



Full wwPDB X-ray Structure Validation Report ⓘ

May 21, 2020 – 09:24 am BST

PDB ID : 1HXF
Title : HUMAN THROMBIN COMPLEX WITH HIRUDIN VARIANT
Authors : Tulinsky, A.; Zhang, E.
Deposited on : 1996-09-09
Resolution : 2.10 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
Xtrriage (Phenix) : **NOT EXECUTED**
EDS : **NOT EXECUTED**
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.11

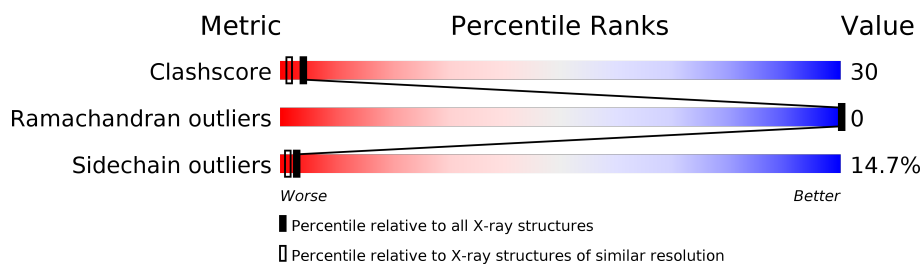
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.10 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 (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	141614	5710 (2.10-2.10)
Ramachandran outliers	138981	5647 (2.10-2.10)
Sidechain outliers	138945	5648 (2.10-2.10)

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 $\leq 5\%$

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	L	36	
2	H	259	
3	I	10	

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 2447 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called THROMBIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	L	26	217	137	35	44	1	0	0	0

- Molecule 2 is a protein called THROMBIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	H	248	2007	1279	356	358	14	0	0	0

- Molecule 3 is a protein called HIRUDIN VARIANT.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
3	I	10	85	56	10	19	0	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	L	14	Total 14	O 14	0	0
4	H	121	Total 121	O 121	0	0
4	I	3	Total 3	O 3	0	0

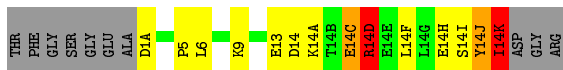
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes 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.

Note EDS was not executed.

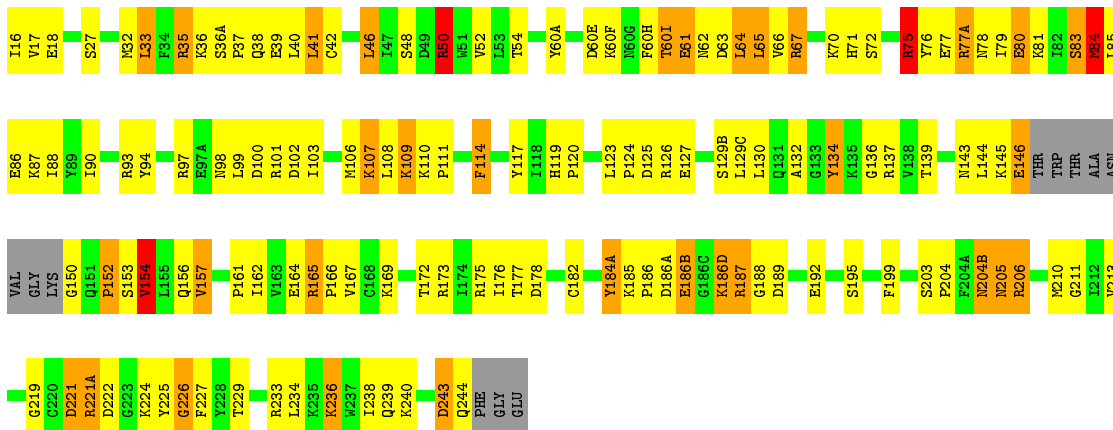
- Molecule 1: THROMBIN

Chain L: 



- Molecule 2: THROMBIN

Chain H: 



- Molecule 3: HIRUDIN VARIANT

Chain I: 



4 Data and refinement statistics

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	70.66Å 72.47Å 73.09Å 90.00° 100.75° 90.00°	Depositor
Resolution (Å)	7.00 – 2.10	Depositor
% Data completeness (in resolution range)	(Not available) (7.00-2.10)	Depositor
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	PROLSQ	Depositor
R, R_{free}	0.151 , (Not available)	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	2447	wwPDB-VP
Average B, all atoms (Å ²)	25.0	wwPDB-VP

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).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	L	0.87	0/219	2.26	10/291 (3.4%)
2	H	0.91	0/2058	2.16	72/2780 (2.6%)
3	I	0.98	0/87	2.58	7/117 (6.0%)
All	All	0.91	0/2364	2.19	89/3188 (2.8%)

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
2	H	0	5
3	I	0	1
All	All	0	6

There are no bond length outliers.

All (89) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	233	ARG	NE-CZ-NH1	22.76	131.68	120.30
2	H	233	ARG	NE-CZ-NH2	-18.18	111.21	120.30
2	H	165	ARG	NE-CZ-NH1	17.27	128.93	120.30
2	H	67	ARG	NE-CZ-NH1	14.68	127.64	120.30
2	H	35	ARG	NE-CZ-NH2	-13.59	113.51	120.30
3	I	63	TYR	CB-CG-CD1	12.48	128.49	121.00
2	H	221(A)	ARG	NE-CZ-NH1	-11.90	114.35	120.30
2	H	97	ARG	NE-CZ-NH2	-11.22	114.69	120.30
1	L	1(A)	ASP	CB-CG-OD1	-10.07	109.23	118.30
2	H	221	ASP	CB-CG-OD1	9.74	127.07	118.30
2	H	117	TYR	CB-CG-CD2	-9.72	115.17	121.00
2	H	109	LYS	CA-CB-CG	9.72	134.78	113.40
2	H	97	ARG	NE-CZ-NH1	9.68	125.14	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	243	ASP	CB-CG-OD1	9.08	126.47	118.30
2	H	114	PHE	CB-CG-CD1	-8.91	114.56	120.80
1	L	14	ASP	CB-CG-OD2	8.84	126.26	118.30
2	H	175	ARG	NE-CZ-NH2	8.83	124.72	120.30
2	H	93	ARG	NE-CZ-NH2	8.60	124.60	120.30
2	H	184(A)	TYR	CB-CG-CD2	8.53	126.11	121.00
2	H	102	ASP	CB-CG-OD1	-8.28	110.85	118.30
2	H	178	ASP	CB-CG-OD2	-8.25	110.88	118.30
3	I	63	TYR	CB-CG-CD2	-8.23	116.06	121.00
3	I	63	TYR	CB-CA-C	8.20	126.80	110.40
2	H	184(A)	TYR	CB-CG-CD1	-8.01	116.19	121.00
3	I	55	ASP	CB-CG-OD1	7.81	125.33	118.30
1	L	1(A)	ASP	CB-CG-OD2	7.81	125.33	118.30
2	H	132	ALA	O-C-N	7.76	136.39	123.20
1	L	14	ASP	CB-CG-OD1	-7.70	111.37	118.30
3	I	64	LEU	CA-C-O	7.36	135.56	120.10
2	H	206	ARG	NE-CZ-NH1	-7.11	116.74	120.30
2	H	137	ARG	NE-CZ-NH2	7.04	123.82	120.30
2	H	77(A)	ARG	NE-CZ-NH2	-7.02	116.79	120.30
2	H	225	TYR	CB-CG-CD1	-6.82	116.91	121.00
2	H	50	ARG	NE-CZ-NH1	-6.71	116.94	120.30
2	H	134	TYR	CG-CD1-CE1	6.64	126.62	121.30
2	H	94	TYR	CB-CG-CD2	-6.60	117.04	121.00
2	H	101	ARG	NE-CZ-NH2	-6.51	117.04	120.30
2	H	137	ARG	NE-CZ-NH1	-6.45	117.08	120.30
2	H	110	LYS	CA-CB-CG	6.44	127.56	113.40
2	H	60(A)	TYR	CB-CG-CD1	-6.42	117.15	121.00
2	H	67	ARG	NH1-CZ-NH2	-6.41	112.35	119.40
2	H	114	PHE	CB-CG-CD2	6.38	125.27	120.80
2	H	132	ALA	CA-C-O	-6.33	106.80	120.10
2	H	80	GLU	CA-CB-CG	6.32	127.30	113.40
2	H	117	TYR	CB-CG-CD1	6.22	124.73	121.00
2	H	164	GLU	CG-CD-OE2	6.14	130.58	118.30
2	H	35	ARG	NH1-CZ-NH2	6.12	126.14	119.40
2	H	42	CYS	CA-CB-SG	6.09	124.97	114.00
2	H	173	ARG	NE-CZ-NH2	6.07	123.33	120.30
2	H	76	TYR	CB-CG-CD1	-6.05	117.37	121.00
2	H	83	SER	N-CA-CB	6.04	119.57	110.50
2	H	165	ARG	NH1-CZ-NH2	-5.97	112.83	119.40
2	H	97	ARG	CD-NE-CZ	-5.96	115.25	123.60
1	L	14(D)	ARG	CG-CD-NE	5.90	124.18	111.80
1	L	14(D)	ARG	CD-NE-CZ	5.87	131.81	123.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	111	PRO	N-CA-CB	5.76	110.21	103.30
2	H	146	GLU	N-CA-CB	5.73	120.91	110.60
2	H	233	ARG	CD-NE-CZ	5.73	131.62	123.60
2	H	77	GLU	OE1-CD-OE2	-5.70	116.47	123.30
1	L	14(C)	GLU	CG-CD-OE2	5.69	129.68	118.30
3	I	55	ASP	CB-CG-OD2	-5.69	113.18	118.30
2	H	77	GLU	CG-CD-OE1	5.66	129.63	118.30
2	H	154	VAL	N-CA-CB	-5.66	99.06	111.50
2	H	125	ASP	CB-CG-OD1	-5.65	113.22	118.30
2	H	100	ASP	O-C-N	5.60	131.66	122.70
2	H	205	ASN	OD1-CG-ND2	5.59	134.76	121.90
2	H	75	ARG	NE-CZ-NH2	5.58	123.09	120.30
2	H	93	ARG	CD-NE-CZ	-5.52	115.87	123.60
2	H	205	ASN	CB-CG-ND2	-5.51	103.47	116.70
3	I	63	TYR	CA-CB-CG	5.37	123.61	113.40
2	H	77(A)	ARG	CD-NE-CZ	5.34	131.08	123.60
1	L	13	GLU	CA-CB-CG	5.28	125.01	113.40
2	H	50	ARG	CB-CA-C	-5.26	99.88	110.40
2	H	117	TYR	O-C-N	5.26	131.11	122.70
2	H	77(A)	ARG	NE-CZ-NH1	5.25	122.93	120.30
2	H	169	LYS	C-N-CA	5.16	134.61	121.70
2	H	187	ARG	NE-CZ-NH1	-5.16	117.72	120.30
2	H	93	ARG	NE-CZ-NH1	-5.14	117.73	120.30
2	H	206	ARG	CD-NE-CZ	-5.13	116.42	123.60
2	H	164	GLU	CA-CB-CG	5.13	124.68	113.40
2	H	84	MET	O-C-N	5.12	130.89	122.70
1	L	14(J)	TYR	CB-CG-CD1	5.11	124.07	121.00
2	H	226	GLY	O-C-N	5.07	130.81	122.70
2	H	107	LYS	O-C-N	5.04	130.76	122.70
2	H	154	VAL	CB-CA-C	5.03	120.96	111.40
2	H	60(E)	ASP	CB-CG-OD1	-5.02	113.78	118.30
2	H	94	TYR	CG-CD1-CE1	-5.01	117.29	121.30
1	L	14(K)	ILE	CB-CA-C	5.00	121.61	111.60
2	H	94	TYR	CG-CD2-CE2	-5.00	117.30	121.30

There are no chirality outliers.

All (6) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	H	157	VAL	Mainchain
2	H	172	THR	Mainchain
2	H	210	MET	Mainchain

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Mol	Chain	Res	Type	Group
2	H	54	THR	Mainchain
2	H	60(H)	PHE	Mainchain
3	I	63	TYR	Sidechain

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	L	217	0	220	5	0
2	H	2007	0	1985	125	0
3	I	85	0	71	7	0
4	H	121	0	0	22	0
4	I	3	0	0	0	0
4	L	14	0	0	0	0
All	All	2447	0	2276	136	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 30.

All (136) 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:236:LYS:N	2:H:236:LYS:HD2	1.36	1.24
2:H:224:LYS:HG3	4:H:514:HOH:O	1.43	1.19
2:H:236:LYS:H	2:H:236:LYS:CD	1.51	1.15
2:H:187:ARG:HG2	4:H:532:HOH:O	1.54	1.06
2:H:50:ARG:HH11	2:H:50:ARG:HG2	1.11	1.06
2:H:50:ARG:HD2	4:H:476:HOH:O	1.61	0.97
2:H:85:LEU:HD13	2:H:106:MET:HE2	1.51	0.93
2:H:17:VAL:O	2:H:188:GLY:HA2	1.71	0.89
2:H:50:ARG:HH11	2:H:50:ARG:CG	1.85	0.89
2:H:75:ARG:HG3	2:H:75:ARG:HH11	1.36	0.88
2:H:176:ILE:HD12	2:H:227:PHE:CE2	2.11	0.85
2:H:46:LEU:HD22	2:H:48:SER:O	1.76	0.84
2:H:35:ARG:O	2:H:38:GLN:HA	1.80	0.80
2:H:50:ARG:HG2	2:H:50:ARG:NH1	1.94	0.78

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:61:GLU:OE1	2:H:87:LYS:HA	1.85	0.77
2:H:75:ARG:NH2	4:H:469:HOH:O	2.18	0.76
2:H:50:ARG:NE	2:H:107:LYS:NZ	2.34	0.76
2:H:50:ARG:HE	2:H:107:LYS:NZ	1.84	0.75
2:H:139:THR:HG22	2:H:157:VAL:HG22	1.67	0.74
2:H:18:GLU:HG3	2:H:187:ARG:HB2	1.67	0.73
2:H:50:ARG:HE	2:H:107:LYS:HZ1	1.35	0.73
2:H:236:LYS:HD2	2:H:236:LYS:H	0.64	0.73
2:H:60(F):LYS:HE2	4:H:527:HOH:O	1.88	0.73
2:H:75:ARG:HG3	2:H:75:ARG:NH1	2.03	0.71
2:H:146:GLU:HB2	4:H:519:HOH:O	1.89	0.71
2:H:72:SER:OG	2:H:75:ARG:HG2	1.91	0.71
2:H:60(F):LYS:CE	4:H:527:HOH:O	2.38	0.70
2:H:50:ARG:NE	2:H:107:LYS:HZ2	1.90	0.70
2:H:36:LYS:HE2	4:H:513:HOH:O	1.91	0.70
2:H:224:LYS:HE3	4:H:514:HOH:O	1.94	0.67
2:H:185:LYS:H	2:H:186(B):GLU:HG3	1.59	0.66
2:H:236:LYS:N	2:H:236:LYS:CD	2.21	0.66
2:H:185:LYS:N	2:H:186(B):GLU:HG3	2.11	0.65
2:H:46:LEU:CD2	2:H:48:SER:O	2.44	0.65
2:H:85:LEU:HD13	2:H:106:MET:CE	2.26	0.64
2:H:87:LYS:HD3	2:H:88:ILE:H	1.64	0.63
2:H:75:ARG:CG	2:H:75:ARG:NH1	2.62	0.62
2:H:36:LYS:HD3	3:I:64:LEU:HD23	1.82	0.61
2:H:146:GLU:CD	2:H:221(A):ARG:HE	2.05	0.60
2:H:165:ARG:CD	4:H:422:HOH:O	2.50	0.60
2:H:204(B):ASN:O	2:H:205:ASN:HB2	2.03	0.58
2:H:146:GLU:OE1	2:H:221(A):ARG:NE	2.37	0.57
2:H:80:GLU:O	2:H:81:LYS:HD2	2.04	0.57
2:H:50:ARG:HH21	2:H:107:LYS:HE3	1.69	0.57
2:H:77(A):ARG:O	4:H:404:HOH:O	2.17	0.57
2:H:239:GLN:HG3	4:H:496:HOH:O	2.04	0.57
2:H:87:LYS:HD3	2:H:88:ILE:N	2.20	0.56
1:L:14(J):TYR:C	1:L:14(K):ILE:HG12	2.26	0.56
2:H:75:ARG:CZ	4:H:469:HOH:O	2.52	0.56
2:H:70:LYS:HE3	2:H:72:SER:O	2.05	0.55
1:L:5:PRO:HA	1:L:9:LYS:HG3	1.89	0.54
2:H:165:ARG:HD3	4:H:422:HOH:O	2.05	0.54
2:H:146:GLU:CB	4:H:519:HOH:O	2.53	0.54
2:H:165:ARG:NH2	2:H:177:THR:O	2.40	0.54
2:H:165:ARG:HB3	2:H:166:PRO:HD3	1.90	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:37:PRO:O	2:H:39:GLU:HG2	2.08	0.53
2:H:84:MET:HE1	4:H:513:HOH:O	2.08	0.52
2:H:35:ARG:HD3	2:H:39:GLU:OE2	2.09	0.52
2:H:85:LEU:CD1	2:H:106:MET:CE	2.87	0.52
2:H:165:ARG:NE	4:H:422:HOH:O	2.43	0.52
3:I:60:PRO:HB2	3:I:62:GLU:CD	2.29	0.52
2:H:187:ARG:NH2	2:H:221:ASP:O	2.44	0.51
2:H:188:GLY:O	2:H:189:ASP:HB2	2.09	0.51
2:H:167:VAL:HG11	2:H:185:LYS:HE2	1.93	0.51
2:H:36:LYS:HG2	2:H:65:LEU:HD22	1.92	0.51
2:H:52:VAL:HG21	2:H:108:LEU:HD21	1.92	0.51
2:H:52:VAL:CG2	2:H:108:LEU:HD21	2.41	0.50
2:H:187:ARG:HB3	2:H:221:ASP:OD1	2.11	0.50
1:L:14(I):SER:C	1:L:14(K):ILE:H	2.13	0.50
1:L:14(D):ARG:CZ	1:L:14(H):GLU:OE2	2.60	0.50
2:H:103:ILE:HD11	2:H:238:ILE:HD11	1.94	0.50
2:H:36:LYS:HE3	2:H:62:ASN:O	2.12	0.49
2:H:16:ILE:HA	2:H:189:ASP:O	2.13	0.49
2:H:203:SER:HB3	2:H:204(B):ASN:ND2	2.28	0.49
2:H:18:GLU:HB2	2:H:188:GLY:HA2	1.95	0.48
2:H:182:CYS:HA	2:H:226:GLY:O	2.13	0.48
2:H:129(C):LEU:HD21	2:H:204:PRO:CD	2.44	0.47
2:H:17:VAL:HG11	2:H:221:ASP:CB	2.44	0.47
2:H:186(D):LYS:O	4:H:532:HOH:O	2.20	0.47
2:H:50:ARG:CG	2:H:50:ARG:NH1	2.56	0.47
2:H:70:LYS:NZ	2:H:80:GLU:OE2	2.41	0.47
3:I:58:GLU:CD	3:I:58:GLU:H	2.18	0.47
2:H:60(I):THR:HB	2:H:63:ASP:OD2	2.15	0.47
2:H:211:GLY:HA2	2:H:229:THR:O	2.15	0.47
2:H:156:GLN:C	2:H:157:VAL:HG23	2.35	0.46
2:H:204(B):ASN:C	2:H:204(B):ASN:HD22	2.19	0.46
1:L:14(C):GLU:O	1:L:14(F):LEU:HB2	2.15	0.46
2:H:114:PHE:HD1	2:H:114:PHE:HA	1.43	0.46
2:H:204(B):ASN:O	2:H:205:ASN:CB	2.64	0.46
2:H:35:ARG:NH2	4:H:486:HOH:O	2.47	0.46
2:H:77(A):ARG:O	2:H:78:ASN:HB2	2.16	0.46
2:H:136:GLY:HA3	2:H:199:PHE:CZ	2.51	0.45
2:H:50:ARG:NH2	2:H:86:GLU:OE1	2.49	0.45
2:H:203:SER:HB3	2:H:204(B):ASN:HD21	1.81	0.45
2:H:229:THR:HG22	2:H:234:LEU:HD12	1.98	0.45
2:H:86:GLU:HB2	2:H:109:LYS:HA	1.97	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:123:LEU:HA	2:H:124:PRO:HD3	1.86	0.45
2:H:98:ASN:O	2:H:99:LEU:HB2	2.17	0.45
2:H:17:VAL:O	2:H:18:GLU:HB2	2.17	0.45
2:H:144:LEU:HD11	2:H:152:PRO:HA	2.00	0.44
3:I:60:PRO:HG2	3:I:63:TYR:CD2	2.52	0.44
2:H:186:PRO:HB3	2:H:222:ASP:HB3	2.00	0.44
2:H:134:TYR:O	2:H:162:ILE:HG13	2.18	0.44
2:H:176:ILE:HD12	2:H:227:PHE:HE2	1.78	0.43
2:H:70:LYS:NZ	2:H:75:ARG:O	2.45	0.43
2:H:70:LYS:HE3	2:H:70:LYS:HB3	1.76	0.43
2:H:204(B):ASN:H	2:H:204(B):ASN:ND2	2.16	0.43
2:H:114:PHE:CD1	2:H:114:PHE:N	2.85	0.43
2:H:204(B):ASN:N	2:H:204(B):ASN:HD22	2.17	0.42
2:H:204(B):ASN:N	2:H:204(B):ASN:ND2	2.67	0.42
2:H:41:LEU:HD23	2:H:64:LEU:HD22	2.02	0.42
2:H:156:GLN:C	2:H:157:VAL:CG2	2.88	0.42
2:H:176:ILE:CD1	2:H:227:PHE:CE2	2.93	0.42
2:H:167:VAL:HG23	2:H:167:VAL:H	1.59	0.42
2:H:60(I):THR:O	2:H:63:ASP:HB2	2.20	0.42
2:H:213:VAL:HG13	4:H:429:HOH:O	2.19	0.42
2:H:35:ARG:HD2	2:H:41:LEU:HD11	2.01	0.42
2:H:206:ARG:HD3	2:H:206:ARG:HH11	1.47	0.41
2:H:219:GLY:HA3	2:H:221(A):ARG:NE	2.35	0.41
3:I:60:PRO:HB2	3:I:62:GLU:OE2	2.20	0.41
2:H:71:HIS:CD2	2:H:154:VAL:HG22	2.56	0.41
3:I:61:GLY:C	3:I:63:TYR:N	2.72	0.41
2:H:32:MET:HB3	2:H:67:ARG:HB2	2.02	0.41
2:H:32:MET:HG3	2:H:40:LEU:HD12	2.03	0.41
2:H:161:PRO:HD3	2:H:184(A):TYR:CZ	2.56	0.41
2:H:126:ARG:NE	4:H:466:HOH:O	2.53	0.41
2:H:236:LYS:O	2:H:240:LYS:HB2	2.20	0.41
2:H:67:ARG:HH21	2:H:80:GLU:CD	2.24	0.41
2:H:61:GLU:OE1	2:H:87:LYS:CA	2.62	0.41
2:H:119:HIS:HA	2:H:120:PRO:HD3	1.88	0.41
2:H:17:VAL:HG11	2:H:221:ASP:HB3	2.03	0.41
2:H:129(C):LEU:HD21	2:H:204:PRO:HD3	2.03	0.40
2:H:33:LEU:HA	2:H:33:LEU:HD23	1.85	0.40
2:H:146:GLU:N	4:H:509:HOH:O	2.15	0.40
2:H:143:ASN:HA	2:H:150:GLY:O	2.22	0.40
3:I:60:PRO:HG2	3:I:63:TYR:CE2	2.56	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 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	L	24/36 (67%)	22 (92%)	2 (8%)	0	100	100
2	H	244/259 (94%)	227 (93%)	17 (7%)	0	100	100
3	I	8/10 (80%)	8 (100%)	0	0	100	100
All	All	276/305 (90%)	257 (93%)	19 (7%)	0	100	100

There are no Ramachandran outliers to report.

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	L	25/31 (81%)	21 (84%)	4 (16%)	2	1
2	H	217/225 (96%)	185 (85%)	32 (15%)	3	1
3	I	9/9 (100%)	8 (89%)	1 (11%)	6	3
All	All	251/265 (95%)	214 (85%)	37 (15%)	3	1

All (37) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	L	6	LEU
1	L	14(A)	LYS
1	L	14(D)	ARG
1	L	14(K)	ILE
2	H	27	SER

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Mol	Chain	Res	Type
2	H	33	LEU
2	H	36(A)	SER
2	H	41	LEU
2	H	46	LEU
2	H	50	ARG
2	H	60(I)	THR
2	H	61	GLU
2	H	64	LEU
2	H	65	LEU
2	H	66	VAL
2	H	75	ARG
2	H	79	ILE
2	H	83	SER
2	H	84	MET
2	H	90	ILE
2	H	127	GLU
2	H	129(B)	SER
2	H	130	LEU
2	H	145	LYS
2	H	152	PRO
2	H	153	SER
2	H	154	VAL
2	H	186(A)	ASP
2	H	186(B)	GLU
2	H	186(D)	LYS
2	H	192	GLU
2	H	195	SER
2	H	204(B)	ASN
2	H	236	LYS
2	H	243	ASP
2	H	244	GLN
3	I	58	GLU

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

Mol	Chain	Res	Type
2	H	78	ASN
2	H	156	GLN
2	H	204(B)	ASN

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 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.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

EDS was not executed - this section is therefore empty.

6.2 Non-standard residues in protein, DNA, RNA chains

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

6.4 Ligands

EDS was not executed - this section is therefore empty.

6.5 Other polymers

EDS was not executed - this section is therefore empty.