



# Stem Cells @ UCR

**Stem Cell Center Newsletter – Jul 2021, No. 6**

## UCR Researchers Develop a New Method that Expands the World of Small RNAs

A team of researchers led by UCR scientists have developed a new RNA-sequencing method — Panoramic RNA Display by Overcoming RNA Modification Aborted Sequencing (PANDORA-seq) — that can help discover numerous modified small RNAs that were previously undetectable. This study utilized somatic and pluripotent stem cells and features collaborative work from **Dr. Qi Chen's** lab (Biomed) and **Dr. Sihem Cheloufi's** lab (Biochem).



Dr. Cheloufi



Dr. Chen

This study is published in *Nature Cell Biology* and is titled is “PANDORA-seq expands the repertoire of regulatory small RNAs by overcoming RNA modifications.” [Link to article.](#)

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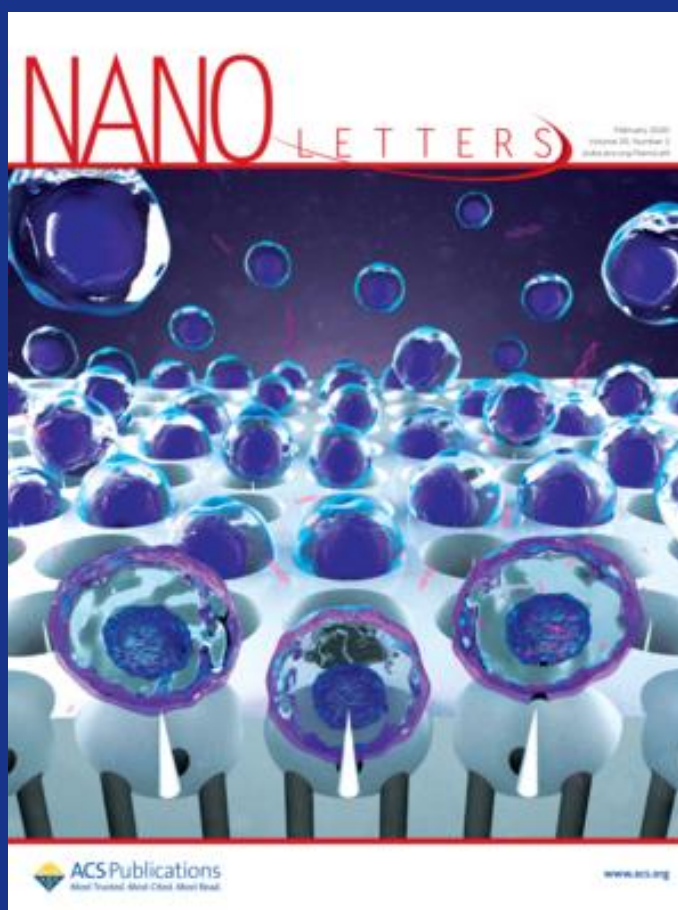
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# Technology Highlight – Rao Lab (UCR)

Deterministic Mechanoporation (DMP): An emerging platform for advanced cellular engineering.

Leveraging a novel nanomechanical gene delivery approach, DMP offers unique promise for efficiently delivering a diverse range of cargos into cells while preserving their viability. In doing so, DMP circumvents the limitations of prevailing transfection approaches, thus providing new opportunities for genetic manipulation and interrogation in both basic and translational research applications. While originally developed within the context of T cell engineering, DMP's cargo- and cell-agnostic mechanism of action opens the possibility for far broader utility, including stem cell engineering.

For more information, check out Dr. Masa Rao's recent publication in *Nano Letters* titled "Massively-Parallelized, Deterministic Mechanoporation for Intracellular Delivery." Link: <https://pubs.acs.org/doi/abs/10.1021/acs.nanolett.9b03175>



## Recent Publications

### Learn about Stem Cell Research @ UCR

Shi, J., Zhang, Y., Tan, D. et al. **PANDORA-seq expands the repertoire of regulatory small RNAs by overcoming RNA modifications.** Nat Cell Biol 23, 424–436 (2021). [LINK](#) (Stem Cell Center affiliated labs that contributed include Murn, Wang, Cheloufi and Chen)

Franklin R, Murn J, Cheloufi S. **Cell Fate Decisions in the Wake of Histone H3 Deposition.** Front Cell Dev Biol. 2021 Apr 20;9:654915. [LINK](#)

Sanchez MM, Morgan JT. **Generation of Self-assembled Vascularized Human Skin Equivalents.** J Vis Exp. 2021 Feb 12;(168). [LINK](#)

Lin SC, Loza A, Antrim L, Talbot P. **Video bioinformatics analysis of human pluripotent stem cell morphology, quality, and cellular dynamics.** Stem Cells Transl Med. 2021 Jun 5. [LINK](#)

Guan BX, Bhanu B, Theagarajan R, Liu H, Talbot P, Weng N. **Human embryonic stem cell classification: random network with autoencoded feature extractor.** J Biomed Opt. 2021 Apr;26(5):052913. [LINK](#)

Soh R, Hardy A, Zur Nieden NI. **The FOXO signaling axis displays conjoined functions in redox homeostasis and stemness.** Free Radic Biol Med. 2021 Jun;169:224-237. [LINK](#)

IKC Martinez, B Bhanu, NI zur Nieden. **Video-based calcification assay: A novel method for kinetic analysis of osteogenesis in live cultures.** (2021). MethodsX 8, 101265. [LINK](#)

RM Charney, MS Prasad, MI García-Castro. **Current insights into neural crest cell development and pathologies.** (2021). Diagnosis, Management and Modeling of Neurodevelopmental Disorders. Chapter 11, 127-137. [LINK](#)

Zhang C, Lin J, Nguyen NT, Guo Y, Xu C, Seo C, Villafana E, Jimenez H, Chai Y, Guan R, Liu H. **Antimicrobial Bioresorbable Mg-Zn-Ca Alloy for Bone Repair in a Comparison Study with Mg-Zn-Sr Alloy and Pure Mg.** ACS Biomater Sci Eng. 2020 Jan 13;6(1):517-538. [LINK](#)

Changlu Xu, Chengli Hung, Yue Cao, and Huinan H. Liu. **Tunable Crosslinking, Reversible Phase Transition, and 3D Printing of Hyaluronic Acid Hydrogels via Dynamic Coordination of Innate Carboxyl Groups and Metallic Ions.** ACS Appl. Bio Mater. 2021 4 (3), 2408-2428. [LINK](#)

# Meet the CIRM-Bridges Interns Working in Stem Cell Labs at UCR

## Sean Connolly

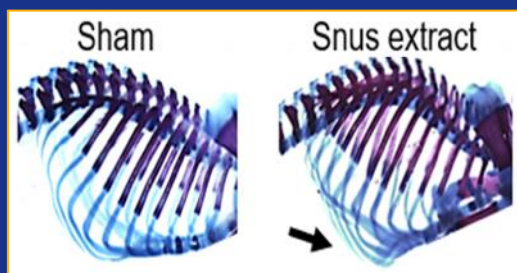
(Mentor: Dr. Hideaki Tsutsui)



Sean has a bachelor's degree in Biology and is currently studying to get his master's in Biology at CSUSB. The goal of his project is to use a new rotary wall bioreactor, supplied to us by Synthecon, to culture human embryonic stem cells and to identify how controlled fluidic shear influences both pluripotency and cell fate. He is currently working on calibrating the optimal temperature to run the bioreactor and hopes to start culturing in it soon.

## Danielle Zamora

(Mentor: Dr. Nicole zur Nieden)



Danielle is currently working towards her B.S. in Biology from CSUSB. The zur Nieden lab is currently assessing *in utero* exposure to tobacco products such as Camel Snus and Camel Blue extracts to determine the effects to skeletal development. Danielle's current project is to quantify discrepancies in phenotypes of various bones.

## Claudia Osuna

(Mentor: Dr. Prue Talbot)



Claudia is an intern from California State University, San Bernardino and she has a Bachelor's of Science in Biology. Her project focuses on researching treatments for SARS-CoV-2, and she is currently testing the potential antiviral properties of Zinc Chloride.

## Jack Ona

(Mentor: Dr. Prue Talbot)



Jack is an intern from California State University, San Bernardino, and he has a Bachelor's of Science in Biology (Minor in Chemistry). Jack's project focuses on researching the therapeutic effects of Melatonin on SARS-CoV-2 viral entry.

## Meet the CIRM-Bridges Interns working in stem cell labs at UCR (continued)

**John Fregeau**  
(Mentor: Dr. Jin Nam)



John is an intern from the California State University, San Bernardino where he will be obtaining his Bachelor's in Biology this summer. He is working in the UCR TREAT Lab (Tissue Regenerative Engineering And mechano Transduction Lab) run by Dr. Nam. John's project is to find the optimal duration needed for neural stem cell differentiation using mechano-electrical stimulation.

**Mehdi Ilbacki Zadeh Mahabadi**  
(Mentor: Dr. Huinan Liu)



Mehdi is an intern from California State University, Channel Islands where he is obtaining his Master's in Biotechnology. Mehdi is studying the proliferation of human neural stem cells in response to magnesium ions and different alkaline pH. He is currently investigating the effect of magnesium alloys on human neural stem cell differentiation.

## Congratulations to these recent graduates!



**Dr. Careen Khachatoorian (Talbot Lab)**  
**Dr. Kris Dias (Karginov Lab)**  
**Dr. Jiajia Lin (Liu Lab)**  
**Dr. Wayne Leu (Liu Lab)**