



# wwPDB X-ray Structure Validation Summary Report ⓘ

May 16, 2020 – 02:12 am BST

PDB ID : 3IKM  
Title : Crystal structure of human mitochondrial DNA polymerase holoenzyme  
Authors : Lee, Y.-S.; Kennedy, W.D.; Yin, Y.W.  
Deposited on : 2009-08-06  
Resolution : 3.24 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.

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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  
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

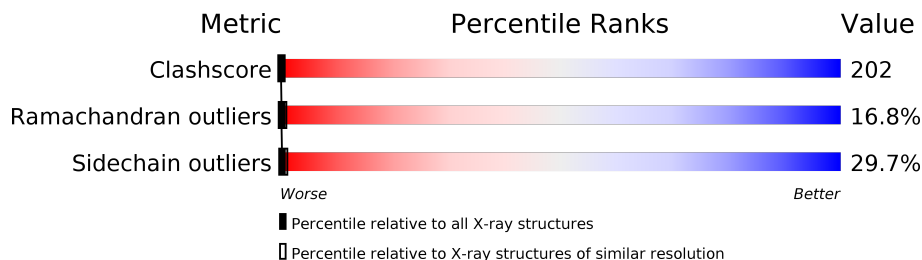
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.24 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	1755 (3.28-3.20)
Ramachandran outliers	138981	1728 (3.28-3.20)
Sidechain outliers	138945	1727 (3.28-3.20)

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  $\geq 3$ , 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  $\leq 5\%$ .

Mol	Chain	Length	Quality of chain
1	A	1172	5% 45% 34% 9% 7%
1	D	1172	5% 43% 34% 11% 7%
2	B	427	11% 50% 17% 5% 17%
2	C	427	6% 54% 25% 8% 7%
2	E	427	6% 55% 19% . 17%
2	F	427	5% 54% 25% 8% 7%

## 2 Entry composition [i](#)

There are 2 unique types of molecules in this entry. The entry contains 29480 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called DNA polymerase subunit gamma-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	1093	8681	5505	1537	1589	50	0	0	0
1	D	1094	8695	5515	1540	1590	50	0	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	354	ASN	-	SEE REMARK 999	UNP P54098
A	355	SER	-	SEE REMARK 999	UNP P54098
D	354	ASN	-	SEE REMARK 999	UNP P54098
D	354A	SER	-	SEE REMARK 999	UNP P54098

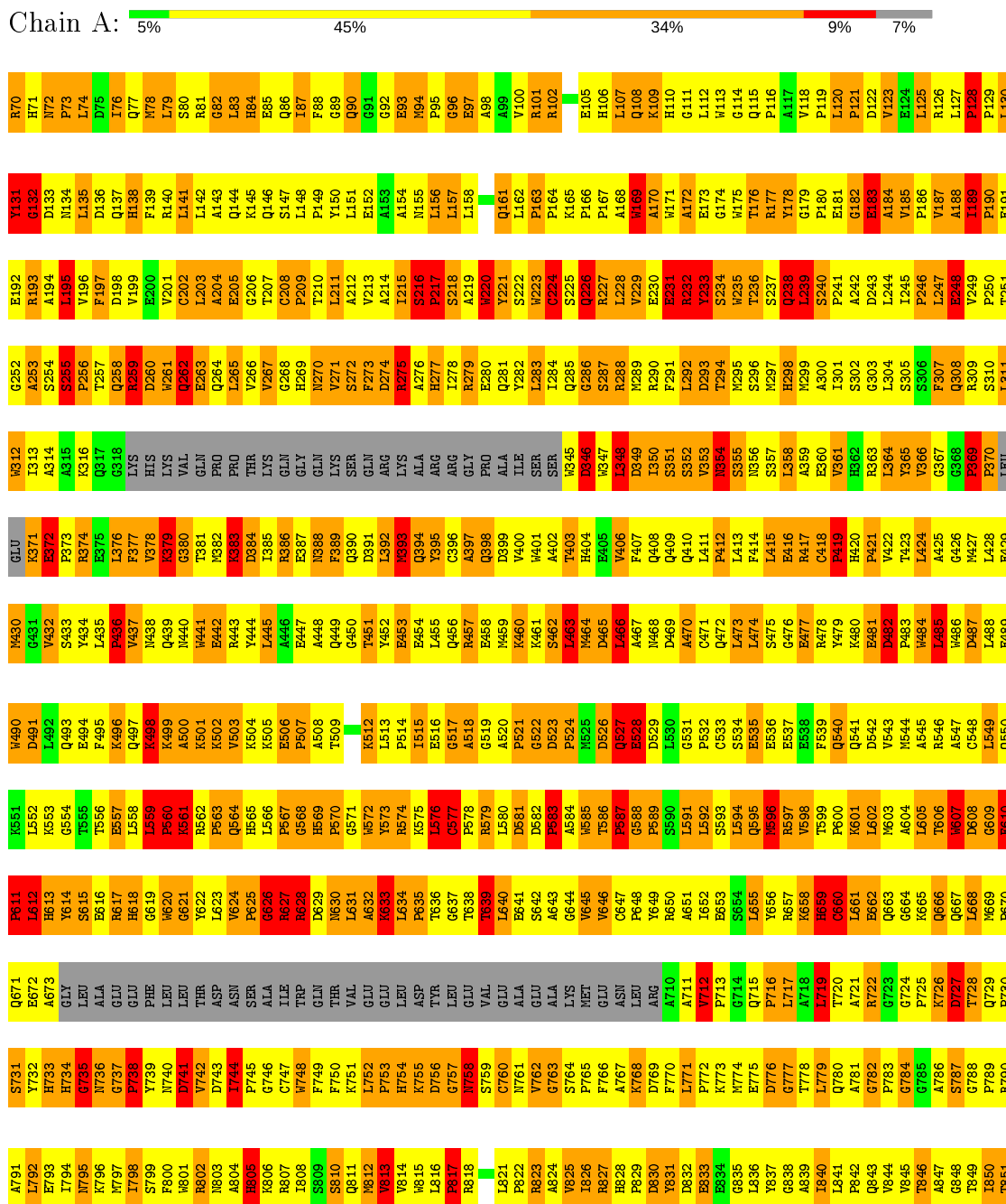
- Molecule 2 is a protein called DNA polymerase subunit gamma-2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	355	2871	1840	504	511	16	0	0	0
2	C	396	3181	2031	563	571	16	0	0	0
2	E	355	2871	1840	504	511	16	0	0	0
2	F	396	3181	2031	563	571	16	0	0	0

### 3 Residue-property plots

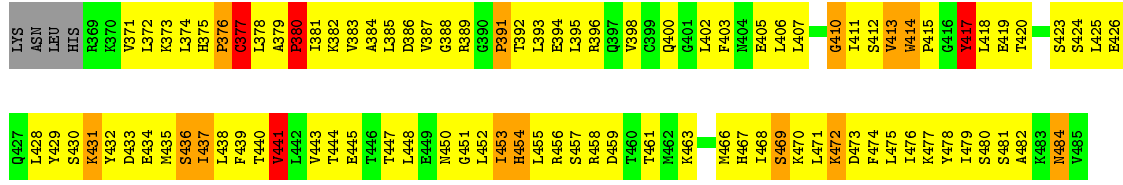
These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: DNA polymerase subunit gamma-1

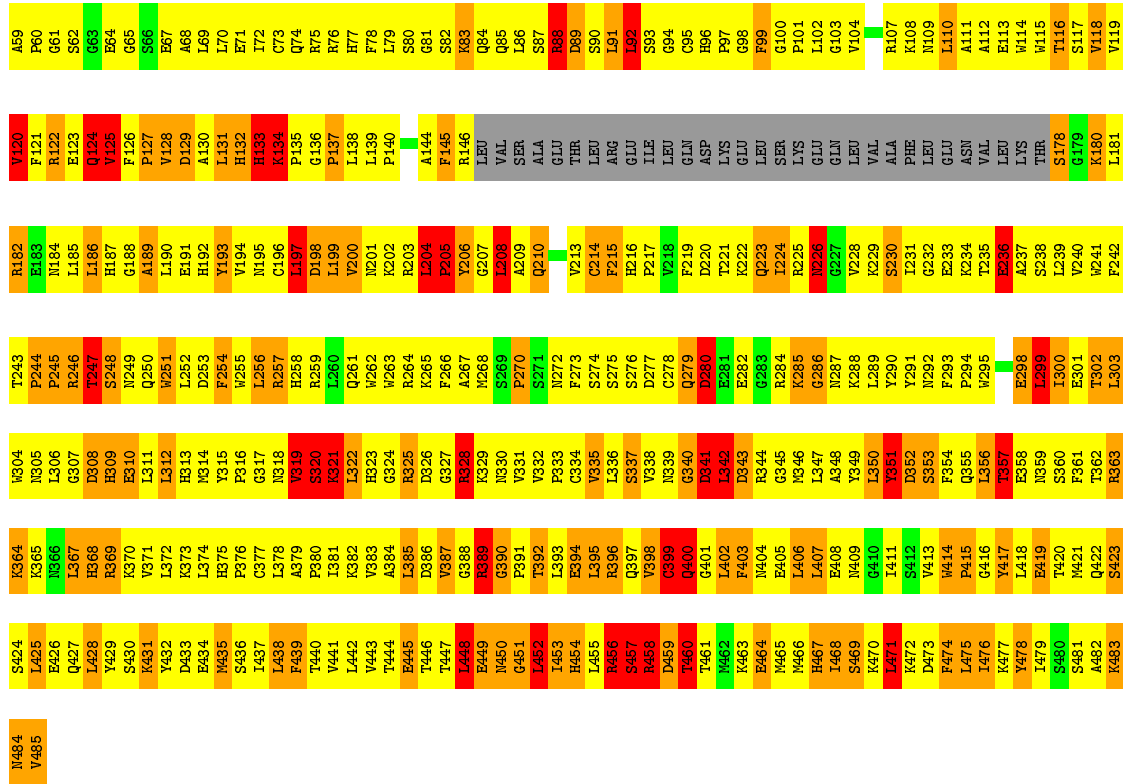
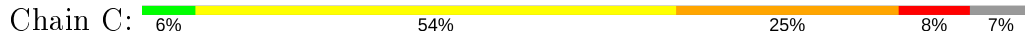


R852	R853	R854	V855	V856	V857	V858	V859	W860	W861	W862	W863	W864	W865	W866	W867	W868	W869	W870	W871	S872	S873	S874	S875	S876	S877	D880	V881	D882	S883	Q884	E885	L886	W887	D880	V881	D882	S883	Q884	E885	L886	W887	D880	V881	D882	S883	Q884	E885	L886	W887																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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R913	G914	D915	A916	F917	A918	G919	V920	F921	H922	R923	G924	D925	A926	F927	A928	G929	V930	F931	H932	R933	G934	D935	A936	F937	A938	G939	V940	F941	H942	R943	G944	D945	A946	F947	A948	G949	V950	F951	H952	R953	G954	D955	A956	F957	A958	G959	V960	F961	H962	R963	G964	D965	A966	F967	A968	G969	V970	F971	H972	R973	G974	D975	A976	F977	A978	G979	V980	F981	H982	R983	G984	D985	A986	F987	A988	G989	V990	F991	H992	R993	G994	D995	A996	F997	A998	G999	V1000	F1001	H1002	R1003	G1004	D1005	A1006	F1007	A1008	G1009	V1010	F1011	H1012	R1013	G1014	D1015	A1016	F1017	A1018	G1019	V1020	F1021	H1022	R1023	G1024	D1025	A1026	F1027	A1028	G1029	V1030	F1031	H1032	R1033	G1034	D1035	A1036	F1037	A1038	G1039	V1040	F1041	H1042	R1043	G1044	D1045	A1046	F1047	A1048	G1049	V1050	F1051	H1052	R1053	G1054	D1055	A1056	F1057	A1058	G1059	V1060	F1061	H1062	R1063	G1064	D1065	A1066	F1067	A1068	G1069	V1070	F1071	H1072	R1073	G1074	D1075	A1076	F1077	A1078	G1079	V1080	F1081	H1082	R1083	G1084	D1085	A1086	F1087	A1088	G1089	V1090	F1091	H1092	R1093	G1094	D1095	A1096	F1097	A1098	G1099	V1100	F1101	H1102	R1103	G1104	D1105	A1106	F1107	A1108	G1109	V1110	F1111	H1112	R1113	G1114	D1115	A1116	F1117	A1118	G1119	V1120	F1121	H1122	R1123	G1124	D1125	A1126	F1127	A1128	G1129	V1130	F1131	H1132	R1133	G1134	D1135	A1136	F1137	A1138	G1139	V1140	F1141	H1142	R1143	G1144	D1145	A1146	F1147	A1148	G1149	V1150	F1151	H1152	R1153	G1154	D1155	A1156	F1157	A1158	G1159	V1160	F1161	H1162	R1163	G1164	D1165	A1166	F1167	A1168	G1169	V1170	F1171	H1172	R1173	G1174	D1175	A1176	F1177	A1178	G1179	V1180	F1181	H1182	R1183	G1184	D1185	A1186	F1187	A1188	G1189	V1190	F1191	H1192	R1193	G1194	D1195	A

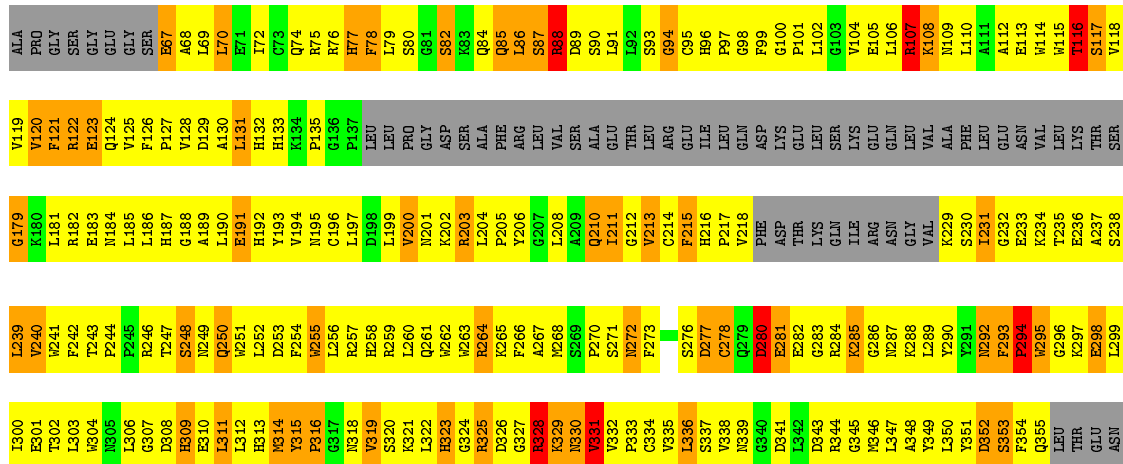
S615	S616	S617	S618	S619	S620	S621	S622	S623	S624	S625	S626	S627	S628	S629	S630	S631	S632	S633	S634	S635	S636	S637	S638	S639	S640	S641	S642	S643	S644	S645	S646	S647	S648	S649	S650	S651	S652	S653	S654	S655	S656	S657	S658	S659	S660	S661	S662	S663	S664	S665	S666	S667	S668	S669	S670	S671	S672	S673	S674	S675	S676	S677	S678	S679	S680	S681	S682	S683	S684	S685	S686	S687	S688	S689	S690	S691	S692	S693	S694	S695	S696	S697	S698	S699	S700	S701	S702	S703	S704	S705	S706	S707	S708	S709	S710	S711	S712	S713	S714	S715	S716	S717	S718	S719	S720	S721	S722	S723	S724	S725	S726	S727	S728	S729	S730	S731	S732	S733	S734																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
LEU	ALA	GLU	GLU	PHE	LEU	LEU	THR	ASP	ASN	SER	ALA	ILE	TRP	GLN	THR	VAL	GLU	GLU	LEU	ASP	TYR	LEU	GLU	VAL	VAL	GLU	ALA	GLU	LYS	MET	GLU	ASN	LEU	LEU	D850	D851	A711	A712	P713	P714	P715	P716	P717	P718	P719	P720	P721	P722	P723	P724	P725	P726	P727	P728	P729	P730	P731	P732	P733	P734																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
K735	K736	K737	K738	K739	K740	K741	K742	K743	K744	K745	K746	K747	K748	K749	K750	K751	K752	K753	K754	K755	K756	K757	K758	K759	K760	K761	K762	K763	K764	K765	K766	K767	K768	K769	K770	K771	K772	K773	K774	K775	K776	K777	K778	K779	K780	K781	K782	K783	K784	K785	K786	K787	K788	K789	K790	K791	K792	K793	K794	K795	K796	K797	K798	K799	K800	K801	K802	K803	K804	K805	K806	K807	K808	K809	K810	K811	K812	K813	K814	K815	K816	K817	K818	K819	K820	K821	K822	K823	K824	K825	K826	K827	K828	K829	K830	K831	K832	K833	K834	K835	K836	K837	K838	K839	K840	K841	K842	K843	K844	K845	K846	K847	K848	K849	K850	K851	K852	K853	K854	K855	K856	K857	K858	K859	K860	K861	K862	K863	K864	K865	K866	K867	K868	K869	K870	K871	K872	K873	K874	K875	K876	K877	K878	K879	K880	K881	K882	K883	K884	K885	K886	K887	K888	K889	K890	K891	K892	K893	K894	K895	K896	K897	K898	K899	K900	K901	K902	K903	K904	K905	K906	K907	K908	K909	K910	K911	K912	K913	K914	K915	K916	K917	K918	K919	K920	K921	K922	K923	K924	K925	K926	K927	K928	K929	K930	K931	K932	K933	K934	K935	K936	K937	K938	K939	K940	K941	K942	K943	K944	K945	K946	K947	K948	K949	K950	K951	K952	K953	K954	K955	K956	K957	K958	K959	K960	K961	K962	K963	K964	K965	K966	K967	K968	K969	K970	K971	K972	K973	K974	K975	K976	K977	K978	K979	K980	K981	K982	K983	K984	K985	K986	K987	K988	K989	K990	K991	K992	K993	K994	K995	K996	K997	K998	K999	G1000	G1001	G1002	G1003	G1004	G1005	G1006	G1007	G1008	G1009	G1010	G1011	G1012	G1013	G1014	G1015	G1016	G1017	G1018	G1019	G1020	G1021	G1022	G1023	G1024	G1025	G1026	G1027	G1028	G1029	G1030	G1031	G1032	G1033	G1034	G1035	G1036	G1037	G1038	G1039	G1040	G1041	G1042	G1043	G1044	G1045	G1046	G1047	G1048	G1049	G1050	G1051	G1052	G1053	G1054	G1055	G1056	G1057	G1058	G1059	G1060	G1061	G1062	G1063	G1064	G1065	G1066	G1067	G1068	G1069	G1070	G1071	G1072	G1073	G1074	G1075	G1076	G1077	G1078	G1079	G1080	G1081	G1082	G1083	G1084	G1085	G1086	G1087	G1088	G1089	G1090	G1091	G1092	G1093	G1094	G1095	G1096	G1097	G1098	G1099	G1100	G1101	G1102	G1103	G1104	G1105	G1106	G1107	G1108	G1109	G1110	G1111	G1112	G1113	G1114	G1115	G1116	G1117	G1118	G1119	G1120	G1121	G1122	G1123	G1124	G1125	G1126	G1127	G1128	G1129	G1130	G1131	G1132	G1133	G1134	G1135	G1136	G1137	G1138	G1139	G1140	G1141	G1142	G1143	G1144	G1145	G1146	G1147	G1148	G1149	G1150	G1151	G1152	G1153	G1154	G1155	G1156	G1157	G1158	G1159	G1160	G1161	G1162	G1163	G1164	G1165	G1166	G1167	G1168	G1169	G1170	G1171	G1172	G1173	G1174	G1175	G1176	G1177	G1178	G1179	G1180	G1181	G1182	G1183	G1184	G1185	G1186	G1187	G1188	G1189	G1190	G1191	G1192	G1193	G1194	G1195	G1196	G1197	G1198	G1199	G1200	G1201	G1202	G1203	G1204	G1205	G1206	G1207	G1208	G1209	G1210	G1211	G1212	G1213	G1214	G1215	G1216	G1217	G1218	G1219	G1220	G1221	G1222	G1223	G1224	G1225	G1226	G1227	G1228	G1229	G1230	G1231	G1232	G1233	G1234	G1235	G1236	G1237	G1238	G1239	G1240	G1241	G1242	G1243	G1244	G1245	G1246	G1247	G1248	G1249	G1250	G1251	G1252	G1253	G1254	G1255	G1256	G1257	G1258	G1259	G1260	G1261	G1262	G1263	G1264	G1265	G1266	G1267	G1268	G1269	G1270	G1271	G1272	G1273	G1274	G1275	G1276	G1277	G1278	G1279	G1280	G1281	G1282	G1283	G1284	G1285	G1286	G1287	G1288	G1289	G1290	G1291	G1292	G1293	G1294	G1295	G1296	G1297	G1298	G1299	G1300	G1301	G1302	G1303	G1304	G1305	G1306	G1307	G1308	G1309	G1310	G1311	G1312	G1313	G1314	G1315	G1316	G1317	G1318	G1319	G1320	G1321	G1322	G1323	G1324	G1325	G1326	G1327	G1328	G1329	G1330	G1331	G1332	G1333	G1334	G1335	G1336	G1337	G1338	G1339	G1340	G1341	G1342	G1343	G1344	G1345	G1346	G1347	G1348	G1349	G1350	G1351	G1352	G1353	G1354	G1355	G1356	G1357	G1358	G1359	G1360	G1361	G1362	G1363	G1364	G1365	G1366	G1367	G1368	G1369	G1370	G1371	G1372	G1373	G1374	G1375	G1376	G1377	G1378	G1379	G1380	G1381	G1382	G1383	G1384	G1385	G1386	G1387	G1388	G1389	G1390	G1391	G1392	G1393	G1394	G1395	G1396	G1397	G1398	G1399	G1400	G1401	G1402	G1403	G1404	G1405	G1406	G1407	G1408	G1409	G1410	G1411	G1412	G1413	G1414	G1415	G1416	G1417	G1418	G1419	G1420	G1421	G1422	G1423	G1424	G1425	G1426	G1427	G1428	G1429	G1430	G1431	G1432	G1433	G1434	G1435	G1436	G1437	G1438	G1439	G1440	G1441	G1442	G1443	G1444	G1445	G1446	G1447	G1448	G1449	G1450	G1451	G1452	G1453	G1454	G1455	G1456	G1457	G1458	G1459	G1460	G1461	G1462	G1463	G1464	G1465	G1466	G1467	G1468	G1469	G1470	G1471	G1472	G1473	G1474	G1475	G1476	G1477	G1478	G1479	G1480	G1481	G1482	G1483	G1484	G1485	G1486	G1487	G1488	G1489	G1490	G1491	G1492	G1493	G1494	G1495	G1496	G1497	G1498	G1499	G1500	G1501	G1502	G1503	G1504	G1505	G1506	G1507	G1508	G1509	G1510	G1511	G1512	G1513	G1514	G1515	G1516	G1517	G1518	G1519	G1520	G1521	G1522	G1523	G1524	G1525	G1526	G1527	G1528	G1529	G1530	G1531	G1532	G1533	G1534	G1535	G1536	G1537	G1538	G1539	G1540	G1541	G1542	G1543	G1544	G1545	G1546	G1547	G1548	G1549	G1550	G1551	G1552	G1553	G1554	G1555	G1556	G1557	G1558	G1559	G1560	G1561	G1562	G1563	G1564	G1565	G1566	G1567	G1568	G1569	G1570	G1571	G1572	G1573	G1574	G1575	G1576	G1577	G1578	G1579	G1580	G1581	G1582	G1583	G1584	G1585	G1586	G1587	G1588	G1589	G1590	G1591	G1592	G1593	G1594	G1595	G1596	G1597	G1598	G1599	G1600	G1601	G1602	G1603	G1604	G1605	G1606	G1607	G1608	G1609	G1610	G1611	G1612	G1613	G1614	G1615	G1616	G1617	G1618	G1619	G1620	G1621	G1622	G1623	G1624	G1625	G1626	G1627	G1628	G1629	G1630	G1631	G1632	G1633	G1634	G1635	G1636	G1637	G1638	G1639	G1640	G1641	G1642	G1643	G1644	G1645	G1646	G1647	G1648	G1649	G1650	G1651	G1652	G1653	G1654	G1655	G1656	G1657	G1658	G1659	G1660	G1661	G1662	G1663	G1664	G1665	G1666	G1667	G1668	G1669	G1670	G1671	G1672	G1673	G1674	G1675	G1676	G1677	G1678	G1679	G1680	G1681	G1682	G1683	G1684	G1685	G1686	G1687	G1688	G1689	G1690	G1691	G1692	G1693	G1694	G1695	G1696	G1697	G1698	G1699	G1700	G1701	G1702	G1703	G1704	G1705	G1706	G1707	G1708	G1709	G1710	G1711	G1712	G1713	G1714	G1715	G1716	G1717	G1718	G1719	G1720	G1721	G1722	G1723	G1724	G1725	G1726	G1727	G1728	G1729	G1730	G1731	G1732	G1733	G1734	G1735	G1736	G1737	G1738	G1739	G1740	G1741	G1742	G1743	G1744	G1745	G1746	G1747	G1748	G1749	G1750	G1751	G1752	G1753	G1754	G1755	G1756	G1757	G1758	G1759	G1760	G1761	G1762	G1763	G1764	G1765	G1766	G1767	G1768	G1769	G1770	G1771	G1772	G1773	G1774	G1775	G1776	G1777	G1778	G1779	G1780	G1781	G1782	G1783	G1784	G1785	G1786	G1787	G1788	G1789	G1790	G1791	G1792	G1793	G1794	G1795	G1796	G1797	G1798	G1799	G1800	G1801	G1802	G1803	G1804	G1805	G1806	G1807	G1808	G1809	G1810	G1811	G1812	G1813	G1814	G1815	G1816	G1817	G1818	G1819	G1820	G1821	G1822	G1823	G1824	G1825	G1826	G1827	G1828	G1829	G1830	G1831	G1832	G1833	G1834	G1835	G1836	G1837	G1838	G1839	G1840	G1841	G1842	G1843	G1844	G1845	G1846	G1847	G1848	G1849	G1850	G1851	G1852	G1853	G1854	G1855	G1856	G1857	G1858	G1859	G1860	G1861	G1862	G1863	G1864	G1865	G1866	G1867	G1868	G1869	G1870	G1871	G1872	G1873	G1874	G1875	G1876	G1877	G1878	G1879	G1880	G1881	G1882	G1883	G1884	G1885	G1886	G1887	G1888	G1889	G1890	G1891	G1892	G1893	G1894	G1895	G1896	G1897	G1898	G1899	G1900	G1901	G1902	G1903	G1904	G1905	G1906	G1907	G1908	G1909	G1910	G1911	G1912	G1913	G1914	G1915	G1916	G1917	G1918	G1919	G1920	G1921	G1922	G1923	G1924	G1925	G1926	G1927	G1928	G1929	G1930	G1931	G1932	G1933	G1934	G1935	G1936	G1937	G1938	G1939	G1940	G1941	G1942	G1943	G1944	G1945	G1946	G1947	G1948	G1949	G1950	G1951	G1952	G1953	G1954	G1955	G1956	G1957	G1958	G1959	G1960	G1961	G1962	G1963	G1964	G1



• Molecule 2: DNA polymerase subunit gamma-2



• Molecule 2: DNA polymerase subunit gamma-2



SER	T420	S480
PHE	M421	S481
THR	Q422	A482
ARG	S423	K483
LYS	S424	N484
LYS	L425	V485
ASN	E426	
LEU	Q427	
HIS	L428	
	Y429	
	K370	
	S430	
	V371	
	L372	
	K373	
	L374	
	H375	
	P376	
	I437	
	C377	
	L378	
	A379	
	P380	
	I381	
	K382	
	V383	
	V443	
	A384	
	L385	
	D386	
	V387	
	T447	
	L448	
	G388	
	E449	
	R389	
	G390	
	P391	
	T392	
	L393	
	E394	
	L395	
	R396	
	Q397	
	V398	
	C399	
	Q400	
	T460	
	T461	
	M462	
	L463	
	M464	
	M465	
	M466	
	H467	
	I468	
	I469	
	S469	
	K470	
	L471	
	S412	
	V413	
	D473	
	F474	
	L475	
	G416	
	Y417	
	L418	
	I479	
	S481	
	A482	

● Molecule 2: DNA polymerase subunit gamma-2

Chain F: 5% 54% 25% 8% 7%

A59	F121	L181	F242	T302	R363	S423	K483
F60	R122	R182	T243	L303	K364	S424	M484
661	E183	E183	F244	M304	M365	L425	V485
	Q124	M184	F245	M305	N366	E426	
	V125	L185	R246	L306	H367	Q427	
	F126	L186	T247	G307	H368	L428	
	P127	H187	S248	D308	R369	Y429	
	V128	G188	M249	H309	K370	S430	
	A68	A189	Q250	E310	V371	K431	
	D129	L190	M251	L311	L372	Y432	
	L69	E191	L252	L312	K373	D433	
	L70	E191	L253	H313	L374	E434	
	E71	H192	D254	H314	H375	M435	
	L72	H193	F254	M314	R376	S436	
	C73	K134	M255	Y315	P377	L437	
	Q74	P135	L256	F316	C378	L438	
	Q75	G136	R257	G317	L378	L439	
	R76	P137	E258	N318	A379	F439	
	H77	L138	R259	V319	P380	T440	
	F78	L139	D260	S320	I381	V441	
	L79	P140	V200	K321	K382	L442	
	S80	G141	M201	M262	V383	V443	
	681	D142	K202	M263	A384	T444	
	S82	S143	R203	G324	L385	E445	
		A144	R204	K265	D386	T446	
		F145	P205	F266	V387	T447	
		R146	Y206	A267	G388	L448	
		VAL	G207	M268	R389	E449	
		LEU	L208	S269	G390	M450	
		SER	R209	P270	P391	G451	
		ALA	A210	V330	T392	L452	
		GLU	Q211	G331	L453	T453	
		THR	T212	V332	E394	H454	
			G213	P333	L395	L455	
				G334	R396	R456	
				S335	S457	D458	
				L336	V398	T459	
				S337	C399	T460	
				V338	Q400	T461	
				R339	G401	M462	
				G340	L402	K463	
				D341	F403	E464	
				L342	M404	M465	
				D343	E405	M466	
				R344	L406	H467	
				G345	L407	T468	
				M346	E408	S469	
				L347	M409	K470	
				A348	G410	L471	
				L349	Y349	M472	
				L350	L350	D473	
				V351	V351	F474	
				D352	V413	L475	
				S353	W414	K477	
				F354	G415	Y478	
				P294	F354	I479	
				M295	G416	S481	
				Q355	L417	A482	
				L356	Y417		
				G296	L418		
				K297	E419		
				E298	T420		
				L299	M421		
				S300	Q422		
				E301			



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 32	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	138.39Å 138.39Å 226.31Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	46.92 – 3.24 46.92 – 3.25	Depositor EDS
% Data completeness (in resolution range)	89.5 (46.92-3.24) 89.5 (46.92-3.25)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.35 (at 3.25Å)	Xtriage
Refinement program	CNS 1.2	Depositor
R, $R_{free}$	0.284 , 0.303 0.362 , (Not available)	Depositor DCC
$R_{free}$ test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	91.9	Xtriage
Anisotropy	0.045	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.28 , 64.6	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.022 for -h,-k,l 0.468 for h,-h-k,-l 0.023 for -k,-h,-l	Xtriage
$F_o, F_c$ correlation	0.83	EDS
Total number of atoms	29480	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	85.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.11% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality

### 5.1 Standard geometry

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
1	A	0.72	10/8913 (0.1%)	1.33	149/12100 (1.2%)
1	D	0.81	18/8927 (0.2%)	1.45	161/12118 (1.3%)
2	B	0.60	2/2944 (0.1%)	0.99	16/3981 (0.4%)
2	C	0.68	0/3262	1.31	47/4411 (1.1%)
2	E	0.67	6/2944 (0.2%)	1.11	23/3981 (0.6%)
2	F	0.64	0/3262	1.28	37/4411 (0.8%)
All	All	0.72	36/30252 (0.1%)	1.31	433/41002 (1.1%)

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	A	0	4
1	D	1	3
2	B	0	1
2	C	0	1
2	E	1	2
2	F	0	1
All	All	2	12

The worst 5 of 36 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	358	GLU	CG-CD	12.87	1.71	1.51
2	E	385	LEU	CA-CB	-11.49	1.27	1.53
1	D	352	SER	N-CA	9.45	1.65	1.46
1	A	232	ARG	N-CA	-8.85	1.28	1.46
2	E	382	LYS	N-CA	-8.69	1.28	1.46

The worst 5 of 433 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	382	LYS	N-CA-C	16.56	155.72	111.00
2	E	385	LEU	N-CA-C	16.34	155.11	111.00
1	D	248	GLU	CA-C-N	-14.80	84.64	117.20
2	B	280	ASP	C-N-CA	14.32	157.51	121.70
1	A	1212	ILE	C-N-CD	-12.99	92.03	120.60

All (2) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
1	D	249	VAL	CA
2	E	385	LEU	CA

5 of 12 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1179	PHE	Sidechain
1	A	221	TYR	Sidechain
1	A	239	LEU	Mainchain
1	A	395	TYR	Sidechain
2	B	417	TYR	Sidechain

## 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	8681	0	8521	3592	8
1	D	8695	0	8540	3900	7
2	B	2871	0	2862	809	0
2	C	3181	0	3168	1419	1
2	E	2871	0	2862	945	0
2	F	3181	0	3168	1467	4
All	All	29480	0	29121	11814	10

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 202.

The worst 5 of 11814 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:D:352:SER:C	1:D:352:SER:CA	1.74	1.55
1:D:460:LYS:N	1:D:460:LYS:HE2	1.20	1.48
2:E:432:TYR:HB2	2:E:437:ILE:CD1	1.51	1.39
1:D:352:SER:CA	1:D:358:GLU:OE2	1.73	1.36
1:D:914:THR:O	1:D:918:TRP:HB3	1.24	1.35

The worst 5 of 10 symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:673:ALA:O	2:F:318:ASN:O[2_734]	1.91	0.29
1:A:673:ALA:C	2:F:318:ASN:O[2_734]	1.98	0.22
1:A:1034:ARG:NE	2:F:450:ASN:ND2[1_545]	2.04	0.16
1:A:994:TRP:NE1	1:D:522:GLY:N[1_545]	2.06	0.14
1:D:1232:GLU:OE2	2:F:223:GLN:OE1[2_844]	2.11	0.09

### 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	1085/1172 (93%)	629 (58%)	254 (23%)	202 (19%)	0	0
1	D	1086/1172 (93%)	645 (59%)	234 (22%)	207 (19%)	0	0
2	B	349/427 (82%)	205 (59%)	94 (27%)	50 (14%)	0	1
2	C	394/427 (92%)	254 (64%)	84 (21%)	56 (14%)	0	1
2	E	349/427 (82%)	219 (63%)	79 (23%)	51 (15%)	0	1
2	F	394/427 (92%)	251 (64%)	93 (24%)	50 (13%)	0	1
All	All	3657/4052 (90%)	2203 (60%)	838 (23%)	616 (17%)	0	0

5 of 616 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	72	ASN
1	A	76	ILE
1	A	96	GLY
1	A	163	PRO
1	A	169	TRP

### 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	918/988 (93%)	611 (67%)	307 (33%)	0 0
1	D	919/988 (93%)	584 (64%)	335 (36%)	0 0
2	B	317/380 (83%)	259 (82%)	58 (18%)	1 7
2	C	350/380 (92%)	260 (74%)	90 (26%)	0 1
2	E	317/380 (83%)	270 (85%)	47 (15%)	3 13
2	F	350/380 (92%)	245 (70%)	105 (30%)	0 1
All	All	3171/3496 (91%)	2229 (70%)	942 (30%)	0 1

5 of 942 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	C	369	ARG
1	D	308	GLN
2	F	231	ILE
2	C	407	LEU
1	D	145	LYS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 119 such sidechains are listed below:

Mol	Chain	Res	Type
2	C	454	HIS
1	D	394	GLN
2	F	84	GLN
1	D	86	GLN

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Mol	Chain	Res	Type
1	D	155	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](#)

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

### 5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

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

There are no ligands in this entry.

### 5.7 Other polymers [i](#)

There are no such residues in this entry.

### 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

Unable to reproduce the depositors R factor - this section is therefore empty.

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

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.3 Carbohydrates

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.4 Ligands

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.5 Other polymers

Unable to reproduce the depositors R factor - this section is therefore empty.