



Full wwPDB/EMDatabank EM Map/Model Validation Report ⓘ

Jan 30, 2017 – 12:25 PM EST

PDB ID : 5TSJ
EMDB ID: : EMD-8462
Title : Thermus thermophilus V/A-ATPase bound to VH dAbs
Authors : Davies, R.B.; Smits, C.; Wong, A.S.W.; Stock, D.; Sandin, S.; Stewart, A.G.
Deposited on : 2016-10-29
Resolution : 8.70 Å(reported)

This is a Full wwPDB/EMDatabank EM Map/Model Validation Report
for a publicly released PDB/EMDB entry.

We welcome your comments at validation@mail.wwpdb.org
A user guide is available at
<http://wwpdb.org/validation/2016/EMValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

MolProbity : 4.02b-467
Mogul : unknown
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)
Validation Pipeline (wwPDB-VP) : rb-20028442

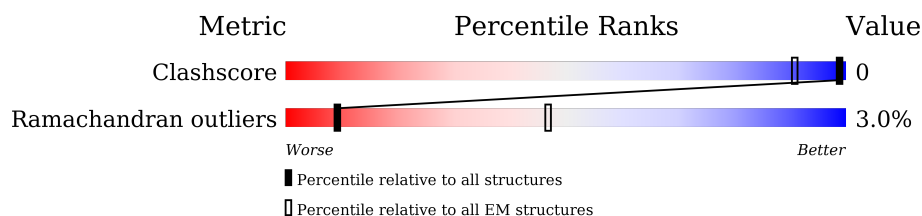
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 8.70 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.













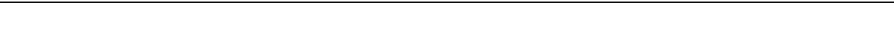

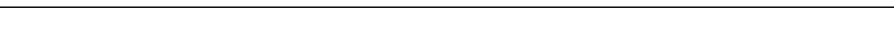
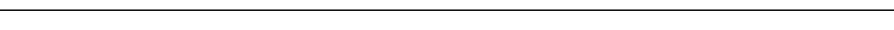
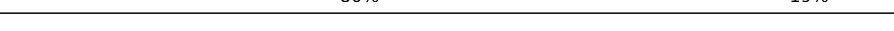


Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	114402	924
Ramachandran outliers	111179	726

The table below summarises the geometric issues observed across the polymeric chains. The red, orange, yellow and green segments on the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. 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 $\leq 5\%$.

Mol	Chain	Length	Quality of chain
1	A	577	95% 5%
1	B	577	93% 7%
1	C	577	95% 5%
2	D	457	92% 8%
2	E	457	93% 7%
2	F	457	95% 5%
3	G	186	93% 6% .
3	H	186	95% . .
4	I	105	92% . . 5%
4	J	105	93% . 5%
5	K	210	91% 9%

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Mol	Chain	Length	Quality of chain
6	L	100	 90% 10%
7	M	323	 95% . .
8	N	652	 91% . 5%
9	O	99	 78% . 19%
9	P	99	 78% . 19%
9	Q	99	 78% . 19%
9	R	99	 80% . 19%
9	S	99	 80% . 19%
9	T	99	 79% . 19%
9	U	99	 80% . 19%
9	V	99	 80% . 19%
9	W	99	 76% 5% 19%
9	X	99	 78% . 19%
9	Y	99	 80% . 19%
9	Z	99	 79% . 19%
10	1	149	 78% . 21%
10	2	149	 78% . 21%

2 Entry composition

There are 10 unique types of molecules in this entry. The entry contains 24625 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.

- Molecule 1 is a protein called V-type ATP synthase alpha chain.

Mol	Chain	Residues	Atoms				AltConf	Trace
1	A	577	Total	C	N	O	0	0
			2307	1154	577	576		
1	B	576	Total	C	N	O	0	0
			2303	1152	576	575		
1	C	577	Total	C	N	O	0	0
			2307	1154	577	576		

- Molecule 2 is a protein called V-type ATP synthase beta chain.

Mol	Chain	Residues	Atoms				AltConf	Trace
2	D	457	Total	C	N	O	0	0
			1827	914	457	456		
2	E	457	Total	C	N	O	0	0
			1827	914	457	456		
2	F	457	Total	C	N	O	0	0
			1827	914	457	456		

- Molecule 3 is a protein called V-type ATP synthase subunit E.

Mol	Chain	Residues	Atoms				AltConf	Trace
3	G	184	Total	C	N	O	0	0
			734	368	184	182		
3	H	184	Total	C	N	O	0	0
			734	368	184	182		

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
G	134	MET	LEU	conflict	UNP P74901
G	171	MET	LEU	conflict	UNP P74901
G	178	MET	LEU	conflict	UNP P74901
H	134	MET	LEU	conflict	UNP P74901
H	171	MET	LEU	conflict	UNP P74901

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Chain	Residue	Modelled	Actual	Comment	Reference
H	178	MET	LEU	conflict	UNP P74901

- Molecule 4 is a protein called V-type ATPase subunit G.

Mol	Chain	Residues	Atoms				AltConf	Trace
4	I	100	Total	C	N	O	0	0
			399	200	100	99		
4	J	100	Total	C	N	O	0	0
			399	200	100	99		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
I	16	GLY	-	expression tag	UNP H9ZQR3
J	16	GLY	-	expression tag	UNP H9ZQR3

- Molecule 5 is a protein called V-type ATP synthase subunit D.

Mol	Chain	Residues	Atoms				AltConf	Trace
5	K	210	Total	C	N	O	0	0
			839	420	210	209		

- Molecule 6 is a protein called V-type ATP synthase subunit F.

Mol	Chain	Residues	Atoms				AltConf	Trace
6	L	100	Total	C	N	O	0	0
			399	200	100	99		

- Molecule 7 is a protein called V-type ATP synthase subunit C.

Mol	Chain	Residues	Atoms				AltConf	Trace
7	M	320	Total	C	N	O	0	0
			1279	640	320	319		

- Molecule 8 is a protein called Archaeal/vacuolar-type H⁺-ATPase subunit I.

Mol	Chain	Residues	Atoms				AltConf	Trace
8	N	619	Total	C	N	O	0	0
			2474	1238	619	617		

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
N	154	ARG	LYS	conflict	UNP H9ZQR4
N	164	ALA	VAL	conflict	UNP H9ZQR4
N	173	PRO	ALA	conflict	UNP H9ZQR4

- Molecule 9 is a protein called Vacuolar type ATP synthase subunit.

Mol	Chain	Residues	Atoms				AltConf	Trace
9	O	80	Total 319	C 160	N 80	O 79	0	0
9	P	80	Total 319	C 160	N 80	O 79	0	0
9	Q	80	Total 319	C 160	N 80	O 79	0	0
9	R	80	Total 319	C 160	N 80	O 79	0	0
9	S	80	Total 319	C 160	N 80	O 79	0	0
9	T	80	Total 319	C 160	N 80	O 79	0	0
9	U	80	Total 319	C 160	N 80	O 79	0	0
9	V	80	Total 319	C 160	N 80	O 79	0	0
9	W	80	Total 319	C 160	N 80	O 79	0	0
9	X	80	Total 319	C 160	N 80	O 79	0	0
9	Y	80	Total 319	C 160	N 80	O 79	0	0
9	Z	80	Total 319	C 160	N 80	O 79	0	0

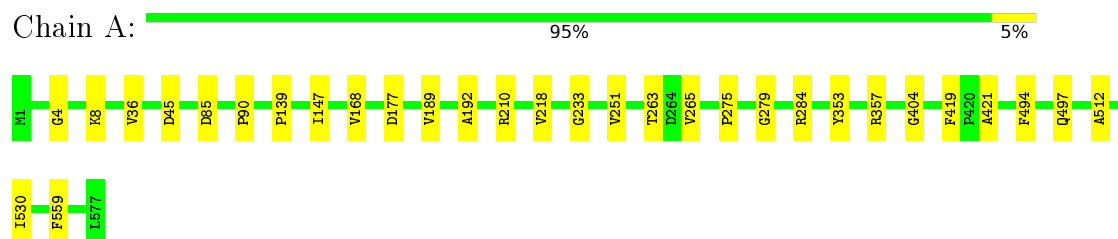
- Molecule 10 is a protein called Human heavy chain domain antibody.

Mol	Chain	Residues	Atoms				AltConf	Trace
10	1	117	Total 571	C 337	N 117	O 117	0	0
10	2	117	Total 571	C 337	N 117	O 117	0	0

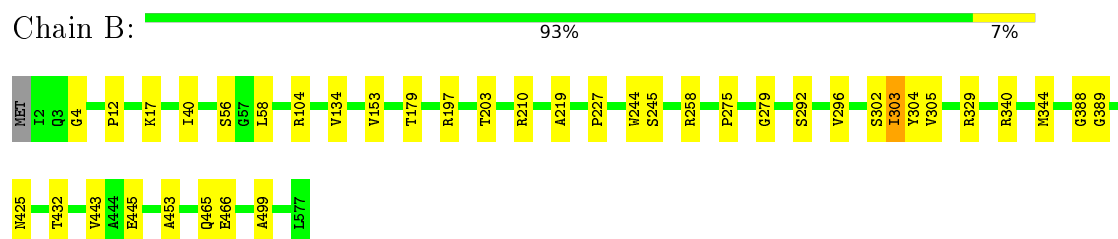
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. 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. 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.

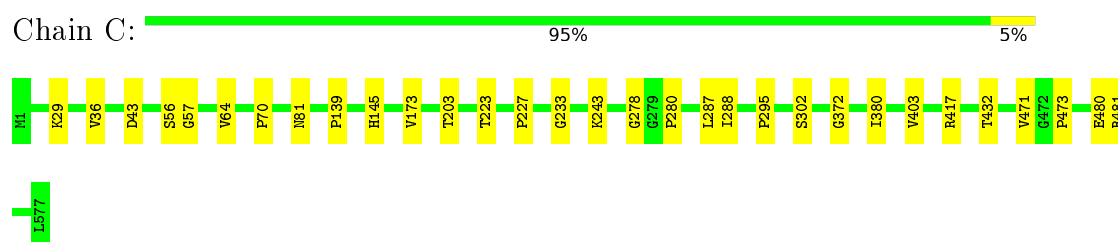
- Molecule 1: V-type ATP synthase alpha chain



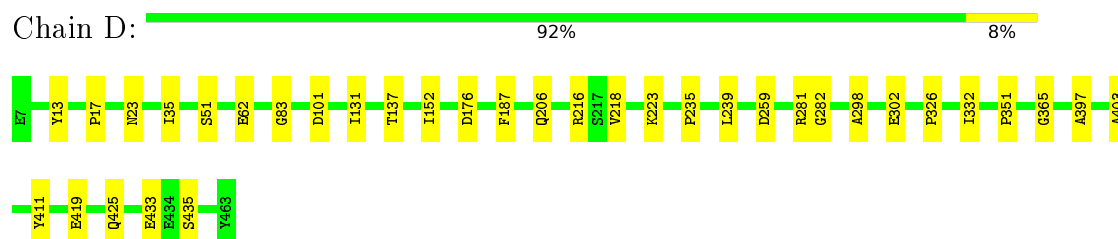
- Molecule 1: V-type ATP synthase alpha chain



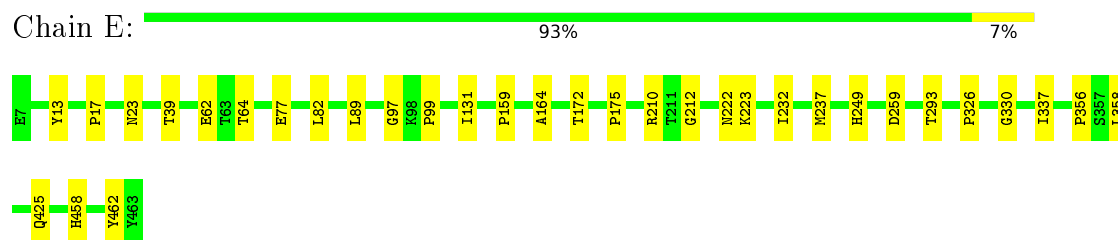
- Molecule 1: V-type ATP synthase alpha chain



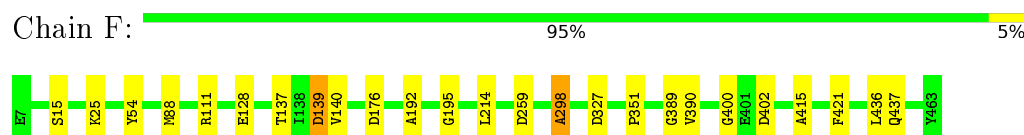
- Molecule 2: V-type ATP synthase beta chain



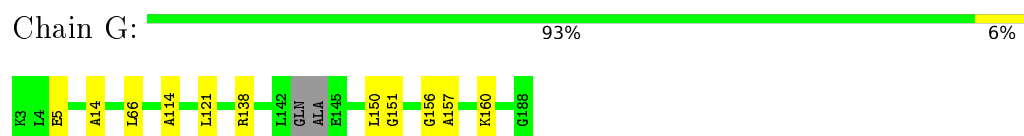
- Molecule 2: V-type ATP synthase beta chain



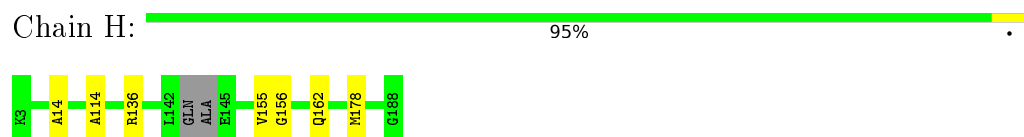
- Molecule 2: V-type ATP synthase beta chain



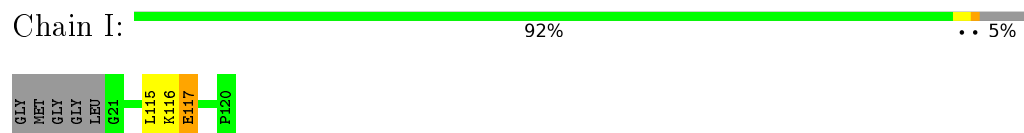
- Molecule 3: V-type ATP synthase subunit E



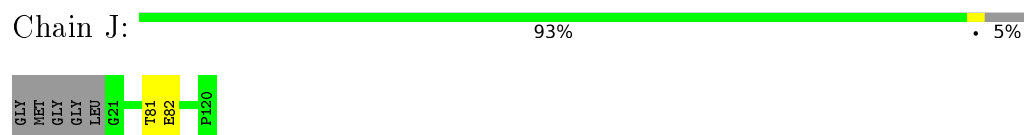
- Molecule 3: V-type ATP synthase subunit E



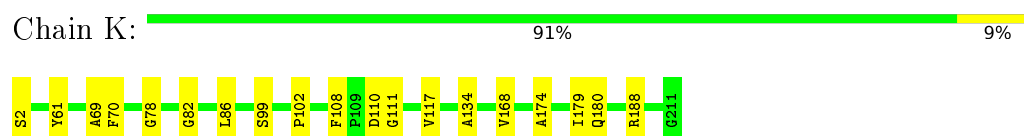
- Molecule 4: V-type ATPase subunit G




- Molecule 4: V-type ATPase subunit G



- Molecule 5: V-type ATP synthase subunit D



- Molecule 6: V-type ATP synthase subunit F

Chain L:  90% 10%




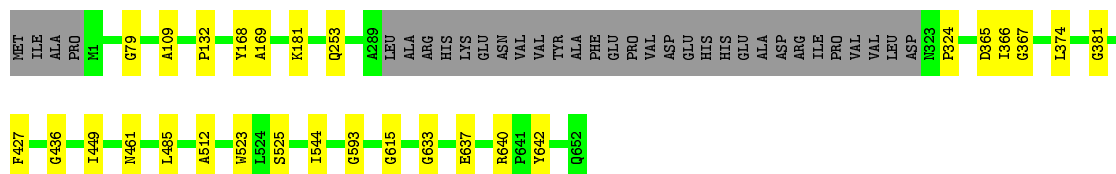
- Molecule 7: V-type ATP synthase subunit C

Chain M:  95% . .




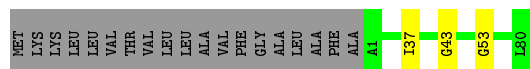
- Molecule 8: Archaeal/vacuolar-type H⁺-ATPase subunit I

Chain N:  91% . 5%




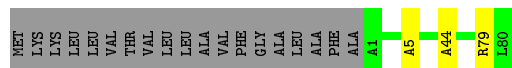
- Molecule 9: Vacuolar type ATP synthase subunit

Chain O:  78% . 19%




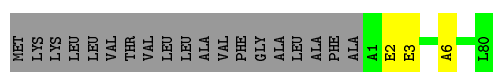
- Molecule 9: Vacuolar type ATP synthase subunit

Chain P:  78% . 19%




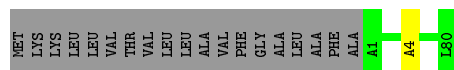
- Molecule 9: Vacuolar type ATP synthase subunit

Chain Q:  78% . 19%

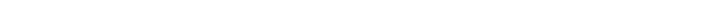


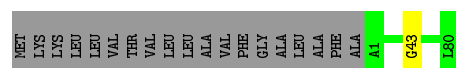
- Molecule 9: Vacuolar type ATP synthase subunit

Chain R:  80% . 19%

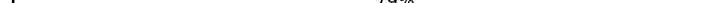


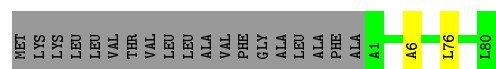
- Molecule 9: Vacuolar type ATP synthase subunit

Chain S:  80% 19%

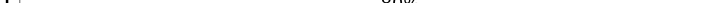


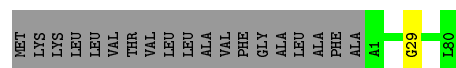
- Molecule 9: Vacuolar type ATP synthase subunit

Chain T:  79% • 19%

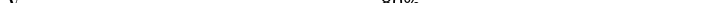


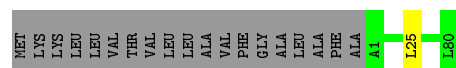
- Molecule 9: Vacuolar type ATP synthase subunit

Chain U:  80% . 19%

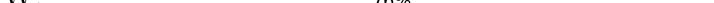


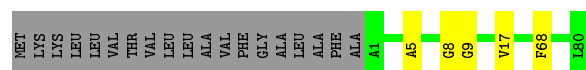
- Molecule 9: Vacuolar type ATP synthase subunit

Chain V:  80% . 19%

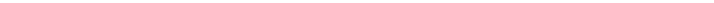


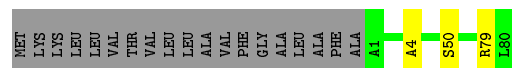
- Molecule 9: Vacuolar type ATP synthase subunit

Chain W:  76% 5% 19%




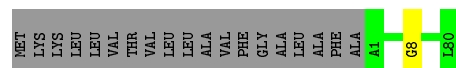
- Molecule 9: Vacuolar type ATP synthase subunit

Chain X:  78% . 19%



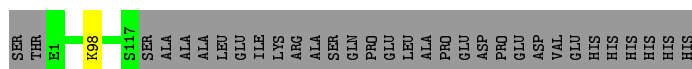
- Molecule 9: Vacuolar type ATP synthase subunit

Chain Y:  80% . 19%



- Molecule 9: Vacuolar type ATP synthase subunit

Chain Z: 79% • 19%



4 Experimental information

Property	Value	Source
Reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	Depositor
Number of particles used	61045	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	Not provided	Depositor
Microscope	FEI TALOS ARCTICA	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/\text{\AA}^2$)	Not provided	Depositor
Minimum defocus (nm)	Not provided	Depositor
Maximum defocus (nm)	Not provided	Depositor
Magnification	Not provided	Depositor
Image detector	Not provided	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

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 > 2$	RMSZ	# $ Z > 2$
1	A	1.51	4/2306 (0.2%)	1.64	12/2881 (0.4%)
1	B	1.54	5/2302 (0.2%)	1.62	10/2876 (0.3%)
1	C	1.53	2/2306 (0.1%)	1.65	9/2881 (0.3%)
10	1	0.64	0/570	0.99	0/788
10	2	0.64	0/570	0.99	0/788
2	D	1.56	5/1826 (0.3%)	1.66	10/2281 (0.4%)
2	E	1.53	2/1826 (0.1%)	1.67	10/2281 (0.4%)
2	F	1.51	2/1826 (0.1%)	1.66	4/2281 (0.2%)
3	G	1.50	1/732 (0.1%)	1.54	2/912 (0.2%)
3	H	1.49	2/732 (0.3%)	1.52	1/912 (0.1%)
4	I	1.38	0/398	1.39	0/496
4	J	1.45	0/398	1.47	1/496 (0.2%)
5	K	1.48	3/838 (0.4%)	1.60	6/1046 (0.6%)
6	L	1.53	2/398 (0.5%)	1.66	3/496 (0.6%)
7	M	1.50	2/1278 (0.2%)	1.55	7/1596 (0.4%)
8	N	1.54	7/2472 (0.3%)	1.55	8/3087 (0.3%)
9	O	1.59	3/318 (0.9%)	1.56	0/396
9	P	1.54	0/318	1.55	2/396 (0.5%)
9	Q	1.56	0/318	1.54	1/396 (0.3%)
9	R	1.55	0/318	1.54	0/396
9	S	1.61	1/318 (0.3%)	1.42	0/396
9	T	1.57	0/318	1.51	1/396 (0.3%)
9	U	1.60	1/318 (0.3%)	1.55	0/396
9	V	1.59	0/318	1.51	1/396 (0.3%)
9	W	1.59	1/318 (0.3%)	1.56	1/396 (0.3%)
9	X	1.50	0/318	1.53	0/396
9	Y	1.50	0/318	1.57	0/396
9	Z	1.58	0/318	1.67	1/396 (0.3%)
All	All	1.50	43/24594 (0.2%)	1.58	90/30850 (0.3%)

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
10	1	0	1
10	2	0	1
7	M	0	1
All	All	0	3

All (43) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	G	151	GLY	N-CA	-6.97	1.35	1.46
3	H	156	GLY	CA-C	-6.62	1.41	1.51
7	M	117	GLY	CA-C	-6.52	1.41	1.51
1	C	372	GLY	N-CA	-6.32	1.36	1.46
8	N	374	LEU	C-N	6.29	1.48	1.34
2	E	64	THR	C-N	6.16	1.44	1.33
1	C	278	GLY	CA-C	-6.12	1.42	1.51
8	N	633	GLY	N-CA	-5.93	1.37	1.46
5	K	78	GLY	CA-C	-5.83	1.42	1.51
9	S	43	GLY	N-CA	-5.78	1.37	1.46
9	O	37	ILE	C-N	5.71	1.43	1.33
8	N	615	GLY	N-CA	-5.62	1.37	1.46
1	B	4	GLY	CA-C	-5.61	1.42	1.51
5	K	111	GLY	CA-C	-5.58	1.43	1.51
9	U	29	GLY	CA-C	5.48	1.60	1.51
8	N	79	GLY	CA-C	-5.44	1.43	1.51
1	A	353	TYR	N-CA	-5.38	1.35	1.46
9	W	68	PHE	C-N	5.37	1.42	1.33
2	F	400	GLY	N-CA	-5.37	1.38	1.46
1	B	227	PRO	N-CA	-5.36	1.38	1.47
8	N	485	LEU	C-N	5.34	1.42	1.33
1	B	17	LYS	C-N	5.33	1.42	1.33
3	H	155	VAL	C-N	5.31	1.42	1.33
2	D	282	GLY	CA-C	-5.30	1.43	1.51
1	B	12	PRO	N-CA	-5.28	1.38	1.47
2	E	39	THR	C-N	5.28	1.42	1.33
2	D	51	SER	N-CA	-5.27	1.35	1.46
2	D	83	GLY	CA-C	-5.26	1.43	1.51
1	A	357	ARG	CA-C	-5.26	1.39	1.52
9	O	43	GLY	N-CA	-5.25	1.38	1.46
1	A	192	ALA	CA-C	-5.20	1.39	1.52
2	F	298	ALA	C-N	5.20	1.42	1.33
6	L	20	GLY	CA-C	-5.18	1.43	1.51
7	M	17	GLY	N-CA	-5.18	1.38	1.46
6	L	22	GLY	N-CA	-5.10	1.38	1.46

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	O	53	GLY	N-CA	-5.10	1.38	1.46
1	A	279	GLY	CA-C	-5.07	1.43	1.51
1	B	425	ASN	C-N	5.06	1.42	1.33
8	N	461	ASN	C-N	5.05	1.45	1.34
8	N	593	GLY	N-CA	5.05	1.53	1.46
2	D	302	GLU	N-CA	-5.03	1.36	1.46
2	D	298	ALA	C-N	5.01	1.42	1.33
5	K	188	ARG	N-CA	-5.00	1.36	1.46

All (90) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	139	ASP	O-C-N	-6.91	111.64	122.70
2	D	35	ILE	O-C-N	6.70	133.42	122.70
2	E	462	TYR	N-CA-C	-6.56	93.28	111.00
1	B	303	ILE	C-N-CA	6.28	137.39	121.70
2	E	337	ILE	N-CA-C	-6.22	94.22	111.00
7	M	78	GLY	C-N-CA	6.19	137.18	121.70
1	C	473	PRO	C-N-CA	6.14	137.06	121.70
1	C	43	ASP	N-CA-C	-6.13	94.46	111.00
1	A	218	VAL	N-CA-C	-6.02	94.76	111.00
1	C	173	VAL	N-CA-C	-6.01	94.76	111.00
2	F	111	ARG	N-CA-C	-5.99	94.82	111.00
1	A	404	GLY	N-CA-C	-5.91	98.33	113.10
8	N	427	PHE	C-N-CA	5.83	136.26	121.70
7	M	23	SER	O-C-N	-5.78	113.46	122.70
9	P	44	ALA	O-C-N	5.78	131.94	122.70
2	F	54	TYR	O-C-N	5.76	131.92	122.70
9	T	76	LEU	O-C-N	5.72	131.86	122.70
2	E	212	GLY	O-C-N	-5.71	113.56	122.70
8	N	253	GLN	O-C-N	-5.70	113.58	122.70
8	N	109	ALA	O-C-N	-5.69	113.59	122.70
1	B	58	LEU	O-C-N	5.68	131.79	122.70
2	F	195	GLY	N-CA-C	-5.68	98.90	113.10
1	B	153	VAL	N-CA-C	-5.65	95.75	111.00
1	B	279	GLY	N-CA-C	-5.64	99.01	113.10
9	Z	58	PHE	O-C-N	5.61	131.68	122.70
6	L	85	ASP	C-N-CA	5.53	135.53	121.70
1	A	419	PHE	N-CA-C	-5.52	96.09	111.00
5	K	108	PHE	N-CA-C	-5.50	96.14	111.00
1	B	244	TRP	C-N-CA	5.49	135.42	121.70
2	D	206	GLN	C-N-CA	5.49	135.41	121.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	K	86	LEU	N-CA-C	-5.46	96.25	111.00
1	B	465	GLN	C-N-CA	5.44	135.29	121.70
2	D	397	ALA	O-C-N	5.42	131.37	122.70
3	H	136	ARG	O-C-N	-5.40	114.06	122.70
2	E	172	THR	N-CA-C	-5.40	96.42	111.00
8	N	381	GLY	N-CA-C	-5.40	99.60	113.10
3	G	66	LEU	O-C-N	-5.40	114.06	122.70
9	V	25	LEU	O-C-N	-5.38	114.10	122.70
7	M	9	ASN	C-N-CA	5.37	135.13	121.70
1	A	8	LYS	O-C-N	5.37	131.29	122.70
2	E	232	ILE	O-C-N	-5.37	114.11	122.70
3	G	121	LEU	N-CA-C	-5.37	96.51	111.00
7	M	142	VAL	CA-C-N	5.36	132.11	117.10
8	N	324	PRO	CA-C-O	-5.36	107.34	120.20
1	A	251	VAL	N-CA-C	-5.35	96.56	111.00
2	D	433	GLU	C-N-CA	5.34	135.06	121.70
1	B	453	ALA	C-N-CA	5.34	135.04	121.70
8	N	132	PRO	O-C-N	5.33	131.22	122.70
2	E	222	ASN	C-N-CA	5.30	134.95	121.70
1	A	4	GLY	N-CA-C	-5.30	99.86	113.10
1	C	29	LYS	N-CA-C	-5.29	96.73	111.00
1	B	197	ARG	N-CA-C	-5.28	96.75	111.00
1	A	559	PHE	CA-C-N	5.28	131.87	117.10
1	A	497	GLN	N-CA-C	-5.27	96.77	111.00
5	K	102	PRO	C-N-CA	5.26	134.84	121.70
1	A	189	VAL	O-C-N	-5.24	114.32	122.70
2	D	131	ILE	C-N-CA	5.20	134.70	121.70
1	C	223	THR	N-CA-C	-5.18	97.01	111.00
1	A	530	ILE	O-C-N	-5.17	114.42	122.70
2	E	249	HIS	C-N-CA	5.17	134.62	121.70
9	W	17	VAL	C-N-CA	5.14	133.10	122.30
1	C	145	HIS	N-CA-C	-5.13	97.14	111.00
5	K	61	TYR	C-N-CA	5.13	134.53	121.70
8	N	512	ALA	C-N-CA	5.12	134.50	121.70
1	C	481	ARG	O-C-N	-5.11	114.52	122.70
7	M	78	GLY	CA-C-O	-5.11	111.41	120.60
1	A	147	ILE	C-N-CA	5.10	134.44	121.70
2	D	411	TYR	C-N-CA	5.10	134.44	121.70
1	C	380	ILE	N-CA-C	-5.09	97.24	111.00
2	E	131	ILE	O-C-N	-5.09	114.55	122.70
5	K	86	LEU	CA-C-N	-5.09	106.00	117.20
1	A	421	ALA	N-CA-C	-5.09	97.26	111.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	P	44	ALA	CA-C-O	-5.08	109.43	120.10
2	D	218	VAL	N-CA-C	-5.08	97.29	111.00
1	B	329	ARG	C-N-CA	5.07	134.37	121.70
2	E	458	HIS	CA-C-O	-5.06	109.47	120.10
6	L	74	ILE	N-CA-C	-5.06	97.33	111.00
5	K	2	SER	N-CA-C	-5.06	97.34	111.00
4	J	82	GLU	O-C-N	5.05	130.79	122.70
2	D	365	GLY	O-C-N	-5.04	114.63	122.70
8	N	523	TRP	C-N-CA	5.04	134.30	121.70
7	M	283	VAL	C-N-CA	5.04	132.87	122.30
9	Q	2	GLU	C-N-CA	5.04	134.29	121.70
6	L	51	LEU	N-CA-C	-5.03	97.41	111.00
2	D	152	ILE	N-CA-C	-5.03	97.42	111.00
2	D	187	PHE	O-C-N	5.03	130.75	122.70
7	M	243	GLU	N-CA-C	-5.02	97.44	111.00
1	B	203	THR	N-CA-C	-5.01	97.46	111.00
2	E	356	PRO	O-C-N	5.01	130.72	122.70
1	C	203	THR	N-CA-C	-5.01	97.48	111.00

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
10	1	98	LYS	Peptide
10	2	98	LYS	Peptide
7	M	3	ASP	Peptide

5.2 Too-close contacts ⓘ

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2307	0	654	0	0
1	B	2303	0	650	0	0
1	C	2307	0	654	0	0
2	D	1827	0	510	0	0
2	E	1827	0	510	0	0
2	F	1827	0	510	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	G	734	0	191	0	0
3	H	734	0	191	0	0
4	I	399	0	100	2	0
4	J	399	0	100	0	0
5	K	839	0	230	0	0
6	L	399	0	119	0	0
7	M	1279	0	357	0	0
8	N	2474	0	691	0	0
9	O	319	0	109	0	0
9	P	319	0	109	0	0
9	Q	319	0	109	0	0
9	R	319	0	109	0	0
9	S	319	0	109	0	0
9	T	319	0	109	0	0
9	U	319	0	109	0	0
9	V	319	0	109	0	0
9	W	319	0	109	0	0
9	X	319	0	109	0	0
9	Y	319	0	109	0	0
9	Z	319	0	109	0	0
10	1	571	0	269	0	0
10	2	571	0	269	0	0
All	All	24625	0	7313	2	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 0.

All (2) 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)
4:I:115:LEU:O	4:I:117:GLU:N	2.30	0.61
4:I:115:LEU:C	4:I:117:GLU:H	2.19	0.43

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 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	Percentiles	
1	A	575/577 (100%)	504 (88%)	56 (10%)	15 (3%)	7	45
1	B	574/577 (100%)	477 (83%)	72 (12%)	25 (4%)	3	33
1	C	575/577 (100%)	499 (87%)	56 (10%)	20 (4%)	4	39
2	D	455/457 (100%)	370 (81%)	65 (14%)	20 (4%)	3	33
2	E	455/457 (100%)	370 (81%)	64 (14%)	21 (5%)	3	33
2	F	455/457 (100%)	377 (83%)	57 (12%)	21 (5%)	3	33
3	G	180/186 (97%)	162 (90%)	10 (6%)	8 (4%)	3	33
3	H	180/186 (97%)	167 (93%)	9 (5%)	4 (2%)	8	49
4	I	98/105 (93%)	91 (93%)	5 (5%)	2 (2%)	9	51
4	J	98/105 (93%)	94 (96%)	3 (3%)	1 (1%)	19	65
5	K	208/210 (99%)	172 (83%)	25 (12%)	11 (5%)	2	29
6	L	98/100 (98%)	78 (80%)	15 (15%)	5 (5%)	2	30
7	M	318/323 (98%)	307 (96%)	7 (2%)	4 (1%)	15	60
8	N	615/652 (94%)	559 (91%)	43 (7%)	13 (2%)	9	50
9	O	78/99 (79%)	76 (97%)	2 (3%)	0	100	100
9	P	78/99 (79%)	74 (95%)	2 (3%)	2 (3%)	7	45
9	Q	78/99 (79%)	72 (92%)	4 (5%)	2 (3%)	7	45
9	R	78/99 (79%)	73 (94%)	4 (5%)	1 (1%)	15	60
9	S	78/99 (79%)	74 (95%)	4 (5%)	0	100	100
9	T	78/99 (79%)	75 (96%)	2 (3%)	1 (1%)	15	60
9	U	78/99 (79%)	75 (96%)	3 (4%)	0	100	100
9	V	78/99 (79%)	72 (92%)	6 (8%)	0	100	100
9	W	78/99 (79%)	74 (95%)	1 (1%)	3 (4%)	4	37
9	X	78/99 (79%)	74 (95%)	1 (1%)	3 (4%)	4	37
9	Y	78/99 (79%)	74 (95%)	3 (4%)	1 (1%)	15	60

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
9	Z	78/99 (79%)	74 (95%)	3 (4%)	1 (1%)	15	60
10	1	115/149 (77%)	111 (96%)	4 (4%)	0	100	100
10	2	115/149 (77%)	111 (96%)	4 (4%)	0	100	100
All	All	6050/6455 (94%)	5336 (88%)	530 (9%)	184 (3%)	9	42

All (184) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	134	VAL
1	B	258	ARG
1	B	303	ILE
1	B	305	VAL
1	B	466	GLU
1	C	227	PRO
1	C	480	GLU
2	D	259	ASP
2	D	419	GLU
2	E	62	GLU
2	E	175	PRO
2	F	25	LYS
2	F	139	ASP
2	F	176	ASP
2	F	298	ALA
5	K	117	VAL
7	M	4	ASP
8	N	169	ALA
8	N	365	ASP
8	N	642	TYR
9	Q	3	GLU
1	A	85	ASP
1	A	210	ARG
1	A	233	GLY
1	A	512	ALA
1	B	210	ARG
1	B	292	SER
1	B	443	VAL
1	B	445	GLU
1	C	64	VAL
1	C	70	PRO
1	C	302	SER
1	C	403	VAL

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Mol	Chain	Res	Type
1	C	417	ARG
1	C	471	VAL
2	D	17	PRO
2	D	176	ASP
2	D	239	LEU
2	D	332	ILE
2	D	425	GLN
2	E	82	LEU
2	E	97	GLY
2	E	210	ARG
2	E	330	GLY
2	F	15	SER
2	F	140	VAL
2	F	192	ALA
2	F	327	ASP
3	G	14	ALA
3	G	150	LEU
3	G	157	ALA
3	H	14	ALA
4	I	116	LYS
5	K	168	VAL
6	L	64	ARG
8	N	544	ILE
9	R	4	ALA
9	T	6	ALA
9	Z	4	ALA
1	A	177	ASP
1	A	494	PHE
1	B	104	ARG
1	B	219	ALA
1	B	296	VAL
1	B	302	SER
1	B	340	ARG
1	C	233	GLY
1	C	295	PRO
1	C	432	THR
2	D	23	ASN
2	D	101	ASP
2	E	17	PRO
2	E	23	ASN
2	E	77	GLU
2	E	164	ALA

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Mol	Chain	Res	Type
2	E	293	THR
2	E	425	GLN
2	F	88	MET
2	F	128	GLU
2	F	351	PRO
2	F	415	ALA
3	G	114	ALA
3	G	156	GLY
3	G	160	LYS
3	H	162	GLN
3	H	178	MET
5	K	69	ALA
5	K	70	PHE
5	K	82	GLY
5	K	110	ASP
6	L	23	ALA
7	M	185	GLN
8	N	367	GLY
8	N	449	ILE
8	N	525	SER
8	N	637	GLU
9	Q	6	ALA
9	W	8	GLY
9	X	4	ALA
9	Y	8	GLY
1	A	90	PRO
1	B	432	THR
1	B	499	ALA
1	C	36	VAL
1	C	56	SER
1	C	57	GLY
1	C	81	ASN
2	D	137	THR
2	D	281	ARG
2	D	435	SER
2	E	89	LEU
2	E	223	LYS
2	E	358	LEU
2	F	137	THR
2	F	214	LEU
2	F	389	GLY
3	H	114	ALA

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Mol	Chain	Res	Type
6	L	52	LEU
7	M	224	PHE
8	N	181	LYS
8	N	436	GLY
8	N	640	ARG
9	P	5	ALA
9	X	79	ARG
1	A	36	VAL
1	A	45	ASP
1	A	263	THR
1	A	284	ARG
1	B	56	SER
1	B	245	SER
1	C	243	LYS
1	C	287	LEU
2	D	62	GLU
2	D	216	ARG
2	D	403	ALA
2	E	13	TYR
2	E	326	PRO
2	F	259	ASP
2	F	402	ASP
2	F	421	PHE
2	F	437	GLN
3	G	138	ARG
4	I	117	GLU
5	K	99	SER
5	K	134	ALA
5	K	174	ALA
5	K	180	GLN
6	L	55	PRO
6	L	79	GLU
8	N	366	ILE
9	P	79	ARG
9	W	5	ALA
9	W	9	GLY
9	X	50	SER
1	A	139	PRO
1	B	179	THR
1	B	304	TYR
2	D	13	TYR
2	D	223	LYS

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Mol	Chain	Res	Type
2	E	237	MET
2	E	259	ASP
2	F	436	LEU
3	G	5	GLU
4	J	81	THR
7	M	184	ASP
8	N	168	TYR
1	A	168	VAL
1	A	275	PRO
2	E	99	PRO
1	B	40	ILE
1	B	388	GLY
1	B	389	GLY
2	D	326	PRO
1	C	280	PRO
1	C	288	ILE
2	D	351	PRO
5	K	179	ILE
1	B	275	PRO
1	C	139	PRO
2	D	235	PRO
1	A	265	VAL
1	B	344	MET
2	E	159	PRO
2	F	390	VAL

5.3.2 Protein sidechains ⓘ

There are no protein residues with a non-rotameric sidechain to report in this entry.

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 [i](#)

There are no carbohydrates 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.