

# Multi-scale visualization of living large animals by infrared and minimized microscope

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We developed minimized and customized microscope for large animal imaging with three approaches, 1:system size reduction, 2: infrared and transparent signals, and 3:micro-to-macro scale coverage. Conventional commercial microscope setup is hard to be used in operation room for pigs, and we developed new minimized systems for pig visualization.

1: Reflectance of fluorescence signal is usually effective for mice, but imaging depth is limited to 1mm even two photon microscope is used. Brightfield approach with transparent LED illumination has advantage in pig visualization. System size is reduced to 200g with maintenance of submicron spatial resolutions, and operated by hand-held.

2: In addition to visible wavelength, near infrared signals was obtained using InGaAs sensors, and single cell dynamics in microcirculation in living animals can be observed without specific staining.

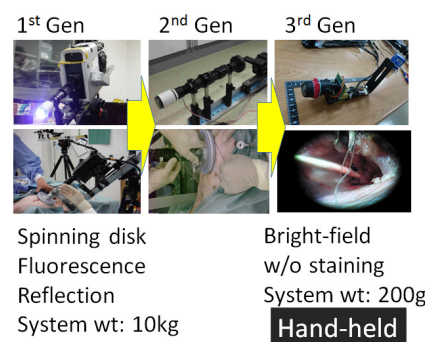
3: We covered micro- to macro-scales, using two mode zooming

forming modes. Whole organ and single cell structures were condensed into one image.

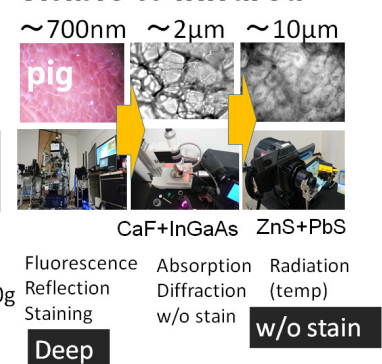
We evaluated these systems, after transient ischemic surgery of intestines. We observed thrombus formation and inflammatory responses in micro levels after ischemia. Organ temperature was reduced, but warmer statues followed reflecting tissue viability.

## Multi-scale in vivo visualization of large animal

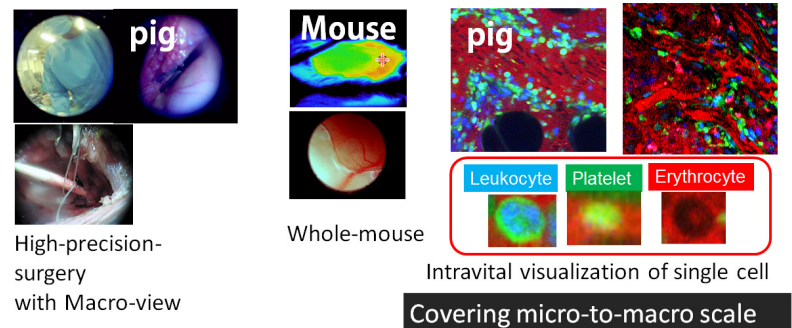
### Size reduction



### Visible to infrared



### Micro-to-macro



## Multi-scale XYZT in vivo imaging

