



Video Publishing: The Long-Overdue Modernization of Scientific Research and Education

INFORUM 2018

Pawel Kania | Account Manager – Eastern Europe

Abstract

- **60–90% of scientific articles cannot be reproduced** because the methods used and described lack clarity and depth
- The scientific publishing format is almost **the same as 450 years ago**. Research has, however, becoming more and more complex over time
- **65% of people are visual learners**. Videos, in addition to complementary text protocols, offers more clarity, productivity, and reproducibility

An Innovative Solution

joVE is more than a journal or a database

An Innovative Solution is JoVE

joVE (Journal of Visualized Experiments) is the leading producer and publisher of scientific video resources in the world with the mission to increase the productivity of research and education in science, medicine and engineering.

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Mission

To advance scientific research and education by **increasing productivity, reproducibility, and efficiency of knowledge transfer** for scientists, educators, and students worldwide **through visual learning solutions.**

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Video Journal & Science Education

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Designed for scientists and researchers

jove | SCIENCE EDUCATION

Designed for faculty and students

Video Journal

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• MEDICINE

• NEUROSCIENCE

Video Journal

NEUROSCIENCE


Simultaneous Two-photon *In Vivo* Imaging of Synaptic Inputs and Postsynaptic Targets in the Mouse Retrosplenial Cortex

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* These authors contributed equally

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CHAPTERS

- 0:00 Title
- 1:27 Surgery Preparation
- 3:37 Cranial Window Surgery
- 8:30 Virus Injection
- 10:43 Cranial Window Implantation
- 13:15 Imaging
- 15:12 Results

Video Journal

ABSTRACT INTRODUCTION PROTOCOL RESULTS DISCUSSION MATERIALS REFERENCES DOWNLOADS

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Łukasiewicz, K., Robacha, M., Bożycki, Ł., Radwanska, K., Czajkowski, R. Simultaneous Two-photon *In Vivo* Imaging of Synaptic Inputs and Postsynaptic Targets in the Mouse Retrosplenial Cortex. *J. Vis. Exp.* (109), e53528, doi:10.3791/53528 (2016).


TRANSLATE TEXT TO:
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ABSTRACT

This video shows the craniotomy procedure that allows chronic imaging of neurons in the mouse retrosplenial cortex (RSC) using *in vivo* two-photon microscopy in Thy1-GFP transgenic mouse line. This approach creates a possibility to investigate the correlation of behavioural manipulations with changes in neuronal morphology *in vivo*.

The cranial window implantation procedure was considered to be limited only to the easily accessible cortex regions such as the barrel field. Our approach allows visualization of neurons in the highly vascularized RSC. RSC is an important element of the brain circuit responsible for spatial memory, previously deemed to be problematic for *in vivo* two-photon imaging.

The cranial window implantation over the RSC is combined with an injection of mCherry-expressing recombinant adeno-associated virus (rAAV^{mCherry}) into the dorsal hippocampus. The expressed mCherry spreads out to axonal projections from the hippocampus to RSC, enabling



CITE THIS

CHAPTERS

0:00	Title
1:27	Surgery Preparation
3:37	Cranial Window Surgery
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10:43	Cranial Window Implantation

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1 VIDEO TITLE

Video title and breadcrumbs.

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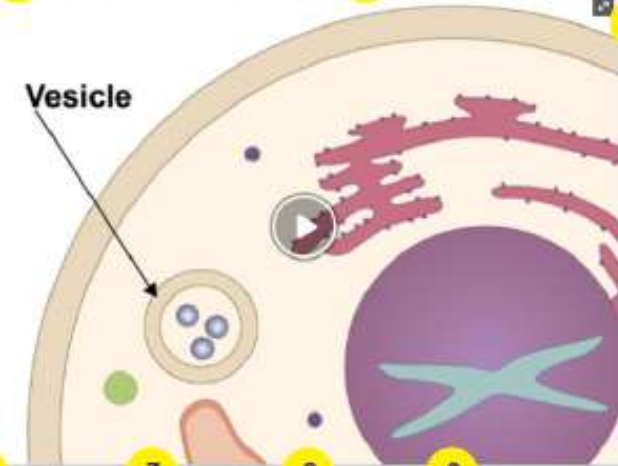
1 An Introduction to Endocytosis and Exocytosis

2 USE JoVE IN YOUR CLASSROOM

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4 THE ARTICLE IS OPEN ACCESS

Vesicle



6 DOWNLOAD PDF 7 ADD TO FAVORITE 8 EMBED 9 SHARE

10 TRANSLATE TEXT TO:
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10 SUMMARY

Cells can take in substances from the extracellular environment by endocytosis and actively release molecules into it by exocytosis. Both processes involve lipid membrane-bound sacs called vesicles. Knowledge of the molecular architecture and mechanisms of both is key to understanding normal cell physiology, as well as the disease states that arise when they become defective.

This video will first briefly review a few pivotal discoveries in the history of endo- and exocytosis research. Next, some key questions will be examined, followed by a discussion of the prominent methods used to investigate these problems, including cell labeling, fusion assays, and fluorescence imaging. Finally, it will explore current research being conducted by scientists in the field today.

11 CITE THIS VIDEO

JoVE Science Education Database. Cell Biology: An Introduction to Endocytosis and Exocytosis. JoVE, Cambridge, MA, (2017).

10 SUMMARY

Description of the video content.

11 CITE THIS VIDEO

Copying a citation automatically adds it to a citations list available in your user account.

A screenshot of the JoVE website. The page title is 'An Introduction to Endocytosis and Exocytosis'. The page features a video player with a play button and a diagram of a cell. Below the video player are buttons for 'DOWNLOAD PDF', 'ADD TO FAVORITE', 'EMBED', and 'SHARE'. To the right of the video player is a 'CHAPTERS' section with a list of chapters: '0:00 Overview', '1:10 A Brief History of the Field', '4:14 Key Questions', '5:40 Prominent Methods', '7:24 Applications', and '8:57 Summary'. Below the chapters are two buttons: 'Fusion Assay Using 2D Microscopy' and 'Cell-Surface Biorecognition Assay'. The page also has a search bar at the top and a navigation menu.

History of JoVE



2006 – Princeton University

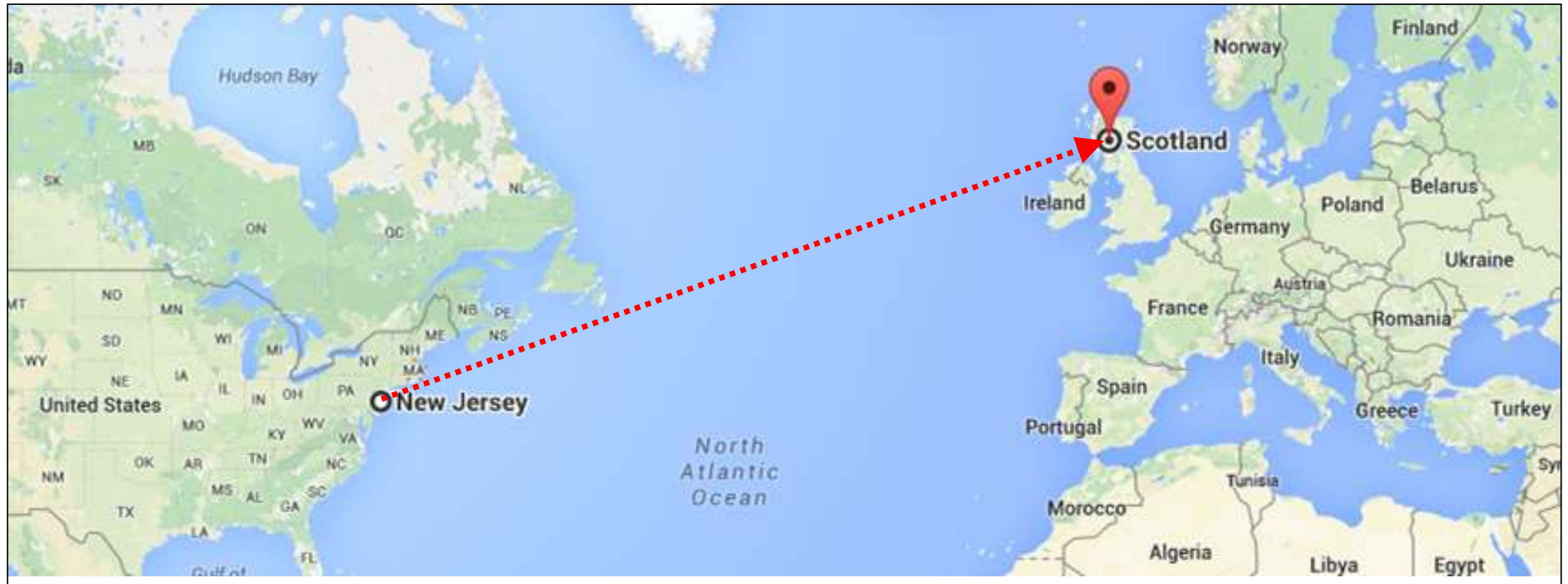


reproduce



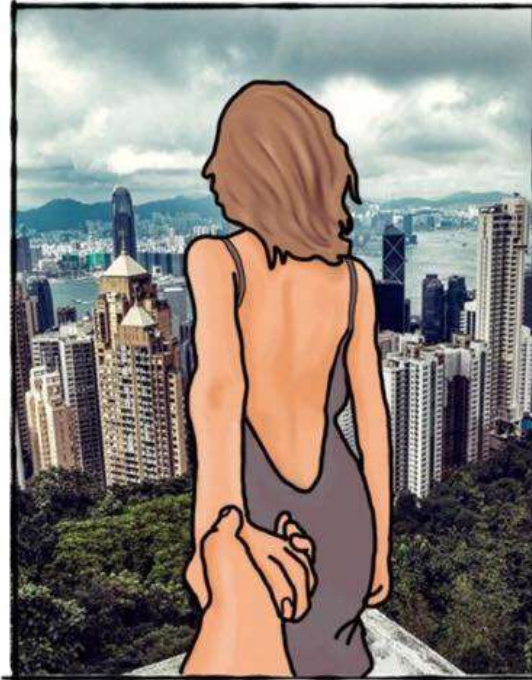
From New Jersey to Scotland – \$10.000

Total cost for 2 months of work, travel, and reagents? \$10,000 to learn 1 experiment

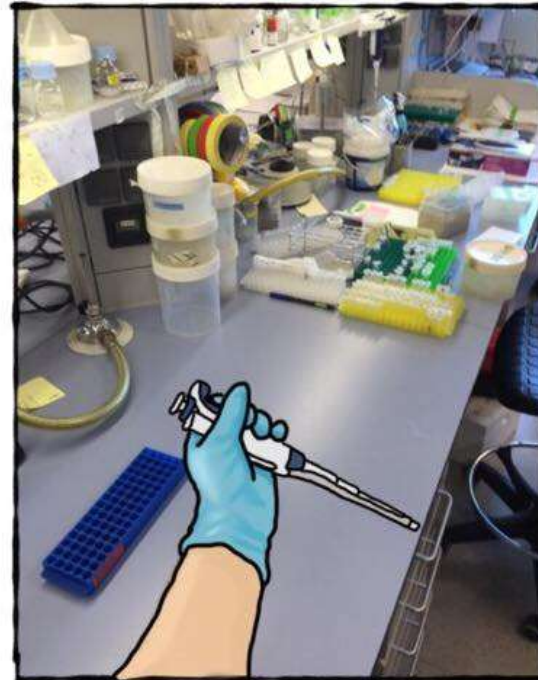


YouTube vs JoVE

The story of my life



PEOPLE



ME

Journal of Visualized Experiments

JoVE is



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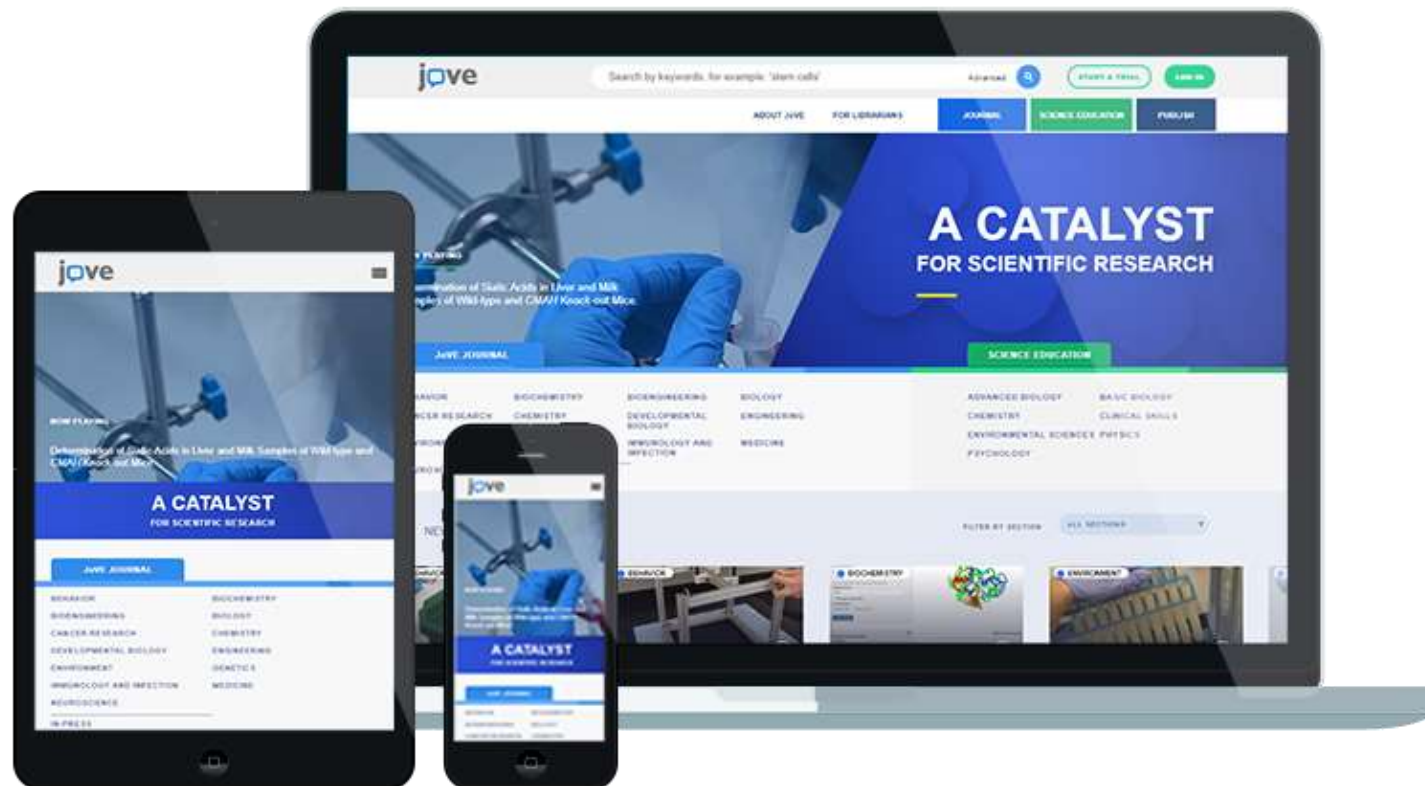
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JoVE.com

Tradition vs New Solutions

Why new solutions bring effects?



Passive learning is an oxymoron, there is no such thing.

- K. Patricia Cross

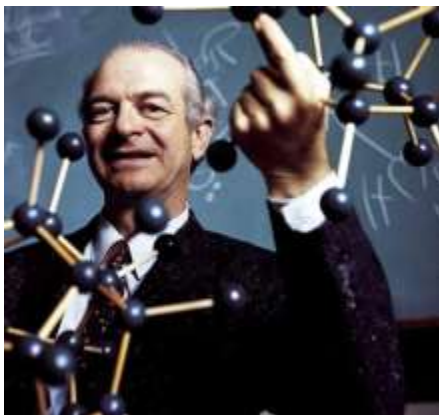
E-Learning



The Internet is becoming the town square for the global village of tomorrow.

– Bill Gates

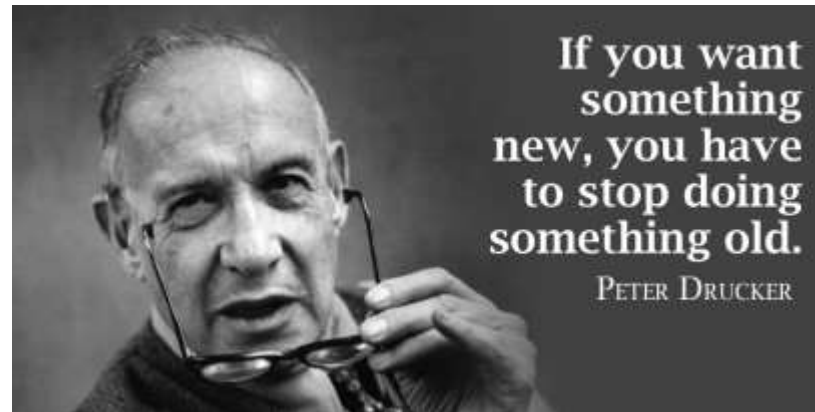
(1955- ; co-founder of the Microsoft Corporation)



The best way to have a good idea is to have a lot of ideas.

– Linus Pauling

(1901-1994; American chemist; author and educator)



If you want something new, you have to stop doing something old.

PETER DRUCKER

The basic economic resource is no longer capital, nor natural resources, nor labor. It is and will be knowledge.

– Peter Drucker

(1909-2005; American management consultant)

Why Video?



It is said that 1.000 ...

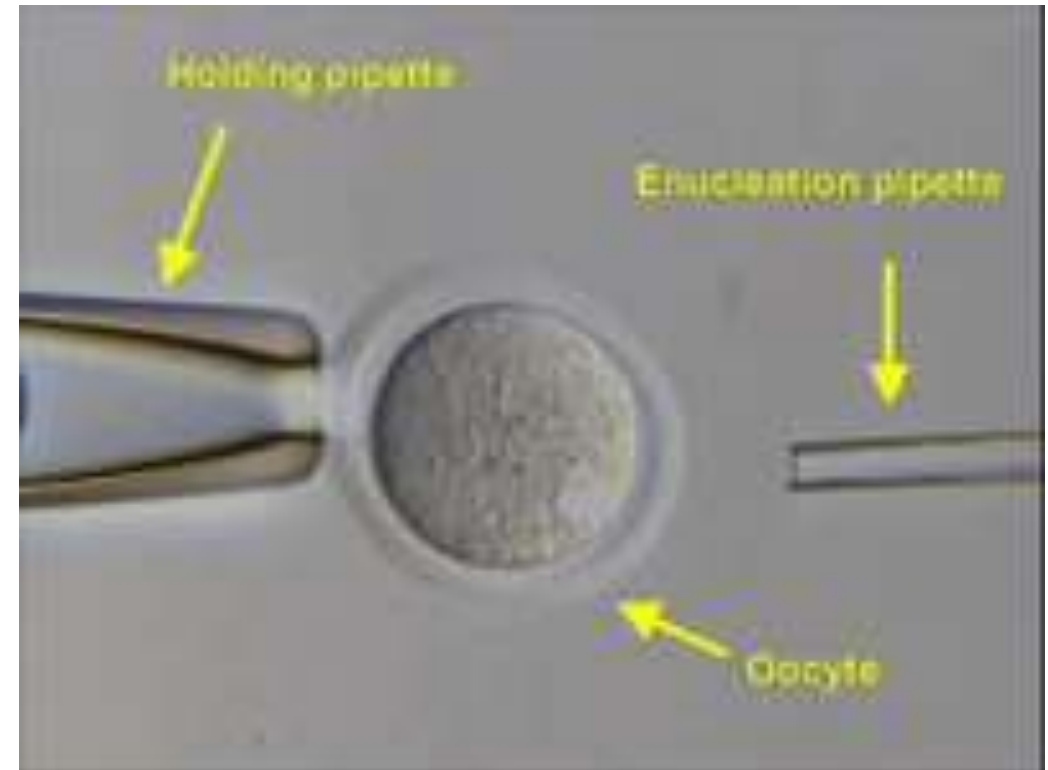
- *1 picture brings more than 1.000 words*
- *1 movie brings more than 1.000 pictures*
- *1 movie brings more than 1.000.000+ words?*

The **POWER** of Visualization

Text of article

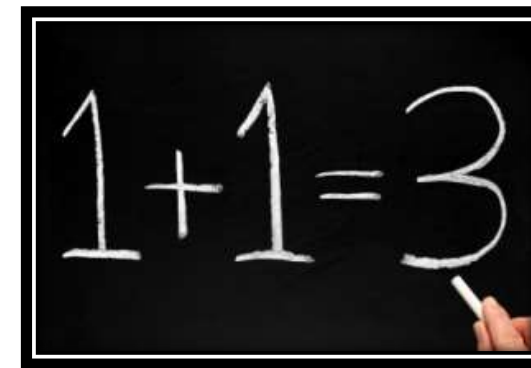
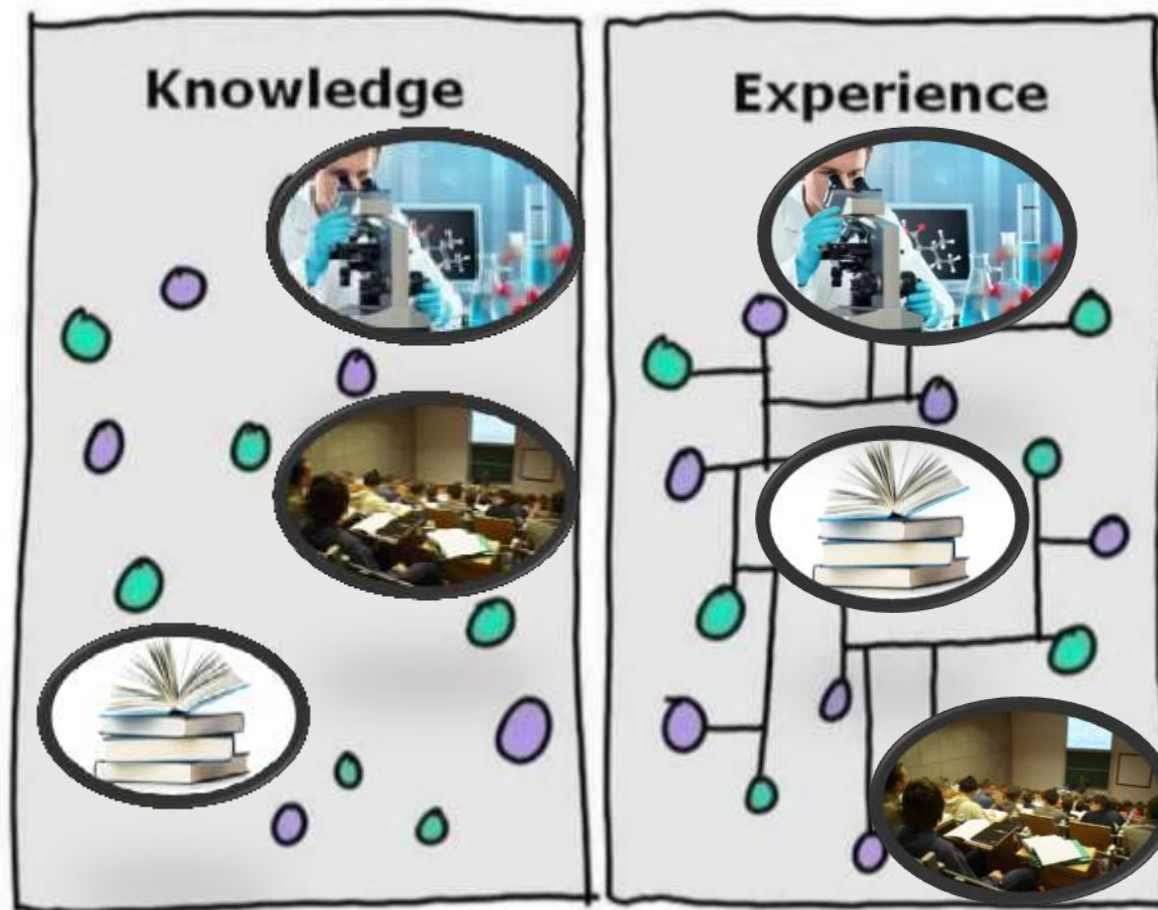
Position the metaphase spindle at 3 o'clock and hold it with holding pipette. Apply piezo pulses to penetrate the zona pellucida. Touch the metaphase plate with the enucleation pipette. Aspirate the spindle and withdraw the pipette.

Real life

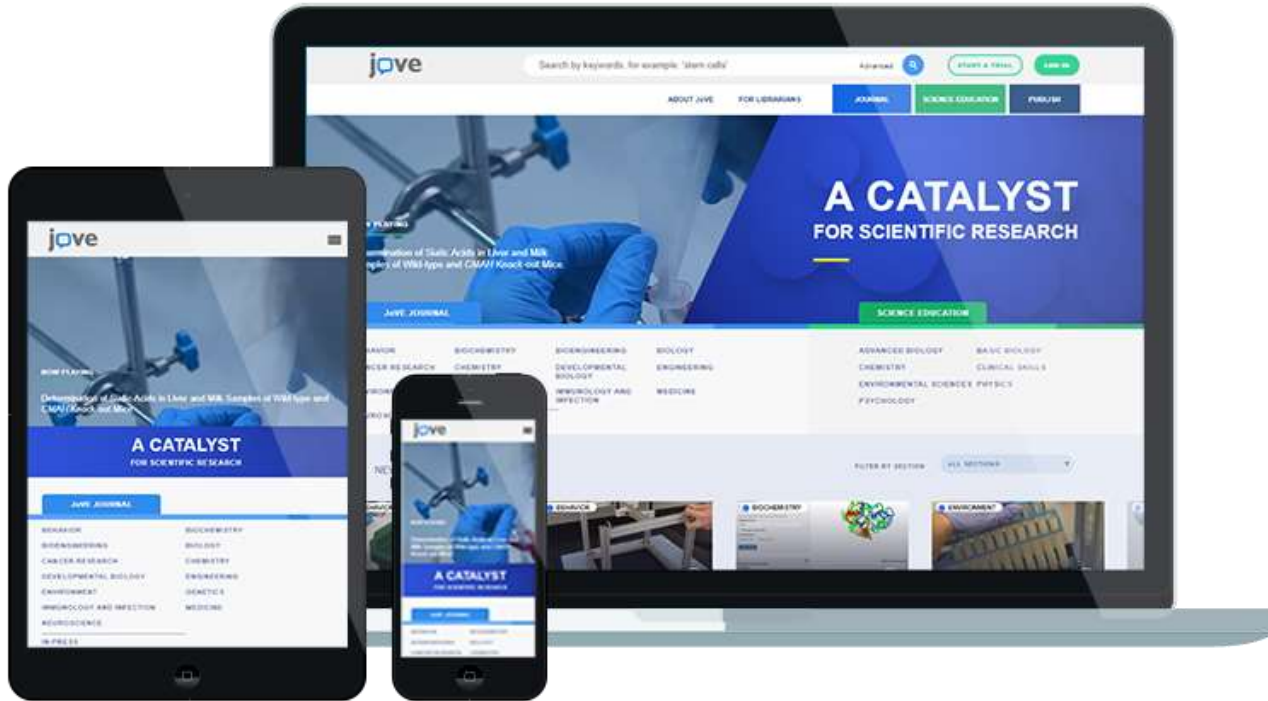


Visualization improves knowledge transfer of how-to (methods)

Knowledge vs Experience



Efficiency



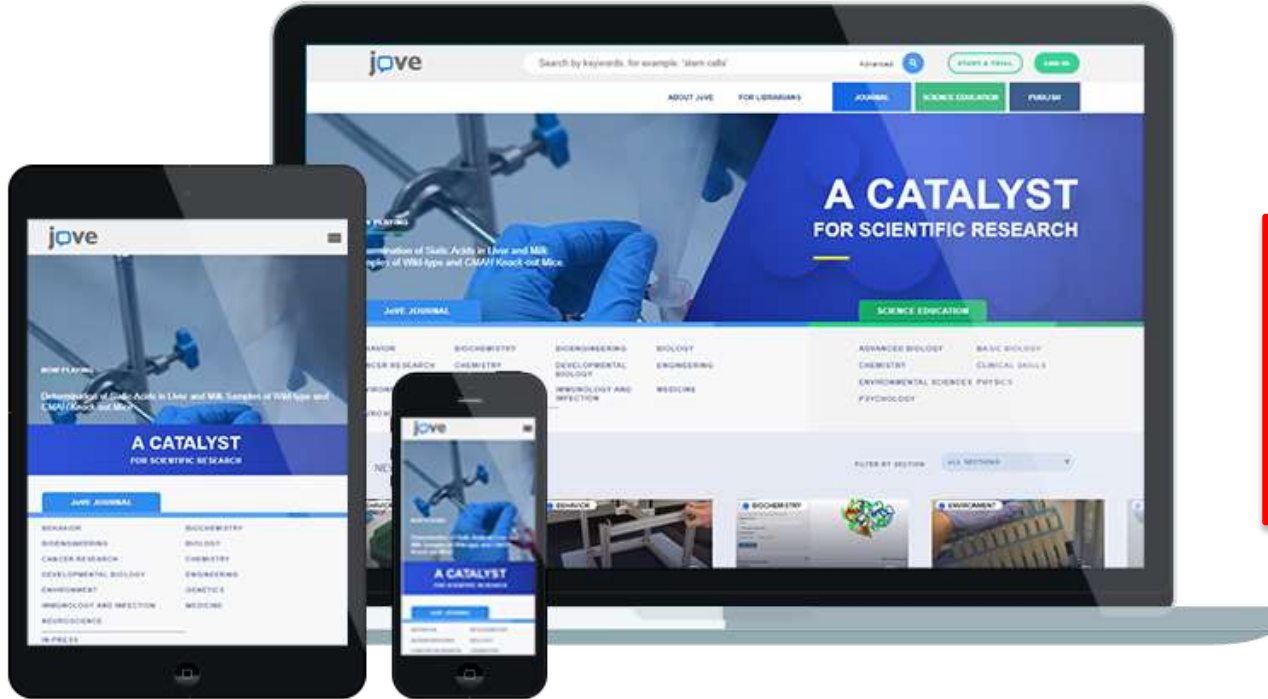
Passive learning is an oxymoron, there is no such thing.
- K. Patricia Cross

*Education is what remains after one has forgotten
what one has learned in school.*
- Albert Einstein

**An implementation of active learning (learning → doing)
builds a continuum of learning for active engagement.**



Efficiency of JoVE



The Learning Pyramid (National Learning Laboratories in Betel, Maine) suggests us the average student retention rates as:

0-10% Lecture,
10-20% Reading
20-30% Audiovisual
30-50% Demonstration
50-75% Discussion
75-90% Teach Others

Here we see that JoVE Journal provides researchers up to **75%** of knowledge retention.

Efficiency of JoVE

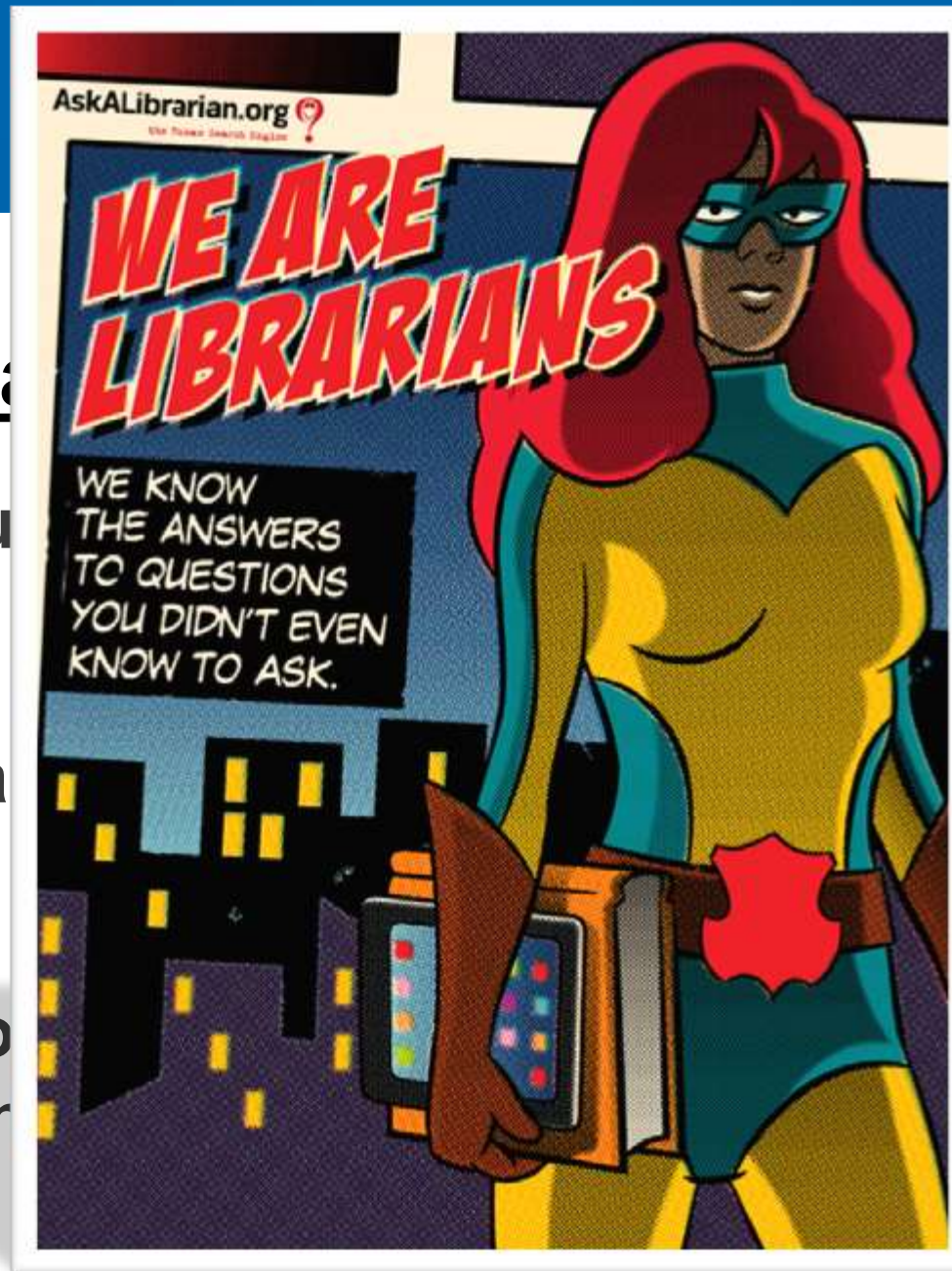


Report which was conducted by an independent, non-profit educational research organization **STEM Education Evaluation Center at TERC, Cambridge, MA** (www.terc.edu) shows that:

- Students who watched a JoVE video before their lab class **scored up to two times better - that's a 100% improvement** - on tests compared to those students who just read the text handout.
- Also, between **65% and 95% of students also felt more confident working in the lab**, felt they understood the lab techniques, and felt they knew the core scientific concepts better because they watched the video.

For Scientists / Librarians

- Increased productivity and reproducibility
- Expanded research dissemination
- Savings for laboratory budgets and scholarship



For Faculty / Students

- Increased speed of learning and classroom management
- Significant growth in student learning outcomes, retention

JoVE ROCKS!

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Recommendations

SAVED MY LAB \$40,000 A YEAR

Visualizing the experimental technique decreases the time it takes to perform with high efficacy. By using JoVE dissection techniques, saving the was also able to learn new techniques from having to hire new personnel (this would have been a ~\$40,000

DR. MARY WALLINGFORD
SENIOR FELLOW
University of Washington

JOVE SAVES TIME FOR BUSY CLINICIANS

Busy clinicians don't have time to read lengthy text material. Video makes our research more accessible for clinical researchers and people that are making decisions about treating patients.

CATHERINE LANG
PROFESSOR AND
ASSOCIATE DIRECTOR OF
MOVEMENT SCIENCE
PROGRAM
Washington
University School of
Medicine

INCREASED SUCCESS RATE FROM 40% TO 90%

...able tries for students to learn catheter placement as now when we teach this JoVE video we have a success rate percent.

cy
gan

Examples

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BIOLOGY (Institute of Science and Technology Austria)

<https://www.jove.com/video/55044/light-sheet-fluorescence-microscopy-plant-roots-growing-on-surface>

BIOENGINEERING (Erasmus MC, Rotterdam)

<https://www.jove.com/video/53603/in-vivo-quantitative-assessment-myocardial-structure-function>

CHEMISTRY (University of Tokyo)

<https://www.jove.com/video/54885/measurement-particle-size-distribution-turbid-solutions-dynamic-light>

MEDICINE (The George Washington University)

<https://www.jove.com/video/4115/nadh-fluorescence-imaging-isolated-biventricular-working-rabbit>

GENETICS (Baylor College of Medicine, University of Perugia)

<https://www.jove.com/video/57278/highly-efficient-gene-disruption-murine-human-hematopoietic>

Science Education is a database of 8 sections with an aim to increase the productivity of education while working with students

BASIC BIOLOGY - Lab Animal Search

<https://www.jove.com/science-education/10198/compound-administration-i>

ADVANCED BIOLOGY - Neuroscience

<https://www.jove.com/science-education/5209/explant-culture-of-neural-tissue>

Thank you!

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