**Supplementary Figure Legends**

**Fig. S1.** Shoaling test of adult zebrafish that were developmentally exposed to IPP (A, E), BPDP (B, F), EHDP (C, G), and IDDP (D, H). Total activity (A-D) was calculated as the total distance traveled by the fish in each minute of the trial. Shoal response (E-H) was calculated as the average distance of the fish from the tank side on which the video was playing in each minute of the trial.

**Fig. S2**. Predator avoidance test of adult zebrafish that were developmentally exposed to IPP (A, E), BPDP (B, F), EHDP (C, G), and IDDP (D, H). Total activity (A-D) was calculated as the total distance traveled by the fish in each minute of the trial. Predator response (E-H) was calculated as the average distance of the fish from the tank side on which the predator simulation was playing in each minute of the trial.

**Supplementary Data**

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| **Table S1** Supplier specifications and purity analysis of NTP-provided chemicals |  |
| **Molecular Weight** | **Chemical Name** | **CAS** | **Conc. (mM)** | **Supplier** | **Lot Number** | **CoAPurity(%)** | **DeterminedPurity(%)** | **Volume (mL)** | **Method** |
| 452.52 | Isopropylated phenyl phosphate (IPP) | 68937-41-7 | 20.1 | ICL-IP America Inc. | 10335H0302 | Not Listed | 45.2 | 5 | CIPS CHEM11254 MRI2038 110860, GC Profile, purity based on 3 combined components; also contains 10.9% TPP |
| 382.39 | tert-Butylphenyl diphenyl phosphate (BPDP) | 56803-37-3 | 20.1 |  Ubichem PLC | M062011NS | Unknown | 64.5 | 5 | CIPS CHEM10729 MRI1512 110730, GC/MS purity based on 5 components, Mix of isomers of mono, di, and tris(tert-butyl phenyl): also contains 35.2% TPP |
| 362.41 | 2-Ethylhexyl diphenyl phosphate (EHDP) | 1241-94-7 | 20.2 | TCI America | BKUNE | 92.8 | 98.5 | 5 | CIPS CHEM11643 MRI2176 110730, GC/MS |
| 390.45 | Isodecyl diphenyl phosphate (IDDP) | 29761-21-5 | 20.1 | Bayville Chemical Supply Company | 122AI | ≥95 | 89.2 | 5 | CIPS CHEM11641 MRI2174 110860, GC/MS purity based on combined components identified as IDDP isomers |
| Vial Type: 11 mL, 3 dram, Amber, Teflon lined screw cap |  |

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| **Table S2** Larval activity testing |
| **Set** | **Treatment** | **Cohort** | **Fish per cohort** | **Fish per treatment** |
| **Set 1** | **0.1% DMSO** | 1 | 30 | 92 |
| 2 | 24 |
| 3 | 30 |
| 4 | 8 |
| **0.01 µM IPP** | 2 | 25 | 62 |
| 3 | 29 |
| 4 | 8 |
| **0.03 µM IPP** | 1 | 28 | 88 |
| 2 | 24 |
| 3 | 28 |
| 4 | 8 |
| **0.1 µM IPP** | 2 | 24 | 81 |
| 3 | 29 |
| 4 | 8 |
| **Set 2** | **0.1% DMSO** | 7 | 18 | 63 |
| 8 | 29 |
| 9 | 20 |
| **0.003 µM BPDP** | 7 | 18 | 18 |
| **0.03 µM BPDP** | 7 | 19 | 67 |
| 8 | 28 |
| 9 | 20 |
| **0.3 µM BPDP** | 7 | 17 | 67 |
| 8 | 30 |
| 9 | 20 |
| **0.03 µM EHDP** | 7 | 15 | 64 |
| 8 | 29 |
| 9 | 20 |
| **0.3 µM EHDP** | 7 | 13 | 57 |
| 8 | 26 |
| 9 | 18 |
| **0.1 µM IDDP** | 7 | 17 | 63 |
| 8 | 28 |
| 9 | 18 |
| **0.3 µM IDDP** | 8 | 30 | 49 |
| 9 | 19 |
| **1 µM IDDP** | 7 | 15 | 65 |
| 8 | 30 |
| 9 | 20 |
| **10 µM IDDP** | 7 | 15 | 15 |

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| **Table S3** Adult behavior battery |
| **Set** | **Treatment** | **Cohort** | **Fish per cohort** | **Fish per treatment** |
| **Set 1** | **0.1% DMSO** | 1 | 15 | 20 |
| 5 | 5 |
| **0.01 µM IPP** | 4 | 7 | 18 |
| 5 | 11 |
| **0.03 µM IPP** | 1 | 12 | 26 |
| 5 | 14 |
| **0.1 µM IPP** | 5 | 9 | 9 |
| **Set 2** | **0.1% DMSO** | 2A | 9 | 59 |
| 2B | 9 |
| 3A | 10 |
| 3B | 5 |
| 8 | 26 |
| **0.003 µM BPDP** | 2 | 10 | 36 |
| 3A | 13 |
| 3B | 13 |
| **0.03 µM BPDP** | 2A | 11 | 71 |
| 2B | 11 |
| 3A | 14 |
| 3B | 14 |
| 8 | 21 |
| **0.3 µM BPDP** | 2 | 8 | 55 |
| 3A | 14 |
| 3B | 12 |
| 8 | 21 |
| **0.03 µM EHDP** | 2 | 13 | 58 |
| 3A | 13 |
| 3B | 10 |
| 8 | 22 |
| **0.3 µM EHDP** | 2 | 12 | 40 |
| 3A | 10 |
| 3B | 11 |
| 8 | 7 |
| **0.1 µM IDDP** | 2A | 8 | 46 |
| 2B | 9 |
| 3A | 12 |
| 3B | 13 |
| 8 | 4 |
| **0.3 µM IDDP** | 8 | 28 | 28 |
| **1 µM IDDP** | 2A | 9 | 60 |
| 2B | 8 |
| 3A | 11 |
| 3B | 10 |
| 8 | 22 |
| **10 µM IDDP** | 2 | 10 | 31 |
| 3A | 11 |
| 3B | 10 |

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| **Table S4** Survival and dysmorphogenesis at 6 dpf |
| **Set** | **Treatment** | **Cohort** | **Number of embryos****exposed** | **% survival** | **Average % survival** | **Comments** |
| **Set 1** | **0.1% DMSO** | 1 | 40 | 75 | 82.8 |  |
| 2 | 40 | 90 |
| 3 | 40 | 92.5 |
| 4 | 30 | 76.7 |
| 5 | 25 | 80 |  |
| **0.01 µM IPP** | 2 | 40 | 82.5 | 78 |  |
| 3 | 40 | 82.5 |
| 4 | 30 | 83.3 |
| 5 | 25 | 64 |  |
| **0.03 µM IPP** | 1 | 40 | 70 | 78 |  |
| 2 | 40 | 82.5 |
| 3 | 40 | 77.5 |
| 4 | 30 | 80 |
| 5 | 25 | 80 |  |
| **0.1 µM IPP** | 2 | 40 | 82.5 | 79.2 |  |
| 3 | 40 | 77.5 |
| 4 | 30 | 76.7 |
| 5 | 25 | 80 |  |
| **0.3 µM IPP** | 1 | 40 | 67.5 | 67.5 | >50% with spinal curvature |
| **3 µM IPP** | 1 | 40 | 0 | 0 | All with heart-sac edema |
| **Set 2** | **0.1% DMSO** | 1 | 20 | 60 | 75.8 |  |
| 2 | 35 | 77 |  |
| 7 | 20 | 70 |  |
| 8 | 40 | 80 |
| 9 | 25 | 92 |
| **0.003 µM BPDP** | 2 | 35 | 63 | 76.5 |  |
| 7 | 20 | 90 |  |
| **0.03 µM BPDP** | 2 | 35 | 93 | 91.2 |  |
| 7 | 20 | 95 |  |
| 8 | 40 | 85 |
| 9 | 25 | 92 |
| **0.3 µM BPDP** | 2 | 35 | 87 | 89.7 |  |
| 7 | 20 | 85 |  |
| 8 | 40 | 95 |
| 9 | 25 | 92 |
| **3 µM BPDP** | 8 | 40 | 0 | 0 | >50% with spinal curvature |
| 9 | 25 | 0 |
| **0.03 µM EHDP** | 2 | 35 | 70 | 83.6 |  |
| 7 | 20 | 75 |  |
| 8 | 40 | 97.5 |
| 9 | 25 | 92 |
| **0.3 µM EHDP** | 2 | 35 | 70 | 77.2 |  |
| 7 | 20 | 65 |  |
| 8 | 40 | 90 |
| 9 | 25 | 84 |
| **1 µM EHDP** | 8 | 40 | 0 | 0 | >50% with heart-sac edema |
| 9 | 25 | 0 |
| **0.1 µM IDDP** | 2 | 35 | 77 | 85.6 |  |
| 7 | 20 | 85 |  |
| 8 | 40 | 92.5 |
| 9 | 25 | 88 |
| **0.3 µM IDDP** | 8 | 40 | 97.5 | 92.7 |  |
| 9 | 25 | 88 |
| **1 µM IDDP** | 2 | 35 | 73 | 78.4 |  |
| 7 | 20 | 75 |  |
| 8 | 40 | 77.5 |
| 9 | 25 | 88 |
| **10 µM IDDP** | 2 | 35 | 80 | 77.5 |  |
| 7 | 20 | 75 |  |

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| **Table S5** Linear regression parameters for post-tap activity |
| **Parameter** | **0.1% DMSO** | **0.01 µM IPP** | **0.03 µM IPP** | **0.1 µM IPP** |
| **Best-fit values ± SEM** |  |  |  |  |
| **Slope** | -1.017 ± 0.2503 | -0.1811 ± 0.2283 | -0.7832 ± 0.2216 | -0.6757 ± 0.3651 |
| **X-intercept** | 19.16 | 57.15 | 22.06 | 24.81 |
| **95% Confidence Intervals** |  |  |  |  |
| **Slope** | -1.511 to -0.5235 | -0.6316 to 0.2694 | -1.22 to -0.3467 | -1.401 to 0.04986 |
| **Are the slopes different from DMSO control?** | Yes | No | No |
| **F** | 6.052 | 0.4883 | 0.597 |
| **DFn** | 1 | 1 | 1 |
| **DFd** | 366 | 436 | 276 |
| **P value** | 0.0144 | 0.4851 | 0.4404 |