Full wwPDB X-ray Structure Validation Report (i)

Sep 20, 2023 – 09:36 PM EDT

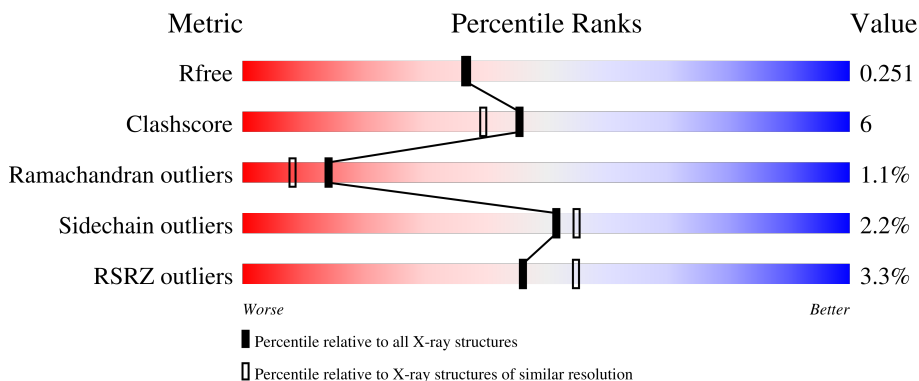|		
PDB ID	:	5JO7
Title	:	Henbane premnaspirodiene synthase (HPS), also known as Henbane vetispiradiene synthase (HVS) from Hyoscyamus muticus
Authors	:	Koo, H.J.; Xu, Y.; Louie, G.V.; Bowman, M.; Noel, J.P.
Deposited on	:	2016-05-02
Resolution	:	2.15 Å(reported)

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 2.15 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
Rfree		0.251
Clashscore		6
Ramachandran outliers		1.1%
Sidechain outliers		2.2%
RSRZ outliers		3.3%

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))
R_{free}	130704	1479 (2.16-2.16)
Clashscore	141614	1585 (2.16-2.16)
Ramachandran outliers	138981	1560 (2.16-2.16)
Sidechain outliers	138945	1559 (2.16-2.16)
RSRZ outliers	127900	1456 (2.16-2.16)

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% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	538	2% / 79% / 15% / • 5%
1	B	538	% / 75% / 17% / • 6%
1	C	538	2% / 79% / 13% / • 7%
1	D	538	7% / 77% / 15% / • 7%

2 Entry composition ⓘ

There are 2 unique types of molecules in this entry. The entry contains 17486 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 Vetispiradiene synthase 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	510	Total 4190	C 2683	N 690	O 800	S 17	0	1	0
1	B	506	Total 4169	C 2674	N 686	O 792	S 17	0	2	0
1	C	503	Total 4141	C 2658	N 677	O 789	S 17	0	2	0
1	D	499	Total 4099	C 2629	N 672	O 781	S 17	0	1	0

There are 32 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	18	GLY	-	expression tag	UNP Q39978
A	19	SER	-	expression tag	UNP Q39978
A	20	HIS	-	expression tag	UNP Q39978
A	21	MET	-	expression tag	UNP Q39978
A	22	ALA	-	expression tag	UNP Q39978
A	30	ARG	HIS	conflict	UNP Q39978
A	381	ARG	GLY	conflict	UNP Q39978
A	387	ALA	GLY	conflict	UNP Q39978
B	18	GLY	-	expression tag	UNP Q39978
B	19	SER	-	expression tag	UNP Q39978
B	20	HIS	-	expression tag	UNP Q39978
B	21	MET	-	expression tag	UNP Q39978
B	22	ALA	-	expression tag	UNP Q39978
B	30	ARG	HIS	conflict	UNP Q39978
B	381	ARG	GLY	conflict	UNP Q39978
B	387	ALA	GLY	conflict	UNP Q39978
C	18	GLY	-	expression tag	UNP Q39978
C	19	SER	-	expression tag	UNP Q39978
C	20	HIS	-	expression tag	UNP Q39978
C	21	MET	-	expression tag	UNP Q39978
C	22	ALA	-	expression tag	UNP Q39978

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Chain	Residue	Modelled	Actual	Comment	Reference
C	30	ARG	HIS	conflict	UNP Q39978
C	381	ARG	GLY	conflict	UNP Q39978
C	387	ALA	GLY	conflict	UNP Q39978
D	18	GLY	-	expression tag	UNP Q39978
D	19	SER	-	expression tag	UNP Q39978
D	20	HIS	-	expression tag	UNP Q39978
D	21	MET	-	expression tag	UNP Q39978
D	22	ALA	-	expression tag	UNP Q39978
D	30	ARG	HIS	conflict	UNP Q39978
D	381	ARG	GLY	conflict	UNP Q39978
D	387	ALA	GLY	conflict	UNP Q39978

- Molecule 2 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	306	Total O 306 306	0	0
2	B	252	Total O 252 252	0	0
2	C	198	Total O 198 198	0	0
2	D	131	Total O 131 131	0	0

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 and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). 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.
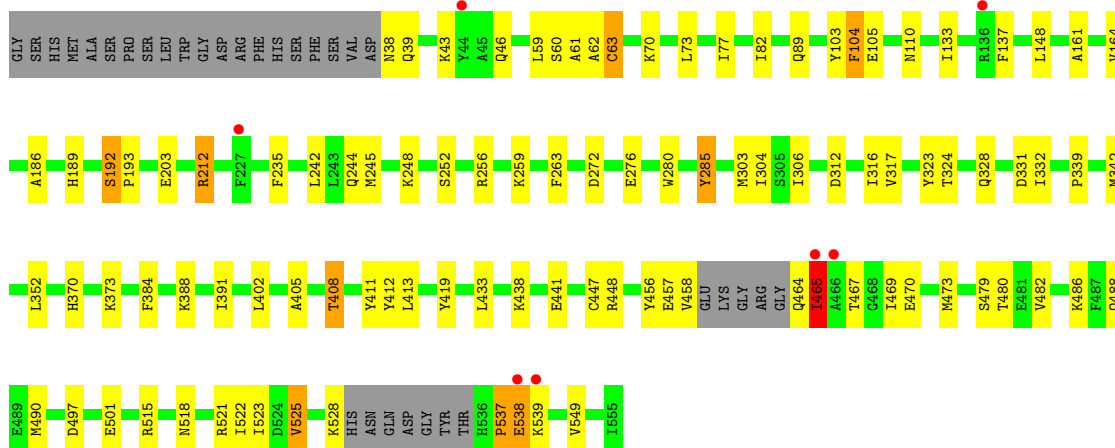
- Molecule 1: Vetispiradiene synthase 1

Chain A:

- Molecule 1: Vetispiradiene synthase 1

Chain B:

- Molecule 1: Vetispiradiene synthase 1

Chain C:

R149 R153 G154 L155 L156 N157 P188 E225 E226 F227 K228 L233 R234 F235 A236 K237 S252 R256 L261 D262 F263 V264 D272 W280 Y285 M303 I304 S305 I306 D312 L349 L352 K358 S361 R365 E378 M395 T426 K427

E428 E431 W432 L433 T445 V449 A454 E457 V458 E459 LYS GLY ARG GLY GLN ILE A466 T467 G468 I469 E470 M473 R474 V478 S479 T480 E481 E485 K486 F487 Q488 E489 I493 N518 I522 I523 Y527 K528 HIS ASN GLN ASP GLY TYR THR HIS P537 E538

K539 V540 L541 V549 I555

• Molecule 1: Vetispiradiene synthase 1

Chain D:

7%

77% 15% • 7%

GLY SER HIS MET ALA SER PRO SER LEU TRP GLY ASP ARG PHE HIS SER PHE SER VAL ASP ASN GLN VAL ALA GLU LYS TYR A45 Q46 E47 I48 K52 T55 S60 A61 A62 C63 G64 T65 T66 L67 K70 L71 N72 L73 I74 D75 I76 K88 Q89 I90 Y98 F104

E105 A106 H107 E108 Y109 N110 D111 S115 R123 V129 A140 N141 G142 R153 L158 F178 A187 P188 H189 L190 K191 S192 P193 E203 P211 I215 R216 E226 F227 K228 F235 L238 D239 Y240 L243 W258 K259 D260 L261 T266 D272

W280 Y285 P288 A293 I304 R329 W330 D331 I332 S333 Q334 R337 E340 I385 W389 F390 M395 P396 S399 Y411 Y412 L413 L414 T415 Y419 L420 G421 K427 E431 W432 L433 I440 E441 Y456 E457 V458 E459 K460 G461 ARG GLY GLN I465

A466 T467 G468 I469 E470 C471 Y472 M473 R474 K486 M490 K528 HIS ASN GLN ASP GLY TYR THR HIS PRO E538 K539 V540 L541 K542 P543 H544 L548 I555

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	100.45Å 100.69Å 222.73Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	74.69 – 2.15 74.69 – 2.15	Depositor EDS
% Data completeness (in resolution range)	85.0 (74.69-2.15) 84.7 (74.69-2.15)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.88 (at 2.14Å)	Xtriage
Refinement program	PHENIX 1.9_1692	Depositor
R, R_{free}	0.191 , 0.250 0.193 , 0.251	Depositor DCC
R_{free} test set	2192 reflections (2.09%)	wwPDB-VP
Wilson B-factor (Å^2)	24.6	Xtriage
Anisotropy	0.591	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 49.4	EDS
L-test for twinning[2]	$< |L| > = 0.50, < L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.016 for k,h,-l	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	17486	wwPDB-VP
Average B, all atoms (Å^2)	40.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 14.08% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

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	A	0.47	0/4283	0.60	1/5800 (0.0%)
1	B	0.40	0/4267	0.57	0/5781
1	C	0.40	0/4237	0.60	4/5739 (0.1%)
1	D	0.36	0/4190	0.52	0/5674
All	All	0.41	0/16977	0.57	5/22994 (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	A	0	1
1	B	0	2
1	C	0	1
1	D	0	1
All	All	0	5

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	485	GLU	C-N-CA	6.60	138.20	121.70
1	A	349	LEU	CA-CB-CG	6.24	129.65	115.30
1	C	485	GLU	N-CA-C	5.98	127.14	111.00
1	C	468	GLY	N-CA-C	-5.27	99.92	113.10
1	C	485	GLU	CA-C-N	5.24	128.72	117.20

There are no chirality outliers.

All (5) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	106	ALA	Peptide
1	B	104	PHE	Peptide
1	B	59	LEU	Peptide
1	C	106	ALA	Peptide
1	D	64	GLY	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	4190	0	4135	50	0
1	B	4169	0	4113	68	0
1	C	4141	0	4092	48	0
1	D	4099	0	4050	50	0
2	A	306	0	0	3	0
2	B	252	0	0	7	0
2	C	198	0	0	6	0
2	D	131	0	0	3	0
All	All	17486	0	16390	212	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 6.

All (212) 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:B:464:GLN:NE2	1:B:465:ILE:O	2.09	0.85
1:A:271:ARG:NH1	1:A:309:ASP:OD1	2.11	0.84
1:D:203:GLU:O	1:D:528:LYS:NZ	2.16	0.79
1:D:340:GLU:OE1	2:D:601:HOH:O	2.03	0.77
1:C:395:MET:HG2	1:C:474:ARG:HD3	1.68	0.76
1:B:61:ALA:HB1	1:B:63:CYS:H	1.51	0.75
1:D:63:CYS:SG	1:D:70:LYS:NZ	2.59	0.74
1:C:225:GLU:O	1:C:228:LYS:NZ	2.19	0.72
1:B:61:ALA:HA	1:B:62:ALA:HB3	1.72	0.70
1:A:465:ILE:O	1:A:467:THR:N	2.22	0.69
1:D:395:MET:HG2	1:D:474:ARG:HD3	1.74	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:104:PHE:H	1:A:104:PHE:HD1	1.42	0.67
1:A:271:ARG:HG3	1:A:271:ARG:HH11	1.59	0.67
1:B:486:LYS:NZ	2:B:601:HOH:O	2.19	0.67
1:A:104:PHE:O	1:A:136:ARG:NH2	2.24	0.66
1:B:408:THR:HG21	2:B:628:HOH:O	1.96	0.65
1:D:64:GLY:H	1:D:65:THR:HA	1.61	0.65
1:B:537:PRO:O	1:B:539:LYS:N	2.30	0.64
1:A:103:TYR:O	1:A:105:GLU:N	2.31	0.63
1:B:339:PRO:HD2	1:B:342:MET:HE2	1.81	0.63
1:A:472:TYR:CZ	1:A:486:LYS:HG2	2.32	0.63
1:C:153:ARG:NH2	2:C:606:HOH:O	2.30	0.62
1:D:192:SER:OG	1:D:193:PRO:HD2	2.01	0.61
1:C:358:LYS:NZ	2:C:608:HOH:O	2.32	0.60
1:B:192:SER:OG	1:B:193:PRO:HD2	2.00	0.60
1:B:285:TYR:CD2	1:B:515:ARG:HD2	2.36	0.60
1:B:61:ALA:HB1	1:B:63:CYS:N	2.17	0.60
1:D:243:LEU:HD21	1:D:288:PRO:HG3	1.82	0.59
1:B:456:TYR:C	1:B:458:VAL:H	2.06	0.59
1:B:60:SER:N	1:B:61:ALA:HB2	2.17	0.58
1:C:188:PRO:O	2:C:601:HOH:O	2.17	0.58
1:C:66:THR:HG23	1:C:68:THR:H	1.68	0.58
1:B:408:THR:HG22	1:B:448:ARG:NH2	2.18	0.58
1:D:74:ILE:HD12	1:D:90:ILE:HG23	1.86	0.58
1:D:456:TYR:HD1	1:D:467:THR:HG21	1.68	0.57
1:A:303:MET:HG3	1:A:352:LEU:HD22	1.87	0.57
1:D:109:TYR:O	1:D:115:SER:OG	2.20	0.57
1:D:334:GLN:OE1	1:D:337:ARG:NH1	2.34	0.56
1:B:304:ILE:HD11	1:B:413:LEU:HD23	1.88	0.56
1:A:470:GLU:HA	1:A:473:MET:HE3	1.86	0.56
1:A:538:GLU:HB2	1:A:540:VAL:HG23	1.88	0.56
1:D:98:TYR:CE1	1:D:129:VAL:HG12	2.41	0.56
1:B:408:THR:HG22	1:B:448:ARG:HH21	1.70	0.56
1:B:323:TYR:CD1	1:B:342:MET:HE3	2.41	0.56
1:B:303:MET:HG3	1:B:352:LEU:HD22	1.87	0.55
1:D:64:GLY:N	1:D:65:THR:HA	2.21	0.55
1:A:137:PHE:HB3	1:A:148:LEU:HD11	1.88	0.55
1:A:285:TYR:CD2	1:A:515:ARG:HD2	2.41	0.55
1:C:52:LYS:NZ	2:C:614:HOH:O	2.40	0.54
1:B:203:GLU:O	1:B:528:LYS:NZ	2.40	0.54
1:C:106:ALA:CB	1:C:107:HIS:HA	2.37	0.54
1:C:518:ASN:O	1:C:522[B]:ILE:HG13	2.07	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:125:HIS:O	1:A:504:ARG:NH1	2.37	0.54
1:A:78:GLU:HA	1:A:83:ALA:HB2	1.89	0.54
1:A:515:ARG:NH2	2:A:619:HOH:O	2.40	0.54
1:C:104:PHE:CG	1:C:133:ILE:HG13	2.43	0.54
1:C:470:GLU:HA	1:C:473:MET:HE3	1.90	0.54
1:B:467:THR:HG23	1:B:470:GLU:H	1.73	0.53
1:A:66:THR:N	1:A:69:GLU:OE2	2.41	0.53
1:B:419:TYR:CE2	1:B:433:LEU:HD11	2.44	0.53
1:D:258:TRP:NE1	1:D:272:ASP:OD1	2.40	0.53
1:B:518:ASN:O	1:B:522:ILE:HG13	2.09	0.53
1:A:263:PHE:CE2	1:A:306:ILE:HG13	2.45	0.52
1:D:419:TYR:CE2	1:D:433:LEU:HD11	2.44	0.52
1:D:472:TYR:CZ	1:D:486:LYS:HG2	2.45	0.52
1:A:463:GLY:HA3	1:A:464:GLN:C	2.29	0.51
1:A:95:ASP:O	1:A:99:ARG:HG2	2.11	0.51
1:B:469:ILE:O	1:B:473:MET:HG3	2.11	0.51
1:C:77:ILE:HG23	1:C:82:ILE:HG13	1.91	0.51
1:C:426:THR:OG1	1:C:428:GLU:HG2	2.11	0.51
1:B:456:TYR:O	1:B:458:VAL:N	2.43	0.51
1:C:303:MET:HG3	1:C:352:LEU:HD22	1.92	0.51
1:A:486:LYS:O	1:A:490:MET:HG3	2.11	0.51
1:C:106:ALA:HB1	1:C:107:HIS:HA	1.92	0.51
1:A:472:TYR:CE2	1:A:486:LYS:HG2	2.46	0.50
1:C:485:GLU:N	1:C:486:LYS:HB3	2.26	0.50
1:A:65:THR:HB	1:A:69:GLU:HG3	1.94	0.50
1:B:137:PHE:HB3	1:B:148:LEU:HD11	1.94	0.50
1:C:110:ASN:OD1	1:C:136:ARG:HD3	2.12	0.50
1:C:61:ALA:C	1:C:63:CYS:H	2.15	0.50
1:C:104:PHE:HZ	1:C:129:VAL:HG23	1.77	0.50
1:C:113:ASN:OD1	1:C:157:ASN:ND2	2.38	0.49
1:A:212:ARG:HD2	2:A:744:HOH:O	2.12	0.49
1:D:123:ARG:HG2	1:D:129:VAL:HG22	1.93	0.49
1:A:166:THR:OG1	1:A:500:GLU:HB2	2.13	0.49
1:C:427:LYS:O	1:C:431:GLU:HG2	2.12	0.49
1:A:280[B]:TRP:HZ3	1:A:541:LEU:HD11	1.78	0.49
1:B:497:ASP:O	1:B:501:GLU:HG2	2.13	0.49
1:C:280[B]:TRP:HZ3	1:C:541:LEU:HD11	1.78	0.49
1:D:469:ILE:O	1:D:473:MET:HG3	2.12	0.49
1:B:285:TYR:CE2	1:B:515:ARG:HD2	2.48	0.49
1:C:469:ILE:O	1:C:473:MET:HG3	2.13	0.49
1:D:48:ILE:HG23	1:D:235:PHE:CE1	2.48	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:60:SER:OG	1:B:61:ALA:HA	2.14	0.48
1:D:107:HIS:HA	1:D:109:TYR:N	2.28	0.48
1:B:212:ARG:HD2	2:B:770:HOH:O	2.14	0.48
1:A:463:GLY:HA3	1:A:464:GLN:O	2.14	0.48
1:C:485:GLU:O	1:C:488:GLN:HB2	2.14	0.48
1:D:304:ILE:HD11	1:D:413:LEU:HD23	1.95	0.48
1:A:272:ASP:HB3	1:B:272:ASP:HB3	1.96	0.48
1:C:489:GLU:O	1:C:493:ILE:HG12	2.14	0.47
1:C:233:LEU:HG	1:C:237:LYS:HE2	1.96	0.47
1:D:329:ARG:NE	2:D:604:HOH:O	2.29	0.47
1:B:323:TYR:HB2	1:B:342:MET:CE	2.45	0.47
1:B:323:TYR:HD1	1:B:342:MET:HE3	1.79	0.47
1:C:138:GLN:NE2	1:C:142:GLY:O	2.48	0.47
1:C:272:ASP:HB3	1:D:272:ASP:HB3	1.97	0.47
1:C:378:GLU:OE2	2:C:602:HOH:O	2.20	0.47
1:B:263:PHE:CE2	1:B:306:ILE:HG13	2.49	0.47
1:A:66:THR:O	1:A:69:GLU:HG2	2.15	0.47
1:B:479:SER:OG	1:B:482:VAL:HG12	2.15	0.47
1:A:324:THR:O	1:A:328:GLN:HG2	2.15	0.47
1:B:252:SER:OG	1:B:256:ARG:NH1	2.48	0.47
1:D:211:PRO:O	1:D:215:ILE:HG12	2.15	0.47
1:A:355:ASP:OD1	2:A:601:HOH:O	2.20	0.46
1:B:259:LYS:HD3	1:B:259:LYS:HA	1.69	0.46
1:D:70:LYS:HA	1:D:70:LYS:HD3	1.58	0.46
1:D:107:HIS:HB2	1:D:110:ASN:OD1	2.15	0.46
1:A:542:LYS:NZ	1:B:312:ASP:OD2	2.48	0.46
1:B:60:SER:HA	1:B:89:GLN:HE21	1.81	0.46
1:C:467:THR:OG1	1:C:468:GLY:HA3	2.15	0.46
1:D:389:TRP:CZ3	1:D:396:PRO:HG3	2.51	0.46
1:B:384:PHE:CZ	1:B:388:LYS:HD2	2.51	0.46
1:D:427:LYS:O	1:D:431:GLU:HG2	2.16	0.46
1:B:61:ALA:HB3	1:B:70:LYS:NZ	2.31	0.45
1:C:303:MET:HE2	1:C:349:LEU:HD13	1.99	0.45
1:B:317:VAL:CG2	1:B:391:ILE:HG13	2.47	0.45
1:B:521:ARG:O	1:B:525:VAL:HG13	2.16	0.45
1:C:252:SER:O	1:C:256:ARG:HG3	2.16	0.45
1:A:304:ILE:HD11	1:A:413:LEU:HD23	1.98	0.45
1:C:486:LYS:N	1:C:489:GLU:H	2.15	0.45
1:B:324:THR:O	1:B:328:GLN:HG2	2.16	0.45
1:B:488:GLN:NE2	2:B:624:HOH:O	2.49	0.45
1:D:331:ASP:OD1	1:D:332:ILE:N	2.50	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:43:LYS:NZ	2:B:609:HOH:O	2.37	0.44
1:B:104:PHE:HD2	1:B:133:ILE:O	2.00	0.44
1:B:70:LYS:HD3	1:B:70:LYS:HA	1.74	0.44
1:C:95:ASP:O	1:C:99:ARG:HG2	2.17	0.44
1:C:104:PHE:O	1:C:136:ARG:NH2	2.47	0.44
1:C:149:ARG:HA	1:C:155:LEU:HD11	1.99	0.44
1:D:107:HIS:HA	1:D:108:GLU:C	2.37	0.44
1:A:427:LYS:O	1:A:431:GLU:HG2	2.17	0.44
1:B:161:ALA:O	1:B:164:VAL:HG22	2.18	0.44
1:C:445:THR:O	1:C:449:VAL:HB	2.17	0.44
1:C:395:MET:HG2	1:C:474:ARG:CD	2.44	0.44
1:A:459:GLU:O	1:A:461:GLY:N	2.51	0.44
1:B:38:ASN:HA	1:B:39:GLN:HA	1.82	0.44
1:A:518:ASN:O	1:A:522:ILE:HG13	2.18	0.43
1:B:373:LYS:NZ	2:B:612:HOH:O	2.44	0.43
1:C:365:ARG:HD3	2:C:702:HOH:O	2.17	0.43
1:C:523:ILE:HD11	1:C:527:TYR:HE2	1.83	0.43
1:A:77:ILE:HG23	1:A:82:ILE:HG13	2.01	0.43
1:A:105:GLU:O	1:A:106:ALA:HB3	2.18	0.43
1:B:331:ASP:OD1	1:B:332:ILE:N	2.52	0.43
1:B:339:PRO:HD2	1:B:342:MET:CE	2.48	0.43
1:C:228:LYS:HD3	1:C:233:LEU:HD22	2.00	0.43
1:A:65:THR:HB	1:A:69:GLU:CG	2.49	0.43
1:C:486:LYS:H	1:C:489:GLU:CB	2.31	0.43
1:B:186:ALA:HA	1:B:189[A]:HIS:NE2	2.34	0.43
1:C:263:PHE:CE2	1:C:306:ILE:HG13	2.53	0.43
1:D:105:GLU:HA	1:D:106:ALA:HA	1.90	0.43
1:D:329:ARG:HD3	2:D:608:HOH:O	2.18	0.43
1:A:222:TYR:CZ	1:A:228:LYS:HB2	2.54	0.43
1:A:415:THR:HG21	1:A:440:LEU:HD13	2.01	0.42
1:B:316:ILE:N	2:B:621:HOH:O	2.48	0.42
1:B:280[A]:TRP:HZ3	1:B:411:TYR:OH	2.03	0.42
1:D:104:PHE:N	1:D:104:PHE:CD2	2.87	0.42
1:A:528:LYS:HD2	1:A:528:LYS:HA	1.83	0.42
1:B:412:TYR:OH	1:B:441:GLU:OE1	2.23	0.42
1:D:293:ALA:HA	1:D:421:GLY:HA3	2.01	0.42
1:D:390:PHE:CD1	1:D:465:ILE:HG23	2.54	0.42
1:D:259:LYS:HA	1:D:259:LYS:HD3	1.82	0.42
1:A:263:PHE:CD2	1:A:306:ILE:HG13	2.53	0.42
1:D:415:THR:HG21	1:D:440:LEU:HD13	2.00	0.42
1:A:419:TYR:CE2	1:A:433:LEU:HD11	2.54	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:104:PHE:N	1:D:104:PHE:HD2	2.18	0.42
1:D:243:LEU:HD23	1:D:243:LEU:HA	1.65	0.42
1:D:486:LYS:O	1:D:490:MET:HG3	2.20	0.42
1:B:447:CYS:HA	1:B:523:ILE:HG12	2.02	0.41
1:D:216:ARG:HD3	1:D:240:TYR:CZ	2.55	0.41
1:D:261:LEU:HD23	1:D:261:LEU:HA	1.89	0.41
1:D:72:ASN:O	1:D:76:ILE:HG12	2.19	0.41
1:D:544:HIS:O	1:D:548:LEU:HB2	2.20	0.41
1:B:60:SER:HA	1:B:89:GLN:NE2	2.35	0.41
1:B:248:LYS:HE2	1:B:549:VAL:O	2.21	0.41
1:C:66:THR:O	1:C:69:GLU:HG2	2.20	0.41
1:D:412:TYR:OH	1:D:441:GLU:OE1	2.33	0.41
1:B:103:TYR:HB3	1:B:105:GLU:HG3	2.02	0.41
1:B:73:LEU:O	1:B:77:ILE:HG12	2.19	0.41
1:D:470:GLU:HA	1:D:473:MET:HE3	2.03	0.41
1:B:242:LEU:HA	1:B:245:MET:HE2	2.02	0.41
1:B:276:GLU:OE2	1:B:538:GLU:HG3	2.21	0.41
1:A:44:TYR:CD1	1:A:238:LEU:HD22	2.56	0.41
1:A:306:ILE:HD13	1:A:306:ILE:HA	1.93	0.41
1:B:43:LYS:O	1:B:46:GLN:HB2	2.21	0.41
1:B:405:ALA:HA	1:B:408:THR:HB	2.02	0.41
1:D:280[B]:TRP:HZ3	1:D:541:LEU:HD11	1.85	0.41
1:D:385:ILE:HA	1:D:385:ILE:HD13	1.85	0.41
1:B:77:ILE:HG23	1:B:82:ILE:HG13	2.03	0.41
1:B:104:PHE:HZ	1:B:110:ASN:HA	1.85	0.41
1:B:486:LYS:O	1:B:490:MET:HG3	2.21	0.41
1:A:426:THR:OG1	1:A:428:GLU:HG2	2.21	0.40
1:A:470:GLU:HA	1:A:473:MET:CE	2.52	0.40
1:B:244:GLN:HG2	1:B:248:LYS:HE3	2.03	0.40
1:D:52:LYS:HG2	1:D:235:PHE:CZ	2.56	0.40
1:A:211:PRO:O	1:A:215:ILE:HG12	2.21	0.40
1:A:259:LYS:NZ	1:A:272:ASP:OD2	2.55	0.40
1:C:459:GLU:OE2	1:C:459:GLU:N	2.44	0.40
1:C:312:ASP:OD2	1:D:542:LYS:NZ	2.54	0.40
1:A:387:ALA:O	1:A:391:ILE:HG12	2.22	0.40
1:C:261:LEU:HD23	1:C:261:LEU:HA	1.93	0.40
1:C:304:ILE:HD12	1:C:304:ILE:HG23	1.88	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	A	507/538 (94%)	489 (96%)	14 (3%)	4 (1%)	19	12
1	B	502/538 (93%)	485 (97%)	12 (2%)	5 (1%)	15	9
1	C	499/538 (93%)	479 (96%)	15 (3%)	5 (1%)	15	9
1	D	494/538 (92%)	471 (95%)	15 (3%)	8 (2%)	9	4
All	All	2002/2152 (93%)	1924 (96%)	56 (3%)	22 (1%)	14	8

All (22) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	104	PHE
1	A	460	LYS
1	A	462	ARG
1	A	466	ALA
1	B	192	SER
1	B	465	ILE
1	C	62	ALA
1	C	104	PHE
1	C	457	GLU
1	C	458	VAL
1	C	486	LYS
1	D	47	GLU
1	D	60	SER
1	D	467	THR
1	B	457	GLU
1	B	537	PRO
1	B	538	GLU
1	D	110	ASN
1	D	192	SER
1	D	457	GLU
1	D	459	GLU
1	D	107	HIS

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	A	458/481 (95%)	446 (97%)	12 (3%)	46	47
1	B	457/481 (95%)	446 (98%)	11 (2%)	49	51
1	C	454/481 (94%)	446 (98%)	8 (2%)	59	63
1	D	449/481 (93%)	441 (98%)	8 (2%)	59	63
All	All	1818/1924 (94%)	1779 (98%)	39 (2%)	52	57

All (39) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	108	GLU
1	A	164	VAL
1	A	227	PHE
1	A	228	LYS
1	A	235	PHE
1	A	285	TYR
1	A	306	ILE
1	A	327	ILE
1	A	354	ASP
1	A	411	TYR
1	A	414	LEU
1	A	549	VAL
1	B	63	CYS
1	B	212	ARG
1	B	235	PHE
1	B	285	TYR
1	B	370	HIS
1	B	402	LEU
1	B	408	THR
1	B	438	LYS
1	B	465	ILE
1	B	480	THR
1	B	525	VAL
1	C	66	THR

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Mol	Chain	Res	Type
1	C	129	VAL
1	C	235	PHE
1	C	285	TYR
1	C	361	SER
1	C	433	LEU
1	C	486	LYS
1	C	549	VAL
1	D	65	THR
1	D	67	LEU
1	D	88	LYS
1	D	228	LYS
1	D	266	THR
1	D	285	TYR
1	D	399	SER
1	D	411	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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 monosaccharides in this entry.

5.6 Ligand geometry ⓘ

There are no ligands in this entry.

5.7 Other polymers ⓘ

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 ⓘ

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	510/538 (94%)	-0.23	9 (1%)	68	75	12, 26, 58, 133	0
1	B	506/538 (94%)	-0.22	7 (1%)	75	80	17, 33, 65, 116	0
1	C	503/538 (93%)	-0.11	12 (2%)	59	67	19, 38, 76, 106	0
1	D	499/538 (92%)	0.27	38 (7%)	13	19	21, 52, 95, 126	0
All	All	2018/2152 (93%)	-0.08	66 (3%)	46	55	12, 37, 81, 133	0

All (66) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	65	THR	7.4
1	D	227	PHE	6.8
1	C	227	PHE	6.5
1	C	63	CYS	5.0
1	B	44	TYR	4.6
1	D	555	ILE	4.6
1	A	104	PHE	4.4
1	B	465	ILE	4.3
1	A	466	ALA	4.2
1	A	465	ILE	4.2
1	B	538	GLU	4.0
1	A	462	ARG	3.9
1	D	64	GLY	3.9
1	B	227	PHE	3.9
1	D	63	CYS	3.8
1	D	158	LEU	3.7
1	D	141	ASN	3.7
1	D	61	ALA	3.4
1	D	465	ILE	3.4
1	D	461	GLY	3.3
1	C	467	THR	3.3

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Mol	Chain	Res	Type	RSRZ
1	B	539	LYS	3.2
1	D	142	GLY	3.2
1	D	541	LEU	3.1
1	D	153	ARG	3.0
1	D	178	PHE	3.0
1	D	459	GLU	2.9
1	A	457	GLU	2.8
1	D	111	ASP	2.7
1	A	458	VAL	2.7
1	C	478	VAL	2.7
1	D	71	LEU	2.7
1	D	140	ALA	2.6
1	D	190	LEU	2.6
1	D	189	HIS	2.5
1	C	539	LYS	2.5
1	D	280[A]	TRP	2.5
1	D	187	ALA	2.5
1	C	555	ILE	2.5
1	D	460	LYS	2.5
1	D	466	ALA	2.5
1	D	528	LYS	2.4
1	D	538	GLU	2.4
1	D	456	TYR	2.4
1	B	466	ALA	2.4
1	D	192	SER	2.4
1	D	67	LEU	2.3
1	D	70	LYS	2.3
1	A	461	GLY	2.3
1	D	539	LYS	2.3
1	C	481	GLU	2.3
1	A	464	GLN	2.3
1	C	466	ALA	2.3
1	C	264	VAL	2.3
1	D	193	PRO	2.3
1	C	480	THR	2.2
1	D	540	VAL	2.2
1	C	105	GLU	2.2
1	D	238	LEU	2.2
1	D	191	LYS	2.2
1	D	62	ALA	2.2
1	D	226	GLU	2.1
1	B	136	ARG	2.1

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Mol	Chain	Res	Type	RSRZ
1	D	55	THR	2.1
1	C	454	ALA	2.0
1	A	463	GLY	2.0

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

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4 Ligands ⓘ

There are no ligands in this entry.

6.5 Other polymers ⓘ

There are no such residues in this entry.