Order of magnitude power calculation:

Gottschalk
http://www.sciencedirect.com/science/article/pii/S0960982205014077#
used 1.6 mW/mm^2 but failed to see responses from a fiber light,
whereas we use 4V * 2 Amps / 1.5 cm^2 say = tens of mW/mm^2

Experiment: Friday October 10th

Worms prepared by Nikhil on plates with all-trans-retinal in the OP50 bacteria… get specs from him… he used specs from his previous experiment

EG5025
oxIs351 contains [unc-47p::channelrhodopsin::mCherry + lin-15(+) + Litmus]
desired result → slow down?

As soon as you hit the light, they stop -- and then with more light exposure they start moving again -- the pause lasts a second or so

THIS ONE REALLY WORKS! THEY STOP MOVING! Should do this first in the demo...

Light power: 3.8V, 1Amp limited, with Maxine's light setup and the 75mm focal length

ZX899
ljIs123 [mec-4p::ChR2(H134R)::YFP(codon-optimized) + unc-122p::RFP]. zxEx621 [glr-1p::Mac::mCherry + elt-2p::GFP].
more withdrawls / backing up

See some backing up… immediate

THIS COULD BE ITEM #2 in the demo…

ZX388
zxIs3 [unc-47p::ChR2(H134R)::YFP + lin-15(+)].
desired result → slow down…

Not as dramatic an effect as the EG5025?

EG5027
oxIs353 contains [myo-3p::channelrhodopsin::mCherry + lin-15(+) + Litmus]
desired result → contraction of all muscles, maybe egg laying

Didn't see much from this initially but maybe still worth trying with the better light source.

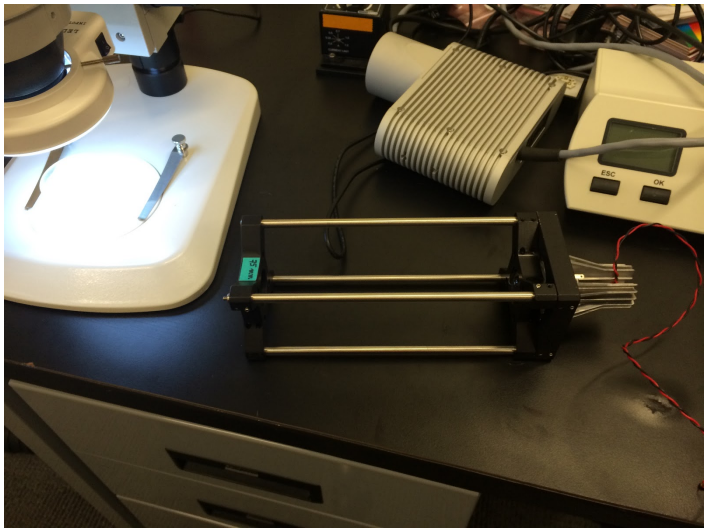
EG5096
oxIs364 contains [unc-17p::channelrhodopsin::mCherry + lin-15(+) + Litmus].
desired result → produces coiling with light?

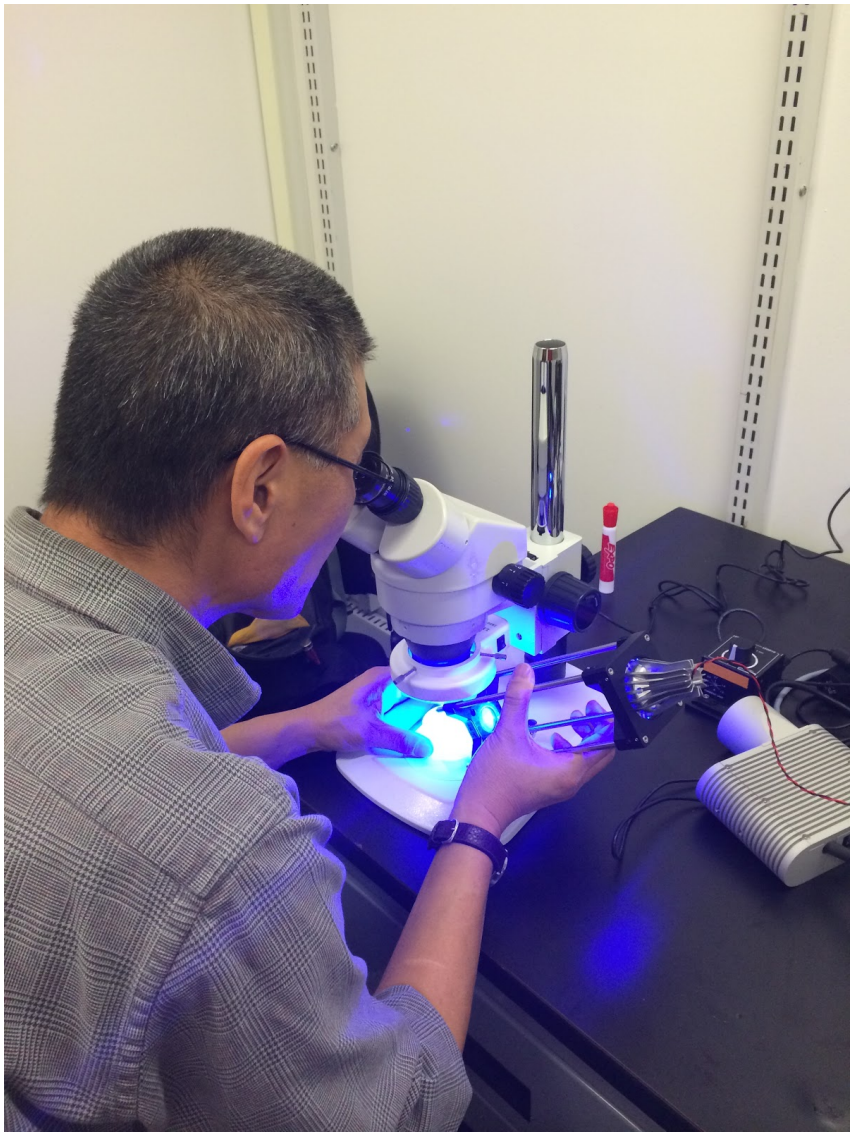
This looks like it might be working, to give a partial coiling-up! … when the light is focused on just the right place?
75 mm focal length on the 2nd lens to focus the LED

May not happen for all worms...

ZX460
zxIs6 [unc-17p::ChR2(H134R)::YFP + lin-15(+)] V.
produce coiling…

Unclear if this is working...


ESC
OK



Muscle spasm:

ChR2(gf)::YFP, expressed in body wall and egg-laying muscles from the ***myo-3*** promoter (transgene*zxEx17[pmyo-3::ChR2(gf)::YFP]*), was detectable at the plasma membrane (Figure 2A, Figure S1A in theSupplemental Data available with this article online) and in intracellular structures colocalizing with a marker for the endoplasmic reticulum (ER; Figures S1A–S1C). When exposed to light, *zxEx17* animals reproducibly showed strong and simultaneous contractions of (apparently) all muscle cells, causing **a readily visible shrinking of the body** (Figure 2B; Movie S1). **Often, adult animals expelled eggs**, as a result of contraction of vulval muscles, of increased internal pressure, or of both (Movie S2).

Should see this in EG5027,

Mechanosensory response:

Next, we tested whether ChR2 could depolarize neuronal cells, namely the mechanosensory neurons ALM, PLM, AVM, and PVM. Here, we expressed it from the ***mec-4*** **promoter** (*zxEx18[pmec-4::ChR2(gf)::YFP]*). ChR2(gf)::YFP was detectable at plasma membranes (cell bodies and processes) and in membranous intracellular compartments (Figure 4A).

Analyzing light responses is complicated by the fact that *C. elegans* avoids strong light, most likely as a result of (noxious) heat caused by light absorption[17], though a specific light response was also reported [18]. However, when *zxEx18* animals were illuminated five consecutive times for circa 1 s with blue light, individuals raised in the presence of retinal **showed withdrawals (and sometimes accelerations) significantly more often** (circa 72% in first, and 35% in fifth, trials; Figure 4B; Movie S3) than the same transgenic animals raised without retinal (circa 10% and 16%, respectively; Figure 4B).

Should see this ZX899
