



Full wwPDB X-ray Structure Validation Report ⓘ

May 14, 2020 – 10:47 am BST

PDB ID : 3VJB
Title : Crystal structure of the human squalene synthase
Authors : Liu, C.I.; Jeng, W.Y.; Chang, W.J.; Wang, A.H.J.
Deposited on : 2011-10-14
Resolution : 2.05 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467
Xtriage (Phenix) : 1.13
EDS : 2.11
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) : 2.11

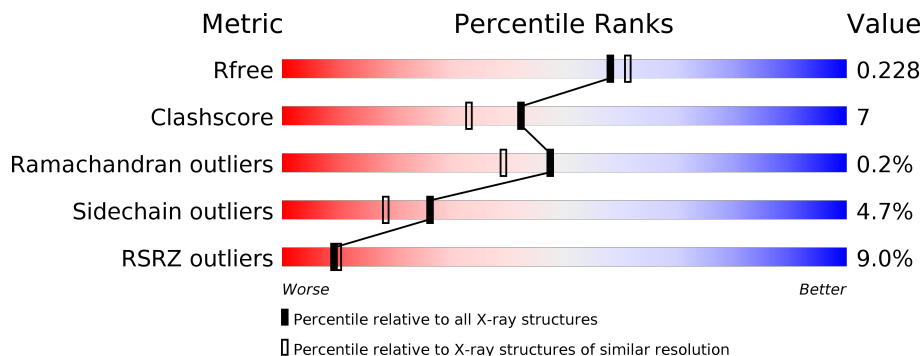
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.05 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	1692 (2.04-2.04)
Clashscore	141614	1773 (2.04-2.04)
Ramachandran outliers	138981	1752 (2.04-2.04)
Sidechain outliers	138945	1752 (2.04-2.04)
RSRZ outliers	127900	1672 (2.04-2.04)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. 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	343	 85% 8% 6%
1	B	343	 85% 10%
1	C	343	 84% 13%
1	D	343	 76% 18%
1	E	343	 82% 12%
1	F	343	 71% 21% 6%

2 Entry composition [i](#)

There are 2 unique types of molecules in this entry. The entry contains 16888 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 Squalene synthase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	323	Total 2615	C 1663	N 443	O 491	S 18	0	0	0
1	B	333	Total 2691	C 1711	N 459	O 503	S 18	0	0	0
1	C	334	Total 2700	C 1716	N 459	O 507	S 18	0	0	0
1	D	330	Total 2673	C 1701	N 455	O 499	S 18	0	0	0
1	E	329	Total 2658	C 1692	N 450	O 498	S 18	0	0	0
1	F	324	Total 2625	C 1670	N 444	O 493	S 18	0	0	0

There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	28	GLY	-	EXPRESSION TAG	UNP P37268
A	29	SER	-	EXPRESSION TAG	UNP P37268
A	30	HIS	-	EXPRESSION TAG	UNP P37268
B	28	GLY	-	EXPRESSION TAG	UNP P37268
B	29	SER	-	EXPRESSION TAG	UNP P37268
B	30	HIS	-	EXPRESSION TAG	UNP P37268
C	28	GLY	-	EXPRESSION TAG	UNP P37268
C	29	SER	-	EXPRESSION TAG	UNP P37268
C	30	HIS	-	EXPRESSION TAG	UNP P37268
D	28	GLY	-	EXPRESSION TAG	UNP P37268
D	29	SER	-	EXPRESSION TAG	UNP P37268
D	30	HIS	-	EXPRESSION TAG	UNP P37268
E	28	GLY	-	EXPRESSION TAG	UNP P37268
E	29	SER	-	EXPRESSION TAG	UNP P37268
E	30	HIS	-	EXPRESSION TAG	UNP P37268
F	28	GLY	-	EXPRESSION TAG	UNP P37268
F	29	SER	-	EXPRESSION TAG	UNP P37268

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Chain	Residue	Modelled	Actual	Comment	Reference
F	30	HIS	-	EXPRESSION TAG	UNP P37268

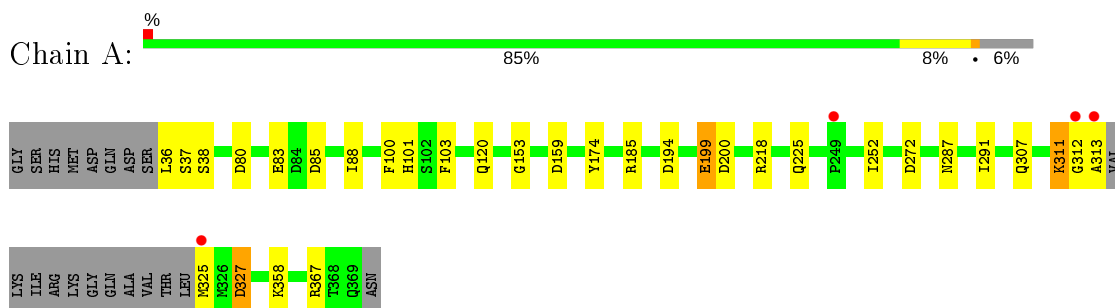
- Molecule 2 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	234	Total O 234 234	0	0
2	B	193	Total O 193 193	0	0
2	C	202	Total O 202 202	0	0
2	D	82	Total O 82 82	0	0
2	E	159	Total O 159 159	0	0
2	F	56	Total O 56 56	0	0

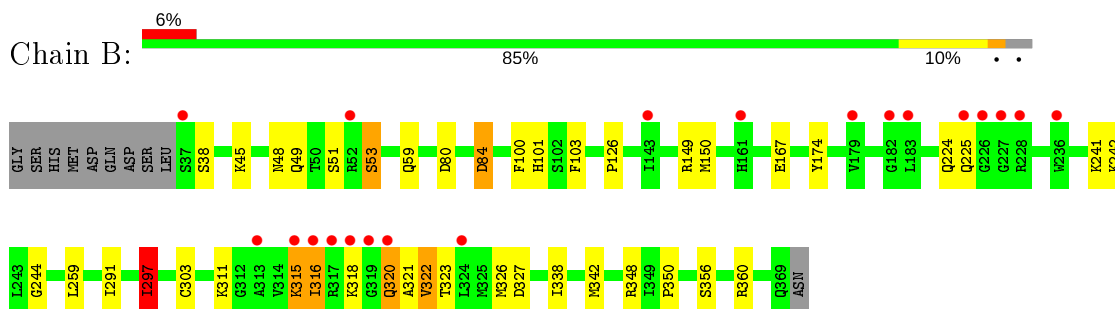
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry 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.

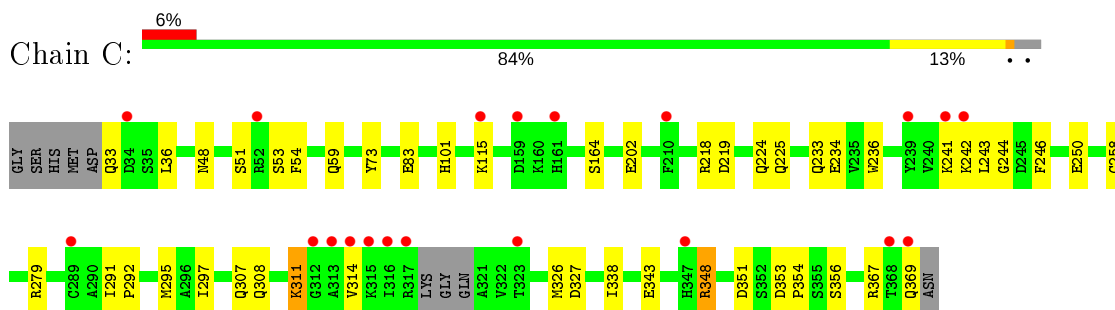
- Molecule 1: Squalene synthase



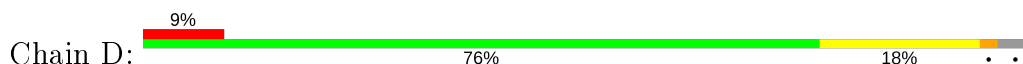
- Molecule 1: Squalene synthase

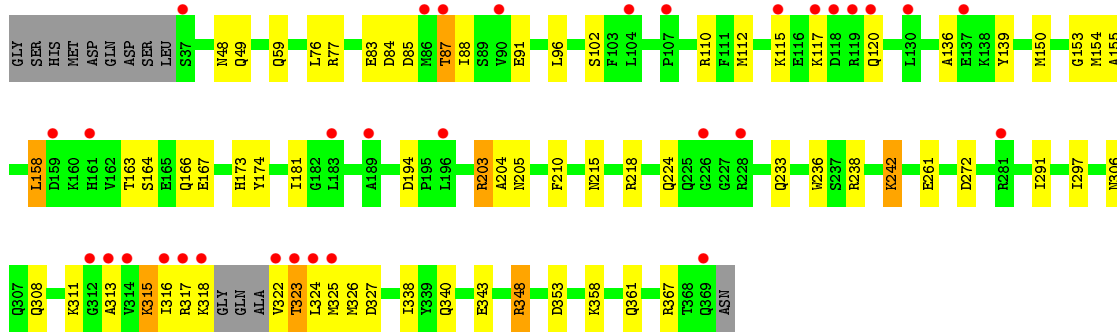


- Molecule 1: Squalene synthase

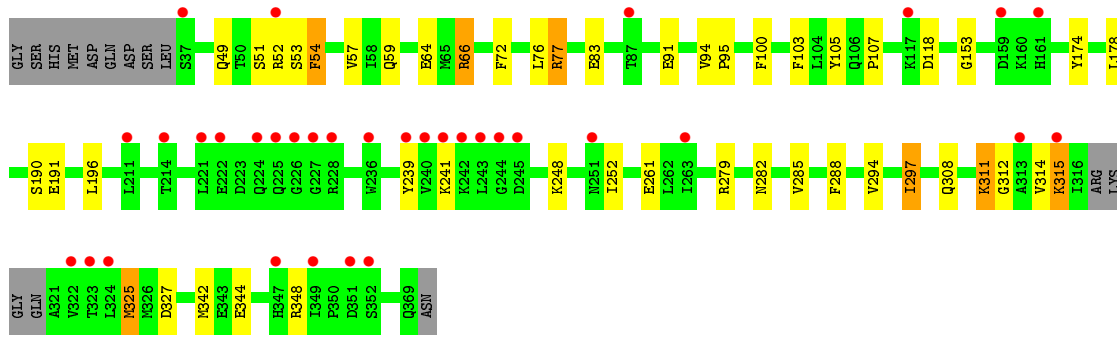
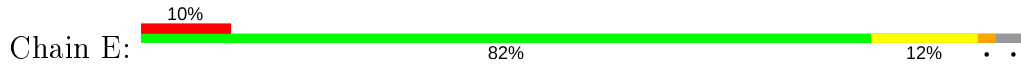


- Molecule 1: Squalene synthase

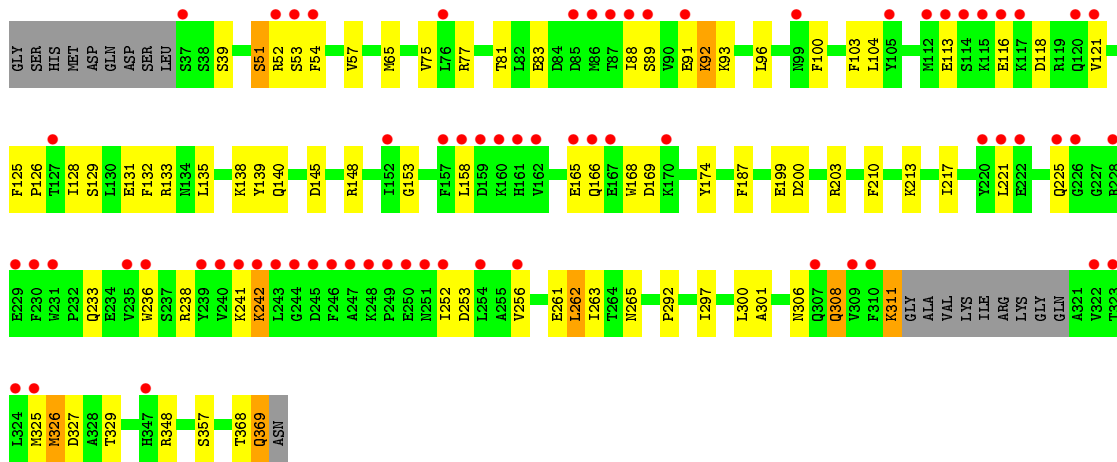




• Molecule 1: Squalene synthase



• Molecule 1: Squalene synthase



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	85.61Å 153.86Å 91.52Å 90.00° 91.68° 90.00°	Depositor
Resolution (Å)	29.40 – 2.05 29.44 – 2.05	Depositor EDS
% Data completeness (in resolution range)	98.2 (29.40-2.05) 98.2 (29.44-2.05)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.65 (at 2.04Å)	Xtrriage
Refinement program	REFMAC 5.5.0109	Depositor
R, R_{free}	0.169 , 0.227 0.169 , 0.228	Depositor DCC
R_{free} test set	7255 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	33.7	Xtrriage
Anisotropy	0.734	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 54.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	0.024 for h,-k,-l	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	16888	wwPDB-VP
Average B, all atoms (Å ²)	54.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.87% 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	0.45	0/2669	0.78	5/3609 (0.1%)
1	B	0.38	0/2746	0.71	3/3713 (0.1%)
1	C	0.41	0/2754	0.72	1/3724 (0.0%)
1	D	0.33	0/2727	0.64	1/3686 (0.0%)
1	E	0.38	0/2712	0.69	2/3668 (0.1%)
1	F	0.30	0/2679	0.61	0/3624
All	All	0.38	0/16287	0.69	12/22024 (0.1%)

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	D	0	1

There are no bond length outliers.

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	297	ILE	CB-CA-C	-6.22	99.17	111.60
1	E	66	ARG	NE-CZ-NH1	-6.11	117.25	120.30
1	A	194	ASP	N-CA-CB	-5.58	100.56	110.60
1	C	279	ARG	NE-CZ-NH1	-5.46	117.57	120.30
1	A	272	ASP	CB-CG-OD1	5.41	123.17	118.30
1	A	327	ASP	CB-CG-OD1	5.34	123.11	118.30
1	E	297	ILE	CG1-CB-CG2	-5.31	99.72	111.40
1	A	367	ARG	CB-CG-CD	-5.30	97.82	111.60
1	D	291	ILE	CG1-CB-CG2	-5.30	99.75	111.40
1	B	149	ARG	NE-CZ-NH1	-5.17	117.72	120.30
1	A	367	ARG	CB-CA-C	-5.15	100.10	110.40
1	B	84	ASP	CB-CA-C	-5.01	100.38	110.40

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	D	313	ALA	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	2615	0	2577	18	0
1	B	2691	0	2669	29	0
1	C	2700	0	2672	29	0
1	D	2673	0	2652	57	0
1	E	2658	0	2631	36	0
1	F	2625	0	2590	59	0
2	A	234	0	0	8	0
2	B	193	0	0	6	0
2	C	202	0	0	5	0
2	D	82	0	0	3	0
2	E	159	0	0	2	0
2	F	56	0	0	7	0
All	All	16888	0	15791	219	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 7.

All (219) 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:167:GLU:HG2	2:B:1056:HOH:O	1.43	1.13
1:E:297:ILE:HD11	1:E:342:MET:CE	1.84	1.06
1:A:325:MET:O	1:C:327:ASP:HB2	1.56	1.02
1:F:132:PHE:O	2:F:954:HOH:O	1.81	0.98
1:C:54:PHE:HA	2:C:1175:HOH:O	1.64	0.97
1:F:213:LYS:O	1:F:217:ILE:HG12	1.66	0.95
1:B:315:LYS:H	1:B:315:LYS:HD3	1.35	0.90
1:E:297:ILE:HD11	1:E:342:MET:HE3	1.52	0.89

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:48:ASN:HD21	1:C:59:GLN:HE22	1.18	0.88
1:D:48:ASN:HD21	1:D:59:GLN:HE22	1.22	0.85
1:F:65:MET:CE	1:F:187:PHE:HD1	1.91	0.83
1:E:64:GLU:HG2	2:E:1302:HOH:O	1.79	0.83
1:D:315:LYS:HD2	1:D:315:LYS:O	1.79	0.81
1:D:348:ARG:HH11	1:D:348:ARG:HG2	1.48	0.78
1:F:65:MET:HE1	1:F:187:PHE:CD1	2.18	0.77
1:D:163:THR:HG22	1:D:164:SER:N	1.99	0.77
1:F:65:MET:CE	1:F:187:PHE:CD1	2.70	0.75
1:B:297:ILE:CG2	1:B:342:MET:HE1	2.15	0.75
1:D:322:VAL:HG12	1:D:324:LEU:HB2	1.69	0.74
1:F:327:ASP:OD2	2:F:905:HOH:O	2.06	0.74
1:F:88:ILE:HG22	1:F:93:LYS:HG3	1.70	0.74
1:D:325:MET:O	1:F:327:ASP:HB2	1.87	0.73
1:E:297:ILE:CD1	1:E:342:MET:CE	2.64	0.73
1:A:80:ASP:OD1	2:A:1166:HOH:O	2.07	0.72
1:B:297:ILE:CG2	1:B:342:MET:CE	2.67	0.72
1:B:297:ILE:HG21	1:B:342:MET:CE	2.19	0.72
1:F:135:LEU:HB2	2:F:954:HOH:O	1.90	0.72
1:B:84:ASP:OD1	2:B:884:HOH:O	2.08	0.71
1:F:88:ILE:CG2	1:F:93:LYS:HG3	2.19	0.71
1:D:322:VAL:HG12	1:D:324:LEU:CB	2.21	0.71
1:D:85:ASP:HB3	1:D:88:ILE:HD12	1.71	0.71
1:F:54:PHE:CE1	1:F:57:VAL:HG21	2.24	0.71
1:F:65:MET:HE1	1:F:187:PHE:HD1	1.53	0.71
1:D:343:GLU:OE2	1:D:367:ARG:HD3	1.91	0.70
1:D:167:GLU:HG2	2:D:1205:HOH:O	1.91	0.69
1:D:297:ILE:HD13	1:D:338:ILE:HG12	1.73	0.69
1:D:83:GLU:HB2	1:D:154:MET:HE2	1.75	0.68
1:F:210:PHE:HZ	1:F:297:ILE:HD13	1.59	0.68
1:D:323:THR:HG23	1:D:323:THR:O	1.91	0.68
1:D:83:GLU:HB2	1:D:154:MET:CE	2.24	0.67
1:C:48:ASN:HD21	1:C:59:GLN:NE2	1.91	0.66
1:E:282:ASN:HD22	1:E:285:VAL:H	1.42	0.66
1:A:83:GLU:OE1	2:A:1166:HOH:O	2.14	0.66
1:A:200:ASP:HB3	2:A:1310:HOH:O	1.96	0.65
1:B:51:SER:HB2	2:B:1280:HOH:O	1.97	0.65
1:F:129:SER:HB3	1:F:133:ARG:HH12	1.61	0.65
1:A:101:HIS:HE1	2:A:794:HOH:O	1.78	0.65
1:E:77:ARG:HD2	1:E:118:ASP:OD2	1.98	0.64
1:F:140:GLN:CG	2:F:954:HOH:O	2.46	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:369:GLN:NE2	1:F:369:GLN:O	2.30	0.62
1:C:348:ARG:HH11	1:C:348:ARG:HG3	1.65	0.62
1:D:203:ARG:NH2	1:D:272:ASP:OD1	2.32	0.62
1:B:48:ASN:HD21	1:B:59:GLN:HE22	1.48	0.62
1:C:202:GLU:HB3	2:C:1247:HOH:O	2.00	0.61
1:D:49:GLN:HE21	1:D:120:GLN:HE21	1.48	0.61
1:D:323:THR:H	1:D:340:GLN:NE2	1.97	0.60
1:E:57:VAL:HG11	1:E:288:PHE:HA	1.83	0.60
1:D:48:ASN:HD21	1:D:59:GLN:NE2	1.97	0.60
1:E:327:ASP:OD2	1:F:326:MET:HA	2.01	0.60
1:D:324:LEU:HD12	1:D:326:MET:H	1.66	0.59
1:F:129:SER:HB3	1:F:133:ARG:NH1	2.17	0.59
1:D:323:THR:H	1:D:340:GLN:HE22	1.49	0.59
1:D:306:ASN:HD21	1:D:315:LYS:HZ1	1.49	0.59
1:A:311:LYS:NZ	1:A:311:LYS:HB2	2.18	0.59
1:E:297:ILE:CD1	1:E:342:MET:HE1	2.33	0.58
1:F:145:ASP:OD1	1:F:148:ARG:NH2	2.37	0.57
1:A:307:GLN:HG2	2:A:697:HOH:O	2.03	0.57
1:E:59:GLN:O	1:E:66:ARG:HD2	2.05	0.57
1:D:348:ARG:HH11	1:D:348:ARG:CG	2.17	0.57
1:C:308:GLN:HA	1:C:311:LYS:HG2	1.87	0.56
1:F:118:ASP:O	1:F:121:VAL:HG12	2.05	0.56
1:C:218:ARG:NH1	1:C:219:ASP:OD1	2.39	0.56
1:F:39:SER:OG	1:F:131:GLU:OE2	2.21	0.56
1:C:101:HIS:HE1	2:C:968:HOH:O	1.88	0.55
1:E:297:ILE:CD1	1:E:342:MET:HE3	2.28	0.55
1:E:344:GLU:O	1:E:348:ARG:HG3	2.06	0.55
1:D:181:ILE:HD13	1:D:204:ALA:HB3	1.88	0.55
1:D:306:ASN:HD21	1:D:315:LYS:NZ	2.05	0.55
1:A:185:ARG:NH2	2:A:1117:HOH:O	2.29	0.55
1:D:308:GLN:NE2	1:D:315:LYS:NZ	2.55	0.55
1:D:324:LEU:HD11	1:D:326:MET:O	2.07	0.54
1:E:51:SER:O	1:E:53:SER:N	2.41	0.54
1:A:312:GLY:O	1:A:313:ALA:HB2	2.08	0.54
1:E:315:LYS:HE3	1:E:315:LYS:H	1.73	0.54
1:D:163:THR:CG2	1:D:164:SER:N	2.69	0.54
1:E:297:ILE:HD11	1:E:342:MET:HE1	1.81	0.54
1:F:210:PHE:CZ	1:F:297:ILE:HD13	2.42	0.53
1:E:327:ASP:HB2	1:F:325:MET:O	2.08	0.53
1:F:263:ILE:HG23	1:F:300:LEU:HG	1.91	0.53
1:C:54:PHE:CA	2:C:1175:HOH:O	2.39	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:150:MET:HB2	1:D:174:TYR:O	2.08	0.53
1:E:51:SER:C	1:E:53:SER:H	2.11	0.53
1:A:287:ASN:O	1:A:291:ILE:HG12	2.09	0.53
1:E:311:LYS:NZ	1:E:311:LYS:HB2	2.23	0.52
1:F:238:ARG:NH2	1:F:261:GLU:OE2	2.40	0.52
1:C:51:SER:HB2	1:C:73:TYR:CZ	2.44	0.52
1:F:121:VAL:HG23	1:F:128:ILE:HD13	1.92	0.52
1:B:327:ASP:OD2	1:C:327:ASP:OD1	2.28	0.52
1:C:233:GLN:HA	1:C:236:TRP:NE1	2.25	0.52
1:D:155:ALA:HA	1:D:158:LEU:HD22	1.92	0.52
1:B:323:THR:HA	1:B:326:MET:CE	2.40	0.51
1:C:33:GLN:HB3	1:C:36:LEU:HG	1.92	0.51
1:C:343:GLU:OE1	1:C:367:ARG:NH2	2.41	0.51
1:C:348:ARG:NH1	2:C:699:HOH:O	2.43	0.51
1:A:218:ARG:NH1	2:A:772:HOH:O	2.36	0.51
1:B:101:HIS:HD2	2:B:855:HOH:O	1.92	0.51
1:F:83:GLU:HG2	2:F:1126:HOH:O	2.09	0.51
1:E:239:TYR:OH	1:E:261:GLU:OE1	2.21	0.51
1:D:163:THR:HG22	1:D:164:SER:H	1.71	0.51
1:F:327:ASP:OD1	1:F:329:THR:OG1	2.27	0.51
1:B:150:MET:HG3	1:B:174:TYR:O	2.09	0.51
1:F:233:GLN:HA	1:F:236:TRP:CD1	2.46	0.51
1:F:233:GLN:HA	1:F:236:TRP:NE1	2.26	0.51
1:B:48:ASN:HD21	1:B:59:GLN:NE2	2.09	0.50
1:D:353:ASP:OD1	2:D:757:HOH:O	2.20	0.50
1:F:253:ASP:O	1:F:256:VAL:HG12	2.10	0.50
1:B:100:PHE:HA	1:B:103:PHE:CD2	2.47	0.50
1:B:323:THR:HA	1:B:326:MET:HE2	1.94	0.50
1:D:210:PHE:CE2	1:D:297:ILE:HG13	2.46	0.50
1:B:297:ILE:HG21	1:B:342:MET:HE3	1.92	0.50
1:E:190:SER:O	1:E:191:GLU:HB2	2.12	0.50
1:F:241:LYS:C	1:F:242:LYS:HD2	2.32	0.50
1:D:327:ASP:HB2	1:E:325:MET:O	2.12	0.49
1:E:53:SER:OG	1:E:54:PHE:N	2.45	0.49
1:A:120:GLN:HB2	2:A:1014:HOH:O	2.12	0.49
1:A:311:LYS:HZ2	1:A:311:LYS:HB2	1.77	0.49
1:E:100:PHE:HA	1:E:103:PHE:CD2	2.47	0.49
1:B:356:SER:O	1:B:360:ARG:HG3	2.11	0.49
1:D:308:GLN:HE22	1:D:315:LYS:NZ	2.11	0.49
1:A:100:PHE:HA	1:A:103:PHE:CD2	2.48	0.49
1:B:320:GLN:H	1:B:320:GLN:CD	2.15	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:85:ASP:HB3	1:A:88:ILE:HD12	1.94	0.49
1:D:324:LEU:CD1	1:D:326:MET:HB2	2.43	0.49
1:E:196:LEU:HD21	1:E:279:ARG:CZ	2.43	0.48
1:E:294:VAL:O	1:E:297:ILE:HG22	2.13	0.48
1:C:291:ILE:HB	1:C:292:PRO:HD3	1.96	0.48
1:D:315:LYS:HD3	1:D:317:ARG:HH21	1.78	0.48
1:F:168:TRP:CZ3	1:F:213:LYS:HE3	2.49	0.48
1:D:322:VAL:CG1	1:D:324:LEU:HB2	2.42	0.48
1:D:236:TRP:CZ3	1:D:242:LYS:HA	2.49	0.47
1:B:80:ASP:OD1	2:B:884:HOH:O	2.20	0.47
1:A:153:GLY:HA3	1:A:174:TYR:CG	2.49	0.47
1:D:324:LEU:CD1	1:D:326:MET:O	2.62	0.47
1:C:348:ARG:NH1	1:C:348:ARG:HG3	2.28	0.46
1:F:221:LEU:O	1:F:225:GLN:HG2	2.16	0.46
1:F:301:ALA:O	1:F:348:ARG:NH2	2.48	0.46
1:B:315:LYS:N	1:B:315:LYS:HD3	2.15	0.46
1:F:51:SER:O	1:F:52:ARG:C	2.53	0.46
1:F:77:ARG:HD2	1:F:77:ARG:HA	1.76	0.46
1:D:166:GLN:CD	1:D:166:GLN:H	2.19	0.46
1:E:72:PHE:CZ	1:E:76:LEU:HD11	2.52	0.45
1:F:327:ASP:OD1	1:F:327:ASP:C	2.55	0.45
1:F:75:VAL:HG11	1:F:104:LEU:HD21	1.97	0.45
1:F:88:ILE:HG21	1:F:93:LYS:HG3	1.96	0.45
1:D:316:ILE:H	1:D:316:ILE:HG13	1.57	0.45
1:F:308:GLN:HA	1:F:311:LYS:HD3	1.99	0.45
1:B:53:SER:HB2	2:B:1249:HOH:O	2.16	0.45
1:F:54:PHE:CE1	1:F:57:VAL:CG2	2.97	0.45
1:F:368:THR:O	1:F:369:GLN:C	2.56	0.44
1:D:233:GLN:HA	1:D:236:TRP:NE1	2.32	0.44
1:E:311:LYS:HZ2	1:E:312:GLY:H	1.65	0.44
1:D:323:THR:HG22	1:D:340:GLN:HE22	1.82	0.44
1:E:105:TYR:O	1:E:107:PRO:HD3	2.17	0.44
1:D:136:ALA:HB3	1:D:139:TYR:CD2	2.52	0.44
1:D:210:PHE:HE2	1:D:297:ILE:HG13	1.83	0.43
1:C:224:GLN:NE2	1:C:244:GLY:HA2	2.33	0.43
1:F:140:GLN:HG2	2:F:954:HOH:O	2.16	0.43
1:E:57:VAL:CG1	1:E:288:PHE:HA	2.47	0.43
1:E:94:VAL:HB	1:E:95:PRO:HD3	2.00	0.43
1:C:233:GLN:HA	1:C:236:TRP:CD1	2.54	0.43
1:D:238:ARG:NH2	1:D:261:GLU:OE2	2.52	0.43
1:D:224:GLN:HG2	2:D:879:HOH:O	2.19	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:259:LEU:HD21	1:B:303:CYS:O	2.19	0.42
1:F:121:VAL:HG23	1:F:128:ILE:CD1	2.47	0.42
1:F:140:GLN:HG3	2:F:954:HOH:O	2.14	0.42
1:B:45:LYS:O	1:B:49:GLN:HG3	2.18	0.42
1:C:326:MET:HB3	1:C:326:MET:HE3	1.72	0.42
1:E:49:GLN:NE2	2:E:1211:HOH:O	2.53	0.42
1:D:153:GLY:HA3	1:D:174:TYR:CG	2.54	0.42
1:E:153:GLY:HA3	1:E:174:TYR:CG	2.54	0.42
1:D:85:ASP:OD1	1:D:87:THR:HB	2.19	0.42
1:C:292:PRO:HA	1:C:295:MET:HE2	2.02	0.42
1:B:297:ILE:HD13	1:B:338:ILE:HA	2.02	0.42
1:D:326:MET:HA	1:F:327:ASP:HB2	2.01	0.42
1:B:348:ARG:O	1:B:350:PRO:HD3	2.19	0.42
1:C:164:SER:HA	1:C:234:GLU:HB2	2.02	0.42
1:D:83:GLU:HB2	1:D:154:MET:HE3	1.99	0.42
1:E:314:VAL:HA	1:E:315:LYS:HE3	2.02	0.42
1:A:252:ILE:HD11	1:A:307:GLN:HB2	2.02	0.41
1:B:291:ILE:HD11	1:C:326:MET:HE3	2.02	0.41
1:F:138:LYS:HE3	1:F:139:TYR:CZ	2.54	0.41
1:D:173:HIS:HD2	1:D:205:ASN:OD1	2.03	0.41
1:A:199:GLU:HG2	1:E:196:LEU:HD22	2.02	0.41
1:B:224:GLN:NE2	1:B:244:GLY:HA2	2.35	0.41
1:B:297:ILE:H	1:B:297:ILE:HG13	1.67	0.41
1:C:246:PHE:HE2	1:C:258:CYS:HG	1.68	0.41
1:F:262:LEU:O	1:F:265:ASN:HB3	2.21	0.41
1:D:110:ARG:HD3	1:D:112:MET:SD	2.61	0.41
1:E:308:GLN:HB3	1:E:314:VAL:HG22	2.02	0.41
1:F:153:GLY:HA3	1:F:174:TYR:CG	2.55	0.41
1:F:200:ASP:OD2	1:F:203:ARG:HB2	2.21	0.41
1:C:297:ILE:HD13	1:C:338:ILE:HG12	2.02	0.41
1:C:353:ASP:HA	1:C:354:PRO:HD3	1.85	0.41
1:F:89:SER:HB3	1:F:92:LYS:HE3	2.03	0.41
1:D:215:ASN:OD1	1:D:218:ARG:NH2	2.54	0.41
1:D:322:VAL:HG12	1:D:324:LEU:HB3	2.00	0.41
1:D:324:LEU:HD12	1:D:326:MET:N	2.33	0.41
1:E:174:TYR:HA	1:E:178:LEU:HD12	2.04	0.41
1:F:100:PHE:HA	1:F:103:PHE:CD2	2.55	0.41
1:F:306:ASN:OD1	1:F:308:GLN:N	2.52	0.41
1:F:369:GLN:O	1:F:369:GLN:CG	2.69	0.41
1:C:236:TRP:CE2	1:C:243:LEU:HB2	2.56	0.40
1:F:125:PHE:N	1:F:126:PRO:CD	2.84	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:213:LYS:HE2	1:F:265:ASN:OD1	2.22	0.40
1:B:322:VAL:O	1:B:326:MET:HE2	2.22	0.40
1:F:54:PHE:CE1	1:F:292:PRO:HG3	2.56	0.40
1:C:353:ASP:HB3	1:C:356:SER:HB3	2.03	0.40
1:D:348:ARG:CG	1:D:348:ARG:NH1	2.82	0.40
1:F:81:THR:HG23	1:F:116:GLU:HG2	2.02	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	319/343 (93%)	313 (98%)	6 (2%)	0	100	100
1	B	331/343 (96%)	321 (97%)	8 (2%)	2 (1%)	25	15
1	C	330/343 (96%)	321 (97%)	8 (2%)	1 (0%)	41	31
1	D	326/343 (95%)	314 (96%)	12 (4%)	0	100	100
1	E	325/343 (95%)	314 (97%)	10 (3%)	1 (0%)	41	31
1	F	320/343 (93%)	304 (95%)	16 (5%)	0	100	100
All	All	1951/2058 (95%)	1887 (97%)	60 (3%)	4 (0%)	47	39

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	316	ILE
1	E	52	ARG
1	B	321	ALA
1	C	314	VAL

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	288/305 (94%)	279 (97%)	9 (3%)	40	33
1	B	296/305 (97%)	283 (96%)	13 (4%)	28	21
1	C	298/305 (98%)	286 (96%)	12 (4%)	31	24
1	D	295/305 (97%)	275 (93%)	20 (7%)	16	8
1	E	293/305 (96%)	283 (97%)	10 (3%)	37	30
1	F	290/305 (95%)	271 (93%)	19 (7%)	16	9
All	All	1760/1830 (96%)	1677 (95%)	83 (5%)	26	18

All (83) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	36	LEU
1	A	37	SER
1	A	38	SER
1	A	159	ASP
1	A	199	GLU
1	A	225	GLN
1	A	311	LYS
1	A	327	ASP
1	A	358	LYS
1	B	38	SER
1	B	53	SER
1	B	126	PRO
1	B	225	GLN
1	B	241	LYS
1	B	242	LYS
1	B	297	ILE
1	B	311	LYS
1	B	315	LYS
1	B	316	ILE
1	B	318	LYS
1	B	320	GLN
1	B	322	VAL

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Mol	Chain	Res	Type
1	C	53	SER
1	C	83	GLU
1	C	115	LYS
1	C	225	GLN
1	C	241	LYS
1	C	242	LYS
1	C	250	GLU
1	C	307	GLN
1	C	311	LYS
1	C	348	ARG
1	C	351	ASP
1	C	369	GLN
1	D	76	LEU
1	D	77	ARG
1	D	84	ASP
1	D	87	THR
1	D	91	GLU
1	D	96	LEU
1	D	102	SER
1	D	115	LYS
1	D	117	LYS
1	D	158	LEU
1	D	194	ASP
1	D	203	ARG
1	D	242	LYS
1	D	311	LYS
1	D	315	LYS
1	D	318	LYS
1	D	323	THR
1	D	348	ARG
1	D	358	LYS
1	D	361	GLN
1	E	54	PHE
1	E	77	ARG
1	E	83	GLU
1	E	91	GLU
1	E	241	LYS
1	E	248	LYS
1	E	252	ILE
1	E	311	LYS
1	E	315	LYS
1	E	325	MET

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Mol	Chain	Res	Type
1	F	51	SER
1	F	53	SER
1	F	91	GLU
1	F	92	LYS
1	F	96	LEU
1	F	113	GLU
1	F	158	LEU
1	F	165	GLU
1	F	166	GLN
1	F	169	ASP
1	F	199	GLU
1	F	242	LYS
1	F	252	ILE
1	F	262	LEU
1	F	308	GLN
1	F	311	LYS
1	F	326	MET
1	F	357	SER
1	F	369	GLN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (36) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	225	GLN
1	A	283	GLN
1	A	307	GLN
1	B	59	GLN
1	B	101	HIS
1	B	140	GLN
1	B	224	GLN
1	B	308	GLN
1	B	340	GLN
1	C	49	GLN
1	C	59	GLN
1	C	101	HIS
1	C	224	GLN
1	C	293	GLN
1	C	307	GLN
1	D	49	GLN
1	D	59	GLN
1	D	98	HIS
1	D	140	GLN

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Mol	Chain	Res	Type
1	D	173	HIS
1	D	306	ASN
1	D	308	GLN
1	D	340	GLN
1	E	49	GLN
1	E	140	GLN
1	E	282	ASN
1	E	308	GLN
1	E	361	GLN
1	F	49	GLN
1	F	98	HIS
1	F	106	GLN
1	F	120	GLN
1	F	140	GLN
1	F	283	GLN
1	F	308	GLN
1	F	340	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues

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	323/343 (94%)	-0.01	4 (1%) 79 81	24, 35, 60, 75	0
1	B	333/343 (97%)	0.26	20 (6%) 21 23	29, 41, 78, 98	0
1	C	334/343 (97%)	0.35	20 (5%) 21 23	25, 39, 85, 108	0
1	D	330/343 (96%)	0.47	32 (9%) 7 8	38, 59, 98, 116	0
1	E	329/343 (95%)	0.50	34 (10%) 6 6	28, 47, 89, 104	0
1	F	324/343 (94%)	0.88	68 (20%) 1 0	34, 72, 117, 136	0
All	All	1973/2058 (95%)	0.41	178 (9%) 9 10	24, 48, 97, 136	0

All (178) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	324	LEU	10.1
1	B	319	GLY	8.4
1	C	313	ALA	7.2
1	F	250	GLU	7.2
1	C	315	LYS	7.0
1	E	241	LYS	6.2
1	D	313	ALA	5.9
1	F	323	THR	5.9
1	F	230	PHE	5.9
1	B	318	LYS	5.7
1	F	229	GLU	5.6
1	C	314	VAL	5.6
1	F	243	LEU	5.5
1	F	241	LYS	5.5
1	D	115	LYS	5.5
1	E	324	LEU	5.5
1	E	52	ARG	5.3
1	B	317	ARG	5.3
1	E	313	ALA	5.2

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Mol	Chain	Res	Type	RSRZ
1	D	317	ARG	5.2
1	F	347	HIS	5.0
1	F	244	GLY	4.9
1	B	316	ILE	4.9
1	C	312	GLY	4.8
1	E	211	LEU	4.8
1	D	117	LYS	4.8
1	E	242	LYS	4.7
1	D	325	MET	4.7
1	F	117	LYS	4.6
1	A	312	GLY	4.6
1	F	167	GLU	4.5
1	E	323	THR	4.5
1	F	162	VAL	4.5
1	E	228	ARG	4.4
1	C	316	ILE	4.3
1	E	225	GLN	4.2
1	F	159	ASP	4.1
1	F	325	MET	4.0
1	F	160	LYS	3.9
1	F	247	ALA	3.9
1	E	226	GLY	3.9
1	F	225	GLN	3.8
1	F	158	LEU	3.8
1	B	225	GLN	3.8
1	F	222	GLU	3.8
1	F	239	TYR	3.7
1	F	251	ASN	3.7
1	E	351	ASP	3.6
1	C	317	ARG	3.6
1	D	161	HIS	3.6
1	A	313	ALA	3.6
1	D	318	LYS	3.6
1	F	310	PHE	3.6
1	F	88	ILE	3.5
1	F	252	ILE	3.5
1	E	37	SER	3.5
1	B	320	GLN	3.4
1	F	85	ASP	3.4
1	D	37	SER	3.3
1	C	52	ARG	3.3
1	D	159	ASP	3.3

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Mol	Chain	Res	Type	RSRZ
1	F	113	GLU	3.3
1	B	179	VAL	3.2
1	E	214	THR	3.2
1	D	119	ARG	3.2
1	E	263	ILE	3.2
1	F	242	LYS	3.2
1	D	322	VAL	3.2
1	E	224	GLN	3.2
1	C	242	LYS	3.2
1	F	170	LYS	3.2
1	E	352	SER	3.2
1	B	313	ALA	3.1
1	C	368	THR	3.1
1	F	249	PRO	3.1
1	B	37	SER	3.1
1	A	325	MET	3.1
1	F	235	VAL	3.1
1	E	245	ASP	3.1
1	F	53	SER	3.1
1	F	246	PHE	3.1
1	E	347	HIS	3.0
1	F	161	HIS	3.0
1	D	228	ARG	3.0
1	B	315	LYS	3.0
1	E	227	GLY	2.9
1	F	86	MET	2.9
1	D	107	PRO	2.9
1	F	245	ASP	2.9
1	D	86	MET	2.9
1	F	91	GLU	2.9
1	D	120	GLN	2.8
1	F	254	LEU	2.8
1	D	324	LEU	2.8
1	E	221	LEU	2.8
1	F	256	VAL	2.8
1	E	349	ILE	2.7
1	F	248	LYS	2.7
1	F	121	VAL	2.7
1	F	115	LYS	2.7
1	E	251	ASN	2.7
1	E	161	HIS	2.7
1	A	249	PRO	2.7

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Mol	Chain	Res	Type	RSRZ
1	B	183	LEU	2.7
1	E	243	LEU	2.7
1	E	322	VAL	2.7
1	F	99	ASN	2.7
1	C	347	HIS	2.7
1	E	240	VAL	2.6
1	F	309	VAL	2.6
1	F	105	TYR	2.6
1	B	236	TRP	2.6
1	D	316	ILE	2.6
1	E	159	ASP	2.6
1	D	226	GLY	2.6
1	F	116	GLU	2.6
1	C	159	ASP	2.6
1	D	312	GLY	2.6
1	C	239	TYR	2.5
1	F	165	GLU	2.5
1	C	241	LYS	2.5
1	D	130	LEU	2.5
1	D	281	ARG	2.5
1	D	87	THR	2.5
1	F	220	TYR	2.5
1	B	226	GLY	2.5
1	F	37	SER	2.5
1	D	183	LEU	2.4
1	F	240	VAL	2.4
1	D	137	GLU	2.4
1	F	120	GLN	2.4
1	D	314	VAL	2.4
1	F	54	PHE	2.3
1	B	227	GLY	2.3
1	E	117	LYS	2.3
1	D	196	LEU	2.3
1	F	322	VAL	2.3
1	F	114	SER	2.3
1	B	228	ARG	2.3
1	E	87	THR	2.3
1	E	244	GLY	2.3
1	F	157	PHE	2.3
1	E	315	LYS	2.3
1	F	89	SER	2.3
1	D	104	LEU	2.2

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Mol	Chain	Res	Type	RSRZ
1	E	239	TYR	2.2
1	F	228	ARG	2.2
1	F	226	GLY	2.2
1	F	76	LEU	2.2
1	D	118	ASP	2.2
1	F	152	ILE	2.2
1	F	221	LEU	2.2
1	C	115	LYS	2.2
1	C	34	ASP	2.2
1	E	236	TRP	2.2
1	F	307	GLN	2.2
1	D	189	ALA	2.2
1	B	324	LEU	2.1
1	F	231	TRP	2.1
1	D	369	GLN	2.1
1	B	52	ARG	2.1
1	F	52	ARG	2.1
1	C	369	GLN	2.1
1	D	90	VAL	2.1
1	C	323	THR	2.1
1	B	161	HIS	2.1
1	F	166	GLN	2.1
1	B	143	ILE	2.1
1	C	161	HIS	2.1
1	B	182	GLY	2.1
1	C	289	CYS	2.1
1	F	112	MET	2.0
1	D	323	THR	2.0
1	F	127	THR	2.0
1	C	210	PHE	2.0
1	F	236	TRP	2.0
1	E	222	GLU	2.0
1	F	87	THR	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 carbohydrates 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.