CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

MEMORANDUM

Received November 17, 2026
Original signed copy on file

Date: November 17, 2026

To: Melissa Miller-Henson Executive Director
Fish and Game Commission

From: Meghan Hertel, Director

Subject: **Agenda Item for the December 15-16, 2026 Meeting: Receipt of Restricted Species Permit Amendment Request from U.C. Davis to Possess Transgenic Axolotls**

The University of California, Davis (UCD) has submitted an Amendment Request to the California Department of Fish and Wildlife (Department) to add transgenic axolotl (*Ambystoma mexicanum*) to its Restricted Species Permit (Permit No. RD-00537) for use in biomedical research. According to Title 14, Section 671.1(a)(8)(H), all approved applications to possess transgenic aquatic animals shall be reviewed by the California Fish and Game Commission (Commission) at a regularly scheduled meeting. The Commission may deny the issuance of a permit if it determines that the applicant is unable to meet the regulatory requirements for the importation, transportation, possession, and confinement of transgenic aquatic animals.

Axolotls are a type of salamander that have been used for research for more than 200 years. Axolotls are particularly well-suited for biomedical research because of their remarkable ability to regrow lost limbs, whole organs, and parts of their central nervous system https://www.orip.nih.gov/about-orip/research-highlights/amazing-axolotl-valuable-model-regenerative-medicine. UCD has agreed to comply with containment and security conditions as specified in Title 14 of the California Code of Regulations. Fisheries Branch has coordinated with the regional staff responsible for this area and the Fish Health Lab. The Department recommends approving UCD's Amendment Request to possess transgenic Axolotls.

If you have any questions or need additional information on this matter, please contact Jay Rowan, Chief, Fisheries Branch at (916) 212-3164.

Attachment

ec: Chad Dibble, Deputy Director
Wildlife and Fisheries Division

Jay Rowan, Branch Chief
Fisheries Branch
Wildlife and Fisheries Division

Kevin Kwak, DMV, Ph.D.
Veterinarian Specialist
Fisheries Branch

Christine Richey, DVM
Veterinarian Specialist
Fisheries Branch

Colin Purdy, Env. Program Manager
North Central Region (Region 2)

Nick Bauer, Anadromous Fisheries Supervisor
North Central Region (Region 2)

David Thessel, Deputy Executive Director
Fish and Game Commission

Ari Cornman, Wildlife Advisor
Fish and Game Commission

State of California – Department of Fish and Wildlife

2026 RESTRICTED SPECIES PERMIT AMENDMENT REQUEST

DFW 1313b (REV. 10/28/25) Page 1 of 2

IMPORTANT! YOU MAY NOT OBTAIN ANIMALS PRIOR TO AMENDMENT APPROVAL

Fees include a nonrefundable three percent (3%) application fee, not to exceed $7.50 per item. *(Section 700.4, Title 14, California Code of Regulations CCR).*

FEE: $80.60 *(Nonrefundable application fee must accompany this amendment request.)*

SEE INSTRUCTIONS ON PAGE 2. TYPE OR PRINT CLEARLY.

FIRST NAME	M.I.	LAST NAME	PERMIT NUMBER
Shay		Cook	RD-00537

BUSINESS NAME	DAY TELEPHONE
U.C. Davis	

LOCATION OF ANIMAL(S) HOUSING: Note: Animals being held at multiple locations require inspection certification by the Department that each of those facilities meet the minimum applicable housing requirements as set forth in subsection 671.1(a)(8)(A-F), Sections 671.3-671.4 and/or 671.7(b), Title 14, of the CCR.

ADDRESS	CITY	STATE	ZIP CODE	COUNTY
1089 Veterinary Medicine Drive	Davis	CA	95616	Yolo
ADDRESS	CITY	STATE	ZIP CODE	COUNTY

List all restricted animals **TO BE ACQUIRED** in the following order: mammals, birds, fish, or reptiles. Group animals by order, family, and species. Use the following letters to denote sex: M=Male, F=Female, and U=Neutered or Unknown. Mark an "X" in the **TO BE ACQUIRED** column for animals to be acquired within the next year. **Unique Identifiers:** Use the following letters to denote unique identifying methods (See Section 671.1(c)(3)(J), Title 14, of the CCR): M=Microchip, T=Tattoo, and A=Alternative Method. Aquaculture and fish permittees: Identify the actual number in the ID number field and identify either W=Weight, V=Volume or C=Count in the method field. Remember to complete the Importation Only Section below for animals being imported into California. For California Residents Only: **All native species obtained from a licensed California Wildlife Rehabilitation Facility require a Native Species Exhibiting Permit.** Contact the License and Revenue Branch at (916) 928-5846 or SPU@wildlife.ca.gov if you need additional information.

COMMON NAME	SCIENTIFIC NAME	ID NUMBER	METHOD	SEX	AGE
Axolotl (SOX10 CRISPR	Ambystoma mexicanum	Multiple	A	Unkno	Juven
Axolotl (TUBB3-GFP repor	Ambystoma mexicanum	Multiple	A	Unkno	Juven

WILL ANIMALS BE IMPORTED INTO CALIFORNIA? ☑ YES, COMPLETE IMPORTATION SECTION ☐ NO, EXPLAIN:

Animals will be imported from Lexington, Kentucky from the Ambystoma Genetic Resource Center (https://ambystoma.uky.edu/genetic-stock-center/).

IMPORT ONLY: COMPLETE THIS SECTION IF YOU ARE IMPORTING ANIMALS INTO CALIFORNIA

LIST SPECIES TO BE IMPORTED	NUMBER OF ANIMALS	ORIGIN *(State or Country)*
Ambystoma mexicanum	50	Kentucky

PERSON/BUSINESS SHIPPING ANIMALS	DAY TELEPHONE
Ambystoma Genetic Stock Center	859-323-5679

ADDRESS	CITY	STATE	ZIP CODE
Biomedical Biological Sciences Research Building, 741 S. Lim	Lexington	KY	40536

NAME OF CARRIER	POINT OF ENTRY INTO CALIFORNIA
UPS	Shipped overnight via overnight air/unknown

I certify under penalty of perjury under the laws and regulations of the State of California that all information on this application is true and correct and I am not violating any city or county laws. I agree to comply with the provisions of Section 671, Title 14, of the CCR. I understand it is unlawful to use or possess a permit which was obtained by fraud or deceit (Fish and Game Code Section 1052b). I understand that in the event that this information is found to be untrue or incorrect, the permit will be considered invalid and must be surrendered where purchased and I will be subject to criminal prosecution. I further understand that failure to comply with the terms and conditions of a permit may result in revocation of current permit and/or denial of future permits. Violation of this section is a misdemeanor, punishable by fine of not more than $1,000.00, imprisonment in the county jail for not more than six months, or both the fine and the imprisonment. In addition, I may be subject to civil penalties as stated in Fish and Game Code Section 2125.

APPLICANT'S SIGNATURE *(Must be in ink)*	DATE
X 094bd86a-7a55-48d6-a2e4-8b3087d9e6c1 Digitally signed by 094bd86a-7a55-48d6-a2e4-8b3087d9e6c1 Date: 2026.08.13 10:08:52 -07'00'	

FOR DEPARTMENT OF FISH AND WILDLIFE USE ONLY

REVIEWED BY/DATE	TRANSACTION#	ISSUED BY/DATE

INSTRUCTIONS FOR COMPLETING THE RESTRICTED SPECIES PERMIT AMENDMENT REQUEST

Use this form to: 1) add species you are not currently authorized to possess; 2) increase the number of animals where there are condition limitations; or 3) add/change facility locations.

Please allow 45 business days for processing your request. Amendments for transgenic species must go before the Fish and Game Commission, so you must allow an additional 30 business days. Incomplete requests will be returned and could delay the issuance of your amendment. Contact the Department of Fish and Wildlife (Department), License and Revenue Branch at (916) 928-5846 or SPU@wildlife.ca.gov if you need additional information regarding Restricted Species Permits.

To complete this application, you must:

1. It is mandatory to complete all items unless exempted.
2. Sign and date the amendment request in ink (an **original** signature is required).
3. Provide a list of animals to be acquired.
4. Provide a statement of purpose describing in detail the planned use for each animal. Applicants shall include relevant materials, as appropriate, including any lists of prospective clients with their contact information or contracts with clients or websites, scripts, brochures or flyers promoting or describing the planned use of the animals. If the animals will be used in an educational program, the applicant shall provide an explanation why live restricted species are necessary and samples of the educational material and message that will be distributed (not required for animal care, AZA, breeding, research and single event breeding permittees).
5. Provide a resume that provides dates and details documenting you or your full-time employee's qualifying experience caring for restricted animals at a facility engaged in a similar or directly related activity to the permit requested and for the animal(s) to be acquired. This experience shall have been acquired within the previous five years and include a total of at least one year full-time, hands-on experience caring for a species in the same family or closely related taxonomic family as the species requested (required for breeding, exhibiting, nuisance bird abatement, shelter and single event breeding permittees only).
6. Provide a letter of recommendation, written within the previous five years on **letterhead stationery, with an original signature**, from the facility where you or your full-time employee gained the experience. Document the quality and extent of the knowledge and experience, as related to the species and permit requested (required for breeding, exhibiting, nuisance bird abatement, shelter and single event breeding permittees only).
7. Provide an updated copy of your Emergency Action Plan that includes the new species.
8. Provide an updated Breeding Plan that includes the new species (required for breeding and single event breeding permittees only).
9. Provide photograph(s) of the enclosure(s) for animal(s) to be acquired that includes all required elements of the minimum standards as specified in Section 671.3.
10. Provide any other supporting documentation required by regulations.
11. Mail the completed application and supporting documentation with a cashier's check, money order, personal or business check*, or credit card** authorization form with the appropriate fee to the Department of Fish and Wildlife, License and Revenue Branch, PO Box 944209, Sacramento, CA 94244-2090 or apply in person. **DO NOT SEND CASH**.

IMPORTANT INFORMATION FROM THE DEPARTMENT OF PUBLIC HEALTH

The Department of Public Health (CDPH) has regulatory authority over the importation of specified carnivores (including skunks and raccoons), nonhuman primates and bats, due to potential health hazards.

Section 2606.8, Title 17, of the CCR, prohibits the importation of skunks because the hazard to the public from exposure to rabies is extremely high. The CDPH is concerned that certain wild animals could carry rabies and introduce new strains of rabies into the state of California. Therefore, the Department routinely denies requests for the importation and possession of skunks and raccoons. Exceptions may rarely be made for zoological or research institutions demonstrating an extraordinary need. The importation of other specified carnivores, bats or nonhuman primates may be allowed under a CDPH permit in certain circumstances. **For more information on CDPH permits, please contact them at (916) 552-9740.**

NOTICE

Disclosure Statement—Under Section 671.1, Title 14, of the CCR, the Department of Fish and Wildlife is authorized to collect information from applicants to maintain a record of licensure. All information requested on this application is mandatory unless otherwise indicated. All information except the street address and telephone number of the applicant may be provided to the public, if requested. All information related to a business may be released, including the residence address if it is the same as the business address. Other personal information submitted on this application may be released for law enforcement purposes, pursuant to court order, or for official natural resources management purposes.

A licensee may obtain a copy of his/her license records maintained by the Department by submitting a written request to the Custodian of Records, at the Department of Fish and Wildlife, License and Revenue Branch, PO Box 944209, Sacramento, CA 94244-2090. All requests must include the requester's name, address, and telephone number.

PAYMENT POLICY

***Personal or business checks** will be accepted by the Department if name and address are imprinted on the check. Checks returned to the Department due to insufficient funds will render your permit invalid. The Department may also deny the issuance or renewal of any permit if a person has failed to reimburse the Department for the amount due. Any activity performed without a valid permit is a violation of the Fish and Game Code and therefore subject to enforcement action.
****Credit Cards**—Licenses, permits, tags, stamps, or registrations may be purchased with a Visa or MasterCard.

USDA

United States Department of Agriculture

Marketing and Regulatory Programs

Animal and Plant Health Inspection Service

Animal Care

This is to certify that
University Of California Davis

is a registered Class R - Research Facility under the

Animal Welfare Act

(7 U.S.C. 2131 et seq.)

Certificate No. 93-R-0433

Customer No. 9192

Deputy Administrator

APHIS FORM 7021 (JUL 2019)

United States Department of Agriculture
Animal and Plant Health Inspection Service

WCAMPBELL
INS-0001507486

Inspection Report

University Of California Davis

One Shields Ave
Davis, CA 95616

Customer ID: **9192**

Certificate: **93-R-0433**

Site: 001
UNIVERSITY OF CALIFORNIA, DAVIS

Type: FOCUSED INSPECTION

Date: 09-DEC-2025

No non-compliant items were identified during this inspection.

This inspection and exit interview were conducted with facility representatives.

Additional Inspectors:

KATHARINE FRANK, VETERINARY MEDICAL OFFICER

Prepared By: WILLIAM CAMPBELL
USDA, APHIS, Animal Care

Title: VETERINARY MEDICAL OFFICER

Date: 16-DEC-2025

Received by Title: Facility Representative

Date: 16-DEC-2025

United States Department of Agriculture
Animal and Plant Health Inspection Service

Customer: 9192
Inspection Date: 09-Dec-2025

Species Inspected

Cust No	Cert No	Site	Site Name	Inspection
9192	93-R-0433	001	UNIVERSITY OF CALIFORNIA, DAVIS	09-DEC-2025

Count	Scientific Name	Common Name
000000	NONE	NONE
000000	Total	

UNIVERSITY OF CALIFORNIA, DAVIS

BERKELEY · DAVIS · IRVINE · LOS ANGELES · MERCED · RIVERSIDE · SAN DIEGO · SAN FRANCISCO

SANTA BARBARA · SANTA CRUZ

Institutional Animal Care and Use Committee
One Shields Avenue
University of California, Davis
Davis, CA 95616-8545
(530)752-2364
Fax: (530)752-4994

August 24, 2026

To Whom it May Concern:

The following application was reviewed and approved by the UC Davis IACUC on October 29, 2025. Active protocols are reviewed annually.

Title: **Functional Analysis of Crest EffectorS in Craniofacial Development-2**
Principal Investigator: **Crystal D. Rogers**
Protocol #: **24603**
Institution: **University of California, Davis**

This institution is accredited by the Association for Assessment and Accreditation of Laboratory Animal Care, International (AAALAC). This institution has an Animal Welfare Assurance on file with the Office of Laboratory Animal Welfare (OLAW). The Assurance Number is D16-00272 (A3433-01).

The IACUC is constituted in accordance with U.S. Public Health Service (PHS) Animal Welfare Policy and includes a member of the public and a non-scientist.

IACUC Administrator
IACUC Office
University of California, Davis

Award Abstract # 2143217

CAREER: Functional Analysis of Crest EffectorS in Craniofacial Development

NSF Org:
IOS Division Of Integrative Organismal Systems
Recipient:
UNIVERSITY OF CALIFORNIA, DAVIS
Initial Amendment Date:
December 16, 2021
Latest Amendment Date:
July 21, 2025
Award Number:
2143217
Award Instrument:
Continuing Grant
Program Manager: Anna Allen akallen@nsf.gov (703)292-8011 IOS Division Of Integrative Organismal Systems BIO Directorate for Biological Sciences
Start Date:
January 1, 2022
End Date:
December 31, 2026 (Estimated)
Total Intended Award Amount:
$1,257,466.00
Total Awarded Amount to Date:
$1,257,466.00
Funds Obligated to Date:
FY 2022 = $657,466.00 FY 2024 = $200,000.00 FY 2025 = $400,000.00
History of Investigator:
Crystal D Rogers (Principal Investigator) crdrogers@ucdavis.edu

Feedback

Recipient Sponsored Research Office:

University of California-Davis
1850 RESEARCH PARK DR STE 300
DAVIS
CA US 95618-6153
(530)754-7700

Sponsor Congressional District:

04

Primary Place of Performance:

University of California-Davis
OR/Sponsored Programs
Davis
CA US 95618-6134

Primary Place of Performance Congressional District:

04

Unique Entity Identifier (UEI):

TX2DAGQPENZ5

Parent UEI:

NSF Program(s):

Animal Developmental Mechanism,
Cross-BIO Activities

Primary Program Source:

01002425DB NSF RESEARCH & RELATED ACTIVIT
01002526DB NSF RESEARCH & RELATED ACTIVIT
01002627DB NSF RESEARCH & RELATED ACTIVIT
010V2122DB R&RA ARP Act DEFC V

Program Reference Code(s):

102Z, 1045, 1119, 112Z, 1228, 5920, 9178, 9179, 9251

Program Element Code(s):

111900, 727500

Award Agency Code:

4900

Fund Agency Code:

4900

Assistance Listing Number(s):

47.074

Feedback

ABSTRACT

This award is funded in whole or in part under the American Rescue Plan Act of 2021 (Public Law 117- 2).

A long-standing question in the fields of developmental and evolutionary biology is to understand how animals develop different outer appearances using similar genetic programs. The goal of this project is to enhance our knowledge of how embryonic neural crest stem cells form the tissues that make the face in closely related organisms, and how these stem cells give rise distinct outer appearances. To achieve this goal, Dr. Rogers at UC Davis will work with undergraduate students to dissect the programs that regulate the formation of neural crest cells in three bird species. The dual research and educational project called Functional Analysis of Crest EffectorS (FACES), will identify how changing the expression of these proteins at early embryonic stages drives differences in beak structure in quail, chicken, and peafowl embryos. Dr. Rogers has a strong background in studying neural crest cells and early development across various species, and is one of the few investigators in the world performing cross-species analyses to define the molecular control of cell specification and cell migration in avians. This faculty Early Career Development Award (CAREER) will fund a research and educational program that provides professional growth, hands-on research opportunities and long-term mentoring for undergraduate students, and will increase our fundamental understanding of how complex tissues are formed during vertebrate embryonic development. By asking the question, “what regulates the cells that make the face?” we can unravel the mechanisms driving formation of faces in different species.

Much of the information we know about neural crest development has been identified independently in a handful of model organisms, and the findings have been incorporated into a neural crest gene regulatory network model to resolve protein-gene interactions. However, we lack confirmation of the functional conservation of proteins across species, thereby making comprehensive understanding of neural crest evolution and development challenging. Although the expression of the factors that regulate neural crest development are conserved, we do not know if they function at th same developmental time, regulate the same targets, or if changes in these factors drive phenotypic variation across species. This CAREER will directly address this barrier to knowledge by defining the roles of three SOXE (SRY-related H box Group E) transcription factors, and their putative targets, type I and II cadherin molecules, in the formation of neu crest cells and their craniofacial derivatives. Quail, chick, and peafowl embryos will be used to compare expression timing, protein function, and outcome of protein perturbations on craniofacial (beak) formation. The objectives are to 1) identify the roles of SOXE factors during neural crest (NC) specification and the epithelial-mesenchymal transition (EMT) in chick versus quail embryos, 2) determine the cadherin code that controls NC cell fate and EMT in chick vs quail, and 3) quantify the effects of SOXE and cadherin perturbations on craniofacial beak structure. Collectively, this work will shed light on the molecular, cellular, and organismal-level mechanisms that drive neural crest cell formation and will significantly increase our understanding of how organisms use the same factors to drive differential morphogenesis.

This award reflects NSF's statutory mission and has been deemed worthy of support through evaluation using the Foundation's intellectual merit and broader impacts review criteria.

Feedback

PUBLICATIONS PRODUCED AS A RESULT OF THIS RESEARCH

Note: *When clicking on a Digital Object Identifier (DOI) number, you will be taken to an external site maintained by the publisher. Some full text articles may not yet be available without a charge during the embargo (administrative interval).*

Some links on this page may take you to non-federal websites. Their policies may differ from this site.

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Show All

Adamson, Carly J. and MorrisonWelch, Nikolas and Rogers, Crystal D. "The amazing and anomalous axolotls as scientific models" *Developmental Dynamics*, v.251, 2022 https://doi.org/10.1002/dvdy.470 Citation Details

Calisi-Rodríguez, Rebecca M and Alicea-Torres, Kevin and Peng, Jamy C and Theodosiou, Nicole A and Rogers, Crystal D "Speaking science in a fractured world: making truth land when facts alone cannot" *Development*, v.152, 2025 https://doi.org/10.1242/dev.205206 Citation Details

Cox, Ben Dillon and Yang, Hailong and Moore, Joshua and Ahuja, Neha and Amundson, Kirk and Aponte-Santiago, Nicole and Coomer, Cagney and Gong, Yan and Herbert, Amy L and Manzano, Concepcion and Martínez-Gómez, Jesús and Satterlee, James and Brady, Siobhá "Reprogramming our fate: a postdoctoral reflection on current challenges and prospects for developmental biology" *Developmental Biology*, 2025 https://doi.org/10.1016/j.ydbio.2025.11.012 Citation Details

Echeverria, Camilo V and Leathers, Tess A and Rogers, Crystal D "Comparative analysis of fixation techniques for signal detection in avian embryos" *Developmental Biology*, v.517, 2024 https://doi.org/10.1016/j.ydbio.2024.09.002 Citation Details

Leathers, Tess A and Ramarapu, Raneesh and Rogers, Crystal D "Spatiotemporal characterization of cyclooxygenase pathway enzymes during vertebrate embryonic development" *Developmental Biology*, v.518, 2024 https://doi.org/10.1016/j.ydbio.2024.11.009 Citation Details

Leathers, Tess A. and Rogers, Crystal D. "Nonsteroidal anti-inflammatory drugs and implications for the cyclooxygenase pathway in embryonic development" *American Journal of Physiology-Cell Physiology*, v.324, 2023 https://doi.org/10.1152/ajpcell.00430.2022 Citation Details

Leathers, Tess A. and Rogers, Crystal D. "Time to go: neural crest cell epithelial-to-mesenchymal transition" *Development*, v.149, 2022 https://doi.org/10.1242/dev.200712 Citation Details

Marshall, Emma J and Ramarapu, Raneesh and Leathers, Tess A and Morrison-Welch, Nikolas and Sandberg, Kathryn Kawashima, Maxim and Rogers, Crystal D "NSAID-mediated cyclooxygenase inhibition disrupts ectodermal derivative formation in axolotl embryos" *Differentiation*, v.143, 2025 https://doi.org/10.1016/j.diff.2025.100856 Citation Details

Murray, Debra D and Williams, Clintoria R and Gaddy, Jennifer A and Rogers, Crystal D and Kirabo, Annet and Santisteban, Monica M and Wanjalla, Celestine N and Williams, Edith M and Sweetwyne, Mariya T and Damo, Steven M and Murray, Sandra A and Stokes, D "The power of junior faculty mentoring committees" *Journal of Cellular Physiology*, v.239, 2024 https://doi.org/10.1002/jcp.31360 Citation Details

Rogers, Crystal D and Amemiya, Chris and Arur, Swathi and Babonis, Leslie and Barresi, Michael and Bartlett, Madelaine and Behringer, Richard and Benham-Pyle, Blair and Bergmann, Dominique and Blackman, Ben and Brown, C Titus and Browne, Bill and Camacho, "Pluripotency of a founding field: rebranding developmental biology" *Development*, v.151, 2024 https://doi.org/10.1242/dev.202342 Citation Details

(Showing: 1 - 10 of 11)

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Please report errors in award information by writing to: awardsearch@nsf.gov.

Feedback

RePORT ⟩ RePORTER

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Description
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Sub-Projects
Publications
Patents
Outcomes
Clinical Studies
News and More
History
Similar Projects

Cyclooxygenase signaling in neural crest migration and craniofacial development

Project Number
1R03DE035523-01

Contact PI/Project Leader
ROGERS, CRYSTAL D

Awardee Organization

Description

Abstract Text

Abstract/Summary Statement: The role of cyclooxygenase signaling in neural crest migration This proposed project aims to identify the role of cyclooxygenase (COX) signaling in regulating neural crest (NC) epithelial-to-mesenchymal transition (EMT), migration, and differentiation during embryonic development. NC cells are pivotal for forming diverse tissues in adult organisms and their dysregulation is linked to congenital anomalies like craniofacial clefts, jaw malformations, and congenital cranial neuropathy. The proposed research aims to reveal how COX signaling regulates NC EMT, migration, and differentiation by identifying which intracellular effectors link COX enzymes to cell state changes during NC EMT and migration, and how perturbation of COX signaling disrupts NC cell integrity, migration, and differentiation. By addressing these questions, we will uncover fundamental COX-mediated mechanisms driving NC cell development with implications for understanding craniofacial birth defects. Using the avian embryo model for its accessibility and developmental conservation with humans, Aim 1 will employ targeted gain- and loss-of-function experiments paired with RNA sequencing to delineate the intracellular effectors that bridge COX signaling with the NC gene regulatory network. In Aim 2, we will functionally characterize the impact of COX perturbation on NC cell integrity, migration, and subsequent differentiation into essential craniofacial and cranial peripheral nervous system components. We will pair functional perturbations with in situ hybridization chain reaction, immunohistochemistry, and high-resolution fluorescence imaging across various developmental stages to quantitatively characterize the craniofacial defects that occur after COX signaling modulation. Our preliminary findings indicate that COX inhibition inhibits NC migration and disrupts tissue formation, highlighting the critical role of COX-mediated pathways in development. The insights gained from this study will address a significant gap in our knowledge of the upstream regulation of EMT, thereby broadening our understanding of congenital birth defects and mitigating pathological EMT in adult diseases. Ultimately, this work will lay the foundation for future R01 applications that will dissect the COX signaling-dependent gene regulatory network to better identify potential therapeutic targets, driving translational advances that improve human health by targeting COX- dependent mechanisms in developmental contexts.

Public Health Relevance Statement

Project Narrative The ability of cells to transition through different cellular states, from tightly adherent to migratory and invasive, underlies many biological processes important for human dental, oral, and craniofacial health and disease. These transitions can be affected by both genetic and environmental perturbations that alter embryonic development or disease progression. We propose to investigate the fundamental modulators of cell state transitions during embryogenesis to better understand the process in healthy cells and how they are hijacked during disease.

NIH Spending Category

No NIH Spending Category available.

Project Terms

Address **Adhesions** **Adult** **Affect** **Animal Model** **Arachidonic Acids** **Automobile Driving** **Biological Process** **Birds** **Cadherins** **Cartilage** **Cell membrane** **Cells** **Cephalic** **Computer Models** **Congenital Abnormality** **Coupled** **Cranial nerve diseases** **Craniofacial Abnormalities** **Cytoskeleton** **Data** **Defect** **Dental** **Development** **Disease** **Disease Progression** **Distant** **Embryo** **Embryonic Development** **Enzymes** **Exposure to** **Face** **Foundations** **Future** **Genetic** **Genetic Transcription**

Read More

Details

Contact PI/ Project Leader

Name
ROGERS, CRYSTAL D

Title
ASSISTANT PROFESSOR

Contact

View Email

Other PIs

Not Applicable

Program Official

Name
SAIFUDEEN, ZUBAIDA

Contact

View Email

Organization

Name
UNIVERSITY OF CALIFORNIA AT DAVIS

City
DAVIS

Country
UNITED STATES (US)

Department Type
VETERINARY SCIENCES

Organization Type
SCHOOLS OF VETERINARY MEDICINE

State Code
CA

Congressional District
04

Other Information

Opportunity Number
PAR-25-105

Study Section
Skeletal Biology Development and Disease Study Section[SBDD]

Fiscal Year
2026

Award Notice Date
02-July-2026

Administering Institutes or Centers
National Institute of Dental and Craniofacial Research

Assistance Listing Number
93.121

DUNS Number
047120084

UEI
TX2DAGQPENZ5

Project Start Date
01-July-2026

Project End Date
30-June-2028

Budget Start Date
01-July-2026

Budget End Date
30-June-2028

No Cost Extension
N

Project Funding Information for 2026

Total Funding
$301,086

Direct Costs
$200,000

Indirect Costs
$101,086

Year	Funding IC	FY Total Cost by IC
2026	National Institute of Dental and Craniofacial Research	$301,086

Sub Projects

No Sub Projects information available for 1R03DE035523-01

Publications

> Disclaimer

No Publications available for 1R03DE035523-01

Patents

No Patents information available for 1R03DE035523-01

Outcomes

The Project Outcomes shown here are displayed verbatim as submitted by the Principal Investigator (PI) for this award. Any opinions, findings, and conclusions or recommendations expressed are those of the PI and do not necessarily reflect the views of the National Institutes of Health. NIH has not endorsed the content below.

No Outcomes available for 1R03DE035523-01

Clinical Studies

No Clinical Studies information available for 1R03DE035523-01

News and More

Related News Releases

No news release information available for 1R03DE035523-01

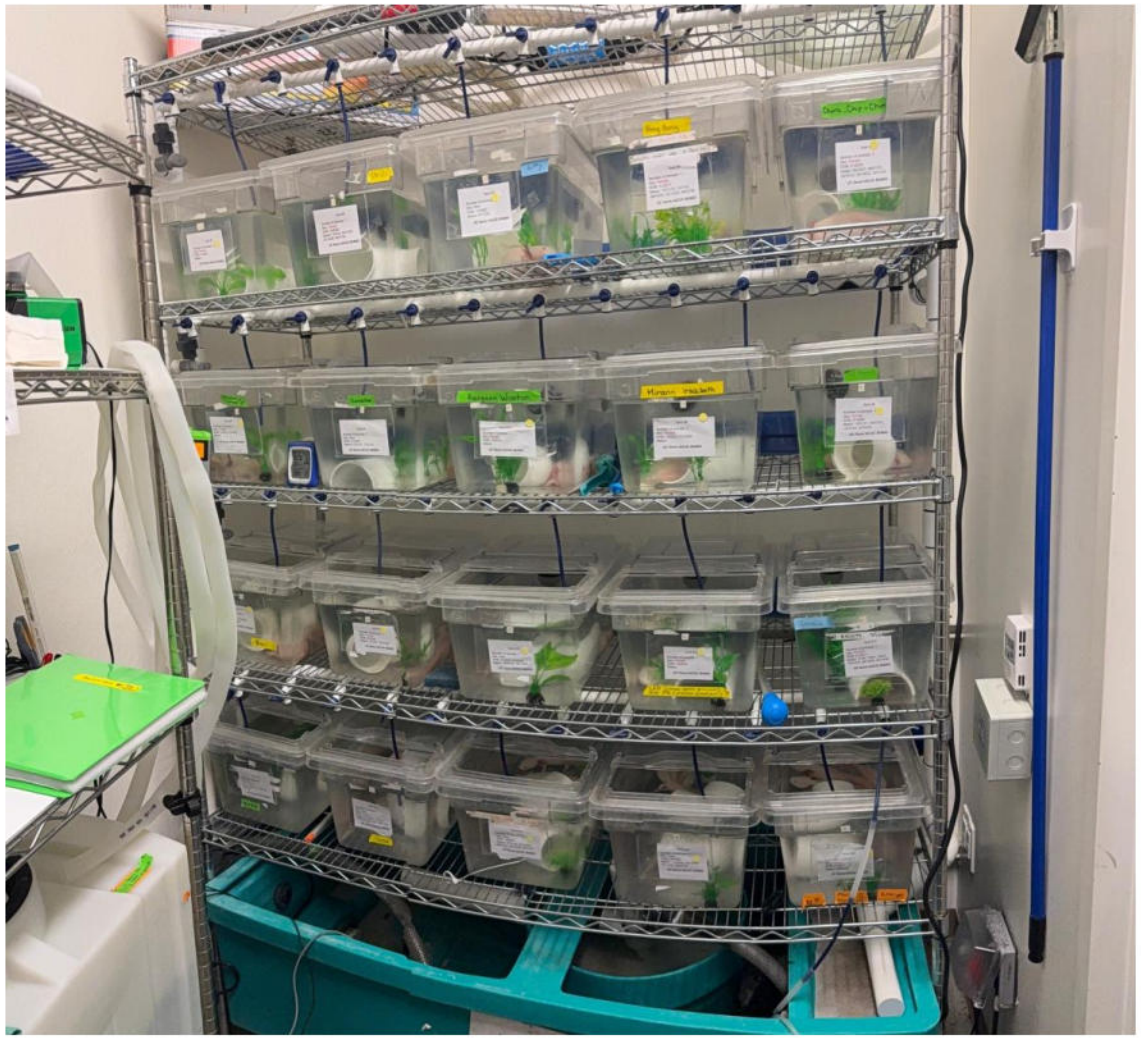
History

No Historical information available for 1R03DE035523-01

Similar Projects

No Similar Projects information available for 1R03DE035523-01

VetMed 3B Room 3130 B: Permanent Facility

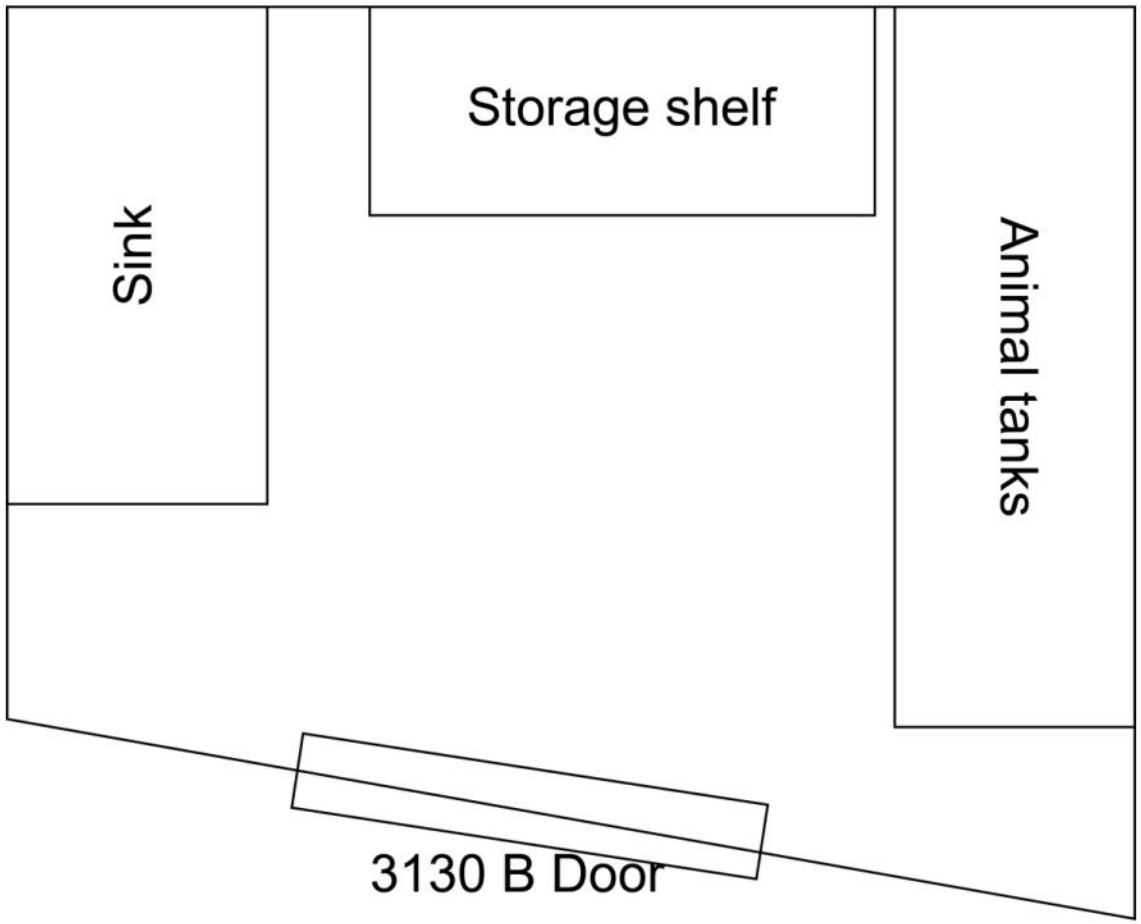


Tank #1 Number of animals: 2 Sex: F DOB: 12/2013	Tank #2 Number of animals: 1 Sex: F DOB: 10/2022	Tank #3 Number of animals: 2 Sex: M DOB: 10/2022	Tank #4 Number of animals: 1 Sex: F DOB: 1/2017	Tank #5 Number of animals: 3 Sex: F DOB: 1/2020
Tank #6 Number of animals: 2 Sex: F DOB: 12/2013, 1/2020	Tank #7 Number of animals: 1 Sex: M DOB: 1/2020	Tank #10 Number of animals: 2 Sex: F DOB: 12/2013	Tank #9 Number of animals: 2 Sex: F DOB: 12/2013, 1/2020	Tank #8 Number of animals: 3 Sex: F DOB: 1/2020
Tank #11 Number of animals: 2 Sex: F DOB: 1/2017, 1/2020	Tank #12 Number of animals: 3 Sex: F DOB: 1/2020	Tank #13 Number of animals: 2 Sex: M DOB: 1/2027, 1/2020	Tank #14 Number of animals: 1 Sex: F DOB: 12/2013	Tank #15 Number of animals: 1 Sex: F DOB: 12/2017
Tank #16 Number of animals: 1 Sex: M DOB: 1/2017	Tank #17 Number of animals: 1 Sex: M DOB: 1/2017	Tank #18 Number of animals: 2 Sex: M DOB: 1/2017	Tank #19 Number of animals: 2 Sex: M DOB: 10/2022	Tank#20 Number of animals: 3 Sex: F DOB: 1/2017





VetMed 3B Room 3130 B



VetMed 3B Room 3130 B- adapted animal enclosures



Tanks:
Cambro 12189CW135 Camwear® 18" x 12" x 9"
Clear Food Storage Box
Capacity: 4.75 Gallons



Lids:
Cambro 1218SCCW135 Camwear® 18" x 12"
Clear Sliding Lid for Food Storage Box

VetMed 3B Room 3206: Temporary Housing





1 Number of animals: 2 Type: Juvenile melanoid	3 Number of animals: 4 Type: Tadpole melanoid	5 Number of animals: 1 Type: Juvenile leucistic	7 Number of animals: 1 Type: Juvenile leucistic	9 Number of animals: 1 Type: Juvenile leucistic	11 Number of animals: 1 Type: Juvenile leucistic	13 Number of animals: 1 Type: Juvenile leucistic	15 Number of animals: 1 Type: Juvenile leucistic
2 Number of animals: 3 Type: Juvenile melanoid	4 Number of animals: 4 Type: Tadpole melanoid	6 Number of animals: 3 Type: Tadpole melanoid	8 Number of animals: 4 Type: Tadpole melanoid	10 Number of animals: 4 Type: Tadpole melanoid	12 Number of animals: 3 Type: Tadpole melanoid	14 Number of animals: 1 Type: Juvenile melanoid	16 Number of animals: 1 Type: Juvenile melanoid

VetMed 3B Room 3206- adapted animal enclosures



Click to see full view

Tanks:
Lee's Kritter Keeper, Rectangle with Lid - Small, Assorted Colors, 9.25"L x 6"W x 7"H, 0.5 gallons



Click to see full view

Tanks:
Lee's Kritter Keeper, Medium Rectangle w/Lid, Label, 11.88 x 7.75 x 8.13 inches, 1.75 gallons



Click to see full view

Tanks:
Lee's Kritter Keeper, Large Rectangle with Lid, 14.5"L x 8.75"W x 9.75"H, 3.0 gallons

UC Davis Emergency Action Plan
Per CDFW 671.1(c)(3)(I)1. a-f
Updated Oct. 2025

Class Mammalia
- Order Insectivora (desert shrews, moles)
- Order Scandentia (tree shrews)
- Order Xenarthra (armadillos)
- Order marsupialia (opossums)
- Order Rodentia (voles, gerbils)
- Order Carnivora (ferrets)
- Order Chiroptera (Egyptian fruit bats)

Class Aves (American Kestrel, owls, Quaker parrots, red tailed hawks)
- Order Falconiformes
- Order Strigiformes
- Order Psittaciformes

Class Amphibia
- Order: Caudata &mash; salamanders (including transgenic)
- Order Anuura (frogs-including transgenic)

Class Agnatha
- Order Petromyzontidae (lampreys)

Class Osteichthyes (Bony Fishes)
- Order Cypriniformes / Family Cyprinidae including transgenic zebrafish and medaka
- Order Perciformes / Family Cichlidae including tilapia

Class Actinooptergii
- Order Syngnathifomes (Ray-finned fishes including transgenic seahorse)

Class Gastroda
- Order Mesogastropoda / Family *Pomacea canaliculate (channeled apple snail)*

The University of California, Davis (UC Davis) is fully accredited by AAALAC International, a process that includes a rigorous inspection and evaluation of facility security. Re-capture equipment and immobilization drugs, lethal dispatch methods for various animals and personnel who are trained to carry out the lethal dispatch methods, medical supplies/first aid kits and locations, mobile transport cages and equipment, and written plans of action for emergencies have been reviewed and approved by AAALAC.

a. List of the re-capture equipment available, including but not limited to darting equipment, nets, traps, and chemical immobilization drugs

Small animals, birds and fish are housed in primary enclosures (caging, aviaries, tanks, etc.) within secure IACUC approved housing as specified by PHS Policy, the ILAR *Guide for the Care and Use of Laboratory Animals*, and the USDA Animal Welfare Act. As such, the escape of these animals is unlikely. Should an animal escape its primary enclosure, gloves, nets and live traps for small mammals, such as the Havahart traps, are available.

A small mammal that escapes its primary caging will seek protective shelter within its secondary enclosure (locked rooms within locked buildings). Therefore in addition to using a live trap, an open un-occupied cage with bedding, food and water in it serves as an effective shelter and may serve as the least stressful recapture technique for small mammals since they are already contained in a secondary enclosure (locked vivarium). Chemical immobilization for small mammals can be achieved by baiting food with drugs such as midazolam/hydromorphone or other drugs as recommended by Campus Veterinary Services (CVS). Nets and leather gloves will be available within the rooms that house the tree shrews and Egyptian fruit bats as well as in the hallway outside of the tree shrew and bat rooms to capture an animal in the event of an escape. Darting is not appropriate for these small species.

Owls, kestrels, parrots and hawks can be captured with a net or lure. These birds are maintained in an aviary laboratory animal facility with partial or full secondary building containment and in naturalistic caging. Should a bird escape into the secondary containment, fresh dead mice can be baited with a sedative to chemically immobilize the bird. The appropriate drug as recommended by Campus Veterinary Services could be used as an oral sedative to immobilize the bird. Alternatively birds may be netted using a long handled pool net, and (especially owls) may be enticed back into nest boxes and then netted. Leather gloves should be worn for handling raptors or owls.

Escaped aquatic, semi aquatic species, and amphibians are captured by hand using gloves and/or nets as appropriate. Drains for rooms containing *Xenopus*, *Bufo marinus,* and *Ambystoma mexicanum* are screened and water is discharged to the UC Davis campus wastewater treatment plant. Water from fish tanks may be discharged into municipal sewage systems, the UC Davis wastewater treatment plant or into its own isolated drainage system where, as it leaves the building, it is screened at the floor drain and may be injected with sodium hypochlorite for disinfection, then drained to a dead-end percolation pond within the facility's security fence perimeter. Each vivarium housing these species maintains the appropriately sized nets, buckets, caging/tanks for the species and number of animals housed.

Snails are housed in primary enclosures (tanks) approved by the USDA PPQ 526 plant pest permit. As such, the escape of these animals is unlikely. Should an animal escape its primary enclosure, gloves and nets are available for capturing them by hand. All drains are screened, and water is discharged into municipal sewage systems. Nets, buckets, caging/tanks for handling of snails are always available in the room. Secondary (recirculation snail system) and tertiary (locked room) ensure containment in the approved spaces.

Ambystoma mexicanum are fully aquatic salamanders maintained in secure tanks or other approved aquatic enclosures within secure, access-controlled UC Davis laboratory or vivarium space. Animals may include wild-type/non-transgenic animals, naturally occurring color morphs such as leucistic and melanoid animals, and genetically modified/transgenic animals. Escape from both the primary enclosure and the secured animal room is therefore unlikely. Appropriately sized aquarium nets, smooth nitrile gloves, buckets, and secure temporary aquatic containers with lids are maintained in or readily available to rooms housing axolotls. If an axolotl escapes from its primary enclosure, trained personnel will immediately recapture the animal

using a net or gloved hands, as appropriate, while minimizing handling and protecting the animal's skin and external gills. The animal will be placed into an appropriate container containing conditioned water and evaluated for evidence of injury or distress. If an animal cannot immediately be located, access to the room will be restricted as appropriate and personnel will systematically search the room, including areas beneath and behind tanks, racks, and other equipment. Because axolotls are aquatic and dependent upon appropriate aquatic conditions for long-term survival, an escaped animal would be expected to remain within or near the secured animal-housing area rather than establish itself elsewhere in the building. The same recapture procedures apply to wild-type/non-transgenic and genetically modified/transgenic axolotls. Transgenic or genetically modified axolotls will not be released into the environment under any circumstances. Any escaped transgenic animal will be returned to secure containment if it can be safely recaptured. If secure recapture and containment cannot be accomplished, the animal will be humanely euthanized according to the approved IACUC protocol. Water, animals, embryos, larvae, or viable biological material from transgenic axolotl housing will not intentionally be released into natural waterways.

b. Description of humane lethal dispatch methods for various animals and a list of qualified personnel who are trained to carry out the methods

A full range of chemical euthanasia agents are immediately available through the UC Davis Veterinary Medical Teaching Hospital and Campus Veterinary Services. The most common methods of euthanasia employed are carbon dioxide overdose in small animals, barbiturate overdose in both small and large animals, and buffered MS222 overdose in aquatic animals. Physical methods of euthanasia such as cervical dislocation, decapitation, or double pithing may be performed on some species by trained personnel.

Species-specific methods of euthanasia are clearly described in all IACUC approved individual animal care and use protocols. Unless the investigator scientifically justifies an exception in their protocol, methods must be compatible with the most recent version of the AVMA's Panel on Euthanasia.

Euthanasia is performed either by trained vivaria staff, research staff, CVS, or otherwise under the direction of the Attending Veterinarian. Training in appropriate euthanasia methods is provided to investigators through Campus Veterinary Services under the direction of the Attending Veterinarian, the IACUC Office, or by the investigator or his/her staff. Campus Veterinary Services employs on average five veterinarians and four Registered Veterinary Technicians.

Snails are euthanized through cold temperature (incubation at -20C). Euthanasia can be performed by anybody with access to the snail facility.

Axolotls will be euthanized according to the methods specified in the applicable UC Davis IACUC-approved protocol. For animals covered by the Rogers laboratory protocol, euthanasia is performed using an overdose of buffered pharmaceutical-grade MS-222 (tricaine methanesulfonate), followed by an approved secondary method (exsanguination) to ensure death.

Emergency euthanasia will be performed only by trained and protocol-approved research personnel, vivarium personnel, Campus Veterinary Services personnel, or individuals acting under the direction of the Attending Veterinarian. If an escaped or injured animal cannot be safely returned to appropriate housing, or if the animal has sustained an injury for which recovery is unlikely, Campus Veterinary Services will be contacted as appropriate and humane euthanasia will be performed according to the approved protocol. The same humane euthanasia procedures apply to wild-type/non-transgenic, leucistic, melanoid, and transgenic/genetically modified *A. mexicanum*.

c. List of medical supplies/first aid kits and where they are located

Each campus department housing live vertebrate animals and snails at UC Davis must maintain an Injury and Illness Prevention Program (IIPP). The authority and responsibility for the implementation and maintenance of the Injury and Illness Prevention Program (IIPP) is in accordance with University Policy (UC Davis Policy & Procedure Manual Section 290-15: Safety Management Program) and California Code of Regulations (8 CCR, Section 3203). A first aid kit and a comprehensive, departmental specific, copy of the IIPP is available in every vivarium.

Additionally, the UC Davis Occupational Health Services is a Campus-based medical clinic that offers treatment for work-related injuries and illness, work-related preventive medicine and injury & illness prevention services, and OSHA and departmentally-mandated medical surveillance programs. Medical care is provided by physicians experienced in Occupational Medicine.

The existing UC Davis provisions for medical supplies, first aid kits, Occupational Health Services, and departmental Injury and Illness Prevention Programs apply to personnel working with *A. mexicanum*. Personnel handling escaped animals will use appropriate personal protective equipment, including smooth nitrile gloves when direct contact is required, both to protect personnel and to minimize damage to the axolotl's delicate skin and mucus layer. Any personnel injury occurring during an emergency response will be addressed according to UC Davis occupational health and emergency procedures.

d. Description of mobile transport cages and equipment on hand

Within the institution, animals are transported in university vehicles that include climate-controlled vans for small animals or in personal climate-controlled vehicles. Occasionally, animals are carried (in an approved transport cage or carrier) by personnel between buildings. All animals are transported in appropriate transport conditions and carriers, as specified by PHS policy, the ILAR *Guide for the Care and Use of Laboratory Animals*, the FASS *Guide for the care and Use of Agricultural Animals in Research and Teaching*, and the USDA Animal Welfare Act.

Small animal species: Small animals are transported in a primary container (cage/crate/box) within a cargo van, or occasionally in the passenger area of other vehicles (i.e., in the cab of a pickup truck). Climate control is achieved via flow-through to the cargo area from the vehicle's air conditioning and heating unit. An exception might be wild rodents or birds, which may be transported to the facility in transport cages in the bed of pickup trucks when ambient temperature is appropriate for the individual species. Bats are transported per detailed transport SOP instructions included with the animal care and use protocol or SOP. Animals may be transported to other facilities on campus within walking distance by investigators. In this case, the animals are typically moved in a covered cage or cart.

Center for Aquatic Biology and Aquaculture: A three-quarter ton truck to transfer fish has been adapted to carry bed tanks or a haul tank trailer (both insulated), and carry oxygen cylinders. A complete supply and range of buckets and nets are also available.

The snails will be shipped to UC Davis, the boxes will be opened inside room 222. Only embryos unable to complete maturation to adults, or adults unable to produce viable offspring may leave snail room based on USDA permit and this will be done using tanks or smaller containers.

Axolotls will be transported in secure, leak-resistant containers of appropriate size containing an appropriate volume of conditioned water (buckets or tanks). Containers will have secure lids and sufficient secondary containment to prevent release of animals or water during transport. For movement between rooms or facilities on the UC Davis campus, transport will be performed by trained personnel using secure containers and, when appropriate, carts or other secondary containment. Environmental conditions will be maintained within an appropriate range for axolotls during transport. Wild-type/non-transgenic and transgenic animals will be appropriately identified during transport. Transgenic animals will remain securely contained throughout transport and will not be transported outside approved locations except under applicable institutional approvals and permits.

e. List of emergency telephone numbers that includes the local department regional office, 911, and animal control agencies

Local CDFW Departmental regional office - Region 2 – 916-358-2900

Local CDFW Departmental regional office - Region 3 – 707-944-5500

DAVIS CAMPUS Police

- EMERGENCY: **911** or **530-752-1230**
- Non-Emergency: **530-752-1727**

SACRAMENTO CAMPUS Police

- EMERGENCY: **911** or **916-734-2555**
- Non-Emergency: **916-734-2555**

Campus Veterinary Services – 530-752-0514

530-219-3076 (emergency and after hours/weekend/holiday)
Local Animal Control Agencies

Yolo County Animal Services – 530- 668-5287
Solano County Animal Control – 707-449-1700
Sacramento County Animal Control – 916-368-7387

f. Written plan of action for emergencies

UC Davis maintains a comprehensive emergency operations plan which includes detailed animal care emergency response/recovery plan information for all campus vivaria.

This plan describes how individual UC Davis's animal care departments will address emergency and contingency planning and training to provide for the humane handling, treatment, transportation, housing and care of laboratory animals in the event of an emergency or disaster. The Animal Care Program (ACP) is responsible for the husbandry and care of all animals used in research and teaching at UC Davis.

Snails: Local emergencies would be likely limited to medical emergencies, fire or earthquakes. The building housing snails is enveloped in a reinforced concrete frame structure, and the snail facility is protected from all but catastrophic natural events. In preparation for earthquakes, the snail housing racks are anchored to the floor to prevent tipping. If an emergency occurred while the staff was actively working with the snails, the staff would secure the animals, if safe to do so, and make sure that the door was locked before leaving the snail facility to take care of their safety. Depending on the emergency, emergency responders would be briefed on containment requirements, and the staff would inspect the snail facility as soon as possible to ensure that the animals remained properly housed. In the event that staff could not reach the snail facility, snails would eventually succumb due to unfavorable environmental conditions at this location.

Ambystoma mexicanum (axolotls): The UC Davis comprehensive emergency operations and animal care emergency response/recovery plans apply to all *A. mexicanum* maintained under this permit. The following additional species-specific procedures will apply to wild-type/non-transgenic and transgenic axolotls. In the event of a tank failure, plumbing failure, flooding, power outage, earthquake, fire, or other emergency that compromises primary housing, personnel will, when it is safe to do so:

- Secure animals within intact tanks or transfer them to secure temporary aquatic containers with conditioned water.
- Account for animals to the extent possible and inspect the room for escaped animals.
- Recapture escaped animals using nets or gloved hands and place them into secure aquatic containment.
- Separate injured or compromised animals for evaluation and contact Campus Veterinary Services when veterinary assessment is required.
- Move animals to alternate approved housing if the normal housing location cannot safely maintain appropriate environmental conditions.

- Ensure that transgenic/genetically modified animals remain under secure containment and are not released into the environment.
- If containment of a transgenic animal cannot be maintained, humanely euthanize the animal using the IACUC-approved method rather than permit environmental release.
- Notify appropriate UC Davis personnel and, when required by the restricted species permit or applicable regulations, the California Department of Fish and Wildlife.

In the event of an emergency requiring immediate evacuation of personnel, human safety will take priority. If it can be accomplished safely and without delaying evacuation, personnel will secure tanks, containers, and room doors before leaving. Authorized personnel will inspect the animal-housing area and restore appropriate husbandry and containment as soon as the area can safely be re-entered. Because *A. mexicanum* is a fully aquatic species maintained within primary aquatic enclosures inside secured rooms, multiple levels of containment reduce the likelihood of an animal escaping from the facility. Transgenic animals are subject to the same physical containment measures with the additional requirement that they will never be intentionally released into the environment. Following any incident involving loss of containment, personnel will account for affected animals and document and report the event in accordance with applicable UC Davis, IACUC, biosafety, and CDFW requirements.

Because confidentiality of this document could not be confirmed by the Sacramento CDFW office, and as previously agreed between the CDFW permit officer and UCD IACUC Office, the entire document is not included in the interest of UCD staff, researcher, and animal safety and security. The complete written plan, however, including specific locations and names of authorized personnel will be made available to CDFW inspectors during any on-site inspection.

Additional notes:

The CDFW and UC Davis entered into a *California Department of Fish and Wildlife Memorandum of Understanding for Research Facility Inspections* effective April 27, 2022 through April 27, 2027.

UC DAVIS
UNIVERSITY OF CALIFORNIA

Fish Conservation and Culture Lab, Byron CA

Biological and Ag Engineering Dept.

Emergency Action Plan

In compliance with:

California Code of Regulations

Title 8, Section 3220

Implementation Date: 07/27/2026

Annual Review Date*: 07/28/2026

*Reviewed and initialed by Department Safety Coordinator

Introduction

An Emergency Action & Evacuation Plan (herein referred to as an EAP) covers designated actions employers and employees must take to ensure employee safety from emergencies. Cal-OSHA regulations require employers to establish, implement and maintain an EAP. The program must be in writing and include the following elements:

- The preferred means of reporting fires and other emergencies
- A system to alert and notify employees of an emergency
- Evacuation types, procedures and emergency escape routes
- Procedures for employees who remain to operate critical plant operations before they evacuate
- A procedure to account for all employees after an emergency evacuation is completed
- Rescue and medical duties for those employees who are able to perform them
- Names or regular job titles of persons or departments who can be contacted for further information or explanation of duties under the plan

How to Complete This Plan Successfully:

This document includes a template for creating a departmental EAP, as well as additional incident and emergency response training that should be incorporated into the annual training for the EAP. As you read through the document, click on the gray shaded areas and type in the information requested.

Example: Enter Department Name

This template was designed to help the Department Safety Coordinator (herein referred to as "DSC") create an EAP, with the understanding that not all departments will have the same structure or protocols during an emergency. As the creator of your department's plan, you have the flexibility to adjust it to fit your needs to best assure the safety of your colleagues in an emergency.

EAPs are often lengthy documents filled with explanations of the intended actions of every conceivable building occupant. When an event actually occurs, such plans are seldom used efficiently for three reasons: 1) people lack knowledge of the plan, 2) people do not understand the plan, or 3) the plan fails to address the varied physical locations where it must work.

In order for your EAP to be successful, there are essential elements that need to be implemented. These essential elements are detailed on page 8, *Responsibilities of the Department Safety Coordinators.*

If you have questions or suggestions regarding this document, please direct those to the UC Davis Office of Emergency Management and Mission Continuity at prepare@ucdavis.edu.

Contact Information

This EAP has been prepared for UC Davis Fish Conservation and Culture Lab, Byron. The plan complies with California Code of Regulations, Title 8, Section 3220.

Fish Conservation and Culture Lab, Byron (BAE dept off campus)

(Office Name)

17501 Byron Hwy. Byron CA, 94514; Adjacent to Skinner Fish Facility

(Office Location)

209-830-9803	N/A
(Phone)	*(email)*

Tien-Chieh Hung, FCCL	[redacted]wk [redacted]cell	[redacted]
(Director/Dean/Chairperson/Lead)	*(Phone)*	*(email)*

Victor Duraj *(Department Safety Coordinator)*	[redacted]	[redacted]
	(Phone)	*(email)*

Md. Moshiur Rahman, FCCL	[redacted]wk [redacted]cell	[redacted]
(Alternate Safety Contact)	*(Phone)*	*(email)*

This Emergency Action & Evacuation Plan will be reviewed annually in: **July**

Emergency Protocols-Alert and Notification

Reporting Emergencies:

In the event of an emergency, UC Davis employees should contact UC Davis Dispatch by dialing **9-1-1** from a land line or from a cell phone call 530-752-1230.

You should call 9-1-1:

- In the event of a medical emergency
- To report all fire incidents, ***even if the fire is extinguished***
- To report criminal or suspicious behavior
- If you are in doubt about the seriousness of a situation, such as any possible situation that you believe may be serious and that may result in injury, death, loss of property, apprehension of a suspected criminal or prevention of a crime that is about to occur.

Provide the following information to UC Davis Dispatch upon calling

- Where you are
- The address or location of the event

Alert and Notification of Employees:

The university has a variety of ways to alert employees and students to emergencies and provide direction. These include:

- Audible alarms
- Visual alarms/signals
- Verbal notification
- UC Davis WarnMe / Aggie Alert
- Social media

Examples of notification methods include: fire alarm system, PA system, phone tree, bullhorn, even just flashing the lights can be a way to let people know there is an emergency happening.

The department itself will use the following methods to provide alerts and notifications to its employees:

Primary Method: Audible alarms (air horns)/ Verbal notification

Additional notifications: Visual alarms/signals

Emergency Protocols-Evacuation

Evacuation Procedures & Routes

Many incidents (*e.g.* building fire, police response) could require an evacuation of all or part of the campus. All employees must evacuate the building when notified to do so. The type of evacuation or protective measure may be specified as part of the notification. Please refer to Policy & Procedure 390-10 for more information on Campus Emergency Policy.

Evacuation Types

- **Evacuation:** Evacuation is total building or partial building evacuation due to conditions making it no longer safe to remain inside a building or a specific area in a building. This level of evacuation requires occupants to move out and away from the building being evacuated.

- **Controlled Evacuation:** Controlled evacuation is total building or partial building evacuation due to safety conditions or an armed intruder making it no longer safe to remain inside a building or specific area in a building. This level of evacuation requires occupants to move out and away from the building once notified.
- **Shelter-in-Place:** Shelter-in-place means selecting a small interior room, with no or few windows, and taking refuge there; it does not mean sealing off your entire office. Shelter-in-place is used in emergency situations where hazardous materials have been released into the atmosphere or in emergencies related to civil unrest or violent demonstrations.
- **Lock Down:** Lockdown is the temporary sheltering technique utilized to limit exposure to an armed intruder or similar incident. When alerted, occupants of a building within the area of concern will lock all doors and windows, not allowing entry or exit to anyone until the all clear has been sounded. If you are in a ground floor office or common area, take precautions and move away from glass windows or doors and seek shelter in a locked room of office.

Prior to Exiting

After being notified to evacuate, stop all work activities and evacuate immediately. Securely close departmental and office doors behind you. You may choose to lock your doors to prevent property theft (the UC Davis Fire Department has keys to campus buildings and rooms if access is necessary). Remember that you may not be allowed back into the building for an extended time.

Evacuation Routes/Exiting the Building

During an emergency evacuation, use the nearest door or stairway if available. Each employee needs to be aware of at least two exit routes in their main building in the event one is compromised.
All campus buildings over one story high must have building evacuation signs posted on every floor. The signs must be posted at all stairway and elevator landings and immediately inside all public entrances to the buildings. More information on this is available in the FireNet Emergency Evacuation Signs.

Persons involved with developing the EAP need to address how to evacuate colleagues with special needs that are unable to evacuate on their own. More information and guidance on this topic can be found in the FireNet Guidelines to Emergency Evacuation Procedures for Employees/Clients with Disabilities.

Assembly Area

After exiting the building, all employees, students, volunteers, and visitors should follow the evacuation route to the pre-arranged assembly area.

Assembly Area Guidelines have been developed to help DSCs choose the safest location to assemble.

The Department Director/Dean/Chair should assign an Assembly Area Manager to each evacuation location. List all buildings in which department members are assigned space and the corresponding assembly areas and manager.

All buildings/ labs Rolling Chain-Link Fence Gate at Aquaculture Facility Tien-Chieh Hung

All employees should stay within your respective group at the Assembly Area. No one should leave the area until notified by the First Responders, Assembly Area Manager, or Responder Liaison.

Assigned Job Responsibilities

Assembly Area Manager Duties:

It is recommended that the senior employee or their designee acts as the Assembly Area Manager. The Assembly Area Manager should be responsible for taking roll call and therefore it is imperative that *prior* to an emergency the Department Safety Coordinator (DSC) and Assembly Area Manager work together to ensure an updated employee roll call sheet is available and accessible at the time of the emergency. Ideally, the person responsible for roll call will take a personnel list (use attached form or alternate) before leaving the building. The Assembly Area Manager should report any injuries in need of immediate care to First Responders. Any other minor injuries should be documented and reported through the proper chain of command to Fadi Fathallah (Department Head).

The Assembly Area Manager is responsible for sharing information as it becomes available to the evacuated persons. The Assembly Area Manager *should not leave* the assembly area; therefore, it is suggested the Assembly Area Manager assign a liaison to the First Responders.

Responder Liaison Duties:

The Responder Liaison ensures important communication and information exchange between the First and Second Responders (*e.g.* Fire, Police, Facilities), and the Area Assembly Manager. The Responder Liaison (whom may be the DSC if present) is responsible for informing the on-scene Incident

Commander of the status of department employees and visitors. Responder Liaisons should be prepared to provide the following information (if known)

- Nature of the emergency (*e.g.* fire)
- Location of the emergency
- Number of persons trapped
- Number of persons hurt
- Number of persons unaccounted for

If needed, the Responder Liaison should recruit volunteers to help direct and contain evacuees to the Assembly Area.

After a major incident, building occupants may not re-enter buildings until cleared by a campus official.

Procedures for Employees Who Remain to Operate Critical Operations

Safety is a top priority at UC Davis, and there are no critical operations worth risking one's welfare to perform. If you believe your department has critical operations requiring an employee(s) to remain in the building during an evacuation (most departments will not), please contact UC Davis Office of Emergency Management and Mission Continuity to develop this section of the plan.

AED / CPR Training

UC Davis relies on the UC Davis Fire Department and partnering agencies to provide rescue and medical assistance. It may be useful to document employees in your department who have specialized medical training.

No staff are currently AED/CPR certified

The individuals listed above should not practice outside their scope of training and are not expected or required to assist in any emergency or medical situation.

Responsibilities of the Department Safety Coordinator

Md. Moshiur Rahman is responsible for implementing essential elements including planning, evaluating, and implementing the EAP. The following duties must be performed to maintain an effective EAP:

- Review and update the EAP annually or as needed.
- Update and submit the Emergency Call List to the UC Davis Dispatch Center.
- Train employees on the location of emergency exits, fire extinguishers, manual pull stations, first aid kits, and AEDs if applicable.
- Ensure evacuation routes are posted and walkways remain clear at all times.
- Train employees annually on the EAP, including the "Additional Training" sections. Ensure all new hires are familiar with the procedures and a copy of the plan is made available. **Document all training.**
- Train the Assembly Area Managers, Responder Liaisons, and Alternate Department Safety Contact. Confirm they understand their duties as assigned in the plan.
- Exercise your department's EAP annually. It is recommended you exercise your plan in the following order:

    1. **Conduct a Tabletop Exercise.** This will allow departments to use their training on the EAP, as well as to work through any inefficiencies *prior* to an emergency. Contact the UC Davis Office of Emergency Management and Mission Continuity for training or assistance with your tabletop exercise.

    2. **Schedule a Building Evacuation.** The UC Davis Fire Department can perform a limited number of building evacuations each month. Advanced notice and coordination between the departments that share your building **before** the exercise is critical. The Fire Department **will not** conduct the exercise if coordination between department DSCs has not occurred. Please contact your Department Safety Coordinator to schedule an exercise. Evacuations will be scheduled on a first come first serve basis and times and dates will be decided based on the Fire Department's availability. To schedule a fire drill, please contact the UC Davis Fire Department.

Signatures

This EAP has been reviewed and approved by the following individuals:

_____ _____

(Department Chair, or other Responsible Person) *(Date)*

The Safety Contact and Alternate are aware of their responsibilities, as described in this plan:

_____ _____

(Department Safety Coordinator) *(Date)*

_____ _____

(Alternate Safety Contact) *(Date)*

Additional Comments:


EMERGENCY EVACUATION ROUTE

Roll Call Sheet

Department of Biological and Agricultural Engineering
Office Location: Fish Conservation and Culture Laboratory

Dept. Safety Coordinator and Alternate Safety Contact are responsible for maintaining a current list of personnel in the department. This form can be used, or, if your department currently has a directory, you can format it into a roll sheet with room and building location and attach it to the EAP. Assembly Area Managers and DSCs should have a copy to complete roll call during an emergency.

Employee Name	Phone	Cell/Other Phone	Building/Room	Status/ Location
Luke Ellison	[redacted]	[redacted]	Main Office	
Tien-Chieh Hung	Same	[redacted]	Main Office	
Md. Moshiur	Same	[redacted]	Research Office	
Troy Stevenson	Same	[redacted]	Main Office	

Communications for Campus-Wide Emergencies

In the event of a major emergency, there are multiple ways to distribute life-saving and other important information. Familiarize the individuals in your department with these communication methods:

- **Sign up in advance to receive UC Davis WarnMe messages**
  This emergency notification service provides students and employees with timely information and instructions during emergencies. UC Davis WarnMe can send alerts by e-mail, text, telephone and cell phone messaging. To deliver messages, WarnMe uses employees' work contact information from the university's online directory, students' e-mail addresses and personal contact information you voluntarily provide. Register and update your information at http://warnme.ucdavis.edu.

- **Check the University homepage** www.ucdavis.edu
  UC Davis posts information about emergencies and other major news on its home page at www.ucdavis.edu**.** News can also be found at www.news.ucdavis.edu

- **Check official UC Davis social media channels**
  UC Davis posts emergency information on its official social media channels. These channels include twitter, Facebook, Instagram and Snapchat. You can subscribe to updates from UC Davis by liking or following the channels. You can find all of the University's official social media channels at https://www.ucdavis.edu/social-media.

- **Call the Emergency Status Line (530) 752-4000**
  The Emergency Status Line provides a brief recorded telephone message about the status of the Davis campus in an emergency. Messages will indicate the emergency's nature, and provide brief instructions. As more information becomes available, messages will point to additional information sources, such as the UC Davis home page.

- **Follow reports in the news media**
  UC Davis works with the news media to share information about emergencies and provide direction to the university community. KFBK Radio in Sacramento (93.1 FM / 1530 AM) is the primary station for the federal Emergency Alert System for several area counties.

In a campus-wide emergency, the campus may communicate using one or all of the above methods of communication depending on the incident.

You will not be notified of every incident to which the UC Davis Police or Fire departments responds.

Sheltering-in-Place

One of the instructions you may be given in an emergency is to shelter-in-place. Shelter-in-place is used mainly for hazardous materials incidents and sustained police action, or when it is more dangerous to venture outside than to remain indoors in your current location. This means you should remain indoors until authorities tell you it is safe or you are told to evacuate. The following are guidelines that should be shared with your department's employees.

General Guidelines on how to Shelter-in-Place

- Select a small, interior room, with no or few windows, ideally with a hard-wired telephone (cellular telephone equipment may be overwhelmed or damaged during an emergency).
- Close and lock all windows and exterior doors.
- Review your EAP, inspect your workplace emergency kits if you have them.
- Do not exit the building until instructed to do so by campus officials.
- Check for status updates using the resources detailed in the section, "Communications for Campus Wide Emergencies."

Specific for a Hazardous Material Incident

- Turn off all fans, heating and air conditioning systems.
- If possible, seal all cracks around the door and any vents into the room.
- If you are in your car, close windows and turn off vents and air conditioning.

In an incident requiring you to shelter-in-place, it may take several hours before it is safe to leave your building. It is important to have food and water in your office or work location to last a minimum of 24 hours, and preferably up to 72 hours. Having a workplace preparedness kit is easy to make and a good idea.

Community Survival Strategies for an Active Shooter

The UC Davis Police Department hosts workshops for members of the campus community on strategies to increase the likelihood of surviving an active shooter incident. The workshop covers five steps for increasing your chances of surviving an active shooter incident and also provides demonstrations for attacking the attacker.

It is recommended departments allow two hours release time for employees. Community presentations are available on the Davis and Sacramento campuses throughout the year. To locate or schedule a workshop visit the UC Davis Police Department website.

In the training, *Community Survival Strategies for an Active Shooter* participants should be aware that the presentation deals with a very sensitive subject and uses actual audio tape from the 9-1-1 call at the Columbine shootings. Participants will also have the opportunity to see different types of firearms and should be prepared to hear what an actual gunshot sounds like.

Training Sign-in Sheet

**All Employees need to have documented training **

Training Topic: Emergency Action & Evacuation Plan Date: _____

Instructor/Trainer: _____

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
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9. _____
10. _____
11. _____
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17. _____
18. _____
19. _____
20. _____

TRANSGENIC AQUATIC ANIMALS
TERMS AND CONDITIONS

(CDFW, Fisheries Branch, 8/28/2025)

All transgenic aquatic animals authorized by this permit shall be maintained in accordance with the regulations set forth in Section 671.1(a)(8), Title 14, of the California Code of Regulations as follows:

1. All transgenic aquatic animals shall be held, raised, and transported in a closed-water system or in a system which treats effluent discharge from the facility with a disinfection system adequate to ensure against the inadvertent release of live animals. No water from the named facility shall be discharged directly into any waters of the state. Discharge is authorized into municipal sewage treatment systems.

2. Unauthorized removal of any transgenic aquatic animals from the named facility is prohibited. The permittee shall ensure ample facility security to prevent unauthorized access, including a detailed security plan (include if available), and a locked housing for these transgenic aquatic animals with restricted (key card/key/code) access only. Conspicuous signage shall be displayed in the pertinent laboratory and vivaria/vivarium stating "These are restricted species. DO NOT remove them or allow others to remove them from this facility."

3. Movement of live transgenic aquatic animals held at the permitted facility will be via permittee's authorized personnel or by common carrier (i.e., FedEx, UPS, etc.) only, unless authorized otherwise by prior written approval by the Department. Animals shipped within the State, by the permittee, or common carrier, must be in secure, sealed containers that prevent escape during transport. Transgenic animals may only be transported to other facilities that are permitted to possess them.

4. Release of transgenic aquatic animals or their progeny into waters of the state is prohibited.

5. If transgenic aquatic animals are held with non-transgenic animals of the same species, all such animals that commingle with transgenic animals shall be treated as transgenic and may not be introduced into waters of the state. Non-transgenic animals that can be individually identified as non-transgenic may be exempt from this provision with prior department approval.

6. The permittee will notify the Department by telephone at (916) 709-3287 or electronic mail at Shay.Mussulman@wildlife.ca.gov within 24 hours if a shipment has not reached its point of destination before 48 hours after its estimated time of arrival.

7. For shipments of transgenic animals both within State and out of State, records showing the date of shipment, the number of animals shipped, the name and address of the consignee, the shipper, and positive confirmation of receipt of shipment must be maintained at the permitted facility for a minimum period of one year. The records shall be made available for inspection during normal business hours upon request of the Department.