

May 11, 2024 – 03:10 pm BST

PDB ID	:	6RAO
EMDB ID	:	EMD-4782
Title	:	Cryo-EM structure of the anti-feeding prophage (AFP) baseplate, 6-fold symmetrised
Authors	:	Desfosses, A.
Deposited on	:	2019-04-06
Resolution	:	3.10  Å(reported)

This is a Full wwPDB EM 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/EMValidationReportHelp with specific help available everywhere you see the (i) 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 (1)) were used in the production of this report:

EMDB validation analysis	:	0.0.1.dev92
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber $(2001)$
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

## 1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:  $ELECTRON\ MICROSCOPY$ 

The reported resolution of this entry is 3.10 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	EM structures
	(#Entries)	(#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the 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 EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain	
1	А	149	9%89%	10% •
1	В	149	85%	14% •
2	С	354	85%	14% ••
3	D	451	71% 8%	21%
4	F	149	84%	15% •
5	Н	140	64% 22%	• 11%
6	Е	417	15% 72% 20%	• 7%
7	G	229	10%	17% ••



Mol	Chain	Length	Quality of chain						
			51%						
8	Ι	607	59%		13%	•	27%		
			31%						
9	J	963	41%	15%	•			43%	



## 2 Entry composition (i)

There are 9 unique types of molecules in this entry. The entry contains 22409 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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.

Mol	Chain	Residues		At	oms	AltConf	Trace			
1	Δ	1/18	Total	С	Ν	0	S	0	0	
	ГЛ	140	1148	729	187	228	4	0	0	
1	В	1/18	Total	С	Ν	Ο	$\mathbf{S}$	0	0	
	D	140	1148	729	187	228	4			

• Molecule 1 is a protein called Afp1.

• Molecule 2 is a protein called Afp2.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	С	351	Total 2718	C 1740	N 450	O 522	S 6	0	0

• Molecule 3 is a protein called Afp3.

Mol	Chain	Residues		At	AltConf	Trace			
3	D	358	Total 2747	C 1753	N 462	O 525	${ m S} 7$	0	0

• Molecule 4 is a protein called Afp5.

Mol	Chain	Residues		At	oms	AltConf	Trace		
4	F	149	Total 1196	C 757	N 218	0 215	S 6	0	0

• Molecule 5 is a protein called Afp9.

Mol	Chain	Residues		At	oms	AltConf	Trace		
5	Н	125	Total 994	C 628	N 177	0 184	${ m S}{ m 5}$	0	0

• Molecule 6 is a protein called Afp4.



Mol	Chain	Residues		At	AltConf	Trace			
6	Е	386	Total 3005	C 1920	N 512	O 561	S 12	0	0

• Molecule 7 is a protein called Afp7.

Mol	Chain	Residues		At	AltConf	Trace			
7	G	224	Total 1737	C 1096	N 292	0 343	S 6	0	0

• Molecule 8 is a protein called Afp11.

Mol	Chain	Residues	Atoms			AltConf	Trace		
8	Ι	443	Total 3441	C 2189	N 592	0 648	S 12	0	0

• Molecule 9 is a protein called Afp12.

Mol	Chain	Residues	Atoms			AltConf	Trace		
9	J	548	Total 4275	С 2711	N 737	0 819	S 8	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 atom inclusion in map 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 = 2and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). 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: Afp1





 $\bullet$  Molecule 7: Afp7



 $\bullet$  Molecule 9: Afp12







# 4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C6	Depositor
Number of particles used	46991	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE	Depositor
	CORRECTION	
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{\AA}^2)$	20	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT $(4k \ge 4k)$	Depositor
Maximum map value	0.524	Depositor
Minimum map value	-0.368	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.016	Depositor
Recommended contour level	0.1	Depositor
Map size (Å)	486.0, 486.0, 486.0	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	$1.35, 1.35, \overline{1.35}$	Depositor



# 5 Model quality (i)

## 5.1 Standard geometry (i)

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).

Mal	Chain	Bond	lengths	Bond angles		
		RMSZ	# Z  > 5	RMSZ	# Z  > 5	
1	А	0.34	0/1172	0.60	1/1601~(0.1%)	
1	В	0.42	0/1172	0.65	2/1601~(0.1%)	
2	С	0.40	0/2789	0.62	1/3812~(0.0%)	
3	D	0.32	0/2809	0.56	0/3833	
4	F	0.45	0/1220	0.66	1/1658~(0.1%)	
5	Н	0.36	0/1011	0.69	0/1366	
6	Е	0.38	0/3073	0.66	4/4195~(0.1%)	
7	G	0.40	0/1770	0.75	4/2410~(0.2%)	
8	Ι	0.41	0/3524	0.68	6/4815~(0.1%)	
9	J	0.44	0/4370	0.71	5/5974~(0.1%)	
All	All	0.40	0/22910	0.66	24/31265~(0.1%)	

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
7	G	0	1
8	Ι	0	5
9	J	0	6
All	All	0	12

There are no bond length outliers.

All (24)	) bond	angle	outliers	are	listed	below:
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Mol	Chain	Res	Type	Atoms		$Observed(^{o})$	$Ideal(^{o})$
9	J	423	PRO	CA-N-CD	-8.46	99.65	111.50
7	G	144	LEU	CA-CB-CG	8.25	134.27	115.30
1	В	86	LEU	CA-CB-CG	7.08	131.58	115.30
4	F	75	LEU	CA-CB-CG	6.62	130.51	115.30
8	Ι	133	LEU	CA-CB-CG	6.36	129.92	115.30



Mol	Chain	Res	Type	Atoms	Z	$Observed(^{o})$	$Ideal(^{o})$
7	G	199	ASP	CB-CG-OD1	6.32	123.99	118.30
7	G	11	LEU	CA-CB-CG	6.03	129.17	115.30
1	В	86	LEU	CB-CG-CD1	-5.77	101.19	111.00
8	Ι	379	ARG	C-N-CA	-5.76	107.31	121.70
2	С	73	LEU	CA-CB-CG	5.70	128.40	115.30
6	Е	116	ASP	CB-CG-OD1	5.69	123.42	118.30
7	G	39	LEU	CA-CB-CG	5.56	128.10	115.30
8	Ι	78	LEU	CA-CB-CG	5.55	128.06	115.30
8	Ι	22	LEU	CA-CB-CG	5.53	128.02	115.30
8	Ι	25	ARG	CA-CB-CG	5.35	125.18	113.40
6	Е	194	ASP	CB-CG-OD2	5.21	122.99	118.30
9	J	429	ASP	CB-CG-OD2	5.21	122.99	118.30
6	Е	179	ASP	CB-CG-OD2	5.21	122.99	118.30
9	J	229	ASP	CB-CG-OD2	5.20	122.98	118.30
1	А	23	LEU	CA-CB-CG	5.16	127.16	115.30
9	J	519	ASP	CB-CG-OD2	5.15	122.93	118.30
9	J	424	ASP	CB-CG-OD2	5.09	122.88	118.30
6	Е	318	LEU	CA-CB-CG	5.08	126.97	115.30
8	Ι	61	LEU	CA-CB-CG	5.07	126.96	115.30

There are no chirality outliers.

All (12) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
7	G	141	ALA	Peptide
8	Ι	254	TRP	Peptide
8	Ι	353	ASP	Peptide
8	Ι	368	LEU	Peptide
8	Ι	375	ILE	Peptide
8	Ι	414	ASN	Peptide
9	J	175	PRO	Peptide
9	J	285	ALA	Peptide
9	J	298	LEU	Peptide
9	J	371	ARG	Sidechain
9	J	394	THR	Peptide
9	J	506	ASP	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



Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	А	1148	0	1123	7	0
1	В	1148	0	1123	12	0
2	С	2718	0	2630	35	0
3	D	2747	0	2721	21	0
4	F	1196	0	1206	12	0
5	Н	994	0	998	76	0
6	Ε	3005	0	3004	83	0
7	G	1737	0	1720	26	0
8	Ι	3441	0	3352	59	0
9	J	4275	0	4189	231	0
All	All	22409	0	22066	459	0

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.

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.

All (459) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom 1	Atom 2	Interatomic	Clash
Atom-1	Atom-2	distance $(\text{\AA})$	overlap (Å)
5:H:21:SER:CA	8:I:43:PHE:HZ	1.00	1.58
5:H:50:ARG:HH22	9:J:47:THR:CG2	1.14	1.55
5:H:21:SER:CA	8:I:43:PHE:CZ	1.88	1.54
9:J:298:LEU:CB	9:J:304:LEU:HD12	1.04	1.50
5:H:21:SER:HA	8:I:43:PHE:CZ	1.44	1.48
9:J:298:LEU:HB2	9:J:304:LEU:CD1	1.03	1.48
5:H:21:SER:C	8:I:43:PHE:CZ	1.83	1.25
5:H:50:ARG:NH2	9:J:47:THR:CG2	1.99	1.24
9:J:362:LEU:O	9:J:373:THR:HG21	1.38	1.23
5:H:50:ARG:NH2	9:J:47:THR:HG22	1.53	1.22
6:E:260:THR:CA	9:J:422:GLN:HE21	1.56	1.17
9:J:371:ARG:NH2	9:J:372:ASN:HD21	1.42	1.14
5:H:50:ARG:HH22	9:J:47:THR:HG21	1.09	1.13
6:E:259:LEU:O	9:J:422:GLN:CG	1.96	1.13
9:J:299:GLY:N	9:J:304:LEU:HB3	1.60	1.12
9:J:298:LEU:CB	9:J:304:LEU:CD1	1.80	1.11
5:H:13:CYS:CB	9:J:43:ASP:OD2	2.00	1.09
5:H:16:PHE:CE1	9:J:418:TYR:HE1	1.74	1.06
5:H:21:SER:C	8:I:43:PHE:HZ	1.32	1.03
9:J:293:GLY:HA2	9:J:341:GLY:N	1.73	1.03
6:E:260:THR:CA	9:J:422:GLN:NE2	2.21	1.02



	<b>A</b> 1 <b>O</b>	Interatomic	Clash
Atom-1	Atom-2	distance (Å)	overlap (Å)
5:H:50:ARG:HH22	9:J:47:THR:HG22	0.88	1.01
6:E:259:LEU:O	9:J:422:GLN:HG2	1.61	1.01
6:E:274:LEU:HD21	6:E:276:ARG:HD2	1.42	1.00
9:J:371:ARG:NH2	9:J:372:ASN:ND2	2.08	1.00
5:H:20:PHE:HE2	9:J:434:VAL:HG12	1.24	1.00
6:E:62:ARG:HH12	6:E:213:GLU:HB3	1.27	1.00
9:J:298:LEU:HB3	9:J:304:LEU:CD1	1.92	0.99
5:H:69:THR:O	7:G:5:GLU:OE2	1.81	0.99
5:H:21:SER:HA	8:I:43:PHE:CE2	1.90	0.99
6:E:260:THR:C	9:J:422:GLN:NE2	2.16	0.99
5:H:50:ARG:NH1	9:J:50:GLN:HE22	1.59	0.98
9:J:225:ILE:HG21	9:J:314:LEU:HB2	1.45	0.98
9:J:362:LEU:O	9:J:373:THR:CG2	2.12	0.98
5:H:50:ARG:NH1	9:J:50:GLN:NE2	2.13	0.96
9:J:299:GLY:O	9:J:305:LEU:HB2	1.65	0.96
9:J:298:LEU:H	9:J:298:LEU:HD22	1.30	0.95
9:J:299:GLY:O	9:J:305:LEU:CB	2.14	0.95
9:J:225:ILE:CG2	9:J:314:LEU:HB2	1.96	0.94
6:E:261:SER:N	9:J:422:GLN:HE22	1.65	0.94
9:J:298:LEU:CA	9:J:304:LEU:HD12	1.98	0.94
9:J:298:LEU:CB	9:J:304:LEU:HD11	1.96	0.93
9:J:294:TYR:HD2	9:J:296:LEU:H	1.07	0.93
9:J:299:GLY:H	9:J:304:LEU:HB3	1.21	0.93
6:E:260:THR:N	9:J:422:GLN:HE21	1.65	0.92
9:J:124:PHE:N	9:J:176:THR:HG1	1.67	0.92
6:E:15:LEU:HD12	6:E:15:LEU:H	1.33	0.92
6:E:62:ARG:HH12	6:E:213:GLU:CB	1.82	0.91
6:E:62:ARG:NH1	6:E:213:GLU:HB3	1.84	0.91
6:E:260:THR:HA	9:J:422:GLN:HE21	1.35	0.91
6:E:62:ARG:NH1	6:E:213:GLU:CB	2.35	0.89
9:J:293:GLY:HA2	9:J:341:GLY:H	1.28	0.89
9:J:294:TYR:HE2	9:J:296:LEU:CA	1.86	0.89
5:H:13:CYS:HB3	9:J:43:ASP:OD2	1.69	0.89
5:H:50:ARG:NH2	9:J:47:THR:HG21	1.76	0.88
5:H:16:PHE:CE1	9:J:418:TYR:CE1	2.61	0.88
2:C:331:ILE:O	3:D:443:LEU:O	1.90	0.87
5:H:20:PHE:CE2	9:J:434:VAL:HG12	2.10	0.87
5:H:52:MET:HG3	9:J:17:PHE:CD2	2.11	0.86
5:H:50:ARG:CZ	9:J:47:THR:HG22	2.06	0.86
6:E:20:ASN:O	6:E:20:ASN:ND2	2.08	0.85
2:C:85:VAL:CG1	2:C:89:ASN:O	2.24	0.85



	lo uo pagom	Interatomic	Clash
Atom-1	Atom-2	distance (Å)	overlap (Å)
9:J:309:PRO:HA	9:J:314:LEU:HD11	1.59	0.84
6:E:259:LEU:C	9:J:422:GLN:HE21	1.79	0.83
9:J:299:GLY:N	9:J:300:PRO:HD3	1.92	0.83
9:J:244:VAL:HG11	9:J:307:ALA:O	1.79	0.83
5:H:13:CYS:HB2	9:J:43:ASP:OD2	1.63	0.82
6:E:260:THR:C	9:J:422:GLN:HE22	1.78	0.82
9:J:294:TYR:CE2	9:J:296:LEU:HB2	2.14	0.82
5:H:50:ARG:HH11	9:J:50:GLN:HE22	1.22	0.82
9:J:294:TYR:CD2	9:J:296:LEU:N	2.47	0.81
6:E:259:LEU:O	9:J:422:GLN:HG3	1.79	0.81
9:J:301:LEU:HD22	9:J:301:LEU:O	1.81	0.80
9:J:371:ARG:HH21	9:J:372:ASN:ND2	1.74	0.80
5:H:12:GLN:H	9:J:37:THR:HG1	1.28	0.80
5:H:68:ILE:O	7:G:4:LEU:HD22	1.82	0.79
6:E:274:LEU:HD21	6:E:276:ARG:CD	2.14	0.76
6:E:22:ASP:OD2	6:E:25:THR:OG1	2.04	0.76
9:J:305:LEU:HD22	9:J:308:ILE:HG13	1.68	0.75
5:H:68:ILE:HG22	7:G:4:LEU:HD21	1.68	0.75
9:J:225:ILE:HG21	9:J:314:LEU:CB	2.15	0.75
2:C:85:VAL:HG11	2:C:89:ASN:O	1.86	0.75
5:H:21:SER:C	8:I:43:PHE:CE1	2.56	0.75
9:J:225:ILE:HG12	9:J:317:LEU:HG	1.69	0.74
9:J:294:TYR:CE2	9:J:296:LEU:CA	2.70	0.73
9:J:299:GLY:O	9:J:305:LEU:HB3	1.86	0.73
9:J:299:GLY:N	9:J:300:PRO:CD	2.50	0.73
9:J:308:ILE:H	9:J:309:PRO:HD2	1.52	0.73
9:J:293:GLY:HA3	9:J:340:ASP:HA	1.69	0.73
9:J:422:GLN:HB3	9:J:423:PRO:HD3	1.69	0.73
6:E:261:SER:N	9:J:422:GLN:NE2	2.35	0.72
9:J:371:ARG:HH21	9:J:372:ASN:HD21	1.33	0.72
9:J:298:LEU:HA	9:J:304:LEU:HG	1.69	0.72
9:J:225:ILE:HG22	9:J:226:GLU:N	2.06	0.71
6:E:259:LEU:C	9:J:422:GLN:NE2	2.43	0.71
2:C:271:VAL:O	3:D:293:ASN:ND2	2.23	0.70
9:J:294:TYR:CE2	9:J:296:LEU:N	2.60	0.70
5:H:52:MET:HG3	9:J:17:PHE:CE2	2.27	0.70
6:E:62:ARG:NH1	6:E:213:GLU:HB2	2.05	0.70
5:H:13:CYS:HB3	9:J:38:ASP:HB3	1.74	0.69
9:J:298:LEU:HD22	9:J:298:LEU:N	2.07	0.69
9:J:305:LEU:HD13	9:J:305:LEU:O	1.93	0.69
2:C:143:PRO:HA	2:C:216:TYR:HE1	1.58	0.69



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		Interatomic	Clash
Atom-1	Atom-2	distance $(Å)$	overlap (Å)
6:E:17:GLN:H	6:E:17:GLN:NE2	1.90	0.69
9:J:304:LEU:HD13	9:J:304:LEU:O	1.92	0.69
9:J:301:LEU:HD22	9:J:301:LEU:C	2.14	0.69
6:E:260:THR:HA	9:J:422:GLN:NE2	2.00	0.69
9:J:298:LEU:HB3	9:J:304:LEU:HD11	1.63	0.69
9:J:304:LEU:O	9:J:304:LEU:HD22	1.93	0.68
9:J:305:LEU:HD22	9:J:305:LEU:O	1.93	0.68
9:J:306:LEU:HD13	9:J:306:LEU:O	1.92	0.68
9:J:294:TYR:HE2	9:J:296:LEU:CB	2.07	0.68
9:J:296:LEU:C	9:J:296:LEU:HD13	2.13	0.68
6:E:154:TYR:CD1	6:E:189:GLN:HG2	2.29	0.68
6:E:271:SER:HB2	6:E:290:THR:O	1.93	0.68
1:A:74:LYS:HE2	1:A:79:GLU:HG3	1.77	0.67
5:H:50:ARG:NH1	9:J:47:THR:HG22	2.09	0.67
8:I:139:PRO:HA	8:I:169:ILE:O	1.94	0.67
9:J:298:LEU:HA	9:J:304:LEU:CG	2.25	0.67
9:J:362:LEU:O	9:J:373:THR:CB	2.41	0.67
5:H:15:ALA:O	9:J:44:PRO:HG2	1.96	0.66
9:J:294:TYR:CE2	9:J:296:LEU:CB	2.78	0.66
7:G:129:ASP:HB3	7:G:151:SER:HB3	1.76	0.66
6:E:260:THR:N	9:J:422:GLN:NE2	2.37	0.66
9:J:293:GLY:CA	9:J:341:GLY:N	2.55	0.65
9:J:299:GLY:H	9:J:300:PRO:CD	2.08	0.65
5:H:74:ALA:HB1	7:G:113:GLY:O	1.95	0.65
9:J:308:ILE:N	9:J:309:PRO:HD2	2.11	0.65
5:H:12:GLN:N	9:J:37:THR:OG1	2.14	0.65
9:J:522:GLN:HE22	9:J:531:GLN:HG3	1.62	0.65
6:E:33:THR:HG23	6:E:86:GLY:H	1.62	0.65
9:J:308:ILE:H	9:J:309:PRO:CD	2.10	0.65
9:J:298:LEU:CB	9:J:304:LEU:CG	2.71	0.64
9:J:248:PHE:CE2	9:J:304:LEU:HD11	2.32	0.64
9:J:294:TYR:HE2	9:J:296:LEU:HA	1.59	0.64
2:C:45:PRO:HB2	2:C:89:ASN:ND2	2.13	0.63
5:H:21:SER:N	8:I:43:PHE:HZ	1.90	0.63
5:H:52:MET:CB	9:J:17:PHE:CE2	2.81	0.63
9:J:95:VAL:HG11	9:J:103:ALA:HB2	1.81	0.63
9:J:225:ILE:HD13	9:J:314:LEU:HD22	1.81	0.63
8:I:153:ASP:HB3	8:I:156:GLY:H	1.64	0.62
9:J:298:LEU:CA	9:J:304:LEU:CD1	2.70	0.62
9:J:128:SER:HB3	9:J:172:SER:HB2	1.82	0.62
9:J:225:ILE:CG2	9:J:226:GLU:N	2.63	0.62



		Interatomic	Clash
Atom-1	Atom-2	distance (Å)	overlap (Å)
1:B:36:LEU:HG	1:B:64:ILE:HD12	1.82	0.61
4:F:63:LEU:HD23	4:F:137:LEU:HD12	1.81	0.61
9:J:101:ARG:NH2	9:J:286:PRO:O	2.33	0.61
5:H:68:ILE:HG22	7:G:4:LEU:CD2	2.30	0.61
6:E:274:LEU:HG	6:E:276:ARG:HG3	1.82	0.61
3:D:414:ILE:HG22	3:D:415:THR:HG23	1.81	0.60
6:E:43:VAL:HG12	6:E:43:VAL:O	2.00	0.60
5:H:38:SER:HB3	9:J:42:HIS:CD2	2.36	0.60
9:J:298:LEU:HD23	9:J:298:LEU:C	2.22	0.60
8:I:157:ASN:ND2	8:I:352:ASP:OD2	2.33	0.60
5:H:18:PRO:HB2	9:J:434:VAL:CG1	2.32	0.60
5:H:16:PHE:HB2	5:H:37:GLN:HE21	1.66	0.60
2:C:225:ILE:HG12	2:C:235:VAL:HG12	1.83	0.60
2:C:132:GLY:HA3	2:C:160:TYR:HA	1.84	0.60
6:E:347:TRP:CZ2	7:G:6:ARG:HG3	2.36	0.60
1:A:94:ILE:HB	1:A:112:VAL:HB	1.83	0.59
6:E:274:LEU:CD2	6:E:276:ARG:HD2	2.26	0.59
9:J:294:TYR:HE2	9:J:296:LEU:HB2	1.60	0.59
6:E:259:LEU:O	9:J:422:GLN:NE2	2.35	0.59
9:J:225:ILE:CG2	9:J:226:GLU:H	2.15	0.59
9:J:308:ILE:N	9:J:309:PRO:CD	2.65	0.59
9:J:408:ILE:HG23	9:J:412:GLN:HE21	1.68	0.59
8:I:145:GLY:HA2	8:I:162:GLN:HB2	1.84	0.59
9:J:302:VAL:HG22	9:J:302:VAL:O	2.02	0.59
9:J:309:PRO:HA	9:J:314:LEU:CD1	2.31	0.59
5:H:97:ILE:HG12	5:H:97:ILE:O	2.02	0.59
5:H:25:GLY:O	8:I:54:PHE:HE1	1.86	0.59
9:J:66:SER:H	9:J:69:ASP:HB2	1.68	0.58
8:I:430:VAL:HG22	8:I:451:VAL:HG22	1.86	0.58
8:I:454:ASP:O	8:I:456:ARG:NH2	2.36	0.58
9:J:293:GLY:CA	9:J:341:GLY:H	2.09	0.57
6:E:71:HIS:O	6:E:75:ASN:ND2	2.37	0.57
2:C:92:ASP:OD2	2:C:96:GLN:NE2	2.37	0.57
9:J:300:PRO:HD2	9:J:304:LEU:H	1.69	0.57
7:G:132:VAL:HG12	7:G:148:VAL:HG22	1.85	0.57
5:H:50:ARG:HH12	9:J:47:THR:HG22	1.68	0.57
9:J:364:LEU:HD23	9:J:373:THR:HG22	1.87	0.57
9:J:124:PHE:N	9:J:176:THR:OG1	2.36	0.57
2:C:31:LEU:HD21	2:C:90:ILE:HG12	1.85	0.57
9:J:300:PRO:HB2	9:J:303:ASN:HB2	1.85	0.57
9:J:373:THR:O	9:J:373:THR:OG1	2.19	0.57



	to uo page	Interatomic	Clash
Atom-1	Atom-2	distance (Å)	overlap (Å)
2:C:160:TYR:HB2	2:C:222:LEU:HD21	1.86	0.56
4:F:119:GLN:HB3	4:F:134:THR:HB	1.88	0.56
5:H:69:THR:HB	7:G:5:GLU:OE2	2.04	0.56
6:E:192:SER:H	6:E:195:GLN:HE21	1.52	0.56
8:I:139:PRO:HB3	8:I:170:THR:HG22	1.88	0.56
9:J:301:LEU:HD13	9:J:302:VAL:HG12	1.87	0.56
4:F:29:ARG:HB3	4:F:66:GLU:HB2	1.87	0.56
1:A:22:THR:HB	1:A:95:MET:HB3	1.86	0.56
8:I:222:ALA:N	8:I:229:PHE:O	2.38	0.56
8:I:150:GLY:HA2	8:I:364:THR:HG22	1.88	0.56
9:J:299:GLY:H	9:J:300:PRO:HD3	1.69	0.56
1:B:113:SER:OG	1:B:142:ASP:OD1	2.23	0.55
5:H:18:PRO:HB2	9:J:434:VAL:HG11	1.88	0.55
9:J:295:VAL:HA	9:J:338:VAL:HA	1.87	0.55
9:J:259:GLU:HA	9:J:262:ARG:HG2	1.88	0.55
9:J:297:ASN:HB2	9:J:336:TRP:CB	2.37	0.55
9:J:298:LEU:CA	9:J:304:LEU:CG	2.84	0.55
9:J:371:ARG:HD2	9:J:371:ARG:C	2.27	0.55
6:E:130:ASN:HD21	6:E:178:GLU:H	1.53	0.55
9:J:298:LEU:H	9:J:298:LEU:CD2	2.12	0.55
5:H:85:LEU:HD23	7:G:167:GLN:NE2	2.22	0.55
6:E:15:LEU:H	6:E:15:LEU:CD1	2.12	0.55
8:I:407:ARG:NH2	9:J:92:CYS:O	2.35	0.54
9:J:129:LEU:HD11	9:J:169:LEU:HD13	1.89	0.54
9:J:427:ILE:HG22	9:J:428:ASP:N	2.22	0.54
5:H:19:ARG:NE	9:J:430:GLN:HB3	2.22	0.54
9:J:364:LEU:HG	9:J:371:ARG:HA	1.89	0.54
6:E:22:ASP:O	6:E:26:MET:HG2	2.08	0.54
6:E:122:LEU:HD13	6:E:173:LEU:HB2	1.90	0.54
5:H:88:GLU:HA	5:H:88:GLU:OE2	2.07	0.54
9:J:299:GLY:C	9:J:305:LEU:HB2	2.27	0.54
3:D:213:VAL:HG22	3:D:299:VAL:HG12	1.90	0.54
8:I:502:ALA:HB2	8:I:569:LEU:HD23	1.89	0.54
9:J:412:GLN:CB	9:J:420:LEU:HD21	2.38	0.54
9:J:502:ILE:HG22	9:J:513:ASN:HB3	1.90	0.54
1:B:117:PRO:HB3	1:B:137:ILE:HD11	1.89	0.53
2:C:333:ILE:HD12	3:D:445:PHE:CE1	2.43	0.53
9:J:423:PRO:O	9:J:423:PRO:HD2	2.08	0.53
9:J:349:ALA:H	9:J:352:LEU:HD12	1.74	0.53
5:H:69:THR:CG2	6:E:390:LEU:HD13	2.39	0.53
9:J:467:ALA:HA	9:J:501:ALA:HA	1.89	0.53



		Interatomic	Clash
Atom-1	Atom-2	distance (Å)	overlap (Å)
9:J:177:ARG:HA	9:J:180:GLN:HE21	1.74	0.53
6:E:289:ARG:NH1	6:E:394:GLU:OE1	2.42	0.52
8:I:134:GLN:NE2	8:I:375:ILE:O	2.42	0.52
8:I:414:ASN:HA	8:I:417:ARG:HB3	1.92	0.52
9:J:296:LEU:HD13	9:J:296:LEU:O	2.08	0.52
8:I:501:THR:HG1	8:I:570:SER:HG	1.49	0.52
2:C:160:TYR:HB2	2:C:222:LEU:HD11	1.91	0.52
9:J:412:GLN:HB3	9:J:420:LEU:HD21	1.91	0.52
9:J:183:SER:HB3	9:J:187:LEU:HB2	1.91	0.52
9:J:362:LEU:O	9:J:373:THR:OG1	2.28	0.52
5:H:52:MET:HB2	9:J:17:PHE:CE2	2.43	0.52
6:E:30:ILE:HB	6:E:123:VAL:HG22	1.90	0.52
9:J:169:LEU:HB2	9:J:208:VAL:HG12	1.89	0.52
9:J:296:LEU:HD12	9:J:337:GLN:HB2	1.92	0.52
9:J:422:GLN:HB3	9:J:423:PRO:CD	2.38	0.52
5:H:74:ALA:CB	7:G:113:GLY:O	2.58	0.52
9:J:225:ILE:HG22	9:J:226:GLU:H	1.72	0.51
6:E:211:GLN:OE1	6:E:211:GLN:HA	2.08	0.51
2:C:45:PRO:HB2	2:C:89:ASN:HD21	1.74	0.51
9:J:127:VAL:HG22	9:J:173:LEU:HD11	1.93	0.51
8:I:405:ALA:HB2	9:J:529:GLY:HA3	1.92	0.51
6:E:96:LEU:CD2	6:E:129:LEU:HD23	2.41	0.50
5:H:19:ARG:HE	9:J:430:GLN:HB3	1.76	0.50
5:H:52:MET:CB	9:J:17:PHE:HE2	2.22	0.50
6:E:34:PRO:HG2	6:E:59:PHE:HB3	1.94	0.50
9:J:59:LEU:HD21	9:J:448:GLY:HA3	1.93	0.50
1:B:36:LEU:HD21	1:B:96:ILE:HD12	1.93	0.50
2:C:222:LEU:HD23	2:C:224:MET:HE1	1.94	0.50
1:A:117:PRO:HB3	1:A:137:ILE:HD11	1.94	0.50
2:C:348:PHE:HE2	6:E:312:GLU:HG2	1.77	0.50
1:A:53:PHE:HD1	1:B:12:TYR:CE1	2.30	0.50
5:H:71:GLU:OE1	7:G:9:SER:HB2	2.12	0.50
5:H:96:VAL:O	5:H:96:VAL:HG22	2.11	0.50
6:E:52:LEU:HD12	6:E:73:PHE:HB2	1.94	0.50
2:C:195:ALA:HA	2:C:235:VAL:HG23	1.94	0.49
5:H:12:GLN:N	9:J:37:THR:HG1	2.04	0.49
9:J:225:ILE:CG1	9:J:317:LEU:HG	2.39	0.49
9:J:294:TYR:HD2	9:J:296:LEU:N	1.91	0.49
9:J:427:ILE:CG2	9:J:428:ASP:N	2.75	0.49
6:E:96:LEU:HG	6:E:129:LEU:HD21	1.94	0.49
6:E:240:TRP:HB3	6:E:307:LEU:HD13	1.95	0.49



		Interatomic	Clash
Atom-1	Atom-2	distance (Å)	overlap (Å)
4:F:141:ASP:OD2	6:E:344:ARG:NH1	2.46	0.49
2:C:176:ILE:HG23	2:C:199:VAL:HG11	1.94	0.49
4:F:124:ASP:HB3	4:F:127:SER:HB3	1.93	0.49
8:I:172:GLN:NE2	8:I:236:ASP:O	2.45	0.49
3:D:390:ARG:HA	3:D:393:GLN:HG2	1.93	0.49
6:E:27:PRO:HA	6:E:120:LEU:HB2	1.94	0.49
7:G:10:LYS:HA	7:G:33:ASN:HD21	1.78	0.49
8:I:407:ARG:HH11	9:J:559:GLY:HA3	1.78	0.49
9:J:240:GLN:OE1	9:J:311:VAL:HG13	2.13	0.49
3:D:311:GLN:HE22	3:D:333:TRP:HD1	1.59	0.49
6:E:176:LEU:HD12	6:E:203:TRP:HB2	1.93	0.49
6:E:259:LEU:O	9:J:422:GLN:CD	2.51	0.49
8:I:43:PHE:HA	8:I:51:TRP:HE3	1.78	0.49
8:I:496:LYS:HB2	8:I:586:THR:HG22	1.95	0.49
5:H:38:SER:CB	9:J:42:HIS:CD2	2.95	0.48
5:H:52:MET:CG	9:J:17:PHE:CE2	2.94	0.48
9:J:294:TYR:CD2	9:J:294:TYR:C	2.85	0.48
3:D:198:VAL:HB	3:D:204:VAL:HG21	1.94	0.48
3:D:307:THR:H	3:D:310:GLN:HE21	1.60	0.48
9:J:8:PHE:O	9:J:12:LYS:HB2	2.13	0.48
6:E:96:LEU:HD23	6:E:129:LEU:HD23	1.94	0.48
6:E:165:ARG:HA	6:E:198:ARG:HD2	1.94	0.48
7:G:207:ASN:HD21	7:G:222:ARG:H	1.61	0.48
5:H:107:ARG:HG2	6:E:395:PHE:HB2	1.95	0.48
6:E:2:THR:OG1	6:E:3:MET:N	2.46	0.48
9:J:376:SER:OG	9:J:377:GLU:N	2.47	0.48
2:C:315:LYS:HE3	2:C:321:GLN:HB2	1.94	0.48
3:D:183:TYR:O	3:D:203:GLN:NE2	2.42	0.48
6:E:274:LEU:HD21	6:E:276:ARG:CG	2.43	0.48
2:C:312:GLN:HE21	2:C:317:LEU:HD22	1.77	0.48
6:E:22:ASP:CG	6:E:25:THR:OG1	2.52	0.48
8:I:78:LEU:HD21	9:J:31:LEU:HD12	1.96	0.48
9:J:427:ILE:CG2	9:J:428:ASP:H	2.27	0.48
4:F:47:GLU:OE2	4:F:50:ARG:NE	2.47	0.47
2:C:253:ARG:NH1	2:C:257:ASN:OD1	2.47	0.47
6:E:33:THR:HG22	6:E:84:PRO:CB	2.44	0.47
9:J:533:ALA:H	9:J:548:GLN:HE22	1.61	0.47
2:C:33:ALA:CB	2:C:90:ILE:HD11	2.45	0.47
5:H:63:PHE:HB3	5:H:72:LEU:HD11	1.96	0.47
6:E:274:LEU:CD2	6:E:276:ARG:CD	2.88	0.47
6:E:336:LYS:HD2	6:E:365:ILE:HG22	1.96	0.47



	<b>A</b> t and <b>D</b>	Interatomic	Clash	
Atom-1	Atom-2	distance $(\text{\AA})$	overlap (Å)	
9:J:299:GLY:HA2	9:J:305:LEU:N	2.30	0.47	
9:J:371:ARG:CZ	9:J:372:ASN:ND2	2.75	0.47	
1:B:62:PRO:HG2	1:B:141:ALA:HB3	1.97	0.47	
6:E:340:TRP:NE1	6:E:357:GLU:OE2	2.47	0.47	
9:J:321:LYS:HE2	9:J:335:ARG:HD3	1.97	0.47	
5:H:51:ILE:HD13	9:J:54:TRP:CD1	2.50	0.47	
5:H:68:ILE:HG23	5:H:108:LEU:HD21	1.96	0.47	
6:E:17:GLN:NE2	6:E:17:GLN:N	2.61	0.47	
8:I:453:PRO:HG3	8:I:468:LEU:HB2	1.96	0.47	
5:H:42:LEU:HD11	5:H:87:HIS:HB2	1.98	0.46	
9:J:299:GLY:C	9:J:305:LEU:CB	2.81	0.46	
1:B:142:ASP:OD1	1:B:142:ASP:N	2.42	0.46	
3:D:339:LYS:HG3	3:D:341:ASP:H	1.80	0.46	
9:J:558:LEU:O	9:J:576:ARG:NH2	2.39	0.46	
9:J:293:GLY:HA3	9:J:340:ASP:CA	2.39	0.46	
9:J:518:LEU:HD23	9:J:521:LEU:HD12	1.97	0.46	
5:H:44:MET:CE	9:J:417:CYS:SG	3.03	0.46	
4:F:15:LEU:HD13	4:F:22:PRO:HG3	1.98	0.46	
7:G:114:LYS:HD2	7:G:114:LYS:HA	1.68	0.46	
9:J:107:VAL:O	9:J:178:TYR:OH	2.34	0.46	
9:J:304:LEU:HD13	9:J:304:LEU:C	2.36	0.46	
8:I:145:GLY:N	8:I:163:THR:O	2.49	0.46	
9:J:300:PRO:HD2	9:J:303:ASN:HB2	1.97	0.46	
2:C:222:LEU:HD23	2:C:224:MET:CE	2.46	0.46	
3:D:110:THR:HB	3:D:268:LEU:HD21	1.98	0.46	
9:J:349:ALA:HB1	9:J:351:PRO:HD2	1.98	0.46	
6:E:62:ARG:CZ	6:E:213:GLU:HB2	2.45	0.45	
8:I:415:ASN:HD21	9:J:562:ARG:HH12	1.64	0.45	
9:J:385:GLN:NE2	9:J:387:ASP:OD2	2.48	0.45	
5:H:21:SER:N	8:I:43:PHE:CZ	2.73	0.45	
6:E:197:GLN:HG3	6:E:299:TRP:HB3	1.97	0.45	
9:J:298:LEU:C	9:J:298:LEU:CD2	2.85	0.45	
1:B:149:ALA:HB3	2:C:281:GLN:HE22	1.82	0.45	
2:C:239:ARG:NH1	2:C:243:ASP:OD1	2.48	0.45	
7:G:204:ALA:HA	7:G:209:LEU:HD13	1.98	0.45	
8:I:251:ASP:OD1	8:I:251:ASP:N	2.50	0.45	
8:I:468:LEU:HD21	8:I:472:ARG:HD2	1.97	0.45	
8:I:403:ARG:HE	9:J:269:ASP:HB2	1.80	0.45	
9:J:225:ILE:HG12	9:J:317:LEU:CG	2.42	0.45	
7:G:116:ARG:NH1	7:G:119:ASN:O	2.49	0.45	
6:E:169:GLN:HE21	6:E:169:GLN:HB3	1.49	0.45	



		Interatomic	Clash	
Atom-1	Atom-2	distance (Å)	overlap (Å)	
9:J:255:ARG:HB3	9:J:280:GLY:HA3	1.99	0.45	
7:G:28:MET:HB3	7:G:91:MET:HG2	1.98	0.45	
8:I:408:GLN:O	8:I:409:ARG:NH1	2.43	0.45	
3:D:364:LEU:HD22	3:D:380:VAL:HG13	1.99	0.45	
7:G:105:PRO:HB2	7:G:126:ARG:HD2	1.98	0.45	
8:I:43:PHE:HA	8:I:51:TRP:CE3	2.52	0.45	
5:H:70:ASP:OD2	7:G:2:SER:O	2.35	0.44	
5:H:85:LEU:HD23	7:G:167:GLN:HE22	1.81	0.44	
8:I:509:VAL:HG23	8:I:510:VAL:HG23	1.99	0.44	
6:E:274:LEU:CG	6:E:276:ARG:HG3	2.47	0.44	
8:I:500:VAL:N	8:I:589:ALA:O	2.45	0.44	
9:J:226:GLU:HG3	9:J:315:SER:HB2	1.98	0.44	
2:C:210:ASP:HB3	2:C:226:ARG:HH12	1.83	0.44	
7:G:18:ASP:N	7:G:18:ASP:OD1	2.48	0.44	
6:E:225:ALA:HB1	6:E:248:LEU:HD22	1.99	0.44	
6:E:274:LEU:CD2	6:E:276:ARG:HG3	2.47	0.44	
8:I:91:LEU:HD11	9:J:24:ALA:HB2	1.98	0.44	
8:I:145:GLY:H	8:I:163:THR:HB	1.82	0.44	
9:J:483:ALA:HA	9:J:486:GLN:HB2	2.00	0.44	
1:B:97:SER:HB3	1:B:106:VAL:HG13	2.00	0.44	
2:C:193:ALA:HA	2:C:251:PRO:HG3	2.00	0.43	
5:H:16:PHE:HE1	9:J:418:TYR:CE1	2.26	0.43	
6:E:103:LEU:HA	6:E:108:MET:HG3	2.00	0.43	
6:E:176:LEU:HD11	6:E:272:CYS:SG	2.58	0.43	
8:I:98:MET:O	8:I:101:THR:OG1	2.35	0.43	
8:I:244:VAL:HG23	8:I:336:VAL:HG12	2.00	0.43	
6:E:71:HIS:CE1	6:E:75:ASN:HD21	2.35	0.43	
3:D:346:TYR:HB3	3:D:348:PRO:HD2	2.00	0.43	
1:A:142:ASP:OD1	1:A:142:ASP:N	2.46	0.43	
1:B:94:ILE:HB	1:B:112:VAL:HB	2.00	0.43	
3:D:274:ILE:HA	3:D:277:VAL:HG22	2.01	0.43	
9:J:174:VAL:HA	9:J:175:PRO:HD3	1.76	0.43	
6:E:120:LEU:HD23	6:E:171:PHE:HB3	2.01	0.43	
2:C:50:ARG:NH2	2:C:54:GLU:OE2	2.52	0.43	
7:G:138:ASP:H	7:G:141:ALA:HA	1.84	0.43	
8:I:87:ALA:HA	9:J:27:LYS:HG2	1.99	0.43	
8:I:114:LEU:HD23	9:J:85:GLY:HA2	1.99	0.43	
9:J:225:ILE:HG23	9:J:314:LEU:HB2	1.94	0.43	
9:J:532:ARG:HG3	9:J:548:GLN:HE21	1.82	0.43	
8:I:420:LEU:HD21	8:I:492:LEU:HD21	2.00	0.43	
8:I:431:ARG:HG2	8:I:544:ASN:HD21	1.84	0.43	



		Interatomic	Clash	
Atom-1	Atom-2	distance $(\text{\AA})$	overlap (Å)	
3:D:148:ASP:OD2	3:D:181:LYS:NZ	2.50	0.43	
9:J:65:LEU:H	9:J:65:LEU:HG	1.54	0.43	
9:J:131:GLN:HA	9:J:169:LEU:HA	2.01	0.43	
9:J:439:LEU:HD21	9:J:492:LEU:HD11	1.99	0.43	
4:F:62:SER:OG	4:F:136:GLU:OE2	2.26	0.43	
9:J:401:PHE:CE1	9:J:403:ASP:HB2	2.53	0.43	
6:E:303:GLN:HE22	6:E:392:PRO:HG3	1.83	0.43	
5:H:63:PHE:HA	5:H:66:GLU:HG3	2.00	0.42	
8:I:507:THR:HG1	8:I:563:SER:HG	1.62	0.42	
4:F:79:PHE:CE1	4:F:115:PRO:HB3	2.55	0.42	
8:I:417:ARG:NH2	8:I:430:VAL:H	2.17	0.42	
9:J:244:VAL:CG1	9:J:307:ALA:O	2.61	0.42	
3:D:398:ALA:HB2	3:D:435:VAL:HB	2.00	0.42	
3:D:364:LEU:HD11	3:D:384:ILE:HD11	2.02	0.42	
2:C:143:PRO:HB3	2:C:216:TYR:CD1	2.54	0.42	
9:J:295:VAL:HG12	9:J:338:VAL:HG22	2.01	0.42	
9:J:457:THR:HA	9:J:460:ALA:HB2	2.02	0.42	
4:F:90:TRP:HD1	4:F:90:TRP:O	2.03	0.42	
8:I:134:GLN:HG2	8:I:374:ALA:HA	2.01	0.42	
5:H:44:MET:HE3	9:J:417:CYS:SG	2.60	0.42	
6:E:33:THR:HG22	6:E:84:PRO:HB2	2.02	0.42	
1:B:93:ASP:OD1	1:B:93:ASP:N	2.47	0.42	
8:I:127:VAL:O	8:I:346:ASN:N	2.53	0.42	
8:I:224:GLU:HG3	8:I:225:LEU:H	1.84	0.42	
9:J:75:ASP:OD1	9:J:75:ASP:N	2.51	0.42	
9:J:104:LEU:HB2	9:J:127:VAL:HG21	2.01	0.42	
9:J:597:LEU:HD22	9:J:598:PRO:HD2	2.01	0.42	
5:H:44:MET:HE2	9:J:417:CYS:SG	2.60	0.41	
8:I:118:ALA:O	8:I:399:ARG:NH1	2.52	0.41	
9:J:300:PRO:CB	9:J:303:ASN:HB2	2.49	0.41	
2:C:164:THR:HG23	2:C:203:THR:HB	2.02	0.41	
7:G:173:ALA:HB3	7:G:223:ALA:HB3	2.02	0.41	
9:J:371:ARG:C	9:J:371:ARG:CD	2.87	0.41	
9:J:407:TYR:HB2	9:J:472:ARG:HH22	1.85	0.41	
6:E:17:GLN:N	6:E:17:GLN:CD	2.73	0.41	
2:C:42:ILE:HG22	2:C:44:LYS:H	1.85	0.41	
2:C:259:VAL:HG12	3:D:445:PHE:HE2	1.86	0.41	
5:H:67:ASN:O	5:H:69:THR:N	2.43	0.41	
8:I:136:ASN:OD1	8:I:136:ASN:N	2.53	0.41	
3:D:311:GLN:OE1	3:D:323:ARG:NH1	2.47	0.41	
7:G:112:TRP:HB3	7:G:115:MET:HB3	2.02	0.41	



		Interatomic	Clash	
Atom-1	Atom-2	distance $(\text{\AA})$	overlap (Å)	
8:I:420:LEU:HD13	8:I:480:LEU:HD12	2.02	0.41	
1:A:53:PHE:HD1	1:B:12:TYR:CD1	2.39	0.41	
6:E:26:MET:HB2	6:E:118:THR:HA	2.02	0.41	
8:I:407:ARG:NH2	9:J:90:LEU:HA	2.35	0.41	
2:C:94:VAL:HA	2:C:100:ILE:HD12	2.02	0.41	
3:D:336:ARG:NH2	3:D:439:GLU:OE2	2.54	0.41	
5:H:14:TRP:HB2	9:J:44:PRO:HD2	2.03	0.41	
9:J:228:ALA:O	9:J:229:ASP:OD1	2.38	0.41	
2:C:165:LEU:HB2	2:C:171:VAL:HG23	2.02	0.41	
5:H:68:ILE:O	5:H:70:ASP:N	2.54	0.41	
5:H:68:ILE:H	5:H:68:ILE:HG13	1.49	0.41	
6:E:178:GLU:OE2	6:E:205:ARG:NE	2.53	0.41	
6:E:208:THR:HG21	6:E:220:LEU:HD12	2.02	0.41	
6:E:320:ARG:HA	6:E:323:LEU:HB2	2.03	0.41	
7:G:44:ARG:NE	7:G:64:GLU:OE2	2.51	0.41	
9:J:524:LEU:HD23	9:J:524:LEU:HA	1.92	0.41	
8:I:114:LEU:HD11	9:J:397:PRO:HG3	2.01	0.41	
4:F:31:SER:HB3	4:F:64:VAL:HB	2.02	0.40	
4:F:103:LEU:HA	4:F:104:PRO:HD3	1.96	0.40	
8:I:60:THR:HG23	8:I:63:ALA:H	1.87	0.40	
2:C:33:ALA:HB2	2:C:90:ILE:HD11	2.03	0.40	
6:E:14:LEU:O	6:E:14:LEU:HD12	2.22	0.40	
9:J:89:VAL:HA	9:J:556:PRO:HB3	2.03	0.40	
9:J:135:GLU:HG3	9:J:136:HIS:CD2	2.57	0.40	
9:J:300:PRO:CG	9:J:303:ASN:HB2	2.51	0.40	
9:J:305:LEU:HD13	9:J:305:LEU:C	2.41	0.40	
9:J:536:PRO:HB2	9:J:539:LEU:HB2	2.03	0.40	
9:J:590:ASP:OD1	9:J:590:ASP:N	2.55	0.40	

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 PDB entries followed by that with respect to all EM entries.

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	Perce	entiles
1	А	146/149~(98%)	136 (93%)	8 (6%)	2(1%)	11	40
1	В	146/149~(98%)	133 (91%)	11 (8%)	2(1%)	11	40
2	С	349/354~(99%)	314 (90%)	34 (10%)	1 (0%)	41	73
3	D	352/451~(78%)	328~(93%)	24 (7%)	0	100	100
4	F	147/149~(99%)	132 (90%)	15 (10%)	0	100	100
5	Н	121/140~(86%)	109 (90%)	8 (7%)	4 (3%)	4	21
6	E	380/417~(91%)	338~(89%)	41 (11%)	1 (0%)	41	73
7	G	222/229~(97%)	187 (84%)	33~(15%)	2(1%)	17	52
8	Ι	429/607~(71%)	365~(85%)	63~(15%)	1 (0%)	47	79
9	J	538/963~(56%)	438 (81%)	97~(18%)	3(1%)	25	59
All	All	2830/3608~(78%)	2480 (88%)	334 (12%)	16 (1%)	29	59

All (16) Ramachandran outliers are listed below:

Mol	Chain	$\operatorname{Res}$	Type
5	Н	68	ILE
5	Н	69	THR
9	J	296	LEU
9	J	395	VAL
1	А	5	ALA
1	В	5	ALA
5	Н	92	LEU
7	G	155	ASP
7	G	200	TYR
6	Е	19	SER
1	В	4	THR
2	С	142	LYS
5	Н	67	ASN
9	J	251	PRO
1	А	4	THR
8	Ι	369	VAL

#### 5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent side chain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

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	Perce	ntiles
1	А	127/128~(99%)	125~(98%)	2(2%)	62	84
1	В	127/128~(99%)	125~(98%)	2(2%)	62	84
2	С	284/287~(99%)	281~(99%)	3 (1%)	73	89
3	D	293/368~(80%)	292 (100%)	1 (0%)	92	96
4	F	134/134~(100%)	132~(98%)	2(2%)	65	85
5	Н	108/121~(89%)	104 (96%)	4 (4%)	34	66
6	Ε	324/345~(94%)	316~(98%)	8 (2%)	47	75
7	G	191/195~(98%)	187~(98%)	4 (2%)	53	79
8	Ι	364/509~(72%)	356~(98%)	8 (2%)	52	78
9	J	455/807~(56%)	442 (97%)	13 (3%)	42	72
All	All	2407/3022 (80%)	2360 (98%)	47 (2%)	57	80

All (47) residues with a non-rotameric sidechain are listed below:

Mol	Chain	$\mathbf{Res}$	Type
1	А	75	ASN
1	А	82	ASN
1	В	75	ASN
1	В	82	ASN
2	С	89	ASN
2	С	224	MET
2	С	277	GLN
3	D	400	ASN
4	F	13	ASN
4	F	90	TRP
5	Н	90	ARG
5	Н	96	VAL
5	Н	97	ILE
5	Н	130	ASN
6	Е	15	LEU
6	Ε	16	THR
6	Ε	20	ASN
6	Ε	148	ASP
6	Е	169	GLN
6	Е	213	GLU
6	Е	215	SER
6	Ε	267	ASN
7	G	111	THR
7	G	114	LYS



Mol	Chain	Res	Type
7	G	133	THR
7	G	136	LEU
8	Ι	25	ARG
8	Ι	32	ASN
8	Ι	256	TYR
8	Ι	363	ASN
8	Ι	379	ARG
8	Ι	403	ARG
8	Ι	414	ASN
8	Ι	503	ARG
9	J	65	LEU
9	J	250	ARG
9	J	291	SER
9	J	294	TYR
9	J	296	LEU
9	J	297	ASN
9	J	298	LEU
9	J	301	LEU
9	J	306	LEU
9	J	308	ILE
9	J	311	VAL
9	J	371	ARG
9	J	374	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (43) such sidechains are listed below:

Mol	Chain	$\mathbf{Res}$	Type
1	В	82	ASN
2	С	89	ASN
2	С	277	GLN
2	С	281	GLN
2	С	312	GLN
2	С	321	GLN
3	D	310	GLN
3	D	400	ASN
3	D	447	GLN
4	F	89	GLN
5	Н	37	GLN
5	Н	130	ASN
6	Е	17	GLN
6	Е	71	HIS
6	Е	130	ASN



Mol	Chain	Res	Type
6	Е	169	GLN
6	Е	195	GLN
6	Е	231	GLN
6	Е	267	ASN
7	G	33	ASN
7	G	149	GLN
7	G	167	GLN
7	G	207	ASN
8	Ι	32	ASN
8	Ι	134	GLN
8	Ι	258	GLN
8	Ι	358	GLN
8	Ι	363	ASN
8	Ι	414	ASN
9	J	25	HIS
9	J	50	GLN
9	J	136	HIS
9	J	180	GLN
9	J	337	GLN
9	J	372	ASN
9	J	385	GLN
9	J	412	GLN
9	J	414	GLN
9	J	422	GLN
9	J	522	GLN
9	J	548	GLN
9	J	564	ASN
9	J	574	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)

There are no ligands in this entry.

## 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 Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-4782. These allow visual inspection of the internal detail of the map and identification of artifacts.

Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

### 6.1 Orthogonal projections (i)

#### 6.1.1 Primary map



6.1.2 Raw map



The images above show the map projected in three orthogonal directions.



### 6.2 Central slices (i)

#### 6.2.1 Primary map









Z Index: 180

#### 6.2.2 Raw map



X Index: 180

Y Index: 180



The images above show central slices of the map in three orthogonal directions.



### 6.3 Largest variance slices (i)

#### 6.3.1 Primary map







X Index: 162

Y Index: 163

Z Index: 232

#### 6.3.2 Raw map



X Index: 196

Y Index: 199



The images above show the largest variance slices of the map in three orthogonal directions.



### 6.4 Orthogonal standard-deviation projections (False-color) (i)

#### 6.4.1 Primary map



#### 6.4.2 Raw map



The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.



### 6.5 Orthogonal surface views (i)

#### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.1. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

#### 6.5.2 Raw map



These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

#### 6.6 Mask visualisation (i)

This section was not generated. No masks/segmentation were deposited.



## 7 Map analysis (i)

This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution (i)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.



### 7.2 Volume estimate (i)



The volume at the recommended contour level is 613  $\rm nm^3;$  this corresponds to an approximate mass of 554 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.



### 7.3 Rotationally averaged power spectrum (i)



\*Reported resolution corresponds to spatial frequency of 0.323  ${\rm \AA}^{-1}$ 



## 8 Fourier-Shell correlation (i)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

#### 8.1 FSC (i)



\*Reported resolution corresponds to spatial frequency of 0.323  ${\rm \AA}^{-1}$ 



### 8.2 Resolution estimates (i)

$\begin{bmatrix} Bosolution ostimato (Å) \end{bmatrix}$	Estimation criterion (FSC cut-off)		
resolution estimate (A)	0.143	0.5	Half-bit
Reported by author	3.10	-	-
Author-provided FSC curve	3.12	3.46	3.17
Unmasked-calculated*	3.46	4.03	3.51

\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.46 differs from the reported value 3.1 by more than 10 %



## 9 Map-model fit (i)

This section contains information regarding the fit between EMDB map EMD-4782 and PDB model 6RAO. Per-residue inclusion information can be found in section 3 on page 6.

#### 9.1 Map-model overlays

#### 9.1.1 Map-model overlay (i)



#### 9.1.2 Map-model assembly overlay (i)



The images above show the 3D surface view of the map at the recommended contour level 0.1 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.



#### 9.2 Q-score mapped to coordinate model (i)



The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

#### 9.3 Atom inclusion mapped to coordinate model (i)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.1).



### 9.4 Atom inclusion (i)



At the recommended contour level, 64% of all backbone atoms, 56% of all non-hydrogen atoms, are inside the map.



#### Map-model fit summary (i) 9.5

The table lists the average atom inclusion at the recommended contour level (0.1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score	
All	0.5640	0.5100	1.0
А	0.6860	0.5610	
В	0.7450	0.5830	
С	0.6920	0.5710	
D	0.6390	0.5360	
Е	0.6470	0.5550	
F	0.7860	0.5880	
G	0.6690	0.5290	
Н	0.6260	0.5420	0.0
Ι	0.2970	0.4120	<0.0
J	0.3900	0.4300	

