Flibanserin, a FDA approved dual serotonin receptor agonist-antagonist, provides retinal neuroprotection from light induced damage.

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Purpose: We assessed the neuroprotective effects of Flibanserin (BIMT-17, Addyi), a dual 5-HT_{1A} agonist and 5-HT_{2A} antagonist, in a light-induced retinopathy mouse model.

Methods: Albino BALB/c mice and 5-HT_{1A} KO mice were injected intraperitoneally with either vehicle (to serve as controls) or doses of flibanserin ranging from 0.75 mg/kg to 15 mg/kg. Naïve controls did not receive any injections or light damage. Mice were administered a single injection of flibanserin immediately before light damage or received a five-day treatment course at 48, 24, and 0 hours before light damage and 24 and 48 hours after light damage. Exposing vehicle injected mice to 10,000 lux of uniform light for one hour resulted in light-induced retinopathy. Seven days after light damage, spectral domain optical coherence tomography (SD-OCT) was used to assess retinal structure and electroretinography (ERG) to assess retinal function.

Results: A five-day treatment course of 3 mg/kg, 6 mg/kg, 9 mg/kg and 15 mg/kg flibanserin significantly preserved outer retinal structure and function in a dose dependent manner compared to the vehicle group ($p<0.05$, ANOVA). A single administration of 15 mg/kg flibanserin completely protected mouse retinas from light-induced retinopathy. Outer retinal thickness and function of the 15 mg/kg flibanserin group were not significantly different from the naïve group ($p>0.05$, ANOVA). Interestingly, a single 15 mg/kg dose of flibanserin injected immediately prior to light damage completely protected 5-HT_{1A} KO mouse retinas both structurally and functionally from light-induced retinopathy.

Conclusion: Multiple administrations of flibanserin at doses equal to 3 mg/kg or greater can provide partial neuroprotection, while a dose of 15 mg/kg can provide full neuroprotection. Flibanserin is a fast acting drug that can elicit neuroprotection when delivered immediately before light damage. Dosing 5-HT_{1A} KO mice with 15 mg/kg of flibanserin did not lead to a reduction in neuroprotection, suggesting that flibanserin's neuroprotective effects are not mediated exclusively through 5-HT_{1A}, but potentially through 5-HT_{2A} as well.