



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 06:38 PM UTC

PDB ID : 1EX3 / pdb_00001ex3
Title : CRYSTAL STRUCTURE OF BOVINE CHYMOTRYPSINOGEN A
(TETRAGONAL)
Authors : Pjura, P.E.; Lenhoff, A.M.; Leonard, S.A.; Gittis, A.G.
Deposited on : 2000-04-28
Resolution : 3.00 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

MolProbity : 4-5-2 with Phenix2.0
Xtriage (Phenix) : **NOT EXECUTED**
EDS : **NOT EXECUTED**
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

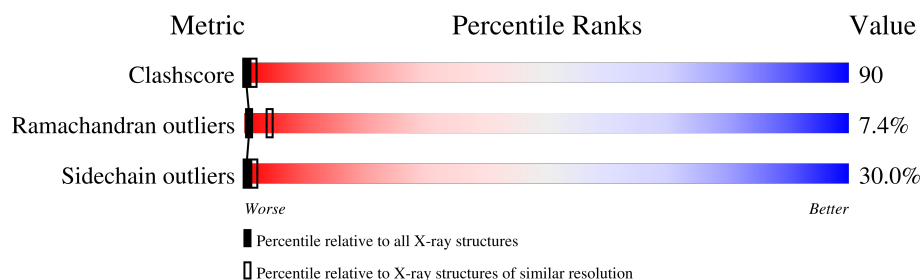
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.00 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	190562	2977 (3.00-3.00)
Ramachandran outliers	187476	2877 (3.00-3.00)
Sidechain outliers	187428	2880 (3.00-3.00)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	245	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 1841 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 CHYMOTRYPSINOGEN A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	245	Total	C	N	O	S	0	0	0
			1799	1127	307	353	12			

- Molecule 2 is water.

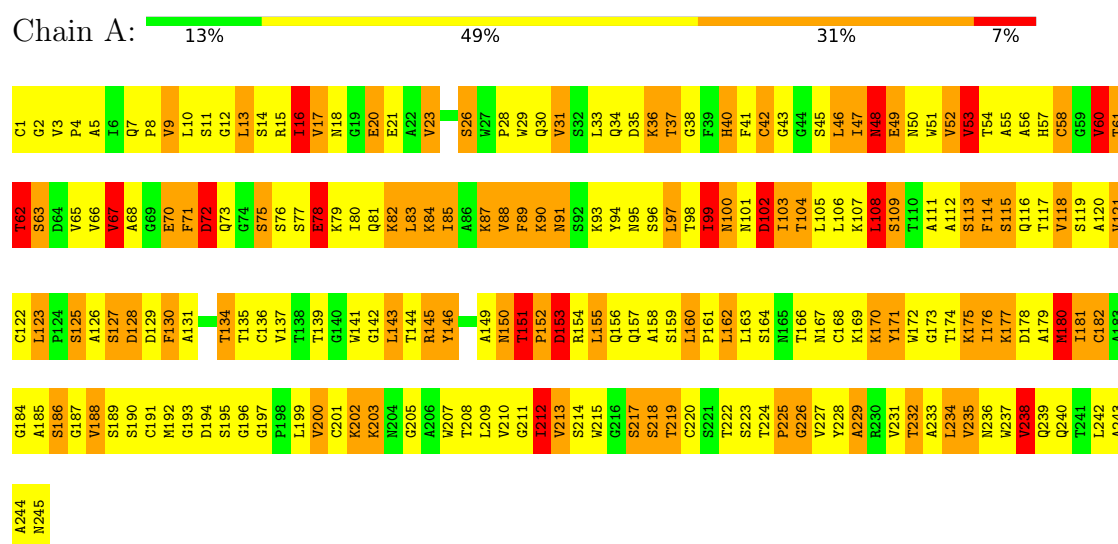
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	42	Total	O	0	0
			42	42		

3 Residue-property plots

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. 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: CHYMOTRYPSINOGEN A



4 Data and refinement statistics

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

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, α , β , γ	114.90 Å 114.90 Å 52.80 Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 3.00	Depositor
% Data completeness (in resolution range)	100.0 (20.00-3.00)	Depositor
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	TNT	Depositor
R, R_{free}	0.204 , (Not available)	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	1841	wwPDB-VP
Average B, all atoms (Å ²)	35.0	wwPDB-VP

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	$\# Z > 5$	RMSZ	$\# Z > 5$
1	A	1.73	27/1835 (1.5%)	2.03	53/2502 (2.1%)

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
1	A	1	0

All (27) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	67	VAL	CA-CB	-7.90	1.44	1.54
1	A	47	ILE	CA-CB	-7.47	1.45	1.54
1	A	66	VAL	CA-CB	-7.44	1.45	1.54
1	A	130	PHE	CA-C	-6.34	1.44	1.52
1	A	180	MET	N-CA	-6.22	1.38	1.45
1	A	123	LEU	CA-C	-6.12	1.44	1.53
1	A	200	VAL	CA-C	-6.12	1.45	1.52
1	A	131	ALA	CA-C	-5.87	1.45	1.52
1	A	61	THR	CA-C	-5.85	1.45	1.52
1	A	72	ASP	N-CA	-5.74	1.39	1.46
1	A	130	PHE	N-CA	-5.59	1.39	1.46
1	A	62	THR	N-CA	-5.51	1.39	1.46
1	A	60	VAL	CA-CB	-5.44	1.48	1.54
1	A	155	LEU	N-CA	-5.42	1.39	1.46
1	A	102	ASP	CG-OD2	5.41	1.35	1.25
1	A	31	VAL	CA-C	-5.41	1.46	1.52
1	A	125	SER	CA-C	-5.39	1.46	1.52
1	A	21	GLU	CD-OE2	5.39	1.35	1.25
1	A	229	ALA	N-CA	-5.38	1.39	1.46
1	A	181	ILE	C-O	5.37	1.30	1.23

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	108	LEU	CA-C	-5.36	1.45	1.53
1	A	129	ASP	C-N	-5.29	1.26	1.33
1	A	20	GLU	CD-OE2	5.14	1.35	1.25
1	A	91	ASN	C-N	-5.13	1.27	1.34
1	A	60	VAL	CA-C	-5.07	1.47	1.52
1	A	146	TYR	N-CA	-5.03	1.39	1.46
1	A	70	GLU	CD-OE2	5.02	1.34	1.25

All (53) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	235	VAL	N-CA-C	11.76	121.58	110.53
1	A	114	PHE	CA-CB-CG	-11.09	102.71	113.80
1	A	226	GLY	CA-C-N	-8.33	112.35	123.10
1	A	226	GLY	C-N-CA	-8.33	112.35	123.10
1	A	58	CYS	N-CA-C	-8.26	103.21	113.28
1	A	146	TYR	CA-CB-CG	-7.50	100.39	113.90
1	A	128	ASP	CA-CB-CG	-7.46	105.14	112.60
1	A	88	VAL	N-CA-C	7.08	118.25	107.77
1	A	78	GLU	N-CA-C	6.97	120.07	110.24
1	A	100	ASN	CA-CB-CG	-6.94	105.66	112.60
1	A	153	ASP	N-CA-C	-6.64	104.44	112.54
1	A	66	VAL	CB-CA-C	-6.59	102.74	110.91
1	A	102	ASP	N-CA-C	6.56	124.78	110.80
1	A	78	GLU	CB-CA-C	6.54	120.24	109.70
1	A	131	ALA	CB-CA-C	-6.53	98.09	109.64
1	A	83	LEU	N-CA-C	6.53	120.10	109.59
1	A	52	VAL	N-CA-C	6.51	117.40	107.77
1	A	134	THR	N-CA-CB	6.50	119.87	110.06
1	A	219	THR	CB-CA-C	-6.49	100.58	111.02
1	A	71	PHE	CA-C-N	-6.47	113.63	123.07
1	A	71	PHE	C-N-CA	-6.47	113.63	123.07
1	A	151	THR	N-CA-CB	6.34	121.66	110.37
1	A	196	GLY	N-CA-C	-6.33	106.94	115.36
1	A	16	ILE	N-CA-C	6.19	117.61	108.45
1	A	130	PHE	CA-CB-CG	-6.17	107.63	113.80
1	A	31	VAL	CB-CA-C	-6.14	102.05	110.90
1	A	23	VAL	N-CA-C	-6.12	102.96	108.95
1	A	178	ASP	CA-CB-CG	6.09	118.69	112.60
1	A	225	PRO	N-CA-CB	6.07	109.63	103.25
1	A	118	VAL	N-CA-C	6.02	117.35	107.24
1	A	48	ASN	N-CA-C	5.99	115.76	107.73

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	89	PHE	N-CA-C	5.94	119.32	107.62
1	A	150	ASN	N-CA-C	5.92	123.41	110.80
1	A	217	SER	N-CA-CB	5.84	120.36	110.49
1	A	26	SER	N-CA-CB	5.79	120.61	110.18
1	A	218	SER	O-C-N	5.66	128.65	122.20
1	A	212	ILE	N-CA-C	5.53	115.95	107.77
1	A	53	VAL	CB-CA-C	-5.53	104.00	111.63
1	A	103	ILE	N-CA-C	5.52	117.86	108.86
1	A	134	THR	CA-C-N	-5.50	113.74	121.72
1	A	134	THR	C-N-CA	-5.50	113.74	121.72
1	A	212	ILE	CB-CA-C	-5.50	102.99	110.42
1	A	4	PRO	N-CA-CB	5.43	108.08	103.35
1	A	9	VAL	CB-CA-C	-5.39	103.09	110.96
1	A	123	LEU	O-C-N	5.32	127.67	121.39
1	A	146	TYR	CB-CA-C	5.28	120.19	111.31
1	A	108	LEU	N-CA-C	5.28	117.67	110.55
1	A	100	ASN	N-CA-C	-5.22	102.76	110.48
1	A	176	ILE	N-CA-C	5.15	115.03	108.12
1	A	48	ASN	CA-C-N	-5.09	113.17	122.38
1	A	48	ASN	C-N-CA	-5.09	113.17	122.38
1	A	47	ILE	CB-CG1-CD1	-5.06	103.17	113.80
1	A	75	SER	N-CA-C	5.02	117.24	108.76

All (1) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
1	A	102	ASP	CA

There are no planarity outliers.

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	1799	0	1777	323	0
2	A	42	0	0	2	0
All	All	1841	0	1777	323	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 90.

All (323) 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)
1:A:72:ASP:HB2	1:A:154:ARG:HG2	1.25	1.13
1:A:90:LYS:HA	1:A:104:THR:HB	1.38	1.02
1:A:34:GLN:HE21	1:A:40:HIS:HB2	1.25	1.01
1:A:56:ALA:HA	1:A:104:THR:CG2	1.97	0.94
1:A:33:LEU:HD12	1:A:42:CYS:HB3	1.49	0.93
1:A:151:THR:HG22	1:A:152:PRO:HD3	1.51	0.93
1:A:72:ASP:HB2	1:A:154:ARG:CG	2.01	0.91
1:A:235:VAL:HA	1:A:238:VAL:HG23	1.50	0.90
1:A:152:PRO:HG3	1:A:156:GLN:NE2	1.86	0.90
1:A:67:VAL:CG1	1:A:80:ILE:HD12	2.04	0.88
1:A:94:TYR:CE1	1:A:102:ASP:HB2	2.09	0.87
1:A:41:PHE:HZ	1:A:60:VAL:HG13	1.38	0.86
1:A:34:GLN:NE2	1:A:40:HIS:HB2	1.90	0.86
1:A:114:PHE:HA	1:A:118:VAL:HG12	1.56	0.85
1:A:160:LEU:C	1:A:160:LEU:HD23	2.01	0.85
1:A:10:LEU:HD23	1:A:157:GLN:NE2	1.94	0.83
1:A:33:LEU:HD12	1:A:42:CYS:CB	2.09	0.83
1:A:146:TYR:C	1:A:149:ALA:O	2.21	0.83
1:A:151:THR:CG2	1:A:152:PRO:HD3	2.10	0.82
1:A:212:ILE:HG13	1:A:229:ALA:HB3	1.62	0.81
1:A:236:ASN:O	1:A:240:GLN:HG3	1.82	0.80
1:A:235:VAL:HA	1:A:238:VAL:CG2	2.11	0.80
1:A:67:VAL:HG11	1:A:80:ILE:HD12	1.63	0.78
1:A:29:TRP:HA	1:A:119:SER:O	1.82	0.78
1:A:29:TRP:HB3	1:A:120:ALA:HA	1.65	0.78
1:A:134:THR:H	1:A:162:LEU:HB2	1.48	0.78
1:A:211:GLY:HA2	1:A:231:VAL:HG23	1.64	0.78
1:A:151:THR:CB	1:A:152:PRO:HD3	2.14	0.78
1:A:34:GLN:HG3	1:A:40:HIS:HA	1.64	0.78
1:A:14:SER:HB3	1:A:20:GLU:OE1	1.83	0.77
1:A:8:PRO:HB3	1:A:26:SER:HB2	1.67	0.76
1:A:29:TRP:O	1:A:45:SER:HA	1.86	0.76
1:A:105:LEU:C	1:A:106:LEU:HD23	2.10	0.75
1:A:16:ILE:HG13	1:A:17:VAL:HG23	1.69	0.74
1:A:16:ILE:HA	1:A:188:VAL:HB	1.68	0.73
1:A:68:ALA:HB3	1:A:81:GLN:HB2	1.69	0.73
1:A:176:ILE:C	1:A:177:LYS:HD2	2.14	0.73

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:174:THR:O	1:A:175:LYS:C	2.33	0.72
1:A:144:THR:C	1:A:146:TYR:H	1.98	0.71
1:A:134:THR:O	1:A:161:PRO:HA	1.89	0.71
1:A:160:LEU:HD22	1:A:160:LEU:H	1.53	0.71
1:A:166:THR:HA	1:A:169:LYS:HD2	1.73	0.70
1:A:146:TYR:HB3	1:A:149:ALA:C	2.17	0.69
1:A:167:ASN:CG	1:A:170:LYS:HE3	2.18	0.69
1:A:35:ASP:OD1	1:A:38:GLY:N	2.25	0.68
1:A:152:PRO:HG3	1:A:156:GLN:HE21	1.57	0.68
1:A:152:PRO:HG3	1:A:156:GLN:CD	2.17	0.68
1:A:9:VAL:HG23	1:A:23:VAL:HG21	1.75	0.68
1:A:172:TRP:CZ3	1:A:215:TRP:HZ3	2.11	0.68
1:A:177:LYS:HD2	1:A:177:LYS:N	2.09	0.68
1:A:139:THR:HB	1:A:155:LEU:HD11	1.75	0.68
1:A:103:ILE:HB	1:A:234:LEU:HD12	1.76	0.68
1:A:34:GLN:CG	1:A:40:HIS:HA	2.24	0.67
1:A:115:SER:OG	1:A:116:GLN:N	2.24	0.67
1:A:85:ILE:HG21	1:A:88:VAL:HG22	1.77	0.66
1:A:234:LEU:N	1:A:234:LEU:HD23	2.09	0.66
1:A:47:ILE:HG21	1:A:53:VAL:CG2	2.25	0.66
1:A:80:ILE:HG13	1:A:80:ILE:O	1.94	0.66
1:A:40:HIS:HB3	2:A:327:HOH:O	1.95	0.65
1:A:114:PHE:CD1	1:A:118:VAL:HG12	2.31	0.65
1:A:158:ALA:HB2	1:A:192:MET:HE2	1.78	0.65
1:A:61:THR:O	1:A:63:SER:N	2.30	0.65
1:A:16:ILE:C	1:A:188:VAL:HG23	2.22	0.64
1:A:152:PRO:CG	1:A:156:GLN:HG2	2.27	0.64
1:A:29:TRP:CA	1:A:119:SER:O	2.44	0.64
1:A:160:LEU:HD23	1:A:160:LEU:O	1.96	0.64
1:A:160:LEU:C	1:A:160:LEU:CD2	2.71	0.64
1:A:195:SER:HA	1:A:213:VAL:CG1	2.28	0.64
1:A:3:VAL:HG12	1:A:3:VAL:O	1.97	0.64
1:A:50:ASN:HA	1:A:108:LEU:HD12	1.80	0.64
1:A:141:TRP:HB3	1:A:144:THR:HG21	1.79	0.63
1:A:152:PRO:CG	1:A:156:GLN:HE21	2.10	0.63
1:A:100:ASN:HA	1:A:180:MET:HE3	1.80	0.63
1:A:134:THR:HG22	1:A:135:THR:N	2.13	0.63
1:A:174:THR:O	1:A:176:ILE:N	2.32	0.63
1:A:182:CYS:HA	1:A:226:GLY:O	1.98	0.63
1:A:172:TRP:CH2	1:A:215:TRP:HZ3	2.16	0.63
1:A:233:ALA:C	1:A:234:LEU:HD23	2.24	0.62

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:236:ASN:O	1:A:237:TRP:C	2.37	0.62
1:A:78:GLU:HB2	1:A:80:ILE:CG2	2.29	0.62
1:A:175:LYS:O	1:A:177:LYS:HD3	1.98	0.62
1:A:10:LEU:HD23	1:A:157:GLN:CD	2.23	0.62
1:A:49:GLU:HB2	1:A:112:ALA:O	1.98	0.62
1:A:85:ILE:HD13	1:A:106:LEU:HB3	1.81	0.62
1:A:152:PRO:HG3	1:A:156:GLN:CG	2.29	0.62
1:A:243:ALA:O	1:A:245:ASN:N	2.33	0.62
1:A:61:THR:C	1:A:63:SER:H	2.08	0.62
1:A:56:ALA:HA	1:A:104:THR:HG22	1.80	0.61
1:A:47:ILE:CG2	1:A:53:VAL:HG23	2.31	0.61
1:A:172:TRP:HB2	1:A:176:ILE:HD11	1.82	0.61
1:A:72:ASP:CB	1:A:154:ARG:HG2	2.16	0.61
1:A:29:TRP:HB3	1:A:120:ALA:CA	2.30	0.61
1:A:167:ASN:HA	1:A:170:LYS:HG3	1.81	0.61
1:A:184:GLY:O	1:A:185:ALA:HB3	2.00	0.60
1:A:202:LYS:O	1:A:203:LYS:HB2	2.00	0.60
1:A:160:LEU:HD22	1:A:160:LEU:N	2.13	0.60
1:A:235:VAL:O	1:A:238:VAL:HG23	2.01	0.60
1:A:142:GLY:O	1:A:145:ARG:HG3	2.02	0.60
1:A:130:PHE:CD1	1:A:130:PHE:N	2.68	0.60
1:A:151:THR:HG22	1:A:152:PRO:CD	2.29	0.59
1:A:41:PHE:CZ	1:A:60:VAL:HG13	2.28	0.59
1:A:146:TYR:HB3	1:A:149:ALA:HB3	1.83	0.59
1:A:194:ASP:O	1:A:213:VAL:HG11	2.03	0.59
1:A:211:GLY:HA2	1:A:229:ALA:O	2.02	0.59
1:A:34:GLN:HG2	1:A:40:HIS:N	2.18	0.58
1:A:8:PRO:CB	1:A:26:SER:HB2	2.32	0.58
1:A:12:GLY:O	1:A:13:LEU:C	2.45	0.58
1:A:95:ASN:OD1	1:A:97:LEU:N	2.35	0.58
1:A:52:VAL:HB	1:A:106:LEU:HB2	1.84	0.58
1:A:145:ARG:NH2	2:A:319:HOH:O	2.26	0.58
1:A:146:TYR:HB3	1:A:149:ALA:CB	2.34	0.58
1:A:152:PRO:CG	1:A:156:GLN:NE2	2.65	0.58
1:A:136:CYS:HB3	1:A:200:VAL:O	2.04	0.57
1:A:95:ASN:OD1	1:A:96:SER:N	2.38	0.57
1:A:17:VAL:O	1:A:189:SER:N	2.29	0.57
1:A:152:PRO:HG2	1:A:156:GLN:HG2	1.87	0.57
1:A:167:ASN:ND2	1:A:170:LYS:HE3	2.20	0.57
1:A:146:TYR:CD1	1:A:146:TYR:N	2.73	0.56
1:A:51:TRP:CZ2	1:A:107:LYS:HD2	2.40	0.56

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:141:TRP:O	1:A:144:THR:HG23	2.05	0.56
1:A:125:SER:O	1:A:232:THR:HG22	2.06	0.56
1:A:146:TYR:O	1:A:149:ALA:O	2.23	0.56
1:A:144:THR:C	1:A:146:TYR:N	2.61	0.56
1:A:177:LYS:O	1:A:180:MET:HG3	2.05	0.56
1:A:172:TRP:O	1:A:173:GLY:C	2.48	0.56
1:A:167:ASN:O	1:A:168:CYS:C	2.49	0.55
1:A:47:ILE:HG21	1:A:53:VAL:HG23	1.87	0.55
1:A:107:LYS:NZ	1:A:245:ASN:O	2.39	0.55
1:A:56:ALA:N	1:A:102:ASP:OD2	2.40	0.55
1:A:145:ARG:HH12	1:A:191:CYS:CA	2.19	0.55
1:A:190:SER:C	1:A:192:MET:H	2.13	0.54
1:A:169:LYS:O	1:A:171:TYR:N	2.40	0.54
1:A:17:VAL:N	1:A:188:VAL:HA	2.23	0.54
1:A:137:VAL:HA	1:A:158:ALA:O	2.07	0.54
1:A:152:PRO:HG3	1:A:156:GLN:HG2	1.90	0.54
1:A:75:SER:HB3	1:A:78:GLU:HG3	1.90	0.54
1:A:212:ILE:CG1	1:A:229:ALA:HB3	2.36	0.54
1:A:2:GLY:HA2	1:A:29:TRP:CZ3	2.42	0.54
1:A:151:THR:HB	1:A:152:PRO:HD3	1.90	0.54
1:A:194:ASP:O	1:A:213:VAL:HG21	2.08	0.54
1:A:234:LEU:N	1:A:234:LEU:CD2	2.71	0.54
1:A:114:PHE:HD1	1:A:118:VAL:HG12	1.71	0.53
1:A:243:ALA:C	1:A:245:ASN:H	2.15	0.53
1:A:46:LEU:HD23	1:A:48:ASN:O	2.08	0.53
1:A:134:THR:CG2	1:A:135:THR:N	2.71	0.53
1:A:105:LEU:O	1:A:106:LEU:HD23	2.07	0.53
1:A:36:LYS:C	1:A:38:GLY:N	2.67	0.53
1:A:1:CYS:C	1:A:122:CYS:SG	2.92	0.53
1:A:213:VAL:N	1:A:228:TYR:HD2	2.07	0.53
1:A:87:LYS:C	1:A:88:VAL:HG23	2.33	0.52
1:A:141:TRP:HB3	1:A:144:THR:CG2	2.39	0.52
1:A:145:ARG:HH12	1:A:191:CYS:HA	1.74	0.52
1:A:61:THR:C	1:A:63:SER:N	2.63	0.52
1:A:95:ASN:OD1	1:A:95:ASN:C	2.52	0.52
1:A:29:TRP:CB	1:A:120:ALA:HA	2.38	0.52
1:A:166:THR:O	1:A:169:LYS:HB2	2.10	0.52
1:A:29:TRP:CD1	1:A:29:TRP:C	2.86	0.52
1:A:46:LEU:HD22	1:A:114:PHE:CE1	2.45	0.52
1:A:142:GLY:O	1:A:144:THR:N	2.42	0.52
1:A:231:VAL:O	1:A:232:THR:C	2.51	0.52

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:160:LEU:HB2	1:A:161:PRO:HD2	1.90	0.52
1:A:235:VAL:O	1:A:236:ASN:C	2.53	0.52
1:A:57:HIS:N	1:A:102:ASP:OD2	2.32	0.51
1:A:99:ILE:HG22	1:A:99:ILE:O	2.09	0.51
1:A:89:PHE:O	1:A:237:TRP:HH2	1.93	0.51
1:A:121:VAL:HG22	1:A:122:CYS:N	2.26	0.51
1:A:195:SER:HA	1:A:213:VAL:HG11	1.92	0.51
1:A:30:GLN:NE2	1:A:141:TRP:CZ3	2.78	0.51
1:A:105:LEU:HD11	1:A:238:VAL:HG13	1.92	0.51
1:A:16:ILE:O	1:A:17:VAL:HB	2.10	0.51
1:A:212:ILE:N	1:A:228:TYR:HB3	2.26	0.51
1:A:46:LEU:O	1:A:120:ALA:HA	2.12	0.50
1:A:12:GLY:C	1:A:14:SER:N	2.68	0.50
1:A:177:LYS:H	1:A:180:MET:HG3	1.77	0.50
1:A:188:VAL:N	1:A:222:THR:HB	2.25	0.50
1:A:29:TRP:HB3	1:A:120:ALA:C	2.35	0.50
1:A:67:VAL:HG12	1:A:68:ALA:N	2.25	0.50
1:A:185:ALA:HB2	1:A:225:PRO:HG3	1.94	0.50
1:A:172:TRP:CZ3	1:A:215:TRP:CZ3	2.97	0.50
1:A:17:VAL:HG12	1:A:18:ASN:N	2.27	0.50
1:A:20:GLU:O	1:A:157:GLN:HG2	2.11	0.50
1:A:40:HIS:CG	1:A:73:GLN:HE22	2.28	0.50
1:A:235:VAL:C	1:A:238:VAL:HG23	2.37	0.50
1:A:187:GLY:HA2	1:A:222:THR:HB	1.94	0.50
1:A:212:ILE:O	1:A:213:VAL:C	2.55	0.50
1:A:94:TYR:HA	1:A:101:ASN:HB2	1.94	0.50
1:A:169:LYS:C	1:A:171:TYR:N	2.68	0.50
1:A:210:VAL:O	1:A:210:VAL:HG12	2.11	0.50
1:A:181:ILE:O	1:A:228:TYR:N	2.44	0.49
1:A:200:VAL:HG23	1:A:207:TRP:CE3	2.47	0.49
1:A:103:ILE:HG23	1:A:103:ILE:O	2.11	0.49
1:A:160:LEU:HB2	1:A:161:PRO:CD	2.43	0.49
1:A:174:THR:C	1:A:176:ILE:N	2.69	0.49
1:A:202:LYS:O	1:A:203:LYS:CB	2.61	0.49
1:A:8:PRO:CA	1:A:26:SER:HB2	2.42	0.49
1:A:40:HIS:CD2	1:A:73:GLN:HE22	2.31	0.48
1:A:48:ASN:OD1	1:A:49:GLU:N	2.46	0.48
1:A:62:THR:HG22	1:A:88:VAL:CG2	2.42	0.48
1:A:145:ARG:NH1	1:A:191:CYS:HB3	2.28	0.48
1:A:200:VAL:HG12	1:A:209:LEU:HA	1.95	0.48
1:A:211:GLY:CA	1:A:231:VAL:HG23	2.38	0.48

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:103:ILE:C	1:A:104:THR:HG22	2.38	0.48
1:A:50:ASN:OD1	1:A:111:ALA:HB2	2.14	0.48
1:A:125:SER:O	1:A:126:ALA:C	2.53	0.48
1:A:105:LEU:HG	1:A:237:TRP:HZ3	1.79	0.48
1:A:103:ILE:CB	1:A:234:LEU:HD12	2.43	0.48
1:A:128:ASP:HB3	1:A:130:PHE:CE1	2.48	0.48
1:A:103:ILE:HG21	1:A:234:LEU:CD1	2.43	0.48
1:A:121:VAL:CG2	1:A:122:CYS:N	2.76	0.48
1:A:52:VAL:O	1:A:52:VAL:HG12	2.14	0.47
1:A:56:ALA:HA	1:A:104:THR:HG21	1.92	0.47
1:A:154:ARG:O	1:A:155:LEU:C	2.54	0.47
1:A:190:SER:C	1:A:192:MET:N	2.70	0.47
1:A:53:VAL:HG12	1:A:54:THR:N	2.28	0.47
1:A:87:LYS:C	1:A:88:VAL:CG2	2.87	0.47
1:A:103:ILE:CG2	1:A:234:LEU:CD1	2.92	0.47
1:A:46:LEU:O	1:A:121:VAL:HG12	2.15	0.47
1:A:106:LEU:HD23	1:A:106:LEU:N	2.27	0.47
1:A:172:TRP:CE3	1:A:215:TRP:CZ3	3.03	0.47
1:A:62:THR:HG22	1:A:88:VAL:HG23	1.96	0.46
1:A:139:THR:HG22	1:A:157:GLN:HA	1.97	0.46
1:A:123:LEU:HA	1:A:123:LEU:HD23	1.64	0.46
1:A:219:THR:O	1:A:220:CYS:C	2.58	0.46
1:A:34:GLN:CG	1:A:40:HIS:CA	2.91	0.46
1:A:53:VAL:O	1:A:54:THR:HB	2.15	0.46
1:A:162:LEU:N	1:A:162:LEU:HD23	2.27	0.46
1:A:36:LYS:O	1:A:38:GLY:N	2.49	0.46
1:A:36:LYS:H	1:A:36:LYS:HG3	1.50	0.45
1:A:114:PHE:CD1	1:A:118:VAL:CG1	2.98	0.45
1:A:72:ASP:OD2	1:A:153:ASP:HB2	2.15	0.45
1:A:103:ILE:CG2	1:A:234:LEU:HD12	2.46	0.45
1:A:143:LEU:O	1:A:146:TYR:HD1	1.99	0.45
1:A:20:GLU:CD	1:A:157:GLN:HE21	2.25	0.45
1:A:61:THR:OG1	1:A:63:SER:OG	2.30	0.45
1:A:20:GLU:O	1:A:157:GLN:N	2.46	0.45
1:A:118:VAL:HG12	1:A:118:VAL:O	2.15	0.45
1:A:17:VAL:H	1:A:188:VAL:HA	1.80	0.45
1:A:28:PRO:C	1:A:30:GLN:H	2.24	0.45
1:A:65:VAL:O	1:A:65:VAL:HG13	2.15	0.45
1:A:201:CYS:SG	1:A:210:VAL:HG21	2.56	0.45
1:A:243:ALA:C	1:A:245:ASN:N	2.74	0.45
1:A:78:GLU:HB2	1:A:80:ILE:HG23	1.97	0.45

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:105:LEU:HG	1:A:237:TRP:CZ3	2.52	0.45
1:A:232:THR:O	1:A:235:VAL:HG12	2.17	0.45
1:A:166:THR:O	1:A:167:ASN:C	2.57	0.44
1:A:229:ALA:O	1:A:231:VAL:N	2.51	0.44
1:A:9:VAL:HG23	1:A:23:VAL:CG2	2.44	0.44
1:A:56:ALA:C	1:A:58:CYS:H	2.26	0.44
1:A:195:SER:HA	1:A:213:VAL:HG12	2.00	0.44
1:A:84:LYS:O	1:A:108:LEU:HB3	2.17	0.44
1:A:189:SER:OG	1:A:220:CYS:HB3	2.18	0.44
1:A:47:ILE:HG23	1:A:53:VAL:HG23	1.99	0.44
1:A:30:GLN:O	1:A:30:GLN:HG3	2.13	0.44
1:A:34:GLN:HG2	1:A:40:HIS:CA	2.47	0.44
1:A:115:SER:N	1:A:118:VAL:O	2.50	0.44
1:A:55:ALA:HA	1:A:102:ASP:O	2.17	0.44
1:A:80:ILE:HD11	1:A:82:LYS:HE3	1.99	0.44
1:A:35:ASP:OD1	1:A:35:ASP:C	2.60	0.44
1:A:40:HIS:CB	1:A:73:GLN:HE22	2.30	0.44
1:A:95:ASN:O	1:A:99:ILE:HA	2.18	0.44
1:A:142:GLY:O	1:A:143:LEU:C	2.59	0.44
1:A:145:ARG:HH12	1:A:191:CYS:CB	2.30	0.44
1:A:162:LEU:HD22	1:A:162:LEU:HA	1.66	0.43
1:A:93:LYS:O	1:A:94:TYR:C	2.60	0.43
1:A:152:PRO:C	1:A:154:ARG:N	2.73	0.43
1:A:2:GLY:HA2	1:A:29:TRP:HZ3	1.82	0.43
1:A:103:ILE:HG21	1:A:234:LEU:HD13	2.00	0.43
1:A:108:LEU:O	1:A:109:SER:O	2.36	0.43
1:A:33:LEU:HD12	1:A:42:CYS:HB2	1.97	0.43
1:A:20:GLU:CG	1:A:157:GLN:HE21	2.31	0.43
1:A:98:THR:O	1:A:99:ILE:HB	2.17	0.43
1:A:143:LEU:O	1:A:146:TYR:CD1	2.71	0.43
1:A:164:SER:HG	1:A:167:ASN:H	1.67	0.43
1:A:43:GLY:N	1:A:195:SER:O	2.40	0.42
1:A:145:ARG:NH1	1:A:191:CYS:CB	2.82	0.42
1:A:12:GLY:O	1:A:14:SER:N	2.52	0.42
1:A:121:VAL:HG21	1:A:209:LEU:HB2	2.00	0.42
1:A:145:ARG:NH2	1:A:193:GLY:O	2.53	0.42
1:A:18:ASN:HD22	1:A:18:ASN:HA	1.47	0.42
1:A:51:TRP:CG	1:A:242:LEU:HD11	2.54	0.42
1:A:172:TRP:HB2	1:A:176:ILE:CD1	2.48	0.42
1:A:169:LYS:C	1:A:171:TYR:H	2.28	0.42
1:A:195:SER:C	1:A:197:GLY:H	2.26	0.42

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:5:ALA:HB1	1:A:116:GLN:HG2	2.02	0.42
1:A:28:PRO:HB3	1:A:117:THR:C	2.45	0.42
1:A:85:ILE:HG21	1:A:88:VAL:CG2	2.47	0.42
1:A:166:THR:O	1:A:169:LYS:N	2.53	0.42
1:A:36:LYS:O	1:A:37:THR:C	2.63	0.41
1:A:81:GLN:HE22	1:A:113:SER:N	2.18	0.41
1:A:10:LEU:CD2	1:A:157:GLN:CD	2.91	0.41
1:A:100:ASN:OD1	1:A:179:ALA:HB3	2.19	0.41
1:A:172:TRP:HB2	1:A:176:ILE:CG1	2.50	0.41
1:A:184:GLY:O	1:A:185:ALA:CB	2.67	0.41
1:A:56:ALA:HA	1:A:104:THR:HG23	1.92	0.41
1:A:71:PHE:N	1:A:78:GLU:OE2	2.44	0.41
1:A:143:LEU:O	1:A:146:TYR:HB2	2.20	0.41
1:A:169:LYS:O	1:A:173:GLY:N	2.52	0.41
1:A:172:TRP:CE3	1:A:215:TRP:HZ3	2.38	0.41
1:A:89:PHE:CD1	1:A:89:PHE:N	2.89	0.41
1:A:61:THR:HG1	1:A:63:SER:HG	1.66	0.41
1:A:210:VAL:O	1:A:210:VAL:CG1	2.67	0.41
1:A:234:LEU:O	1:A:238:VAL:HG23	2.19	0.41
1:A:125:SER:C	1:A:127:SER:N	2.77	0.41
1:A:177:LYS:N	1:A:180:MET:HG3	2.35	0.41
1:A:146:TYR:CB	1:A:149:ALA:O	2.69	0.41
1:A:17:VAL:N	1:A:188:VAL:HG23	2.35	0.41
1:A:50:ASN:ND2	1:A:111:ALA:HB2	2.36	0.41
1:A:75:SER:HB3	1:A:78:GLU:CG	2.51	0.41
1:A:114:PHE:HD1	1:A:118:VAL:CG1	2.34	0.41
1:A:158:ALA:CB	1:A:192:MET:HE2	2.46	0.41
1:A:7:GLN:HA	1:A:8:PRO:HD3	1.87	0.41
1:A:48:ASN:OD1	1:A:50:ASN:N	2.29	0.41
1:A:105:LEU:HA	1:A:105:LEU:HD23	1.76	0.41
1:A:57:HIS:O	1:A:57:HIS:CD2	2.74	0.40
1:A:163:LEU:HD23	1:A:163:LEU:HA	1.94	0.40
1:A:15:ARG:C	1:A:16:ILE:CG2	2.94	0.40
1:A:91:ASN:OD1	1:A:91:ASN:C	2.65	0.40
1:A:28:PRO:C	1:A:30:GLN:N	2.79	0.40
1:A:57:HIS:HB3	1:A:94:TYR:OH	2.21	0.40
1:A:67:VAL:HG11	1:A:80:ILE:CD1	2.42	0.40
1:A:67:VAL:HG12	1:A:68:ALA:H	1.87	0.40
1:A:68:ALA:O	1:A:80:ILE:HB	2.20	0.40
1:A:243:ALA:O	1:A:245:ASN:OXT	2.39	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	A	243/245 (99%)	192 (79%)	33 (14%)	18 (7%)	1 4

All (18) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	109	SER
1	A	151	THR
1	A	152	PRO
1	A	203	LYS
1	A	244	ALA
1	A	17	VAL
1	A	62	THR
1	A	217	SER
1	A	102	ASP
1	A	143	LEU
1	A	170	LYS
1	A	186	SER
1	A	188	VAL
1	A	175	LYS
1	A	213	VAL
1	A	238	VAL
1	A	99	ILE
1	A	205	GLY

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	200/200 (100%)	140 (70%)	60 (30%)	0 1

All (60) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	11	SER
1	A	13	LEU
1	A	16	ILE
1	A	31	VAL
1	A	36	LYS
1	A	37	THR
1	A	40	HIS
1	A	42	CYS
1	A	46	LEU
1	A	48	ASN
1	A	49	GLU
1	A	53	VAL
1	A	60	VAL
1	A	63	SER
1	A	67	VAL
1	A	70	GLU
1	A	72	ASP
1	A	76	SER
1	A	77	SER
1	A	78	GLU
1	A	79	LYS
1	A	82	LYS
1	A	83	LEU
1	A	84	LYS
1	A	85	ILE
1	A	87	LYS
1	A	90	LYS
1	A	97	LEU
1	A	99	ILE
1	A	102	ASP
1	A	104	THR
1	A	108	LEU
1	A	113	SER
1	A	115	SER
1	A	121	VAL
1	A	127	SER
1	A	145	ARG
1	A	150	ASN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	153	ASP
1	A	159	SER
1	A	160	LEU
1	A	162	LEU
1	A	171	TYR
1	A	177	LYS
1	A	180	MET
1	A	182	CYS
1	A	186	SER
1	A	199	LEU
1	A	202	LYS
1	A	208	THR
1	A	212	ILE
1	A	214	SER
1	A	218	SER
1	A	223	SER
1	A	224	THR
1	A	227	VAL
1	A	232	THR
1	A	234	LEU
1	A	238	VAL
1	A	239	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	18	ASN
1	A	30	GLN
1	A	34	GLN
1	A	73	GLN
1	A	81	GLN
1	A	156	GLN
1	A	157	GLN
1	A	165	ASN

5.3.3 RNA ⓘ

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 oligosaccharides 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.