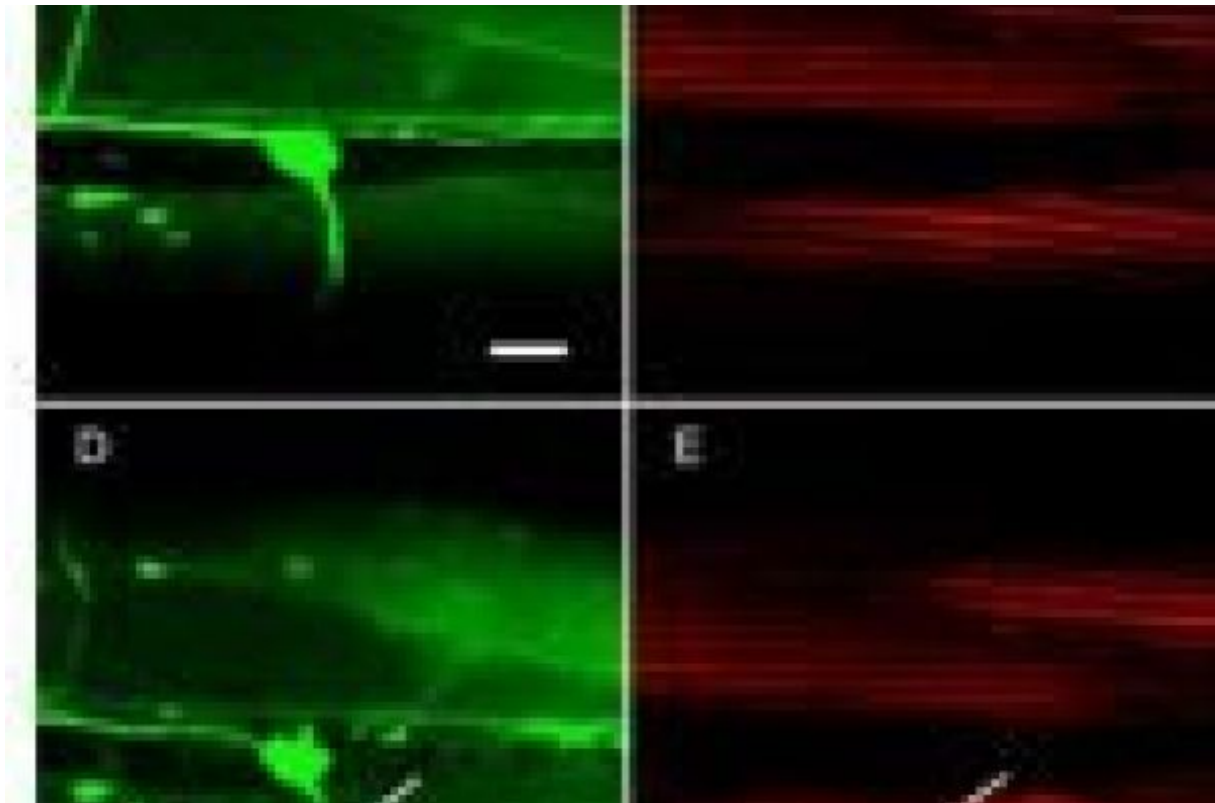




Laser dissection of neurons

ICFO researchers present a new technique on laser dissection of neurons in PLOS ONE.

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ICFO researchers led by Dr. Pablo Loza-Alvarez (SLN Facility head) presented in *PLOS ONE* Journal a new methodology for the assessment of the collateral damage induced by laser dissection of neurons in living soil worms. Their studies centered on the examination of the tissues surrounding the targeted neuron region using a combination of high resolution microscopy modalities.

Ultrashort pulsed lasers are the optimal tools for high precision surgery thanks to their enhanced tissue penetration, high peak powers and low pulse energy. In the case of the nematode *Caenorhabditis elegans*, these lasers have been proven to be particularly useful for successfully dissecting individual axons without affecting their viability. Of particular interest is the peculiar capability of the worm's neurons to regenerate axons after the laser

dissection. Key to understanding the axon regeneration process is the ability to leave tissue components intact, assuring that any subsequently triggered mechanism would be related exclusively to the axon regeneration.

This work focused on the observation of any possible collateral damage attributed to the axon surgery and the minimization of said damage. ICFO researchers use a multimodal microscopy approach that is based on the simultaneous use of several advanced imaging techniques. This allows high resolution observation of many of the processes occurring around the targeted axon, providing a complete damage assessment tool that can be used during and after the neuron surgery. This work promises better understanding of the complicated process of axon regeneration in living organisms.