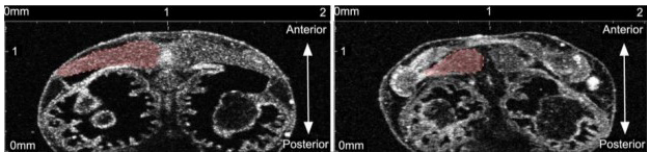
Developmental Biology

THORLABS
APP HIGHLIGHT

APPLICATION

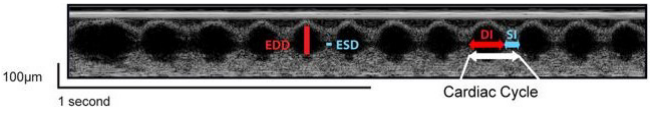


Xenopus Coronal Plane: Ceratohyal Cartilage[1,*]

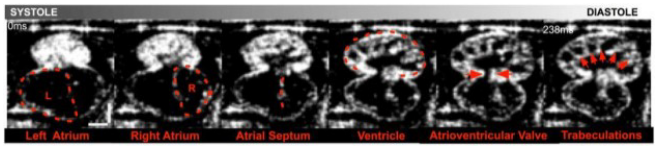
Animal models are studied to understand biological phenomena and transfer the findings to human biology and medicine.

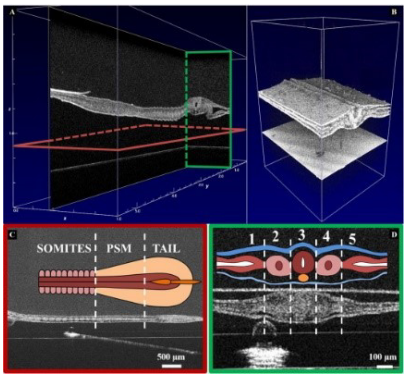
The non-invasive nature of OCT has made it an indispensable tool that allows researchers to image animal models *in-vivo* over the course of the animal's life into adulthood.

EXAMPLE IMAGES



M-scan of drosophila heartbeat. Highlighted regions show the end diastolic diameter (EDD), end systolic diameter (ESD), diastolic interval (DI), and systolic interval (SI).[5,*]





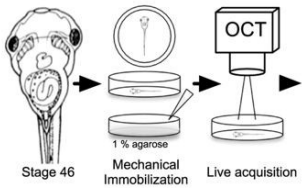
Top: Ventral Three Chamber View during Xenopus Cardiac Cycle[1,*] Right: Morphology of Chicken Embryo (3D View and Sagittal as Well as Transverse Cross Sections)[7,*]

QUICK FACTS

- Animal models can be imaged *in-vivo* and at various stages in their lives.
- Long wavelengths such as 1300 nm penetrate deep into tissue.
- Shorter wavelengths such as 880 nm allow high-resolution imaging.
- The penetration depth may vary depending on the tissue type.
- M-modes (depth scans vs. time) highlight changes at a specific lateral position.

TYPICAL SETUP

For *in-vivo* imaging, zebrafish and xenopus are typically anesthetized and then immobilized, e.g. in agarose. OCT experiments can then be performed from different angles.[1,2]



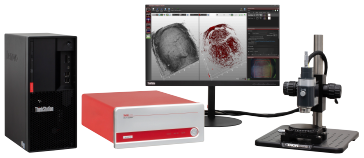
Protocol for xenopus immobilization and imaging.[1,*]

After anesthetization, drosophila flies can be fixed using adhesive. OCT imaging can be performed after the flies wake up.[5]

To image chicken embryos, a window is cut into the eggshell and the vitelline membrane is peeled away. Inserting a glass window preserves the embryo and allows long-term measurements.[6]

RECOMMENDED ITEMS

Choice of OCT System:



TEL221C1

- **TEL221C1:** For Deep Penetration
- **GAN332C1:** For High Axial & Lateral Resolution
- **GAN632C1:** For High Speed and High Axial & Lateral Resolution

Useful Accessories:

- Mitutoyo Lenses for Very High Lateral Resolution:
  OCT-LKM10-SP1 & **OCT-RAM20-SP1**
  4 µm @ 900 nm and 6 µm @ 1300 nm
  OCT-LKM20-SP1 & **OCT-RAM20-SP1**
  2 µm @ 900 nm and 3 µm @ 1300 nm
- Higher Lateral Resolution Lenses Available on Request

Interested? Email OCT@thorlabs.com for more information.

PUBLICATIONS

1) E. Deniz, S. Jonas, M. Hooper, J.N. Griffin, M.A. Choma, M.K. Khokha, Sci. Rep., **7**, 42506, 2017
2) P. Date, P. Ackermann, C. Furey, I.B. Fink, S. Jonas, M.K. Khokha, K.T. Kahle, E. Deniz, Sci. Rep., **9**, 6196, 2019
3) Y.S. Lin, C.C. Chu, P.H. Tsui, C.C. Chang, J. Biophotonics, **6** (9), 668, 2013
4) J. Zhang, W. Ge, Z. Yuan, Biomed. Opt. Express, **6** (10), 3932, 2015
5) A. Lam, P. Karekar, K. Shah, G. Hariharan, M. Fleyshman, H. Kaur, H. Singh, S. Gururaja Rao, Sci. Rep., **8**, 6910, 2018
6) K. Courchaine, M.J. Gray, K. Beel, K. Thornburg, S. Rugonyi, J. Cardiovasc. Dev. Dis., **6** (1), 11, 2019
7) M. Marrese, N. Antonovaite, B.K.A. Nelemans, T.H. Smit, D. Iannuzzi, Acta Biomater., **97**, 524 2019 (in press)