Full wwPDB X-ray Structure Validation Report ⓘ

Jun 22, 2025 – 04:05 PM EDT

PDB ID	:	6N4F / pdb_00006n4f
Title	:	The crystal structure of hemagglutinin from A/canine/IL/11613/2015 (H3N2) influenza virus.
Authors	:	Yang, H.; Stevens, J.
Deposited on	:	2018-11-19
Resolution	:	3.01 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:

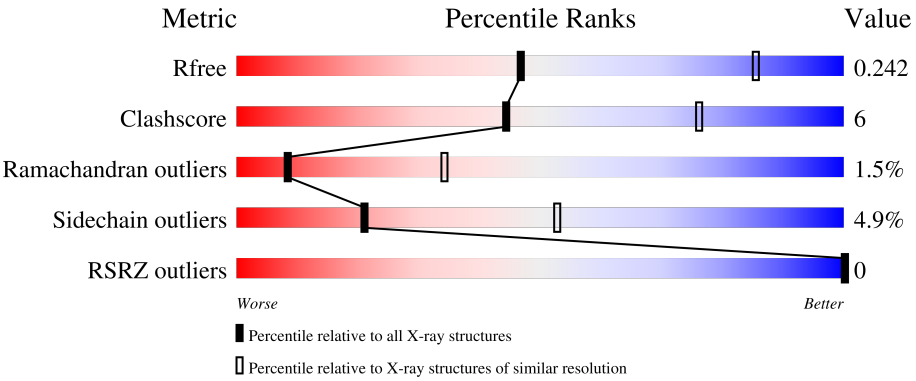
MolProbity	:	4-5-2 with Phenix2.0rc1
Xtriage (Phenix)	:	2.0rc1
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.006 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.44

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 3.01 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	2927 (3.04-3.00)
Clashscore	180529	3300 (3.04-3.00)
Ramachandran outliers	177936	3188 (3.04-3.00)
Sidechain outliers	177891	3191 (3.04-3.00)
RSRZ outliers	164620	2939 (3.04-3.00)

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	334	77% 17% • 5%
1	C	334	76% 18% • 5%
1	E	334	78% 16% • 5%
1	G	334	77% 17% 5%
2	B	182	75% 16% • 5%

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Mol	Chain	Length	Quality of chain
2	D	182	76% 15% • 5%
2	F	182	76% 16% • 5%
2	H	182	75% 16% • 5%

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 15352 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 Hemagglutinin HA1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	317	Total	C	N	O	S	0	0	0
			2442	1526	434	468	14			
1	C	317	Total	C	N	O	S	0	0	0
			2442	1526	434	468	14			
1	E	317	Total	C	N	O	S	0	0	0
			2442	1526	434	468	14			
1	G	317	Total	C	N	O	S	0	0	0
			2442	1526	434	468	14			

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-4	ALA	-	expression tag	UNP A0A218KIQ1
A	-3	ASP	-	expression tag	UNP A0A218KIQ1
A	-2	LEU	-	expression tag	UNP A0A218KIQ1
A	-1	GLY	-	expression tag	UNP A0A218KIQ1
A	0	SER	-	expression tag	UNP A0A218KIQ1
C	-4	ALA	-	expression tag	UNP A0A218KIQ1
C	-3	ASP	-	expression tag	UNP A0A218KIQ1
C	-2	LEU	-	expression tag	UNP A0A218KIQ1
C	-1	GLY	-	expression tag	UNP A0A218KIQ1
C	0	SER	-	expression tag	UNP A0A218KIQ1
E	-4	ALA	-	expression tag	UNP A0A218KIQ1
E	-3	ASP	-	expression tag	UNP A0A218KIQ1
E	-2	LEU	-	expression tag	UNP A0A218KIQ1
E	-1	GLY	-	expression tag	UNP A0A218KIQ1
E	0	SER	-	expression tag	UNP A0A218KIQ1
G	-4	ALA	-	expression tag	UNP A0A218KIQ1
G	-3	ASP	-	expression tag	UNP A0A218KIQ1
G	-2	LEU	-	expression tag	UNP A0A218KIQ1
G	-1	GLY	-	expression tag	UNP A0A218KIQ1
G	0	SER	-	expression tag	UNP A0A218KIQ1

- Molecule 2 is a protein called Hemagglutinin HA2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	172	Total	C	N	O	S	0	0	0
			1396	863	248	279	6			
2	D	172	Total	C	N	O	S	0	0	0
			1396	863	248	279	6			
2	F	172	Total	C	N	O	S	0	0	0
			1396	863	248	279	6			
2	H	172	Total	C	N	O	S	0	0	0
			1396	863	248	279	6			

There are 32 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	175	SER	-	expression tag	UNP A0A2U5FPI7
B	176	GLY	-	expression tag	UNP A0A2U5FPI7
B	177	ARG	-	expression tag	UNP A0A2U5FPI7
B	178	LEU	-	expression tag	UNP A0A2U5FPI7
B	179	VAL	-	expression tag	UNP A0A2U5FPI7
B	180	PRO	-	expression tag	UNP A0A2U5FPI7
B	181	ARG	-	expression tag	UNP A0A2U5FPI7
B	182	GLY	-	expression tag	UNP A0A2U5FPI7
D	175	SER	-	expression tag	UNP A0A2U5FPI7
D	176	GLY	-	expression tag	UNP A0A2U5FPI7
D	177	ARG	-	expression tag	UNP A0A2U5FPI7
D	178	LEU	-	expression tag	UNP A0A2U5FPI7
D	179	VAL	-	expression tag	UNP A0A2U5FPI7
D	180	PRO	-	expression tag	UNP A0A2U5FPI7
D	181	ARG	-	expression tag	UNP A0A2U5FPI7
D	182	GLY	-	expression tag	UNP A0A2U5FPI7
F	175	SER	-	expression tag	UNP A0A2U5FPI7
F	176	GLY	-	expression tag	UNP A0A2U5FPI7
F	177	ARG	-	expression tag	UNP A0A2U5FPI7
F	178	LEU	-	expression tag	UNP A0A2U5FPI7
F	179	VAL	-	expression tag	UNP A0A2U5FPI7
F	180	PRO	-	expression tag	UNP A0A2U5FPI7
F	181	ARG	-	expression tag	UNP A0A2U5FPI7
F	182	GLY	-	expression tag	UNP A0A2U5FPI7
H	175	SER	-	expression tag	UNP A0A2U5FPI7
H	176	GLY	-	expression tag	UNP A0A2U5FPI7
H	177	ARG	-	expression tag	UNP A0A2U5FPI7
H	178	LEU	-	expression tag	UNP A0A2U5FPI7
H	179	VAL	-	expression tag	UNP A0A2U5FPI7
H	180	PRO	-	expression tag	UNP A0A2U5FPI7

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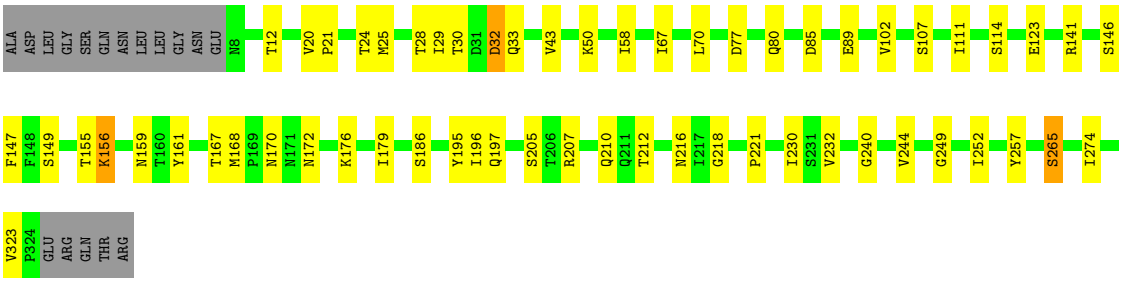
Chain	Residue	Modelled	Actual	Comment	Reference
H	181	ARG	-	expression tag	UNP A0A2U5FPI7
H	182	GLY	-	expression tag	UNP A0A2U5FPI7

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: Hemagglutinin HA1

Chain A:

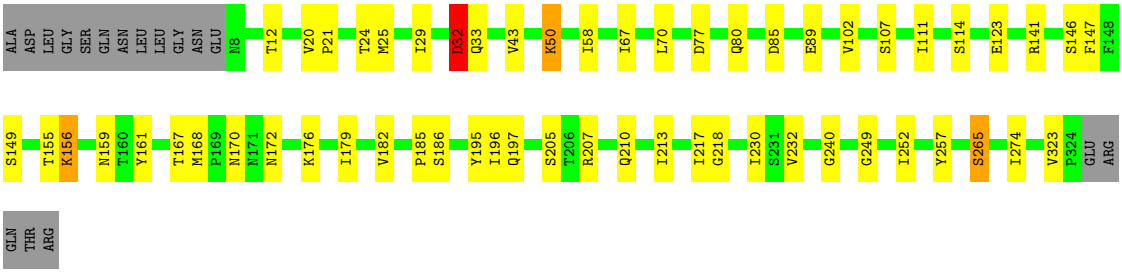


• Molecule 1: Hemagglutinin HA1

Chain C:

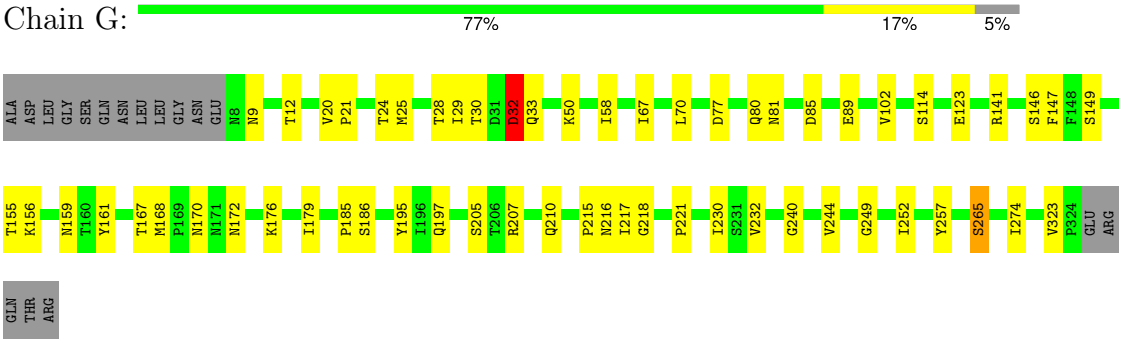
• Molecule 1: Hemagglutinin HA1

Chain E:



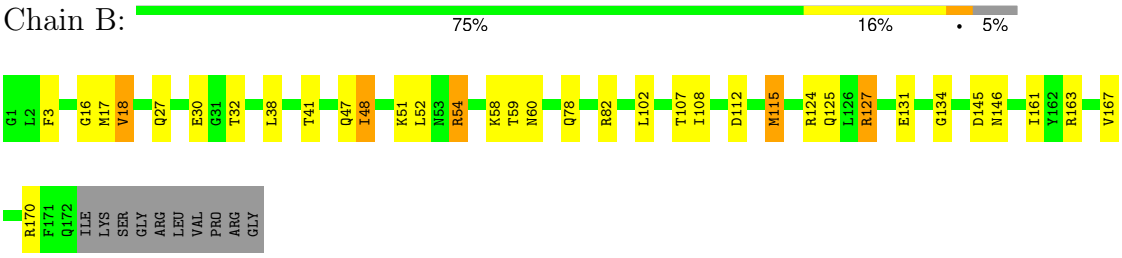
• Molecule 1: Hemagglutinin HA1

Chain G:



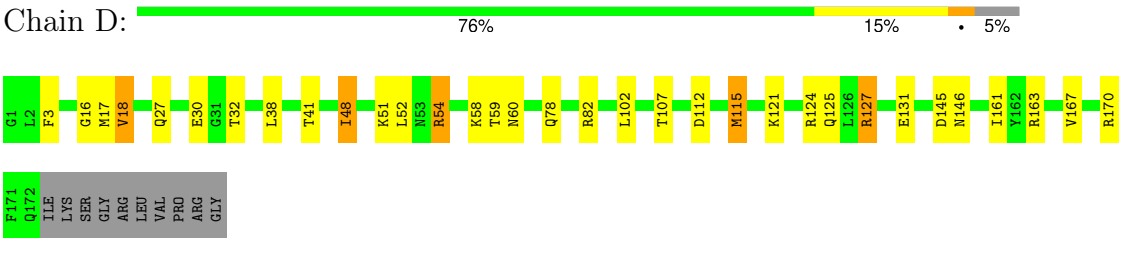
• Molecule 2: Hemagglutinin HA2

Chain B:



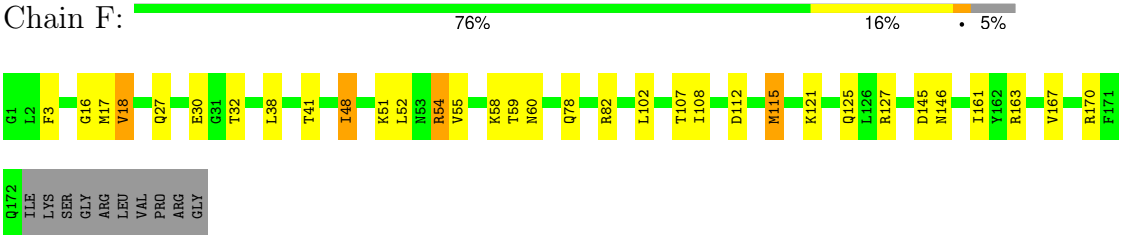
• Molecule 2: Hemagglutinin HA2

Chain D:



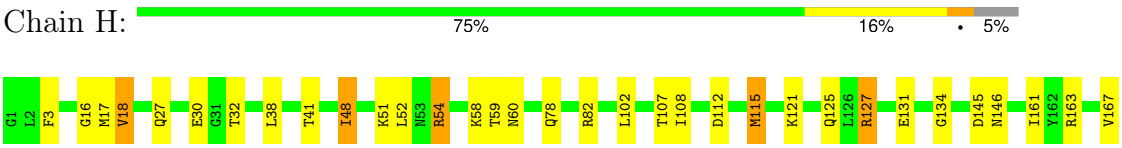
• Molecule 2: Hemagglutinin HA2

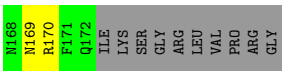
Chain F:



• Molecule 2: Hemagglutinin HA2

Chain H:




N168
N169
R170
F171
Q172
ILE
LYS
SER
GLY
ARG
LEU
VAL
PRO
ARG
GLY

4 Data and refinement statistics (i)

Property	Value	Source
Space group	H 3	Depositor
Cell constants a, b, c, α, β, γ	241.15Å 241.15Å 147.96Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	50.00 – 3.01 50.00 – 3.01	Depositor EDS
% Data completeness (in resolution range)	98.9 (50.00-3.01) 98.9 (50.00-3.01)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.82 (at 3.01Å)	Xtriage
Refinement program	REFMAC 5.8.0049	Depositor
R, R_{free}	0.213 , 0.242 0.215 , 0.242	Depositor DCC
R_{free} test set	3184 reflections (5.06%)	wwPDB-VP
Wilson B-factor (Å^2)	84.5	Xtriage
Anisotropy	0.040	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.30 , 75.7	EDS
L-test for twinning[2]	$< \|L\| > = 0.51$, $< L^2 > = 0.35$	Xtriage
Estimated twinning fraction	0.009 for -1/3*h+1/3*k+4/3*l,-k,2/3*h+1/3*k+1/3*l 0.009 for -2/3*h-1/3*k-4/3*l,-1/3*h-2/3*k+4/3*l,-1/3*h+1/3*k+1/3*l 0.005 for -h,1/3*h-1/3*k-4/3*l,-1/3*h-2/3*k+1/3*l 0.428 for -1/3*h-2/3*k+4/3*l,-2/3*h-1/3*k-4/3*l,1/3*h-1/3*k-1/3*l 0.417 for -h,2/3*h+1/3*k+4/3*l,1/3*h+2/3*k-1/3*l 0.428 for 1/3*h+2/3*k-4/3*l,-k,-2/3*h-1/3*k-1/3*l 0.010 for h,-h-k,-l	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	15352	wwPDB-VP
Average B, all atoms (Å^2)	104.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.79% 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

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	0.84	0/2497	0.99	2/3402 (0.1%)
1	C	0.83	0/2497	0.99	2/3402 (0.1%)
1	E	0.83	0/2497	0.99	3/3402 (0.1%)
1	G	0.84	0/2497	0.99	2/3402 (0.1%)
2	B	0.81	0/1419	0.94	2/1908 (0.1%)
2	D	0.79	0/1419	0.95	3/1908 (0.2%)
2	F	0.80	0/1419	0.95	3/1908 (0.2%)
2	H	0.81	0/1419	0.94	3/1908 (0.2%)
All	All	0.82	0/15664	0.97	20/21240 (0.1%)

There are no bond length outliers.

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	D	146	ASN	N-CA-C	5.88	119.55	112.38
2	H	146	ASN	N-CA-C	5.79	119.44	112.38
2	B	146	ASN	N-CA-C	5.79	119.44	112.38
2	F	146	ASN	N-CA-C	5.77	119.42	112.38
2	B	54	ARG	N-CA-C	-5.40	105.95	112.54
2	D	54	ARG	N-CA-C	-5.32	106.06	112.54
2	F	121	LYS	N-CA-C	-5.24	105.17	112.45
2	D	121	LYS	N-CA-C	-5.18	105.25	112.45
1	G	85	ASP	N-CA-C	-5.15	105.11	111.40
1	E	43	VAL	CB-CA-C	-5.13	103.47	110.96
2	H	54	ARG	N-CA-C	-5.13	105.87	111.82
2	F	54	ARG	N-CA-C	-5.11	106.31	112.54
1	A	43	VAL	CB-CA-C	-5.07	103.56	110.96
1	G	32	ASP	N-CA-C	-5.07	105.94	111.82
2	H	121	LYS	N-CA-C	-5.05	105.43	112.45
1	C	85	ASP	N-CA-C	-5.04	105.25	111.40
1	C	43	VAL	CB-CA-C	-5.04	103.60	110.96
1	E	85	ASP	N-CA-C	-5.03	105.26	111.40
1	A	85	ASP	N-CA-C	-5.02	105.27	111.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	E	32	ASP	N-CA-C	-5.01	106.01	111.82

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	2442	0	2389	35	0
1	C	2442	0	2389	36	0
1	E	2442	0	2389	27	1
1	G	2442	0	2389	33	0
2	B	1396	0	1314	23	0
2	D	1396	0	1314	22	0
2	F	1396	0	1314	14	1
2	H	1396	0	1314	23	0
All	All	15352	0	14812	179	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 6.

All (179) 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)
2:B:163:ARG:O	2:B:167:VAL:HG23	1.79	0.83
2:H:163:ARG:O	2:H:167:VAL:HG23	1.79	0.83
2:D:163:ARG:O	2:D:167:VAL:HG23	1.79	0.81
2:F:163:ARG:O	2:F:167:VAL:HG23	1.79	0.81
1:E:25:MET:HE3	1:E:33:GLN:HB3	1.69	0.74
1:C:25:MET:HE3	1:C:33:GLN:HB3	1.69	0.74
2:B:78:GLN:OE1	2:B:82:ARG:NH1	2.21	0.73
2:D:78:GLN:OE1	2:D:82:ARG:NH1	2.22	0.73
1:G:25:MET:HE3	1:G:33:GLN:HB3	1.69	0.73
1:A:25:MET:HE3	1:A:33:GLN:HB3	1.69	0.73
2:H:78:GLN:OE1	2:H:82:ARG:NH1	2.22	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:32:ASP:OD1	2:D:54:ARG:NH1	2.21	0.72
2:F:78:GLN:OE1	2:F:82:ARG:NH1	2.22	0.72
1:C:32:ASP:OD1	2:H:54:ARG:NH1	2.25	0.70
2:B:54:ARG:NH1	1:G:32:ASP:OD1	2.25	0.70
2:B:48:ILE:HD11	2:B:107:THR:HG23	1.76	0.67
2:H:48:ILE:HD11	2:H:107:THR:HG23	1.75	0.67
2:D:48:ILE:HD11	2:D:107:THR:HG23	1.75	0.67
2:F:16:GLY:O	2:F:18:VAL:HG23	1.95	0.67
2:H:16:GLY:O	2:H:18:VAL:HG23	1.95	0.67
2:F:48:ILE:HD11	2:F:107:THR:HG23	1.75	0.66
2:D:51:LYS:NZ	2:D:107:THR:OG1	2.28	0.66
2:B:16:GLY:O	2:B:18:VAL:HG23	1.95	0.66
2:D:16:GLY:O	2:D:18:VAL:HG23	1.96	0.66
2:F:51:LYS:NZ	2:F:107:THR:OG1	2.28	0.66
1:E:70:LEU:HD21	1:E:179:ILE:CD1	2.28	0.64
1:A:70:LEU:HD21	1:A:179:ILE:CD1	2.27	0.64
2:B:127:ARG:NH2	2:H:131:GLU:OE1	2.30	0.64
2:B:51:LYS:NZ	2:B:107:THR:OG1	2.29	0.64
2:H:51:LYS:NZ	2:H:107:THR:OG1	2.28	0.63
1:C:70:LEU:HD21	1:C:179:ILE:CD1	2.28	0.63
1:G:70:LEU:HD21	1:G:179:ILE:CD1	2.28	0.62
2:D:30:GLU:OE2	2:D:145:ASP:HB2	2.00	0.62
2:H:30:GLU:OE2	2:H:145:ASP:HB2	2.00	0.62
2:B:30:GLU:OE2	2:B:145:ASP:HB2	2.00	0.61
2:F:30:GLU:OE2	2:F:145:ASP:HB2	2.00	0.61
1:C:30:THR:C	2:H:54:ARG:NH2	2.61	0.58
1:A:30:THR:C	2:D:54:ARG:NH2	2.62	0.58
2:F:16:GLY:O	2:F:18:VAL:N	2.36	0.58
2:H:16:GLY:O	2:H:18:VAL:N	2.37	0.58
2:B:16:GLY:O	2:B:18:VAL:N	2.37	0.58
2:B:54:ARG:NH2	1:G:30:THR:C	2.62	0.58
2:D:16:GLY:O	2:D:18:VAL:N	2.37	0.58
1:C:70:LEU:HD21	1:C:179:ILE:HD11	1.87	0.56
1:A:170:ASN:OD1	1:A:172:ASN:HB2	2.06	0.56
1:G:77:ASP:OD2	1:G:141:ARG:NH1	2.39	0.55
1:C:30:THR:O	2:H:54:ARG:NH2	2.39	0.55
1:C:170:ASN:OD1	1:C:172:ASN:HB2	2.06	0.55
1:E:170:ASN:OD1	1:E:172:ASN:HB2	2.06	0.55
1:A:77:ASP:OD2	1:A:141:ARG:NH1	2.39	0.55
1:E:70:LEU:HD21	1:E:179:ILE:HD11	1.88	0.55
1:G:170:ASN:OD1	1:G:172:ASN:HB2	2.07	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:54:ARG:NH2	1:G:30:THR:O	2.41	0.54
1:G:70:LEU:HD21	1:G:179:ILE:HD11	1.88	0.54
1:A:70:LEU:HD21	1:A:179:ILE:HD11	1.87	0.54
2:D:115:MET:HE3	2:D:115:MET:HA	1.90	0.54
2:B:115:MET:HE3	2:B:115:MET:HA	1.90	0.54
2:D:131:GLU:OE1	2:H:127:ARG:NH2	2.39	0.54
1:A:30:THR:O	2:D:54:ARG:NH2	2.41	0.53
2:D:18:VAL:HG12	2:D:18:VAL:O	2.09	0.53
1:C:195:TYR:O	1:C:197:GLN:N	2.40	0.52
2:F:115:MET:HE3	2:F:115:MET:HA	1.90	0.52
2:B:18:VAL:HG12	2:B:18:VAL:O	2.09	0.52
2:F:18:VAL:HG12	2:F:18:VAL:O	2.09	0.52
1:A:195:TYR:O	1:A:197:GLN:N	2.40	0.52
2:H:18:VAL:HG12	2:H:18:VAL:O	2.09	0.52
1:E:77:ASP:OD2	1:E:141:ARG:NH1	2.39	0.51
2:H:115:MET:HE3	2:H:115:MET:HA	1.91	0.51
1:C:221:PRO:HG3	1:G:244:VAL:HG23	1.93	0.51
1:A:28:THR:O	2:D:54:ARG:HD2	2.10	0.50
1:E:186:SER:HA	1:E:218:GLY:O	2.12	0.50
1:C:29:ILE:HD11	2:D:102:LEU:HD23	1.94	0.50
1:A:29:ILE:HD11	2:B:102:LEU:HD23	1.94	0.50
1:E:195:TYR:O	1:E:197:GLN:N	2.40	0.49
1:C:28:THR:O	2:H:54:ARG:HD2	2.13	0.49
1:C:77:ASP:OD2	1:C:141:ARG:NH1	2.38	0.49
1:A:186:SER:HA	1:A:218:GLY:O	2.12	0.49
2:B:54:ARG:HD2	1:G:28:THR:O	2.13	0.49
1:G:186:SER:HA	1:G:218:GLY:O	2.13	0.48
2:B:131:GLU:OE1	2:D:127:ARG:NH2	2.43	0.48
1:A:244:VAL:HG23	1:G:221:PRO:HG3	1.94	0.48
1:G:146:SER:OG	1:G:147:PHE:N	2.46	0.48
1:E:146:SER:OG	1:E:147:PHE:N	2.46	0.48
1:A:221:PRO:HG3	1:C:244:VAL:HG23	1.95	0.47
2:B:48:ILE:HA	2:B:51:LYS:HG2	1.96	0.47
1:C:146:SER:OG	1:C:147:PHE:N	2.45	0.47
1:C:186:SER:HA	1:C:218:GLY:O	2.13	0.47
2:H:48:ILE:HA	2:H:51:LYS:HG2	1.97	0.47
1:A:70:LEU:HD21	1:A:179:ILE:HD13	1.95	0.47
1:E:176:LYS:HE2	1:E:257:TYR:CE2	2.49	0.47
1:G:195:TYR:O	1:G:197:GLN:N	2.40	0.47
2:F:48:ILE:HA	2:F:51:LYS:HG2	1.97	0.47
1:G:176:LYS:HE2	1:G:257:TYR:CE2	2.50	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:48:ILE:HA	2:D:51:LYS:HG2	1.97	0.47
1:G:58:ILE:HG21	1:G:274:ILE:HD12	1.97	0.47
1:E:29:ILE:HD11	2:F:102:LEU:HD23	1.96	0.47
1:E:58:ILE:HG21	1:E:274:ILE:HD12	1.97	0.47
2:D:27:GLN:HG2	2:D:32:THR:HG22	1.97	0.46
1:A:58:ILE:HG21	1:A:274:ILE:HD12	1.97	0.46
1:A:146:SER:OG	1:A:147:PHE:N	2.46	0.46
2:B:27:GLN:HG2	2:B:32:THR:HG22	1.97	0.46
1:C:176:LYS:HE2	1:C:257:TYR:CE2	2.51	0.46
1:G:70:LEU:HD21	1:G:179:ILE:HD13	1.96	0.46
2:H:27:GLN:HG2	2:H:32:THR:HG22	1.97	0.46
1:A:102:VAL:HG22	1:A:232:VAL:HB	1.99	0.45
1:C:58:ILE:HG21	1:C:274:ILE:HD12	1.98	0.45
1:E:102:VAL:HG22	1:E:232:VAL:HB	1.98	0.45
1:E:230:ILE:HD13	1:E:252:ILE:HD13	1.99	0.45
2:F:27:GLN:HG2	2:F:32:THR:HG22	1.97	0.45
1:A:176:LYS:HE2	1:A:257:TYR:CE2	2.51	0.45
1:G:102:VAL:HG22	1:G:232:VAL:HB	1.98	0.45
1:A:216:ASN:HB3	1:C:212:THR:HG21	1.98	0.45
2:B:124:ARG:HD3	2:H:134:GLY:HA2	1.99	0.45
1:G:29:ILE:HD11	2:H:102:LEU:HD23	1.98	0.45
2:H:3:PHE:HB2	2:H:112:ASP:OD1	2.17	0.45
1:C:102:VAL:HG22	1:C:232:VAL:HB	1.99	0.44
1:E:70:LEU:HD21	1:E:179:ILE:HD13	1.96	0.44
1:C:114:SER:HA	1:C:265:SER:O	2.18	0.44
1:G:230:ILE:HD13	1:G:252:ILE:HD13	1.99	0.44
2:F:3:PHE:HB2	2:F:112:ASP:OD1	2.18	0.44
2:D:3:PHE:HB2	2:D:112:ASP:OD1	2.18	0.44
1:A:111:ILE:HD13	1:A:111:ILE:HG21	1.77	0.44
1:C:230:ILE:HD13	1:C:252:ILE:HD13	2.00	0.44
1:E:114:SER:HA	1:E:265:SER:O	2.18	0.44
1:C:20:VAL:HB	1:C:21:PRO:HD2	2.00	0.43
1:C:70:LEU:HD21	1:C:179:ILE:HD13	1.96	0.43
1:G:24:THR:HG22	1:G:25:MET:N	2.34	0.43
1:A:207:ARG:NH2	1:A:240:GLY:O	2.51	0.43
1:A:77:ASP:O	1:A:80:GLN:HG3	2.19	0.43
2:B:134:GLY:HA2	2:D:124:ARG:HD3	1.99	0.43
1:A:212:THR:HG21	1:G:216:ASN:HB3	2.01	0.43
1:C:32:ASP:N	2:H:54:ARG:NH1	2.66	0.43
2:B:3:PHE:HB2	2:B:112:ASP:OD1	2.18	0.43
1:E:24:THR:HG22	1:E:25:MET:N	2.34	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:67:ILE:O	1:E:70:LEU:HB3	2.19	0.43
1:A:20:VAL:HB	1:A:21:PRO:HD2	2.01	0.42
1:A:28:THR:O	2:D:54:ARG:CD	2.67	0.42
1:C:77:ASP:O	1:C:80:GLN:HG3	2.19	0.42
1:A:32:ASP:N	2:D:54:ARG:NH1	2.67	0.42
1:C:24:THR:HG22	1:C:25:MET:N	2.34	0.42
1:E:207:ARG:NH2	1:E:240:GLY:O	2.51	0.42
1:A:67:ILE:O	1:A:70:LEU:HB3	2.20	0.42
1:G:77:ASP:O	1:G:80:GLN:HG3	2.20	0.42
1:E:77:ASP:O	1:E:80:GLN:HG3	2.19	0.42
1:A:230:ILE:HD13	1:A:252:ILE:HD13	2.00	0.42
1:C:123:GLU:OE1	1:C:168:MET:HG2	2.20	0.42
1:G:67:ILE:O	1:G:70:LEU:HB3	2.19	0.42
1:A:123:GLU:OE1	1:A:168:MET:HG2	2.20	0.42
1:C:107:SER:O	1:C:111:ILE:HG23	2.20	0.42
1:G:123:GLU:OE1	1:G:168:MET:HG2	2.20	0.42
1:G:207:ARG:NH2	1:G:240:GLY:O	2.52	0.42
1:C:207:ARG:NH2	1:C:240:GLY:O	2.53	0.41
1:A:161:TYR:CE2	1:A:249:GLY:HA2	2.55	0.41
1:C:67:ILE:O	1:C:70:LEU:HB3	2.19	0.41
1:G:114:SER:HA	1:G:265:SER:O	2.20	0.41
1:A:24:THR:HG22	1:A:25:MET:N	2.35	0.41
1:A:114:SER:HA	1:A:265:SER:O	2.20	0.41
1:E:123:GLU:OE1	1:E:168:MET:HG2	2.19	0.41
1:E:185:PRO:O	1:E:217:ILE:HA	2.20	0.41
1:G:20:VAL:HB	1:G:21:PRO:HD2	2.01	0.41
1:E:107:SER:O	1:E:111:ILE:HG23	2.20	0.41
1:G:185:PRO:O	1:G:217:ILE:HA	2.21	0.41
2:B:54:ARG:CD	1:G:28:THR:O	2.68	0.41
1:C:156:LYS:HD3	1:C:196:ILE:HD11	2.03	0.41
1:A:107:SER:O	1:A:111:ILE:HG23	2.21	0.41
2:B:47:GLN:HG2	1:G:30:THR:HB	2.03	0.41
1:C:30:THR:C	2:H:54:ARG:CZ	2.94	0.41
1:C:161:TYR:CE2	1:C:249:GLY:HA2	2.56	0.41
1:C:275:ASP:OD1	1:E:50:LYS:HE3	2.20	0.41
1:E:20:VAL:HB	1:E:21:PRO:HD2	2.01	0.41
2:F:55:VAL:O	2:F:55:VAL:HG12	2.21	0.41
1:G:161:TYR:CE2	1:G:249:GLY:HA2	2.55	0.41
1:C:185:PRO:O	1:C:217:ILE:HA	2.22	0.40
1:E:161:TYR:CE2	1:E:249:GLY:HA2	2.57	0.40
1:E:182:VAL:HG21	1:E:213:ILE:HG21	2.04	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:156:LYS:HD3	1:A:196:ILE:HD11	2.03	0.40
1:C:182:VAL:HG21	1:C:213:ILE:HG21	2.04	0.40
1:E:156:LYS:HD3	1:E:196:ILE:HD11	2.03	0.40
1:G:9:ASN:O	2:H:169:ASN:ND2	2.54	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:E:32:ASP:OD1	2:F:54:ARG:NH1[2_455]	2.18	0.02

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	315/334 (94%)	286 (91%)	29 (9%)	0	100	100
1	C	315/334 (94%)	284 (90%)	31 (10%)	0	100	100
1	E	315/334 (94%)	285 (90%)	30 (10%)	0	100	100
1	G	315/334 (94%)	285 (90%)	28 (9%)	2 (1%)	22	55
2	B	170/182 (93%)	150 (88%)	13 (8%)	7 (4%)	2	12
2	D	170/182 (93%)	150 (88%)	13 (8%)	7 (4%)	2	12
2	F	170/182 (93%)	150 (88%)	13 (8%)	7 (4%)	2	12
2	H	170/182 (93%)	150 (88%)	13 (8%)	7 (4%)	2	12
All	All	1940/2064 (94%)	1740 (90%)	170 (9%)	30 (2%)	8	34

All (30) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	17	MET

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Mol	Chain	Res	Type
2	D	17	MET
2	F	17	MET
2	H	17	MET
2	B	59	THR
2	B	170	ARG
2	D	59	THR
2	D	170	ARG
2	F	59	THR
2	F	170	ARG
2	H	59	THR
2	H	170	ARG
2	B	58	LYS
2	D	58	LYS
2	F	58	LYS
2	H	58	LYS
2	B	127	ARG
2	D	127	ARG
2	F	127	ARG
1	G	81	ASN
2	H	127	ARG
1	G	215	PRO
2	B	161	ILE
2	D	161	ILE
2	F	18	VAL
2	F	161	ILE
2	H	161	ILE
2	B	18	VAL
2	D	18	VAL
2	H	18	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	276/290 (95%)	263 (95%)	13 (5%)	22 54
1	C	276/290 (95%)	263 (95%)	13 (5%)	22 54

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	E	276/290 (95%)	263 (95%)	13 (5%)	22 54
1	G	276/290 (95%)	263 (95%)	13 (5%)	22 54
2	B	147/155 (95%)	139 (95%)	8 (5%)	18 49
2	D	147/155 (95%)	140 (95%)	7 (5%)	21 53
2	F	147/155 (95%)	139 (95%)	8 (5%)	18 49
2	H	147/155 (95%)	139 (95%)	8 (5%)	18 49
All	All	1692/1780 (95%)	1609 (95%)	83 (5%)	21 53

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

Mol	Chain	Res	Type
1	A	12	THR
1	A	32	ASP
1	A	50	LYS
1	A	89	GLU
1	A	149	SER
1	A	155	THR
1	A	156	LYS
1	A	159	ASN
1	A	167	THR
1	A	205	SER
1	A	210	GLN
1	A	265	SER
1	A	323	VAL
2	B	38	LEU
2	B	41	THR
2	B	48	ILE
2	B	52	LEU
2	B	60	ASN
2	B	108	ILE
2	B	115	MET
2	B	125	GLN
1	C	12	THR
1	C	32	ASP
1	C	50	LYS
1	C	89	GLU
1	C	149	SER
1	C	155	THR
1	C	156	LYS
1	C	159	ASN

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Mol	Chain	Res	Type
1	C	167	THR
1	C	205	SER
1	C	210	GLN
1	C	265	SER
1	C	323	VAL
2	D	38	LEU
2	D	41	THR
2	D	48	ILE
2	D	52	LEU
2	D	60	ASN
2	D	115	MET
2	D	125	GLN
1	E	12	THR
1	E	32	ASP
1	E	50	LYS
1	E	89	GLU
1	E	149	SER
1	E	155	THR
1	E	156	LYS
1	E	159	ASN
1	E	167	THR
1	E	205	SER
1	E	210	GLN
1	E	265	SER
1	E	323	VAL
2	F	38	LEU
2	F	41	THR
2	F	48	ILE
2	F	52	LEU
2	F	60	ASN
2	F	108	ILE
2	F	115	MET
2	F	125	GLN
1	G	12	THR
1	G	32	ASP
1	G	50	LYS
1	G	89	GLU
1	G	149	SER
1	G	155	THR
1	G	156	LYS
1	G	159	ASN
1	G	167	THR

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Mol	Chain	Res	Type
1	G	205	SER
1	G	210	GLN
1	G	265	SER
1	G	323	VAL
2	H	38	LEU
2	H	41	THR
2	H	48	ILE
2	H	52	LEU
2	H	60	ASN
2	H	108	ILE
2	H	115	MET
2	H	125	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (27) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	75	HIS
1	A	145	ASN
1	A	211	GLN
1	A	216	ASN
2	B	60	ASN
2	B	142	HIS
1	C	75	HIS
1	C	145	ASN
1	C	211	GLN
1	C	216	ASN
2	D	60	ASN
2	D	116	ASN
2	D	142	HIS
1	E	75	HIS
1	E	145	ASN
1	E	211	GLN
1	E	216	ASN
2	F	60	ASN
2	F	116	ASN
2	F	142	HIS
1	G	75	HIS
1	G	145	ASN
1	G	211	GLN
1	G	216	ASN
2	H	60	ASN
2	H	116	ASN

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Mol	Chain	Res	Type
2	H	142	HIS

5.3.3 RNA

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates

There are no oligosaccharides in this entry.

5.6 Ligand geometry

There are no ligands in this entry.

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	317/334 (94%)	-1.47	0	100	100	57, 84, 132, 199	0
1	C	317/334 (94%)	-1.46	0	100	100	57, 84, 132, 197	0
1	E	317/334 (94%)	-1.47	0	100	100	59, 86, 132, 189	0
1	G	317/334 (94%)	-1.47	0	100	100	59, 85, 135, 199	0
2	B	172/182 (94%)	-1.19	0	100	100	61, 135, 185, 202	0
2	D	172/182 (94%)	-1.25	0	100	100	59, 137, 186, 212	0
2	F	172/182 (94%)	-1.21	0	100	100	57, 137, 184, 203	0
2	H	172/182 (94%)	-1.17	0	100	100	55, 136, 191, 208	0
All	All	1956/2064 (94%)	-1.38	0	100	100	55, 92, 173, 212	0

There are no RSRZ outliers to report.

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 oligosaccharides in this entry.

6.4 Ligands

There are no ligands in this entry.

6.5 Other polymers

There are no such residues in this entry.