



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 04:59 PM GMT

PDB ID : 4GUK  
Title : New crystal form structure of human NCS1  
Authors : Chengpeng F.; Elias L.  
Deposited on : 2012-08-29  
Resolution : 1.75 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  
<http://wwpdb.org/validation/2016/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 : 1.7 (RC4), CSD as536be (2015)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20026688  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
Refmac : 5.8.0135  
CCP4 : 6.5.0  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : trunk26865

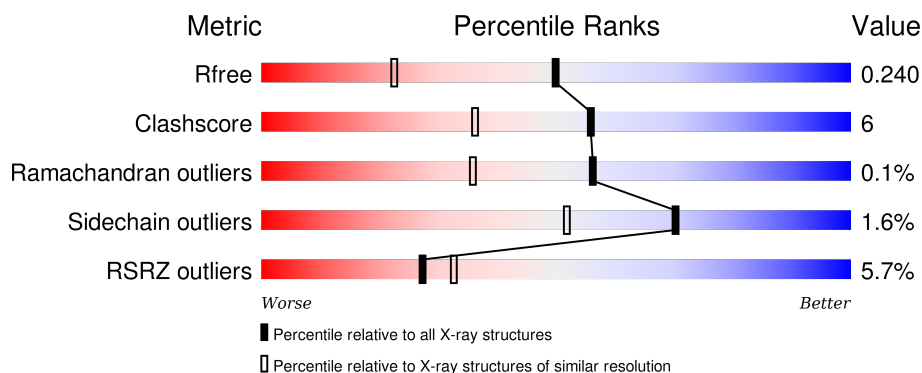
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 1.75 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	91344	1609 (1.76-1.76)
Clashscore	102246	1730 (1.76-1.76)
Ramachandran outliers	100387	1711 (1.76-1.76)
Sidechain outliers	100360	1711 (1.76-1.76)
RSRZ outliers	91569	1610 (1.76-1.76)

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. 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	190	<div> <div>6%</div> <div>84%</div> <div>12%</div> <div>• •</div> </div>
1	B	190	<div> <div>5%</div> <div>79%</div> <div>15%</div> <div>• 6%</div> </div>
1	C	190	<div> <div>6%</div> <div>81%</div> <div>14%</div> <div>• • •</div> </div>
1	D	190	<div> <div>5%</div> <div>82%</div> <div>13%</div> <div>5%</div> </div>

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard

residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	PG4	A	201	-	-	-	X
2	PG4	A	202	-	-	-	X
2	PG4	B	204	-	-	-	X
2	PG4	D	207	-	-	-	X
3	EDO	A	203	-	-	-	X
3	EDO	A	204	-	-	-	X
3	EDO	D	204	-	-	-	X
6	P3G	C	202	-	-	-	X
7	P2G	B	208	-	-	-	X
7	P2G	D	205	-	-	-	X

## 2 Entry composition

There are 9 unique types of molecules in this entry. The entry contains 6402 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 Neuronal calcium sensor 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	183	Total	C	N	O	S	0	0	0
			1475	944	238	288	5			
1	C	182	Total	C	N	O	S	0	0	0
			1469	941	237	286	5			
1	B	179	Total	C	N	O	S	0	0	0
			1454	932	234	283	5			
1	D	180	Total	C	N	O	S	0	0	0
			1460	936	235	284	5			

There are 28 discrepancies between the modelled and reference sequences:

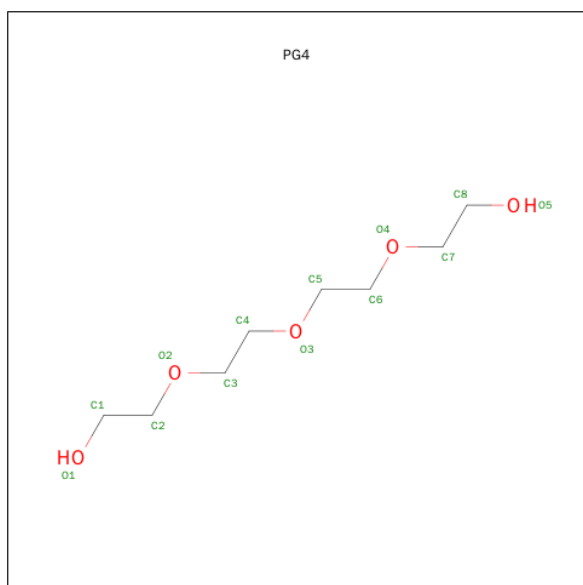
Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MET	-	INITIATING METHIONINE	UNP P62166
A	2	GLY	-	EXPRESSION TAG	UNP P62166
A	3	LYS	-	EXPRESSION TAG	UNP P62166
A	4	SER	-	EXPRESSION TAG	UNP P62166
A	5	ASN	-	EXPRESSION TAG	UNP P62166
A	189	LEU	-	EXPRESSION TAG	UNP P62166
A	190	VAL	-	EXPRESSION TAG	UNP P62166
C	-4	MET	-	INITIATING METHIONINE	UNP P62166
C	-3	GLY	-	EXPRESSION TAG	UNP P62166
C	-2	LYS	-	EXPRESSION TAG	UNP P62166
C	-1	SER	-	EXPRESSION TAG	UNP P62166
C	0	ASN	-	EXPRESSION TAG	UNP P62166
C	182	LEU	-	EXPRESSION TAG	UNP P62166
C	183	VAL	-	EXPRESSION TAG	UNP P62166
B	1	MET	-	INITIATING METHIONINE	UNP P62166
B	2	GLY	-	EXPRESSION TAG	UNP P62166
B	3	LYS	-	EXPRESSION TAG	UNP P62166
B	4	SER	-	EXPRESSION TAG	UNP P62166
B	5	ASN	-	EXPRESSION TAG	UNP P62166
B	189	LEU	-	EXPRESSION TAG	UNP P62166
B	190	VAL	-	EXPRESSION TAG	UNP P62166

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Chain	Residue	Modelled	Actual	Comment	Reference
D	1	MET	-	INITIATING METHIONINE	UNP P62166
D	2	GLY	-	EXPRESSION TAG	UNP P62166
D	3	LYS	-	EXPRESSION TAG	UNP P62166
D	4	SER	-	EXPRESSION TAG	UNP P62166
D	5	ASN	-	EXPRESSION TAG	UNP P62166
D	189	LEU	-	EXPRESSION TAG	UNP P62166
D	190	VAL	-	EXPRESSION TAG	UNP P62166

- Molecule 2 is TETRAETHYLENE GLYCOL (three-letter code: PG4) (formula:  $C_8H_{18}O_5$ ).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			13	8	5		
2	A	1	Total	C	O	0	0
			13	8	5		
2	C	1	Total	C	O	0	0
			13	8	5		
2	B	1	Total	C	O	0	0
			13	8	5		
2	B	1	Total	C	O	0	0
			13	8	5		
2	D	1	Total	C	O	0	0
			13	8	5		
2	D	1	Total	C	O	0	0
			13	8	5		

- Molecule 3 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula:  $C_2H_6O_2$ ).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			4	2	2		
3	A	1	Total	C	O	0	0
			4	2	2		
3	A	1	Total	C	O	0	0
			4	2	2		
3	B	1	Total	C	O	0	0
			4	2	2		
3	D	1	Total	C	O	0	0
			4	2	2		

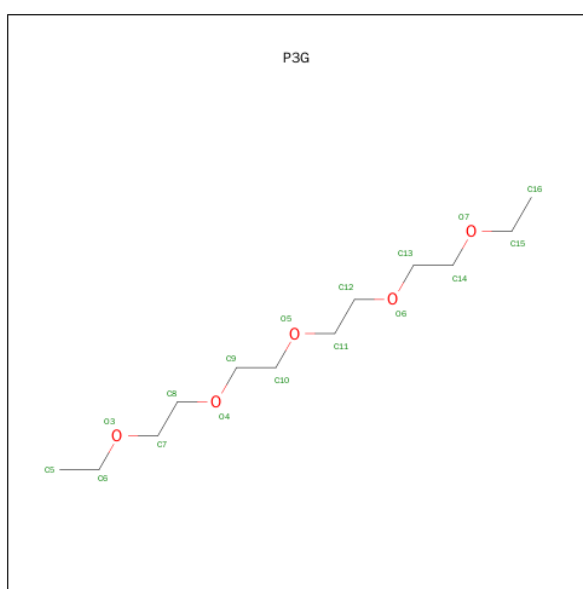
- Molecule 4 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	3	Total	Ca	0	0
			3	3		
4	A	3	Total	Ca	0	0
			3	3		
4	D	3	Total	Ca	0	0
			3	3		
4	C	3	Total	Ca	0	0
			3	3		

- Molecule 5 is SODIUM ION (three-letter code: NA) (formula: Na).

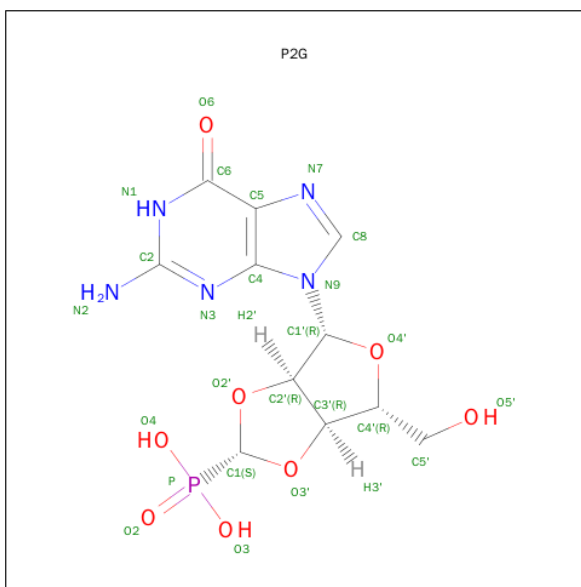
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	B	1	Total Na 1 1	0	0
5	A	1	Total Na 1 1	0	0
5	D	1	Total Na 1 1	0	0
5	C	1	Total Na 1 1	0	0

- Molecule 6 is 3,6,9,12,15-PENTAOXAHEPTADECANE (three-letter code: P3G) (formula:  $C_{12}H_{26}O_5$ ).



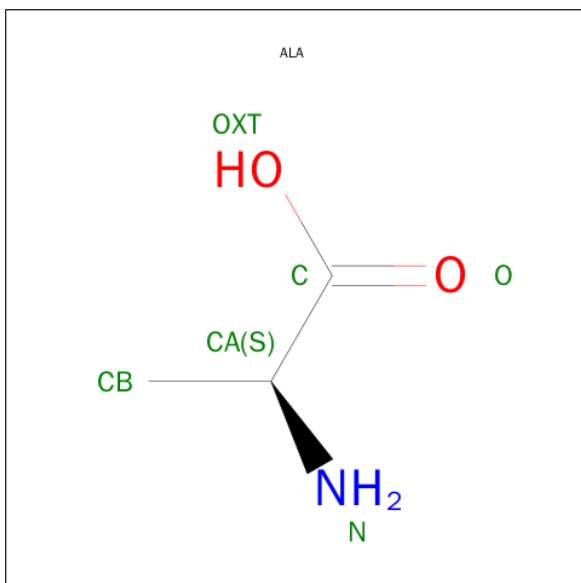
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	C	1	Total C O 10 6 4	0	0

- Molecule 7 is (2S,4R,6R,6AS)-4-(2-AMINO-6-OXO-1,6-DIHYDROPURIN-9-YL)-6-(HYDROXYMETHYL)-TETRAHYDROFURO[3,4-D][1,3]DIOXOL-2-YLPHOSPHONIC ACID (three-letter code: P2G) (formula:  $C_{11}H_{14}N_5O_8P$ ).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	C	1	Total	C	O	0	0
			7	4	3		
7	B	1	Total	C	O	0	0
			7	4	3		
7	B	1	Total	C	O	0	0
			7	4	3		
7	D	1	Total	C	O	0	0
			7	4	3		

- Molecule 8 is ALANINE (three-letter code: ALA) (formula:  $C_3H_7NO_2$ ).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
8	B	1	Total	C	N	O	0	0
			5	3	1	1		

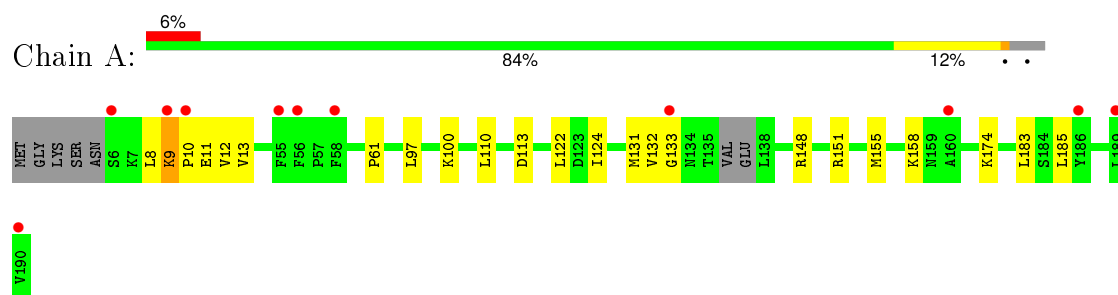
- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	85	Total	O	0	0
			85	85		
9	C	96	Total	O	0	0
			96	96		
9	B	102	Total	O	0	0
			102	102		
9	D	91	Total	O	0	0
			91	91		

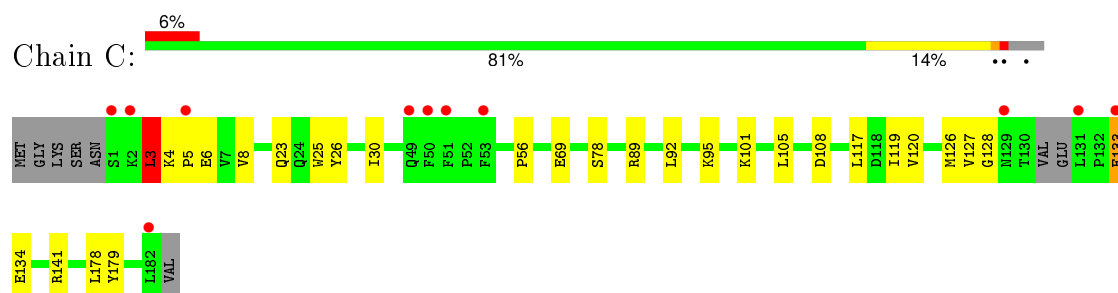
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). 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.

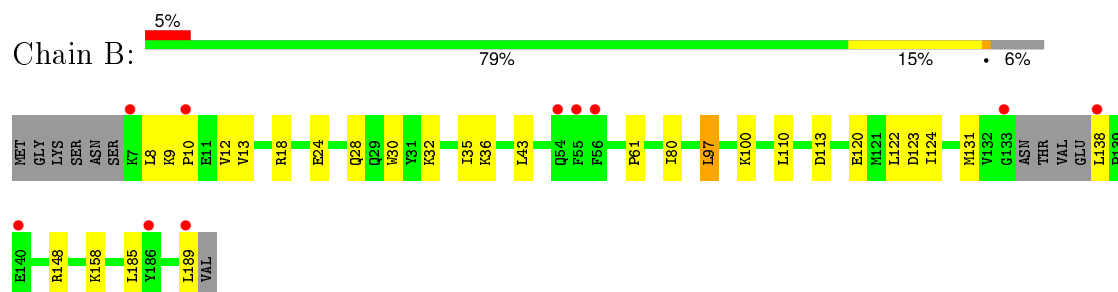
- Molecule 1: Neuronal calcium sensor 1



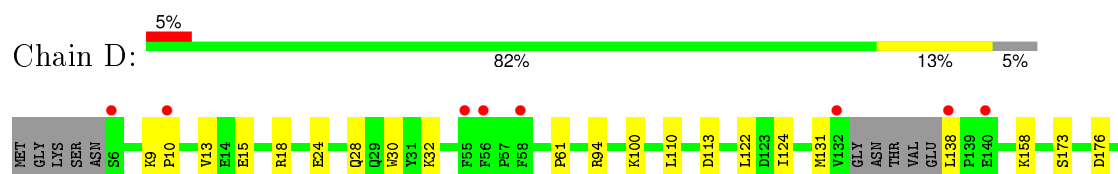
- Molecule 1: Neuronal calcium sensor 1



- Molecule 1: Neuronal calcium sensor 1



- Molecule 1: Neuronal calcium sensor 1





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 31	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	54.99Å 54.99Å 213.95Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	50.00 – 1.75 47.62 – 1.75	Depositor EDS
% Data completeness (in resolution range)	(Not available) (50.00-1.75) 97.5 (47.62-1.75)	Depositor EDS
$R_{merge}$	0.09	Depositor
$R_{sym}$	0.09	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.61 (at 1.75Å)	Xtriage
Refinement program	Phenix	Depositor
R, $R_{free}$	0.201 , 0.243 0.200 , 0.240	Depositor DCC
$R_{free}$ test set	1998 reflections (2.88%)	DCC
Wilson B-factor (Å <sup>2</sup> )	24.5	Xtriage
Anisotropy	0.420	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.36 , 50.9	EDS
Estimated twinning fraction	0.467 for -h,-k,l 0.477 for h,-h-k,-l 0.467 for -k,-h,-l	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtriage
Outliers	0 of 73121 reflections	Xtriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	6402	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	42.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 8.22% of the height of the origin peak. No significant pseudotranslation is detected.*

<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, 0.375 respectively for untwinned datasets, and 0.333, 0.2 for perfectly twinned datasets.

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: P2G, NA, CA, EDO, P3G, PG4

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	0.92	0/1505	0.88	2/2027 (0.1%)
1	B	0.95	2/1484 (0.1%)	0.91	3/1998 (0.2%)
1	C	0.94	0/1499	0.91	3/2019 (0.1%)
1	D	0.94	0/1490	0.89	1/2007 (0.0%)
All	All	0.94	2/5978 (0.0%)	0.90	9/8051 (0.1%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	120	GLU	CG-CD	-5.57	1.43	1.51
1	B	24	GLU	CB-CG	-5.03	1.42	1.52

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	97	LEU	CB-CG-CD1	-7.70	97.91	111.00
1	A	113	ASP	CB-CG-OD1	7.49	125.04	118.30
1	C	108	ASP	CB-CG-OD1	7.37	124.93	118.30
1	C	3	LEU	CA-CB-CG	7.36	132.22	115.30
1	D	113	ASP	CB-CG-OD1	6.94	124.55	118.30
1	A	97	LEU	CB-CG-CD1	-6.92	99.24	111.00
1	C	92	LEU	CB-CG-CD1	-6.42	100.08	111.00
1	B	113	ASP	CB-CG-OD1	6.13	123.81	118.30
1	B	18	ARG	NE-CZ-NH2	-5.06	117.77	120.30

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	1475	0	1418	13	0
1	B	1454	0	1407	18	0
1	C	1469	0	1416	21	0
1	D	1460	0	1408	19	1
2	A	26	0	36	2	0
2	B	26	0	36	4	0
2	C	13	0	18	4	0
2	D	26	0	36	2	0
3	A	12	0	18	0	0
3	B	4	0	6	0	0
3	D	4	0	6	0	0
4	A	3	0	0	0	0
4	B	3	0	0	0	0
4	C	3	0	0	0	0
4	D	3	0	0	0	0
5	A	1	0	0	0	0
5	B	1	0	0	0	0
5	C	1	0	0	0	0
5	D	1	0	0	0	0
6	C	10	0	12	2	0
7	B	14	0	6	0	0
7	C	7	0	3	0	0
7	D	7	0	3	0	0
8	B	5	0	4	1	0
9	A	85	0	0	0	6
9	B	102	0	0	2	6
9	C	96	0	0	3	4
9	D	91	0	0	4	3
All	All	6402	0	5833	74	10

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 6.

All (74) 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:30:TRP:HE1	2:B:209:PG4:H62	1.32	0.93
1:D:15:GLU:OE1	1:D:18:ARG:NH2	2.11	0.83
1:D:28:GLN:O	1:D:32:LYS:HD3	1.82	0.80
1:D:9:LYS:HG3	1:D:10:PRO:HD2	1.65	0.76
1:D:30:TRP:HE1	2:D:206:PG4:H62	1.51	0.75
1:B:9:LYS:HG3	1:B:10:PRO:HD2	1.68	0.74
1:A:148:ARG:HE	2:A:202:PG4:H71	1.50	0.74
1:B:32:LYS:O	1:B:36:LYS:HD3	1.88	0.74
1:B:148:ARG:HE	2:B:204:PG4:H12	1.52	0.73
1:D:173:SER:O	9:D:303:HOH:O	2.07	0.72
1:D:180:VAL:HG23	9:D:303:HOH:O	1.89	0.72
1:B:123:ASP:OD2	9:B:365:HOH:O	2.10	0.68
1:C:8:VAL:HG11	1:C:23:GLN:NE2	2.09	0.68
1:D:13:VAL:HG21	1:D:28:GLN:NE2	2.09	0.68
1:B:13:VAL:HG21	1:B:28:GLN:NE2	2.10	0.67
1:C:78:SER:OG	9:C:359:HOH:O	2.14	0.66
1:C:4:LYS:HG3	1:C:5:PRO:HD2	1.76	0.65
1:D:176:ASP:N	9:D:303:HOH:O	2.31	0.63
1:B:61:PRO:HB3	1:B:131:MET:HG3	1.81	0.63
1:A:9:LYS:HD3	1:A:12:VAL:HG21	1.82	0.62
1:D:28:GLN:OE1	1:D:32:LYS:NZ	2.33	0.61
1:D:13:VAL:HG11	1:D:24:GLU:HG3	1.83	0.60
1:C:141:ARG:HE	2:C:201:PG4:H12	1.66	0.59
1:B:185:LEU:HD23	8:B:205:ALA:HB2	1.88	0.55
1:C:105:LEU:HD21	1:C:119:ILE:HD11	1.89	0.55
1:D:61:PRO:HB3	1:D:131:MET:HG3	1.91	0.53
1:A:61:PRO:HB3	1:A:131:MET:HG3	1.91	0.52
1:A:110:LEU:HD21	1:A:124:ILE:HD11	1.91	0.52
2:B:204:PG4:H71	9:B:401:HOH:O	2.10	0.52
1:D:176:ASP:O	9:D:303:HOH:O	2.20	0.50
1:C:127:VAL:HG23	1:C:128:GLY:H	1.77	0.50
1:B:30:TRP:NE1	2:B:209:PG4:H62	2.14	0.50
1:C:120:VAL:HG22	2:C:201:PG4:H21	1.94	0.50
1:D:13:VAL:CG1	1:D:24:GLU:HG3	2.42	0.49
1:C:56:PRO:HB3	1:C:126:MET:HG3	1.94	0.49
1:D:100:LYS:NZ	1:D:185:LEU:O	2.46	0.49
1:B:158:LYS:HA	1:B:158:LYS:HD2	1.73	0.47
1:C:133:GLU:HG2	1:C:134:GLU:H	1.79	0.47
1:A:100:LYS:NZ	1:A:185:LEU:O	2.48	0.47
1:C:101:LYS:NZ	9:C:322:HOH:O	2.48	0.46
2:C:201:PG4:H32	9:C:393:HOH:O	2.15	0.46
1:B:100:LYS:NZ	1:B:185:LEU:O	2.49	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:8:LEU:HB3	1:A:13:VAL:HG13	1.98	0.46
1:A:174:LYS:HE3	1:A:174:LYS:HB2	1.58	0.46
1:A:151:ARG:O	1:A:155:MET:HG3	2.16	0.45
1:A:183:LEU:HD21	2:A:202:PG4:H11	1.98	0.45
1:D:110:LEU:HD21	1:D:124:ILE:HD11	1.99	0.45
1:A:132:VAL:CG2	1:A:133:GLY:H	2.30	0.45
1:D:158:LYS:HA	1:D:158:LYS:HD2	1.71	0.45
1:C:127:VAL:HG23	1:C:128:GLY:N	2.32	0.45
1:D:32:LYS:HD2	1:D:32:LYS:N	2.32	0.44
1:C:4:LYS:NZ	1:C:6:GLU:HG3	2.32	0.44
1:A:158:LYS:HD2	1:A:158:LYS:HA	1.77	0.44
1:B:185:LEU:HD13	1:B:189:LEU:H	1.83	0.43
1:B:8:LEU:HD22	1:B:12:VAL:HG11	1.99	0.43
1:C:3:LEU:HD13	1:C:26:TYR:CE2	2.53	0.42
1:C:127:VAL:CG2	1:C:128:GLY:H	2.32	0.42
1:B:110:LEU:HD21	1:B:124:ILE:HD11	2.00	0.42
2:C:201:PG4:H31	2:C:201:PG4:H52	1.81	0.42
1:D:94:ARG:HD3	1:D:186:TYR:OH	2.20	0.42
1:B:185:LEU:HD22	1:B:189:LEU:HA	2.01	0.42
1:A:61:PRO:HB3	1:A:131:MET:SD	2.59	0.42
1:D:30:TRP:NE1	2:D:206:PG4:H62	2.27	0.42
1:C:25:TRP:CE2	6:C:202:P3G:H131	2.54	0.42
1:C:25:TRP:NE1	6:C:202:P3G:H131	2.34	0.41
1:C:95:LYS:NZ	1:C:178:LEU:O	2.53	0.41
1:C:4:LYS:HZ2	1:C:6:GLU:HB2	1.86	0.41
1:C:30:ILE:HD13	1:C:30:ILE:HA	1.89	0.41
1:C:3:LEU:HD23	1:C:8:VAL:HG12	2.02	0.41
1:B:35:ILE:HD13	1:B:35:ILE:HA	1.82	0.41
1:C:89:ARG:HD3	1:C:179:TYR:OH	2.21	0.40
1:B:97:LEU:HD12	1:B:97:LEU:HA	1.84	0.40
1:A:10:PRO:HG2	1:A:11:GLU:OE2	2.21	0.40
1:B:43:LEU:HB3	1:B:80:ILE:HB	2.03	0.40

All (10) 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)
9:A:385:HOH:O	9:B:382:HOH:O[1_655]	1.56	0.64
9:A:305:HOH:O	9:B:318:HOH:O[1_655]	1.66	0.54
9:C:316:HOH:O	9:D:380:HOH:O[2_565]	1.75	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
9:A:374:HOH:O	9:B:318:HOH:O[1_655]	1.78	0.42
9:C:385:HOH:O	9:D:380:HOH:O[2_565]	1.84	0.36
9:A:320:HOH:O	9:B:397:HOH:O[1_665]	2.01	0.19
9:A:385:HOH:O	9:B:317:HOH:O[1_655]	2.01	0.19
9:A:368:HOH:O	9:B:373:HOH:O[1_655]	2.04	0.16
9:C:374:HOH:O	9:D:371:HOH:O[2_665]	2.18	0.02
1:D:189:LEU:O	9:C:384:HOH:O[3_454]	2.19	0.01

## 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	179/190 (94%)	173 (97%)	6 (3%)	0	100	100
1	B	175/190 (92%)	170 (97%)	5 (3%)	0	100	100
1	C	178/190 (94%)	171 (96%)	6 (3%)	1 (1%)	30	12
1	D	176/190 (93%)	172 (98%)	4 (2%)	0	100	100
All	All	708/760 (93%)	686 (97%)	21 (3%)	1 (0%)	56	36

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	3	LEU

### 5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	157/168 (94%)	155 (99%)	2 (1%)	76	60
1	B	156/168 (93%)	154 (99%)	2 (1%)	76	60
1	C	156/168 (93%)	152 (97%)	4 (3%)	54	28
1	D	156/168 (93%)	154 (99%)	2 (1%)	76	60
All	All	625/672 (93%)	615 (98%)	10 (2%)	70	52

All (10) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	9	LYS
1	A	122	LEU
1	C	3	LEU
1	C	69	GLU
1	C	117	LEU
1	C	133	GLU
1	B	122	LEU
1	B	138	LEU
1	D	122	LEU
1	D	138	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 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 carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

Of 34 ligands modelled in this entry, 16 are monoatomic - leaving 18 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	$\# Z  > 2$
2	PG4	A	201	-	12,12,12	0.73	0	11,11,11	1.51	2 (18%)
2	PG4	A	202	-	12,12,12	0.58	0	11,11,11	1.55	3 (27%)
3	EDO	A	203	-	3,3,3	0.48	0	2,2,2	0.46	0
3	EDO	A	204	-	3,3,3	0.52	0	2,2,2	0.63	0
3	EDO	A	205	-	3,3,3	0.51	0	2,2,2	0.80	0
2	PG4	B	204	-	12,12,12	0.58	0	11,11,11	1.76	2 (18%)
8	ALA	B	205	-	3,4,5	0.60	0	0,4,6	0.00	-
3	EDO	B	206	-	3,3,3	0.48	0	2,2,2	0.83	0
7	P2G	B	207	-	6,6,28	0.47	0	5,5,44	1.59	0
7	P2G	B	208	-	6,6,28	0.63	0	5,5,44	1.30	1 (20%)
2	PG4	B	209	-	12,12,12	0.53	0	11,11,11	1.78	4 (36%)
2	PG4	C	201	-	12,12,12	0.58	0	11,11,11	1.76	3 (27%)
6	P3G	C	202	-	9,9,16	0.51	0	8,8,15	1.76	3 (37%)
7	P2G	C	206	-	6,6,28	0.41	0	5,5,44	1.37	0
3	EDO	D	204	-	3,3,3	0.51	0	2,2,2	0.72	0
7	P2G	D	205	-	6,6,28	0.53	0	5,5,44	1.49	0
2	PG4	D	206	-	12,12,12	0.51	0	11,11,11	1.93	5 (45%)
2	PG4	D	207	-	12,12,12	0.35	0	11,11,11	2.08	5 (45%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the chemical component dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	PG4	A	201	-	-	0/10/10/10	0/0/0/0
2	PG4	A	202	-	-	0/10/10/10	0/0/0/0
3	EDO	A	203	-	-	0/1/1/1	0/0/0/0
3	EDO	A	204	-	-	0/1/1/1	0/0/0/0
3	EDO	A	205	-	-	0/1/1/1	0/0/0/0
2	PG4	B	204	-	-	0/10/10/10	0/0/0/0
8	ALA	B	205	-	-	0/0/2/4	0/0/0/0
3	EDO	B	206	-	-	0/1/1/1	0/0/0/0

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
7	P2G	B	207	-	-	0/4/4/36	0/0/0/4
7	P2G	B	208	-	-	0/4/4/36	0/0/0/4
2	PG4	B	209	-	-	0/10/10/10	0/0/0/0
2	PG4	C	201	-	-	0/10/10/10	0/0/0/0
6	P3G	C	202	-	-	0/7/7/14	0/0/0/0
7	P2G	C	206	-	-	0/4/4/36	0/0/0/4
3	EDO	D	204	-	-	0/1/1/1	0/0/0/0
7	P2G	D	205	-	-	0/4/4/36	0/0/0/4
2	PG4	D	206	-	-	0/10/10/10	0/0/0/0
2	PG4	D	207	-	-	0/10/10/10	0/0/0/0

There are no bond length outliers.

All (28) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	201	PG4	O3-C4-C3	2.01	119.32	110.36
2	A	201	PG4	O4-C6-C5	2.03	119.37	110.36
2	D	206	PG4	O3-C4-C3	2.04	119.41	110.36
2	C	201	PG4	O2-C3-C4	2.04	119.42	110.36
2	B	209	PG4	O3-C4-C3	2.07	119.59	110.36
2	B	209	PG4	O2-C3-C4	2.11	119.72	110.36
2	B	209	PG4	C5-O3-C4	2.16	122.61	113.31
6	C	202	P3G	C13-O6-C12	2.20	122.75	113.31
2	D	206	PG4	C7-O4-C6	2.20	122.78	113.31
7	B	208	P2G	C4'-O4'-C1'	2.22	122.84	113.31
6	C	202	P3G	C11-O5-C10	2.22	122.85	113.31
2	A	202	PG4	O3-C5-C6	2.26	120.40	110.36
2	D	206	PG4	O2-C3-C4	2.26	120.42	110.36
2	D	207	PG4	C3-O2-C2	2.29	123.15	113.31
2	D	206	PG4	C5-O3-C4	2.30	123.20	113.31
2	B	209	PG4	O4-C6-C5	2.32	120.66	110.36
6	C	202	P3G	O6-C12-C11	2.34	120.75	110.36
2	A	202	PG4	O2-C2-C1	2.47	121.82	110.43
2	D	206	PG4	O4-C6-C5	2.50	121.46	110.36
2	D	207	PG4	O4-C7-C8	2.56	122.20	110.43
2	D	207	PG4	O2-C2-C1	2.57	122.26	110.43
2	A	202	PG4	O2-C3-C4	2.57	121.79	110.36
2	C	201	PG4	C7-O4-C6	3.08	126.56	113.31
2	D	207	PG4	O3-C5-C6	3.10	124.12	110.36
2	B	204	PG4	O3-C5-C6	3.32	125.11	110.36
2	B	204	PG4	O4-C7-C8	3.62	127.09	110.43
2	C	201	PG4	O3-C5-C6	3.64	126.54	110.36

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	207	PG4	O2-C3-C4	3.88	127.62	110.36

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

7 monomers are involved in 15 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	202	PG4	2	0
2	B	204	PG4	2	0
8	B	205	ALA	1	0
2	B	209	PG4	2	0
2	C	201	PG4	4	0
6	C	202	P3G	2	0
2	D	206	PG4	2	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	183/190 (96%)	0.26	11 (6%) 25 30	21, 37, 86, 100	0
1	B	179/190 (94%)	0.23	10 (5%) 28 33	20, 37, 82, 100	1 (0%)
1	C	182/190 (95%)	0.29	11 (6%) 25 30	20, 37, 85, 100	0
1	D	180/190 (94%)	0.26	9 (5%) 32 38	20, 37, 85, 100	1 (0%)
All	All	724/760 (95%)	0.26	41 (5%) 27 32	20, 37, 86, 100	2 (0%)

All (41) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	5	PRO	5.6
1	A	56	PHE	5.3
1	C	51	PHE	5.1
1	D	56	PHE	5.1
1	D	55	PHE	4.5
1	D	58	PHE	4.3
1	B	56	PHE	4.3
1	B	138	LEU	4.0
1	B	55	PHE	4.0
1	C	182	LEU	3.9
1	A	55	PHE	3.8
1	D	10	PRO	3.6
1	D	6	SER	3.4
1	A	189	LEU	3.4
1	C	53	PHE	3.3
1	D	140	GLU	3.1
1	C	1	SER	3.1
1	A	133	GLY	3.1
1	D	190	VAL	3.0
1	C	49	GLN	3.0
1	C	50	PHE	2.9

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Mol	Chain	Res	Type	RSRZ
1	A	58	PHE	2.9
1	C	131	LEU	2.8
1	B	189	LEU	2.8
1	B	10	PRO	2.8
1	A	10	PRO	2.5
1	B	186	TYR	2.5
1	A	6	SER	2.4
1	B	140	GLU	2.4
1	C	2	LYS	2.3
1	D	138	LEU	2.3
1	B	133	GLY	2.3
1	B	54	GLN	2.2
1	C	129	ASN	2.2
1	A	160	ALA	2.1
1	C	133	GLU	2.1
1	A	186	TYR	2.1
1	A	190	VAL	2.0
1	D	132	VAL	2.0
1	B	7	LYS	2.0
1	A	9	LYS	2.0

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

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

## 6.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

## 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 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	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
3	EDO	A	203	4/4	0.85	0.20	7.05	53,54,60,62	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
2	PG4	B	204	13/13	0.71	0.14	3.73	21,33,48,51	0
3	EDO	D	204	4/4	0.90	0.20	3.68	62,62,64,65	0
7	P2G	B	208	7/25	0.79	0.13	3.27	44,50,66,66	0
3	EDO	A	204	4/4	0.83	0.17	3.00	62,62,63,66	0
7	P2G	D	205	7/25	0.80	0.14	2.90	47,50,67,69	0
2	PG4	D	207	13/13	0.91	0.12	2.67	22,40,62,65	0
6	P3G	C	202	10/17	0.72	0.15	2.64	44,48,56,59	0
2	PG4	A	202	13/13	0.89	0.12	2.06	23,40,49,54	0
2	PG4	A	201	13/13	0.86	0.13	2.06	42,48,60,61	0
2	PG4	D	206	13/13	0.82	0.13	1.92	46,57,69,69	0
2	PG4	C	201	13/13	0.90	0.12	1.86	19,38,48,49	0
2	PG4	B	209	13/13	0.82	0.13	1.75	45,58,68,70	0
7	P2G	B	207	7/25	0.73	0.12	1.64	60,63,67,70	0
7	P2G	C	206	7/25	0.76	0.14	1.64	48,61,68,72	0
3	EDO	B	206	4/4	0.91	0.11	0.98	53,55,62,62	0
5	NA	D	208	1/1	0.98	0.10	0.92	18,18,18,18	0
4	CA	A	208	1/1	0.95	0.10	-0.20	25,25,25,25	0
4	CA	C	204	1/1	0.97	0.08	-0.40	21,21,21,21	0
4	CA	D	203	1/1	0.94	0.09	-0.45	24,24,24,24	0
4	CA	C	205	1/1	0.96	0.09	-0.47	24,24,24,24	0
4	CA	B	203	1/1	0.94	0.09	-0.64	25,25,25,25	0
4	CA	A	206	1/1	0.95	0.07	-1.19	30,30,30,30	0
4	CA	D	202	1/1	0.97	0.08	-1.20	22,22,22,22	0
4	CA	C	203	1/1	0.94	0.07	-1.26	30,30,30,30	0
4	CA	A	207	1/1	0.98	0.07	-1.41	22,22,22,22	0
4	CA	D	201	1/1	0.94	0.07	-1.55	29,29,29,29	0
4	CA	B	202	1/1	0.98	0.07	-1.63	22,22,22,22	0
4	CA	B	201	1/1	0.95	0.07	-1.67	31,31,31,31	0
5	NA	A	209	1/1	0.95	0.05	-1.97	27,27,27,27	0
5	NA	B	210	1/1	0.97	0.05	-2.05	27,27,27,27	0
5	NA	C	207	1/1	0.96	0.05	-2.25	28,28,28,28	0
3	EDO	A	205	4/4	0.75	0.13	-	62,64,65,69	0
8	ALA	B	205	5/6	0.58	0.22	-	86,87,91,92	0

## 6.5 Other polymers ⓘ

There are no such residues in this entry.