



Full wwPDB X-ray Structure Validation Report ⓘ

Sep 10, 2020 – 09:42 AM BST

PDB ID : 6RO0
Title : CRYSTAL STRUCTURE OF GENETICALLY DETOXIFIED PERTUSSIS TOXIN GDPT.
Authors : Bertrand, T.
Deposited on : 2019-05-10
Resolution : 2.13 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 : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.14.3.dev2
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) : 2.14.3.dev2

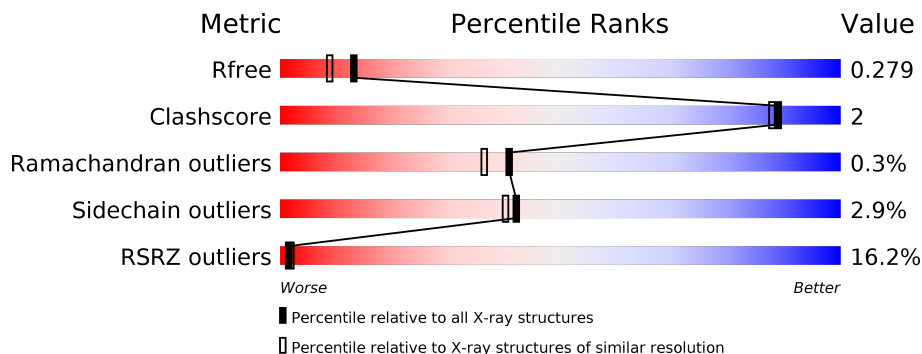
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.13 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	2523 (2.16-2.12)
Clashscore	141614	2653 (2.16-2.12)
Ramachandran outliers	138981	2618 (2.16-2.12)
Sidechain outliers	138945	2617 (2.16-2.12)
RSRZ outliers	127900	2485 (2.16-2.12)

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 $\leq 5\%$. 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	269	<div style="display: flex; align-items: center;"> <div style="width: 9%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 79%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 13%; height: 10px; background-color: grey;"></div> </div>
1	G	269	<div style="display: flex; align-items: center;"> <div style="width: 34%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 76%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 7%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 17%; height: 10px; background-color: grey;"></div> </div>
2	B	226	<div style="display: flex; align-items: center;"> <div style="width: 4%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 81%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 6%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 13%; height: 10px; background-color: grey;"></div> </div>
2	H	226	<div style="display: flex; align-items: center;"> <div style="width: 0%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 80%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 8%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 12%; height: 10px; background-color: grey;"></div> </div>
3	C	227	<div style="display: flex; align-items: center;"> <div style="width: 27%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 81%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 5%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 13%; height: 10px; background-color: grey;"></div> </div>
3	I	227	<div style="display: flex; align-items: center;"> <div style="width: 10%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 81%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 5%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 14%; height: 10px; background-color: grey;"></div> </div>

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Mol	Chain	Length	Quality of chain
4	D	152	<p>10% 69% 6% 28%</p>
4	E	152	<p>16% 66% 6% 28%</p>
4	J	152	<p>8% 66% 6% 28%</p>
4	K	152	<p>12% 67% 5% 28%</p>
5	F	133	<p>12% 62% 12% 26%</p>
5	L	133	<p>5% 60% 14% 26%</p>

2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 15156 atoms, of which 72 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 Pertussis toxin subunit 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	224	Total 1762	C 1092	N 316	O 348	S 6	0	0	0
1	G	222	Total 1744	C 1082	N 314	O 342	S 6	0	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	9	LYS	ARG	engineered mutation	UNP T1SR96
A	129	GLY	GLU	engineered mutation	UNP T1SR96
G	9	LYS	ARG	engineered mutation	UNP T1SR96
G	129	GLY	GLU	engineered mutation	UNP T1SR96

- Molecule 2 is a protein called Islet-activating protein S2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	197	Total 1529	C 966	N 261	O 293	S 9	0	0	0
2	H	199	Total 1542	C 973	N 263	O 297	S 9	0	0	0

- Molecule 3 is a protein called Islet-activating protein S3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	C	197	Total 1528	C 974	N 259	O 286	S 9	0	0	0
3	I	196	Total 1521	C 969	N 258	O 285	S 9	0	0	0

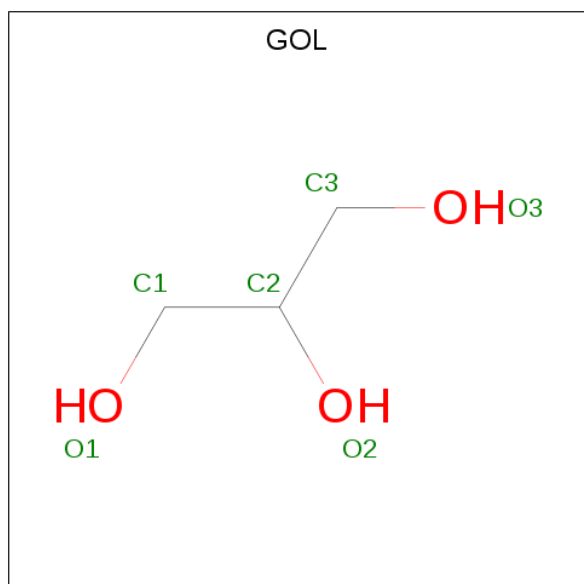
- Molecule 4 is a protein called Islet-activating protein S4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	D	110	Total	C	N	O	S	0	0	0
			838	536	143	147	12			
4	E	110	Total	C	N	O	S	0	0	0
			838	536	143	147	12			
4	J	110	Total	C	N	O	S	0	0	0
			838	536	143	147	12			
4	K	110	Total	C	N	O	S	0	0	0
			838	536	143	147	12			

- Molecule 5 is a protein called Pertussis toxin subunit 5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	F	98	Total	C	N	O	S	0	0	0
			764	489	125	144	6			
5	L	98	Total	C	N	O	S	0	0	0
			764	489	125	144	6			

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



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	A	1	Total	C	H	O	0	0
			14	3	8	3		
6	B	1	Total	C	H	O	0	0
			14	3	8	3		
6	B	1	Total	C	H	O	0	0
			14	3	8	3		
6	B	1	Total	C	H	O	0	0
			14	3	8	3		

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	D	1	Total	C	H	O	0	0
			14	3	8	3		
6	F	1	Total	C	H	O	0	0
			14	3	8	3		
6	H	1	Total	C	H	O	0	0
			14	3	8	3		
6	H	1	Total	C	H	O	0	0
			14	3	8	3		
6	J	1	Total	C	H	O	0	0
			14	3	8	3		

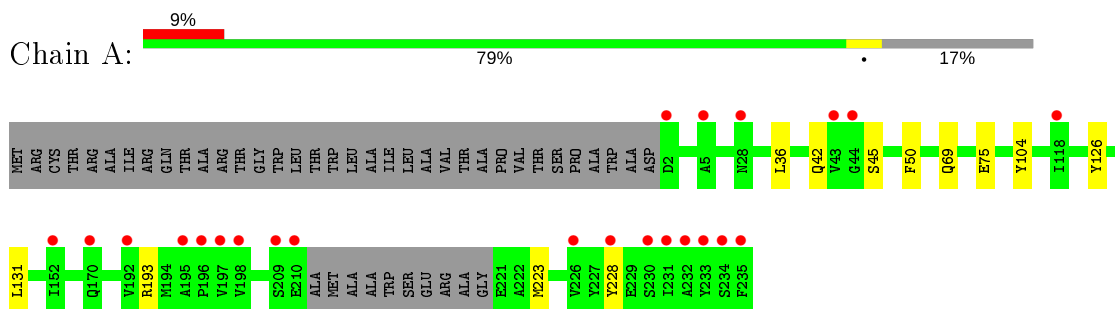
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	74	Total	O	0	0
			74	74		
7	B	101	Total	O	0	0
			101	101		
7	C	32	Total	O	0	0
			32	32		
7	D	30	Total	O	0	0
			30	30		
7	E	25	Total	O	0	0
			25	25		
7	F	40	Total	O	0	0
			40	40		
7	G	22	Total	O	0	0
			22	22		
7	H	86	Total	O	0	0
			86	86		
7	I	52	Total	O	0	0
			52	52		
7	J	25	Total	O	0	0
			25	25		
7	K	18	Total	O	0	0
			18	18		
7	L	19	Total	O	0	0
			19	19		

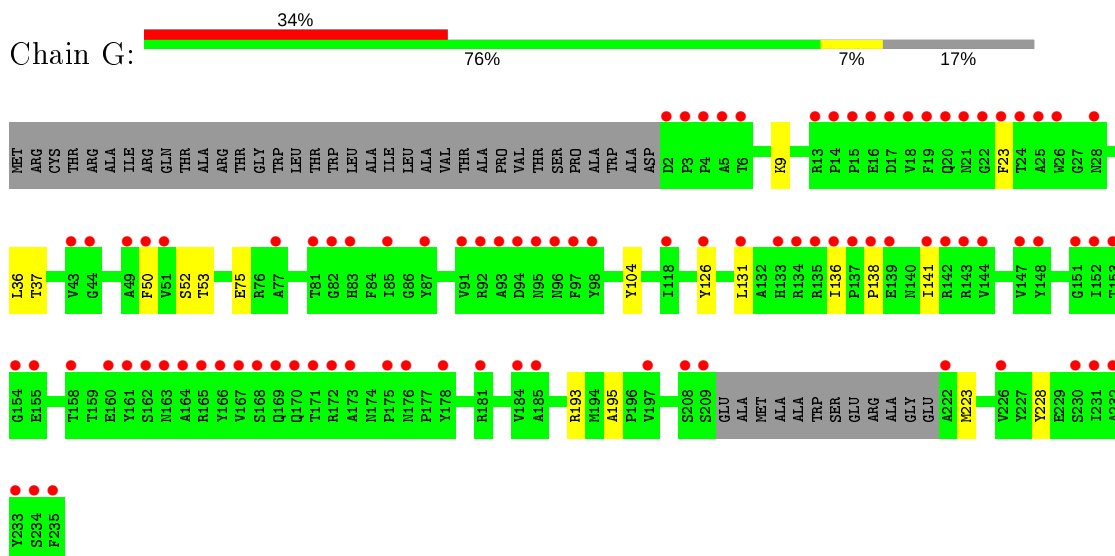
3 Residue-property plots [i](#)

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.

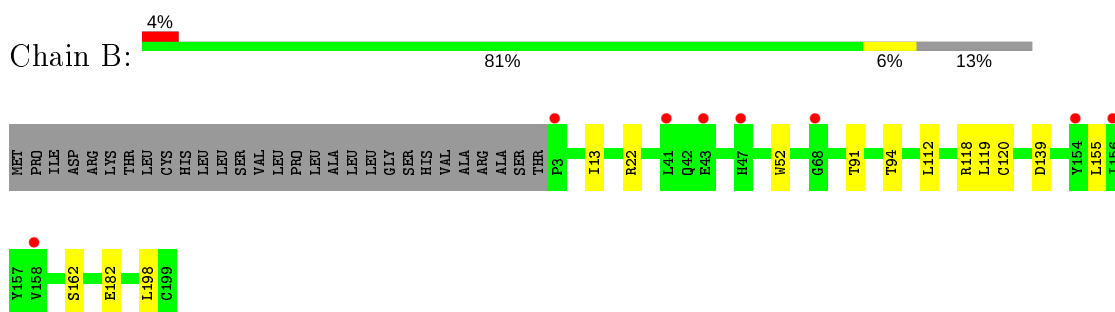
- Molecule 1: Pertussis toxin subunit 1



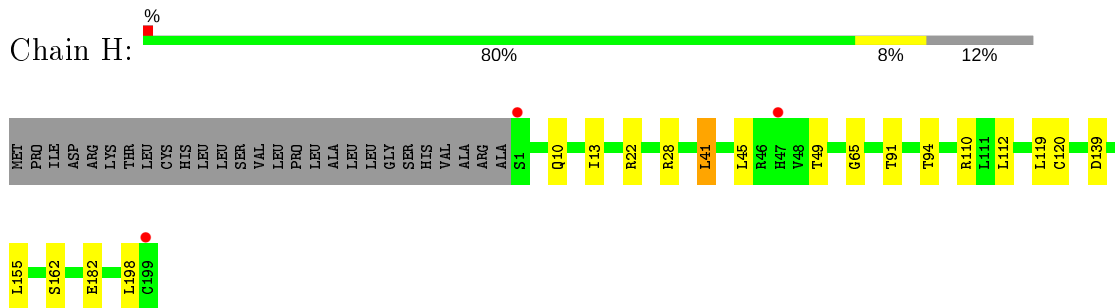
- Molecule 1: Pertussis toxin subunit 1



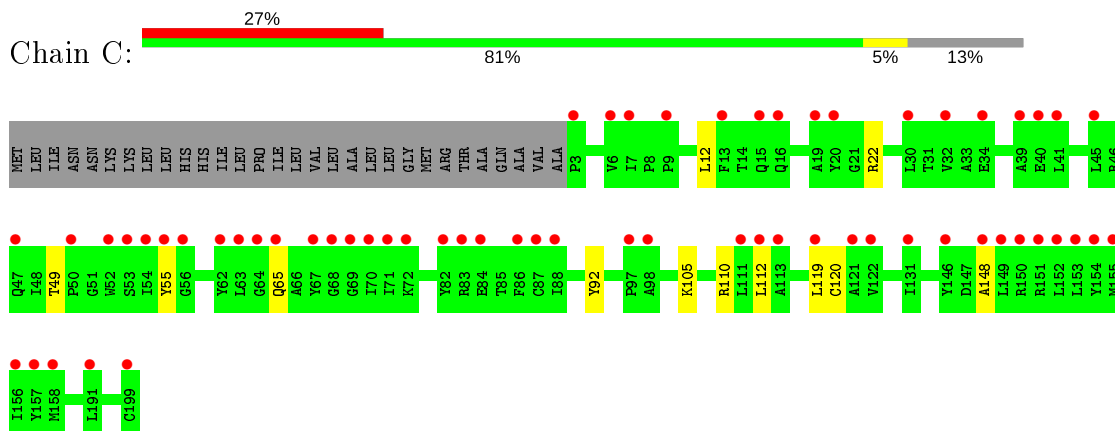
- Molecule 2: Islet-activating protein S2



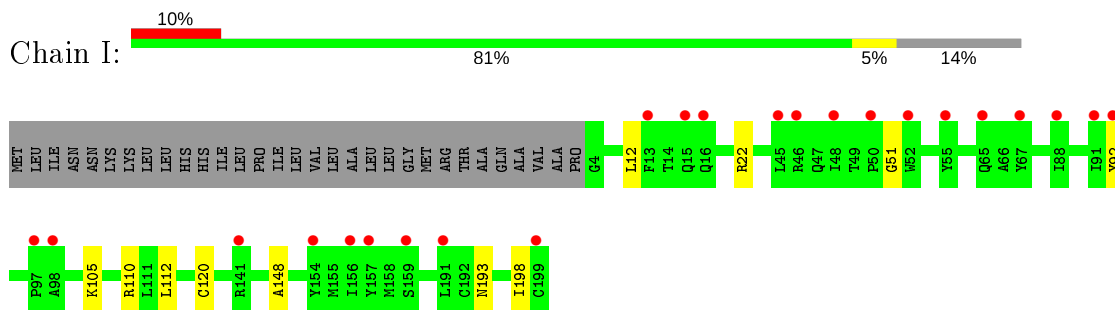
- Molecule 2: Islet-activating protein S2



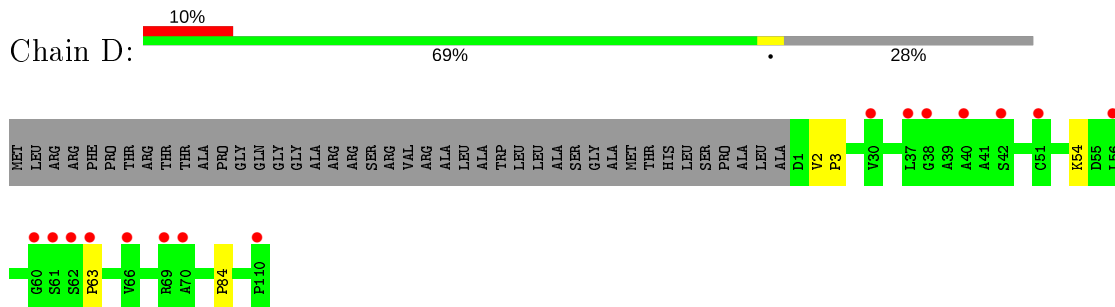
- Molecule 3: Islet-activating protein S3



- Molecule 3: Islet-activating protein S3

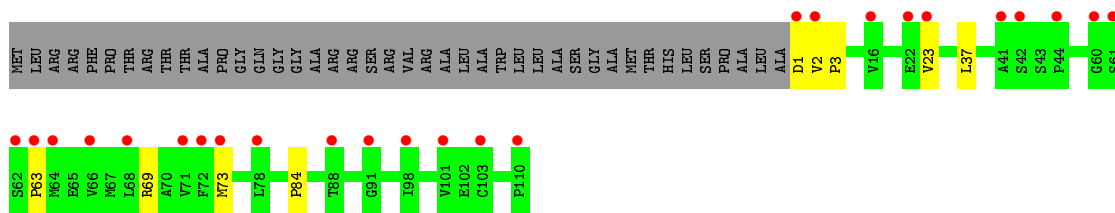


- Molecule 4: Islet-activating protein S4

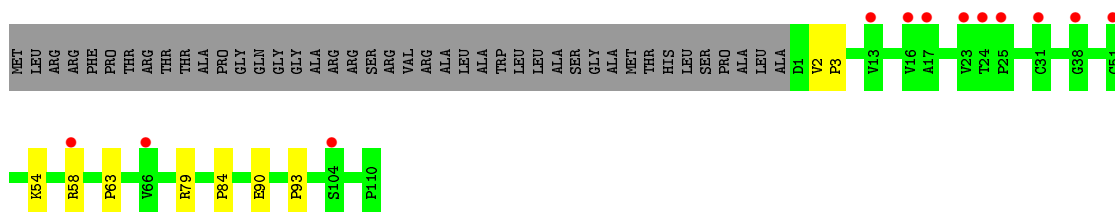


- Molecule 4: Islet-activating protein S4

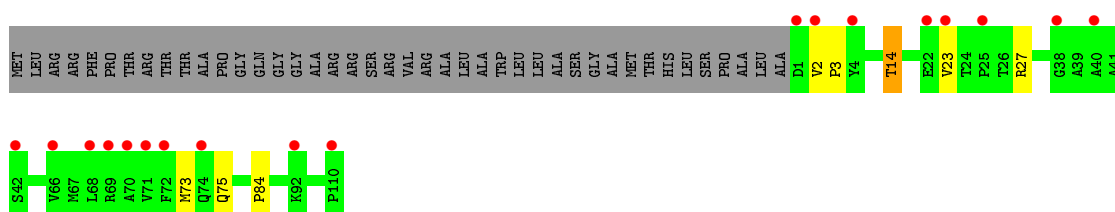




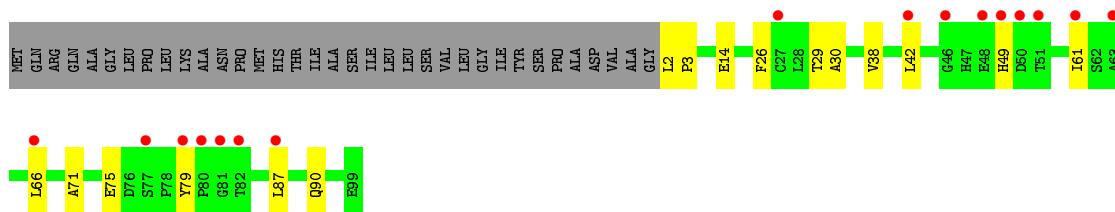
• Molecule 4: Islet-activating protein S4



• Molecule 4: Islet-activating protein S4



• Molecule 5: Pertussis toxin subunit 5



• Molecule 5: Pertussis toxin subunit 5



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	94.46Å 160.80Å 194.83Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	46.62 – 2.13 46.62 – 2.13	Depositor EDS
% Data completeness (in resolution range)	99.5 (46.62-2.13) 99.5 (46.62-2.13)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.51 (at 2.14Å)	Xtrriage
Refinement program	autoBUSTER 2.11.7	Depositor
R, R_{free}	0.240 , 0.260 0.255 , 0.279	Depositor DCC
R_{free} test set	8309 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å ²)	48.6	Xtrriage
Anisotropy	0.633	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 51.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	15156	wwPDB-VP
Average B, all atoms (Å ²)	64.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.38% 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: 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	0.35	0/1802	0.56	0/2447
1	G	0.35	0/1784	0.55	0/2423
2	B	0.36	0/1566	0.58	0/2126
2	H	0.36	0/1579	0.59	0/2145
3	C	0.37	0/1565	0.58	0/2126
3	I	0.37	0/1557	0.58	0/2115
4	D	0.38	0/856	0.61	0/1155
4	E	0.37	0/856	0.61	0/1155
4	J	0.38	0/856	0.61	0/1155
4	K	0.37	0/856	0.61	0/1155
5	F	0.36	0/782	0.64	0/1059
5	L	0.36	0/782	0.60	0/1059
All	All	0.36	0/14841	0.59	0/20120

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	1762	0	1652	5	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	G	1744	0	1640	7	0
2	B	1529	0	1481	4	0
2	H	1542	0	1495	8	0
3	C	1528	0	1492	5	0
3	I	1521	0	1484	4	0
4	D	838	0	874	4	0
4	E	838	0	874	6	0
4	J	838	0	874	8	0
4	K	838	0	874	5	0
5	F	764	0	747	7	0
5	L	764	0	747	8	0
6	A	6	8	8	0	0
6	B	18	24	24	0	0
6	D	6	8	8	0	0
6	F	6	8	8	0	0
6	H	12	16	16	0	0
6	J	6	8	8	1	0
7	A	74	0	0	0	0
7	B	101	0	0	0	0
7	C	32	0	0	0	0
7	D	30	0	0	0	0
7	E	25	0	0	0	0
7	F	40	0	0	0	0
7	G	22	0	0	0	0
7	H	86	0	0	0	0
7	I	52	0	0	0	0
7	J	25	0	0	0	0
7	K	18	0	0	0	0
7	L	19	0	0	0	0
All	All	15084	72	14306	56	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 (56) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:45:LEU:O	2:H:49:THR:HG22	1.90	0.71
4:K:14:THR:HG23	5:L:93:PRO:HG3	1.79	0.64
1:G:36:LEU:HD22	1:G:104:TYR:HB2	1.80	0.63
2:H:49:THR:HG23	2:H:65:GLY:H	1.65	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:119:LEU:HB2	4:E:63:PRO:HB3	1.83	0.60
1:A:36:LEU:HD22	1:A:104:TYR:HB2	1.84	0.58
4:K:2:VAL:HG22	4:K:3:PRO:HD2	1.85	0.58
4:J:2:VAL:HG22	4:J:3:PRO:HD2	1.85	0.58
4:D:2:VAL:HG22	4:D:3:PRO:HD2	1.85	0.58
3:I:198:ILE:HD12	4:J:90:GLU:HG3	1.86	0.57
4:E:2:VAL:HG22	4:E:3:PRO:HD2	1.86	0.57
2:H:119:LEU:HB2	4:J:63:PRO:HB3	1.87	0.56
3:I:112:LEU:HB3	3:I:120:CYS:HB2	1.91	0.53
3:I:148:ALA:HB2	4:J:54:LYS:HE2	1.91	0.52
3:C:49:THR:HG23	3:C:55:TYR:HE2	1.74	0.52
5:F:71:ALA:HB3	5:F:90:GLN:HB3	1.92	0.51
2:H:112:LEU:HB3	2:H:120:CYS:HB2	1.93	0.51
5:L:71:ALA:HB3	5:L:90:GLN:HB3	1.92	0.51
2:B:52:TRP:CG	4:J:93:PRO:HB3	2.47	0.50
1:A:69:GLN:HG3	4:E:37:LEU:HD23	1.94	0.50
2:B:112:LEU:HB3	2:B:120:CYS:HB2	1.94	0.49
2:H:155:LEU:HD22	5:L:61:ILE:HG23	1.94	0.49
5:L:30:ALA:HB3	5:L:38:VAL:HB	1.95	0.49
5:L:2:LEU:N	5:L:3:PRO:HD3	2.28	0.49
5:F:30:ALA:HB3	5:F:38:VAL:HB	1.95	0.49
3:C:112:LEU:HB3	3:C:120:CYS:HB2	1.95	0.48
3:C:12:LEU:HD21	3:C:92:TYR:HB2	1.95	0.48
5:F:2:LEU:N	5:F:3:PRO:HD3	2.28	0.48
1:G:9:LYS:HB2	1:G:53:THR:HG22	1.95	0.48
3:I:12:LEU:HD21	3:I:92:TYR:HB2	1.96	0.47
2:B:119:LEU:HB2	4:D:63:PRO:HB3	1.98	0.46
3:C:148:ALA:HB2	4:D:54:LYS:HE2	1.98	0.46
2:H:110:ARG:HH21	4:J:79:ARG:HH12	1.65	0.45
2:B:155:LEU:HD22	5:F:61:ILE:HG23	1.98	0.45
1:A:42:GLN:HB2	1:A:45:SER:HB3	1.99	0.44
4:K:2:VAL:HG12	4:K:84:PRO:HA	2.00	0.44
4:E:2:VAL:HG12	4:E:84:PRO:HA	2.00	0.44
1:A:193:ARG:HH11	1:A:223:MET:HG3	1.83	0.44
1:G:23:PHE:HB2	1:G:136:ILE:HB	1.99	0.44
4:D:2:VAL:HG12	4:D:84:PRO:HA	2.00	0.44
1:G:138:PRO:HA	1:G:141:ILE:HD12	2.00	0.44
1:G:193:ARG:HH11	1:G:223:MET:HG3	1.82	0.44
4:J:2:VAL:HG12	4:J:84:PRO:HA	2.00	0.43
1:G:195:ALA:HB1	4:K:75:GLN:CG	2.49	0.43
2:H:49:THR:CG2	2:H:65:GLY:H	2.31	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:E:73:MET:SD	5:F:66:LEU:HD21	2.58	0.43
4:K:73:MET:CE	5:L:66:LEU:HD11	2.49	0.42
4:E:69:ARG:O	4:E:73:MET:HG2	2.20	0.42
4:J:58:ARG:HB3	6:J:201:GOL:H31	2.02	0.42
5:F:75:GLU:HB2	5:F:87:LEU:HD11	2.02	0.41
5:L:14:GLU:HB2	5:L:29:THR:HB	2.02	0.41
5:L:75:GLU:HB2	5:L:87:LEU:HD11	2.03	0.41
5:F:14:GLU:HB2	5:F:29:THR:HB	2.01	0.41
1:A:50:PHE:HB3	1:A:131:LEU:HB3	2.03	0.41
2:H:10:GLN:HG3	2:H:41:LEU:HD13	2.03	0.41
1:G:50:PHE:HB3	1:G:131:LEU:HB3	2.03	0.41

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	220/269 (82%)	215 (98%)	5 (2%)	0	100	100
1	G	218/269 (81%)	213 (98%)	5 (2%)	0	100	100
2	B	195/226 (86%)	188 (96%)	7 (4%)	0	100	100
2	H	197/226 (87%)	190 (96%)	7 (4%)	0	100	100
3	C	195/227 (86%)	190 (97%)	4 (2%)	1 (0%)	29	22
3	I	194/227 (86%)	189 (97%)	3 (2%)	2 (1%)	15	8
4	D	108/152 (71%)	107 (99%)	1 (1%)	0	100	100
4	E	108/152 (71%)	108 (100%)	0	0	100	100
4	J	108/152 (71%)	106 (98%)	2 (2%)	0	100	100
4	K	108/152 (71%)	106 (98%)	2 (2%)	0	100	100
5	F	96/133 (72%)	94 (98%)	1 (1%)	1 (1%)	15	8

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
5	L	96/133 (72%)	92 (96%)	3 (3%)	1 (1%)	15	8
All	All	1843/2318 (80%)	1798 (98%)	40 (2%)	5 (0%)	41	36

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
5	F	49	HIS
3	I	51	GLY
3	C	110	ARG
3	I	110	ARG
5	L	45	ALA

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	184/216 (85%)	181 (98%)	3 (2%)	62	65
1	G	182/216 (84%)	177 (97%)	5 (3%)	44	43
2	B	164/189 (87%)	155 (94%)	9 (6%)	21	16
2	H	166/189 (88%)	156 (94%)	10 (6%)	19	14
3	C	156/181 (86%)	153 (98%)	3 (2%)	57	59
3	I	155/181 (86%)	152 (98%)	3 (2%)	57	59
4	D	94/124 (76%)	94 (100%)	0	100	100
4	E	94/124 (76%)	92 (98%)	2 (2%)	53	54
4	J	94/124 (76%)	94 (100%)	0	100	100
4	K	94/124 (76%)	91 (97%)	3 (3%)	39	37
5	F	83/110 (76%)	80 (96%)	3 (4%)	35	32
5	L	83/110 (76%)	79 (95%)	4 (5%)	25	21
All	All	1549/1888 (82%)	1504 (97%)	45 (3%)	42	40

All (45) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	75	GLU
1	A	126	TYR
1	A	228	TYR
2	B	13	ILE
2	B	22	ARG
2	B	91	THR
2	B	94	THR
2	B	118	ARG
2	B	139	ASP
2	B	162	SER
2	B	182	GLU
2	B	198	LEU
3	C	22	ARG
3	C	65	GLN
3	C	105	LYS
4	E	1	ASP
4	E	23	VAL
5	F	26	PHE
5	F	42	LEU
5	F	79	TYR
1	G	37	THR
1	G	52	SER
1	G	75	GLU
1	G	126	TYR
1	G	228	TYR
2	H	13	ILE
2	H	22	ARG
2	H	28	ARG
2	H	41	LEU
2	H	91	THR
2	H	94	THR
2	H	139	ASP
2	H	162	SER
2	H	182	GLU
2	H	198	LEU
3	I	22	ARG
3	I	105	LYS
3	I	193	ASN
4	K	14	THR
4	K	23	VAL
4	K	27	ARG
5	L	6	LEU
5	L	26	PHE

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Mol	Chain	Res	Type
5	L	48	GLU
5	L	79	TYR

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	133	HIS
3	C	16	GLN
3	I	65	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

9 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	$\# Z > 2$
6	GOL	F	101	-	5,5,5	0.07	0	5,5,5	0.17	0
6	GOL	D	201	-	5,5,5	0.05	0	5,5,5	0.11	0
6	GOL	A	301	-	5,5,5	0.05	0	5,5,5	0.16	0
6	GOL	B	201	-	5,5,5	0.11	0	5,5,5	0.11	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
6	GOL	B	202	-	5,5,5	0.04	0	5,5,5	0.20	0
6	GOL	H	201	-	5,5,5	0.04	0	5,5,5	0.15	0
6	GOL	J	201	-	5,5,5	0.06	0	5,5,5	0.17	0
6	GOL	H	202	-	5,5,5	0.06	0	5,5,5	0.21	0
6	GOL	B	203	-	5,5,5	0.03	0	5,5,5	0.20	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
6	GOL	F	101	-	-	0/4/4/4	-
6	GOL	D	201	-	-	0/4/4/4	-
6	GOL	A	301	-	-	0/4/4/4	-
6	GOL	B	201	-	-	0/4/4/4	-
6	GOL	B	202	-	-	0/4/4/4	-
6	GOL	H	201	-	-	0/4/4/4	-
6	GOL	J	201	-	-	0/4/4/4	-
6	GOL	H	202	-	-	0/4/4/4	-
6	GOL	B	203	-	-	0/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	J	201	GOL	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	224/269 (83%)	0.70	23 (10%) 6 8	37, 57, 80, 122	0
1	G	222/269 (82%)	1.91	92 (41%) 0 0	63, 89, 114, 133	0
2	B	197/226 (87%)	0.51	8 (4%) 37 45	34, 52, 68, 77	0
2	H	199/226 (88%)	0.30	3 (1%) 73 78	41, 54, 69, 78	0
3	C	197/227 (86%)	1.52	62 (31%) 0 0	41, 69, 103, 117	0
3	I	196/227 (86%)	0.86	23 (11%) 4 5	45, 63, 87, 100	0
4	D	110/152 (72%)	0.85	15 (13%) 3 3	37, 53, 76, 91	0
4	E	110/152 (72%)	1.42	25 (22%) 0 0	37, 60, 83, 89	0
4	J	110/152 (72%)	0.83	12 (10%) 5 7	42, 55, 83, 90	0
4	K	110/152 (72%)	1.00	18 (16%) 1 2	47, 63, 87, 91	0
5	F	98/133 (73%)	1.01	16 (16%) 1 2	40, 56, 90, 106	0
5	L	98/133 (73%)	0.68	6 (6%) 21 26	47, 65, 84, 90	0
All	All	1871/2318 (80%)	0.97	303 (16%) 1 2	34, 61, 98, 133	0

All (303) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	170	GLN	7.8
3	C	67	TYR	7.3
3	C	63	LEU	7.2
1	G	164	ALA	7.1
4	E	2	VAL	6.7
1	G	168	SER	6.6
3	C	55	TYR	6.3
1	G	20	GLN	6.2
4	E	1	ASP	6.1
1	G	93	ALA	6.1
1	G	19	PHE	5.9

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Mol	Chain	Res	Type	RSRZ
5	F	81	GLY	5.9
5	F	49	HIS	5.7
3	C	16	GLN	5.5
1	G	167	VAL	5.5
1	G	97	PHE	5.5
1	G	171	THR	5.4
4	K	23	VAL	5.3
1	G	161	TYR	5.3
3	C	45	LEU	5.3
1	G	23	PHE	5.2
3	C	3	PRO	5.2
3	C	15	GLN	5.1
1	G	136	ILE	5.1
3	I	15	GLN	5.1
1	G	152	ILE	5.1
1	G	154	GLY	5.0
1	G	209	SER	5.0
3	I	48	ILE	4.9
1	G	133	HIS	4.8
3	C	71	ILE	4.7
4	E	44	PRO	4.6
4	K	42	SER	4.6
3	C	97	PRO	4.5
1	G	162	SER	4.5
1	G	21	ASN	4.5
3	I	97	PRO	4.5
1	G	166	TYR	4.4
1	G	173	ALA	4.4
1	A	234	SER	4.4
4	J	24	THR	4.4
1	G	169	GLN	4.4
1	G	16	GLU	4.4
3	I	199	CYS	4.3
1	A	231	ILE	4.2
3	C	70	ILE	4.2
1	G	148	TYR	4.2
1	G	141	ILE	4.1
4	E	110	PRO	4.1
1	G	13	ARG	4.1
1	G	208	SER	4.1
1	G	163	ASN	4.1
1	G	14	PRO	4.0

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Mol	Chain	Res	Type	RSRZ
1	G	135	ARG	4.0
1	G	144	VAL	4.0
3	C	50	PRO	4.0
4	J	25	PRO	4.0
1	G	44	GLY	3.9
1	G	18	VAL	3.9
1	G	96	ASN	3.9
1	G	81	THR	3.9
1	G	4	PRO	3.9
5	L	78	PRO	3.9
1	G	143	ARG	3.9
1	G	138	PRO	3.9
5	F	80	PRO	3.8
1	G	134	ARG	3.8
4	E	23	VAL	3.7
4	K	40	ALA	3.7
1	G	95	ASN	3.7
1	G	2	ASP	3.7
1	G	28	ASN	3.7
1	G	139	GLU	3.7
1	G	176	ASN	3.7
3	C	64	GLY	3.6
4	D	61	SER	3.6
3	C	54	ILE	3.5
1	G	137	PRO	3.5
3	C	65	GLN	3.5
4	E	61	SER	3.5
1	A	232	ALA	3.5
1	G	231	ILE	3.5
1	G	83	HIS	3.5
1	G	6	THR	3.4
2	B	3	PRO	3.4
1	G	233	TYR	3.4
3	I	65	GLN	3.4
4	K	2	VAL	3.4
3	C	154	TYR	3.4
4	D	38	GLY	3.4
4	E	101	VAL	3.4
3	C	41	LEU	3.3
4	E	66	VAL	3.3
3	I	98	ALA	3.3
4	E	64	MET	3.3

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Mol	Chain	Res	Type	RSRZ
4	J	23	VAL	3.3
5	L	80	PRO	3.3
3	C	199	CYS	3.2
1	G	155	GLU	3.2
3	I	52	TRP	3.2
3	C	7	ILE	3.2
3	C	86	PHE	3.2
1	G	147	VAL	3.2
5	F	46	GLY	3.1
3	I	16	GLN	3.1
4	J	38	GLY	3.1
1	G	142	ARG	3.1
4	J	51	CYS	3.1
3	C	87	CYS	3.1
1	G	165	ARG	3.1
3	C	69	GLY	3.0
4	K	38	GLY	3.0
1	G	24	THR	3.0
1	G	158	THR	3.0
1	G	77	ALA	3.0
3	C	83	ARG	3.0
1	A	28	ASN	3.0
1	G	235	PHE	3.0
3	I	50	PRO	3.0
1	A	233	TYR	2.9
5	F	79	TYR	2.9
1	G	82	GLY	2.9
3	C	152	LEU	2.9
4	E	68	LEU	2.9
1	G	160	GLU	2.9
1	A	170	GLN	2.9
1	G	181	ARG	2.9
1	A	235	PHE	2.9
4	D	51	CYS	2.9
4	K	68	LEU	2.9
2	B	68	GLY	2.9
1	G	234	SER	2.9
3	C	150	ARG	2.8
1	G	15	PRO	2.8
4	D	60	GLY	2.8
4	E	72	PHE	2.8
4	D	110	PRO	2.8

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Mol	Chain	Res	Type	RSRZ
1	G	98	TYR	2.8
3	I	154	TYR	2.8
5	F	48	GLU	2.8
3	C	9	PRO	2.8
3	C	82	TYR	2.8
4	K	69	ARG	2.8
4	D	40	ALA	2.8
1	G	92	ARG	2.8
1	A	228	TYR	2.8
3	C	146	TYR	2.8
3	C	39	ALA	2.7
1	G	197	VAL	2.7
4	E	63	PRO	2.7
1	G	50	PHE	2.7
1	G	126	TYR	2.7
4	E	42	SER	2.7
4	J	66	VAL	2.7
3	C	62	TYR	2.7
3	I	13	PHE	2.7
1	G	175	PRO	2.7
4	E	91	GLY	2.7
4	D	37	LEU	2.7
3	C	131	ILE	2.7
4	D	42	SER	2.7
4	K	22	GLU	2.7
3	I	191	LEU	2.7
2	H	1	SER	2.6
1	A	152	ILE	2.6
4	E	73	MET	2.6
1	A	197	VAL	2.6
3	C	121	ALA	2.6
2	B	47	HIS	2.6
4	K	1	ASP	2.6
3	C	151	ARG	2.6
3	C	119	LEU	2.6
5	F	63	ALA	2.6
1	G	172	ARG	2.6
3	C	72	LYS	2.6
3	C	84	GLU	2.6
1	A	118	ILE	2.6
1	G	22	GLY	2.6
1	G	26	TRP	2.6

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Mol	Chain	Res	Type	RSRZ
4	K	25	PRO	2.6
4	K	70	ALA	2.5
4	E	22	GLU	2.5
3	C	13	PHE	2.5
4	E	103	CYS	2.5
1	G	230	SER	2.5
3	C	32	VAL	2.5
4	E	16	VAL	2.5
4	J	58	ARG	2.5
3	C	111	LEU	2.5
4	E	60	GLY	2.5
2	H	199	CYS	2.5
4	D	66	VAL	2.5
1	A	195	ALA	2.5
4	E	41	ALA	2.5
3	C	155	MET	2.4
4	E	98	ILE	2.4
1	G	43	VAL	2.4
4	K	66	VAL	2.4
3	C	158	MET	2.4
3	C	153	LEU	2.4
3	C	113	ALA	2.4
3	I	91	ILE	2.4
5	F	27	CYS	2.4
2	B	41	LEU	2.4
5	F	66	LEU	2.4
1	A	5	ALA	2.4
4	K	110	PRO	2.4
3	I	92	TYR	2.4
1	G	94	ASP	2.4
5	L	5	HIS	2.4
3	C	88	ILE	2.4
5	F	50	ASP	2.4
4	D	69	ARG	2.3
1	A	2	ASP	2.3
2	B	154	TYR	2.3
1	G	3	PRO	2.3
1	G	151	GLY	2.3
4	D	62	SER	2.3
3	C	148	ALA	2.3
1	G	153	THR	2.3
1	G	118	ILE	2.3

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Mol	Chain	Res	Type	RSRZ
3	I	157	TYR	2.3
5	L	79	TYR	2.3
5	F	42	LEU	2.3
1	G	49	ALA	2.3
3	C	30	LEU	2.3
1	A	226	VAL	2.3
3	C	34	GLU	2.3
3	I	156	ILE	2.3
1	G	222	ALA	2.3
1	A	192	VAL	2.3
1	G	91	VAL	2.3
4	E	71	VAL	2.3
3	C	52	TRP	2.3
1	G	87	TYR	2.2
3	C	98	ALA	2.2
3	C	112	LEU	2.2
5	F	82	THR	2.2
3	C	40	GLU	2.2
1	G	5	ALA	2.2
1	G	232	ALA	2.2
3	C	47	GLN	2.2
3	I	46	ARG	2.2
5	F	87	LEU	2.2
3	C	157	TYR	2.2
1	A	230	SER	2.2
1	G	51	VAL	2.2
4	J	13	VAL	2.2
3	C	191	LEU	2.2
1	A	196	PRO	2.2
2	B	43	GLU	2.2
1	A	198	VAL	2.2
3	C	122	VAL	2.2
4	K	4	TYR	2.2
2	H	47	HIS	2.2
3	I	159	SER	2.2
4	J	104	SER	2.2
4	J	31	CYS	2.2
3	I	67	TYR	2.2
1	A	44	GLY	2.2
1	G	85	ILE	2.1
3	I	45	LEU	2.1
5	F	51	THR	2.1

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Mol	Chain	Res	Type	RSRZ
5	F	77	SER	2.1
5	F	61	ILE	2.1
4	E	78	LEU	2.1
1	G	184	VAL	2.1
3	C	20	TYR	2.1
5	L	2	LEU	2.1
3	C	53	SER	2.1
3	C	19	ALA	2.1
4	D	70	ALA	2.1
4	E	88	THR	2.1
2	B	156	ILE	2.1
3	C	68	GLY	2.1
4	E	62	SER	2.1
1	A	43	VAL	2.1
4	J	16	VAL	2.1
4	K	72	PHE	2.1
1	G	17	ASP	2.1
1	G	178	TYR	2.1
3	I	55	TYR	2.1
4	D	56	LEU	2.1
1	G	25	ALA	2.1
1	G	131	LEU	2.0
3	C	156	ILE	2.0
3	I	141	ARG	2.0
4	D	63	PRO	2.0
4	K	74	GLN	2.0
1	G	185	ALA	2.0
4	K	71	VAL	2.0
4	K	92	LYS	2.0
5	L	10	PHE	2.0
3	C	56	GLY	2.0
1	A	209	SER	2.0
3	C	149	LEU	2.0
1	A	210	GLU	2.0
1	G	226	VAL	2.0
3	C	6	VAL	2.0
3	I	88	ILE	2.0
4	J	17	ALA	2.0
2	B	158	VAL	2.0
4	D	30	VAL	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(\AA^2)	Q<0.9
6	GOL	H	202	6/6	0.60	0.26	96,97,97,97	0
6	GOL	J	201	6/6	0.66	0.27	93,93,94,94	0
6	GOL	B	203	6/6	0.81	0.16	81,82,83,83	0
6	GOL	B	202	6/6	0.82	0.31	95,96,97,97	0
6	GOL	D	201	6/6	0.83	0.29	86,86,87,87	0
6	GOL	F	101	6/6	0.84	0.24	99,99,100,100	0
6	GOL	A	301	6/6	0.84	0.19	91,91,91,91	0
6	GOL	B	201	6/6	0.85	0.41	111,111,111,111	0
6	GOL	H	201	6/6	0.92	0.22	81,81,82,82	0

6.5 Other polymers [i](#)

There are no such residues in this entry.