Full wwPDB X-ray Structure Validation Report ⓘ

Mar 22, 2025 – 12:28 PM EDT

PDB ID	:	6EEW
Title	:	Crystal structure of Catharanthus roseus tryptophan decarboxylase in complex with L-tryptophan
Authors	:	Torrens-Spence, M.P.; Chiang, Y.; Smith, T.; Vicent, M.A.; Wang, Y.; Weng, J.K.
Deposited on	:	2018-08-15
Resolution	:	2.05 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*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

The following versions of software and data (see references ⓘ) were used in the production of this report:

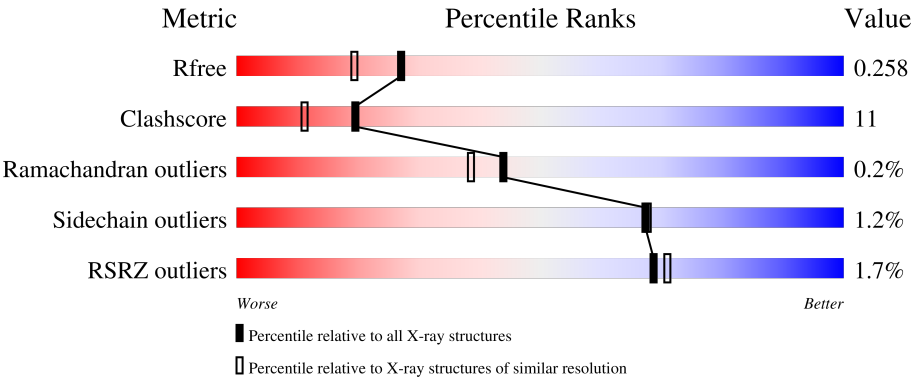
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.21
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.004 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.41.4

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.05 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}	164625	3436 (2.08-2.04)
Clashscore	180529	3661 (2.08-2.04)
Ramachandran outliers	177936	3649 (2.08-2.04)
Sidechain outliers	177891	3649 (2.08-2.04)
RSRZ outliers	164620	3436 (2.08-2.04)

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	500	75% 20%
1	B	500	73% 20% 6%
1	C	500	72% 20% 7%
1	D	500	73% 19% 7%

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	TRP	D	601	-	-	X	-

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 15476 atoms, of which 48 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.

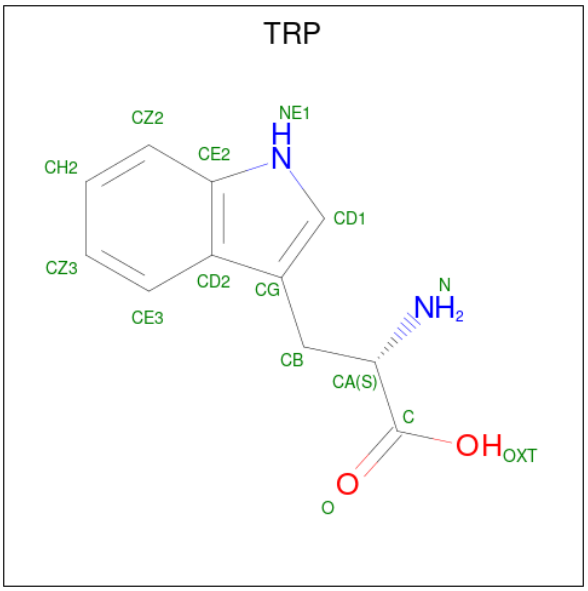
- Molecule 1 is a protein called Aromatic-L-amino-acid decarboxylase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	479	Total	C	N	O	P	S	0	5	0
			3866	2485	642	713	1	25			
1	B	468	Total	C	N	O	P	S	0	5	0
			3770	2422	628	694	1	25			
1	C	467	Total	C	N	O	P	S	0	6	0
			3779	2428	629	696	1	25			
1	D	464	Total	C	N	O	P	S	0	3	0
			3719	2392	618	683	1	25			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	401	ALA	GLY	conflict	UNP P17770
B	401	ALA	GLY	conflict	UNP P17770
C	401	ALA	GLY	conflict	UNP P17770
D	401	ALA	GLY	conflict	UNP P17770

- Molecule 2 is TRYPTOPHAN (three-letter code: TRP) (formula: $C_{11}H_{12}N_2O_2$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	H	N	O	0	0
			27	11	12	2	2		
2	B	1	Total	C	H	N	O	0	0
			27	11	12	2	2		
2	C	1	Total	C	H	N	O	0	0
			27	11	12	2	2		
2	D	1	Total	C	H	N	O	0	0
			27	11	12	2	2		

- Molecule 3 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Ca	0	0
			1	1		
3	B	1	Total	Ca	0	0
			1	1		
3	C	1	Total	Ca	0	0
			1	1		
3	D	1	Total	Ca	0	0
			1	1		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	59	Total	O	0	0
			59	59		

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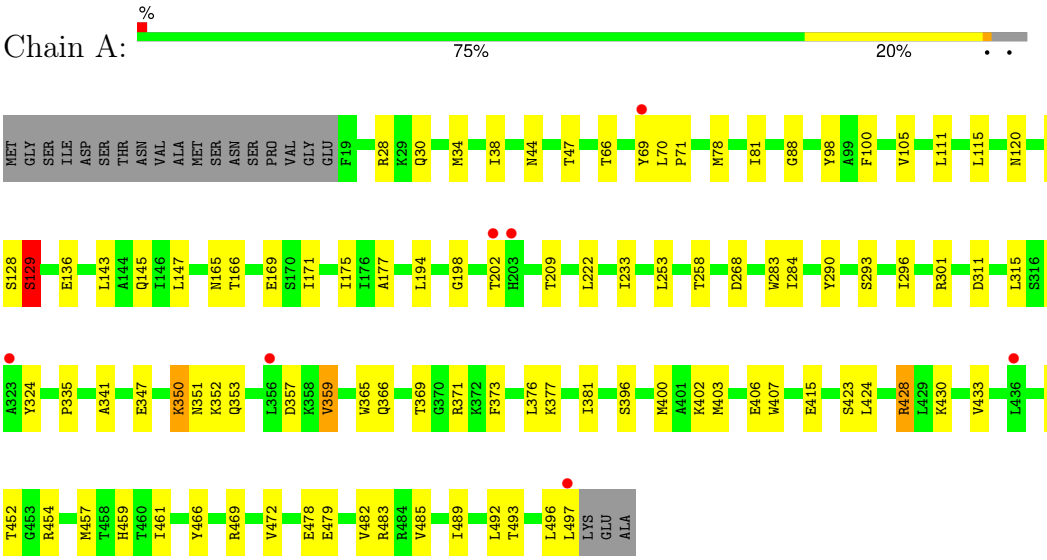
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	78	Total O 78 78	0	0
4	C	46	Total O 46 46	0	0
4	D	47	Total O 47 47	0	0

3 Residue-property plots (i)

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.

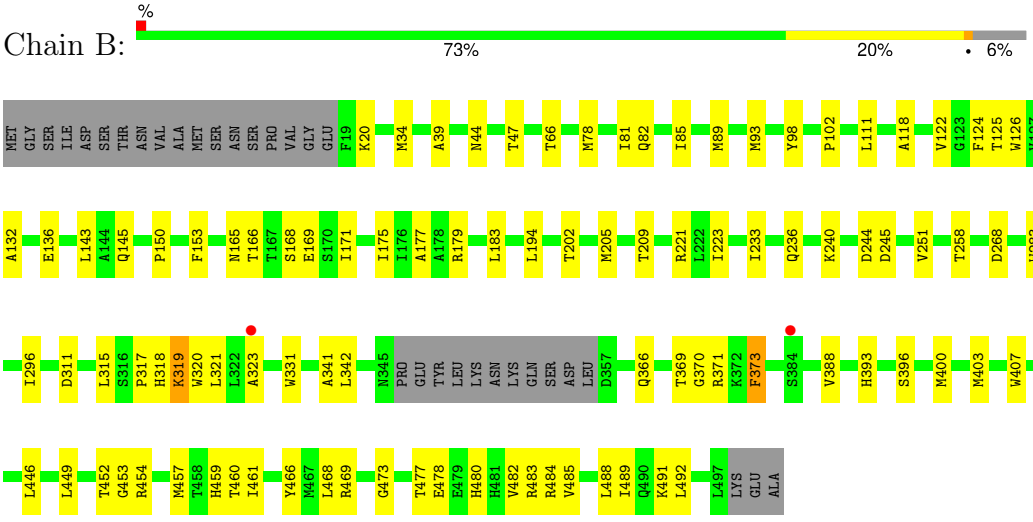
• Molecule 1: Aromatic-L-amino-acid decarboxylase

Chain A:



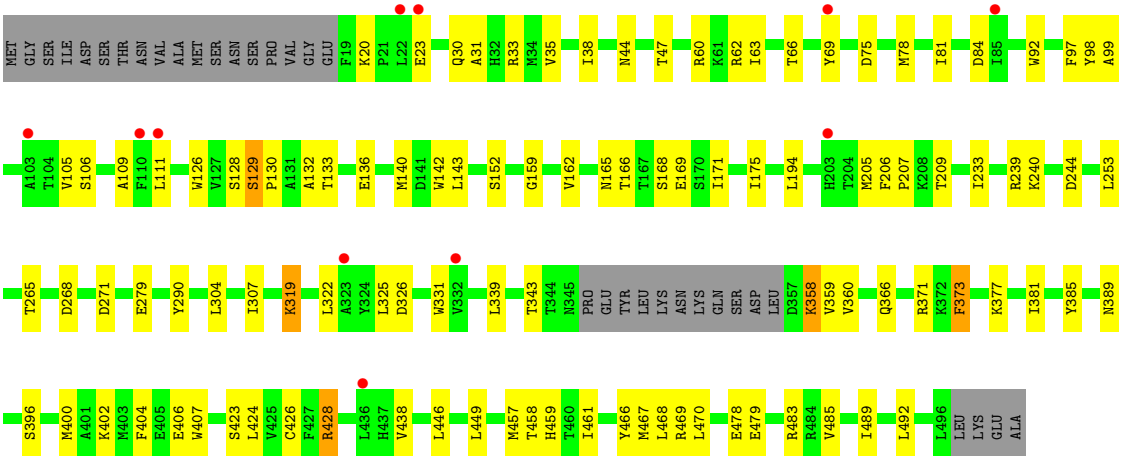
• Molecule 1: Aromatic-L-amino-acid decarboxylase

Chain B:



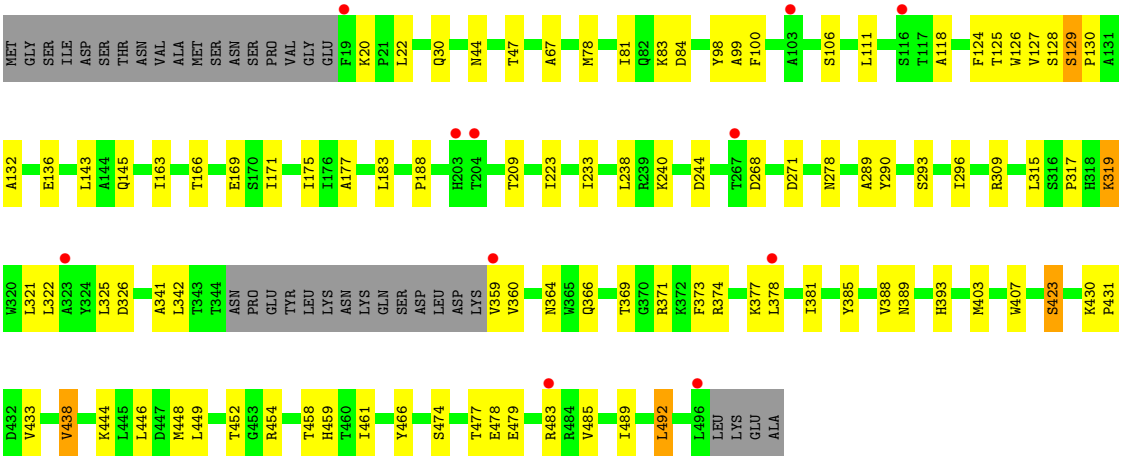
• Molecule 1: Aromatic-L-amino-acid decarboxylase

Chain C:



• Molecule 1: Aromatic-L-amino-acid decarboxylase

Chain D:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	107.61Å 69.61Å 133.47Å 90.00° 93.78° 90.00°	Depositor
Resolution (Å)	133.18 – 2.05 133.18 – 2.05	Depositor EDS
% Data completeness (in resolution range)	88.1 (133.18-2.05) 75.4 (133.18-2.05)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	0.72 (at 2.05Å)	Xtriage
Refinement program	PHENIX 1.12_2829	Depositor
R, R_{free}	0.220 , 0.256 0.222 , 0.258	Depositor DCC
R_{free} test set	108768 reflections (1.81%)	wwPDB-VP
Wilson B-factor (Å^2)	33.7	Xtriage
Anisotropy	0.425	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 42.3	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	15476	wwPDB-VP
Average B, all atoms (Å^2)	63.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.75% of the height of the origin peak. No significant pseudotranslation is detected.*

[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

Bond lengths and bond angles in the following residue types are not validated in this section: CA, LLP

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	0.37	0/3934	0.54	0/5345
1	B	0.37	0/3834	0.55	0/5208
1	C	0.34	0/3844	0.53	0/5221
1	D	0.39	0/3783	0.53	0/5140
All	All	0.37	0/15395	0.54	0/20914

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	3866	0	3865	100	0
1	B	3770	0	3770	97	0
1	C	3779	0	3771	91	0
1	D	3719	0	3722	88	0
2	A	15	12	9	5	0
2	B	15	12	9	2	0
2	C	15	12	9	3	0
2	D	15	12	9	6	0
3	A	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
4	A	59	0	0	3	0
4	B	78	0	0	2	0
4	C	46	0	0	1	0
4	D	47	0	0	3	0
All	All	15428	48	15164	346	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 11.

All (346) 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:C:400[A]:MET:HE3	1:C:479:GLU:HA	1.32	1.05
1:A:78:MET:HE2	1:A:81:ILE:HD12	1.44	0.96
1:D:78:MET:HE2	1:D:81:ILE:HD12	1.48	0.95
1:C:78:MET:HE2	1:C:81:ILE:HD12	1.52	0.91
1:A:175:ILE:HD12	1:A:209:THR:HG22	1.54	0.88
1:B:290:TYR:OH	1:B:423:SER:HB2	1.74	0.88
1:C:20:LYS:HD2	1:C:23:GLU:OE2	1.74	0.88
1:D:175:ILE:HD12	1:D:209:THR:HG22	1.52	0.88
1:D:366:GLN:OE1	1:D:371:ARG:HD2	1.75	0.87
1:B:449:LEU:HD23	1:B:492:LEU:HD12	1.59	0.84
1:D:290:TYR:OH	1:D:423:SER:HB2	1.77	0.84
1:D:431:PRO:HA	1:D:438:VAL:HG13	1.59	0.82
1:D:78:MET:CE	1:D:81:ILE:HD12	2.08	0.82
1:B:320:TRP:CZ2	1:B:423:SER:OG	2.34	0.81
1:C:290:TYR:OH	1:C:423:SER:HB3	1.81	0.80
1:D:461:ILE:HD13	1:D:466:TYR:HA	1.64	0.80
1:A:78:MET:CE	1:A:81:ILE:HD12	2.10	0.80
1:C:175:ILE:HD12	1:C:209:THR:HG22	1.66	0.78
1:D:166:THR:OG1	1:D:169:GLU:HG2	1.83	0.77
1:B:366:GLN:HE22	1:B:371:ARG:HG3	1.50	0.76
1:A:69[B]:TYR:CZ	1:B:388:VAL:HG22	2.21	0.76
1:A:290:TYR:HB3	4:A:726:HOH:O	1.85	0.76
1:B:78:MET:HE1	1:B:81:ILE:HD12	1.67	0.76
1:C:78:MET:CE	1:C:81:ILE:HD12	2.17	0.75
1:B:461:ILE:HD13	1:B:466:TYR:HA	1.67	0.75
1:A:461:ILE:HD11	1:A:466:TYR:HD2	1.51	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:461:ILE:HD13	1:A:466:TYR:HA	1.70	0.73
1:A:352:LYS:O	1:A:353:GLN:HG2	1.88	0.73
1:D:366:GLN:CD	1:D:371:ARG:HD2	2.09	0.73
1:C:143:LEU:HB3	1:C:331:TRP:HZ2	1.53	0.73
1:B:175:ILE:HD12	1:B:209:THR:HG22	1.68	0.73
1:A:128:SER:O	1:A:129:SER:HB2	1.88	0.73
1:A:396:SER:O	1:A:400[B]:MET:HG3	1.88	0.73
1:A:400[A]:MET:HE1	1:A:478:GLU:C	2.09	0.73
1:A:100:PHE:HB3	2:A:601:TRP:CB	2.20	0.72
1:C:66:THR:HG22	1:D:145:GLN:OE1	1.88	0.71
1:D:366:GLN:HE22	1:D:371:ARG:HG3	1.52	0.71
1:C:240:LYS:HE3	1:C:244:ASP:OD2	1.91	0.71
1:B:461:ILE:HD11	1:B:466:TYR:HD2	1.56	0.71
1:A:100:PHE:HB3	2:A:601:TRP:HB3	1.74	0.70
1:A:175:ILE:HD12	1:A:209:THR:CG2	2.22	0.70
1:C:461:ILE:HD11	1:C:466:TYR:HD2	1.57	0.70
1:C:132:ALA:HA	1:C:373:PHE:CE1	2.28	0.69
1:A:171:ILE:O	1:A:175:ILE:HG13	1.92	0.69
1:B:78:MET:CE	1:B:81:ILE:HD12	2.23	0.69
1:D:461:ILE:HD11	1:D:466:TYR:HD2	1.56	0.69
1:B:78:MET:O	1:B:82[B]:GLN:HG3	1.93	0.69
1:B:221:ARG:NH1	1:B:245:ASP:OD2	2.26	0.68
1:B:128:SER:O	1:B:129:SER:HB2	1.92	0.68
1:A:98:TYR:CE2	1:A:485:VAL:HG21	2.29	0.68
1:C:400[A]:MET:HE3	1:C:479:GLU:CA	2.17	0.67
1:A:366:GLN:HE22	1:A:371:ARG:HG3	1.59	0.67
1:D:128:SER:O	1:D:129:SER:HB2	1.95	0.67
1:A:290:TYR:OH	1:A:423:SER:HB3	1.95	0.67
1:B:136:GLU:OE1	1:B:371:ARG:NH2	2.29	0.66
1:B:396:SER:O	1:B:400[B]:MET:HG3	1.95	0.66
1:D:126:TRP:CE2	1:D:130:PRO:HB3	2.31	0.66
1:A:69[B]:TYR:O	1:B:388:VAL:HG23	1.95	0.65
1:A:366:GLN:OE1	1:A:371:ARG:HD2	1.96	0.65
1:B:452:THR:HG22	1:B:454:ARG:HG3	1.79	0.65
1:C:166:THR:HB	1:C:319:LLP:OP3	1.96	0.65
1:A:315:LEU:HD12	1:A:317:PRO:HD3	1.76	0.65
1:C:128:SER:O	1:C:129:SER:HB2	1.96	0.65
1:D:377:LYS:O	1:D:381:ILE:HG13	1.97	0.65
1:B:223:ILE:CD1	1:B:233:ILE:HD13	2.27	0.65
1:B:98:TYR:CE2	1:B:485:VAL:HG21	2.33	0.64
1:C:69[B]:TYR:CZ	1:D:388:VAL:HG22	2.31	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:452:THR:HG22	1:D:454:ARG:HG3	1.79	0.64
1:A:166:THR:OG1	1:A:169:GLU:HG2	1.97	0.64
1:A:449:LEU:HD23	1:A:492:LEU:HD12	1.79	0.64
1:D:461:ILE:HD11	1:D:466:TYR:CD2	2.33	0.63
1:A:66:THR:HG22	1:B:145:GLN:OE1	1.99	0.63
1:A:177:ALA:HA	1:A:341:ALA:HB2	1.80	0.63
1:C:461:ILE:HD13	1:C:466:TYR:HA	1.80	0.63
1:A:145:GLN:OE1	1:B:66:THR:HG22	1.99	0.63
1:B:166:THR:OG1	1:B:169:GLU:HG2	1.99	0.63
1:B:449:LEU:CD2	1:B:492:LEU:HD12	2.27	0.63
1:D:319:LLP:H4'1	2:D:601:TRP:NE1	2.13	0.63
1:D:449:LEU:HD23	1:D:492:LEU:CD2	2.28	0.63
1:C:239:ARG:NH2	1:C:279:GLU:OE1	2.23	0.62
1:C:165:ASN:HB2	1:C:169[B]:GLU:OE2	1.99	0.62
1:A:69[A]:TYR:O	1:B:388:VAL:HG23	1.98	0.62
1:A:461:ILE:HD11	1:A:466:TYR:CD2	2.34	0.62
1:B:223:ILE:HD12	1:B:233:ILE:HD13	1.81	0.61
1:A:69[B]:TYR:CE1	1:B:388:VAL:HG22	2.35	0.61
1:C:69[B]:TYR:O	1:D:388:VAL:HG23	2.00	0.61
1:C:194:LEU:HB3	1:C:253:LEU:HD22	1.83	0.61
1:D:407:TRP:CH2	1:D:483[A]:ARG:HG2	2.36	0.60
1:C:166:THR:OG1	1:C:169[B]:GLU:HG2	2.01	0.60
1:D:290:TYR:OH	1:D:423:SER:CB	2.48	0.60
1:B:400[B]:MET:HE3	1:B:477:THR:HG22	1.81	0.60
1:D:44:ASN:O	1:D:47:THR:HB	2.02	0.59
1:A:407:TRP:HZ3	1:A:482:VAL:HG12	1.66	0.59
1:B:177:ALA:HA	1:B:341:ALA:HB2	1.84	0.59
1:B:424:LEU:HD11	1:B:469:ARG:HB3	1.83	0.59
1:C:428:ARG:NH2	1:C:438:VAL:HG11	2.18	0.59
1:D:124:PHE:HD1	1:D:125:THR:HG23	1.68	0.59
1:A:124:PHE:HD1	1:A:125:THR:HG23	1.67	0.58
1:A:446:LEU:HD22	1:A:459:HIS:HB3	1.85	0.58
1:A:88:GLY:O	1:B:130:PRO:HD2	2.03	0.58
1:A:400[A]:MET:HE1	1:A:478:GLU:O	2.04	0.58
1:D:431:PRO:CA	1:D:438:VAL:HG13	2.33	0.58
1:D:175:ILE:HD12	1:D:209:THR:CG2	2.29	0.58
1:D:290:TYR:HH	1:D:423:SER:HB2	1.69	0.58
1:D:485:VAL:O	1:D:489:ILE:HG13	2.03	0.57
1:C:136:GLU:CD	1:C:371:ARG:HH22	2.06	0.57
1:C:136:GLU:OE1	1:C:371:ARG:NH2	2.36	0.57
1:C:319:LLP:OP2	1:D:369:THR:HB	2.04	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:126:TRP:CG	1:A:359:VAL:HG11	2.40	0.57
1:C:319:LLP:H5'1	2:C:601:TRP:CD1	2.40	0.57
1:B:44:ASN:O	1:B:47:THR:HB	2.05	0.57
1:B:171:ILE:O	1:B:175:ILE:HG13	2.04	0.57
1:C:62:ARG:HD3	1:C:84:ASP:OD1	2.05	0.56
1:C:78:MET:CE	1:C:78:MET:HA	2.35	0.56
1:B:150:PRO:HG2	1:B:153:PHE:CE2	2.40	0.56
1:B:480:HIS:O	1:B:484:ARG:HG3	2.05	0.56
1:C:396:SER:O	1:C:400[B]:MET:HG3	2.04	0.56
1:D:319:LLP:HE3	2:D:601:TRP:CZ2	2.40	0.56
1:D:315:LEU:HD12	1:D:317:PRO:HD3	1.87	0.56
1:D:430:LYS:O	1:D:433:VAL:HG22	2.06	0.56
1:C:44:ASN:O	1:C:47:THR:HB	2.06	0.55
1:C:69[B]:TYR:CE1	1:D:388:VAL:HG22	2.41	0.55
1:A:127:VAL:HG12	4:A:704:HOH:O	2.07	0.55
1:D:223:ILE:HD11	1:D:238:LEU:HD13	1.87	0.55
1:B:124:PHE:HD1	1:B:125:THR:HG23	1.72	0.55
1:A:402:LYS:O	1:A:406:GLU:HG3	2.08	0.54
1:B:124:PHE:HB3	1:B:369:THR:O	2.07	0.54
1:B:315:LEU:HD12	1:B:317:PRO:HD3	1.90	0.54
1:C:485:VAL:O	1:C:489:ILE:HG13	2.08	0.54
1:B:143:LEU:HB3	1:B:331:TRP:HZ2	1.72	0.54
1:C:99:ALA:HB1	1:C:458:THR:HG23	1.90	0.54
1:A:377:LYS:O	1:A:381:ILE:HG13	2.08	0.54
1:C:69[A]:TYR:O	1:D:388:VAL:HG23	2.07	0.53
1:C:105:VAL:CG2	1:D:22:LEU:HD22	2.38	0.53
1:A:115:LEU:HD23	1:A:376:LEU:HD21	1.90	0.53
1:D:99:ALA:HB1	1:D:458:THR:HG23	1.90	0.53
1:A:478:GLU:OE2	1:B:20:LYS:NZ	2.38	0.53
1:C:377:LYS:O	1:C:381:ILE:HG13	2.08	0.53
1:B:194:LEU:HD23	1:B:251:VAL:HB	1.90	0.53
1:A:78:MET:CE	1:A:78:MET:HA	2.38	0.53
1:A:424:LEU:HD11	1:A:469:ARG:HB3	1.89	0.53
1:B:78:MET:HE2	1:B:78:MET:HA	1.90	0.53
1:B:461:ILE:HD11	1:B:466:TYR:CD2	2.39	0.53
1:B:319:LLP:H4'1	2:B:601:TRP:CD1	2.44	0.52
1:D:106:SER:HB3	1:D:322:LEU:HB3	1.90	0.52
1:C:319:LLP:H4'1	2:C:601:TRP:CD1	2.44	0.52
1:C:126:TRP:CE2	1:C:130:PRO:HB3	2.44	0.52
1:D:403:MET:CE	1:D:479:GLU:HG3	2.38	0.52
1:C:105:VAL:HG23	1:D:22:LEU:HD22	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:202:THR:HG21	1:B:258:THR:OG1	2.09	0.52
1:C:446:LEU:CD2	1:C:459:HIS:HB3	2.39	0.52
1:D:163:ILE:HG21	1:D:374:ARG:HB3	1.92	0.52
1:A:479:GLU:OE2	1:A:483[A]:ARG:NH2	2.37	0.52
1:B:175:ILE:HD12	1:B:209:THR:CG2	2.37	0.52
1:A:319:LLP:OP2	1:B:369:THR:HB	2.10	0.52
1:C:78:MET:HE2	1:C:78:MET:HA	1.91	0.52
1:D:78:MET:CE	1:D:78:MET:HA	2.39	0.52
1:B:449:LEU:HD23	1:B:492:LEU:CD1	2.38	0.52
1:B:366:GLN:OE1	1:B:371:ARG:HD2	2.09	0.51
1:A:136:GLU:OE1	1:A:371:ARG:NH2	2.35	0.51
1:D:293:SER:O	1:D:296:ILE:HG12	2.10	0.51
1:C:446:LEU:HD11	1:C:457:MET:O	2.11	0.51
1:C:175:ILE:HD12	1:C:209:THR:CG2	2.38	0.51
1:B:236[B]:GLN:HA	1:B:236[B]:GLN:OE1	2.10	0.50
1:B:293:SER:O	1:B:296:ILE:HG12	2.10	0.50
1:A:233:ILE:HG13	1:A:268:ASP:OD1	2.11	0.50
1:A:28:ARG:NH1	1:B:39:ALA:HB3	2.26	0.50
1:B:488:LEU:HD12	1:B:491:LYS:HE2	1.93	0.50
1:C:290:TYR:HB3	4:C:717:HOH:O	2.10	0.50
1:D:132:ALA:HA	1:D:373:PHE:CE1	2.46	0.50
1:A:120:ASN:HB3	1:B:93:MET:HE3	1.94	0.50
1:C:478:GLU:OE2	1:D:20:LYS:NZ	2.43	0.50
1:D:240:LYS:HE3	1:D:244:ASP:OD2	2.11	0.50
1:A:44:ASN:O	1:A:47:THR:HB	2.12	0.50
1:C:304:LEU:O	1:C:307:ILE:HB	2.12	0.49
1:C:426:CYS:HB3	1:C:467:MET:SD	2.52	0.49
1:C:168:SER:OG	1:C:319:LLP:OP1	2.21	0.49
1:C:468:LEU:N	1:C:468:LEU:HD12	2.26	0.49
1:A:177:ALA:HA	1:A:341:ALA:CB	2.42	0.49
1:A:485:VAL:O	1:A:489:ILE:HG13	2.12	0.49
1:D:403:MET:HE3	1:D:479:GLU:HG3	1.93	0.49
1:C:404:PHE:CE1	1:C:470:LEU:HD22	2.47	0.49
1:D:474:SER:HB3	1:D:477:THR:OG1	2.12	0.49
1:B:240:LYS:HE3	1:B:244:ASP:OD2	2.12	0.49
1:A:124:PHE:HB3	1:A:369:THR:O	2.12	0.49
1:B:366:GLN:HE22	1:B:371:ARG:CG	2.23	0.49
1:A:194:LEU:HB3	1:A:253:LEU:HD22	1.94	0.49
1:B:283:TRP:HA	1:B:311:ASP:OD2	2.13	0.49
1:B:468:LEU:HD12	1:B:468:LEU:N	2.28	0.49
1:A:111:LEU:HD22	1:B:34:MET:HB2	1.94	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:147:LEU:HD11	1:A:315:LEU:HD21	1.94	0.48
1:C:461:ILE:HD11	1:C:466:TYR:CD2	2.43	0.48
1:A:202:THR:HG21	1:A:258:THR:OG1	2.13	0.48
1:B:457:MET:HE3	1:B:469:ARG:O	2.13	0.48
1:B:177:ALA:HA	1:B:341:ALA:CB	2.42	0.48
1:C:98:TYR:CE2	1:C:485:VAL:HG21	2.49	0.48
1:A:319:LLP:NZ	1:A:319:LLP:O3	2.46	0.48
1:C:271:ASP:OD1	1:C:271:ASP:N	2.45	0.48
1:C:140:MET:HE2	1:C:162:VAL:N	2.29	0.48
1:A:452:THR:HG22	1:A:454:ARG:H	1.78	0.48
1:C:60[A]:ARG:NH2	1:C:63:ILE:O	2.42	0.48
1:D:452:THR:HG22	1:D:454:ARG:CG	2.44	0.47
1:A:400[A]:MET:CE	1:A:482:VAL:HG23	2.44	0.47
1:A:497:LEU:N	1:A:497:LEU:HD12	2.29	0.47
1:B:165:ASN:HB2	1:B:169:GLU:OE2	2.14	0.47
1:A:301:ARG:HG3	1:A:301:ARG:HH11	1.79	0.47
1:B:446:LEU:HD22	1:B:459:HIS:HB3	1.96	0.47
1:C:233:ILE:HG13	1:C:268:ASP:OD1	2.15	0.47
1:D:177:ALA:HA	1:D:341:ALA:HB2	1.95	0.47
1:C:126:TRP:CG	1:C:359:VAL:HG11	2.49	0.47
1:C:385:TYR:O	1:C:389:ASN:HB2	2.15	0.47
1:C:132:ALA:HA	1:C:373:PHE:CZ	2.49	0.47
1:B:223:ILE:HD12	1:B:233:ILE:CD1	2.45	0.46
1:C:109:ALA:HB2	1:C:381:ILE:HD11	1.97	0.46
1:D:319:LLP:H4'1	2:D:601:TRP:CE2	2.50	0.46
1:A:319:LLP:H4'1	2:A:601:TRP:NE1	2.30	0.46
1:B:168:SER:OG	1:B:319:LLP:OP1	2.29	0.46
1:C:60[B]:ARG:HH22	1:D:359:VAL:HG11	1.81	0.46
1:C:106:SER:HB3	1:C:322:LEU:HB3	1.98	0.46
1:D:271:ASP:N	1:D:271:ASP:OD1	2.48	0.46
1:A:78:MET:HE2	1:A:78:MET:HA	1.97	0.46
1:B:132:ALA:HA	1:B:373:PHE:CE1	2.50	0.46
1:B:366:GLN:NE2	1:B:371:ARG:HG3	2.25	0.46
1:A:430:LYS:O	1:A:433:VAL:HG22	2.15	0.46
1:C:111:LEU:HD11	1:D:30:GLN:HB3	1.97	0.46
1:C:206:PHE:HB3	1:C:207:PRO:HD3	1.97	0.46
1:D:233:ILE:HG13	1:D:268:ASP:OD1	2.14	0.46
1:A:400[A]:MET:HE2	1:A:482:VAL:HG23	1.98	0.46
1:B:150:PRO:HG2	1:B:153:PHE:CD2	2.51	0.46
1:D:359:VAL:HG13	1:D:360:VAL:HG13	1.96	0.46
1:D:478:GLU:HB3	4:D:705:HOH:O	2.14	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:369:THR:HB	1:B:319:LLP:OP2	2.14	0.46
1:A:496:LEU:C	1:A:497:LEU:HD12	2.35	0.46
1:D:126:TRP:NE1	1:D:130:PRO:HB3	2.30	0.46
1:A:293:SER:O	1:A:296:ILE:HG12	2.16	0.46
1:B:321:LEU:HD12	1:B:321:LEU:HA	1.71	0.46
1:B:136:GLU:CD	1:B:371:ARG:HH22	2.17	0.46
1:B:319:LLP:NZ	1:B:319:LLP:O3	2.44	0.46
1:A:283:TRP:HA	1:A:311:ASP:OD2	2.16	0.45
1:D:171:ILE:O	1:D:175:ILE:HG13	2.16	0.45
1:D:289:ALA:HA	1:D:315:LEU:HA	1.98	0.45
1:D:78:MET:HE2	1:D:78:MET:HA	1.98	0.45
1:D:364:ASN:HB3	4:D:732:HOH:O	2.17	0.45
1:B:407:TRP:HZ3	1:B:482:VAL:HG12	1.82	0.45
1:D:100:PHE:HB3	2:D:601:TRP:HA	1.98	0.45
1:C:142:TRP:CE3	1:D:67:ALA:HB2	2.52	0.45
1:C:171:ILE:O	1:C:175:ILE:HG13	2.17	0.45
1:C:400[A]:MET:CE	1:C:479:GLU:HA	2.24	0.45
1:D:136:GLU:OE1	1:D:371:ARG:NH2	2.46	0.45
1:B:485:VAL:O	1:B:489:ILE:HG13	2.17	0.44
1:A:400[A]:MET:HE2	1:A:482:VAL:CG2	2.47	0.44
1:A:407:TRP:CZ3	1:A:482:VAL:HG12	2.49	0.44
1:B:102:PRO:HG3	1:B:473:GLY:HA3	1.98	0.44
1:A:124:PHE:CE2	2:B:601:TRP:HB3	2.51	0.44
1:C:461:ILE:HD13	1:C:466:TYR:CA	2.48	0.44
1:A:415:GLU:HG2	1:A:428:ARG:HG2	2.00	0.44
1:A:175:ILE:CD1	1:A:209:THR:HG22	2.38	0.44
1:C:339:LEU:O	1:C:343:THR:HG22	2.18	0.44
1:D:319:LLP:HE3	2:D:601:TRP:CH2	2.53	0.44
1:A:105:VAL:HB	1:A:324:TYR:CZ	2.52	0.44
1:D:143:LEU:HD12	1:D:143:LEU:HA	1.82	0.44
1:A:143:LEU:HD12	1:A:143:LEU:HA	1.79	0.44
1:B:452:THR:HG22	1:B:454:ARG:CG	2.47	0.44
1:D:183:LEU:HD22	1:D:188:PRO:HA	1.99	0.44
1:D:378:LEU:HD23	1:D:381:ILE:HD12	1.99	0.44
1:C:366:GLN:OE1	1:C:371:ARG:HD2	2.17	0.44
1:B:233:ILE:HG13	1:B:268:ASP:OD1	2.18	0.44
1:B:461:ILE:HD13	1:B:466:TYR:CA	2.44	0.43
1:A:283:TRP:CD1	1:A:283:TRP:C	2.92	0.43
1:C:469:ARG:HB2	1:C:469:ARG:HH11	1.83	0.43
1:A:493:THR:O	1:A:497:LEU:HD13	2.18	0.43
1:C:30:GLN:HB3	1:D:111:LEU:HD11	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:446:LEU:HD22	1:D:459:HIS:HB3	2.00	0.43
1:A:30:GLN:HB3	1:B:111:LEU:HD11	2.01	0.43
1:A:366:GLN:OE1	1:A:371:ARG:CD	2.65	0.43
1:C:133:THR:HG21	1:C:360:VAL:O	2.18	0.43
1:A:38:ILE:HG23	1:B:118:ALA:HB1	2.01	0.43
1:B:366:GLN:CD	1:B:371:ARG:HD2	2.39	0.43
1:A:198:GLY:O	1:A:222:LEU:HA	2.19	0.43
1:B:318:HIS:HA	1:B:323:ALA:O	2.19	0.43
1:A:446:LEU:HD11	1:A:457:MET:O	2.18	0.43
1:B:126:TRP:CE2	1:B:130:PRO:HB3	2.54	0.43
1:B:453:GLY:HA2	4:B:736:HOH:O	2.17	0.43
1:C:92:TRP:HA	1:C:97:PHE:CD2	2.54	0.43
1:C:402:LYS:O	1:C:406:GLU:HG3	2.19	0.43
1:D:171:ILE:HG22	1:D:209:THR:HG21	2.01	0.43
1:B:122:VAL:HG12	1:B:124:PHE:CD2	2.54	0.43
1:A:284:ILE:N	1:A:311:ASP:OD2	2.38	0.43
1:C:407:TRP:CH2	1:C:483[A]:ARG:HG2	2.54	0.43
1:C:446:LEU:HD22	1:C:459:HIS:HB3	2.00	0.42
1:A:34:MET:HB2	1:B:111:LEU:HD22	2.02	0.42
1:A:335:PRO:HB3	1:A:365:TRP:CH2	2.54	0.42
1:A:400[A]:MET:CE	1:A:482:VAL:CG2	2.98	0.42
1:B:122:VAL:HG12	1:B:124:PHE:HD2	1.85	0.42
1:C:126:TRP:CD1	1:C:359:VAL:HG11	2.54	0.42
1:A:357:ASP:HA	4:A:718:HOH:O	2.19	0.42
1:C:449:LEU:HD23	1:C:492:LEU:HD12	2.01	0.42
1:D:278:ASN:HD21	1:D:309:ARG:HB3	1.84	0.42
1:A:366:GLN:NE2	1:A:371:ARG:HG3	2.32	0.42
1:C:366:GLN:HE22	1:C:371:ARG:HG3	1.84	0.42
1:A:347:GLU:HG3	1:A:350:LYS:HE2	2.02	0.42
1:B:370:GLY:O	1:B:371:ARG:HG3	2.20	0.42
1:C:152:SER:O	1:C:159:GLY:HA3	2.19	0.42
1:B:85:ILE:O	1:B:89:MET:HG2	2.19	0.42
1:D:366:GLN:NE2	1:D:371:ARG:CD	2.83	0.42
1:A:165:ASN:HB2	1:A:169:GLU:OE2	2.20	0.42
1:B:315:LEU:HD12	1:B:315:LEU:C	2.41	0.41
1:A:70:LEU:HB3	1:A:71:PRO:HD2	2.02	0.41
1:C:424:LEU:HD11	1:C:469:ARG:HB3	2.01	0.41
1:A:400[A]:MET:CE	1:A:479:GLU:HA	2.50	0.41
1:C:33:ARG:NH1	1:C:75:ASP:OD1	2.43	0.41
1:D:166:THR:HB	1:D:319:LLP:OP3	2.20	0.41
1:D:321:LEU:HD12	1:D:321:LEU:HA	1.91	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:150:PRO:HG2	1:B:153:PHE:HE2	1.85	0.41
1:B:205:MET:N	4:B:716:HOH:O	2.54	0.41
1:C:171:ILE:HG22	1:C:209:THR:HG21	2.03	0.41
1:D:319:LLP:H5'1	2:D:601:TRP:NE1	2.36	0.41
1:B:400[A]:MET:HE1	1:B:478:GLU:C	2.41	0.41
1:B:483[B]:ARG:HG2	1:B:483[B]:ARG:HH11	1.86	0.41
1:D:223:ILE:CD1	1:D:238:LEU:HD13	2.50	0.41
1:A:423:SER:OG	1:A:472:VAL:O	2.28	0.41
1:D:98:TYR:CE2	1:D:485:VAL:HG21	2.56	0.41
1:D:325:LEU:HA	1:D:326:ASP:HA	1.73	0.41
1:B:179:ARG:O	1:B:183:LEU:HG	2.21	0.41
1:B:400[B]:MET:HE2	1:B:482:VAL:HG21	2.03	0.41
1:C:205:MET:HE3	1:C:319:LLP:H6	2.03	0.41
1:C:325:LEU:HA	1:C:326:ASP:HA	1.78	0.41
1:C:358:LYS:CA	1:C:358:LYS:HE2	2.51	0.41
1:D:319:LLP:H4'1	1:D:319:LLP:H5'1	1.80	0.41
1:D:444:LYS:O	1:D:448:MET:HG3	2.21	0.41
1:A:319:LLP:H4'1	2:A:601:TRP:CE2	2.56	0.40
1:A:352:LYS:C	1:A:353:GLN:HG2	2.41	0.40
1:A:319:LLP:H4'1	2:A:601:TRP:CD1	2.57	0.40
1:D:83:LYS:HE2	1:D:83:LYS:HB3	1.87	0.40
1:D:127:VAL:HG23	4:D:709:HOH:O	2.20	0.40
1:D:385:TYR:O	1:D:389:ASN:HB2	2.22	0.40
1:B:460:THR:HB	1:B:469:ARG:HD2	2.04	0.40
1:C:38:ILE:HG23	1:D:118:ALA:HB1	2.04	0.40
1:C:319:LLP:H4'1	2:C:601:TRP:CG	2.56	0.40
1:A:127:VAL:HG12	1:A:127:VAL:H	1.62	0.40
1:A:350:LYS:HG3	1:A:351:ASN:N	2.37	0.40
1:A:403:MET:HG2	1:A:407:TRP:CZ2	2.57	0.40
1:B:403:MET:HG2	1:B:407:TRP:CZ2	2.56	0.40
1:C:31:ALA:O	1:C:35:VAL:HG23	2.21	0.40
1:C:265:THR:HG23	1:C:424:LEU:HD23	2.03	0.40
1:D:83:LYS:HE3	1:D:84:ASP:OD1	2.21	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	481/500 (96%)	466 (97%)	14 (3%)	1 (0%)	44	38
1	B	468/500 (94%)	455 (97%)	12 (3%)	1 (0%)	44	38
1	C	468/500 (94%)	454 (97%)	13 (3%)	1 (0%)	44	38
1	D	462/500 (92%)	447 (97%)	14 (3%)	1 (0%)	44	38
All	All	1879/2000 (94%)	1822 (97%)	53 (3%)	4 (0%)	44	38

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	129	SER
1	B	129	SER
1	C	129	SER
1	D	129	SER

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	428/440 (97%)	422 (99%)	6 (1%)	62	62
1	B	417/440 (95%)	413 (99%)	4 (1%)	73	73
1	C	417/440 (95%)	414 (99%)	3 (1%)	81	82
1	D	411/440 (93%)	406 (99%)	5 (1%)	67	68
All	All	1673/1760 (95%)	1655 (99%)	18 (1%)	67	70

All (18) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	127	VAL
1	A	129	SER
1	A	350	LYS
1	A	359	VAL
1	A	373	PHE
1	A	428	ARG
1	B	342	LEU
1	B	373	PHE
1	B	393	HIS
1	B	436	LEU
1	C	358	LYS
1	C	373	PHE
1	C	428	ARG
1	D	342	LEU
1	D	393	HIS
1	D	423	SER
1	D	438	VAL
1	D	492	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	120	ASN
1	C	120	ASN
1	D	278	ASN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

4 non-standard protein/DNA/RNA residues 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	$\#\|Z\| > 2$
1	LLP	C	319	1	23,24,25	2.59	7 (30%)	25,32,34	1.39	5 (20%)
1	LLP	A	319	1	23,24,25	2.50	6 (26%)	25,32,34	1.48	4 (16%)
1	LLP	B	319	1	23,24,25	2.51	7 (30%)	25,32,34	1.51	5 (20%)
1	LLP	D	319	1	23,24,25	2.49	5 (21%)	25,32,34	1.54	5 (20%)

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
1	LLP	C	319	1	-	5/16/17/19	0/1/1/1
1	LLP	A	319	1	-	7/16/17/19	0/1/1/1
1	LLP	B	319	1	-	7/16/17/19	0/1/1/1
1	LLP	D	319	1	-	6/16/17/19	0/1/1/1

All (25) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	319	LLP	C4-C4'	7.11	1.61	1.46
1	D	319	LLP	C4-C4'	6.95	1.61	1.46
1	B	319	LLP	C4-C4'	6.92	1.61	1.46
1	A	319	LLP	C4-C4'	6.90	1.61	1.46
1	C	319	LLP	C4-C5	-5.02	1.35	1.42
1	C	319	LLP	C4'-NZ	4.92	1.43	1.27
1	B	319	LLP	C4-C5	-4.81	1.35	1.42
1	D	319	LLP	C4'-NZ	4.67	1.42	1.27
1	B	319	LLP	C4'-NZ	4.65	1.42	1.27
1	D	319	LLP	C4-C5	-4.61	1.35	1.42
1	A	319	LLP	C4'-NZ	4.60	1.42	1.27
1	A	319	LLP	C4-C5	-4.51	1.35	1.42
1	C	319	LLP	C2'-C2	3.74	1.56	1.50
1	A	319	LLP	C2'-C2	3.57	1.56	1.50
1	D	319	LLP	C2'-C2	3.57	1.56	1.50
1	B	319	LLP	C2'-C2	3.50	1.55	1.50
1	A	319	LLP	C6-N1	3.11	1.40	1.34
1	B	319	LLP	C6-N1	3.00	1.40	1.34
1	D	319	LLP	C6-N1	2.98	1.40	1.34

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	319	LLP	C6-N1	2.94	1.40	1.34
1	B	319	LLP	C5'-C5	2.60	1.57	1.50
1	C	319	LLP	C5'-C5	2.29	1.56	1.50
1	A	319	LLP	C5'-C5	2.23	1.56	1.50
1	C	319	LLP	C4-C3	-2.22	1.37	1.41
1	B	319	LLP	P-OP2	-2.10	1.47	1.54

All (19) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	319	LLP	C4-C4'-NZ	-3.98	105.67	124.04
1	A	319	LLP	C4-C4'-NZ	-3.49	107.95	124.04
1	D	319	LLP	C5-C6-N1	-3.15	118.71	123.83
1	B	319	LLP	C3-C4-C5	3.04	120.71	118.28
1	C	319	LLP	C4-C4'-NZ	-2.87	110.79	124.04
1	D	319	LLP	C5-C4-C4'	-2.86	117.06	121.47
1	A	319	LLP	CE-NZ-C4'	-2.83	109.65	118.72
1	D	319	LLP	C4-C4'-NZ	-2.82	111.02	124.04
1	A	319	LLP	C3-C4-C5	2.71	120.45	118.28
1	C	319	LLP	CE-NZ-C4'	-2.70	110.08	118.72
1	C	319	LLP	C3-C4-C5	2.59	120.35	118.28
1	B	319	LLP	CE-NZ-C4'	-2.52	110.64	118.72
1	D	319	LLP	CD-CE-NZ	-2.42	104.43	110.83
1	A	319	LLP	C5-C6-N1	-2.42	119.90	123.83
1	B	319	LLP	C5-C4-C4'	-2.22	118.04	121.47
1	D	319	LLP	C3-C4-C5	2.19	120.03	118.28
1	B	319	LLP	C5-C6-N1	-2.07	120.46	123.83
1	C	319	LLP	C5-C6-N1	-2.05	120.50	123.83
1	C	319	LLP	C5-C4-C4'	-2.03	118.34	121.47

There are no chirality outliers.

All (25) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	319	LLP	C5'-OP4-P-OP1
1	A	319	LLP	C5'-OP4-P-OP2
1	A	319	LLP	C5'-OP4-P-OP3
1	B	319	LLP	C5'-OP4-P-OP1
1	B	319	LLP	C5'-OP4-P-OP2
1	B	319	LLP	C5'-OP4-P-OP3
1	C	319	LLP	C5'-OP4-P-OP1
1	C	319	LLP	C5'-OP4-P-OP2

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Mol	Chain	Res	Type	Atoms
1	C	319	LLP	C5'-OP4-P-OP3
1	D	319	LLP	C5'-OP4-P-OP1
1	D	319	LLP	C5'-OP4-P-OP2
1	D	319	LLP	C5'-OP4-P-OP3
1	A	319	LLP	C4-C4'-NZ-CE
1	B	319	LLP	C4-C4'-NZ-CE
1	C	319	LLP	C4-C4'-NZ-CE
1	D	319	LLP	C4-C4'-NZ-CE
1	A	319	LLP	C-CA-CB-CG
1	A	319	LLP	CD-CE-NZ-C4'
1	B	319	LLP	CD-CE-NZ-C4'
1	C	319	LLP	CD-CE-NZ-C4'
1	D	319	LLP	CD-CE-NZ-C4'
1	B	319	LLP	C4-C5-C5'-OP4
1	B	319	LLP	C-CA-CB-CG
1	D	319	LLP	C-CA-CB-CG
1	A	319	LLP	C3-C4-C4'-NZ

There are no ring outliers.

4 monomers are involved in 23 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	C	319	LLP	7	0
1	A	319	LLP	5	0
1	B	319	LLP	4	0
1	D	319	LLP	7	0

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 8 ligands modelled in this entry, 4 are monoatomic - leaving 4 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	TRP	A	601	-	14,16,16	0.86	1 (7%)	13,22,22	1.13	1 (7%)
2	TRP	D	601	-	14,16,16	0.88	1 (7%)	13,22,22	1.18	1 (7%)
2	TRP	C	601	-	14,16,16	0.99	1 (7%)	13,22,22	1.31	1 (7%)
2	TRP	B	601	-	14,16,16	0.94	0	13,22,22	1.16	1 (7%)

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	TRP	A	601	-	-	5/7/8/8	0/2/2/2
2	TRP	D	601	-	-	6/7/8/8	0/2/2/2
2	TRP	C	601	-	-	4/7/8/8	0/2/2/2
2	TRP	B	601	-	-	4/7/8/8	0/2/2/2

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	601	TRP	OXT-C	-2.32	1.23	1.30
2	A	601	TRP	OXT-C	-2.03	1.24	1.30
2	D	601	TRP	OXT-C	-2.01	1.24	1.30

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	C	601	TRP	OXT-C-O	-2.97	117.33	124.08
2	D	601	TRP	OXT-C-O	-2.84	117.64	124.08
2	A	601	TRP	OXT-C-O	-2.61	118.15	124.08
2	B	601	TRP	OXT-C-O	-2.44	118.56	124.08

There are no chirality outliers.

All (19) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	601	TRP	O-C-CA-N

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Mol	Chain	Res	Type	Atoms
2	D	601	TRP	N-CA-CB-CG
2	D	601	TRP	C-CA-CB-CG
2	A	601	TRP	OXT-C-CA-N
2	D	601	TRP	OXT-C-CA-CB
2	B	601	TRP	N-CA-CB-CG
2	C	601	TRP	N-CA-CB-CG
2	D	601	TRP	O-C-CA-CB
2	B	601	TRP	O-C-CA-CB
2	B	601	TRP	OXT-C-CA-CB
2	A	601	TRP	CA-CB-CG-CD1
2	C	601	TRP	CA-CB-CG-CD1
2	D	601	TRP	OXT-C-CA-N
2	C	601	TRP	O-C-CA-CB
2	C	601	TRP	OXT-C-CA-CB
2	D	601	TRP	O-C-CA-N
2	A	601	TRP	OXT-C-CA-CB
2	B	601	TRP	OXT-C-CA-N
2	A	601	TRP	O-C-CA-CB

There are no ring outliers.

4 monomers are involved in 16 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	601	TRP	5	0
2	D	601	TRP	6	0
2	C	601	TRP	3	0
2	B	601	TRP	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^{th} 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^2)	Q<0.9
1	A	478/500 (95%)	0.19	7 (1%)	71	74	26, 56, 87, 130	5 (1%)
1	B	467/500 (93%)	0.20	3 (0%)	85	87	22, 54, 74, 109	5 (1%)
1	C	466/500 (93%)	0.43	11 (2%)	59	61	26, 65, 102, 124	6 (1%)
1	D	463/500 (92%)	0.44	11 (2%)	59	61	33, 66, 101, 114	3 (0%)
All	All	1874/2000 (93%)	0.31	32 (1%)	69	71	22, 59, 97, 130	19 (1%)

All (32) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	359	VAL	3.8
1	C	69[A]	TYR	3.7
1	A	323	ALA	3.6
1	B	323	ALA	3.5
1	C	111	LEU	3.4
1	C	110	PHE	3.3
1	D	323	ALA	3.3
1	D	204	THR	3.2
1	A	69[A]	TYR	3.1
1	A	436	LEU	3.1
1	D	483[A]	ARG	2.9
1	C	23	GLU	2.9
1	D	496	LEU	2.9
1	D	19	PHE	2.8
1	B	423	SER	2.7
1	C	85	ILE	2.6
1	B	384[A]	SER	2.5
1	D	378	LEU	2.5
1	A	356	LEU	2.4
1	A	202	THR	2.4
1	A	497	LEU	2.4

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Mol	Chain	Res	Type	RSRZ
1	C	436	LEU	2.4
1	D	203	HIS	2.3
1	C	22	LEU	2.3
1	C	203	HIS	2.2
1	C	332	VAL	2.2
1	D	267	THR	2.1
1	C	323	ALA	2.1
1	A	203	HIS	2.1
1	D	103	ALA	2.0
1	D	116	SER	2.0
1	C	103	ALA	2.0

6.2 Non-standard residues in protein, DNA, RNA chains (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. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
1	LLP	A	319	24/25	0.94	0.10	42,54,66,69	0
1	LLP	B	319	24/25	0.95	0.09	45,50,59,63	0
1	LLP	D	319	24/25	0.95	0.09	50,61,69,74	0
1	LLP	C	319	24/25	0.96	0.08	53,60,66,70	0

6.3 Carbohydrates (i)

There are no monosaccharides 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. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	CA	A	602	1/1	0.90	0.18	71,71,71,71	0
2	TRP	C	601	15/15	0.91	0.10	50,65,87,87	0
2	TRP	A	601	15/15	0.91	0.14	70,85,105,105	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	TRP	B	601	15/15	0.92	0.10	46,63,72,76	0
3	CA	B	602	1/1	0.92	0.12	64,64,64,64	0
3	CA	C	602	1/1	0.92	0.20	89,89,89,89	0
3	CA	D	602	1/1	0.92	0.13	80,80,80,80	0
2	TRP	D	601	15/15	0.95	0.10	57,77,94,95	0

6.5 Other polymers (i)

There are no such residues in this entry.