Supplementary Information for

Knockdown of a zebrafish aryl hydrocarbon receptor repressor (*ahrra*) affects expression of genes related to photoreceptor development and hematopoiesis

by

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Toxicological Sciences

Contents:

Supplementary Table S1.

No effect of AHRRa-MO on mRNA expression of AHR, ARNT, or HIF.

ProbeName	GeneName[a]	log2FC[b]	FC[b]	adj.p.Val
A_15_P120520	ahr1a	0.046	1.03	0.969
A_15_P116264	ahr2	0.159	1.12	0.786
A_15_P103538	ahr2	-0.012	0.99	0.985
A_15_P105040	arnt2	0.191	1.14	0.759
A_15_P105424	hif1αb	-0.031	0.98	0.966
A_15_P120565	hif1αb	-0.253	0.84	0.591
A_15_P101004	hif2α	0.210	1.16	0.845
A_15_P101503	hif3α	-0.514	0.70	0.319
A_15_P101062	hif3α	0.482	1.40	0.392
A_15_P108026	hif3α	-0.279	0.82	0.658
A_15_P102540	hif3α	-0.057	0.96	0.938

[a] Other members of these gene subfamilies were not on the array.
[b] FC=fold change.

Supplementary Table S3. List of eye-related genes differentially expressed by AHRRa-MO knockdown in zebrafish.

Agilent Probe Name	Gene Name	Gene Symbol	Fold Change	B-statistic
A_15_P115980	Opsin 1 (cone pigments), short-wave-sensitive 1	*opn1sw1*	-7.24	13.53
A_15_P107533	Phosphodiesterase 6C, cGMP-specific, cone, alpha prime	*pde6c*	-8.09	13.30
A_15_P114133	Phosphodiesterase 6H, cGMP-specific, cone	*pde6h*	-10.09	12.54
A_15_P117046	Opsin 1 (cone pigments), medium-wave-sensitive, 1	*opn1mw1*	-7.35	12.35
A_15_P106879	Arrestin 3, retinal (X-arrestin)	*arr3b*	-4.40	11.94
A_15_P120294	Retinal degradation slow 2	*rds2*	-5.22	11.37
A_15_P111532	Guanine nucleotide binding protein (G protein), beta polypeptide 3	*gnb3*	-5.58	11.16
A_15_P121399	Guanine nucleotide binding protein (G protein), alpha transducing activity polypeptide 2	*gnat2*	-7.08	10.98
A_15_P107383	Phosducin 2	*pdc2*	-3.61	10.50
A_15_P102875	Retinal degradation slow 4	*rds4*	-5.60	10.19
A_15_P110693	Retinal degradation slow 2	*rds2*	-3.57	10.05
A_15_P119413	Opsin 1 (cone pigments), short-wave-sensitive 2	*opn1sw2*	-5.59	9.17
A_15_P119429	Opsin 1 (cone pigments), long-wave-sensitive, 2	*opn1lw2*	-2.98	8.72
A_15_P111012	Opsin 1 (cone pigments), long-wave-sensitive, 2	*opn1lw2*	-3.37	8.54
A_15_P104674	Retinol binding protein 4, like	*rbp4l*	-3.26	8.48
A_15_P104664	Arrestin 3, retinal (X-arrestin), like	*arr3l*	-5.21	8.32
A_15_P108795	Retinaldehyde binding protein 1b	*rlbp1b*	-2.99	6.34
A_15_P114820	Recoverin	*rcv1*	-2.12	3.60
A_15_P120962	ATPase, Na+/K+ transporting, beta 2b polypeptide	*atp1b2b*	-2.07	3.36
A_15_P105587	Prominin 1 b	*prom1b*	-2.28	2.98
A_15_P104366	RP9_HUMAN (Q8TA86) Retinitis pigmentosa 9 protein (Pim-1-associated protein	*PAP-1*	-1.71	2.09
A_15_P115534	Retinal pigment epithelium-specific protein 65a	*rpe65a*	-1.83	1.28
A_15_P102985	GTP binding protein 4	*gtpbp4*	-1.65	1.01
A_15_P117563	Bardet-Biedl syndrome 5	*bbs5*	-1.75	0.35
A_15_P109667	Crystallin, gamma M2c	*crygm2c*	2.18	1.12

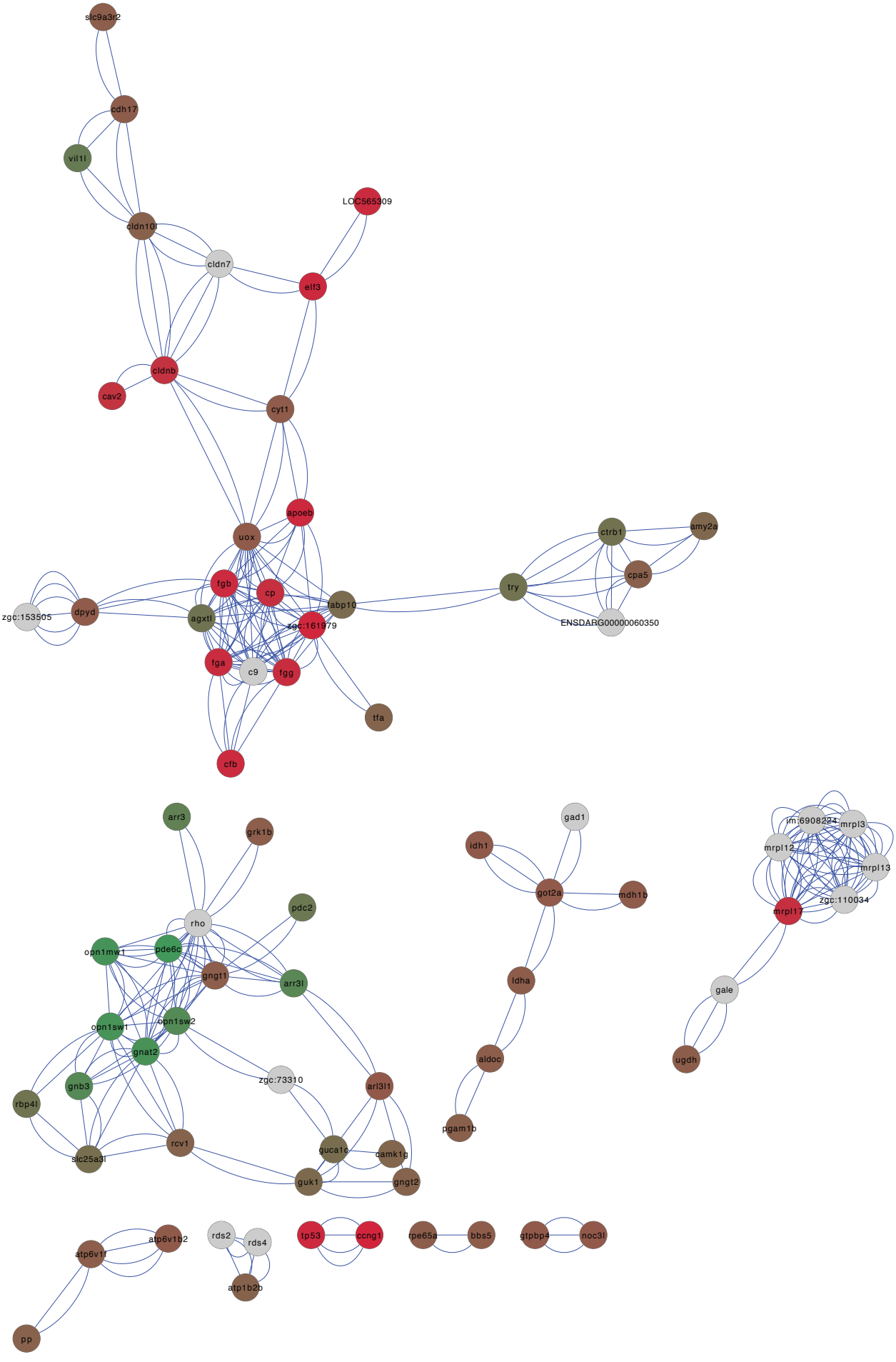
Supplemental Figure S1. Biological network of differentially expressed genes.

All the differentially expressed genes from the AHRRa-MO group were analyzed for functional association using the STRING database and statistically significant networks were identified using jActiveModules v2.23. Nodes are colored based on the expression values.

Supplemental Figure S2. Replicate experimental results confirming the effect of TCDD on AHRR-MO induced *arr3b* (A), *hbbe3* (B) and *mmp9* (C) gene expression changes.

Beta-actin was used as an internal standard. The Delta-Delta Ct method was used to determine the fold-change in gene expression. Values represent mean+S.D. (Two-way ANOVA; n=3). Bonferoni post-hoc test was used for determining statistical significance. [a] $p \leq 0.05$ TCDD versus DMSO; *$p \leq 0.05$ AHRRa-MO group versus no-MO treatment.

Figure S1.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cp
fabp10
agxtl
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c9
fgg
tfa
cfb
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grk1b
pdc2
rho
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arr3l
opn1sw1
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gnat2
gnb3
rbp4l
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arl3l1
rcv1
slc25a3l
guca1c
camk1g
guk1
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gad1
idh1
got2a
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ldha
aldoc
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mrpl3
mrpl12
mrpl13
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mrpl17
gale
ugdh
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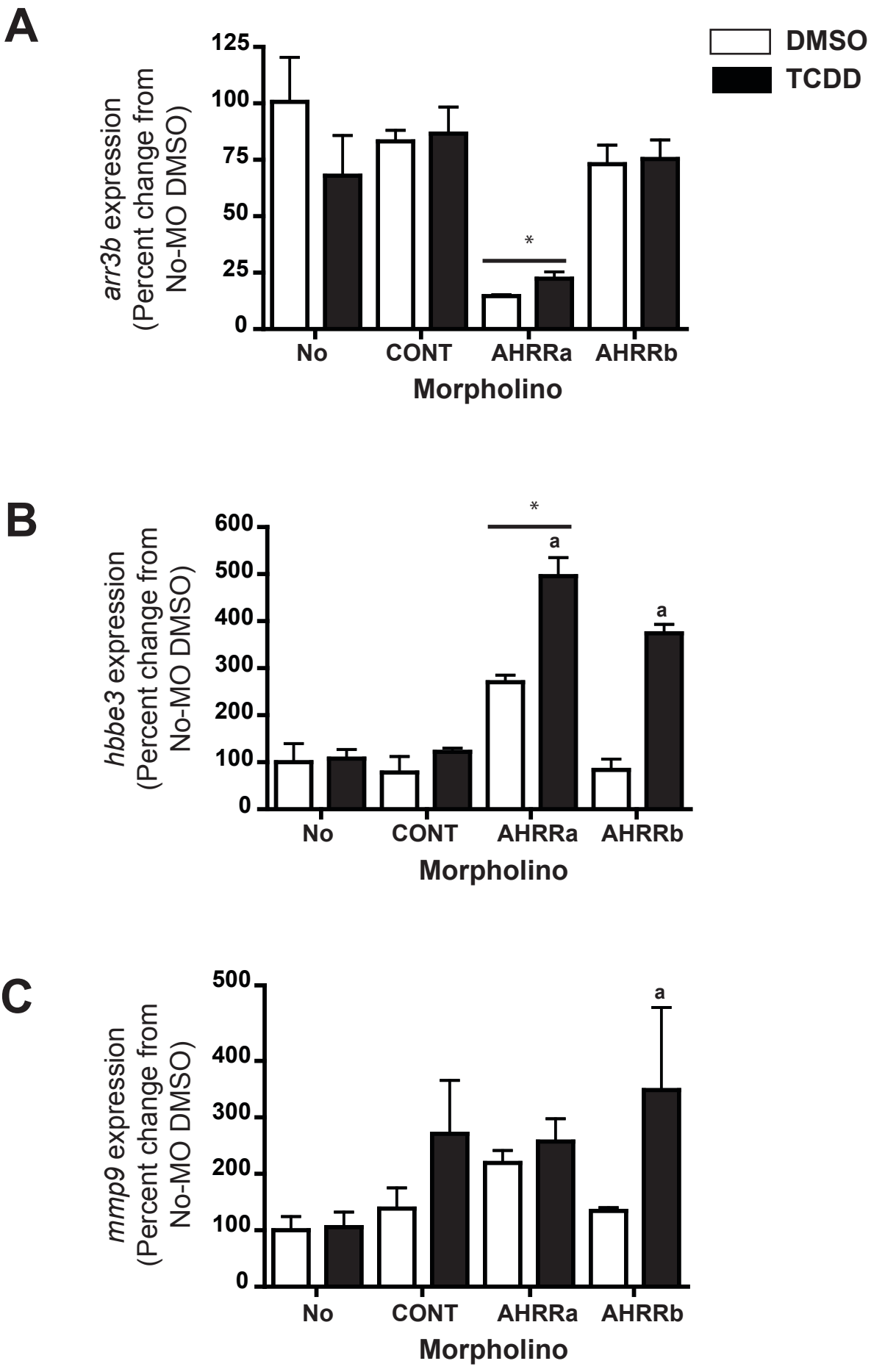
tp53
ccng1
rpe65a
bbs5
gtpbp4
noc3l

Figure S2.


A
DMSO
TCDD
arr3b expression
(Percent change from
No-MO DMSO)
125
100
75
50
25
0
*
No
CONT
AHRRa
AHRRb
Morpholino
B
hbbe3 expression
(Percent change from
No-MO DMSO)
600
500
400
300
200
100
0
*
a
a
No
CONT
AHRRa
AHRRb
Morpholino
C
mmp9 expression
(Percent change from
No-MO DMSO)
500
400
300
200
100
0
a
No
CONT
AHRRa
AHRRb
Morpholino