

Video Article

September 2011: This Month in JoVE

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Abstract

Video Link

The video component of this article can be found at <https://www.jove.com/video/3877/>

Protocol

Live Imaging of Dorsal Root Axons after Rhizotomy

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An in vivo imaging protocol to monitor primary sensory axons following dorsal root crush is described. The procedures utilize wide-field fluorescence microscopy and thy1-YFP transgenic mice, and permit repeated imaging of axon regeneration over 4 cm in the PNS and axon interactions with the interface of the CNS.

Introducing Shear Stress in the Study of Bacterial Adhesion

Magali Soyer, Guillaume Duménil

Blood vessels as a target for infection, Paris center for cardiovascular research, INSERM U970

During the infection process, a key step is the adhesion of pathogens with host cells. In most instances this adhesion step occurs in the presence of mechanical stress generated by flowing liquid. We describe a technique that introduces shear stress as an important parameter in the study of bacterial adhesion.

Guide Wire Assisted Catheterization and Colored Dye Injection for Vascular Mapping of Monochorionic Twin Placentas

Eric B. Jelin¹, Samuel C. Schecter¹, Kelly D. Gonzales¹, Shinjiro Hirose¹, Hanmin Lee¹, Geoffrey A. Machin², Larry Rand³, Vickie A. Feldstein⁴

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Vascular mapping of monochorionic (MC) twin placentas after birth provides a means for detailed demonstration of vascular connections between the twins' circulations. Imbalance of these connections is thought to play a pivotal role in the development of complications of MC twinning including twin-to-twin transfusion syndrome.

Accurate and Simple Evaluation of Vascular Anastomoses in Monochorionic Placenta using Colored Dye

Enrico Lopriore¹, Femke Slaghekke², Johanna M. Middeldorp², Frans J. Klumper², Jan M. van Lith³, Frans J. Walther¹, Dick Oepkes²

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Twin-to-twin transfusion syndrome and twin anemia polycythemia sequence are two potentially devastating problems in perinatal medicine. Both disorders occur only in monochorionic twins and result from unbalanced blood flow through placental vascular anastomoses. We provide a simple protocol to accurately evaluate the presence of vascular anastomoses using colored dye injection of placental vessels after birth.

Diagnosis of Ecto- and Endoparasites in Laboratory Rats and Mice

Christina M. Parkinson¹, Alexandra O'Brien¹, Theresa M. Albers¹, Meredith A. Simon¹, Charles B. Clifford¹, Kathleen R. Pritchett-Corning^{2,3}

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This article describes various procedures for screening rats and mice to detect endo- or ectoparasitism. Several diagnostic assays will be demonstrated, both those suitable for use on live animals and those used after euthanasia of the animal. Photographs to aid in identification of rat and mouse parasites will be included.

Autologous Endothelial Progenitor Cell-Seeding Technology and Biocompatibility Testing For Cardiovascular Devices in Large Animal Model

Alexandra E. Jantzen¹, Whitney O. Lane², Shawn M. Gage³, Justin M. Haseltine¹, Lauren J. Galinat¹, Ryan M. Jamiolkowski⁴, Fu-Hsiung Lin³, George A. Truskey¹, Hardean E. Achneck³

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A method for seeding titanium blood-contacting biomaterials with autologous cells and testing biocompatibility is described. This method uses endothelial progenitor cells and titanium tubes, seeded within minutes of surgical implantation into porcine venae cavae. This technique is adaptable to many other implantable biomedical devices.

Multiparametric Optical Mapping of the Langendorff-perfused Rabbit Heart

Qing Lou, Wenwen Li, Igor R. Efimov

Department of Biomedical Engineering, Washington University in St. Louis

This article describes the basic procedures for conducting optical mapping experiments in the Langendorff-perfused rabbit heart using the panoramic imaging system, and the dual (voltage and calcium) imaging modality.

Optical Mapping of Action Potentials and Calcium Transients in the Mouse Heart

Di Lang, Matthew Sulkin, Qing Lou, Igor R. Efimov

Department of Biomedical Engineering, Washington University in St. Louis

This paper details the dissection procedure, instrumental setup, and experimental conditions during optical mapping of transmembrane potential (Vm) and intracellular calcium transient (CaT) in intact isolated Langendorff perfused mouse hearts.

Imaging G-protein Coupled Receptor (GPCR)-mediated Signaling Events that Control Chemotaxis of Dictyostelium Discoideum

Xuehua Xu, Tian Jin

Chemotaxis Signal Section, Laboratory of Immunogenetics, National Institute of Allergy and Infectious Diseases, National Institutes of Health

Here, we describe detailed live cell imaging methods for investigating chemotaxis. We present fluorescence microscopic methods to monitor spatiotemporal dynamics of signaling events in migrating cells. Measurement of signaling events permits us to further understand how a GPCR-signaling network achieves gradient sensing of chemoattractants and controls directional migration of eukaryotic cells.

Using a Comparative Species Approach to Investigate the Neurobiology of Paternal Responses

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The comparative species approach allows behavioral neuroscientists to explore various neurobiological factors associated with specific behaviors viewed as characteristic of a specific animal model. Taking advantage of naturally occurring differences in behavior between closely related species, this technique doesn't require invasive techniques to manipulate the expression of the behavior.