Oleksiak et al. BMC Genomics

Additional file 4: Table S2. Differential gene expression and PCB inducibility in pairwise comparisons of NBH and SC embryos at 5, 10, and 15 dpf.

Gene	NBH PCB / NBH DMSO	SC PCB / SC DMSO	NBH DMSO / SC DMSO
5 days post fertilization			
basic leucine zipper nuclear factor 1 [Mus musculus]_603	-1.03	**5.09**[c]	-1.52
Cytochrome P450 1A1 (EC 1.14.14.1) (CYPIA1)_1115	1.29	**4.82**[b,c]	-1.12
*UnAn_29411_6378 (CYP1B1)	-1.03	**4.61**[b,c]	-2.51
T-cell surface glycoprotein CD3 delta chain precursor (T-cell receptor T3 delta chain)_3770	1.14	**2.92**[b,c]	-1.64
*UnAn_27910_5543 (CYP1B1)	1.22	**2.54**[b,c]	-1.32
Diablo homolog, mitochondrial precursor (Second mitochondria-derived activator of caspase) (Smac protein) (Direct IAP binding protein with low pI)_1191	-1.03	**2.40**	2.14
UnAn_21996_4295	1.28	**1.84**[b,c]	1.02
Small inducible cytokine A4 homolog precursor (Macrophage inflammatory protein 1-beta homolog)_3581	1.13	**1.78**[c]	1.03
Synaptophysin-like protein (Pantophysin)_3753	-1.15	**1.43**	1.64
ATP synthase lipid-binding protein, mitochondrial precursor (EC 3.6.3.14) (ATP synthase proteolipid P2) (ATPase protein 9) (ATPase subunit C)_560	**1.79**	1.31	1.47
Hypothetical protein C31G5.21 in chromosome I_1963	1.12	1.27	**1.98**
hect domain and RLD 4 isoform b [Homo sapiens]_1806	**1.33**	1.21	-1.06
UnAn_26723_4896	-1.14	1.14	**2.12**
UnAn_23246_4614	-1.09	1.03	**1.96**
UnAn_22726_4401	1.03	-1.10	**1.88**
Proteasome subunit beta type 7 precursor (EC 3.4.25.1) (Proteasome subunit Z) (Macropain chain Z) (Multicatalytic endopeptidase complex chain Z)_3109	**1.41**	-1.10	-1.14
Deoxyribonuclease-1 precursor (EC 3.1.21.1) (Deoxyribonuclease I) (DNase I)_1181	1.48	-1.14	**-2.57**
Guanidinoacetate N-methyltransferase (EC 2.1.1.2)_1754	-1.16	-1.25	**-3.28**
10 days post fertilization			
*UnAn_29411_6378 (CYP1B1)	1.09	**11.78**[a,c]	1.12
Cytochrome P450 1A1 (EC 1.14.14.1) (CYPIA1)_1115	1.10	**6.10**[a,c]	-1.13
T-cell surface glycoprotein CD3 delta chain precursor (T-cell receptor T3 delta chain)_3770	1.07	**5.47**[a,c]	-1.25
*UnAn_27910_5543 (CYP1B1)	-1.02	**3.36**[a,c]	-1.29
Tubulointerstitial nephritis antigen-like precursor (Androgen-regulated gene protein 1) (Adrenocortical zonation factor 1) (AZ-1) (Tubulointersititial nephritis antigen-related protein) (TARP)_4042	1.49	**3.00**[c]	-1.03
**UnAn_29159_6257 (apolipoprotein E)	1.18	**2.66**[c]	-1.20
**UnAn_28041_5632 (apolipoprotein E)	1.02	**2.43**[c]	-1.01
Acidic phosphoprotein precursor (50 kDa antigen)_277	1.11	**2.37**[c]	-1.15
**UnAn_23610r_4780 (apolipoprotein E)	1.06	**2.30**[c]	-1.45
UnAn_21996_4295	-1.15	**2.09**[a,c]	-1.01
Apomucin (Mucin core protein) (Fragment)_492	1.16	**2.02**[c]	1.45
C61 protein [Mus musculus]_684	1.22	**1.99**[c]	1.84
WAP four-disulfide core domain protein 3 precursor (Putative protease inhibitor WAP14)_6790	1.02	**1.96**	1.59
Tyrosine aminotransferase (EC 2.6.1.5) (L-tyrosine:2-oxoglutarate aminotransferase) (TAT)_4064	-1.14	**1.90**[c]	-1.24

MHC class II transactivator (CIITA)_2363	1.03	**1.76**[c]	-1.06
UnAn_23121_4564	-1.09	**1.75**	1.54
Troponin C, slow skeletal and cardiac muscles (TN-C)_3995	1.08	1.63	**2.68**
Epsin-4 (Epsin-related protein) (EpsinR) (Enthoprotin)_1384	1.38	**1.62**	2.03
UnAn_27985_5592	-1.10	**1.44**	1.13
AMP deaminase 1 (EC 3.5.4.6) (Myoadenylate deaminase) (AMP deaminase isoform M)_431	1.27	**1.43**	1.49
UnAn_29343_6349	1.20	**1.31**	1.48
UnAn_29849_6655	1.11	1.24	**1.67**
Cathepsin D precursor (EC 3.4.23.5)_755	**-1.45**	1.04	1.01
UnAn_22785_4432	-1.24	-1.01	**-1.84**
UnAn_20648_4152	**1.32**	-1.05	1.01
Mitogen-activated protein kinase kinase 1 interacting protein 1 (MEK binding partner 1) (Mp1)_2424	-1.10	-1.07	**-1.51**
Epididymal secretory glutathione peroxidase precursor (EC 1.11.1.9) (Epididymis-specific glutathione peroxidase-like protein) (EGLP)_1378	**-1.73**	-1.15	-1.32
Muted protein homolog_2461	**-1.60**	-1.16	-1.50
UnAn_22879_4456	**1.56**	-1.20	-1.51
UnAn_22354_4332	-1.09	-1.28	**2.13**[c]
Type II antifreeze protein precursor (AFP)_4059	-1.12	-1.30	**1.72**[c]
T-cell surface glycoprotein CD8 beta chain precursor (CD8 antigen 37 kDa chain) (OX-8 membrane antigen)_3771	**1.51**	-1.32	-1.12
UnAn_20957_4180	**-1.84**	-1.32	-1.48
Chromobox protein homolog 2 (Modifier 3 protein) (M33)_827	**-1.65**	-1.47	-1.36
Beta enolase (EC 4.2.1.11) (2-phospho-D-glycerate hydro-lyase) (Muscle-specific enolase) (MSE) (Skeletal muscle enolase) (Enolase 3)_620	-1.00	**-1.53**	-1.29
UnAn_27466_5284	1.30	**-1.54**	-1.33
Transcription factor PU.1_3890	1.19	**-1.55**	-1.36
UnAn_22873_4452	-1.00	**-1.55**[c]	1.30
RWD domain containing protein 1 (Small androgen receptor-interacting protein)_3458	1.05	**-1.73**	-1.05
Parvalbumin beta_2778	1.30	**-1.80**[c]	-1.49
15 days post fertilization			
*UnAn_29411_6378 (CYP1B1)	-1.04	**12.30**[a,b]	-1.05
Cytochrome P450 1A1 (EC 1.14.14.1) (CYPIA1)_1115	-1.19	**10.27**[a,b]	1.17
T-cell surface glycoprotein CD3 delta chain precursor (T-cell receptor T3 delta chain)_3770	1.21	**8.82**[a,b]	1.04
*UnAn_27910_5543 (CYP1B1)	1.14	**4.98**[a,b]	-1.25
**UnAn_23610r_4780 (apolipoprotein E)	-1.09	**4.93**[b]	1.44
quiescin Q6 isoform a [Homo sapiens]_3294	1.36	**4.89**	1.50
**UnAn_29159_6257 (apolipoprotein E)	1.09	**4.53**[b]	-1.13
Acidic phosphoprotein precursor (50 kDa antigen)_277	-1.09	**4.40**[b]	-1.09
basic leucine zipper nuclear factor 1 [Mus musculus]_603	1.30	**3.60**[a]	1.17
**UnAn_28041_5632 (apolipoprotein E)	-1.13	**3.45**[b]	-1.09
Probable pancreatic secretory proteinase inhibitor (PSTI type)_3040	-1.03	**3.29**	1.39
Tubulointerstitial nephritis antigen-like precursor (Androgen-regulated gene protein 1) (Adrenocortical zonation factor 1) (AZ-1) (Tubulointersititial nephritis antigen-related protein) (TARP)_4042	-1.04	**3.15**[b]	-1.22
Uridine phosphorylase 1 (EC 2.4.2.3) (UrdPase 1) (UPase 1)_6714	-1.06	**2.91**	-1.25
Atrial natriuteric peptide-converting enzyme (EC 3.4.21.-) (pro-ANP-converting enzyme) (Corin) (Heart specific serine proteinase ATC2)	1.13	**2.82**	-1.24

(Transmembrane protease, serine 10)_581			
Hypothetical 26.3 kDa protein in RAD4-CHD1 intergenic region_1951	1.14	**2.72**	-1.11
UnAn_23180_4586	-1.14	**2.47**	-1.05
Tyrosine aminotransferase (EC 2.6.1.5) (L-tyrosine:2-oxoglutarate aminotransferase) (TAT)_4064	1.01	**2.37**[b]	-1.12
UnAn_29008_6183	1.03	**2.31**	1.18
Protein C18orf37 homolog_3139	1.10	**2.28**	-1.12
UnAn_29009_6184	-1.11	**2.27**	-1.30
UnAn_28776_6045	1.16	**2.26**	1.06
Ependymin precursor (EPD)_1371	-1.07	**2.25**	1.13
Catalase (EC 1.11.1.6)_747	1.13	**2.20**	-1.11
ETHE1 protein [Mus musculus]_1408	-1.29	**2.17**	-1.03
Proteasome subunit alpha type 2 (EC 3.4.25.1) (Proteasome component C3) (Macropain subunit C3) (Multicatalytic endopeptidase complex subunit C3) (XC3)_3093	1.33	**2.17**	1.31
NDRG1 protein (N-myc downstream regulated gene 1 protein) (Protein Ndr1)_2613	1.03	**2.07**	1.56
Lymphocyte antigen Ly-6D precursor (E48 antigen)_2288	-1.19	**2.01**	1.49
UnAn_23610f_4779	-1.00	**1.99**	-1.27
Catalase (EC 1.11.1.6)_746	1.34	**1.91**	-1.00
Isocitrate dehydrogenase [NADP] cytoplasmic (EC 1.1.1.42) (Oxalosuccinate decarboxylase) (IDH) (NADP(+)-specific ICDH) (IDP)_2174	-1.18	**1.91**	1.69
Desmin_1185	1.11	**1.88**	1.15
UnAn_21996_4295	1.03	**1.85**[a,b]	1.01
UnAn_23047_4537	-1.08	**1.85**	1.06
hypothetical protein LOC76747 [Mus musculus]_2043	-1.07	**1.83**	1.03
Angiogenic factor with G patch and FHA domains 1 (Angiogenic factor VG5Q) (Vasculogenesis gene on 5q) (hVG5Q)_437	-1.04	**1.80**	1.16
Trafficking protein particle complex subunit 4 (Synbindin) (TRS23 homolog)_3861	-1.21	**1.74**	1.39
Prostaglandin E2 receptor, EP4 subtype (Prostanoid EP4 receptor) (PGE receptor, EP4 subtype)_3080	-1.30	**1.71**	-1.00
BTG1 protein (B-cell translocation gene 1 protein)_680	1.04	**1.70**	-1.27
Homogentisate 1,2-dioxygenase (EC 1.13.11.5) (Homogentisicase) (Homogentisate oxygenase) (Homogentisic acid oxidase)_1922	1.12	**1.69**	1.05
C61 protein [Mus musculus]_684	-1.01	**1.67**[b]	1.12
Ferritin, middle subunit (EC 1.16.3.1) (Ferritin M)_1504	-1.30	**1.64**	1.13
Microsomal glutathione S-transferase 3 (EC 2.5.1.18) (Microsomal GST-3) (Microsomal GST-III)_2370	1.05	**1.63**	1.37
UnAn_23426_4694	-1.09	**1.62**	1.28
CXXC finger 5 [Mus musculus]_1022	-1.05	**1.62**	-1.11
L-lactate dehydrogenase B chain (EC 1.1.1.27) (LDH-B)_2272	1.22	**1.61**	-1.08
Complement factor H-related protein 1 precursor (FHR-1) (H factor-like protein 1) (H-factor-like 1) (H36)_965	1.05	**1.60**	1.05
MHC class II transactivator (CIITA)_2363	1.16	**1.60**[b]	-1.07
SH3-binding kinase [Rattus norvegicus]_3551	-1.27	**1.57**	**1.92**
Death-associated protein 1 (DAP-1)_1164	1.15	**1.56**	-1.02
UnAn_21166_4205	-1.30	**1.55**	1.23
Small inducible cytokine A4 homolog precursor (Macrophage inflammatory protein 1-beta homolog)_3581	-1.11	**1.52**[a]	1.14
Potassium/sodium hyperpolarization-activated cyclic nucleotide-gated channel 2 (Brain cyclic nucleotide gated channel 2) (BCNG-2)_2946	-1.10	**1.51**	1.22

Dual specificity protein kinase CLK1 (EC 2.7.1.37) (EC 2.7.1.112) (CDC-like kinase 1)_1275	-1.05	**1.45**	1.12
Zinc finger protein HRX (ALL-1) (Trithorax-like protein)_6862	-1.11	**1.44**	1.13
UnAn_22453_4351	-1.08	**1.39**	1.26
Major vault protein (MVP) (Fragment)_2313	-1.24	**1.36**	1.16
Protein C20orf149_3143	-1.01	**1.36**	-1.02
retinoblastoma-associated factor 600 [Homo sapiens]_3364	-1.13	**1.35**	1.39
Magnesium-chelatase subunit chlI (EC 6.6.1.1) (Mg-protoporphyrin IX chelatase)_2310	1.06	**1.34**	-1.06
Nuclear protein 1 (Protein p8) (Candidate of metastasis 1)_2690	**1.30**	1.26	-1.15
Deoxyribonuclease II alpha precursor (EC 3.1.22.1) (DNase II alpha) (Acid DNase) (Lysosomal DNase II) (R31240_2)_1179	1.08	**1.25**	1.06
UnAn_26842_4966	**-1.24**	1.10	1.00
lymphocyte specific 1 [Mus musculus]_2290	1.07	1.09	**1.55**
Cytochrome P450 2J5 (EC 1.14.14.1) (CYPIIJ5) (Arachidonic acid epoxygenase)_1128	**-1.31**	-1.01	-1.09
Vesicle-associated membrane protein-associated protein A (VAMP-associated protein A) (VAMP-A) (VAP-A) (33 kDa Vamp-associated protein) (VAP-33)_6752	**1.37**	-1.04	-1.09
UnAn_28436_5873	-1.05	-1.05	**1.77**
UnAn_22354_4332	-1.66	-1.13	**3.06**[b]
UnAn_28168_5719	1.02	**-1.23**	**-1.28**
UnAn_22442_4346	1.11	**-1.25**	1.03
Putative deoxyribose-phosphate aldolase (EC 4.1.2.4) (Phosphodeoxyriboaldolase) (Deoxyriboaldolase) (DERA)_3257	1.11	**-1.31**	-1.07
Protein disulfide-isomerase A4 precursor (EC 5.3.4.1) (Protein ERp-72) (ERp72)_3171	1.20	**-1.38**	-1.20
UnAn_29527_6431	1.06	**-1.40**	-1.26
UnAn_27136_5101	-1.09	**-1.41**	-1.04
30S ribosomal protein S12_57	1.02	**-1.45**	1.14
UnAn_29811_6629	1.10	**-1.45**	-1.41
UnAn_28943_6156	1.10	**-1.49**	1.21
UnAn_27329_5204	1.03	**-1.52**	-1.02
UnAn_22816_4445	-1.18	**-1.53**	-1.24
UnAn_27946_5561	-1.01	**-1.54**	1.06
Aminoacylase-1 (EC 3.5.1.14) (N-acyl-L-amino-acid amidohydrolase) (ACY-1)_429	-1.19	**-1.55**	-1.28
hypothetical protein LOC196463 [Homo sapiens]_1986	-1.05	**-1.56**	-1.10
Complement component C8 beta chain precursor (Complement component 8 beta subunit)_949	**-1.37**	**-1.56**	-1.14
UnAn_22239_4326	1.04	**-1.56**	-1.31
UnAn_27682_5419	-1.02	**-1.57**	-1.32
UnAn_23417_4689	1.13	**-1.61**	-1.04
UnAn_26954_5016	1.05	**-1.62**	-1.44
UnAn_29337_6346	1.06	**-1.65**	-1.51
Brain mitochondrial carrier protein-1 (BMCP-1) (Mitochondrial uncoupling protein 5) (UCP 5) (Solute carrier family 25, member 14)_659	-1.11	**-1.67**	1.10
UnAn_22706_4390	1.05	**-1.68**	-1.05
Guanine nucleotide-binding protein G(T) gamma-T1 subunit (Transducin gamma chain)_1765	1.19	**-1.68**	1.10
Keratin, type I cytoskeletal 50 kDa (GK50)_2201	-1.40	**-1.71**	-1.21
UnAn_27580_5360	-1.10	**-1.71**	-1.11
UnAn_28350_5828	1.16	**-1.78**	-1.28

Pre-mRNA branch site protein p14 (SF3B 14 kDa subunit)_3005	1.12	**-1.78**	1.12
ADP/ATP translocase 3 (Adenine nucleotide translocator 2) (ANT 3) (ADP,ATP carrier protein 3) (Solute carrier family 25, member 6) (ADP,ATP carrier protein, isoform T2) (ANT 2)_356	-1.03	**-1.78**	-1.02
UnAn_28216_5745	-1.11	**-1.79**	1.15
UnAn_29734_6576	1.23	**-1.80**	1.21
UnAn_27931_5556	-1.45	**-1.82**	-1.44
Type II antifreeze protein precursor (AFP)_4059	**-1.59**	**-1.83**	**2.12**[b]
UnAn_29519_6426	1.30	**-1.87**	-1.51
Acidic phosphoprotein precursor (50 kDa antigen)_281	1.13	**-1.90**	-1.11
UnAn_27991_5597	-1.05	**-1.90**	-1.20
Plasma serine protease inhibitor precursor (PCI) (Protein C inhibitor) (Plasminogen activator inhibitor-3) (PAI3) (Acrosomal serine protease inhibitor)_2905	1.09	**-1.91**	1.02
UnAn_27774_5467	-1.04	**-1.93**	-1.54
UnAn_23396_4676	-1.08	**-1.95**	1.05
UnAn_22873_4452	**-1.54**	**-1.96**[b]	**2.60**
Collagen alpha 2(I) chain precursor_907	1.24	**-1.96**	1.14
Cathepsin Z precursor (EC 3.4.22.-)_767	1.12	**-2.00**	1.04
Myosin-binding protein C, cardiac-type (Cardiac MyBP-C) (C-protein, cardiac muscle isoform)_2505	1.26	**-2.02**	-1.18
UnAn_22121_4311	-1.25	**-2.02**	-1.46
Zinc finger protein 330 (Nucleolar autoantigen 36)_6850	-1.01	**-2.07**	1.18
Transposon TX1 hypothetical 149 kDa protein (ORF 2)_3957	1.20	**-2.14**	-1.02
UnAn_26838_4964	1.15	**-2.18**	-1.48
UnAn_23457_4702	1.02	**-2.34**	1.22
UnAn_23472_4711	-1.02	**-2.39**	1.25
UnAn_27220_5147	1.09	**-2.50**	1.12
UnAn_23456_4701	-1.01	**-2.55**	1.22
UnAn_22871_4450	1.02	**-2.56**	-1.08
Collagen alpha 1(X) chain precursor_902	-1.12	**-2.59**	1.31
Parvalbumin beta_2775	-1.22	**-2.71**	1.04
UnAn_23738_4838	-1.00	**-2.72**	1.28
UnAn_23258_4621	1.19	**-2.90**	-1.51
Apomucin (Mucin core protein) (Fragment)_492	1.07	**-2.96**[b]	-1.70
UnAn_23473_4712	1.04	**-3.19**	-1.31
Parvalbumin beta_2776	1.08	**-3.72**	1.19
Parvalbumin beta_2778	-1.02	**-3.90**[b]	-1.10
UnAn_22872_4451	-1.22	**-4.11**	-1.02
UnAn_29186_6274	-1.27	**-4.86**	-1.18

Genes with significant differences in pairwise comparisons of gene expression are included. Gene expression ratios are indicated. A gene with a positive fold-difference is more highly expressed in the population/treatment listed first, and a gene with a negative fold-difference is more highly expressed in the population/treatment listed last. Genes are listed in order of ratios in the reference population (SC) comparison with tolerant population (SC). Ratios with significant p-values are in **bold**. See Table S1 (Additional file 2) for a list of all genes significant in the ANOVA analysis. NBH: New Bedford Harbor; SC: Scorton Creek; PCB: PCB-126; DMSO:

dimethylsulfoxide. Unannotated genes are denoted by UnAn and a unique number. Some of the unannotated probes were subsequently annotated after extension using the 454 database; see Table S4 (Additional file 6) for details.

*These two probes represent the same transcript, which has been annotated as cytochrome P450 1B1 (CYP1B1) using data from 454 libraries.

** These three probes represent the same transcript, which has been annotated as apolipoprotein E using data from 454 libraries.

[a]Also differentially expressed at 5 dpf.

[b]Also differentially expressed at 10 dpf.

[c]Also differentially expressed at 15 dpf.