



Full wwPDB X-ray Structure Validation Report ⓘ

Nov 19, 2024 – 10:05 AM EST

PDB ID : 8GM8
Title : Crystal structure of shark nonclassical MHC CLASS I, UFA
Authors : Castro, C.D.; Adams, E.J.
Deposited on : 2023-03-24
Resolution : 2.83 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
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 1.21
EDS : 3.0
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4 : 9.0.003 (Gargrove)
Density-Fitness : 1.0.11
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.39

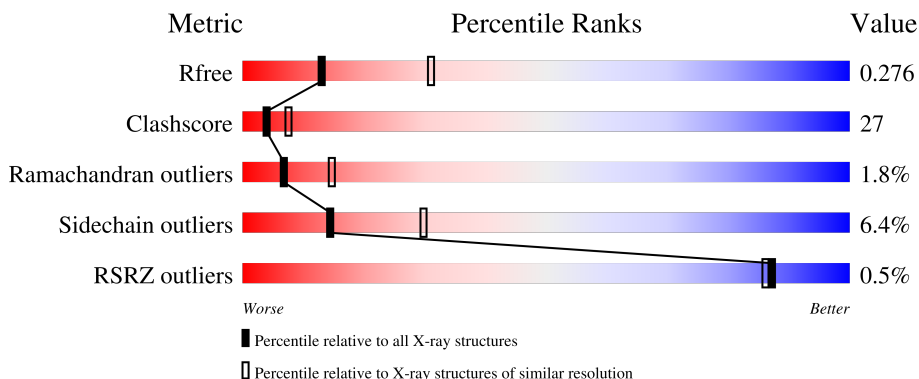
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.83 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.



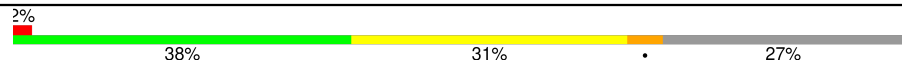
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	1367 (2.86-2.82)
Clashscore	180529	1455 (2.86-2.82)
Ramachandran outliers	177936	1422 (2.86-2.82)
Sidechain outliers	177891	1423 (2.86-2.82)
RSRZ outliers	164620	1368 (2.86-2.82)

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	265	
1	C	265	
1	E	265	
2	B	95	
2	D	95	

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Mol	Chain	Length	Quality of chain
2	F	95	 <p>A horizontal bar chart representing the quality of chain. The bar is divided into four segments: a small red segment (2%), a green segment (38%), a yellow segment (31%), and a grey segment (27%). A small black dot is located on the yellow segment.</p>

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 7672 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 MHC class I protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	257	Total 2063	C 1316	N 349	O 383	S 15	0	0	0
1	C	257	Total 2067	C 1318	N 350	O 384	S 15	4	1	0
1	E	188	Total 1494	C 955	N 250	O 278	S 11	4	1	0

- Molecule 2 is a protein called Beta-2-microglobulin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	93	Total 746	C 474	N 121	O 148	S 3	0	0	0
2	D	92	Total 731	C 463	N 118	O 147	S 3	0	0	0
2	F	69	Total 543	C 342	N 91	O 107	S 3	0	0	0

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	0	PRO	-	expression tag	UNP F4ZE04
D	0	PRO	-	expression tag	UNP F4ZE04
F	0	PRO	-	expression tag	UNP F4ZE04

- Molecule 3 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C₈H₁₅NO₆).

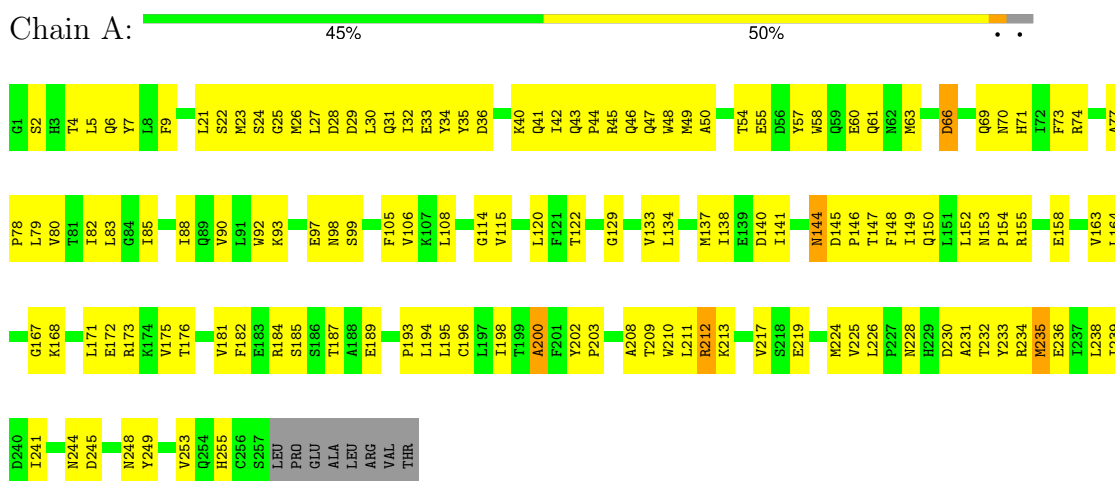


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
3	B	1	Total	C	N	O	0	0
			14	8	1	5		
3	D	1	Total	C	N	O	0	0
			14	8	1	5		

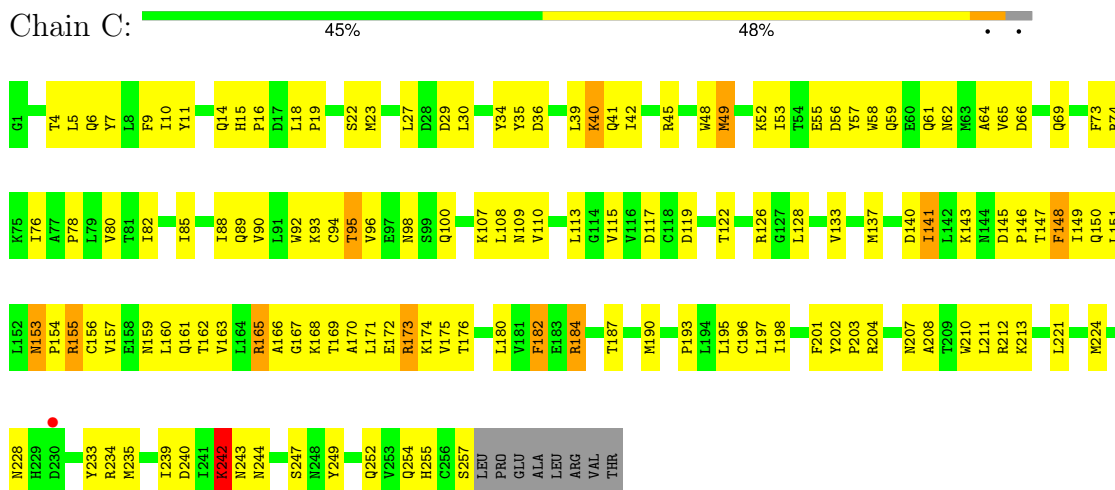
3 Residue-property plots [i](#)

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 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: MHC class I protein

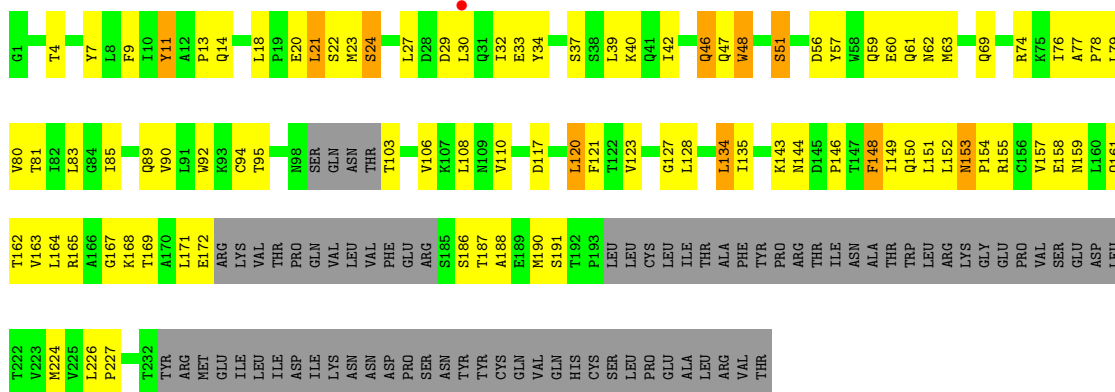


- Molecule 1: MHC class I protein



- Molecule 1: MHC class I protein

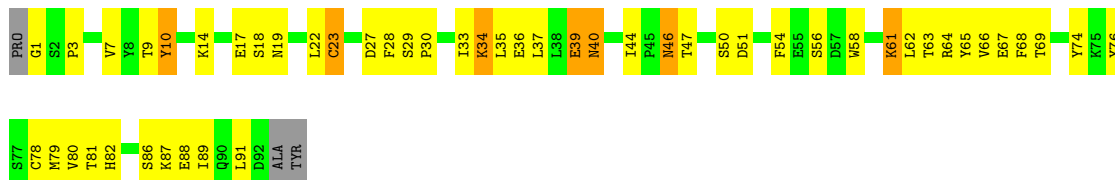




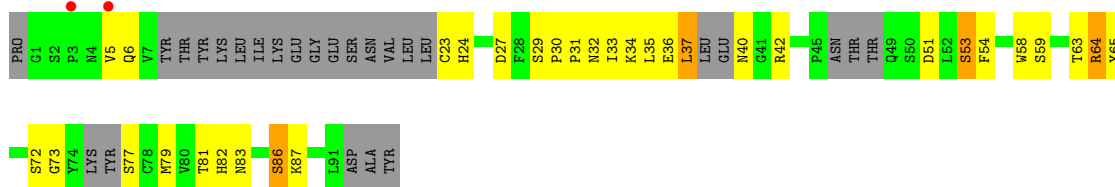
● Molecule 2: Beta-2-microglobulin



● Molecule 2: Beta-2-microglobulin



● Molecule 2: Beta-2-microglobulin



4 Data and refinement statistics i

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	59.06Å 89.86Å 90.08Å 63.57° 78.25° 80.35°	Depositor
Resolution (Å)	79.80 – 2.83 79.80 – 2.83	Depositor EDS
% Data completeness (in resolution range)	93.9 (79.80-2.83) 94.0 (79.80-2.83)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.11 (at 2.82Å)	Xtrriage
Refinement program	PHENIX 1.20.1-4487	Depositor
R, R_{free}	0.229 , 0.274 0.231 , 0.276	Depositor DCC
R_{free} test set	1639 reflections (4.53%)	wwPDB-VP
Wilson B-factor (Å ²)	98.8	Xtrriage
Anisotropy	0.305	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.28 , 89.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.000 for -h,-l,-k	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	7672	wwPDB-VP
Average B, all atoms (Å ²)	130.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.38% 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](#)

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

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	0.60	0/2107	0.85	0/2868
1	C	0.55	0/2111	0.80	0/2873
1	E	0.57	0/1522	0.84	0/2066
2	B	0.70	0/764	0.84	0/1035
2	D	0.56	0/748	0.79	0/1016
2	F	0.50	0/553	0.79	0/744
All	All	0.58	0/7805	0.82	0/10602

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	2063	0	2066	109	0
1	C	2067	0	2070	126	0
1	E	1494	0	1495	85	0
2	B	746	0	723	26	0
2	D	731	0	694	58	0
2	F	543	0	509	30	0
3	B	14	0	13	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	D	14	0	13	0	0
All	All	7672	0	7583	419	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 27.

All (419) 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:E:150:GLN:HA	1:E:154:PRO:HD2	1.38	1.06
1:A:194:LEU:HB2	1:A:241:ILE:HD11	1.41	1.03
2:D:3:PRO:HB3	2:D:28:PHE:HB3	1.39	1.01
2:D:36:GLU:HB2	2:D:79:MET:HB3	1.44	0.99
2:F:36:GLU:HG3	2:F:79:MET:HB3	1.48	0.94
1:A:46:GLN:HG2	1:A:48:TRP:NE1	1.83	0.93
1:E:103:THR:HA	1:E:121:PHE:HE2	1.37	0.90
1:E:79:LEU:HD22	1:E:134:LEU:HD11	1.57	0.87
1:A:230:ASP:OD1	1:A:232:THR:HG22	1.75	0.85
1:A:228:ASN:HD22	1:A:232:THR:HG23	1.42	0.85
1:C:153:ASN:HB3	1:C:154:PRO:HD3	1.60	0.83
1:E:186:SER:HA	1:E:190:MET:HG3	1.60	0.83
1:A:225:VAL:HG22	1:A:235:MET:HG2	1.62	0.81
2:B:5:VAL:HG21	2:B:80:VAL:HG11	1.64	0.80
1:A:114:GLY:HA3	1:A:129:GLY:HA3	1.64	0.80
1:E:48:TRP:CH2	1:E:167:GLY:HA2	2.18	0.78
2:D:23:CYS:HB2	2:D:37:LEU:HD21	1.66	0.76
1:A:189:GLU:N	1:A:189:GLU:OE1	2.18	0.75
1:C:180:LEU:HB3	1:C:182:PHE:HE1	1.51	0.75
1:A:27:LEU:HD22	1:A:163:VAL:HG23	1.69	0.75
1:C:169:THR:HA	1:C:172:GLU:OE2	1.88	0.74
2:B:7:VAL:HG12	2:B:91:LEU:HD23	1.68	0.74
1:C:48:TRP:NE1	1:C:167:GLY:HA2	2.03	0.74
1:A:167:GLY:O	1:A:171:LEU:HD12	1.88	0.74
1:A:33:GLU:OE2	1:A:61:GLN:NE2	2.20	0.74
1:C:18:LEU:HD23	1:C:19:PRO:HD2	1.69	0.73
1:E:190:MET:SD	1:E:191:SER:N	2.61	0.73
1:C:52:LYS:HE2	1:C:52:LYS:HA	1.70	0.72
1:C:61:GLN:N	1:C:61:GLN:OE1	2.24	0.71
1:A:155:ARG:NH1	1:A:158:GLU:OE1	2.24	0.71
1:E:27:LEU:HD22	1:E:163:VAL:HG12	1.72	0.71
1:A:168:LYS:O	1:A:172:GLU:HG3	1.92	0.70

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:5:LEU:HB2	1:C:160:LEU:HD13	1.74	0.70
2:D:46:ASN:HD22	2:D:46:ASN:N	1.90	0.70
1:C:56:ASP:OD1	1:C:57:TYR:N	2.24	0.70
2:D:33:ILE:HG13	2:D:82:HIS:HB2	1.74	0.69
1:E:127:GLY:HA3	1:E:135:ILE:HD13	1.72	0.69
1:E:69:GLN:HE21	1:E:74:ARG:HG3	1.58	0.69
1:E:168:LYS:HG3	1:E:172:GLU:OE2	1.93	0.68
1:E:48:TRP:HH2	1:E:167:GLY:HA2	1.56	0.68
1:A:46:GLN:HG2	1:A:48:TRP:HE1	1.59	0.68
1:C:9:PHE:CE1	1:C:23:MET:HG3	2.29	0.68
1:E:9:PHE:HD2	1:E:21:LEU:HD21	1.59	0.67
1:C:48:TRP:CD1	1:C:167:GLY:HA2	2.29	0.67
1:C:39:LEU:HD12	1:C:41:GLN:HE21	1.59	0.67
1:C:115:VAL:HG21	2:D:58:TRP:CZ2	2.29	0.67
2:D:7:VAL:HG23	2:D:91:LEU:HA	1.76	0.66
2:F:33:ILE:O	2:F:34:LYS:HD3	1.95	0.66
1:C:55:GLU:N	1:C:55:GLU:OE1	2.27	0.66
2:D:22:LEU:CD2	2:D:65:TYR:HB3	2.26	0.66
2:D:68:PHE:HZ	2:D:76:TYR:CZ	2.13	0.66
1:C:146:PRO:HA	1:C:149:ILE:HG13	1.77	0.66
1:C:53:ILE:HD13	1:C:58:TRP:HE1	1.61	0.65
1:A:6:GLN:O	1:A:25:GLY:HA2	1.96	0.65
1:A:198:ILE:HD12	1:A:235:MET:HE2	1.77	0.65
1:C:53:ILE:HG22	1:C:162:THR:HG22	1.77	0.65
1:A:97:GLU:O	1:A:99:SER:N	2.30	0.64
1:C:45:ARG:NH2	2:D:51:ASP:OD1	2.31	0.64
1:C:9:PHE:CZ	1:C:23:MET:HG3	2.32	0.64
1:A:78:PRO:O	1:A:82:ILE:HG12	1.97	0.64
1:A:224:MET:SD	1:A:226:LEU:HD11	2.37	0.64
2:D:78:CYS:HB3	2:D:89:ILE:HD11	1.79	0.64
1:C:90:VAL:HG22	1:C:108:LEU:HG	1.79	0.64
2:D:34:LYS:HB2	2:D:81:THR:HB	1.79	0.64
1:C:195:LEU:HD21	1:C:197:LEU:HB2	1.80	0.63
1:C:204:ARG:O	1:C:204:ARG:NH1	2.28	0.63
2:D:74:TYR:HB2	2:D:76:TYR:CZ	2.32	0.63
2:D:50:SER:HB3	2:D:62:LEU:HD12	1.78	0.63
1:C:203:PRO:HD2	1:C:255:HIS:HE1	1.63	0.63
1:E:76:ILE:O	1:E:80:VAL:HG13	1.98	0.63
1:A:57:TYR:OH	1:A:61:GLN:NE2	2.32	0.62
2:F:36:GLU:CG	2:F:79:MET:HB3	2.26	0.62
1:A:203:PRO:HD2	1:A:255:HIS:CE1	2.34	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:68:PHE:CZ	2:D:76:TYR:CZ	2.86	0.62
1:E:150:GLN:HA	1:E:154:PRO:CD	2.23	0.62
2:B:55:GLU:HB2	2:B:57:ASP:OD1	1.98	0.62
1:E:18:LEU:HD11	2:F:31:PRO:HB2	1.82	0.62
1:E:23:MET:HG2	1:E:24:SER:N	2.13	0.62
2:B:34:LYS:HB3	2:B:81:THR:HB	1.81	0.62
1:C:78:PRO:O	1:C:82:ILE:HD12	2.00	0.61
1:A:9:PHE:HB2	1:A:90:VAL:HB	1.82	0.61
2:F:86:SER:C	2:F:87:LYS:HE2	2.20	0.61
2:D:14:LYS:HD2	2:D:17:GLU:HG2	1.83	0.61
1:C:175:VAL:O	1:C:201:PHE:HA	2.01	0.61
2:D:14:LYS:HG3	2:D:14:LYS:O	2.00	0.61
1:A:173:ARG:HH12	1:A:231:ALA:HB3	1.65	0.60
2:B:81:THR:HA	2:B:85:ASP:O	2.00	0.60
1:C:150:GLN:O	1:C:154:PRO:HD2	2.00	0.60
1:C:207:ASN:HB3	1:C:254:GLN:HB2	1.82	0.60
2:B:7:VAL:HG12	2:B:91:LEU:HA	1.83	0.60
2:F:30:PRO:HD2	2:F:82:HIS:CE1	2.35	0.60
1:E:77:ALA:O	1:E:80:VAL:HG22	2.02	0.60
1:C:94:CYS:HG	1:C:156:CYS:HG	1.50	0.59
1:E:103:THR:HA	1:E:121:PHE:CE2	2.27	0.59
1:C:211:LEU:HD11	1:C:252:GLN:HB2	1.84	0.59
1:C:69:GLN:HA	1:C:73:PHE:HD2	1.67	0.59
2:D:78:CYS:HB3	2:D:89:ILE:CD1	2.33	0.58
1:C:196:CYS:HB2	1:C:210:TRP:CZ2	2.37	0.58
1:A:27:LEU:H	1:A:32:ILE:HG23	1.67	0.58
2:F:29:SER:HB3	2:F:30:PRO:HD3	1.85	0.58
1:C:212:ARG:HG3	1:C:213:LYS:HG2	1.86	0.58
1:C:115:VAL:HG21	2:D:58:TRP:CH2	2.38	0.58
2:F:36:GLU:O	2:F:37:LEU:HB3	2.03	0.58
1:C:89:GLN:NE2	1:C:109:ASN:HD22	2.02	0.58
1:E:103:THR:HG23	1:E:121:PHE:HD2	1.69	0.58
1:A:202:TYR:HB3	1:A:203:PRO:HD3	1.84	0.58
1:C:89:GLN:HE21	1:C:109:ASN:HD22	1.50	0.58
1:A:210:TRP:CD1	1:A:239:ILE:HD12	2.39	0.58
1:E:148:PHE:CE1	1:E:152:LEU:HD11	2.39	0.58
1:E:79:LEU:HG	1:E:83:LEU:HG	1.86	0.57
2:D:30:PRO:HD2	2:D:82:HIS:CE1	2.38	0.57
2:D:22:LEU:HD23	2:D:65:TYR:HB3	1.87	0.57
1:A:133:VAL:O	1:A:137:MET:HB2	2.04	0.57
2:F:40:ASN:O	2:F:42:ARG:HD2	2.05	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:149:ILE:HD12	1:C:150:GLN:N	2.21	0.56
2:F:42:ARG:HG2	2:F:77:SER:HA	1.86	0.56
1:E:60:GLU:HG2	1:E:155:ARG:NH1	2.20	0.56
1:A:69:GLN:HA	1:A:73:PHE:HD2	1.70	0.56
2:D:7:VAL:CG2	2:D:91:LEU:HA	2.35	0.56
1:A:184:ARG:CZ	1:A:185:SER:H	2.19	0.56
1:C:15:HIS:HB3	1:C:18:LEU:HB2	1.87	0.56
1:E:7:TYR:OH	1:E:61:GLN:NE2	2.36	0.56
1:C:4:THR:OG1	1:C:95:THR:HG22	2.06	0.55
1:E:127:GLY:HA3	1:E:135:ILE:CD1	2.37	0.55
1:A:137:MET:O	1:A:141:ILE:HG12	2.06	0.55
1:E:60:GLU:HA	1:E:63:MET:HE2	1.87	0.55
1:C:204:ARG:HB2	1:C:233:TYR:CE2	2.41	0.55
2:D:47:THR:HG22	2:D:64:ARG:HG2	1.88	0.55
1:E:57:TYR:HE2	1:E:159:ASN:HB3	1.71	0.55
1:E:158:GLU:O	1:E:161:GLN:HG3	2.07	0.55
1:A:245:ASP:HB3	1:A:248:ASN:OD1	2.07	0.55
1:A:150:GLN:O	1:A:154:PRO:HD2	2.07	0.55
1:E:127:GLY:CA	1:E:135:ILE:HD13	2.36	0.55
1:E:151:LEU:HA	1:E:155:ARG:HD2	1.89	0.55
1:C:9:PHE:HB2	1:C:90:VAL:HB	1.87	0.55
1:C:49:MET:O	1:C:53:ILE:HD11	2.06	0.55
1:C:57:TYR:HD2	1:C:58:TRP:HD1	1.55	0.54
2:D:46:ASN:N	2:D:46:ASN:ND2	2.55	0.54
1:A:57:TYR:CE2	1:A:61:GLN:HG3	2.40	0.54
2:D:7:VAL:HA	2:D:22:LEU:O	2.07	0.54
1:C:34:TYR:CE1	1:C:36:ASP:HB2	2.43	0.54
2:D:35:LEU:HD22	2:D:80:VAL:HG12	1.88	0.54
1:C:74:ARG:HG2	1:C:74:ARG:HH11	1.72	0.54
1:A:44:PRO:HB3	1:A:58:TRP:CH2	2.43	0.54
1:E:46:GLN:HB3	1:E:48:TRP:CD1	2.43	0.54
1:C:80:VAL:HG13	1:C:85:ILE:HB	1.89	0.54
1:E:77:ALA:O	1:E:81:THR:HG23	2.08	0.54
1:A:106:VAL:HG23	1:A:120:LEU:HD11	1.90	0.54
1:A:241:ILE:HG22	1:A:244:ASN:H	1.72	0.54
1:C:190:MET:HA	1:C:240:ASP:OD2	2.08	0.54
1:A:46:GLN:HG2	1:A:48:TRP:CD1	2.43	0.54
1:A:21:LEU:O	1:A:36:ASP:HA	2.08	0.53
1:C:221:LEU:HD12	1:C:239:ILE:HD11	1.90	0.53
1:E:103:THR:HG23	1:E:121:PHE:CD2	2.42	0.53
2:F:42:ARG:HG2	2:F:77:SER:N	2.23	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:94:CYS:SG	1:C:156:CYS:SG	3.05	0.53
1:E:56:ASP:HA	1:E:59:GLN:HG2	1.91	0.53
1:E:146:PRO:HA	1:E:149:ILE:HG13	1.89	0.53
1:C:11:TYR:CE2	1:C:73:PHE:HB3	2.44	0.53
1:C:212:ARG:HD3	1:C:212:ARG:C	2.28	0.53
1:C:117:ASP:HB3	1:C:126:ARG:HB3	1.90	0.53
1:C:180:LEU:HB3	1:C:182:PHE:CE1	2.39	0.53
1:C:48:TRP:HE1	1:C:167:GLY:HA2	1.74	0.53
1:E:7:TYR:HD2	1:E:92:TRP:CE3	2.27	0.53
1:C:174:LYS:HD3	1:C:203:PRO:HG3	1.91	0.53
1:A:232:THR:OG1	1:A:233:TYR:N	2.42	0.53
2:D:47:THR:HG23	2:D:66:VAL:HB	1.91	0.53
1:A:225:VAL:HG22	1:A:235:MET:CG	2.37	0.52
1:E:144:ASN:N	1:E:144:ASN:HD22	2.07	0.52
1:A:7:TYR:HA	1:A:25:GLY:HA2	1.92	0.52
1:C:57:TYR:HE1	1:C:159:ASN:HB3	1.75	0.52
1:E:4:THR:HG22	1:E:95:THR:OG1	2.10	0.52
2:F:64:ARG:HD2	2:F:65:TYR:H	1.74	0.52
1:C:187:THR:OG1	1:C:190:MET:HB2	2.10	0.52
2:D:44:ILE:N	2:D:44:ILE:HD12	2.25	0.52
1:E:85:ILE:HD12	1:E:110:VAL:HG12	1.91	0.52
2:F:35:LEU:O	2:F:64:ARG:NH1	2.43	0.52
1:A:27:LEU:HG	1:A:171:LEU:HD21	1.92	0.52
1:E:153:ASN:HB3	1:E:154:PRO:HD3	1.90	0.52
1:A:7:TYR:HE2	1:A:33:GLU:OE2	1.93	0.52
2:D:18:SER:HB2	2:D:67:GLU:OE2	2.10	0.52
1:E:42:ILE:HD11	1:E:62:ASN:HA	1.91	0.52
1:E:11:TYR:CZ	1:E:13:PRO:HG3	2.44	0.51
2:B:5:VAL:HG22	2:B:25:ALA:HB2	1.92	0.51
1:A:241:ILE:HG23	1:A:249:TYR:CE2	2.44	0.51
1:E:42:ILE:HD11	1:E:62:ASN:CA	2.40	0.51
1:E:127:GLY:C	1:E:128:LEU:HD23	2.30	0.51
1:A:181:VAL:C	1:A:182:PHE:HD1	2.14	0.51
1:C:228:ASN:HD21	1:C:234:ARG:HB3	1.75	0.51
2:B:29:SER:HB3	2:B:30:PRO:HD3	1.92	0.51
1:A:210:TRP:O	1:A:211:LEU:HD13	2.11	0.51
1:C:58:TRP:CD1	1:C:58:TRP:N	2.78	0.51
1:E:227:PRO:HG2	2:F:24:HIS:CD2	2.46	0.50
1:C:6:GLN:HE21	1:C:93:LYS:HD3	1.76	0.50
1:C:39:LEU:HD12	1:C:41:GLN:NE2	2.26	0.50
2:D:44:ILE:HG21	2:D:66:VAL:HG21	1.93	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:80:VAL:HG22	2:D:87:LYS:O	2.12	0.50
1:E:224:MET:CE	2:F:6:GLN:HG3	2.41	0.50
1:C:4:THR:HG23	1:C:95:THR:HG23	1.92	0.50
1:C:234:ARG:NH2	2:D:9:THR:O	2.45	0.50
1:A:70:ASN:HB3	1:A:74:ARG:NH2	2.26	0.50
2:D:39:GLU:N	2:D:44:ILE:HD11	2.25	0.50
1:A:194:LEU:HB2	1:A:241:ILE:CD1	2.26	0.50
1:E:120:LEU:HB3	1:E:153:ASN:HB2	1.94	0.50
1:E:14:GLN:N	1:E:14:GLN:OE1	2.44	0.50
1:C:53:ILE:CD1	1:C:58:TRP:HE1	2.23	0.49
1:A:35:TYR:HB2	1:A:42:ILE:HG13	1.93	0.49
1:E:90:VAL:HG13	1:E:108:LEU:HG	1.94	0.49
1:A:182:PHE:O	1:A:194:LEU:HD12	2.13	0.49
1:C:140:ASP:O	1:C:141:ILE:C	2.51	0.49
1:A:184:ARG:NE	1:A:184:ARG:HA	2.26	0.49
1:A:238:LEU:O	1:A:239:ILE:HG13	2.12	0.49
1:C:39:LEU:O	1:C:41:GLN:NE2	2.45	0.49
1:C:165:ARG:HG2	1:C:166:ALA:N	2.28	0.49
2:B:71:GLN:O	2:B:74:TYR:HB2	2.12	0.49
2:F:27:ASP:OD1	2:F:59:SER:HB2	2.12	0.49
2:B:55:GLU:HG2	2:B:61:LYS:HD3	1.94	0.49
1:C:36:ASP:O	1:C:39:LEU:HB3	2.13	0.49
2:D:22:LEU:HD21	2:D:65:TYR:HB3	1.93	0.49
1:C:195:LEU:CD2	1:C:197:LEU:HB2	2.42	0.49
1:A:4:THR:HG21	1:A:93:LYS:HE2	1.95	0.49
1:A:184:ARG:HB3	1:A:193:PRO:HB2	1.95	0.49
1:C:168:LYS:HA	1:C:171:LEU:HD12	1.94	0.49
1:A:212:ARG:HD3	1:A:213:LYS:HG3	1.95	0.48
2:B:14:LYS:HD2	2:B:14:LYS:HA	1.59	0.48
1:C:65:VAL:HG13	1:C:66:ASP:OD1	2.13	0.48
1:A:80:VAL:HB	1:A:85:ILE:HB	1.94	0.48
1:A:2:SER:HA	1:A:97:GLU:HA	1.96	0.48
1:A:196:CYS:HB2	1:A:210:TRP:CZ2	2.48	0.48
1:A:212:ARG:HE	1:A:213:LYS:HE3	1.78	0.48
1:A:208:ALA:HB2	1:A:253:VAL:HG13	1.95	0.48
1:C:61:GLN:O	1:C:65:VAL:HG12	2.12	0.48
1:E:11:TYR:HA	1:E:20:GLU:O	2.14	0.48
1:C:163:VAL:O	1:C:167:GLY:N	2.45	0.48
1:C:242:LYS:O	1:C:243:ASN:C	2.49	0.48
2:D:68:PHE:HZ	2:D:76:TYR:OH	1.97	0.48
1:E:226:LEU:HD11	2:F:6:GLN:HB2	1.95	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:42:ILE:HD13	1:C:61:GLN:HB3	1.96	0.48
1:A:34:TYR:CE1	2:B:51:ASP:HB3	2.49	0.47
1:C:184:ARG:HG3	1:C:193:PRO:HB2	1.95	0.47
2:B:38:LEU:HB2	2:B:77:SER:OG	2.14	0.47
2:D:14:LYS:HG3	2:D:17:GLU:HB2	1.96	0.47
1:C:107:LYS:C	1:C:108:LEU:HD12	2.34	0.47
1:E:47:GLN:NE2	1:E:51:SER:OG	2.47	0.47
1:A:80:VAL:HG11	1:A:88:ILE:HD11	1.96	0.47
1:C:15:HIS:ND1	1:C:16:PRO:HD2	2.28	0.47
1:C:57:TYR:CZ	1:C:61:GLN:NE2	2.82	0.47
1:C:92:TRP:HZ2	1:C:156:CYS:HB2	1.80	0.47
1:C:184:ARG:HG3	1:C:193:PRO:HG2	1.96	0.47
1:E:32:ILE:HG13	1:E:33:GLU:HG2	1.97	0.47
2:F:42:ARG:HG2	2:F:77:SER:CA	2.44	0.47
1:A:212:ARG:HG3	1:A:249:TYR:CE1	2.50	0.47
1:C:27:LEU:HD22	1:C:163:VAL:HG23	1.97	0.47
1:A:144:ASN:OD1	1:A:144:ASN:N	2.48	0.47
1:A:234:ARG:NH1	1:A:236:GLU:OE2	2.48	0.47
1:C:145:ASP:O	1:C:148:PHE:N	2.47	0.47
1:E:164:LEU:O	1:E:167:GLY:HA3	2.15	0.47
1:A:79:LEU:HG	1:A:83:LEU:CD2	2.45	0.47
1:C:108:LEU:O	1:C:115:VAL:HA	2.15	0.47
1:E:117:ASP:HB2	1:E:128:LEU:HD11	1.96	0.47
2:D:80:VAL:HG23	2:D:80:VAL:O	2.14	0.46
1:A:228:ASN:ND2	1:A:232:THR:HG23	2.21	0.46
1:C:176:THR:HG22	1:C:257:SER:O	2.16	0.46
1:C:161:GLN:OE1	1:C:161:GLN:N	2.37	0.46
1:C:224:MET:HG2	1:C:224:MET:O	2.14	0.46
2:F:6:GLN:O	2:F:23:CYS:HA	2.15	0.46
1:A:148:PHE:CE2	1:A:152:LEU:HD11	2.51	0.46
1:C:154:PRO:HA	1:C:157:VAL:HG12	1.97	0.46
2:D:10:TYR:C	2:D:10:TYR:CD1	2.88	0.46
1:C:145:ASP:OD1	1:C:147:THR:HG22	2.16	0.46
2:B:83:ASN:OD1	2:B:83:ASN:O	2.34	0.46
1:A:108:LEU:O	1:A:115:VAL:HA	2.16	0.46
1:A:147:THR:O	1:A:150:GLN:HB2	2.15	0.46
1:E:79:LEU:O	1:E:80:VAL:C	2.53	0.46
1:E:85:ILE:CD1	1:E:110:VAL:HG12	2.45	0.46
1:A:182:PHE:CD1	1:A:182:PHE:N	2.83	0.46
1:A:175:VAL:HG23	1:A:202:TYR:HB2	1.98	0.45
1:C:76:ILE:HG22	1:C:137:MET:HE2	1.97	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:1:GLY:HA3	2:D:29:SER:HB2	1.96	0.45
1:E:150:GLN:CA	1:E:154:PRO:HD2	2.27	0.45
1:C:42:ILE:HD11	1:C:62:ASN:N	2.31	0.45
1:C:242:LYS:NZ	1:C:244:ASN:HD21	2.15	0.45
1:E:167:GLY:O	1:E:169:THR:N	2.35	0.45
1:A:184:ARG:O	1:A:193:PRO:HD2	2.17	0.45
1:A:9:PHE:CE2	1:A:23:MET:HG2	2.51	0.45
1:A:45:ARG:NH1	2:B:51:ASP:OD1	2.49	0.45
1:A:30:LEU:HD21	1:A:202:TYR:OH	2.15	0.45
1:A:202:TYR:CD2	1:A:202:TYR:C	2.88	0.45
2:D:22:LEU:HD23	2:D:22:LEU:HA	1.74	0.45
1:A:45:ARG:HD3	1:A:45:ARG:HA	1.62	0.45
2:D:39:GLU:OE1	2:D:40:ASN:ND2	2.49	0.45
1:A:146:PRO:HA	1:A:149:ILE:CG2	2.47	0.45
1:A:85:ILE:HD13	1:A:85:ILE:HA	1.64	0.45
1:E:34:TYR:CD2	2:F:51:ASP:OD2	2.69	0.45
2:B:62:LEU:HD12	2:B:62:LEU:HA	1.69	0.45
2:D:30:PRO:HD2	2:D:82:HIS:NE2	2.32	0.45
1:C:5:LEU:HB2	1:C:160:LEU:CD1	2.44	0.45
1:C:7:TYR:HD1	1:C:23:MET:SD	2.40	0.45
2:D:7:VAL:HG22	2:D:89:ILE:HD13	1.99	0.45
1:E:48:TRP:CZ3	1:E:167:GLY:HA2	2.51	0.44
1:E:162:THR:HG23	1:E:165:ARG:HH22	1.82	0.44
2:B:80:VAL:HG23	2:B:80:VAL:O	2.17	0.44
2:D:78:CYS:O	2:D:88:GLU:HA	2.18	0.44
1:A:47:GLN:O	1:A:50:ALA:N	2.50	0.44
1:A:77:ALA:N	1:A:78:PRO:CD	2.80	0.44
1:C:19:PRO:HG3	1:C:36:ASP:OD2	2.17	0.44
1:C:174:LYS:CD	1:C:203:PRO:HG3	2.48	0.44
1:E:168:LYS:HA	1:E:171:LEU:HB2	1.98	0.44
1:C:212:ARG:HA	1:C:249:TYR:CE1	2.52	0.44
2:D:18:SER:HA	2:D:69:THR:HG22	1.98	0.44
1:E:154:PRO:O	1:E:157:VAL:HB	2.16	0.44
1:E:148:PHE:HE1	1:E:152:LEU:HD11	1.83	0.44
1:E:227:PRO:HG2	2:F:24:HIS:HD2	1.82	0.44
2:B:13:ILE:HD12	2:B:13:ILE:O	2.17	0.44
1:E:34:TYR:CG	2:F:51:ASP:OD2	2.71	0.44
1:A:71:HIS:ND1	1:A:148:PHE:CD1	2.86	0.44
1:C:74:ARG:HG2	1:C:74:ARG:NH1	2.33	0.44
1:C:119:ASP:HB3	1:C:122:THR:HG22	1.98	0.44
1:C:39:LEU:O	1:C:40:LYS:HB2	2.18	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:146:PRO:O	1:C:150:GLN:HG3	2.18	0.44
1:C:82:ILE:HD12	1:C:82:ILE:H	1.83	0.44
1:C:146:PRO:HA	1:C:149:ILE:CG1	2.45	0.44
1:C:212:ARG:HD2	1:C:213:LYS:HD3	1.99	0.44
2:F:33:ILE:HG13	2:F:82:HIS:HB2	1.99	0.43
1:C:151:LEU:HA	1:C:155:ARG:HB3	2.00	0.43
1:E:89:GLN:OE1	2:F:58:TRP:HB3	2.18	0.43
1:E:106:VAL:HG23	1:E:120:LEU:HD21	2.00	0.43
1:A:217:VAL:HG22	1:A:219:GLU:OE1	2.18	0.43
1:A:145:ASP:OD1	1:A:145:ASP:C	2.56	0.43
1:C:35:TYR:HA	1:C:39:LEU:HD23	2.01	0.43
1:C:56:ASP:O	1:C:59:GLN:HB3	2.17	0.43
1:E:32:ILE:CG1	1:E:33:GLU:HG2	2.48	0.43
1:C:10:ILE:HB	1:C:22:SER:OG	2.18	0.43
1:C:170:ALA:O	1:C:173:ARG:HB3	2.18	0.43
2:D:44:ILE:CG2	2:D:66:VAL:HG21	2.48	0.43
2:D:54:PHE:HA	2:D:61:LYS:HG3	1.99	0.43
1:C:210:TRP:CD1	1:C:239:ILE:CG1	3.01	0.43
2:D:79:MET:HA	2:D:79:MET:HE3	2.00	0.43
2:D:79:MET:CE	2:D:86:SER:HB3	2.48	0.43
1:E:152:LEU:N	1:E:152:LEU:HD12	2.32	0.43
1:A:5:LEU:O	1:A:93:LYS:HA	2.18	0.43
2:D:74:TYR:HB2	2:D:76:TYR:CE1	2.53	0.43
1:E:4:THR:HA	1:E:94:CYS:O	2.19	0.43
1:E:77:ALA:N	1:E:78:PRO:HD2	2.33	0.43
1:E:79:LEU:HD23	1:E:80:VAL:N	2.33	0.43
2:F:5:VAL:HA	2:F:24:HIS:O	2.19	0.43
1:C:202:TYR:CD2	1:C:203:PRO:N	2.87	0.43
1:A:85:ILE:HG23	1:A:85:ILE:HD12	1.82	0.42
1:A:105:PHE:O	1:A:120:LEU:HD11	2.18	0.42
2:F:72:SER:HB3	2:F:73:GLY:H	1.64	0.42
1:A:26:MET:HB3	1:A:31:GLN:HA	2.00	0.42
1:A:92:TRP:CD1	1:A:92:TRP:C	2.90	0.42
1:E:187:THR:OG1	1:E:188:ALA:N	2.49	0.42
1:A:57:TYR:CZ	1:A:61:GLN:NE2	2.88	0.42
2:B:4:ASN:O	2:B:25:ALA:HA	2.19	0.42
2:B:30:PRO:HD2	2:B:82:HIS:CE1	2.55	0.42
1:C:117:ASP:HB2	1:C:128:LEU:HD22	2.01	0.42
1:C:96:VAL:HG12	1:C:160:LEU:HD21	2.01	0.42
1:C:182:PHE:HB2	1:C:184:ARG:HH12	1.85	0.42
2:F:53:SER:HB3	2:F:54:PHE:H	1.52	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:42:ILE:HG22	1:A:43:GLN:N	2.35	0.42
1:A:55:GLU:O	1:A:58:TRP:N	2.46	0.42
2:F:36:GLU:HB2	2:F:79:MET:H	1.84	0.42
1:A:212:ARG:HG3	1:A:249:TYR:CZ	2.55	0.42
2:B:47:THR:HA	2:B:66:VAL:HG23	2.01	0.42
2:B:91:LEU:HD23	2:B:91:LEU:HA	1.94	0.42
1:C:76:ILE:HG22	1:C:137:MET:CE	2.50	0.42
1:C:110:VAL:HB	1:C:113:LEU:HB2	2.01	0.42
1:C:212:ARG:HA	1:C:249:TYR:CD1	2.55	0.42
1:A:9:PHE:HA	1:A:22:SER:O	2.20	0.41
1:C:64:ALA:HA	1:C:151:LEU:HD21	2.02	0.41
2:D:37:LEU:HD23	2:D:78:CYS:HB2	2.01	0.41
1:E:29:ASP:OD1	1:E:29:ASP:O	2.37	0.41
2:B:36:GLU:HG3	2:B:79:MET:HB3	2.02	0.41
1:A:40:LYS:O	1:A:41:GLN:HB3	2.20	0.41
1:C:29:ASP:O	1:C:30:LEU:HD23	2.20	0.41
1:C:119:ASP:OD2	1:C:122:THR:HG22	2.19	0.41
2:D:33:ILE:CG1	2:D:82:HIS:HB2	2.46	0.41
1:E:29:ASP:HB3	1:E:30:LEU:HD12	2.02	0.41
1:E:79:LEU:CD2	1:E:134:LEU:HD11	2.39	0.41
1:A:134:LEU:O	1:A:138:ILE:HG13	2.20	0.41
1:C:153:ASN:O	1:C:157:VAL:HG12	2.20	0.41
1:C:212:ARG:HH22	1:C:244:ASN:ND2	2.19	0.41
2:D:3:PRO:CB	2:D:28:PHE:HB3	2.29	0.41
1:E:9:PHE:HB2	1:E:90:VAL:HB	2.02	0.41
1:A:217:VAL:CG1	1:A:239:ILE:HD13	2.50	0.41
1:C:208:ALA:HB3	1:C:235:MET:HE1	2.01	0.41
1:C:242:LYS:O	1:C:242:LYS:HE2	2.20	0.41
1:E:60:GLU:HA	1:E:63:MET:CE	2.50	0.41
1:A:32:ILE:HB	1:A:49:MET:HG3	2.03	0.41
1:A:217:VAL:CG2	1:A:219:GLU:OE1	2.68	0.41
2:B:11:LYS:HE3	2:B:11:LYS:HB3	1.36	0.41
2:D:1:GLY:HA3	2:D:29:SER:CB	2.51	0.41
2:D:68:PHE:CD1	2:D:69:THR:N	2.88	0.41
1:E:77:ALA:HA	1:E:80:VAL:HG22	2.02	0.41
1:A:27:LEU:O	1:A:28:ASP:HB2	2.20	0.41
3:B:101:NAG:H82	3:B:101:NAG:C1	2.51	0.41
1:E:60:GLU:HG2	1:E:155:ARG:CZ	2.50	0.41
1:A:182:PHE:HD1	1:A:182:PHE:N	2.18	0.41
1:C:88:ILE:HG22	1:C:90:VAL:HG23	2.03	0.41
2:D:9:THR:OG1	2:D:19:ASN:OD1	2.39	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:9:PHE:CD2	1:E:21:LEU:HD21	2.48	0.41
1:E:9:PHE:CD2	1:E:23:MET:HB2	2.56	0.41
1:A:60:GLU:CD	1:A:155:ARG:HH21	2.22	0.41
1:A:63:MET:HA	1:A:66:ASP:OD2	2.22	0.40
1:A:164:LEU:HD13	1:A:164:LEU:O	2.21	0.40
1:A:226:LEU:HD22	2:B:8:TYR:CE1	2.56	0.40
2:D:44:ILE:HD12	2:D:44:ILE:H	1.86	0.40
1:A:66:ASP:O	1:A:70:ASN:N	2.41	0.40
2:D:14:LYS:CG	2:D:17:GLU:HB2	2.50	0.40
1:E:89:GLN:NE2	2:F:54:PHE:CG	2.89	0.40
1:A:175:VAL:CG1	1:A:200:ALA:HB1	2.51	0.40
1:C:242:LYS:HB3	1:C:242:LYS:HZ3	1.86	0.40
1:A:185:SER:O	1:A:187:THR:HG23	2.21	0.40
1:C:89:GLN:HE21	1:C:109:ASN:ND2	2.18	0.40
1:E:59:GLN:HG3	1:E:60:GLU:N	2.35	0.40
2:F:33:ILE:C	2:F:34:LYS:HD3	2.41	0.40
1:A:195:LEU:HD23	1:A:196:CYS:C	2.42	0.40
2:B:52:LEU:HA	2:B:62:LEU:HD13	2.03	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	255/265 (96%)	221 (87%)	30 (12%)	4 (2%)	8	16
1	C	256/265 (97%)	214 (84%)	35 (14%)	7 (3%)	4	9
1	E	180/265 (68%)	157 (87%)	19 (11%)	4 (2%)	5	11
2	B	91/95 (96%)	83 (91%)	8 (9%)	0	100	100
2	D	90/95 (95%)	79 (88%)	10 (11%)	1 (1%)	12	24
2	F	59/95 (62%)	46 (78%)	12 (20%)	1 (2%)	7	15

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
All	All	931/1080 (86%)	800 (86%)	114 (12%)	17 (2%)	7	15

All (17) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	98	ASN
2	D	40	ASN
1	C	40	LYS
1	C	98	ASN
1	A	29	ASP
1	C	153	ASN
1	E	40	LYS
1	E	46	GLN
2	F	83	ASN
1	A	153	ASN
1	A	200	ALA
1	C	198	ILE
1	C	242	LYS
1	E	153	ASN
1	E	123	VAL
1	C	141	ILE
1	C	133	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	235/242 (97%)	225 (96%)	10 (4%)	25	48
1	C	235/242 (97%)	222 (94%)	13 (6%)	18	36
1	E	168/242 (69%)	156 (93%)	12 (7%)	12	26
2	B	87/88 (99%)	82 (94%)	5 (6%)	17	34
2	D	84/88 (96%)	75 (89%)	9 (11%)	5	11
2	F	63/88 (72%)	56 (89%)	7 (11%)	5	10

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
All	All	872/990 (88%)	816 (94%)	56 (6%)	14	30

All (56) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	24	SER
1	A	54	THR
1	A	66	ASP
1	A	122	THR
1	A	140	ASP
1	A	144	ASN
1	A	176	THR
1	A	209	THR
1	A	212	ARG
1	A	235	MET
2	B	9	THR
2	B	11	LYS
2	B	36	GLU
2	B	48	THR
2	B	56	SER
1	C	14	GLN
1	C	49	MET
1	C	95	THR
1	C	100	GLN
1	C	143	LYS
1	C	148	PHE
1	C	155	ARG
1	C	165	ARG
1	C	173	ARG
1	C	182	PHE
1	C	184	ARG
1	C	242	LYS
1	C	247	SER
2	D	10	TYR
2	D	23	CYS
2	D	27	ASP
2	D	34	LYS
2	D	39	GLU
2	D	46	ASN
2	D	56	SER
2	D	61	LYS
2	D	63	THR

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Mol	Chain	Res	Type
1	E	11	TYR
1	E	21	LEU
1	E	22	SER
1	E	24	SER
1	E	37	SER
1	E	39	LEU
1	E	48	TRP
1	E	51	SER
1	E	120	LEU
1	E	134	LEU
1	E	143	LYS
1	E	148	PHE
2	F	32	ASN
2	F	37	LEU
2	F	53	SER
2	F	63	THR
2	F	64	ARG
2	F	81	THR
2	F	86	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (25) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	3	HIS
1	A	31	GLN
1	A	61	GLN
1	A	98	ASN
1	A	159	ASN
1	A	228	ASN
1	A	229	HIS
2	B	71	GLN
2	B	82	HIS
1	C	6	GLN
1	C	41	GLN
1	C	70	ASN
1	C	89	GLN
1	C	98	ASN
1	C	229	HIS
1	C	243	ASN
1	C	244	ASN
1	E	31	GLN
1	E	41	GLN

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Mol	Chain	Res	Type
1	E	47	GLN
1	E	61	GLN
1	E	69	GLN
1	E	144	ASN
2	F	4	ASN
2	F	82	HIS

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

2 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	NAG	D	101	2	14,14,15	1.06	2 (14%)	17,19,21	0.68	0
3	NAG	B	101	2	14,14,15	1.19	2 (14%)	17,19,21	1.72	2 (11%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	D	101	2	-	2/6/23/26	0/1/1/1
3	NAG	B	101	2	-	5/6/23/26	0/1/1/1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	101	NAG	C1-C2	3.15	1.56	1.52
3	D	101	NAG	C1-C2	3.06	1.56	1.52
3	B	101	NAG	O5-C1	2.66	1.48	1.43
3	D	101	NAG	O5-C1	2.37	1.47	1.43

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	101	NAG	C2-N2-C7	5.39	130.12	122.90
3	B	101	NAG	C1-C2-N2	2.03	113.63	110.43

There are no chirality outliers.

All (7) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	101	NAG	C1-C2-N2-C7
3	B	101	NAG	O5-C5-C6-O6
3	B	101	NAG	C8-C7-N2-C2
3	B	101	NAG	O7-C7-N2-C2
3	D	101	NAG	C8-C7-N2-C2
3	D	101	NAG	O7-C7-N2-C2
3	B	101	NAG	C4-C5-C6-O6

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	101	NAG	1	0

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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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	257/265 (96%)	-0.51	0 100 100	74, 110, 165, 188	0
1	C	257/265 (96%)	-0.45	1 (0%) 89 88	79, 141, 187, 214	1 (0%)
1	E	188/265 (70%)	-0.40	1 (0%) 87 86	73, 126, 200, 226	1 (0%)
2	B	93/95 (97%)	-0.75	1 (1%) 77 76	76, 90, 122, 156	0
2	D	92/95 (96%)	-0.44	0 100 100	102, 137, 196, 230	0
2	F	69/95 (72%)	-0.24	2 (2%) 54 49	108, 160, 194, 221	0
All	All	956/1080 (88%)	-0.47	5 (0%) 87 86	73, 127, 188, 230	2 (0%)

All (5) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	30	LEU	3.3
1	C	230	ASP	2.5
2	F	5	VAL	2.4
2	F	3	PRO	2.4
2	B	0	PRO	2.3

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](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	NAG	B	101	14/15	0.59	0.10	135,146,156,157	0
3	NAG	D	101	14/15	0.75	0.10	167,173,190,195	0

6.5 Other polymers [i](#)

There are no such residues in this entry.