

Video Article

October 2016: This Month in JoVE

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Abstract

Here's a look at what's coming up in the October 2016 issue of [JoVE: The Journal of Visualized Experiments](#).

In [Immunology and Infection](#), we showcase a series of four videos detailing safety and logistical procedures for working in an Animal Biosafety Level 4, or (A)BSL-4, laboratory. The [first](#) of this group, filmed at the NIH Integrated Research Facility at Fort Detrick, demonstrates the safe entry and exit procedures for work inside an (A)BSL-4 suit laboratory suite. Inhalation studies of high-consequence pathogens can simulate natural aerosol transmission, or allow researchers to investigate outcomes of intentional pathogenic aerosol releases. In the [second](#) of this series, the authors walk through the safe operation of aerobiology chambers for maximum containment level pathogens, such as the Ebola virus.

The challenge of carrying out [medical imaging](#) in a high biosafety environment is the focus of the third of these releases. Here, our Authors detail how to prepare animals infected with high-consequence pathogens for noninvasive medical imaging, whilst ensuring that the equipment remains easily accessed and free from contamination. In the [final video](#) of this miniseries, we take an in-depth look at the extra precautions and procedures involved in performing viral assays in a Class II biosafety cabinet in a BSL-4 environment. As a whole, these four releases are a valuable library for researchers handling challenging and potentially harmful biological materials.

Woody plants and secondary tree stems are key habitats, as well as being of great cultural and commercial importance. Understanding stem growth and wood formation is therefore an important topic for tree production, conservation, and preservation. In [JoVE Genetics](#) this month, [Spokevicius et al](#) (our Authors) describe a method to create transgenic somatic tissue sectors directly in the living secondary stem of woody plants. This versatile method can facilitate rapid functional characterization of genes of interest, be utilized in a range of tree species, and test multiple genes and promoters at a high throughput level.

Arguably one of the most recognizable paintings of all time, the Mona Lisa is famous for the subject's elusive smile and indefinable expression. In [JoVE Behavior](#), [Soranzo and Newbury](#) (our Authors) demonstrate how a similar visual illusion-dubbed the "uncatchable smile" because of its tendency to disappear as the observer tries to catch it-was discovered in La Bella Principessa, also by Da Vinci. Using a combination of methods including interobservation, psychophysical experiments, and structured interviews, the authors reveal that the ambiguity in La Bella Principessa's expression is attributed to a visual illusion at the mouth of the subject similar to that observed in the Mona Lisa.

You've just had a sneak peek of the October 2016 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/5814/>

Protocol

Safety Precautions and Operating Procedures in an (A)BSL-4 Laboratory: 1. Biosafety Level 4 Suit Laboratory Suite Entry and Exit Procedures

Krisztina Janosko¹, Michael R. Holbrook¹, Ricky Adams¹, Jason Barr¹, Laura Bollinger¹, Je T'aime Newton², Corrie Ntiforo², Linda Coe¹, Jiro Wada¹, Daniela Pusi¹, Peter B. Jahrling¹, Jens H. Kuhn¹, Matthew G. Lackemeyer¹

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Although researchers are generally knowledgeable about procedures and safety precautions required for biosafety level 1 or 2 (BSL-1/2) experiments, they may not be familiar with experimental procedures in BSL-4 suit laboratories. This article provides a detailed visual demonstration of BSL-4 suit laboratory systems check, laboratory entry, movement, and exit procedures.

Safety Precautions and Operating Procedures in an (A)BSL-4 Laboratory: 2. General Practices

Steven Mazur, Michael R. Holbrook, Tracey Burdette, Nicole Joselyn, Jason Barr, Daniela Pusi, Laura Bollinger, Linda Coe, Peter B. Jahrling, Matthew G. Lackemeyer, Jiro Wada, Jens H. Kuhn, Krisztina Janosko

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Performing viral assays in a BSL-4 laboratory is more involved compared to work in a BSL-2 laboratory due to required additional safety precautions. Here, we present an overview of practices and procedures used inside a BSL-4 laboratory illustrating proper Class II biosafety cabinet usage, waste management/disposal, and sample removal.

Safety Precautions and Operating Procedures in an (A)BSL-4 Laboratory: 4. Medical Imaging Procedures

Russell Byrum, Lauren Keith, Christopher Bartos, Marisa St. Claire, Matthew G. Lackemeyer, Michael R. Holbrook, Krisztina Janosko, Jason Barr, Daniela Pusi, Laura Bollinger, Jiro Wada, Linda Coe, Lisa E. Hensley, Peter B. Jahrling, Jens H. Kuhn, Margaret R. Lentz

Integrated Research Facility at Frederick, National Institute of Allergy and Infectious Diseases (NIAID), **National Institutes of Health (NIH)**

Here, we present an overview of the preparation and animal handling procedures required to safely perform medical imaging in an animal biosafety level 4 laboratory. Computed tomography of a mock-infected guinea pig illustrates these procedures that may be used to evaluate the disease caused by a high consequence pathogen.

Safety Precautions and Operating Procedures in an (A)BSL-4 Laboratory: 3. Aerobiology

J. Kyle Bohannon, Krisztina Janosko, Michael R. Holbrook, Jason Barr, Daniela Pusi, Laura Bollinger, Linda Coe, Lisa E. Hensley, Peter B. Jahrling, Jiro Wada, Jens H. Kuhn, Matthew G. Lackemeyer

Integrated Research Facility at Frederick, National Institute of Allergy and Infectious Diseases (NIAID), **National Institutes of Health (NIH)**

As high-consequence pathogens can potentially infect subjects through airborne particles, aerobiology has been increasingly applied in pathogenesis research and medical countermeasure development. We present a detailed visual demonstration of aerobiology procedures during an aerosol challenge in nonhuman primates in an animal biosafety level 4 maximum containment environment.

Investigating the 'Uncatchable Smile' in Leonardo da Vinci's La Bella Principessa: A Comparison with the Mona Lisa and Pollaiuolo's Portrait of a Girl

Alessandro Soranzo, Michelle Newberry

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This paper discusses the methodology used to reveal the 'Uncatchable Smile' illusion in Leonardo da Vinci's La Bella Principessa portrait. A combination of three methods was used (inter-observation, structured interviews, and psychophysical experiments), which led to an investigation that shaped itself without prior beliefs, thus reducing potential researcher bias.

The Use of Induced Somatic Sector Analysis (ISSA) for Studying Genes and Promoters Involved in Wood Formation and Secondary Stem Development

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Here we present a protocol that facilitates the medium to high throughput functional characterization of gene and promoter constructs in tree secondary stem tissue within comparatively short time frames. It is efficient, easy to use and widely applicable to a range of tree species.

Disclosures

No conflicts of interest declared.