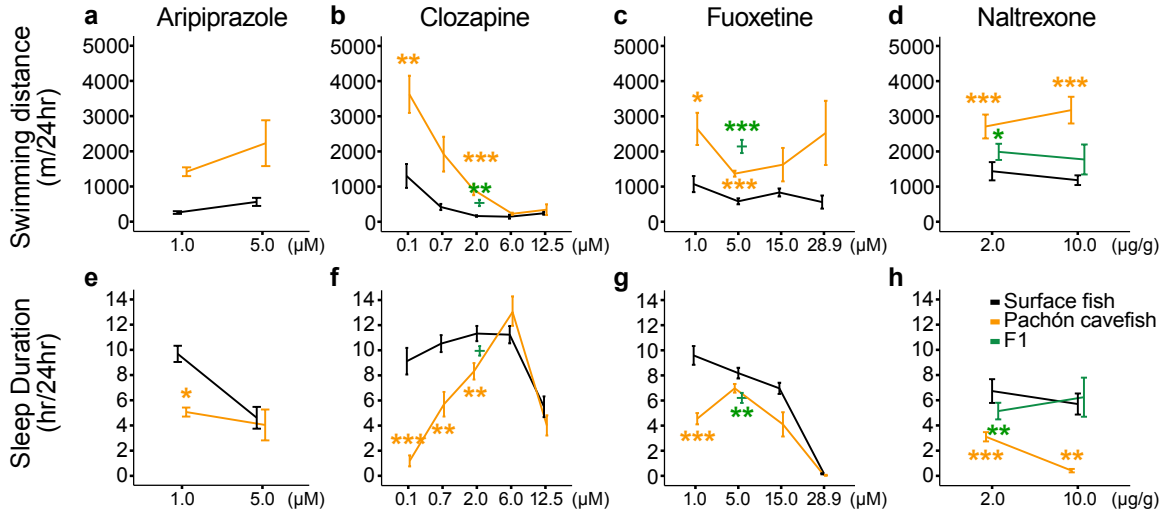




Additional file 10.1. Human drugs for psychiatric disease mitigated cavefish-type symptoms in a dose-dependent manner.

(a-d) Swimming distance per 24 hours assayed under the different drug concentrations (mean $\pm$ s.e.m.: m). (e-h) Sleep duration per 24 hours assayed under the different drug concentrations (hours). Note that in the control (no drugs), surface fish, Pachón cavefish and the F₁ hybrid slept 6.4 ± 0.4 hours, 1.8 ± 0.2 hours and 4.2 ± 0.4 hours (mean $\pm$ s.e.m.), respectively (not shown here). The same individuals were used in the swimming distance assay (a-d). Note that in the control (no drugs), surface fish, cavefish and their F₁ hybrid swam $1,249 \pm 109$ m, $3,495 \pm 226$ m and $3,150 \pm 281$ m (mean $\pm$ s.e.m.), respectively (not shown here). Drug concentrations were determined by referring to previous experiments[1–3]. N = 88, 85 and 43 for surface fish, Pachón cavefish and F₁ hybrid in total, respectively. All statistical scores are available in Additional file 9.2.

(a, e) Aripiprazole dose response in swimming distance and sleep duration. Pachón cavefish significantly reduced swimming distance and recovered sleep duration with 1 μ M of the aripiprazole treatment. Fish survival was compromised at 5 μ M.

(b, f) Clozapine dose response in swimming distance and sleep duration. Cavefish reduced hyperactivity and recovered sleep duration at higher doses. The response of F₁ hybrid was only observed at 2 μ M (see Figure 3, too). Fish survival was compromised at 12.5 μ M.

(c, g) Fluoxetine hydrochloride dose response in swimming distance and sleep duration. Cavefish reduced hyperactivity and recovered sleep with a peak at 5 μ M. The drug response was measured only at this peak point in F₁ hybrids (see Figure 3, too). Fish survival was compromised at 28.9 μ M.

(d, h) Naltrexone hydrochloride dose response in swimming distance and sleep duration. Both cavefish and surface fish didn't change their behavior in 2 or 10 μ g/body weight g.

Black line: surface fish, orange line: cavefish, and green line: F₁ hybrid. For some drugs, only a single concentration was tested for F₁ hybrids.

*: P < 0.05, **: P < 0.01, ***: P < 0.001 comparing with surface fish at the same drug concentration with Bonferroni correction.

Additional file 10.2. Statistical scores for Additional file 9.1

Fluoxetine-HCl		F stats	P-values						
Sleep duration	Population	F(1,72) = 43.5	<0.001	N	1.0	5.0	15.0	(28.9) (μM)	
	Dose	F(2,72) = 7.3	0.0		Surface fish	10	18	10	5
	Pop × Dose	F(2,72) = 6.4	0.0		Pachón cavefish	10	20	10	3 (lethal dose)
Swimming distance	Population	F(1,72) = 28.1	<0.001						
	Dose	F(2,72) = 7.3	0.0						
	Pop × Dose	F(2,72) = 1.6	0.2						
Clozapine		F stats	P-values						
Sleep duration	Population	F(1,77) = 30.2	<0.001	N	0.1	0.7	2.0	6.0 (12.5) (μM)	
	Dose	F(3,77) = 21.2	<0.001		Surface fish	8	10	19	5
	Pop × Dose	F(3,77) = 8.1	<0.001		Pachón cavefish	10	10	18	5 (lethal dose)
Swimming distance	Population	F(1,77) = 32.1	<0.001						
	Dose	F(3,77) = 24.7	<0.001						
	Pop × Dose	F(3,77) = 5.5	0.0						
Naltrexone-HCl		F stats	P-values						
Sleep duration	Population	F(1,52) = 25.1	<0.001	N	2.0	10.0	(μg/ body weight g)		
	Dose	F(1,52) = 4.3	0.0		Surface fish	20	8		
	Pop × Dose	F(1,52) = 0.9	0.3		Pachón cavefish	20	8		
Swimming distance	Population	F(1,52) = 23.1	<0.001						
	Dose	F(1,52) = 0.2	0.6						
	Pop × Dose	F(1,52) = 0.7	0.4						
Aripiprazole		F stats	P-values						
Sleep duration	Population	F(1,45) = 21.1	<0.001	N	1.0	(5.0)	(μM)		
	Before and After treatment	F(1,45) = 3.3	0.1		Surface fish	23	10		
	Pop × BfAf	F(1,45) = 7.9	0.0		Pachón cavefish	24	10 (lethal dose)		
Swimming distance	Population	F(1,45) = 21.5	<0.001						
	Before and After treatment	F(1,45) = 69.6	<0.001						
	Pop × BfAf	F(1,45) = 39.8	<0.001						

BfAf: Before and after the drug treatment. Pop: population

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