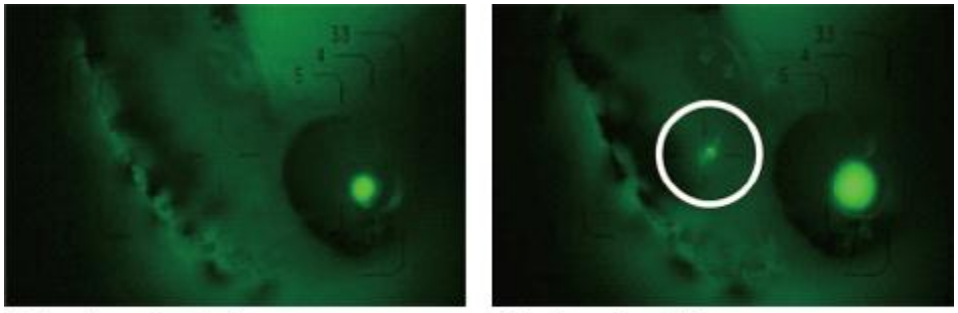
IR-LEGO Infrared Laser-Evoked Gene Operator IR-LEGO Systems

- A system to trigger expression of desired genes under biological microscope.
- Localized heating feature with 1480nm near infrared laser
- Simultaneous application of laser irradiation and fluorescent observation is possible
- Add-on type system for existing upright/inverted fluorescence microscopes (Adaptive models: Olympus BX51, BX61, IX71, IX81 Nikon Ti, TE2000)



Before laser irradiation

After laser irradiation

[Photo credit]
Dr. Shunsuke Yuba, National Institute of Advanced Industrial Science and Technology (AIST)
Dr. Yasuhiro Kamei, National Institute for Basic Biology (NIBB)

Result of Gene Expression Check Test

What is IR-LEGO ?

Infrared Laser-Evoked Gene Operator (IR-LEGO) is developed as the world's first technology by consolidated research team led by Dr. Shunsuke Yuba at National Institute of Advanced Industrial Science and Technology (AIST). This is a technique to induce specified genes that are under the control of a heat shock promoter at defined time, by heating single cells that consist of genetically-modified organisms, with an infrared laser. IR-LEGO could be adopted to all the genetically-modified experimental organisms that the heat shock promoters function and the internal focus of infrared laser are available. Because of its high efficiency and reproducibility,

and less detrimental effect from laser, IR-LEGO is a new and prospective tool for future gene function analysis.

IR-LEGO System (Set up on a vibration isolated table)

Part Number	Equipment Configuration
IR-LEGO-490	490mW, CW laser/Electric focus
IR-LEGO-490/P	490mW, CW and pulsed laser/Electric focus
IR-LEGO-200	200mW, CW laser/Electric focus
IR-LEGO-200/P	200mW, CW and pulsed laser/Electric focus

IR-LEGO Mini (Direct installation to a biological microscope)

Part Number	Equipment Configuration
IR-LEGO-490/mini	490mW, CW laser
IR-LEGO-490/mini/E	490mW, CW laser/Electric focus
IR-LEGO-490/P/mini	490mW, CW and pulsed laser
IR-LEGO-490/P/mini/E	490mW, CW and pulsed laser/Electric focus
IR-LEGO-200/mini	200mW, CW laser
IR-LEGO-200/mini/E	200mW, CW laser/Electric focus
IR-LEGO-200/P/mini	200mW, CW and pulsed laser
IR-LEGO-200/P/mini/E	200mW, CW and pulsed laser/Electric focus
LMS-AD-NI-BP	Adapter for Nikon microscopes (compatible with Ti and TE2000)
LMS-AD-OL-BP	Adapter for Olympus microscopes (compatible with IX73 and IX83)

*1 Specify the manufacturer and model of your microscope.

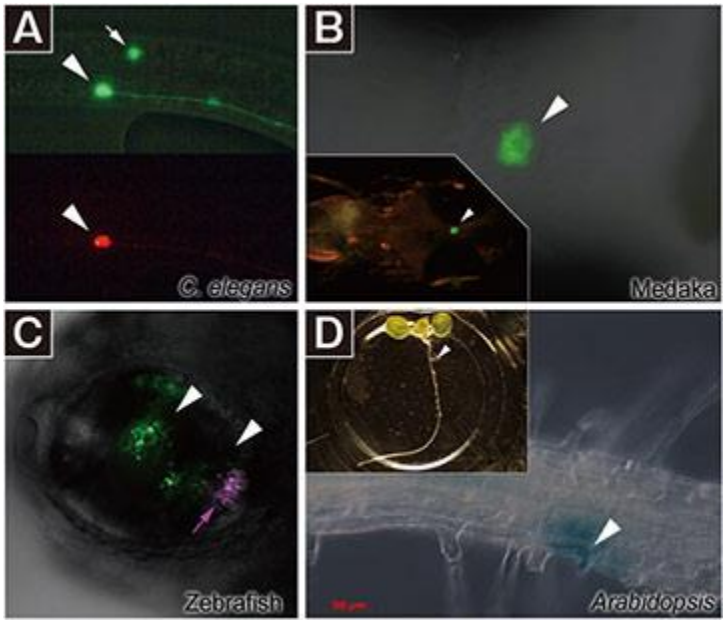
*2 Some models of microscopes are not compatible.
Contact our International Sales Division for more information.

*3 Carrying-in and adjustment fees for system setup are required separately.

*4 The electric focus models are equipped with a function to correct the laser focal position based on
chromatic aberration of each objective lens (preset system).

Applications of IR-LEGO for Various Species

Utilizing a strain (cell) that carries a heat shock promoter driven transgene, an infrared (IR) laser is irradiated at parts indicated by white arrowhead marks.



A: Example of induced RFP expression by IR laser irradiation on the GFP marked neuron of the nematode (*C. elegans*) The white arrow indicate a neuron not irradiated.
The red flourescence by RFP is obtained on a neuron and neuraxon that irradiated by a laser (white arrowhead).
Photo credit: Dr. Motoshi Suzuki & Dr. Shin Takagi, Nagoya University

B: Example of induced GFP expression by IR laser irradiation on a pineal gland of medaka (*O. latipes*) larvae.
Photo credit: Dr. Tomonori Deguchi,
National Institute of Advanced Industrial Science and Technology (AIST)
Dr. Yasuhiro Kamei,
National Institute for Basic Biology (NIBB)

C: Example of induced Kaede expression by IR laser irradiation (2 points) on a part of zebrafish (*D. relio*) retina.
Kaede is partially photoconverted after its expression (purple arrow).
Photo credit: Dr. Mariko Itoh & Dr. Kohei Hatta, University of Hyogo

D: Example of induced GUS expression by IR laser irradiation on lateral root tips of Arabidopsis (*A. thaliana*).
Photo credit: Dr. Hiroko Urawa & Dr. Kiyotaka Okada,National Institute for Basic Biology (NIBB)