

Video Article

2017: JoVE's Year in ReviewCaitlin McAllister¹, Dipesh Navani¹¹JoVE Content ProductionCorrespondence to: Dipesh Navani at dipesh.navani@jove.comURL: <https://www.jove.com/video/5981>DOI: [doi:10.3791/5981](https://doi.org/10.3791/5981)

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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 Cerbo^{*1}, Sara Sechi^{*2}, 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 Gao^{1,2}, 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^{1,2}, Emily B. Flinn¹, Stephen Demarais¹, Bronson K. Strickland¹, Guiming Wang¹, Chad M. Dacus³

¹Department of Wildlife, Fisheries and Aquaculture, **Mississippi State University**, ²Department of Natural Resource Management, **South Dakota State University**, ³Mississippi 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 Kang¹, Jae-Gyun Choi¹, Ji-Young Moon², Suk-Yun Kang², Yeonhee Ryu², Jin Bong Park¹, Hyun-Woo Kim^{1,3}

¹Department of Physiology and Medical Science, College of Medicine and Brain Research Institute, **Chungnam National University**, ²KM Fundamental Research Division, **Korea Institute of Oriental Medicine (KIOM)**, ³Department of Neuroscience and Cell Biology, **University of Texas Medical Branch at Galveston**

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-Iñiguez¹, AmirHessam Aminfar¹, Joey Chong², Gloria Burke², Albertina Zuniga¹, David R. Weise², Marko Princevac¹

¹Department of Mechanical Engineering, **University of California, Riverside**, ²Pacific 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 Manara¹, Luca Soldi^{1,2,4}, Sara Mastromarino^{1,3,5}, Kostantinos Boboridis¹, Davide Robba¹, Luka Vlahovic¹, Rudy Konings¹

¹European Commission, Joint Research Centre, ²Energy Department, **Politecnico di Milano**, ³Department of Chemical Physics, **Sapienza - Università di Roma**, ⁴CEA Saclay, ⁵TU Delft

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.