



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 08:08 AM UTC

PDB ID : 1VKX / pdb_00001vkx
Title : CRYSTAL STRUCTURE OF THE NFKB P50/P65 HETERODIMER COM-
PLEXED TO THE IMMUNOGLOBULIN KB DNA
Authors : Chen, F.; Huang, D.B.; Ghosh, G.
Deposited on : 1997-09-17
Resolution : 2.90 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
Xtriage (Phenix) : **NOT EXECUTED**
EDS : **NOT EXECUTED**
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

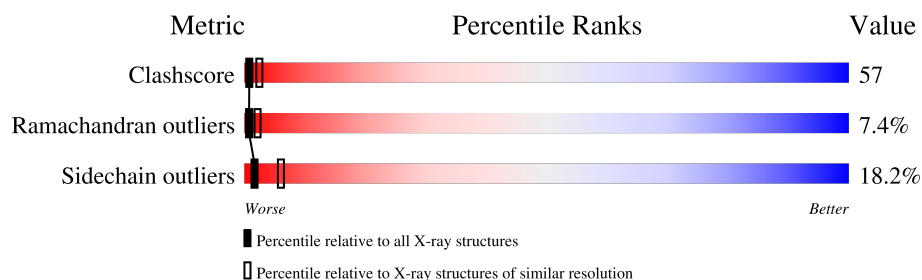
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.90 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))
Clashscore	190562	2690 (2.90-2.90)
Ramachandran outliers	187476	2623 (2.90-2.90)
Sidechain outliers	187428	2625 (2.90-2.90)

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 $\leq 5\%$.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	C	12	8% 58% 25% 8%
2	D	12	17% 83%
3	A	273	26% 53% 19% .
4	B	312	28% 49% 21% .

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 5116 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 DNA chain called DNA (5'-D(*TP*GP*GP*GP*GP*AP*CP*TP*TP*TP*CP*C)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	C	12	Total	C	N	O	P	0	0	0
			243	117	42	73	11			

- Molecule 2 is a DNA chain called DNA (5'-D(*AP*GP*GP*AP*AP*AP*GP*TP*CP*CP*CP*C)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	D	12	Total	C	N	O	P	0	0	0
			243	116	49	67	11			

- Molecule 3 is a protein called PROTEIN (NF-KAPPA B P65 SUBUNIT).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	A	273	Total	C	N	O	S	0	0	0
			2176	1356	401	408	11			

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	19	ALA	PRO	conflict	UNP Q04207

- Molecule 4 is a protein called PROTEIN (NF-KAPPA B P50 SUBUNIT).

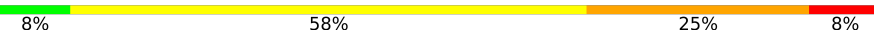
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	B	312	Total	C	N	O	S	0	0	0
			2454	1554	428	460	12			

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. 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. 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.

Note EDS was not executed.

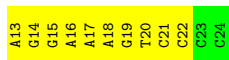
- Molecule 1: DNA (5'-D(*TP*GP*GP*GP*GP*AP*CP*TP*TP*TP*CP*C)-3')

Chain C: 

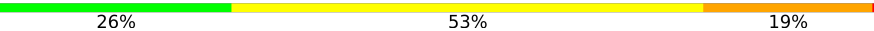


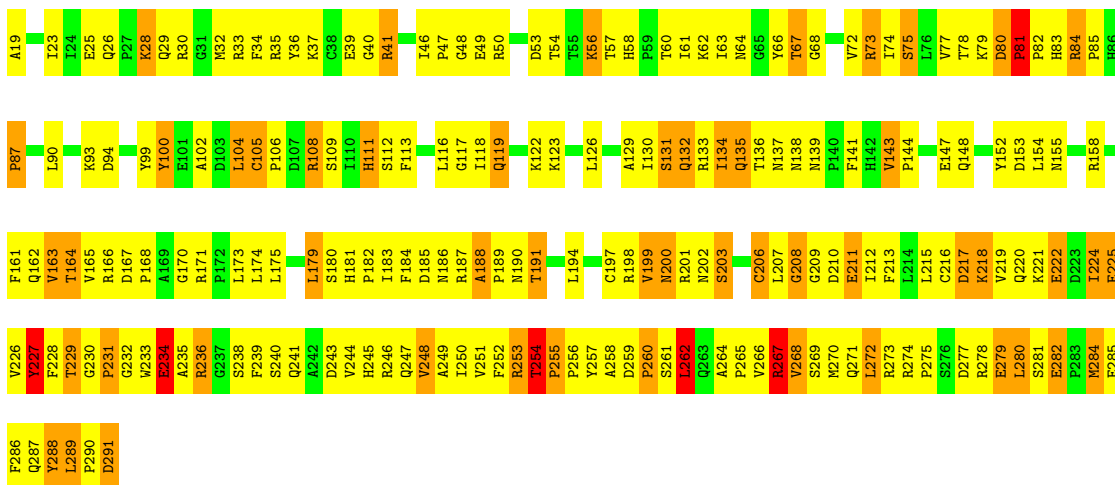
- Molecule 2: DNA (5'-D(*AP*GP*GP*AP*AP*AP*GP*TP*CP*CP*CP*C)-3')

Chain D: 

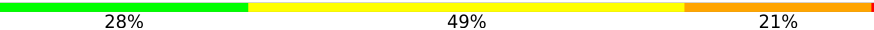


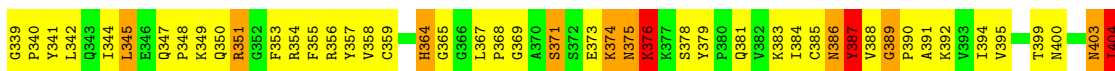
- Molecule 3: PROTEIN (NF-KAPPA B P65 SUBUNIT)

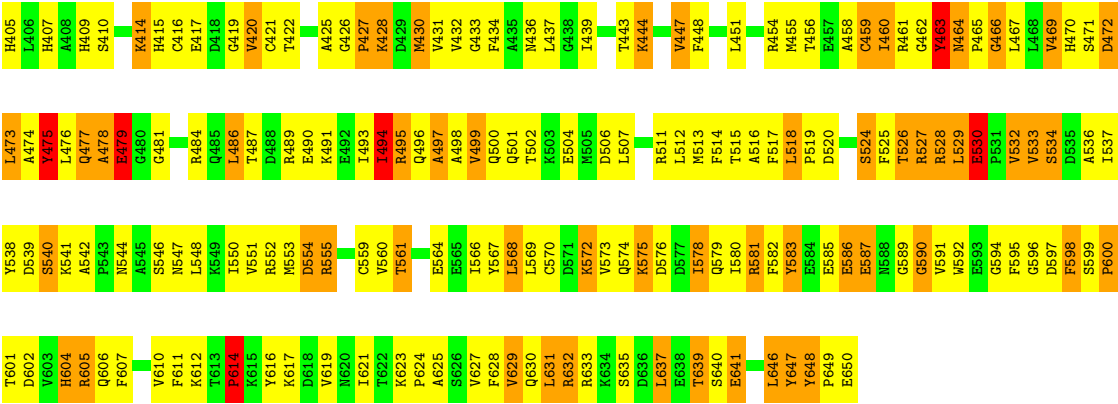
Chain A: 



- Molecule 4: PROTEIN (NF-KAPPA B P50 SUBUNIT)

Chain B: 





4 Data and refinement statistics

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, α , β , γ	106.61Å 106.61Å 206.56Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	8.00 – 2.90	Depositor
% Data completeness (in resolution range)	(Not available) (8.00-2.90)	Depositor
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	X-PLOR	Depositor
R, R_{free}	0.208 , 0.320	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	5116	wwPDB-VP
Average B, all atoms (Å ²)	27.0	wwPDB-VP

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	C	0.57	0/271	1.05	2/417 (0.5%)
2	D	0.52	0/273	0.82	0/419
3	A	0.85	2/2228 (0.1%)	1.47	41/3021 (1.4%)
4	B	0.82	1/2506 (0.0%)	1.32	33/3384 (1.0%)
All	All	0.81	3/5278 (0.1%)	1.35	76/7241 (1.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	C	0	3
3	A	0	1
4	B	0	2
All	All	0	6

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	118	ILE	C-N	-7.57	1.22	1.33
4	B	639	THR	CA-C	-6.19	1.50	1.53
3	A	119	GLN	C-N	-5.15	1.25	1.33

All (76) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	135	GLN	N-CA-C	-12.13	95.59	111.24
3	A	81	PRO	CA-C-N	-11.17	106.27	120.79
3	A	81	PRO	C-N-CA	-11.17	106.27	120.79
3	A	254	THR	CA-C-N	10.67	127.45	119.66
3	A	254	THR	C-N-CA	10.67	127.45	119.66
4	B	386	ASN	N-CA-C	-10.53	97.53	111.74

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	68	GLY	CA-C-N	9.78	129.53	119.76
3	A	68	GLY	C-N-CA	9.78	129.53	119.76
4	B	527	ARG	N-CA-C	9.68	125.53	109.46
3	A	105	CYS	CA-C-N	9.63	129.38	119.56
3	A	105	CYS	C-N-CA	9.63	129.38	119.56
3	A	217	ASP	N-CA-C	-9.13	97.35	110.59
4	B	472	ASP	N-CA-C	-9.08	101.46	112.54
3	A	248	VAL	N-CA-C	8.54	119.78	111.67
3	A	232	GLY	N-CA-C	-8.48	103.00	114.95
3	A	289	LEU	N-CA-C	8.28	119.65	110.13
4	B	404	ILE	N-CA-C	8.22	119.05	107.37
4	B	530	GLU	CA-C-N	8.01	128.64	119.99
4	B	530	GLU	C-N-CA	8.01	128.64	119.99
1	C	12	DC	C2'-C3'-O3'	-7.81	99.78	111.50
3	A	188	ALA	CA-C-N	7.61	129.35	119.84
3	A	188	ALA	C-N-CA	7.61	129.35	119.84
3	A	131	SER	N-CA-C	-7.57	102.39	111.69
3	A	282	GLU	N-CA-C	-7.56	98.59	109.48
3	A	81	PRO	N-CA-C	7.51	119.86	110.70
4	B	525	PHE	N-CA-C	-7.47	97.52	109.39
4	B	526	THR	N-CA-C	7.45	119.04	111.07
4	B	430	MET	N-CA-C	7.23	120.21	111.82
4	B	641	GLU	N-CA-C	-7.22	99.46	109.71
4	B	463	TYR	N-CA-C	-7.13	103.68	112.38
3	A	163	VAL	N-CA-C	7.05	120.27	109.12
3	A	265	PRO	N-CA-C	6.81	126.49	112.47
4	B	635	SER	N-CA-C	6.71	118.25	111.07
4	B	600	PRO	N-CA-C	-6.39	104.54	113.81
4	B	447	VAL	N-CA-C	6.35	116.46	110.30
3	A	203	SER	N-CA-C	6.34	117.98	111.14
4	B	534	SER	N-CA-C	6.31	119.06	110.35
4	B	387	TYR	N-CA-C	6.29	124.19	110.80
3	A	256	PRO	N-CA-C	-6.21	101.44	111.19
4	B	497	ALA	N-CA-C	-6.11	104.70	111.36
3	A	255	PRO	CA-C-N	-6.11	113.66	119.76
3	A	255	PRO	C-N-CA	-6.11	113.66	119.76
4	B	486	LEU	N-CA-C	-6.09	100.70	110.14
3	A	255	PRO	N-CA-C	6.03	116.26	110.47
3	A	106	PRO	N-CA-C	6.02	121.66	113.84
4	B	459	CYS	N-CA-C	-5.97	105.26	112.54
4	B	631	LEU	N-CA-C	-5.94	102.65	110.43
3	A	46	ILE	CB-CA-C	-5.84	104.58	110.89

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	53	ASP	N-CA-C	5.75	119.11	111.75
4	B	639	THR	CB-CA-C	-5.64	108.24	116.53
4	B	428	LYS	N-CA-C	-5.60	105.79	113.30
4	B	466	GLY	N-CA-C	-5.57	108.21	114.40
3	A	264	ALA	CA-C-N	5.55	126.78	119.84
3	A	264	ALA	C-N-CA	5.55	126.78	119.84
4	B	583	TYR	N-CA-C	5.55	117.52	108.76
3	A	85	PRO	N-CA-C	-5.54	101.80	110.50
4	B	464	ASN	CA-C-N	5.54	125.85	119.92
4	B	464	ASN	C-N-CA	5.54	125.85	119.92
4	B	371	SER	N-CA-C	5.53	117.64	108.13
4	B	464	ASN	N-CA-C	-5.46	99.34	108.94
3	A	267	ARG	N-CA-C	5.44	116.21	108.54
3	A	80	ASP	N-CA-C	5.43	118.54	109.09
4	B	604	HIS	N-CA-C	5.33	116.93	108.67
4	B	369	GLY	N-CA-C	-5.32	104.05	112.66
4	B	386	ASN	CA-C-N	5.26	131.59	121.54
4	B	386	ASN	C-N-CA	5.26	131.59	121.54
3	A	122	LYS	N-CA-C	-5.23	102.12	109.96
1	C	1	DT	C3'-C2'-C1'	-5.18	93.83	101.60
3	A	80	ASP	CA-C-N	5.15	125.68	120.38
3	A	80	ASP	C-N-CA	5.15	125.68	120.38
4	B	494	ILE	N-CA-C	-5.11	106.09	110.74
3	A	87	PRO	N-CA-C	5.06	120.41	113.84
3	A	119	GLN	CA-C-N	-5.02	113.60	122.74
3	A	119	GLN	C-N-CA	-5.02	113.60	122.74
3	A	183	ILE	N-CA-C	-5.02	101.25	108.48
3	A	208	GLY	N-CA-C	5.00	125.04	113.18

There are no chirality outliers.

All (6) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	A	227	TYR	Sidechain
4	B	387	TYR	Sidechain
4	B	648	TYR	Sidechain
1	C	1	DT	Sidechain
1	C	3	DG	Sidechain
1	C	9	DT	Sidechain

5.2 Too-close contacts

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	C	243	0	138	40	0
2	D	243	0	135	37	0
3	A	2176	0	2137	232	0
4	B	2454	0	2449	288	0
All	All	5116	0	4859	570	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 57.

All (570) 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:D:19:DG:C8	2:D:20:DT:H72	1.77	1.18
4:B:487:THR:HB	4:B:490:GLU:HB2	1.26	1.17
2:D:13:DA:H2''	2:D:14:DG:H5''	1.22	1.16
1:C:2:DG:H2''	1:C:3:DG:C5'	1.82	1.10
4:B:465:PRO:HB2	4:B:467:LEU:HD13	1.32	1.08
1:C:2:DG:H2''	1:C:3:DG:H5'	1.35	1.06
4:B:390:PRO:HA	4:B:426:GLY:HA2	1.36	1.05
3:A:33:ARG:HH21	3:A:35:ARG:HH12	1.07	1.02
4:B:559:CYS:SG	4:B:561:THR:HG23	2.01	0.98
4:B:520:ASP:HB3	4:B:526:THR:HB	1.43	0.97
3:A:33:ARG:HH21	3:A:35:ARG:NH1	1.63	0.95
3:A:200:ASN:HB2	3:A:213:PHE:HB2	1.45	0.94
1:C:7:DC:C6	1:C:8:DT:H71	2.04	0.92
2:D:13:DA:C2'	2:D:14:DG:H5''	1.99	0.90
4:B:458:ALA:HB1	4:B:464:ASN:HB3	1.54	0.89
4:B:388:VAL:HG21	4:B:518:LEU:HD13	1.52	0.88
4:B:340:PRO:HA	4:B:385:CYS:O	1.73	0.87
4:B:376:LYS:HE3	4:B:376:LYS:HA	1.56	0.87
4:B:388:VAL:H	4:B:430:MET:HE2	1.37	0.86
4:B:579:GLN:HE21	4:B:632:ARG:NH1	1.74	0.86
3:A:23:ILE:HG21	3:A:26:GLN:NE2	1.91	0.86
4:B:390:PRO:HA	4:B:426:GLY:CA	2.06	0.85
3:A:206:CYS:SG	3:A:291:ASP:N	2.48	0.85

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:B:371:SER:HB2	4:B:378:SER:HB3	1.58	0.85
4:B:573:VAL:HB	4:B:578:ILE:HG13	1.57	0.85
1:C:7:DC:C5	1:C:8:DT:H73	2.10	0.85
4:B:448:PHE:HE2	4:B:499:VAL:HG22	1.42	0.84
3:A:23:ILE:HG21	3:A:26:GLN:HE21	1.41	0.84
4:B:527:ARG:HD2	4:B:528:ARG:H	1.41	0.84
4:B:554:ASP:HB2	4:B:567:TYR:H	1.42	0.84
3:A:255:PRO:HG2	3:A:288:TYR:OH	1.77	0.84
4:B:487:THR:CB	4:B:490:GLU:HB2	2.06	0.84
3:A:200:ASN:HB3	3:A:213:PHE:H	1.41	0.83
3:A:221:LYS:HG3	3:A:241:GLN:HE21	1.43	0.83
4:B:481:GLY:HA3	4:B:484:ARG:HD3	1.59	0.82
2:D:20:DT:H1'	2:D:21:DC:H5'	1.60	0.82
3:A:257:TYR:CE2	3:A:266:VAL:HG11	2.15	0.82
3:A:289:LEU:HB3	3:A:290:PRO:HD2	1.62	0.82
4:B:632:ARG:HG2	4:B:632:ARG:HH11	1.43	0.82
4:B:460:ILE:HA	4:B:484:ARG:NH2	1.95	0.81
3:A:78:THR:HG22	3:A:80:ASP:H	1.45	0.81
1:C:1:DT:H4'	4:B:436:ASN:ND2	1.95	0.81
3:A:233:TRP:CD1	3:A:258:ALA:HB2	2.15	0.81
3:A:224:ILE:HD13	3:A:225:GLU:H	1.45	0.81
3:A:245:HIS:CD2	4:B:569:LEU:HB3	2.16	0.81
3:A:221:LYS:HD2	3:A:241:GLN:HB3	1.63	0.81
3:A:224:ILE:HD13	3:A:225:GLU:N	1.97	0.80
2:D:19:DG:N9	2:D:20:DT:H72	1.97	0.80
3:A:80:ASP:HB3	3:A:81:PRO:HD2	1.65	0.79
4:B:448:PHE:CE2	4:B:499:VAL:HG22	2.17	0.79
4:B:624:PRO:HB2	4:B:646:LEU:HD21	1.64	0.79
4:B:465:PRO:HG3	4:B:467:LEU:HD22	1.64	0.79
1:C:7:DC:C6	1:C:8:DT:C7	2.64	0.79
3:A:284:MET:SD	3:A:285:GLU:N	2.52	0.79
3:A:267:ARG:H	3:A:267:ARG:HD2	1.47	0.78
3:A:139:ASN:HD21	3:A:143:VAL:HG23	1.46	0.78
4:B:371:SER:HB2	4:B:378:SER:CB	2.13	0.77
4:B:463:TYR:HA	4:B:528:ARG:NH1	1.99	0.77
4:B:550:ILE:HD12	4:B:568:LEU:HD11	1.65	0.77
4:B:383:LYS:HG2	4:B:384:ILE:O	1.85	0.76
3:A:273:ARG:HD2	3:A:280:LEU:HD11	1.68	0.76
3:A:246:ARG:HG3	4:B:607:PHE:CE2	2.22	0.75
4:B:460:ILE:HA	4:B:484:ARG:HH21	1.52	0.74
1:C:2:DG:H2''	1:C:3:DG:H5''	1.69	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:B:616:TYR:CG	4:B:617:LYS:N	2.54	0.74
4:B:388:VAL:HG21	4:B:518:LEU:CD1	2.16	0.74
4:B:632:ARG:NH1	4:B:632:ARG:HG2	2.01	0.74
4:B:465:PRO:HG2	4:B:467:LEU:HB2	1.69	0.74
1:C:2:DG:C2'	1:C:3:DG:C5'	2.64	0.73
4:B:599:SER:OG	4:B:601:THR:HB	1.89	0.73
3:A:33:ARG:NH2	3:A:187:ARG:HH21	1.85	0.73
3:A:132:GLN:HG2	3:A:133:ARG:NH1	2.04	0.73
3:A:104:LEU:HD12	3:A:111:HIS:HE2	1.52	0.73
3:A:37:LYS:HB2	3:A:119:GLN:CD	2.14	0.72
3:A:233:TRP:CG	3:A:234:GLU:H	2.08	0.72
4:B:455:MET:HB3	4:B:469:VAL:HG22	1.71	0.72
3:A:224:ILE:HD11	3:A:272:LEU:HG	1.71	0.71
4:B:470:HIS:CE1	4:B:493:ILE:HB	2.25	0.71
4:B:501:GLN:O	4:B:504:GLU:HG2	1.89	0.71
4:B:579:GLN:NE2	4:B:632:ARG:NH1	2.37	0.71
2:D:14:DG:H4'	2:D:14:DG:OP1	1.88	0.71
3:A:233:TRP:CH2	3:A:288:TYR:HE2	2.07	0.71
4:B:614:PRO:HG2	4:B:647:TYR:OH	1.91	0.71
3:A:49:GLU:HG3	3:A:50:ARG:H	1.54	0.71
3:A:104:LEU:HD12	3:A:111:HIS:NE2	2.06	0.71
4:B:384:ILE:HD12	4:B:430:MET:HE3	1.72	0.71
3:A:33:ARG:NH2	3:A:35:ARG:HH12	1.86	0.71
4:B:455:MET:SD	4:B:469:VAL:HG13	2.31	0.70
1:C:2:DG:C2'	1:C:3:DG:H5''	2.21	0.70
3:A:111:HIS:N	3:A:111:HIS:ND1	2.38	0.70
4:B:466:GLY:HA3	4:B:473:LEU:HB3	1.73	0.70
3:A:246:ARG:HG3	4:B:607:PHE:CD2	2.27	0.70
1:C:7:DC:N1	1:C:8:DT:H71	2.06	0.70
4:B:395:VAL:HG12	4:B:421:CYS:HB2	1.74	0.69
3:A:56:LYS:H	3:A:56:LYS:HD2	1.57	0.69
4:B:459:CYS:SG	4:B:494:ILE:HD11	2.32	0.69
3:A:190:ASN:HB3	3:A:220:GLN:HE22	1.57	0.69
4:B:560:VAL:HG13	4:B:616:TYR:HB3	1.74	0.69
4:B:581:ARG:HG3	4:B:581:ARG:HH11	1.58	0.69
4:B:548:LEU:HD12	4:B:548:LEU:H	1.58	0.69
4:B:564:GLU:O	4:B:612:LYS:HA	1.93	0.68
4:B:497:ALA:O	4:B:501:GLN:HG3	1.93	0.68
4:B:388:VAL:HG11	4:B:518:LEU:HB3	1.75	0.68
3:A:210:ASP:O	3:A:253:ARG:HA	1.94	0.67
1:C:7:DC:C5	1:C:8:DT:C7	2.77	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:73:ARG:NH1	3:A:73:ARG:HG2	2.07	0.67
3:A:202:ASN:HB2	3:A:286:PHE:HA	1.76	0.67
4:B:351:ARG:HH11	4:B:351:ARG:HB3	1.58	0.67
3:A:228:PHE:HE2	3:A:286:PHE:CG	2.13	0.67
3:A:245:HIS:HD2	4:B:569:LEU:HB3	1.60	0.67
4:B:387:TYR:HB2	4:B:430:MET:HG3	1.75	0.67
3:A:219:VAL:HG22	3:A:247:GLN:O	1.94	0.66
3:A:267:ARG:HG3	3:A:267:ARG:HH11	1.60	0.66
3:A:139:ASN:HD21	3:A:143:VAL:H	1.41	0.66
3:A:277:ASP:OD2	3:A:279:GLU:HB2	1.95	0.66
4:B:407:HIS:HE1	4:B:506:ASP:O	1.79	0.66
4:B:353:PHE:CE2	4:B:439:ILE:HD12	2.29	0.66
3:A:87:PRO:HD3	3:A:130:ILE:HD11	1.77	0.66
4:B:416:CYS:O	4:B:417:GLU:HG3	1.95	0.66
4:B:528:ARG:HG3	4:B:528:ARG:HH11	1.60	0.65
3:A:267:ARG:HD2	3:A:267:ARG:N	2.11	0.65
3:A:78:THR:HB	3:A:83:HIS:HA	1.77	0.65
3:A:141:PHE:CZ	3:A:179:LEU:HD11	2.32	0.65
4:B:455:MET:HB3	4:B:469:VAL:CG2	2.26	0.65
4:B:351:ARG:HB3	4:B:351:ARG:NH1	2.11	0.65
3:A:126:LEU:HD23	3:A:126:LEU:O	1.96	0.65
3:A:238:SER:HB3	3:A:253:ARG:CG	2.27	0.65
4:B:555:ARG:HH11	4:B:555:ARG:HB3	1.61	0.65
4:B:463:TYR:HA	4:B:528:ARG:CZ	2.26	0.65
3:A:33:ARG:HB3	3:A:186:ASN:HB3	1.77	0.64
3:A:56:LYS:H	3:A:56:LYS:CD	2.09	0.64
3:A:203:SER:HB3	3:A:289:LEU:CD1	2.28	0.64
4:B:495:ARG:O	4:B:499:VAL:HG23	1.98	0.64
4:B:527:ARG:HD2	4:B:528:ARG:N	2.12	0.64
4:B:583:TYR:HA	4:B:592:TRP:O	1.97	0.64
3:A:73:ARG:HG2	3:A:73:ARG:HH11	1.61	0.64
2:D:15:DG:H1'	2:D:16:DA:H5''	1.80	0.64
1:C:3:DG:H2''	1:C:4:DG:OP2	1.97	0.63
4:B:367:LEU:HD11	4:B:537:ILE:HD13	1.79	0.63
4:B:514:PHE:HB2	4:B:532:VAL:HG12	1.80	0.63
2:D:14:DG:H2''	2:D:15:DG:O5'	1.98	0.63
3:A:245:HIS:HB3	3:A:249:ALA:HB3	1.81	0.63
3:A:189:PRO:HB3	3:A:218:LYS:HE3	1.80	0.63
3:A:206:CYS:SG	3:A:262:LEU:CB	2.87	0.63
1:C:2:DG:H1'	1:C:3:DG:H5''	1.81	0.63
4:B:459:CYS:SG	4:B:473:LEU:HG	2.39	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:57:THR:HG22	3:A:58:HIS:N	2.13	0.62
4:B:400:ASN:HA	4:B:511:ARG:HE	1.64	0.62
4:B:405:HIS:CE1	4:B:501:GLN:HE22	2.16	0.62
3:A:141:PHE:CE2	3:A:179:LEU:HD11	2.34	0.62
4:B:625:ALA:O	4:B:647:TYR:N	2.32	0.62
3:A:139:ASN:ND2	3:A:143:VAL:HG23	2.13	0.62
3:A:228:PHE:HB3	3:A:233:TRP:CH2	2.34	0.62
4:B:518:LEU:HB3	4:B:519:PRO:HD2	1.82	0.62
3:A:62:LYS:HD3	3:A:64:ASN:HD21	1.65	0.62
4:B:426:GLY:N	4:B:427:PRO:HD3	2.15	0.62
4:B:551:VAL:HB	4:B:569:LEU:O	1.99	0.61
2:D:20:DT:H5'	2:D:20:DT:H6	1.65	0.61
3:A:104:LEU:HB2	3:A:111:HIS:HD2	1.64	0.61
2:D:14:DG:H8	2:D:14:DG:C5'	2.12	0.61
3:A:25:GLU:OE2	3:A:57:THR:HG21	2.00	0.61
4:B:387:TYR:CD1	4:B:387:TYR:C	2.79	0.61
3:A:158:ARG:HH11	3:A:158:ARG:HG2	1.66	0.61
3:A:105:CYS:SG	3:A:108:ARG:NH2	2.74	0.61
3:A:139:ASN:ND2	3:A:143:VAL:H	1.98	0.61
3:A:221:LYS:O	3:A:241:GLN:HG2	2.01	0.61
3:A:206:CYS:SG	3:A:262:LEU:HB2	2.41	0.60
3:A:229:THR:O	3:A:268:VAL:HB	2.02	0.60
4:B:598:PHE:HB2	4:B:602:ASP:HB2	1.83	0.60
3:A:81:PRO:HB2	3:A:82:PRO:HD3	1.83	0.60
4:B:630:GLN:HG3	4:B:630:GLN:O	2.00	0.60
3:A:233:TRP:CG	3:A:234:GLU:N	2.68	0.60
3:A:238:SER:HB3	3:A:253:ARG:HG3	1.82	0.60
3:A:246:ARG:C	3:A:248:VAL:H	2.07	0.60
3:A:259:ASP:OD2	3:A:262:LEU:HD12	2.01	0.60
4:B:395:VAL:CG1	4:B:421:CYS:HB2	2.31	0.60
3:A:63:ILE:HD12	3:A:163:VAL:HG11	1.84	0.60
3:A:270:MET:HE2	3:A:286:PHE:HB2	1.83	0.60
4:B:349:LYS:NZ	4:B:351:ARG:HG3	2.17	0.60
3:A:188:ALA:HB3	3:A:191:THR:HG22	1.83	0.59
3:A:200:ASN:CB	3:A:213:PHE:HB2	2.25	0.59
2:D:20:DT:C1'	2:D:21:DC:H5'	2.29	0.59
3:A:208:GLY:O	3:A:210:ASP:N	2.36	0.59
4:B:495:ARG:HG3	4:B:496:GLN:N	2.17	0.59
1:C:1:DT:H1'	1:C:2:DG:O5'	2.03	0.59
4:B:339:GLY:O	4:B:386:ASN:HB2	2.03	0.59
1:C:7:DC:C4	1:C:8:DT:H73	2.37	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:143:VAL:HG12	3:A:144:PRO:HD2	1.85	0.59
3:A:217:ASP:O	3:A:219:VAL:HG13	2.03	0.59
3:A:225:GLU:OE2	3:A:227:TYR:HE1	1.84	0.59
4:B:560:VAL:HG11	4:B:619:VAL:HA	1.84	0.59
4:B:465:PRO:CG	4:B:467:LEU:HD22	2.32	0.59
3:A:203:SER:HB3	3:A:289:LEU:HD12	1.85	0.58
4:B:391:ALA:H	4:B:426:GLY:HA2	1.68	0.58
1:C:3:DG:N7	4:B:364:HIS:ND1	2.51	0.58
2:D:14:DG:C5'	2:D:14:DG:C8	2.87	0.58
3:A:133:ARG:O	3:A:134:ILE:HG23	2.03	0.58
4:B:512:LEU:HB2	4:B:534:SER:OG	2.03	0.58
4:B:632:ARG:HH11	4:B:632:ARG:CG	2.16	0.58
3:A:211:GLU:OE2	3:A:213:PHE:HE1	1.85	0.58
2:D:19:DG:N7	4:B:541:LYS:HE3	2.18	0.58
3:A:33:ARG:NH2	3:A:35:ARG:NH1	2.44	0.58
1:C:1:DT:H4'	4:B:436:ASN:CG	2.29	0.58
4:B:383:LYS:NZ	4:B:385:CYS:SG	2.71	0.58
4:B:474:ALA:O	4:B:475:TYR:HB2	2.03	0.58
3:A:227:TYR:CD1	3:A:273:ARG:HD3	2.39	0.58
3:A:215:LEU:HD13	4:B:604:HIS:CD2	2.40	0.57
3:A:239:PHE:HB3	3:A:252:PHE:HA	1.87	0.57
3:A:228:PHE:CG	3:A:255:PRO:HG3	2.39	0.57
3:A:206:CYS:SG	3:A:262:LEU:HB3	2.44	0.57
3:A:208:GLY:HA2	3:A:254:THR:HG22	1.86	0.57
3:A:233:TRP:CD1	3:A:234:GLU:H	2.23	0.57
4:B:553:MET:CG	4:B:568:LEU:HD12	2.35	0.57
4:B:599:SER:O	4:B:602:ASP:N	2.37	0.57
4:B:581:ARG:HG3	4:B:581:ARG:NH1	2.20	0.56
4:B:417:GLU:O	4:B:420:VAL:HG12	2.04	0.56
2:D:19:DG:P	4:B:444:LYS:HE3	2.45	0.56
3:A:226:VAL:HG21	3:A:252:PHE:CD2	2.40	0.56
4:B:467:LEU:HA	4:B:471:SER:OG	2.04	0.56
4:B:561:THR:CG2	4:B:650:GLU:HG3	2.35	0.56
4:B:470:HIS:CE1	4:B:473:LEU:HB2	2.41	0.56
3:A:153:ASP:C	3:A:155:ASN:H	2.14	0.56
3:A:240:SER:O	3:A:243:ASP:N	2.37	0.56
4:B:465:PRO:C	4:B:467:LEU:H	2.12	0.56
1:C:10:DT:C7	3:A:36:TYR:CD1	2.88	0.56
3:A:113:PHE:CE2	3:A:161:PHE:HE2	2.24	0.56
3:A:228:PHE:N	3:A:235:ALA:O	2.39	0.56
4:B:387:TYR:C	4:B:387:TYR:HD1	2.13	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:73:ARG:HH11	3:A:73:ARG:CG	2.18	0.56
3:A:90:LEU:HA	3:A:117:GLY:O	2.06	0.56
4:B:497:ALA:C	4:B:499:VAL:H	2.15	0.55
1:C:8:DT:O2	1:C:9:DT:C6	2.60	0.55
3:A:48:GLY:O	3:A:49:GLU:C	2.49	0.55
3:A:123:LYS:HD2	3:A:126:LEU:HD12	1.86	0.55
3:A:287:GLN:O	3:A:287:GLN:HG3	2.07	0.55
4:B:375:ASN:O	4:B:376:LYS:HG2	2.06	0.55
3:A:26:GLN:HE21	3:A:26:GLN:HA	1.72	0.55
3:A:72:VAL:HG13	3:A:72:VAL:O	2.06	0.55
3:A:245:HIS:CE1	4:B:570:CYS:O	2.59	0.55
4:B:455:MET:HE2	4:B:469:VAL:HA	1.87	0.55
4:B:623:LYS:HG3	4:B:624:PRO:HD2	1.88	0.55
3:A:165:VAL:HG22	3:A:175:LEU:CD1	2.37	0.55
3:A:233:TRP:HD1	3:A:258:ALA:HB2	1.70	0.55
4:B:550:ILE:CD1	4:B:631:LEU:HD13	2.36	0.55
3:A:94:ASP:HB3	3:A:102:ALA:HB2	1.89	0.55
4:B:553:MET:HG3	4:B:568:LEU:HD12	1.87	0.55
4:B:579:GLN:HE21	4:B:632:ARG:HH11	1.50	0.55
3:A:200:ASN:CB	3:A:213:PHE:H	2.15	0.55
3:A:277:ASP:O	3:A:278:ARG:HB2	2.06	0.55
4:B:387:TYR:CD1	4:B:388:VAL:N	2.74	0.54
4:B:542:ALA:HB1	4:B:544:ASN:ND2	2.22	0.54
2:D:15:DG:H2''	2:D:16:DA:C5'	2.37	0.54
4:B:390:PRO:HA	4:B:426:GLY:C	2.31	0.54
4:B:354:ARG:CZ	4:B:356:ARG:NH1	2.71	0.54
4:B:456:THR:O	4:B:460:ILE:HG23	2.07	0.54
2:D:16:DA:H5'	2:D:16:DA:H8	1.72	0.54
3:A:66:TYR:CD1	3:A:67:THR:N	2.75	0.54
4:B:597:ASP:O	4:B:598:PHE:HB3	2.07	0.54
4:B:349:LYS:HZ1	4:B:351:ARG:HG3	1.72	0.54
4:B:420:VAL:C	4:B:421:CYS:SG	2.91	0.54
1:C:2:DG:C1'	1:C:3:DG:H5''	2.36	0.54
4:B:394:ILE:O	4:B:394:ILE:HG13	2.07	0.54
3:A:210:ASP:O	3:A:254:THR:N	2.33	0.54
4:B:528:ARG:HH11	4:B:528:ARG:CG	2.21	0.54
3:A:100:TYR:CD1	3:A:100:TYR:C	2.85	0.54
3:A:226:VAL:HG21	3:A:252:PHE:CE2	2.43	0.53
2:D:14:DG:H5''	2:D:14:DG:C8	2.42	0.53
4:B:460:ILE:HG13	4:B:460:ILE:O	2.07	0.53
4:B:477:GLN:OE1	4:B:478:ALA:HB3	2.07	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:197:CYS:HB2	3:A:215:LEU:O	2.09	0.53
4:B:459:CYS:SG	4:B:473:LEU:CD1	2.96	0.53
4:B:494:ILE:HG22	4:B:495:ARG:N	2.24	0.53
3:A:166:ARG:HD2	3:A:170:GLY:O	2.09	0.53
4:B:400:ASN:HA	4:B:511:ARG:NE	2.24	0.53
4:B:465:PRO:C	4:B:467:LEU:N	2.62	0.53
4:B:550:ILE:HD11	4:B:631:LEU:HD13	1.90	0.53
3:A:26:GLN:O	3:A:48:GLY:HA2	2.09	0.53
4:B:410:SER:HB3	4:B:419:GLY:HA3	1.89	0.53
4:B:349:LYS:O	4:B:350:GLN:HB3	2.09	0.52
4:B:353:PHE:CD2	4:B:439:ILE:HD12	2.44	0.52
4:B:388:VAL:HG21	4:B:518:LEU:HD22	1.92	0.52
4:B:542:ALA:HB1	4:B:544:ASN:HD21	1.75	0.52
3:A:33:ARG:CZ	3:A:187:ARG:HE	2.22	0.52
4:B:374:LYS:HD2	4:B:374:LYS:N	2.23	0.52
4:B:477:GLN:HG3	4:B:478:ALA:H	1.75	0.52
3:A:220:GLN:HB3	3:A:222:GLU:OE1	2.10	0.52
3:A:228:PHE:HB2	3:A:235:ALA:O	2.09	0.52
2:D:14:DG:H2'	2:D:15:DG:C5'	2.39	0.52
3:A:257:TYR:OH	3:A:266:VAL:HG21	2.10	0.52
4:B:425:ALA:HB2	4:B:432:VAL:HB	1.92	0.52
2:D:20:DT:C2'	2:D:21:DC:H5'	2.40	0.52
3:A:19:ALA:HA	3:A:64:ASN:O	2.10	0.52
4:B:353:PHE:HE2	4:B:439:ILE:HD12	1.71	0.52
4:B:458:ALA:HB1	4:B:464:ASN:CB	2.34	0.52
4:B:341:TYR:HA	4:B:529:LEU:HD11	1.92	0.52
4:B:574:GLN:O	4:B:576:ASP:N	2.43	0.52
1:C:4:DG:O6	4:B:364:HIS:CE1	2.63	0.52
2:D:14:DG:H8	2:D:14:DG:H5'	1.74	0.52
3:A:167:ASP:OD1	3:A:171:ARG:N	2.43	0.52
3:A:215:LEU:HD13	4:B:604:HIS:CG	2.46	0.51
4:B:470:HIS:CE1	4:B:473:LEU:HD23	2.44	0.51
3:A:57:THR:CG2	3:A:58:HIS:N	2.73	0.51
3:A:84:ARG:HA	3:A:143:VAL:HG21	1.91	0.51
3:A:226:VAL:O	3:A:236:ARG:HA	2.09	0.51
3:A:233:TRP:CE3	3:A:257:TYR:HE1	2.28	0.51
4:B:384:ILE:HG22	4:B:385:CYS:H	1.76	0.51
4:B:632:ARG:CZ	4:B:637:LEU:HD23	2.40	0.51
2:D:20:DT:H2'	4:B:359:CYS:SG	2.50	0.51
3:A:104:LEU:CD1	3:A:111:HIS:HE2	2.22	0.51
3:A:248:VAL:HG21	4:B:605:ARG:HB3	1.90	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:234:GLU:O	3:A:234:GLU:HG2	2.11	0.51
4:B:513:MET:HG3	4:B:533:VAL:HG12	1.92	0.51
4:B:586:GLU:O	4:B:587:GLU:HB2	2.10	0.51
1:C:7:DC:C2'	1:C:8:DT:H71	2.39	0.51
3:A:33:ARG:CZ	3:A:187:ARG:HH21	2.24	0.51
3:A:34:PHE:CD1	3:A:34:PHE:N	2.79	0.51
3:A:233:TRP:O	3:A:234:GLU:HB3	2.09	0.51
4:B:572:LYS:HG3	4:B:572:LYS:O	2.10	0.51
3:A:33:ARG:HB2	3:A:187:ARG:HG2	1.93	0.51
3:A:255:PRO:O	3:A:288:TYR:OH	2.26	0.51
4:B:404:ILE:HD12	4:B:513:MET:CE	2.41	0.51
4:B:559:CYS:SG	4:B:561:THR:CG2	2.87	0.51
4:B:387:TYR:HB2	4:B:430:MET:HE2	1.91	0.51
1:C:7:DC:H2'	1:C:8:DT:H71	1.94	0.50
3:A:227:TYR:CE1	3:A:273:ARG:HD3	2.46	0.50
3:A:229:THR:HA	3:A:234:GLU:HA	1.93	0.50
4:B:342:LEU:HG	4:B:516:ALA:HB2	1.93	0.50
4:B:384:ILE:O	4:B:385:CYS:SG	2.62	0.50
4:B:627:VAL:HG23	4:B:628:PHE:N	2.27	0.50
3:A:258:ALA:O	3:A:260:PRO:HD3	2.11	0.50
4:B:354:ARG:HA	4:B:540:SER:HB3	1.93	0.50
4:B:463:TYR:HB2	4:B:517:PHE:CZ	2.46	0.50
4:B:583:TYR:CE1	4:B:628:PHE:HB2	2.46	0.50
3:A:60:THR:HG23	3:A:111:HIS:C	2.37	0.50
3:A:216:CYS:SG	3:A:248:VAL:O	2.60	0.50
2:D:16:DA:H5'	2:D:16:DA:C8	2.47	0.50
3:A:26:GLN:O	3:A:49:GLU:N	2.42	0.50
3:A:39:GLU:O	3:A:41:ARG:N	2.45	0.50
3:A:194:LEU:HD11	3:A:274:ARG:HB2	1.93	0.50
1:C:6:DA:H3'	3:A:247:GLN:NE2	2.26	0.50
4:B:388:VAL:CG2	4:B:518:LEU:HD22	2.42	0.50
4:B:414:LYS:HE2	4:B:415:HIS:CE1	2.46	0.50
4:B:616:TYR:CD1	4:B:647:TYR:CD2	2.99	0.50
4:B:458:ALA:O	4:B:464:ASN:O	2.30	0.49
4:B:477:GLN:HG3	4:B:479:GLU:OE1	2.12	0.49
2:D:19:DG:C8	2:D:20:DT:C7	2.72	0.49
4:B:384:ILE:C	4:B:385:CYS:HG	2.18	0.49
3:A:34:PHE:N	3:A:185:ASP:OD1	2.45	0.49
3:A:33:ARG:HH21	3:A:187:ARG:HH21	1.55	0.49
4:B:475:TYR:C	4:B:476:LEU:HD22	2.36	0.49
3:A:104:LEU:HB2	3:A:111:HIS:CD2	2.46	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:B:459:CYS:CB	4:B:494:ILE:HD11	2.43	0.49
4:B:378:SER:O	4:B:379:TYR:HB3	2.11	0.49
3:A:233:TRP:CZ2	3:A:235:ALA:HB3	2.47	0.49
1:C:3:DG:H2''	1:C:4:DG:C8	2.48	0.49
4:B:354:ARG:CA	4:B:540:SER:HB3	2.43	0.49
4:B:461:ARG:C	4:B:463:TYR:H	2.21	0.49
3:A:246:ARG:C	3:A:248:VAL:N	2.70	0.48
4:B:403:ASN:H	4:B:403:ASN:HD22	1.61	0.48
1:C:1:DT:H2''	1:C:2:DG:OP2	2.12	0.48
2:D:15:DG:OP2	4:B:605:ARG:NH2	2.41	0.48
3:A:90:LEU:HD22	3:A:116:LEU:HD22	1.95	0.48
4:B:632:ARG:HD3	4:B:639:THR:HG22	1.95	0.48
4:B:579:GLN:NE2	4:B:632:ARG:HH12	2.09	0.48
4:B:585:GLU:HA	4:B:591:VAL:HA	1.94	0.48
1:C:8:DT:O2	1:C:9:DT:N1	2.46	0.48
4:B:461:ARG:HD2	4:B:463:TYR:CE2	2.49	0.48
4:B:599:SER:O	4:B:600:PRO:C	2.57	0.48
4:B:462:GLY:C	4:B:464:ASN:N	2.69	0.48
4:B:616:TYR:HB2	4:B:647:TYR:CD1	2.48	0.48
1:C:1:DT:C2	1:C:2:DG:C5'	2.97	0.48
3:A:49:GLU:HG3	3:A:50:ARG:N	2.24	0.47
3:A:248:VAL:HG13	4:B:604:HIS:NE2	2.29	0.47
1:C:9:DT:H2'	1:C:10:DT:H71	1.95	0.47
4:B:399:THR:HG21	4:B:405:HIS:HB2	1.96	0.47
4:B:495:ARG:O	4:B:498:ALA:HB3	2.14	0.47
3:A:129:ALA:O	3:A:132:GLN:N	2.47	0.47
1:C:1:DT:C1'	1:C:2:DG:O5'	2.62	0.47
3:A:138:ASN:OD1	3:A:138:ASN:C	2.56	0.47
4:B:387:TYR:CE1	4:B:389:GLY:N	2.77	0.47
3:A:79:LYS:O	3:A:79:LYS:HG2	2.13	0.47
4:B:399:THR:O	4:B:511:ARG:NE	2.44	0.47
4:B:470:HIS:CD2	4:B:473:LEU:HB2	2.50	0.47
4:B:477:GLN:O	4:B:528:ARG:NH2	2.47	0.47
4:B:555:ARG:HH11	4:B:555:ARG:CB	2.26	0.47
3:A:267:ARG:HG3	3:A:267:ARG:NH1	2.28	0.47
1:C:11:DC:H1'	1:C:12:DC:H5'	1.97	0.47
4:B:392:LYS:HD2	4:B:422:THR:CG2	2.45	0.47
4:B:434:PHE:CD2	4:B:514:PHE:HE1	2.33	0.47
4:B:463:TYR:HB2	4:B:517:PHE:CE1	2.49	0.47
4:B:580:ILE:HD13	4:B:611:PHE:CD1	2.49	0.47
2:D:20:DT:H2''	2:D:21:DC:H5'	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:35:ARG:HH11	3:A:187:ARG:NH2	2.12	0.47
3:A:216:CYS:HG	3:A:248:VAL:C	2.18	0.47
4:B:447:VAL:CG1	4:B:502:THR:HG23	2.45	0.47
4:B:470:HIS:C	4:B:472:ASP:H	2.23	0.47
4:B:409:HIS:CE1	4:B:507:LEU:HB3	2.49	0.47
3:A:225:GLU:HG3	3:A:225:GLU:O	2.14	0.46
3:A:233:TRP:CH2	3:A:288:TYR:CE2	2.97	0.46
3:A:289:LEU:HB3	3:A:290:PRO:CD	2.37	0.46
4:B:589:GLY:O	4:B:590:GLY:O	2.33	0.46
4:B:591:VAL:HG12	4:B:592:TRP:N	2.31	0.46
1:C:1:DT:C2	1:C:2:DG:O5'	2.68	0.46
4:B:456:THR:C	4:B:458:ALA:H	2.24	0.46
2:D:20:DT:C7	4:B:357:TYR:CD1	2.99	0.46
3:A:180:SER:O	3:A:181:HIS:C	2.58	0.46
3:A:257:TYR:CD2	3:A:259:ASP:HB3	2.51	0.46
3:A:33:ARG:HA	3:A:186:ASN:H	1.80	0.46
3:A:73:ARG:NH1	3:A:162:GLN:NE2	2.64	0.46
4:B:404:ILE:HG22	4:B:511:ARG:NH2	2.31	0.46
4:B:465:PRO:CG	4:B:467:LEU:HB2	2.42	0.46
4:B:513:MET:O	4:B:513:MET:HG2	2.15	0.46
4:B:403:ASN:H	4:B:403:ASN:ND2	2.13	0.46
4:B:374:LYS:HD2	4:B:374:LYS:H	1.80	0.46
4:B:447:VAL:HG12	4:B:502:THR:HG23	1.98	0.46
4:B:560:VAL:HG23	4:B:648:TYR:O	2.14	0.46
4:B:388:VAL:O	4:B:390:PRO:N	2.49	0.46
4:B:391:ALA:HB1	4:B:518:LEU:HD23	1.98	0.46
1:C:6:DA:H1'	1:C:7:DC:C6	2.51	0.46
3:A:165:VAL:C	3:A:166:ARG:HH11	2.24	0.45
3:A:289:LEU:CB	3:A:290:PRO:HD2	2.40	0.45
4:B:384:ILE:HG22	4:B:385:CYS:N	2.31	0.45
4:B:646:LEU:C	4:B:646:LEU:CD2	2.88	0.45
3:A:221:LYS:CG	3:A:241:GLN:HE21	2.23	0.45
4:B:394:ILE:HA	4:B:421:CYS:O	2.17	0.45
3:A:199:VAL:O	3:A:199:VAL:HG13	2.16	0.45
4:B:388:VAL:CG2	4:B:518:LEU:HD13	2.36	0.45
4:B:491:LYS:O	4:B:495:ARG:HB3	2.17	0.45
1:C:3:DG:C2'	1:C:4:DG:OP2	2.65	0.45
3:A:158:ARG:HG2	3:A:158:ARG:NH1	2.29	0.45
4:B:560:VAL:CG1	4:B:619:VAL:HA	2.46	0.45
3:A:158:ARG:HH12	3:A:182:PRO:HD3	1.81	0.45
3:A:66:TYR:CD1	3:A:66:TYR:C	2.95	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:B:448:PHE:CD1	4:B:448:PHE:C	2.94	0.45
4:B:455:MET:CB	4:B:469:VAL:HG22	2.43	0.45
4:B:546:SER:O	4:B:633:ARG:NH2	2.48	0.45
3:A:61:ILE:O	3:A:61:ILE:HG13	2.16	0.44
3:A:84:ARG:HD2	3:A:148:GLN:HA	1.98	0.44
3:A:153:ASP:C	3:A:155:ASN:N	2.76	0.44
4:B:345:LEU:HD12	4:B:431:VAL:HG22	1.99	0.44
3:A:134:ILE:HG21	3:A:148:GLN:HE22	1.82	0.44
3:A:267:ARG:N	3:A:267:ARG:CD	2.80	0.44
2:D:21:DC:H2''	2:D:22:DC:O5'	2.16	0.44
3:A:84:ARG:NE	3:A:152:TYR:CE2	2.83	0.44
3:A:224:ILE:O	3:A:225:GLU:HB3	2.17	0.44
4:B:621:ILE:HG22	4:B:623:LYS:O	2.18	0.44
3:A:104:LEU:HD12	3:A:111:HIS:CD2	2.52	0.44
3:A:198:ARG:HD3	4:B:610:VAL:HG21	1.99	0.44
4:B:487:THR:HG21	4:B:489:ARG:NE	2.32	0.44
3:A:164:THR:HA	3:A:173:LEU:O	2.17	0.44
3:A:210:ASP:HB2	3:A:254:THR:HB	1.99	0.44
3:A:268:VAL:HG23	3:A:269:SER:N	2.33	0.44
4:B:388:VAL:HG21	4:B:518:LEU:CD2	2.48	0.44
4:B:474:ALA:O	4:B:475:TYR:CB	2.64	0.44
4:B:524:SER:C	4:B:526:THR:N	2.75	0.44
3:A:244:VAL:HG22	3:A:250:ILE:HG12	1.99	0.44
4:B:381:GLN:HB3	4:B:433:GLY:HA2	1.99	0.44
4:B:410:SER:HB3	4:B:419:GLY:CA	2.48	0.44
1:C:1:DT:H1'	1:C:2:DG:P	2.57	0.44
3:A:248:VAL:HG13	4:B:604:HIS:HE2	1.83	0.44
4:B:460:ILE:HG21	4:B:486:LEU:HD11	1.99	0.44
3:A:228:PHE:CE2	3:A:286:PHE:CG	3.00	0.43
4:B:470:HIS:O	4:B:473:LEU:HB2	2.18	0.43
4:B:616:TYR:CD2	4:B:617:LYS:N	2.86	0.43
4:B:632:ARG:HD2	4:B:637:LEU:HA	1.99	0.43
4:B:416:CYS:SG	4:B:437:LEU:CD2	3.06	0.43
4:B:559:CYS:SG	4:B:560:VAL:N	2.91	0.43
3:A:37:LYS:O	3:A:37:LYS:HG3	2.18	0.43
3:A:123:LYS:O	3:A:126:LEU:HB2	2.19	0.43
3:A:153:ASP:O	3:A:155:ASN:N	2.51	0.43
4:B:350:GLN:HG3	4:B:536:ALA:O	2.17	0.43
4:B:469:VAL:HG12	4:B:470:HIS:N	2.34	0.43
4:B:597:ASP:O	4:B:598:PHE:CB	2.66	0.43
2:D:15:DG:H2''	2:D:16:DA:H5'	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:30:ARG:HG3	3:A:184:PHE:CD2	2.53	0.43
4:B:344:ILE:HD11	4:B:532:VAL:HG13	2.00	0.43
4:B:451:LEU:HD12	4:B:451:LEU:HA	1.81	0.43
4:B:511:ARG:HG2	4:B:536:ALA:HA	2.00	0.43
4:B:595:PHE:O	4:B:596:GLY:C	2.61	0.43
3:A:81:PRO:CB	3:A:82:PRO:HD3	2.47	0.43
4:B:469:VAL:HG11	4:B:494:ILE:HG12	2.01	0.43
1:C:1:DT:C2	1:C:2:DG:H5''	2.53	0.43
1:C:2:DG:OP1	4:B:365:GLY:C	2.61	0.43
3:A:190:ASN:HB3	3:A:220:GLN:NE2	2.29	0.43
3:A:278:ARG:O	3:A:280:LEU:HD12	2.19	0.43
3:A:73:ARG:HH11	3:A:162:GLN:HE21	1.65	0.43
3:A:188:ALA:HA	3:A:189:PRO:HD2	1.70	0.43
3:A:203:SER:HB3	3:A:289:LEU:HD11	1.99	0.43
3:A:228:PHE:HE1	3:A:252:PHE:CE1	2.37	0.43
4:B:544:ASN:ND2	4:B:544:ASN:H	2.16	0.43
1:C:3:DG:N7	4:B:364:HIS:CE1	2.87	0.42
3:A:30:ARG:HG3	3:A:184:PHE:HD2	1.84	0.42
3:A:84:ARG:NH2	3:A:152:TYR:CD2	2.78	0.42
4:B:354:ARG:N	4:B:540:SER:HB3	2.34	0.42
4:B:538:TYR:O	4:B:539:ASP:C	2.62	0.42
4:B:547:ASN:O	4:B:548:LEU:C	2.62	0.42
4:B:555:ARG:HH11	4:B:555:ARG:CG	2.32	0.42
4:B:566:ILE:HG22	4:B:567:TYR:N	2.32	0.42
2:D:13:DA:H8	2:D:13:DA:O5'	2.02	0.42
3:A:199:VAL:O	3:A:200:ASN:C	2.61	0.42
4:B:477:GLN:O	4:B:528:ARG:NH1	2.52	0.42
4:B:582:PHE:N	4:B:594:GLY:O	2.49	0.42
4:B:640:SER:O	4:B:641:GLU:C	2.61	0.42
3:A:141:PHE:HZ	3:A:179:LEU:HD11	1.80	0.42
3:A:206:CYS:SG	3:A:289:LEU:O	2.65	0.42
4:B:388:VAL:O	4:B:389:GLY:C	2.61	0.42
4:B:454:ARG:HG2	4:B:454:ARG:HH11	1.84	0.42
4:B:501:GLN:C	4:B:504:GLU:HG2	2.44	0.42
3:A:84:ARG:NH2	3:A:152:TYR:CG	2.85	0.42
3:A:287:GLN:O	3:A:289:LEU:HG	2.19	0.42
4:B:399:THR:CG2	4:B:405:HIS:HB2	2.49	0.42
4:B:646:LEU:C	4:B:646:LEU:HD22	2.44	0.42
3:A:163:VAL:HG12	3:A:164:THR:N	2.34	0.42
3:A:271:GLN:NE2	3:A:281:SER:O	2.52	0.42
2:D:13:DA:H2''	2:D:14:DG:C8	2.55	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:B:376:LYS:HA	4:B:376:LYS:CE	2.36	0.42
4:B:548:LEU:HD23	4:B:578:ILE:HD11	2.01	0.42
3:A:37:LYS:HB2	3:A:119:GLN:OE1	2.19	0.42
3:A:274:ARG:HE	3:A:277:ASP:CG	2.27	0.42
4:B:470:HIS:HE2	4:B:494:ILE:HG13	1.83	0.42
4:B:599:SER:C	4:B:601:THR:N	2.73	0.42
4:B:388:VAL:HB	4:B:518:LEU:HD22	2.02	0.42
4:B:443:THR:O	4:B:444:LYS:C	2.62	0.42
4:B:454:ARG:HG2	4:B:454:ARG:NH1	2.35	0.42
1:C:12:DC:N4	2:D:14:DG:H1	2.18	0.42
3:A:130:ILE:HD12	3:A:130:ILE:HG23	1.76	0.42
4:B:358:VAL:O	4:B:358:VAL:HG22	2.19	0.42
4:B:579:GLN:NE2	4:B:632:ARG:HH11	2.13	0.42
4:B:598:PHE:HB2	4:B:602:ASP:CB	2.50	0.42
4:B:473:LEU:O	4:B:474:ALA:C	2.63	0.41
4:B:568:LEU:HD21	4:B:631:LEU:CD1	2.50	0.41
4:B:582:PHE:CD2	4:B:629:VAL:HG22	2.55	0.41
4:B:349:LYS:CB	4:B:368:PRO:HG2	2.50	0.41
4:B:347:GLN:HB3	4:B:348:PRO:HD2	2.01	0.41
4:B:470:HIS:C	4:B:472:ASP:N	2.77	0.41
2:D:18:DA:H3'	4:B:444:LYS:NZ	2.36	0.41
3:A:77:VAL:HG23	3:A:158:ARG:HB2	2.03	0.41
3:A:139:ASN:HD21	3:A:143:VAL:N	2.13	0.41
3:A:211:GLU:OE2	3:A:213:PHE:CE1	2.69	0.41
2:D:13:DA:O5'	2:D:13:DA:C8	2.72	0.41
3:A:74:ILE:HG22	3:A:75:SER:N	2.35	0.41
3:A:164:THR:O	3:A:164:THR:HG22	2.21	0.41
3:A:216:CYS:HB2	3:A:272:LEU:HD21	2.01	0.41
4:B:623:LYS:CG	4:B:624:PRO:HD2	2.49	0.41
4:B:487:THR:HG22	4:B:489:ARG:HG3	2.03	0.41
2:D:15:DG:C1'	2:D:16:DA:H5''	2.48	0.41
2:D:15:DG:C2'	2:D:16:DA:H5''	2.50	0.41
3:A:84:ARG:NH2	3:A:152:TYR:CE2	2.86	0.41
4:B:460:ILE:CG2	4:B:486:LEU:HD11	2.51	0.41
4:B:461:ARG:C	4:B:463:TYR:N	2.79	0.41
4:B:487:THR:O	4:B:490:GLU:HB3	2.20	0.41
2:D:19:DG:H2'	4:B:357:TYR:CE2	2.56	0.41
4:B:559:CYS:HA	4:B:648:TYR:CD1	2.56	0.41
3:A:93:LYS:HG2	3:A:94:ASP:OD2	2.21	0.41
3:A:163:VAL:CG1	3:A:164:THR:N	2.84	0.41
4:B:432:VAL:O	4:B:432:VAL:HG13	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:9:DT:C2	1:C:10:DT:C5	3.08	0.40
3:A:141:PHE:HZ	3:A:179:LEU:CD1	2.34	0.40
3:A:206:CYS:HB3	3:A:262:LEU:HB2	2.02	0.40
4:B:355:PHE:CE1	4:B:439:ILE:HD13	2.56	0.40
3:A:236:ARG:H	3:A:236:ARG:HG2	1.56	0.40
3:A:277:ASP:CG	3:A:279:GLU:H	2.29	0.40
4:B:470:HIS:O	4:B:473:LEU:CB	2.69	0.40
2:D:17:DA:H2''	2:D:18:DA:C8	2.56	0.40
4:B:511:ARG:NH1	4:B:533:VAL:HG21	2.37	0.40
3:A:261:SER:O	3:A:262:LEU:O	2.39	0.40
3:A:74:ILE:O	3:A:99:TYR:HB2	2.22	0.40
3:A:212:ILE:HG22	3:A:213:PHE:N	2.37	0.40
4:B:420:VAL:O	4:B:421:CYS:SG	2.79	0.40
4:B:528:ARG:NH1	4:B:528:ARG:CG	2.85	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	
3	A	271/273 (99%)	208 (77%)	44 (16%)	19 (7%)	1	2
4	B	310/312 (99%)	241 (78%)	45 (14%)	24 (8%)	1	2
All	All	581/585 (99%)	449 (77%)	89 (15%)	43 (7%)	1	2

All (43) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	A	29	GLN
3	A	40	GLY
3	A	81	PRO
3	A	209	GLY

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Mol	Chain	Res	Type
3	A	231	PRO
3	A	234	GLU
3	A	268	VAL
4	B	373	GLU
4	B	387	TYR
4	B	414	LYS
4	B	427	PRO
4	B	475	TYR
4	B	479	GLU
4	B	575	LYS
3	A	28	LYS
3	A	41	ARG
3	A	134	ILE
3	A	154	LEU
3	A	199	VAL
3	A	262	LEU
4	B	389	GLY
4	B	469	VAL
4	B	478	ALA
4	B	524	SER
4	B	590	GLY
4	B	598	PHE
4	B	647	TYR
3	A	200	ASN
3	A	218	LYS
4	B	375	ASN
4	B	561	THR
4	B	572	LYS
4	B	587	GLU
4	B	606	GLN
3	A	225	GLU
4	B	376	LYS
4	B	530	GLU
4	B	554	ASP
4	B	614	PRO
3	A	230	GLY
4	B	649	PRO
3	A	260	PRO
3	A	275	PRO

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	
3	A	242/242 (100%)	191 (79%)	51 (21%)	1	4
4	B	268/268 (100%)	226 (84%)	42 (16%)	2	9
All	All	510/510 (100%)	417 (82%)	93 (18%)	2	6

All (93) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	A	28	LYS
3	A	32	MET
3	A	47	PRO
3	A	54	THR
3	A	56	LYS
3	A	67	THR
3	A	73	ARG
3	A	75	SER
3	A	81	PRO
3	A	84	ARG
3	A	100	TYR
3	A	104	LEU
3	A	108	ARG
3	A	109	SER
3	A	111	HIS
3	A	112	SER
3	A	131	SER
3	A	132	GLN
3	A	135	GLN
3	A	136	THR
3	A	137	ASN
3	A	143	VAL
3	A	147	GLU
3	A	164	THR
3	A	168	PRO
3	A	174	LEU
3	A	179	LEU

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Mol	Chain	Res	Type
3	A	191	THR
3	A	201	ARG
3	A	206	CYS
3	A	207	LEU
3	A	211	GLU
3	A	222	GLU
3	A	224	ILE
3	A	227	TYR
3	A	229	THR
3	A	231	PRO
3	A	234	GLU
3	A	236	ARG
3	A	251	VAL
3	A	253	ARG
3	A	254	THR
3	A	262	LEU
3	A	267	ARG
3	A	272	LEU
3	A	279	GLU
3	A	280	LEU
3	A	282	GLU
3	A	284	MET
3	A	288	TYR
3	A	291	ASP
4	B	345	LEU
4	B	351	ARG
4	B	364	HIS
4	B	374	LYS
4	B	376	LYS
4	B	387	TYR
4	B	403	ASN
4	B	404	ILE
4	B	420	VAL
4	B	428	LYS
4	B	444	LYS
4	B	460	ILE
4	B	463	TYR
4	B	473	LEU
4	B	475	TYR
4	B	477	GLN
4	B	479	GLU
4	B	494	ILE

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Mol	Chain	Res	Type
4	B	495	ARG
4	B	499	VAL
4	B	500	GLN
4	B	515	THR
4	B	518	LEU
4	B	528	ARG
4	B	529	LEU
4	B	530	GLU
4	B	532	VAL
4	B	533	VAL
4	B	540	SER
4	B	552	ARG
4	B	555	ARG
4	B	568	LEU
4	B	575	LYS
4	B	578	ILE
4	B	581	ARG
4	B	586	GLU
4	B	605	ARG
4	B	614	PRO
4	B	629	VAL
4	B	632	ARG
4	B	637	LEU
4	B	646	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (22) such sidechains are listed below:

Mol	Chain	Res	Type
3	A	64	ASN
3	A	114	GLN
3	A	132	GLN
3	A	139	ASN
3	A	148	GLN
3	A	162	GLN
3	A	220	GLN
3	A	241	GLN
4	B	343	GLN
4	B	350	GLN
4	B	396	GLN
4	B	403	ASN
4	B	405	HIS
4	B	407	HIS

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Mol	Chain	Res	Type
4	B	409	HIS
4	B	441	HIS
4	B	500	GLN
4	B	501	GLN
4	B	544	ASN
4	B	579	GLN
4	B	606	GLN
4	B	620	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 oligosaccharides in this entry.

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 ⓘ

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates ⓘ

EDS was not executed - this section is therefore empty.

6.4 Ligands ⓘ

EDS was not executed - this section is therefore empty.

6.5 Other polymers ⓘ

EDS was not executed - this section is therefore empty.