



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 08:14 AM GMT

PDB ID : 3DV1  
Title : Crystal structure of human beta-secretase in complex with NVP-ARV999  
Authors : Rondeau, J.-M.  
Deposited on : 2008-07-18  
Resolution : 2.10 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

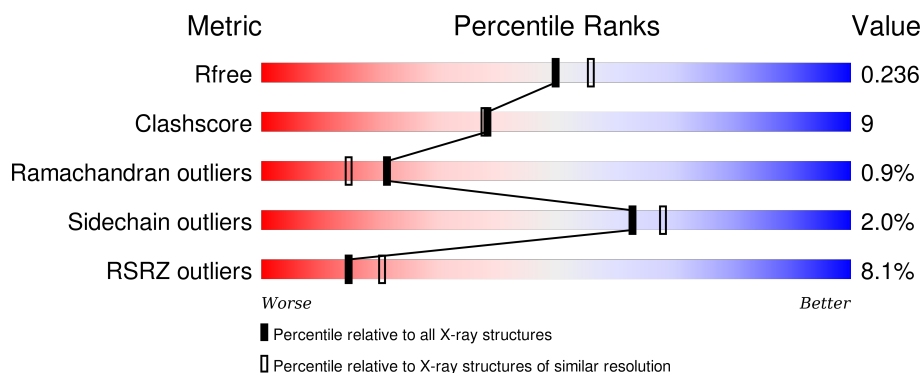
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 2.10 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	3939 (2.10-2.10)
Clashscore	102246	4460 (2.10-2.10)
Ramachandran outliers	100387	4413 (2.10-2.10)
Sidechain outliers	100360	4414 (2.10-2.10)
RSRZ outliers	91569	3948 (2.10-2.10)

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	402	<div> <div>8%</div> <div> <div></div> <div>75%</div> <div>18%</div> <div>• 6%</div> </div> </div>
1	B	402	<div> <div>9%</div> <div> <div></div> <div>75%</div> <div>17%</div> <div>• 6%</div> </div> </div>
1	C	402	<div> <div>6%</div> <div> <div></div> <div>75%</div> <div>18%</div> <div>• 5%</div> </div> </div>

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 9552 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.

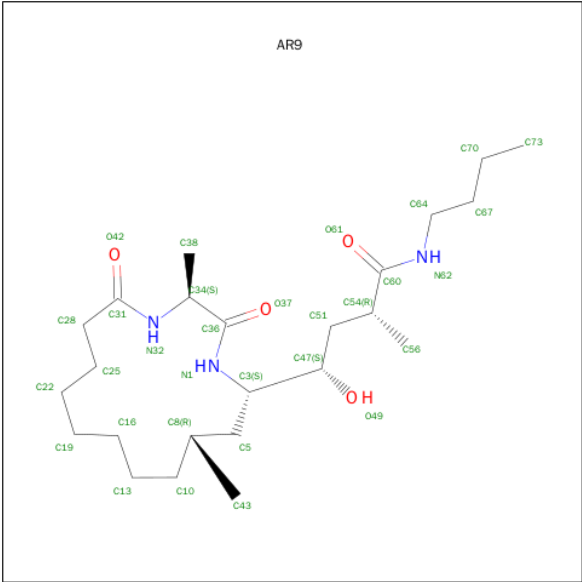
- Molecule 1 is a protein called Beta-secretase 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	377	Total	C	N	O	S	0	0	0
			2966	1898	493	561	14			
1	B	378	Total	C	N	O	S	0	0	0
			2975	1904	494	563	14			
1	C	381	Total	C	N	O	S	0	0	0
			2993	1917	497	565	14			

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	33P	GLY	-	EXPRESSION TAG	UNP P56817
A	34P	PRO	-	EXPRESSION TAG	UNP P56817
B	33P	GLY	-	EXPRESSION TAG	UNP P56817
B	34P	PRO	-	EXPRESSION TAG	UNP P56817
C	33P	GLY	-	EXPRESSION TAG	UNP P56817
C	34P	PRO	-	EXPRESSION TAG	UNP P56817

- Molecule 2 is (2R,4S)-N-BUTYL-4-[(2S,5S,7R)-2,7-DIMETHYL-3,15-DIOXO-1,4-DIAZACYCLOPENTADECAN-5-YL]-4-HYDROXY-2-METHYLBUTANAMIDE (three-letter code: AR9) (formula: C<sub>24</sub>H<sub>45</sub>N<sub>3</sub>O<sub>4</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			31	24	3	4		
2	B	1	Total	C	N	O	0	0
			31	24	3	4		
2	C	1	Total	C	N	O	0	0
			31	24	3	4		

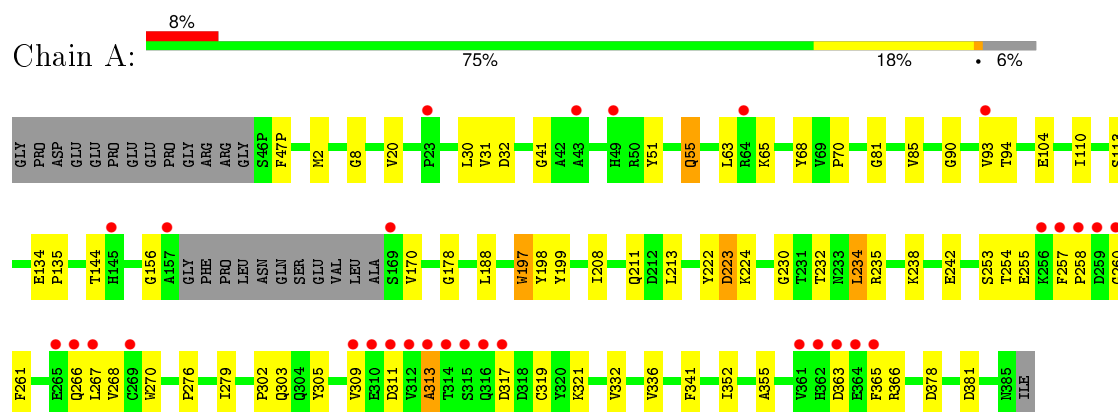
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	170	Total	O	0	0
			170	170		
3	B	164	Total	O	0	0
			164	164		
3	C	191	Total	O	0	0
			191	191		

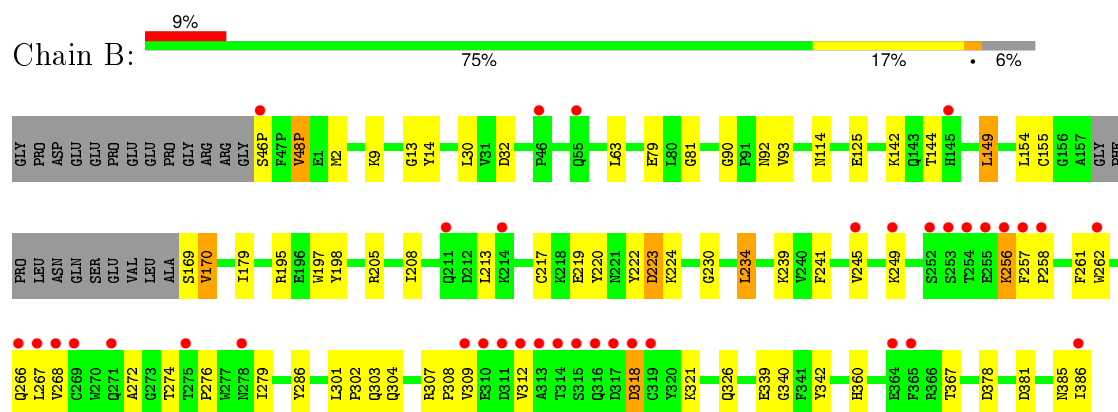
### 3 Residue-property plots [i](#)

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.

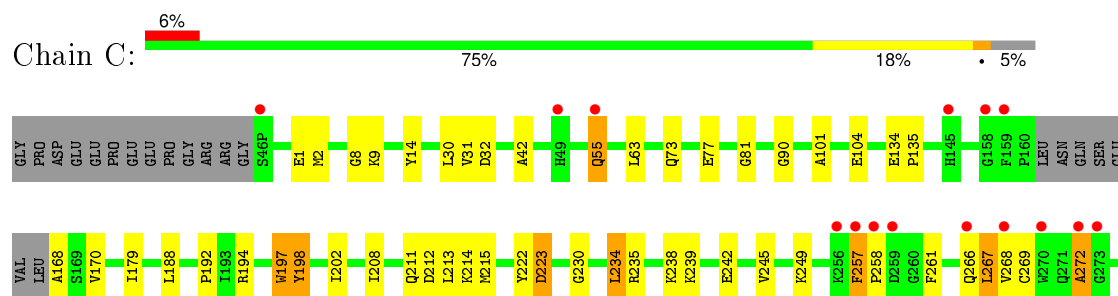
#### • Molecule 1: Beta-secretase 1

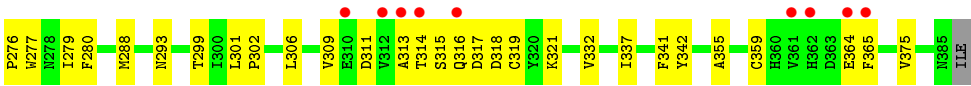


#### • Molecule 1: Beta-secretase 1



#### • Molecule 1: Beta-secretase 1





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	82.03Å 102.94Å 99.92Å 90.00° 103.66° 90.00°	Depositor
Resolution (Å)	55.52 – 2.10 55.51 – 2.10	Depositor EDS
% Data completeness (in resolution range)	99.4 (55.52-2.10) 99.5 (55.51-2.10)	Depositor EDS
$R_{merge}$	0.06	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.16 (at 2.10Å)	Xtriage
Refinement program	CNX	Depositor
R, $R_{free}$	0.207 , 0.241 0.205 , 0.236	Depositor DCC
$R_{free}$ test set	9307 reflections (11.10%)	DCC
Wilson B-factor (Å <sup>2</sup> )	40.6	Xtriage
Anisotropy	0.204	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 46.8	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtriage
Outliers	0 of 93153 reflections	Xtriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	9552	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	46.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.39% 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: AR9

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	0.28	0/3041	0.62	1/4133 (0.0%)
1	B	0.28	0/3050	0.62	2/4144 (0.0%)
1	C	0.29	0/3070	0.63	2/4173 (0.0%)
All	All	0.28	0/9161	0.62	5/12450 (0.0%)

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	234	LEU	N-CA-C	-5.73	95.54	111.00
1	C	234	LEU	N-CA-C	-5.42	96.36	111.00
1	B	234	LEU	N-CA-C	-5.28	96.75	111.00
1	B	198	TYR	N-CA-C	-5.16	97.06	111.00
1	C	198	TYR	N-CA-C	-5.05	97.37	111.00

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2966	0	2875	58	0
1	B	2975	0	2886	53	0
1	C	2993	0	2899	53	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	A	31	0	45	3	0
2	B	31	0	45	1	0
2	C	31	0	45	1	0
3	A	170	0	0	1	0
3	B	164	0	0	1	0
3	C	191	0	0	3	0
All	All	9552	0	8795	162	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 9.

All (162) 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:A:55:GLN:NE2	1:A:55:GLN:H	1.65	0.95
1:A:104:GLU:HB3	1:B:48(P):VAL:HG21	1.54	0.90
1:B:301:LEU:H	1:B:304:GLN:NE2	1.77	0.82
1:A:55:GLN:HE21	1:A:55:GLN:H	1.26	0.81
1:B:258:PRO:HG3	1:B:266:GLN:NE2	1.96	0.81
1:B:208:ILE:HG12	1:B:213:LEU:HD11	1.66	0.78
1:C:267:LEU:H	1:C:267:LEU:HD23	1.48	0.77
1:B:267:LEU:HD23	1:B:267:LEU:H	1.50	0.76
1:C:55:GLN:NE2	1:C:55:GLN:H	1.83	0.76
1:B:301:LEU:H	1:B:304:GLN:HE21	1.35	0.73
1:B:309:VAL:HG21	1:B:321:LYS:HG3	1.68	0.73
1:A:104:GLU:HB3	1:B:48(P):VAL:CG2	2.20	0.71
1:A:303:GLN:NE2	1:A:363:ASP:HB3	2.08	0.69
1:A:104:GLU:OE1	1:B:46(P):SER:HA	1.94	0.67
1:A:267:LEU:HD13	1:A:319:CYS:HB3	1.75	0.67
1:B:272:ALA:HA	1:B:318:ASP:OD1	1.94	0.67
1:C:267:LEU:HD12	1:C:319:CYS:HB3	1.77	0.66
1:B:267:LEU:HB3	1:B:321:LYS:HG2	1.77	0.66
1:A:303:GLN:HE22	1:A:363:ASP:HB3	1.61	0.64
1:C:194:ARG:HD2	1:C:202:ILE:HD11	1.80	0.64
1:B:125:GLU:OE2	1:B:195:ARG:NH1	2.33	0.62
1:B:301:LEU:HB3	1:B:302:PRO:HD2	1.81	0.62
1:A:65:LYS:NZ	1:A:65:LYS:HB2	2.15	0.62
1:C:272:ALA:HA	1:C:318:ASP:OD2	2.01	0.61
1:B:241:PHE:O	1:B:245:VAL:HG23	2.00	0.61
1:B:222:TYR:O	1:B:223:ASP:CB	2.49	0.61
1:B:256:LYS:HD2	1:B:256:LYS:N	2.16	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:267:LEU:HD13	1:C:309:VAL:HG21	1.81	0.61
1:C:272:ALA:HB2	1:C:316:GLN:O	2.00	0.61
1:A:276:PRO:O	1:A:279:ILE:HG12	2.00	0.61
1:B:149:LEU:HD12	1:B:149:LEU:C	2.21	0.61
1:A:261:PHE:CD1	1:A:268:VAL:HG23	2.36	0.60
1:B:276:PRO:O	1:B:279:ILE:HG12	2.03	0.59
1:A:366:ARG:HA	1:C:211:GLN:HE22	1.67	0.59
1:B:219:GLU:OE1	1:B:239:LYS:HD2	2.02	0.58
1:C:321:LYS:HB2	1:C:321:LYS:NZ	2.18	0.58
1:A:32:ASP:OD1	1:A:230:GLY:HA3	2.03	0.58
1:B:2:MET:HG2	1:B:90:GLY:HA2	1.85	0.58
1:C:211:GLN:HB2	3:C:648:HOH:O	2.03	0.57
1:B:257:PHE:HD2	1:B:268:VAL:HG11	1.69	0.57
1:A:55:GLN:HE21	1:A:55:GLN:N	2.01	0.57
1:A:222:TYR:O	1:A:223:ASP:CB	2.53	0.56
1:B:258:PRO:HG3	1:B:266:GLN:HE22	1.71	0.56
1:A:208:ILE:HG13	1:A:213:LEU:HD11	1.88	0.56
1:A:68:TYR:OH	1:A:70:PRO:HB3	2.06	0.55
1:C:2:MET:HG2	1:C:90:GLY:HA2	1.89	0.55
1:C:32:ASP:OD1	1:C:230:GLY:HA3	2.06	0.55
1:C:238:LYS:O	1:C:242:GLU:HG3	2.06	0.55
1:B:9:LYS:HZ3	1:B:169:SER:N	2.06	0.54
1:C:261:PHE:HA	1:C:266:GLN:O	2.06	0.54
1:B:249:LYS:HD3	1:B:262:TRP:NE1	2.22	0.54
1:B:301:LEU:HD11	1:B:367:THR:HA	1.90	0.54
1:A:93:VAL:HG21	1:A:144:THR:CG2	2.38	0.53
1:A:8:GLY:C	1:A:170:VAL:HG22	2.28	0.53
1:A:2:MET:HG2	1:A:90:GLY:HA2	1.91	0.53
1:B:142:LYS:NZ	1:B:142:LYS:HB2	2.24	0.52
1:A:222:TYR:O	1:A:223:ASP:HB3	2.08	0.52
1:B:32:ASP:OD1	1:B:230:GLY:HA3	2.10	0.52
1:A:238:LYS:O	1:A:242:GLU:HG3	2.10	0.52
1:B:93:VAL:HG21	1:B:144:THR:CG2	2.40	0.52
1:A:63:LEU:HG	1:A:81:GLY:HA2	1.90	0.52
1:C:293:ASN:HA	1:C:375:VAL:HA	1.92	0.51
1:C:63:LEU:HG	1:C:81:GLY:HA2	1.94	0.50
1:B:13:GLY:HA3	1:B:30:LEU:HD11	1.93	0.50
1:B:14:TYR:CE2	1:B:170:VAL:HG13	2.46	0.50
1:C:267:LEU:N	1:C:267:LEU:HD23	2.23	0.50
1:B:179:ILE:HG23	1:B:342:TYR:HE2	1.77	0.49
1:C:1:GLU:HG2	3:C:665:HOH:O	2.13	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:222:TYR:O	1:C:223:ASP:CB	2.60	0.49
1:A:198:TYR:CE2	1:A:224:LYS:HE3	2.48	0.49
1:C:269:CYS:HA	1:C:318:ASP:O	2.13	0.48
1:C:268:VAL:O	1:C:319:CYS:HA	2.13	0.48
1:B:301:LEU:N	1:B:304:GLN:HE21	2.08	0.48
1:C:276:PRO:O	1:C:279:ILE:HG12	2.13	0.48
1:A:255:GLU:HG3	1:A:279:ILE:CD1	2.44	0.48
1:A:257:PHE:HD2	1:A:268:VAL:HG21	1.78	0.48
1:A:267:LEU:HD12	1:A:267:LEU:O	2.13	0.47
1:C:9:LYS:HZ3	1:C:168:ALA:N	2.13	0.47
1:C:8:GLY:O	1:C:170:VAL:HG22	2.14	0.47
1:B:272:ALA:O	1:B:274:THR:HG23	2.15	0.47
1:A:253:SER:C	1:A:255:GLU:H	2.17	0.47
1:B:155:CYS:O	1:B:170:VAL:HG22	2.14	0.47
1:B:205:ARG:HB3	1:B:286:TYR:HB2	1.96	0.47
1:B:378:ASP:HB3	1:B:381:ASP:OD2	2.14	0.47
1:B:154:LEU:O	1:B:339:GLU:HA	2.15	0.47
1:B:307:ARG:HA	1:B:308:PRO:HD3	1.78	0.46
1:B:241:PHE:CD2	1:B:326:GLN:HB3	2.50	0.46
1:C:337:ILE:O	1:C:341:PHE:HD1	1.98	0.46
1:B:385:ASN:O	1:B:386:ILE:C	2.53	0.46
1:C:212:ASP:O	1:C:214:LYS:HG3	2.15	0.46
1:A:378:ASP:HB3	1:A:381:ASP:OD2	2.15	0.45
1:A:93:VAL:HG22	1:A:94:THR:N	2.31	0.45
1:C:188:LEU:HD23	1:C:355:ALA:HB2	1.99	0.45
1:A:188:LEU:HD23	1:A:355:ALA:HB2	1.98	0.45
1:A:30:LEU:HD13	2:A:501:AR9:H13	1.99	0.45
2:A:501:AR9:H25	2:A:501:AR9:H16	1.71	0.45
1:B:63:LEU:HG	1:B:81:GLY:HA2	1.99	0.45
1:A:311:ASP:OD1	1:A:313:ALA:HB3	2.17	0.44
1:A:110:ILE:HB	1:A:113:SER:HB3	1.99	0.44
2:B:501:AR9:H25	2:B:501:AR9:H16	1.72	0.44
1:A:8:GLY:O	1:A:170:VAL:HG22	2.17	0.44
1:A:134:GLU:HA	1:A:135:PRO:HD3	1.86	0.44
1:C:235:ARG:HB2	1:C:332:VAL:HB	1.98	0.44
1:B:79:GLU:HG3	3:B:777:HOH:O	2.16	0.44
1:A:65:LYS:HZ2	1:A:65:LYS:HB2	1.83	0.44
1:C:364:GLU:HG3	1:C:365:PHE:CD1	2.53	0.44
1:C:267:LEU:HD13	1:C:309:VAL:CG2	2.46	0.44
1:B:267:LEU:HD23	1:B:267:LEU:N	2.25	0.44
1:C:321:LYS:HZ3	1:C:321:LYS:HB2	1.82	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:232:THR:O	1:A:336:VAL:HG23	2.18	0.44
1:C:301:LEU:HB3	1:C:302:PRO:HD2	1.99	0.43
1:C:192:PRO:CG	1:C:288:MET:HE2	2.48	0.43
1:A:41:GLY:O	1:A:51:TYR:HB2	2.18	0.43
1:B:309:VAL:CG2	1:B:321:LYS:HG3	2.45	0.43
1:C:55:GLN:CD	1:C:55:GLN:H	2.20	0.43
1:C:364:GLU:HG3	1:C:365:PHE:CE1	2.53	0.43
1:B:261:PHE:HA	1:B:266:GLN:O	2.19	0.43
1:A:31:VAL:HG23	1:A:31:VAL:O	2.17	0.43
1:C:208:ILE:HG13	1:C:213:LEU:HD21	2.01	0.43
1:A:197:TRP:CG	1:A:198:TYR:N	2.87	0.43
1:C:299:THR:HG21	3:C:649:HOH:O	2.18	0.43
1:A:270:TRP:O	1:A:317:ASP:HB3	2.19	0.43
1:B:257:PHE:CD2	1:B:268:VAL:HG11	2.52	0.42
1:B:93:VAL:HG11	1:B:144:THR:HG21	2.01	0.42
1:C:359:CYS:SG	1:C:359:CYS:O	2.77	0.42
1:C:277:TRP:HZ3	1:C:306:LEU:HD12	1.84	0.42
1:C:179:ILE:HG23	1:C:342:TYR:HE2	1.84	0.42
1:A:341:PHE:HB3	1:A:355:ALA:O	2.19	0.42
1:C:134:GLU:HA	1:C:135:PRO:HD3	1.86	0.42
1:A:261:PHE:HA	1:A:266:GLN:O	2.20	0.42
1:C:258:PRO:O	1:C:261:PHE:HB3	2.19	0.42
1:A:365:PHE:CD1	1:A:366:ARG:HG3	2.54	0.42
1:C:257:PHE:CD1	1:C:257:PHE:N	2.87	0.42
1:B:302:PRO:HG2	1:B:303:GLN:OE1	2.19	0.42
1:A:211:GLN:HB2	3:A:664:HOH:O	2.19	0.42
1:C:215:MET:CE	1:C:239:LYS:HG2	2.49	0.42
1:C:42:ALA:CB	1:C:101:ALA:HB1	2.49	0.42
1:A:258:PRO:C	1:A:260:GLY:H	2.22	0.42
1:C:55:GLN:NE2	1:C:55:GLN:N	2.59	0.42
1:A:30:LEU:CD1	2:A:501:AR9:H13	2.50	0.42
1:C:73:GLN:HG3	2:C:501:AR9:H38A	2.00	0.41
1:B:223:ASP:OD2	1:B:224:LYS:NZ	2.48	0.41
1:C:14:TYR:O	1:C:31:VAL:HG22	2.20	0.41
1:A:55:GLN:NE2	1:A:55:GLN:N	2.48	0.41
1:A:268:VAL:O	1:A:319:CYS:HA	2.21	0.41
1:A:302:PRO:HA	1:A:305:TYR:CE2	2.55	0.41
1:A:267:LEU:HD12	1:A:267:LEU:C	2.41	0.41
1:C:197:TRP:CG	1:C:198:TYR:N	2.89	0.41
1:A:20:VAL:HG22	1:A:85:VAL:HG22	2.02	0.41
1:B:261:PHE:CD1	1:B:268:VAL:HG13	2.56	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:363:ASP:OD2	1:A:366:ARG:O	2.39	0.41
1:A:235:ARG:HB2	1:A:332:VAL:HB	2.03	0.41
1:B:222:TYR:O	1:B:223:ASP:HB3	2.17	0.41
1:C:280:PHE:HB3	1:C:302:PRO:HB3	2.03	0.41
1:C:245:VAL:CG1	1:C:249:LYS:HE3	2.50	0.41
1:A:309:VAL:HG21	1:A:321:LYS:HG3	2.02	0.40
1:C:77:GLU:HB2	1:C:104:GLU:HG3	2.02	0.40
1:B:217:CYS:HA	1:B:220:TYR:CD1	2.56	0.40
1:B:340:GLY:HA2	1:B:360:HIS:HB2	2.03	0.40
1:C:311:ASP:OD1	1:C:315:SER:OG	2.39	0.40
1:A:199:TYR:HB3	1:A:352:ILE:HD11	2.03	0.40
1:A:47(P):PHE:CZ	1:A:178:GLY:HA3	2.56	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	373/402 (93%)	352 (94%)	17 (5%)	4 (1%)	17	11
1	B	374/402 (93%)	352 (94%)	20 (5%)	2 (0%)	34	30
1	C	377/402 (94%)	363 (96%)	10 (3%)	4 (1%)	17	11
All	All	1124/1206 (93%)	1067 (95%)	47 (4%)	10 (1%)	21	15

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	223	ASP
1	A	313	ALA
1	B	223	ASP
1	C	223	ASP
1	A	254	THR

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Mol	Chain	Res	Type
1	B	312	VAL
1	C	272	ALA
1	C	313	ALA
1	C	314	THR
1	A	156	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	322/342 (94%)	319 (99%)	3 (1%)	84	89
1	B	323/342 (94%)	314 (97%)	9 (3%)	51	55
1	C	324/342 (95%)	317 (98%)	7 (2%)	60	64
All	All	969/1026 (94%)	950 (98%)	19 (2%)	63	68

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

Mol	Chain	Res	Type
1	A	55	GLN
1	A	197	TRP
1	A	234	LEU
1	B	48(P)	VAL
1	B	92	ASN
1	B	114	ASN
1	B	149	LEU
1	B	170	VAL
1	B	197	TRP
1	B	234	LEU
1	B	256	LYS
1	B	318	ASP
1	C	30	LEU
1	C	55	GLN
1	C	197	TRP
1	C	234	LEU
1	C	257	PHE

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Mol	Chain	Res	Type
1	C	267	LEU
1	C	317	ASP

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	55	GLN
1	A	98	ASN
1	A	114	ASN
1	A	326	GLN
1	B	92	ASN
1	B	114	ASN
1	B	266	GLN
1	B	293	ASN
1	B	304	GLN
1	C	55	GLN
1	C	114	ASN
1	C	271	GLN
1	C	294	GLN

### 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](#)

3 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the chemical component dictionary. The Link

column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	AR9	A	501	-	31,31,31	0.76	1 (3%)	36,39,39	1.64	6 (16%)
2	AR9	B	501	-	31,31,31	0.70	0	36,39,39	1.58	6 (16%)
2	AR9	C	501	-	31,31,31	0.74	0	36,39,39	1.61	5 (13%)

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	AR9	A	501	-	-	0/43/43/43	0/0/1/1
2	AR9	B	501	-	-	0/43/43/43	0/0/1/1
2	AR9	C	501	-	-	0/43/43/43	0/0/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	501	AR9	C5-C3	2.10	1.56	1.53

All (17) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	501	AR9	C54-C51-C47	-5.01	108.01	114.24
2	C	501	AR9	C54-C51-C47	-4.88	108.18	114.24
2	B	501	AR9	C54-C51-C47	-4.54	108.59	114.24
2	B	501	AR9	C56-C54-C60	-3.85	103.90	109.34
2	A	501	AR9	C8-C5-C3	-3.51	108.36	115.56
2	C	501	AR9	C56-C54-C60	-3.30	104.68	109.34
2	A	501	AR9	C56-C54-C60	-3.28	104.70	109.34
2	C	501	AR9	C8-C5-C3	-3.26	108.87	115.56
2	B	501	AR9	C8-C5-C3	-3.21	108.97	115.56
2	C	501	AR9	O42-C31-C28	-2.76	117.22	121.98
2	A	501	AR9	O42-C31-C28	-2.69	117.34	121.98
2	A	501	AR9	C5-C3-N1	-2.67	106.56	110.15
2	B	501	AR9	O42-C31-C28	-2.47	117.73	121.98
2	C	501	AR9	C5-C3-N1	-2.46	106.84	110.15
2	B	501	AR9	C5-C3-N1	-2.28	107.08	110.15

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	501	AR9	C34-N32-C31	-2.13	118.17	121.44
2	A	501	AR9	C38-C34-N32	-2.06	106.43	110.31

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

3 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	501	AR9	3	0
2	B	501	AR9	1	0
2	C	501	AR9	1	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	377/402 (93%)	0.65	31 (8%) 14 20	28, 43, 74, 110	0
1	B	378/402 (94%)	0.73	37 (9%) 10 13	26, 44, 93, 125	0
1	C	381/402 (94%)	0.49	24 (6%) 23 31	28, 41, 75, 102	0
All	All	1136/1206 (94%)	0.62	92 (8%) 15 20	26, 42, 84, 125	0

All (92) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	312	VAL	16.8
1	A	312	VAL	13.0
1	B	314	THR	12.3
1	B	313	ALA	10.1
1	B	386	ILE	7.2
1	C	313	ALA	7.0
1	B	256	LYS	6.0
1	C	312	VAL	5.9
1	B	310	GLU	5.6
1	A	311	ASP	5.6
1	B	311	ASP	5.4
1	A	314	THR	5.3
1	B	315	SER	5.3
1	C	362	HIS	4.8
1	B	254	THR	4.5
1	B	316	GLN	4.4
1	B	257	PHE	4.4
1	A	316	GLN	4.3
1	A	313	ALA	4.2
1	A	259	ASP	4.2
1	B	268	VAL	4.1
1	C	365	PHE	4.0
1	C	256	LYS	4.0

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Mol	Chain	Res	Type	RSRZ
1	C	272	ALA	3.8
1	B	262	TRP	3.7
1	A	362	HIS	3.7
1	C	316	GLN	3.7
1	B	317	ASP	3.7
1	A	257	PHE	3.6
1	A	23	PRO	3.6
1	C	46(P)	SER	3.6
1	C	314	THR	3.6
1	A	258	PRO	3.5
1	B	365	PHE	3.5
1	A	43	ALA	3.5
1	C	258	PRO	3.4
1	B	46(P)	SER	3.4
1	B	271	GLN	3.4
1	A	256	LYS	3.3
1	A	317	ASP	3.3
1	B	252	SER	3.2
1	B	364	GLU	3.2
1	C	273	GLY	3.2
1	B	309	VAL	3.2
1	C	361	VAL	3.2
1	B	319	CYS	3.1
1	A	365	PHE	3.1
1	A	310	GLU	3.1
1	B	253	SER	3.0
1	C	259	ASP	3.0
1	A	315	SER	3.0
1	B	318	ASP	2.9
1	B	269	CYS	2.9
1	A	265	GLU	2.9
1	C	159	PHE	2.8
1	C	270	TRP	2.8
1	C	266	GLN	2.8
1	B	258	PRO	2.8
1	B	245	VAL	2.8
1	B	266	GLN	2.7
1	C	257	PHE	2.7
1	A	49	HIS	2.7
1	C	145	HIS	2.7
1	A	363	ASP	2.6
1	A	260	GLY	2.5

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Mol	Chain	Res	Type	RSRZ
1	B	255	GLU	2.5
1	A	269	CYS	2.5
1	B	249	LYS	2.5
1	B	211	GLN	2.5
1	B	145	HIS	2.5
1	A	309	VAL	2.5
1	C	268	VAL	2.4
1	C	158	GLY	2.4
1	A	64	ARG	2.4
1	C	310	GLU	2.4
1	A	267	LEU	2.4
1	A	364	GLU	2.4
1	C	55	GLN	2.3
1	A	266	GLN	2.3
1	A	145	HIS	2.3
1	B	46	PRO	2.3
1	B	267	LEU	2.3
1	B	278	ASN	2.2
1	B	55	GLN	2.2
1	A	93	VAL	2.1
1	B	275	THR	2.1
1	A	157	ALA	2.1
1	B	214	LYS	2.1
1	C	364	GLU	2.1
1	A	361	VAL	2.1
1	C	49	HIS	2.1
1	A	169	SER	2.1

## 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( $\text{\AA}^2$ )	Q<0.9
2	AR9	B	501	31/31	0.95	0.16	1.76	30,36,46,48	0
2	AR9	C	501	31/31	0.95	0.17	1.30	30,34,40,42	0
2	AR9	A	501	31/31	0.94	0.16	1.28	32,37,43,44	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.