



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 03:04 PM UTC

PDB ID : 2O7U / pdb_00002o7u
Title : Crystal structure of K206E/K296E mutant of the N-terminal half molecule of human transferrin
Authors : Baker, H.M.; Nurizzo, D.; Mason, A.B.; Baker, E.N.
Deposited on : 2006-12-11
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	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

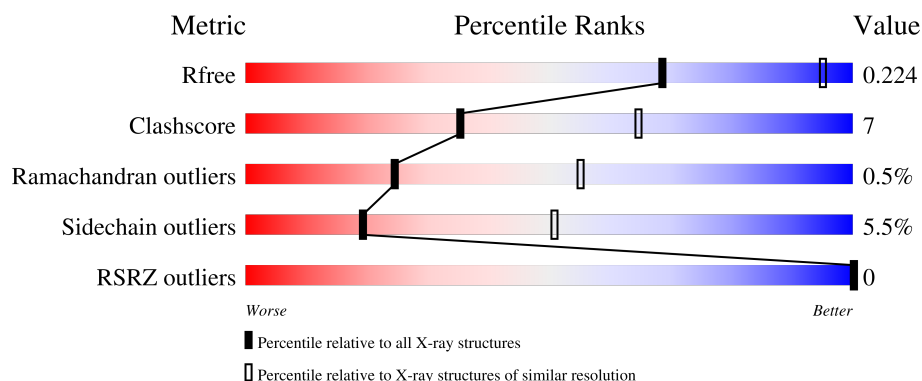
1 Overall quality at a glance

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}	180053	3866 (2.80-2.80)
Clashscore	190562	4276 (2.80-2.80)
Ramachandran outliers	187476	4196 (2.80-2.80)
Sidechain outliers	187428	4198 (2.80-2.80)
RSRZ outliers	180081	3869 (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	337	 73% 20% . .
1	B	337	 74% 20% . .
1	C	337	 73% 21% . .
1	D	337	 83% 13% . .
1	E	337	 83% 13% . .

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
1	F	337	 84%12% ..
1	G	337	 85%11% ..
1	H	337	 85%11% ..
1	I	337	 86%11% ..

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 23067 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 Serotransferrin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	B	329	Total	C	N	O	S	0	0	0
			2550	1610	435	484	21			
1	A	329	Total	C	N	O	S	0	0	0
			2550	1610	435	484	21			
1	C	329	Total	C	N	O	S	0	0	0
			2550	1610	435	484	21			
1	D	329	Total	C	N	O	S	0	0	0
			2550	1610	435	484	21			
1	E	329	Total	C	N	O	S	0	0	0
			2550	1610	435	484	21			
1	F	329	Total	C	N	O	S	0	0	0
			2550	1610	435	484	21			
1	G	329	Total	C	N	O	S	0	0	0
			2550	1610	435	484	21			
1	H	329	Total	C	N	O	S	0	0	0
			2550	1610	435	484	21			
1	I	329	Total	C	N	O	S	0	0	0
			2550	1610	435	484	21			

There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	206	GLU	LYS	engineered mutation	UNP P02787
B	296	GLU	LYS	engineered mutation	UNP P02787
A	206	GLU	LYS	engineered mutation	UNP P02787
A	296	GLU	LYS	engineered mutation	UNP P02787
C	206	GLU	LYS	engineered mutation	UNP P02787
C	296	GLU	LYS	engineered mutation	UNP P02787
D	206	GLU	LYS	engineered mutation	UNP P02787
D	296	GLU	LYS	engineered mutation	UNP P02787
E	206	GLU	LYS	engineered mutation	UNP P02787
E	296	GLU	LYS	engineered mutation	UNP P02787
F	206	GLU	LYS	engineered mutation	UNP P02787

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
F	296	GLU	LYS	engineered mutation	UNP P02787
G	206	GLU	LYS	engineered mutation	UNP P02787
G	296	GLU	LYS	engineered mutation	UNP P02787
H	206	GLU	LYS	engineered mutation	UNP P02787
H	296	GLU	LYS	engineered mutation	UNP P02787
I	206	GLU	LYS	engineered mutation	UNP P02787
I	296	GLU	LYS	engineered mutation	UNP P02787

- Molecule 2 is FE (III) ION (CCD ID: FE) (formula: Fe).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	B	1	Total Fe 1 1	0	0
2	A	1	Total Fe 1 1	0	0
2	C	1	Total Fe 1 1	0	0
2	D	1	Total Fe 1 1	0	0
2	E	1	Total Fe 1 1	0	0
2	F	1	Total Fe 1 1	0	0
2	G	1	Total Fe 1 1	0	0
2	H	1	Total Fe 1 1	0	0
2	I	1	Total Fe 1 1	0	0

- Molecule 3 is CARBONATE ION (CCD ID: CO3) (formula: CO₃).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	B	1	Total	C	O	0	0
			4	1	3		
3	A	1	Total	C	O	0	0
			4	1	3		
3	C	1	Total	C	O	0	0
			4	1	3		
3	D	1	Total	C	O	0	0
			4	1	3		
3	E	1	Total	C	O	0	0
			4	1	3		
3	F	1	Total	C	O	0	0
			4	1	3		
3	G	1	Total	C	O	0	0
			4	1	3		
3	H	1	Total	C	O	0	0
			4	1	3		
3	I	1	Total	C	O	0	0
			4	1	3		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	10	Total	O	0	0
			10	10		
4	A	9	Total	O	0	0
			9	9		
4	C	8	Total	O	0	0
			8	8		

Continued on next page...

Continued from previous page...

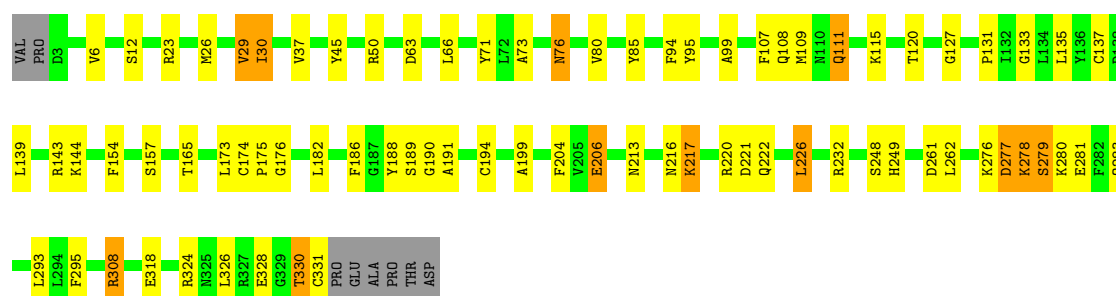
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	D	10	Total 10	O 10	0	0
4	E	10	Total 10	O 10	0	0
4	F	10	Total 10	O 10	0	0
4	G	2	Total 2	O 2	0	0
4	H	8	Total 8	O 8	0	0
4	I	5	Total 5	O 5	0	0

3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

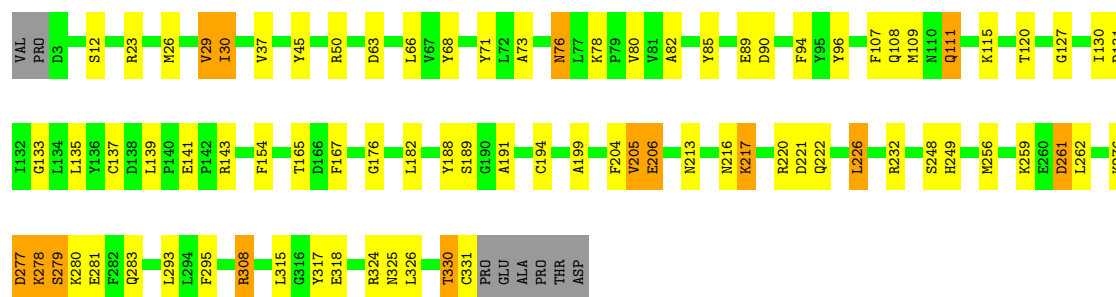
• Molecule 1: Serotransferrin

Chain B: 



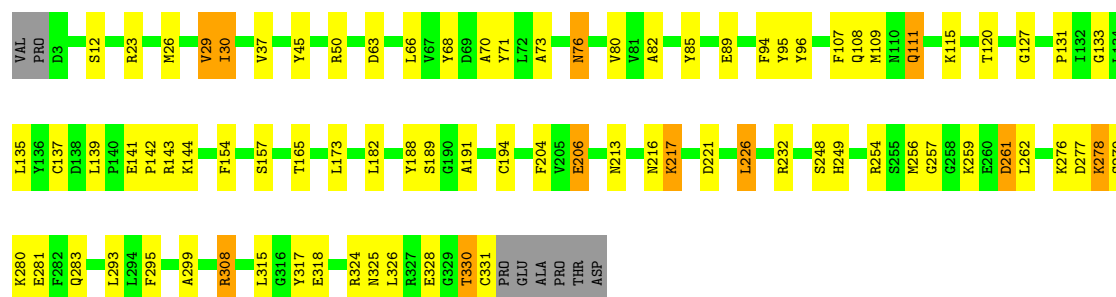
• Molecule 1: Serotransferrin

Chain A: 


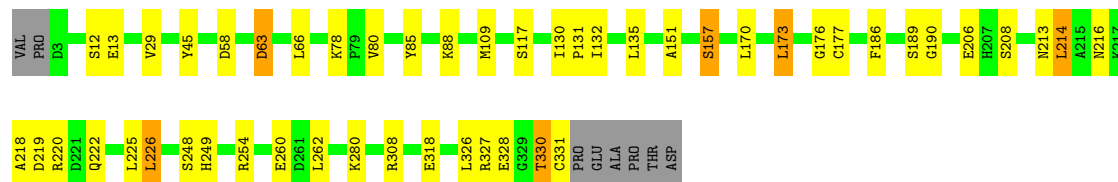


• Molecule 1: Serotransferrin


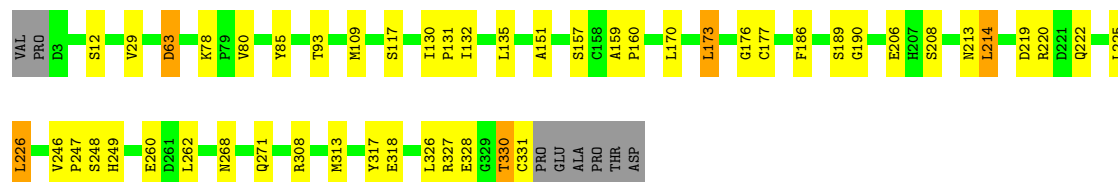
Chain C: 




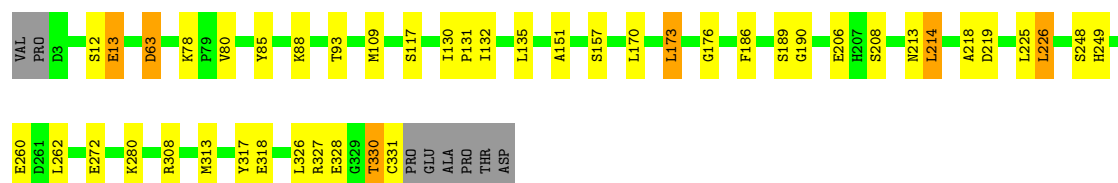
• Molecule 1: Serotransferrin

Chain D:  83% 13% ..


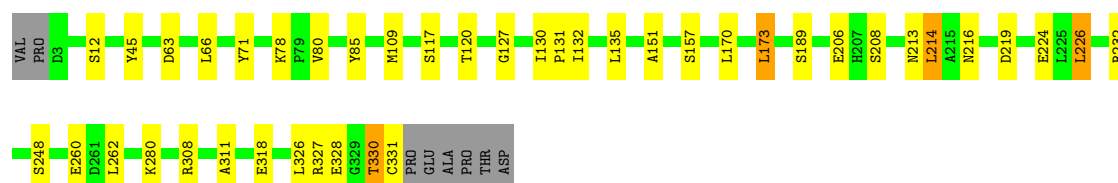
• Molecule 1: Serotransferrin

Chain E:  83% 13% ..


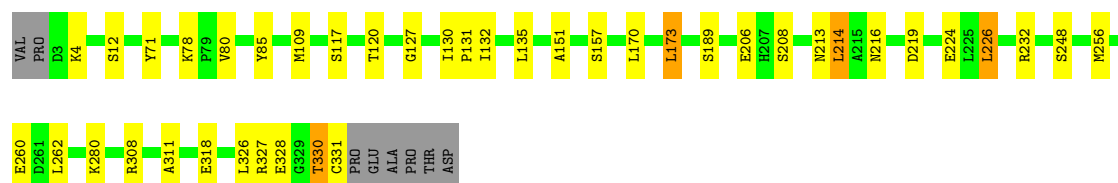
• Molecule 1: Serotransferrin

Chain F:  84% 12% ..

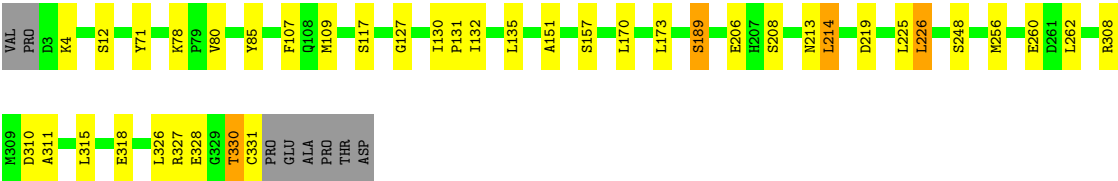
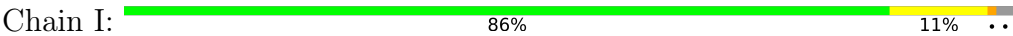
• Molecule 1: Serotransferrin

Chain G:  85% 11% ..

• Molecule 1: Serotransferrin

Chain H:  85% 11% ..

● Molecule 1: Sero transferrin



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	169.46Å 97.90Å 208.95Å 90.00° 90.01° 90.00°	Depositor
Resolution (Å)	29.76 – 2.80 29.76 – 2.80	Depositor EDS
% Data completeness (in resolution range)	97.3 (29.76-2.80) 97.2 (29.76-2.80)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.58 (at 2.80Å)	Xtriage
Refinement program	REFMAC	Depositor
R, R_{free}	0.230 , 0.259 0.224 , 0.224	Depositor DCC
R_{free} test set	4162 reflections (4.93%)	wwPDB-VP
Wilson B-factor (Å ²)	53.2	Xtriage
Anisotropy	0.141	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.25 , 26.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	0.036 for -1/2*h+3/2*k,1/2*h+1/2*k,-l 0.036 for -1/2*h-3/2*k,-1/2*h+1/2*k,-l 0.440 for 1/2*h+3/2*k,1/2*h-1/2*k,-l 0.439 for 1/2*h-3/2*k,-1/2*h-1/2*k,-l 0.032 for -h,-k,l	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	23067	wwPDB-VP
Average B, all atoms (Å ²)	57.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.02% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: FE, CO3

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	0.72	0/2611	1.02	9/3532 (0.3%)
1	B	0.72	0/2611	0.99	3/3532 (0.1%)
1	C	0.72	0/2611	0.99	3/3532 (0.1%)
1	D	0.66	0/2611	0.93	1/3532 (0.0%)
1	E	0.65	0/2611	0.92	0/3532
1	F	0.67	0/2611	0.93	1/3532 (0.0%)
1	G	0.61	0/2611	0.90	1/3532 (0.0%)
1	H	0.60	0/2611	0.91	1/3532 (0.0%)
1	I	0.59	0/2611	0.90	1/3532 (0.0%)
All	All	0.66	0/23499	0.94	20/31788 (0.1%)

There are no bond length outliers.

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	206	GLU	CA-CB-CG	6.70	127.50	114.10
1	A	205	VAL	CB-CA-C	5.96	121.06	111.29
1	I	107	PHE	N-CA-C	5.66	117.84	110.43
1	A	206	GLU	CB-CG-CD	5.56	122.05	112.60
1	A	139	LEU	CA-C-N	-5.47	114.08	119.99
1	A	139	LEU	C-N-CA	-5.47	114.08	119.99
1	D	216	ASN	N-CA-C	5.33	117.42	108.73
1	C	70	ALA	N-CA-C	5.21	117.71	111.71
1	A	78	LYS	CA-C-N	-5.14	114.62	119.76
1	A	78	LYS	C-N-CA	-5.14	114.62	119.76
1	B	139	LEU	CA-C-N	-5.13	114.44	119.99
1	B	139	LEU	C-N-CA	-5.13	114.44	119.99
1	C	139	LEU	CA-C-N	-5.13	114.45	119.99
1	C	139	LEU	C-N-CA	-5.13	114.45	119.99
1	B	6	VAL	CB-CA-C	-5.13	104.76	110.96

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	G	216	ASN	N-CA-C	5.11	117.06	108.73
1	F	13	GLU	N-CA-C	5.10	116.84	111.28
1	A	167	PHE	CA-C-N	5.02	124.63	119.56
1	A	167	PHE	C-N-CA	5.02	124.63	119.56
1	H	216	ASN	N-CA-C	5.00	116.89	108.73

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	2550	0	2453	70	1
1	B	2550	0	2453	51	0
1	C	2550	0	2453	73	0
1	D	2550	0	2453	32	0
1	E	2550	0	2453	34	0
1	F	2550	0	2453	34	1
1	G	2550	0	2453	24	0
1	H	2550	0	2453	37	0
1	I	2550	0	2453	34	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
2	E	1	0	0	0	0
2	F	1	0	0	0	0
2	G	1	0	0	0	0
2	H	1	0	0	0	0
2	I	1	0	0	0	0
3	A	4	0	0	0	0
3	B	4	0	0	0	0
3	C	4	0	0	0	0
3	D	4	0	0	0	0
3	E	4	0	0	0	0
3	F	4	0	0	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	G	4	0	0	0	0
3	H	4	0	0	0	0
3	I	4	0	0	1	0
4	A	9	0	0	0	0
4	B	10	0	0	0	0
4	C	8	0	0	0	0
4	D	10	0	0	1	0
4	E	10	0	0	0	0
4	F	10	0	0	1	0
4	G	2	0	0	0	0
4	H	8	0	0	0	0
4	I	5	0	0	0	0
All	All	23067	0	22077	333	1

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 (333) 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:D:218:ALA:CB	1:F:218:ALA:HB2	1.93	0.98
1:D:218:ALA:HB2	1:F:218:ALA:CB	1.95	0.96
1:D:218:ALA:HB2	1:F:218:ALA:HB1	1.49	0.92
1:D:218:ALA:HB1	1:F:218:ALA:HB2	1.51	0.92
1:D:218:ALA:CB	1:F:218:ALA:CB	2.48	0.89
1:A:82:ALA:HB3	1:I:256:MET:HE1	1.54	0.87
1:C:82:ALA:HB3	1:H:256:MET:HE1	1.58	0.85
1:A:108:GLN:HE22	1:A:232:ARG:HG3	1.41	0.83
1:A:82:ALA:HB3	1:I:256:MET:CE	2.10	0.81
1:A:109:MET:HE2	1:A:226:LEU:HB3	1.63	0.81
1:B:109:MET:HE2	1:B:226:LEU:HB3	1.64	0.79
1:B:108:GLN:HE22	1:B:232:ARG:HG3	1.48	0.79
1:C:109:MET:HE2	1:C:226:LEU:HB3	1.65	0.79
1:C:108:GLN:HE22	1:C:232:ARG:HG3	1.48	0.78
1:C:82:ALA:HB3	1:H:256:MET:CE	2.14	0.76
1:B:308:ARG:HH11	1:B:308:ARG:HG2	1.51	0.74
1:C:142:PRO:HD3	1:E:330:THR:HB	1.68	0.74
1:C:308:ARG:HG2	1:C:308:ARG:HH11	1.52	0.73
1:A:308:ARG:HG2	1:A:308:ARG:HH11	1.54	0.72
1:I:308:ARG:O	1:I:308:ARG:HG2	1.90	0.72
1:C:94:PHE:HZ	1:H:308:ARG:HB2	1.54	0.71

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:330:THR:HG22	1:B:331:CYS:H	1.56	0.71
1:C:94:PHE:CZ	1:H:308:ARG:HB2	2.26	0.71
1:G:308:ARG:O	1:G:308:ARG:HG2	1.91	0.70
1:H:330:THR:HG22	1:H:331:CYS:H	1.57	0.70
1:A:94:PHE:HZ	1:I:308:ARG:HB2	1.57	0.70
1:H:308:ARG:O	1:H:308:ARG:HG2	1.91	0.69
1:A:107:PHE:HB3	1:A:115:LYS:HE3	1.75	0.69
1:C:330:THR:HG22	1:C:331:CYS:H	1.58	0.69
1:I:330:THR:HG22	1:I:331:CYS:H	1.57	0.69
1:A:330:THR:HG22	1:A:331:CYS:H	1.58	0.69
1:C:107:PHE:HB3	1:C:115:LYS:HE3	1.75	0.68
1:G:330:THR:HG22	1:G:331:CYS:H	1.58	0.68
1:B:107:PHE:HB3	1:B:115:LYS:HE3	1.76	0.68
1:A:94:PHE:CZ	1:I:308:ARG:HB2	2.29	0.67
1:F:214:LEU:HD11	1:F:219:ASP:HB2	1.75	0.67
1:C:63:ASP:HA	1:C:249:HIS:CD2	2.30	0.66
1:C:94:PHE:CZ	1:H:308:ARG:HG3	2.30	0.66
1:D:214:LEU:HD11	1:D:219:ASP:HB2	1.77	0.65
1:B:308:ARG:HG2	1:B:308:ARG:O	1.96	0.65
1:G:326:LEU:O	1:G:326:LEU:HG	1.96	0.65
1:H:326:LEU:HG	1:H:326:LEU:O	1.96	0.65
1:I:326:LEU:O	1:I:326:LEU:HG	1.96	0.65
1:E:214:LEU:HD11	1:E:219:ASP:HB2	1.78	0.64
1:E:308:ARG:HG2	1:E:308:ARG:O	1.96	0.64
1:H:214:LEU:HD11	1:H:219:ASP:HB2	1.79	0.64
1:A:308:ARG:HG2	1:A:308:ARG:O	1.97	0.64
1:A:23:ARG:HA	1:A:37:VAL:CG1	2.29	0.63
1:B:63:ASP:HA	1:B:249:HIS:CD2	2.34	0.63
1:F:308:ARG:O	1:F:308:ARG:HG2	1.97	0.63
1:C:94:PHE:HZ	1:H:308:ARG:CG	2.12	0.62
1:C:308:ARG:HG2	1:C:308:ARG:O	1.99	0.62
1:A:96:TYR:OH	1:I:308:ARG:HD2	1.99	0.62
1:C:96:TYR:OH	1:H:308:ARG:HD2	2.00	0.62
1:C:141:GLU:O	1:E:330:THR:CB	2.48	0.62
1:D:326:LEU:O	1:D:326:LEU:HG	2.00	0.62
1:I:214:LEU:HD11	1:I:219:ASP:HB2	1.82	0.62
1:A:82:ALA:CB	1:I:256:MET:CE	2.76	0.62
1:C:94:PHE:HZ	1:H:308:ARG:CB	2.13	0.62
1:C:23:ARG:HA	1:C:37:VAL:CG1	2.30	0.62
1:F:151:ALA:HB2	1:F:170:LEU:HG	1.81	0.62
1:A:89:GLU:O	1:I:71:TYR:OH	2.18	0.61

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:130:ILE:HB	1:E:131:PRO:HD3	1.82	0.61
1:B:23:ARG:HA	1:B:37:VAL:CG1	2.30	0.61
1:F:130:ILE:HB	1:F:131:PRO:HD3	1.81	0.61
1:D:130:ILE:HB	1:D:131:PRO:HD3	1.82	0.61
1:A:189:SER:HB2	1:A:213:ASN:OD1	2.01	0.61
1:C:82:ALA:CB	1:H:256:MET:CE	2.79	0.61
1:A:94:PHE:CZ	1:I:308:ARG:HG3	2.35	0.61
1:A:63:ASP:HA	1:A:249:HIS:CD2	2.36	0.60
1:E:151:ALA:HB2	1:E:170:LEU:HG	1.83	0.60
1:F:326:LEU:HG	1:F:326:LEU:O	2.01	0.60
1:B:217:LYS:HE3	1:B:221:ASP:OD1	2.02	0.60
1:C:142:PRO:CD	1:E:330:THR:HB	2.31	0.59
1:C:189:SER:HB2	1:C:213:ASN:OD1	2.01	0.59
1:B:308:ARG:HH11	1:B:308:ARG:CG	2.16	0.59
1:A:82:ALA:CB	1:I:256:MET:HE2	2.32	0.59
1:A:217:LYS:HE3	1:A:221:ASP:OD1	2.02	0.59
1:E:326:LEU:O	1:E:326:LEU:HG	2.02	0.59
1:F:206:GLU:OE1	4:F:604:HOH:O	2.17	0.59
1:D:308:ARG:O	1:D:308:ARG:HG2	2.02	0.59
1:A:259:LYS:NZ	1:E:313:MET:HE2	2.17	0.59
1:G:214:LEU:HD11	1:G:219:ASP:HB2	1.84	0.59
1:E:330:THR:HG22	1:E:331:CYS:H	1.68	0.58
1:A:109:MET:CE	1:A:226:LEU:HB3	2.32	0.58
1:D:330:THR:HG22	1:D:331:CYS:H	1.68	0.58
1:B:45:TYR:CD2	1:B:66:LEU:HD13	2.38	0.58
1:C:308:ARG:HH11	1:C:308:ARG:CG	2.15	0.58
1:A:50:ARG:HG3	1:A:50:ARG:HH11	1.69	0.58
1:A:94:PHE:HZ	1:I:308:ARG:CB	2.17	0.58
1:B:189:SER:HB2	1:B:213:ASN:OD1	2.04	0.58
1:C:141:GLU:O	1:E:330:THR:OG1	2.22	0.57
1:D:151:ALA:HB2	1:D:170:LEU:HG	1.85	0.57
1:A:94:PHE:HZ	1:I:308:ARG:CG	2.17	0.57
1:C:259:LYS:NZ	1:F:313:MET:HE2	2.18	0.57
1:A:308:ARG:HH11	1:A:308:ARG:CG	2.17	0.57
1:F:330:THR:HG22	1:F:331:CYS:H	1.69	0.57
1:C:217:LYS:HE3	1:C:221:ASP:OD1	2.04	0.57
1:C:85:TYR:CE2	1:C:248:SER:HB3	2.40	0.57
1:C:94:PHE:HZ	1:H:308:ARG:HG3	1.66	0.57
1:I:151:ALA:HB2	1:I:170:LEU:HG	1.85	0.57
1:A:85:TYR:CE2	1:A:248:SER:HB3	2.40	0.56
1:C:82:ALA:CB	1:H:256:MET:HE2	2.36	0.56

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:I:130:ILE:HB	1:I:131:PRO:HD3	1.87	0.56
1:A:94:PHE:HZ	1:I:308:ARG:HG3	1.70	0.56
1:C:89:GLU:O	1:H:71:TYR:OH	2.22	0.56
1:B:95:TYR:CD2	1:B:206:GLU:HG3	2.41	0.56
1:C:95:TYR:CD2	1:C:206:GLU:HG3	2.40	0.56
1:G:130:ILE:HB	1:G:131:PRO:HD3	1.88	0.56
1:H:151:ALA:HB2	1:H:170:LEU:HG	1.88	0.56
1:E:326:LEU:O	1:E:327:ARG:HG3	2.06	0.56
1:C:45:TYR:CD2	1:C:66:LEU:HD13	2.41	0.55
1:C:120:THR:HG22	1:C:188:TYR:HA	1.89	0.55
1:H:130:ILE:HB	1:H:131:PRO:HD3	1.89	0.55
1:G:151:ALA:HB2	1:G:170:LEU:HG	1.88	0.55
1:C:308:ARG:O	1:C:308:ARG:NH1	2.40	0.55
1:B:120:THR:HG22	1:B:188:TYR:HA	1.87	0.55
1:C:141:GLU:O	1:E:330:THR:HB	2.06	0.55
1:A:50:ARG:HG3	1:A:50:ARG:NH1	2.21	0.54
1:A:317:TYR:CE2	1:I:4:LYS:HE2	2.42	0.54
1:D:206:GLU:OE1	4:D:607:HOH:O	2.18	0.54
1:B:50:ARG:HG3	1:B:50:ARG:HH11	1.72	0.54
1:A:120:THR:HG22	1:A:188:TYR:HA	1.88	0.54
1:C:109:MET:CE	1:C:226:LEU:HB3	2.37	0.54
1:B:308:ARG:O	1:B:308:ARG:NH1	2.40	0.54
1:F:63:ASP:HA	1:F:249:HIS:CD2	2.43	0.54
1:B:109:MET:CE	1:B:226:LEU:HB3	2.35	0.54
1:C:26:MET:O	1:C:30:ILE:HB	2.07	0.54
1:D:326:LEU:O	1:D:327:ARG:HG3	2.07	0.54
1:A:191:ALA:O	1:A:194:CYS:HB3	2.08	0.54
1:C:259:LYS:HZ1	1:F:313:MET:HE2	1.73	0.53
1:B:29:VAL:HG12	1:B:30:ILE:HD12	1.89	0.53
1:C:29:VAL:HG12	1:C:30:ILE:HD12	1.90	0.53
1:I:109:MET:HE2	1:I:226:LEU:HB3	1.89	0.53
1:A:45:TYR:CD2	1:A:66:LEU:HD13	2.44	0.53
1:C:23:ARG:HA	1:C:37:VAL:HG12	1.91	0.52
1:B:26:MET:O	1:B:30:ILE:HB	2.09	0.52
1:F:109:MET:HE2	1:F:226:LEU:HB3	1.91	0.52
1:B:50:ARG:HG3	1:B:50:ARG:NH1	2.23	0.52
1:D:117:SER:OG	1:D:157:SER:HB3	2.08	0.52
1:G:326:LEU:O	1:G:327:ARG:HG3	2.10	0.52
1:I:326:LEU:O	1:I:327:ARG:HG3	2.09	0.52
1:C:191:ALA:O	1:C:194:CYS:HB3	2.10	0.52
1:H:109:MET:HE2	1:H:226:LEU:HB3	1.92	0.52

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:I:85:TYR:HE2	1:I:248:SER:HB3	1.74	0.52
1:E:85:TYR:HE2	1:E:248:SER:HB3	1.74	0.52
1:D:109:MET:HE2	1:D:226:LEU:HB3	1.92	0.52
1:E:109:MET:HE2	1:E:226:LEU:HB3	1.92	0.51
1:E:63:ASP:HA	1:E:249:HIS:CD2	2.44	0.51
1:B:191:ALA:O	1:B:194:CYS:HB3	2.11	0.51
1:H:326:LEU:O	1:H:327:ARG:HG3	2.11	0.51
1:A:23:ARG:HA	1:A:37:VAL:HG12	1.90	0.51
1:D:189:SER:HB2	1:D:213:ASN:OD1	2.11	0.51
1:H:85:TYR:HE2	1:H:248:SER:HB3	1.75	0.51
1:A:29:VAL:HG12	1:A:30:ILE:HD12	1.92	0.51
1:C:50:ARG:HG3	1:C:50:ARG:HH11	1.76	0.51
1:G:109:MET:HE2	1:G:226:LEU:HB3	1.92	0.51
1:E:189:SER:HB2	1:E:213:ASN:OD1	2.11	0.50
1:B:45:TYR:CE2	1:B:66:LEU:HD13	2.45	0.50
1:B:324:ARG:C	1:B:326:LEU:H	2.19	0.50
1:A:26:MET:O	1:A:30:ILE:HB	2.11	0.50
1:H:206:GLU:HG2	1:H:208:SER:H	1.76	0.50
1:C:326:LEU:HG	1:C:326:LEU:O	2.12	0.50
1:I:206:GLU:HG2	1:I:208:SER:H	1.77	0.50
1:B:23:ARG:HA	1:B:37:VAL:HG12	1.93	0.50
1:F:326:LEU:O	1:F:327:ARG:HG3	2.11	0.50
1:C:317:TYR:CE2	1:H:4:LYS:HE2	2.47	0.49
1:D:85:TYR:HE2	1:D:248:SER:HB3	1.77	0.49
1:E:117:SER:OG	1:E:157:SER:HB3	2.12	0.49
1:A:308:ARG:O	1:A:308:ARG:NH1	2.41	0.49
1:F:117:SER:OG	1:F:157:SER:HB3	2.12	0.49
1:G:85:TYR:HE2	1:G:248:SER:HB3	1.76	0.49
1:F:189:SER:HB2	1:F:213:ASN:OD1	2.13	0.49
1:B:326:LEU:O	1:B:326:LEU:HG	2.13	0.49
1:F:214:LEU:CD1	1:F:219:ASP:HB2	2.42	0.49
1:B:280:LYS:C	1:B:283:GLN:HE22	2.20	0.49
1:I:330:THR:HG22	1:I:331:CYS:N	2.27	0.49
1:C:50:ARG:HG3	1:C:50:ARG:NH1	2.28	0.49
1:F:85:TYR:HE2	1:F:248:SER:HB3	1.78	0.48
1:C:261:ASP:CG	1:F:317:TYR:HB3	2.37	0.48
1:B:137:CYS:O	1:B:143:ARG:NH2	2.46	0.48
1:E:132:ILE:HG22	1:E:326:LEU:HD11	1.95	0.48
1:G:206:GLU:HG2	1:G:208:SER:H	1.78	0.48
1:C:45:TYR:CE2	1:C:66:LEU:HD13	2.48	0.48
1:C:324:ARG:C	1:C:326:LEU:H	2.21	0.48

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:63:ASP:HA	1:D:249:HIS:CD2	2.49	0.48
1:G:71:TYR:HB2	1:G:311:ALA:CB	2.43	0.48
1:H:85:TYR:HE2	1:H:248:SER:CB	2.27	0.48
1:A:108:GLN:NE2	1:A:232:ARG:HG3	2.21	0.48
1:E:214:LEU:CD1	1:E:219:ASP:HB2	2.43	0.48
1:A:107:PHE:CB	1:A:115:LYS:HE3	2.43	0.47
1:C:94:PHE:C	1:C:94:PHE:CD2	2.92	0.47
1:H:330:THR:HG22	1:H:331:CYS:N	2.26	0.47
1:B:85:TYR:CE2	1:B:248:SER:HB3	2.48	0.47
1:B:115:LYS:O	1:B:154:PHE:HB3	2.15	0.47
1:A:261:ASP:CG	1:E:317:TYR:HB3	2.39	0.47
1:A:326:LEU:HG	1:A:326:LEU:O	2.13	0.47
1:D:206:GLU:HG2	1:D:208:SER:H	1.80	0.47
1:H:78:LYS:HA	1:H:78:LYS:HD3	1.73	0.47
1:B:220:ARG:C	1:B:222:GLN:H	2.23	0.47
1:A:280:LYS:C	1:A:283:GLN:HE22	2.23	0.47
1:A:324:ARG:C	1:A:326:LEU:H	2.22	0.47
1:C:107:PHE:CB	1:C:115:LYS:HE3	2.43	0.47
1:D:78:LYS:HA	1:D:78:LYS:HD3	1.72	0.47
1:G:78:LYS:HA	1:G:78:LYS:HD3	1.73	0.47
1:A:85:TYR:HE2	1:A:248:SER:HB3	1.80	0.47
1:H:214:LEU:CD1	1:H:219:ASP:HB2	2.45	0.47
1:C:133:GLY:HA2	1:C:326:LEU:HD13	1.96	0.46
1:C:137:CYS:O	1:C:143:ARG:NH2	2.47	0.46
1:E:186:PHE:O	1:E:190:GLY:HA3	2.15	0.46
1:B:199:ALA:HA	1:F:13:GLU:HG3	1.96	0.46
1:C:73:ALA:HA	1:C:76:ASN:OD1	2.16	0.46
1:D:214:LEU:CD1	1:D:219:ASP:HB2	2.42	0.46
1:A:259:LYS:HZ1	1:E:313:MET:HE2	1.79	0.46
1:I:71:TYR:HB2	1:I:311:ALA:CB	2.45	0.46
1:B:107:PHE:CB	1:B:115:LYS:HE3	2.43	0.46
1:C:280:LYS:C	1:C:283:GLN:HE22	2.23	0.46
1:A:256:MET:HE2	1:E:93:THR:HG21	1.97	0.46
1:C:261:ASP:CG	1:F:317:TYR:CB	2.89	0.46
1:G:224:GLU:OE2	1:G:232:ARG:HD3	2.15	0.46
1:C:276:LYS:NZ	1:C:299:ALA:O	2.45	0.45
1:B:108:GLN:H	1:B:111:GLN:HG3	1.81	0.45
1:G:132:ILE:HG22	1:G:326:LEU:HD11	1.98	0.45
1:H:71:TYR:HB2	1:H:311:ALA:CB	2.46	0.45
1:B:157:SER:HA	1:B:173:LEU:HD22	1.99	0.45
1:A:176:GLY:HA3	1:D:176:GLY:HA3	1.98	0.45

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:78:LYS:HA	1:E:78:LYS:HD3	1.71	0.45
1:I:189:SER:HB2	1:I:213:ASN:OD1	2.16	0.45
1:A:115:LYS:O	1:A:154:PHE:HB3	2.16	0.45
1:A:133:GLY:HA2	1:A:326:LEU:HD13	1.98	0.45
1:E:268:ASN:O	1:E:271:GLN:HB3	2.16	0.45
1:F:206:GLU:HG2	1:F:208:SER:H	1.80	0.45
1:A:120:THR:OG1	1:A:127:GLY:HA3	2.17	0.45
1:E:206:GLU:HG2	1:E:208:SER:H	1.82	0.45
1:I:85:TYR:HE2	1:I:248:SER:CB	2.30	0.45
1:B:133:GLY:HA2	1:B:326:LEU:HD13	1.99	0.45
1:G:117:SER:OG	1:G:157:SER:HB3	2.16	0.45
1:I:78:LYS:HA	1:I:78:LYS:HD3	1.75	0.45
1:C:68:TYR:HB2	1:C:315:LEU:HD11	1.99	0.44
1:F:157:SER:HA	1:F:173:LEU:HD22	1.99	0.44
1:A:293:LEU:C	1:A:295:PHE:H	2.25	0.44
1:G:189:SER:HB2	1:G:213:ASN:OD1	2.17	0.44
1:G:214:LEU:CD1	1:G:219:ASP:HB2	2.48	0.44
1:C:94:PHE:CZ	1:H:308:ARG:CB	2.94	0.44
1:C:256:MET:HE2	1:F:93:THR:HG21	1.99	0.44
1:F:186:PHE:O	1:F:190:GLY:HA3	2.18	0.44
1:I:132:ILE:HG22	1:I:326:LEU:HD11	1.98	0.44
1:C:330:THR:HG22	1:C:331:CYS:N	2.29	0.44
1:G:85:TYR:HE2	1:G:248:SER:CB	2.31	0.44
1:A:137:CYS:O	1:A:143:ARG:NH2	2.50	0.44
1:I:214:LEU:CD1	1:I:219:ASP:HB2	2.47	0.44
1:A:199:ALA:HA	1:D:13:GLU:HG3	1.99	0.44
1:C:293:LEU:C	1:C:295:PHE:H	2.26	0.44
1:B:276:LYS:O	1:B:278:LYS:HD2	2.17	0.44
1:A:108:GLN:H	1:A:111:GLN:HG3	1.83	0.44
1:E:176:GLY:O	1:E:177:CYS:C	2.61	0.44
1:B:293:LEU:C	1:B:295:PHE:H	2.25	0.44
1:G:330:THR:HG22	1:G:331:CYS:N	2.28	0.44
1:A:68:TYR:HB2	1:A:315:LEU:HD11	2.00	0.43
1:D:157:SER:HA	1:D:173:LEU:HD22	2.00	0.43
1:B:94:PHE:CD2	1:B:94:PHE:C	2.96	0.43
1:A:89:GLU:HG2	1:F:272:GLU:OE1	2.18	0.43
1:A:220:ARG:C	1:A:222:GLN:H	2.25	0.43
1:F:132:ILE:HG22	1:F:326:LEU:HD11	1.99	0.43
1:A:131:PRO:HB3	1:A:204:PHE:CD1	2.53	0.43
1:C:115:LYS:O	1:C:154:PHE:HB3	2.17	0.43
1:B:131:PRO:HB3	1:B:204:PHE:CD1	2.54	0.43

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:73:ALA:HA	1:A:76:ASN:OD1	2.19	0.43
1:C:108:GLN:H	1:C:111:GLN:HG3	1.84	0.43
1:C:120:THR:OG1	1:C:127:GLY:HA3	2.19	0.43
1:F:78:LYS:HA	1:F:78:LYS:HD3	1.73	0.43
1:F:280:LYS:HA	1:F:280:LYS:HD3	1.80	0.43
1:H:117:SER:OG	1:H:157:SER:HB3	2.18	0.43
1:C:76:ASN:OD1	1:C:76:ASN:N	2.49	0.43
1:C:85:TYR:HE2	1:C:248:SER:HB3	1.84	0.43
1:I:117:SER:OG	1:I:157:SER:HB3	2.18	0.43
1:B:324:ARG:C	1:B:326:LEU:N	2.76	0.43
1:G:157:SER:HA	1:G:173:LEU:HD22	2.00	0.43
1:A:45:TYR:CE2	1:A:66:LEU:HD13	2.53	0.43
1:A:261:ASP:CG	1:E:317:TYR:CB	2.92	0.43
1:H:189:SER:HB2	1:H:213:ASN:OD1	2.18	0.43
1:C:131:PRO:HB3	1:C:204:PHE:CD1	2.53	0.43
1:E:220:ARG:C	1:E:222:GLN:H	2.27	0.43
1:G:330:THR:CG2	1:G:331:CYS:H	2.26	0.43
1:H:132:ILE:HG22	1:H:326:LEU:HD11	2.01	0.43
1:B:220:ARG:C	1:B:222:GLN:N	2.77	0.42
1:A:94:PHE:CD2	1:A:94:PHE:C	2.97	0.42
1:B:73:ALA:HA	1:B:76:ASN:OD1	2.19	0.42
1:A:276:LYS:O	1:A:278:LYS:HD2	2.19	0.42
1:D:58:ASP:OD1	1:D:254:ARG:NH2	2.53	0.42
1:D:132:ILE:HG22	1:D:326:LEU:HD11	2.00	0.42
1:H:120:THR:OG1	1:H:127:GLY:HA3	2.19	0.42
1:A:277:ASP:OD2	1:F:88:LYS:HG3	2.19	0.42
1:B:330:THR:HG22	1:B:331:CYS:N	2.27	0.42
1:D:176:GLY:O	1:D:177:CYS:C	2.63	0.42
1:H:224:GLU:OE2	1:H:232:ARG:HD3	2.20	0.42
1:B:186:PHE:O	1:B:190:GLY:HA3	2.20	0.42
1:C:63:ASP:HA	1:C:249:HIS:CG	2.55	0.42
1:C:82:ALA:CB	1:H:256:MET:HE1	2.38	0.42
1:E:157:SER:HA	1:E:173:LEU:HD22	2.01	0.42
1:B:120:THR:OG1	1:B:127:GLY:HA3	2.20	0.42
1:B:176:GLY:HA3	1:F:176:GLY:HA3	2.01	0.41
1:A:130:ILE:HB	1:A:131:PRO:CD	2.49	0.41
1:A:330:THR:HG22	1:A:331:CYS:N	2.30	0.41
1:C:324:ARG:C	1:C:326:LEU:N	2.78	0.41
1:G:45:TYR:CZ	1:G:66:LEU:HD22	2.55	0.41
1:B:144:LYS:NZ	1:B:328:GLU:OE2	2.53	0.41
1:G:120:THR:OG1	1:G:127:GLY:HA3	2.20	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:76:ASN:OD1	1:A:76:ASN:N	2.53	0.41
1:H:157:SER:HA	1:H:173:LEU:HD22	2.01	0.41
1:I:127:GLY:N	3:I:600:CO3:O1	2.51	0.41
1:C:276:LYS:O	1:C:278:LYS:HD2	2.20	0.41
1:G:280:LYS:HA	1:G:280:LYS:HD3	1.85	0.41
1:C:144:LYS:NZ	1:C:328:GLU:OE2	2.52	0.41
1:B:279:SER:O	1:B:283:GLN:NE2	2.54	0.41
1:A:324:ARG:C	1:A:326:LEU:N	2.78	0.41
1:D:45:TYR:CZ	1:D:66:LEU:HD22	2.56	0.41
1:D:280:LYS:HD3	1:D:280:LYS:HA	1.80	0.41
1:E:246:VAL:HA	1:E:247:PRO:HD3	1.95	0.41
1:H:280:LYS:HD3	1:H:280:LYS:HA	1.85	0.41
1:D:186:PHE:O	1:D:190:GLY:HA3	2.21	0.41
1:A:220:ARG:C	1:A:222:GLN:N	2.79	0.40
1:D:220:ARG:C	1:D:222:GLN:H	2.29	0.40
1:B:174:CYS:O	1:B:175:PRO:C	2.64	0.40
1:A:279:SER:O	1:A:283:GLN:NE2	2.54	0.40
1:C:254:ARG:NH1	1:C:257:GLY:O	2.54	0.40
1:B:99:ALA:HB3	1:B:226:LEU:HB2	2.02	0.40
1:C:157:SER:HA	1:C:173:LEU:HD22	2.02	0.40
1:E:63:ASP:HB2	1:E:249:HIS:CE1	2.57	0.40
1:A:90:ASP:OD1	1:I:310:ASP:CB	2.69	0.40
1:B:277:ASP:OD2	1:D:88:LYS:HG3	2.22	0.40
1:E:159:ALA:O	1:E:160:PRO:C	2.65	0.40
1:I:311:ALA:O	1:I:315:LEU:HG	2.22	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:141:GLU:O	1:F:330:THR:OG1[3_455]	2.19	0.01

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	327/337 (97%)	289 (88%)	33 (10%)	5 (2%)	8	28
1	B	327/337 (97%)	288 (88%)	35 (11%)	4 (1%)	10	34
1	C	327/337 (97%)	289 (88%)	33 (10%)	5 (2%)	8	28
1	D	327/337 (97%)	302 (92%)	25 (8%)	0	100	100
1	E	327/337 (97%)	302 (92%)	25 (8%)	0	100	100
1	F	327/337 (97%)	302 (92%)	25 (8%)	0	100	100
1	G	327/337 (97%)	300 (92%)	27 (8%)	0	100	100
1	H	327/337 (97%)	303 (93%)	24 (7%)	0	100	100
1	I	327/337 (97%)	301 (92%)	26 (8%)	0	100	100
All	All	2943/3033 (97%)	2676 (91%)	253 (9%)	14 (0%)	24	55

All (14) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	281	GLU
1	C	281	GLU
1	B	12	SER
1	B	277	ASP
1	B	330	THR
1	A	281	GLU
1	C	12	SER
1	C	277	ASP
1	C	330	THR
1	A	12	SER
1	A	325	ASN
1	A	330	THR
1	A	277	ASP
1	C	325	ASN

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	274/281 (98%)	254 (93%)	20 (7%)	13	38
1	B	274/281 (98%)	255 (93%)	19 (7%)	14	41
1	C	274/281 (98%)	255 (93%)	19 (7%)	14	41
1	D	274/281 (98%)	259 (94%)	15 (6%)	19	51
1	E	274/281 (98%)	260 (95%)	14 (5%)	21	54
1	F	274/281 (98%)	261 (95%)	13 (5%)	23	57
1	G	274/281 (98%)	262 (96%)	12 (4%)	25	59
1	H	274/281 (98%)	263 (96%)	11 (4%)	28	63
1	I	274/281 (98%)	261 (95%)	13 (5%)	23	57
All	All	2466/2529 (98%)	2330 (94%)	136 (6%)	19	51

All (136) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	29	VAL
1	B	30	ILE
1	B	71	TYR
1	B	76	ASN
1	B	80	VAL
1	B	111	GLN
1	B	135	LEU
1	B	165	THR
1	B	182	LEU
1	B	206	GLU
1	B	216	ASN
1	B	217	LYS
1	B	226	LEU
1	B	261	ASP
1	B	262	LEU
1	B	278	LYS
1	B	279	SER
1	B	308	ARG
1	B	318	GLU
1	A	29	VAL
1	A	30	ILE
1	A	71	TYR
1	A	76	ASN
1	A	80	VAL
1	A	111	GLN
1	A	135	LEU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	165	THR
1	A	182	LEU
1	A	205	VAL
1	A	206	GLU
1	A	216	ASN
1	A	217	LYS
1	A	226	LEU
1	A	261	ASP
1	A	262	LEU
1	A	278	LYS
1	A	279	SER
1	A	308	ARG
1	A	318	GLU
1	C	29	VAL
1	C	30	ILE
1	C	71	TYR
1	C	76	ASN
1	C	80	VAL
1	C	111	GLN
1	C	135	LEU
1	C	165	THR
1	C	182	LEU
1	C	206	GLU
1	C	216	ASN
1	C	217	LYS
1	C	226	LEU
1	C	261	ASP
1	C	262	LEU
1	C	278	LYS
1	C	279	SER
1	C	308	ARG
1	C	318	GLU
1	D	12	SER
1	D	29	VAL
1	D	63	ASP
1	D	80	VAL
1	D	135	LEU
1	D	157	SER
1	D	173	LEU
1	D	214	LEU
1	D	225	LEU
1	D	226	LEU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	D	260	GLU
1	D	262	LEU
1	D	318	GLU
1	D	328	GLU
1	D	330	THR
1	E	12	SER
1	E	29	VAL
1	E	63	ASP
1	E	80	VAL
1	E	135	LEU
1	E	173	LEU
1	E	214	LEU
1	E	225	LEU
1	E	226	LEU
1	E	260	GLU
1	E	262	LEU
1	E	318	GLU
1	E	328	GLU
1	E	330	THR
1	F	12	SER
1	F	63	ASP
1	F	80	VAL
1	F	135	LEU
1	F	173	LEU
1	F	214	LEU
1	F	225	LEU
1	F	226	LEU
1	F	260	GLU
1	F	262	LEU
1	F	318	GLU
1	F	328	GLU
1	F	330	THR
1	G	12	SER
1	G	63	ASP
1	G	80	VAL
1	G	135	LEU
1	G	173	LEU
1	G	214	LEU
1	G	226	LEU
1	G	260	GLU
1	G	262	LEU
1	G	318	GLU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	G	328	GLU
1	G	330	THR
1	H	12	SER
1	H	80	VAL
1	H	135	LEU
1	H	173	LEU
1	H	214	LEU
1	H	226	LEU
1	H	260	GLU
1	H	262	LEU
1	H	318	GLU
1	H	328	GLU
1	H	330	THR
1	I	12	SER
1	I	80	VAL
1	I	135	LEU
1	I	173	LEU
1	I	189	SER
1	I	214	LEU
1	I	225	LEU
1	I	226	LEU
1	I	260	GLU
1	I	262	LEU
1	I	318	GLU
1	I	328	GLU
1	I	330	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (33) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	55	ASN
1	B	92	GLN
1	B	108	GLN
1	B	283	GLN
1	B	289	HIS
1	B	325	ASN
1	A	108	GLN
1	A	172	GLN
1	A	283	GLN
1	A	289	HIS
1	A	325	ASN
1	C	108	GLN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	C	283	GLN
1	C	289	HIS
1	C	325	ASN
1	D	20	GLN
1	D	289	HIS
1	E	108	GLN
1	E	289	HIS
1	F	20	GLN
1	F	76	ASN
1	F	108	GLN
1	F	283	GLN
1	F	289	HIS
1	G	76	ASN
1	G	108	GLN
1	G	289	HIS
1	H	76	ASN
1	H	289	HIS
1	I	76	ASN
1	I	108	GLN
1	I	283	GLN
1	I	289	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](#)

Of 18 ligands modelled in this entry, 9 are monoatomic - leaving 9 for Mogul analysis.

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	CO3	E	600	2	3,3,3	0.75	0	2,3,3	0.25	0
3	CO3	F	600	2	3,3,3	0.71	0	2,3,3	0.14	0
3	CO3	A	600	2	3,3,3	0.80	0	2,3,3	0.27	0
3	CO3	C	600	2	3,3,3	0.72	0	2,3,3	0.37	0
3	CO3	B	600	2	3,3,3	0.71	0	2,3,3	0.56	0
3	CO3	D	600	2	3,3,3	0.72	0	2,3,3	0.38	0
3	CO3	H	600	2	3,3,3	0.78	0	2,3,3	0.17	0
3	CO3	I	600	2	3,3,3	0.83	0	2,3,3	0.11	0
3	CO3	G	600	2	3,3,3	0.79	0	2,3,3	0.25	0

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	I	600	CO3	1	0

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 [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	329/337 (97%)	-1.20	0 100 100	48, 57, 64, 69	0
1	B	329/337 (97%)	-1.23	0 100 100	48, 57, 64, 70	0
1	C	329/337 (97%)	-1.25	0 100 100	48, 57, 64, 70	0
1	D	329/337 (97%)	-1.25	0 100 100	47, 57, 64, 70	0
1	E	329/337 (97%)	-1.26	0 100 100	47, 57, 64, 70	0
1	F	329/337 (97%)	-1.27	0 100 100	47, 57, 64, 70	0
1	G	329/337 (97%)	-1.22	0 100 100	47, 57, 64, 70	0
1	H	329/337 (97%)	-1.24	0 100 100	47, 57, 64, 70	0
1	I	329/337 (97%)	-1.25	0 100 100	47, 57, 64, 70	0
All	All	2961/3033 (97%)	-1.24	0 100 100	47, 57, 64, 70	0

There are no RSRZ outliers to report.

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 oligosaccharides 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(\AA^2)	Q<0.9
3	CO3	A	600	4/4	0.98	0.10	43,44,44,44	0
3	CO3	C	600	4/4	0.98	0.05	43,44,44,44	0
3	CO3	D	600	4/4	0.98	0.06	49,49,50,50	0
3	CO3	F	600	4/4	0.98	0.07	49,49,50,50	0
3	CO3	G	600	4/4	0.98	0.05	49,50,50,50	0
3	CO3	H	600	4/4	0.98	0.05	49,49,50,50	0
3	CO3	E	600	4/4	0.99	0.04	49,49,50,50	0
3	CO3	B	600	4/4	0.99	0.04	43,44,44,44	0
3	CO3	I	600	4/4	0.99	0.04	49,49,50,50	0
2	FE	B	500	1/1	1.00	0.03	39,39,39,39	0
2	FE	A	500	1/1	1.00	0.04	39,39,39,39	0
2	FE	C	500	1/1	1.00	0.03	39,39,39,39	0
2	FE	D	500	1/1	1.00	0.04	44,44,44,44	0
2	FE	E	500	1/1	1.00	0.03	43,43,43,43	0
2	FE	F	500	1/1	1.00	0.03	43,43,43,43	0
2	FE	G	500	1/1	1.00	0.04	44,44,44,44	0
2	FE	H	500	1/1	1.00	0.03	44,44,44,44	0
2	FE	I	500	1/1	1.00	0.04	43,43,43,43	0

6.5 Other polymers ⓘ

There are no such residues in this entry.