



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 23, 2021 – 04:33 PM EDT

PDB ID : 3CRX  
Title : CRE RECOMBINASE/DNA COMPLEX INTERMEDIATE I  
Authors : Gopaul, D.N.; Guo, F.; Vanduyne, G.D.  
Deposited on : 1998-06-19  
Resolution : 2.50 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](mailto: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.

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

MolProbity : 4.02b-467  
Xtrriage (Phenix) : **NOT EXECUTED**  
EDS : **NOT EXECUTED**  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.23.2

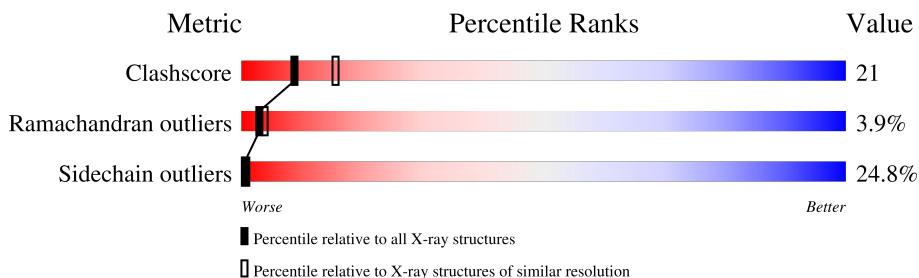
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.50 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	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)

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  $\geq 3$ , 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	35	49% (Green) 51% (Yellow)
2	D	35	46% (Green) 51% (Yellow) 3% (Grey)
3	E	35	63% (Green) 37% (Yellow)
4	F	35	46% (Green) 51% (Yellow) 3% (Grey)
5	A	343	45% (Green) 36% (Yellow) 10% (Orange) 6% (Red) 3% (Grey)
5	B	343	50% (Green) 35% (Yellow) 8% (Orange) 6% (Red) 1% (Grey)

## 2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 8168 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 35-MER.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
1	C	35	714	346	125	209	34	0	0	0

- Molecule 2 is a DNA chain called DNA 35-MER.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
2	D	34	694	335	121	204	34	0	0	0

- Molecule 3 is a DNA chain called DNA 35-MER.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
3	E	35	714	346	125	209	34	0	0	0

- Molecule 4 is a DNA chain called DNA 35-MER.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
4	F	34	700	337	125	204	34	0	0	0

- Molecule 5 is a protein called CRE RECOMBINASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
5	A	323	2555	1588	485	467	15	0	0	0
5	B	323	2555	1588	485	467	15	0	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	173	LYS	ARG	engineered mutation	UNP P06956
B	173	LYS	ARG	engineered mutation	UNP P06956

- Molecule 6 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	C	14	Total O 14 14	0	0
6	D	32	Total O 32 32	0	0
6	E	9	Total O 9 9	0	0
6	A	82	Total O 82 82	0	0
6	B	99	Total O 99 99	0	0

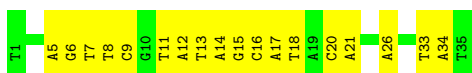
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. 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.

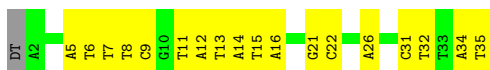
- Molecule 1: DNA 35-MER

Chain C: 49% 51%



- Molecule 2: DNA 35-MER

Chain D: 46% 51%



- Molecule 3: DNA 35-MER

Chain E: 63% 37%



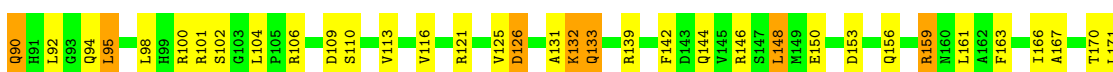
- Molecule 4: DNA 35-MER

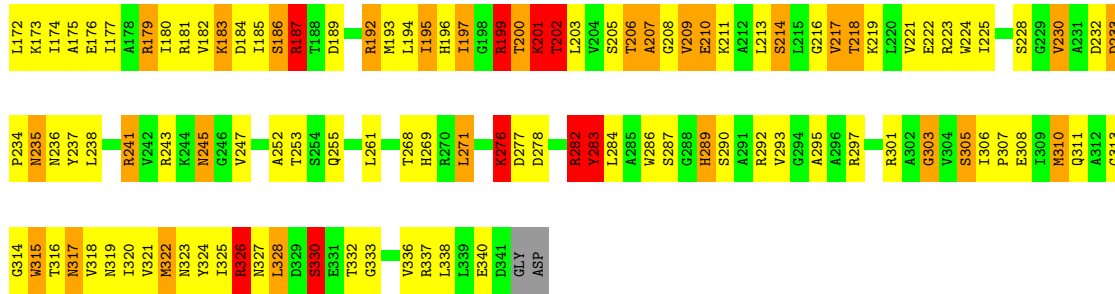
Chain F: 46% 51%



- Molecule 5: CRE RECOMBINASE

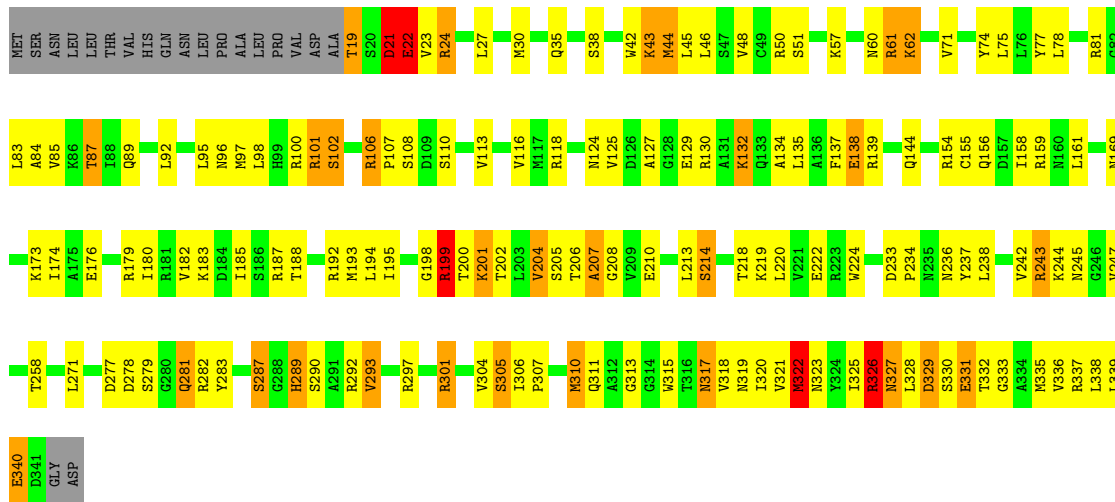
Chain A: 45% 36% 10% 6%





• Molecule 5: CRE RECOMBINASE

Chain B: 50% 35% 8% • 6%



## 4 Data and refinement statistics

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

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	106.30Å 122.70Å 179.50Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	27.30 – 2.50	Depositor
% Data completeness (in resolution range)	94.4 (27.30-2.50)	Depositor
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.07	Depositor
Refinement program	X-PLOR 3.851	Depositor
R, $R_{free}$	0.198 , 0.268	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	8168	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	44.0	wwPDB-VP

## 5 Model quality i

### 5.1 Standard geometry i

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	0.21	0/800	0.65	0/1233
2	D	0.21	0/777	0.65	0/1196
3	E	0.22	0/800	0.65	0/1233
4	F	0.20	0/785	0.64	0/1210
5	A	0.43	1/2596 (0.0%)	0.65	7/3500 (0.2%)
5	B	0.42	0/2596	0.64	7/3500 (0.2%)
All	All	0.36	1/8354 (0.0%)	0.65	14/11872 (0.1%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	283	TYR	CB-CG	7.26	1.62	1.51

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	326	ARG	NE-CZ-NH2	7.32	123.96	120.30
5	A	283	TYR	CB-CG-CD1	7.30	125.38	121.00
5	A	187	ARG	NE-CZ-NH2	7.13	123.86	120.30
5	A	282	ARG	NE-CZ-NH2	7.12	123.86	120.30
5	B	326	ARG	NE-CZ-NH2	6.74	123.67	120.30
5	B	24	ARG	NE-CZ-NH2	6.62	123.61	120.30
5	B	61	ARG	NE-CZ-NH2	6.48	123.54	120.30
5	B	21	ASP	O-C-N	-6.33	112.58	122.70
5	A	330	SER	O-C-N	6.31	132.79	122.70
5	B	19	THR	C-N-CA	-5.85	107.07	121.70
5	B	322	MET	CG-SD-CE	5.79	109.46	100.20
5	A	322	MET	CG-SD-CE	5.63	109.21	100.20
5	A	282	ARG	O-C-N	-5.38	114.08	122.70
5	B	19	THR	O-C-N	-5.34	114.16	122.70

There are no chirality outliers.



There are no planarity outliers.

## 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	714	0	401	20	0
2	D	694	0	388	33	0
3	E	714	0	401	14	0
4	F	700	0	388	22	0
5	A	2555	0	2578	146	1
5	B	2555	0	2578	98	1
6	A	82	0	0	4	0
6	B	99	0	0	11	0
6	C	14	0	0	1	1
6	D	32	0	0	2	0
6	E	9	0	0	0	1
All	All	8168	0	6734	301	2

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 21.

All (301) 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)
5:B:60:ASN:HB2	6:B:404:HOH:O	1.35	1.23
4:F:21:DC:H2''	4:F:22:DG:H5''	1.42	1.01
2:D:21:DG:H2''	2:D:22:DC:H5''	1.42	1.01
3:E:5:DA:H2''	3:E:6:DC:H5''	1.50	0.94
1:C:5:DA:H2''	1:C:6:DG:H5''	1.50	0.93
2:D:5:DA:H2''	2:D:6:DT:H5''	1.51	0.91
4:F:5:DA:H2''	4:F:6:DA:H5''	1.51	0.91
5:A:186:SER:HB3	5:A:194:LEU:HD22	1.51	0.91
5:A:206:THR:O	5:A:208:GLY:N	2.04	0.89
5:A:325:ILE:O	5:A:328:LEU:HB2	1.74	0.87
5:A:276:LYS:HA	5:A:284:LEU:HD22	1.56	0.86
1:C:13:DT:H2'	5:B:87:THR:HG22	1.58	0.85
5:A:317:ASN:HD22	5:A:319:ASN:HD21	1.24	0.83

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:E:8:DT:H1'	3:E:9:DC:H5'	1.61	0.82
1:C:8:DT:H1'	1:C:9:DC:H5'	1.61	0.81
5:A:310:MET:HE2	5:A:321:VAL:HG21	1.62	0.80
5:A:282:ARG:O	5:A:283:TYR:HB2	1.83	0.79
5:B:301:ARG:HH11	5:B:328:LEU:HD23	1.47	0.79
2:D:5:DA:C2'	2:D:6:DT:H5''	2.13	0.78
4:F:5:DA:C2'	4:F:6:DA:H5''	2.13	0.78
5:A:225:ILE:HG23	5:A:230:VAL:HG23	1.65	0.77
5:A:282:ARG:O	5:A:283:TYR:CB	2.30	0.77
5:A:206:THR:O	5:A:207:ALA:C	2.22	0.77
5:B:237:TYR:O	6:B:417:HOH:O	2.04	0.76
5:A:200:THR:HB	5:A:205:SER:HB2	1.68	0.74
5:A:217:VAL:O	5:A:221:VAL:HG23	1.87	0.73
5:A:200:THR:CB	5:A:205:SER:HB2	2.19	0.73
5:A:301:ARG:HG3	5:A:328:LEU:HD11	1.71	0.73
5:A:159:ARG:HG2	5:A:159:ARG:HH11	1.54	0.73
1:C:5:DA:C2'	1:C:6:DG:H5''	2.19	0.72
5:B:204:VAL:HG13	5:B:205:SER:H	1.55	0.72
3:E:5:DA:C2'	3:E:6:DC:H5''	2.19	0.72
5:A:276:LYS:HA	5:A:284:LEU:CD2	2.19	0.71
5:A:159:ARG:HH11	5:A:159:ARG:CG	2.03	0.71
5:A:196:HIS:HB2	5:A:209:VAL:O	1.91	0.70
3:E:6:DC:H2'	3:E:7:DT:H72	1.75	0.68
5:A:159:ARG:HG2	5:A:159:ARG:NH1	2.09	0.68
5:B:306:ILE:N	5:B:307:PRO:HD2	2.08	0.68
1:C:6:DG:H2'	1:C:7:DT:H72	1.76	0.68
2:D:6:DT:H2'	2:D:7:DT:H72	1.76	0.67
4:F:6:DA:H2'	4:F:7:DT:H72	1.76	0.67
5:B:21:ASP:O	5:B:22:GLU:C	2.32	0.67
1:C:15:DG:H2''	1:C:16:DC:H5'	1.75	0.66
3:E:15:DC:H2''	3:E:16:DG:H5'	1.75	0.66
5:B:98:LEU:O	5:B:102:SER:HB3	1.95	0.66
4:F:21:DC:C2'	4:F:22:DG:H5''	2.24	0.66
5:A:173:LYS:HB2	5:A:176:GLU:CD	2.16	0.66
2:D:21:DG:C2'	2:D:22:DC:H5''	2.24	0.66
5:A:144:GLN:O	5:A:148:LEU:HD12	1.96	0.65
5:A:173:LYS:O	5:A:177:ILE:HG13	1.95	0.65
5:A:146:ARG:O	5:A:150:GLU:HB3	1.96	0.64
5:A:187:ARG:NH1	6:A:379:HOH:O	2.29	0.64
5:A:199:ARG:O	5:A:200:THR:HG23	1.98	0.64
5:A:245:ASN:N	5:A:245:ASN:HD22	1.93	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:13:DT:C4'	5:A:282:ARG:HH21	2.10	0.64
5:B:213:LEU:HB2	5:B:218:THR:HG22	1.80	0.64
5:B:78:LEU:HB3	5:B:83:LEU:HD12	1.81	0.63
5:A:200:THR:OG1	5:A:205:SER:HB2	1.98	0.63
5:A:202:THR:O	5:A:202:THR:OG1	2.12	0.63
2:D:22:DC:H5	6:D:53:HOH:O	1.82	0.63
5:A:192:ARG:HG2	5:A:213:LEU:O	1.99	0.63
5:A:142:PHE:O	5:A:146:ARG:HB2	1.99	0.62
5:A:297:ARG:HA	5:A:325:ILE:HG22	1.82	0.62
5:A:293:VAL:HG13	5:A:324:TYR:HB3	1.82	0.61
1:C:13:DT:OP2	5:B:87:THR:HG21	2.00	0.61
5:B:204:VAL:HG22	5:B:205:SER:N	2.15	0.61
5:B:180:ILE:HD13	5:B:195:ILE:HG21	1.81	0.61
5:A:171:LEU:HD13	5:A:292:ARG:HA	1.83	0.61
5:A:195:ILE:O	5:A:195:ILE:HG13	1.97	0.61
2:D:13:DT:H4'	5:A:282:ARG:HH21	1.65	0.61
5:A:203:LEU:O	5:B:130:ARG:HG3	1.99	0.61
5:A:182:VAL:HG23	5:A:236:ASN:O	2.01	0.61
5:B:179:ARG:NH2	5:B:199:ARG:HD2	2.15	0.60
5:B:243:ARG:HH11	5:B:243:ARG:HG2	1.65	0.60
5:B:62:LYS:O	6:B:346:HOH:O	2.17	0.59
2:D:26:DA:OP1	5:B:287:SER:HB2	2.01	0.59
5:A:159:ARG:HB2	5:A:224:TRP:CZ3	2.38	0.59
5:B:214:SER:O	5:B:218:THR:HG23	2.02	0.59
5:B:134:ALA:HA	5:B:283:TYR:CD1	2.37	0.59
5:B:204:VAL:HG13	5:B:205:SER:N	2.17	0.59
5:B:60:ASN:CB	6:B:404:HOH:O	2.11	0.59
5:B:84:ALA:HB3	5:B:87:THR:HG23	1.84	0.58
5:B:318:VAL:O	5:B:321:VAL:HG22	2.03	0.58
5:B:57:LYS:HD3	6:B:412:HOH:O	2.04	0.58
2:D:6:DT:H4'	5:A:241:ARG:HD3	1.86	0.57
5:A:48:VAL:HG21	5:A:94:GLN:HG3	1.85	0.57
5:B:174:ILE:HD12	5:B:258:THR:HB	1.86	0.57
5:A:181:ARG:O	5:A:185:ILE:HD12	2.04	0.57
2:D:15:DT:H73	6:D:58:HOH:O	2.04	0.56
5:A:200:THR:O	5:A:201:LYS:HB2	2.05	0.56
5:B:185:ILE:HD11	5:B:238:LEU:HD22	1.87	0.56
5:B:206:THR:O	5:B:208:GLY:N	2.38	0.56
5:A:201:LYS:O	5:A:202:THR:HG22	2.06	0.56
5:B:322:MET:O	5:B:326:ARG:HG2	2.06	0.56
5:B:271:LEU:O	5:B:271:LEU:HD22	2.05	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:14:DA:OP1	5:A:132:LYS:HD2	2.07	0.55
5:A:173:LYS:HB2	5:A:176:GLU:OE1	2.06	0.55
5:A:181:ARG:HA	5:A:237:TYR:HA	1.87	0.55
5:A:206:THR:C	5:A:208:GLY:N	2.60	0.55
5:A:333:GLY:O	5:A:337:ARG:HG3	2.06	0.55
2:D:16:DA:OP2	5:A:320:ILE:HG13	2.08	0.54
5:A:71:VAL:O	5:A:75:LEU:HG	2.08	0.54
5:A:218:THR:O	5:A:222:GLU:HG3	2.08	0.54
5:B:97:MET:HE2	6:B:387:HOH:O	2.07	0.54
5:A:268:THR:HG22	5:A:286:TRP:HZ3	1.73	0.54
5:A:159:ARG:CG	5:A:159:ARG:NH1	2.68	0.54
5:A:228:SER:OG	5:A:230:VAL:HG22	2.07	0.54
4:F:5:DA:H2''	4:F:6:DA:C5'	2.32	0.54
5:A:271:LEU:HG	5:A:271:LEU:O	2.08	0.54
2:D:5:DA:H2''	2:D:6:DT:C5'	2.32	0.53
5:A:202:THR:O	5:A:203:LEU:HB2	2.08	0.53
5:A:207:ALA:HB2	5:B:130:ARG:NH1	2.22	0.53
5:B:193:MET:H	5:B:218:THR:HG21	1.73	0.53
5:B:85:VAL:O	5:B:89:GLN:HG3	2.08	0.53
5:A:159:ARG:HB2	5:A:224:TRP:CE3	2.44	0.53
5:B:198:GLY:O	5:B:199:ARG:HB2	2.08	0.53
3:E:20:DG:H2''	3:E:21:DT:OP2	2.08	0.53
5:A:174:ILE:HG13	5:A:175:ALA:H	1.74	0.52
1:C:14:DA:H5''	5:B:132:LYS:O	2.08	0.52
5:A:176:GLU:HG3	5:A:179:ARG:NH1	2.24	0.52
1:C:20:DC:H2''	1:C:21:DA:OP2	2.08	0.52
2:D:34:DA:H2''	2:D:35:DT:O5'	2.09	0.52
4:F:34:DA:H2''	4:F:35:DT:O5'	2.09	0.52
5:B:233:ASP:O	5:B:236:ASN:HB2	2.09	0.52
5:B:325:ILE:O	5:B:326:ARG:C	2.48	0.52
5:B:323:ASN:HA	5:B:326:ARG:HD2	1.91	0.52
5:A:172:LEU:HD21	5:A:197:ILE:CD1	2.40	0.52
5:A:171:LEU:HD11	5:A:295:ALA:HB3	1.92	0.51
5:B:161:LEU:HG	5:B:220:LEU:HD22	1.92	0.51
5:A:182:VAL:HG21	5:A:230:VAL:O	2.09	0.51
5:A:317:ASN:HD22	5:A:319:ASN:ND2	2.03	0.51
5:A:197:ILE:HD12	5:A:197:ILE:H	1.73	0.51
5:B:44:MET:O	5:B:48:VAL:HG23	2.10	0.51
5:B:204:VAL:HG22	5:B:205:SER:H	1.74	0.51
4:F:17:DG:H2''	4:F:18:DT:H71	1.93	0.51
2:D:13:DT:H5'	5:A:282:ARG:NH2	2.25	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:A:328:LEU:HD13	5:A:328:LEU:O	2.10	0.51
1:C:13:DT:H71	5:B:87:THR:HB	1.92	0.51
5:A:235:ASN:HB3	5:A:252:ALA:HB1	1.93	0.51
5:B:301:ARG:HG3	5:B:301:ARG:O	2.11	0.51
2:D:15:DT:H2''	2:D:16:DA:OP2	2.09	0.50
4:F:15:DA:H2''	4:F:16:DT:OP2	2.09	0.50
5:A:113:VAL:O	5:A:116:VAL:HG12	2.11	0.50
5:B:245:ASN:OD1	5:B:247:VAL:HB	2.12	0.50
5:B:71:VAL:O	5:B:75:LEU:HG	2.12	0.50
5:A:172:LEU:HD21	5:A:197:ILE:HD13	1.92	0.50
5:A:277:ASP:HB2	5:A:284:LEU:CD1	2.42	0.50
5:B:154:ARG:O	5:B:158:ILE:HG13	2.13	0.49
5:B:113:VAL:O	5:B:116:VAL:HG12	2.13	0.49
5:B:305:SER:HB2	5:B:307:PRO:HD2	1.95	0.49
5:A:65:PRO:HB3	5:A:104:LEU:HD13	1.94	0.49
5:A:214:SER:HB3	5:B:336:VAL:HG13	1.93	0.49
5:A:245:ASN:N	5:A:245:ASN:ND2	2.60	0.49
5:A:35:GLN:HB2	6:B:349:HOH:O	2.13	0.49
5:A:200:THR:O	5:A:201:LYS:CB	2.61	0.49
5:A:171:LEU:CD1	5:A:295:ALA:HB3	2.43	0.48
2:D:6:DT:H2'	2:D:7:DT:C7	2.43	0.48
4:F:6:DA:H2'	4:F:7:DT:C7	2.43	0.48
5:A:177:ILE:HA	5:A:180:ILE:CD1	2.43	0.48
5:B:155:CYS:HB3	5:B:242:VAL:HG11	1.94	0.48
5:B:202:THR:HG23	5:B:202:THR:O	2.14	0.48
5:B:321:VAL:HG23	5:B:322:MET:N	2.29	0.48
2:D:13:DT:H71	5:A:87:THR:HG23	1.96	0.48
5:B:135:LEU:N	6:B:372:HOH:O	2.44	0.48
5:B:325:ILE:HG22	5:B:328:LEU:HD13	1.96	0.48
5:B:326:ARG:NH1	6:B:410:HOH:O	2.47	0.48
2:D:13:DT:C5'	5:A:282:ARG:HH21	2.26	0.48
3:E:6:DC:H2'	3:E:7:DT:C7	2.42	0.48
1:C:6:DG:H2'	1:C:7:DT:C7	2.42	0.48
5:B:277:ASP:OD2	5:B:279:SER:HB3	2.13	0.48
5:A:282:ARG:HD2	5:A:283:TYR:CD2	2.48	0.47
5:A:289:HIS:HA	6:A:351:HOH:O	2.14	0.47
5:B:317:ASN:HD22	5:B:317:ASN:HA	1.53	0.47
5:B:144:GLN:NE2	6:B:355:HOH:O	2.48	0.47
5:A:245:ASN:HD22	5:A:245:ASN:H	1.61	0.47
5:B:96:ASN:OD1	5:B:107:PRO:HD2	2.14	0.47
5:B:279:SER:OG	5:B:281:GLN:HB2	2.14	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:17:DA:H2'	1:C:18:DT:H72	1.97	0.47
5:A:159:ARG:HH11	5:A:159:ARG:CB	2.28	0.47
5:A:269:HIS:HB2	5:A:286:TRP:CE3	2.50	0.47
5:A:306:ILE:HB	5:A:307:PRO:HD3	1.96	0.46
5:B:137:PHE:HB2	5:B:290:SER:HB3	1.97	0.46
5:A:199:ARG:O	5:A:200:THR:CG2	2.64	0.46
5:A:310:MET:HE1	5:A:318:VAL:HA	1.96	0.46
2:D:11:DT:H1'	2:D:12:DA:C8	2.50	0.46
2:D:16:DA:C2	3:E:22:DA:C2	3.03	0.46
5:A:133:GLN:H	5:A:133:GLN:NE2	2.13	0.46
4:F:11:DT:H1'	4:F:12:DA:C8	2.50	0.46
5:A:194:LEU:HD11	5:A:210:GLU:OE2	2.16	0.46
5:B:297:ARG:HA	5:B:325:ILE:HD12	1.97	0.46
5:B:213:LEU:HB2	5:B:218:THR:CG2	2.45	0.46
1:C:12:DA:OP1	5:B:81:ARG:NH2	2.49	0.46
5:B:35:GLN:HA	5:B:35:GLN:NE2	2.31	0.46
5:B:188:THR:HG22	5:B:194:LEU:CD1	2.46	0.46
5:B:289:HIS:O	5:B:293:VAL:HG13	2.16	0.46
5:A:74:TYR:O	5:A:77:TYR:HB3	2.16	0.45
5:B:124:ASN:O	5:B:127:ALA:HB3	2.15	0.45
5:A:336:VAL:O	5:A:340:GLU:HG3	2.16	0.45
5:A:132:LYS:HB3	5:A:283:TYR:CE2	2.50	0.45
5:A:170:THR:C	5:A:172:LEU:N	2.70	0.45
5:A:306:ILE:N	5:A:307:PRO:CD	2.79	0.45
5:A:232:ASP:O	5:A:233:ASP:HB2	2.15	0.45
5:A:245:ASN:ND2	5:A:245:ASN:H	2.15	0.45
2:D:5:DA:H4'	5:A:243:ARG:HA	1.99	0.45
5:A:159:ARG:HH11	5:A:159:ARG:HB3	1.82	0.45
5:A:243:ARG:HB2	5:A:245:ASN:HD21	1.82	0.45
5:A:170:THR:O	5:A:172:LEU:N	2.50	0.45
5:A:186:SER:OG	5:A:187:ARG:N	2.47	0.45
5:B:182:VAL:HB	5:B:234:PRO:HA	1.99	0.45
5:A:216:GLY:O	5:A:217:VAL:HG23	2.17	0.45
5:A:56:CYS:HB3	5:A:61:ARG:O	2.17	0.44
5:A:183:LYS:HG3	5:A:184:ASP:N	2.32	0.44
5:B:325:ILE:HB	5:B:326:ARG:H	1.67	0.44
1:C:16:DC:OP2	5:B:320:ILE:HG21	2.17	0.44
5:A:199:ARG:O	5:A:200:THR:OG1	2.31	0.44
5:A:313:GLY:O	5:A:315:TRP:N	2.50	0.44
5:B:173:LYS:HB2	5:B:176:GLU:HG3	1.99	0.44
5:B:193:MET:H	5:B:218:THR:CG2	2.30	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:A:305:SER:O	5:A:308:GLU:HB2	2.17	0.44
5:A:166:ILE:O	5:A:170:THR:HG23	2.17	0.44
4:F:5:DA:C1'	4:F:6:DA:H5''	2.47	0.44
1:C:13:DT:C7	5:B:87:THR:HB	2.47	0.44
2:D:5:DA:C1'	2:D:6:DT:H5''	2.47	0.44
5:B:106:ARG:H	5:B:106:ARG:HG3	1.65	0.44
5:B:159:ARG:HB2	5:B:224:TRP:CZ3	2.53	0.44
5:A:199:ARG:O	5:A:200:THR:CB	2.66	0.44
2:D:5:DA:H1'	2:D:6:DT:H5''	1.98	0.43
5:A:301:ARG:C	5:A:303:GLY:H	2.22	0.43
5:A:233:ASP:OD1	5:A:235:ASN:HB2	2.19	0.43
6:C:46:HOH:O	5:B:43:LYS:HD2	2.16	0.43
5:A:213:LEU:HD13	5:A:221:VAL:HG21	1.99	0.43
5:B:74:TYR:O	5:B:77:TYR:HB3	2.18	0.43
4:F:5:DA:H1'	4:F:6:DA:H5''	1.98	0.43
5:A:194:LEU:C	5:A:194:LEU:HD23	2.38	0.43
5:B:138:GLU:H	5:B:138:GLU:HG2	1.49	0.43
5:A:201:LYS:HD2	5:A:201:LYS:HA	1.76	0.43
5:A:293:VAL:HG13	5:A:324:TYR:CG	2.54	0.43
5:A:320:ILE:O	5:A:323:ASN:HB2	2.19	0.43
1:C:11:DT:OP2	5:B:50:ARG:NH1	2.52	0.43
5:A:301:ARG:HG3	5:A:328:LEU:CD1	2.43	0.43
2:D:6:DT:H2''	2:D:7:DT:C6	2.54	0.43
2:D:11:DT:H3	3:E:26:DA:H61	1.66	0.43
4:F:6:DA:H2''	4:F:7:DT:C6	2.54	0.43
5:B:194:LEU:HB3	5:B:210:GLU:OE1	2.19	0.43
5:B:313:GLY:HA3	5:B:315:TRP:CZ3	2.54	0.43
5:A:292:ARG:NH2	5:A:313:GLY:O	2.51	0.43
5:B:42:TRP:O	5:B:46:LEU:HG	2.19	0.43
5:B:101:ARG:HG3	5:B:101:ARG:HH11	1.84	0.43
5:B:333:GLY:HA2	5:B:337:ARG:HB3	2.01	0.43
2:D:7:DT:H2'	2:D:8:DT:H72	2.01	0.42
5:A:84:ALA:O	5:A:88:ILE:HG13	2.19	0.42
5:A:293:VAL:HG13	5:A:324:TYR:CB	2.48	0.42
5:A:201:LYS:C	5:A:202:THR:HG22	2.39	0.42
5:A:255:GLN:HG3	6:A:362:HOH:O	2.19	0.42
5:A:121:ARG:NH1	6:A:381:HOH:O	2.52	0.42
5:A:170:THR:C	5:A:172:LEU:H	2.21	0.42
5:A:183:LYS:HB3	5:A:234:PRO:HB3	2.00	0.42
1:C:26:DA:H61	4:F:11:DT:H3	1.67	0.42
4:F:7:DT:H2'	4:F:8:DT:H72	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:B:21:ASP:O	5:B:23:VAL:N	2.52	0.42
5:B:323:ASN:ND2	6:B:388:HOH:O	2.52	0.42
5:A:206:THR:O	5:A:208:GLY:CA	2.67	0.42
5:B:97:MET:HG2	5:B:101:ARG:HD3	2.02	0.42
2:D:8:DT:H1'	2:D:9:DC:H5'	2.00	0.42
5:A:61:ARG:NH2	5:A:73:ASP:OD2	2.49	0.42
5:A:323:ASN:HA	5:A:326:ARG:HD3	2.02	0.42
5:B:201:LYS:HD2	5:B:201:LYS:HA	1.90	0.42
1:C:33:DT:H2''	1:C:34:DA:C8	2.55	0.41
4:F:8:DT:H1'	4:F:9:DC:H5'	2.00	0.41
4:F:18:DT:H2''	4:F:19:DT:H72	2.01	0.41
5:A:175:ALA:O	5:A:179:ARG:HG2	2.19	0.41
5:A:201:LYS:NZ	5:B:125:VAL:HG13	2.34	0.41
5:B:306:ILE:HG22	5:B:310:MET:SD	2.60	0.41
2:D:11:DT:O2	3:E:26:DA:C2	2.73	0.41
3:E:33:DT:H2''	3:E:34:DA:C8	2.56	0.41
4:F:31:DG:H2''	4:F:32:DT:OP2	2.20	0.41
5:A:235:ASN:HD22	5:A:235:ASN:HA	1.65	0.41
2:D:31:DC:H2''	2:D:32:DT:OP2	2.20	0.41
5:A:121:ARG:O	5:A:125:VAL:HG23	2.21	0.41
5:A:211:LYS:HA	5:B:331:GLU:OE1	2.21	0.41
4:F:17:DG:H2''	4:F:18:DT:C7	2.50	0.41
5:A:214:SER:O	5:A:218:THR:HG22	2.20	0.41
5:B:326:ARG:O	5:B:327:ASN:HB2	2.20	0.41
2:D:11:DT:H3	3:E:26:DA:N6	2.18	0.41
5:A:282:ARG:CG	5:A:282:ARG:HH11	2.34	0.41
2:D:11:DT:O2	3:E:26:DA:N1	2.53	0.41
3:E:26:DA:OP1	5:A:289:HIS:ND1	2.53	0.41
5:B:329:ASP:OD1	5:B:329:ASP:N	2.52	0.41
5:B:206:THR:O	5:B:207:ALA:C	2.58	0.41
5:A:100:ARG:HH12	5:A:106:ARG:NH1	2.19	0.41
1:C:26:DA:C2	4:F:11:DT:O2	2.73	0.40
5:A:90:GLN:HE21	5:A:90:GLN:HB2	1.67	0.40
5:A:163:PHE:CE1	5:A:261:LEU:HD22	2.56	0.40
5:A:245:ASN:ND2	5:A:247:VAL:H	2.20	0.40
1:C:26:DA:N6	4:F:11:DT:H3	2.19	0.40
5:B:306:ILE:N	5:B:307:PRO:CD	2.78	0.40
5:A:106:ARG:O	5:A:109:ASP:HB2	2.22	0.40
5:A:176:GLU:O	5:A:180:ILE:HG13	2.20	0.40
5:B:323:ASN:HA	5:B:326:ARG:CD	2.52	0.40
5:A:95:LEU:HD12	5:A:95:LEU:HA	1.86	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:A:177:ILE:HA	5:A:180:ILE:HD12	2.03	0.40

All (2) 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)
6:C:49:HOH:O	6:E:200:HOH:O[4_566]	0.28	1.92
5:A:126:ASP:OD1	5:B:199:ARG:NH2[4_566]	1.85	0.35

## 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	
5	A	321/343 (94%)	275 (86%)	31 (10%)	15 (5%)	2	2
5	B	321/343 (94%)	287 (89%)	24 (8%)	10 (3%)	4	5
All	All	642/686 (94%)	562 (88%)	55 (9%)	25 (4%)	3	4

All (25) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
5	A	200	THR
5	A	201	LYS
5	A	207	ALA
5	A	276	LYS
5	A	283	TYR
5	B	199	ARG
5	B	204	VAL
5	B	326	ARG
5	B	327	ASN
5	B	340	GLU
5	A	314	GLY

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Mol	Chain	Res	Type
5	B	22	GLU
5	B	207	ALA
5	B	304	VAL
5	A	217	VAL
5	A	131	ALA
5	A	330	SER
5	B	332	THR
5	A	167	ALA
5	A	199	ARG
5	A	303	GLY
5	B	331	GLU
5	A	202	THR
5	A	233	ASP
5	A	209	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	
5	A	270/287 (94%)	197 (73%)	73 (27%)	0	0
5	B	270/287 (94%)	209 (77%)	61 (23%)	1	1
All	All	540/574 (94%)	406 (75%)	134 (25%)	0	1

All (134) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
5	A	20	SER
5	A	24	ARG
5	A	38	SER
5	A	39	GLU
5	A	43	LYS
5	A	44	MET
5	A	51	SER
5	A	58	LEU
5	A	61	ARG

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
5	A	62	LYS
5	A	81	ARG
5	A	86	LYS
5	A	90	GLN
5	A	92	LEU
5	A	95	LEU
5	A	98	LEU
5	A	101	ARG
5	A	102	SER
5	A	110	SER
5	A	126	ASP
5	A	132	LYS
5	A	133	GLN
5	A	139	ARG
5	A	148	LEU
5	A	153	ASP
5	A	156	GLN
5	A	159	ARG
5	A	161	LEU
5	A	179	ARG
5	A	183	LYS
5	A	186	SER
5	A	187	ARG
5	A	189	ASP
5	A	192	ARG
5	A	193	MET
5	A	195	ILE
5	A	197	ILE
5	A	199	ARG
5	A	201	LYS
5	A	202	THR
5	A	206	THR
5	A	210	GLU
5	A	214	SER
5	A	218	THR
5	A	219	LYS
5	A	223	ARG
5	A	230	VAL
5	A	235	ASN
5	A	238	LEU
5	A	241	ARG
5	A	245	ASN

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
5	A	253	THR
5	A	271	LEU
5	A	276	LYS
5	A	278	ASP
5	A	282	ARG
5	A	283	TYR
5	A	287	SER
5	A	289	HIS
5	A	290	SER
5	A	305	SER
5	A	310	MET
5	A	311	GLN
5	A	315	TRP
5	A	316	THR
5	A	317	ASN
5	A	322	MET
5	A	326	ARG
5	A	327	ASN
5	A	328	LEU
5	A	330	SER
5	A	332	THR
5	A	338	LEU
5	B	19	THR
5	B	21	ASP
5	B	22	GLU
5	B	24	ARG
5	B	27	LEU
5	B	30	MET
5	B	38	SER
5	B	43	LYS
5	B	44	MET
5	B	45	LEU
5	B	51	SER
5	B	61	ARG
5	B	62	LYS
5	B	87	THR
5	B	92	LEU
5	B	95	LEU
5	B	100	ARG
5	B	101	ARG
5	B	102	SER
5	B	106	ARG

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
5	B	108	SER
5	B	110	SER
5	B	118	ARG
5	B	129	GLU
5	B	132	LYS
5	B	138	GLU
5	B	139	ARG
5	B	156	GLN
5	B	169	ASN
5	B	183	LYS
5	B	187	ARG
5	B	192	ARG
5	B	199	ARG
5	B	200	THR
5	B	201	LYS
5	B	214	SER
5	B	219	LYS
5	B	222	GLU
5	B	243	ARG
5	B	244	LYS
5	B	278	ASP
5	B	281	GLN
5	B	282	ARG
5	B	287	SER
5	B	289	HIS
5	B	292	ARG
5	B	293	VAL
5	B	301	ARG
5	B	305	SER
5	B	310	MET
5	B	311	GLN
5	B	317	ASN
5	B	319	ASN
5	B	322	MET
5	B	326	ARG
5	B	329	ASP
5	B	330	SER
5	B	335	MET
5	B	338	LEU
5	B	339	LEU
5	B	340	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (11)

such sidechains are listed below:

Mol	Chain	Res	Type
5	A	40	HIS
5	A	90	GLN
5	A	133	GLN
5	A	144	GLN
5	A	235	ASN
5	A	245	ASN
5	A	317	ASN
5	B	35	GLN
5	B	40	HIS
5	B	144	GLN
5	B	317	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

### 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

### 5.6 Ligand geometry [i](#)

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.