Full wwPDB X-ray Structure Validation Report ⓘ

May 13, 2020 – 03:27 pm BST

PDB ID	:	2DU3
Title	:	Crystal structure of Archaeoglobus fulgidus O-phosphoseryl-tRNA synthetase complexed with tRNACys and O-phosphoserine
Authors	:	Fukunaga, R.
Deposited on	:	2006-07-20
Resolution	:	2.60 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 following versions of software and data (see references ⓘ) were used in the production of this report:

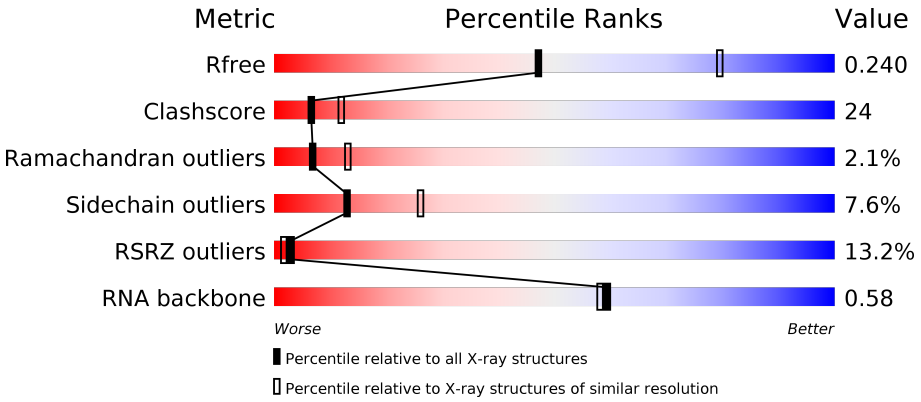
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.11
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.11

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 2.60 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}	130704	3163 (2.60-2.60)
Clashscore	141614	3518 (2.60-2.60)
Ramachandran outliers	138981	3455 (2.60-2.60)
Sidechain outliers	138945	3455 (2.60-2.60)
RSRZ outliers	127900	3104 (2.60-2.60)
RNA backbone	3102	1040 (2.90-2.30)

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 on 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	D	71	52% 49% 30% 20% •
2	A	534	14% 57% 38% 5% •
2	B	534	6% 53% 30% • 13%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 9748 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.

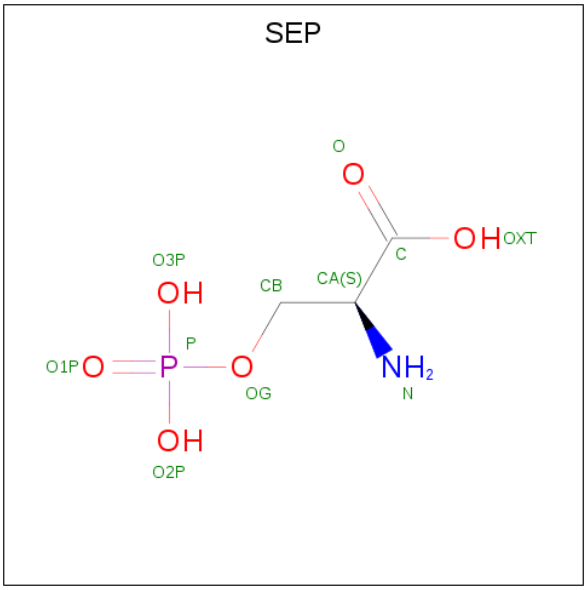
- Molecule 1 is a RNA chain called tRNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	D	71	Total	C	N	O	P	0	0	0
			1520	675	272	502	71			

- Molecule 2 is a protein called O-phosphoseryl-tRNA synthetase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	A	534	Total	C	N	O	S	0	0	0
			4321	2786	719	803	13			
2	B	465	Total	C	N	O	S	0	0	0
			3763	2429	630	691	13			

- Molecule 3 is PHOSPHOSERINE (three-letter code: SEP) (formula: $C_3H_8NO_6P$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	0
			11	3	1	6	1		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	0
			11	3	1	6	1		

- Molecule 4 is water.

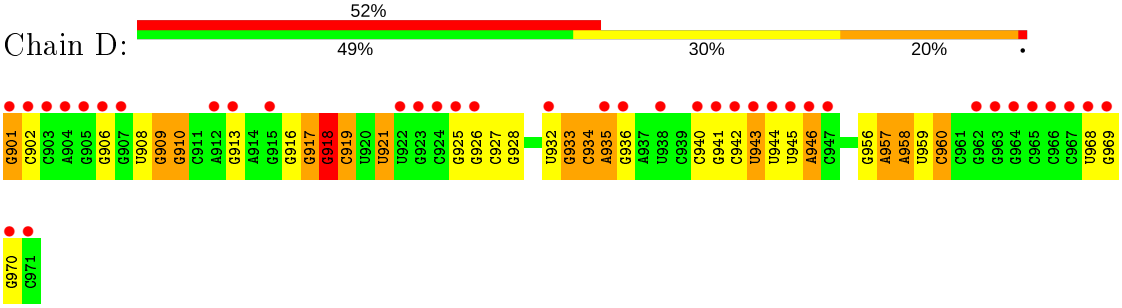
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	62	Total	O	0	0
			62	62		
4	B	60	Total	O	0	0
			60	60		

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 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.

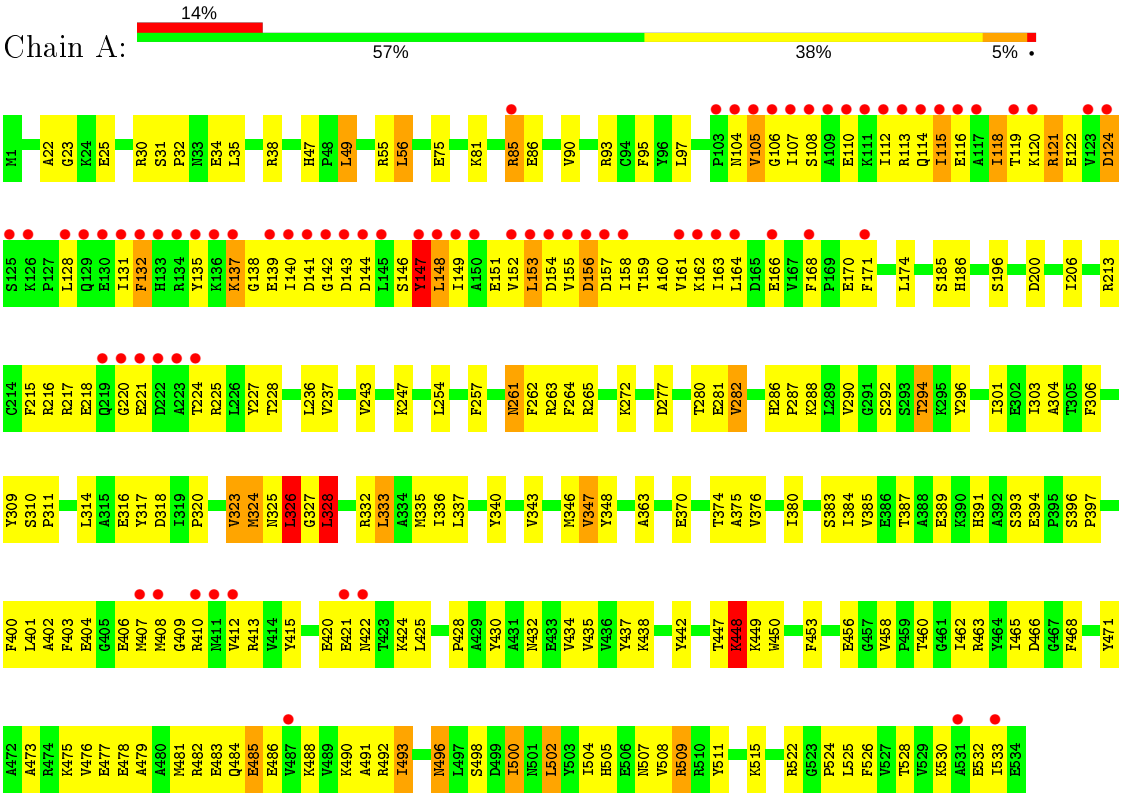
- Molecule 1: tRNA

Chain D:



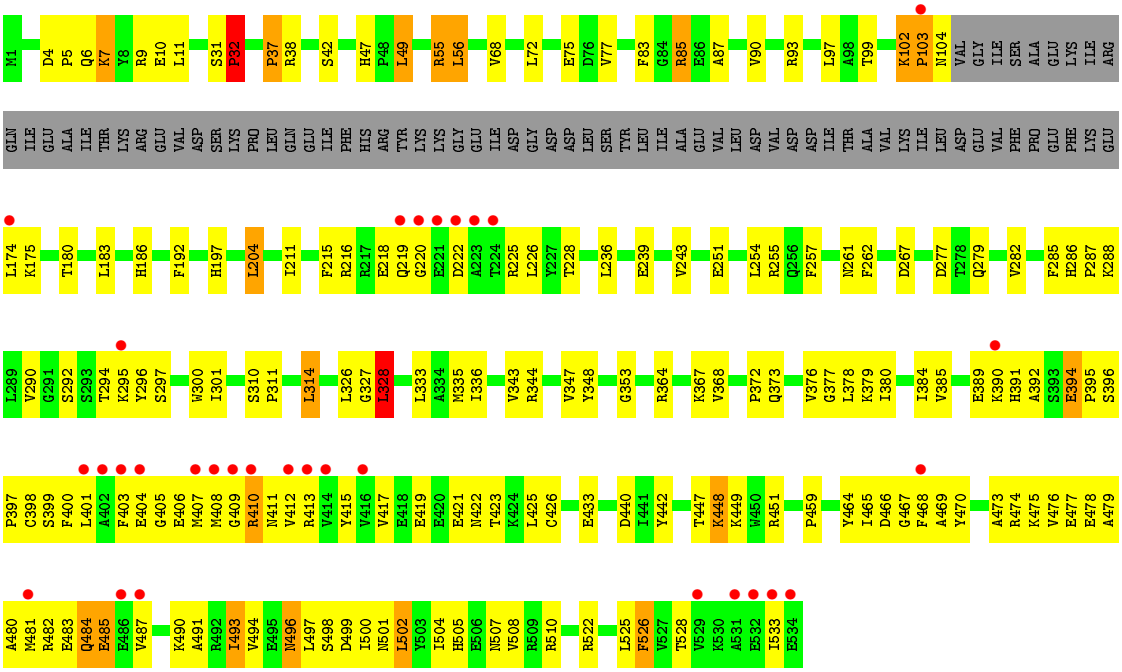
- Molecule 2: O-phosphoseryl-tRNA synthetase

Chain A:



- Molecule 2: O-phosphoseryl-tRNA synthetase

Chain B:


M1 D4 P5 Q6 K7 Y8 R9 E10 L11 S31 P32 P37 R38 S42 H47 P48 L49 R55 L56 V68 L72 E75 D76 V77 F83 G84 R85 E86 A87 V90 R93 L97 A98 T99 K102 P103 N104 VAL GLY ILE SER ALA GLU LYS ILE ARG
GLN ILE GLU ALA ILE THR LYS ARG GLU VAL ASP SER LYS PRO LEU GLN GLU ILE PHE HIS ARG TYR LYS LYS GLY GLU ILE ASP GLY ASP ASP LEU SER TYR LEU ILE ALA GLU VAL LEU ASP VAL ASP ASP ILE THR ALA VAL LYS ILE LEU ASP GLU VAL PHE PRO GLU PHE LYS GLU
L174 K175 T180 L183 H186 F192 H197 L204 I211 F215 R216 R217 E218 Q219 G220 E221 D222 A223 T224 R225 L226 Y227 T228 L236 E239 V243 E251 L254 R255 Q256 F257 N261 F262 D267 D277 T278 Q279 V282 F285 H286 P287 K288
L289 V290 G291 S292 S293 T294 K295 Y296 S297 W300 I301 S310 P311 L314 L326 G327 L328 L333 A334 M335 I336 V343 R344 V347 Y348 G353 R364 K367 V368 P372 Q373 V376 G377 L378 K379 I380 I384 V385 E389 K390 H391 A392 S393 E394 P395 S396
P397 C398 S399 F400 L401 A402 F403 E404 G405 E406 M407 M408 G409 R410 N411 V412 R413 V414 Y415 V416 V417 E418 E419 E420 E421 N422 T423 K424 L425 C426 E433 D440 I441 Y442 T447 K448 K449 W450 R451 P459 Y464 I465 D466 G467 F468 A469 Y470 A473 R474 K475 V476 E477 E478 A479
A480 M481 R482 E483 Q484 E485 E486 V487 K490 A491 R492 I493 V494 E495 N496 L497 S498 D499 I500 N501 L502 Y503 I504 H505 E506 N507 V508 R509 R510 R522 L525 F526 V527 T528 V529 K530 A531 E532 I533 E534

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, α, β, γ	149.12Å 149.12Å 153.91Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	49.46 – 2.60 49.46 – 2.60	Depositor EDS
% Data completeness (in resolution range)	99.5 (49.46-2.60) 99.6 (49.46-2.60)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.28 (at 2.61Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.204 , 0.249 0.197 , 0.240	Depositor DCC
R_{free} test set	3077 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å^2)	65.0	Xtriage
Anisotropy	0.112	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 72.7	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.014 for -h,-k,l	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	9748	wwPDB-VP
Average B, all atoms (Å^2)	89.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.75% 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: SEP

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	D	0.35	1/1697 (0.1%)	0.72	2/2644 (0.1%)
2	A	0.42	0/4418	0.64	2/5968 (0.0%)
2	B	0.43	0/3851	0.67	1/5202 (0.0%)
All	All	0.41	1/9966 (0.0%)	0.67	5/13814 (0.0%)

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

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	901	G	OP3-P	-6.84	1.52	1.61

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	D	918	G	N9-C1'-C2'	8.25	124.72	114.00
2	B	328	LEU	CA-CB-CG	6.32	129.83	115.30
2	A	328	LEU	CA-CB-CG	5.99	129.07	115.30
2	A	326	LEU	CA-CB-CG	5.45	127.83	115.30
1	D	901	G	OP1-P-OP2	-5.15	111.88	119.60

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	D	918	G	Sidechain

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	D	1520	0	769	40	0
2	A	4321	0	4339	246	0
2	B	3763	0	3774	166	0
3	A	22	0	10	1	0
4	A	62	0	0	6	0
4	B	60	0	0	3	0
All	All	9748	0	8892	437	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 24.

All (437) 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)
2:B:464:TYR:HA	2:B:500:ILE:HD11	1.16	1.13
2:B:55:ARG:HH21	2:B:55:ARG:HG2	1.12	1.10
2:A:85:ARG:HD2	2:A:85:ARG:H	1.19	1.07
2:B:376:VAL:HA	2:B:379:LYS:HE2	1.43	1.00
1:D:933:G:H22	2:A:492:ARG:HD3	1.28	0.98
2:B:448:LYS:HD3	2:B:448:LYS:H	1.26	0.97
2:B:216:ARG:HG2	2:B:218:GLU:HG2	1.49	0.94
2:B:504:ILE:HB	2:B:508:VAL:HG21	1.49	0.92
2:B:47:HIS:HD2	2:B:49:LEU:H	1.16	0.92
2:B:376:VAL:HG11	2:B:407:MET:HB3	1.55	0.89
2:B:397:PRO:HD3	2:B:421:GLU:HA	1.55	0.88
2:A:478:GLU:HB3	2:A:482:ARG:HH22	1.36	0.88
2:A:504:ILE:HB	2:A:508:VAL:HG21	1.56	0.88
2:A:22:ALA:O	2:A:25:GLU:HG2	1.73	0.88
2:B:75:GLU:OE2	2:B:180:THR:HG23	1.74	0.87
2:A:106:GLY:HA2	2:A:110:GLU:HB2	1.56	0.87
2:B:47:HIS:CD2	2:B:49:LEU:H	1.92	0.87

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:294:THR:HG23	2:A:296:TYR:H	1.39	0.86
2:B:267:ASP:HB3	2:B:279:GLN:HG2	1.59	0.85
1:D:942:C:O2'	1:D:943:U:H5'	1.77	0.85
2:B:85:ARG:N	2:B:85:ARG:HD2	1.91	0.85
2:A:144:ASP:HA	2:A:147:TYR:CE1	2.12	0.84
2:A:496:ASN:ND2	2:A:498:SER:HB3	1.92	0.84
2:B:407:MET:HE1	2:B:477:GLU:HG3	1.61	0.83
2:B:55:ARG:NH2	2:B:55:ARG:HG2	1.91	0.82
1:D:933:G:N2	2:A:492:ARG:HD3	1.95	0.81
2:A:110:GLU:HA	2:A:113:ARG:HB3	1.61	0.81
2:A:394:GLU:HG3	2:A:400:PHE:HZ	1.45	0.81
2:A:413:ARG:NH1	2:A:532:GLU:HG3	1.96	0.81
2:A:131:ILE:HD12	2:A:131:ILE:H	1.46	0.80
2:A:394:GLU:HG3	2:A:400:PHE:CZ	2.17	0.79
2:A:387:THR:HG21	2:A:402:ALA:HA	1.65	0.78
2:A:47:HIS:CD2	2:A:49:LEU:H	2.01	0.78
2:B:474:ARG:HH11	2:B:474:ARG:HG3	1.48	0.78
2:A:460:THR:HG23	2:A:462:ILE:H	1.47	0.78
2:A:157:ASP:HB3	2:A:161:VAL:HG13	1.65	0.77
1:D:933:G:H1	2:A:492:ARG:HE	1.31	0.77
2:A:47:HIS:HD2	2:A:49:LEU:H	1.33	0.77
2:B:504:ILE:HD12	2:B:508:VAL:HG23	1.67	0.76
2:B:397:PRO:HG3	2:B:419:GLU:O	1.84	0.76
2:B:55:ARG:HH21	2:B:55:ARG:CG	1.95	0.76
2:A:500:ILE:HG22	2:A:502:LEU:HB2	1.67	0.76
2:A:505:HIS:O	2:A:508:VAL:HG22	1.86	0.75
2:B:85:ARG:H	2:B:85:ARG:HD2	1.51	0.75
2:A:475:LYS:HE2	2:A:475:LYS:HA	1.68	0.75
2:B:447:THR:HG23	2:B:448:LYS:HE2	1.68	0.75
2:B:464:TYR:HA	2:B:500:ILE:CD1	2.09	0.75
2:B:448:LYS:CD	2:B:448:LYS:H	1.93	0.74
2:A:31:SER:HB2	2:A:32:PRO:HD2	1.70	0.74
2:B:504:ILE:HB	2:B:508:VAL:CG2	2.17	0.74
2:A:118:ILE:H	2:A:118:ILE:HD12	1.52	0.74
2:A:90:VAL:O	2:A:93:ARG:HG2	1.88	0.74
2:B:448:LYS:N	2:B:448:LYS:HD3	2.04	0.73
2:A:85:ARG:CD	2:A:85:ARG:H	1.99	0.73
1:D:957:A:H4'	1:D:958:A:OP1	1.85	0.73
2:A:504:ILE:HB	2:A:508:VAL:CG2	2.18	0.72
2:B:175:LYS:N	2:B:175:LYS:HD2	2.04	0.72
2:B:347:VAL:HG22	2:B:348:TYR:CD2	2.25	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:218:GLU:HG3	2:A:225:ARG:HG2	1.71	0.72
2:A:500:ILE:CG2	2:A:502:LEU:HD22	2.19	0.72
2:B:505:HIS:O	2:B:508:VAL:HG22	1.90	0.72
2:A:488:LYS:HD3	2:A:530:LYS:HE2	1.70	0.72
2:A:324:MET:HE1	2:A:325:ASN:C	2.10	0.71
2:A:148:LEU:HG	2:A:160:ALA:HB2	1.71	0.71
2:A:110:GLU:HG2	2:A:114:GLN:HE21	1.55	0.71
2:B:447:THR:HG22	2:B:449:LYS:H	1.56	0.70
2:A:374:THR:HG22	2:A:376:VAL:H	1.55	0.69
2:A:404:GLU:OE2	2:A:413:ARG:HB3	1.92	0.69
1:D:933:G:H1	2:A:492:ARG:NE	1.90	0.69
1:D:941:G:H2'	1:D:942:C:H5'	1.74	0.69
2:A:347:VAL:HG22	2:A:348:TYR:CD2	2.28	0.68
2:A:306:PHE:HB2	2:A:324:MET:CE	2.23	0.68
2:A:465:ILE:HD12	2:A:466:ASP:H	1.59	0.68
1:D:916:G:H2'	1:D:959:U:O2'	1.93	0.68
2:A:434:VAL:HB	2:A:460:THR:HG21	1.75	0.68
2:A:153:LEU:O	2:A:154:ASP:HB2	1.94	0.68
2:A:149:ILE:HG13	2:A:155:VAL:HA	1.74	0.68
2:A:287:PRO:O	2:A:290:VAL:HG22	1.93	0.68
2:B:372:PRO:HB2	2:B:378:LEU:HD23	1.76	0.68
2:B:409:GLY:C	2:B:410:ARG:HD3	2.14	0.68
2:A:496:ASN:HD21	2:A:498:SER:HB3	1.59	0.67
2:B:47:HIS:HD2	2:B:49:LEU:N	1.90	0.67
2:B:490:LYS:HB3	2:B:528:THR:HG23	1.75	0.67
2:A:157:ASP:HA	2:A:160:ALA:HB3	1.76	0.67
2:A:500:ILE:HG21	2:A:502:LEU:HD22	1.75	0.67
2:A:306:PHE:HB2	2:A:324:MET:HE3	1.76	0.66
2:A:85:ARG:N	2:A:85:ARG:HH21	1.94	0.66
1:D:942:C:C2'	1:D:943:U:H5'	2.25	0.66
2:A:493:ILE:H	2:A:493:ILE:HD12	1.61	0.65
2:B:286:HIS:HD2	2:B:288:LYS:H	1.43	0.65
2:B:287:PRO:O	2:B:290:VAL:HG22	1.96	0.65
1:D:959:U:H5'	1:D:960:C:OP2	1.97	0.65
2:B:192:PHE:HE2	2:B:314:LEU:HD13	1.62	0.65
2:A:85:ARG:HD2	2:A:85:ARG:N	2.02	0.65
2:B:37:PRO:O	2:B:364:ARG:HG3	1.97	0.64
1:D:934:C:H4'	1:D:935:A:OP2	1.97	0.64
2:A:430:TYR:O	2:A:465:ILE:HG13	1.98	0.64
2:A:56:LEU:HD13	2:A:257:PHE:CZ	2.33	0.63
1:D:957:A:O2'	1:D:958:A:O5'	2.15	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:448:LYS:CD	2:A:448:LYS:H	2.12	0.63
2:A:478:GLU:HA	2:A:481:MET:HE2	1.80	0.63
2:A:428:PRO:HG2	2:A:524:PRO:HG2	1.80	0.63
2:A:396:SER:HB3	2:A:420:GLU:O	1.99	0.62
2:A:47:HIS:HD2	2:A:49:LEU:N	1.97	0.62
2:A:131:ILE:HD12	2:A:131:ILE:N	2.12	0.62
2:A:465:ILE:HD12	2:A:466:ASP:N	2.14	0.62
2:B:451:ARG:HH21	2:B:451:ARG:HG3	1.64	0.62
2:B:4:ASP:HB3	2:B:7:LYS:HD3	1.81	0.62
2:A:448:LYS:H	2:A:448:LYS:CE	2.12	0.62
2:A:406:GLU:OE1	2:A:409:GLY:HA2	1.99	0.61
2:B:376:VAL:HA	2:B:379:LYS:CE	2.27	0.61
2:A:55:ARG:HD2	4:A:1062:HOH:O	1.99	0.61
1:D:941:G:C2'	1:D:942:C:H5'	2.30	0.61
2:A:243:VAL:HG12	2:A:247:LYS:HE3	1.81	0.61
2:A:220:GLY:HA2	2:A:227:TYR:OH	2.00	0.61
2:A:311:PRO:HA	2:A:314:LEU:HD23	1.82	0.60
2:B:11:LEU:O	2:B:11:LEU:HD23	2.01	0.60
2:B:485:GLU:HA	2:B:533:ILE:HG12	1.84	0.60
2:B:479:ALA:HB2	2:B:487:VAL:HG11	1.84	0.60
2:A:118:ILE:N	2:A:118:ILE:HD12	2.16	0.60
2:B:496:ASN:HD22	2:B:496:ASN:C	2.04	0.60
2:A:434:VAL:O	2:A:460:THR:HG22	2.02	0.60
2:B:343:VAL:HG23	4:B:569:HOH:O	2.02	0.60
2:B:328:LEU:HD12	2:B:328:LEU:C	2.22	0.60
2:A:335:MET:HE2	2:A:343:VAL:HG13	1.84	0.59
2:A:393:SER:O	2:A:424:LYS:HD3	2.02	0.59
2:A:257:PHE:O	2:A:286:HIS:HE1	1.85	0.59
2:B:496:ASN:ND2	2:B:499:ASP:H	1.99	0.59
2:A:303:ILE:O	2:A:328:LEU:HD22	2.03	0.59
2:A:335:MET:HE1	2:A:343:VAL:HG22	1.83	0.59
2:A:460:THR:HG23	2:A:462:ILE:N	2.16	0.59
2:B:277:ASP:HB2	4:B:576:HOH:O	2.03	0.59
2:A:504:ILE:HD12	2:A:508:VAL:HG23	1.83	0.58
1:D:909:G:H4'	1:D:910:G:OP2	2.02	0.58
2:A:148:LEU:HG	2:A:160:ALA:CB	2.32	0.58
2:B:32:PRO:O	2:B:38:ARG:NH1	2.36	0.58
2:B:408:MET:CE	2:B:481:MET:HB3	2.33	0.58
1:D:909:G:H1'	1:D:946:A:H1'	1.85	0.58
2:A:185:SER:HA	2:A:215:PHE:O	2.04	0.58
2:A:137:LYS:HE3	2:A:137:LYS:HA	1.86	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:433:GLU:OE2	2:B:459:PRO:HB2	2.04	0.58
2:B:192:PHE:CE2	2:B:314:LEU:HD13	2.39	0.57
2:A:412:VAL:HG22	2:A:533:ILE:HG22	1.86	0.57
2:B:226:LEU:HD21	2:B:344:ARG:HG2	1.86	0.57
1:D:917:G:H4'	1:D:918:G:OP1	2.05	0.57
2:B:391:HIS:O	2:B:425:LEU:HD23	2.03	0.57
2:A:383:SER:O	2:A:387:THR:HG23	2.05	0.57
2:A:471:TYR:O	2:A:475:LYS:HG2	2.04	0.57
2:B:485:GLU:HA	2:B:533:ILE:CG1	2.35	0.57
2:B:174:LEU:C	2:B:175:LYS:HD2	2.26	0.56
2:B:396:SER:HA	2:B:397:PRO:C	2.24	0.56
2:A:200:ASP:HB2	2:B:510:ARG:HE	1.69	0.56
1:D:913:G:H21	1:D:921:U:H5	1.52	0.56
2:A:81:LYS:NZ	2:A:316:GLU:HB3	2.21	0.56
2:A:335:MET:CE	2:A:343:VAL:HG22	2.36	0.56
2:A:407:MET:HG2	2:A:408:MET:SD	2.46	0.56
1:D:918:G:O2'	1:D:919:C:OP1	2.23	0.56
2:A:200:ASP:HA	2:B:507:ASN:ND2	2.21	0.56
2:A:30:ARG:HB2	2:A:35:LEU:CD1	2.35	0.56
2:B:401:LEU:HD13	2:B:415:TYR:CE1	2.41	0.56
2:A:448:LYS:HE2	2:A:448:LYS:H	1.69	0.56
2:A:500:ILE:HG23	2:A:500:ILE:O	2.05	0.56
2:A:118:ILE:H	2:A:118:ILE:CD1	2.19	0.55
2:A:324:MET:HE1	2:A:326:LEU:N	2.22	0.55
2:A:491:ALA:O	2:A:526:PHE:HA	2.06	0.55
2:A:139:GLU:HB3	2:A:143:ASP:OD1	2.05	0.55
1:D:968:U:H2'	1:D:969:G:C8	2.42	0.55
2:A:343:VAL:HG23	4:A:1022:HOH:O	2.06	0.55
2:A:115:ILE:O	2:A:115:ILE:HD13	2.05	0.55
2:A:485:GLU:HA	2:A:533:ILE:HG13	1.89	0.55
2:B:222:ASP:OD2	2:B:344:ARG:HD3	2.06	0.54
2:A:478:GLU:HA	2:A:481:MET:CE	2.38	0.54
2:B:222:ASP:HA	2:B:225:ARG:O	2.07	0.54
2:A:448:LYS:H	2:A:448:LYS:HD3	1.73	0.53
2:B:93:ARG:HD2	2:B:216:ARG:HD2	1.89	0.53
2:A:412:VAL:HG13	2:A:533:ILE:HG22	1.91	0.53
2:B:292:SER:OG	2:B:294:THR:HG22	2.08	0.53
2:A:148:LEU:HG	2:A:160:ALA:CA	2.39	0.53
2:A:407:MET:O	2:A:408:MET:HB2	2.07	0.53
2:A:264:PHE:HB3	2:A:280:THR:CG2	2.39	0.53
2:B:4:ASP:OD1	2:B:7:LYS:HD3	2.09	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:7:LYS:N	2:B:7:LYS:HD2	2.23	0.53
2:A:478:GLU:HB3	2:A:482:ARG:NH2	2.14	0.53
2:A:490:LYS:HB3	2:A:528:THR:HG23	1.90	0.53
2:A:347:VAL:HG22	2:A:348:TYR:CE2	2.44	0.53
2:B:372:PRO:HG3	2:B:473:ALA:HB3	1.91	0.53
2:A:131:ILE:CD1	2:A:131:ILE:H	2.17	0.52
2:B:482:ARG:HG3	2:B:482:ARG:HH21	1.73	0.52
2:B:482:ARG:O	2:B:483:GLU:HB2	2.09	0.52
2:B:4:ASP:CG	2:B:7:LYS:HD3	2.29	0.52
2:A:301:ILE:HD11	2:A:332:ARG:HD3	1.91	0.52
2:A:437:TYR:OH	2:A:438:LYS:HE2	2.09	0.52
2:B:395:PRO:O	2:B:398:CYS:HB3	2.10	0.52
1:D:926:G:H2'	1:D:927:C:C6	2.45	0.52
2:B:465:ILE:HG13	2:B:466:ASP:N	2.24	0.52
1:D:970:G:N3	1:D:970:G:H2'	2.24	0.52
2:A:488:LYS:HG2	2:A:530:LYS:HG2	1.91	0.52
2:B:5:PRO:O	2:B:9:ARG:HB2	2.10	0.52
1:D:917:G:O2'	1:D:918:G:H5'	2.10	0.52
2:A:47:HIS:CD2	2:A:49:LEU:HB2	2.45	0.51
2:A:488:LYS:HE2	2:A:530:LYS:HD3	1.92	0.51
2:B:4:ASP:CB	2:B:7:LYS:HD3	2.41	0.51
2:A:135:TYR:HA	2:A:139:GLU:HG3	1.92	0.51
2:A:158:ILE:HG13	2:A:159:THR:N	2.26	0.51
2:B:335:MET:SD	2:B:343:VAL:HG22	2.50	0.51
2:A:118:ILE:HG22	2:A:119:THR:N	2.25	0.51
2:B:32:PRO:HG3	2:B:470:TYR:CZ	2.44	0.51
1:D:918:G:HO2'	1:D:919:C:P	2.33	0.51
2:A:128:LEU:HA	2:A:131:ILE:HD13	1.92	0.51
2:A:144:ASP:C	2:A:146:SER:H	2.13	0.51
1:D:925:G:H2'	1:D:926:G:O4'	2.10	0.51
2:A:401:LEU:HA	2:A:415:TYR:CD1	2.46	0.51
2:B:396:SER:HB2	2:B:423:THR:HG23	1.92	0.51
1:D:917:G:H2'	1:D:956:G:H22	1.76	0.51
1:D:917:G:H2'	1:D:956:G:N2	2.26	0.51
2:A:447:THR:O	2:A:449:LYS:N	2.44	0.50
2:B:47:HIS:CD2	2:B:49:LEU:HB2	2.46	0.50
2:A:32:PRO:O	2:A:38:ARG:NH1	2.44	0.50
2:A:481:MET:C	2:A:483:GLU:H	2.15	0.50
2:B:468:PHE:CE2	2:B:491:ALA:HB2	2.47	0.50
1:D:927:C:H2'	1:D:928:G:H8	1.76	0.50
2:A:261:ASN:HD22	2:A:262:PHE:H	1.60	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:292:SER:OG	2:A:294:THR:HG22	2.12	0.50
2:A:294:THR:HG23	2:A:296:TYR:N	2.17	0.50
2:A:380:ILE:O	2:A:384:ILE:HG13	2.12	0.50
2:A:160:ALA:O	2:A:164:LEU:HG	2.12	0.50
2:B:183:LEU:HD13	2:B:215:PHE:CG	2.47	0.49
2:B:465:ILE:HG13	2:B:466:ASP:H	1.77	0.49
2:A:224:THR:O	2:A:225:ARG:HB2	2.11	0.49
2:B:380:ILE:HG12	2:B:403:PHE:CD1	2.47	0.49
2:A:509:ARG:HD2	4:A:1024:HOH:O	2.13	0.49
2:A:243:VAL:CG1	2:A:247:LYS:HE3	2.43	0.49
2:A:448:LYS:N	2:A:448:LYS:HD3	2.27	0.49
2:A:81:LYS:HZ2	2:A:316:GLU:HB3	1.77	0.49
2:B:392:ALA:HB1	2:B:426:CYS:HB2	1.94	0.49
2:A:324:MET:CE	2:A:325:ASN:C	2.80	0.49
2:B:368:VAL:HA	2:B:502:LEU:HD12	1.95	0.49
2:B:480:ALA:HA	2:B:533:ILE:CD1	2.43	0.49
2:A:385:VAL:O	2:A:389:GLU:HG3	2.13	0.48
2:A:264:PHE:HB3	2:A:280:THR:HG21	1.95	0.48
2:B:83:PHE:CD2	2:B:90:VAL:HG21	2.48	0.48
2:A:458:VAL:HG23	2:A:458:VAL:O	2.14	0.48
2:B:484:GLN:O	2:B:533:ILE:HD11	2.12	0.48
2:B:480:ALA:HA	2:B:533:ILE:HD13	1.96	0.48
2:A:156:ASP:OD1	2:A:158:ILE:HG23	2.14	0.48
2:A:447:THR:HG22	2:A:449:LYS:H	1.78	0.48
2:A:112:ILE:HD12	2:A:115:ILE:HG21	1.95	0.48
2:A:363:ALA:HB2	2:A:458:VAL:CG2	2.43	0.48
2:A:428:PRO:HG2	2:A:524:PRO:CG	2.43	0.48
2:A:370:GLU:HG3	2:A:471:TYR:CD2	2.48	0.48
2:B:474:ARG:NH1	2:B:474:ARG:HG3	2.22	0.48
2:A:196:SER:HB3	2:A:317:TYR:HB3	1.95	0.48
2:B:328:LEU:C	2:B:328:LEU:CD1	2.82	0.48
2:A:75:GLU:HB3	4:A:1012:HOH:O	2.12	0.48
2:B:497:LEU:O	2:B:500:ILE:HG22	2.14	0.48
2:B:396:SER:HB2	2:B:423:THR:CG2	2.44	0.48
2:A:490:LYS:HD2	2:A:492:ARG:HH12	1.80	0.47
2:A:509:ARG:NH1	4:A:1003:HOH:O	2.42	0.47
2:A:155:VAL:O	2:A:158:ILE:HG12	2.15	0.47
2:B:83:PHE:CE2	2:B:90:VAL:HG21	2.49	0.47
2:A:106:GLY:CA	2:A:110:GLU:HB2	2.38	0.47
2:B:85:ARG:H	2:B:85:ARG:CD	2.26	0.47
2:A:162:LYS:O	2:A:166:GLU:HG2	2.14	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:326:LEU:HD13	2:A:327:GLY:N	2.30	0.47
1:D:934:C:H5"	1:D:935:A:O5'	2.14	0.47
2:A:31:SER:CB	2:A:32:PRO:HD2	2.44	0.47
2:A:447:THR:C	2:A:449:LYS:N	2.68	0.47
1:D:935:A:H1'	2:A:524:PRO:HD3	1.95	0.47
2:A:135:TYR:HA	2:A:139:GLU:CG	2.45	0.47
2:A:301:ILE:HD13	2:A:336:ILE:HD11	1.97	0.47
2:B:197:HIS:HE1	4:B:577:HOH:O	1.98	0.47
2:B:493:ILE:HD12	2:B:493:ILE:H	1.80	0.47
2:A:154:ASP:CB	2:A:158:ILE:HD11	2.45	0.47
2:A:168:PHE:C	2:A:170:GLU:H	2.17	0.47
2:A:460:THR:CG2	2:A:462:ILE:H	2.23	0.47
2:B:294:THR:HG23	2:B:296:TYR:HB2	1.97	0.47
2:B:251:GLU:HG3	2:B:262:PHE:CE2	2.49	0.46
2:A:121:ARG:HH11	2:A:121:ARG:HG3	1.80	0.46
2:B:218:GLU:C	2:B:220:GLY:H	2.19	0.46
2:B:6:GLN:O	2:B:10:GLU:HG2	2.15	0.46
2:A:327:GLY:HA3	3:A:1001:SEP:CB	2.44	0.46
2:A:110:GLU:CG	2:A:114:GLN:HE21	2.24	0.46
2:A:139:GLU:OE1	2:A:139:GLU:HA	2.15	0.46
2:A:432:ASN:O	2:A:463:ARG:HA	2.15	0.46
1:D:946:A:N3	1:D:946:A:H2'	2.29	0.46
2:A:160:ALA:O	2:A:163:ILE:HG22	2.15	0.46
2:A:376:VAL:O	2:A:380:ILE:HG13	2.16	0.46
2:A:410:ARG:O	2:A:412:VAL:HG23	2.15	0.46
2:A:493:ILE:CD1	2:A:493:ILE:H	2.23	0.46
2:B:290:VAL:HA	2:B:297:SER:O	2.16	0.46
2:B:31:SER:HB2	2:B:32:PRO:HD2	1.97	0.46
2:B:390:LYS:HG3	2:B:391:HIS:CD2	2.50	0.46
2:B:75:GLU:HB3	2:B:77:VAL:HG12	1.98	0.46
2:A:128:LEU:HD23	2:A:128:LEU:H	1.80	0.46
2:B:394:GLU:HG3	2:B:400:PHE:HZ	1.81	0.46
1:D:935:A:OP2	2:A:428:PRO:HG3	2.16	0.46
2:B:404:GLU:HG3	2:B:413:ARG:HG2	1.98	0.46
2:A:30:ARG:HB3	2:A:34:GLU:HB2	1.97	0.46
2:A:448:LYS:CD	2:A:448:LYS:N	2.79	0.46
2:B:175:LYS:N	2:B:175:LYS:CD	2.78	0.46
2:B:225:ARG:HH21	2:B:225:ARG:HG3	1.80	0.46
2:A:447:THR:O	2:A:450:TRP:N	2.39	0.46
2:A:484:GLN:NE2	2:A:486:GLU:O	2.46	0.45
2:A:146:SER:C	2:A:148:LEU:H	2.20	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:161:VAL:HG23	2:A:162:LYS:N	2.31	0.45
2:A:479:ALA:C	2:A:481:MET:H	2.18	0.45
2:B:364:ARG:O	2:B:367:LYS:NZ	2.48	0.45
2:B:72:LEU:HD23	2:B:72:LEU:O	2.17	0.45
2:B:394:GLU:HG3	2:B:400:PHE:CZ	2.51	0.45
2:A:105:VAL:HG11	2:A:132:PHE:CE1	2.51	0.45
2:B:410:ARG:N	2:B:410:ARG:HD3	2.31	0.45
2:A:442:TYR:CE2	2:A:453:PHE:HE2	2.34	0.45
2:A:38:ARG:CZ	2:A:462:ILE:HD11	2.47	0.45
2:A:475:LYS:CA	2:A:475:LYS:HE2	2.44	0.45
2:A:507:ASN:ND2	2:B:204:LEU:HD13	2.32	0.45
2:B:85:ARG:C	2:B:87:ALA:H	2.20	0.45
2:A:434:VAL:HB	2:A:460:THR:CG2	2.44	0.44
2:B:385:VAL:HG13	2:B:465:ILE:HD12	1.98	0.44
2:B:7:LYS:CD	2:B:7:LYS:H	2.30	0.44
1:D:936:G:O2'	2:A:522:ARG:CZ	2.65	0.44
2:B:496:ASN:HD21	2:B:498:SER:HB3	1.82	0.44
2:A:137:LYS:HG3	2:A:138:GLY:N	2.33	0.44
2:B:412:VAL:CG2	2:B:533:ILE:HG22	2.47	0.44
2:A:106:GLY:O	2:A:108:SER:N	2.50	0.44
2:A:93:ARG:O	2:A:217:ARG:HG2	2.18	0.44
1:D:909:G:C4'	1:D:910:G:OP2	2.66	0.44
1:D:940:C:H2'	1:D:941:G:H8	1.82	0.44
2:A:286:HIS:HD2	2:A:288:LYS:H	1.65	0.44
2:A:363:ALA:HB2	2:A:458:VAL:HG23	1.99	0.44
2:B:344:ARG:HG3	2:B:344:ARG:HH21	1.82	0.44
2:B:380:ILE:O	2:B:384:ILE:HG13	2.17	0.44
2:B:496:ASN:ND2	2:B:498:SER:HB3	2.33	0.44
2:A:120:LYS:O	2:A:121:ARG:C	2.54	0.44
2:A:485:GLU:OE1	2:A:486:GLU:N	2.49	0.44
2:B:447:THR:HG22	2:B:448:LYS:N	2.33	0.44
2:A:122:GLU:OE1	2:A:124:ASP:HB2	2.17	0.44
2:B:326:LEU:HD13	2:B:326:LEU:C	2.38	0.44
2:B:347:VAL:CG2	2:B:348:TYR:CE2	3.01	0.44
1:D:917:G:O2'	1:D:918:G:C5'	2.65	0.44
2:A:511:TYR:CZ	2:A:515:LYS:HG3	2.52	0.44
2:B:479:ALA:HB2	2:B:487:VAL:CG1	2.48	0.44
2:A:310:SER:O	2:A:314:LEU:HD22	2.17	0.43
2:A:397:PRO:CG	2:A:421:GLU:HG2	2.48	0.43
2:A:437:TYR:CZ	2:A:438:LYS:HE2	2.53	0.43
2:A:340:TYR:CG	2:A:346:MET:HG2	2.53	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:477:GLU:O	2:A:481:MET:HE2	2.17	0.43
2:B:204:LEU:HD23	2:B:239:GLU:HG3	2.01	0.43
2:A:306:PHE:HB3	2:A:326:LEU:HD22	2.01	0.43
2:A:484:GLN:HG2	2:A:485:GLU:H	1.83	0.43
2:A:23:GLY:HA3	4:A:1016:HOH:O	2.18	0.43
2:A:485:GLU:HA	2:A:533:ILE:O	2.17	0.43
2:B:257:PHE:O	2:B:286:HIS:HE1	2.00	0.43
2:B:478:GLU:O	2:B:482:ARG:HB2	2.18	0.43
2:A:113:ARG:C	2:A:115:ILE:H	2.20	0.43
2:A:282:VAL:HG13	2:A:304:ALA:C	2.39	0.43
2:B:6:GLN:HE21	2:B:9:ARG:HH11	1.67	0.43
2:A:121:ARG:NH1	2:A:122:GLU:O	2.51	0.43
2:A:306:PHE:CD1	2:A:306:PHE:C	2.91	0.43
2:B:491:ALA:O	2:B:526:PHE:HA	2.18	0.43
2:A:333:LEU:HD22	2:A:337:LEU:HG	2.01	0.43
2:B:295:LYS:C	2:B:297:SER:H	2.21	0.43
1:D:935:A:C4	2:A:524:PRO:HD2	2.53	0.43
2:B:326:LEU:HD13	2:B:327:GLY:N	2.33	0.43
2:B:405:GLY:O	2:B:411:ASN:HA	2.19	0.43
2:A:141:ASP:CG	2:A:142:GLY:N	2.72	0.42
2:A:148:LEU:HG	2:A:160:ALA:HA	2.01	0.42
2:A:171:PHE:CD2	2:A:171:PHE:N	2.87	0.42
2:A:442:TYR:CD2	2:A:453:PHE:HE2	2.36	0.42
2:A:370:GLU:HG3	2:A:471:TYR:HD2	1.82	0.42
2:B:56:LEU:HB3	2:B:211:ILE:CD1	2.50	0.42
2:A:397:PRO:HG3	2:A:421:GLU:HG2	2.01	0.42
2:A:507:ASN:HD22	2:B:204:LEU:HD13	1.84	0.42
2:B:294:THR:CG2	2:B:296:TYR:HB2	2.50	0.42
2:B:408:MET:HE3	2:B:481:MET:HB3	2.01	0.42
2:A:200:ASP:HA	2:B:507:ASN:HD21	1.85	0.42
2:A:437:TYR:HE2	2:A:456:GLU:HB2	1.84	0.42
2:A:215:PHE:CD1	2:A:215:PHE:N	2.87	0.42
2:B:292:SER:O	2:B:294:THR:N	2.46	0.42
2:B:385:VAL:O	2:B:389:GLU:HG3	2.19	0.42
2:A:146:SER:O	2:A:148:LEU:N	2.46	0.42
2:B:310:SER:HA	2:B:311:PRO:HD3	1.97	0.42
2:B:451:ARG:NH2	2:B:451:ARG:HG3	2.31	0.42
2:B:467:GLY:O	2:B:501:ASN:HB3	2.19	0.42
2:B:7:LYS:CD	2:B:7:LYS:N	2.82	0.42
1:D:901:G:H2'	1:D:902:C:C6	2.55	0.42
2:A:185:SER:HB2	2:A:216:ARG:HD3	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:412:VAL:HG12	2:B:413:ARG:N	2.35	0.42
2:B:475:LYS:HA	2:B:475:LYS:HD2	1.74	0.42
1:D:917:G:O2'	1:D:918:G:P	2.77	0.42
2:A:143:ASP:O	2:A:146:SER:HB3	2.20	0.41
2:A:206:ILE:HB	2:A:237:VAL:HB	2.02	0.41
2:A:309:TYR:HB2	2:A:323:VAL:HG13	2.02	0.41
2:B:56:LEU:HB3	2:B:211:ILE:HD13	2.01	0.41
2:B:474:ARG:NH1	2:B:474:ARG:CG	2.81	0.41
2:A:122:GLU:OE2	2:A:122:GLU:HA	2.21	0.41
2:B:218:GLU:O	2:B:219:GLN:HB3	2.20	0.41
2:B:494:VAL:O	2:B:522:ARG:HA	2.20	0.41
2:A:340:TYR:CD1	2:A:346:MET:HG2	2.53	0.41
2:B:421:GLU:CD	2:B:421:GLU:H	2.22	0.41
2:B:6:GLN:HG2	2:B:9:ARG:NH1	2.36	0.41
2:A:115:ILE:HG23	2:A:115:ILE:O	2.20	0.41
2:A:144:ASP:HA	2:A:147:TYR:CZ	2.54	0.41
2:A:261:ASN:HD21	2:A:263:ARG:HH22	1.68	0.41
2:A:282:VAL:HG13	2:A:304:ALA:O	2.21	0.41
2:A:403:PHE:O	2:A:413:ARG:HA	2.20	0.41
2:A:86:GLU:OE1	2:A:272:LYS:HG2	2.19	0.41
2:B:500:ILE:HG23	2:B:502:LEU:HD22	2.01	0.41
2:B:90:VAL:O	2:B:93:ARG:HG2	2.20	0.41
2:A:265:ARG:NE	2:A:281:GLU:OE1	2.49	0.41
2:B:301:ILE:HD13	2:B:336:ILE:HD11	2.02	0.41
2:A:468:PHE:O	2:A:471:TYR:HB3	2.20	0.41
2:B:399:SER:HA	2:B:417:VAL:HG12	2.02	0.41
2:B:364:ARG:HG3	2:B:364:ARG:HH21	1.86	0.41
2:B:385:VAL:HG23	2:B:469:ALA:CB	2.51	0.41
2:A:116:GLU:O	2:A:118:ILE:HD12	2.20	0.41
2:A:95:PHE:CE2	2:B:97:LEU:HD23	2.55	0.41
1:D:933:G:H1	2:A:492:ARG:CD	2.33	0.41
2:A:220:GLY:C	2:A:221:GLU:HG3	2.40	0.41
2:A:213:ARG:HH21	2:A:228:THR:CG2	2.34	0.41
2:A:314:LEU:HD11	2:A:323:VAL:CG1	2.50	0.41
2:B:215:PHE:N	2:B:215:PHE:CD1	2.89	0.41
2:B:102:LYS:O	2:B:104:ASN:N	2.54	0.40
2:B:285:PHE:HB2	2:B:300:TRP:CE2	2.57	0.40
2:B:377:GLY:O	2:B:380:ILE:HB	2.21	0.40
2:A:490:LYS:CD	2:A:492:ARG:HH12	2.34	0.40
2:A:121:ARG:NH1	2:A:121:ARG:HG3	2.35	0.40
2:A:141:ASP:C	2:A:143:ASP:H	2.23	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:391:HIS:O	2:A:425:LEU:HD23	2.22	0.40
2:A:473:ALA:O	2:A:476:VAL:HG22	2.21	0.40
2:B:103:PRO:HG3	2:B:174:LEU:HD12	2.03	0.40
1:D:957:A:H1'	1:D:959:U:C5	2.56	0.40
2:A:292:SER:CB	2:A:294:THR:HG22	2.52	0.40
2:A:374:THR:HG22	2:A:375:ALA:N	2.37	0.40
2:B:406:GLU:HB3	2:B:411:ASN:OD1	2.22	0.40
2:A:119:THR:HG22	2:A:120:LYS:N	2.36	0.40
2:A:479:ALA:C	2:A:481:MET:N	2.75	0.40
2:B:440:ASP:HB2	2:B:442:TYR:CE2	2.57	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
2	A	532/534 (100%)	467 (88%)	51 (10%)	14 (3%)	5 9
2	B	461/534 (86%)	423 (92%)	31 (7%)	7 (2%)	10 21
All	All	993/1068 (93%)	890 (90%)	82 (8%)	21 (2%)	7 13

All (21) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	A	118	ILE
2	A	156	ASP
2	A	107	ILE
2	A	124	ASP
2	A	140	ILE
2	A	174	LEU
2	A	448	LYS
2	B	484	GLN

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Mol	Chain	Res	Type
2	A	147	TYR
2	A	294	THR
2	B	32	PRO
2	B	103	PRO
2	B	422	ASN
2	A	151	GLU
2	A	153	LEU
2	A	121	ARG
2	B	526	PHE
2	B	353	GLY
2	A	152	VAL
2	A	105	VAL
2	B	394	GLU

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
2	A	464/464 (100%)	430 (93%)	34 (7%)	14 28
2	B	402/464 (87%)	370 (92%)	32 (8%)	12 24
All	All	866/928 (93%)	800 (92%)	66 (8%)	13 26

All (66) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	A	49	LEU
2	A	56	LEU
2	A	85	ARG
2	A	97	LEU
2	A	104	ASN
2	A	115	ILE
2	A	132	PHE
2	A	137	LYS
2	A	147	TYR
2	A	148	LEU

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Mol	Chain	Res	Type
2	A	186	HIS
2	A	236	LEU
2	A	254	LEU
2	A	261	ASN
2	A	277	ASP
2	A	282	VAL
2	A	318	ASP
2	A	320	PRO
2	A	323	VAL
2	A	324	MET
2	A	326	LEU
2	A	328	LEU
2	A	333	LEU
2	A	347	VAL
2	A	422	ASN
2	A	435	VAL
2	A	448	LYS
2	A	485	GLU
2	A	493	ILE
2	A	496	ASN
2	A	500	ILE
2	A	502	LEU
2	A	509	ARG
2	A	525	LEU
2	B	7	LYS
2	B	32	PRO
2	B	37	PRO
2	B	42	SER
2	B	49	LEU
2	B	55	ARG
2	B	56	LEU
2	B	68	VAL
2	B	85	ARG
2	B	99	THR
2	B	102	LYS
2	B	186	HIS
2	B	204	LEU
2	B	228	THR
2	B	236	LEU
2	B	243	VAL
2	B	254	LEU
2	B	255	ARG

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Mol	Chain	Res	Type
2	B	261	ASN
2	B	282	VAL
2	B	314	LEU
2	B	328	LEU
2	B	333	LEU
2	B	373	GLN
2	B	410	ARG
2	B	448	LYS
2	B	476	VAL
2	B	485	GLU
2	B	493	ILE
2	B	496	ASN
2	B	502	LEU
2	B	525	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (17) such sidechains are listed below:

Mol	Chain	Res	Type
2	A	47	HIS
2	A	104	ASN
2	A	114	GLN
2	A	129	GLN
2	A	133	HIS
2	A	261	ASN
2	A	286	HIS
2	A	382	GLN
2	A	422	ASN
2	A	496	ASN
2	B	6	GLN
2	B	47	HIS
2	B	219	GLN
2	B	261	ASN
2	B	286	HIS
2	B	382	GLN
2	B	496	ASN

5.3.3 RNA

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	D	70/71 (98%)	17 (24%)	5 (7%)

All (17) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	D	906	G
1	D	908	U
1	D	909	G
1	D	910	G
1	D	917	G
1	D	918	G
1	D	919	C
1	D	921	U
1	D	932	U
1	D	933	G
1	D	935	A
1	D	943	U
1	D	944	U
1	D	945	U
1	D	946	A
1	D	958	A
1	D	960	C

All (5) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	D	909	G
1	D	917	G
1	D	918	G
1	D	934	C
1	D	957	A

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)

2 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	$\#\|Z\| > 2$
3	SEP	A	1002	-	7,10,10	1.57	1 (14%)	8,14,14	1.96	2 (25%)
3	SEP	A	1001	-	7,10,10	1.57	1 (14%)	8,14,14	1.78	2 (25%)

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
3	SEP	A	1002	-	-	1/6/10/10	-
3	SEP	A	1001	-	-	1/6/10/10	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	1002	SEP	P-O1P	3.35	1.61	1.50
3	A	1001	SEP	P-O1P	3.34	1.61	1.50

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	1002	SEP	OG-CB-CA	4.55	112.02	108.06
3	A	1001	SEP	OG-CB-CA	4.02	111.57	108.06
3	A	1002	SEP	O3P-P-OG	2.11	112.36	106.73
3	A	1001	SEP	O3P-P-OG	2.05	112.18	106.73

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	1002	SEP	CA-CB-OG-P
3	A	1001	SEP	CA-CB-OG-P

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	1001	SEP	1	0

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, 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	D	71/71 (100%)	2.83	37 (52%) 0 0	91, 166, 199, 200	0
2	A	534/534 (100%)	0.79	73 (13%) 3 1	32, 65, 182, 200	0
2	B	465/534 (87%)	0.35	31 (6%) 17 13	34, 60, 139, 189	0
All	All	1070/1139 (93%)	0.73	141 (13%) 3 2	32, 65, 180, 200	0

All (141) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	A	109	ALA	13.3
2	A	149	ILE	12.5
2	A	223	ALA	12.4
2	A	132	PHE	9.6
2	A	116	GLU	9.0
1	D	904	A	8.7
2	B	223	ALA	8.1
1	D	944	U	7.9
1	D	902	C	7.7
2	A	114	GLN	7.6
1	D	901	G	7.4
1	D	969	G	7.4
1	D	970	G	7.4
1	D	968	U	7.1
1	D	903	C	7.1
2	A	150	ALA	6.6
2	A	115	ILE	6.5
2	A	106	GLY	6.5
2	A	220	GLY	6.5
1	D	971	C	6.4
1	D	945	U	6.3
1	D	905	G	6.3
1	D	906	G	6.2

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Mol	Chain	Res	Type	RSRZ
2	A	110	GLU	6.1
2	A	108	SER	6.0
2	A	155	VAL	5.9
2	B	222	ASP	5.8
2	A	219	GLN	5.7
2	A	113	ARG	5.6
2	A	123	VAL	5.6
1	D	966	C	5.5
2	B	224	THR	5.3
2	A	135	TYR	5.1
2	A	126	LYS	5.1
2	A	222	ASP	5.1
2	A	125	SER	5.1
2	A	162	LYS	4.9
2	B	534	GLU	4.8
2	A	221	GLU	4.7
2	A	156	ASP	4.7
2	A	103	PRO	4.7
1	D	925	G	4.6
2	A	161	VAL	4.6
2	A	133	HIS	4.6
2	B	401	LEU	4.6
2	A	152	VAL	4.6
2	B	221	GLU	4.5
1	D	967	C	4.5
2	A	111	LYS	4.4
2	A	117	ALA	4.4
1	D	943	U	4.3
2	A	142	GLY	4.2
1	D	965	C	4.2
2	A	131	ILE	4.1
1	D	964	G	4.1
2	A	130	GLU	4.1
2	B	407	MET	4.0
1	D	913	G	4.0
1	D	907	G	4.0
2	B	414	VAL	3.9
2	A	85	ARG	3.9
2	A	145	LEU	3.9
2	A	147	TYR	3.8
2	A	154	ASP	3.8
2	A	148	LEU	3.8

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Mol	Chain	Res	Type	RSRZ
2	A	107	ILE	3.8
2	B	402	ALA	3.8
2	B	412	VAL	3.8
2	B	529	VAL	3.8
2	A	158	ILE	3.7
1	D	924	C	3.7
2	A	140	ILE	3.7
2	A	137	LYS	3.7
2	B	403	PHE	3.6
2	A	533	ILE	3.6
2	B	295	LYS	3.6
2	A	129	GLN	3.6
1	D	932	U	3.6
2	B	531	ALA	3.6
2	A	224	THR	3.5
2	A	119	THR	3.5
2	A	104	ASN	3.5
2	A	168	PHE	3.4
2	A	141	ASP	3.4
2	A	166	GLU	3.4
2	A	120	LYS	3.3
2	A	157	ASP	3.3
2	A	408	MET	3.3
2	B	487	VAL	3.2
2	A	134	ARG	3.2
2	A	163	ILE	3.2
2	A	128	LEU	3.1
2	A	112	ILE	3.1
2	B	103	PRO	3.1
2	A	411	ASN	2.9
2	A	143	ASP	2.9
1	D	923	G	2.8
2	A	410	ARG	2.8
1	D	935	A	2.8
2	A	164	LEU	2.7
2	A	421	GLU	2.7
2	B	410	ARG	2.7
1	D	963	G	2.7
2	B	219	GLN	2.6
2	A	171	PHE	2.6
2	B	533	ILE	2.6
2	B	390	LYS	2.6

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Mol	Chain	Res	Type	RSRZ
1	D	922	U	2.6
2	B	174	LEU	2.6
2	B	416	VAL	2.6
2	A	153	LEU	2.6
1	D	926	G	2.5
2	A	139	GLU	2.5
1	D	912	A	2.5
2	B	413	ARG	2.5
2	A	124	ASP	2.5
2	B	481	MET	2.5
2	B	409	GLY	2.5
1	D	947	C	2.5
2	B	408	MET	2.4
2	A	412	VAL	2.4
1	D	940	C	2.4
2	B	404	GLU	2.3
2	A	105	VAL	2.3
1	D	941	G	2.3
2	B	486	GLU	2.3
1	D	942	C	2.3
2	A	531	ALA	2.3
2	B	468	PHE	2.3
2	B	220	GLY	2.3
2	A	136	LYS	2.2
2	A	144	ASP	2.2
2	A	407	MET	2.2
2	A	422	ASN	2.2
1	D	936	G	2.2
1	D	915	G	2.2
1	D	946	A	2.1
1	D	938	U	2.1
2	B	532	GLU	2.1
2	A	487	VAL	2.1
1	D	962	G	2.0

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

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

6.3 Carbohydrates (i)

There are no carbohydrates in this entry.

6.4 Ligands (i)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. 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	SEP	A	1002	11/11	0.95	0.21	43,47,68,111	0
3	SEP	A	1001	11/11	0.96	0.23	43,55,81,130	0

6.5 Other polymers (i)

There are no such residues in this entry.