Full wwPDB X-ray Structure Validation Report (i)

Oct 5, 2024 – 04:19 PM EDT

PDB ID	:	1BVN
Title	:	PIG PANCREATIC ALPHA-AMYLASE IN COMPLEX WITH THE PROTEINACEOUS INHIBITOR TENDAMISTAT
Authors	:	Machius, M.; Wiegand, G.; Epp, O.; Huber, R.
Deposited on	:	1998-09-16
Resolution	:	2.50 Å(reported)

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

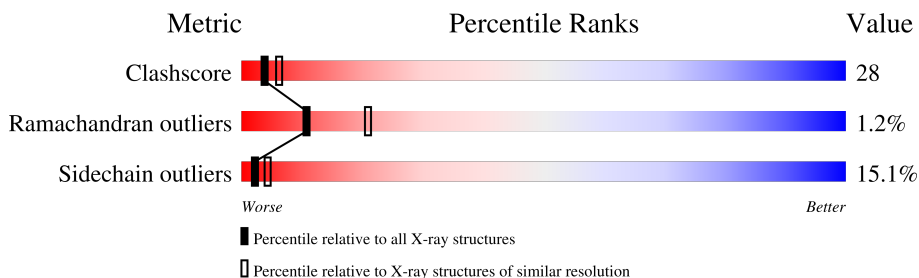|		
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

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 2.50 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	Percentile Ranks	Value
Clashscore		28
Ramachandran outliers		1.2%
Sidechain outliers		15.1%

Worse   *Better*

▮ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	180529	6282 (2.50-2.50)
Ramachandran outliers	177936	6191 (2.50-2.50)
Sidechain outliers	177891	6193 (2.50-2.50)

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 <=5%

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	P	496	52% 39% 9%
2	T	74	41% 50% 5% •

2 Entry composition ⓘ

There are 5 unique types of molecules in this entry. The entry contains 4606 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 PROTEIN (ALPHA-AMYLASE).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	P	496	Total 3907	C 2467	N 689	O 730	S 21	0	0	0

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
P	12	ASP	SER	conflict	UNP P00690
P	49	VAL	ILE	conflict	UNP P00690
P	196	LEU	ILE	conflict	UNP P00690
P	243	SER	GLN	conflict	UNP P00690
P	310	SER	ALA	conflict	UNP P00690
P	404	GLN	GLU	conflict	UNP P00690
P	451	ASN	ASP	conflict	UNP P00690
P	484	GLN	GLU	conflict	UNP P00690

- Molecule 2 is a protein called PROTEIN (TENDAMISTAT).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	T	71	Total 536	C 333	N 90	O 109	S 4	0	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
T	829	GLU	GLN	conflict	UNP P01092

- Molecule 3 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	P	1	Total 1	Ca 1	0	0

- Molecule 4 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	P	1	Total 1	Cl 1	0	0

- Molecule 5 is water.

| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	P	144	Total 144	O 144	0	0
5	T	17	Total 17	O 17	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. 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: PROTEIN (ALPHA-AMYLASE)

Chain P:
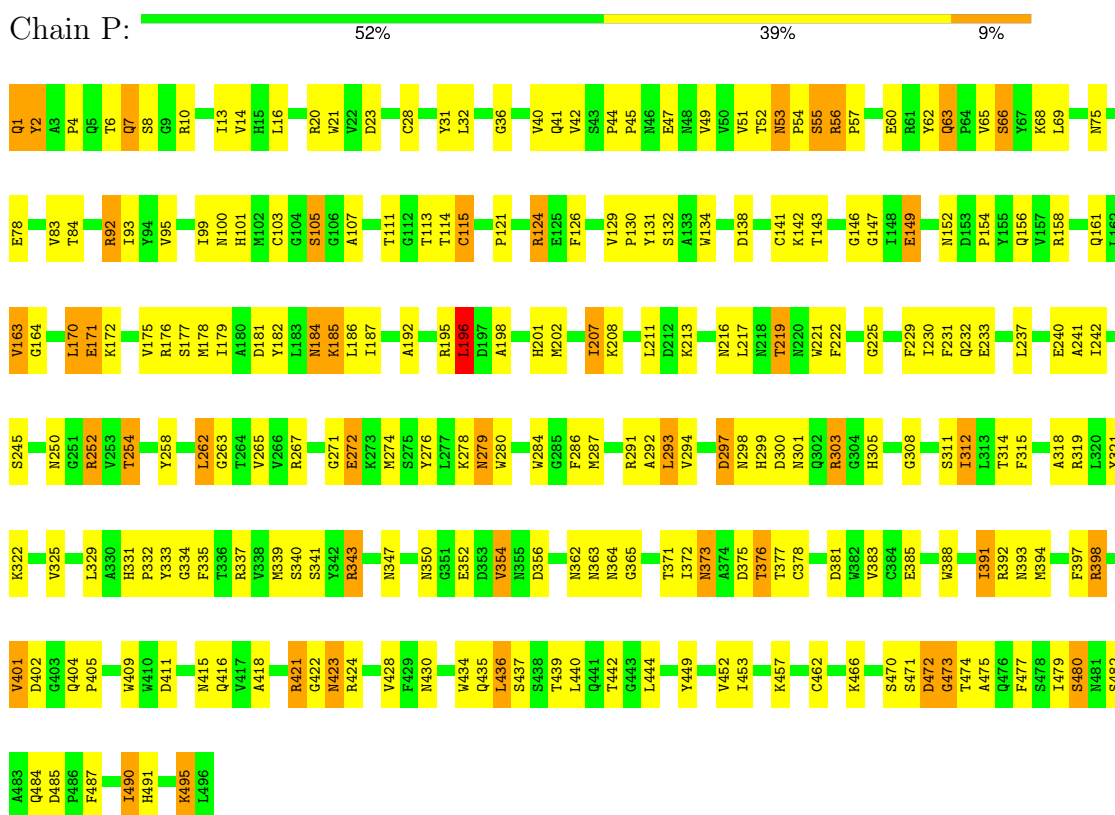
• Molecule 2: PROTEIN (TENDAMISTAT)

Chain T:
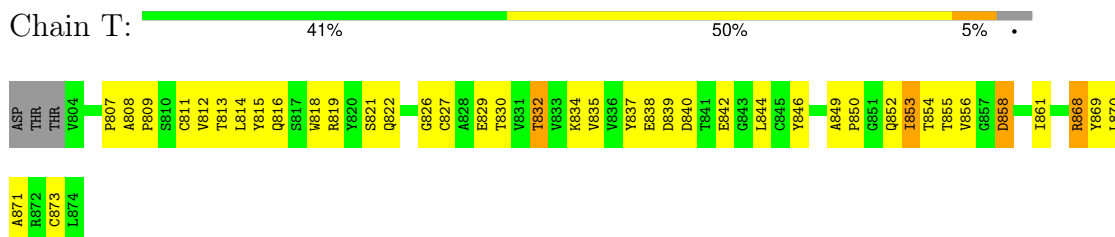
4 Data and refinement statistics ⓘ

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

Property	Value	Source
Space group	P 65 2 2	Depositor
Cell constants a, b, c, α, β, γ	77.70Å 77.70Å 359.50Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	29.40 – 2.50	Depositor
% Data completeness (in resolution range)	73.7 (29.40-2.50)	Depositor
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	X-PLOR 3.185	Depositor
R, R_{free}	0.166 , 0.260	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	4606	wwPDB-VP
Average B, all atoms (Å^2)	26.0	wwPDB-VP

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: CL, CA

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	P	0.42	0/4017	0.69	3/5459 (0.1%)
2	T	0.44	0/548	0.64	0/748
All	All	0.43	0/4565	0.69	3/6207 (0.0%)

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	P	0	2

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	P	196	LEU	CA-CB-CG	-5.40	102.87	115.30
1	P	473	GLY	N-CA-C	-5.36	99.71	113.10
1	P	293	LEU	N-CA-C	-5.13	97.14	111.00

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	P	2	TYR	Sidechain
1	P	53	ASN	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	P	3907	0	3684	210	0
2	T	536	0	497	40	0
3	P	1	0	0	0	0
4	P	1	0	0	0	0
5	P	144	0	0	5	0
5	T	17	0	0	1	0
All	All	4606	0	4181	241	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 28.

All (241) 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:P:143:THR:HG23	1:P:146:GLY:H	1.34	0.92
1:P:423:ASN:HD22	1:P:423:ASN:H	1.13	0.91
1:P:99:ILE:HD11	1:P:196:LEU:HD21	1.53	0.91
1:P:401:VAL:HG11	1:P:421:ARG:HB2	1.53	0.91
1:P:301:ASN:HB3	1:P:312:ILE:HG12	1.50	0.90
1:P:314:THR:HG22	1:P:315:PHE:H	1.39	0.88
1:P:141:CYS:SG	1:P:143:THR:HG22	2.15	0.86
1:P:100:ASN:HD22	1:P:101:HIS:HD2	1.29	0.80
1:P:143:THR:HG21	1:P:147:GLY:O	1.81	0.80
2:T:853:ILE:HG13	2:T:853:ILE:O	1.82	0.80
1:P:263:GLY:O	1:P:267:ARG:HG3	1.81	0.79
1:P:65:VAL:HG11	1:P:113:THR:HG21	1.63	0.79
1:P:63:GLN:HG2	1:P:103:CYS:HA	1.64	0.78
1:P:10:ARG:NH1	1:P:36:GLY:HA2	1.98	0.77
1:P:31:TYR:OH	1:P:392:ARG:HG3	1.85	0.77
1:P:375:ASP:O	1:P:376:THR:HB	1.85	0.77
1:P:449:TYR:HB3	1:P:490:ILE:HG12	1.66	0.77
1:P:398:ARG:HG3	1:P:398:ARG:HH11	1.51	0.76
1:P:170:LEU:HD12	1:P:202:MET:HG2	1.67	0.75
1:P:397:PHE:O	1:P:401:VAL:HG23	1.88	0.73
1:P:416:GLN:OE1	1:P:436:LEU:HD12	1.87	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:P:377:THR:HG22	1:P:378:CYS:H	1.51	0.73
1:P:100:ASN:HD22	1:P:101:HIS:CD2	2.07	0.71
1:P:331:HIS:HD2	1:P:333:TYR:H	1.40	0.70
2:T:829:GLU:HG3	2:T:830:THR:N	2.06	0.70
1:P:237:LEU:CD1	2:T:853:ILE:HG12	2.22	0.70
1:P:54:PRO:O	1:P:55:SER:HB3	1.92	0.70
1:P:170:LEU:CD1	1:P:202:MET:HG2	2.22	0.69
1:P:401:VAL:CG1	1:P:421:ARG:HB2	2.23	0.69
1:P:371:THR:HG22	1:P:373:ASN:ND2	2.08	0.69
1:P:75:ASN:ND2	1:P:78:GLU:HG3	2.09	0.68
2:T:839:ASP:O	2:T:840:ASP:HB2	1.93	0.68
1:P:237:LEU:HD13	2:T:853:ILE:HG12	1.76	0.68
1:P:305:HIS:CD2	2:T:815:TYR:HA	2.30	0.67
1:P:449:TYR:CB	1:P:490:ILE:HG12	2.25	0.67
1:P:265:VAL:HG22	1:P:272:GLU:HG2	1.76	0.66
2:T:830:THR:OG1	2:T:849:ALA:HA	1.96	0.66
2:T:829:GLU:HG3	2:T:830:THR:H	1.60	0.65
2:T:846:TYR:CD1	2:T:856:VAL:HG13	2.32	0.65
1:P:105:SER:HB3	1:P:164:GLY:O	1.97	0.64
1:P:398:ARG:HG3	1:P:398:ARG:NH1	2.10	0.63
2:T:835:VAL:HG23	5:T:1019:HOH:O	1.98	0.63
1:P:314:THR:HG22	1:P:315:PHE:N	2.12	0.63
1:P:362:ASN:ND2	1:P:365:GLY:H	1.96	0.63
1:P:63:GLN:CG	1:P:103:CYS:HA	2.29	0.63
1:P:65:VAL:HG21	1:P:113:THR:HG22	1.80	0.62
2:T:811:CYS:HB2	2:T:826:GLY:O	1.99	0.62
1:P:331:HIS:CD2	1:P:333:TYR:H	2.17	0.62
1:P:143:THR:HG23	1:P:146:GLY:N	2.10	0.61
1:P:184:ASN:HB3	1:P:187:ILE:HD12	1.82	0.61
1:P:152:ASN:O	1:P:154:PRO:HD3	2.01	0.61
1:P:217:LEU:HB3	1:P:222:PHE:CD2	2.36	0.60
2:T:822:GLN:HG2	2:T:855:THR:HA	1.84	0.60
1:P:65:VAL:HG11	1:P:113:THR:CG2	2.31	0.60
1:P:466:LYS:NZ	1:P:466:LYS:HB2	2.17	0.59
1:P:418:ALA:HB2	1:P:428:VAL:HG13	1.85	0.59
1:P:154:PRO:HG3	1:P:241:ALA:HB1	1.85	0.59
1:P:298:ASN:HB3	1:P:301:ASN:HD22	1.68	0.59
1:P:305:HIS:HD2	2:T:816:GLN:H	1.50	0.59
1:P:240:GLU:HG3	2:T:854:THR:HG23	1.84	0.58
2:T:837:TYR:C	2:T:839:ASP:H	2.05	0.58
1:P:175:VAL:O	1:P:179:ILE:HG13	2.04	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:P:192:ALA:HB2	1:P:222:PHE:HZ	1.68	0.57
1:P:4:PRO:HB2	1:P:6:THR:HG23	1.85	0.57
1:P:134:TRP:HD1	1:P:172:LYS:HZ1	1.52	0.57
1:P:278:LYS:HD3	1:P:409:TRP:CD1	2.40	0.57
1:P:287:MET:HG3	1:P:292:ALA:HB2	1.85	0.57
1:P:278:LYS:HB2	1:P:409:TRP:CE2	2.40	0.57
1:P:404:GLN:HG3	1:P:424:ARG:HG3	1.87	0.57
1:P:423:ASN:H	1:P:423:ASN:ND2	1.93	0.56
1:P:75:ASN:HD21	1:P:78:GLU:HG3	1.69	0.56
1:P:13:ILE:HG22	1:P:337:ARG:HG3	1.88	0.56
1:P:49:VAL:HG12	1:P:63:GLN:HB3	1.87	0.56
1:P:216:ASN:ND2	1:P:225:GLY:HA2	2.21	0.56
1:P:322:LYS:HE3	1:P:485:ASP:OD1	2.06	0.55
1:P:442:THR:HB	1:P:473:GLY:O	2.06	0.55
2:T:835:VAL:HG23	2:T:856:VAL:HG12	1.88	0.55
1:P:303:ARG:HB3	1:P:356:ASP:HB2	1.88	0.55
1:P:305:HIS:CD2	1:P:352:GLU:HG3	2.42	0.55
1:P:305:HIS:CD2	2:T:816:GLN:H	2.25	0.55
1:P:63:GLN:HG2	1:P:103:CYS:CA	2.36	0.54
1:P:69:LEU:HD21	1:P:186:LEU:HD21	1.88	0.54
1:P:57:PRO:O	1:P:60:GLU:HG2	2.08	0.54
1:P:126:PHE:HB2	1:P:131:TYR:HB2	1.90	0.54
2:T:812:VAL:HG12	2:T:870:LEU:HD12	1.90	0.54
1:P:21:TRP:HZ3	1:P:42:VAL:CG2	2.21	0.54
1:P:394:MET:HA	1:P:397:PHE:HB3	1.89	0.53
1:P:51:VAL:HG13	5:P:1161:HOH:O	2.08	0.53
1:P:297:ASP:O	1:P:298:ASN:HB3	2.08	0.53
1:P:132:SER:C	1:P:134:TRP:N	2.60	0.53
1:P:211:LEU:HD13	1:P:230:ILE:HD13	1.90	0.52
1:P:142:LYS:HG2	5:P:1069:HOH:O	2.09	0.52
1:P:28:CYS:HA	1:P:32:LEU:HD12	1.90	0.52
1:P:339:MET:HG3	1:P:340:SER:N	2.24	0.52
1:P:341:SER:HB2	5:P:1003:HOH:O	2.08	0.52
2:T:835:VAL:CG2	2:T:856:VAL:HG12	2.39	0.52
1:P:211:LEU:CD1	1:P:230:ILE:HD13	2.40	0.51
1:P:308:GLY:HA3	1:P:312:ILE:HD13	1.92	0.51
1:P:297:ASP:O	1:P:301:ASN:HB2	2.09	0.51
1:P:84:THR:HG23	1:P:221:TRP:HZ2	1.76	0.51
1:P:449:TYR:CE2	1:P:495:LYS:HB2	2.45	0.51
1:P:4:PRO:HA	1:P:229:PHE:CG	2.45	0.51
2:T:837:TYR:C	2:T:839:ASP:N	2.64	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:P:177:SER:O	1:P:181:ASP:OD1	2.28	0.50
1:P:298:ASN:ND2	1:P:299:HIS:N	2.60	0.50
1:P:423:ASN:HD22	1:P:423:ASN:N	1.90	0.50
1:P:192:ALA:HB2	1:P:222:PHE:CZ	2.47	0.50
1:P:472:ASP:HB3	1:P:474:THR:H	1.76	0.50
1:P:364:ASN:OD1	1:P:364:ASN:O	2.29	0.50
2:T:849:ALA:O	2:T:852:GLN:HB2	2.11	0.50
1:P:331:HIS:CG	1:P:332:PRO:HD2	2.46	0.50
1:P:198:ALA:HB1	1:P:201:HIS:HD2	1.76	0.50
1:P:453:ILE:HG12	1:P:487:PHE:CE2	2.47	0.50
1:P:466:LYS:HB2	1:P:466:LYS:HZ2	1.76	0.50
1:P:42:VAL:HG12	1:P:95:VAL:HA	1.93	0.49
1:P:279:ASN:HB3	1:P:284:TRP:HE1	1.77	0.49
1:P:1:GLN:N	1:P:252:ARG:HG3	2.28	0.49
1:P:195:ARG:HG3	1:P:231:PHE:CE2	2.48	0.49
1:P:21:TRP:CZ3	1:P:42:VAL:CG2	2.95	0.49
1:P:442:THR:CG2	1:P:444:LEU:HD12	2.42	0.49
1:P:20:ARG:HD3	1:P:23:ASP:OD2	2.12	0.49
1:P:62:TYR:O	1:P:101:HIS:HE1	1.96	0.49
1:P:362:ASN:HD22	1:P:365:GLY:N	2.11	0.48
1:P:362:ASN:HD22	1:P:365:GLY:H	1.60	0.48
1:P:52:THR:C	1:P:55:SER:HA	2.33	0.48
2:T:868:ARG:HG2	2:T:869:TYR:HD1	1.79	0.48
1:P:170:LEU:HD21	1:P:179:ILE:HD12	1.96	0.48
1:P:314:THR:CG2	1:P:315:PHE:H	2.21	0.48
1:P:472:ASP:CB	1:P:474:THR:HG22	2.43	0.48
2:T:808:ALA:HB1	2:T:809:PRO:HD2	1.96	0.48
1:P:402:ASP:HA	5:P:1085:HOH:O	2.14	0.48
1:P:207:ILE:HD12	1:P:211:LEU:HG	1.94	0.47
1:P:53:ASN:N	1:P:55:SER:H	2.13	0.47
1:P:107:ALA:O	1:P:121:PRO:HG2	2.14	0.47
1:P:83:VAL:HA	1:P:93:ILE:HD13	1.97	0.47
1:P:132:SER:C	1:P:134:TRP:H	2.17	0.47
1:P:232:GLN:OE1	1:P:250:ASN:HB2	2.15	0.47
1:P:398:ARG:HH11	1:P:398:ARG:CG	2.22	0.47
1:P:404:GLN:HB3	1:P:422:GLY:HA3	1.95	0.47
1:P:10:ARG:HH11	1:P:36:GLY:HA2	1.77	0.47
1:P:13:ILE:HD12	1:P:335:PHE:HE2	1.80	0.47
1:P:437:SER:HA	1:P:477:PHE:O	2.15	0.47
2:T:807:PRO:HA	2:T:871:ALA:HA	1.96	0.47
1:P:126:PHE:O	1:P:130:PRO:HA	2.14	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:P:439:THR:HA	1:P:475:ALA:O	2.15	0.46
1:P:416:GLN:CD	1:P:436:LEU:HD12	2.36	0.46
1:P:308:GLY:HA3	1:P:312:ILE:CD1	2.45	0.46
1:P:146:GLY:O	1:P:161:GLN:HG2	2.15	0.46
1:P:56:ARG:NH1	1:P:60:GLU:OE2	2.48	0.46
1:P:254:THR:HG22	1:P:293:LEU:HD23	1.97	0.46
1:P:453:ILE:HG12	1:P:487:PHE:CZ	2.51	0.46
1:P:240:GLU:HB3	5:P:1021:HOH:O	2.15	0.46
1:P:490:ILE:O	1:P:491:HIS:HB3	2.16	0.46
2:T:808:ALA:HB1	2:T:809:PRO:CD	2.46	0.46
2:T:812:VAL:HG23	2:T:827:CYS:SG	2.55	0.46
1:P:1:GLN:NE2	1:P:2:TYR:CE2	2.85	0.46
1:P:1:GLN:H3	1:P:291:ARG:HD3	1.81	0.45
1:P:1:GLN:N	1:P:291:ARG:HD3	2.32	0.45
1:P:16:LEU:HD12	1:P:40:VAL:HG11	1.98	0.45
1:P:182:TYR:CE1	1:P:186:LEU:HD11	2.51	0.45
1:P:321:TYR:O	1:P:325:VAL:HG23	2.16	0.45
1:P:428:VAL:O	1:P:487:PHE:HB2	2.16	0.45
2:T:818:TRP:CZ2	2:T:819:ARG:HD3	2.51	0.45
1:P:99:ILE:HD11	1:P:196:LEU:CD2	2.35	0.45
1:P:7:GLN:O	1:P:8:SER:C	2.55	0.45
1:P:10:ARG:NH1	1:P:36:GLY:CA	2.74	0.45
1:P:219:THR:O	1:P:219:THR:HG23	2.16	0.45
1:P:405:PRO:O	1:P:421:ARG:HA	2.17	0.45
1:P:207:ILE:HG13	1:P:208:LYS:N	2.28	0.45
1:P:231:PHE:HA	1:P:252:ARG:O	2.17	0.45
1:P:272:GLU:HG3	1:P:276:TYR:HD2	1.82	0.44
1:P:129:VAL:HG11	1:P:131:TYR:CE2	2.53	0.44
1:P:161:GLN:HE21	1:P:164:GLY:HA2	1.83	0.44
1:P:371:THR:HG22	1:P:373:ASN:HD22	1.78	0.44
1:P:1:GLN:HB2	1:P:291:ARG:HD3	1.99	0.44
1:P:149:GLU:HB2	1:P:156:GLN:NE2	2.31	0.44
1:P:362:ASN:ND2	1:P:365:GLY:N	2.63	0.44
1:P:472:ASP:HB3	1:P:474:THR:HG22	1.99	0.44
2:T:854:THR:CG2	2:T:855:THR:N	2.80	0.44
1:P:184:ASN:CB	1:P:187:ILE:HD12	2.47	0.44
1:P:397:PHE:CD1	1:P:397:PHE:C	2.91	0.44
1:P:21:TRP:HZ3	1:P:42:VAL:HG22	1.83	0.44
1:P:130:PRO:HD2	1:P:178:MET:HE3	1.98	0.44
1:P:4:PRO:HG3	1:P:335:PHE:CE1	2.52	0.43
1:P:329:LEU:O	1:P:398:ARG:NH1	2.51	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:P:416:GLN:HG2	1:P:430:ASN:HA	2.00	0.43
1:P:179:ILE:O	1:P:182:TYR:HB3	2.17	0.43
1:P:207:ILE:HG12	1:P:250:ASN:ND2	2.32	0.43
1:P:130:PRO:HD2	1:P:178:MET:CE	2.49	0.43
1:P:305:HIS:NE2	1:P:352:GLU:HG3	2.34	0.43
2:T:854:THR:HG22	2:T:855:THR:N	2.34	0.43
1:P:47:GLU:HG3	1:P:115:CYS:HB2	1.99	0.43
1:P:258:TYR:CE1	1:P:262:LEU:HD12	2.53	0.43
1:P:54:PRO:HD2	1:P:57:PRO:HG3	2.00	0.43
1:P:279:ASN:HB3	1:P:284:TRP:NE1	2.33	0.43
1:P:393:ASN:HD22	1:P:452:VAL:HB	1.84	0.43
2:T:868:ARG:HG2	2:T:869:TYR:CD1	2.54	0.43
1:P:237:LEU:HD23	1:P:237:LEU:HA	1.82	0.43
1:P:233:GLU:HA	1:P:254:THR:OG1	2.19	0.43
1:P:404:GLN:CG	1:P:424:ARG:HG3	2.47	0.43
1:P:45:PRO:O	1:P:69:LEU:HA	2.18	0.43
1:P:158:ARG:CZ	1:P:242:ILE:HG12	2.49	0.43
2:T:832:THR:OG1	2:T:873:CYS:HB2	2.18	0.42
1:P:171:GLU:HA	1:P:176:ARG:HH21	1.84	0.42
1:P:240:GLU:CG	2:T:854:THR:HG23	2.48	0.42
1:P:274:MET:HB2	1:P:415:ASN:HA	2.00	0.42
2:T:814:LEU:HD12	2:T:822:GLN:O	2.19	0.42
1:P:6:THR:HA	1:P:92:ARG:HD3	2.02	0.42
1:P:21:TRP:CZ3	1:P:42:VAL:HG21	2.54	0.42
1:P:181:ASP:O	1:P:185:LYS:HB2	2.18	0.42
1:P:354:VAL:O	1:P:354:VAL:HG13	2.18	0.42
1:P:383:VAL:HB	1:P:385:GLU:OE1	2.20	0.42
1:P:184:ASN:HA	1:P:187:ILE:HB	2.00	0.42
1:P:424:ARG:O	1:P:491:HIS:HB2	2.19	0.42
1:P:13:ILE:HD12	1:P:335:PHE:CE2	2.54	0.42
1:P:198:ALA:HB1	1:P:201:HIS:CD2	2.53	0.42
1:P:237:LEU:HD12	2:T:853:ILE:HG12	1.97	0.42
2:T:829:GLU:CG	2:T:830:THR:N	2.80	0.42
1:P:163:VAL:CG1	2:T:858:ASP:HB2	2.50	0.42
1:P:442:THR:HG21	1:P:444:LEU:HD12	2.02	0.42
1:P:286:PHE:HB3	1:P:333:TYR:OH	2.19	0.42
1:P:44:PRO:HA	1:P:45:PRO:HD3	1.77	0.42
1:P:436:LEU:HD22	1:P:479:ILE:HD12	2.01	0.41
1:P:388:TRP:HB2	1:P:391:ILE:HG13	2.02	0.41
2:T:829:GLU:CG	2:T:830:THR:H	2.30	0.41
2:T:870:LEU:HD23	2:T:870:LEU:HA	1.90	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:P:298:ASN:HB3	1:P:301:ASN:ND2	2.36	0.41
1:P:391:ILE:H	1:P:391:ILE:HG12	1.65	0.41
1:P:421:ARG:HE	1:P:421:ARG:HB3	1.61	0.41
1:P:53:ASN:HA	1:P:55:SER:N	2.35	0.41
1:P:480:SER:C	1:P:482:SER:H	2.23	0.41
1:P:53:ASN:CA	1:P:55:SER:H	2.34	0.41
1:P:56:ARG:N	1:P:57:PRO:HD3	2.35	0.41
1:P:65:VAL:HG12	1:P:66:SER:OG	2.21	0.41
1:P:124:ARG:NH2	1:P:138:ASP:HB2	2.36	0.41
1:P:343:ARG:NH2	1:P:381:ASP:OD1	2.53	0.41
1:P:184:ASN:HA	1:P:187:ILE:CG1	2.51	0.40
1:P:377:THR:HG22	1:P:378:CYS:N	2.27	0.40
2:T:834:LYS:HD2	2:T:842:GLU:OE1	2.22	0.40
1:P:305:HIS:CE1	1:P:352:GLU:HG3	2.56	0.40
2:T:830:THR:OG1	2:T:850:PRO:HD3	2.21	0.40

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 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	P	494/496 (100%)	440 (89%)	47 (10%)	7 (1%)	9	17
2	T	69/74 (93%)	65 (94%)	4 (6%)	0	100	100
All	All	563/570 (99%)	505 (90%)	51 (9%)	7 (1%)	11	21

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	P	280	TRP
1	P	55	SER
1	P	111	THR

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Mol	Chain	Res	Type
1	P	271	GLY
1	P	318	ALA
1	P	334	GLY
1	P	170	LEU

5.3.2 Protein sidechains ⓘ

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	P	413/413 (100%)	351 (85%)	62 (15%)	2	4
2	T	57/60 (95%)	48 (84%)	9 (16%)	2	4
All	All	470/473 (99%)	399 (85%)	71 (15%)	2	4

All (71) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	P	1	GLN
1	P	7	GLN
1	P	14	VAL
1	P	41	GLN
1	P	56	ARG
1	P	63	GLN
1	P	66	SER
1	P	68	LYS
1	P	92	ARG
1	P	105	SER
1	P	114	THR
1	P	115	CYS
1	P	124	ARG
1	P	149	GLU
1	P	163	VAL
1	P	171	GLU
1	P	184	ASN
1	P	185	LYS
1	P	196	LEU

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Mol	Chain	Res	Type
1	P	207	ILE
1	P	213	LYS
1	P	219	THR
1	P	245	SER
1	P	252	ARG
1	P	254	THR
1	P	262	LEU
1	P	272	GLU
1	P	279	ASN
1	P	294	VAL
1	P	297	ASP
1	P	300	ASP
1	P	303	ARG
1	P	311	SER
1	P	312	ILE
1	P	319	ARG
1	P	343	ARG
1	P	347	ASN
1	P	350	ASN
1	P	354	VAL
1	P	363	ASN
1	P	372	ILE
1	P	373	ASN
1	P	376	THR
1	P	391	ILE
1	P	398	ARG
1	P	401	VAL
1	P	411	ASP
1	P	421	ARG
1	P	423	ASN
1	P	434	TRP
1	P	435	GLN
1	P	436	LEU
1	P	440	LEU
1	P	457	LYS
1	P	462	CYS
1	P	470	SER
1	P	471	SER
1	P	472	ASP
1	P	480	SER
1	P	484	GLN
1	P	490	ILE

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Mol	Chain	Res	Type
1	P	495	LYS
2	T	813	THR
2	T	821	SER
2	T	832	THR
2	T	838	GLU
2	T	844	LEU
2	T	853	ILE
2	T	858	ASP
2	T	861	ILE
2	T	868	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	P	1	GLN
1	P	101	HIS
1	P	161	GLN
1	P	279	ASN
1	P	298	ASN
1	P	301	ASN
1	P	305	HIS
1	P	331	HIS
1	P	347	ASN
1	P	362	ASN
1	P	364	ASN
1	P	373	ASN
1	P	423	ASN

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 ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 2 ligands modelled in this entry, 2 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

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.