



wwPDB X-ray Structure Validation Summary Report ⓘ

Nov 2, 2023 – 11:30 AM EDT

PDB ID : 3HMJ
Title : Saccharomyces cerevisiae FAS type I
Authors : Johansson, P.; Mulinacci, B.; Koestler, C.; Vollrath, R.; Oesterhelt, D.;
Grininger, M.
Deposited on : 2009-05-29
Resolution : 4.00 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

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.36
buster-report : 1.1.7 (2018)
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) : 2.36

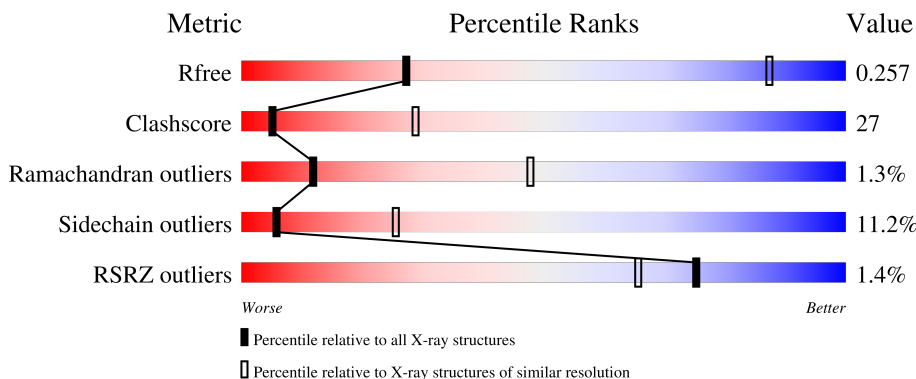
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 4.00 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	1087 (4.30-3.70)
Clashscore	141614	1148 (4.30-3.70)
Ramachandran outliers	138981	1108 (4.30-3.70)
Sidechain outliers	138945	1099 (4.30-3.70)
RSRZ outliers	127900	1028 (4.34-3.66)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	1887	 2% 55% 32% 5% 7%
1	B	1887	 2% 55% 32% 5% 7%
1	C	1887	 3% 54% 33% 5% 7%
2	G	2051	 51% 40% 8% .
2	H	2051	 51% 40% 8% .

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Mol	Chain	Length	Quality of chain
2	I	2051	 51% 40% 8%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 88830 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.

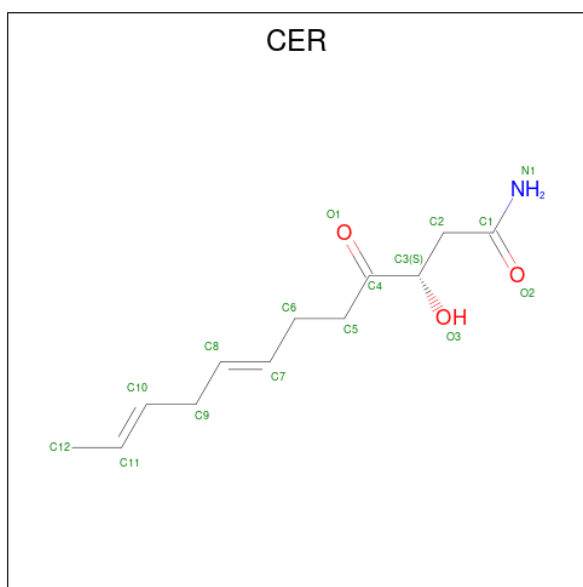
- Molecule 1 is a protein called Fatty acid synthase subunit alpha.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	1750	13572	8594	2292	2637	49	0	0	0
1	B	1750	13572	8594	2292	2637	49	0	0	0
1	C	1750	13572	8594	2292	2637	49	0	0	0

- Molecule 2 is a protein called Fatty acid synthase subunit beta.

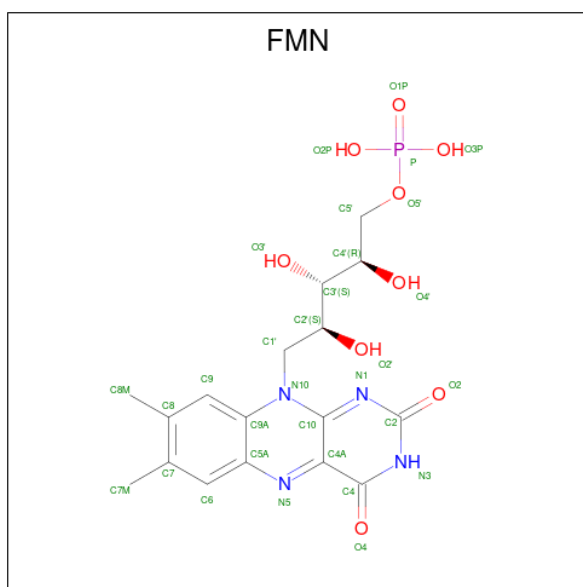
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	G	2033	15995	10253	2660	3026	56	0	0	0
2	H	2033	15995	10253	2660	3026	56	0	0	0
2	I	2033	15995	10253	2660	3026	56	0	0	0

- Molecule 3 is (2S, 3R)-3-HYDROXY-4-OXO-7,10-TRANS,TRANS-DODECADIENAMIDE (three-letter code: CER) (formula: C₁₂H₁₉NO₃).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			12	8	1	3		
3	B	1	Total	C	N	O	0	0
			12	8	1	3		
3	C	1	Total	C	N	O	0	0
			12	8	1	3		

- Molecule 4 is FLAVIN MONONUCLEOTIDE (three-letter code: FMN) (formula: C₁₇H₂₁N₄O₉P).

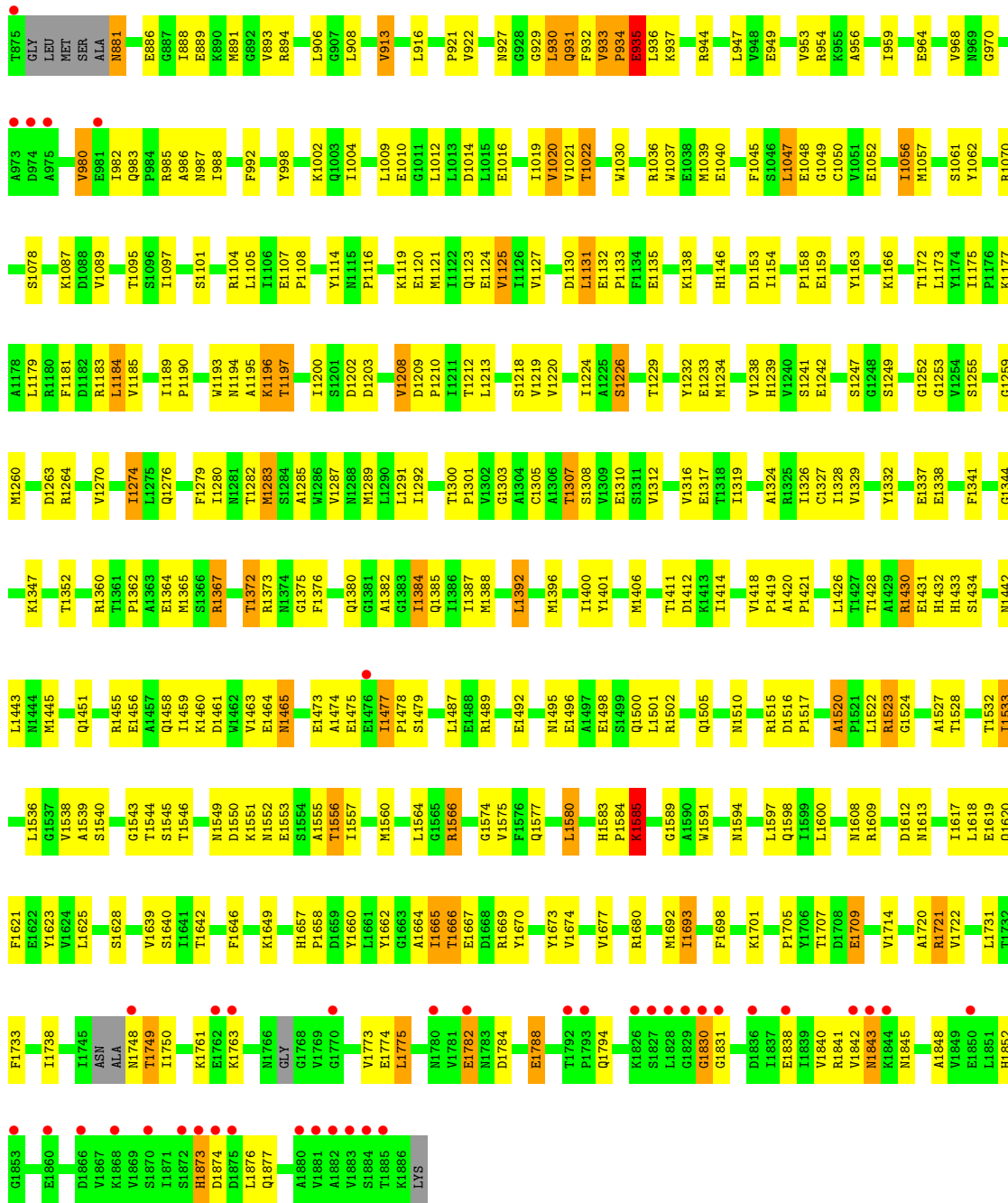


Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	G	1	Total	C	N	O	P	0	0
			31	17	4	9	1		

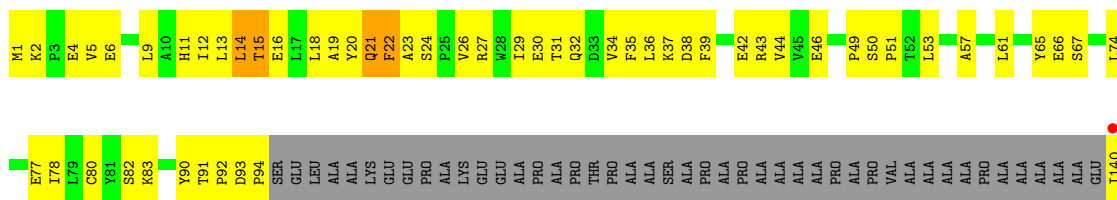
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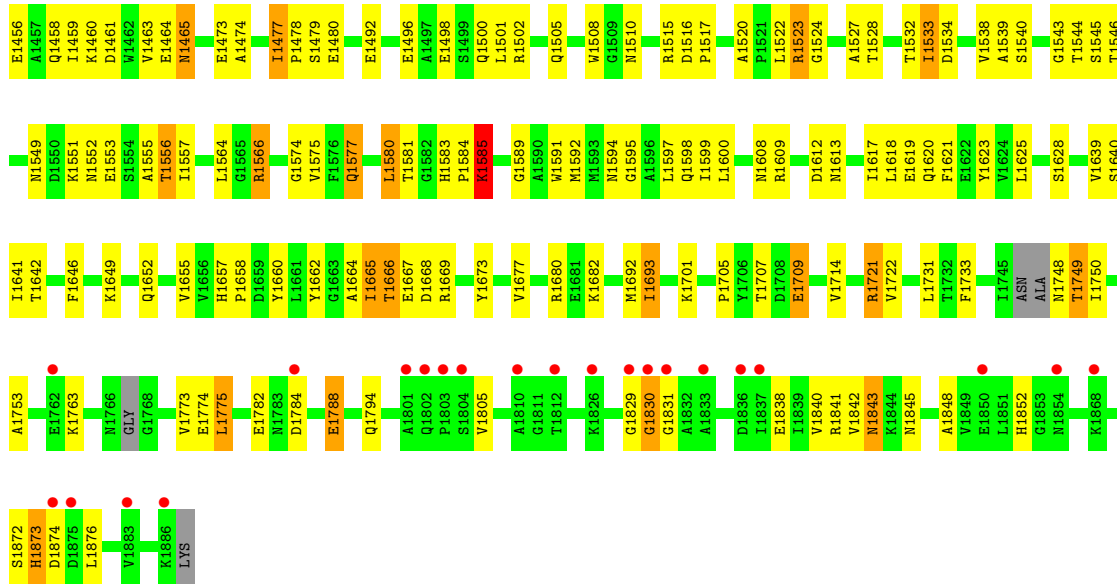
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	H	1	Total	C	N	O	P	0	0
			31	17	4	9	1		
4	I	1	Total	C	N	O	P	0	0
			31	17	4	9	1		



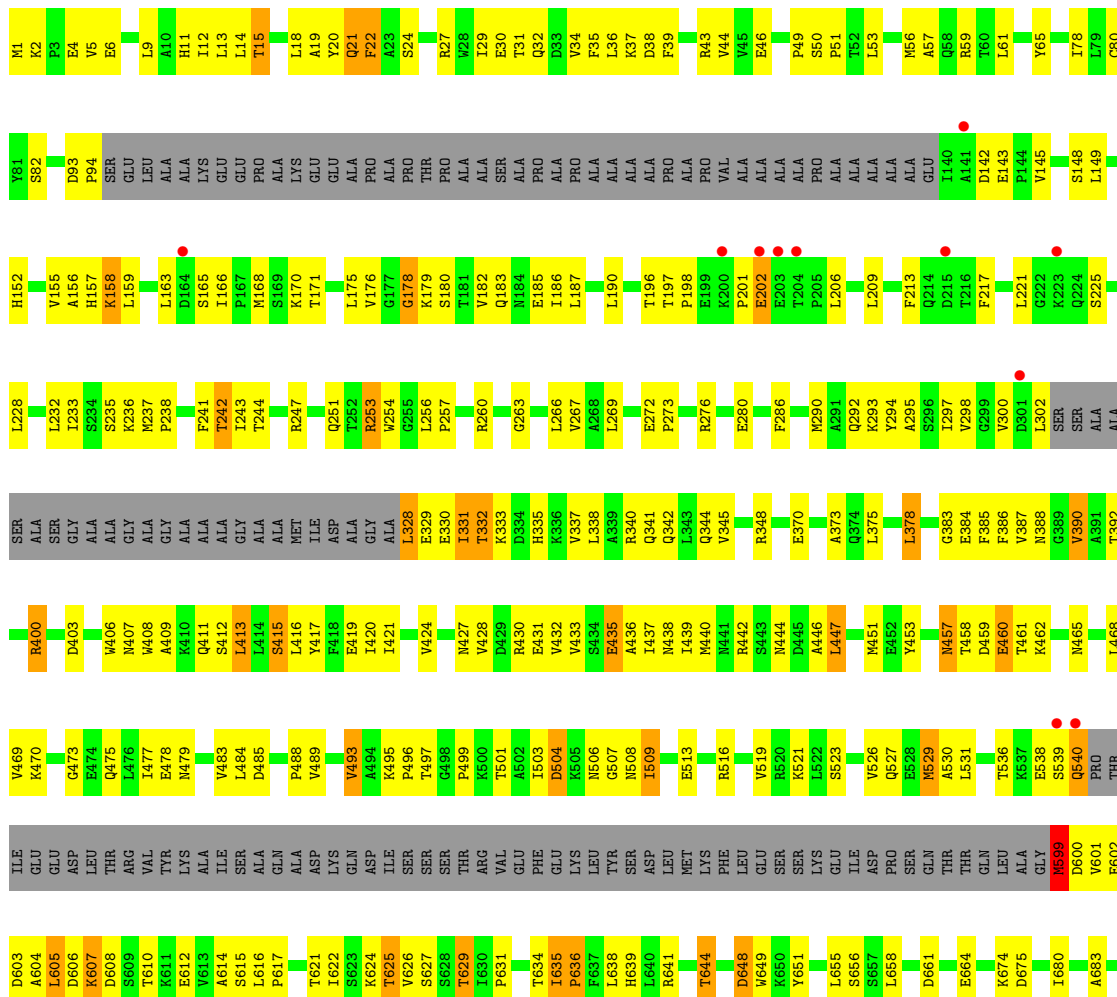
• Molecule 1: Fatty acid synthase subunit alpha

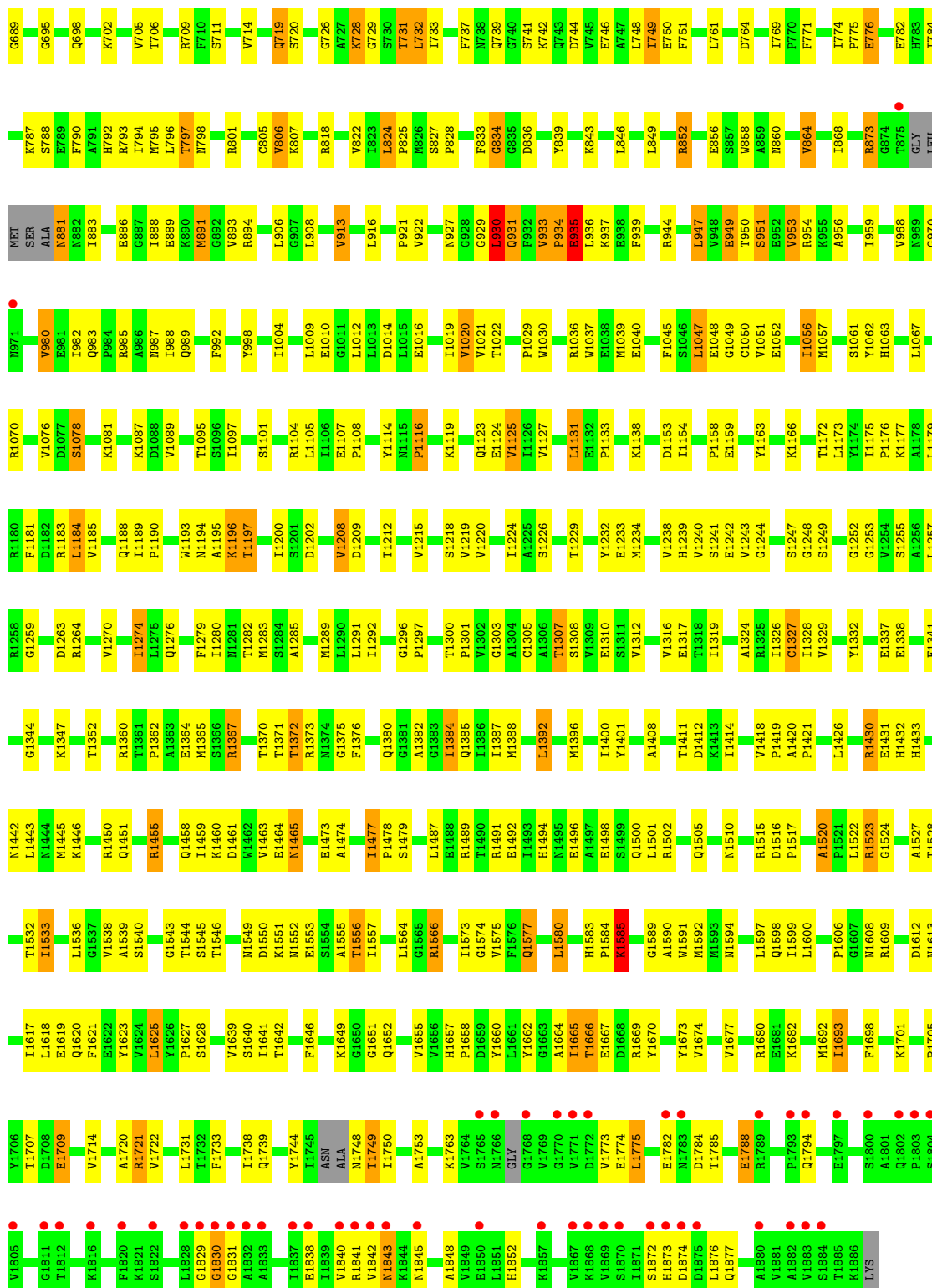


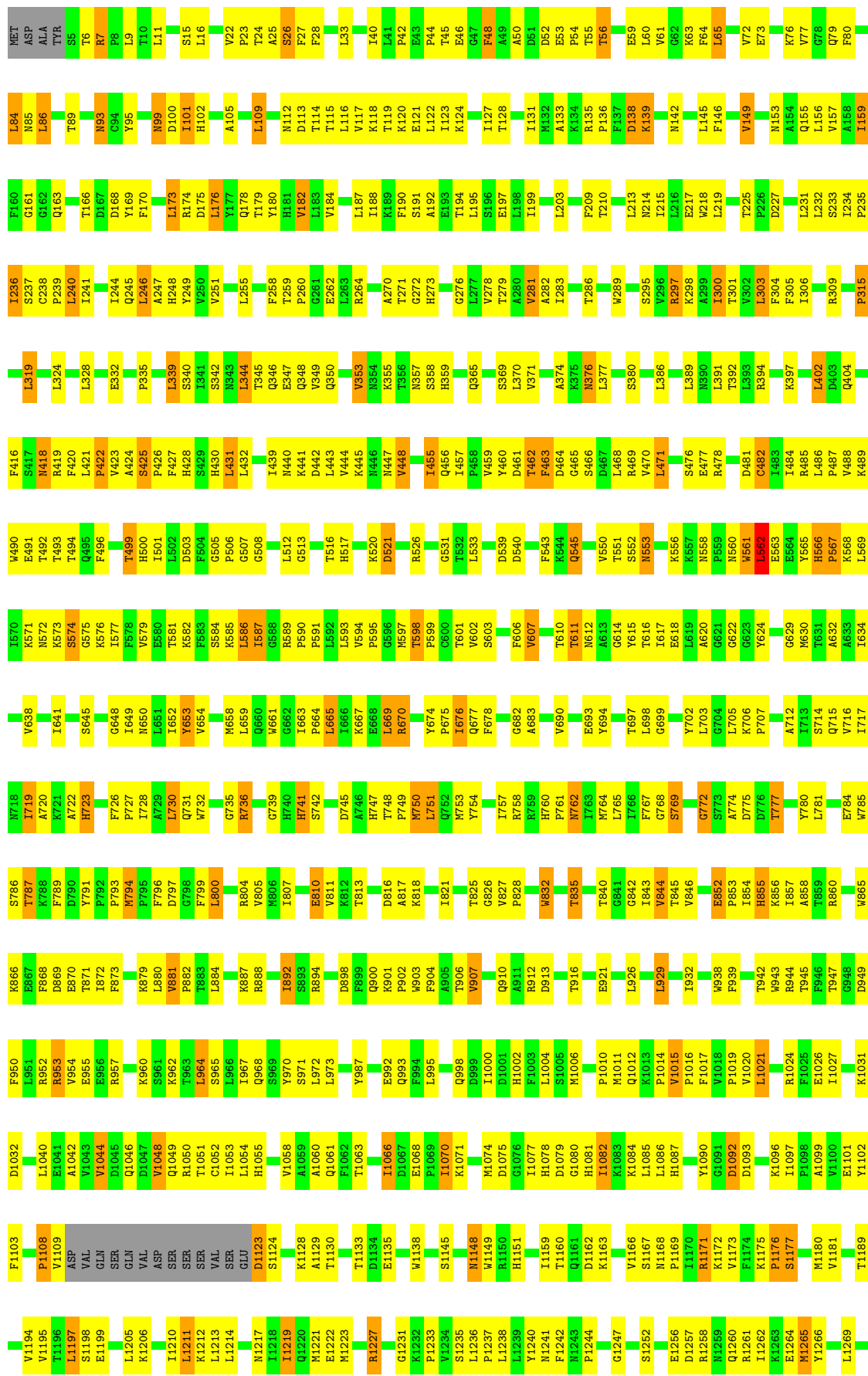
S1366	I1280	W1193	K1087	Y982	SER	G689	GLY	E538	D469	F386	L302	S225	A141	
R1367	M1281	M1194	D1088	R985	ALA	G695	M899	S539	E460	V390	SER	S235	D142	
T1370	M1282	A1195	V1089	R988	M882	T788	D600	Q540	T461	A391	ALA	L228	E143	
T1371	S1284	K1196	T1095	I988	I833	Q698	V601	THR	K462	T392	SER	L232	V145	
A1285	K1197	T1197	S1096	Q989	D603	F790	D603	ILE	M465	R400	ALA	L233	L149	
R1373	W1286	T1197	I1097	F992	E886	K702	A604	GLU	L466	T401	ALA	S294	H152	
M1374	M1287	S1201	S1101	R989	G887	V705	L605	GLU	V469	F402	GLY	K236	V155	
F1376	M1288	D1202	R1104	Y998	E888	T706	K607	ASP	K470	D403	ALA	M237	A156	
Q1380	V1208	V1208	L1105	I1004	M891	R709	S609	ARG	G473	W406	GLY	P238	H157	
P1297	D1209	D1209	Y1114	L1009	G892	F710	T610	VAL	I477	W407	ALA	F241	K188	
T1300	T1212	T1212	M1115	E1010	R801	S711	K611	TYR	E478	W408	GLY	T242	L163	
M1386	M1116	M1116	P1116	G1011	V714	V714	E812	LYS	M479	A409	ALA	T244	L164	
P1301	L1216	L1216	K1119	L1012	C805	Q719	S615	ILE	V483	K410	ALA	R247	S165	
M1388	V1217	V1217	L1013	L908	R806	S720	T621	ALA	L484	S412	GLY	Q251	M168	
G1303	S1218	S1218	D1014	L1014	K807	S720	I622	GLN	L414	L414	ALA	T252	S169	
A1304	V1219	V1219	Q1123	L1015	R818	G726	S623	ALA	P488	S415	MET	R263	K170	
C1305	E1124	E1124	E1124	E1016	V822	A727	K624	ASP	V489	L416	ILE	R265	T171	
M1326	V1125	V1125	V1125	I1019	R822	K728	T625	LYS	W493	F418	ALA	W254	L175	
P1307	I1126	I1126	V1020	V1020	I824	G729	V626	GLN	V494	F419	GLY	G255	V176	
S1308	V1127	V1127	V1021	V922	R825	S730	S627	ASP	K495	E419	ALA	L256	G177	
V1309	E1128	E1128	V1021	T1022	M826	I732	T629	SER	P496	L420	ALA	P257	G178	
E1310	E1129	E1129	L930	L930	R827	I732	I630	SER	G498	V424	SER	R260	K179	
E1311	D1130	D1130	V933	V933	P828	F737	P631	SER	P499	W427	THR	G263	S180	
M1324	E1132	E1132	P934	P934	F833	F737	T634	ARG	K500	N427	THR	L266	L181	
C1306	P1133	P1133	K937	K937	G834	S741	I685	VAL	T501	A429	GLU	V267	V182	
S1226	K1138	K1138	E938	E938	G835	K742	P636	GLU	A502	D429	THR	R286	M184	
S1226	K1145	K1145	F939	F939	D836	Q743	F637	PHE	R430	R430	THR	A285	E185	
T1240	K1145	K1145	E1040	E1040	G837	D744	L638	GLU	D504	E431	GLY	L269	I186	
S1241	I1154	I1154	R944	R944	M838	V745	T644	LEU	N506	V432	LEU	E272	L187	
V1238	E1045	E1045	F1045	F1045	Y839	E746	T644	TYR	G507	S434	THR	P273	L190	
H1239	S1046	S1046	S1046	S1046	K843	A747	D648	ASP	N508	E435	ASP	R276	G195	
V1240	L1047	L1047	L1047	L1047	L748	I749	I749	ASP	A436	A436	ASP	E280	T196	
S1242	E1048	E1048	E1048	E1048	L846	E750	Y651	LEU	T510	L437	LEU	A283	T197	
E1242	G1049	G1049	C1050	C1050	L849	F751	L655	LEU	N438	N438	LEU	K284	P198	
G1244	V1051	V1051	V053	V053	L849	L761	D661	PHE	M440	M440	LEU	A285	P201	
S1247	E1052	E1052	R954	R954	R852	D764	E664	LEU	M441	R442	LEU	F286	E202	
G1248	S1046	S1046	R955	R955	W858	I769	E664	SER	N444	N444	LEU	M290	L206	
S1249	M1057	M1057	A956	A956	M860	P770	F668	SER	M446	M446	LEU	A291	L209	
G1252	S1061	S1061	Y959	Y959	V864	F771	G670	ILE	L447	L447	ASP	K292	L213	
G1253	Y1062	Y1062	E964	E964	I868	I774	K674	ASP	M451	M451	PRG	Y294	F213	
V1254	M1066	M1066	V968	V968	R873	E776	D675	PRG	M529	M529	PRG	K293	F217	
S1255	R1070	R1070	G970	G970	R874	E780	I680	GLN	A530	A530	GLN	L297	S218	
A1256	P1071	P1071	R873	R873	T875	L781	T681	THR	L455	L455	THR	V288	G219	
L1257	V1174	V1174	W858	W858	GLY	H782	A683	GLN	N457	N457	GLN	V300	A220	
L1258	L1175	L1175	M860	M860	H782	H782	G882	LEU	M457	M457	LEU	D301	L221	
G1259	P1176	P1176	V864	V864	I784	I784	A683	ALA	T536	T536	ALA			
R1259	K1177	K1177	E964	E964										
D1263	A1178	A1178	V968	V968										
R1264	L1179	L1179	R968	R968										
R1283	R1183	R1183	G970	G970										
R1284	L1184	L1184	R873	R873										
V1270	V1185	V1185	T875	T875										
V1271	L1274	L1274	GLY	GLY										
R1448	L1275	L1275	H783	H783										
T1361	Q1276	Q1276	LEU	LEU										
R1450	F1279	F1279	MET	MET										
Q1451														
A1363														
E1364														
M1365														

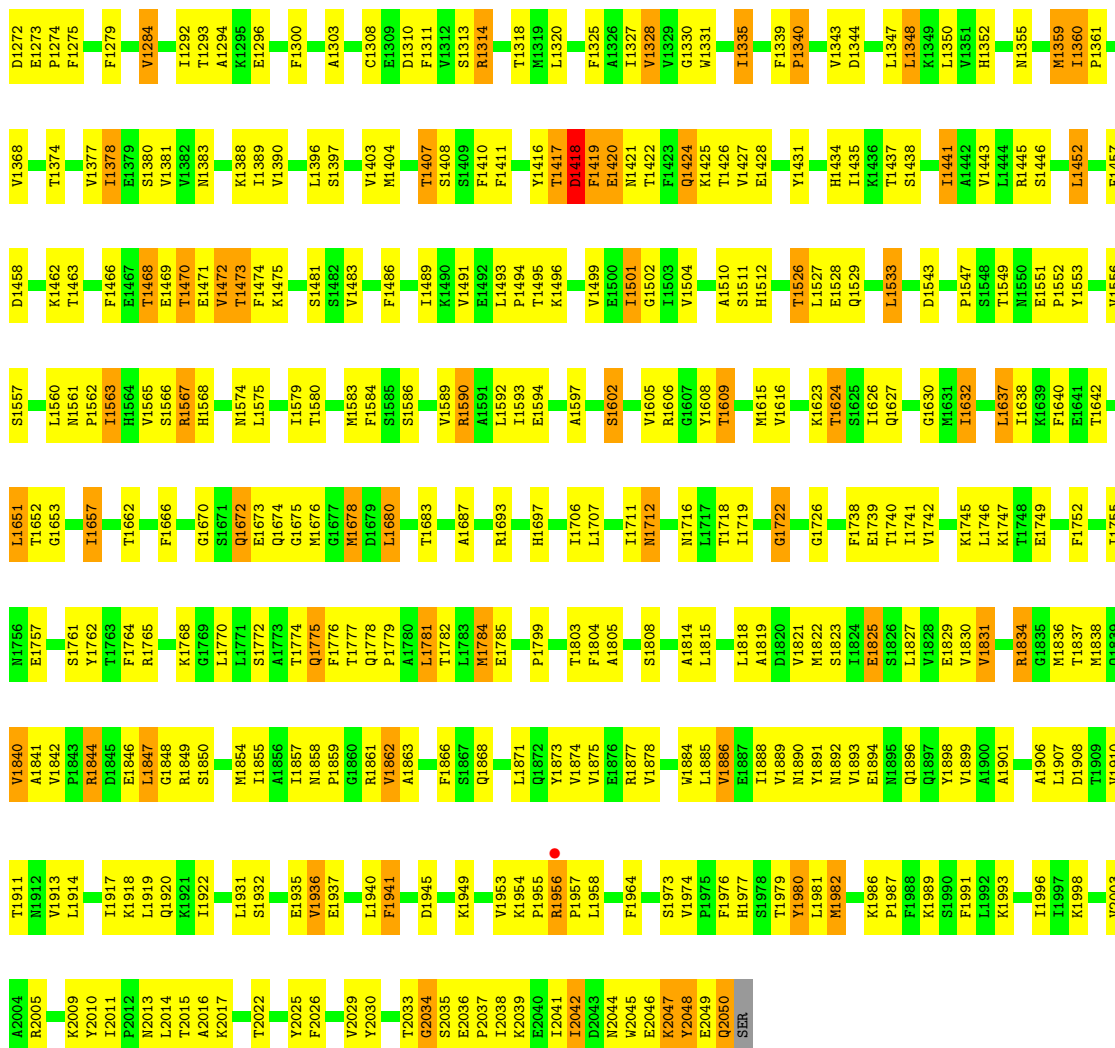


● Molecule 1: Fatty acid synthase subunit alpha

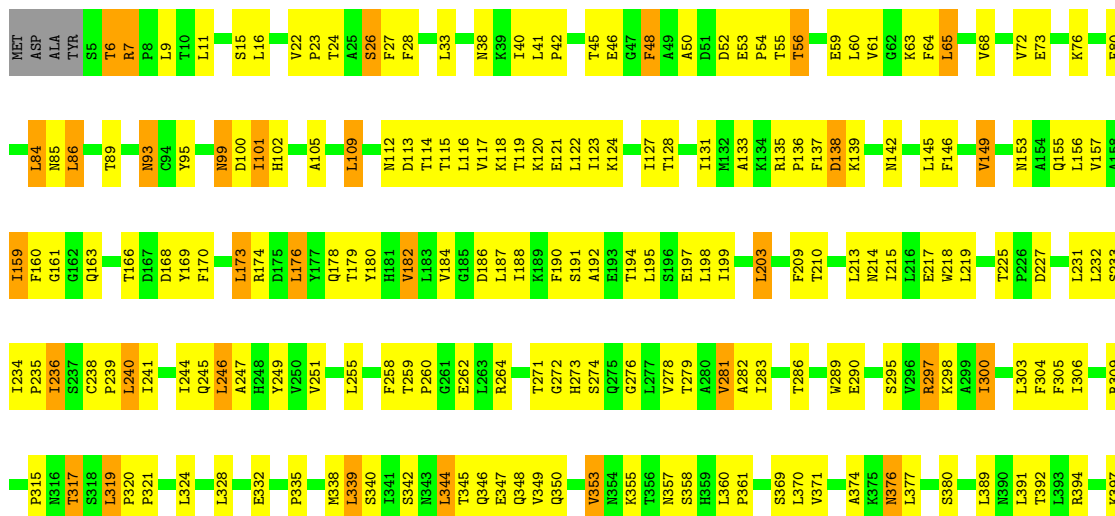




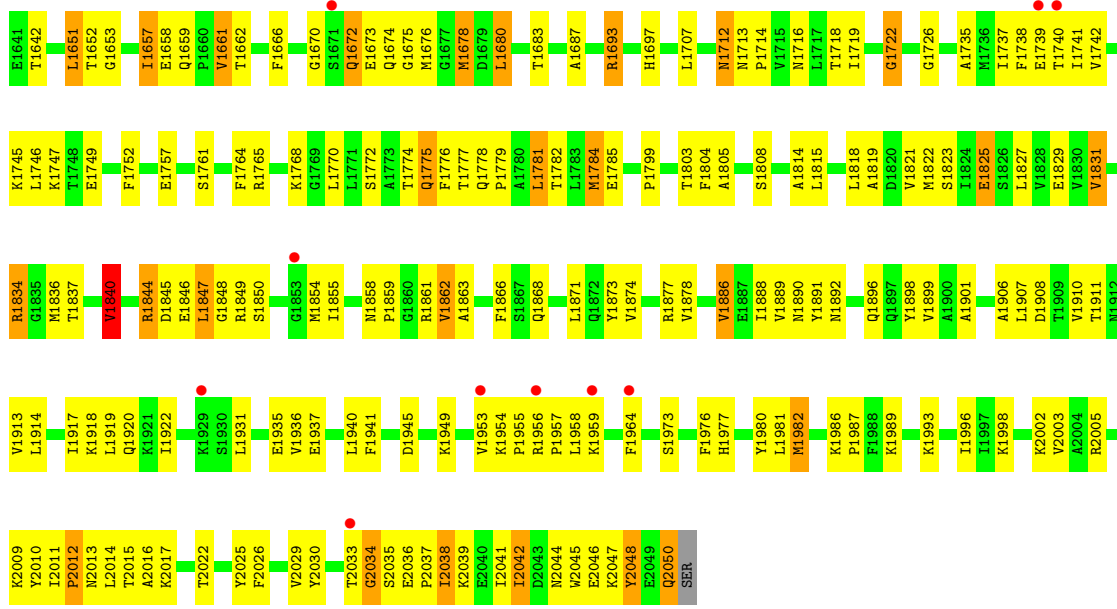




• Molecule 2: Fatty acid synthase subunit beta

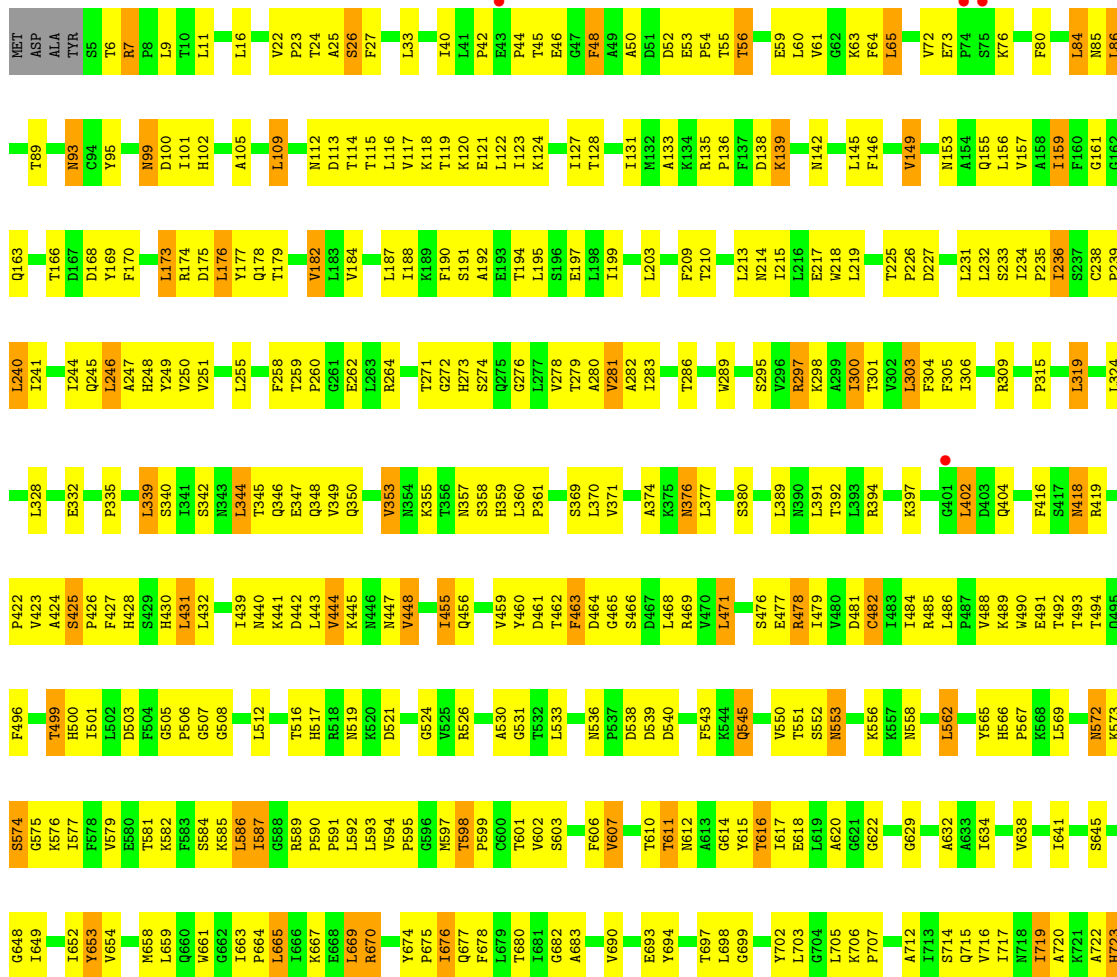


V1556	D1468	F1279	L1040	T945	A858	E784	I717	P567	I483	L402
S1557	K1462	D1280	E1041	F946	T859	W785	H718	K568	I484	L403
L1560	T1463	P1281	A1042	T947	R860	S786	A719	L569	R485	Q404
P1561	V1377	E1282	V1043	G948	W865	T787	A720	I641	L486	Q404
I1563	I1378	L1205	V1044	D949	V866	K788	K721	N572	P487	P408
I1564	V1381	K1206	D1045	F950	K866	F789	A722	K573	V468	F409
I1469	V1382	ASP	Q1046	L951	E867	D790	H723	S574	F409	F409
T1470	SER	Q1047	V1047	R952	F868	Y791	F726	G575	F416	F416
E1471	SER	D1048	R953	R953	D869	P792	F727	K576	S417	S417
V1472	VAL	Q1049	V954	V954	E870	P793	F727	I577	N418	N418
R1567	VAL	R1050	E955	E955	T871	M794	F728	F578	N418	N418
H1568	GLU	T1051	E956	E956	T872	F795	A729	V579	R419	R419
K1475	D1123	C1052	C1052	C1052	R873	F796	L730	E580	Q495	Q495
N1574	K1128	I1053	I1053	K960	D797	D797	Q731	T581	R420	R420
L1575	A1129	L1054	L1054	L964	G798	G798	W732	K582	L421	L421
I1579	M1221	V1058	V1058	L964	F799	F799	W733	F583	P422	P422
T1580	M1223	A1059	A1059	I967	L800	L800	T733	T499	V423	V423
M1583	R1227	A1060	A1060	Y970	R804	R804	R736	H500	A424	A424
F1584	T1228	Q1061	Q1061	S971	R805	R805	R736	S425	S425	S425
S1585	E1138	F1062	F1062	L972	R806	R806	S742	S426	S426	S426
S1586	E1138	T1063	T1063	L973	I807	I807	S742	H428	H428	H428
V1589	G1231	I1066	I1066	Y987	E810	E810	D745	L431	L431	L431
R1590	P1233	D1067	D1067	Q993	R834	R834	A746	V433	V433	V433
E1497	V1234	E1068	E1068	Q993	T813	T813	H747	P434	P434	P434
L1498	S1235	V1069	V1069	R994	R832	R832	H748	I439	I439	I439
V1499	N1148	I1070	I1070	F994	D816	D816	P749	N440	N440	N440
E1500	M1149	K1071	K1071	L995	R898	R898	D898	K441	K441	K441
I1501	R1150	F1072	F1072	R998	F899	F899	M750	D442	D442	D442
G1502	H1151	M1074	M1074	Q900	K818	K818	L751	L443	L443	L443
L1503	A1152	D1075	D1075	K901	Q752	Q752	Q752	V444	V444	V444
V1504	I1159	G1076	G1076	P902	I821	I821	I676	K445	K445	K445
V1506	I1160	H1077	H1077	W903	A822	A822	Q677	N446	N446	N446
A1510	Q1161	F1003	F1003	F904	C824	C824	V602	N447	N447	N447
H1512	D1162	D1079	D1079	T906	G826	G826	S603	I455	I455	I455
P1515	K1163	H1081	H1081	V907	R827	R827	F678	Q456	Q456	Q456
T1526	V1166	I1082	I1082	M1006	P828	P828	V690	V459	V459	V459
I1338	S1167	K1084	K1084	P1010	N762	N762	T610	Y460	Y460	Y460
F1339	N1168	L1085	L1085	M1011	I763	I763	N612	D461	D461	D461
P1340	P1169	L1086	L1086	Q1012	E833	E833	N612	T462	T462	T462
V1343	I1170	Y1090	Y1090	V1015	Q834	Q834	Y615	P463	P463	P463
D1344	R1171	G1091	G1091	P1016	T855	T855	T616	G465	G465	G465
L1347	K1172	D1092	D1092	F1017	Y836	Y836	I617	T551	T551	T551
L1348	V1173	D1093	D1093	F1018	P839	P839	E618	S552	S552	S552
S1437	K1174	K1263	K1263	V1019	T840	T840	L619	N653	N653	N653
L1348	F1175	E1264	E1264	M1020	R844	R844	G622	V470	V470	V470
K1349	P1176	M1265	M1265	L1021	T845	T845	G622	L471	L471	L471
L1350	S1177	I1097	I1097	L1021	V846	V846	Y624	N560	N560	N560
V1351	M1180	V1100	V1100	R1024	D775	D775	P707	W561	W561	W561
H1352	M1181	E1101	E1101	F1025	D776	D776	P707	E563	E563	E563
M1355	V1181	Y1102	Y1102	I1026	T777	T777	G629	E564	E564	E564
M1359	T1189	F1103	F1103	I1027	Y778	Y778	M630	Y565	Y565	Y565
I1360	E1273	P1109	P1109	K1031	P779	P779	T631	D481	D481	D481
F1457	F1275	V1109	V1109	D1032	W780	W780	Q715	C482	C482	C482
F1457	T1196	ASP	ASP	ASP	L781	L781	V716			



● Molecule 2: Fatty acid synthase subunit beta

Chain I: 51% 40% 8%



V1986	E1937	L1940	F1941	D1945	K1949	V1953	P1954	P1955	K1956	P1957	L1958	K1959	F1964	S1973	V1886	F1976	H1977	Y1980	L1981	M1982	K1983	K1986	P1987	F1988	K1989	K1993	K1996	P1997	F1998	L1999	V2003	A2004	R2005	K2009	Y2010	L2011	R2012	L2014	T2015	A2016	K2017	Q2020	Y2021	T2022	Y2025	F2026								
I1855	P1859	G1860	R1861	R1862	F1866	F1867	Q1868	L1871	K1872	V1873	L1874	R1877	M1878	G1879	K1880	V1886	E1887	V1888	V1889	M1890	L1891	M1892	V1893	Q1896	F1897	Y1898	M1899	A1900	A1901	A1906	L1907	D1908	V1909	V1910	V1913	L1914	I1917	K1918	L1919	Q1920	K1921	I1922	Q1928	K1929	S1930	L1931	S1932	E1935						
S1761	F1765	L1770	T1774	Q1775	F1776	T1777	Q1778	P1779	A1780	L1781	T1782	L1783	M1784	G1785	P1799	T1803	F1804	A1805	S1808	L1814	L1815	L1818	A1819	D1820	V1821	M1822	S1823	L1824	E1825	S1826	L1827	V1828	E1829	V1830	V1831	R1834	G1835	M1836	T1837	R1844	D1845	E1846	G1848	A1849	S1850	M1854								
P1562	H1563	H1564	V1565	S1566	H1567	M1574	L1575	I1579	L1580	M1583	F1584	S1585	S1586	V1589	R1590	A1591	L1592	I1593	E1594	A1597	A1598	D1599	S1602	V1605	R1606	G1607	Y1608	T1609	M1615	V1616	K1623	T1624	S1625	I1626	Q1627	G1630	M1631	I1632	L1637	I1638	K1639	F1640	F1641	T1642	L1651	T1652								
K1462	T1463	T1468	E1469	T1470	E1471	V1472	F1474	K1475	S1481	S1482	V1483	F1486	V1491	E1492	L1493	P1494	T1495	K1496	V1499	E1500	L1501	G1502	I1503	V1504	A1510	S1511	H1512	H1513	N1514	P1515	T1526	L1527	E1528	L1533	D1543	P1547	S1548	T1549	N1550	E1551	P1552	Y1553	V1556	L1560	N1561									
G1653	I1657	T1662	F1666	G1670	S1671	Q1672	A1673	Q1674	G1675	M1676	G1677	M1678	D1679	L1680	T1683	S1684	L1687	Q1688	R1689	S1689	H1697	L1707	M1712	N1716	L1717	T1718	L1719	G1722	G1726	A1735	H1736	I1737	F1738	E1739	T1740	I1741	V1742	K1745	L1746	K1747	F1748	F1752	E1757											
S1761	F1765	L1770	T1774	Q1775	F1776	T1777	Q1778	P1779	A1780	L1781	T1782	L1783	M1784	G1785	P1799	T1803	F1804	A1805	S1808	L1814	L1815	L1818	A1819	D1820	V1821	M1822	S1823	L1824	E1825	S1826	L1827	V1828	E1829	V1830	V1831	R1834	G1835	M1836	T1837	R1844	D1845	E1846	G1848	A1849	S1850	M1854								
I1855	P1859	G1860	R1861	R1862	F1866	F1867	Q1868	L1871	K1872	V1873	L1874	R1877	M1878	G1879	K1880	V1886	E1887	V1888	V1889	M1890	L1891	M1892	V1893	Q1896	F1897	Y1898	M1899	A1900	A1901	A1906	L1907	D1908	V1909	V1910	V1913	L1914	I1917	K1918	L1919	Q1920	K1921	I1922	Q1928	K1929	S1930	L1931	S1932	E1935						
F726	F727	I728	A729	L730	Q731	W732	T733	R736	G737	G738	G739	H740	H741	S742	D745	A746	H747	T748	P749	W750	L751	Q752	M753	Y754	T757	R758	R759	H760	P761	M762	I763	M764	L765	I766	F767	G768	S769	G772	S773	A774	D775	D776	T777	Y778	P779	Y790	E784	W785	S786	T787	R788	F789	K866	E867
Y791	F792	M794	P795	F796	D797	G798	F799	L800	R804	G805	V806	M806	L807	E810	R811	K812	T813	D816	A817	Q900	K818	L821	A822	F894	C824	G826	V827	P828	W832	I763	M764	L765	I766	F767	G768	S769	G772	S773	A774	D775	D776	T777	Y778	P779	Y790	E784	W785	S786	T787	R788	F789	K866	E867	
F868	D869	T871	E873	F873	K879	L880	V881	P882	R887	I892	S893	R894	L895	M896	A897	D898	F899	Q900	K901	P902	W903	P904	A905	C924	V907	Q910	A911	R912	D913	L914	A915	T916	E921	G842	I843	V844	L829	I932	W938	F939	H854	H855	K856	L857	A858	T859	R860	L864	W865	P866	K1031	D1032	P1108	V1109
R852	R853	Y854	E855	E856	R857	K960	S961	K962	T963	L964	S965	L966	L1054	H1055	Y970	L895	S971	L972	L973	A979	Y987	Q993	F994	L995	Q998	P999	I1000	D1001	F1002	F1003	L1004	S1005	M1006	P1010	M1011	Q1012	V1015	F1016	V1018	P1019	V1020	L1021	R1024	F1025	E1026	I1027	V1028	K1031	D1032	P1108	V1109			
L1040	E1041	A1042	V1043	D1044	Q1045	D1047	L1048	Q1049	R1050	L1051	C1052	I1053	H1054	H1055	V1058	A1059	A1060	Q1061	T1063	I1066	D1067	P1068	F1069	L1070	K1071	M1074	D1075	G1076	I1077	H1078	D1079	G1080	H1081	I1082	K1083	K1084	L1085	L1086	H1087	Y1090	G1091	D1092	D1093	K1096	I1097	E1101	F1102	F1103	P1108	V1109				
ASP	VAL	GLN	SER	GLN	VAL	ASP	SER	SER	VAL	SER	GLU	D1123	S1124	A1129	T1130	A1133	D1134	E1135	W1138	S1145	M1148	L1236	P1237	R1238	L1239	H1151	I1159	T1160	Q1161	D1162	K1163	V1166	S1167	M1168	P1169	I1170	R1171	K1172	Q1260	R1261	F1173	G1091	D1092	D1093	K1096	I1097	E1101	F1102	F1103	P1108	V1109			
E1199	L1205	K1206	I1210	L1211	K1212	L1213	L1214	M1217	N1218	L1219	Q1220	M1221	E1222	M1223	R1227	T1228	G1231	K1232	V1234	S1235	M1236	P1237	L1238	L1239	H1151	I1159	T1160	Q1161	D1162	K1163	V1166	S1167	M1168	P1169	I1170	R1171	K1172	Q1260	R1261	F1173	G1091	D1092	D1093	K1096	I1097	E1101	F1102	F1103	P1108	V1109				
F1279	R1282	D1283	V1284	I1284	T1289	V1293	E1296	F1300	A1303	C1308	E1309	M1404	F1311	S1312	S1313	R1314	T1318	M1319	L1320	A1321	P1322	D1418	F1419	E1420	I1421	V1422	F1423	G1330	W1331	I1385	I1388	F1339	H1434	I1435	K1436	D1344	L1347	L1348	K1349	L1350	V1351	H1352	M1355	G1356	Y1357	K1358	M1359	L1360						
V1368	T1374	V1377	I1378	V1381	V1382	I1389	V1390	L1396	S1397	V1403	M1404	E1405	S1406	F1410	F1411	Y1416	L1417	D1418	F1419	E1420	I1421	V1422	F1423	G1330	W1331	I1385	I1388	F1339	H1434	I1435	K1436	D1344	L1347	L1348	K1349	L1350	V1351	H1352	M1355	G1356	Y1357	K1358	M1359	L1360										

V2029	T2033	G2034	E2035	P2037	I2038	K2039	E2040	I2041	L2042	D2043	M2044	W2045	E2046	K2047	Y2048	E2049	Q2050	SER
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4 Data and refinement statistics

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, α , β , γ	231.88Å 231.88Å 756.78Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 4.00 20.00 – 4.00	Depositor EDS
% Data completeness (in resolution range)	97.3 (20.00-4.00) 97.3 (20.00-4.00)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.71 (at 3.94Å)	Xtrriage
Refinement program	PHENIX	Depositor
R, R_{free}	0.266 , 0.267 0.257 , 0.257	Depositor DCC
R_{free} test set	8521 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å ²)	130.2	Xtrriage
Anisotropy	0.319	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.23 , 74.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.36$, $\langle L^2 \rangle = 0.19$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.90	EDS
Total number of atoms	88830	wwPDB-VP
Average B, all atoms (Å ²)	168.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.67% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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 [i](#)

5.1 Standard geometry [i](#)

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

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	0.43	5/13822 (0.0%)	0.59	6/18682 (0.0%)
1	B	0.43	3/13822 (0.0%)	0.61	9/18682 (0.0%)
1	C	0.43	4/13822 (0.0%)	0.59	4/18682 (0.0%)
2	G	0.41	7/16360 (0.0%)	0.58	6/22198 (0.0%)
2	H	0.40	7/16360 (0.0%)	0.57	3/22198 (0.0%)
2	I	0.40	5/16360 (0.0%)	0.58	10/22198 (0.0%)
All	All	0.42	31/90546 (0.0%)	0.59	38/122640 (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
2	G	0	1
2	H	0	2
2	I	0	1
All	All	0	4

The worst 5 of 31 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	992	PHE	C-N	13.35	1.59	1.34
1	C	992	PHE	C-N	13.18	1.59	1.34
2	I	842	GLY	C-N	11.12	1.59	1.34
2	G	315	PRO	C-N	10.45	1.58	1.34
1	C	485	ASP	C-N	9.61	1.56	1.34

The worst 5 of 38 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	1116	PRO	O-C-N	-11.67	104.02	122.70
2	I	1982	MET	O-C-N	-9.44	107.59	122.70
2	G	842	GLY	O-C-N	-8.86	108.52	122.70
2	G	1053	ILE	O-C-N	-8.58	108.97	122.70
1	B	992	PHE	O-C-N	8.47	137.19	121.10

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	G	1108	PRO	Peptide
2	H	1108	PRO	Peptide
2	H	1256	GLU	Mainchain
2	I	1108	PRO	Peptide

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	A	13572	0	13489	663	15
1	B	13572	0	13490	618	6
1	C	13572	0	13490	638	22
2	G	15995	0	15978	1026	32
2	H	15995	0	15978	1023	7
2	I	15995	0	15977	983	26
3	A	12	0	10	3	0
3	B	12	0	10	4	0
3	C	12	0	10	4	0
4	G	31	0	19	7	0
4	H	31	0	19	6	0
4	I	31	0	19	8	0
All	All	88830	0	88489	4773	54

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 27.

The worst 5 of 4773 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:A:1749:THR:CB	1:A:1874:ASP:HB3	1.53	1.37
1:B:1749:THR:CB	1:B:1874:ASP:HB3	1.56	1.34
1:B:1749:THR:CB	1:B:1873:HIS:O	1.75	1.32
1:A:1464:GLU:HG3	1:A:1773:VAL:CG1	1.58	1.32
1:C:1749:THR:CB	1:C:1874:ASP:HB3	1.62	1.29

The worst 5 of 54 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:C:1784:ASP:CA	2:G:1087:HIS:CE1[7_655]	0.16	2.04
1:A:1784:ASP:CG	2:I:1087:HIS:CE1[7_545]	0.52	1.68
1:C:1784:ASP:C	2:G:1087:HIS:NE2[7_655]	0.54	1.66
1:C:1784:ASP:CB	2:G:1087:HIS:ND1[7_655]	0.56	1.64
1:A:1784:ASP:OD2	2:I:1087:HIS:ND1[7_545]	0.58	1.62

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	1736/1887 (92%)	1614 (93%)	100 (6%)	22 (1%)	12	48
1	B	1736/1887 (92%)	1619 (93%)	100 (6%)	17 (1%)	15	53
1	C	1736/1887 (92%)	1618 (93%)	96 (6%)	22 (1%)	12	48
2	G	2029/2051 (99%)	1825 (90%)	173 (8%)	31 (2%)	10	45
2	H	2029/2051 (99%)	1826 (90%)	173 (8%)	30 (2%)	10	45
2	I	2029/2051 (99%)	1829 (90%)	174 (9%)	26 (1%)	12	48
All	All	11295/11814 (96%)	10331 (92%)	816 (7%)	148 (1%)	12	48

5 of 148 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	488	PRO
1	A	504	ASP
1	A	538	GLU
1	A	605	LEU
1	A	834	GLY

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	1460/1566 (93%)	1308 (90%)	152 (10%)	7	28
1	B	1460/1566 (93%)	1312 (90%)	148 (10%)	7	29
1	C	1460/1566 (93%)	1310 (90%)	150 (10%)	7	28
2	G	1772/1789 (99%)	1563 (88%)	209 (12%)	5	24
2	H	1772/1789 (99%)	1560 (88%)	212 (12%)	5	23
2	I	1772/1789 (99%)	1561 (88%)	211 (12%)	5	24
All	All	9696/10065 (96%)	8614 (89%)	1082 (11%)	6	25

5 of 1082 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	I	476	SER
2	I	723	HIS
2	I	471	LEU
2	I	1533	LEU
1	C	1087	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 294 such sidechains are listed below:

Mol	Chain	Res	Type
2	H	1148	ASN
2	I	1672	GLN
2	H	1367	GLN
2	I	545	GLN

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Mol	Chain	Res	Type
1	B	1542	HIS

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 monosaccharides in this entry.

5.6 Ligand geometry [i](#)

6 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	CER	A	2748	-	10,11,15	4.19	3 (30%)	9,13,17	3.18	3 (33%)
3	CER	B	2748	-	10,11,15	4.19	3 (30%)	9,13,17	3.05	3 (33%)
4	FMN	I	3051	-	33,33,33	6.32	24 (72%)	48,50,50	1.30	7 (14%)
4	FMN	H	3051	-	33,33,33	6.23	21 (63%)	48,50,50	1.31	8 (16%)
3	CER	C	2748	-	10,11,15	4.21	3 (30%)	9,13,17	3.18	3 (33%)
4	FMN	G	3051	-	33,33,33	6.32	21 (63%)	48,50,50	1.30	5 (10%)

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	CER	A	2748	-	-	5/12/12/16	-
3	CER	B	2748	-	-	5/12/12/16	-
4	FMN	I	3051	-	-	5/18/18/18	0/3/3/3
4	FMN	H	3051	-	-	5/18/18/18	0/3/3/3
3	CER	C	2748	-	-	5/12/12/16	-
4	FMN	G	3051	-	-	5/18/18/18	0/3/3/3

The worst 5 of 75 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	G	3051	FMN	C6-C7	12.51	1.57	1.39
4	G	3051	FMN	C9-C9A	12.29	1.59	1.39
4	I	3051	FMN	C6-C7	12.18	1.57	1.39
4	I	3051	FMN	C6-C5A	12.15	1.59	1.40
4	H	3051	FMN	C9-C9A	12.15	1.59	1.39

The worst 5 of 29 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	2748	CER	O1-C4-C5	-7.72	107.97	121.70
3	A	2748	CER	O1-C4-C5	-7.67	108.06	121.70
3	B	2748	CER	O1-C4-C5	-7.34	108.64	121.70
3	A	2748	CER	C5-C4-C3	-3.86	110.87	117.94
3	B	2748	CER	C5-C4-C3	-3.77	111.03	117.94

There are no chirality outliers.

5 of 30 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	2748	CER	C2-C3-C4-O1
3	B	2748	CER	C2-C3-C4-O1
3	C	2748	CER	C2-C3-C4-O1
4	G	3051	FMN	C2'-C3'-C4'-C5'
4	G	3051	FMN	O3'-C3'-C4'-C5'

There are no ring outliers.

6 monomers are involved in 32 short contacts:

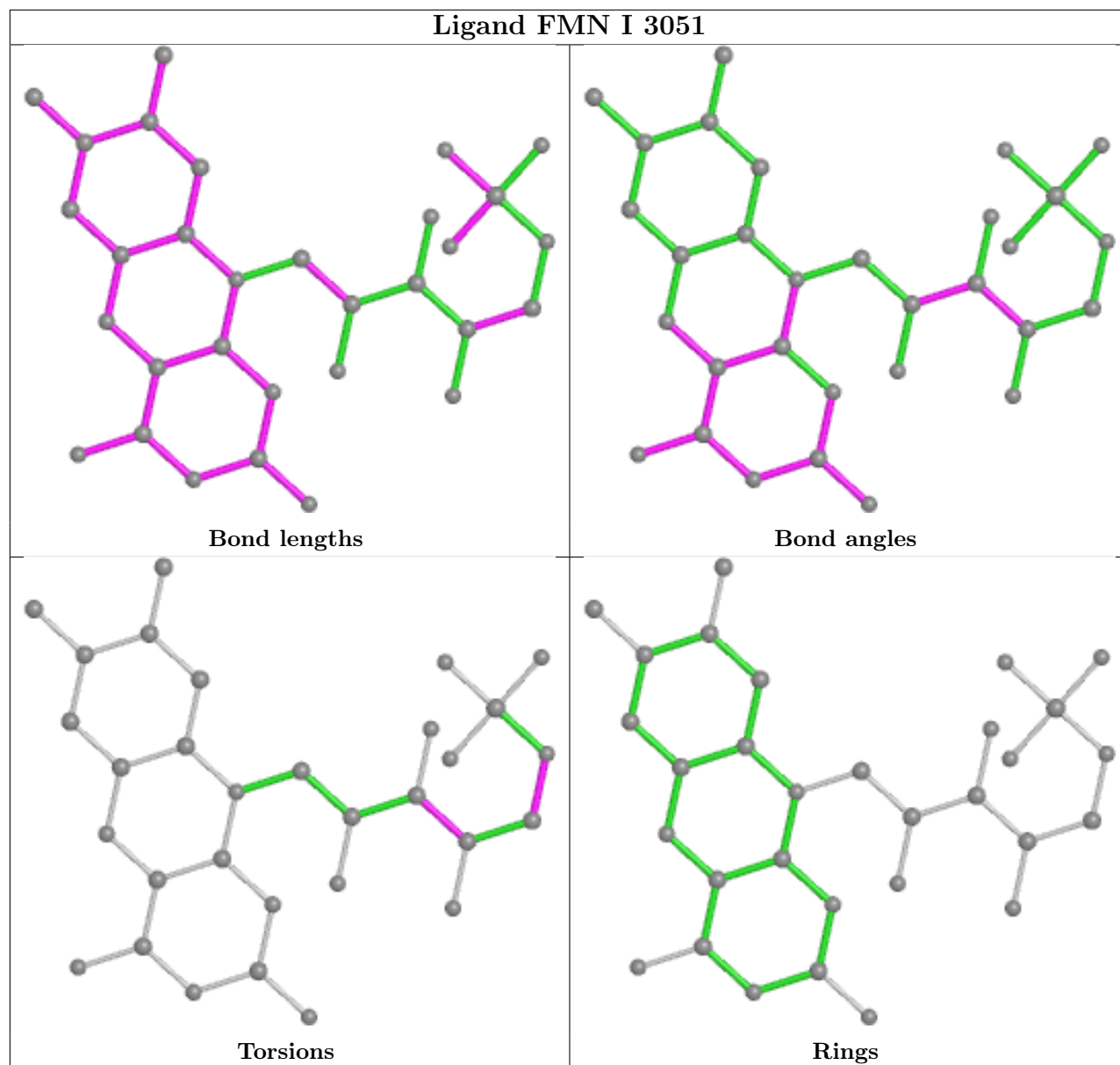
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	2748	CER	3	0

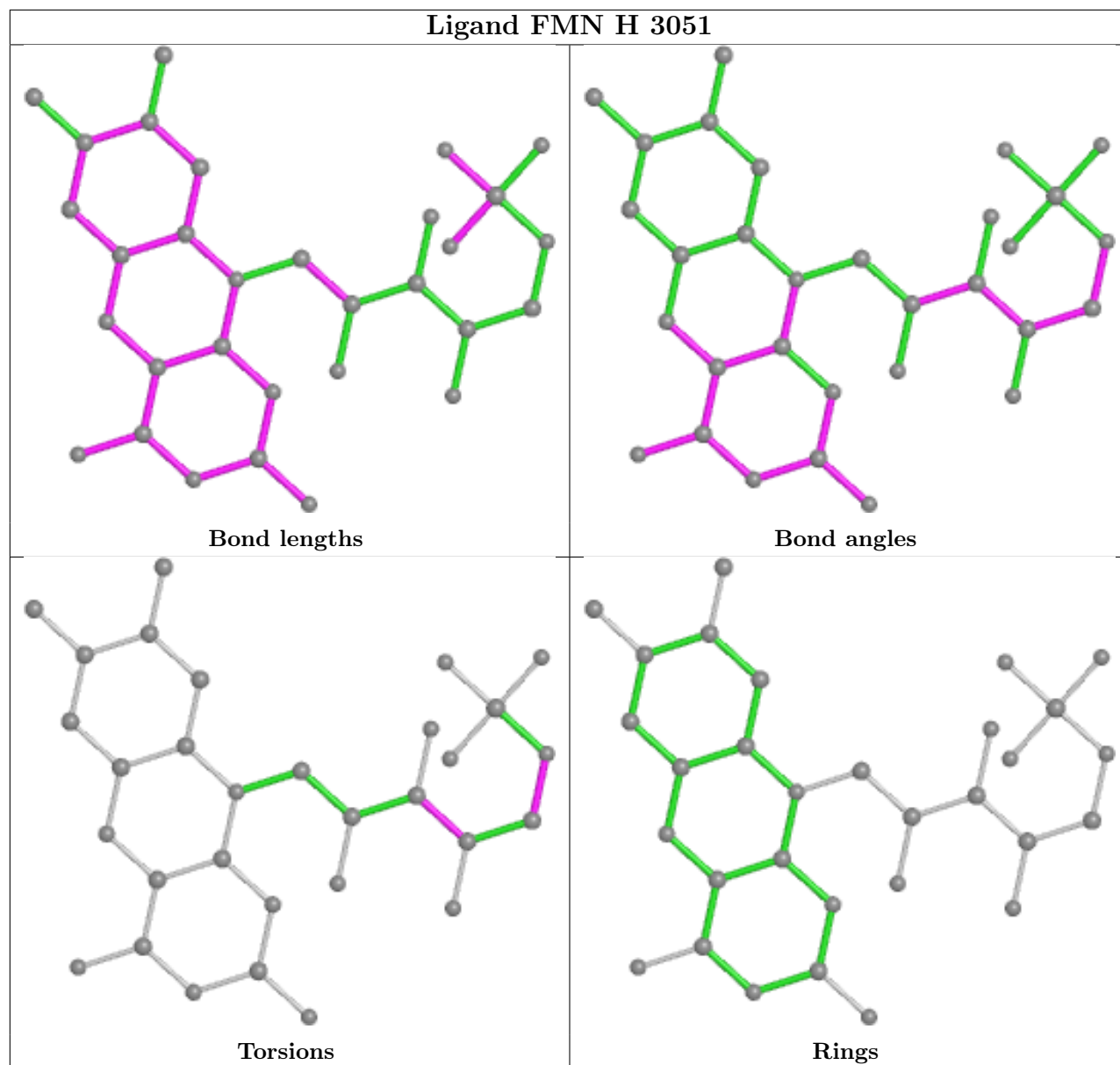
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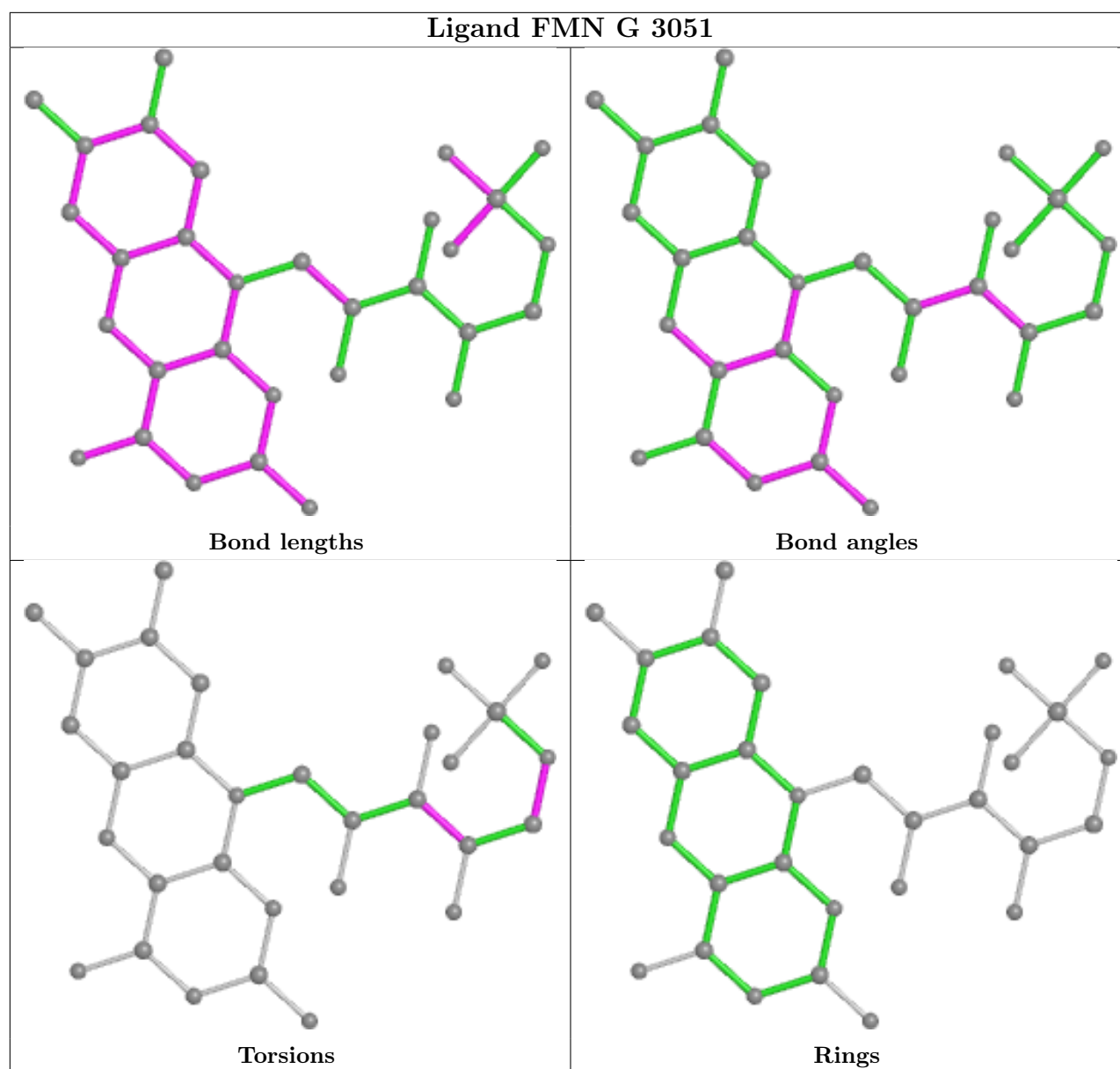
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Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	2748	CER	4	0
4	I	3051	FMN	8	0
4	H	3051	FMN	6	0
3	C	2748	CER	4	0
4	G	3051	FMN	7	0

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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	1750/1887 (92%)	-0.30	46 (2%) 56 46	95, 134, 347, 457	0
1	B	1750/1887 (92%)	-0.34	32 (1%) 68 59	96, 132, 302, 419	0
1	C	1750/1887 (92%)	-0.26	62 (3%) 44 35	98, 135, 423, 568	0
2	G	2033/2051 (99%)	-0.45	1 (0%) 100 100	131, 169, 218, 267	0
2	H	2033/2051 (99%)	-0.36	10 (0%) 91 85	130, 170, 215, 265	0
2	I	2033/2051 (99%)	-0.43	6 (0%) 94 90	131, 171, 215, 261	0
All	All	11349/11814 (96%)	-0.36	157 (1%) 75 65	95, 162, 239, 568	0

The worst 5 of 157 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	1882	ALA	10.4
1	C	1831	GLY	9.1
1	A	1829	GLY	8.0
1	C	1830	GLY	7.7
1	C	1870	SER	7.6

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](#)

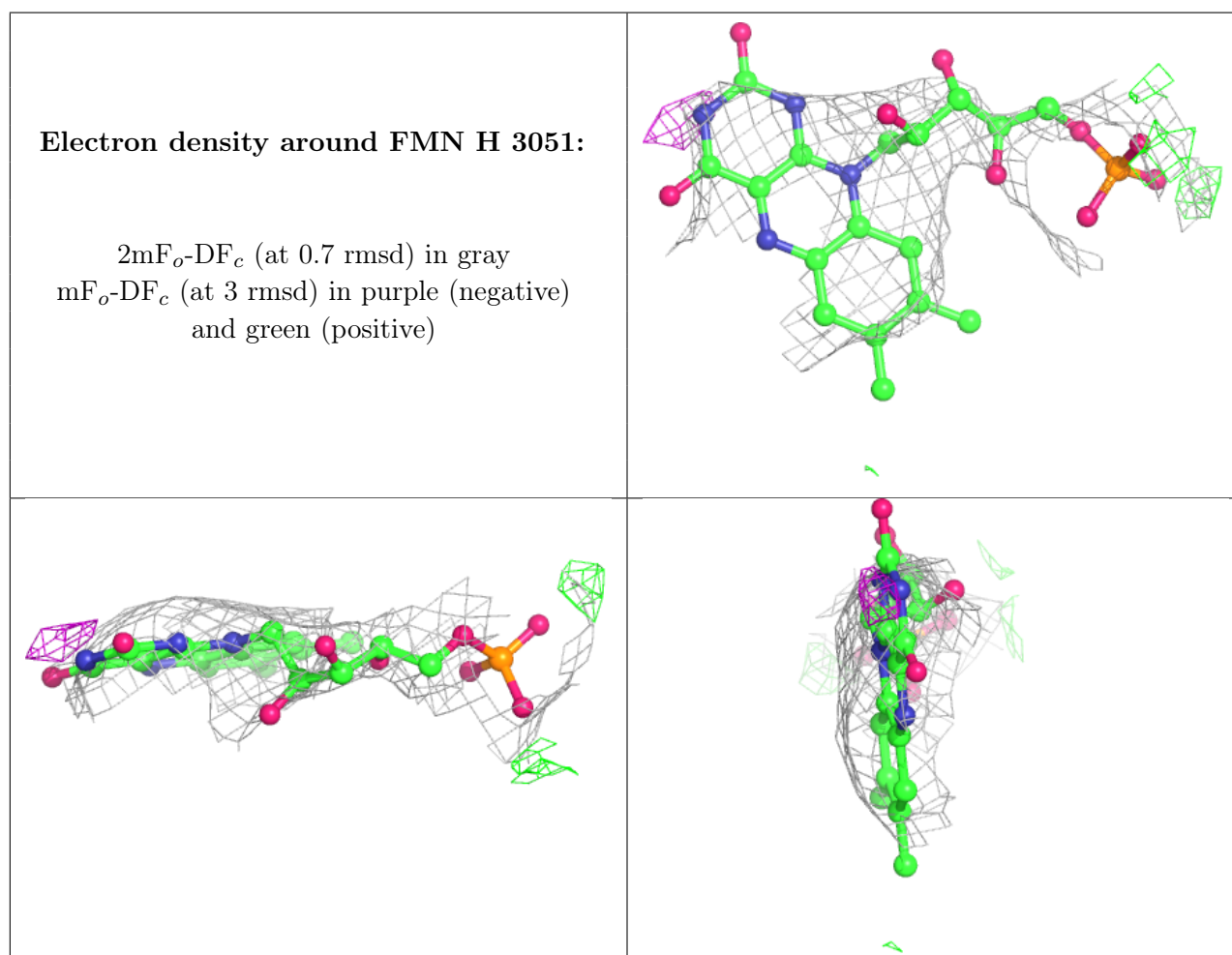
There are no monosaccharides in this entry.

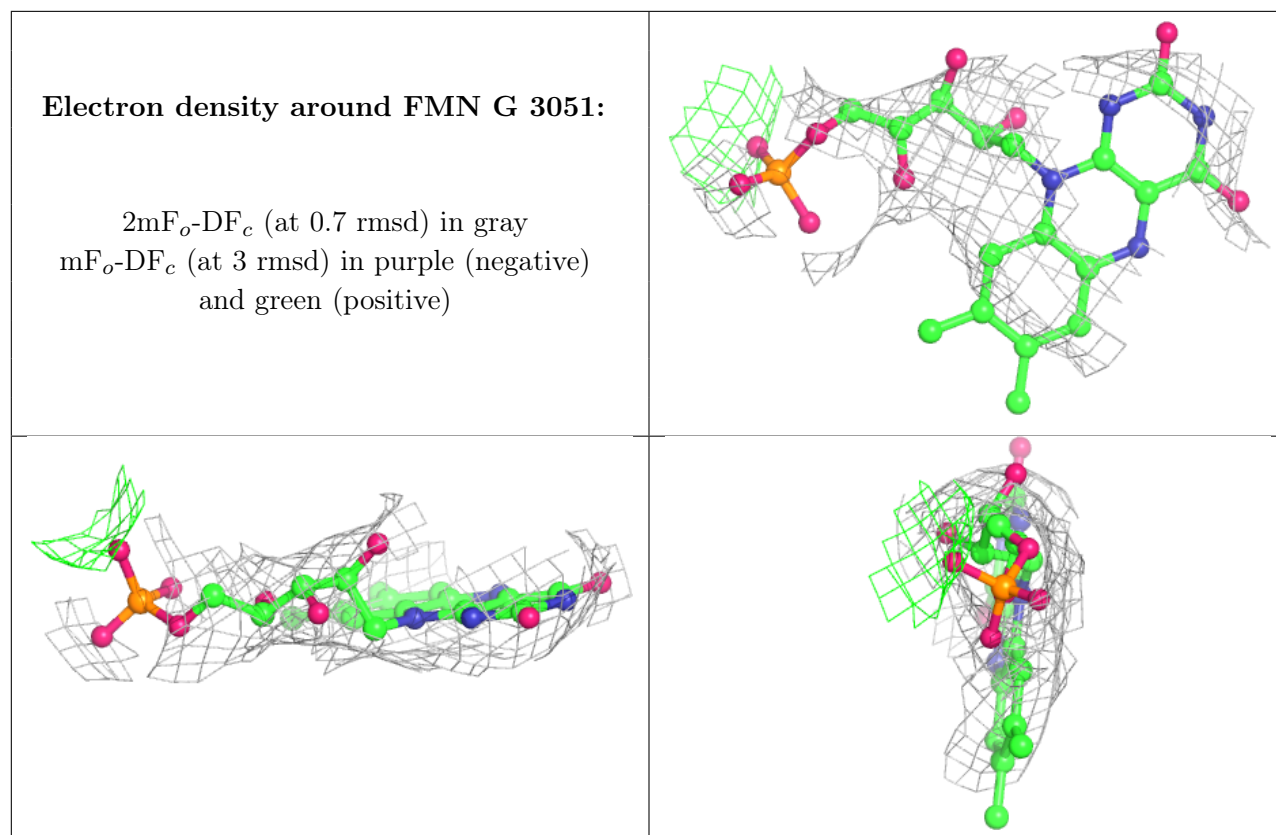
6.4 Ligands [i](#)

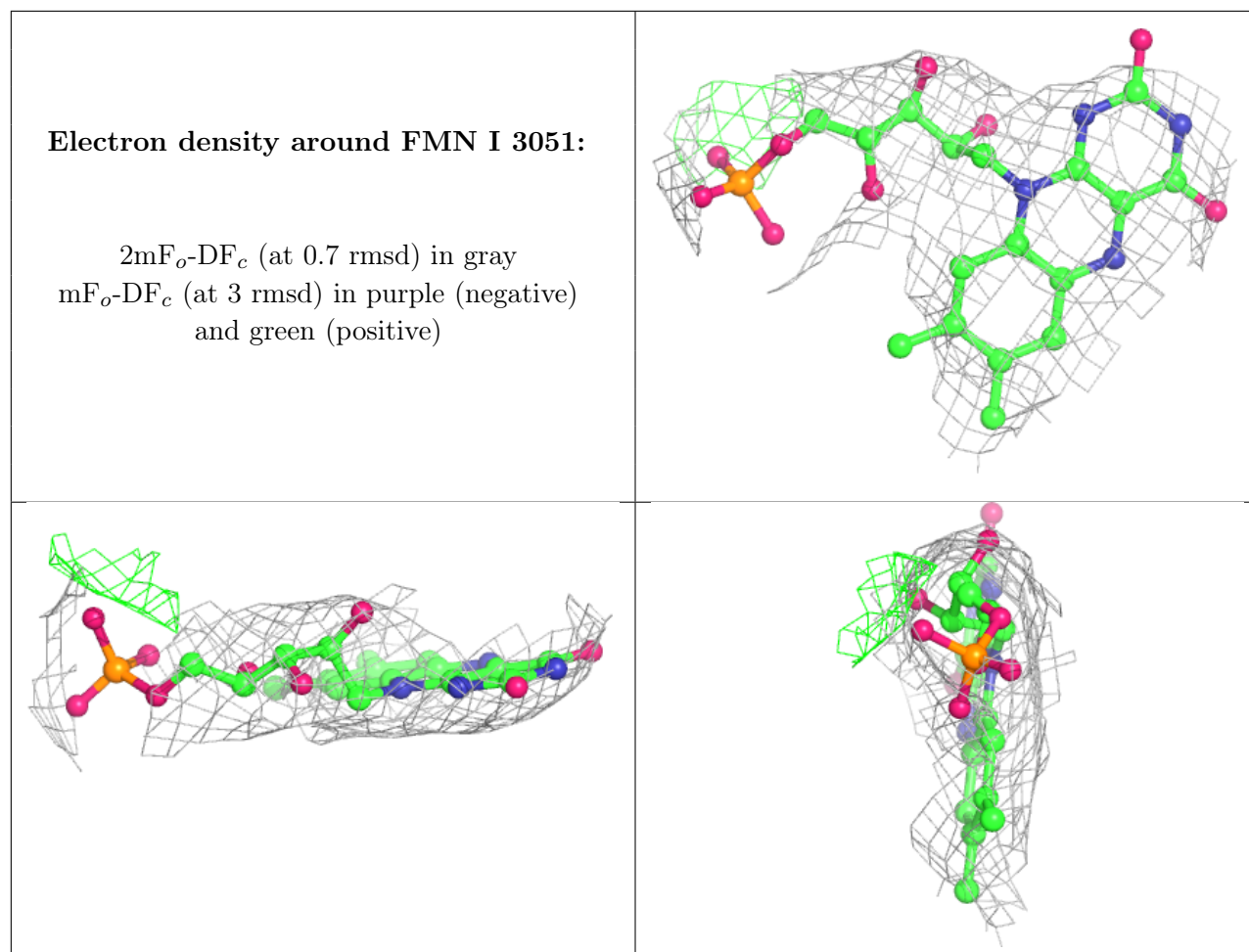
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	FMN	H	3051	31/31	0.80	0.32	131,157,181,186	0
4	FMN	G	3051	31/31	0.82	0.27	135,158,184,203	0
4	FMN	I	3051	31/31	0.82	0.26	129,161,178,201	0
3	CER	A	2748	12/16	0.84	0.30	67,131,240,249	0
3	CER	C	2748	12/16	0.90	0.34	67,131,249,250	0
3	CER	B	2748	12/16	0.91	0.20	67,131,249,250	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.







6.5 Other polymers [i](#)

There are no such residues in this entry.