

IR VIVO™ IMAGER : REAL-TIME *IN VIVO* IMAGING OF ICG IN THE NIR-II



METHODS

To illustrate the potential of our system, a full 1 hour imaging experiment was conducted and the results were analyzed as follow.

- » A CD-1 male mouse was first anesthetized and shaved and placed on the vertical stage inside the imaging chamber.
- » The anesthesia gas was regulated through a nose cone.
- » The mouse was illuminated using 780 nm excitation wavelength with power at ~ 2.25 mW/mm².
- » Emitted light was detected through a 1250 nm long pass emission filter.
- » The integration time was set at 50 ms resulting in an acquisition speed of 12.5 frames per second.
- » The acquisition of images started 30 seconds before injection of ICG.
- » ICG was prepared at a concentration of 1 mg/ml and a 0.2 ml dose was injected intravenously via catheter into the tail vein of the mouse.

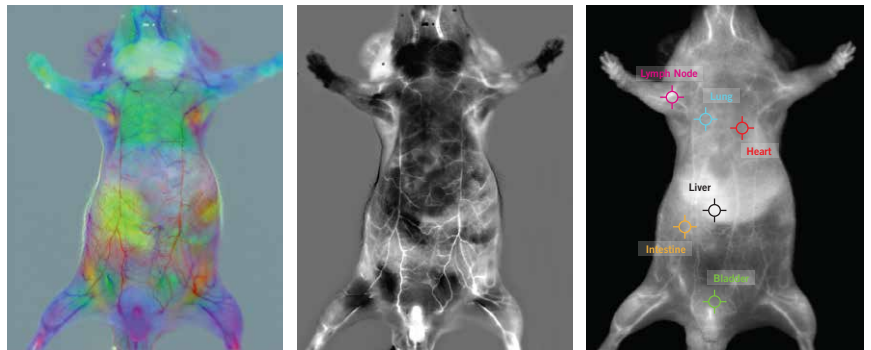
RESULTS

The fluorescence intensity values of the heart and lung show almost no variation between 0.8 and 3 minutes of image acquisitions enabling indirect telemetry measurements. A frequency analysis of the fluorescence intensity data gave values of 278 bpm for heart beat rate and 53 breaths per minute for respiration rate which falls within the range reported in the literature¹.

Similar analysis of the fluorescence intensity coming from the intestine 30 minutes after injection resulted in 24 contractions per minute during hepatobiliary elimination phase and 47 contractions per minute for the intestinal elimination phase, values which are also corroborated by scientific publications².

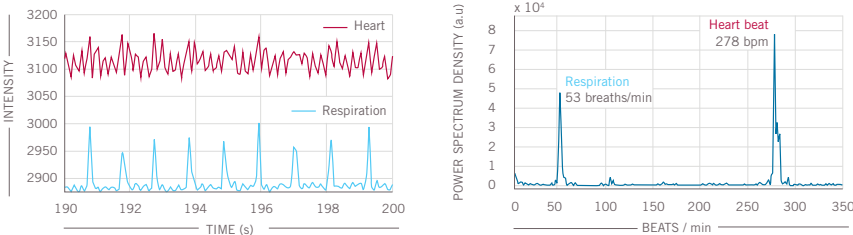
PRINCIPAL COMPONENT ANALYSIS AND ORGAN IDENTIFICATION

Using statistical procedures to correlate similar profiles together, it is possible to identify organs of the mouse without the need of a tracer.



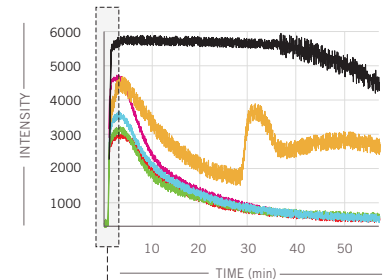
HEART AND RESPIRATORY RATES

Frequency analysis of fluorescence intensity changes in heart and lung regions allowed to measure the heart beat and respiration rates of the mouse contact free.



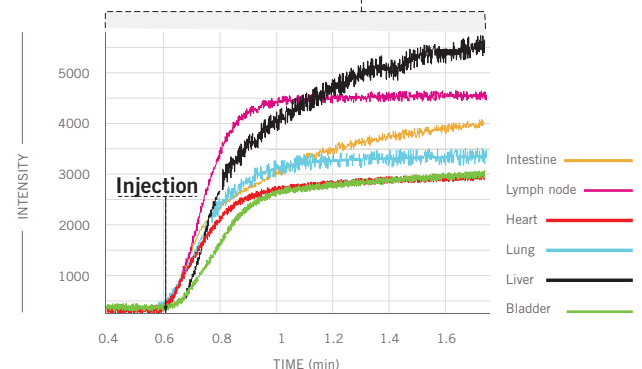
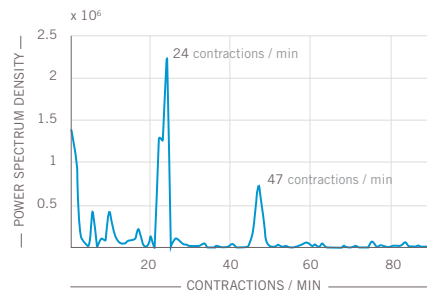
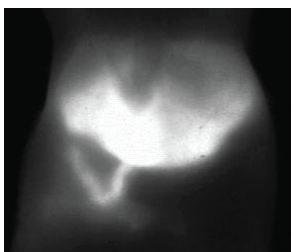
METABOLIC AND KINETIC DATA ANALYSIS

ROI analysis of different organs for uptake and excretion measurements of ICG throughout the body of the mouse.



HEPATOBILIARY AND INTESTINAL ANALYSIS

With slow frame rate, it is possible to quantify contractions observed in the intestine muscles as the dye is excreted through digestive system.



CONCLUSION

Anatomical and functional imaging can be carried out with IR VIVO™ for research on drug biodistribution, pharmacokinetics, animal models of human disease and helping with translational research programs in optical surgical navigation.

