Full wwPDB X-ray Structure Validation Report (i)

Oct 24, 2023 – 05:51 PM EDT

PDB ID	:	3FPH
Title	:	Crystal Structure of E81Q mutant of MtNAS in complex with L-Glutamate
Authors	:	Dreyfus, C.; Pignol, D.; Arnoux, P.
Deposited on	:	2009-01-05
Resolution	:	1.80 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 (i) 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 (1)) were used in the production of this report:

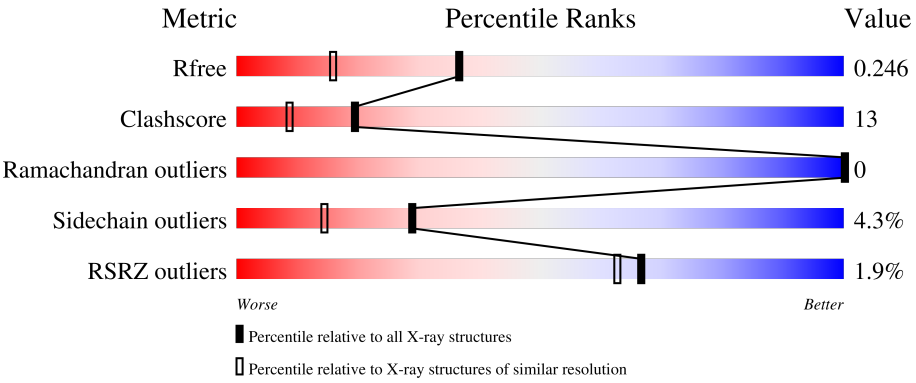
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

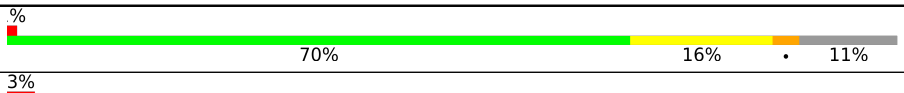
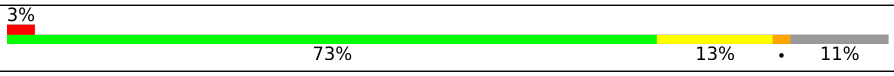
The reported resolution of this entry is 1.80 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	5950 (1.80-1.80)
Clashscore	141614	6793 (1.80-1.80)
Ramachandran outliers	138981	6697 (1.80-1.80)
Sidechain outliers	138945	6696 (1.80-1.80)
RSRZ outliers	127900	5850 (1.80-1.80)

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 <=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	298	
1	B	298	

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 4977 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 Putative uncharacterized protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	264	Total	C	N	O	S	0	0	0
			2111	1347	360	393	11			
1	B	264	Total	C	N	O	S	0	0	0
			2111	1347	360	393	11			

There are 66 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	81	GLN	GLU	engineered mutation	UNP O26771
A	267	LYS	-	expression tag	UNP O26771
A	268	GLY	-	expression tag	UNP O26771
A	269	GLU	-	expression tag	UNP O26771
A	270	LEU	-	expression tag	UNP O26771
A	271	ASN	-	expression tag	UNP O26771
A	272	SER	-	expression tag	UNP O26771
A	273	LYS	-	expression tag	UNP O26771
A	274	LEU	-	expression tag	UNP O26771
A	275	GLU	-	expression tag	UNP O26771
A	276	GLY	-	expression tag	UNP O26771
A	277	LYS	-	expression tag	UNP O26771
A	278	PRO	-	expression tag	UNP O26771
A	279	ILE	-	expression tag	UNP O26771
A	280	PRO	-	expression tag	UNP O26771
A	281	ASN	-	expression tag	UNP O26771
A	282	PRO	-	expression tag	UNP O26771
A	283	LEU	-	expression tag	UNP O26771
A	284	LEU	-	expression tag	UNP O26771
A	285	GLY	-	expression tag	UNP O26771
A	286	LEU	-	expression tag	UNP O26771
A	287	ASP	-	expression tag	UNP O26771
A	288	SER	-	expression tag	UNP O26771
A	289	THR	-	expression tag	UNP O26771
A	290	ARG	-	expression tag	UNP O26771

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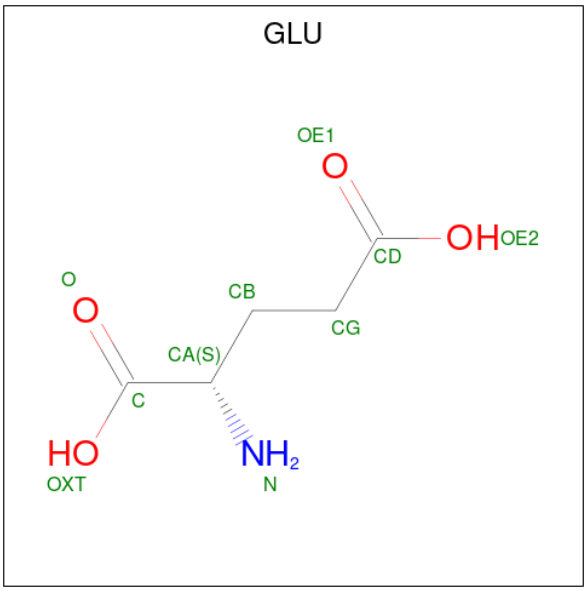
Chain	Residue	Modelled	Actual	Comment	Reference
A	291	THR	-	expression tag	UNP O26771
A	292	GLY	-	expression tag	UNP O26771
A	293	HIS	-	expression tag	UNP O26771
A	294	HIS	-	expression tag	UNP O26771
A	295	HIS	-	expression tag	UNP O26771
A	296	HIS	-	expression tag	UNP O26771
A	297	HIS	-	expression tag	UNP O26771
A	298	HIS	-	expression tag	UNP O26771
B	81	GLN	GLU	engineered mutation	UNP O26771
B	267	LYS	-	expression tag	UNP O26771
B	268	GLY	-	expression tag	UNP O26771
B	269	GLU	-	expression tag	UNP O26771
B	270	LEU	-	expression tag	UNP O26771
B	271	ASN	-	expression tag	UNP O26771
B	272	SER	-	expression tag	UNP O26771
B	273	LYS	-	expression tag	UNP O26771
B	274	LEU	-	expression tag	UNP O26771
B	275	GLU	-	expression tag	UNP O26771
B	276	GLY	-	expression tag	UNP O26771
B	277	LYS	-	expression tag	UNP O26771
B	278	PRO	-	expression tag	UNP O26771
B	279	ILE	-	expression tag	UNP O26771
B	280	PRO	-	expression tag	UNP O26771
B	281	ASN	-	expression tag	UNP O26771
B	282	PRO	-	expression tag	UNP O26771
B	283	LEU	-	expression tag	UNP O26771
B	284	LEU	-	expression tag	UNP O26771
B	285	GLY	-	expression tag	UNP O26771
B	286	LEU	-	expression tag	UNP O26771
B	287	ASP	-	expression tag	UNP O26771
B	288	SER	-	expression tag	UNP O26771
B	289	THR	-	expression tag	UNP O26771
B	290	ARG	-	expression tag	UNP O26771
B	291	THR	-	expression tag	UNP O26771
B	292	GLY	-	expression tag	UNP O26771
B	293	HIS	-	expression tag	UNP O26771
B	294	HIS	-	expression tag	UNP O26771
B	295	HIS	-	expression tag	UNP O26771
B	296	HIS	-	expression tag	UNP O26771
B	297	HIS	-	expression tag	UNP O26771
B	298	HIS	-	expression tag	UNP O26771

- Molecule 2 is GLUTAMIC ACID (three-letter code: GLU) (formula: $C_5H_9NO_4$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C N O 20 10 2 8	0	1
2	B	1	Total C N O 20 10 2 8	0	1

- Molecule 3 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total Na 1 1	0	0
3	B	1	Total Na 1 1	0	0

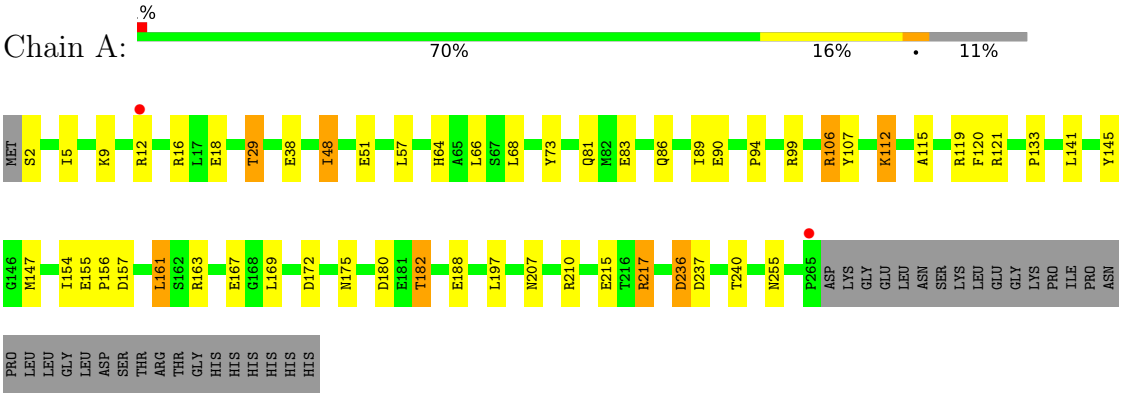
- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	349	Total O 349 349	0	0
4	B	364	Total O 364 364	0	0

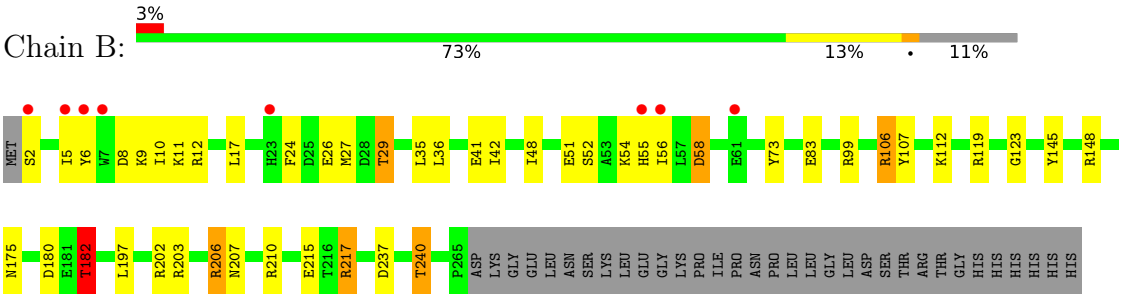
3 Residue-property plots (i)

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: Putative uncharacterized protein



• Molecule 1: Putative uncharacterized protein



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	66.20Å 69.78Å 146.51Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	60.30 – 1.80 60.33 – 1.80	Depositor EDS
% Data completeness (in resolution range)	96.5 (60.30-1.80) 96.5 (60.33-1.80)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	0.07	Depositor
$< I/\sigma(I) >$ [1]	2.14 (at 1.80Å)	Xtriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.191 , 0.246 0.190 , 0.246	Depositor DCC
R_{free} test set	3067 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å^2)	25.5	Xtriage
Anisotropy	0.297	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.37 , 50.2	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	4977	wwPDB-VP
Average B, all atoms (Å^2)	28.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.04% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

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

5 Model quality

5.1 Standard geometry

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

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	0.85	2/2153 (0.1%)	0.84	5/2912 (0.2%)
1	B	0.90	0/2153	0.95	7/2912 (0.2%)
All	All	0.88	2/4306 (0.0%)	0.90	12/5824 (0.2%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	188	GLU	CG-CD	6.14	1.61	1.51
1	A	188	GLU	CD-OE1	5.54	1.31	1.25

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	99	ARG	NE-CZ-NH2	-15.65	112.48	120.30
1	B	217	ARG	NE-CZ-NH2	-13.76	113.42	120.30
1	B	99	ARG	NE-CZ-NH1	13.04	126.82	120.30
1	B	217	ARG	NE-CZ-NH1	11.12	125.86	120.30
1	A	217	ARG	NE-CZ-NH2	-9.78	115.41	120.30
1	A	217	ARG	NE-CZ-NH1	8.68	124.64	120.30
1	A	106	ARG	NE-CZ-NH2	-8.42	116.09	120.30
1	B	106	ARG	NE-CZ-NH2	-7.25	116.68	120.30
1	A	99	ARG	NE-CZ-NH2	-7.05	116.77	120.30
1	A	99	ARG	NE-CZ-NH1	5.94	123.27	120.30
1	B	217	ARG	CD-NE-CZ	5.54	131.35	123.60
1	B	182	THR	N-CA-CB	-5.27	100.29	110.30

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	2111	0	2108	56	0
1	B	2111	0	2108	51	4
2	A	20	0	10	3	0
2	B	20	0	10	3	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
4	A	349	0	0	20	5
4	B	364	0	0	21	1
All	All	4977	0	4236	109	5

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 13.

All (109) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:112:LYS:HZ3	1:A:112:LYS:CB	1.01	1.44
1:A:175:ASN:HB2	4:A:709:HOH:O	1.15	1.25
1:A:147:MET:SD	4:A:721:HOH:O	1.93	1.23
1:A:157:ASP:HB2	4:A:522:HOH:O	1.49	1.11
1:B:217:ARG:HD3	4:B:343:HOH:O	1.53	1.09
1:A:112:LYS:NZ	1:A:112:LYS:HB3	1.09	1.08
1:A:236:ASP:HB3	4:A:387:HOH:O	1.52	1.06
1:B:36:LEU:HD11	1:B:73:TYR:HE1	1.16	1.05
1:A:237:ASP:O	1:A:240:THR:HG23	1.62	0.99
1:A:90:GLU:HG3	4:A:442:HOH:O	1.62	0.99
1:B:26:GLU:HG3	4:B:696:HOH:O	1.65	0.95
1:B:106:ARG:HG3	4:B:303:HOH:O	1.66	0.94
1:A:141:LEU:HD22	1:A:147:MET:HE3	1.48	0.93
1:B:36:LEU:HD11	1:B:73:TYR:CE1	2.05	0.91
1:B:2:SER:HA	4:B:509:HOH:O	1.76	0.86
1:B:36:LEU:CD1	1:B:73:TYR:HE1	1.90	0.83
1:B:29:THR:HG23	4:B:601:HOH:O	1.81	0.81
1:B:207:ASN:ND2	1:B:210:ARG:CZ	2.42	0.80
1:A:112:LYS:HB3	1:A:112:LYS:HZ1	1.46	0.80

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:210:ARG:HD3	4:B:719:HOH:O	1.81	0.80
1:A:141:LEU:HD22	1:A:147:MET:CE	2.12	0.79
1:A:141:LEU:CD2	1:A:147:MET:HE3	2.12	0.79
1:A:18:GLU:HG2	1:A:68:LEU:HD11	1.66	0.77
1:B:29:THR:HG21	1:B:83:GLU:OE1	1.85	0.76
1:B:210:ARG:NH1	4:B:371:HOH:O	2.19	0.76
1:B:36:LEU:CD1	1:B:73:TYR:CE1	2.69	0.75
1:A:112:LYS:HB3	1:A:112:LYS:HZ2	1.51	0.72
1:B:207:ASN:ND2	1:B:210:ARG:NE	2.37	0.72
1:A:217:ARG:HD3	4:A:400:HOH:O	1.88	0.71
1:B:2:SER:CA	4:B:509:HOH:O	2.38	0.69
1:A:29:THR:HG21	1:A:83:GLU:OE1	1.92	0.69
1:B:206:ARG:O	1:B:210:ARG:HG3	1.92	0.68
1:A:73:TYR:HE1	4:A:365:HOH:O	1.76	0.68
1:B:27:MET:HG2	4:B:470:HOH:O	1.93	0.68
1:B:119:ARG:HD3	4:B:494:HOH:O	1.93	0.68
1:A:2:SER:N	4:A:487:HOH:O	2.28	0.67
1:B:10:ILE:HD12	1:B:56:ILE:HD11	1.75	0.67
1:B:180:ASP:OD1	1:B:182:THR:HB	1.94	0.67
1:B:207:ASN:HD21	1:B:210:ARG:CZ	2.07	0.67
1:A:145:TYR:HB2	1:A:147:MET:HE2	1.75	0.67
1:A:172:ASP:OD2	4:A:605:HOH:O	2.12	0.67
1:B:29:THR:CG2	4:B:601:HOH:O	2.40	0.67
1:B:207:ASN:HD22	1:B:210:ARG:NE	1.94	0.65
1:B:202:ARG:HH11	1:B:202:ARG:HG2	1.62	0.64
1:A:112:LYS:CB	1:A:112:LYS:NZ	1.87	0.64
1:A:112:LYS:HZ3	1:A:112:LYS:HB3	0.46	0.62
1:A:119:ARG:NH2	1:A:121:ARG:HD3	2.16	0.60
1:B:237:ASP:O	1:B:240:THR:HG22	2.02	0.59
1:A:2:SER:HB2	4:A:487:HOH:O	2.01	0.59
1:A:51:GLU:HG3	4:A:508:HOH:O	2.02	0.59
1:B:6:TYR:CE1	1:B:42:ILE:HG12	2.38	0.59
1:B:210:ARG:HB3	4:B:719:HOH:O	2.03	0.58
1:B:27:MET:HE3	4:B:470:HOH:O	2.04	0.57
1:B:107:TYR:CZ	2:B:302[A]:GLU:HB2	2.37	0.57
1:B:123:GLY:O	1:B:148:ARG:CZ	2.52	0.56
1:A:141:LEU:CD2	1:A:147:MET:CE	2.80	0.56
1:B:123:GLY:O	1:B:148:ARG:NH2	2.38	0.56
1:B:207:ASN:HD22	1:B:210:ARG:CD	2.20	0.55
1:B:24:PHE:HA	4:B:470:HOH:O	2.06	0.55
1:A:154:ILE:HD13	1:A:180:ASP:HB3	1.89	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:237:ASP:O	1:B:240:THR:CG2	2.56	0.54
1:A:2:SER:CA	4:A:487:HOH:O	2.56	0.54
1:A:207:ASN:ND2	1:A:210:ARG:HH11	2.06	0.54
1:A:182:THR:HG23	4:A:391:HOH:O	2.07	0.54
1:A:175:ASN:CB	4:A:709:HOH:O	2.00	0.53
1:B:207:ASN:HA	1:B:210:ARG:HG3	1.89	0.53
1:B:207:ASN:HD22	1:B:210:ARG:HD2	1.73	0.52
1:B:112:LYS:HG2	1:B:145:TYR:OH	2.11	0.51
1:A:107:TYR:CZ	2:A:302[A]:GLU:HB2	2.47	0.50
1:B:206:ARG:O	1:B:210:ARG:CG	2.59	0.49
1:A:16:ARG:NH1	1:A:38:GLU:OE2	2.43	0.49
1:B:41:GLU:HG2	4:B:724:HOH:O	2.12	0.49
1:A:86:GLN:NE2	4:A:484:HOH:O	2.23	0.48
1:A:48:ILE:HD12	4:A:628:HOH:O	2.13	0.48
1:B:217:ARG:CD	4:B:343:HOH:O	2.33	0.48
1:A:89:ILE:CD1	1:A:161:LEU:HD23	2.44	0.48
1:B:107:TYR:CZ	2:B:302[B]:GLU:HB2	2.48	0.47
1:B:202:ARG:HG2	1:B:202:ARG:NH1	2.28	0.47
1:A:89:ILE:HD11	1:A:161:LEU:HD23	1.96	0.47
1:A:207:ASN:HD22	1:A:210:ARG:HD2	1.80	0.47
1:A:57:LEU:HD22	1:A:66:LEU:HD13	1.97	0.46
1:A:18:GLU:HG2	1:A:68:LEU:CD1	2.42	0.46
1:A:81:GLN:HB3	1:A:133:PRO:HG2	1.98	0.46
1:A:180:ASP:OD1	1:A:182:THR:HG22	2.15	0.46
1:B:54:LYS:O	1:B:58:ASP:HB2	2.16	0.46
1:B:203:ARG:HG3	4:B:479:HOH:O	2.15	0.45
1:B:8:ASP:O	1:B:12:ARG:HG3	2.17	0.45
1:A:89:ILE:CD1	1:A:161:LEU:CD2	2.95	0.45
1:A:94:PRO:HB2	1:A:169:LEU:HD23	1.98	0.45
1:B:207:ASN:HA	1:B:210:ARG:CD	2.46	0.45
1:A:119:ARG:HA	1:A:119:ARG:HD2	1.70	0.44
2:B:302[B]:GLU:HG3	4:B:329:HOH:O	2.16	0.44
1:A:64:HIS:CE1	4:A:468:HOH:O	2.71	0.44
1:A:145:TYR:HB2	1:A:147:MET:CE	2.45	0.43
2:A:302[B]:GLU:HG3	4:A:553:HOH:O	2.17	0.43
1:A:73:TYR:OH	1:A:255:ASN:ND2	2.52	0.43
1:A:115:ALA:HA	1:A:120:PHE:CD2	2.54	0.43
1:B:2:SER:N	4:B:509:HOH:O	2.51	0.42
1:B:11:LYS:HE2	4:B:520:HOH:O	2.19	0.42
1:A:107:TYR:CZ	2:A:302[B]:GLU:HB2	2.54	0.42
1:B:9:LYS:HE2	4:B:450:HOH:O	2.20	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:119:ARG:HH22	1:A:121:ARG:HD3	1.85	0.42
1:B:17:LEU:HD21	1:B:35:LEU:HD13	2.02	0.42
1:B:52:SER:O	1:B:55:HIS:HB3	2.20	0.42
1:A:2:SER:CB	4:A:487:HOH:O	2.65	0.41
1:A:155:GLU:HA	1:A:156:PRO:HD3	1.97	0.40
1:A:106:ARG:HD3	4:A:325:HOH:O	2.21	0.40
1:A:163:ARG:O	1:A:167:GLU:HG3	2.21	0.40
1:A:5:ILE:HD12	1:A:9:LYS:NZ	2.37	0.40

All (5) 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:B:202:ARG:NH1	4:A:369:HOH:O[3_655]	1.55	0.65
1:B:202:ARG:CZ	4:A:369:HOH:O[3_655]	1.78	0.42
1:B:202:ARG:NH2	4:A:510:HOH:O[3_655]	1.99	0.21
4:A:718:HOH:O	4:B:331:HOH:O[3_545]	2.02	0.18
1:B:202:ARG:NH2	4:A:369:HOH:O[3_655]	2.04	0.16

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	262/298 (88%)	256 (98%)	6 (2%)	0	100	100
1	B	262/298 (88%)	259 (99%)	3 (1%)	0	100	100
All	All	524/596 (88%)	515 (98%)	9 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	229/259 (88%)	220 (96%)	9 (4%)	32 17
1	B	229/259 (88%)	218 (95%)	11 (5%)	25 11
All	All	458/518 (88%)	438 (96%)	20 (4%)	29 14

All (20) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	12	ARG
1	A	29	THR
1	A	48	ILE
1	A	112	LYS
1	A	161	LEU
1	A	182	THR
1	A	197	LEU
1	A	215	GLU
1	A	236	ASP
1	B	5	ILE
1	B	29	THR
1	B	48	ILE
1	B	51	GLU
1	B	58	ASP
1	B	175	ASN
1	B	182	THR
1	B	197	LEU
1	B	206	ARG
1	B	215	GLU
1	B	240	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	21	ASN
1	A	175	ASN

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Mol	Chain	Res	Type
1	A	207	ASN
1	B	55	HIS
1	B	75	ASN
1	B	81	GLN
1	B	86	GLN
1	B	175	ASN
1	B	207	ASN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 6 ligands modelled in this entry, 2 are monoatomic - leaving 4 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	$\#\|Z\| > 2$
2	GLU	A	302[A]	-	8,9,9	1.39	2 (25%)	10,11,11	0.85	0
2	GLU	B	302[A]	-	8,9,9	1.39	2 (25%)	10,11,11	1.19	0
2	GLU	A	302[B]	-	8,9,9	1.40	2 (25%)	10,11,11	1.03	0
2	GLU	B	302[B]	-	8,9,9	1.26	1 (12%)	10,11,11	1.41	1 (10%)

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
2	GLU	A	302[A]	-	-	4/9/9/9	-
2	GLU	B	302[A]	-	-	6/9/9/9	-
2	GLU	A	302[B]	-	-	6/9/9/9	-
2	GLU	B	302[B]	-	-	6/9/9/9	-

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	302[B]	GLU	OXT-C	-2.64	1.21	1.30
2	A	302[A]	GLU	CB-CG	-2.37	1.45	1.52
2	B	302[A]	GLU	CB-CG	-2.33	1.45	1.52
2	B	302[B]	GLU	CB-CG	-2.23	1.45	1.52
2	B	302[A]	GLU	OXT-C	-2.20	1.23	1.30
2	A	302[A]	GLU	OE2-CD	-2.02	1.23	1.30
2	A	302[B]	GLU	CB-CG	-2.01	1.46	1.52

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	302[B]	GLU	OXT-C-CA	2.68	122.53	113.38

There are no chirality outliers.

All (22) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	302[B]	GLU	O-C-CA-N
2	B	302[B]	GLU	OXT-C-CA-CB
2	B	302[A]	GLU	OXT-C-CA-CB
2	B	302[A]	GLU	O-C-CA-CB
2	B	302[B]	GLU	O-C-CA-CB
2	B	302[A]	GLU	OXT-C-CA-N
2	A	302[A]	GLU	OXT-C-CA-N
2	B	302[B]	GLU	OXT-C-CA-N
2	A	302[B]	GLU	OXT-C-CA-N
2	A	302[A]	GLU	O-C-CA-N
2	A	302[B]	GLU	O-C-CA-N
2	B	302[A]	GLU	O-C-CA-N
2	A	302[A]	GLU	O-C-CA-CB

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Mol	Chain	Res	Type	Atoms
2	A	302[A]	GLU	OXT-C-CA-CB
2	A	302[B]	GLU	O-C-CA-CB
2	A	302[B]	GLU	OXT-C-CA-CB
2	A	302[B]	GLU	OE2-CD-CG-CB
2	B	302[B]	GLU	OE2-CD-CG-CB
2	A	302[B]	GLU	OE1-CD-CG-CB
2	B	302[B]	GLU	OE1-CD-CG-CB
2	B	302[A]	GLU	OE2-CD-CG-CB
2	B	302[A]	GLU	OE1-CD-CG-CB

There are no ring outliers.

4 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	302[A]	GLU	1	0
2	B	302[A]	GLU	1	0
2	A	302[B]	GLU	2	0
2	B	302[B]	GLU	2	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

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, 95^{th} 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	264/298 (88%)	-0.10	2 (0%)	86	84	17, 26, 40, 46	0
1	B	264/298 (88%)	-0.15	8 (3%)	50	44	14, 23, 38, 50	0
All	All	528/596 (88%)	-0.12	10 (1%)	66	63	14, 24, 39, 50	0

All (10) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	6	TYR	3.8
1	B	55	HIS	3.6
1	B	56	ILE	3.6
1	B	5	ILE	3.1
1	B	2	SER	2.8
1	A	265	PRO	2.7
1	B	7	TRP	2.5
1	B	23	HIS	2.4
1	A	12	ARG	2.3
1	B	61	GLU	2.1

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

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

6.3 Carbohydrates

There are no monosaccharides in this entry.

6.4 Ligands (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, 95^{th} 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
2	GLU	A	302[A]	10/10	0.90	0.15	26,28,30,32	10
2	GLU	A	302[B]	10/10	0.90	0.15	20,24,27,29	10
2	GLU	B	302[A]	10/10	0.90	0.16	20,23,24,25	10
2	GLU	B	302[B]	10/10	0.90	0.16	19,24,25,26	10
3	NA	B	299	1/1	0.98	0.13	20,20,20,20	0
3	NA	A	299	1/1	0.99	0.13	26,26,26,26	0

6.5 Other polymers (i)

There are no such residues in this entry.