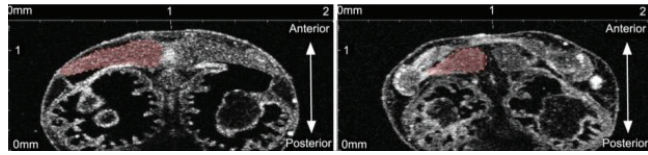


APPLICATION



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.

QUICK FACTS

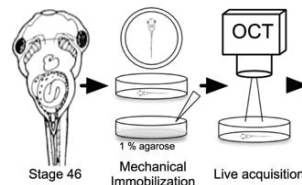
- ◆ Animal models can be imaged *in vivo* and at various stages in their lives.
- ◆ Long wavelengths such as 1300 nm penetrate deep into tissue.
- ◆ Shorter wavelengths such as 880 nm allow high-resolution imaging.
- ◆ The penetration depth may vary depending on the tissue type.
- ◆ M-modes (depth scans 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.^{1,4}

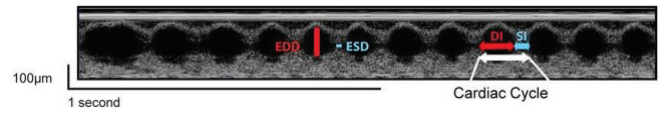
After anesthetization, *drosophila* flies can be fixed using adhesive. OCT imaging can be performed after the flies wake up.²

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.⁵

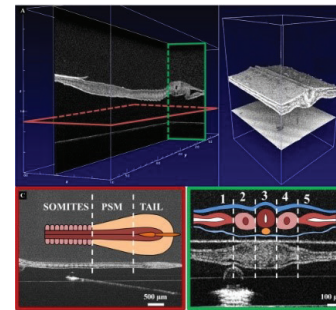
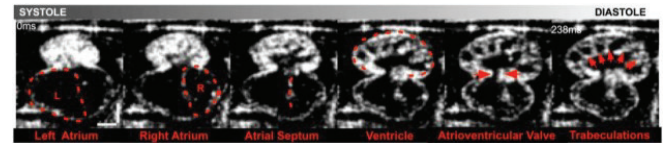


Protocol for *xenopus* immobilization and imaging.^{1,*}

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).^{2,*}



Top: Ventral Three Chamber View during *Xenopus* Cardiac Cycle^{1,*}
Left: Morphology of Chicken Embryo (3D View and Sagittal as Well as Transverse Cross Sections)^{3,*}

RECOMMENDED ITEMS

Choice of OCT System:

- ◆ **TEL221C1(/M)**: For Deep Penetration
- ◆ **GAN332C1(/M)**: For High Axial & Lateral Resolution
- ◆ **GAN632C1(/M)**: For High Speed and High Axial & Lateral Resolution



Custom Modifications:

- ◆ Alternate Lens Kits for Higher Lateral Resolution:
 - 10X Scan Lens Kit: 4 µm at 900 nm and 6 µm at 1300 nm
 - 20X Scan Lens Kit: 2 µm at 900 nm and 3 µm at 1300 nm
- ◆ Higher Lateral Resolution Lenses Available on Request

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- 3) M. Marrese, N. Antonovaite, B.K.A. Nelemans, T.H. Smit, D. Iannuzzi, *Acta Biomater.*, **97**, 524, 2019
- 4) P. Date, P. Ackermann, C. Furey, I.B. Fink, S. Jonas, M.K. Khokha, K.T. Kahle, E. Deniz, *Sci. Rep.*, **9**, 6196, 2019
- 5) K. Courchaine, M.J. Gray, K. Beel, K. Thornburg, S. Rugonyi, *J. Cardiovasc. Dev. Dis.*, **6** (1), 11, 2019
- 6) Y.S. Lin, C.C. Chu, P.H. Tsui, C.C. Chang, *J. Biophotonics*, **6** (9), 668, 2013
- 7) J. Zhang, W. Ge, Z. Yuan, *Biomed. Opt. Express*, **6** (10), 3932, 2015

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