



wwPDB EM Map/Model Validation Report ⓘ

Apr 10, 2016 – 01:38 PM BST

PDB ID : 3IYM
EMDB ID: : EMD-5161
Title : Backbone Trace of the Capsid Protein Dimer of a Fungal Partitivirus from Electron Cryomicroscopy and Homology Modeling
Authors : Tang, J.; Pan, J.; Havens, W.F.; Ochoa, W.F.; Li, H.; Sinkovits, R.S.; Guu, T.S.Y.; Ghabrial, S.A.; Nibert, M.L.; Tao, J.Y.; Baker, T.S.
Deposited on : 2010-02-05
Resolution : 4.70 Å(reported)

This is a wwPDB EM Map/Model Validation Report for a publicly released PDB/EMDB entry.
For rigid body fitted models, validation errors reported here could stem from errors in the original structure(s) used in the fitting.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<http://wwpdb.org/validation/2016/EMValidationReportHelp>

MolProbity : 4.02b-467
Mogul : unknown
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)
Validation Pipeline (wwPDB-VP) : trunk27241

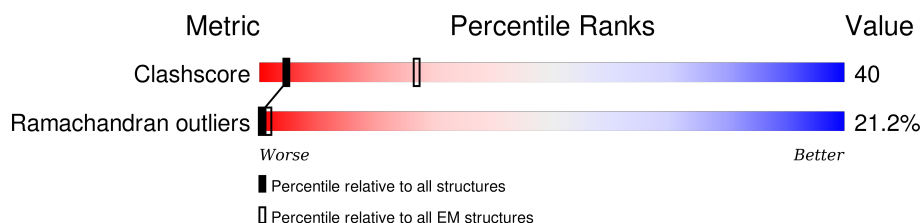
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 4.70 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)	EM structures (#Entries)
Clashscore	114402	924
Ramachandran outliers	111179	726

The table below summarises the geometric issues observed across the polymeric chains. The red, orange, yellow and green segments on the bar indicate the fraction of residues that contain outliers for ≥ 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 $\leq 5\%$.

Mol	Chain	Length	Quality of chain
1	A	434	 53% 32% 6% 9%
1	B	434	 51% 34% 6% 9%

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 3168 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 Capsid protein.

Mol	Chain	Residues	Atoms				AltConf	Trace
1	A	396	Total	C	N	O	0	0
			1584	792	396	396		
1	B	396	Total	C	N	O	0	0
			1584	792	396	396		

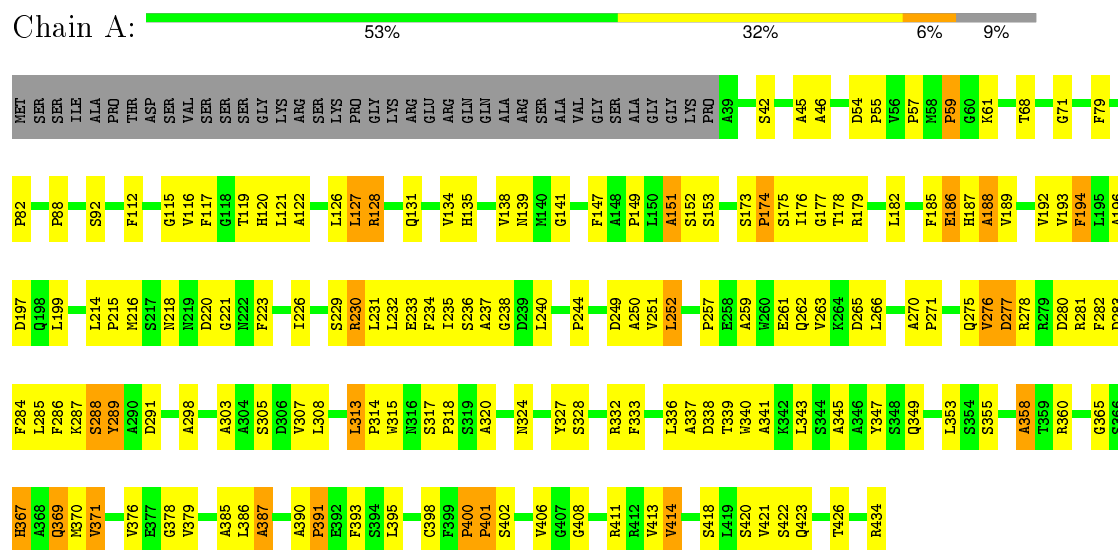
There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	185	PHE	TYR	ENGINEERED	UNP Q6YDQ6
A	409	LEU	ILE	ENGINEERED	UNP Q6YDQ6
B	185	PHE	TYR	ENGINEERED	UNP Q6YDQ6
B	409	LEU	ILE	ENGINEERED	UNP Q6YDQ6

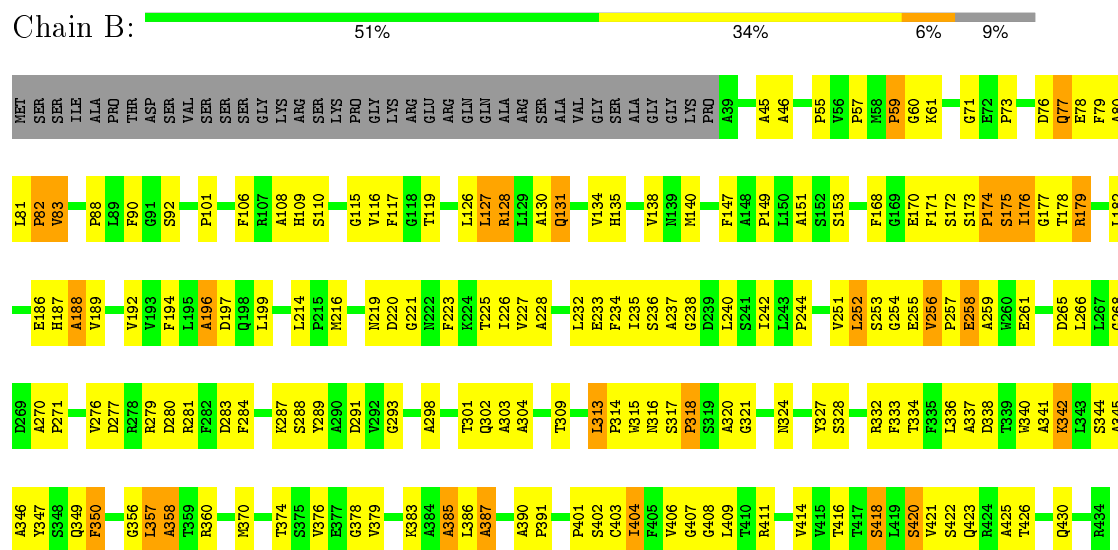
3 Residue-property plots

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. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

• Molecule 1: Capsid protein



• Molecule 1: Capsid protein



4 Experimental information

Property	Value	Source
Reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, 1	Depositor
Number of images	14252	Depositor
Resolution determination method	Not provided	Depositor
CTF correction method	Not provided	Depositor
Microscope	TECNAI G2	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/\text{\AA}^2$)	15	Depositor
Minimum defocus (nm)	1.4	Depositor
Maximum defocus (nm)	2.2	Depositor
Magnification	50000	Depositor
Image detector	KODAK SO-163 electron-image FILM	Depositor

5 Model quality

5.1 Standard geometry

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# $ Z > 2$	RMSZ	# $ Z > 2$
1	A	0.34	0/1583	0.80	0/1977
1	B	0.38	0/1583	0.87	0/1977
All	All	0.36	0/3166	0.84	0/3954

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	1584	0	428	75	0
1	B	1584	0	428	87	0
All	All	3168	0	856	159	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 40.

All (159) 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:236:SER:O	1:B:240:LEU:N	2.20	0.74
1:B:256:VAL:O	1:B:258:GLU:N	2.22	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:328:SER:O	1:B:332:ARG:N	2.22	0.72
1:B:385:ALA:O	1:B:387:ALA:N	2.21	0.71
1:A:278:ARG:O	1:A:282:PHE:N	2.19	0.71
1:A:276:VAL:O	1:A:278:ARG:N	2.23	0.70
1:B:420:SER:O	1:B:422:SER:N	2.24	0.70
1:A:126:LEU:O	1:A:128:ARG:N	2.25	0.70
1:B:301:THR:C	1:B:303:ALA:H	1.95	0.69
1:B:284:PHE:O	1:B:288:SER:N	2.25	0.69
1:A:420:SER:O	1:A:422:SER:N	2.26	0.69
1:A:236:SER:O	1:A:240:LEU:N	2.25	0.69
1:B:313:LEU:O	1:B:315:TRP:N	2.27	0.68
1:B:115:GLY:O	1:B:119:THR:N	2.26	0.68
1:A:337:ALA:O	1:A:341:ALA:N	2.27	0.68
1:A:282:PHE:O	1:A:285:LEU:N	2.27	0.67
1:A:259:ALA:O	1:A:263:VAL:N	2.25	0.67
1:A:338:ASP:O	1:A:343:LEU:N	2.28	0.67
1:A:115:GLY:O	1:A:119:THR:N	2.28	0.67
1:A:176:ILE:O	1:A:178:THR:N	2.28	0.67
1:B:172:SER:O	1:B:174:PRO:N	2.28	0.67
1:A:369:GLN:O	1:A:371:VAL:N	2.28	0.67
1:A:280:ASP:O	1:A:284:PHE:N	2.19	0.67
1:A:313:LEU:O	1:A:315:TRP:N	2.28	0.66
1:A:275:GLN:O	1:A:277:ASP:N	2.28	0.66
1:A:332:ARG:O	1:A:336:LEU:N	2.29	0.66
1:A:281:ARG:O	1:A:285:LEU:N	2.28	0.65
1:A:233:GLU:O	1:A:237:ALA:N	2.26	0.65
1:B:336:LEU:O	1:B:340:TRP:N	2.26	0.65
1:A:328:SER:O	1:A:332:ARG:N	2.29	0.65
1:A:376:VAL:O	1:A:378:GLY:N	2.30	0.65
1:A:284:PHE:O	1:A:288:SER:N	2.29	0.64
1:A:358:ALA:O	1:A:360:ARG:N	2.29	0.64
1:B:233:GLU:O	1:B:237:ALA:N	2.27	0.64
1:A:283:ASP:O	1:A:287:LYS:N	2.29	0.64
1:B:176:ILE:O	1:B:178:THR:N	2.30	0.64
1:A:333:PHE:O	1:A:337:ALA:N	2.24	0.64
1:B:358:ALA:C	1:B:360:ARG:H	2.01	0.64
1:B:126:LEU:O	1:B:128:ARG:N	2.32	0.63
1:B:252:LEU:O	1:B:254:GLY:N	2.31	0.63
1:B:301:THR:O	1:B:303:ALA:N	2.32	0.62
1:B:182:LEU:O	1:B:186:GLU:N	2.32	0.62
1:B:402:SER:O	1:B:404:ILE:N	2.27	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:320:ALA:O	1:A:324:ASN:N	2.34	0.61
1:B:332:ARG:O	1:B:336:LEU:N	2.33	0.61
1:B:337:ALA:O	1:B:341:ALA:N	2.35	0.60
1:B:59:PRO:C	1:B:61:LYS:H	2.04	0.60
1:B:225:THR:O	1:B:227:VAL:N	2.34	0.60
1:B:338:ASP:O	1:B:342:LYS:N	2.28	0.60
1:B:420:SER:O	1:B:423:GLN:N	2.34	0.59
1:B:402:SER:C	1:B:404:ILE:H	2.06	0.58
1:B:175:SER:O	1:B:178:THR:O	2.22	0.57
1:A:282:PHE:O	1:A:286:PHE:N	2.33	0.57
1:A:336:LEU:O	1:A:340:TRP:N	2.38	0.56
1:A:422:SER:O	1:A:426:THR:N	2.32	0.56
1:B:108:ALA:O	1:B:110:SER:N	2.31	0.56
1:B:345:ALA:C	1:B:347:TYR:H	2.09	0.56
1:B:289:TYR:C	1:B:291:ASP:H	2.09	0.56
1:B:225:THR:O	1:B:228:ALA:N	2.29	0.56
1:B:261:GLU:O	1:B:265:ASP:N	2.35	0.56
1:A:182:LEU:O	1:A:186:GLU:N	2.27	0.55
1:B:376:VAL:O	1:B:378:GLY:N	2.34	0.55
1:B:81:LEU:O	1:B:82:PRO:O	2.25	0.55
1:B:187:HIS:O	1:B:188:ALA:O	2.25	0.55
1:B:426:THR:O	1:B:430:GLN:N	2.40	0.54
1:A:187:HIS:O	1:A:188:ALA:O	2.25	0.54
1:A:249:ASP:O	1:A:251:VAL:N	2.41	0.54
1:B:82:PRO:O	1:B:83:VAL:O	2.26	0.54
1:A:358:ALA:C	1:A:360:ARG:H	2.10	0.54
1:A:400:PRO:O	1:A:401:PRO:O	2.26	0.54
1:B:304:ALA:O	1:B:309:THR:N	2.33	0.54
1:A:420:SER:O	1:A:423:GLN:N	2.38	0.53
1:B:76:ASP:O	1:B:78:GLU:N	2.41	0.53
1:B:313:LEU:O	1:B:316:ASN:N	2.41	0.53
1:A:120:HIS:C	1:A:122:ALA:H	2.12	0.53
1:A:234:PHE:C	1:A:236:SER:H	2.13	0.52
1:B:356:GLY:O	1:B:357:LEU:O	2.28	0.52
1:B:131:GLN:O	1:B:135:HIS:N	2.27	0.52
1:A:54:ASP:O	1:A:151:ALA:O	2.28	0.52
1:A:196:ALA:O	1:A:199:LEU:N	2.43	0.52
1:A:385:ALA:O	1:A:387:ALA:N	2.42	0.51
1:B:407:GLY:O	1:B:409:LEU:N	2.44	0.51
1:A:261:GLU:O	1:A:265:ASP:N	2.40	0.51
1:A:193:VAL:O	1:A:194:PHE:O	2.28	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:128:ARG:C	1:B:130:ALA:H	2.14	0.50
1:B:134:VAL:O	1:B:138:VAL:N	2.35	0.50
1:A:379:VAL:O	1:B:414:VAL:O	2.30	0.50
1:A:367:HIS:C	1:A:369:GLN:H	2.14	0.50
1:A:414:VAL:O	1:B:379:VAL:O	2.29	0.50
1:A:174:PRO:C	1:A:176:ILE:H	2.15	0.50
1:B:301:THR:C	1:B:303:ALA:N	2.64	0.50
1:A:134:VAL:O	1:A:138:VAL:N	2.44	0.50
1:B:127:LEU:O	1:B:128:ARG:O	2.28	0.50
1:A:336:LEU:O	1:A:339:THR:N	2.42	0.50
1:A:218:ASN:C	1:A:220:ASP:H	2.13	0.50
1:B:236:SER:C	1:B:238:GLY:N	2.65	0.50
1:A:185:PHE:C	1:A:187:HIS:H	2.15	0.50
1:B:59:PRO:O	1:B:61:LYS:N	2.45	0.49
1:B:280:ASP:O	1:B:284:PHE:N	2.26	0.49
1:A:127:LEU:O	1:A:128:ARG:O	2.31	0.49
1:A:226:ILE:O	1:A:231:LEU:O	2.30	0.49
1:B:240:LEU:C	1:B:242:ILE:H	2.16	0.49
1:B:131:GLN:H	1:B:134:VAL:H	1.59	0.49
1:B:333:PHE:O	1:B:337:ALA:N	2.25	0.48
1:B:318:PRO:O	1:B:321:GLY:N	2.46	0.48
1:B:236:SER:C	1:B:238:GLY:H	2.16	0.48
1:B:59:PRO:C	1:B:61:LYS:N	2.67	0.48
1:A:289:TYR:C	1:A:291:ASP:H	2.17	0.48
1:A:259:ALA:O	1:A:262:GLN:N	2.47	0.48
1:B:342:LYS:O	1:B:345:ALA:N	2.43	0.48
1:B:279:ARG:O	1:B:283:ASP:N	2.47	0.47
1:B:416:THR:C	1:B:418:SER:H	2.18	0.47
1:B:255:GLU:O	1:B:256:VAL:O	2.32	0.47
1:B:225:THR:C	1:B:227:VAL:H	2.18	0.47
1:B:219:ASN:O	1:B:221:GLY:N	2.48	0.46
1:A:251:VAL:O	1:A:252:LEU:O	2.33	0.46
1:A:59:PRO:C	1:A:61:LYS:H	2.17	0.46
1:B:334:THR:O	1:B:338:ASP:N	2.30	0.46
1:B:277:ASP:O	1:B:281:ARG:N	2.49	0.45
1:B:77:GLN:C	1:B:79:PHE:H	2.18	0.45
1:B:358:ALA:O	1:B:360:ARG:N	2.50	0.45
1:B:179:ARG:O	1:B:182:LEU:N	2.50	0.45
1:A:214:LEU:O	1:A:216:MET:N	2.50	0.45
1:A:336:LEU:C	1:A:339:THR:H	2.19	0.44
1:B:291:ASP:C	1:B:293:GLY:H	2.20	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:434:ARG:O	1:B:350:PHE:N	2.49	0.44
1:A:194:PHE:C	1:A:196:ALA:H	2.20	0.44
1:A:236:SER:C	1:A:238:GLY:N	2.70	0.44
1:A:275:GLN:C	1:A:277:ASP:N	2.71	0.44
1:A:391:PRO:O	1:A:395:LEU:N	2.48	0.43
1:B:251:VAL:O	1:B:252:LEU:O	2.36	0.43
1:A:174:PRO:O	1:A:176:ILE:N	2.51	0.43
1:A:120:HIS:O	1:A:122:ALA:N	2.44	0.43
1:A:278:ARG:O	1:A:281:ARG:N	2.52	0.43
1:B:196:ALA:O	1:B:199:LEU:N	2.52	0.43
1:B:345:ALA:C	1:B:347:TYR:N	2.73	0.42
1:A:229:SER:O	1:A:230:ARG:O	2.37	0.42
1:A:236:SER:C	1:A:238:GLY:H	2.23	0.42
1:A:333:PHE:C	1:A:336:LEU:H	2.24	0.42
1:B:358:ALA:C	1:B:360:ARG:N	2.70	0.41
1:A:345:ALA:C	1:A:347:TYR:H	2.24	0.41
1:B:236:SER:O	1:B:238:GLY:N	2.54	0.41
1:B:78:GLU:C	1:B:80:ALA:H	2.24	0.41
1:B:283:ASP:O	1:B:287:LYS:N	2.54	0.41
1:B:214:LEU:O	1:B:216:MET:N	2.54	0.41
1:B:402:SER:C	1:B:404:ILE:N	2.73	0.41
1:B:266:LEU:C	1:B:268:GLY:N	2.74	0.41
1:B:422:SER:O	1:B:425:ALA:N	2.54	0.41
1:A:358:ALA:C	1:A:360:ARG:N	2.73	0.41
1:A:135:HIS:O	1:A:139:ASN:N	2.53	0.41
1:A:262:GLN:O	1:A:266:LEU:N	2.38	0.41
1:B:320:ALA:O	1:B:324:ASN:N	2.48	0.41
1:B:344:SER:C	1:B:346:ALA:N	2.74	0.41
1:A:303:ALA:C	1:A:305:SER:H	2.25	0.40
1:B:168:PHE:C	1:B:170:GLU:H	2.25	0.40
1:B:234:PHE:C	1:B:236:SER:H	2.25	0.40
1:A:262:GLN:O	1:A:265:ASP:N	2.54	0.40
1:A:185:PHE:C	1:A:187:HIS:N	2.75	0.40
1:B:90:PHE:C	1:B:92:SER:H	2.24	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

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	394/434 (91%)	226 (57%)	83 (21%)	85 (22%)	0	2
1	B	394/434 (91%)	219 (56%)	93 (24%)	82 (21%)	0	2
All	All	788/868 (91%)	445 (56%)	176 (22%)	167 (21%)	0	2

All (167) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	42	SER
1	A	46	ALA
1	A	57	PRO
1	A	82	PRO
1	A	92	SER
1	A	127	LEU
1	A	128	ARG
1	A	131	GLN
1	A	147	PHE
1	A	149	PRO
1	A	152	SER
1	A	174	PRO
1	A	177	GLY
1	A	179	ARG
1	A	188	ALA
1	A	192	VAL
1	A	194	PHE
1	A	223	PHE
1	A	230	ARG
1	A	232	LEU
1	A	244	PRO
1	A	250	ALA
1	A	252	LEU
1	A	257	PRO
1	A	270	ALA

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Mol	Chain	Res	Type
1	A	271	PRO
1	A	277	ASP
1	A	314	PRO
1	A	318	PRO
1	A	353	LEU
1	A	369	GLN
1	A	370	MET
1	A	390	ALA
1	A	400	PRO
1	A	401	PRO
1	A	402	SER
1	A	406	VAL
1	A	413	VAL
1	A	421	VAL
1	B	46	ALA
1	B	55	PRO
1	B	57	PRO
1	B	77	GLN
1	B	82	PRO
1	B	83	VAL
1	B	127	LEU
1	B	128	ARG
1	B	131	GLN
1	B	147	PHE
1	B	149	PRO
1	B	151	ALA
1	B	173	SER
1	B	174	PRO
1	B	179	ARG
1	B	188	ALA
1	B	192	VAL
1	B	194	PHE
1	B	223	PHE
1	B	226	ILE
1	B	244	PRO
1	B	252	LEU
1	B	253	SER
1	B	257	PRO
1	B	259	ALA
1	B	270	ALA
1	B	271	PRO
1	B	276	VAL

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Mol	Chain	Res	Type
1	B	302	GLN
1	B	314	PRO
1	B	350	PHE
1	B	358	ALA
1	B	370	MET
1	B	385	ALA
1	B	386	LEU
1	B	387	ALA
1	B	390	ALA
1	B	401	PRO
1	B	403	CYS
1	B	421	VAL
1	A	55	PRO
1	A	175	SER
1	A	197	ASP
1	A	221	GLY
1	A	235	ILE
1	A	276	VAL
1	A	289	TYR
1	A	308	LEU
1	A	358	ALA
1	A	371	VAL
1	A	386	LEU
1	A	387	ALA
1	A	398	CYS
1	A	408	GLY
1	A	414	VAL
1	B	109	HIS
1	B	153	SER
1	B	171	PHE
1	B	177	GLY
1	B	220	ASP
1	B	232	LEU
1	B	318	PRO
1	B	357	LEU
1	B	404	ILE
1	B	408	GLY
1	B	418	SER
1	A	68	THR
1	A	112	PHE
1	A	117	PHE
1	A	121	LEU

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Mol	Chain	Res	Type
1	A	151	ALA
1	A	298	ALA
1	A	327	TYR
1	A	349	GLN
1	A	367	HIS
1	A	391	PRO
1	A	411	ARG
1	A	418	SER
1	B	45	ALA
1	B	116	VAL
1	B	117	PHE
1	B	140	MET
1	B	175	SER
1	B	197	ASP
1	B	258	GLU
1	B	374	THR
1	B	411	ARG
1	A	45	ALA
1	A	79	PHE
1	A	153	SER
1	A	288	SER
1	A	313	LEU
1	A	355	SER
1	A	393	PHE
1	B	59	PRO
1	B	60	GLY
1	B	106	PHE
1	B	176	ILE
1	B	189	VAL
1	B	196	ALA
1	B	298	ALA
1	B	342	LYS
1	B	349	GLN
1	B	383	LYS
1	B	391	PRO
1	B	406	VAL
1	B	420	SER
1	A	88	PRO
1	A	189	VAL
1	B	235	ILE
1	B	313	LEU
1	B	327	TYR

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Mol	Chain	Res	Type
1	A	186	GLU
1	A	317	SER
1	B	256	VAL
1	A	215	PRO
1	A	59	PRO
1	A	141	GLY
1	A	173	SER
1	A	365	GLY
1	B	88	PRO
1	B	317	SER
1	A	116	VAL
1	A	307	VAL
1	B	71	GLY
1	B	73	PRO
1	B	101	PRO
1	A	71	GLY

5.3.2 Protein sidechains [i](#)

There are no protein residues with a non-rotameric sidechain to report in this entry.

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](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.