Introduction

SCHOOL OF MEDICINE

JIVERSITY

IRGINIA

Established in 1979, the Advanced Microscopy Facility (AMF) is a state-of-the art service and user facility in the heart of the University's biomedical research community providing electron and light microscopy imaging technologies for basic scientists, physicians, and students. The facility provides:

- Access to electron and light microscopes
- Training in operation of all facility microscopes and ancillary equipment
- A full range of TEM and SEM sample preparatory services
- Consultation regarding microscopy applications in biomedical investigations.
- Microscopy courses and workshops
- Outreach activities: local schools, organizations

Major Equipment

- JEOL 1230 transmission electron microscope
- Zeiss Sigma VP HD field emission scanning electron microscope
- Zeiss LSM 880 confocal microscope (inverted)
- Zeiss LSM 710 NLO confocal and twophoton microscope (upright)
- Zeiss LSM 700 confocal microscope (inverted)
- Zeiss LSM 510 META confocal microscope (inverted)





Disruption of epithelial apical-basal polarity by loss of the tumor suppressor lethal giant larvae (*IgI*)–*Adrian Halme Laboratory* Drosophila melanogaster eye-antennal imaginal discs were imaged at late third instar from wild type (top) and lgl tumor (bottom) expressing larvae. Discs were stained with rhodamine phalloidin (actin) and indirect immunofluorescence targeting apically localized proteins atypical Protein Kinase C (aPKC) and Discs large (Dlg).

Novel function of IGF1R during brain development–*Maojin* Yao, Hui Zong Laboratory Wildtype (WT) and mutant progenies of neural progenitor cells in the mouse hippocampus were uniquely labeled by MADM (Mosaic Analysis with Double Markers) with tdtomato and GFP, respectively, via a single interchromosomal mitotic recombination event. In **A**, there are about equal numbers of green (*IGF1R*^{+/+}) and red cells. In **B**, green cells (*IGF1R^{-/-}*) are much less than WT red cells, suggesting that inactivation of IGF1R promotes degeneration of neural progenitor cells.

ADVANCED MICROSCOPY FACILITY

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AMF-Supported Research Highlights















Mitonchondrial networks-David Kashatus Laboratory Human embryonic kidney cells expressing a mitochondrially targeted YFP (green). The nucleus are labelled with DAPI (blue).

Oct4^{Δ/Δ}/ApoE^{-/-} SM-eYFP^{+/+}

Smooth muscle cell (SMC)-specific conditional knockout of the pluripotency gene Oct4 was associated with reduction in phenotypically modified SMCs in ApoE knockout mice–Olga Cherepanova, Gary Owens Laboratory.

Immunostaining of brachiocephalic arteries of SMC-specific Oct4 WT $(Oct4^{WT/WT}ApoE^{-/-}SMC-eYFP^{+/+})$ or KO $(Oct4^{\Delta/\Delta} ApoE^{-/-}SMC-eYFP^{+/+})$ SMC lineage-tracing mice fed a Western diet for 18 weeks. DAPI - nuclei, Acta2 (SMC marker), YFP (SMC-lineage tracing marker).

Introducing the New Zeiss LSM880 with AiryScan

Our new Zeiss LSM880 confocal microscope was installed in April and is now ready to serve you. It is located in MR4 Room 5136. Main features of the 880 include:

- Completely cooled Quasar Detector (ie: the 34 channel Spectral GaAsP array) with supreme sensitivity, which is best suited for spectral and multi-label imaging.
- Cooled scanners providing fast imaging speed (13fps at 512x 512).
- 405, 458, 488, 514, 543, 561, 594, 633nm laser lines.
- Definite focus designed to eliminate Z drift.
- Environmental chamber with temperature and CO₂ control for live cell imaging.
- Improved electronics allowing for faster data handling.

AiryScan will arrive in September! It offers unprecedented isotropic 1.7 fold increase in resolution over a conventional confocal. This super-resolution imaging requires NO special dyes, NO special sample handling protocols and NO extensive post processing steps.

Announcements

- The AMF, Dr. Jeffrey Saucerman of Department of Biomedical Engineering, and Dr. Mitchell Smith of Department of Microbiology were recently awarded a grant by the Jefferson Trust for a seminar series on imaging technology.
- The AMF has established an Image of the Quarter Award to highlight the achievement of the facility users.

Acknowledgements

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