Video Article

2017: JoVE's Year in Review

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Abstract

In January 2017, JoVE Behavior got off to a fetching start with a protocol to monitor the effects of a special diet for dogs with anxiety. This streamlined approach even uses a tool that most of us already have in our pockets: a smartphone! (54878)

JoVE Biology helped us keep up with our New Year’s fitness goals well into February with an article investigating the link between aerobic exercise and autophagy. (55099)

In March, JoVE Bioengineering showed us that paper isn’t going the way of the dinosaurs just yet! Our authors showcased 3-dimensional paper microfluidic devices that could be used to make cheap and simple immunoassays. (55287)

JoVE Environment was buzzing about honey bees during April. Here, our authors demonstrated a protocol that can be used to investigate the effects of pesticides on honey bee colonies. (55296)

In May, JoVE Behavior reminded us all to take a deep breath. Our authors used electroencephalography and electrocardiography to investigate traditional spiritual stress reduction techniques. (55455)

During June, JoVE Science Education released an astonishing 8 new collections covering topics in Clinical Skills, Psychology, and Physics! Meanwhile, in the video journal, our authors gained the upper “hand” against infectious disease with a protocol to compare different hand washing techniques. (55604)

In July, we were treated to a real spectacle in JoVE Medicine when our authors demonstrated a new way to use a smartphone and lens to record images of the fundus - and we can all see how smart that is. (55958)

We all fawned over this protocol in the August issue of JoVE Environment. Here, our researchers relocated wild white-tailed deer to controlled habitats to examine the effects of environment and genetics on development. (56059)

In September, JoVE Science Education continued its impressive growth trajectory and released 5 new collections covering topics in Chemistry and Biology. Over in the video journal, our authors in JoVE Bioengineering gave us a smashing protocol for simulating high speed collisions with bicycle helmets. (56288)

Then, JoVE Neuroscience got a move on in October with an automated gait analysis for mice with nerve injuries. Here, our authors had mice strut their stuff on a glass runway to illuminate their footprints for the camera. (56402)

During November, JoVE Engineering really turned up the heat as our authors described wind tunnel experiments that simulate forest fires in chaparral shrubs. (56591)

Finally, in December JoVE finished the year with a bang. Not only did we publish our 7,000th video but in JoVE Chemistry our authors showcased laboratory experiments designed to simulate a nuclear reactor core meltdown and improve the safety of nuclear power plants - that’s actually pretty cool. (54807)

This year in review is just a sampling of more than 1,000 video protocols that JoVE published during 2017. Browse the JoVE archives for thousands of other videos and visit our website every week to see brand-new content.

Video Link

The video component of this article can be found at https://www.jove.com/video/5981/
Protocol

Behavioral Disturbances: An Innovative Approach to Monitor the Modulatory Effects of a Nutraceutical Diet
Alessandro Di Cerbo1, Sara Sechi2, Sergio Canello3, Gianandrea Guidetti3, Filippo Fiore2, Raffaella Cocco2
1School of Specialization in Clinical Biochemistry, “G. d’Annunzio” University, 2Department of Veterinary Medicine, Pathology and Veterinary Clinic Section, University of Sassari, 3Research and Development Department, Forza10 USA Corp.

We report a simple approach to evaluate the effectiveness of a specific diet in positively modulating the daily activity and clinical and behavioral symptoms of dogs with evident behavioral disturbances.

Activating Autophagy by Aerobic Exercise in Mice
Altea Rocchi, Congcong He
Department of Cell and Molecular Biology, Northwestern University

Autophagy activation is beneficial in the prevention of a number of diseases. One of the physiological approaches to induce autophagy in vivo is physical exercise. Here we show how to activate autophagy by aerobic exercise and measure autophagy levels in mice.

Fabrication of Three-dimensional Paper-based Microfluidic Devices for Immunoassays
Syrena C. Fernandes, Daniel J. Wilson, Charles R. Mace
Department of Chemistry, Tufts University

We detail a method to fabricate three-dimensional paper-based microfluidic devices for use in the development of immunoassays. Our approach to device assembly is a type of multilayer, additive manufacturing. We demonstrate a sandwich immunoassay to provide representative results for these types of paper-based devices.

Evaluating the Effect of Environmental Chemicals on Honey Bee Development from the Individual to Colony Level
Chong-Yu Ko, Yue-Wen Chen, Yu-Shin Nai
Department of Biotechnology and Animal Science, National Ilan University

Herein we present a method to feed pesticide contaminated food to both an individual honey bee and a beehive colony. The procedure evaluates the pesticide effect on individual honey bees by in vivo feeding of basic larval diet and also on the natural condition of beehive colony.

Using Wavelet Entropy to Demonstrate how Mindfulness Practice Increases Coordination between Irregular Cerebral and Cardiac Activities
Hin Hung Sik1, Junling Gao1,2, Jicong Fan1, Bonnie Wai Yan Wu1, Hang Kin Leung1, Yeung Sam Hung2
1Centre of Buddhist Studies, The University of Hong Kong, 2Department of Electrical and Electronic Engineering, The University of Hong Kong

This manuscript describes how to use the wavelet entropy index to analyze high-density electroencephalography (EEG) and electrocardiography (ECG) data. We show that the irregularity of cerebral and cardiac activities became more coordinated during mindfulness-based stress reduction practice.

A Method to Test the Efficacy of Handwashing for the Removal of Emerging Infectious Pathogens
Marlene K. Wolfe, Daniele S. Lantagne
Department of Civil and Environmental Engineering, Tufts University

Handwashing is widely recommended to prevent infectious disease transmission. However, there is little evidence on which handwashing methods are most efficacious at removing infectious disease pathogens. We developed a method to assess the efficacy of handwashing methods at removing microorganisms.

Smartphone Fundus Photography
Hossein Nazari Khanamiri, Austin Nakatsuka, Jaafar El-Annan
Department of Ophthalmology and Visual Sciences, University of Texas Medical Branch

Fundus photography normally requires specialized fundus cameras that are not always available in all clinical settings. Here, a simple method to record ocular fundus images using a smartphone camera and a conventional high-plus handheld indirect ophthalmoscopy lens is described.
Protocol for Assessing the Relative Effects of Environment and Genetics on Antler and Body Growth for a Long-lived Cervid
Eric S. Michel\textsuperscript{1,2}, Emily B. Flinn\textsuperscript{1}, Stephen Demarais\textsuperscript{1}, Bronson K. Strickland\textsuperscript{1}, Guiming Wang\textsuperscript{1}, Chad M. Dacus\textsuperscript{3}
\textsuperscript{1}Department of Wildlife, Fisheries and Aquaculture, Mississippi State University, \textsuperscript{2}Department of Natural Resource Management, South Dakota State University, \textsuperscript{3}Mississippi Department of Wildlife, Fisheries and Parks

Phenotypic differences among cervid populations may be related to population-level genetics or nutrition; discerning which is difficult in the wild. This protocol describes how we designed a controlled study where nutritional variation was eliminated. We found that phenotypic variation of male white-tailed deer was more limited by nutrition than genetics.

A Test Bed to Examine Helmet Fit and Retention and Biomechanical Measures of Head and Neck Injury in Simulated Impact
Henry Y. Yu, Brooklynn M. Knowles, Christopher R. Dennison
Department of Mechanical Engineering, University of Alberta

Using an anthropometric head and neck, optical fiber-based fit force transducers, an array of head acceleration and neck force/moment transducers, and a dual high speed camera system, we present a test bed to study helmet retention and effects on biomechanical measures of head and neck injury secondary to head impact.

Automated Gait Analysis in Mice with Chronic Constriction Injury
Dong-Wook Kang\textsuperscript{1}, Jae-Gyun Choi\textsuperscript{1}, Ji-Young Moon\textsuperscript{2}, Suk-Yun Kang\textsuperscript{2}, Yeonhee Ryu\textsuperscript{2}, Jin Bong Park\textsuperscript{1}, Hyun-Woo Kim\textsuperscript{1,3}
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The precise assessment of pain response in a neuropathic animal model is critical to investigate the pathophysiology of pain diseases and develop new analgesics. We present a sensitive and objective method to determine the sensory function of the rodent hind paw by an automated gait analysis system.

Wind Tunnel Experiments to Study Chaparral Crown Fires
Jeanette Cobian-Iñiguez\textsuperscript{1}, Amir Hessam Aminfar\textsuperscript{1}, Joey Chong\textsuperscript{2}, Gloria Burke\textsuperscript{2}, Albertina Zuniga\textsuperscript{1}, David R. Weise\textsuperscript{2}, Marko Princevac\textsuperscript{1}
\textsuperscript{1}Department of Mechanical Engineering, University of California, Riverside, \textsuperscript{2}Pacific Southwest Research Station, USDA Forest Service

This protocol describes wind tunnel experiments designed to study the transition of a fire from the ground to the canopy of chaparral shrubs.

Laser-heating and Radiance Spectrometry for the Study of Nuclear Materials in Conditions Simulating a Nuclear Power Plant Accident
Dario Manara\textsuperscript{1}, Luca Soldi\textsuperscript{1,2,4}, Sara Mastromarino\textsuperscript{1,3,5}, Kostantinos Boboridis\textsuperscript{1}, Davide Robba\textsuperscript{1}, Luka Vlahovic\textsuperscript{1}, Rudy Konings\textsuperscript{1}
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We present experiments in which real nuclear fuel, cladding, and containment materials are laser heated to temperatures beyond 3,000 K while their behavior is studied by radiance spectroscopy and thermal analysis. These experiments simulate, on a laboratory scale, the formation of a lava-phase following a nuclear reactor core meltdown.

Disclosures
No conflicts of interest declared.