

Video Article

This Month in JoVE - Assessing Freezing Tolerance in Plants, Patterning 2D Shapes with DNA, Studying Ischemia *In Vitro*, Studying Social Cognition in Monkeys

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Abstract

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

In [JoVE Environment](#), it's the middle of spring in the earth's Northern Hemisphere, so seeds are sprouting and buds are blooming. But for actively growing plants, especially those with no freezing tolerance, a cold snap can be deadly. A hard frost can dramatically alter natural ecosystems and devastate agriculture. Even more concerning, erratic weather patterns related to climate change can cause cold-susceptible plants to bud and bloom too early, then fall victim to a subsequent freeze. To protect plants from freezing, we need a better understanding of the freezing process. [Wisniewski et al.](#) describe a protocol to visualize this process using high-resolution infrared thermography (HRIT). Using this technology, scientists can determine how ice forms and propagates, and test various compounds that might alter the freezing process or increase freezing tolerance.

In [JoVE Chemistry](#), the principles of self-assembly have been used to engineer a variety of complex structures from biological and non-biological building blocks. This month, [Wei et al.](#) present detailed protocols for the self-assembly of single-stranded DNA tiles into complex 2D shapes with the tiles acting as molecular pixels on molecular canvases. These are visualized by atomic force microscopy. The modular nature of this approach allows it to be scalable, and the tiles can self-assemble into tubes and rectangles of varying sizes. This technique is also highly versatile-enabling the construction virtually any 2D shape.

In [JoVE Clinical & Translational Medicine](#), ischemic stroke happens when a blockage in an artery restricts blood flow to the brain, depriving it of oxygen and nutrients. When the blood returns, reperfusion can cause further damage by disrupting the blood-brain barrier and triggering inflammation and oxidative stress. There are many *in vivo* models of ischemia-reperfusion injury, and while all disease models have drawbacks, *in vivo* models tend to be technically challenging, with limited applicability for mechanistic studies. To help overcome some of these limitations, [Alluri et al.](#) present an *in vitro* model of ischemia-reperfusion, which can be used to study the molecular mechanisms of blood-brain barrier dysfunction and signs of oxidative stress.

In [JoVE Behavior](#), [Fagot et al.](#) study social cognition in monkeys. In this protocol, monkeys living in social groups have free access to multiple test units. When a monkey enters a testing chamber, and reaches through the hand port, a computer recognizes the monkey through its radio frequency ID (RFID) chip and starts the experiment. A touch screen displays the stimulus and a food dispenser delivers the reward. Over several years, this procedure has been shown enhance motivation in the subjects and favor complex learning-particularly the social aspects.

You've just had a sneak peek of the [May 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 <https://www.jove.com/video/5727/>

Protocol

Self-assembly of Complex Two-dimensional Shapes from Single-stranded DNA Tiles

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DNA tiling is an effective approach to make programmable nanostructures. We describe the protocols to construct complex two-dimensional shapes by the self-assembly of single-stranded DNA tiles.

Assessment of Social Cognition in Non-human Primates Using a Network of Computerized Automated Learning Device (ALDM) Test Systems

Joël Fagot, Yousri Marzouki, Pascal Huguet, Julie Gullstrand, Nicolas Claidière

CNRS, Federation 3C, and Laboratory of Cognitive Psychology, **Aix-Marseille University**

Fagot & Paleressompoulle¹ have published an automated learning device (ALDM) aimed at testing individual cognitive abilities in semi-free ranging monkeys. The main goal of our protocol is to use a network of ALDM test units to study social cognition in non-human primates.

Oxygen-Glucose Deprivation and Reoxygenation as an *In Vitro* Ischemia-Reperfusion Injury Model for Studying Blood-Brain Barrier Dysfunction

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Ischemia-Reperfusion (IR) injury is associated with a high rate of morbidity and mortality. The goal of the *in vitro* model of oxygen-glucose deprivation and reoxygenation (OGD-R) described here is to assess the effects of ischemia reperfusion injury on a variety of cells, particularly in blood-brain barrier (BBB) endothelial cells.

The Use of High-resolution Infrared Thermography (HRIT) for the Study of Ice Nucleation and Ice Propagation in Plants

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Here we present a protocol that allows one to visualize sites of ice formation and avenues of ice propagation in plants utilizing high resolution infrared thermography (HRIT).

Disclosures

No conflicts of interest declared.