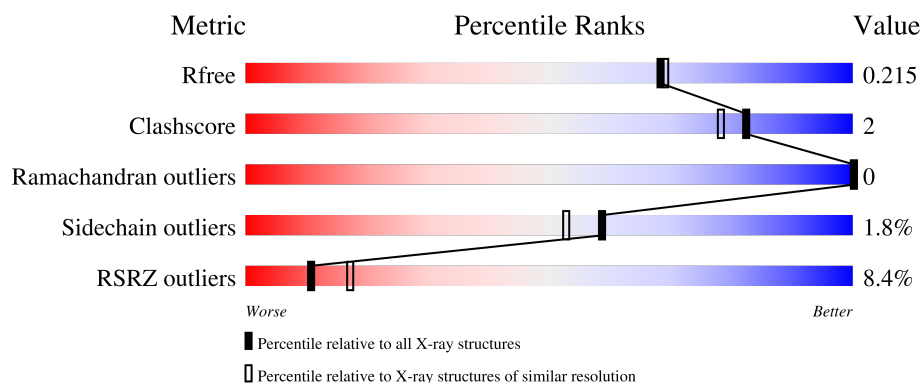
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.95 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	2580 (1.96-1.96)
Clashscore	141614	2705 (1.96-1.96)
Ramachandran outliers	138981	2678 (1.96-1.96)
Sidechain outliers	138945	2678 (1.96-1.96)
RSRZ outliers	127900	2539 (1.96-1.96)

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	B	143	
2	D	106	
3	K	335	

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	GOL	B	201	-	-	-	X
4	GOL	K	405	-	-	X	X
5	TRS	K	401	-	X	-	-

2 Entry composition

There are 8 unique types of molecules in this entry. The entry contains 3845 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 EKC/KEOPS complex subunit LAGE3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	B	84	Total	C	N	O	S	0	0	0
			662	425	121	114	2			

- Molecule 2 is a protein called EKC/KEOPS complex subunit GON7.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	D	48	Total	C	N	O	S	0	0	0
			361	228	58	72	3			

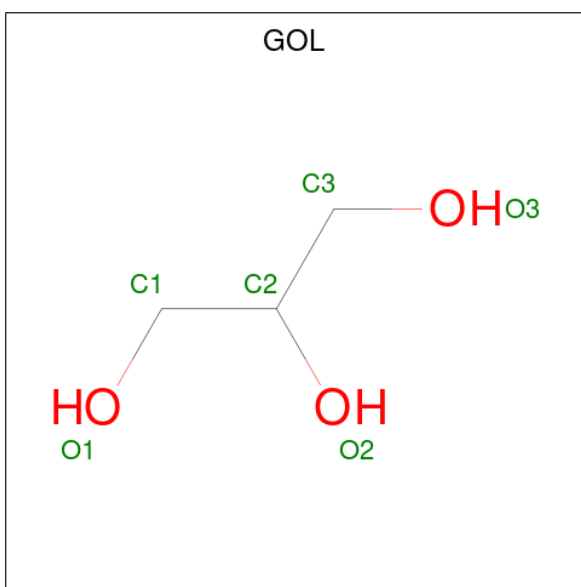
There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	101	HIS	-	expression tag	UNP Q9BXV9
D	102	HIS	-	expression tag	UNP Q9BXV9
D	103	HIS	-	expression tag	UNP Q9BXV9
D	104	HIS	-	expression tag	UNP Q9BXV9
D	105	HIS	-	expression tag	UNP Q9BXV9
D	106	HIS	-	expression tag	UNP Q9BXV9

- Molecule 3 is a protein called Probable tRNA N6-adenosine threonylcarbamoyltransferase.

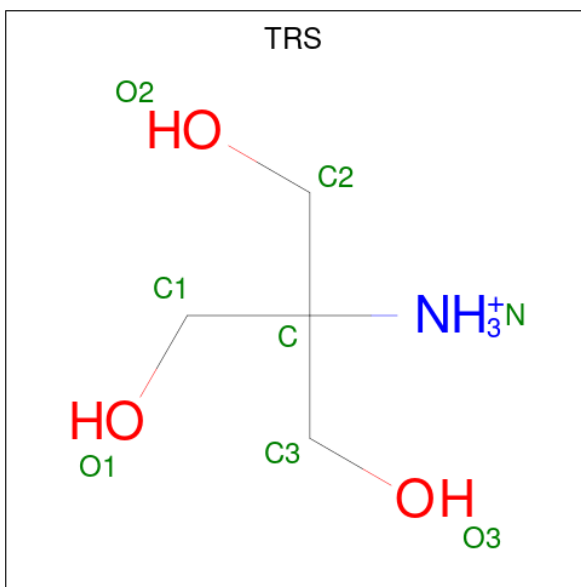
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	K	334	Total	C	N	O	S	0	0	0
			2539	1589	452	477	21			

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



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

- Molecule 5 is 2-AMINO-2-HYDROXYMETHYL-PROPANE-1,3-DIOL (three-letter code: TRS) (formula: $C_4H_{12}NO_3$).

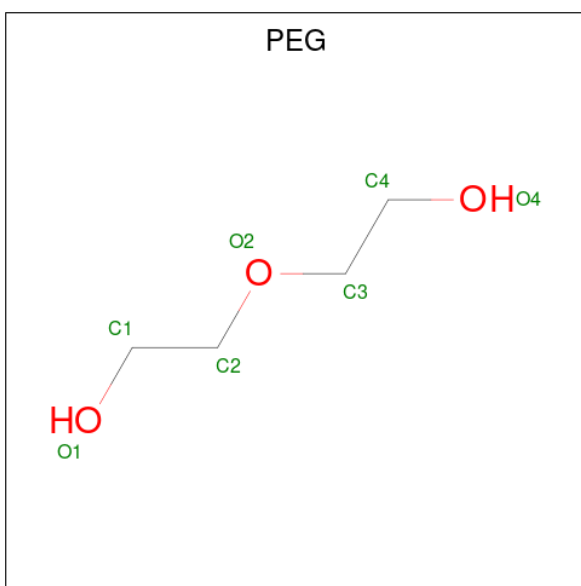


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	K	1	Total	C	N	O	0	0
			8	4	1	3		

- Molecule 6 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	K	1	Total	Mg	0	0
			1	1		

- Molecule 7 is DI(HYDROXYETHYL)ETHER (three-letter code: PEG) (formula: C₄H₁₀O₃).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	K	1	Total C O 7 4 3	0	0
7	K	1	Total C O 7 4 3	0	0
7	K	1	Total C O 7 4 3	0	0

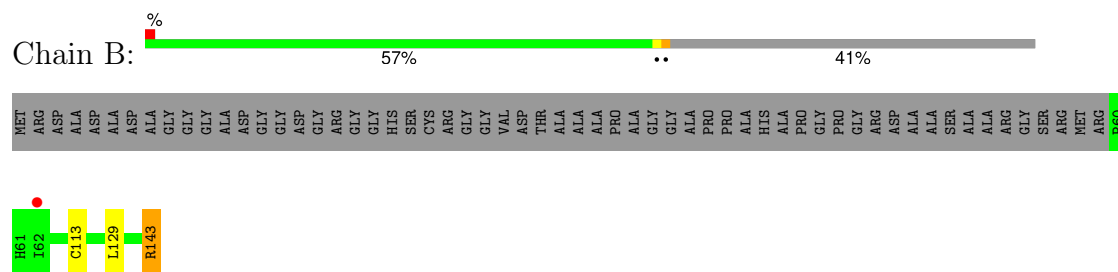
- Molecule 8 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	B	52	Total O 52 52	0	0
8	D	19	Total O 19 19	0	0
8	K	152	Total O 152 152	0	0

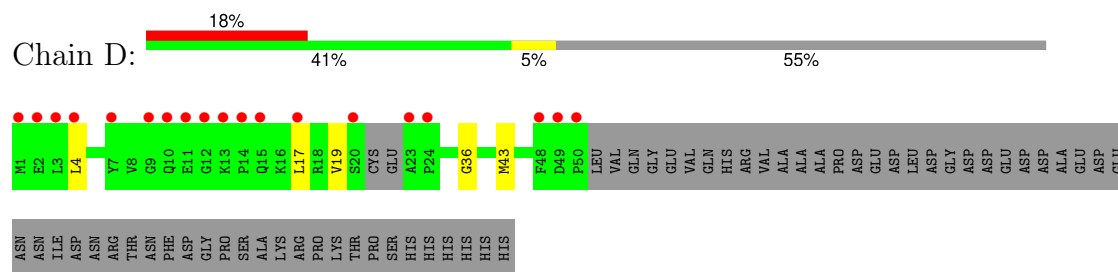
3 Residue-property plots [i](#)

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.

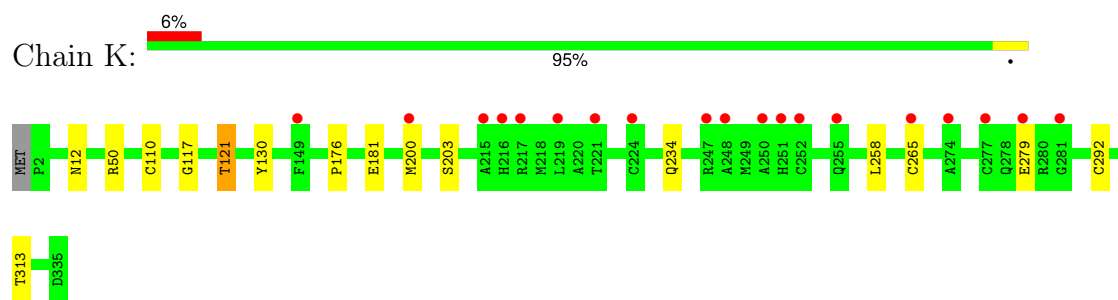
- Molecule 1: EKC/KEOPS complex subunit LAGE3



- Molecule 2: EKC/KEOPS complex subunit GON7



- Molecule 3: Probable tRNA N6-adenosine threonylcarbamoyltransferase



4 Data and refinement statistics

Property	Value	Source
Space group	P 43	Depositor
Cell constants a, b, c, α , β , γ	105.12Å 105.12Å 51.35Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	46.14 – 1.95 46.14 – 1.95	Depositor EDS
% Data completeness (in resolution range)	100.0 (46.14-1.95) 99.7 (46.14-1.95)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.36 (at 1.95Å)	Xtriage
Refinement program	BUSTER 2.10.3	Depositor
R, R_{free}	0.186 , 0.217 0.185 , 0.215	Depositor DCC
R_{free} test set	2068 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	43.2	Xtriage
Anisotropy	0.032	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 50.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.024 for h,-k,-l	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	3845	wwPDB-VP
Average B, all atoms (Å ²)	54.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.99% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: PEG, TRS, GOL, 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	B	0.48	0/678	0.59	0/923
2	D	0.44	0/366	0.58	0/490
3	K	0.50	0/2585	0.62	0/3502
All	All	0.49	0/3629	0.61	0/4915

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	B	662	0	687	2	0
2	D	361	0	357	2	0
3	K	2539	0	2531	15	0
4	B	6	0	7	0	0
4	D	6	0	8	0	0
4	K	18	0	24	6	0
5	K	8	0	12	0	0
6	K	1	0	0	0	0
7	K	21	0	29	2	0
8	B	52	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
8	D	19	0	0	0	0
8	K	152	0	0	0	0
All	All	3845	0	3655	18	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 2.

All (18) 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)
3:K:110:CYS:SG	3:K:130:TYR:HE2	1.51	1.34
3:K:110:CYS:SG	3:K:130:TYR:CE2	2.31	1.16
3:K:12:ASN:HD21	4:K:405:GOL:H2	1.50	0.77
3:K:176:PRO:CD	4:K:405:GOL:H31	2.34	0.58
1:B:129:LEU:HD22	3:K:50:ARG:HG2	1.87	0.55
3:K:110:CYS:SG	3:K:130:TYR:CD2	2.98	0.54
2:D:19:VAL:HG11	2:D:36:GLY:HA2	1.90	0.54
3:K:181:GLU:HA	3:K:234:GLN:HE22	1.75	0.52
3:K:176:PRO:HD3	4:K:405:GOL:H31	1.92	0.51
3:K:176:PRO:HD2	4:K:405:GOL:H31	1.93	0.50
1:B:143:ARG:HH21	7:K:407:PEG:H32	1.76	0.50
2:D:17:LEU:HD22	2:D:43:MET:HB3	1.93	0.49
3:K:265:CYS:HB2	3:K:292:CYS:SG	2.54	0.47
3:K:313:THR:OG1	7:K:408:PEG:H32	2.16	0.45
3:K:121:THR:HG21	3:K:258:LEU:HD13	1.98	0.45
3:K:117:GLY:O	3:K:121:THR:HG22	2.18	0.44
3:K:176:PRO:HD2	4:K:405:GOL:H11	2.00	0.43
3:K:12:ASN:HD21	4:K:405:GOL:C2	2.25	0.41

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	B	82/143 (57%)	81 (99%)	1 (1%)	0	100	100
2	D	44/106 (42%)	44 (100%)	0	0	100	100
3	K	332/335 (99%)	321 (97%)	11 (3%)	0	100	100
All	All	458/584 (78%)	446 (97%)	12 (3%)	0	100	100

There are no Ramachandran outliers to report.

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	B	75/104 (72%)	73 (97%)	2 (3%)	44	34
2	D	39/89 (44%)	38 (97%)	1 (3%)	46	36
3	K	271/272 (100%)	267 (98%)	4 (2%)	65	60
All	All	385/465 (83%)	378 (98%)	7 (2%)	59	53

All (7) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	113	CYS
1	B	143	ARG
2	D	4	LEU
3	K	121	THR
3	K	200	MET
3	K	203	SER
3	K	279	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	61	HIS
1	B	122	ASN
3	K	58	GLN

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Mol	Chain	Res	Type
3	K	182	GLN
3	K	234	GLN

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 10 ligands modelled in this entry, 1 is monoatomic - leaving 9 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	$\# Z > 2$
4	GOL	K	404	-	5,5,5	1.12	0	5,5,5	0.91	0
4	GOL	B	201	-	5,5,5	1.15	0	5,5,5	1.28	0
4	GOL	D	201	-	5,5,5	0.94	0	5,5,5	0.94	0
4	GOL	K	405	-	5,5,5	0.99	0	5,5,5	0.98	0
5	TRS	K	401	-	7,7,7	1.86	2 (28%)	9,9,9	1.71	2 (22%)
4	GOL	K	403	-	5,5,5	0.87	0	5,5,5	0.98	0
7	PEG	K	406	-	6,6,6	0.90	0	5,5,5	0.48	0
7	PEG	K	408	-	6,6,6	0.73	0	5,5,5	0.52	0
7	PEG	K	407	-	6,6,6	0.74	0	5,5,5	0.55	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
4	GOL	K	404	-	-	0/4/4/4	-
4	GOL	B	201	-	-	4/4/4/4	-
4	GOL	D	201	-	-	0/4/4/4	-
4	GOL	K	405	-	-	2/4/4/4	-
5	TRS	K	401	-	-	9/9/9/9	-
4	GOL	K	403	-	-	2/4/4/4	-
7	PEG	K	406	-	-	0/4/4/4	-
7	PEG	K	408	-	-	3/4/4/4	-
7	PEG	K	407	-	-	2/4/4/4	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	K	401	TRS	C3-C	2.97	1.61	1.53
5	K	401	TRS	C2-C	2.54	1.59	1.53

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	K	401	TRS	C3-C-C2	3.77	120.69	110.66
5	K	401	TRS	C3-C-N	-2.19	102.58	108.17

There are no chirality outliers.

All (22) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	B	201	GOL	O1-C1-C2-C3
4	B	201	GOL	C1-C2-C3-O3
4	K	403	GOL	O1-C1-C2-C3
5	K	401	TRS	C2-C-C1-O1
5	K	401	TRS	C3-C-C1-O1
5	K	401	TRS	N-C-C1-O1
5	K	401	TRS	C3-C-C2-O2
5	K	401	TRS	N-C-C2-O2
5	K	401	TRS	C1-C-C3-O3
5	K	401	TRS	C2-C-C3-O3
5	K	401	TRS	N-C-C3-O3

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Mol	Chain	Res	Type	Atoms
4	B	201	GOL	O1-C1-C2-O2
4	B	201	GOL	O2-C2-C3-O3
7	K	408	PEG	O1-C1-C2-O2
7	K	408	PEG	O2-C3-C4-O4
7	K	407	PEG	O2-C3-C4-O4
4	K	405	GOL	O2-C2-C3-O3
4	K	403	GOL	O1-C1-C2-O2
4	K	405	GOL	O1-C1-C2-O2
7	K	407	PEG	C1-C2-O2-C3
7	K	408	PEG	C4-C3-O2-C2
5	K	401	TRS	C1-C-C2-O2

There are no ring outliers.

3 monomers are involved in 8 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	K	405	GOL	6	0
7	K	408	PEG	1	0
7	K	407	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	B	84/143 (58%)	0.23	1 (1%) 79 84	32, 47, 71, 88	0
2	D	48/106 (45%)	1.62	19 (39%) 0 0	37, 69, 98, 106	0
3	K	334/335 (99%)	0.41	19 (5%) 23 32	29, 50, 85, 108	0
All	All	466/584 (79%)	0.50	39 (8%) 11 17	29, 51, 88, 108	0

All (39) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	D	50	PRO	8.1
2	D	11	GLU	6.8
3	K	281	GLY	6.4
3	K	219	LEU	5.6
2	D	13	LYS	4.8
3	K	224	CYS	4.8
2	D	12	GLY	4.1
2	D	49	ASP	4.1
3	K	265	CYS	4.1
2	D	23	ALA	3.9
3	K	216	HIS	3.7
3	K	279	GLU	3.5
2	D	24	PRO	3.4
3	K	252	CYS	3.4
2	D	10	GLN	3.3
2	D	20	SER	3.0
3	K	250	ALA	2.9
2	D	1	MET	2.8
3	K	149	PHE	2.7
2	D	7	TYR	2.6
2	D	48	PHE	2.6
2	D	9	GLY	2.5
2	D	2	GLU	2.5

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Mol	Chain	Res	Type	RSRZ
3	K	248	ALA	2.5
3	K	251	HIS	2.5
2	D	15	GLN	2.4
3	K	221	THR	2.4
2	D	17	LEU	2.3
2	D	4	LEU	2.3
2	D	3	LEU	2.3
3	K	215	ALA	2.2
3	K	277	CYS	2.2
2	D	14	PRO	2.1
3	K	255	GLN	2.1
3	K	274	ALA	2.1
1	B	62	ILE	2.1
3	K	217	ARG	2.0
3	K	200	MET	2.0
3	K	247	ARG	2.0

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

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

6.3 Carbohydrates [i](#)

There are no 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
4	GOL	K	405	6/6	0.64	0.43	79,85,87,87	0
4	GOL	B	201	6/6	0.68	0.47	87,89,89,91	0
7	PEG	K	407	7/7	0.68	0.36	86,86,89,90	0
5	TRS	K	401	8/8	0.79	0.19	62,66,70,72	0
7	PEG	K	406	7/7	0.81	0.19	70,75,80,81	0
4	GOL	D	201	6/6	0.81	0.34	92,92,93,93	0
7	PEG	K	408	7/7	0.82	0.27	56,67,75,75	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	GOL	K	403	6/6	0.94	0.17	71,72,73,73	0
4	GOL	K	404	6/6	0.94	0.12	44,52,55,55	0
6	MG	K	402	1/1	0.94	0.09	68,68,68,68	0

6.5 Other polymers [i](#)

There are no such residues in this entry.