



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 09:09 AM GMT

PDB ID : 3HA0
Title : Crystal structure of the IgE-Fc3-4 domains
Authors : Wurzburg, B.A.
Deposited on : 2009-04-30
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
<http://wwpdb.org/validation/2016/XrayValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467
Mogul : 1.7 (RC4), CSD as536be (2015)
Xtriage (Phenix) : 1.9-1692
EDS : rb-20026688
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)
Refmac : 5.8.0135
CCP4 : 6.5.0
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk26865

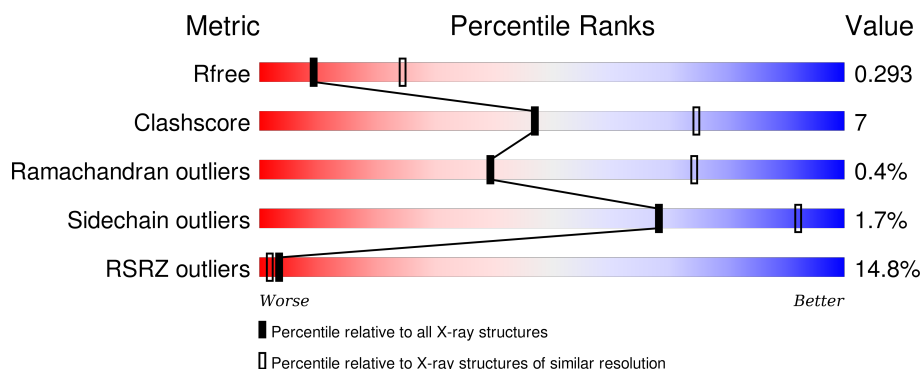
1 Overall quality at a glance

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}	91344	2393 (2.80-2.80)
Clashscore	102246	2827 (2.80-2.80)
Ramachandran outliers	100387	2782 (2.80-2.80)
Sidechain outliers	100360	2784 (2.80-2.80)
RSRZ outliers	91569	2404 (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 on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. 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	223	<div> <div>3%</div> <div>83%</div> <div>11%</div> <div>6%</div> </div>
1	B	223	<div> <div>12%</div> <div>82%</div> <div>11%</div> <div>6%</div> </div>
1	C	223	<div> <div>12%</div> <div>78%</div> <div>15%</div> <div>6%</div> </div>
1	D	223	<div> <div>11%</div> <div>77%</div> <div>16%</div> <div>6%</div> </div>
1	E	223	<div> <div>30%</div> <div>73%</div> <div>19%</div> <div>6%</div> </div>

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Mol	Chain	Length	Quality of chain
1	F	223	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	NAG	B	2	-	-	-	X
2	NAG	C	2	-	-	-	X
2	NAG	E	1	-	-	-	X
2	NAG	F	1	-	-	-	X

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 10276 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 Ig epsilon chain C region.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	209	Total	C	N	O	S	0	0	0
			1640	1027	299	308	6			
1	B	209	Total	C	N	O	S	0	0	0
			1656	1037	305	308	6			
1	C	209	Total	C	N	O	S	0	0	0
			1656	1037	305	308	6			
1	D	209	Total	C	N	O	S	0	0	0
			1656	1037	305	308	6			
1	E	209	Total	C	N	O	S	0	0	0
			1656	1037	305	308	6			
1	F	209	Total	C	N	O	S	0	0	0
			1646	1030	302	308	6			

There are 30 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	325	ALA	-	EXPRESSION TAG	UNP P01854
A	326	ASP	-	EXPRESSION TAG	UNP P01854
A	327	PRO	-	EXPRESSION TAG	UNP P01854
A	371	GLN	ASN	ENGINEERED	UNP P01854
A	383	GLN	ASN	ENGINEERED	UNP P01854
B	325	ALA	-	EXPRESSION TAG	UNP P01854
B	326	ASP	-	EXPRESSION TAG	UNP P01854
B	327	PRO	-	EXPRESSION TAG	UNP P01854
B	371	GLN	ASN	ENGINEERED	UNP P01854
B	383	GLN	ASN	ENGINEERED	UNP P01854
C	325	ALA	-	EXPRESSION TAG	UNP P01854
C	326	ASP	-	EXPRESSION TAG	UNP P01854
C	327	PRO	-	EXPRESSION TAG	UNP P01854
C	371	GLN	ASN	ENGINEERED	UNP P01854
C	383	GLN	ASN	ENGINEERED	UNP P01854
D	325	ALA	-	EXPRESSION TAG	UNP P01854
D	326	ASP	-	EXPRESSION TAG	UNP P01854

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Chain	Residue	Modelled	Actual	Comment	Reference
D	327	PRO	-	EXPRESSION TAG	UNP P01854
D	371	GLN	ASN	ENGINEERED	UNP P01854
D	383	GLN	ASN	ENGINEERED	UNP P01854
E	325	ALA	-	EXPRESSION TAG	UNP P01854
E	326	ASP	-	EXPRESSION TAG	UNP P01854
E	327	PRO	-	EXPRESSION TAG	UNP P01854
E	371	GLN	ASN	ENGINEERED	UNP P01854
E	383	GLN	ASN	ENGINEERED	UNP P01854
F	325	ALA	-	EXPRESSION TAG	UNP P01854
F	326	ASP	-	EXPRESSION TAG	UNP P01854
F	327	PRO	-	EXPRESSION TAG	UNP P01854
F	371	GLN	ASN	ENGINEERED	UNP P01854
F	383	GLN	ASN	ENGINEERED	UNP P01854

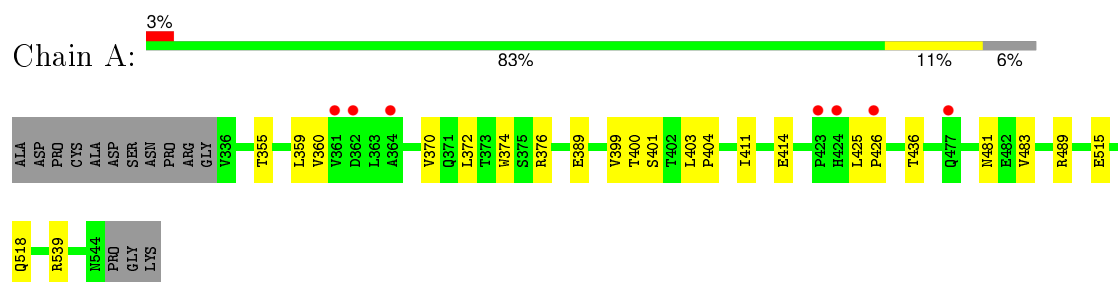
- Molecule 2 is a polymer of unknown type called SUGAR (5-MER).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	5	Total	C	N	O	0	0
			61	34	2	25		
2	B	5	Total	C	N	O	0	0
			61	34	2	25		
2	C	5	Total	C	N	O	0	0
			61	34	2	25		
2	D	5	Total	C	N	O	0	0
			61	34	2	25		
2	E	5	Total	C	N	O	0	0
			61	34	2	25		
2	F	5	Total	C	N	O	0	0
			61	34	2	25		

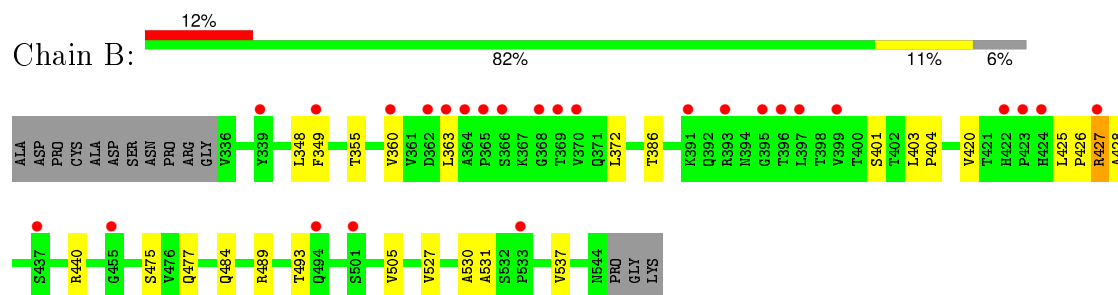
3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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 ($\text{RSRZ} > 2$). 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.

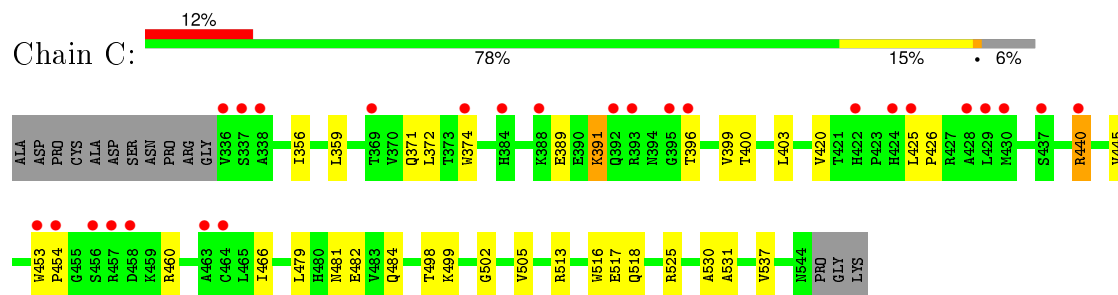
- Molecule 1: Ig epsilon chain C region



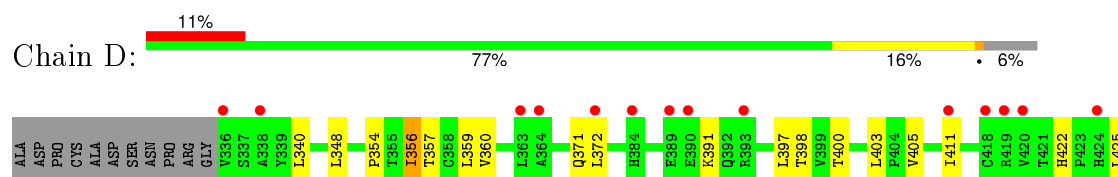
- Molecule 1: Ig epsilon chain C region

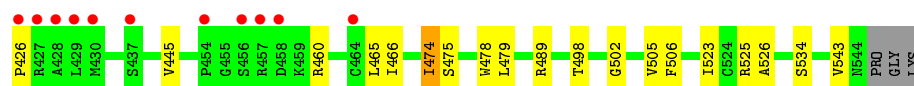


- Molecule 1: Ig epsilon chain C region

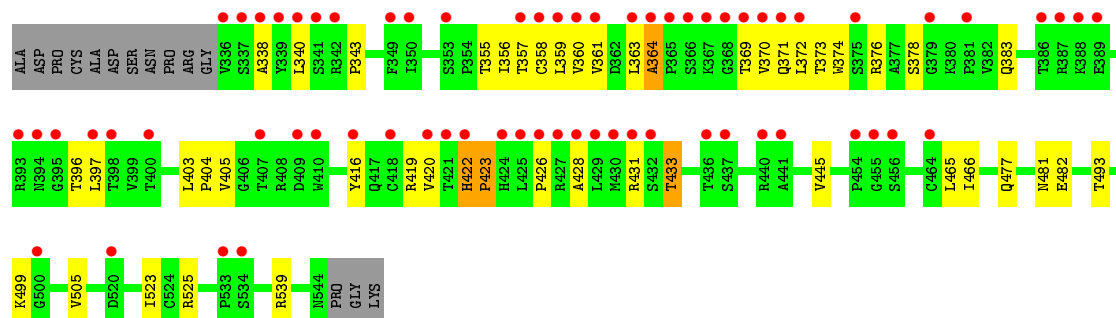
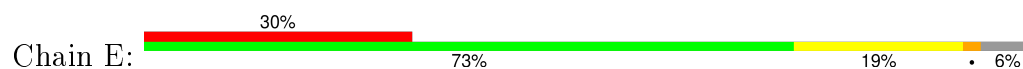


- Molecule 1: Ig epsilon chain C region

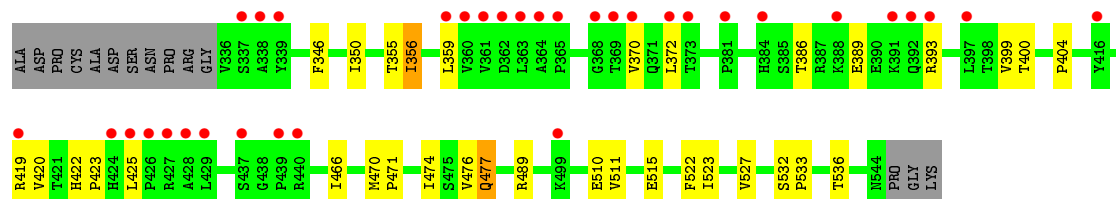
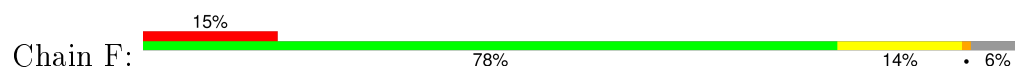




- Molecule 1: Ig epsilon chain C region



- Molecule 1: Ig epsilon chain C region



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	48.90Å 104.90Å 150.00Å 90.00° 96.20° 90.00°	Depositor
Resolution (Å)	29.83 – 2.80 29.82 – 2.80	Depositor EDS
% Data completeness (in resolution range)	100.0 (29.83-2.80) 99.5 (29.82-2.80)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.07	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.24 (at 2.80Å)	Xtriage
Refinement program	REFMAC 5.4.0066	Depositor
R, R_{free}	0.241 , 0.280 0.253 , 0.293	Depositor DCC
R_{free} test set	1860 reflections (5.31%)	DCC
Wilson B-factor (Å ²)	61.8	Xtriage
Anisotropy	0.071	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.28 , 64.6	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Outliers	0 of 36906 reflections	Xtriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	10276	wwPDB-VP
Average B, all atoms (Å ²)	73.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 44.16 % of the origin peak, indicating pseudo translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo translational symmetry is equal to 1.5892e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹ Intensities estimated from amplitudes.

² Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.375 respectively for untwinned datasets, and 0.333, 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: BMA, NAG, MAN

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	0.36	0/1682	0.53	0/2291
1	B	0.35	0/1698	0.50	0/2311
1	C	0.32	0/1698	0.48	0/2311
1	D	0.33	0/1698	0.50	0/2311
1	E	0.27	0/1698	0.46	0/2311
1	F	0.31	0/1688	0.48	0/2298
All	All	0.33	0/10162	0.49	0/13833

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	1640	0	1609	18	0
1	B	1656	0	1641	17	0
1	C	1656	0	1641	29	0
1	D	1656	0	1641	31	0
1	E	1656	0	1643	34	0
1	F	1646	0	1620	31	0
2	A	61	0	52	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	61	0	52	2	0
2	C	61	0	52	1	0
2	D	61	0	52	0	0
2	E	61	0	52	4	0
2	F	61	0	52	0	0
All	All	10276	0	10107	152	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 7.

All (152) 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:C:372:LEU:HD22	1:C:420:VAL:HG22	1.41	1.01
1:A:359:LEU:HD13	1:A:400:THR:HG22	1.55	0.89
1:B:363:LEU:HD22	2:B:1:NAG:H83	1.58	0.85
1:F:359:LEU:HD13	1:F:400:THR:HG22	1.61	0.82
1:D:474:ILE:HD11	1:D:526:ALA:HB1	1.62	0.80
1:D:460:ARG:NH1	1:D:543:VAL:HG13	1.98	0.78
1:A:436:THR:HG22	1:C:453:TRP:HZ2	1.47	0.78
1:B:531:ALA:HB1	1:B:537:VAL:HG23	1.66	0.78
1:E:499:LYS:HZ2	1:F:510:GLU:HG2	1.50	0.75
1:B:425:LEU:O	1:B:425:LEU:HD12	1.85	0.75
1:E:363:LEU:HD22	2:E:1:NAG:H83	1.68	0.74
1:E:499:LYS:NZ	1:F:510:GLU:HG2	2.03	0.73
1:D:359:LEU:HD11	1:D:398:THR:HG23	1.73	0.70
1:E:355:THR:HG22	1:E:404:PRO:HA	1.74	0.70
1:A:436:THR:HG22	1:C:453:TRP:CZ2	2.27	0.70
1:F:370:VAL:HG23	1:F:370:VAL:O	1.91	0.69
1:E:359:LEU:HD21	2:E:2:NAG:H2	1.74	0.69
1:D:425:LEU:O	1:D:425:LEU:HD12	1.94	0.68
1:D:371:GLN:O	1:D:372:LEU:HD23	1.97	0.65
1:B:403:LEU:HD12	1:B:404:PRO:HD2	1.80	0.64
1:B:477:GLN:NE2	1:B:484:GLN:OE1	2.32	0.63
1:C:396:THR:HG21	2:C:1:NAG:H3	1.80	0.62
1:A:360:VAL:HG21	1:A:372:LEU:HD21	1.81	0.62
1:E:370:VAL:HG22	1:E:422:HIS:CD2	2.35	0.61
1:E:363:LEU:O	1:E:364:ALA:HB2	2.01	0.61
1:F:476:VAL:C	1:F:477:GLN:HE21	2.03	0.61
1:D:425:LEU:C	1:D:425:LEU:HD12	2.22	0.60
1:A:436:THR:CG2	1:C:453:TRP:HZ2	2.13	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:361:VAL:HG13	1:E:396:THR:HG21	1.84	0.59
1:E:343:PRO:HD3	1:E:356:ILE:HG22	1.83	0.59
1:F:372:LEU:HD22	1:F:420:VAL:HG22	1.85	0.58
1:A:411:ILE:HG22	1:D:534:SER:HB3	1.86	0.58
1:D:445:VAL:HG13	1:D:466:ILE:HD13	1.86	0.57
1:B:363:LEU:CD2	2:B:1:NAG:H83	2.32	0.57
1:E:356:ILE:HG23	1:E:405:VAL:HG11	1.86	0.57
1:E:445:VAL:HG22	1:E:466:ILE:HG13	1.87	0.56
1:E:376:ARG:HD2	1:E:378:SER:OG	2.05	0.56
1:B:348:LEU:HD23	1:B:349:PHE:CE1	2.41	0.56
1:C:425:LEU:HD12	1:C:426:PRO:HD2	1.88	0.56
1:D:354:PRO:HG2	1:D:405:VAL:HG23	1.88	0.56
1:A:389:GLU:HG2	1:A:399:VAL:HG22	1.88	0.56
1:A:359:LEU:CD1	1:A:400:THR:HG22	2.34	0.55
1:B:372:LEU:HD22	1:B:420:VAL:HG22	1.88	0.55
1:D:359:LEU:HD13	1:D:400:THR:HG22	1.87	0.55
1:F:425:LEU:C	1:F:425:LEU:HD12	2.27	0.55
1:F:372:LEU:CD2	1:F:420:VAL:HG13	2.37	0.54
1:E:482:GLU:HA	1:E:482:GLU:OE1	2.07	0.54
1:B:360:VAL:HG21	1:B:372:LEU:HD21	1.89	0.54
1:E:416:TYR:O	1:E:433:THR:HG22	2.07	0.54
1:E:383:GLN:O	1:E:403:LEU:HD11	2.07	0.54
1:D:391:LYS:HG2	1:D:397:LEU:HD13	1.89	0.54
1:F:466:ILE:HG21	1:F:474:ILE:HD11	1.89	0.54
1:B:425:LEU:HD13	1:B:427:ARG:O	2.08	0.53
1:F:425:LEU:O	1:F:425:LEU:HD12	2.08	0.53
1:E:477:GLN:HE21	1:E:525:ARG:HD2	1.72	0.53
1:D:474:ILE:HD13	1:D:475:SER:N	2.23	0.53
1:C:371:GLN:O	1:C:372:LEU:HD23	2.09	0.53
1:D:460:ARG:CZ	1:D:543:VAL:HG13	2.39	0.53
1:D:340:LEU:HD12	1:D:357:THR:O	2.09	0.52
1:D:445:VAL:HG13	1:D:466:ILE:CD1	2.40	0.52
1:F:489:ARG:NH2	1:F:515:GLU:OE1	2.43	0.52
1:A:370:VAL:O	1:A:370:VAL:HG23	2.10	0.52
1:C:481:ASN:HD21	1:C:518:GLN:CD	2.13	0.51
1:C:440:ARG:HB3	1:C:530:ALA:HB2	1.94	0.50
1:F:356:ILE:H	1:F:356:ILE:HD13	1.75	0.50
1:A:411:ILE:CG2	1:D:534:SER:HB3	2.42	0.49
1:F:372:LEU:HD23	1:F:420:VAL:HG13	1.94	0.49
1:E:374:TRP:CE3	1:E:403:LEU:HD22	2.48	0.49
1:B:493:THR:O	1:B:505:VAL:HG23	2.12	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:338:ALA:HB1	1:E:431:ARG:CZ	2.43	0.48
1:F:350:ILE:HD11	1:F:527:VAL:HG21	1.95	0.48
1:C:513:ARG:NH1	1:C:517:GLU:OE2	2.46	0.48
1:C:479:LEU:HD11	1:C:525:ARG:CZ	2.43	0.48
1:D:478:TRP:C	1:D:479:LEU:HD12	2.33	0.48
1:D:479:LEU:HD21	1:D:525:ARG:NH2	2.28	0.48
1:E:340:LEU:HD12	1:E:357:THR:O	2.12	0.48
1:E:363:LEU:HD22	2:E:1:NAG:C8	2.42	0.47
1:C:531:ALA:HB1	1:C:537:VAL:HG23	1.96	0.47
1:D:466:ILE:HB	1:D:505:VAL:HG13	1.96	0.47
1:C:453:TRP:CG	1:C:454:PRO:HD2	2.50	0.47
1:A:425:LEU:HD12	1:A:426:PRO:HD2	1.97	0.47
1:F:510:GLU:CD	1:F:510:GLU:N	2.69	0.46
1:E:416:TYR:H	1:E:433:THR:HG22	1.80	0.46
1:F:355:THR:HG22	1:F:404:PRO:HA	1.97	0.46
1:D:422:HIS:N	1:D:425:LEU:HD23	2.31	0.46
1:C:481:ASN:O	1:C:482:GLU:C	2.53	0.46
1:F:523:ILE:N	1:F:523:ILE:HD12	2.30	0.46
1:B:425:LEU:C	1:B:425:LEU:HD12	2.35	0.46
1:C:466:ILE:HB	1:C:505:VAL:HG12	1.97	0.46
1:C:374:TRP:CD2	1:C:403:LEU:HD22	2.51	0.46
1:A:374:TRP:CD2	1:A:403:LEU:HD22	2.50	0.46
1:D:359:LEU:CD1	1:D:398:THR:HG23	2.44	0.46
1:E:396:THR:HG22	1:E:397:LEU:N	2.31	0.46
1:A:355:THR:HG22	1:A:404:PRO:HA	1.97	0.46
1:F:350:ILE:HD11	1:F:527:VAL:CG2	2.46	0.45
1:D:479:LEU:HD12	1:D:479:LEU:N	2.31	0.45
1:D:465:LEU:HD13	1:D:506:PHE:CZ	2.50	0.45
1:E:369:THR:HG21	1:E:371:GLN:NE2	2.31	0.45
1:C:479:LEU:HD23	1:C:484:GLN:HA	1.98	0.45
1:D:356:ILE:HD11	1:D:403:LEU:HD23	1.98	0.45
1:F:511:VAL:HG11	1:F:522:PHE:CE2	2.51	0.45
1:E:358:CYS:SG	1:E:359:LEU:N	2.89	0.45
1:C:479:LEU:HD11	1:C:525:ARG:NE	2.32	0.45
1:C:445:VAL:HG13	1:C:466:ILE:CD1	2.47	0.45
1:F:422:HIS:CG	1:F:423:PRO:HD2	2.52	0.45
1:C:479:LEU:HD23	1:C:484:GLN:CA	2.47	0.45
1:D:359:LEU:CD1	1:D:400:THR:HG22	2.48	0.44
1:A:489:ARG:NH2	1:A:515:GLU:OE1	2.50	0.44
1:F:527:VAL:HG22	1:F:536:THR:HG22	2.00	0.44
1:E:363:LEU:CD2	2:E:1:NAG:H83	2.43	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:359:LEU:HD13	1:C:400:THR:HG22	1.98	0.44
1:F:389:GLU:HG3	1:F:399:VAL:HG22	2.00	0.44
1:B:355:THR:HG22	1:B:404:PRO:HA	2.00	0.44
1:E:372:LEU:CD2	1:E:420:VAL:HG22	2.48	0.44
1:D:348:LEU:HD11	1:D:411:ILE:CD1	2.48	0.43
1:C:389:GLU:HG2	1:C:399:VAL:HG13	2.00	0.43
1:F:477:GLN:HE21	1:F:477:GLN:N	2.16	0.43
1:C:479:LEU:HD23	1:C:484:GLN:N	2.34	0.43
1:F:370:VAL:CG2	1:F:370:VAL:O	2.63	0.43
1:C:499:LYS:HZ1	1:D:489:ARG:HH11	1.66	0.43
1:F:477:GLN:N	1:F:477:GLN:NE2	2.67	0.42
1:F:466:ILE:HG21	1:F:474:ILE:CD1	2.49	0.42
1:D:391:LYS:HB3	1:D:391:LYS:NZ	2.34	0.42
1:A:370:VAL:O	1:A:370:VAL:CG2	2.66	0.42
1:F:346:PHE:HD1	1:F:350:ILE:HD12	1.85	0.42
1:A:481:ASN:HD21	1:A:518:GLN:NE2	2.17	0.42
1:A:372:LEU:HD12	1:A:401:SER:HB2	2.02	0.42
1:B:420:VAL:O	1:B:428:ALA:HB1	2.19	0.42
1:E:369:THR:HG21	1:E:371:GLN:HE21	1.83	0.42
1:A:376:ARG:HD3	1:A:414:GLU:HG2	2.00	0.42
1:C:498:THR:HG23	1:C:502:GLY:O	2.20	0.42
1:D:359:LEU:HD12	1:D:360:VAL:H	1.85	0.42
1:B:386:THR:O	1:B:401:SER:HA	2.20	0.42
1:E:419:ARG:NH2	1:E:428:ALA:HB2	2.35	0.42
1:D:523:ILE:N	1:D:523:ILE:HD12	2.34	0.42
1:C:359:LEU:CD1	1:C:400:THR:HG22	2.50	0.41
1:E:422:HIS:ND1	1:E:423:PRO:HD2	2.34	0.41
1:E:465:LEU:HD12	1:E:466:ILE:N	2.36	0.41
1:B:440:ARG:HB3	1:B:530:ALA:HB2	2.02	0.41
1:C:372:LEU:CD2	1:C:420:VAL:HG13	2.50	0.41
1:E:373:THR:HB	1:E:419:ARG:HB3	2.02	0.41
1:F:470:MET:HA	1:F:471:PRO:C	2.41	0.41
1:B:475:SER:HB2	1:B:527:VAL:HB	2.03	0.41
1:E:523:ILE:N	1:E:523:ILE:HD12	2.36	0.41
1:C:513:ARG:HA	1:C:516:TRP:CH2	2.56	0.41
1:E:360:VAL:HG21	1:E:420:VAL:HG21	2.03	0.41
1:F:372:LEU:CD2	1:F:420:VAL:HG22	2.51	0.40
1:D:498:THR:HG23	1:D:502:GLY:O	2.21	0.40
1:F:532:SER:HB2	1:F:533:PRO:HA	2.03	0.40
1:F:350:ILE:CD1	1:F:527:VAL:HG21	2.52	0.40
1:E:493:THR:OG1	1:E:505:VAL:HG23	2.22	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:391:LYS:N	1:C:391:LYS:HD3	2.36	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	207/223 (93%)	200 (97%)	7 (3%)	0	100	100
1	B	207/223 (93%)	198 (96%)	8 (4%)	1 (0%)	34	69
1	C	207/223 (93%)	199 (96%)	8 (4%)	0	100	100
1	D	207/223 (93%)	197 (95%)	9 (4%)	1 (0%)	34	69
1	E	207/223 (93%)	175 (84%)	29 (14%)	3 (1%)	14	42
1	F	207/223 (93%)	197 (95%)	10 (5%)	0	100	100
All	All	1242/1338 (93%)	1166 (94%)	71 (6%)	5 (0%)	39	74

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	E	364	ALA
1	D	426	PRO
1	E	423	PRO
1	E	426	PRO
1	B	426	PRO

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	182/195 (93%)	180 (99%)	2 (1%)	80	95
1	B	185/195 (95%)	183 (99%)	2 (1%)	80	95
1	C	185/195 (95%)	181 (98%)	4 (2%)	60	89
1	D	185/195 (95%)	183 (99%)	2 (1%)	80	95
1	E	185/195 (95%)	181 (98%)	4 (2%)	60	89
1	F	183/195 (94%)	178 (97%)	5 (3%)	52	85
All	All	1105/1170 (94%)	1086 (98%)	19 (2%)	68	92

All (19) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	483	VAL
1	A	539	ARG
1	B	427	ARG
1	B	489	ARG
1	C	356	ILE
1	C	391	LYS
1	C	440	ARG
1	C	460	ARG
1	D	356	ILE
1	D	474	ILE
1	E	422	HIS
1	E	433	THR
1	E	481	ASN
1	E	539	ARG
1	F	356	ILE
1	F	386	THR
1	F	393	ARG
1	F	419	ARG
1	F	477	GLN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (17) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	481	ASN
1	A	484	GLN
1	A	494	GLN

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Mol	Chain	Res	Type
1	B	477	GLN
1	C	477	GLN
1	C	481	ASN
1	C	494	GLN
1	C	535	GLN
1	D	477	GLN
1	D	481	ASN
1	D	484	GLN
1	D	490	HIS
1	D	518	GLN
1	E	371	GLN
1	F	468	ASN
1	F	477	GLN
1	F	484	GLN

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 ⓘ

30 carbohydrates 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	$\# Z > 2$
2	NAG	A	1	1,2	14,14,15	0.44	0	15,19,21	0.94	1 (6%)
2	NAG	A	2	2	14,14,15	0.53	0	15,19,21	0.93	1 (6%)
2	BMA	A	3	2	11,11,12	0.55	0	14,15,17	1.10	1 (7%)
2	MAN	A	4	2	11,11,12	0.56	0	14,15,17	0.79	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	MAN	A	5	2	11,11,12	0.56	0	14,15,17	0.94	1 (7%)
2	NAG	B	1	1,2	14,14,15	0.47	0	15,19,21	0.79	0
2	NAG	B	2	2	14,14,15	0.54	0	15,19,21	0.87	0
2	BMA	B	3	2	11,11,12	0.61	0	14,15,17	1.06	1 (7%)
2	MAN	B	4	2	11,11,12	0.56	0	14,15,17	0.83	0
2	MAN	B	5	2	11,11,12	0.52	0	14,15,17	1.13	1 (7%)
2	NAG	C	1	1,2	14,14,15	0.54	0	15,19,21	0.58	0
2	NAG	C	2	2	14,14,15	0.50	0	15,19,21	0.73	0
2	BMA	C	3	2	11,11,12	0.61	0	14,15,17	1.43	3 (21%)
2	MAN	C	4	2	11,11,12	0.64	0	14,15,17	1.34	2 (14%)
2	MAN	C	5	2	11,11,12	0.55	0	14,15,17	1.14	1 (7%)
2	NAG	D	1	1,2	14,14,15	0.47	0	15,19,21	0.88	0
2	NAG	D	2	2	14,14,15	0.55	0	15,19,21	1.08	0
2	BMA	D	3	2	11,11,12	0.59	0	14,15,17	1.46	3 (21%)
2	MAN	D	4	2	11,11,12	0.62	0	14,15,17	0.95	0
2	MAN	D	5	2	11,11,12	0.54	0	14,15,17	1.04	1 (7%)
2	NAG	E	1	1,2	14,14,15	0.42	0	15,19,21	0.94	1 (6%)
2	NAG	E	2	2	14,14,15	0.50	0	15,19,21	0.80	1 (6%)
2	BMA	E	3	2	11,11,12	0.59	0	14,15,17	0.88	1 (7%)
2	MAN	E	4	2	11,11,12	0.59	0	14,15,17	0.69	0
2	MAN	E	5	2	11,11,12	0.55	0	14,15,17	1.14	1 (7%)
2	NAG	F	1	1,2	14,14,15	0.47	0	15,19,21	0.63	0
2	NAG	F	2	2	14,14,15	0.48	0	15,19,21	0.73	1 (6%)
2	BMA	F	3	2	11,11,12	0.62	0	14,15,17	1.07	1 (7%)
2	MAN	F	4	2	11,11,12	0.48	0	14,15,17	0.94	1 (7%)
2	MAN	F	5	2	11,11,12	0.56	0	14,15,17	0.88	1 (7%)

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	NAG	A	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	A	2	2	-	0/6/23/26	0/1/1/1
2	BMA	A	3	2	-	0/2/19/22	0/1/1/1
2	MAN	A	4	2	-	0/2/19/22	0/1/1/1
2	MAN	A	5	2	-	0/2/19/22	0/1/1/1
2	NAG	B	1	1,2	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	B	2	2	-	0/6/23/26	0/1/1/1
2	BMA	B	3	2	-	0/2/19/22	0/1/1/1
2	MAN	B	4	2	-	0/2/19/22	0/1/1/1
2	MAN	B	5	2	-	0/2/19/22	0/1/1/1
2	NAG	C	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	C	2	2	-	0/6/23/26	0/1/1/1
2	BMA	C	3	2	-	0/2/19/22	0/1/1/1
2	MAN	C	4	2	-	0/2/19/22	0/1/1/1
2	MAN	C	5	2	-	0/2/19/22	0/1/1/1
2	NAG	D	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	D	2	2	-	0/6/23/26	0/1/1/1
2	BMA	D	3	2	-	0/2/19/22	0/1/1/1
2	MAN	D	4	2	-	0/2/19/22	0/1/1/1
2	MAN	D	5	2	-	0/2/19/22	0/1/1/1
2	NAG	E	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	E	2	2	-	0/6/23/26	0/1/1/1
2	BMA	E	3	2	-	0/2/19/22	0/1/1/1
2	MAN	E	4	2	-	0/2/19/22	0/1/1/1
2	MAN	E	5	2	-	0/2/19/22	0/1/1/1
2	NAG	F	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	F	2	2	-	0/6/23/26	0/1/1/1
2	BMA	F	3	2	-	0/2/19/22	0/1/1/1
2	MAN	F	4	2	-	0/2/19/22	0/1/1/1
2	MAN	F	5	2	-	0/2/19/22	0/1/1/1

There are no bond length outliers.

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	4	MAN	O5-C1-C2	-2.89	106.17	110.86
2	C	3	BMA	O5-C1-C2	-2.64	106.57	110.86
2	C	3	BMA	C1-C2-C3	-2.36	106.75	109.54
2	D	3	BMA	O3-C3-C2	-2.15	106.11	110.00
2	D	3	BMA	C2-C3-C4	-2.09	107.50	111.04
2	F	3	BMA	O5-C1-C2	-2.02	107.58	110.86
2	B	3	BMA	C1-O5-C5	2.02	114.81	112.25
2	C	4	MAN	C1-O5-C5	2.02	114.81	112.25
2	F	2	NAG	C1-O5-C5	2.05	114.86	112.25
2	A	2	NAG	C1-O5-C5	2.09	114.90	112.25
2	A	1	NAG	O5-C5-C6	2.09	111.87	107.35
2	C	3	BMA	O3-C3-C4	2.15	115.18	110.34
2	E	2	NAG	C1-O5-C5	2.23	115.08	112.25

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	3	BMA	C1-O5-C5	2.23	115.08	112.25
2	F	5	MAN	C1-O5-C5	2.42	115.32	112.25
2	F	4	MAN	C1-O5-C5	2.47	115.38	112.25
2	A	5	MAN	C1-O5-C5	2.53	115.47	112.25
2	D	3	BMA	O3-C3-C4	2.55	116.08	110.34
2	E	1	NAG	C1-O5-C5	2.56	115.50	112.25
2	A	3	BMA	O3-C3-C4	2.61	116.21	110.34
2	D	5	MAN	C1-O5-C5	2.82	115.83	112.25
2	C	5	MAN	C1-O5-C5	2.88	115.90	112.25
2	B	5	MAN	C1-O5-C5	3.09	116.17	112.25
2	E	5	MAN	C1-O5-C5	3.33	116.48	112.25

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	1	NAG	2	0
2	C	1	NAG	1	0
2	E	1	NAG	3	0
2	E	2	NAG	1	0

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [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, 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	209/223 (93%)	0.31	7 (3%) 50 38	37, 54, 76, 82	0
1	B	209/223 (93%)	0.62	26 (12%) 5 2	45, 58, 86, 92	0
1	C	209/223 (93%)	0.87	26 (12%) 5 2	55, 74, 98, 104	0
1	D	209/223 (93%)	0.84	25 (11%) 6 3	44, 70, 94, 101	0
1	E	209/223 (93%)	1.85	67 (32%) 1 0	65, 93, 124, 126	0
1	F	209/223 (93%)	0.93	34 (16%) 2 1	54, 72, 101, 103	0
All	All	1254/1338 (93%)	0.91	185 (14%) 3 2	37, 69, 115, 126	0

All (185) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	420	VAL	13.3
1	E	370	VAL	12.8
1	E	363	LEU	9.7
1	E	365	PRO	9.1
1	E	431	ARG	8.5
1	C	338	ALA	8.4
1	C	395	GLY	8.4
1	F	426	PRO	8.4
1	E	367	LYS	7.6
1	E	364	ALA	7.5
1	E	400	THR	7.2
1	E	339	TYR	7.0
1	E	336	VAL	6.8
1	B	364	ALA	6.8
1	C	393	ARG	6.6
1	E	426	PRO	6.5
1	A	423	PRO	6.5
1	E	340	LEU	6.3
1	E	422	HIS	6.1

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Mol	Chain	Res	Type	RSRZ
1	B	363	LEU	6.1
1	E	366	SER	6.0
1	B	397	LEU	5.8
1	B	362	ASP	5.7
1	E	397	LEU	5.5
1	E	432	SER	5.4
1	D	428	ALA	5.4
1	F	337	SER	5.4
1	E	416	TYR	5.1
1	F	362	ASP	4.9
1	B	396	THR	4.9
1	B	395	GLY	4.9
1	F	361	VAL	4.8
1	E	368	GLY	4.8
1	E	349	PHE	4.6
1	D	363	LEU	4.6
1	C	392	GLN	4.6
1	E	394	ASN	4.6
1	D	454	PRO	4.5
1	E	430	MET	4.5
1	C	457	ARG	4.5
1	E	360	VAL	4.4
1	E	369	THR	4.4
1	E	410	TRP	4.3
1	E	337	SER	4.3
1	E	358	CYS	4.2
1	D	427	ARG	4.1
1	B	399	VAL	4.1
1	E	353	SER	4.1
1	C	337	SER	4.1
1	D	393	ARG	4.1
1	E	361	VAL	4.1
1	B	369	THR	4.0
1	F	429	LEU	4.0
1	D	429	LEU	4.0
1	E	359	LEU	4.0
1	A	424	HIS	3.9
1	B	368	GLY	3.9
1	E	424	HIS	3.9
1	C	336	VAL	3.9
1	E	437	SER	3.9
1	E	398	THR	3.8

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Mol	Chain	Res	Type	RSRZ
1	B	365	PRO	3.8
1	C	422	HIS	3.8
1	C	396	THR	3.8
1	E	395	GLY	3.8
1	A	362	ASP	3.7
1	B	437	SER	3.7
1	F	393	ARG	3.7
1	B	422	HIS	3.7
1	B	424	HIS	3.6
1	F	397	LEU	3.6
1	F	369	THR	3.5
1	C	456	SER	3.5
1	E	388	LYS	3.5
1	E	455	GLY	3.5
1	D	420	VAL	3.4
1	B	533	PRO	3.4
1	F	427	ARG	3.4
1	D	419	ARG	3.4
1	E	371	GLN	3.4
1	C	454	PRO	3.4
1	B	339	TYR	3.3
1	E	375	SER	3.3
1	A	426	PRO	3.3
1	C	424	HIS	3.3
1	F	425	LEU	3.3
1	D	457	ARG	3.3
1	C	458	ASP	3.3
1	D	426	PRO	3.3
1	F	363	LEU	3.3
1	E	393	ARG	3.3
1	A	364	ALA	3.2
1	C	453	TRP	3.2
1	E	436	THR	3.2
1	E	338	ALA	3.2
1	B	501	SER	3.2
1	F	424	HIS	3.2
1	D	418	CYS	3.2
1	D	372	LEU	3.1
1	B	393	ARG	3.1
1	A	361	VAL	3.1
1	D	336	VAL	3.0
1	E	357	THR	3.0

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Mol	Chain	Res	Type	RSRZ
1	F	368	GLY	3.0
1	E	342	ARG	3.0
1	E	440	ARG	3.0
1	E	386	THR	3.0
1	C	437	SER	3.0
1	E	454	PRO	3.0
1	F	359	LEU	3.0
1	E	350	ILE	3.0
1	F	384	HIS	3.0
1	F	364	ALA	2.9
1	C	369	THR	2.9
1	D	437	SER	2.9
1	D	424	HIS	2.9
1	B	366	SER	2.9
1	B	370	VAL	2.8
1	C	464	CYS	2.8
1	B	455	GLY	2.8
1	D	456	SER	2.8
1	E	425	LEU	2.8
1	F	365	PRO	2.8
1	C	388	LYS	2.7
1	D	411	ILE	2.7
1	B	427	ARG	2.7
1	F	419	ARG	2.6
1	C	430	MET	2.6
1	E	421	THR	2.6
1	E	418	CYS	2.6
1	F	370	VAL	2.6
1	E	387	ARG	2.6
1	F	392	GLN	2.6
1	F	437	SER	2.6
1	B	391	LYS	2.5
1	F	391	LYS	2.5
1	E	381	PRO	2.5
1	F	360	VAL	2.5
1	E	429	LEU	2.5
1	F	416	TYR	2.5
1	E	341	SER	2.5
1	E	409	ASP	2.5
1	F	439	PRO	2.5
1	C	374	TRP	2.5
1	E	372	LEU	2.5

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Mol	Chain	Res	Type	RSRZ
1	D	364	ALA	2.5
1	F	388	LYS	2.5
1	E	379	GLY	2.5
1	D	430	MET	2.4
1	E	407	THR	2.4
1	C	429	LEU	2.4
1	C	428	ALA	2.4
1	E	520	ASP	2.4
1	F	373	THR	2.4
1	D	458	ASP	2.4
1	E	428	ALA	2.3
1	E	464	CYS	2.3
1	F	372	LEU	2.3
1	D	389	GLU	2.3
1	B	360	VAL	2.3
1	E	427	ARG	2.3
1	E	534	SER	2.2
1	B	494	GLN	2.2
1	F	381	PRO	2.2
1	F	440	ARG	2.2
1	F	339	TYR	2.2
1	C	425	LEU	2.2
1	D	464	CYS	2.2
1	F	428	ALA	2.2
1	F	499	LYS	2.2
1	C	440	ARG	2.1
1	C	463	ALA	2.1
1	F	338	ALA	2.1
1	D	338	ALA	2.1
1	B	349	PHE	2.1
1	E	456	SER	2.1
1	E	500	GLY	2.1
1	D	390	GLU	2.1
1	B	423	PRO	2.1
1	A	477	GLN	2.0
1	C	384	HIS	2.0
1	E	389	GLU	2.0
1	E	441	ALA	2.0
1	E	533	PRO	2.0
1	D	384	HIS	2.0

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 ⓘ

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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(Å ²)	Q<0.9
2	NAG	B	2	14/15	0.73	0.42	1.57	96,96,96,97	0
2	NAG	F	1	14/15	0.14	0.62	0.93	100,101,101,102	0
2	NAG	C	2	14/15	0.73	0.42	0.52	95,96,96,97	0
2	NAG	E	1	14/15	0.46	0.59	0.37	111,112,112,112	0
2	NAG	D	1	14/15	0.68	0.34	0.19	97,97,98,99	0
2	NAG	B	1	14/15	0.72	0.36	-0.20	93,94,94,95	0
2	NAG	A	1	14/15	0.82	0.25	-0.56	76,77,79,80	0
2	NAG	A	2	14/15	0.93	0.18	-2.11	81,82,84,86	0
2	MAN	F	4	11/12	0.63	0.31	-	107,107,107,107	0
2	MAN	B	5	11/12	0.50	0.36	-	99,99,99,99	0
2	BMA	B	3	11/12	0.70	0.28	-	98,98,99,100	0
2	MAN	B	4	11/12	0.65	0.36	-	100,100,101,101	0
2	BMA	F	3	11/12	0.58	0.19	-	104,105,106,106	0
2	MAN	E	5	11/12	0.50	0.35	-	109,109,109,109	0
2	MAN	E	4	11/12	0.55	0.37	-	109,109,109,109	0
2	MAN	D	5	11/12	0.50	0.39	-	102,103,103,103	0
2	MAN	F	5	11/12	0.67	0.20	-	104,105,105,105	0
2	BMA	E	3	11/12	0.32	0.53	-	109,109,110,110	0
2	BMA	A	3	11/12	0.79	0.20	-	88,89,91,93	0
2	MAN	C	4	11/12	0.80	0.25	-	95,96,96,96	0
2	NAG	F	2	14/15	0.65	0.30	-	102,103,103,104	0
2	MAN	A	5	11/12	0.78	0.19	-	90,91,91,91	0
2	BMA	D	3	11/12	0.61	0.23	-	102,102,103,104	0
2	NAG	D	2	14/15	0.75	0.46	-	100,101,101,102	0
2	MAN	A	4	11/12	0.48	0.33	-	94,94,94,94	0
2	MAN	D	4	11/12	0.68	0.28	-	105,105,106,106	0
2	BMA	C	3	11/12	0.61	0.31	-	96,97,98,99	0
2	NAG	C	1	14/15	0.72	0.27	-	94,95,95,95	0
2	NAG	E	2	14/15	0.44	0.65	-	110,110,111,111	0
2	MAN	C	5	11/12	0.35	0.41	-	100,100,101,101	0

6.4 Ligands

There are no ligands in this entry.

6.5 Other polymers

There are no such residues in this entry.