

## Supporting information

**Figure S1.** Representative  $^1\text{H}$  NMR spectra (500 MHz) of MPA-induced hormone-independent tumours extracts: a) polar extract obtained from tumour A (section A2) excluding water (5.09-4.68 ppm) and TSP (0.13-0.00 ppm) regions; assignment: (1) Isoleucine, (2) Leucine, (3) Valine, (4) Lactate, (5) Threonine, (6) Alanine, (7) Lysine, (8) Acetate, (9) Proline, (10) Glutamate, (11) Methionine, (12) Acetone, (13) Pyruvate, (14) Succinate, (15) Citrate, (16) Aspartate, (17) Creatine, (18) Phosphocreatine, (19) Ethanolamine, (20) Choline, (21) Phosphocholine, (22) Glycerophosphocholine, (23) Taurine, (24) *scyllo*-inositol, (25) Glycerol, (26) Glycine, (27) Serine, (28) Uridine, (29) Adenosine/Inosine, (30)  $\beta$ -Glucose, (31)  $\alpha$ -Glucose, (32) Uracil, (33) Fumarate, (34) Tyrosine, (35) Histidine, (36) Phenylalanine, (37) Hypoxanthine and (38) Formate; b) lipophilic extract obtained from tumour F (section F2), excluding chloroform (7.50-6.96 ppm), residual methanol (3.57-3.36 ppm) and TMS (0.15-0.00 ppm) regions; assignment: (1') Total 7-lathosterol, (2') Total cholesterol, (3') Fatty acids, (4') Free cholesterol, (5') Esterified cholesterol, (6') Oleic acid (18:1,  $\omega$ -9), (7') Linoleic acid (18:2,  $\omega$ -6), (8') Arachidonic acid (20:4,  $\omega$ -6), (9') Docosahexaenoic acid (22:6,  $\omega$ -3), (10') Phosphatidylethanolamine, (11') Sphingomyelin, (12') Phosphatidylcholine, (13') Glycerophospholipids, (14') Triglycerides, (15') Plasmalogen. \*, residual water.

**Figure S2.** Scores scatter plots (lipophilic extracts) for a) PCA and b) PLS-DA of  $^1\text{H}$  NMR spectra from 59-2-HI and C7-2-HI tumour lines.  $Q^2$  (cum): predictive power.

**Figure S3.** Relative metabolite levels (left) and average lipid characteristics (right) for tumours of a) 59-2-HI and b) C7-2-HI lines. Heatmaps show statistically significant variations ( $|ES| > 0.50$ , ES error < 75%, Wilcoxon Rank-sum  $p$ -value < 0.05). Lines and columns represent tumour sections (or octants) and metabolites, respectively. Metabolite relative peak areas are represented as the ratio of normalized integrals to the highest integral value, in a color scale. Bar plots show average fatty acids unsaturation degree  $[\text{HC}=\text{CH}]/[-\text{CH}_3]$ , polyunsaturation degree  $[\text{=CH-CH}_2\text{-CH=}]/[-\text{CH}_3]$  and average chain length  $([\text{=CH-CH}_2\text{-CH=}] + [-\text{CH}_2\text{-CO}] + [-\text{CH}_2\text{-CH}_2\text{-CH=}] + [(\text{CH}_2)_n])/[(\text{CH}_2)_n]/[(\text{CH}_2)_n])$ , calculated with basis on reference [44]. \*: Wilcoxon Rank-sum  $p$ -value < 0.05.

**Table S1.** 500 MHz  $^1\text{H}$  NMR assignment of metabolites present in medroxyprogesterone acetate (MPA)-induced hormone-independent breast tumours (pH 7.4 for aqueous extracts). s, singlet; d, doublet; dd, doublet of doublets; dt, doublet of triplets; t, triplet; q, quartet; m, multiplet; br, broad.