

JOVE

KATALYZÁTOR VĚDECKÉHO VÝZKUMU A VZDĚLÁVÁNÍ



- 1 - Kdo, co, jak a proč... JoVE**
- 2 - Reprodukovatelnost ve vědě**
- 3 - JoVE Research**
- 4 - JoVE Education**
- 5 - JoVE co se nevešlo...**



JoVE je předním světovým producentem vědeckých video zdrojů s posláním zvýšit produktivitu výzkumu

- **JoVE Research** – zaměřeno na výzkum
- **JoVE Education** – zaměřeno na vzdělávání
 - **JoVE Core:** učebnice
 - **JoVE Lab Manual:** laboratorní základy



2006 – Princeton University: Moshe Pritsker byl typickým vědcem, který se snažil reprodukovat zásadní experimenty z tradiční textové literatury

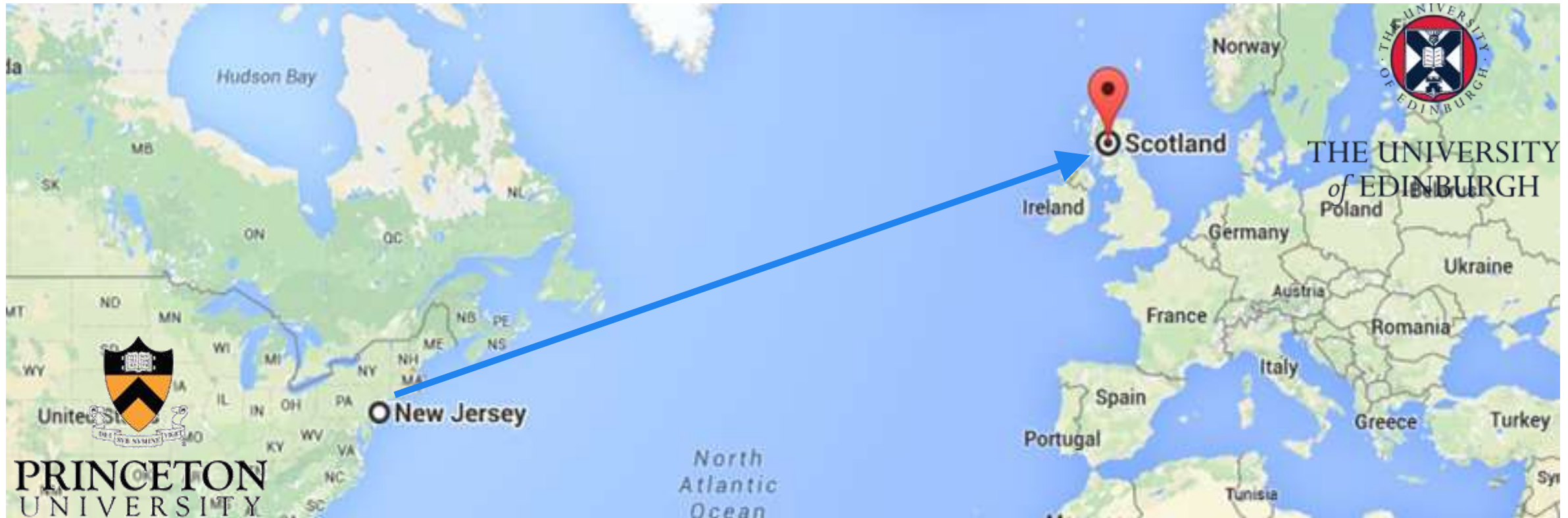


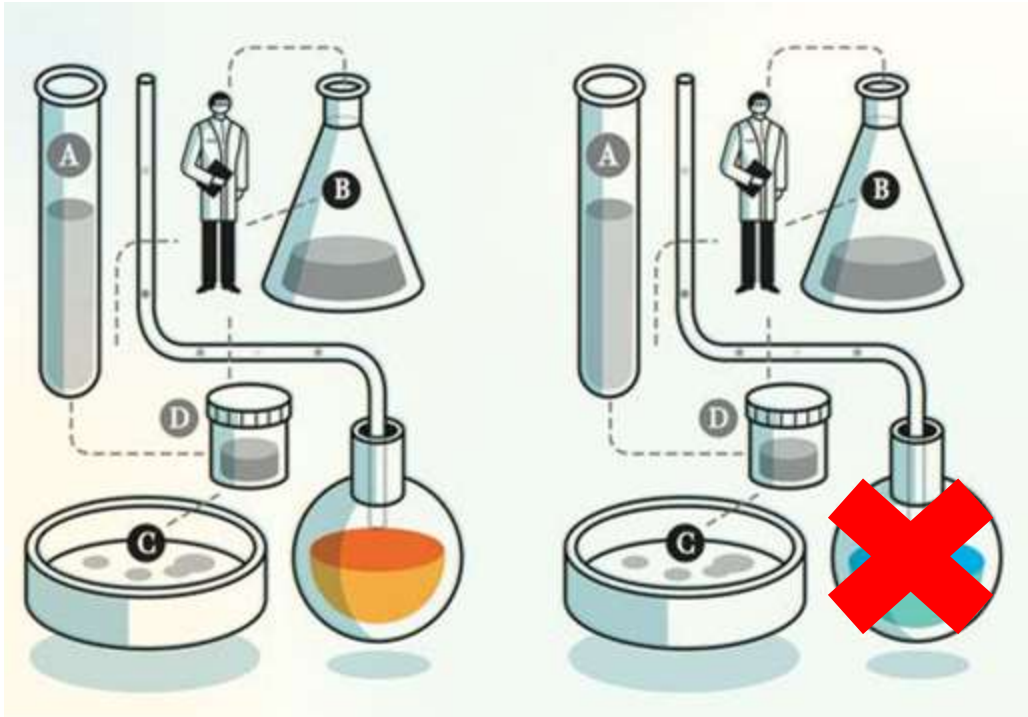
“ES cells were maintained in serum-free culture without feeder cells. ES cells were plated onto gelatin-coated plates in N2B medium and were passaged every 2–4 days. Dissociated cells were harvested in N2B medium, pelleted, resuspended in N2B and replated directly”

Reprodukovatelnost: schopnost opakovat (reprodukovat) publikovaný experiment

Náklady na zopakování experimentu?

- 2 měsíce cestování, vybavení, činidla... \$10,000 za 1 experiment





Pouze **10-40%** publikovaných
vědeckých
článků/experimentů je
reprodukovatelných

(Nature, 2013)

		
Pokus reprodukovat 67 „projektů z oblasti výzkumu rakoviny, ženského zdraví a kardiovaskulární medicíny	Pokus reprodukovat 53 „významných“ článků z oblasti výzkumu rakoviny, publikovaných renomovanými laboratořemi v nejlepších časopisech	Projekt věnovaný replikaci publikovaných odborných článků z oblasti experimentální psychologie
14/67 replikováno (21%)	6/53 replikováno (11%)	33% replikováno

- Tlak na publikační činnost
- Žádná nebo minimální motivace k opakování studií
- Ne-sdílení dat
- Nedostatečná velikost/rozsah vzorků
- Nejasné protokoly (písemné)



(Allison et al., 2016 - Nature)

Jak?



JoVE Research

JoVE Education

Přední světový **vědecký peer-review videočasopis** zaměřený na pomoc vědcům v jejich výzkumu zvýšením **produktivity, efektivity a reprodukovatelnosti**

Inovativní **videodatabáze** věnovaná výuce základů a laboratorních technik prostřednictvím **jednoduché a snadno srozumitelné vizuální formy**

Video Journal

- Peer-reviewed
- Prestižní redakční rada
- Indexován v PubMed a Medline
- Více než 12,000 článků ve 13 sekcích
- Impact Factor: 1.184

High-quality video demonstrations

Detailed text protocols



1. Preparing -LEU Dropout Plates

1. Add 800 mL of sterile, deionized water (H_2O) to a 2 L flask. Add 20.75 g of dropout base (DOR) powder, 0.69 g of CSM-LEU, and 20 g of agar. Mix with a magnetic stir bar. Bring to 1 L with H_2O .
2. Autoclave at 121 °C and 19 psi for 30 min.
3. Remove the flask from the autoclave and allow it to cool to ~65 °C with gentle stirring.
4. Pour 30 mL/plata into 100 mm diameter plates. Let these sit at room temperature for 35-45 h before storing at 4 °C.

2. Integrating GFP-Tub1 for the Constitutive Expression of GFP-labeled Tubulin

1. Boil a stock concentration of 10 ng/mL single-stranded DNA (ssDNA) for 5 min.
2. Combine 2 μL of boiled ssDNA with 400 ng of purified GFP-Tub1 plasmid DNA.

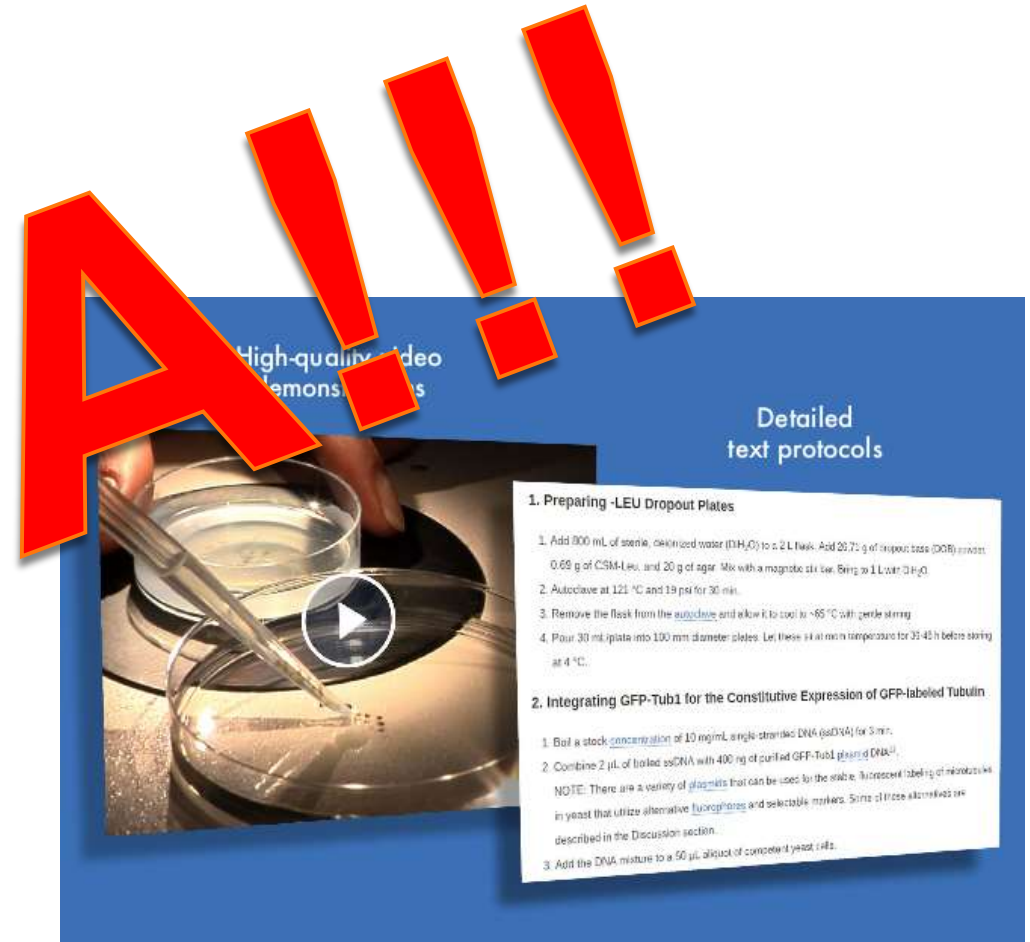
NOTE: There are a variety of plasmids that can be used for the stable, fluorescent labeling of microtubules in yeast that utilize alternative *tub* promoters and selectable markers. Some of these alternatives are described in the Discussion section.

3. Add the DNA mixture to a 50 μL aliquot of competent yeast cells.

Video Journal

- Peer-reviewed
- Prestižní redakční rada
- Indexován v PubMed a Medline
- Více než 12,000 článků ve 13 sekcích
- Impact Factor: 1.1

NUDA



Video Journal

- Klasický plnotextový článek
- Grafika
- Přesné postupy
- Seznamy potřebného materiálu
- Odkazy, reference

High-quality video demonstrations

Detailed text protocols



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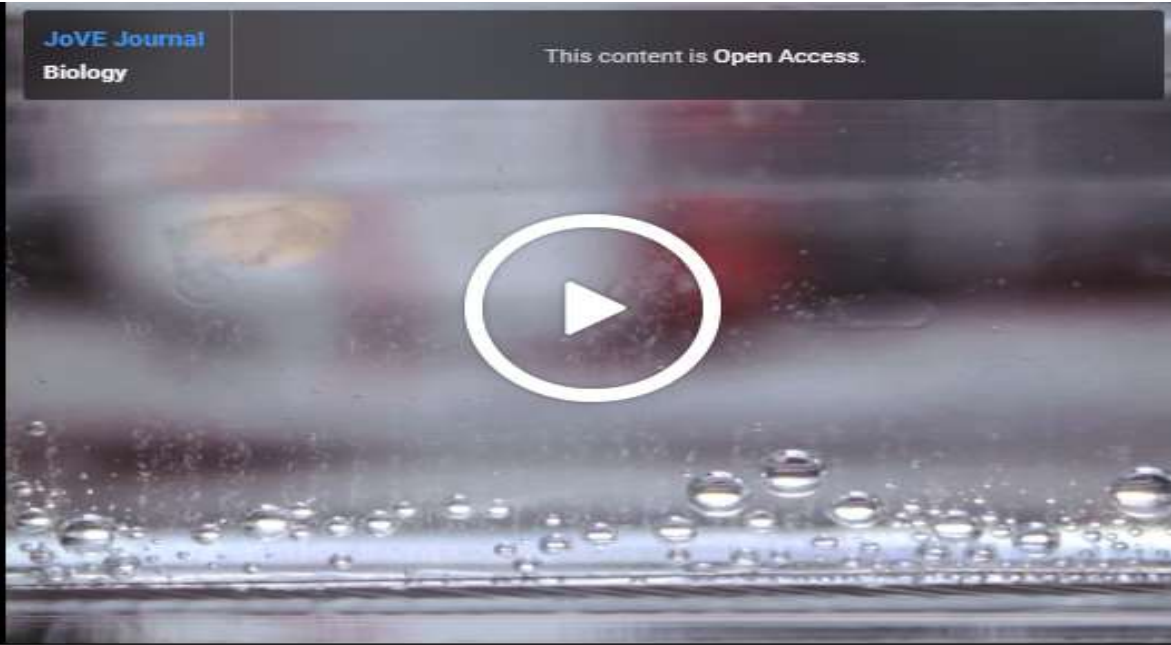
1. Boil a stock concentration of 10 ng/mL single-stranded DNA (ssDNA) for 5 min.
2. Combine 2 μL of boiled ssDNA with 400 ng of purified GFP-Tub1 plasmid DNA.

NOTE: There are a variety of plasmids that can be used for the stable, fluorescent labeling of microtubules in yeast that utilize alternative *hsc70* promoters and selectable markers. Some of these alternatives are described in the Discussion section.

3. Add the DNA mixture to a 50 μL aliquot of competent yeast cells.

- Behaviour
- Biochemistry
- Bioengineering
- Biology
- Cancer Research
- Chemistry
- Developmental Biology
- Engineering
- Environment
- Genetics
- Immunology & Infection
- Medicine
- Neuroscience





Chapters

- 0:05 Title
- 1:31 Preparation of the Gel
- 3:21 Setting up Gel Apparatus and Separating DNA Fragments
- 4:55 Observing Separated DNA Fragments
- 5:43 Results: Agarose Gel Electrophoresis of PCR Products
- 6:23 Conclusion

Agarose Gel Electrophoresis for the Separation of DNA Fragments

doi: [10.3791/3923](https://doi.org/10.3791/3923)

Pei Yun Lee¹, John Costumbrado¹, Chih-Yuan Hsu¹, Yong Hoon Kim¹

¹Department of Molecular, Cell, and Developmental Biology, University of California Los Angeles

Summary [Automatic Translation](#)

April 20th, 2012

A basic protocol for the separation of DNA fragments using agarose gel electrophoresis is described.

ARTICLE

EMBED VIDEO

DOI



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Biology

Agarose Gel Electrophoresis for the Separation of DNA Fragments

doi: [10.3791/3923](https://doi.org/10.3791/3923) Published: April 20, 2012

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Summary

A basic protocol for the separation of DNA fragments using agarose gel electrophoresis is described.

Abstract

Agarose gel electrophoresis is the most effective way of separating DNA fragments of varying sizes ranging from 100 bp to 25 kb¹. Agarose is isolated from the seaweed genera *Gelidium* and *Gracilaria*, and consists of repeated agarobiose (L- and D-galactose) subunits². During gelation, agarose polymers associate non-covalently and form a network of bundles whose pore sizes determine a gel's molecular sieving properties. The use of agarose gel electrophoresis revolutionized the separation of DNA. Prior to the adoption of agarose gels, DNA was primarily separated using sucrose density gradient centrifugation, which only provided an approximation of size. To separate DNA using agarose gel electrophoresis, the DNA is loaded into pre-cast wells in the gel and a current applied. The phosphate backbone of the DNA (and RNA) molecule is negatively charged, therefore when placed in an electric field, DNA fragments will migrate to the positively charged anode. Because DNA has a uniform mass/charge ratio, DNA molecules are separated by size within an agarose gel in a pattern such that the distance traveled is inversely proportional to the log of its molecular weight³. The leading model for DNA movement through an agarose gel is "biased reptation", whereby the leading edge moves forward and pulls the rest of the molecule along⁴. The rate of migration of a DNA molecule through a gel is determined by the following: 1) size of DNA molecule; 2)


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PROTOCOL

1. Preparing BN Gel^{1,2,3}

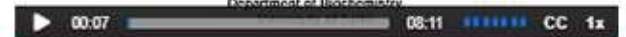
1. Set up the gel caster with 8 cm x 10 cm plates (rectangular glass and notched alumina plate) according to manufacturer's instructions using 0.75 mm spacers.
2. Place a gradient mixer on a stir plate and connect it with the peristaltic pump by a tubing. Attach a syringe needle to the other end of the tubing and place the needle between the glass and aluminum plate. Place magnetic stirrer to the "heavy" (H)-chamber.
3. Prepare the 3.5% (v/v) and 12.5% (v/v) acrylamide (AA) solutions in 15 mL conical centrifuge tubes for the separation gel gradient (see recipes in **Table 1**). To prevent untimely polymerization, keep the centrifuge tubes on ice while preparing the solutions.
CAUTION: Acrylamide is neurotoxic and carcinogenic, wear protective clothes and gloves.
4. Add 5% APS and TEMED right before pipetting the solutions to the gradient mixer. Pipet the 12.5% solution to the H-chamber.
 1. Remove air bubbles from the channel connecting the "light" (L) and H-chamber by opening the valve connecting the two chambers allowing solution to enter to the L-chamber. Close the valve and pipet the traces of solution back to H-chamber.
 2. Finally, pipet the 3.5% solution to the L-chamber.
5. Switch on the magnetic stirrer (the speed of the stir is not critical, but it should ensure proper mixing of the heavy and light solutions), open the valves and switch on the peristaltic pump. Allow the gel solutions to flow between the glass and aluminum plate, the flowrate should be roughly 0.5 mL/min. The needle must be above the liquid all the time, it can be attached to the upper part of the glass plate with a tape.
6. When the H- and L-chambers have emptied, fill them with ultrapure water and allow water to gently overlay the gel surface. The gel polymerization takes around 1-2 hours at RT.
7. Prepare the 3% acrylamide solution (see recipe in **Table 1**) for the stacking gel at RT. Pipet the stacking gel on top of the polymerized separation gel (before casting the stacking gel, remove the water overlaying the gel surface) and place a sample gel comb between the glass and aluminum plate avoiding air bubbles.
 1. Allow to polymerize 30-60 min at RT. Remove the comb gently under ultrapure water. Store the gel at +4 °C.
Pause point. The gel can be stored at +4 °C for a few days. The gel should be kept in moist conditions to avoid drying of the wells and the gel surface.

Analysis of Thylakoid Membrane Protein Complexes by Blue Native Gel Electrophoresis



Marjaana Rantala, Virpi Paakkarinen, and Eva-Mari Aro

Molecular Plant Biology,
Department of Biochemistry



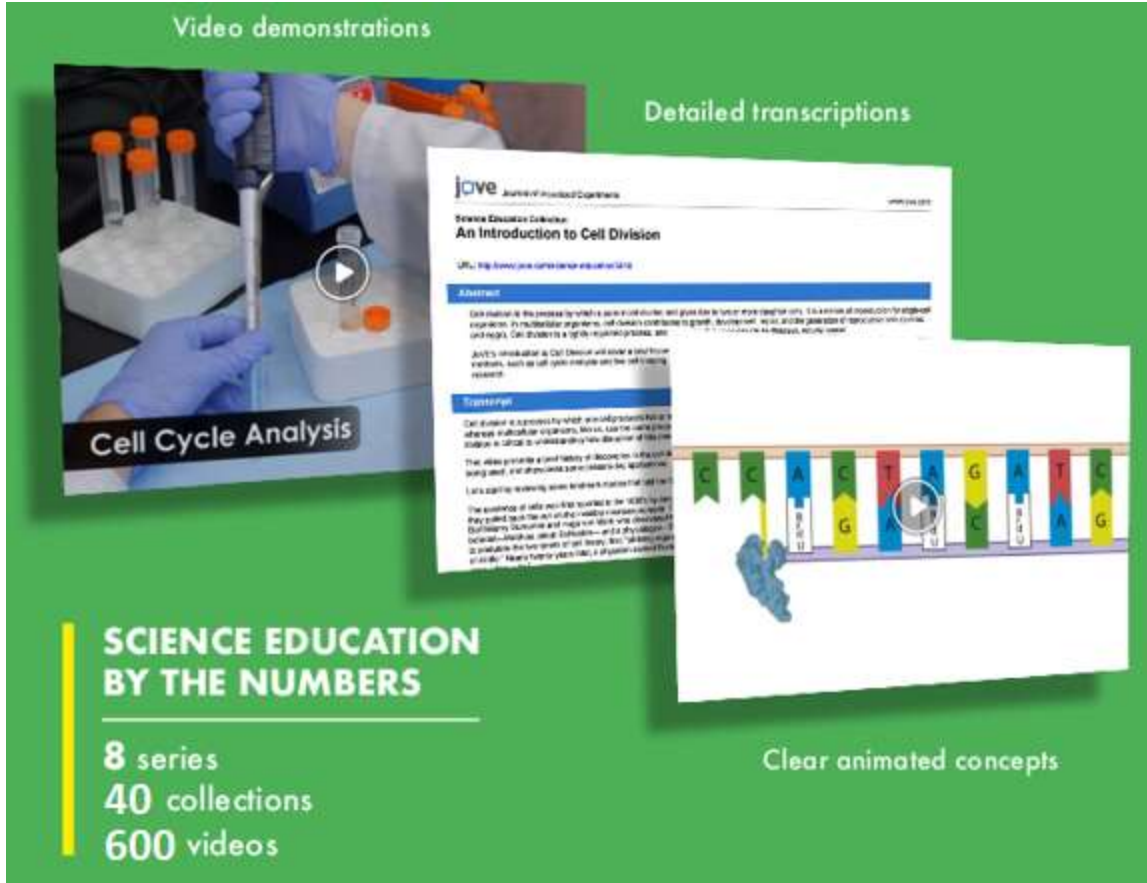
CITE THIS

CHAPTERS

- | | |
|------|--|
| 0:04 | Title |
| 0:35 | Preparing the Blue Native (BN) Gel |
| 3:09 | Thylakoid Solubilization |
| 4:19 | BN-PAGE |
| 5:05 | 2D-SDS-PAGE |
| 6:18 | Results: Protein Complex Pattern and the Composition of Thylakoid Protein Complexes Solubilized with β -DM and Digitonin |
| 7:25 | Conclusion |



SEE RELATED VIDEOS



The banner features a green background with several elements: a video player showing a lab experiment with the title 'Cell Cycle Analysis'; a document titled 'An Introduction to Cell Division' with a play button; a DNA sequence diagram with the text 'Clear animated concepts'; and a statistics box on the left.

Video demonstrations

Detailed transcriptions

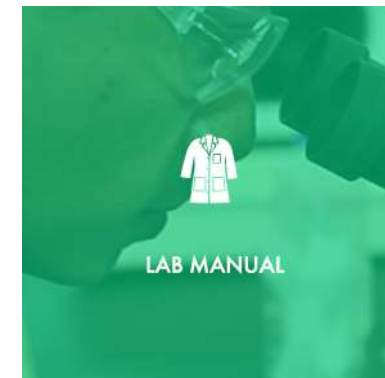
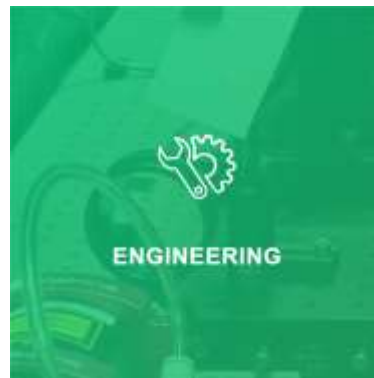
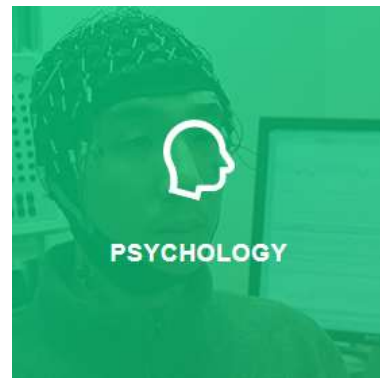
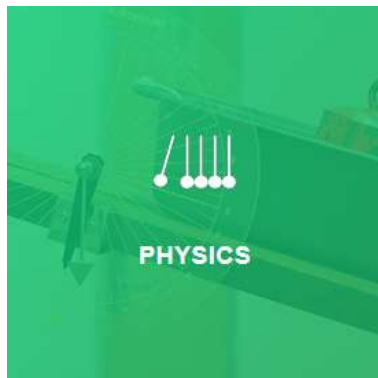
Cell Cycle Analysis

SCIENCE EDUCATION BY THE NUMBERS

- 8 series
- 40 collections
- 600 videos

Clear animated concepts

- Jednoduché, snadno pochopitelné video ukázky výuky laboratorních základů
- 1,000 profesionálně vyrobených záznamů s více než 75 hodinami obsahu
- 15 článků / kolekce
- Záznamy mohou být vkládány přímo do materiálů (embedded video)
- JoVE Quiz Testing Tool – příprava testů / kvízů
- Titulky v 10 jazycích



- 6 kolekcí
- 15 článků / kolekce
- Videa mohou být vkládána přímo do materiálů nebo kdykoliv streamována
- příprava testů / kvízů, sledování výsledků

Access provided via JoVE

All  Research  Education

Browse by subject

- Research +
- Education -
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- Basic Biology
- Advanced Biology
- Chemistry**
- Environmental Sciences
- Physics
- Engineering
- Clinical Skills
- Psychology



General Chemistry

This collection helps provide a solid foundation in general chemistry by showcasing basic lab techniques, demonstrating commonly used equipment, and exploring the theory behind fundamental methodology in Chemistry.



Organic Chemistry

This collection features techniques routinely used in the organic chemistry lab, focusing on regulating temperature and atmosphere during chemical reactions and post-reaction refinement.



Analytical Chemistry

This collection takes a broad look at quantitative analysis and instrumentation including electrochemistry, spectroscopy, chromatography, and mass spectrometry.



Biochemistry

This collection presents commonly used purification



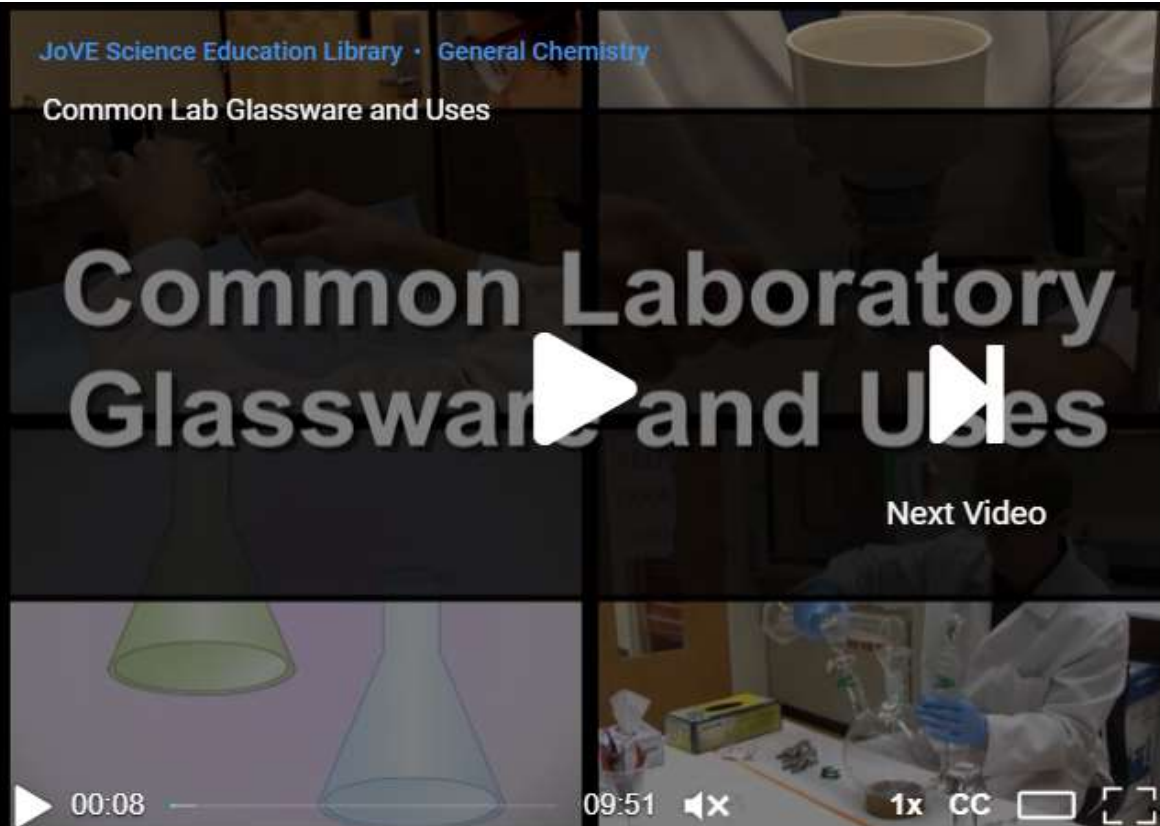
Organic Chemistry II

This collection covers the theory and reactions necessary



Inorganic Chemistry

This collection covers a range of inorganic chemistry



Chapters

Languages

- 0:00 Overview
- 0:52 Principles of Glassware Composition
- 2:03 Qualitative Glassware
- 3:47 Quantitative Glassware
- 5:31 Procedural Glassware
- 6:53 Supporting Equipment
- 8:07 Applications
- 9:27 Summary

Common Lab Glassware and Uses

Transcript

 Automatic Translation ▾

PROTOCOL

EMBED VIDEO



128,684 Views



SCIENCE EDUCATION > CORE

BIOLOGY

Hundreds of foundational concepts are explained through high-impact animations and real-life experimentation.



This content has been unlocked for everyone through December 31st, 2019 11:59:59 PM EST

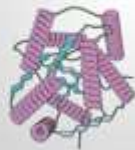
FUNDAMENTALS



Chapter 1: Scientific Inquiry



Chapter 2: Chemistry of Life

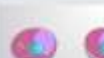


Chapter 3: Macromolecules

CELLULAR PROCESSES

	Chapter 4: Cell Structure and Function		Chapter 5: Membranes and Cellular Transport
	Chapter 6: Cell Signaling		Chapter 7: Metabolism
	Chapter 8: Cellular Respiration		Chapter 9: Photosynthesis
	Chapter 10: Cell Cycle and Division		

GENETICS

	Chapter 11: Meiosis		Chapter 12: Classical and Modern Genetics
	Chapter 13: DNA Structure and Function		Chapter 14: Gene Expression
	Chapter 15: Biotechnology		Chapter 16: Viruses

HUMAN BIOLOGY

	Chapter 17: Nutrition and Digestion		Chapter 18: Nervous System
	Chapter 19: Sensory Systems		Chapter 20: Musculoskeletal System
	Chapter 21: Endocrine System		Chapter 22: Circulatory and Pulmonary Systems
	Chapter 23: Regulation and Excretion		Chapter 24: Immune System
	Chapter 25: Reproduction and Development		

ECOLOGY

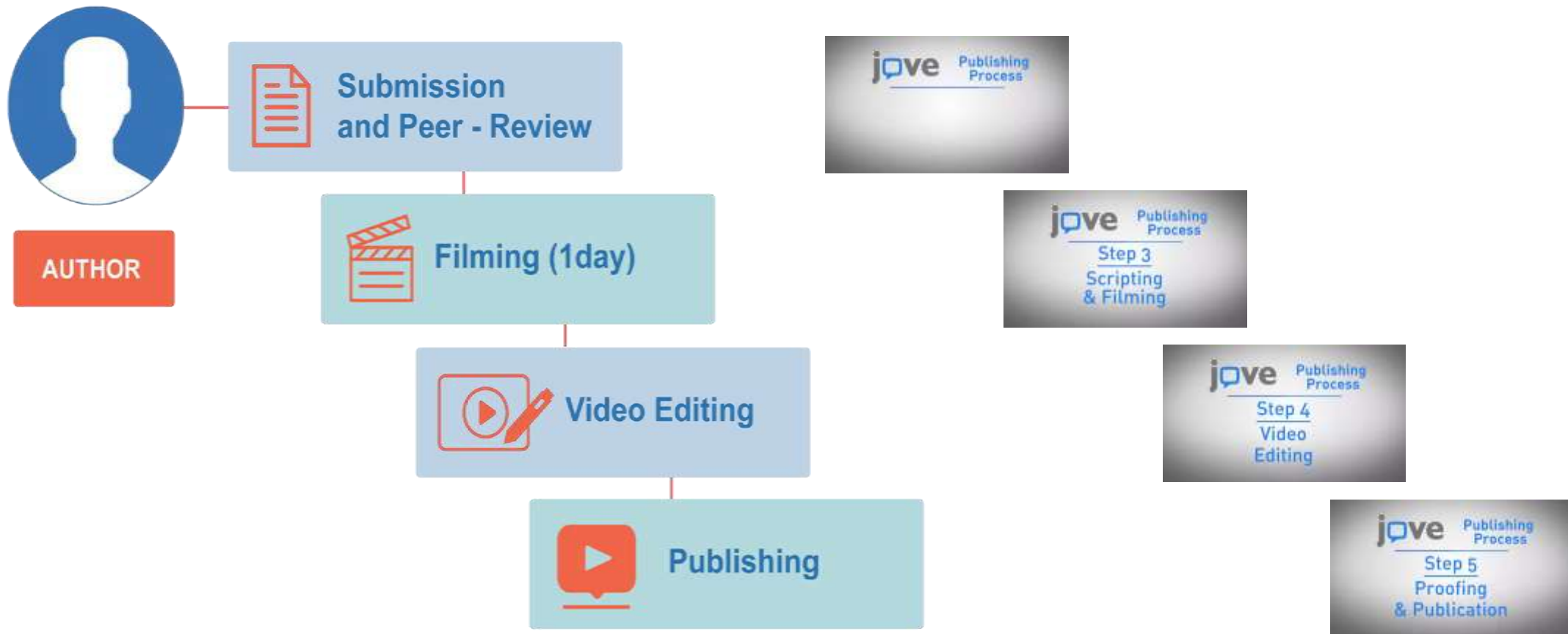
	Chapter 26: Behavior		Chapter 27: Ecosystems
	Chapter 28: Population and Community Ecology		Chapter 29: Conservation and Climate
	Chapter 30: Biological Diversity		

EVOLUTION

	Chapter 31: Speciation and Diversity		Chapter 32: Natural Selection
	Chapter 33: Population Genetics		



Publikování v JoVE



CZECH REPUBLIC

67 ARTICLES FROM 32 INSTITUTIONS

Academy of Science of the Czech Republic
1 published article

Biology Centre CAS
1 published article

Brno University of Technology
4 published articles

Charles University
11 published articles

Charles University and University Hospital Kralovske Vinohrady
1 published article

CLIP - Childhood Leukemia Investigation Prague
1 published article

Czech Academy of Sciences
11 published articles



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Ibrahim Selcuk

ibrahim.selcuk@jove.com

MYJoVE

MANAGE ACCOUNT

JOVE TESTS

FAVORITE ARTICLES

MY PLAYLISTS

SIGN OUT

- Sledování obsahu i mimo kampus (IP adresy)
- Možnost vytvářet „embed codes“ pro sdílení obsahu pro studenty mimo kampus
- Vytváření testů a kvízů
- Seznamy oblíbených/doporučených záznamů
- Možnost komunikovat přímo s autory

- Studenti mohou sledovat videa i když jsou mimo kampus a nemají vlastní JoVE účet
- Můžete je snadno nasměrovat na konkrétní článek
- Je pro ně snadné se k článku vrátit, když je součástí materiálů
- Zajímavá forma obsahu

- Předpřipravené otázky ke každému videu
- Rozhodněte se, zda použít nebo nepoužít jakoukoli otázku
- Vytvářejte své vlastní
- Otázky je možné doplnit vizuálním obsahem
- Rozesílání testů

1. Which of the following is Newton's second law of motion?

☐ A) An object at rest stays at rest, unless acted upon by a force.

☐ B) The forces of two objects acting upon each other are equal in magnitude but opposite in direction.

☐ C) An object in motion stays in motion, unless acted upon by a force.

☒ D) The acceleration of an object is proportional to the force applied to it, or $F=ma$.

No file chosen

6. Please enter your question here

☒ A) Please enter answer A

☐ B) Please enter answer B

☐ C) Please enter answer C

☐ D) Please enter answer D

No file chosen

Send Your Test ⓘ

Introduction to the Centrifuge on An Introduction to the Centrifuge

Update Class List

Pawel.Kania@jove.com,Roman.Lyashenko@jove.com,Marita.Eleftheriadou@jove.com,Christophe.Deschamps@jove.com,Rubin.Zajsi@jove.com

Enter one email address per line or add all emails as a comma separated string.

Update List

Class List

- ☐ Pawel.Kania@jove.com
- ☐ Roman.Lyashenko@jove.com
- ☐ Marita.Eleftheriadou@jove.com
- ☐ Christophe.Deschamps@jove.com
- ☐ Rubin.Zajsi@jove.com

Clear List

Personal Message

Add a personalized message to your students

Add a personalized message to your students.

Set a Deadline

Set a Deadline

Practice Test - Hemacytometer

Below is a list of all students that were sent invitations about this test, as well as information about their scores, if they have taken the test:

Revision #1: Invitation Date 09/26/2019

Email	Test Taken			Q1	Q2	Q3	Q4	Q5	Q6
rebecca.ellerington@jove.c	6/6	100 %	09/26/2019 at 11:44AM						
liz.davey@jove.com	2/6	33 %	09/26/2019 at 11:42AM						
lisa.richard@jove.com	5/6	83 %	09/26/2019 at 11:49AM						
marcus.pedersen@jove.co	2/6	33 %	09/26/2019 at 11:44AM						
mohamed.farah@jove.com	3/6	50 %	09/26/2019 at 11:47AM						
maaike.pols@jove.com	10/31/2019			Test Not Taken - Resend Test					
	Current Deadline								

Studie provedená TERC, Cambridge MA; STEM Education Evaluation Centre



DESALES UNIVERSITY

DeSales University, Pennsylvania

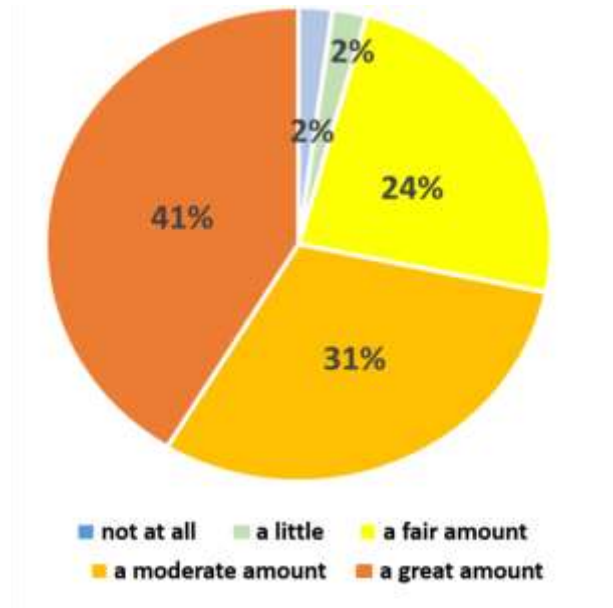
- 94 studentů molekulární biologie
- **Group 1:** 2x sledovali záznam a přečetli si sylabus
- **Group 2:** pouze si přečetli sylabus



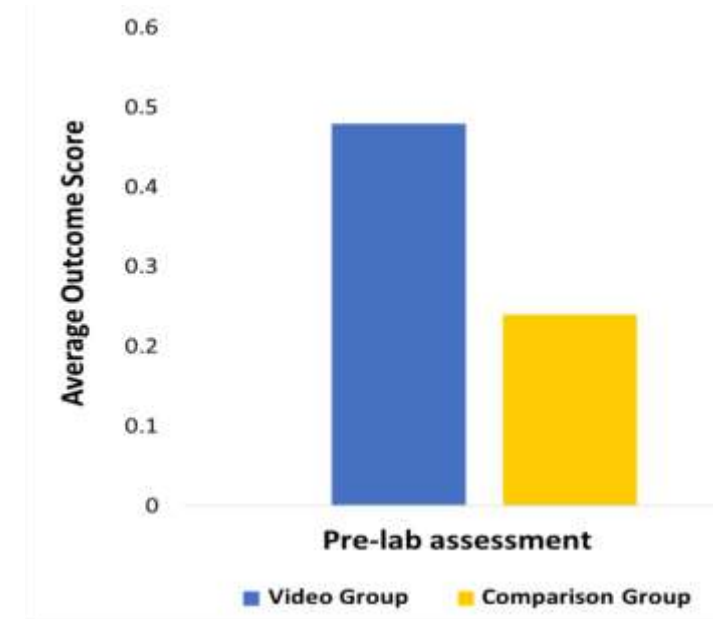
Clemson University, South Carolina

- 252 studentů biologie
- **Group 1:** 2x sledovali záznam a přečetli si sylabus
- **Group 2:** pouze si přečetli sylabus

JoVE Videos improve STEM student performance:



- 89% studentů se cítilo jistěji
- 92% studentů lépe pochopilo experiment
- 96% studentů shledalo JoVE užitečným při vysvětlování základní vědecké koncepce



- Studenti před experimentem dosáhli o 100% vyššího skóre ve srovnání s kontrolní skupinou
- Studenti po experimentu dosáhli o 76% vyššího skóre

Novinky

- Core Chemistry (video textbook)
- Lab Manual Chemistry

„brzy (částečně již) na Vašich obrazovkách“

- Core Psychology (Social) – 9 kapitol v březnu / komplet prosinec 2020
- Core Molecular and Cellular Biology – první polovina od září / komplet prosinec 2020



Shrnutí: JoVE není jen video!!!

jakub.petrik@aip.cz



Děkuji za pozornost
jove

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lucia.polednikova@aib.sk