



# wwPDB X-ray Structure Validation Summary Report ⓘ

May 22, 2020 – 12:37 pm BST

PDB ID : 1T60  
Title : Crystal structure of Type IV collagen NC1 domain from bovine lens capsule  
Authors : Vanacore, R.M.; Shanmugasundararaj, S.; Friedman, D.B.; Bondar, O.; Hudson, B.G.; Sundaramoorthy, M.  
Deposited on : 2004-05-05  
Resolution : 1.50 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.11
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.11

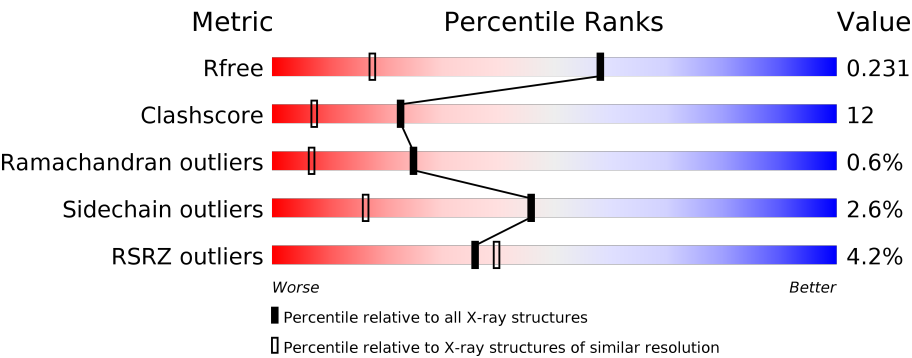
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.50 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))
$R_{free}$	130704	2936 (1.50-1.50)
Clashscore	141614	3144 (1.50-1.50)
Ramachandran outliers	138981	3066 (1.50-1.50)
Sidechain outliers	138945	3064 (1.50-1.50)
RSRZ outliers	127900	2884 (1.50-1.50)

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 on 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  $\leq 5\%$ . 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	229	<div><div></div><div><div></div><div>78%</div><div>19%</div><div>••</div></div></div>
1	B	229	<div><div>7%</div><div><div></div><div>75%</div><div>22%</div><div>••</div></div></div>
1	D	229	<div><div>2%</div><div><div></div><div>76%</div><div>20%</div><div>••</div></div></div>
1	E	229	<div><div>3%</div><div><div></div><div>79%</div><div>18%</div><div>••</div></div></div>
1	G	229	<div><div>3%</div><div><div></div><div>81%</div><div>17%</div><div>•</div></div></div>
1	H	229	<div><div>5%</div><div><div></div><div>76%</div><div>22%</div><div>••</div></div></div>

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Mol	Chain	Length	Quality of chain
1	J	229	
1	K	229	
1	M	229	
1	N	229	
1	P	229	
1	Q	229	
1	S	229	
1	T	229	
1	V	229	
1	W	229	
2	C	227	
2	F	227	
2	I	227	
2	L	227	
2	O	227	
2	R	227	
2	U	227	
2	X	227	

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
4	MPD	J	5009	-	-	-	X
4	MPD	P	5006	-	-	X	-

## 2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 44599 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 type iv collagen.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	223	Total	C	N	O	S	0	0	0
			1724	1085	300	318	21			
1	B	225	Total	C	N	O	S	0	0	0
			1745	1097	307	320	21			
1	D	224	Total	C	N	O	S	0	0	0
			1734	1091	303	319	21			
1	E	224	Total	C	N	O	S	0	0	0
			1735	1091	304	319	21			
1	G	228	Total	C	N	O	S	0	0	0
			1767	1110	310	326	21			
1	H	227	Total	C	N	O	S	0	0	0
			1760	1105	309	325	21			
1	J	224	Total	C	N	O	S	0	0	0
			1734	1091	303	319	21			
1	K	224	Total	C	N	O	S	0	0	0
			1734	1091	303	319	21			
1	M	223	Total	C	N	O	S	0	0	0
			1724	1085	300	318	21			
1	N	224	Total	C	N	O	S	0	0	0
			1738	1093	304	320	21			
1	P	225	Total	C	N	O	S	0	0	0
			1745	1097	307	320	21			
1	Q	224	Total	C	N	O	S	0	0	0
			1734	1091	303	319	21			
1	S	225	Total	C	N	O	S	0	0	0
			1745	1097	307	320	21			
1	T	227	Total	C	N	O	S	0	0	0
			1760	1105	309	325	21			
1	V	224	Total	C	N	O	S	0	0	0
			1734	1091	303	319	21			
1	W	224	Total	C	N	O	S	0	0	0
			1734	1091	303	319	21			

- Molecule 2 is a protein called type iv collagen.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	223	Total	C	N	O	S	0	0	0
			1724	1093	291	321	19			
2	F	222	Total	C	N	O	S	0	0	0
			1720	1089	291	321	19			
2	I	225	Total	C	N	O	S	0	0	0
			1738	1100	294	325	19			
2	L	221	Total	C	N	O	S	0	0	0
			1708	1080	290	319	19			
2	O	224	Total	C	N	O	S	0	0	0
			1732	1097	293	323	19			
2	R	224	Total	C	N	O	S	0	0	0
			1732	1097	293	323	19			
2	U	224	Total	C	N	O	S	0	0	0
			1732	1097	293	323	19			
2	X	223	Total	C	N	O	S	0	0	0
			1724	1091	292	322	19			

- Molecule 3 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

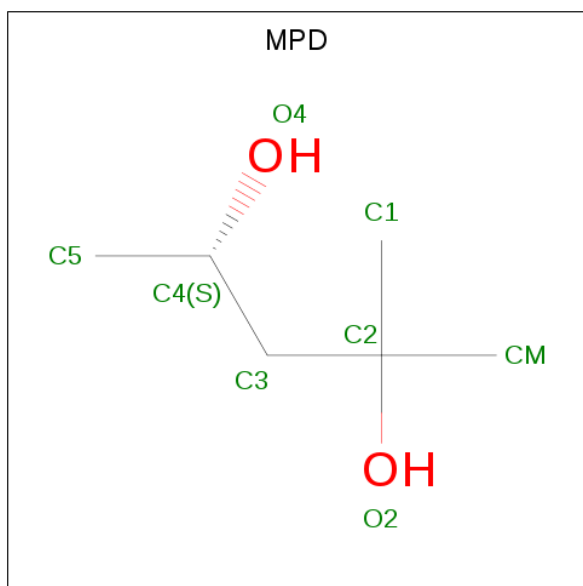
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	P	1	Total	Cl	0	0
			1	1		
3	G	1	Total	Cl	0	0
			1	1		
3	J	1	Total	Cl	0	0
			1	1		
3	D	1	Total	Cl	0	0
			1	1		
3	I	1	Total	Cl	0	0
			1	1		
3	C	1	Total	Cl	0	0
			1	1		
3	V	1	Total	Cl	0	0
			1	1		
3	A	1	Total	Cl	0	0
			1	1		
3	U	1	Total	Cl	0	0
			1	1		
3	X	1	Total	Cl	0	0
			1	1		
3	O	1	Total	Cl	0	0
			1	1		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	R	1	Total	Cl	0	0
			1	1		
3	L	1	Total	Cl	0	0
			1	1		
3	S	1	Total	Cl	0	0
			1	1		
3	F	1	Total	Cl	0	0
			1	1		
3	M	1	Total	Cl	0	0
			1	1		

- Molecule 4 is (4S)-2-METHYL-2,4-PENTANEDIOL (three-letter code: MPD) (formula:  $C_6H_{14}O_2$ ).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			8	6	2		
4	D	1	Total	C	O	0	0
			8	6	2		
4	J	1	Total	C	O	0	0
			8	6	2		
4	M	1	Total	C	O	0	0
			8	6	2		
4	M	1	Total	C	O	0	0
			8	6	2		
4	P	1	Total	C	O	0	0
			8	6	2		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	S	1	Total	C	O	0	0
			8	6	2		
4	S	1	Total	C	O	0	0
			8	6	2		
4	T	1	Total	C	O	0	0
			8	6	2		

- Molecule 5 is POTASSIUM ION (three-letter code: K) (formula: K).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	P	1	Total	K	0	0
			1	1		
5	G	1	Total	K	0	0
			1	1		
5	D	1	Total	K	0	0
			1	1		
5	H	1	Total	K	0	0
			1	1		
5	B	1	Total	K	0	0
			1	1		
5	I	1	Total	K	0	0
			1	1		
5	C	2	Total	K	0	0
			2	2		
5	V	1	Total	K	0	0
			1	1		
5	T	1	Total	K	0	0
			1	1		
5	N	1	Total	K	0	0
			1	1		
5	U	2	Total	K	0	0
			2	2		
5	O	1	Total	K	0	0
			1	1		
5	L	1	Total	K	0	0
			1	1		
5	M	1	Total	K	0	0
			1	1		

- Molecule 6 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	112	Total O 112 112	0	0
6	B	101	Total O 101 101	0	0
6	C	116	Total O 116 116	0	0
6	D	134	Total O 134 134	0	0
6	E	127	Total O 127 127	0	0
6	F	117	Total O 117 117	0	0
6	G	144	Total O 144 144	0	0
6	H	104	Total O 104 104	0	0
6	I	121	Total O 121 121	0	0
6	J	97	Total O 97 97	0	0
6	K	102	Total O 102 102	0	0
6	L	111	Total O 111 111	0	0
6	M	118	Total O 118 118	0	0
6	N	113	Total O 113 113	0	0
6	O	125	Total O 125 125	0	0
6	P	133	Total O 133 133	0	0
6	Q	108	Total O 108 108	0	0
6	R	129	Total O 129 129	0	0
6	S	137	Total O 137 137	0	0
6	T	127	Total O 127 127	0	0
6	U	139	Total O 139 139	0	0
6	V	110	Total O 110 110	0	0

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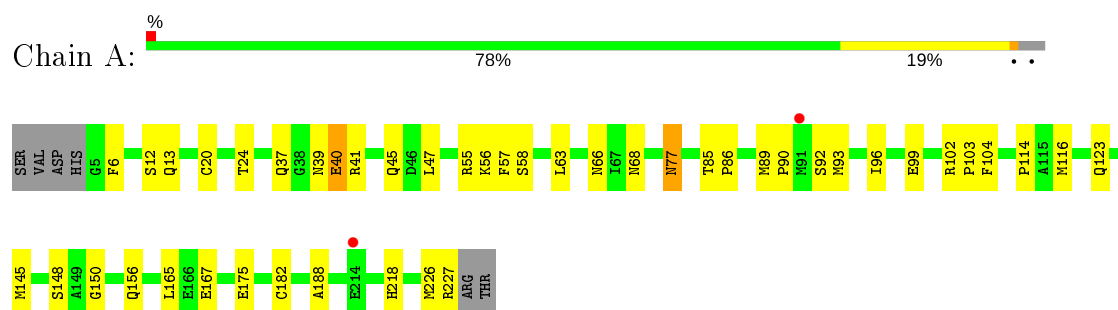
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	W	103	Total 103	O 103	0	0
6	X	110	Total 110	O 110	0	0

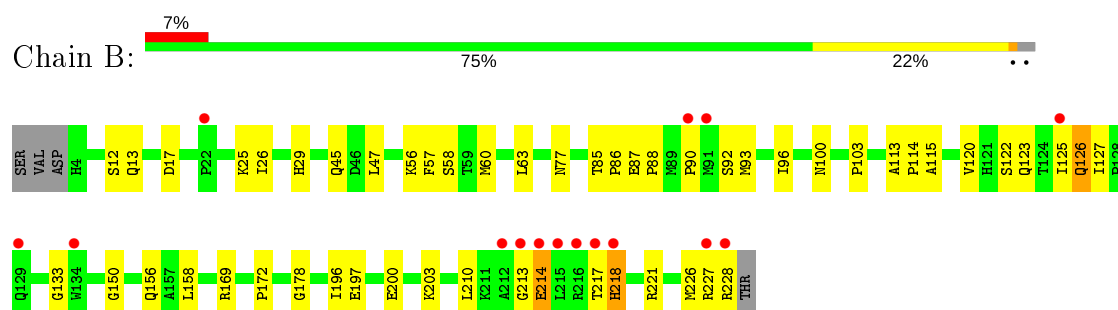
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

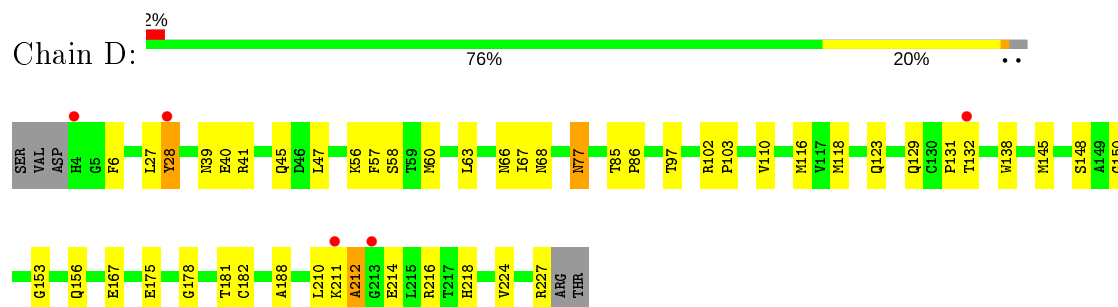
- Molecule 1: type iv collagen



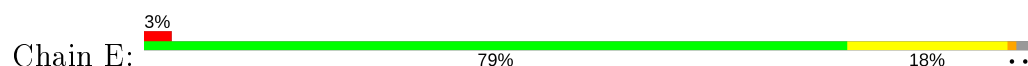
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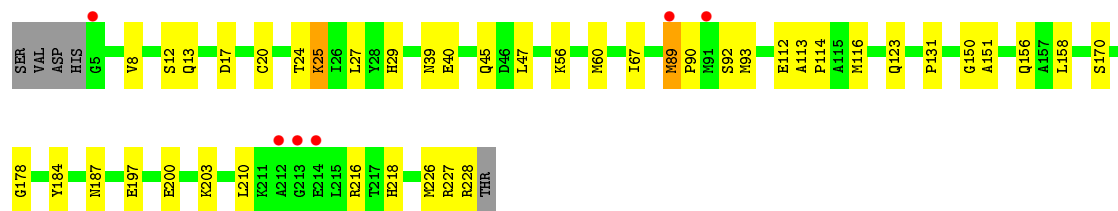


- Molecule 1: type iv collagen

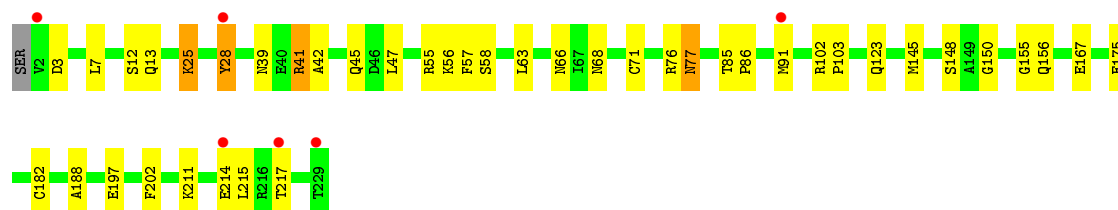
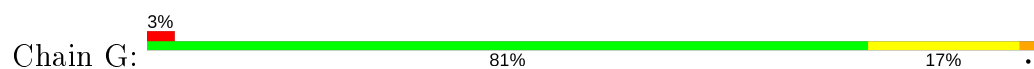


- Molecule 1: type iv collagen

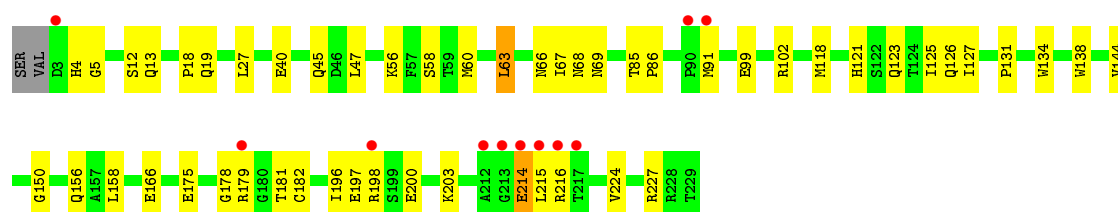
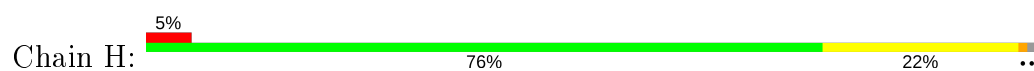




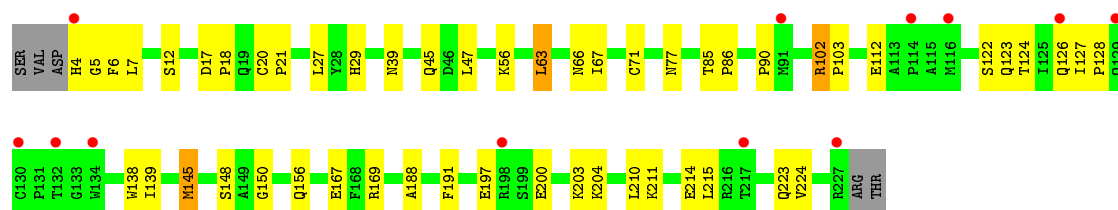
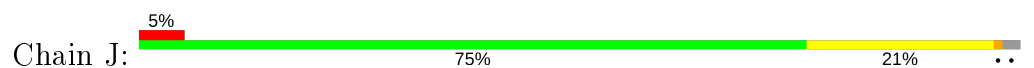
- Molecule 1: type iv collagen



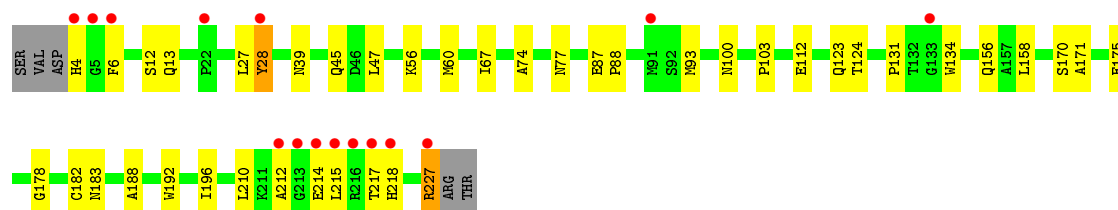
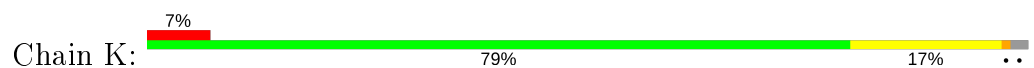
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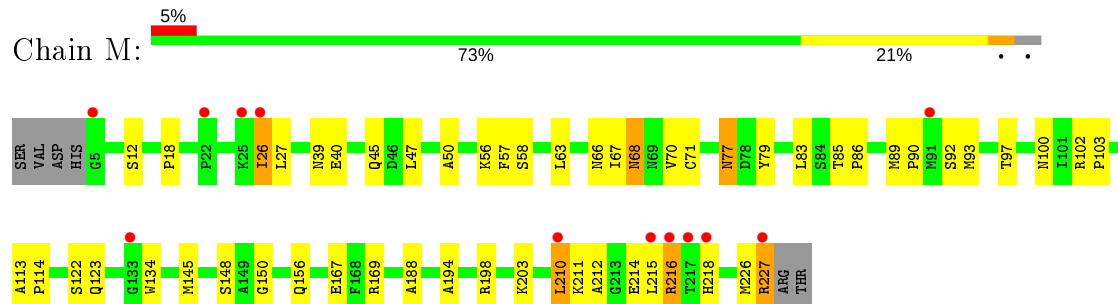
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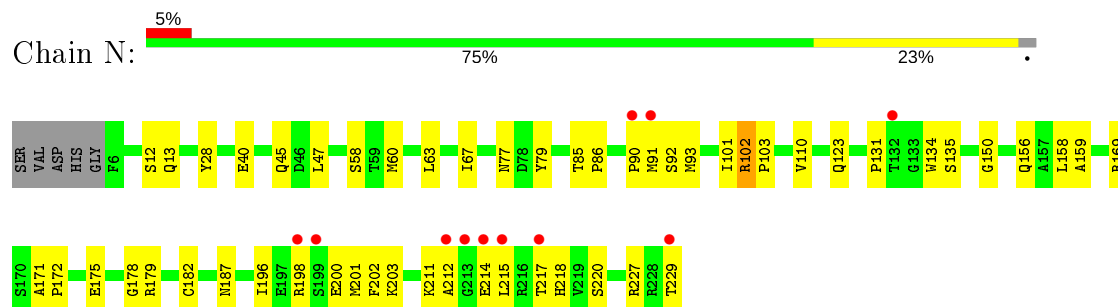
- Molecule 1: type iv collagen



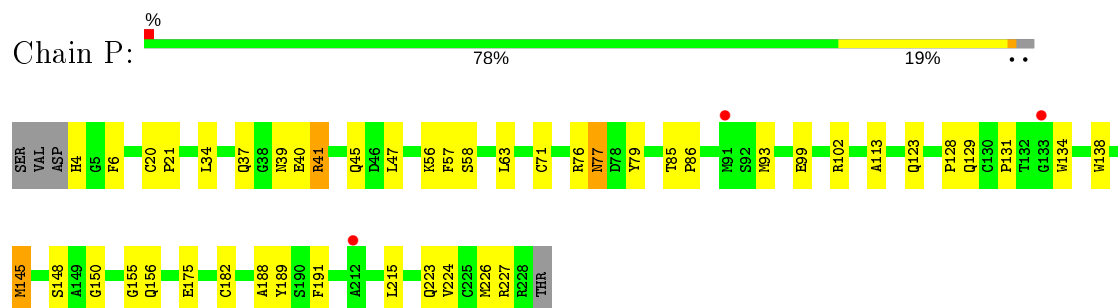
- Molecule 1: type iv collagen



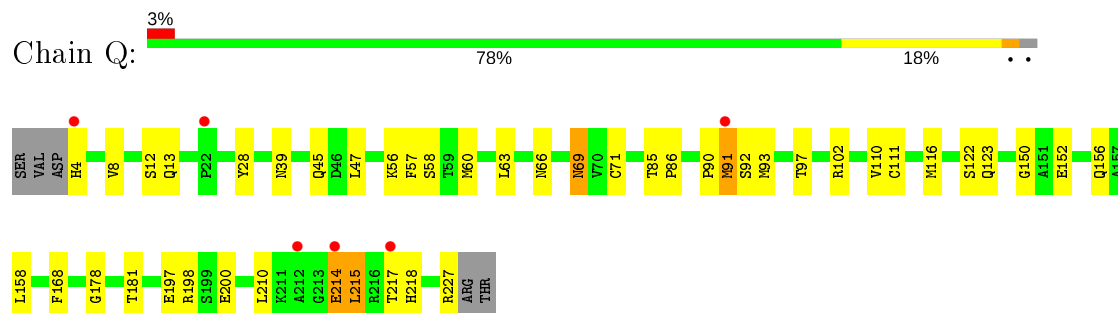
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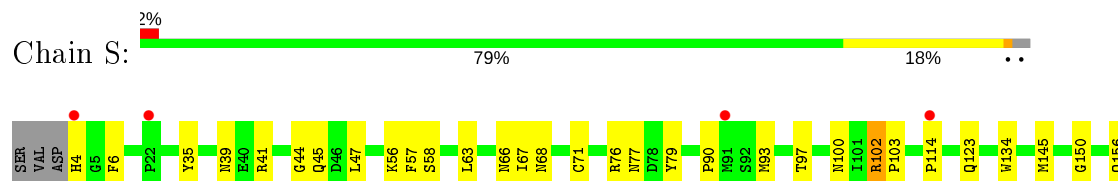
- Molecule 1: type iv collagen



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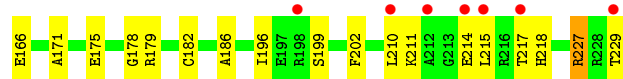
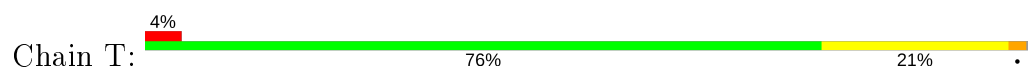


- Molecule 1: type iv collagen

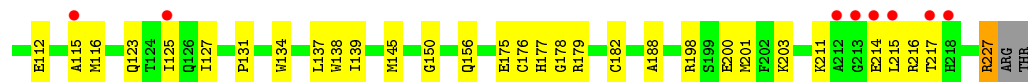




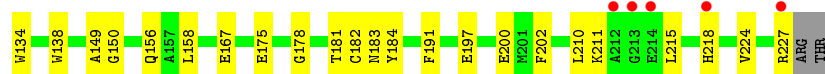
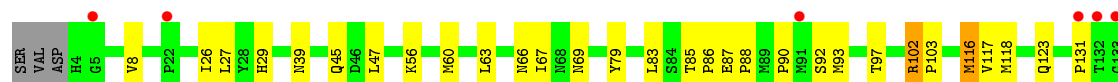
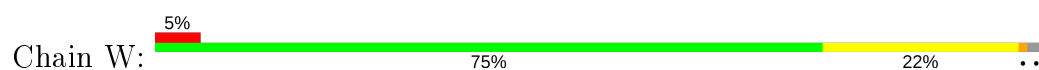
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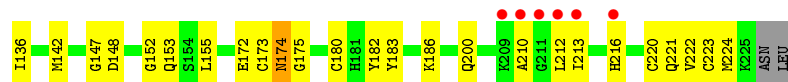
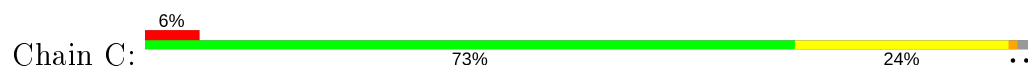
- Molecule 1: type iv collagen



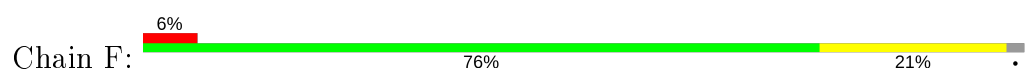
- Molecule 1: type iv collagen

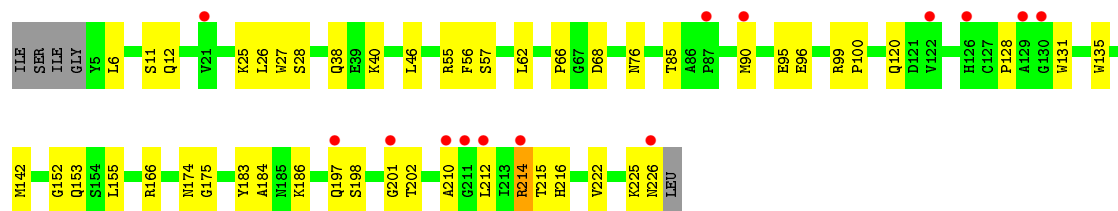


- Molecule 2: type iv collagen

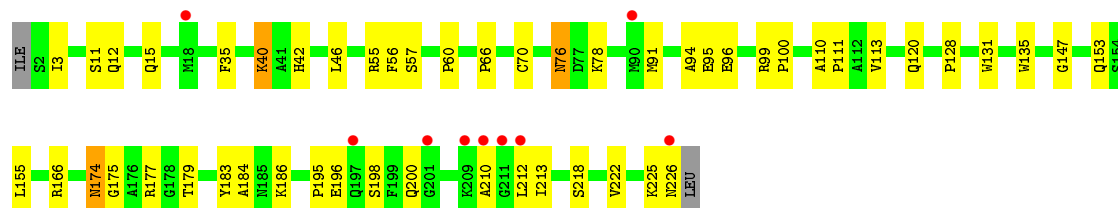
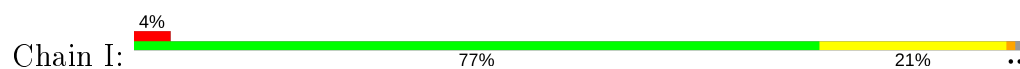


- Molecule 2: type iv collagen

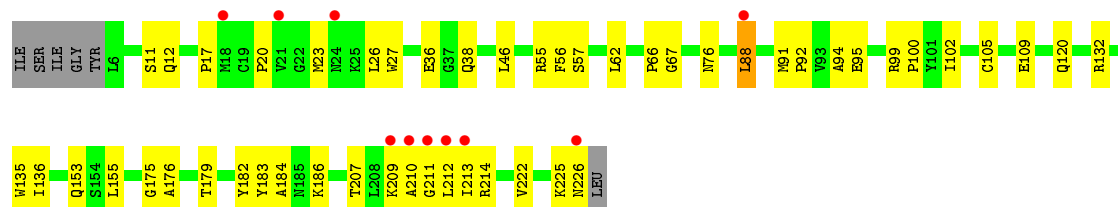
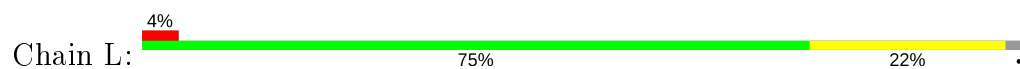




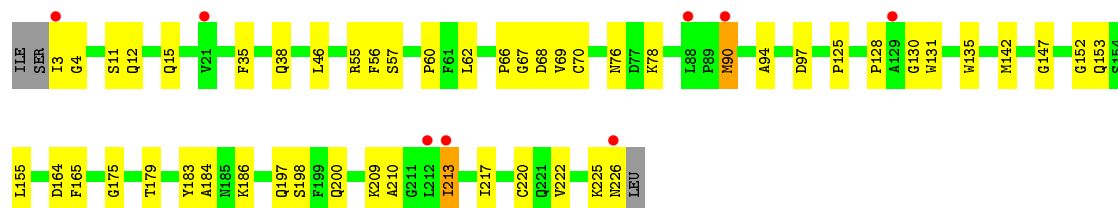
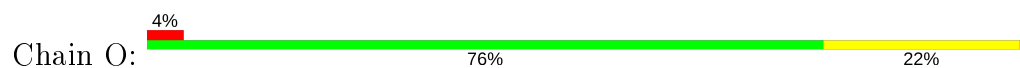
• Molecule 2: type iv collagen



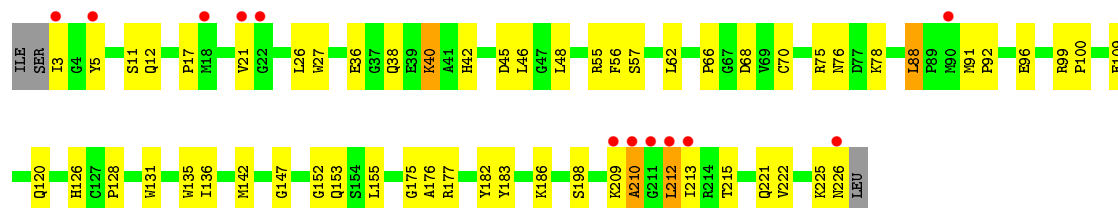
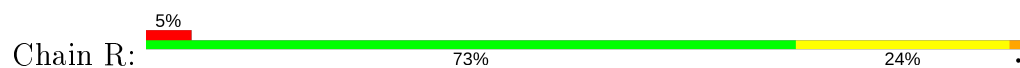
• Molecule 2: type iv collagen



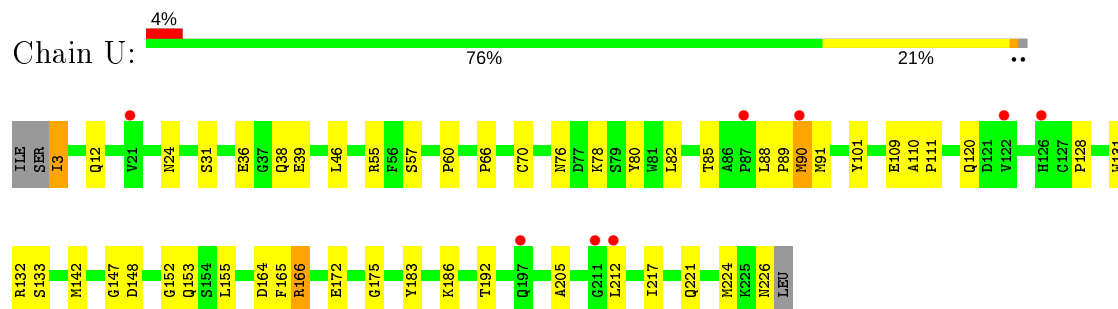
• Molecule 2: type iv collagen



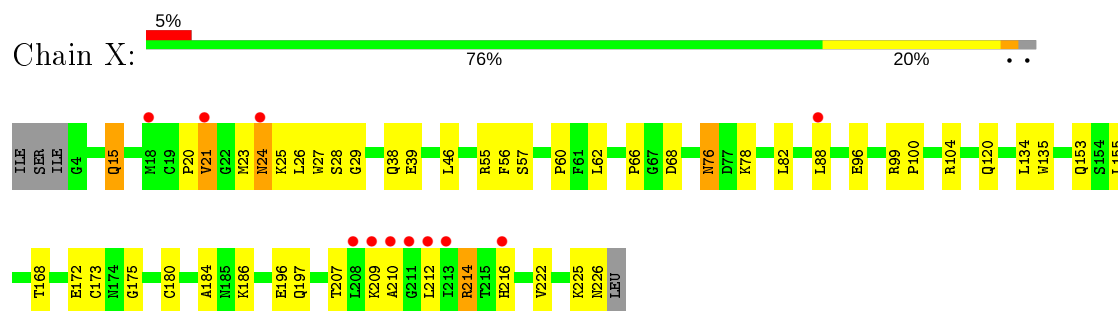
• Molecule 2: type iv collagen



- Molecule 2: type iv collagen



- Molecule 2: type iv collagen



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	127.88Å 140.13Å 160.69Å 90.00° 91.26° 90.00°	Depositor
Resolution (Å)	8.00 – 1.50 50.02 – 1.50	Depositor EDS
% Data completeness (in resolution range)	(Not available) (8.00-1.50) 89.5 (50.02-1.50)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.07	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.09 (at 1.50Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, $R_{free}$	0.189 , 0.216 0.205 , 0.231	Depositor DCC
$R_{free}$ test set	39655 reflections (4.61%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	13.9	Xtriage
Anisotropy	0.228	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.39 , 62.6	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	0.018 for h,-k,-l	Xtriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	44599	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	21.0	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 32.08 % 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 9.9581e-04.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.



## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: K, MPD, CL

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	0.35	0/1774	0.62	0/2410
1	B	0.34	0/1796	0.61	0/2439
1	D	0.36	0/1785	0.63	0/2425
1	E	0.35	0/1785	0.61	0/2424
1	G	0.36	0/1818	0.62	0/2470
1	H	0.34	0/1811	0.60	0/2460
1	J	0.34	0/1785	0.62	0/2425
1	K	0.34	0/1785	0.61	0/2425
1	M	0.35	0/1774	0.61	0/2410
1	N	0.33	0/1788	0.61	0/2429
1	P	0.35	0/1796	0.61	0/2439
1	Q	0.35	0/1785	0.61	0/2425
1	S	0.34	0/1796	0.60	0/2439
1	T	0.34	0/1811	0.61	0/2460
1	V	0.33	0/1785	0.59	0/2425
1	W	0.33	0/1785	0.59	0/2425
2	C	0.36	0/1775	0.65	0/2415
2	F	0.36	0/1771	0.63	0/2410
2	I	0.34	0/1789	0.63	0/2434
2	L	0.35	0/1758	0.64	0/2392
2	O	0.35	0/1783	0.63	0/2426
2	R	0.35	0/1783	0.63	0/2426
2	U	0.35	0/1783	0.64	0/2426
2	X	0.34	0/1775	0.63	0/2415
All	All	0.35	0/42876	0.62	0/58274

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 ⓘ

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	1724	0	1640	45	0
1	B	1745	0	1661	56	0
1	D	1734	0	1647	56	0
1	E	1735	0	1654	39	0
1	G	1767	0	1680	41	0
1	H	1760	0	1672	48	0
1	J	1734	0	1647	55	0
1	K	1734	0	1648	49	0
1	M	1724	0	1640	65	0
1	N	1738	0	1658	49	0
1	P	1745	0	1660	44	0
1	Q	1734	0	1648	41	0
1	S	1745	0	1661	48	0
1	T	1760	0	1672	55	0
1	V	1734	0	1647	57	0
1	W	1734	0	1648	49	0
2	C	1724	0	1637	54	0
2	F	1720	0	1629	39	0
2	I	1738	0	1648	54	0
2	L	1708	0	1619	40	0
2	O	1732	0	1643	43	0
2	R	1732	0	1643	56	0
2	U	1732	0	1643	48	0
2	X	1724	0	1631	51	0
3	A	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
3	F	1	0	0	0	0
3	G	1	0	0	0	0
3	I	1	0	0	0	0
3	J	1	0	0	0	0
3	L	1	0	0	0	0
3	M	1	0	0	0	0
3	O	1	0	0	0	0
3	P	1	0	0	0	0
3	R	1	0	0	0	0
3	S	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	U	1	0	0	0	0
3	V	1	0	0	0	0
3	X	1	0	0	0	0
4	A	8	0	14	0	0
4	D	8	0	14	1	0
4	J	8	0	14	3	0
4	M	16	0	28	1	0
4	P	8	0	14	6	0
4	S	16	0	28	5	0
4	T	8	0	14	0	0
5	B	1	0	0	0	0
5	C	2	0	0	0	0
5	D	1	0	0	0	0
5	G	1	0	0	0	0
5	H	1	0	0	0	0
5	I	1	0	0	0	0
5	L	1	0	0	0	0
5	M	1	0	0	0	0
5	N	1	0	0	0	0
5	O	1	0	0	0	0
5	P	1	0	0	0	0
5	T	1	0	0	0	0
5	U	2	0	0	0	0
5	V	1	0	0	0	0
6	A	112	0	0	4	0
6	B	101	0	0	1	0
6	C	116	0	0	0	0
6	D	134	0	0	3	0
6	E	127	0	0	1	0
6	F	117	0	0	0	0
6	G	144	0	0	1	0
6	H	104	0	0	2	0
6	I	121	0	0	2	0
6	J	97	0	0	1	0
6	K	102	0	0	1	0
6	L	111	0	0	0	0
6	M	118	0	0	2	0
6	N	113	0	0	5	0
6	O	125	0	0	1	0
6	P	133	0	0	3	0
6	Q	108	0	0	1	0
6	R	129	0	0	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	S	137	0	0	4	0
6	T	127	0	0	5	0
6	U	139	0	0	1	0
6	V	110	0	0	3	0
6	W	103	0	0	2	0
6	X	110	0	0	5	0
All	All	44599	0	39702	939	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 12.

The worst 5 of 939 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:B:203:LYS:HE2	1:B:203:LYS:HA	1.40	1.03
1:E:27:LEU:HD21	1:E:112:GLU:HG3	1.40	1.00
1:V:123:GLN:HE22	2:X:55:ARG:H	1.20	0.89
1:N:200:GLU:HA	1:N:203:LYS:HE2	1.56	0.87
1:J:45:GLN:HE22	1:K:158:LEU:H	1.22	0.85

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	221/229 (96%)	214 (97%)	6 (3%)	1 (0%)	29 9
1	B	223/229 (97%)	213 (96%)	9 (4%)	1 (0%)	34 13
1	D	222/229 (97%)	211 (95%)	9 (4%)	2 (1%)	17 3
1	E	222/229 (97%)	213 (96%)	9 (4%)	0	100 100
1	G	226/229 (99%)	218 (96%)	6 (3%)	2 (1%)	17 3

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	H	225/229 (98%)	215 (96%)	9 (4%)	1 (0%)	34	13
1	J	222/229 (97%)	213 (96%)	8 (4%)	1 (0%)	29	9
1	K	222/229 (97%)	211 (95%)	10 (4%)	1 (0%)	29	9
1	M	221/229 (96%)	210 (95%)	10 (4%)	1 (0%)	29	9
1	N	222/229 (97%)	213 (96%)	7 (3%)	2 (1%)	17	3
1	P	223/229 (97%)	217 (97%)	4 (2%)	2 (1%)	17	3
1	Q	222/229 (97%)	212 (96%)	10 (4%)	0	100	100
1	S	223/229 (97%)	215 (96%)	7 (3%)	1 (0%)	34	13
1	T	225/229 (98%)	212 (94%)	13 (6%)	0	100	100
1	V	222/229 (97%)	209 (94%)	12 (5%)	1 (0%)	29	9
1	W	222/229 (97%)	210 (95%)	12 (5%)	0	100	100
2	C	221/227 (97%)	203 (92%)	17 (8%)	1 (0%)	29	9
2	F	220/227 (97%)	205 (93%)	13 (6%)	2 (1%)	17	3
2	I	223/227 (98%)	211 (95%)	10 (4%)	2 (1%)	17	3
2	L	219/227 (96%)	203 (93%)	15 (7%)	1 (0%)	29	9
2	O	222/227 (98%)	208 (94%)	11 (5%)	3 (1%)	11	1
2	R	222/227 (98%)	208 (94%)	12 (5%)	2 (1%)	17	3
2	U	222/227 (98%)	212 (96%)	9 (4%)	1 (0%)	29	9
2	X	221/227 (97%)	200 (90%)	19 (9%)	2 (1%)	17	3
All	All	5333/5480 (97%)	5056 (95%)	247 (5%)	30 (1%)	25	7

5 of 30 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	214	GLU
1	D	212	ALA
2	F	175	GLY
1	H	214	GLU
2	L	175	GLY

### 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	
1	A	189/195 (97%)	185 (98%)	4 (2%)	53	23
1	B	191/195 (98%)	189 (99%)	2 (1%)	76	57
1	D	190/195 (97%)	186 (98%)	4 (2%)	53	23
1	E	190/195 (97%)	185 (97%)	5 (3%)	46	16
1	G	194/195 (100%)	188 (97%)	6 (3%)	40	11
1	H	193/195 (99%)	188 (97%)	5 (3%)	46	16
1	J	190/195 (97%)	186 (98%)	4 (2%)	53	23
1	K	190/195 (97%)	188 (99%)	2 (1%)	73	53
1	M	189/195 (97%)	181 (96%)	8 (4%)	30	6
1	N	191/195 (98%)	187 (98%)	4 (2%)	53	23
1	P	191/195 (98%)	187 (98%)	4 (2%)	53	23
1	Q	190/195 (97%)	184 (97%)	6 (3%)	39	10
1	S	191/195 (98%)	184 (96%)	7 (4%)	34	8
1	T	193/195 (99%)	188 (97%)	5 (3%)	46	16
1	V	190/195 (97%)	184 (97%)	6 (3%)	39	10
1	W	190/195 (97%)	186 (98%)	4 (2%)	53	23
2	C	187/191 (98%)	182 (97%)	5 (3%)	44	15
2	F	187/191 (98%)	182 (97%)	5 (3%)	44	15
2	I	189/191 (99%)	185 (98%)	4 (2%)	53	23
2	L	186/191 (97%)	181 (97%)	5 (3%)	44	15
2	O	188/191 (98%)	184 (98%)	4 (2%)	53	23
2	R	188/191 (98%)	182 (97%)	6 (3%)	39	10
2	U	188/191 (98%)	183 (97%)	5 (3%)	44	15
2	X	187/191 (98%)	180 (96%)	7 (4%)	34	8
All	All	4552/4648 (98%)	4435 (97%)	117 (3%)	46	16

5 of 117 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	M	68	ASN
2	O	164	ASP
1	W	102	ARG

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Mol	Chain	Res	Type
1	M	79	TYR
1	N	79	TYR

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 190 such sidechains are listed below:

Mol	Chain	Res	Type
2	L	15	GLN
1	N	129	GLN
1	W	37	GLN
2	L	120	GLN
1	M	66	ASN

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates ⓘ

There are no carbohydrates in this entry.

## 5.6 Ligand geometry ⓘ

Of 41 ligands modelled in this entry, 32 are monoatomic - leaving 9 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
4	MPD	S	5004	-	7,7,7	0.53	0	9,10,10	0.50	0
4	MPD	M	5003	-	7,7,7	0.61	0	9,10,10	0.55	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	MPD	J	5009	-	7,7,7	0.57	0	9,10,10	0.57	0
4	MPD	M	5008	-	7,7,7	0.62	0	9,10,10	0.48	0
4	MPD	S	5005	-	7,7,7	0.80	0	9,10,10	0.70	0
4	MPD	T	5002	-	7,7,7	1.60	2 (28%)	9,10,10	1.12	0
4	MPD	D	5007	-	7,7,7	0.94	0	9,10,10	0.50	0
4	MPD	A	5001	-	7,7,7	0.53	0	9,10,10	0.52	0
4	MPD	P	5006	-	7,7,7	0.61	0	9,10,10	0.55	0

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
4	MPD	S	5004	-	-	0/5/5/5	-
4	MPD	M	5003	-	-	1/5/5/5	-
4	MPD	J	5009	-	-	0/5/5/5	-
4	MPD	M	5008	-	-	0/5/5/5	-
4	MPD	S	5005	-	-	0/5/5/5	-
4	MPD	T	5002	-	-	0/5/5/5	-
4	MPD	D	5007	-	-	3/5/5/5	-
4	MPD	A	5001	-	-	0/5/5/5	-
4	MPD	P	5006	-	-	0/5/5/5	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	T	5002	MPD	CM-C2	-2.52	1.44	1.52
4	T	5002	MPD	C3-C2	-2.06	1.48	1.53

There are no bond angle outliers.

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	M	5003	MPD	C1-C2-C3-C4
4	D	5007	MPD	C1-C2-C3-C4
4	D	5007	MPD	O2-C2-C3-C4
4	D	5007	MPD	CM-C2-C3-C4

There are no ring outliers.



5 monomers are involved in 16 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	J	5009	MPD	3	0
4	M	5008	MPD	1	0
4	S	5005	MPD	5	0
4	D	5007	MPD	1	0
4	P	5006	MPD	6	0

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data ⓘ

### 6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	223/229 (97%)	-0.00	2 (0%) 84 87	10, 18, 33, 42	0
1	B	225/229 (98%)	0.20	15 (6%) 17 19	11, 19, 41, 49	0
1	D	224/229 (97%)	-0.17	5 (2%) 62 67	8, 14, 33, 49	0
1	E	224/229 (97%)	-0.08	6 (2%) 54 59	9, 16, 35, 45	0
1	G	228/229 (99%)	-0.11	6 (2%) 56 61	9, 15, 39, 47	0
1	H	227/229 (99%)	0.09	11 (4%) 30 33	10, 18, 39, 50	0
1	J	224/229 (97%)	0.14	12 (5%) 25 28	10, 20, 41, 49	0
1	K	224/229 (97%)	0.13	15 (6%) 17 19	10, 18, 41, 50	0
1	M	223/229 (97%)	0.17	12 (5%) 25 28	10, 20, 38, 50	0
1	N	224/229 (97%)	0.24	11 (4%) 29 32	10, 19, 41, 49	0
1	P	225/229 (98%)	-0.15	3 (1%) 77 81	10, 18, 32, 45	0
1	Q	224/229 (97%)	-0.04	6 (2%) 54 59	10, 18, 39, 47	0
1	S	225/229 (98%)	-0.05	5 (2%) 62 67	10, 17, 32, 42	0
1	T	227/229 (99%)	0.13	10 (4%) 34 38	10, 18, 42, 49	0
1	V	224/229 (97%)	0.30	12 (5%) 25 28	12, 22, 42, 50	0
1	W	224/229 (97%)	0.17	11 (4%) 29 32	10, 21, 43, 49	0
2	C	223/227 (98%)	0.27	14 (6%) 20 21	10, 20, 40, 50	0
2	F	222/227 (97%)	0.25	14 (6%) 20 21	9, 19, 38, 50	0
2	I	225/227 (99%)	0.20	9 (4%) 38 42	9, 20, 36, 48	0
2	L	221/227 (97%)	0.21	10 (4%) 33 36	11, 20, 41, 50	0
2	O	224/227 (98%)	0.05	8 (3%) 42 47	9, 17, 34, 45	0
2	R	224/227 (98%)	0.04	12 (5%) 25 28	9, 17, 37, 50	0
2	U	224/227 (98%)	0.09	8 (3%) 42 47	9, 16, 37, 47	0
2	X	223/227 (98%)	0.21	11 (4%) 29 32	10, 20, 41, 50	0

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Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
All	All	5381/5480 (98%)	0.09	228 (4%) 36 40	8, 18, 39, 50	0

The worst 5 of 228 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	C	212	LEU	12.5
2	X	21	VAL	11.6
2	L	212	LEU	10.7
2	X	212	LEU	9.9
2	R	211	GLY	8.5

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

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

## 6.3 Carbohydrates ⓘ

There are no carbohydrates in this entry.

## 6.4 Ligands ⓘ

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
4	MPD	P	5006	8/8	0.59	0.34	42,45,49,50	0
4	MPD	S	5005	8/8	0.62	0.33	47,49,49,50	0
4	MPD	J	5009	8/8	0.64	0.47	46,48,50,50	0
4	MPD	M	5008	8/8	0.70	0.22	38,40,44,46	0
4	MPD	D	5007	8/8	0.71	0.30	42,44,44,46	0
4	MPD	S	5004	8/8	0.75	0.18	45,45,46,47	0
4	MPD	A	5001	8/8	0.82	0.14	37,40,41,44	0
4	MPD	T	5002	8/8	0.84	0.33	45,46,47,47	0
5	K	M	5105	1/1	0.90	0.08	42,42,42,42	0
4	MPD	M	5003	8/8	0.92	0.08	24,29,31,33	0
5	K	D	5102	1/1	0.95	0.06	35,35,35,35	0
5	K	V	5108	1/1	0.96	0.06	36,36,36,36	0
5	K	H	5111	1/1	0.98	0.04	21,21,21,21	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
5	K	B	5109	1/1	0.98	0.05	20,20,20,20	0
5	K	P	5106	1/1	0.98	0.07	33,33,33,33	0
5	K	C	5101	1/1	0.98	0.04	26,26,26,26	0
3	CL	M	5208	1/1	0.99	0.03	15,15,15,15	0
3	CL	V	5215	1/1	0.99	0.04	17,17,17,17	0
3	CL	F	5204	1/1	0.99	0.05	14,14,14,14	0
3	CL	R	5212	1/1	0.99	0.04	14,14,14,14	0
3	CL	G	5205	1/1	0.99	0.05	14,14,14,14	0
3	CL	A	5201	1/1	0.99	0.03	13,13,13,13	0
5	K	G	5103	1/1	0.99	0.06	34,34,34,34	0
5	K	I	5112	1/1	0.99	0.04	21,21,21,21	0
3	CL	X	5216	1/1	0.99	0.05	18,18,18,18	0
3	CL	O	5210	1/1	0.99	0.05	13,13,13,13	0
3	CL	C	5202	1/1	0.99	0.05	15,15,15,15	0
3	CL	L	5209	1/1	0.99	0.03	15,15,15,15	0
5	K	T	5115	1/1	0.99	0.04	17,17,17,17	0
5	K	U	5116	1/1	0.99	0.04	18,18,18,18	0
3	CL	S	5213	1/1	0.99	0.03	16,16,16,16	0
5	K	C	5110	1/1	0.99	0.03	19,19,19,19	0
5	K	L	5104	1/1	0.99	0.04	27,27,27,27	0
5	K	U	5107	1/1	0.99	0.05	30,30,30,30	0
3	CL	P	5211	1/1	0.99	0.04	13,13,13,13	0
5	K	O	5114	1/1	1.00	0.03	16,16,16,16	0
3	CL	I	5206	1/1	1.00	0.02	11,11,11,11	0
3	CL	D	5203	1/1	1.00	0.03	13,13,13,13	0
5	K	N	5113	1/1	1.00	0.03	15,15,15,15	0
3	CL	J	5207	1/1	1.00	0.03	13,13,13,13	0
3	CL	U	5214	1/1	1.00	0.04	12,12,12,12	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.