Video Article

December 2012: This Month in JoVE

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Abstract

Here are some highlights from the December 2012 issue of Journal of Visualized Experiments (JoVE).

This month, Smith and Thayer combine two classical methods-bromodeoxyuridine (BrDU) incorporation and fluorescence *in situ* hybridization (FISH)-to examine replication timing of individual mammalian chromosomes. By analyzing differences in BrDU incorporation, our authors can detect how chromosomal rearrangements cause asynchronous replication between homologous chromosomes of a single cell.

In JoVE Neuroscience, McManus *et al.* study neuromuscular activity in the California sea slug (*Aplysia californica*), and the movements of its feeding apparatus during feeding. Our authors show us how to isolate the slug's mouthparts, induce feeding programs (such as biting and swallowing, and analyze the activity of nerves, muscles, and individual neurons during feeding.

Also in JoVE Neuroscience, Mujagić *et al.* take honeybees (*Apis mellifera*) from the hive to the lab, where they allow the bees to scan different metal surfaces with their antennae. Then, the researchers feed the bees sugar water after certain tactile stimuli. This trains the bees to extend their proboscises, in anticipation of sugar water, when their antennae touch particular surfaces. Our authors then analyze how changes in antennal movement correspond to associative or non-associative tactile learning.

In JoVE Bioengineering, Raza and Lin demonstrate a procedure for generating encapsulated β-cell spheroids in a crosslinked polymer hydrogel. After recovering the aggregates, our authors can use the β-cell spheroids to study cell- and tissue-based therapies for regenerative medicine research.

In JoVE Clinical & Translational Medicine, Lessey *et al.* use methylene blue dye to identify areas of endometriosis, a condition that causes pelvic pain and other genitourinary problems in women. By staining peritoneal surfaces with methylene blue, our authors can identify areas of subtle endometriosis that might otherwise be missed during laparoscopy. This allows our authors to remove all affected tissue, greatly improving surgical outcome for endometriosis patients.

In JoVE Immunology and Infection, we learn that wax moths (*Galleria mellonella*), also known as honeycomb moths, have a lot in common with us mammals. In fact, wax moths have complex innate immune systems that can be used to characterize microbial virulence factors that are relevant to mammalian infections. Ramarao *et al.* show us how to raise the larvae and infect them with microbes or microbial toxins for pathogenesis assays.

This preview summarizes just a few notable video-articles in the December 2012 issue of JoVE. For full-length versions of these and many more video-articles, please visit www.jove.com.

Video Link

The video component of this article can be found at https://www.jove.com/video/5047/

Protocol

Intraoperative Detection of Subtle Endometriosis: A Novel Paradigm for Detection and Treatment of Pelvic Pain Associated with Loss of Peritoneal Integrity

Bruce A. Lessey[1], H. Lee Higdon III[1], Sara E. Miller[2], Thomas A. Price[3]
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Loss of peritoneal integrity provides a new paradigm to understand and treat chronic pelvic pain in women with mild forms of endometriosis and can be easily detected using intraoperative instillation of dye at the time of laparoscopy.

Tactile Conditioning And Movement Analysis Of Antennal Sampling Strategies In Honey Bees (*Apis mellifera* L.)

Samir Mujagić, Simon Michael Würth, Sven Hellbach, Volker Dürr
Biological Cybernetics, CITEC - Cognitive Interaction Technology - Center of Excellence, Bielefeld University

In this protocol we show how to condition harnessed honey bees to tactile stimuli and introduce a 2D motion capture technique for analyzing the kinematics of fine-scale antennal sampling pattern.

An *In Vitro* Preparation for Eliciting and Recording Feeding Motor Programs with Physiological Movements in *Aplysia californica*

Jeffrey M. McManus[1], Hui Lu[1], Hillel J. Chiel[1, 2, 3]
[1]Department of Biology, Case Western Reserve University , [2]Department of Neurosciences, Case Western Reserve University , [3]Department of Biomedical Engineering, Case Western Reserve University

We describe a technique to extracellularly record and stimulate from nerves, muscles, and individual identified neurons *in vitro* while eliciting and observing different types of feeding behaviors in the feeding apparatus of *Aplysia*.

Generation and Recovery of β-cell Spheroids From Step-growth PEG-peptide Hydrogels

Asad Raza, Chien-Chi Lin
Department of Biomedical Engineering, Purdue School of Engineering and Technology, Indiana University - Purdue University at Indianapolis

The following protocol provides techniques for encapsulating pancreatic β-cells in step-growth PEG-peptide hydrogels formed by thiol-ene photo-click reactions. This material platform not only offers a cytocompatible microenvironment for cell encapsulation, but also permits user-controlled rapid recovery of cell structures formed within the hydrogels.

Chromosome Replicating Timing Combined with Fluorescent *In situ* Hybridization

Leslie Smith, Mathew Thayer
Department of Biochemistry and Molecular Biology, Knight Cancer Institute, Oregon Health & Science University

A quantitative method for the analysis of chromosome replication timing is described. The method utilizes BrdU incorporation in combination with fluorescent *in situ* hybridization (FISH) to assess replication timing of mammalian chromosomes. This technique allows for the direct comparison of rearranged and un-rearranged chromosomes within the same cell.

The Insect *Galleria mellonella* as a Powerful Infection Model to Investigate Bacterial Pathogenesis

Nalini Ramarao, Christina Nielsen-Leroux, Didier Lereclus
INRA, Micalis UMR1319, France

Oral and intra haemocolic infection of larvae of the greater wax moth *Galleria mellonella* is described. This insect can be used to study virulence factors of entomopathogenic as well as mammalian opportunistic bacteria. Rearing of the insects, methods of infection and examples of *in vivo* analysis are described.

Disclosures

No conflicts of interest declared.

