

Supplement

“Low-grade inflammation is associated with a heterogeneous lipoprotein subclass profile in apparently healthy population sample”

Table S1. Concentration of inflammatory markers in the study population.

	<i>Coefficient of variation [%]</i>	Concentration of inflammatory markers [pg/ml]				
		Median	Q1	Q3	Mean	SD
Chitinase 3-like 1	11.2	8792	7208	10459	8971	2623
IFN-alpha2	10.2	44.7	38.5	55.3	49.2	16.1
IFN-beta	6.2	21.2	15.9	26.2	22.9	13.7
IFN-gamma	9.6	10.2	8.5	13.6	12.0	5.4
IL-10	5.9	24.2	22.2	26.4	24.2	3.8
IL-11	15.8	1.16	0.78	1.86	1.43	0.96
IL-12 (p40)	5.5	63.1	48.4	90.1	75.0	37.3
IL-19	7.3	35.3	31.7	40.9	37.6	9.4
IL-22	8.9	19.7	17.6	22.5	23.3	30.9
IL-26	9.7	101.7	96.0	107.8	101.3	15.4
IL-29 / IFN-lambda1	9	76.3	60.4	101.9	85.7	43.2
IL-32	7.3	32.1	21.6	54.1	43.4	35.5
IL-34	7.4	170.1	120.2	232.6	192.1	106.1
IL-35	3.4	124.8	101.7	163.7	140.9	56.4
IL-8	7.7	200.1	169.5	240.4	218.4	86.8
MMP-1	10.3	891.3	699.2	1094.7	931.1	374.9
MMP-2	7.7	4399	3575	5291	4758	1897
MMP-3	6.6	5812	4025	7940	6268	2909
Osteocalcin	5	2024	1679	2521	2146	750
Osteopontin (OPN)	11.5	30248	24857	37022	34733	20744
Pentraxin-3	10.3	360.9	251.2	486.1	416.7	267.0
TWEAK / TNFSF12	20.9	210.0	179.9	246.3	214.2	53.0
APRIL / TNFSF13	20.2	106158	89479	127615	110169	32524
BAFF / TNFSF13B	3.7	5586	4819	6786	5963	1947
LIGHT / TNFSF14	9.1	75.7	52.6	107.7	90.9	72.3
TSLP	9.8	62.0	52.7	82.1	71.7	32.4
gp130 / sIL-6Rbeta	4.7	15953	12693	19201	16972	7887
sCD163	9.7	49902	37794	64626	55050	27411
sCD30 / TNFRSF8	4.9	213.2	162.0	273.6	231.9	109.0
sTNF-R1	4.1	904.6	701.4	1116.7	943.1	373.6
sTNF-R2	4.1	1967	1447	2494	2127	974

SD =standard deviation.

Table S2. Associations of lipoprotein subclasses with inflammatory parameters assessed by linear regression analyses. All analyses were adjusted for age, sex, smoking behavior and lean body mass. Orange and blue shading indicate positive and inverse associations.

inverse association with *FDR < 0.05
positive association with *FDR < 0.05

	Beta estimates (stdev) for standardized outcome and exposure																														
	LDL-C	VLDL-C	IDL-C	LDL-P	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/		
	LDL-C	VLDL-C	IDL-C	LDL-P	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	LDL-C/	
Total Cholesterol	0.0270	0.1184	0.1877	0.2810	0.2072	0.1870	0.1853	0.2183	0.1784	0.1235	0.2183	0.1784	0.1235	0.2183	0.1784	0.1235	0.2183	0.1784	0.1235	0.2183	0.1784	0.1235	0.2183	0.1784	0.1235	0.2183	0.1784	0.1235	0.2183	0.1784	0.1235
VLDL Cholesterol	0.1178	0.1230	0.1167	0.0432	0.1156	0.1009	0.1034	0.0463	0.0782	0.0215	0.0543	0.0758	0.0215	0.0543	0.0758	0.0215	0.0543	0.0758	0.0215	0.0543	0.0758	0.0215	0.0543	0.0758	0.0215	0.0543	0.0758	0.0215	0.0543	0.0758	
LDL-1 Cholesterol	0.1102	0.1067	0.1036	0.0823	0.1054	0.0954	0.0810	0.0534	0.0647	0.0327	0.0753	0.0840	0.0327	0.0753	0.0840	0.0327	0.0753	0.0840	0.0327	0.0753	0.0840	0.0327	0.0753	0.0840	0.0327	0.0753	0.0840	0.0327	0.0753	0.0840	
LDL-2 Cholesterol	0.1268	0.1149	0.1129	0.0925	0.1125	0.1079	0.1038	0.0801	0.0718	0.0567	0.1107	0.0715	0.0567	0.1107	0.0715	0.0567	0.1107	0.0715	0.0567	0.1107	0.0715	0.0567	0.1107	0.0715	0.0567	0.1107	0.0715	0.0567	0.1107	0.0715	
LDL-3 Cholesterol	0.1184	0.1184	0.1184	0.0950	0.1184	0.1073	0.1073	0.0952	0.0760	0.0202	0.0428	0.1016	0.0202	0.0428	0.1016	0.0202	0.0428	0.1016	0.0202	0.0428	0.1016	0.0202	0.0428	0.1016	0.0202	0.0428	0.1016	0.0202	0.0428	0.1016	
LDL-4 Cholesterol	0.1275	0.1144	0.1143	0.0978	0.1268	0.0976	0.1234	0.0912	0.0879	-0.0067	0.0389	0.0628	-0.0067	0.0389	0.0628	-0.0067	0.0389	0.0628	-0.0067	0.0389	0.0628	-0.0067	0.0389	0.0628	-0.0067	0.0389	0.0628	-0.0067	0.0389	0.0628	
LDL-5 Cholesterol	0.0880	0.0388	0.0420	0.0652	0.0379	0.0491	0.0234	0.0422	0.0315	-0.0470	0.0207	-0.0427	-0.0470	0.0207	-0.0427	-0.0470	0.0207	-0.0427	-0.0470	0.0207	-0.0427	-0.0470	0.0207	-0.0427	-0.0470	0.0207	-0.0427	-0.0470	0.0207	-0.0427	
IDL Cholesterol	0.1875	0.0531	0.1790	0.1283	0.0528	0.1368	0.1378	0.1569	0.1465	0.0732	0.0261	0.0486	0.0732	0.0261	0.0486	0.0732	0.0261	0.0486	0.0732	0.0261	0.0486	0.0732	0.0261	0.0486	0.0732	0.0261	0.0486	0.0732	0.0261	0.0486	
LDL Cholesterol	0.1730	0.1784	0.1524	0.1779	0.1925	0.1428	0.1501	0.2058	0.1474	0.1264	-0.1221	0.0671	-0.1221	0.0671	-0.1221	0.0671	-0.1221	0.0671	-0.1221	0.0671	-0.1221	0.0671	-0.1221	0.0671	-0.1221	0.0671	-0.1221	0.0671	-0.1221	0.0671	
LDL-1 Triglycerides	0.1188	0.1366	0.1279	0.1279	0.1482	0.1132	0.1146	0.1326	0.0929	0.0297	-0.0247	-0.0286	0.0297	-0.0247	-0.0286	0.0297	-0.0247	-0.0286	0.0297	-0.0247	-0.0286	0.0297	-0.0247	-0.0286	0.0297	-0.0247	-0.0286	0.0297	-0.0247	-0.0286	
LDL-2 Triglycerides	0.0750	0.0743	0.0734	0.0739	0.0739	0.0739	0.0739	0.0739	0.0739	0.0739	0.0739	0.0739	0.0739	0.0739	0.0739	0.0739	0.0739	0.0739	0.0739	0.0739	0.0739	0.0739	0.0739	0.0739	0.0739	0.0739	0.0739	0.0739	0.0739	0.0739	
LDL-3 Triglycerides	0.0913	0.1021	0.0986	0.1013	0.1135	0.0918	0.1021	0.1135	0.0918	0.1021	0.1135	0.0918	0.1021	0.1135	0.0918	0.1021	0.1135	0.0918	0.1021	0.1135	0.0918	0.1021	0.1135	0.0918	0.1021	0.1135	0.0918	0.1021	0.1135	0.0918	
LDL-4 Triglycerides	0.0073	0.1735	0.1625	0.1728	0.1886	0.1782	0.1847	0.2267	0.1377	0.1286	-0.4030	-0.0030	-0.4030	-0.0030	-0.4030	-0.0030	-0.4030	-0.0030	-0.4030	-0.0030	-0.4030	-0.0030	-0.4030	-0.0030	-0.4030	-0.0030	-0.4030	-0.0030	-0.4030	-0.0030	
LDL-5 Triglycerides	0.0517	0.1187	0.1225	0.1267	0.1493	0.0663	0.1193	0.1652	0.0751	0.0888	0.0209	-0.0180	0.0209	-0.0180	0.0209	-0.0180	0.0209	-0.0180	0.0209	-0.0180	0.0209	-0.0180	0.0209	-0.0180	0.0209	-0.0180	0.0209	-0.0180	0.0209		
LDL-6 Triglycerides	0.0346	0.0218	0.0248	0.0262	0.0248	0.0238	0.0247	0.0254	0.0238	0.0247	0.0254	0.0238	0.0247	0.0254	0.0238	0.0247	0.0254	0.0238	0.0247	0.0254	0.0238	0.0247	0.0254	0.0238	0.0247	0.0254	0.0238	0.0247	0.0254	0.0238	
HDL Cholesterol	-0.0741	0.0273	0.0226	0.0250	0.0250	0.0588	0.0391	0.0817	0.0624	0.0130	-0.1369	-0.0783	-0.1369	-0.0783	-0.1369	-0.0783	-0.1369	-0.0783	-0.1369	-0.0783	-0.1369	-0.0783	-0.1369	-0.0783	-0.1369	-0.0783	-0.1369	-0.0783	-0.1369	-0.0783	
HDL-1 Cholesterol	-0.0831	0.0388	0.0327	0.0389	0.0424	0.0561	0.0634	0.0931	0.0689	0.0036	-0.0722	-0.0477	0.0036	-0.0722	-0.0477	0.0036	-0.0722	-0.0477	0.0036	-0.0722	-0.0477	0.0036	-0.0722	-0.0477	0.0036	-0.0722	-0.0477	0.0036	-0.0722	-0.0477	
HDL-2 Cholesterol	-0.0586	0.0213	0.0304	0.0338	0.0544	0.0537	0.0556	0.0492	0.0281	0.0546	-0.1144	-0.1434	0.0546	-0.1144	-0.1434	0.0546	-0.1144	-0.1434	0.0546	-0.1144	-0.1434	0.0546	-0.1144	-0.1434	0.0546	-0.1144	-0.1434	0.0546	-0.1144	-0.1434	
HDL-3 Cholesterol	-0.0276	0.0269	0.0261	0.0261	0.0248	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	0.0241	
HDL-4 Cholesterol	-0.0888	0.0075	-0.0296	-0.0384	-0.1240	-0.0113	-0.1208	0.0258	0.0457	-0.0513	0.0545	-0.0736	-0.0513	0.0545	-0.0736	-0.0513	0.0545	-0.0736	-0.0513	0.0545	-0.0736	-0.0513	0.0545	-0.0736	-0.0513	0.0545	-0.0736	-0.0513	0.0545	-0.0736	
Total Triglycerides	0.1624	0.1202	0.1180	0.1160	0.0969	0.1218	0.1080	0.1032	0.0786	0.0682	0.0367	0.0099	0.0367	0.0099	0.0367	0.0099	0.0367	0.0099	0.0367	0.0099	0.0367	0.0099	0.0367	0.0099	0.0367	0.0099	0.0367	0.0099	0.0367	0.0099	
VLDL Triglycerides	0.1368	0.1058	0.1041	0.1062	0.0955	0.11525	0.0833	0.09126	0.0734	0.0483	0.03189	0.05903	0.0483	0.03189	0.05903	0.0483	0.03189	0.05903	0.0483	0.03189	0.05903	0.0483	0.03189	0.05903	0.0483	0.03189	0.05903	0.0483	0.03189	0.05903	
IDL Triglycerides	0.1589	0.1073	0.1025	0.1142	0.0879	0.1108	0.0811	0.1137	0.0636	0.0548	0.0601	0.0294	0.0601	0.0294	0.0601	0.0294	0.0601	0.0294	0.0601	0.0294	0.0601	0.0294	0.0601	0.0294	0.0601	0.0294	0.0601	0.0294	0.0601	0.0294	
LDL Triglycerides	0.1471	0.1822	0.1817	0.1523	0.1546	0.1509	0.1821	0.1510	0.1466	0.1348	0.0879	-0.2041	-0.0261	0.0867	-0.1844	0.0218	0.0112	-0.1254	0.0181	0.0352	0.0109	0.0480	0.0480	0.0480	0.0480	0.0480	0.0480	0.0480	0.0480	0.0480	
VLDL-1 Triglycerides	0.1317	0.1360	0.1433	0.1058	0.1179	0.1570	0.1615	0.1201	0.0932	0.1262	0.0620	-0.2116	-0.0937	0.0620	-0.2116	-0.0937	0.0620	-0.2116	-0.0937	0.0620	-0.2116	-0.0937	0.0620	-0.2116	-0.0937	0.0620	-0.2116	-0.0937	0.0620	-0.2116	
VLDL-2 Triglycerides	0.0716	0.1393	0.1657	0.1826	0.1634	0.1555	0.1709	0.1106	0.1245	0.1489	0.0714	-0.0707	-0.0481	0.0714	-0.0707	-0.0481	0.0714	-0.0707	-0.0481	0.0714	-0.0707	-0.0481	0.0714	-0.0707	-0.0481	0.0714	-0.0707	-0.0481	0.0714		
VLDL-3 Triglycerides	0.1141	0.1506	0.1373	0.1468	0.1658	0.1598	0.1681	0.1643	0.1371	0.1081	0.0245	-0.0562	-0.0562	0.0245	-0.0562	-0.0562	0.0245	-0.0562	-0.0562	0.0245	-0.0562	-0.0562	0.0245	-0.0562	-0.0562	0.0245	-0.0562	-0.0562	0.0245		
VLDL-4 Triglycerides	0.12615	0.17961	0.1805	0.1543	0.1629	0.1518	0.1737	0.1196	0.1258	0.1381	0.0913	-0.0458	-0.0361	0.0913	-0.0458	-0.0361	0.0913	-0.0458	-0.0361	0.0913	-0.0458	-0.0361	0.0913	-0.0458	-0.0361	0.0913	-0.0458	-0.0361	0.0913		
VLDL-5 Triglycerides	0.1285	0.1304	0.1417	0.1378	0.1243	0.1584	0.1316	0.1175	0.1205	0.0739	0.0545	0.0289	0.0545	0.0289	0.0545	0.0289	0.0545	0.0289	0.0545	0.0289	0.0545	0.0289	0.0545	0.0289	0.0545	0.0289	0.0545	0.0289	0.0545	0.0289	
VLDL-6 Triglycerides	0.1173	0.1022	0.1104	0.1087	0.1087	0.1087	0.1087	0.1087	0.1087	0.1087	0.1087	0.1087	0.1087	0.1087	0.1087	0.1087	0.1087	0.1087	0.1087	0.1087	0.1087	0.1087	0.1087	0.1087	0.1087	0.1087	0.1087	0.1087	0.1087	0.1087	
HDL Triglycerides	0.1188	0.0811	0.0871	0.0797	0.0803	0.1086	0.11629	0.0507	0.0711	0.0211	-0.0440	-0.0755	-0.0440	-0.0755	-0.0440	-0.0755	-0.0440														

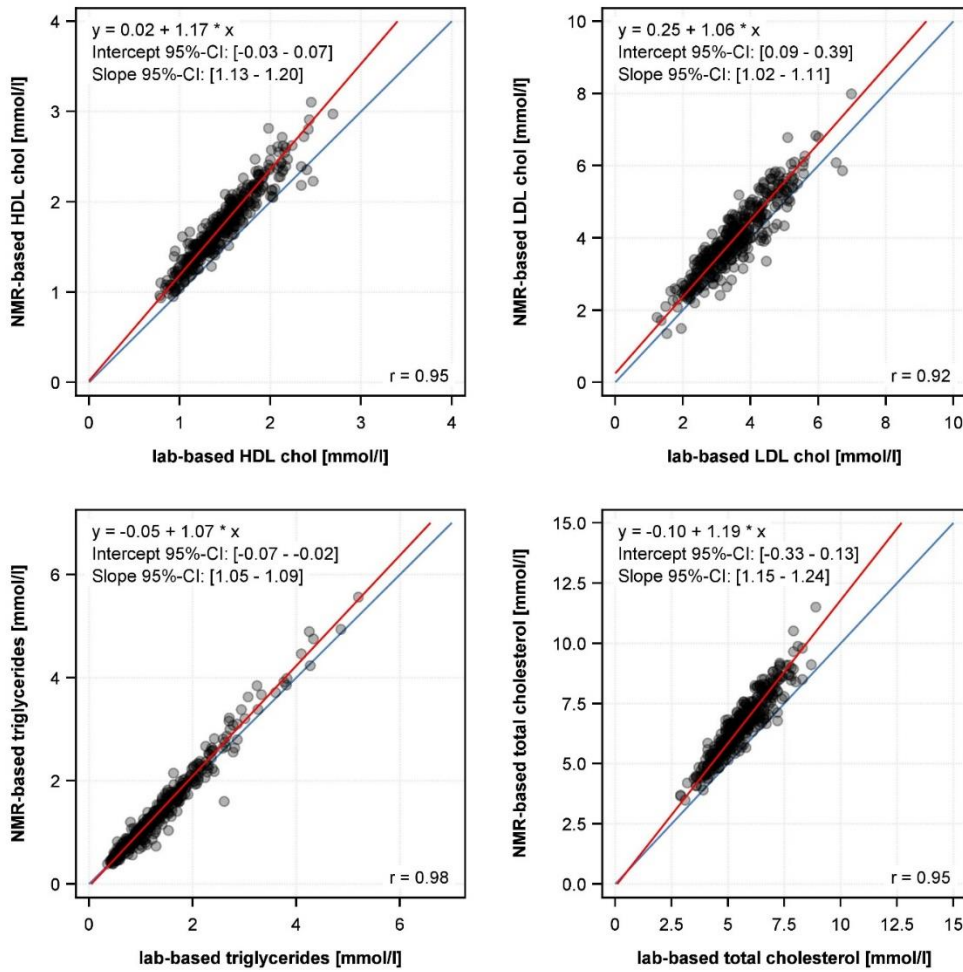


Figure S1. Comparison of the lipid levels measured by NMR spectroscopy and standard laboratory measurements. Passing-Bablok regression plots are displayed: the solid red line represents the regression line, the blue line represents the diagonal. Slope and intercept are given with the 95% confidence interval (CI). Pearson correlation coefficients are given (bottom right).

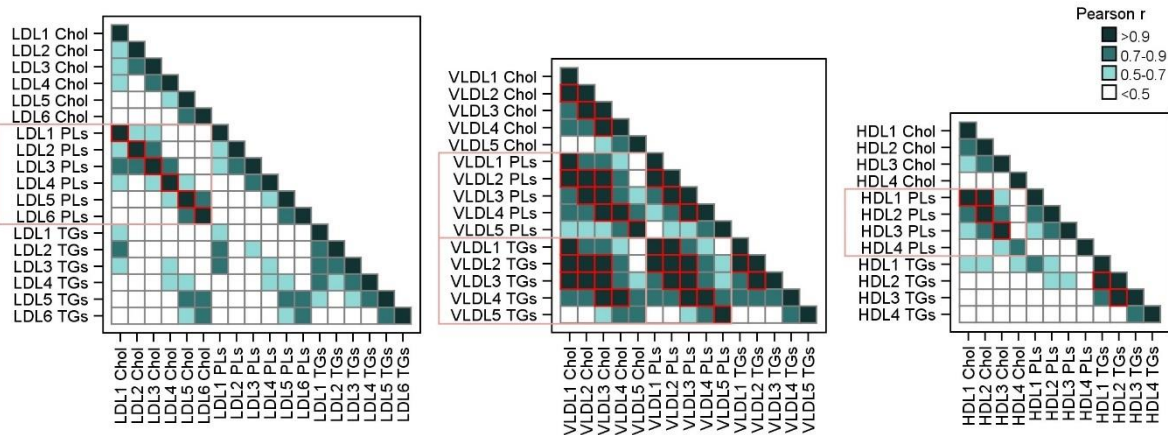


Figure S2. Correlation matrices showing within-particle Pearson correlations of cholesterol, phospholipid and triglyceride content in LDL subclasses (left), VLDL subclasses (middle) and HDL subclasses (right).

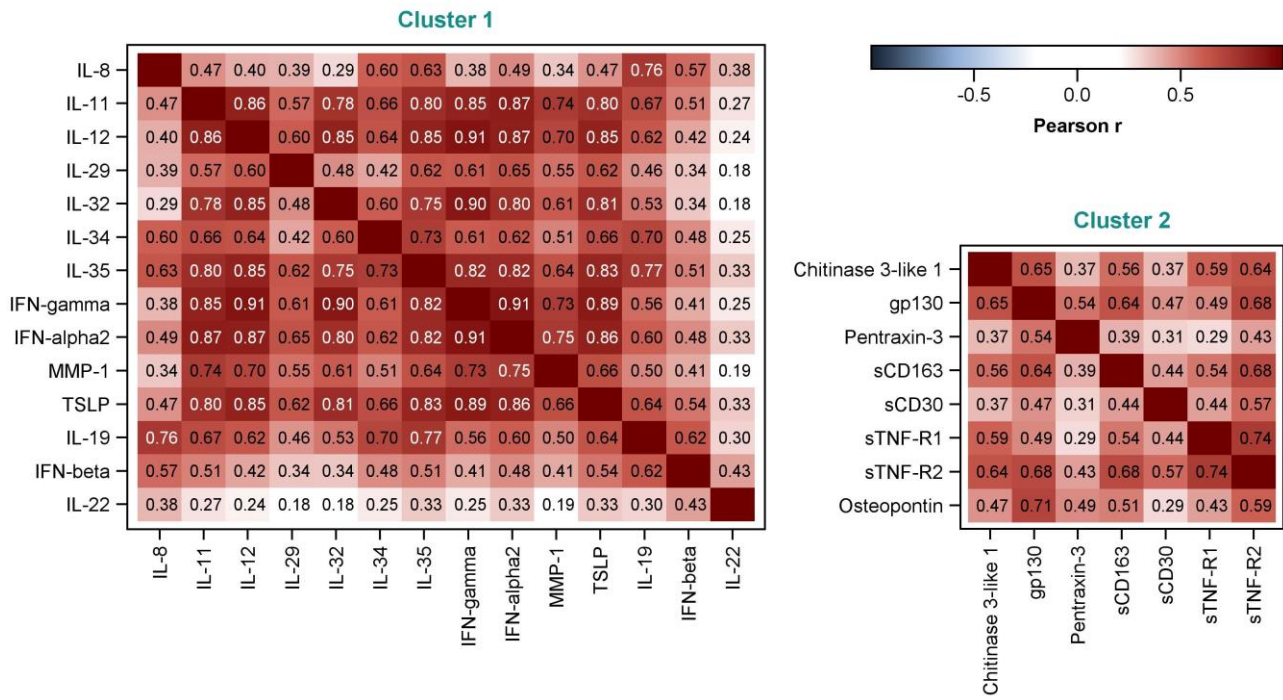


Figure S3. Color-coded Pearson correlation coefficients for the identified clusters of inflammatory markers. For all displayed correlations the p-values was < 0.01.

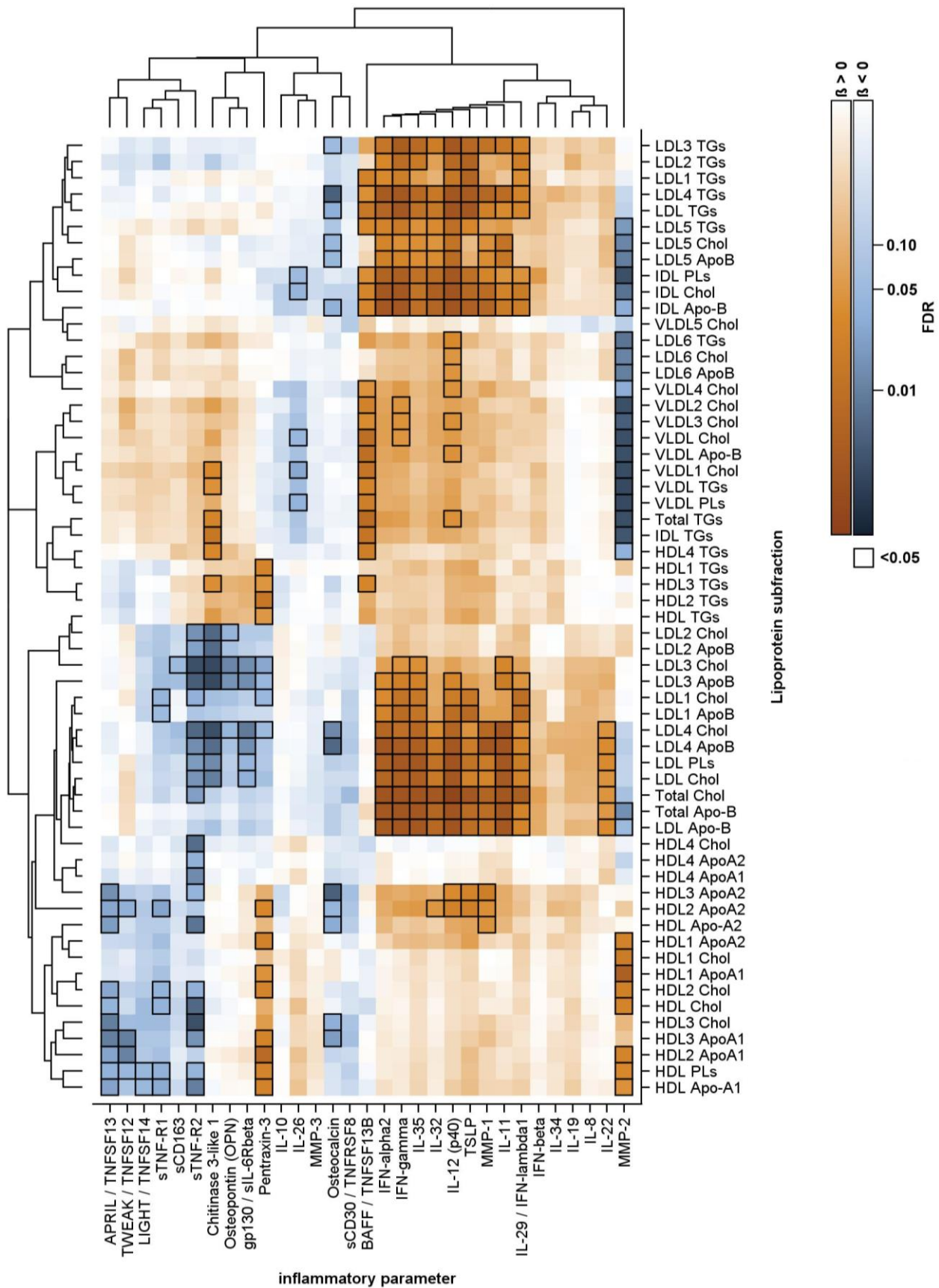


Figure S4. Color coded corrected P values (controlling the false discovery rate (FDR) at 0.05) from linear regression analyses for all investigated associations of lipoprotein subclasses with inflammatory parameters. Significant associations (FDR < 0.05) are marked with a black box. All analyses were adjusted for age, sex, smoking behavior and lean body mass. Orange and blue shading indicate positive and inverse associations, respectively.

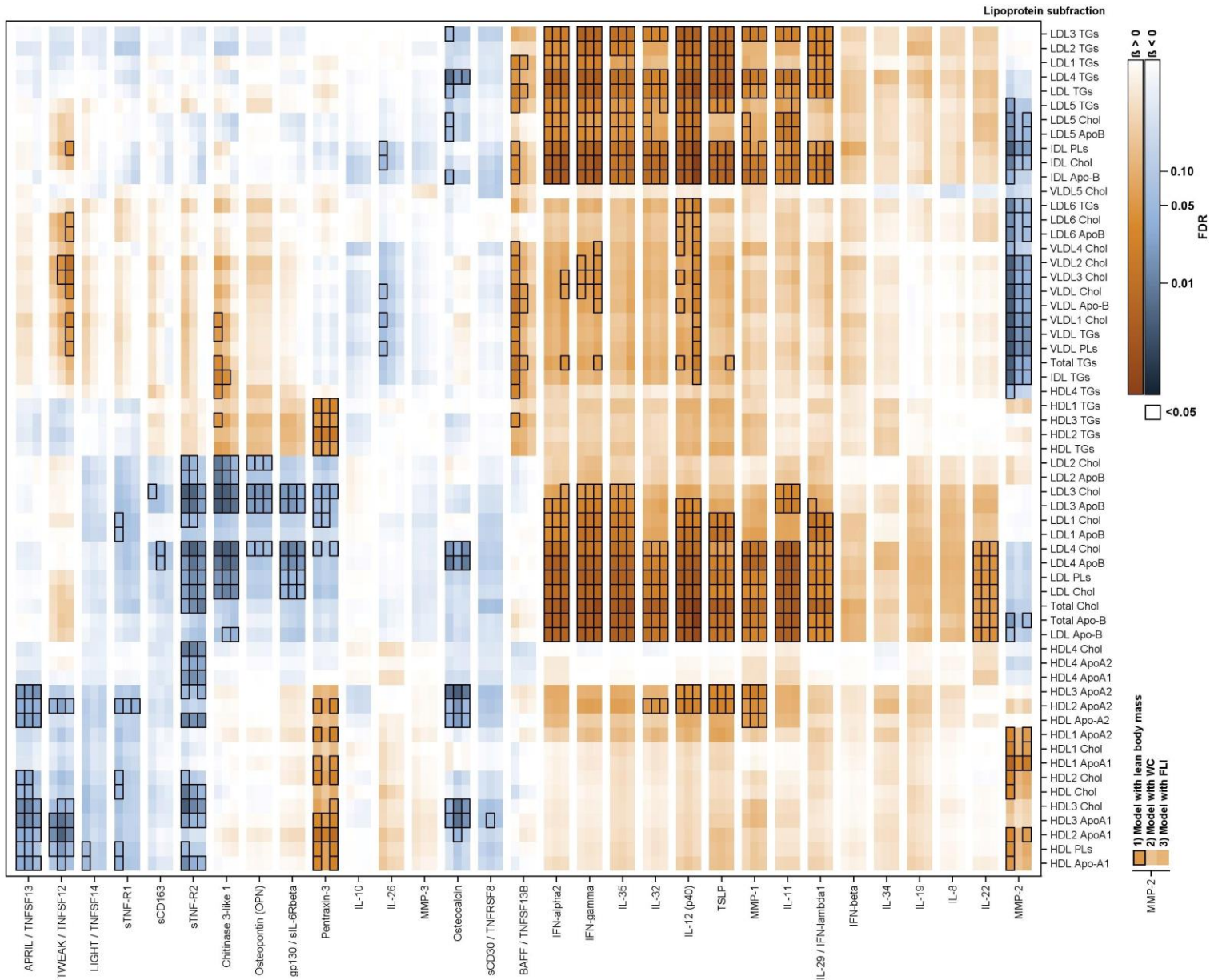


Figure S5. Color coded corrected P values (controlling the false discovery rate (FDR) at 0.05) from linear regression analyses for all investigated associations of lipoprotein subclasses with inflammatory parameters. Significant associations (FDR < 0.05) are marked with a black box. Orange and blue shading indicate positive and inverse associations, respectively. Three different models were calculated: Model 1) adjusted for age, sex, smoking behavior and lean body mass. Model 2) adjusted for age, sex, smoking behavior and waist circumference (WC). Model 3) adjusted for age, sex, smoking behavior and fatty liver index (FLI).