

Video Article

December 2015 - This Month in JoVE: Flu Surveillance in Swine, DNA Nanorobots, Analyzing Crude Oil, and a Translational Model of Depression

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Abstract

Here's a look at what's coming up in the [December 2015 issue](#) of [JoVE: The Journal of Visualized Experiments](#).

In [JoVE Immunology & Infection](#), we know that the peak of flu season is on its way-and because pigs are important hosts for the influenza A virus, it is critical to monitor virus evolution in swine populations to get a snapshot of current circulating strains. Nasal swabs are a gold-standard technique for taking diagnostic samples from live pigs, but it requires restraining the pigs. [Nolting et al.](#) present an alternative sampling method using nasal wipes, which involves rubbing a piece of fabric across the snout of the pig with minimal to no restraint of the animal. The nasal wipe procedure is simple to perform, and virus detection and isolation rates are adequate to make it a viable and low-stress sampling method for flu in pigs.

In [JoVE Chemistry](#), DNA nanorobots are hollow hexagonal nanodevices that open in response to specific stimuli to present the cargo sequestered inside. This month, [Amir et al.](#) describe a nanorobot fabrication protocol that uses the DNA origami technique. This involves mixing short single-stranded DNA staples with long, circular, single-stranded DNA scaffolds. In a standard thermocycler, the staples anneal to the scaffolds, thus driving the folding of the nanorobot. After the folding reaction is complete, agarose gel electrophoresis (AGE) is used to visualize and estimate the purity of the DNA nanorobots. Finally, nanorobot fabrication is verified by transmission electron microscopy (TEM). This procedure allows for the construction of complex 2D/3D nano-architecture.

In [JoVE Environment](#), crude oil is one of the most valuable natural resources because it is the raw material for many fuels and chemical products. Accurate analysis of crude oil, especially the content of highly toxic hydrogen sulfide (H₂S), is essential for developing and implementing safety measures in the event of a release or spill. [Heshka and Hager](#) present a multidimensional gas chromatography method for analyzing dissolved hydrogen sulfide in crude oil samples. As far as we know, this is the only method that can accurately measure dissolved hydrogen sulfide in heavy crudes, without the use of sub-ambient cooling.

In [JoVE Behavior](#), [Frisbee et al.](#) present one of the most useful models for studying the pathophysiology of depression in rodents. This protocol uses a variety of mild stressors, and after a period of exposure to unpredictable chronic mild stress, rodents develop behaviors and cardiovascular alterations that are comparable to the symptoms of clinical depression. This approach allows for detailed studies of the pathological mechanisms of chronic stress, and can be used to test new therapies and interventions for chronic stress-induced depression.

You've just had a sneak peek of the [December 2015 issue](#) of [JoVE](#). Visit the website to see the full-length articles, plus many more, in [JoVE: The Journal of Visualized Experiments](#).

Video Link

The video component of this article can be found at <http://www.jove.com/video/5761/>

Protocol

Folding and Characterization of a Bio-responsive Robot from DNA Origami

Yaniv Amir, Almogit Abu-Horowitz, Ido Bachelet

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DNA origami is a powerful method for fabricating precise nanoscale objects by programming the self-assembly of DNA molecules. Here we describe a protocol for the folding of a bio-responsive robot from DNA origami, its purification and negative staining for transmission electron microscopic imaging (TEM).

An Unpredictable Chronic Mild Stress Protocol for Instigating Depressive Symptoms, Behavioral Changes and Negative Health Outcomes in Rodents

Jefferson C. Frisbee¹, Steven D. Brooks¹, Shyla C. Stanley¹, Alexandre C. d'Audiffret²

¹Department of Physiology and Pharmacology, **West Virginia University Health Sciences Center**, ²Division of Vascular and Endovascular Surgery, Center for Cardiovascular and Respiratory Sciences, **West Virginia University Health Sciences Center**

The unpredictable chronic mild stress (UCMS) protocol is a validated method for studying behavioral and physiological changes associated with chronic stress and depressive symptoms. Eight weeks of imposition of the UCMS protocol induces behavioral changes and poor health outcomes in rodents of either gender.

Nasal Wipes for Influenza A Virus Detection and Isolation from Swine

Jacqueline M. Nolting, Christine M. Szablewski, Jody L. Edwards, Sarah W. Nelson, Andrew S. Bowman

Department of Veterinary Preventive Medicine, **The Ohio State University**

The authors present a protocol to collect swine nasal wipes to detect and isolate influenza A viruses.

Measurement of H₂S in Crude Oil and Crude Oil Headspace Using Multidimensional Gas Chromatography, Deans Switching and Sulfur-selective Detection

Nicole E. Heshka, Darcy B. Hager

CanmetENERGY, **Natural Resources Canada**

A multidimensional gas chromatography method for the analysis of dissolved hydrogen sulfide in liquid crude oil samples is presented. A Deans switch is used to heart-cut light sulfur gases for separation on a secondary column and detection on a sulfur chemiluminescence detector.

Disclosures

No conflicts of interest declared.