The Impact of Pigment-Epithelium-Derived Factor on MCF-7 Cell Metabolism in the Context of Glycaemic Condition

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Supplemental Figure S1 Cross-validated R2Y and Q2 coefficients and permutation test.

Supplemental Table S1 List of identified metabolites extracted from MS-DIAL

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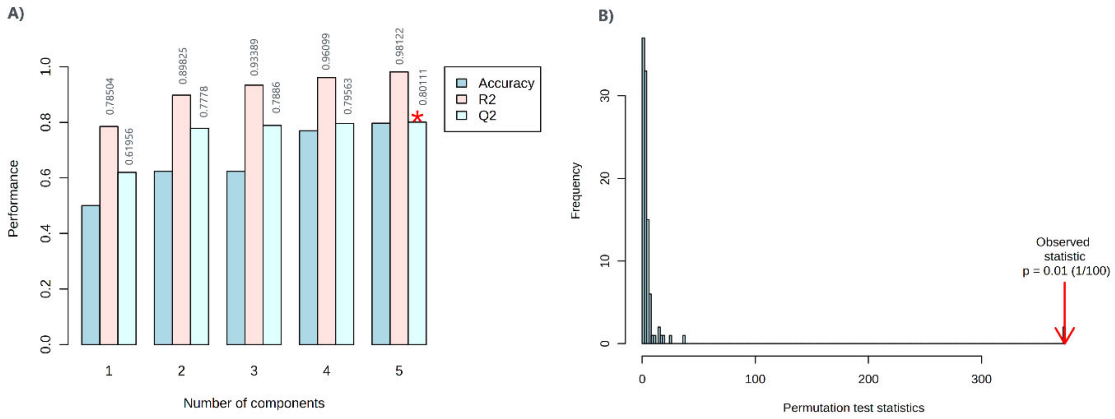

Figure S1: A) Cross-validated R2Y and Q2 coefficients. The red asterisk implies the best classifier. **B)** Based on the histogram displaying the permutation test results with a permutation number of n=100, it is clear that the model has been determined to be significant.

Table S1 List of identified metabolites extracted from MS-DIAL

Metabolite name	Average Rt(min)	Average RI	Quant mass
1-Methylhistamine	10.085	1738.14	174.1294
1-Monopalmitin	14	2584.1	371.4
3-Methylglutaconic acid	8.773	1512.32	191.12
Aminomalonic acid	8.571	1481.78	147.0867
Arachidonic acid	13.157	2385.64	79.0125
beta-Alanine	8.288	1441.1	174.1
Cholesterol	17.216	3263.57	129.1
Citric acid	10.62	1843.05	73.1
Cysteine	9.109	1568.69	69
Dihydrouracil	6.221	1150.24	73.08333
3-Hydroxybutyric acid	6.272	1156.72	191.1143
Homocysteine	9.746	1676.32	234.1231
D-Threitol	8.811	1518.49	217.1429
Ethanolamine	7.188	1286.33	174.1167
Fumaric acid	7.574	1340.79	117.0667
Glycerol	7.227	1290.2	73.1
Glycine	7.484	1328.16	174.1833
Hypotaurine	9.403	1618.09	156.05
Arabitol	10.145	1749.89	69.07895
Malate	8.657	1494.04	147.0846
Proline	7.419	1318.96	142.1046
Threonine	8.02	1403.65	73.1
Lactic acid	5.575	1043.76	73.1
Lysine	11.142	1945.45	174.15
Oxoproline	8.92	1537.04	156.112
Alanine	5.918	1106.82	116.1
Aspartic acid	8.254	1437.24	75
Glutamic acid	9.46	1627.64	246.2053
Isoleucine	7.21	1289.43	158.1913
Methionine	8.886	1531.21	176.125
Ornithine	10.614	1842	142.1

Phenylalanine	9.563	1645.04	73.09583
Serine	7.827	1376.54	73.1
Tyrosine	11.243	1965.28	218.175
Valine	6.472	1185.12	73.1
Malonic acid	6.426	1178.74	147.1
Maltose	14.656	2742.47	73.1
Melibiose	14.736	2761.82	73.1
Methylmalonic acid	6.609	1204.44	147.0955
myo-Inositol	12.073	2133.36	202.1
Oleic acid	12.473	2226.03	73.1
O-Phosphoethanolamine	10.447	1809.17	73.09
Palmitic acid	11.669	2048.86	73.1
Palmitoleic Acid	11.586	2032.5	117.0333
Pimelic acid	9.351	1609.43	149.0444
Stearic acid	12.572	2251.34	341.4
Succinic acid	7.485	1326.34	147.1
Uracil	7.812	1374.52	241.1

RT retention time, RI retention indices

Table S2 Classification of metabolites formed from the ClassyFire system

InChIKey	Kingdom	Superclass	Class	Subclass	Parent Level 1	Parent Level 2	Parent Level 3	Parent Level 4
FHQDWPCFSJMNCT-UHFFFAOYSA-N	Organic compounds	Organic nitrogen compounds	Organonitrogen compounds	Amines	Primary amines	2-arylethylamines		
LUHPQMTVPLRAQA-UHFFFAOYSA-N	Organic compounds	Lipids and lipid-like molecules	Fatty Acyls	Fatty acid esters	Fatty acid esters			
LVVVFIKBESNWRW-CSKARUKUSA-N	Organic compounds	Organometallic compounds	Organometalloid compounds	Organosilicon compounds	Trimethylsilyl esters			
HFJBTSWFKQDXSU-UHFFFAOYSA-N	Organic compounds	Organic acids and derivatives	Carboxylic acids and derivatives	Amino acids, peptides, and analogues	Amino acids and derivatives	Alpha amino acids and derivatives		
YZXBAPSDXZZRGB-DOFZRALJSA-N	Organic compounds	Lipids and lipid-like molecules	Fatty Acyls	Fatty acids and conjugates	Long-chain fatty acids			
UCMIRNVEIXFBKS-UHFFFAOYSA-N	Organic compounds	Organic acids and derivatives	Carboxylic acids and derivatives	Amino acids, peptides, and analogues	Amino acids and derivatives	Beta amino acids and derivatives		
SGNBVLSWZMBQTH-PODYLUTMSA-N	Organic compounds	Lipids and lipid-like molecules	Steroids and steroid derivatives	Ergostane steroids	Ergosterols and derivatives			
KRKNYBCHXYNGOX-UHFFFAOYSA-N	Organic compounds	Organic acids and derivatives	Carboxylic acids and derivatives	Tricarboxylic acids and derivatives	Tricarboxylic acids and derivatives			
XUJNEKJLAYXESH-UHFFFAOYNA-N	Organic compounds	Organic acids and derivatives	Carboxylic acids and derivatives	Amino acids, peptides, and analogues	Amino acids and derivatives	Alpha amino acids and derivatives	Cysteine and derivatives	

OIVLITBTBDPEFK-UHFFFAOYSA-N	Organic compounds	Organoheterocyclic compounds	Diazines	Pyrimidines and pyrimidine derivatives	Pyrimidones			
WHBMMWSBFZVSSR-UHFFFAOYSA-N	Organic compounds	Organic acids and derivatives	Hydroxy acids and derivatives	Beta hydroxy acids and derivatives	Beta hydroxy acids and derivatives			
FFFHZYDWPBMWHY-UHFFFAOYSA-N	Organic compounds	Organic acids and derivatives	Carboxylic acids and derivatives	Amino acids, peptides, and analogues	Amino acids and derivatives	Alpha amino acids and derivatives	Alpha amino acids	
UNXHWFMMPAWVPI-QWWZWVQMSA-N	Organic compounds	Organic oxygen compounds	Organooxygen compounds	Carbohydrates and carbohydrate conjugates	Sugar alcohols			
MZTOEZRSUGVLOG-UHFFFAOYSA-N	Organic compounds	Organometallic compounds	Organometalloid compounds	Organosilicon compounds	Organoheterosilanes	Trialkylheterosilanes		
VZCYOOQTPOCHFL-OWOJBTEDSA-N	Organic compounds	Organic acids and derivatives	Carboxylic acids and derivatives	Dicarboxylic acids and derivatives	Dicarboxylic acids and derivatives			
JQUGYGVCECHKBA-UHFFFAOYSA-N	Organic compounds	Organometallic compounds	Organometalloid compounds	Organosilicon compounds	Organoheterosilanes	Trialkylheterosilanes		
DHMQDGOQFOQNFH-UHFFFAOYSA-N	Organic compounds	Organic acids and derivatives	Carboxylic acids and derivatives	Amino acids, peptides, and analogues	Amino acids and derivatives	Alpha amino acids and derivatives	Alpha amino acids	
VVIUBCNYACGLLV-UHFFFAOYSA-N	Organic compounds	Organic acids and derivatives	Sulfinic acids and derivatives	Sulfinic acids	Sulfinic acids			
SUZLPERYXSOGNY-UHFFFAOYSA-N	Organic compounds	Organic oxygen compounds	Organooxygen compounds	Carbohydrates and carbohydrate conjugates	Monosaccharides			

BJEPYKJPYRNKOW-REOHCLBHSA-N	Organic compounds	Organic acids and derivatives	Hydroxy acids and derivatives	Beta hydroxy acids and derivatives	Beta hydroxy acids and derivatives			
ONIBWKKTOPOVIA-BYPYZUCNSA-N	Organic compounds	Organic acids and derivatives	Carboxylic acids and derivatives	Amino acids, peptides, and analogues	Amino acids and derivatives	Alpha amino acids and derivatives	Proline and derivatives	
AYFVYJQAPQTCCC-GBXIJSLDSA-N	Organic compounds	Organic acids and derivatives	Carboxylic acids and derivatives	Amino acids, peptides, and analogues	Amino acids and derivatives	Alpha amino acids and derivatives	Alpha amino acids	L-alpha-amino acids
JVTAAEKCZFNVCJ-REOHCLBHSA-N	Organic compounds	Organic acids and derivatives	Hydroxy acids and derivatives	Alpha hydroxy acids and derivatives	Alpha hydroxy acids and derivatives			
KDXKERNSBIXSRK-YFKPBYRVSA-N	Organic compounds	Organic acids and derivatives	Carboxylic acids and derivatives	Amino acids, peptides, and analogues	Amino acids and derivatives	Alpha amino acids and derivatives	Alpha amino acids	L-alpha-amino acids
QACGFKAUSXGLCU-UHFFFAOYSA-N	Organic compounds	Organic acids and derivatives	Carboxylic acids and derivatives	Amino acids, peptides, and analogues	Amino acids and derivatives	Alpha amino acids and derivatives	Proline and derivatives	
QNAYBMKLOCPYGJ-REOHCLBHSA-N	Organic compounds	Organic acids and derivatives	Carboxylic acids and derivatives	Amino acids, peptides, and analogues	Amino acids and derivatives	Alpha amino acids and derivatives	Alanine and derivatives	
UTGZLLJGNUQPMX-UHFFFAOYSA-N	Organic compounds	Organic acids and derivatives	Carboxylic acids and derivatives	Amino acids, peptides, and analogues	Amino acids and derivatives	Alpha amino acids and derivatives	Aspartic acid and derivatives	
WHUUTDBJXJRKMK-VKHMYHEASA-N	Organic compounds	Organic acids and derivatives	Carboxylic acids and derivatives	Amino acids, peptides, and analogues	Amino acids and derivatives	Alpha amino acids and derivatives	Glutamic acid and derivatives	

AGPKZVBTJJNPAG-WHFBIAKZSA-N	Organic compounds	Organic acids and derivatives	Carboxylic acids and derivatives	Amino acids, peptides, and analogues	Amino acids and derivatives	Alpha amino acids and derivatives	Isoleucine and derivatives	
FFEARJCKVFRZRR-BYPYZUCNSA-N	Organic compounds	Organic acids and derivatives	Carboxylic acids and derivatives	Amino acids, peptides, and analogues	Amino acids and derivatives	Alpha amino acids and derivatives	Methionine and derivatives	
AHLPHDHHMVZTML-BYPYZUCNSA-N	Organic compounds	Organic acids and derivatives	Carboxylic acids and derivatives	Amino acids, peptides, and analogues	Amino acids and derivatives	Alpha amino acids and derivatives	Alpha amino acids	L-alpha-amino acids
COLNVLDHVKWLRT-QMMMGPOBSA-N	Organic compounds	Organic acids and derivatives	Carboxylic acids and derivatives	Amino acids, peptides, and analogues	Amino acids and derivatives	Alpha amino acids and derivatives	Phenylalanine and derivatives	
MTCFGRXMJLQNBG-REOHCLBHSA-N	Organic compounds	Organic acids and derivatives	Carboxylic acids and derivatives	Amino acids, peptides, and analogues	Amino acids and derivatives	Alpha amino acids and derivatives	Serine and derivatives	
WMWBCQXPKSQMOK-KRWDZBQOSA-N	Organic compounds	Organic acids and derivatives	Carboxylic acids and derivatives	Amino acids, peptides, and analogues	Amino acids and derivatives	Alpha amino acids and derivatives	Phenylalanine and derivatives	
KZSNJWFQEVHDMF-BYPYZUCNSA-N	Organic compounds	Organic acids and derivatives	Carboxylic acids and derivatives	Amino acids, peptides, and analogues	Amino acids and derivatives	Alpha amino acids and derivatives	Valine and derivatives	
OFOBLEOULBTSOW-UHFFFAOYSA-N	Organic compounds	Organic acids and derivatives	Carboxylic acids and derivatives	Dicarboxylic acids and derivatives	Dicarboxylic acids and derivatives			
GUBGYTABKSRVRQ-PICCSMPSSA-N	Organic compounds	Organic oxygen compounds	Organooxygen compounds	Carbohydrates and carbohydrate conjugates	Glycosyl compounds	O-glycosyl compounds		

DLRVVLDZNNYCBX-CQHUIXDMSA-N	Organic compounds	Organic oxygen compounds	Organooxygen compounds	Carbohydrates and carbohydrate conjugates	Glycosyl compounds	O-glycosyl compounds		
ZIYVHBGGAOATLY-UHFFFAOYSA-N	Organic compounds	Organic acids and derivatives	Carboxylic acids and derivatives	Dicarboxylic acids and derivatives	Dicarboxylic acids and derivatives			
CDAISMWEOUEBRE-GPIVLXJGSA-N	Organic compounds	Organic oxygen compounds	Organooxygen compounds	Alcohols and polyols	Secondary alcohols	Cyclohexanols		
ZQPPMHVWECSIRJ-KTKRTIGZSA-N	Organic compounds	Lipids and lipid-like molecules	Fatty Acyls	Fatty acids and conjugates	Long-chain fatty acids			
SUHOOTKUPISOBE-UHFFFAOYSA-N	Organic compounds	Organic acids and derivatives	Organic phosphoric acids and derivatives	Phosphate esters	Phosphoethanolamines			
IPCSVZSSVZVIGE-UHFFFAOYSA-N	Organic compounds	Lipids and lipid-like molecules	Fatty Acyls	Fatty acids and conjugates	Long-chain fatty acids			
UNUADFKHVGBUHA-KHPPLWFESA-N	Organic compounds	Organometallic compounds	Organometalloid compounds	Organosilicon compounds	Trimethylsilyl esters			
VOLKRTUGJXKFMI-UHFFFAOYSA-N	Organic compounds	Organometallic compounds	Organometalloid compounds	Organosilicon compounds	Trimethylsilyl esters			
QIQXTHQIDYTFRH-UHFFFAOYSA-N	Organic compounds	Lipids and lipid-like molecules	Fatty Acyls	Fatty acids and conjugates	Long-chain fatty acids			
KDYFGRWQOYBRFD-UHFFFAOYSA-N	Organic compounds	Organic acids and derivatives	Carboxylic acids and derivatives	Dicarboxylic acids and derivatives	Dicarboxylic acids and derivatives			
FSBNTQRWSOTNEW-UHFFFAOYSA-N	Organic compounds	Organoheterocyclic compounds	Diazines	Pyrimidines and pyrimidine derivatives	Pyrimidines and pyrimidine derivatives			

Table S3: Pathway enrichment analysis of altered metabolites

Metabolic Pathways	[a]Total	[b]Hits	[c]Raw p	[d]FDR
Arginine and Proline Metabolism	53	4	0.00233	0.128
Glycine and Serine Metabolism	59	4	0.00348	0.128
Citric Acid Cycle	32	3	0.00504	0.128
Beta-Alanine Metabolism	34	3	0.006	0.128
Aspartate Metabolism	35	3	0.00652	0.128
Methionine Metabolism	43	3	0.0117	0.19
Glutamate Metabolism	49	3	0.0167	0.234
Mitochondrial Electron Transport Chain	19	2	0.0193	0.235
Betaine Metabolism	21	2	0.0234	0.235
Carnitine Synthesis	22	2	0.0255	0.235
Warburg Effect	58	3	0.0263	0.235
Urea Cycle	29	2	0.0429	0.35
Purine Metabolism	74	3	0.0497	0.36
Ammonia Recycling	32	2	0.0514	0.36
Propanoate Metabolism	42	2	0.0836	0.546
Homocysteine Degradation	9	1	0.101	0.619
Malate-Aspartate Shuttle	10	1	0.112	0.644
Ketone Body Metabolism	13	1	0.143	0.714
Pyrimidine Metabolism	59	2	0.149	0.714
Valine, Leucine and Isoleucine Degradation	60	2	0.153	0.714
Vitamin K Metabolism	14	1	0.153	0.714
Bile Acid Biosynthesis	65	2	0.174	0.741
Alanine Metabolism	17	1	0.183	0.741
Spermidine and Spermine Biosynthesis	18	1	0.193	0.741
Butyrate Metabolism	19	1	0.202	0.741
Tyrosine Metabolism	72	2	0.204	0.741
Catecholamine Biosynthesis	20	1	0.212	0.741
Threonine and 2-Oxobutanoate Degradation	20	1	0.212	0.741
Glutathione Metabolism	21	1	0.221	0.748
Transfer of Acetyl Groups into Mitochondria	22	1	0.231	0.753
Oxidation of Branched Chain Fatty Acids	26	1	0.267	0.817
Phytanic Acid Peroxisomal Oxidation	26	1	0.267	0.817
Phenylalanine and Tyrosine Metabolism	28	1	0.284	0.844
Porphyrin Metabolism	40	1	0.382	1
Histidine Metabolism	43	1	0.404	1
Steroidogenesis	43	1	0.404	1
Steroid Biosynthesis	48	1	0.44	1
Pyruvate Metabolism	48	1	0.44	1

[a] Total Cmpd: total number of compounds in the pathway, [b] Hit: actually matched number from the data

[c] Raw p: p-value calculated from the enrichment analysis, [d] FDR: p-value adjusted using False Discovery Rate