



# wwPDB X-ray Structure Validation Summary Report ⓘ

Aug 15, 2023 – 04:24 PM EDT

PDB ID : 1XBP  
Title : Inhibition of peptide bond formation by pleuromutilins: The structure of the 50S ribosomal subunit from *Deinococcus radiodurans* in complex with Tiamulin  
Authors : Schlunzen, F.; Pyetan, E.; Fucini, P.; Yonath, A.; Harms, J.M.  
Deposited on : 2004-08-31  
Resolution : 3.50 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<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>.

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtrriage (Phenix) : **NOT EXECUTED**  
EDS : **NOT EXECUTED**  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.35

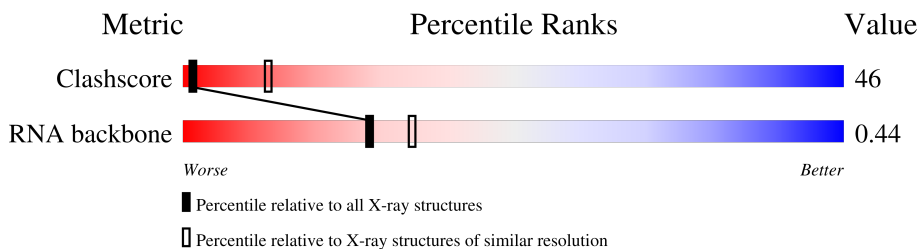
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.50 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))
Clashscore	141614	1036 (3.58-3.42)
RNA backbone	3102	1002 (4.00-3.00)


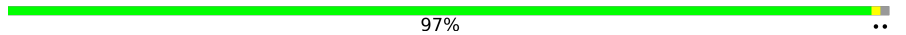


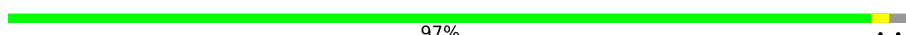






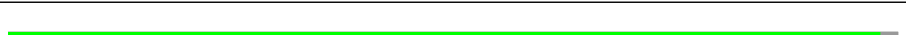

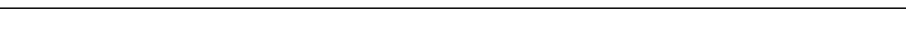
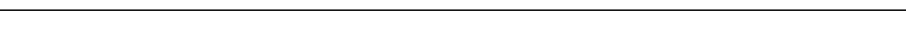
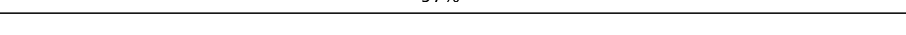
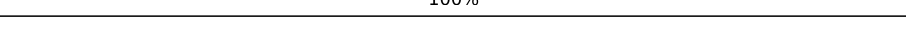
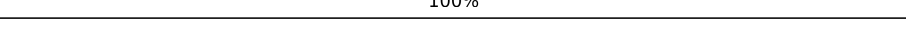
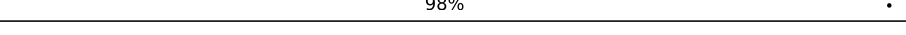
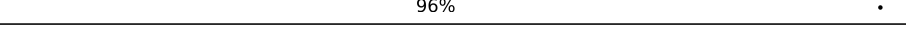
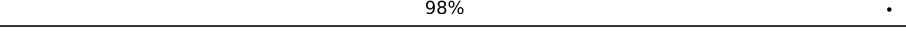
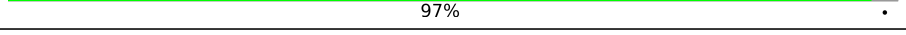
The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria 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  $\leq 5\%$

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	0	2880	11% 63% 19% . .
2	9	124	13% 69% 14% 5%
3	A	274	98% ..
4	B	211	96% ..
5	C	204	97% .
6	D	180	99% .
7	E	185	95% . . .
8	F	146	36% 64%
9	G	144	99% .

*Continued on next page...*

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Mol	Chain	Length	Quality of chain
10	H	174	 82% 18%
11	I	134	 97%
12	J	156	 90% 10%
13	K	141	 87% 12%
14	L	116	 97%
15	M	113	 98%
16	N	166	 75% 25%
17	O	118	 99%
18	P	100	 100%
19	Q	134	 94% 5%
20	R	94	 97%
21	S	115	 98%
22	T	237	 94% 6%
23	U	91	 95% 5%
24	W	67	 97%
25	X	55	 100%
26	Y	73	 100%
27	Z	59	 98%
28	1	55	 96%
29	2	47	 98%
30	3	65	 97%
31	4	37	 95% 5%

## 2 Entry composition [i](#)

There are 32 unique types of molecules in this entry. The entry contains 65328 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 23S RIBOSOMAL RNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
1	0	2766	59359	26479	10949	19166	2765	0	0	0

- Molecule 2 is a RNA chain called 5S RIBOSOMAL RNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
2	9	118	2516	1124	464	811	117	0	0	0

- Molecule 3 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf	Trace
3	A	270	Total	C	0	0	270
			270	270			

- Molecule 4 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf	Trace
4	B	205	Total	C	0	0	205
			205	205			

- Molecule 5 is a protein called 50S ribosomal protein L4.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf	Trace
5	C	197	Total	C	0	0	197
			197	197			

- Molecule 6 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf	Trace
6	D	178	Total	C	0	0	178
			178	178			

- Molecule 7 is a protein called 50S ribosomal protein L6.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
7	E	177	Total C 177 177	0	0	177

- Molecule 8 is a protein called 50S ribosomal protein L9.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
8	F	52	Total C 52 52	0	0	52

- Molecule 9 is a protein called 50S ribosomal protein L11.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
9	G	143	Total C 143 143	0	0	143

- Molecule 10 is a protein called 50S ribosomal protein L13.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
10	H	143	Total C 143 143	0	0	143

- Molecule 11 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
11	I	132	Total C 132 132	0	0	132

- Molecule 12 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
12	J	141	Total C 141 141	0	0	141

- Molecule 13 is a protein called ribosomal protein L16.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
13	K	124	Total C 124 124	0	0	124

- Molecule 14 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
14	L	114	Total C 114 114	0	0	114

- Molecule 15 is a protein called 50S ribosomal protein L18.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
15	M	111	Total C 111 111	0	0	111

- Molecule 16 is a protein called 50S ribosomal protein L19.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
16	N	125	Total C 125 125	0	0	125

- Molecule 17 is a protein called 50S ribosomal protein L20.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
17	O	117	Total C 117 117	0	0	117

- Molecule 18 is a protein called 50S ribosomal protein L21.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
18	P	100	Total C 100 100	0	0	100

- Molecule 19 is a protein called 50S ribosomal protein L22.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
19	Q	127	Total C 127 127	0	0	127

- Molecule 20 is a protein called 50S ribosomal protein L23.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
20	R	93	Total C 93 93	0	0	93

- Molecule 21 is a protein called 50S ribosomal protein L24.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
21	S	113	Total C 113 113	0	0	113

- Molecule 22 is a protein called 50S ribosomal protein L25.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
22	T	223	Total C 223 223	0	0	223

- Molecule 23 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
23	U	86	Total C 86 86	0	0	86

- Molecule 24 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
24	W	65	Total C 65 65	0	0	65

- Molecule 25 is a protein called 50S ribosomal protein L30.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
25	X	55	Total C 55 55	0	0	55

- Molecule 26 is a protein called 50S ribosomal protein L31.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
26	Y	73	Total C 73 73	0	0	73

- Molecule 27 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
27	Z	58	Total C 58 58	0	0	58

- Molecule 28 is a protein called 50S ribosomal protein L33.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
28	1	53	Total C 53 53	0	0	53

- Molecule 29 is a protein called 50S ribosomal protein L34.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
29	2	46	Total C 46 46	0	0	46

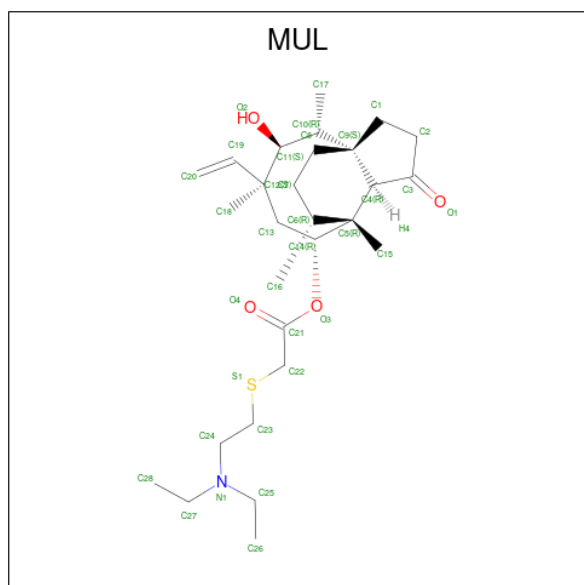
- Molecule 30 is a protein called 50S ribosomal protein L35.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
30	3	63	Total C 63 63	0	0	63

- Molecule 31 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
31	4	35	Total C 35 35	0	0	35

- Molecule 32 is TIAMULIN (three-letter code: MUL) (formula: C<sub>28</sub>H<sub>47</sub>NO<sub>4</sub>S).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
32	0	1	Total C N O S 34 28 1 4 1	0	0



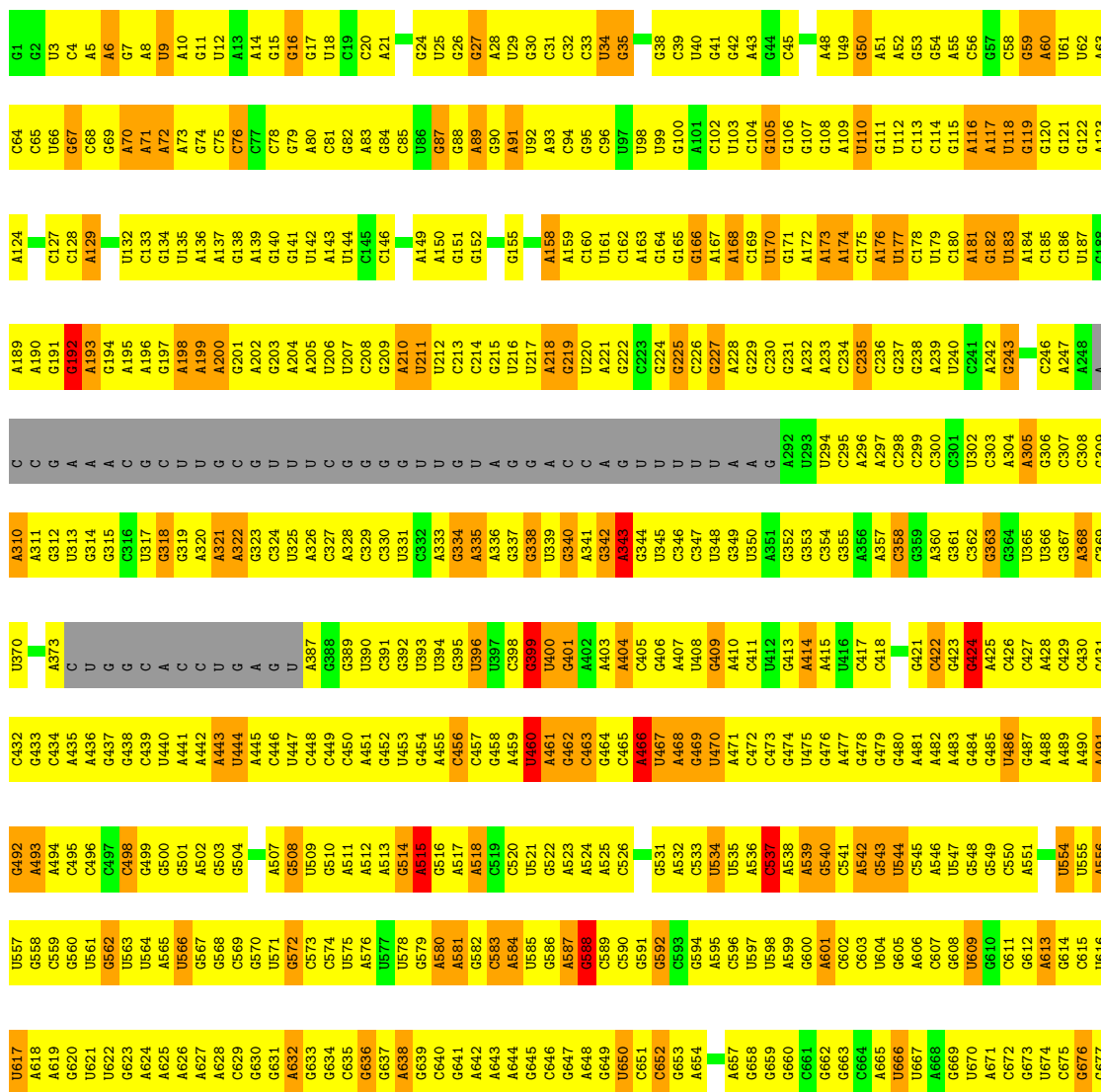
### 3 Residue-property plots i

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

Note EDS was not executed.

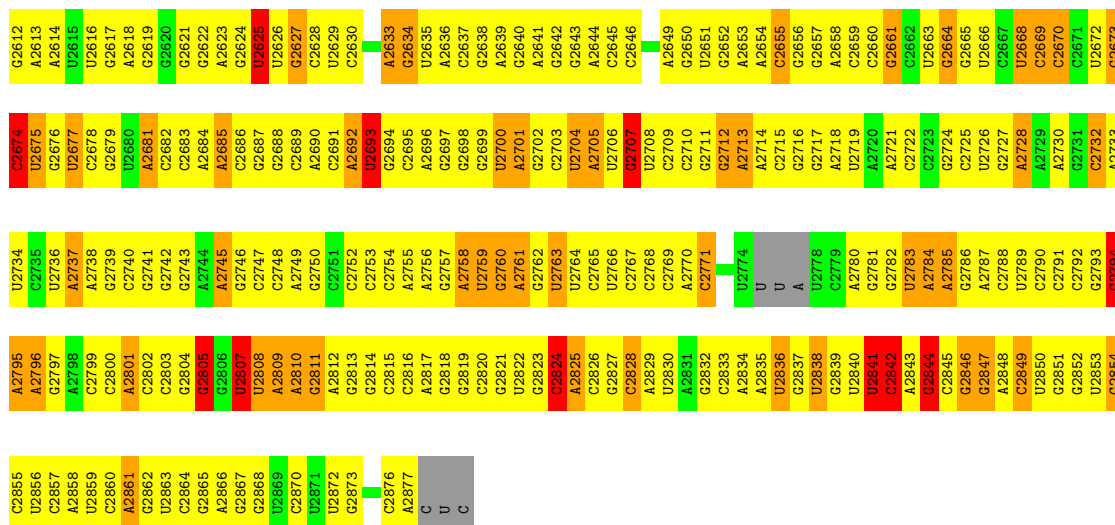
- Molecule 1: 23S RIBOSOMAL RNA

Chain 0:  11% 63% 19%

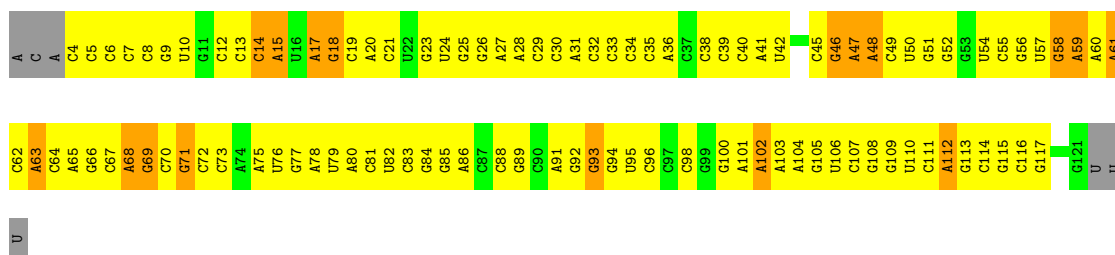




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A2492	G2492	A2493	U2369	G2309	C2244	A2181	C	U1994	G1983	G1857	A1793	A1671
A2493	C2493	A2494	A2245	U2310	A2246	A2182	G	G1995	U1984	A1858	A1794	C1672
A2494	G2494	A2495	A2246	U2311	A2247	A2183	A2117	G1996	U1994	A1859	C1795	A1673
A2495	C2495	A2496	A2247	G2312	A2248	A2184	A2118	U1997	A1995	A1860	A1796	C1674
A2496	G2496	A2497	A2248	G2313	A2249	A2185	A2119	U1998	A1996	A1861	C1797	C1675
A2497	C2497	A2498	A2249	U2314	U2249	U2186	G	U1999	U1988	C1862	U1798	U1676
A2498	G2498	A2499	A2250	A2315	G2250	G2186	G2122	U2000	U1989	C1863	U1799	C1677
A2499	C2499	A2500	U2369	G2316	U2251	U2187	G2123	G2001	G1990	U1864	A1800	A1678
A2500	G2500	A2501	A2251	U2317	U2252	U2188	C2124	A2002	C1941	C1865	C1801	U1679
A2501	C2501	A2502	A2252	G2318	A2253	U2189	C2125	A2003	C1942	C1866	A1802	U1680
A2502	G2502	A2503	A2253	G2319	C2254	C2190	U	U2004	C1943	A1867	G1805	A1681
A2503	C2503	A2504	G2254	G2320	G2255	A2191	U	U2005	C1944	A1868	C1806	A1682
A2504	G2504	A2505	G2255	C2321	G2256	C2192	U	G2006	C1945	A1869	G1807	G1683
A2505	C2505	A2506	G2256	U2322	G	U2196	G2126	G2007	U1946	U1870	C1745	G1684
A2506	G2506	A2507	U2323	U2323	G	U2197	U	G2008	G1947	A1807	A1807	A1685
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A2508	G2508	A2509	A2325	U2325	G2261	U2199	G2132	G2010	C1949	U1809	G1747	C1687
A2509	C2509	A2510	G2326	C2326	C2262	U2200	G2133	U2011	C1950	U1811	U1748	U1688
A2510	G2510	A2511	C2327	U2327	C2263	G2201	U	A2012	G1951	U1812	A1750	U1689
A2511	C2511	A2512	G2328	U2328	G	G2202	U2138	A2013	A1952	A1813	A1751	U1690
A2512	G2512	A2513	U2329	G2329	A2266	G2203	G2139	A2014	A1953	G1814	U1752	G1691
A2513	C2513	A2514	A2267	C2330	A2267	A2204	G2140	G2015	A1954	G1815	A1753	C1692
A2514	G2514	A2515	G2268	G2331	G2268	C2205	A	G2016	A1955	G1816	G1754	A1693
A2515	C2515	A2516	G2269	U2332	G2269	C2206	G	U2017	G1956	U1817	G1755	A1694
A2516	G2516	A2517	U2270	C2333	U2270	G2207	U	G2018	C1957	C1885	C1756	U1695
A2517	C2517	A2518	C2271	U2334	C2271	G2208	C	G2019	U1959	G1886	U1819	G1696
A2518	G2518	A2519	U2271	U2335	G	U2209	A	G2020	A1960	U1887	U1820	U1697
A2519	C2519	A2520	G2272	U2336	C2272	G2209	A	G2021	A1961	U1888	A1821	C1698
A2520	G2520	A2521	U2273	U2337	U2273	U2210	C	G2022	C1962	U1889	C1822	A1699
A2521	C2521	A2522	G2274	A2338	U2274	U2211	A	C2023	C1963	G1892	G1823	C1700
A2522	G2522	A2523	U2275	U2339	U2275	U2212	C	G2024	G1964	C1892	G1824	C1701
A2523	C2523	A2524	A2276	U2340	A2276	G2213	U	U2025	U1965	A2025	C1825	C1702
A2524	G2524	A2525	U2277	G2341	A2277	G	U	G2026	C1966	U1900	U1826	C1703
A2525	C2525	A2526	A2278	U2342	A2278	U2214	A	G2027	U1967	U1887	G1827	G1704
A2526	G2526	A2527	G2281	U2343	G2281	U2215	A	G2028	G1968	U1901	G1828	G1705
A2527	C2527	A2528	G2282	G2344	G2282	U2216	A	C2029	G1969	C1908	C1829	A1706
A2528	G2528	A2529	G2283	A2345	G2283	A2220	U	U2030	C1970	U1909	U1830	A1707
A2529	C2529	A2530	U2284	G2346	U2284	G2221	A	A2031	C1971	U1770	G1831	C1708
A2530	G2530	A2531	U2285	U2347	U2285	U2222	A	G2032	G1972	U1771	G1832	U1709
A2531	C2531	A2532	G2286	A2348	G2286	U2223	G	C2033	C1973	C1772	U1833	C1710
A2532	G2532	A2533	A2287	C2349	A2287	U2224	A2159	G2034	U1974	G1773	G1712	C1711
A2533	C2533	A2534	A2288	G2350	A2288	U2225	A2159	U2035	G1975	A1774	G1713	G1711
A2534	G2534	A2535	A2289	U2351	A2289	A2226	C2160	G2036	U1976	U1775	G1837	G1712
A2535	C2535	A2536	G2292	A2352	A2292	C2227	C2162	A2037	C1977	A1776	A1838	A1714
A2536	G2536	A2537	C2293	U2353	C2293	U2228	U2163	G	U1978	C1917	A1840	A1745
A2537	C2537	A2538	G2294	G2354	G2294	U2229	A	G2038	U1979	G1918	G1841	G1716
A2538	G2538	A2539	U2294	U2355	U2294	G2230	U	A2040	A1980	U1842	U1778	A1717
A2539	C2539	A2540	G2297	A2356	A2297	G2231	A	A2041	A1981	U1843	C1779	A1718
A2540	G2540	A2541	U2298	U2357	U2298	G2232	A2167	A2042	C1982	C1844	C1781	G1719
A2541	C2541	A2542	U2299	G2358	U2299	C2233	G2103	A2043	G1983	U1922	A1845	G1720
A2542	G2542	A2543	A2299	U2359	A2299	C2234	U2105	G2044	A1984	U1923	A1846	A1783
A2543	C2543	A2544	G2300	U2360	G2300	U2235	G2106	A2045	C1985	C1924	G1847	C1722
A2544	G2544	A2545	A2301	G2361	A2301	U2236	G2107	G2046	G1986	C1925	U1848	U1723
A2545	C2545	A2546	G2302	U2362	G2302	C2237	U2171	C2047	G1987	U1926	G1886	C1785
A2546	G2546	A2547	C2303	G2363	C2303	U2238	U2172	C2048	G1988	U1927	U1787	C1726
A2547	C2547	A2548	G2304	U2364	G2304	C2239	G2173	C2049	C1989	G1928	C1788	C1727
A2548	G2548	A2549	C2305	U2365	C2305	U2240	C	G2050	U1990	U1929	C1853	U1789
A2549	C2549	A2550	U2306	U2366	U2306	U2241	U	U2051	C1991	C1930	G1854	G1790
A2550	G2550	A2551	A2307	U2367	A2307	C2242	U	G2052	G1992	G1931	G1855	C1791



• Molecule 2: 5S RIBOSOMAL RNA



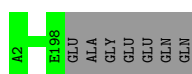
• Molecule 3: 50S ribosomal protein L2



• Molecule 4: 50S ribosomal protein L3



• Molecule 5: 50S ribosomal protein L4



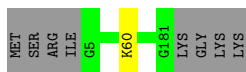
• Molecule 6: 50S ribosomal protein L5

Chain D:  99%



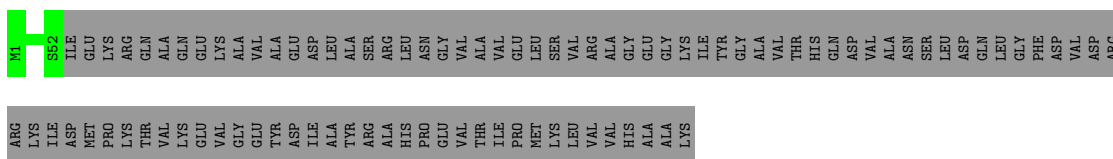
- Molecule 7: 50S ribosomal protein L6

Chain E:  95%



- Molecule 8: 50S ribosomal protein L9

Chain F:  36% 64%




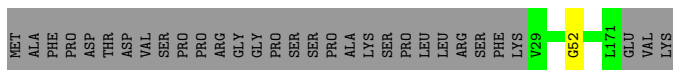
- Molecule 9: 50S ribosomal protein L11

Chain G:  99%



- Molecule 10: 50S ribosomal protein L13

Chain H:  82% 18%




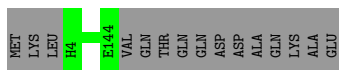
- Molecule 11: 50S ribosomal protein L14

Chain I:  97%




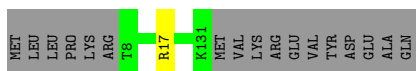
- Molecule 12: 50S ribosomal protein L15

Chain J:  90% 10%



- Molecule 13: ribosomal protein L16

Chain K:  87% 12%



- Molecule 14: 50S ribosomal protein L17

Chain L:  97%



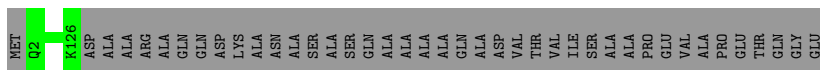
- Molecule 15: 50S ribosomal protein L18

Chain M:  98%



- Molecule 16: 50S ribosomal protein L19

Chain N:  75% 25%



- Molecule 17: 50S ribosomal protein L20

Chain O:  99%



- Molecule 18: 50S ribosomal protein L21

Chain P:  100%

There are no outlier residues recorded for this chain.

- Molecule 19: 50S ribosomal protein L22

Chain Q:  94% 5%



- Molecule 20: 50S ribosomal protein L23

Chain R:  97% ..



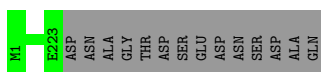
- Molecule 21: 50S ribosomal protein L24

Chain S:  98% .



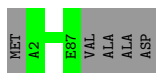
- Molecule 22: 50S ribosomal protein L25

Chain T:  94% 6%



- Molecule 23: 50S ribosomal protein L27

Chain U:  95% 5%



- Molecule 24: 50S ribosomal protein L29

Chain W:  97% .



- Molecule 25: 50S ribosomal protein L30

Chain X:  100%

There are no outlier residues recorded for this chain.

- Molecule 26: 50S ribosomal protein L31

Chain Y:  100%

There are no outlier residues recorded for this chain.

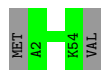
- Molecule 27: 50S ribosomal protein L32

Chain Z:  98% .



- Molecule 28: 50S ribosomal protein L33

Chain 1: 96%



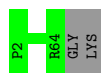
- Molecule 29: 50S ribosomal protein L34

Chain 2: 98%



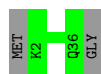
- Molecule 30: 50S ribosomal protein L35

Chain 3: 97%



- Molecule 31: 50S ribosomal protein L36

Chain 4: 95% 5%





## 4 Data and refinement statistics

Xtrriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	I 2 2 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	168.70Å 405.00Å 693.00Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	15.00 – 3.50	Depositor
% Data completeness (in resolution range)	88.3 (15.00-3.50)	Depositor
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.14	Depositor
Refinement program	CNS	Depositor
R, $R_{free}$	0.290 , 0.360	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	65328	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	40.0	wwPDB-VP

## 5 Model quality i

### 5.1 Standard geometry i

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

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	0	0.79	21/66467 (0.0%)	0.82	43/103673 (0.0%)
2	9	0.44	0/2813	0.73	0/4384
All	All	0.78	21/69280 (0.0%)	0.82	43/108057 (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	0	0	260

The worst 5 of 21 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	0	1646	G	C5-C6	-7.94	1.34	1.42
1	0	2570	C	N1-C2	6.85	1.47	1.40
1	0	2801	A	C5-C6	-6.62	1.35	1.41
1	0	2673	G	C5-C6	-6.49	1.35	1.42
1	0	2222	U	N3-C4	-6.45	1.32	1.38

The worst 5 of 43 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	0	2482	A	N9-C1'-C2'	8.75	125.37	114.00
1	0	460	U	N1-C1'-C2'	7.48	123.72	114.00
1	0	859	U	N1-C1'-C2'	-7.43	103.83	112.00
1	0	1710	U	N1-C1'-C2'	7.14	123.28	114.00
1	0	1266	G	N9-C1'-C2'	6.48	122.43	114.00

There are no chirality outliers.

5 of 260 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	0	16	G	Sidechain
1	0	27	G	Sidechain
1	0	6	A	Sidechain
1	0	67	G	Sidechain
1	0	9	U	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	0	59359	0	29916	4247	0
2	9	2516	0	1286	144	0
3	A	270	0	0	2	0
4	B	205	0	0	3	0
5	C	197	0	0	0	0
6	D	178	0	0	0	0
7	E	177	0	0	1	0
8	F	52	0	0	0	0
9	G	143	0	0	0	0
10	H	143	0	0	1	0
11	I	132	0	0	2	0
12	J	141	0	0	0	0
13	K	124	0	0	1	0
14	L	114	0	0	3	0
15	M	111	0	0	0	0
16	N	125	0	0	0	0
17	O	117	0	0	0	0
18	P	100	0	0	0	0
19	Q	127	0	0	1	0
20	R	93	0	0	1	0
21	S	113	0	0	0	0
22	T	223	0	0	0	0
23	U	86	0	0	0	0
24	W	65	0	0	0	0
25	X	55	0	0	0	0
26	Y	73	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
27	Z	58	0	0	0	0
28	1	53	0	0	0	0
29	2	46	0	0	0	0
30	3	63	0	0	0	0
31	4	35	0	0	0	0
32	0	34	0	47	4	0
All	All	65328	0	31249	4383	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 46.

The worst 5 of 4383 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)
1:0:584:A:H4'	1:0:2038:C:N4	1.53	1.23
1:0:1621:C:H4'	1:0:1626:A:N6	1.57	1.19
1:0:918:A:H2'	1:0:919:U:H5''	1.24	1.18
1:0:1339:U:H5''	1:0:1994:U:H1'	1.21	1.18
1:0:1938:U:O2'	1:0:1939:U:H5'	1.42	1.18

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

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

There are no protein backbone outliers to report in this entry.

### 5.3.2 Protein sidechains [i](#)

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

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	0	2757/2880 (95%)	512 (18%)	39 (1%)
2	9	117/124 (94%)	17 (14%)	1 (0%)
All	All	2874/3004 (95%)	529 (18%)	40 (1%)

5 of 529 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	0	34	U
1	0	35	G
1	0	45	C
1	0	48	A
1	0	49	U

5 of 40 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	0	2016	A
1	0	2404	A
1	0	2044	G
1	0	2161	C
1	0	2810	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 monosaccharides in this entry.

#### 5.6 Ligand geometry [i](#)

1 ligand is 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
32	MUL	0	2881	-	36,36,36	1.35	4 (11%)	54,55,55	1.70	9 (16%)

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
32	MUL	0	2881	-	-	5/18/79/79	0/3/3/3

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
32	0	2881	MUL	C5-C14	4.47	1.59	1.56
32	0	2881	MUL	C12-C11	3.52	1.58	1.55
32	0	2881	MUL	O3-C14	2.37	1.50	1.46
32	0	2881	MUL	C10-C11	2.31	1.58	1.56

The worst 5 of 9 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
32	0	2881	MUL	C18-C12-C11	6.34	111.76	108.06
32	0	2881	MUL	O3-C21-C22	5.49	119.56	110.32
32	0	2881	MUL	C16-C6-C7	-2.92	105.97	110.37
32	0	2881	MUL	C9-C10-C11	2.86	115.19	112.56
32	0	2881	MUL	C17-C10-C11	-2.71	110.00	112.11

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
32	0	2881	MUL	C28-C27-N1-C24
32	0	2881	MUL	C28-C27-N1-C25
32	0	2881	MUL	C26-C25-N1-C27
32	0	2881	MUL	C26-C25-N1-C24
32	0	2881	MUL	C23-C24-N1-C27

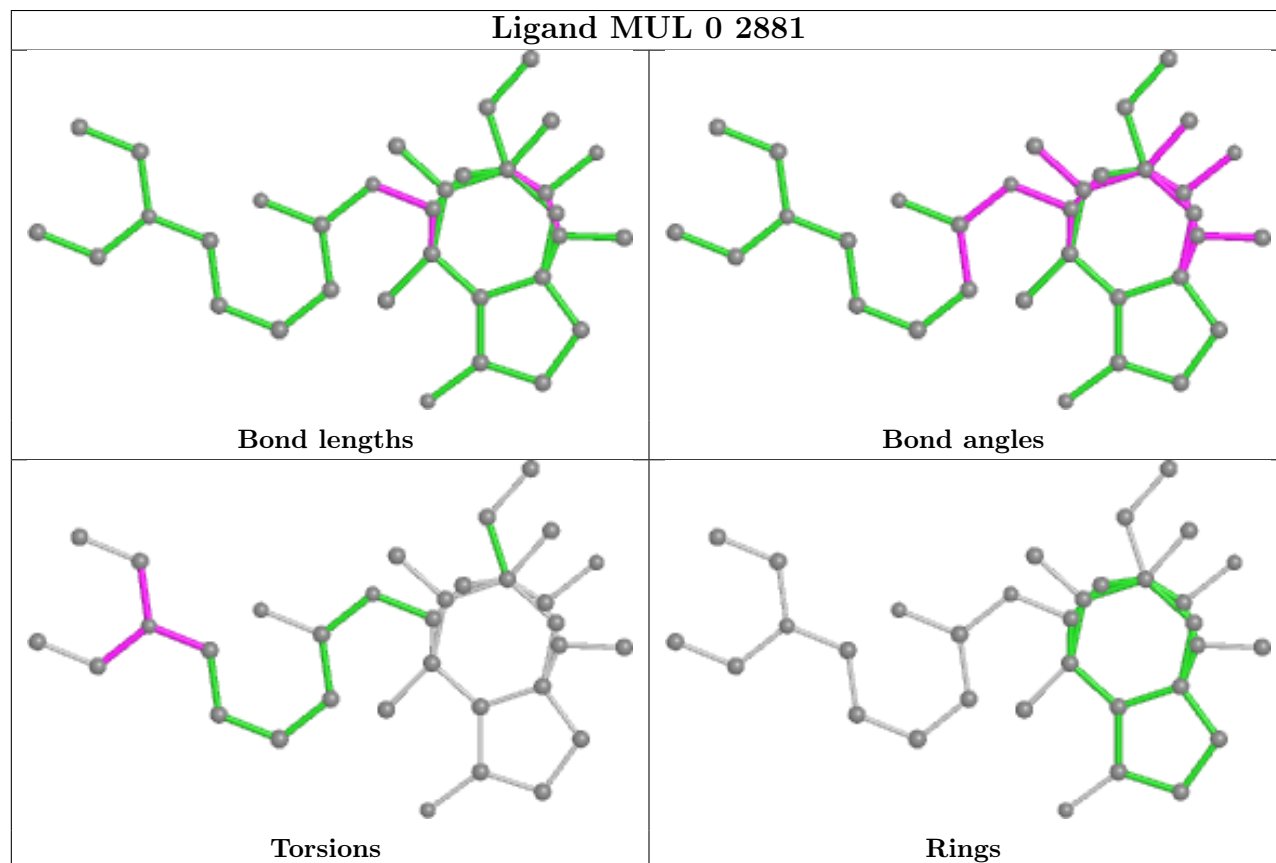
There are no ring outliers.

1 monomer is involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
32	0	2881	MUL	4	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will

also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



## 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

EDS was not executed - this section is therefore empty.

### 6.2 Non-standard residues in protein, DNA, RNA chains

EDS was not executed - this section is therefore empty.

### 6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

### 6.4 Ligands

EDS was not executed - this section is therefore empty.

### 6.5 Other polymers

EDS was not executed - this section is therefore empty.