Video Article

March 2016 - This Month in JoVE: RNA interference in Mosquitoes, iPSCs Derived from Nasal Epithelia, Air Sampling of Atmospheric Aerosols, and Autologous Micro-grafts for Skin Lesions

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Abstract

Here's a look at what's coming up in the March 2016 issue of JoVE: The Journal of Visualized Experiments.

In JoVE Biology, RNA interference (RNAi) is a natural mechanism of gene silencing that occurs via double-stranded RNA (dsRNA), which targets homologous DNA for degradation. This phenomenon allows researchers to selectively silence genes in many eukaryotes-making RNAi an extremely valuable tool for uncovering gene function. However, in the mosquito *Anopheles gambiae*, a major vector for malaria, RNAi has limited ability to target genes during developmental stages. This month, Regna *et al.* present an RNAi protocol using direct injection during pupal development. After the pupae complete development, their adult phenotypes confirm the gene knockdown. This method expands the arsenal of genomic tools for vector insect research.

In JoVE Developmental Biology, induced pluripotent stem cells (iPSCs) have been generated from many cell types, and are valuable models for human development and disease. iPSCs are also valued for their potential applications in regenerative medicine. This month, Ulm *et al.* demonstrate methods for sampling nasal epithelial mucosa from children, then culturing the samples to obtain nasal epithelial cells (NECs), which are reprogrammed into iPSCs. NECs are of particular interest because they're the primary cells infected with respiratory viruses, and are readily accessible during clinical visits. Therefore, this protocol facilitates patient-specific research in airway epithelial biology.

In JoVE Environment, filters are important tools in atmospheric aerosols research. These sampled filters collect ambient particles, such as endotoxins and biological aerosols, for analysis. In this issue, Lang-Yona *et al.* use air-sampled filters for two complementary analyses of atmospheric biological particles: endotoxin and DNA. Specifically, they study endotoxin components of gram-negative bacterial cell walls, known collectively as lipopolysaccharide (LPS). In parallel, they perform a genomic evaluation of the sample's bacterial content. This method can produce highly accurate and reliable analyses for biological aerosol research.

In JoVE Medicine, researchers are finding new ways to treat wounds with a patient's own tissues, This month, Purpura *et al.* describe a new method of creating autologous micrografts. When cultured on collagen sponges, these micro-grafts become bio-complexes ready to use in the treatment of skin lesions. These biocomplexes were applied in a patient, who showed good healing after 30 days. This new regenerative approach shows promise as an efficient, one-step treatment of acute and chronic lesions.

You've just had a sneak peek of the March 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 https://www.jove.com/video/5772/

Protocol

Tissue Characterization after a New Disaggregation Method for Skin Micro-Grafts Generation

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The protocol describes a new method to disaggregate human tissues and to create autologous micro-grafts that, combined with collagen sponges, give rise to human bio-complexes ready to use in the treatment of skin lesions. Further, this system preserves cell viability of micro-grafts at different times after mechanical disaggregation.

Air-sampled Filter Analysis for Endotoxins and DNA Content

Naama Lang-Yona[1,2], Yinon Mazar[1], Michal Pardo[1], Yinon Rudich[1]

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Two complementary analyses of atmospheric biological particles from air sampled filters are described herein: the extraction and detection of endotoxin, and of DNA.

RNAi Trigger Delivery into *Anopheles gambiae* Pupae

Kimberly Regna[1], Rachel M. Harrison[1], Shannon A. Heyse[1], Thomas C. Chiles[1], Kristin Michel[2], Marc A. T. Muskavitch[1,3]

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RNA interference (RNAi) is an extremely valuable tool for uncovering gene function. However, the ability to target genes using RNAi during pre-adult stages is limited in the major human malaria vector *Anopheles gambiae*. We describe an RNAi protocol to reduce gene function via direct injection during pupal development.

Cultivate Primary Nasal Epithelial Cells from Children and Reprogram into Induced Pluripotent Stem Cells

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This publication demonstrates methods for successful sampling and culture of nasal epithelial mucosa from children, and reprogramming these cells to induced Pluripotent Stem Cells (iPSCs).

Disclosures

No conflicts of interest declared.