



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 27, 2023 – 12:37 pm GMT

PDB ID : 7ZU9
Title : CRYSTAL STRUCTURE OF THE C89A_C113A GMP SYNTHETASE IN-ACTIVE DOUBLE MUTANT FROM PLASMODIUM FALCIPARUM
Authors : Ballut, L.; Violot, S.; Aghajari, N.
Deposited on : 2022-05-11
Resolution : 2.80 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 : 4.02b-467
Xtriage (Phenix) : 1.13
EDS : 2.32.1
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.32.1

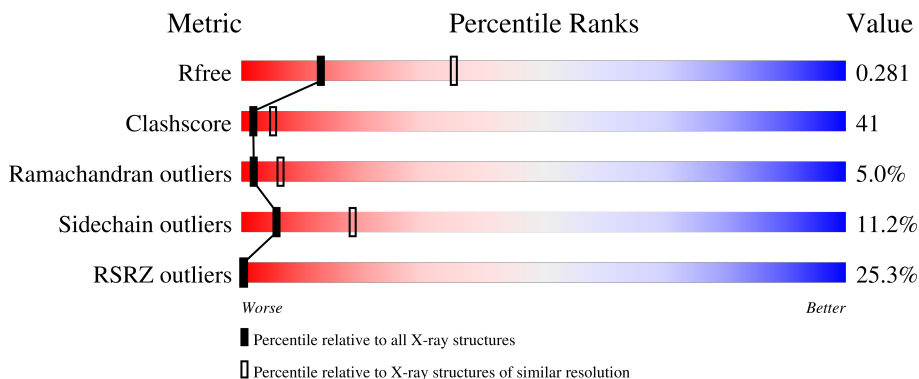
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.80 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))
R_{free}	130704	3140 (2.80-2.80)
Clashscore	141614	3569 (2.80-2.80)
Ramachandran outliers	138981	3498 (2.80-2.80)
Sidechain outliers	138945	3500 (2.80-2.80)
RSRZ outliers	127900	3078 (2.80-2.80)

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 $\leq 5\%$. 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	568	

2 Entry composition [i](#)

There are 2 unique types of molecules in this entry. The entry contains 4084 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 Glutamine amidotransferase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	509	4074	2615	666	774	19	0	0	0

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-12	MET	-	initiating methionine	UNP Q8IJR9
A	-11	ARG	-	expression tag	UNP Q8IJR9
A	-10	GLY	-	expression tag	UNP Q8IJR9
A	-9	SER	-	expression tag	UNP Q8IJR9
A	-8	HIS	-	expression tag	UNP Q8IJR9
A	-7	HIS	-	expression tag	UNP Q8IJR9
A	-6	HIS	-	expression tag	UNP Q8IJR9
A	-5	HIS	-	expression tag	UNP Q8IJR9
A	-4	HIS	-	expression tag	UNP Q8IJR9
A	-3	HIS	-	expression tag	UNP Q8IJR9
A	-2	GLY	-	expression tag	UNP Q8IJR9
A	-1	SER	-	expression tag	UNP Q8IJR9
A	0	MET	-	expression tag	UNP Q8IJR9
A	1	ALA	-	expression tag	UNP Q8IJR9
A	89	ALA	CYS	engineered mutation	UNP Q8IJR9
A	113	ALA	CYS	engineered mutation	UNP Q8IJR9

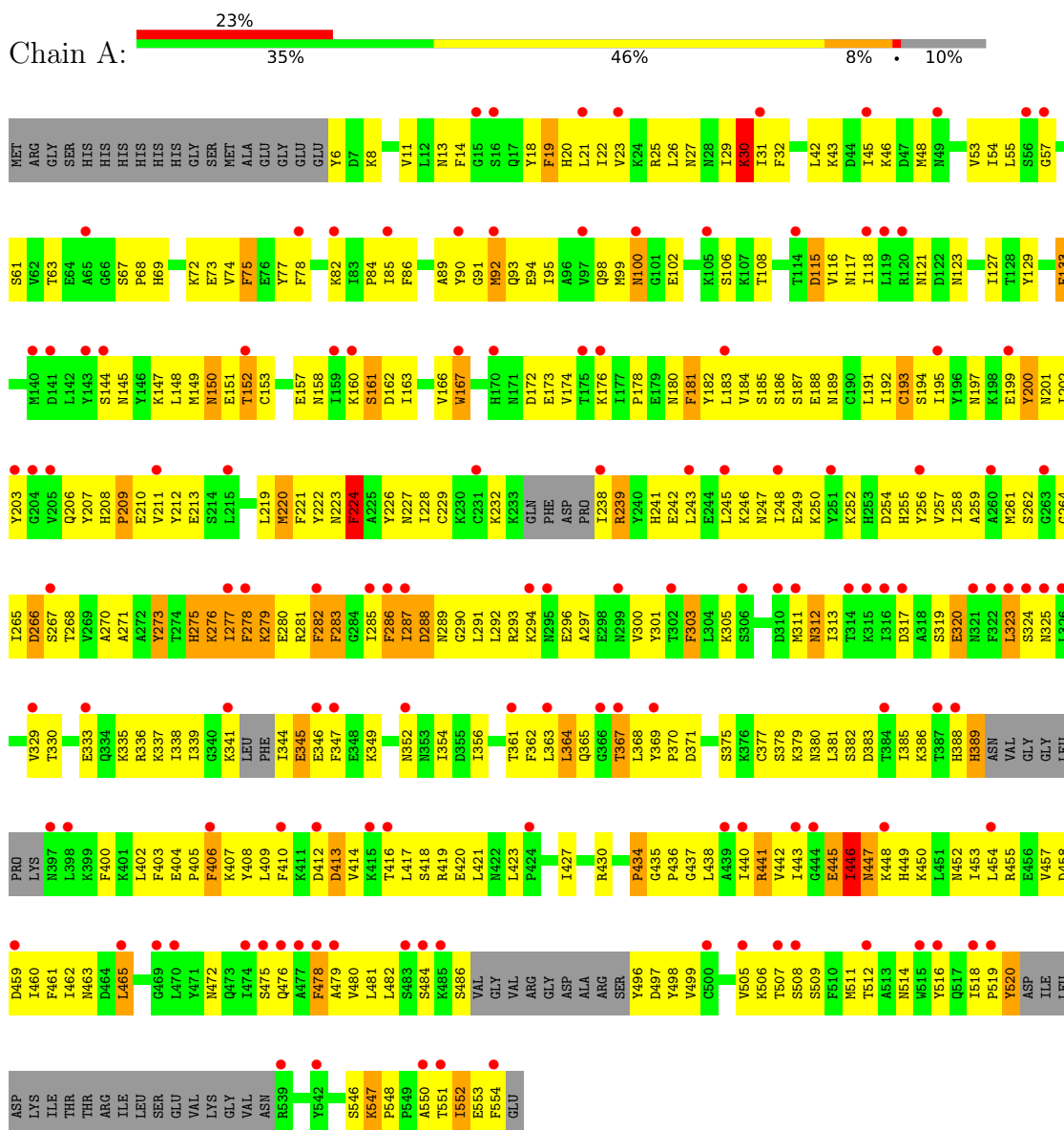
- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	10	Total	O	0	0
			10	10		

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: Glutamine amidotransferase



4 Data and refinement statistics i

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	111.65Å 64.54Å 56.33Å 90.00° 90.03° 90.00°	Depositor
Resolution (Å)	28.16 – 2.80 28.16 – 2.80	Depositor EDS
% Data completeness (in resolution range)	92.3 (28.16-2.80) 92.1 (28.16-2.80)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.59 (at 2.80Å)	Xtrriage
Refinement program	PHENIX (1.20.1_4487: ???)	Depositor
R, R_{free}	0.270 , 0.314 0.246 , 0.281	Depositor DCC
R_{free} test set	462 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	54.7	Xtrriage
Anisotropy	0.017	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.17 , 16.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.40$, $\langle L^2 \rangle = 0.23$	Xtrriage
Estimated twinning fraction	0.360 for -1/2*h+3/2*k,1/2*h+1/2*k,-l 0.326 for -1/2*h-3/2*k,-1/2*h+1/2*k,-l 0.397 for 1/2*h+3/2*k,1/2*h-1/2*k,-l 0.398 for 1/2*h-3/2*k,-1/2*h-1/2*k,-l 0.305 for -h,-k,l	Xtrriage
F_o, F_c correlation	0.89	EDS
Total number of atoms	4084	wwPDB-VP
Average B, all atoms (Å ²)	48.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 11.60% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ 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	0.38	0/4157	0.64	0/5615

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

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	A	4074	0	3971	332	0
2	A	10	0	0	0	0
All	All	4084	0	3971	332	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 41.

All (332) 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:29:ILE:CD1	1:A:222:TYR:HA	1.55	1.36
1:A:29:ILE:HD11	1:A:222:TYR:CA	1.72	1.19
1:A:291:LEU:CD2	1:A:454:LEU:HD23	1.88	1.03
1:A:291:LEU:HD22	1:A:454:LEU:CD2	1.91	1.00

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:291:LEU:CD2	1:A:454:LEU:CD2	2.40	0.99
1:A:144:SER:HA	1:A:548:PRO:HD2	1.46	0.94
1:A:29:ILE:HD11	1:A:222:TYR:HA	0.94	0.92
1:A:276:LYS:HB2	1:A:281:ARG:HH12	1.39	0.87
1:A:192:ILE:HD11	1:A:195:ILE:HD11	1.55	0.87
1:A:220:MET:O	1:A:224:PHE:HB2	1.75	0.86
1:A:54:ILE:HD12	1:A:86:PHE:HB2	1.57	0.86
1:A:291:LEU:HD23	1:A:454:LEU:HD23	1.55	0.85
1:A:323:LEU:HD22	1:A:447:ASN:HA	1.63	0.81
1:A:294:LYS:HD2	1:A:455:ARG:HG2	1.63	0.80
1:A:121:ASN:ND2	1:A:511:MET:SD	2.56	0.78
1:A:267:SER:HA	1:A:270:ALA:HB3	1.67	0.78
1:A:414:VAL:HA	1:A:417:LEU:HB2	1.66	0.76
1:A:181:PHE:O	1:A:512:THR:HG21	1.84	0.76
1:A:86:PHE:HD1	1:A:203:TYR:HB2	1.49	0.76
1:A:385:ILE:HA	1:A:434:PRO:HB3	1.68	0.75
1:A:507:THR:CG2	1:A:512:THR:O	2.33	0.75
1:A:291:LEU:HD22	1:A:454:LEU:HD21	1.69	0.74
1:A:291:LEU:HD23	1:A:454:LEU:CD2	2.10	0.73
1:A:8:LYS:HE3	1:A:48:MET:HB2	1.70	0.73
1:A:29:ILE:HD11	1:A:222:TYR:CB	2.17	0.73
1:A:276:LYS:HB3	1:A:281:ARG:HH22	1.52	0.73
1:A:442:VAL:HG22	1:A:481:LEU:HB3	1.70	0.73
1:A:264:GLY:O	1:A:268:THR:N	2.21	0.72
1:A:445:GLU:O	1:A:446:ILE:HG12	1.89	0.72
1:A:507:THR:HG21	1:A:512:THR:H	1.55	0.72
1:A:552:ILE:HG22	1:A:553:GLU:HG2	1.71	0.72
1:A:305:LYS:HE3	1:A:312:ASN:HA	1.71	0.72
1:A:336:ARG:HE	1:A:440:ILE:HD13	1.55	0.71
1:A:377:CYS:SG	1:A:378:SER:N	2.64	0.71
1:A:149:MET:SD	1:A:149:MET:N	2.62	0.70
1:A:84:PRO:HB2	1:A:86:PHE:CZ	2.26	0.70
1:A:507:THR:HG23	1:A:512:THR:O	1.91	0.70
1:A:29:ILE:CD1	1:A:222:TYR:HD1	2.04	0.70
1:A:276:LYS:CB	1:A:281:ARG:HH22	2.04	0.70
1:A:167:TRP:HH2	1:A:213:GLU:HB2	1.55	0.70
1:A:368:LEU:H	1:A:371:ASP:HB2	1.57	0.70
1:A:85:ILE:O	1:A:203:TYR:N	2.25	0.69
1:A:209:PRO:HG3	1:A:221:PHE:CE2	2.28	0.69
1:A:150:ASN:HB2	1:A:511:MET:HB3	1.75	0.69
1:A:259:ALA:HA	1:A:364:LEU:HB3	1.73	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:290:GLY:HA3	1:A:453:ILE:HG23	1.74	0.69
1:A:385:ILE:HG22	1:A:386:LYS:HG3	1.74	0.67
1:A:443:ILE:HG12	1:A:482:LEU:HA	1.76	0.67
1:A:323:LEU:O	1:A:325:ASN:N	2.26	0.67
1:A:199:GLU:H	1:A:508:SER:HB2	1.60	0.66
1:A:123:ASN:HB3	1:A:127:ILE:HD11	1.77	0.66
1:A:305:LYS:HD2	1:A:313:ILE:HG22	1.78	0.66
1:A:197:ASN:ND2	1:A:200:TYR:HB2	2.11	0.66
1:A:518:ILE:O	1:A:520:TYR:N	2.28	0.66
1:A:106:SER:HB2	1:A:173:GLU:HB2	1.77	0.66
1:A:29:ILE:HD12	1:A:222:TYR:HA	1.70	0.65
1:A:29:ILE:CD1	1:A:222:TYR:CD1	2.80	0.65
1:A:29:ILE:HD11	1:A:222:TYR:CD1	2.32	0.65
1:A:57:GLY:HA3	1:A:90:TYR:HB3	1.79	0.65
1:A:264:GLY:O	1:A:268:THR:HG23	1.97	0.65
1:A:507:THR:CG2	1:A:512:THR:H	2.09	0.64
1:A:482:LEU:O	1:A:498:TYR:HA	1.98	0.64
1:A:271:ALA:HB1	1:A:311:MET:HE1	1.78	0.64
1:A:255:HIS:HB2	1:A:361:THR:HA	1.79	0.64
1:A:330:THR:OG1	1:A:443:ILE:HB	1.98	0.64
1:A:29:ILE:O	1:A:31:ILE:N	2.31	0.63
1:A:265:ILE:HA	1:A:268:THR:OG1	1.99	0.62
1:A:287:ILE:HG21	1:A:292:LEU:HD13	1.81	0.62
1:A:67:SER:O	1:A:69:HIS:ND1	2.28	0.61
1:A:336:ARG:HE	1:A:440:ILE:CD1	2.13	0.61
1:A:344:ILE:O	1:A:388:HIS:CD2	2.54	0.61
1:A:437:GLY:O	1:A:440:ILE:HG22	2.01	0.61
1:A:29:ILE:HG12	1:A:222:TYR:HD1	1.65	0.60
1:A:183:LEU:CD1	1:A:192:ILE:HG13	2.31	0.60
1:A:43:LYS:HA	1:A:46:LYS:HE2	1.83	0.60
1:A:23:VAL:O	1:A:27:ASN:HB2	2.01	0.60
1:A:25:ARG:HH12	1:A:209:PRO:HB2	1.67	0.59
1:A:289:ASN:HA	1:A:319:SER:HA	1.83	0.59
1:A:287:ILE:HG22	1:A:287:ILE:O	2.03	0.59
1:A:89:ALA:HA	1:A:206:GLN:HA	1.84	0.59
1:A:548:PRO:HA	1:A:550:ALA:N	2.18	0.59
1:A:84:PRO:HB3	1:A:201:ASN:HB3	1.84	0.59
1:A:283:PHE:CE2	1:A:352:ASN:HA	2.38	0.58
1:A:547:LYS:HB3	1:A:548:PRO:HD3	1.83	0.58
1:A:283:PHE:HE1	1:A:285:ILE:HD11	1.66	0.58
1:A:323:LEU:HD13	1:A:446:ILE:O	2.03	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:270:ALA:HA	1:A:273:TYR:HD2	1.66	0.58
1:A:288:ASP:HB3	1:A:317:ASP:CG	2.22	0.58
1:A:127:ILE:HD12	1:A:127:ILE:H	1.69	0.58
1:A:197:ASN:HD22	1:A:200:TYR:HB2	1.68	0.58
1:A:241:HIS:ND1	1:A:242:GLU:HG2	2.18	0.58
1:A:277:ILE:HG22	1:A:278:PHE:H	1.68	0.57
1:A:296:GLU:O	1:A:300:VAL:HB	2.04	0.57
1:A:29:ILE:CG1	1:A:222:TYR:HD1	2.17	0.57
1:A:346:GLU:HG3	1:A:347:PHE:CE1	2.38	0.57
1:A:11:VAL:HG23	1:A:54:ILE:HG23	1.85	0.57
1:A:93:GLN:HG2	1:A:174:VAL:HG22	1.86	0.57
1:A:115:ASP:HB3	1:A:163:ILE:HG23	1.85	0.57
1:A:416:THR:O	1:A:419:ARG:N	2.36	0.57
1:A:278:PHE:HB2	1:A:281:ARG:HH21	1.70	0.57
1:A:290:GLY:HA2	1:A:297:ALA:HB2	1.86	0.57
1:A:447:ASN:CG	1:A:448:LYS:H	2.08	0.57
1:A:301:TYR:O	1:A:313:ILE:HG21	2.05	0.57
1:A:333:GLU:O	1:A:337:LYS:HB2	2.05	0.56
1:A:446:ILE:HA	1:A:450:LYS:HD2	1.86	0.56
1:A:145:ASN:O	1:A:514:ASN:ND2	2.38	0.56
1:A:266:ASP:OD1	1:A:266:ASP:N	2.37	0.56
1:A:346:GLU:HA	1:A:388:HIS:CE1	2.41	0.56
1:A:262:SER:O	1:A:292:LEU:HD11	2.06	0.56
1:A:90:TYR:HA	1:A:93:GLN:HB2	1.88	0.55
1:A:276:LYS:HB2	1:A:281:ARG:NH1	2.16	0.55
1:A:291:LEU:HA	1:A:454:LEU:HD23	1.88	0.55
1:A:21:LEU:HD22	1:A:210:GLU:HA	1.88	0.55
1:A:99:MET:HE1	1:A:202:ILE:HG21	1.89	0.55
1:A:29:ILE:CD1	1:A:222:TYR:CA	2.49	0.55
1:A:365:GLN:HB2	1:A:406:PHE:CE1	2.42	0.55
1:A:72:LYS:O	1:A:75:PHE:N	2.40	0.55
1:A:273:TYR:CD1	1:A:273:TYR:C	2.81	0.54
1:A:250:LYS:NZ	1:A:256:TYR:HA	2.22	0.54
1:A:30:LYS:HB3	1:A:232:LYS:HZ1	1.72	0.54
1:A:277:ILE:HG22	1:A:278:PHE:N	2.23	0.54
1:A:446:ILE:HB	1:A:450:LYS:HD2	1.89	0.54
1:A:445:GLU:CD	1:A:445:GLU:H	2.11	0.54
1:A:441:ARG:HG3	1:A:480:VAL:HG13	1.90	0.54
1:A:148:LEU:HD12	1:A:183:LEU:O	2.07	0.54
1:A:300:VAL:HG13	1:A:301:TYR:HD1	1.73	0.54
1:A:336:ARG:NE	1:A:440:ILE:HD13	2.22	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:211:VAL:HG12	1:A:212:TYR:H	1.73	0.53
1:A:442:VAL:HA	1:A:481:LEU:O	2.08	0.53
1:A:209:PRO:HG3	1:A:221:PHE:CZ	2.44	0.53
1:A:224:PHE:O	1:A:228:ILE:HG12	2.09	0.53
1:A:291:LEU:HD13	1:A:437:GLY:HA3	1.90	0.53
1:A:250:LYS:HZ1	1:A:256:TYR:HA	1.73	0.53
1:A:99:MET:O	1:A:100:ASN:CB	2.56	0.53
1:A:287:ILE:H	1:A:317:ASP:HB2	1.73	0.53
1:A:445:GLU:OE2	1:A:484:SER:HA	2.09	0.53
1:A:46:LYS:HG2	1:A:77:TYR:CE1	2.43	0.53
1:A:267:SER:HA	1:A:270:ALA:CB	2.36	0.53
1:A:286:PHE:O	1:A:287:ILE:HB	2.08	0.53
1:A:46:LYS:HG2	1:A:77:TYR:HE1	1.75	0.52
1:A:184:VAL:HB	1:A:194:SER:HB3	1.90	0.52
1:A:27:ASN:ND2	1:A:31:ILE:O	2.43	0.52
1:A:365:GLN:HB2	1:A:406:PHE:HE1	1.74	0.52
1:A:6:TYR:HE2	1:A:31:ILE:HA	1.74	0.52
1:A:30:LYS:HD2	1:A:32:PHE:HE1	1.75	0.52
1:A:117:ASN:HD21	1:A:163:ILE:HG12	1.74	0.52
1:A:271:ALA:HB1	1:A:311:MET:CE	2.40	0.52
1:A:448:LYS:C	1:A:450:LYS:H	2.13	0.52
1:A:255:HIS:CB	1:A:361:THR:HA	2.39	0.52
1:A:300:VAL:HG13	1:A:301:TYR:CD1	2.45	0.52
1:A:258:ILE:HD12	1:A:283:PHE:CD2	2.44	0.52
1:A:329:VAL:HG12	1:A:330:THR:H	1.73	0.52
1:A:293:ARG:NH2	1:A:430:ARG:HB2	2.25	0.52
1:A:507:THR:HG22	1:A:512:THR:N	2.25	0.52
1:A:149:MET:SD	1:A:182:TYR:HB3	2.49	0.52
1:A:406:PHE:O	1:A:407:LYS:CB	2.58	0.51
1:A:507:THR:CG2	1:A:512:THR:N	2.71	0.51
1:A:551:THR:HG22	1:A:552:ILE:H	1.74	0.51
1:A:133:PHE:CZ	1:A:191:LEU:HD12	2.45	0.51
1:A:551:THR:HG22	1:A:552:ILE:N	2.24	0.51
1:A:73:GLU:HG2	1:A:74:VAL:N	2.25	0.51
1:A:435:GLY:N	1:A:436:PRO:HD3	2.26	0.51
1:A:185:SER:HB2	1:A:193:CYS:HB3	1.93	0.51
1:A:300:VAL:HA	1:A:303:PHE:CD2	2.45	0.51
1:A:475:SER:OG	1:A:506:LYS:HA	2.11	0.51
1:A:199:GLU:HB3	1:A:412:ASP:HB2	1.93	0.51
1:A:221:PHE:O	1:A:224:PHE:HB3	2.11	0.50
1:A:19:PHE:O	1:A:23:VAL:HG13	2.11	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:118:ILE:HD13	1:A:186:SER:O	2.11	0.50
1:A:257:VAL:O	1:A:258:ILE:HD13	2.12	0.50
1:A:266:ASP:OD2	1:A:368:LEU:HD11	2.11	0.50
1:A:435:GLY:H	1:A:436:PRO:HD3	1.76	0.50
1:A:116:VAL:HG13	1:A:187:SER:HA	1.94	0.50
1:A:185:SER:CB	1:A:193:CYS:HB3	2.42	0.50
1:A:238:ILE:HG12	1:A:239:ARG:N	2.27	0.50
1:A:291:LEU:CD2	1:A:452:ASN:O	2.60	0.49
1:A:277:ILE:O	1:A:278:PHE:HB2	2.11	0.49
1:A:427:ILE:HG12	1:A:430:ARG:NH1	2.27	0.49
1:A:200:TYR:HB3	1:A:202:ILE:HG13	1.94	0.49
1:A:150:ASN:C	1:A:150:ASN:HD22	2.15	0.49
1:A:301:TYR:CD2	1:A:313:ILE:HG13	2.47	0.49
1:A:330:THR:CG2	1:A:335:LYS:HE2	2.43	0.49
1:A:380:ASN:OD1	1:A:381:LEU:N	2.46	0.49
1:A:182:TYR:CE1	1:A:512:THR:OG1	2.58	0.49
1:A:108:THR:HG21	1:A:189:ASN:HB3	1.94	0.49
1:A:293:ARG:HE	1:A:430:ARG:HD2	1.79	0.48
1:A:53:VAL:HB	1:A:78:PHE:CZ	2.48	0.48
1:A:261:MET:HG2	1:A:285:ILE:H	1.78	0.48
1:A:275:HIS:O	1:A:276:LYS:HB2	2.14	0.48
1:A:286:PHE:O	1:A:287:ILE:CB	2.62	0.48
1:A:441:ARG:HD3	1:A:554:PHE:N	2.29	0.48
1:A:446:ILE:CA	1:A:450:LYS:HD2	2.44	0.48
1:A:178:PRO:HD3	1:A:195:ILE:HD13	1.96	0.47
1:A:409:LEU:HD13	1:A:413:ASP:HB3	1.96	0.47
1:A:55:LEU:HB3	1:A:91:GLY:HA3	1.96	0.47
1:A:258:ILE:O	1:A:364:LEU:N	2.46	0.47
1:A:270:ALA:HA	1:A:273:TYR:CD2	2.48	0.47
1:A:29:ILE:HG22	1:A:31:ILE:HG12	1.97	0.47
1:A:250:LYS:HA	1:A:255:HIS:NE2	2.29	0.47
1:A:409:LEU:HB3	1:A:413:ASP:HB2	1.95	0.47
1:A:406:PHE:O	1:A:407:LYS:HB3	2.14	0.47
1:A:246:LYS:HA	1:A:246:LYS:HD2	1.51	0.47
1:A:291:LEU:HA	1:A:454:LEU:HB2	1.96	0.47
1:A:486:SER:O	1:A:486:SER:OG	2.26	0.47
1:A:223:ASN:O	1:A:227:ASN:HB2	2.14	0.47
1:A:445:GLU:HG2	1:A:446:ILE:H	1.78	0.47
1:A:283:PHE:CD1	1:A:283:PHE:C	2.88	0.47
1:A:367:THR:HG21	1:A:389:HIS:HB3	1.96	0.47
1:A:369:TYR:HB3	1:A:370:PRO:HD3	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:419:ARG:HB3	1:A:420:GLU:H	1.32	0.47
1:A:547:LYS:HB3	1:A:548:PRO:CD	2.44	0.47
1:A:345:GLU:C	1:A:347:PHE:H	2.18	0.47
1:A:147:LYS:HE2	1:A:547:LYS:HE2	1.97	0.47
1:A:291:LEU:CB	1:A:454:LEU:HD23	2.46	0.46
1:A:129:TYR:CD1	1:A:188:GLU:HA	2.50	0.46
1:A:20:HIS:HA	1:A:23:VAL:HG22	1.97	0.46
1:A:186:SER:HB3	1:A:191:LEU:O	2.15	0.46
1:A:239:ARG:HG3	1:A:243:LEU:HD22	1.96	0.46
1:A:149:MET:HG3	1:A:182:TYR:CD1	2.51	0.46
1:A:183:LEU:HD11	1:A:192:ILE:HG13	1.97	0.46
1:A:197:ASN:O	1:A:201:ASN:HA	2.15	0.46
1:A:167:TRP:CH2	1:A:213:GLU:HB2	2.44	0.46
1:A:404:GLU:N	1:A:405:PRO:HD3	2.31	0.46
1:A:427:ILE:O	1:A:430:ARG:HG2	2.16	0.46
1:A:454:LEU:HD12	1:A:458:ASP:OD1	2.15	0.46
1:A:92:MET:HA	1:A:95:ILE:HG22	1.98	0.46
1:A:511:MET:O	1:A:512:THR:OG1	2.34	0.46
1:A:278:PHE:O	1:A:279:LYS:HB2	2.16	0.45
1:A:61:SER:HB3	1:A:63:THR:HG22	1.97	0.45
1:A:461:PHE:O	1:A:465:LEU:HD23	2.15	0.45
1:A:300:VAL:HA	1:A:303:PHE:HD2	1.81	0.45
1:A:312:ASN:N	1:A:312:ASN:ND2	2.64	0.45
1:A:94:GLU:O	1:A:98:GLN:HG3	2.16	0.45
1:A:178:PRO:HG2	1:A:195:ILE:HG21	1.98	0.45
1:A:209:PRO:HG2	1:A:210:GLU:H	1.81	0.45
1:A:172:ASP:OD1	1:A:172:ASP:N	2.49	0.45
1:A:460:ILE:HA	1:A:463:ASN:ND2	2.31	0.45
1:A:144:SER:O	1:A:147:LYS:NZ	2.50	0.45
1:A:339:ILE:HB	1:A:346:GLU:OE1	2.17	0.45
1:A:413:ASP:OD1	1:A:413:ASP:N	2.49	0.45
1:A:117:ASN:ND2	1:A:163:ILE:HG12	2.32	0.45
1:A:280:GLU:CB	1:A:312:ASN:OD1	2.65	0.45
1:A:443:ILE:HG21	1:A:482:LEU:HD23	1.98	0.45
1:A:199:GLU:HG3	1:A:508:SER:HB2	1.99	0.44
1:A:277:ILE:CG2	1:A:278:PHE:H	2.26	0.44
1:A:345:GLU:HB2	1:A:346:GLU:H	1.57	0.44
1:A:181:PHE:HB2	1:A:512:THR:HG21	2.00	0.44
1:A:228:ILE:HG13	1:A:229:CYS:N	2.33	0.44
1:A:291:LEU:HD23	1:A:452:ASN:O	2.18	0.44
1:A:160:LYS:O	1:A:161:SER:C	2.54	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:385:ILE:O	1:A:435:GLY:N	2.50	0.44
1:A:516:TYR:CD1	1:A:518:ILE:HG13	2.52	0.44
1:A:354:ILE:C	1:A:356:ILE:H	2.21	0.44
1:A:446:ILE:O	1:A:447:ASN:HB2	2.17	0.44
1:A:160:LYS:O	1:A:162:ASP:N	2.51	0.44
1:A:245:LEU:C	1:A:247:ASN:H	2.20	0.44
1:A:182:TYR:OH	1:A:509:SER:N	2.50	0.43
1:A:286:PHE:CB	1:A:341:LYS:HB3	2.48	0.43
1:A:507:THR:HG22	1:A:512:THR:HB	2.00	0.43
1:A:86:PHE:CD1	1:A:203:TYR:HB2	2.39	0.43
1:A:186:SER:CB	1:A:191:LEU:O	2.66	0.43
1:A:254:ASP:O	1:A:356:ILE:HG13	2.18	0.43
1:A:85:ILE:HB	1:A:202:ILE:HG12	2.01	0.43
1:A:238:ILE:HG12	1:A:239:ARG:H	1.82	0.43
1:A:354:ILE:HG23	1:A:356:ILE:HB	1.99	0.43
1:A:375:SER:HA	1:A:379:LYS:HE3	2.01	0.43
1:A:551:THR:H	1:A:554:PHE:HA	1.83	0.43
1:A:157:GLU:OE1	1:A:227:ASN:ND2	2.52	0.43
1:A:239:ARG:HD3	1:A:239:ARG:HA	1.48	0.43
1:A:19:PHE:CD1	1:A:19:PHE:N	2.86	0.43
1:A:250:LYS:HG2	1:A:255:HIS:CE1	2.54	0.43
1:A:287:ILE:HA	1:A:289:ASN:OD1	2.18	0.43
1:A:459:ASP:HA	1:A:462:ILE:HB	2.00	0.43
1:A:82:LYS:HB3	1:A:82:LYS:HE2	1.79	0.43
1:A:261:MET:O	1:A:261:MET:HG3	2.19	0.43
1:A:102:GLU:HB3	1:A:176:LYS:HG3	2.01	0.43
1:A:194:SER:O	1:A:195:ILE:HG13	2.18	0.43
1:A:219:LEU:HD12	1:A:222:TYR:HB3	2.01	0.43
1:A:438:LEU:HD21	1:A:479:ALA:HB3	2.01	0.43
1:A:86:PHE:CG	1:A:224:PHE:HZ	2.36	0.42
1:A:166:VAL:HB	1:A:207:TYR:HB2	2.01	0.42
1:A:252:LYS:HD3	1:A:252:LYS:HA	1.80	0.42
1:A:278:PHE:O	1:A:280:GLU:N	2.51	0.42
1:A:445:GLU:C	1:A:446:ILE:HG23	2.39	0.42
1:A:368:LEU:HB3	1:A:370:PRO:HD2	2.00	0.42
1:A:29:ILE:HD11	1:A:222:TYR:HD1	1.73	0.42
1:A:209:PRO:HG3	1:A:221:PHE:HE2	1.82	0.42
1:A:89:ALA:O	1:A:93:GLN:HG3	2.18	0.42
1:A:42:LEU:HD23	1:A:45:ILE:HD11	2.01	0.42
1:A:336:ARG:NH2	1:A:382:SER:O	2.51	0.42
1:A:182:TYR:HE2	1:A:508:SER:OG	2.03	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:409:LEU:HD23	1:A:409:LEU:HA	1.91	0.42
1:A:481:LEU:HD12	1:A:499:VAL:O	2.20	0.42
1:A:84:PRO:HB3	1:A:201:ASN:CB	2.50	0.42
1:A:282:PHE:CD1	1:A:282:PHE:N	2.87	0.42
1:A:409:LEU:HD22	1:A:413:ASP:OD2	2.20	0.42
1:A:476:GLN:HB2	1:A:505:VAL:HG22	2.01	0.42
1:A:14:PHE:CG	1:A:68:PRO:HB2	2.54	0.41
1:A:29:ILE:HD11	1:A:222:TYR:CG	2.55	0.41
1:A:427:ILE:HG12	1:A:430:ARG:HH11	1.84	0.41
1:A:476:GLN:HB2	1:A:505:VAL:CG2	2.49	0.41
1:A:283:PHE:HE2	1:A:352:ASN:HA	1.82	0.41
1:A:291:LEU:HG	1:A:320:GLU:HA	2.01	0.41
1:A:478:PHE:CE2	1:A:552:ILE:HG23	2.56	0.41
1:A:271:ALA:O	1:A:275:HIS:HB2	2.20	0.41
1:A:29:ILE:HG12	1:A:222:TYR:CD1	2.52	0.41
1:A:278:PHE:HD2	1:A:281:ARG:HE	1.68	0.41
1:A:410:PHE:O	1:A:414:VAL:HG22	2.20	0.41
1:A:262:SER:HB2	1:A:386:LYS:HE3	2.03	0.41
1:A:75:PHE:HE1	1:A:85:ILE:HD13	1.86	0.41
1:A:95:ILE:HG13	1:A:99:MET:HE2	2.02	0.41
1:A:380:ASN:ND2	1:A:383:ASP:H	2.19	0.41
1:A:89:ALA:O	1:A:93:GLN:N	2.39	0.41
1:A:447:ASN:OD1	1:A:448:LYS:N	2.54	0.41
1:A:180:ASN:ND2	1:A:197:ASN:OD1	2.54	0.41
1:A:435:GLY:N	1:A:436:PRO:CD	2.84	0.41
1:A:446:ILE:CB	1:A:450:LYS:HD2	2.51	0.41
1:A:14:PHE:O	1:A:68:PRO:HG2	2.21	0.40
1:A:187:SER:O	1:A:191:LEU:HD23	2.21	0.40
1:A:386:LYS:HB3	1:A:386:LYS:HE2	1.97	0.40
1:A:22:ILE:O	1:A:26:LEU:HG	2.21	0.40
1:A:150:ASN:O	1:A:152:THR:N	2.55	0.40
1:A:152:THR:OG1	1:A:153:CYS:N	2.44	0.40
1:A:283:PHE:C	1:A:283:PHE:HD1	2.24	0.40
1:A:320:GLU:OE2	1:A:452:ASN:HB3	2.22	0.40
1:A:363:LEU:C	1:A:363:LEU:HD12	2.41	0.40
1:A:497:ASP:OD1	1:A:499:VAL:HG13	2.21	0.40
1:A:85:ILE:HG22	1:A:202:ILE:HG23	2.03	0.40
1:A:418:SER:O	1:A:421:LEU:HB2	2.21	0.40
1:A:423:LEU:HD23	1:A:423:LEU:HA	1.86	0.40
1:A:30:LYS:C	1:A:30:LYS:HD3	2.41	0.40
1:A:454:LEU:HD13	1:A:454:LEU:HA	1.80	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	497/568 (88%)	381 (77%)	91 (18%)	25 (5%)	2 6

All (25) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	30	LYS
1	A	100	ASN
1	A	152	THR
1	A	287	ILE
1	A	324	SER
1	A	445	GLU
1	A	446	ILE
1	A	457	VAL
1	A	519	PRO
1	A	151	GLU
1	A	447	ASN
1	A	286	PHE
1	A	320	GLU
1	A	349	LYS
1	A	224	PHE
1	A	275	HIS
1	A	277	ILE
1	A	434	PRO
1	A	449	HIS
1	A	345	GLU
1	A	400	PHE
1	A	161	SER
1	A	248	ILE
1	A	249	GLU
1	A	209	PRO

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	447/514 (87%)	397 (89%)	50 (11%)	6 18

All (50) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	13	ASN
1	A	18	TYR
1	A	19	PHE
1	A	30	LYS
1	A	75	PHE
1	A	92	MET
1	A	115	ASP
1	A	133	PHE
1	A	150	ASN
1	A	158	ASN
1	A	167	TRP
1	A	181	PHE
1	A	193	CYS
1	A	200	TYR
1	A	208	HIS
1	A	220	MET
1	A	224	PHE
1	A	226	TYR
1	A	239	ARG
1	A	266	ASP
1	A	273	TYR
1	A	276	LYS
1	A	278	PHE
1	A	279	LYS
1	A	282	PHE
1	A	283	PHE
1	A	288	ASP
1	A	303	PHE
1	A	312	ASN
1	A	323	LEU

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Mol	Chain	Res	Type
1	A	338	ILE
1	A	362	PHE
1	A	364	LEU
1	A	367	THR
1	A	389	HIS
1	A	402	LEU
1	A	403	PHE
1	A	406	PHE
1	A	408	TYR
1	A	413	ASP
1	A	441	ARG
1	A	446	ILE
1	A	465	LEU
1	A	472	ASN
1	A	478	PHE
1	A	496	TYR
1	A	520	TYR
1	A	546	SER
1	A	547	LYS
1	A	552	ILE

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

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 monosaccharides 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

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	509/568 (89%)	1.43	129 (25%) 0 0	20, 44, 85, 165	0

All (129) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	248	ILE	9.6
1	A	477	ALA	8.0
1	A	251	TYR	7.7
1	A	310	ASP	7.7
1	A	57	GLY	7.5
1	A	469	GLY	7.1
1	A	118	ILE	7.0
1	A	306	SER	6.9
1	A	346	GLU	6.6
1	A	508	SER	6.5
1	A	412	ASP	6.4
1	A	195	ILE	6.4
1	A	256	TYR	6.3
1	A	483	SER	5.8
1	A	287	ILE	5.8
1	A	479	ALA	5.8
1	A	326	LEU	5.5
1	A	415	LYS	5.4
1	A	505	VAL	5.4
1	A	361	THR	5.4
1	A	119	LEU	5.3
1	A	316	ILE	5.2
1	A	286	PHE	5.2
1	A	367	THR	5.2
1	A	140	MET	5.2
1	A	484	SER	5.1
1	A	443	ILE	5.1

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Mol	Chain	Res	Type	RSRZ
1	A	518	ILE	5.0
1	A	397	ASN	4.9
1	A	325	ASN	4.9
1	A	100	ASN	4.9
1	A	444	GLY	4.8
1	A	551	THR	4.7
1	A	515	TRP	4.6
1	A	176	LYS	4.6
1	A	519	PRO	4.5
1	A	459	ASP	4.4
1	A	295	ASN	4.4
1	A	416	THR	4.3
1	A	144	SER	4.3
1	A	92	MET	4.3
1	A	500	CYS	4.2
1	A	439	ALA	4.1
1	A	347	PHE	4.1
1	A	159	ILE	4.0
1	A	485	LYS	4.0
1	A	474	ILE	3.9
1	A	65	ALA	3.9
1	A	282	PHE	3.8
1	A	56	SER	3.6
1	A	478	PHE	3.6
1	A	322	PHE	3.3
1	A	82	LYS	3.3
1	A	314	THR	3.3
1	A	507	THR	3.3
1	A	120	ARG	3.2
1	A	323	LEU	3.2
1	A	31	ILE	3.2
1	A	114	THR	3.1
1	A	294	LYS	3.1
1	A	152	THR	3.1
1	A	105	LYS	3.1
1	A	410	PHE	3.0
1	A	470	LEU	3.0
1	A	90	TYR	3.0
1	A	315	LYS	2.9
1	A	406	PHE	2.9
1	A	260	ALA	2.9
1	A	204	GLY	2.9

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Mol	Chain	Res	Type	RSRZ
1	A	245	LEU	2.9
1	A	175	THR	2.9
1	A	448	LYS	2.8
1	A	215	LEU	2.8
1	A	398	LEU	2.8
1	A	516	TYR	2.8
1	A	321	ASN	2.8
1	A	143	TYR	2.7
1	A	15	GLY	2.7
1	A	424	PRO	2.7
1	A	199	GLU	2.7
1	A	203	TYR	2.7
1	A	329	VAL	2.7
1	A	16	SER	2.7
1	A	554	PHE	2.7
1	A	317	ASP	2.7
1	A	243	LEU	2.6
1	A	366	GLY	2.6
1	A	231	CYS	2.6
1	A	311	MET	2.6
1	A	363	LEU	2.6
1	A	277	ILE	2.6
1	A	21	LEU	2.5
1	A	183	LEU	2.5
1	A	278	PHE	2.5
1	A	475	SER	2.5
1	A	205	VAL	2.5
1	A	302	THR	2.5
1	A	454	LEU	2.5
1	A	78	PHE	2.5
1	A	211	VAL	2.4
1	A	440	ILE	2.4
1	A	542	TYR	2.4
1	A	97	VAL	2.4
1	A	238	ILE	2.4
1	A	167	TRP	2.4
1	A	352	ASN	2.4
1	A	45	ILE	2.3
1	A	141	ASP	2.3
1	A	285	ILE	2.3
1	A	388	HIS	2.3
1	A	476	GLN	2.3

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Mol	Chain	Res	Type	RSRZ
1	A	160	LYS	2.2
1	A	341	LYS	2.2
1	A	299	ASN	2.2
1	A	387	THR	2.2
1	A	85	ILE	2.2
1	A	539	ARG	2.2
1	A	324	SER	2.2
1	A	369	TYR	2.2
1	A	23	VAL	2.2
1	A	263	GLY	2.1
1	A	550	ALA	2.1
1	A	333	GLU	2.1
1	A	170	HIS	2.1
1	A	267	SER	2.0
1	A	49	ASN	2.0
1	A	384	THR	2.0
1	A	512	THR	2.0
1	A	465	LEU	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.