

Video Article

August 2015 - This Month in JoVE: Isolating Stem Cells, Bioengineering the Kidney, and Getting Kids to eat Carrots

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Abstract

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

In [JoVE Developmental Biology](#), a major goal in stem cell research is to grow human pluripotent stem cells (hPSCs) in fully humanized conditions without using feeder cells, exogenous supplements, or synthetic substrates. This will eliminate the risk of contamination by animal cells and facilitate economical mass production for therapeutic applications. [Jung and Kim](#) previously showed that chorionic cells from the human placenta could support the propagation of hPSCs. So this month, they isolate and culture placental chorionic cells and use the placenta-conditioned media to culture the hPSCs. The result is an almost completely humanized culture system that can advance stem cell research and regenerative medicine.

Also in [JoVE Developmental Biology](#), the ability to genetically reprogram differentiated cells into stem-like states has revolutionized the field of regenerative medicine. Induced pluripotent stem cells (iPSCs) can be derived from many different cell types, including lymphocytes from whole blood and keratinocytes from skin samples. But these require pretty invasive extraction methods, so [Hung et al.](#) focus on the keratinocytes from hair follicles, which can be harvested simply by plucking a few hairs. Our authors culture the follicles to isolate keratinocytes, and transfect them with non-viral episomal vectors to produce iPSCs. These could be used for disease modeling and for deriving patient-specific stem cells.

[JoVE Bioengineering](#) also applies to regenerative medicine with a protocol by [Uzarski et al.](#) for bioengineering kidney tissues. This involves carefully removing the cells from kidneys by perfusion. The decellularized tissue retains much of the kidney's intricate structure, so it serves as a biological scaffold for new renal cells. The kidney scaffolds are recellularized with human renal cells, which repopulate the matrix, proliferate, and survive in perfusion culture for over a week. With a shortage of donor kidneys available for transplantation, patients with renal failure may benefit from kidney grafts made from their own cells.

In [JoVE Behavior](#), feeding disorders are common in young children, especially those with developmental delays. So [Weber and Gutierrez](#) demonstrate a treatment protocol that includes three different procedures for presenting foods: One procedure involves several successive steps that approximate eating. In another, preferred foods are always placed on the left side. This is designed to foster compliance with foods served on the left. In the third procedure, the non-preferred food is placed on top of the preferred one, and always served from the left. Parents, teachers, and clinicians can try this simple protocol before seeking more specialized treatment.

You've just had a sneak peek of the [August 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/5745/>

Protocol

Generation of Integration-free Human Induced Pluripotent Stem Cells Using Hair-derived Keratinocytes

Sandy S.C. Hung, Alice Pébay, Raymond C.B. Wong

Centre for Eye Research Australia & Department of Ophthalmology, **University of Melbourne**

This manuscript provides a step-by-step procedure for the derivation and maintenance of human keratinocytes from plucked hair and subsequent generation of integration-free human induced pluripotent stem cells (hiPSCs) by episomal vectors.

Epithelial Cell Repopulation and Preparation of Rodent Extracellular Matrix Scaffolds for Renal Tissue Development

Joseph S. Uzarski^{1,2}, Jimmy Su^{1,2,3,4}, Yan Xie^{1,2}, Zheng Jenny Zhang^{1,2}, Heather H. Ward⁵, Angela Wandinger-Ness⁶, William M. Miller^{7,8}, Jason A. Wertheim^{1,2,3,4,8,9}

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This protocol describes decellularization of Sprague Dawley rat kidneys by antegrade perfusion of detergents through the vasculature, producing acellular renal extracellular matrices that serve as templates for repopulation with human renal epithelial cells. Recellularization and use of the resazurin perfusion assay to monitor growth is performed within specially-designed perfusion bioreactors.

A Treatment Package without Escape Extinction To Address Food Selectivity

Jessica Weber¹, Anibal Gutierrez, Jr.²

¹**Florida International University**, ²Department of Psychology and the Center for Children and Families, **Florida International University**

Feeding difficulties are a common problem for children with developmental disorders, including autism, and behavioral interventions often include escape extinction. Recent research has begun to evaluate treatments that do not include escape extinction. This manuscript describes a multicomponent treatment package that does not use escape extinction to treat feeding difficulties.

A Novel Culture Model for Human Pluripotent Stem Cell Propagation on Gelatin in Placenta-conditioned Media

Ji-Hye Jung, Byung Soo Kim

Department of Biomedical Science, **Graduate School of Medicine, Korea University**

This protocol provides a simple and efficient way to propagate human pluripotent stem cells (hPSCs) using only conditioned media derived from the human placenta in a gelatin-coated dish without additional exogenous supplementation or hPSC-specific synthetic substrata.

Disclosures

No conflicts of interest declared.