W O R L D W I D E
wwPDB
P R O T E I N   D A T A   B A N K

wwPDB X-ray Structure Validation Summary Report ⓘ

Oct 11, 2021 – 08:40 AM EDT

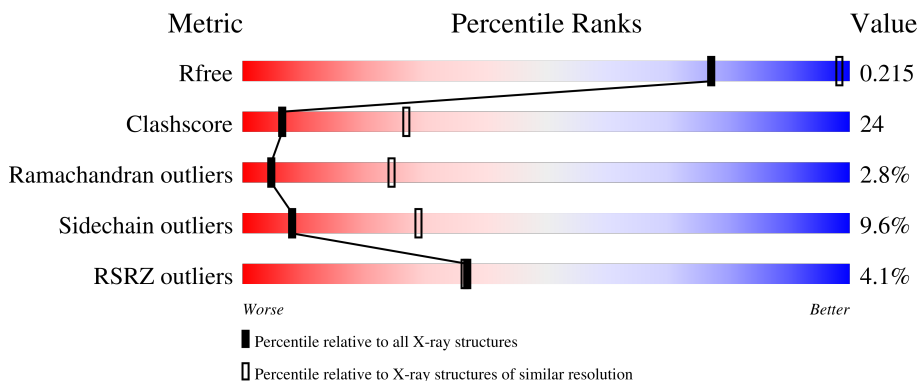|		
PDB ID	:	2R5I
Title	:	Pentamer Structure of Major Capsid Protein L1 of Human Papilloma Virus type 18
Authors	:	Bishop, B.; Dasgupta, J.; Chen, X.S.
Deposited on	:	2007-09-03
Resolution	:	3.40 Å(reported)

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 3.40 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	Percentile Ranks	Value
Rfree		0.215
Clashscore		24
Ramachandran outliers		2.8%
Sidechain outliers		9.6%
RSRZ outliers		4.1%

Worse   *Better*

▮ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1026 (3.48-3.32)
Clashscore	141614	1055 (3.48-3.32)
Ramachandran outliers	138981	1038 (3.48-3.32)
Sidechain outliers	138945	1038 (3.48-3.32)
RSRZ outliers	127900	2173 (3.50-3.30)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=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 <=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	428	5% / 46% 38% 14% ··
1	B	428	4% / 46% 39% 13% ··
1	C	428	5% / 48% 38% 12% ··
1	D	428	2% / 46% 40% 11% ··
1	E	428	2% / 46% 39% 13% ··

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Mol	Chain	Length	Quality of chain
1	F	428	6% 41% 44% 14% ..
1	G	428	5% 41% 45% 11% ..
1	H	428	3% 43% 42% 12% ..
1	I	428	3% 49% 37% 12% ..
1	J	428	4% 43% 42% 13% ..
1	K	428	3% 47% 38% 13% ..
1	L	428	5% 48% 37% 12% ..
1	M	428	5% 45% 41% 12% ..
1	N	428	4% 46% 36% 15% ..
1	O	428	4% 48% 37% 12% ..

2 Entry composition (i)

There is only 1 type of molecule in this entry. The entry contains 49845 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 L1 protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	423	Total	C	N	O	S	0	0	0
			3323	2098	562	643	20			
1	B	423	Total	C	N	O	S	0	0	0
			3323	2098	562	643	20			
1	C	423	Total	C	N	O	S	0	0	0
			3323	2098	562	643	20			
1	D	423	Total	C	N	O	S	0	0	0
			3323	2098	562	643	20			
1	E	423	Total	C	N	O	S	0	0	0
			3323	2098	562	643	20			
1	F	423	Total	C	N	O	S	0	0	0
			3323	2098	562	643	20			
1	G	423	Total	C	N	O	S	0	0	0
			3323	2098	562	643	20			
1	H	423	Total	C	N	O	S	0	0	0
			3323	2098	562	643	20			
1	I	423	Total	C	N	O	S	0	0	0
			3323	2098	562	643	20			
1	J	423	Total	C	N	O	S	0	0	0
			3323	2098	562	643	20			
1	K	423	Total	C	N	O	S	0	0	0
			3323	2098	562	643	20			
1	L	423	Total	C	N	O	S	0	0	0
			3323	2098	562	643	20			
1	M	423	Total	C	N	O	S	0	0	0
			3323	2098	562	643	20			
1	N	423	Total	C	N	O	S	0	0	0
			3323	2098	562	643	20			
1	O	423	Total	C	N	O	S	0	0	0
			3323	2098	562	643	20			

There are 135 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	20	ALA	-	expression tag	UNP Q80B70
A	47	ASP	ASN	engineered mutation	UNP Q80B70
A	175	SER	CYS	engineered mutation	UNP Q80B70
A	393	GLN	HIS	engineered mutation	UNP Q80B70
A	405	GLY	-	linker	UNP Q80B70
A	406	GLY	-	linker	UNP Q80B70
A	407	SER	-	linker	UNP Q80B70
A	408	GLY	-	linker	UNP Q80B70
A	409	GLY	-	linker	UNP Q80B70
B	20	ALA	-	expression tag	UNP Q80B70
B	47	ASP	ASN	engineered mutation	UNP Q80B70
B	175	SER	CYS	engineered mutation	UNP Q80B70
B	393	GLN	HIS	engineered mutation	UNP Q80B70
B	405	GLY	-	linker	UNP Q80B70
B	406	GLY	-	linker	UNP Q80B70
B	407	SER	-	linker	UNP Q80B70
B	408	GLY	-	linker	UNP Q80B70
B	409	GLY	-	linker	UNP Q80B70
C	20	ALA	-	expression tag	UNP Q80B70
C	47	ASP	ASN	engineered mutation	UNP Q80B70
C	175	SER	CYS	engineered mutation	UNP Q80B70
C	393	GLN	HIS	engineered mutation	UNP Q80B70
C	405	GLY	-	linker	UNP Q80B70
C	406	GLY	-	linker	UNP Q80B70
C	407	SER	-	linker	UNP Q80B70
C	408	GLY	-	linker	UNP Q80B70
C	409	GLY	-	linker	UNP Q80B70
D	20	ALA	-	expression tag	UNP Q80B70
D	47	ASP	ASN	engineered mutation	UNP Q80B70
D	175	SER	CYS	engineered mutation	UNP Q80B70
D	393	GLN	HIS	engineered mutation	UNP Q80B70
D	405	GLY	-	linker	UNP Q80B70
D	406	GLY	-	linker	UNP Q80B70
D	407	SER	-	linker	UNP Q80B70
D	408	GLY	-	linker	UNP Q80B70
D	409	GLY	-	linker	UNP Q80B70
E	20	ALA	-	expression tag	UNP Q80B70
E	47	ASP	ASN	engineered mutation	UNP Q80B70
E	175	SER	CYS	engineered mutation	UNP Q80B70
E	393	GLN	HIS	engineered mutation	UNP Q80B70
E	405	GLY	-	linker	UNP Q80B70
E	406	GLY	-	linker	UNP Q80B70
E	407	SER	-	linker	UNP Q80B70

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Chain	Residue	Modelled	Actual	Comment	Reference
E	408	GLY	-	linker	UNP Q80B70
E	409	GLY	-	linker	UNP Q80B70
F	20	ALA	-	expression tag	UNP Q80B70
F	47	ASP	ASN	engineered mutation	UNP Q80B70
F	175	SER	CYS	engineered mutation	UNP Q80B70
F	393	GLN	HIS	engineered mutation	UNP Q80B70
F	405	GLY	-	linker	UNP Q80B70
F	406	GLY	-	linker	UNP Q80B70
F	407	SER	-	linker	UNP Q80B70
F	408	GLY	-	linker	UNP Q80B70
F	409	GLY	-	linker	UNP Q80B70
G	20	ALA	-	expression tag	UNP Q80B70
G	47	ASP	ASN	engineered mutation	UNP Q80B70
G	175	SER	CYS	engineered mutation	UNP Q80B70
G	393	GLN	HIS	engineered mutation	UNP Q80B70
G	405	GLY	-	linker	UNP Q80B70
G	406	GLY	-	linker	UNP Q80B70
G	407	SER	-	linker	UNP Q80B70
G	408	GLY	-	linker	UNP Q80B70
G	409	GLY	-	linker	UNP Q80B70
H	20	ALA	-	expression tag	UNP Q80B70
H	47	ASP	ASN	engineered mutation	UNP Q80B70
H	175	SER	CYS	engineered mutation	UNP Q80B70
H	393	GLN	HIS	engineered mutation	UNP Q80B70
H	405	GLY	-	linker	UNP Q80B70
H	406	GLY	-	linker	UNP Q80B70
H	407	SER	-	linker	UNP Q80B70
H	408	GLY	-	linker	UNP Q80B70
H	409	GLY	-	linker	UNP Q80B70
I	20	ALA	-	expression tag	UNP Q80B70
I	47	ASP	ASN	engineered mutation	UNP Q80B70
I	175	SER	CYS	engineered mutation	UNP Q80B70
I	393	GLN	HIS	engineered mutation	UNP Q80B70
I	405	GLY	-	linker	UNP Q80B70
I	406	GLY	-	linker	UNP Q80B70
I	407	SER	-	linker	UNP Q80B70
I	408	GLY	-	linker	UNP Q80B70
I	409	GLY	-	linker	UNP Q80B70
J	20	ALA	-	expression tag	UNP Q80B70
J	47	ASP	ASN	engineered mutation	UNP Q80B70
J	175	SER	CYS	engineered mutation	UNP Q80B70
J	393	GLN	HIS	engineered mutation	UNP Q80B70

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Chain	Residue	Modelled	Actual	Comment	Reference
J	405	GLY	-	linker	UNP Q80B70
J	406	GLY	-	linker	UNP Q80B70
J	407	SER	-	linker	UNP Q80B70
J	408	GLY	-	linker	UNP Q80B70
J	409	GLY	-	linker	UNP Q80B70
K	20	ALA	-	expression tag	UNP Q80B70
K	47	ASP	ASN	engineered mutation	UNP Q80B70
K	175	SER	CYS	engineered mutation	UNP Q80B70
K	393	GLN	HIS	engineered mutation	UNP Q80B70
K	405	GLY	-	linker	UNP Q80B70
K	406	GLY	-	linker	UNP Q80B70
K	407	SER	-	linker	UNP Q80B70
K	408	GLY	-	linker	UNP Q80B70
K	409	GLY	-	linker	UNP Q80B70
L	20	ALA	-	expression tag	UNP Q80B70
L	47	ASP	ASN	engineered mutation	UNP Q80B70
L	175	SER	CYS	engineered mutation	UNP Q80B70
L	393	GLN	HIS	engineered mutation	UNP Q80B70
L	405	GLY	-	linker	UNP Q80B70
L	406	GLY	-	linker	UNP Q80B70
L	407	SER	-	linker	UNP Q80B70
L	408	GLY	-	linker	UNP Q80B70
L	409	GLY	-	linker	UNP Q80B70
M	20	ALA	-	expression tag	UNP Q80B70
M	47	ASP	ASN	engineered mutation	UNP Q80B70
M	175	SER	CYS	engineered mutation	UNP Q80B70
M	393	GLN	HIS	engineered mutation	UNP Q80B70
M	405	GLY	-	linker	UNP Q80B70
M	406	GLY	-	linker	UNP Q80B70
M	407	SER	-	linker	UNP Q80B70
M	408	GLY	-	linker	UNP Q80B70
M	409	GLY	-	linker	UNP Q80B70
N	20	ALA	-	expression tag	UNP Q80B70
N	47	ASP	ASN	engineered mutation	UNP Q80B70
N	175	SER	CYS	engineered mutation	UNP Q80B70
N	393	GLN	HIS	engineered mutation	UNP Q80B70
N	405	GLY	-	linker	UNP Q80B70
N	406	GLY	-	linker	UNP Q80B70
N	407	SER	-	linker	UNP Q80B70
N	408	GLY	-	linker	UNP Q80B70
N	409	GLY	-	linker	UNP Q80B70
O	20	ALA	-	expression tag	UNP Q80B70

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Chain	Residue	Modelled	Actual	Comment	Reference
O	47	ASP	ASN	engineered mutation	UNP Q80B70
O	175	SER	CYS	engineered mutation	UNP Q80B70
O	393	GLN	HIS	engineered mutation	UNP Q80B70
O	405	GLY	-	linker	UNP Q80B70
O	406	GLY	-	linker	UNP Q80B70
O	407	SER	-	linker	UNP Q80B70
O	408	GLY	-	linker	UNP Q80B70
O	409	GLY	-	linker	UNP Q80B70

3 Residue-property plots ⓘ

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry 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: L1 protein

• Molecule 1: L1 protein

• Molecule 1: L1 protein

Chain C:

• Molecule 1: L1 protein

Chain D:

• Molecule 1: L1 protein

Chain E:

• Molecule 1: L1 protein

Chain F:

• Molecule 1: L1 protein

Chain G:

• Molecule 1: L1 protein

Chain H:

[Residue validation strip for residues D244 through L475]

• Molecule 1: L1 protein

Chain I:

[Chain I quality bar: 3%, 49%, 37%, 12%]

[Residue validation strips for Chain I, residues A20 through L475]

• Molecule 1: L1 protein

Chain J:

[Chain J quality bar: 4%, 43%, 42%, 13%]

[Residue validation strips for Chain J, residues A20 through A239]

Y242 S245 M246 F247 F248 C249 L250 R251 R252 E253 Q254 L255 R258 H259 F260 W261 N262 R263 M267 Q273 Y276 I277 K278 M282 C289 V290 Y291 S292 P293 S294 P295 S296 G297 S298 I299 V300 T301 S302 D303 F307 N308 K309 P310 Y311 W312 L313 H314 K315 A316 Q317

N320 N321 G322 V323 C324 W325 H326 N327 Q328 L329 T332 V333 V334 D335 R338 S339 T340 I344 C345 S350 P351 V352 P353 G354 Q355 T356 D357 A358 F361 K362 Y364 S365 R366 H367 V368 E369 E370 Y371 D372 F375 I376 I382 T383 L384 T385 A386 D387 V388 M389 I392

M395 N396 I399 L400 E401 N404 **GLY GLY SER GLY GLY** N438 K444 L445 K446 F447 W448 N449 V450 D451 L452 K453 E454 K455 L458 D459 L460 D461 Q462 Y463 P464 L465 G466 R467 K468 F469 L470 V471 Q472 L475

• Molecule 1: L1 protein

Chain K:

3%

47% 38% 13% ••

A20 V21 V22 N23 T24 T29 R30 T31 S32 Y35 H36 A37 S40 R41 L42 V45 Y49 F50 R51 A54 G55 G56 G57 N58 K59 Q60 D61 I62 P63 K64 Y68 Q69 Y70 R71 V72 F73 R74 V75 Q76 D79 F83 G84 L85 P86 D87 T88 S89 I90 Y91 N92 P93

E94 T95 Q96 R97 L98 V99 V105 E106 I107 G108 R109 G110 Q111 P112 L113 G114 V115 G116 L117 H120 P121 F122 Y123 N124 L125 L126 D127 E130 S131 S132 H133 A134 A135 T136 S137 N138 V139 S140 E141 D142 V143 R144 V147 D150 Y151 Q155 L156 C157 I158 L159 I165 G166 E167

H168 W169 A170 K171 A174 S175 K176 S177 R178 P179 L180 D184 C185 L188 T193 E196 D197 G198 D199 M200 V201 D202 T203 D209 F210 L213 T216 K217 C218 E219 V220 P221 L222 D223 Q226 C229 K230 Y231 P232 D233 Y234 L235 Q236 M237 D240 P241 Y242 G243 D244

S245 M246 F247 F248 C249 L250 R251 R252 E253 Q254 L255 F256 A257 R258 H259 F260 W261 N262 P272 Q273 S274 L275 K278 R283 C289 V290 Y291 S292 P293 S294 S298 I299 V300 T301 F307 R308 K309 P310 Y311 W312 L313 H314 K315 A316 Q317 G318 H319 N320 N321 G322 C324 W325 H326

N327 Q328 L329 F330 V331 V334 D335 R338 S339 T340 N341 L342 T343 I344 C345 Q349 S350 P351 V352 P353 Y356 D357 K360 Q363 Y364 S365 R366 H367 V368 E369 E370 Y371 D372 L379 C380 T381 I382 T383 L384 T385 A386 D387 V388 M389 N396 S397 S398 E401 N404 **GLY**

GLY SER GLY GLY N438 K444 L445 K446 F447 W448 N449 V450 K453 E454 L458 D459 L460 D461 L465 G466 R467 Q472 A473 Q474 L475

• Molecule 1: L1 protein

Chain L:

5%

48% 37% 12% ••

A20 V21 V22 N23 T24 D25 D26 Y27 R30 T31 F34 Y35 H36 A37 S40 R41 L42 V45 G46 A54 G55 G56 G57 N58 K59 Q60 V65 S66 A67 Y68 Q69 Y70 R71 R74 K82 L85 P86 D87 T88 S89 I90 Y91 N92 P93 E94 T95 Q96 R97 L98 V99

C102 V105 E106 I107 G108 R109 G110 Q111 P112 L113 G114 V115 G116 L117 S118 G119 H120 P121 F122 K125 L126 D127 E130 S131 S132 H133 A134 A135 T136 S137 N138 V139 S140 E141 D142 S148 Y151 T154 Q155 L156 L159 A164 E167 H168 W169 T173 A174 S175 K176 S177

R178 S181 C185 P186 P187 L188 E189 L190 K191 N192 T193 V194 L195 E196 D197 G198 D199 M200 V201 D202 T203 T216 K217 C218 E219 V220 P221 L222 D223 I224 C225 Q226 S227 K230 Y231 P232 D233 Q236 M237 D244 S245 M246 F247 F248 C249 L250 R251 R252 E253 Q254 L255 F256 A257 R258

H259 F260 W261 N262 M267 G268 D269 T270 V271 P272 Q273 Y276 I277 K278 M282 R283 C289 V290 Y291 S292 P293 S294 G297 S298 I299 V300 T301 L306 F307 N308 Y311 W312 L313 H314 K315 A316 Q317 N320 N321 G322 V323 C324 W325 H326 N327 Q328 V331 V334 D335

T340 N341 L342 T343 I344 C345 Q349 S350 P351 V352 P353 G354 K360 Q363 Y364 S365 R366 H367 V368 E369 E370 Y371 D372 F375 I376 F377 Q378 L379 C380 T381 I382 T383 L384 T385 A386 D387 V388 M389 S390 Y391 I392 Q393 N396 S397 S398 E401 N404 GLY GLY SER GLY GLY N438

K439 D443 K444 L445 K446 F447 W448 L452 K453 E454 K455 F456 D459 L460 D461 Q462 Y463 P464 L465 G466 R467 Q472 A473 G474 L475

• Molecule 1: L1 protein

Chain M:

A20 V21 V22 N23 T24 V28 T29 R30 T31 F34 Y35 H36 A37 S40 R41 L42 L43 T44 V45 R51 V52 P53 A54 G55 G56 G57 N58 K59 Q60 D61 I62 P63 V65 K64 S66 A67 Y68 Q69 Y70 R71 V72 V75 P80 N81 K82 F83 G84 L85 P86 D87 T88 S89 I90 Y91

N92 P93 E94 T95 Q96 R97 L98 V99 W100 A101 V105 E106 R109 G110 Q111 P112 L113 G114 L117 H120 P121 F122 Y123 N124 K125 L126 D127 E130 S131 S132 H133 A134 A135 T136 S137 N138 V139 S140 E141 D142 V143 R144 V147 S148 Y151 L156 C157 I158 L159 W169 A170

K171 G172 T173 A174 S175 K176 S177 R178 P179 L180 C185 L188 E189 L190 K191 N192 T193 D197 M200 V201 D202 T203 S204 Y205 G206 A207 M208 D215 T216 K217 C218 E219 V220 P221 L222 D223 I224 C225 Q226 Y231 P232 D233 Y234 L235 Q236 M246 F247 F248 C249 L250 R251 R252 E253

Q254 L255 P256 A257 R258 H259 F260 W261 M262 R263 D269 T270 Q273 K278 M282 R283 C289 V290 Y291 S292 P293 S294 G297 S298 I299 V300 T301 S302 D303 S304 P307 N308 K309 P310 Y311 W312 L313 H314 K315 A316 Q317 G318 H319 N320 N321 G322 V323 C324 W325 H326 N327 Q328 L329

F330 V331 T332 V333 V334 D335 T340 N341 L342 T343 I344 C345 A346 S347 T348 Q349 S350 P351 V352 P353 D357 A358 T359 K360 F361 K362 Q363 Y364 S365 R366 H367 V368 E369 E370 Y371 D372 I376 L379 C380 T381 I382 T383 L384 T385 A386 D387 V388 M389 S390 Y391 I392 Q393 N396 L400

E401 D402 W403 N404 GLY SER GLY GLY N438 K439 L445 K446 F447 W448 K453 E454 K455 F456 S457 L458 D459 L460 D461 P464 L465 K468 V471 Q472 A473 G474 L475

• Molecule 1: L1 protein

Chain N:

A20 V21 V22 N23 T24 I33 F34 Y35 H36 A37 S40 R41 L42 V45 G46 D47 P48 Y49 F50 R51 V52 P53 A54 G55 N58 K59 Q60 D61 I62 P63 K64 V65 S66 A67 Y68 Q69 Y70 R71 V72 F73 R74 N81 K82 F83 G84 L85 P86 D87 T88 S89 I90 Y91 N92 P93 E94

T95 Q96 R97 L98 V99 W100 A101 C102 V105 E106 R109 G110 Q111 P112 L113 G114 V115 G116 L117 H120 P121 F122 Y123 L126 D127 S131 S132 H133 A134 A135 T136 S137 N138 V139 S140 E141 D142 V143 R144 N146 V147 S148 V149 D150 Y151 K152 L156 C157 I158 L159 G160 I165

W169 G172 T173 A174 S175 K176 S177 R178 P179 L180 S181 C185 L188 E189 L190 K191 E196 D197 G198 D199 M200 V201 D202 T203 S204 Y205 M208 L213 Q214 D215 T216 K217 C218 E219 V220 P221 L222 C225 C229 K230 Y231 P232 D233 Q236 Y242 M246 F247 F248

C249 L250 R251 R252 E253 Q254 L255 R258 H259 F260 W261 M262 R263 P272 Q273 K278 C289 V290 Y291 S292 P293 S294 P295 S296 G297 S298 I299 V300 T301 S302 D303 L306 F307 N308 K309 P310 Y311 W312 L313 A316 Q317 N320 N321 G322 V323 C324 N327 Q328 L329 F330 V331 T332

V333 V334 R338 S339 T340 N341 L342 T343 I344 C345 S350 P351 V352 P353 G354 Q355 Y356 K360 Q363 Y364 S365 R366 H367 V368 E369 E370 Y371 D372 L373 I376 C380 T381 I382 T383 L384 T385 A386 D387 V388 M389 I392 Q393 S394 M395 N396 S397 E401 N404 GLY GLY SER

GLY GLY N438 K439 D440 L445 K446 F447 W448 N449 V450 E454 K455 F456 S457 L458 D459 L460 D461 Q462 Y463 P464 L465 G466 R467 K468 F469 L470 V471 Q472 L475

• Molecule 1: L1 protein

Chain O:

4%

48%   37%   12%   ••

A20 V21 V22 N23 R30 I33 F34 Y35 H36 A37 S40 R41 L42 V45 G46 D47 P48 Y49 F50 R51 G55 K59 Q60 S66 A67 Y68 Q69 Y70 R71 V72 F73 R74 K82 F83 G84 L85 P86 D87 I90 Y91 N92 P93 Q96 R97 L98 V99 A103 G104 V105

E106 I107 G108 R109 G110 Q111 P112 V115 G116 L117 H120 P121 F122 Y123 N124 K125 L126 D127 E130 H133 A134 A135 T136 S137 N138 V139 S140 E141 D142 V143 R144 V147 S148 V149 D150 Y151 Q155 L156 C157 I158 L159 E167 H168 W169 A170 K171 G172 T173 A174 S175 K176 S177 R178

P179 L180 G183 D184 C185 P186 P187 L188 E189 L190 K191 N192 T193 E196 D197 V201 D202 T203 G204 Y205 M208 L213 Q214 D215 T216 K217 C218 E219 V220 P221 L222 C225 C229 K230 Y231 P232 D233 Y234 L235 Q236 M237 Y242 G243 D244 S245 M246 F247 F248 C249 L250 R251 R252

E253 Q254 L255 F256 A257 R258 H259 F260 W261 N262 R263 A264 Q273 S274 K278 Q279 M282 R283 A284 S285 C289 V290 Y291 S292 P293 S294 P295 S296 G297 S298 I299 V300 T301 F307 N308 Y311 W312 L313 H314 K315 A316 Q317 N320 N321 C324 W325 H326 N327 Q328 L329 F330 V331

T332 V333 V334 T340 N341 L342 T343 I344 C345 A346 S347 S350 P351 V352 P353 K360 F361 K362 Y364 S365 R366 H367 V368 E369 E370 Y371 D372 F375 I376 F377 Q378 T381 I382 T383 L384 D387 V388 M389 S390 Y391 I392 Q393 N396 S397 S398 I399 L400 E401 N404 GLY GLY

SER GLY GLY N438 K446 F447 W448 K453 E454 K455 D459 L460 D461 L465 K468 G474 L475

4   Data and refinement statistics   ⓘ

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	81.16Å 105.04Å 235.75Å 87.56° 85.66° 68.16°	Depositor
Resolution (Å)	40.00 – 3.40 51.09 – 2.90	Depositor EDS
% Data completeness (in resolution range)	99.7 (40.00-3.40) 99.3 (51.09-2.90)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	19.60	Depositor
$< I/\sigma(I) >$ [1]	1.34 (at 2.91Å)	Xtriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.214 , 0.260 0.204 , 0.215	Depositor DCC
R_{free} test set	11857 reflections (7.47%)	wwPDB-VP
Wilson B-factor (Å^2)	63.4	Xtriage
Anisotropy	0.374	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.33 , 60.1	EDS
L-test for twinning[2]	$< |L| > = 0.52, < L^2 > = 0.35$	Xtriage
Estimated twinning fraction	0.000 for -h,-h+k,-l	Xtriage
F_o,F_c correlation	0.92	EDS
Total number of atoms	49845	wwPDB-VP
Average B, all atoms (Å^2)	52.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.88% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.

[2]Theoretical values of $< |L| >$, $< L^2 >$ 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 ⓘ

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	1.92	72/3408 (2.1%)	1.47	35/4633 (0.8%)
1	B	1.93	78/3408 (2.3%)	1.44	36/4633 (0.8%)
1	C	1.89	64/3408 (1.9%)	1.47	38/4633 (0.8%)
1	D	1.96	79/3408 (2.3%)	1.44	29/4633 (0.6%)
1	E	1.99	80/3408 (2.3%)	1.47	41/4633 (0.9%)
1	F	2.02	90/3408 (2.6%)	1.46	34/4633 (0.7%)
1	G	2.03	90/3408 (2.6%)	1.48	33/4633 (0.7%)
1	H	1.93	71/3408 (2.1%)	1.52	46/4633 (1.0%)
1	I	1.84	46/3408 (1.3%)	1.42	34/4633 (0.7%)
1	J	1.94	71/3408 (2.1%)	1.50	41/4633 (0.9%)
1	K	1.89	66/3408 (1.9%)	1.45	41/4633 (0.9%)
1	L	1.99	81/3408 (2.4%)	1.51	42/4633 (0.9%)
1	M	1.91	70/3408 (2.1%)	1.44	33/4633 (0.7%)
1	N	1.90	72/3408 (2.1%)	1.43	31/4633 (0.7%)
1	O	1.95	80/3408 (2.3%)	1.51	37/4633 (0.8%)
All	All	1.94	1110/51120 (2.2%)	1.47	551/69495 (0.8%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	D	0	1

The worst 5 of 1110 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	439	LYS	CE-NZ	16.04	1.89	1.49
1	L	311	TYR	CE2-CZ	15.05	1.58	1.38
1	O	311	TYR	CE2-CZ	15.03	1.58	1.38
1	E	311	TYR	CE2-CZ	14.64	1.57	1.38
1	I	311	TYR	CE2-CZ	14.61	1.57	1.38

The worst 5 of 551 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	L	109	ARG	NE-CZ-NH1	-17.51	111.55	120.30
1	F	263	ARG	NE-CZ-NH2	-16.83	111.89	120.30
1	L	109	ARG	NE-CZ-NH2	16.15	128.38	120.30
1	L	366	ARG	NE-CZ-NH2	-13.69	113.45	120.30
1	O	252	ARG	NE-CZ-NH2	-13.15	113.72	120.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	D	53	PRO	Peptide

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	3323	0	3192	188	1
1	B	3323	0	3192	170	0
1	C	3323	0	3192	154	1
1	D	3323	0	3192	151	0
1	E	3323	0	3192	161	0
1	F	3323	0	3192	199	0
1	G	3323	0	3192	197	0
1	H	3323	0	3192	202	0
1	I	3323	0	3192	165	0
1	J	3323	0	3192	166	0
1	K	3323	0	3192	152	0
1	L	3323	0	3192	175	0
1	M	3323	0	3192	166	0
1	N	3323	0	3192	174	0
1	O	3323	0	3192	157	0
All	All	49845	0	47880	2325	1

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 24.

The worst 5 of 2325 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:J:446:LYS:CG	1:J:446:LYS:CD	1.75	1.63
1:B:141:GLU:CB	1:B:141:GLU:CG	1.75	1.63
1:C:191:LYS:CE	1:C:191:LYS:CD	1.76	1.62
1:L:360:LYS:CD	1:L:360:LYS:CE	1.78	1.61
1:F:465:LEU:CG	1:F:465:LEU:CD1	1.74	1.61

All (1) 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)
1:A:387:ASP:OD2	1:C:360:LYS:NZ[1_565]	2.12	0.08

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 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	419/428 (98%)	372 (89%)	34 (8%)	13 (3%)	4	23
1	B	419/428 (98%)	370 (88%)	34 (8%)	15 (4%)	3	21
1	C	419/428 (98%)	372 (89%)	36 (9%)	11 (3%)	5	26
1	D	419/428 (98%)	373 (89%)	38 (9%)	8 (2%)	8	31
1	E	419/428 (98%)	373 (89%)	34 (8%)	12 (3%)	4	24
1	F	419/428 (98%)	367 (88%)	43 (10%)	9 (2%)	7	30
1	G	419/428 (98%)	366 (87%)	42 (10%)	11 (3%)	5	26
1	H	419/428 (98%)	362 (86%)	46 (11%)	11 (3%)	5	26
1	I	419/428 (98%)	373 (89%)	32 (8%)	14 (3%)	4	22
1	J	419/428 (98%)	369 (88%)	39 (9%)	11 (3%)	5	26
1	K	419/428 (98%)	370 (88%)	39 (9%)	10 (2%)	6	28

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	L	419/428 (98%)	369 (88%)	36 (9%)	14 (3%)	4	22
1	M	419/428 (98%)	367 (88%)	37 (9%)	15 (4%)	3	21
1	N	419/428 (98%)	376 (90%)	30 (7%)	13 (3%)	4	23
1	O	419/428 (98%)	372 (89%)	38 (9%)	9 (2%)	7	30
All	All	6285/6420 (98%)	5551 (88%)	558 (9%)	176 (3%)	5	24

5 of 176 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	61	ASP
1	A	131	SER
1	A	135	ALA
1	B	59	LYS
1	B	131	SER

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	370/371 (100%)	331 (90%)	39 (10%)	7	25
1	B	370/371 (100%)	339 (92%)	31 (8%)	11	36
1	C	370/371 (100%)	334 (90%)	36 (10%)	8	28
1	D	370/371 (100%)	337 (91%)	33 (9%)	9	33
1	E	370/371 (100%)	337 (91%)	33 (9%)	9	33
1	F	370/371 (100%)	332 (90%)	38 (10%)	7	26
1	G	370/371 (100%)	334 (90%)	36 (10%)	8	28
1	H	370/371 (100%)	335 (90%)	35 (10%)	8	29
1	I	370/371 (100%)	337 (91%)	33 (9%)	9	33
1	J	370/371 (100%)	335 (90%)	35 (10%)	8	29
1	K	370/371 (100%)	331 (90%)	39 (10%)	7	25
1	L	370/371 (100%)	330 (89%)	40 (11%)	6	24

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	M	370/371 (100%)	335 (90%)	35 (10%)	8	29
1	N	370/371 (100%)	333 (90%)	37 (10%)	7	27
1	O	370/371 (100%)	338 (91%)	32 (9%)	10	35
All	All	5550/5565 (100%)	5018 (90%)	532 (10%)	8	29

5 of 532 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	N	23	ASN
1	N	225	CYS
1	M	475	LEU
1	O	293	PRO
1	F	255	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 221 such sidechains are listed below:

Mol	Chain	Res	Type
1	H	462	GLN
1	J	363	GLN
1	O	396	ASN
1	N	308	ASN
1	I	153	GLN

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 monosaccharides in this entry.

5.6 Ligand geometry ⓘ

There are no ligands in this entry.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

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, 95th 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(Å²)	Q<0.9
1	A	423/428 (98%)	0.06	21 (4%)	28	29	16, 46, 103, 121	0
1	B	423/428 (98%)	-0.08	19 (4%)	33	33	19, 45, 101, 127	0
1	C	423/428 (98%)	0.08	20 (4%)	31	31	15, 45, 103, 123	0
1	D	423/428 (98%)	-0.15	10 (2%)	59	57	14, 44, 102, 126	0
1	E	423/428 (98%)	-0.19	10 (2%)	59	57	15, 45, 104, 123	0
1	F	423/428 (98%)	0.19	25 (5%)	22	23	19, 50, 105, 123	0
1	G	423/428 (98%)	0.16	22 (5%)	27	27	22, 50, 103, 127	0
1	H	423/428 (98%)	-0.10	14 (3%)	46	45	19, 46, 103, 124	0
1	I	423/428 (98%)	-0.13	13 (3%)	49	48	17, 45, 101, 123	0
1	J	423/428 (98%)	-0.08	17 (4%)	38	37	18, 46, 103, 123	0
1	K	423/428 (98%)	-0.14	11 (2%)	56	54	18, 44, 103, 122	0
1	L	423/428 (98%)	-0.01	20 (4%)	31	31	16, 46, 103, 122	0
1	M	423/428 (98%)	-0.04	20 (4%)	31	31	18, 46, 102, 126	0
1	N	423/428 (98%)	-0.11	18 (4%)	35	35	19, 45, 103, 125	0
1	O	423/428 (98%)	-0.03	17 (4%)	38	37	17, 46, 103, 126	0
All	All	6345/6420 (98%)	-0.04	257 (4%)	37	36	14, 46, 104, 127	0

The worst 5 of 257 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	135	ALA	7.8
1	D	133	HIS	7.7
1	M	57	GLY	7.5
1	O	134	ALA	7.1
1	N	86	PRO	7.1

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 monosaccharides in this entry.

6.4 Ligands ⓘ

There are no ligands in this entry.

6.5 Other polymers ⓘ

There are no such residues in this entry.