

Supplementary Table S1.

Upregulated gene profile in human breast cancer MCF-7 cells with fucoxanthinol (FxOH) treatment.^a

| No. | Gene symbol | Description | Fold ^b | p-Value ^c |
|-----|---------------------|---|-------------------|-------------------------|
| 1 | <i>HMOX1</i> | Heme oxygenase 1 | 419.6 | 9.2 × 10 ⁻¹³ |
| 2 | <i>DDIT3</i> | DNA-damage-inducible transcript 3 | 229.4 | 7.0 × 10 ⁻¹² |
| 3 | <i>CYP1A1</i> | Cytochrome P450, family 1, subfamily A, polypeptide 1 | 190.5 | 2.8 × 10 ⁻¹⁰ |
| 4 | <i>HSPA6</i> | Heat shock 70kDa protein 6 (HSP70B) | 175.3 | 1.8 × 10 ⁻⁸ |
| 5 | <i>ATF3</i> | Activating transcription factor 3 | 164.7 | 5.3 × 10 ⁻¹¹ |
| 6 | <i>FAM129A</i> | Family with sequence similarity 129, member A | 130.3 | 2.4 × 10 ⁻⁸ |
| 7 | <i>SLC7A11</i> | Solute carrier family 7 (anionic amino acid transporter light chain, xc- system), member 11 | 114.2 | 9.4 × 10 ⁻¹² |
| 8 | <i>GEM</i> | GTP binding protein overexpressed in skeletal muscle | 78.4 | 3.6 × 10 ⁻¹⁰ |
| 9 | <i>AKRIC1</i> | Aldo-keto reductase family 1, member C1 | 71.9 | 8.3 × 10 ⁻¹¹ |
| 10 | <i>GADD45A</i> | Growth arrest and DNA-damage-inducible, alpha | 63.8 | 8.1 × 10 ⁻¹¹ |
| 11 | <i>GABARAPL1</i> | GABA(A) receptor-associated protein like 1 | 57.8 | 2.2 × 10 ⁻¹⁰ |
| 12 | <i>IL1RL1</i> | Interleukin 1 receptor-like 1 | 46.5 | 2.0 × 10 ⁻⁷ |
| 13 | <i>MAP1B</i> | Microtubule associated protein 1B | 45.3 | 2.1 × 10 ⁻¹⁰ |
| 14 | <i>ETV5</i> | Ets variant 5 | 44.7 | 2.6 × 10 ⁻⁹ |
| 15 | <i>PPP1R15A</i> | Protein phosphatase 1, regulatory subunit 15A | 44.6 | 1.3 × 10 ⁻⁹ |
| 16 | <i>DNAJB9</i> | DnaJ (Hsp40) homolog, subfamily B, member 9 | 44.0 | 7.7 × 10 ⁻¹⁰ |
| 17 | <i>NR1D1</i> | Nuclear receptor subfamily 1, group D, member 1 | 40.6 | 7.9 × 10 ⁻¹⁰ |
| 18 | <i>AKRIC2</i> | Aldo-keto reductase family 1, member C2 | 39.3 | 5.7 × 10 ⁻¹⁰ |
| 19 | <i>RFPL4A</i> | Ret finger protein-like 4A | 36.7 | 2.0 × 10 ⁻⁸ |
| 20 | <i>HSPB8</i> | Heat shock 22kDa protein 8 | 36.6 | 1.0 × 10 ⁻¹⁰ |
| 21 | <i>FKBP14</i> | FK506 binding protein 14 | 33.7 | 2.9 × 10 ⁻¹⁰ |
| 22 | <i>MMP13</i> | Matrix metalloproteinase 13 | 30.0 | 8.3 × 10 ⁻⁹ |
| 23 | <i>BHLHE41</i> | Basic helix-loop-helix family, member e41 | 29.6 | 1.0 × 10 ⁻⁹ |
| 24 | <i>TNFAIP3</i> | Tumor necrosis factor, alpha-induced protein 3 | 28.9 | 1.1 × 10 ⁻⁹ |
| 25 | <i>CREBRF</i> | CREB3 regulatory factor | 27.3 | 5.9 × 10 ⁻⁹ |
| 26 | <i>IL6R</i> | Interleukin 6 receptor | 26.8 | 1.1 × 10 ⁻⁸ |
| 27 | <i>SPX</i> | Spexin hormone | 23.0 | 1.6 × 10 ⁻⁸ |
| 28 | <i>SAT1</i> | Spermidine/spermine N1-acetyltransferase 1 | 22.5 | 4.8 × 10 ⁻¹⁰ |
| 29 | <i>RGS2</i> | Regulator of G-protein signaling 2 | 21.8 | 3.0 × 10 ⁻⁸ |
| 30 | <i>REXO1L10P</i> | REX1, RNA exonuclease 1 homolog-like 10, pseudogene | 21.6 | 2.6 × 10 ⁻⁷ |
| 31 | <i>ZFAND2A</i> | Zinc finger, AN1-type domain 2A | 21.4 | 4.3 × 10 ⁻¹⁰ |
| 32 | <i>GTPBP2</i> | GTP binding protein 2 | 21.1 | 1.2 × 10 ⁻⁸ |
| 33 | <i>ZNF165</i> | Zinc finger protein 165 | 19.9 | 2.9 × 10 ⁻⁹ |
| 34 | <i>MMP10</i> | Matrix metalloproteinase 10 | 19.8 | 3.9 × 10 ⁻⁷ |
| 35 | <i>MMP1</i> | Matrix metalloproteinase 1 | 19.6 | 2.7 × 10 ⁻⁸ |
| 36 | <i>RFPL4AL1</i> | Ret finger protein-like 4A-like 1 | 19.6 | 1.1 × 10 ⁻⁸ |
| 37 | <i>FKBP11; ARF3</i> | FK506 binding protein 11; ADP-ribosylation factor 3 | 19.4 | 1.4 × 10 ⁻⁹ |
| 38 | <i>ERO1B</i> | Endoplasmic reticulum oxidoreductase beta | 19.1 | 1.9 × 10 ⁻⁸ |
| 39 | <i>DNAJB4</i> | DnaJ (Hsp40) homolog, subfamily B, member 4 | 18.3 | 2.1 × 10 ⁻⁹ |
| 40 | <i>HSPA13</i> | Heat shock protein 70kDa family, member 13 | 18.3 | 3.4 × 10 ⁻⁹ |

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|---------------------------------|---------------|--|------|-----------------------|
| 41 | <i>TRIB3</i> | Tribbles pseudokinase 3 | 17.9 | 1.7×10^{-9} |
| 42 | <i>FOSL1</i> | FOS-like antigen 1 | 17.9 | 5.2×10^{-8} |
| 43 | <i>GCLM</i> | Glutamate-cysteine ligase, modifier subunit | 17.6 | 7.6×10^{-10} |
| 44 | <i>ANXA1</i> | Annexin A1 | 17.2 | 3.2×10^{-8} |
| 45 | <i>CHAC1</i> | ChaC glutathione-specific gamma-glutamylcyclotransferase 1 | 17.2 | 2.3×10^{-8} |
| 46 | <i>LAMP3</i> | Lysosomal-associated membrane protein 3 | 16.6 | 1.6×10^{-8} |
| 47 | <i>HBEGF</i> | Heparin-binding EGF-like growth factor | 16.4 | 3.0×10^{-10} |
| 48 | <i>TSPYL2</i> | TSPY-like 2 | 16.1 | 4.2×10^{-9} |
| 49 | <i>DEDD2</i> | Death effector domain containing 2 | 15.6 | 1.1×10^{-8} |
| 50 | <i>LSMEM1</i> | Leucine-rich single-pass membrane protein 1 | 15.6 | 1.3×10^{-8} |
| ECM receptor interaction signal | | | | |
| 1 | <i>LAMC2</i> | Laminin, gamma 2 | 5.1 | 3.7×10^{-8} |
| 2 | <i>ITGA6</i> | Integrin alpha 6 | 3.6 | 2.3×10^{-6} |

^a Among all 1,579 upregulated genes with significant alterations, the top 50 genes (fold) with 2 genes belonging to ECM receptor interaction signal were shown. ^b Fold change of gene expression in MCF-7 cells with FxOH treatment, compared with that of control cells. ^c Significant difference between MCF-7 cells with and without FxOH treatment using one-way ANOVA ($n=3$).