

## JoVE videos

The Journal of Visualized Experiments (JoVE) offers a wide variety of explanatory videos within various biomedical research fields. Visit <https://www.jove.com/> for the full library. Note: The UU/UMCU holds a license for JoVE. You might need to login with your institutional credentials in order to view the full video.

Apart from the videos on their website, JoVE also offers video 'cartridges' that can be embedded within your Blackboard course. The cartridges available for us as UU/UMCU are listed below. If you would like to embed one or more of these cartridges into your Blackboard course, please contact Janine Geerling ([j.j.geerling@umcutrecht.nl](mailto:j.j.geerling@umcutrecht.nl)).

Overview UU video cartridges:

### 1. General Laboratory Techniques

- a. An introduction to the centrifuge
- b. Introduction to the microplate reader
- c. Understanding concentration and measuring volumes
- d. Making solutions in the laboratory
- e. An introduction to the micropipettor
- f. Introduction to serological pipettes and pipettors
- g. Introduction to the Bunsen burner
- h. An introduction to working in the hood
- i. Measuring mass in the laboratory
- j. Introduction to the spectrophotometer
- k. Histological sample preparation for light microscopy
- l. Introduction to fluorescence microscopy
- m. Introduction to light microscopy
- n. Regulating temperature in the lab: preserving samples using cold
- o. Regulating temperature in the lab: applying heat

### 2. Basic Methods in Cellular and Molecular Biology

- a. Using a hemacytometer to count cells
- b. Passaging cells
- c. PCR: the polymerase chain reaction
- d. DNA gel electrophoresis
- e. Separating protein with SDS-PAGE
- f. Bacterial transformation: the heat shock method
- g. Bacterial transformation: electroporation
- h. The ELISA method
- i. Plasmid purification
- j. Gel purification
- k. The Western blot
- l. An introduction to transfection
- m. DNA ligation reactions
- n. Restriction enzyme digests
- o. Molecular cloning

### 3. Lab Safety

- a. Proper personal protective equipment
- b. Emergency eyewash and shower stations
- c. Electrical safety
- d. Working with centrifuges
- e. Working with hot and cold sources
- f. Guidelines in case of a laboratory emergency
- g. Chemical storage: categories, hazards and compatibilities
- h. Safe handling of mineral acids
- i. Handling chemical spills
- j. Proper use of autoclaves
- k. Fume hoods and laminar flow cabinets
- l. Handling air- and water-sensitive chemicals using a Schlenk line
- m. Proper operation of vacuum based equipment
- n. Operating the glovebox
- o. Operation of high-pressure reactor vessels
- p. Decontamination for laboratory biosafety
- q. Proper waste disposal

### 4. Cell biology

- a. An introduction to cell division
- b. Cell cycle analysis
- c. Live cell imaging of mitosis
- d. An introduction to cell motility and migration
- e. The transwell migration assay
- f. Invasion assay using 3D matrices
- g. An introduction to endocytosis and exocytosis
- h. Cell-surface biotinylation assay
- i. FM dyes in vesicle recycling
- j. An introduction to cell metabolism
- k. The ATP bioluminescence assay
- l. Detecting reactive oxygen species
- m. An introduction to cell death
- n. The TUNEL assay
- o. Annexin V and propidium iodid labeling

### 5. Genetics

- a. An overview of genetic analysis
- b. Genetic crosses
- c. Genetic screens
- d. An overview of genetics and disease
- e. SNP genotyping
- f. Cytogenetics
- g. An overview of gene expression
- h. Expression profiling with microarrays
- i. RNA-seq
- j. An overview of epigenetics
- k. DNA methylation analysis
- l. Chromatin immunoprecipitation
- m. An overview of genetic engineering
- n. Recombineering and gene targeting
- o. Genome editing

6. Biology I: Yeast, drosophila and C. elegans
  - a. An introduction to *Caenorhabditis elegans*
  - b. Yeast maintenance
  - c. Drosophila maintenance
  - d. *C. elegans* maintenance
  - e. Yeast reproduction
  - f. Drosophila development and reproduction
  - g. *C. elegans* development and reproduction
  - h. Isolating nucleic acids from yeast
  - i. Drosophila larval IHC
  - j. RNAi in *C. elegans*
  - k. Yeast transformation and cloning
  - l. *Drosophila melanogaster* embryo and larva harvesting and preparation
  - m. *C. elegans* chemotaxis assay
  
7. Biology II: Mouse, zebrafish and chick
  - a. An introduction to the laboratory mouse: *mus musculus*
  - b. An introduction to the chick: *gallus gallus domesticus*
  - c. An introduction to the zebrafish: *danio rerio*
  - d. Basic mouse care and maintenance
  - e. Basic chick care and maintenance
  - f. Zebrafish maintenance and husbandry
  - g. Development and reproduction of the laboratory mouse
  - h. Development of the chick
  - i. Zebrafish reproduction and development
  - j. Mouse genotyping
  - k. *In ovo* electroporation of chicken embryos
  - l. Zebrafish breeding and embryo handling
  - m. Introducing experimental agents into the mouse
  - n. Chick *ex ovo* culture
  - o. Zebrafish microinjection techniques
  
8. Developmental biology
  - a. An introduction to developmental genetics
  - b. Gene silencing with morpholinos
  - c. Genetic engineering of model organisms
  - d. An introduction to molecular developmental biology
  - e. Whole-mount *in situ* hybridization
  - f. An introduction to stem cell biology
  - g. Embryonic stem cell culture and differentiation
  - h. Induced pluripotency
  - i. An introduction to organogenesis
  - j. Fate mapping
  - k. Transplantation studies
  - l. An introduction to aging and regeneration
  - m. Invertebrate lifespan quantification
  - n. Tissue regeneration with somatic stem cells

## 9. Immunology

- a. Flow cytometry and fluorescence-activated cell sorting (FACS) isolation of splenic B lymphocytes
- b. Magnetic activated cell sorting (MACS): isolation of thymic T lymphocytes
- c. ELISA assays: indirect, sandwich and competitive
- d. ELISPOT assay: detection of IFN- $\gamma$  secreting splenocytes
- e. Immunohistochemistry and immunocytochemistry: tissue imaging via light microscopy
- f. Antibody generation: producing monoclonal antibodies using hybridomas
- g. Immunofluorescence microscopy: immunofluorescence staining of paraffin-embedded tissue sections
- h. Confocal fluorescence microscopy: a technique to determine the localization of proteins in mouse fibroblasts
- i. Immunoprecipitation-based techniques: purification of endogenous proteins using agarose beads
- j. Cell cycle analysis: assessing CD4 and CD8 T cell proliferation after stimulation using CFSE staining and flow cytometry
- k. Adoptive cell transfer: introducing donor mouse splenocytes to a host mouse and assessing success via FACS
- l. Assay for cell death: chromium release assay of cytotoxic ability

## 10. Laboratory animal research

- a. Rodent handling and restraint techniques
- b. Basic care procedures
- c. Fundamentals of breeding and weaning
- d. Rodent identification I
- e. Rodent identification II
- f. Compound administration I
- g. Compound administration II
- h. Compound administration III
- i. Compound administration IV
- j. Blood withdrawal I
- k. Blood withdrawal II
- l. Anesthesia induction and maintenance
- m. Considerations for rodent surgery
- n. Diagnostic necropsy and tissue harvest
- o. Sterile tissue harvest

## 11. Microbiology

- a. Creating a Winogradsky column: a method to enrich the microbial species in a sediment sample
- b. Serial dilutions and plating: microbial enumeration
- c. Enrichment cultures: culturing aerobic and anaerobic microbes on selective and differential medias
- d. Pure cultures and streak plating: isolation of single bacterial colonies from a mixed sample
- e. 16s rRNA sequencing: a PCR-based technique to identify bacterial species
- f. Growth curves: generating growth curves using colony forming units and optical density measurements
- g. Antibiotic susceptibility testing: epsilometer tests to determine MIC values of two antibiotics and evaluate antibiotic synergy
- h. Microscopy and staining: Gram, capsule and endospore staining
- i. Plaque assay: a method to determine viral titer as plaque forming units (PFU)
- j. Transformation of *E.coli* cells using an adapted calcium chloride procedure
- k. Conjugation: a method to transfer ampicillin resistance from donor to recipient *E.coli*
- l. Phage transduction: a method to transfer ampicillin resistance from donor to recipient *E.coli*

## 12. Neuroscience

- a. An introduction to neurophysiology
- b. Patch clamp electrophysiology
- c. Calcium imaging in neurons
- d. An introduction to neuroanatomy
- e. Rodent stereotaxic surgery
- f. Histological staining of neural tissue
- g. An introduction to behavioral neuroscience
- h. The Morris water maze
- i. fMRI: functional magnetic resonance imaging
- j. An introduction to cellular and molecular neuroscience
- k. Primary neuronal cultures
- l. Neuronal transfection methods
- m. An introduction to developmental neurobiology
- n. Murine *in utero* electroporation
- o. Explant culture of neural tissue