

Video Article

May 2017: This Month in JoVE

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Abstract

Here's a look at what's coming up in the May 2017 issue of [JoVE: The World's Premier Video Journal](#)

Mindfulness is at the heart of our first featured article this month, from [JoVE Behavior](#). Here, [our Authors](#) use a combination of electroencephalography* (EEG) and electrocardiography* (ECG) to investigate traditional spiritual stress-reduction techniques. Examining the EEG and ECG's of participants before and after an 8-week Mindfulness-based Stress Reduction course, the authors recorded changes in the wavelet entropy of these data based on the training level or meditation type used. This provides a quantifiable methodology for the study of the effects of mindfulness training on the links between the brain and the heart.

This slides nicely into our next highlighted article on another heart- and brain- healthy subject - fish oils. In [JoVE Chemistry](#), [our Authors](#) present a protocol for the rapid evaluation of the lipid profiles in fish oil supplements. Using high resolution Nuclear Magnetic Resonance spectroscopy, individual fatty acids can be identified, as well as their positional distribution on the glycerol backbone. This method is a powerful analytical tool for the screening encapsulated supplements, and can help protect consumers from any "fishy" products...

From wellness and fish oils to well-oiled fish, our next article in [JoVE Biology](#) looks at the effects of alcohol exposure on zebrafish. To investigate Alcoholic Liver Disease (ALD)*, [our Authors](#) exposed zebrafish larvae to acute ethanol treatment, and then visualized their livers using a specifically optimized Hematoxylin and Eosin (H&E)* staining protocol. The authors show that steatosis and swelling of the hepatic blood vessels is apparent after just 24 hours of exposure to high ethanol levels. This versatile protocol can also be applied to other models of toxin- and virus-induced injury in the increasingly used zebrafish liver model.

Finally this month, let's chill out with a novel freezing method from [JoVE Biology](#). Here, [our Authors](#) present time-resolved electron microscopy, dubbed "flash-and-freeze", which gives a snapshot of membrane dynamics on the order of milliseconds and nanometers. The "flash" is an optogenetic stimulation of neuronal activity, and induces neurotransmitter release. A high-pressure "freeze" then swiftly preserves the cells at the resultant stages, allowing researchers to follow morphological changes after synaptic transmission. That's super cool!

You've just had a sneak peek of the May 2017 issue of [JoVE](#). Visit the website to see the full-length articles, plus many more, in JoVE: The World's Premier Video Journal.

Video Link

The video component of this article can be found at <https://www.jove.com/video/5839/>

Protocol

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

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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.

Cardiac Muscle Cell-based Actuator and Self-stabilizing Biorobot - Part 2

Neerajha Nagarajan¹, Merrel T. Holley², Christian Danielson², Kidong Park², Pinar Zorlutuna¹

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In this study, a biological actuator and a self-stabilizing, swimming biorobot with functionalized elastomeric cantilever arms are seeded with cardiomyocytes, cultured, and characterized for their biochemical and biomechanical properties over time.

NMR Spectroscopy as a Robust Tool for the Rapid Evaluation of the Lipid Profile of Fish Oil Supplements

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Here, high-resolution ¹H and ¹³C Nuclear Magnetic Resonance (NMR) spectroscopy was used as a rapid and reliable tool for quantitative and qualitative analysis of encapsulated fish oil supplements.

Flash-and-Freeze: A Novel Technique to Capture Membrane Dynamics with Electron Microscopy

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We developed a novel technique in electron microscopy, "flash-and-freeze," that enables the visualization of membrane dynamics with ms temporal resolution. This technique combines the optogenetic stimulation of neurons with high-pressure freezing. Here, we demonstrate the procedures and describe the protocols in detail.

Disclosures

No conflicts of interest declared.