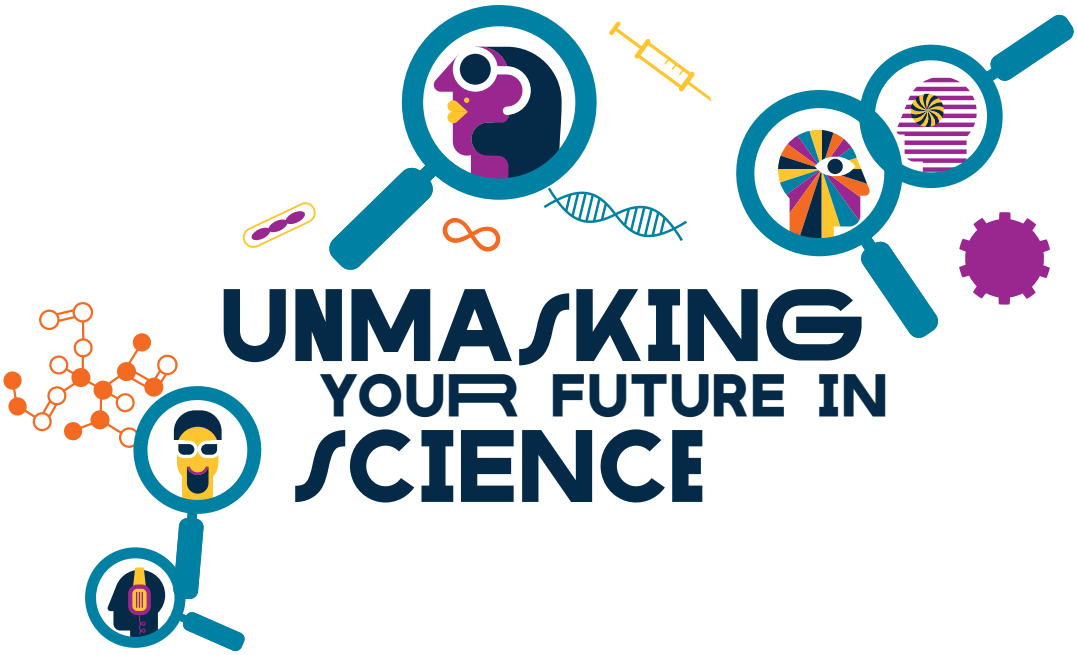
UNMASKING YOUR FUTURE IN SCIENCE

41st Annual Summer Student Research Program Symposium

FRIDAY, AUGUST 5, 2022

UCSF Benioff Children's Hospital Oakland



Theme for the 2022 Summer Student Research Program

Our theme this summer – Unmasking Your Future in Science – is a wordplay on what we hope is the transition out of the pandemic and back to open learning and activity. While masks are not fully out of our lives, we remain hopeful that we will turn the corner in the near future.

Unmasking is also a reference to the concern and intentional action that we must take when anyone in our community cannot breathe. It is asking *"How is racism operating here, and organizing and strategizing to act." (Camara Phyllis Jones)*

Unmasking is also a metaphor for making the road to STEM less obscured for you. It may be hard to see all the opportunities that exist when considering a career in medicine, research, or community care. This program will explore many diverse areas of science to show you options you might not have considered, and will provide tools to start this journey through networking and skill building.

Unmasking is also a symbol for the inevitable sense of imposterism that is pervasive in the early stages of your career. *"We may never be able to banish these feelings entirely, but we can have open conversations about academic or professional challenges. With increasing awareness of how common these experiences are, perhaps we can feel freer about our feelings and build confidence in some simple truths: you have talent, you are capable, and you belong." (Elizabeth Cox)*

Welcome to the 41st annual Summer Student Research Symposium! We are here to applaud this year's incredibly bright, curious and creative interns, who, in their diversity also represent the hope for the future in biomedical research. Though the interns come from diverse racial and socioeconomic backgrounds, all have one common goal — they are considering careers in biomedical research and other health care fields.

Over the past 9 weeks, these students have been exploring challenging basic, clinical and public health questions, actively engaged in weekly scientific lectures, and explored what it means to actually "do science". Their rigorous weekly curriculum included journal clubs, ethics discussions, blogging on social media and some interns shared their science with patients recovering from a bone marrow transplant through the CIRM Pen Pal program. On the lighter side, students connected through small group discussions, lunches, game nights, as well as weekly Wordle and Kahoot contests. While we continue to live in a peri-pandemic world, a number of interns struggled silently with health issues, or had to overcome significant logistical obstacles to conduct their research. Despite these challenges, students have been incredibly strong and resilient, a character trait that will prove invaluable as they continue on in their educational journey.

A total of 39 interns will be presenting the findings of their research. On Friday, August 5th, students will give a 5-minute oral presentation and answer questions about their research from their peers. All presentations will be given over zoom, the format we continued to use for curriculum this summer to allow for flexible schedules and decreased transportation costs. On Friday, each student will present their findings in a scientific poster. Practice sharing scientific data thru different mediums will hone students' ability to communicate complicated science to the public, a skill set essential for budding scientists. We invite you to join these inquisitive young minds as they share what they have explored this summer, topics ranging from the development of special imaging techniques for rare cardiovascular diseases, the impact of pain on cognitive function in sickle cell disease, determining optimal tools to assess vitamin B-12 in rural populations, exploring associations between COVID infections and the increase in pediatric Graves Disease, to investigating the inappropriate use of antibiotics to treat urinary tract infections.

We feel truly privileged and honored to have the trainees in our organization and hope that their summer research experience offered a brief glimpse into the exciting world of biomedical research. Most importantly, thanks to all of the MLK, BCH-Oakland, UCSF and UCB mentors and supervisors who are the backbone of the program. We appreciate their time, effort, and profound commitment to mentor these students. A very special shout out also goes to David Killilea, Roialle Jennings, and Lisa Romero for their hurculean efforts to make this program such a success, Raquel Manzo, Kathy Schultz, Holly Duden, Alison Killilea, Lily Mirels, and all UCSF and BCH-Oakland staff, guest seminar speakers and other friends of the SSRP for their effort and time, which made this summer's program a huge success. We acknowledge the support and funding provided by the NIH, DDCF, CIRM, and the Lubin Scholarship Fund. We wish the trainees all the very best in their future scientific endeavors; please keep in touch as we are always anxious to hear what are alumni are up to!

Sincerely,

Ellen B Fung

Ellen B Fung, PhD
Professor, Pediatrics/Division of Hematology, UCSF
Principle Investigator & Co-Director
Summer Student Research Program

Marsha Treadwell

Marsha Treadwell, PhD
Professor, Pediatrics/Division of Hematology, UCSF
Principle Investigator & Co-Director
Summer Student Research Program

UCSF Benioff Children's Hospital Oakland

UNMASKING YOUR FUTURE IN SCIENCE

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Support for the 2022 Summer Student Research Program was generously funded by the following programs and foundations

National Institutes of Health
STIMULUS:
Science & Technology IMmersion for Underrepresented Learners in the US
R25 HL125451
Co-PI: Fung EB, Treadwell M

California Institute for Regenerative Medicine
SUSTAIN-A-SPARK: Supporting Underrepresented STEM Adapting to Change: Summer Program to Accelerate Regenerative Medicine Knowledge
EDUC3-13114
Co-PI Fung EB, Killilea D

Doris Duke Charitable Foundation
SUSTAIN
SSRP Supporting Underrepresented STEM Adapting to Change
#2020-241
Co-PI: Fung EB, Treadwell M

National Science Foundation
Scholarships for Excellence, Achievement, and Professional Competence in Science, Math, and Engineering
Award No. 1564587
Co-PI: Mark Wong, PhD, Seti Sidharta, PhD

The Bertram Lubin Scholarship Fund

Various Anonymous Donors

Program Advisory Committee Members

Frank Bayliss, PhD
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Director, Student Enrichment Opportunities Office
San Francisco State University

Gino Galvez, PhD
External Evaluator, SSRP
Director, Center for Evaluation and Educational Effectiveness (CEEE)
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California State University, Long Beach

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Executive Director, ACHPP

Caroline Hastings, MD
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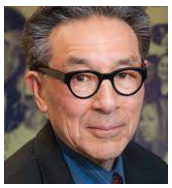
Hematologist/Oncologist
UCSF Benioff Children's Hospital, Oakland



John Matsui, PhD
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Assistant Dean, Biological Sciences
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Vasanthy Narayanaswami, PhD FAHA
Professor of Biochemistry
Program Director, MARC U*STAR
California State University Long Beach

Seti Sidharta, PhD
Director, Center for Science Excellence Program
Contra Costa College

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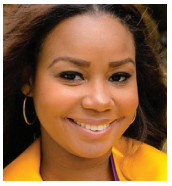
Principle Investigator
Associate Scientist
Co-Director, SSRP
UCSF Benioff Children's Hospital Oakland

Lisa Romero
Student Assistant / Website Creator, SSRP
UCSF Benioff Children's Hospital Oakland



Roialle Jennings
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Program Manager, SSRP
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Professor, Division of Hematology, UCSF
Co-Director, SSRP
UCSF Benioff Children's Hospital Oakland

SSRP 2022 Selection Committees

Undergraduate, March 9, 11am-1 pm

David Killilea, PhD
Manager, Research Resource Program, UCSF
Program Manager, Summer Student Research Program

Ellen Fung, PhD RD CCD
Adjunct Professor, UCSF
Director, Bone Density Clinic
Co-Director, Summer Student Research Program

Marsha Treadwell, PhD
Professor, UCSF
Jordan Fund Endowed Chair
Co-Director, Summer Student Research Program

Kala Mehta, DSc, MPH
Associate Adjunct Professor, UCSF
Director, Pre-Health Undergraduate Program

Tajii Thomas
SSRP Alumni
Graduate, Howard University

Christine McDonald, ScD
Assistant Professor, UCSF
Director of the International Zinc Nutrition Consultative Group

Steve Mack, PhD
Adjunct Professor, UCSF

Karen Daley, MA, LMFT
Many Rivers Healing

Marvin Lopez
Director, Student Programs
Engineering Student Services, UC Berkeley

High School, March 11, 1-3 pm

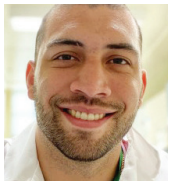
David Killilea, PhD
Manager, Research Resource Program, UCSF
Program Manager, Summer Student Research Program

Ellen Fung, PhD RD CCD
Adjunct Professor, UCSF
Director, Bone Density Clinic
Co-Director, Summer Student Research Program

Kathleen Schultz, MSc
Staff Research Associate II, Research Resource Program
University of California, San Franciscso

Sarah McCarthy
SSRP Alumni
Undergraduate, Stanford University

Phillip Bollinger
IT Service Lead, Retired
UCSF Benioff Children's Hospital Oakland



Tony Munoz, MS
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University of California, San Franciscso

Sarah King, PhD
Research Laboratory Supervisor
University of California, San Franciscso

Hart Horneman
Staff Research Associate III
University of California, San Franciscso

Michelle Ednacott, MS
Program Manager, CHAMPS
UCSF Benioff Children's Hospital Oakland

Summer Student Research Program
Focusing on our diversity

UNMASKING YOUR FUTURE IN SCIENCE

Summer Student Research Program Curriculum

Program Objectives:

1. *Connect with other like-minded and motivated students*
2. *Develop a basic understanding of research design and methodology*
3. *Learn to read and critically evaluate scientific literature*
4. *Present scientific topics effectively and succinctly*
5. *Develop a professional relationship with a scientific mentor*
6. *Create a detailed scientific proposal under the guidance of your mentor*
7. *Gain a deeper understanding of careers in the biomedical sciences*

Overview

The virtual curriculum provided during the 2022 Summer Student Research Program (SSRP) will consist of both **required** and **elective** content, which will be organized through the UCSF learning management system known as the Collaborative Learning Environment (CLE).

The **required curriculum** consists of synchronous and asynchronous programmatic lectures and videos, as well as research with your mentor. It is expected that these items combined with the research you will perform with your mentor will take approximately 20-30 hours per week. About 9 hours of required curriculum will be provided through synchronous Zoom sessions presented on Tuesdays & Thursdays from 2-5 pm. You are expected to be present and interactive for these synchronous Zoom sessions. Other required content, including your research design and proposal development, safety training, and assigned training modules will happen outside of the synchronous Zoom sessions at times of convenience for you and your mentor. It is important that you organize your time to complete these assignments without falling behind. Elements of the required curriculum cannot be substituted, and all aspects must be attended for program completion.

The **elective curriculum** consists of a wide range of **optional** virtual content that we have curated and believe to have value for your educational enrichment and career development. The elective curriculum will consist of both synchronous and asynchronous options, including UCSF Grand Rounds (hospital-wide presentations from clinical staff) and iBiology lecture videos. The individual events, including their dates and times when applicable, will be posted on the CLE.

Required Items to be Completed During First Week of the Program

Instructions and links to each training module are located on CLE.

- Safety training through UC Learning – 4 modules
- Collaborative Institutional Training Initiative (CITI) courses - 3 modules
- Foundational Training in DEI – 1 module

Summer Student Research Program Curriculum

Summer Student Research Program
Focusing on our diversity

UNMASKING YOUR FUTURE IN SCIENCE

Weekly Required Curriculum

- Attendance at every Tuesday and Thursday Zoom lecture from 2-5pm PST.
- View weekly assignments for iBiology & other videos posted on CLE. Viewing before lectures will have the maximum benefit. Discussions of videos will occur in small group sessions.

Programmatic Requirements for all students

- Fill out pre- and post-program online evaluations
- Turn in Individual Development Plan by **Friday, June 17 at 5:00 pm**
- Turn in Research Proposal by **Wednesday, June 29 at 5:00 pm**
- Turn in Personal statement by **Wednesday, July 6 at 5:00 pm**
- Turn in Research abstract by **Wednesday, July 20 at 5:00 pm**
- Attendance at final symposium on **Thursday, August 4th & Friday, August 5th**

Each funding program (NIH, CIRM & DDCF) also has their own specific requirements as well. This will be reviewed during Orientation. Instructions and templates are located on CLE.

Elective Curriculum

- Weekly office hours with SSRP Program Leadership (Wednesdays, 4-5 pm)
- Grand rounds lectures at BCH-Oakland or UCSF West Bay
- Movie & reading suggestions that highlight important topics in STEM
- Additional enrichment material listed on CLE

Social Networking Opportunities

- SSRP alumni presentation
- Small group discussions led by returning students to discuss lectures & related topics
- Social events with SSRP colleagues

Applications Used in Virtual Programming

- Synchronous Presentations: Zoom
- Learning Management System: CLE (Moodle platform)
- Communications: Slack

Program Contact Information

Ellen Fung, PhD	Program Co-Director	ellen.fung@ucsf.edu
Marsha Treadwell, PhD	Program Co-Director	marsha.treadwell@ucsf.edu
David Killilea, PhD	Program Manager	david.killilea@ucsf.edu
Roialle Jennings	Program Coordinator	roialle.jennings@ucsf.edu
Lisa Romero	Student Coordinator	lisa.romero@ucsf.edu

Summer Student Research Program
Lecture Series 2022

Week 1	Theme: Hemoglobinopathies		
6/9/22	Scientific Presentation #1	Ash Lal, MD	Clinical Overview of Thalassemia: a rare hemoglobinopathy
6/9/22	Patient Perspective	Kim Au	A patient's perspective living with Thalassemia
Week 2	**Theme: Diabetes & Epidemiology**		
6/14/22	Day in the Life #1	Janille Miranda	A Day in the Life of a Pharmacy Student
6/14/22	Day in the Life #2	Anthony Muiru, MD	A Day in the Life of a UCSF nephrologist
6/16/22	Scientific Presentation #2	Steve Mack, PhD	Dissecting HLA Association with Type-1-Diabetes in Non-European Populations
6/16/22	Scientific Presentation #3	Alka Kanaya, MD	Type 2 Diabetes: Risk Factors and Prevention Strategies
Week 3	**Theme: Stem Cells & Gene Therapy**		
6/21/22	Day in Life #3	Troy Coaston	A Day in the Life of a First Year Medical Student
6/21/22	Workshop	Elaine Chan	Digital Literacy Workshop
6/23/22	Scientific Presentation #4	Mark Walters, MD	Update on Gene Therapy Trials
6/23/22	Scientific Presentation #5	Marci Moriarty, MSN	Patient perspective on Bone Marrow Transplant
Week 4	**Theme: Gun Violence & Homelessness**		
6/28/22	Professional Presentation	Theo Roth, MD, PhD	Health Care Career Trajectories: MD, PhD and MD/PhD
6/28/22	Scientific Presentation #6	Ryo Sanabria-Higuchi, PhD	What doesn't kill you makes you stronger: stress and aging
6/30/22	Scientific Presentation #7	Margot Kushel, MD	Aging Among Homeless Populations: Causes, Consequences and Solutions
6/30/22	Scientific Presentation #8	Ashkon Shaainfar, MD	Long-term mortality in pediatric firearm assault survivors
Week 5	**Theme: Immunity & The Gut**		
7/5/22	Day in the Life #5	Jacqueline Madden, PNP	A Day in the Life of a Nurse Practitioner
7/5/22	Scientific Presentation #9	David Killilea, PhD	Got Whole Grains?
7/7/22	Scientific Presentation #10	Daniel Soulsby, MD	Health Disparities in Pediatric Rheumatology: The Path to Health Equity
7/7/22	Scientific Presentation #11	Susan Lynch, MD	The Microbiome

Summer Student Research Program Lecture Series 2022

Week 6	Theme: COVID		
7/12/22	Day in the Life of #6	Tony Munoz, MS	A Day in the Life of a Research Associate in BioTech
7/12/22	Workshop	Karen Daly, MA, LMFT	Mindfulness Workshop, Part 1
7/14/22	Scientific Presentation #12	Peter Chin Hong, MD	Top 10 lessons learned from COVID response with a focus on minority populations- a way forward
7/14/22	Scientific Presentation #13	Kim Rhoads, MD	Health Equity Requires Action
Week 7	**Theme: Non-Traditional Therapies**		
7/19/22	Day in the life #7	Oyebimpe Adesina, MD	A Day in the Life of a Hematologist
7/19/22	Workshop	Ellen Fung, PhD and David Killilea, PhD	Bioethics Workshop
7/21/22	Scientific Presentation #14	Carter Lebares, MD	Using Mindfulness to Reduce Stress in Training Surgical Residents
7/21/22	Scientific Presentation #15	June Tester, MD, MPH	Food as Medicine
Week 8	**Theme: Supporting the Disadvantaged Patient**		
7/26/22	Day in the Life #9	Chloe Ghent	A Day in the Life of a Graduate Student
7/26/22	Scientific Presentation #16	Ariel Kauss, PhD	Gene Therapy: Then and Now
7/26/22	Workshop	Karen Daly, MA, LMFT	Mindfulness Workshop, Part 2
7/28/22	Scientific Presentation #17	Alison Reed, MD & Mareen McGrath, PNP	UCSF NICH: Novel Interventions in Children's Healthcare
7/28/22	Scientific Presentation #18	Noemi Spinazzi, MD	Down Syndrome
Week 9	**Theme: You!**		
8/3/22	CIRM SPARK Symposium	MLK Research Buidling, UCSF	
8/4/22	SSRP Oral Presentations		
8/5/22	SSRP Symposium & Celebration	MLK Research Buidling, UCSF	

Mentor Monday

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UNMASKING YOUR FUTURE IN SCIENCE

SSRP Fun-*g* Friday

Please Register by Monday August 1st

We need to know you are coming to the SSRP Symposium on Friday Aug 5th. As a reminder, we need to keep the size of the event manageable (COVID restrictions still in place), but feel free to invite 2 of your favorite people along to the celebration. Everyone must be vaccinated, and must register by ***Monday August 1st*** using this link:

https://na.eventscloud.com/704247

Lunch & Hospital Tour

Join us for Pizza and a tour of the UCSF Benioff Children's Oakland Hospital on Friday July 29th 12-2 pm. So we know how much pizza to order, please RSVP to Henry Ocampo at: henry.ocampo@ucsf.edu Tell him you are part of the SSRP Program.

"Grand Rounds" Clinical Lecture This Week

Tuesday, July 26 at 8:00 am

"Unintentional Injury Prevention Education and Outreach in Alameda"

Kathryn Woolbright
Supervising Program Specialist-Injury Prevention Prog Manager

https://ucsf.zoom.us/webinar/register/WN_Uj5K_KYFQvyLw57R0UMj9w

Flash Talk Recordings

If you want to review the recording of your flash talk before you give your oral presentation, or take a look at any of the past recorded lectures, remember you can find them all in this box drive - HERE

Symposium Details

Each student will be required to give a 5 minute oral presentation, followed by brief Q & A. Order of talks will be sent out by Friday July 29.

Thursday August 4
Oral Sessions
Location: Online via Zoom
10:00-1:30 and 2:00 - 5:00 pm

Friday August 5
Poster Presentation & End of Summer Celebration
Location: MLK Research Building
12:00 - 4:00 pm
Lunch Provided
You may invite up to 2 family or friends. All attendees must be vaccinated and register.

Volume 04 | July 4, 2022

UNMASKING YOUR FUTURE IN SCIENCE

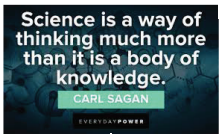
SSRP Mentor Monday

Happy 4th of July! In case you are losing track of time just like I am...We will be starting SSRP week 5 tomorrow. Research projects are in full swing. Students have been engaging with some very interesting speakers, asking incredibly thoughtful questions- we are so impressed! See below for highlights & upcoming SSRP events.

What Your Intern Was Up To Recently...

Day in the Life of Series: Students heard from Ryo Sanabria, PhD, former SSRP mentor now an Asst Prof at USC who studies the intersection b/t stress & aging.
Professional Development: Pathways towards careers in Medicine.
Week 3: "Bone marrow transplant in hemoglobinopathies" Mark Walters, MD. "The Patient Perspective in BMT" Marci Moriarty, RN BSN
Week 4: "*Aging Among Homeless Populations: Causes, Consequences and Solutions*" by Margot Kushel, MD,

"*Long-term mortality in pediatric firearm assault survivors*" Ashkon Shaahinfar, MD



Quote From the Week...

"No Medicine is as Powerful as Housing"
-Dr. Margot Kushel

Your Students Flash Talk

Each student will be giving a 3 min flash talk this summer. Ask your student which Thursday afternoon they will be presenting. You can see prior recorded flash talks at this box drive:

https://ucsf.box.com/s/g27u2vw39ngu3ckre9sr1gutuxazo30i

SSRP is on Instagram

Follow weekly highlights from students in the program, and their reflections on science on our SSRP instagram account:
chorissrp

Supply Reimbursement Details

All mentors may be reimbursed up to $1000. Detailed information was sent out via email on 6/28. Here is a brief summary...

For UCSF Faculty/Staff Mentors: Please order supplies directly through the BearBuy system. The "cart" should then be assigned to Roi Jennings: roialle.jennings@ucsf.edu who will submit the purchase on your behalf with the SSRP chartstring account.

For Non-UCSF Mentors (this includes BCH-Oakland): Send list of supplies to Roi Jennings in an email: roialle.jennings@ucsf.edu, and she will send list to purchaser so the items can be ordered in BearBuy. We will try to order the exact item or its equivalent. If items cannot be found in BearBuy, Roi will contact you with an alternative plan.

Summer Student Research Program
Focusing on our diversity

Reminder

We plan all our didactic programming for students on Tuesdays and Thursdays from 2- 5 pm. If at all possible, please refrain from scheduling meetings with your students during this protected time.

Key dates:

- **Official Program, June 7 to August 5th**
- **3 page Research Proposal Due:** June 29th by 5:00 pm
- **Student Oral Presentations:** Thursday August 4th via Zoom (all students)
- **Poster Presentations:** Friday August 5th at MLK Research Building, Time TBD
- **Synchronous Sessions** – *Required* activity that all students should attend
  - Tuesdays 2:00-5:00 pm (PST) – SSRP programming via Zoom
  - Thursdays 2:00-5:00 pm (PST) – SSRP programming via Zoom
- **Weekly Research Project Sessions** – to be worked out with you and your student

Mentor Monday

SSRP Fun-*g* Friday

Highlights from This Weeks Speakers

Daniel Soulsby, MD

Title: "Health Equity and Pediatric Rheumatology."

Health equity is achieved when every person has the opportunity to attain his or her full health potential

Susan Lynch, PhD

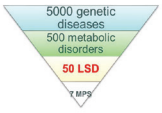
Title: "Bridging the Gap: Introduction to the Microbiome and Health"

Jacqueline Madden, PNP

Day in the Life of ...a Research Nurse. An unexpected career caring for patients with Mucopolysaccaridosis (MPS).

What is MPS?

- MPS are one class of Lysosomal Storage Disorders which are rare, genetic, devastating, total body diseases



Microbiome Perturbation Associates with Disease

REMINDER

Tuesdays & Thursdays 2:00 - 5:00 pm are reserved for SSRP Curriculum. If at all possible, please do not arrange research meetings with your mentor during this time or plan any non-program appointments. If you do have an emergency, sessions are always taped. Recordings can be found in this box drive: https://ucsf.box.com/s/g27u2vw39ngu3ckre9sr1gutuxazo30i.

"Grand Rounds" Clinical Lectures

Tuesday, July 13 at 8:00 am

"Eating Disorders in the Pandemic Era"
Sara M. Buckelew, MD, MPH
Director, Eating Disorders Program
Adolescent Medicine Specialist, UCSF

https://ucsf.zoom.us/webinar/register/WN_Uj5K_KYFQvyLw57R0UMj9w

Individual Development Plan

By now you should have completed your IDP and met with either Roi or Lisa to discuss/revise. This goal setting document will be shared with your mentor shortly. If you have yet to meet to discuss, contact Roi/Lisa to sign up for a 15 min session.

Volume 05 | June 24 2022

SSRP Fun-*g* Friday

Week 3 under our belts now...More SSRP Alumni... Thanks to everyone for your thorough engagement in the program...remember "It's not a sprint but a marathon".

Highlights from This Weeks Speakers

Troy Coaston - SSRP Alumni

Medical Schools Admissions Statistics:
https://mec.aamc.org/msar-ui/#/landing
UWorld for MCAT Preparations:
https://www.uworld.com/
Information about the UCLA PRIME-Program:
https://medschool.ucla.edu/prime
Charles R. Drew Medical School:
https://www.cdrewu.edu/com

Tips from Troy:
-Determine the vibe of the school you wish to attend
-Apply to a breadth of schools
-Determine non-negotiables to ensure a good school-life balance
-Start applying early

Elaine Chan - College Advisor

Free personality test:
https://www.truity.com/test/type-finder-personality-test-new

Job websites:

- Indeed https://www.indeed.com/
- HandShake https://joinhandshake.com/
- Idealist (non-profit work, specifically) https://www.idealist.org/en
- GlassDoor provides insight into workplace culture and salaries
- Volunteer-match
- https://www.volunteermatch.org/search/?l=Oakland%2C+CA%2C+USA
- Job outlook website:

https://www.onetonline.org/
Websites for Free Classes:

- Coursera https://www.coursera.org/
- Udemy https://www.udemy.com/

Mentoring Tips

Thought this was worth sharing again...
New Mentor Tips will be posted next week

- Start by getting to know your student and allowing them to know you. This will ease student anxiety and allow for more open communication.
- Write down your expectations and share them with your student.
- Most students are more successful with a structured learning environment. Map out your objectives, be concrete. Nothing is too basic. Clear objectives allow the student to feel successful and build on their successes.
- Have a weekly plan for your student and frequent check ins, particularly at the start of the program. If too busy, have a lab member meet with them some days.
- Create a plan for 'what to do when finished.' This could be a Box folder with reading material and other projects to enhance their learning when they complete their weekly objectives

Fun-g Friday

SSRP Fun-g Friday

Program officially starts this coming **Monday, June 6th** - See below for program details for the week ahead. Grab onto your hats... going to be a busy week

Orientation

We will start off the program with an orientation on **Monday, June 6th at 1:00 pm**. This is via ZOOM, link here: https://ucsf.zoom.us/j/93536503878?pwd=cUxGcmhlNzhmbTBJUkcyMTk3aHNLZz09

Heads up: Come prepared to share in your small group about something that represents you, and be prepared to explain it. could be an object, a story, or?

Make Up Orientation Monday, June 13, 12-1 pm
For any student still in school on 6/6. The recording from 6/6 will be sent to students ahead of session. Roi and Ellen available to answer student questions.

Sign up for Slack

We will be using SLACK this summer to communicate with each other. Our SLACK channel will be "ssrp-2022". You can login to this channel using this

June is Pride Month

LGBTQ+ Pride Month) is celebrated annually in June to honor the 1969 Stonewall riots, and works to achieve equal justice and equal opportunity for lesbian, gay, bisexual, transgender, and questioning (LGBTQ+) Americans. In June of 1969, patrons and supporters of the Stonewall Inn in New York City staged an uprising to resist the police harassment and persecution to which LGBT Americans were commonly subjected. This uprising marks the beginning of a movement to outlaw discriminatory laws and practices against LGBT Americans.

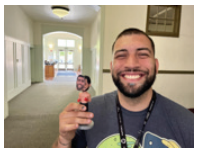
Key dates:

- **All Student Orientation on Monday, June 6th: 1:00 - 4:00 pm (PST)** – *Required* activity that all students should attend unless unable due to final exams.
- **Make up Orientation: Monday June 13th at 12:00 pm (PST)** - *For those students who are still in school on June 6th*
- **Official Program, June 7 to August 5th** – Please put in your calendar to avoid any absences due to travel, vacation, etc.
- **Synchronous Sessions** – *Required* activity that all students should attend
  - Tuesdays 2:00-5:00 pm (PST) – SSRP programming via Zoom
  - Thursdays 2:00-5:00 pm (PST) – SSRP programming via Zoom
- **Weekly Research Project Sessions** – to be worked out with you and your mentor

Roi's Recommendations

Juneteenth Celebrations in Oakland at Lake Merritt
2 Day Festival to celebrate holistic wellness. Partnering with the Bay's best wellness providers, we provide meditation, mental health, yoga, Tai Chi, Self-defence, spoken word, silent party by the Sound Tasting crew, interactive art installations, a youth zone, keynote speakers, black excellence awards, vendors, and more.
11:00 - 8:00 pm Saturday and Sunday
To Register Follow this Link: https://www.afrooak.com/

1. Alignment between science & politics
2. Work fast
3. Hate is a virus
4. Protest is a valid public health response
5. Each community is unique
6. Communicate with empathy
7. Disparities are amplified in pandemics
8. Pandemics are syndemics
9. Money talks
10. The future is bright



Kim Rhoads, MD MS MPH

Title: *Health Equity Requires Action*

"After all is said and done, a lot more is said than done"

"Each of us is a piece of the puzzle & every piece is important" -Arnold Perkins

REMINDER - ABSTRACTS DUE

Your abstract is due Wednesday, July 20 by 5:00 pm
This is a FIRM Deadline
Failure to turn your abstract in on time may result in removal from the abstract book
Abstract Template is in CLE. Turn in your abstract thru CLE

Lunch & Hospital Tour

Join us for Pizza and a tour of the UCSF Benioff Children's Oakland Hospital on Friday July 29th 12-2 pm. So we know how much pizza to order, please RSVP to Henry Ocampo at: henry.ocampo@ucsf.edu Tell him you are part of the SSRP Program.

"Grand Rounds" Clinical Lectures

Tuesday, July 19 at 8:00 am

"Improving Health Care Access for Black and Spanish-speaking patients with Down Syndrome"

https://ucsf.zoom.us/webinar/register/WN_Uj5K_KYFQvyLw57R0UMj9w

Research Ethics Training

All students are required to complete research ethics training by today, 6/10/22. This training is provided through the "CITI- Human Subjects Protection Training" website, and takes roughly 4 hours to complete the required modules. We will be explaining this in more detail the first week of the program, however, some mentors may request you to complete this training ASAP. Email Ms. Jennings if you need links to this training before week 1.

Juneteenth Holiday

Juneteenth is the oldest national commemoration of ending slavery in the US. From its Galveston, TX origin in 1865, the observance of Juneteenth as the African American Emancipation Day has spread across the US. UCSF is honoring the holiday this year on **Monday, June 20th**. UCSF buildings will be on holiday schedule and students should not be expected to work in the lab or clinic on.

There will be a Juneteenth Celebration on Thursday, June 16 from 4:30-6:00 pm at the MLK Research Building Courtyard. If you are interested in attending, please **RSVP HERE**

Pre-Program Survey

Your opinions matter! Critical to the continued success of our program is knowing what you think about it. We conduct pre and post program surveys each year. The Pre-Survey link is **found HERE**
The link can also be found in CLE.
Please complete by Monday, **June 13th, using your SSRP ID: 1XX-22**

SSRP Curriculum

All aspects of the SSRP Curriculum can be found online through our 'CLE'. This program may be familiar to you, as most academic programs use something similar, e.g. Google Classroom, BlackBoard, Canvas. You log into this through: **myaccess.ucsf.edu** once your UCSF account is active. Here you can find upcoming lectures, proposal due dates, and elective activities and readings.

Fun-g Friday

Roi's Recommendations

The warmer weather signifies our want to enjoy life outside of the house. As enjoy some fun in the sun with our friends and family, it is equally important to keep our immune system fueled and ready. A nice smoothie creates the perfect opportunity to have a refreshing drink, to get some of your daily fruits and veggies intake, and ensure you are eating things to boost your immune system.

This week I have really enjoyed making a pineapple and ginger smoothie!

Ingredients:
1 ½ cup frozen pineapple
1 banana
½ cup greek yogurt (I used honey but use a flavor you enjoy or a vegan option)
1 cup coconut milk
fresh ginger (I used a sizable piece because I LOVE ginger, but please use what you're comfortable with)

Roi's Recommendations

Forest Bathing

Stress is a part of everyday life. But too much stress can take a toll on your mind and body. Feeling stressed for long periods of time can lead to depression, increased anxiety, and even physical symptoms, like body aches. One simple way to manage stress? Spending time in nature — or forest bathing.

What is forest bathing?
In 1982, the Japanese Ministry of Agriculture created the term *shinrin-yoku*, which translates to "forest bathing" or "absorbing the forest atmosphere." The practice encourages people to simply spend time in nature — no actual bathing required. It's also very low impact, which means you don't have to go for intense trail runs or hikes. The goal of forest bathing is to live in the present moment while immersing your senses in the sights and sounds of a natural setting.

The health benefits of forest bathing:
There's a reason why the largest cities in the world have parks, trees, and pockets of nature woven throughout their busy streets. One study by the *International Journal of Environmental Health Research* found that spending time in an urban park can have a positive impact on a person's sense of well-being. Aside from city parks, the more in-depth practice of forest bathing has been found to lower blood pressure, heart rate, and levels of harmful hormones — like cortisol, which your body produces when it's stressed.[2] This can help put you in a more calm and relaxed state. In addition, studies have found that simply spending 10 to 20 minutes a day outdoors can lead to increased well-being and happiness — and decreased amounts of stress.

How to practice forest bathing:
While the word "forest" is in the name of this practice, don't worry — heading out to a heavily wooded area isn't required. You could take a trip to a nearby park, your favorite local trail, the beach, or any natural setting. Just be sure to turn off or silence your phone or other devices. The key is to practice mindfulness. That means being present and fully in the moment. Once you've arrived at your destination, take a few deep breaths and center yourself. Focus on what your senses are taking in — whether it's the scent of clean ocean air or a chorus of chirping birds. Spend a few moments simply observing your surroundings. Sit and watch how the trees sway in the wind or simply walk around. If you decide to walk, go at a leisurely pace and without a specific destination in mind. It's important to let your mind and senses explore and indulge.

-Excerpt from Kaiser Permanente "Thrive"

SSRP Fun-*g* Friday

First week with all SSRP interns. First small group session. First in our "Day in the life of Series" presentations... Exciting stuff and we are just getting started. Thanks to everyone for your thorough engagement in the program...remember "It's not a sprint but a marathon". Enjoy the long weekend!

Parking Options for Students at BCH-Oakland Campus

The north parking lot (off 58th St) is an open lot for UCSF employees and is currently free (if you can believe it). Students interning either at the MLK or BCH-Oakland campuses are welcome to park here and walking the remaining 5 blocks (or waiting for the free shuttle).

"Grand Rounds" Clinical Lectures

BCH-Oakland
June 21, 2022, 8:00 am (Zoom)
"Hydronephrosis: From Prenatal Imaging to Imaging After UTIs"
Speker: Aris H. Oates, MD
Pediatric Nephrologist

Personal Statements

Reminder, your personal statements are due on **Wednesday, July 6th by 5:00 pm**. Please turn them in thru CLE. 200 words maximum. For examples from past years students, take a look at the SSRP website "Symposium Guides"

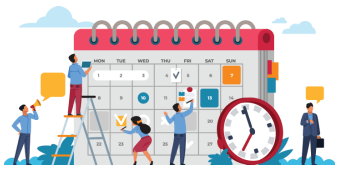
"Grand Rounds" Clinical Lectures

No Grand Rounds this week due to the 4th of July Holiday.
More time to work on your Personal Statements :)

Individual Development Plan

You should have completed your IDP. Now it's time to meet with Roi or Lisa to share your plan. Please use this google form to schedule your 15 min session.

Sign up here



July 4th Holiday

UCSF is honoring the holiday this year on **Monday, June 4th**. UCSF buildings will be on holiday schedule and students should not be expected to work in the lab or clinic on this holiday.

Saving $ In College

Elaine Chan shared some additional information with us about creative ways to save money while going to college as well as a worksheet for budgeting expenses. We will drop these in SLACK for those interested. Thanks Elaine!

David's Dais

David's Dais

The first week of SSRP is in the books and we've already covered a lot, from scientific literacy to the treatment of (& living with) a hemoglobinopathy. Hopefully you have communicated with your mentor to work out where you be and what topic you will be working on this summer. And maybe you have started researching the questions that you will be exploring, like googling the key concepts or reviewing previous papers by your mentor you found on PubMed or ResearchGate. Remember that it's up to you to 'own your project.'

So how to get the most out of this program? Be a sponge. This program will cover many different aspects of biomedical science, and you might be surprised where your path will take you. The specific project you are given may not seem esoteric or unexciting at first, but try to figure out how it fits into the bigger picture or community outreach. You may learn about another angle of research or a unique tool that someone is working with in your group that ends up being really cool. Engaging with your group and doing your best on your own project is the best way to increase your opportunities for inspiration.

This happened to me in graduate school. I decided to work in a lab that studied lung diseases because the PI seemed supportive, but soon found out that the lung stuff bored me to tears. I stuck with it, and five years later had my degree. During that time, I came across a few papers on how imbalances in iron contributed to lung disease. For whatever reason, that fascinated me. After graduating, I sought out a lab where I could learn all about iron and health. That search brought me to UC Berkeley and eventually a happy life here in the Bay Area. I found out that I really loved understanding how metals act in the body, leading to the ultimate direction of my career. I still go to work excited about what new thing I can learn, which is such a gift. My interest of metals has introduced me to a huge community of like-minded colleagues, helped me travel the world in conferences, and even spread into my life outside of work with volunteer work teaching metal chemistry to elementary school classes and as a hobby collecting element specimens, though the purchase of uranium on eBay probably has me on a government watch list! (If you like to geek out on the periodic table too, check out https://periodictable.com.) If I had not forced myself to finish my work in the pulmonary lab, I might never have found the area of science that really inspires me.

My experience is not uncommon, and in fact most scientists and clinicians do not take a linear path. I encourage you to ask your mentors and fellow lab members about their challenges and inspirations. How did they arrive at their current job? What advice would they give to their young self? Knowing what they know now, would they choose a different field? Or a different career? It can be scary when thinking about what you want to do for your life's work, but this is a safe-space to begin that exploration. In the words of Marie Curie (first female recipient of the Nobel Prize & discoverer of 2 elements on the period table, "Nothing in life is to be feared, it is only to be understood. Now is the time to understand more, so that we may fear less."

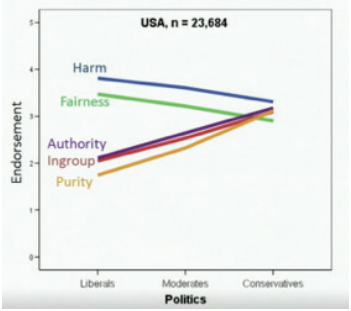
David's Dais

Sorry, no words of wisdom this week... David's on vacation

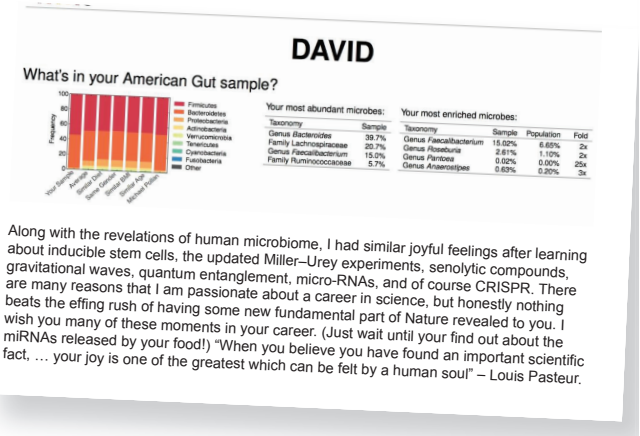
David's Dais

Dr. Lebares brought up some hard questions in her lecture on Thursday: How do we change behavior? What can we do when patient choices are counterproductive to their health, or the health of the community? The anecdote about her patient willing to lose his leg to diabetic necrosis in order to continue enjoying sweets was striking. Yet I imagine similar (hopefully less dramatic) conversations are everyday occurrences in clinical care. Perhaps it is reassuring to know that decision-making is itself a science that can be studied and better understood. The Science of Behavior Change offers helpful resources for the health profession. In fact, we could all use some training from this field of science and apply its tools in everyday life.

During Dr. Lebares' lecture, I couldn't stop thinking about current events. While best to avoid politics, I'm going there because of the recent Jan 6th hearings which have me feel a lot of anger and frustration tonight. I have immediate family living in the rural South who, let's say, are evangelical for the opposite side of the political spectrum than me. I am dumbfounded by their beliefs and wonder if we even have a common language anymore. Yes, political identity and tribalism is powerful, but I *still* want to change their minds. Fortunately, this too is science. I recently revisited the principles of Moral Foundations Theory, popularized in Jonathan Haidt's book The Righteous Mind. The theory reveals several moral 'foundations' (see graph) that have different value settings based on a person's ideology, as determined from a large international study. It helped me to understand why my aunt rants about lawlessness while missing the obvious social inequities that exist within the typical news story. It also helped me to craft my own arguments to better fit her ideological context for a real conversation.



No social theory is not perfect, but MFT gives me hope that science will help us overcome what sometimes seems like an insurmountable social illness in our time. As Haidt said, "Morality binds and blinds. It binds us into ideological teams that fight each other as though the fate of the world depended on our side winning each battle. It blinds us to the fact that each team is composed of good people who have something important to say." I struggle to see the way forward right now, but I take comfort in knowing that many previous social challenges seemed impassible but were eventually advanced by scientific reason.



David's Dais

David's Dais

In the summer of 1999, NASA lost a $300 million space probe called the Mars Climate Orbiter. The MCO was a spunky spacecraft with cutting-edge instruments designed to study the surface and hydrology of Mars in preparation for advanced missions to the Red Planet. Instead, the probe likely burned up upon entry, setting planetary exploration back almost 10 years. So what happened? Turns out the builder Lockheed Martin was using Imperial units in their code, while NASA was obviously using metrics. No one bothered to check this, and the MCO entered the Martian atmosphere at a suicidal trajectory. The spacecraft was most literally lost in translation. Insert 3 face-palm and 1 teary-eyed emoji.

While tragic, this story still provides a learning opportunity. The obvious lesson here is that details matter. Whether it's absorbance values from a lab spectrophotometer, or diagnostic readings in a medical chart review, or a spat of new code from a batched job in R, the key to success is to make certain you understand the details that underpin your data. What are your measurements actually showing? What are the assumptions in your data? How could your data be interpreted in a different way? Be critical. Test your alternatives. Own your project. Share any concerns you have with your supervisor or mentor, as your attention to detail might mitigate any inherent errors. Occasionally, these irregularities lead to major shifts in the understanding of the system you are trying to study. Attention to detail has led to many surprise discoveries, including penicillin, rubber, microwaves, superglue, Velcro, and a host of other can't-live-without-it parts of everyday life. It's like Dr. Mack said, the most important scientific tool is the human brain.

So what did NASA do after the humiliating failure of the MCO? They identified the error and put procedures in place to make sure incompatible technical data would never happen again. In 2005, NASA launched the Mars Reconnaissance Orbiter and it has performed flawlessly. The MRO has revealed that Mars had diverse wet environments billions of years ago and still remains dynamic today. MRO has also discovered underground geologic structures, novel atmospheric layers, and documented the planet's daily weather cycle. The spacecraft remains productive in an extended mission more than 10 years after completion of its primary mission. The data from the MRO will be fundamental to future human missions to Mars. "*Do not judge me by my successes, judge me by how many times I fell down and got back up again*." - Nelson Mandela

David's Dais

If you peek outside just before sunrise, you can see an alignment of planets that hasn't happened since the early 1990s. In the line from the horizon up, you'll find dim Mercury, bright Venus, reddish Mars, also bright Jupiter, and yellowish Saturn. And depending on when you look, the moon will be dancing between different planets, with the photo above projecting the June 24th pre-dawn sky. Pretty cool stuff. As a night owl, I don't function well in the early morning, but I plan to make myself wake up and check out this planet party!

So what contrived metaphors can I draw from this? Well, first take advantage of the many opportunities that the universe provides. You can start with the ones in this program. Commit yourself to asking a question of our presenters, especially if you are shy. Reach out to a speaker who inspired you and ask to be part of their network. Ask your mentor if you can continue to assist on their project remotely after the program ends. Try to push your comfort zone – you might like what happens. Secondly, the planets may be hard to see due to the noise of light pollution, and that happens in science too. There is always noise in the data. Sometimes it is external, so you have to improve your methodology or refine your analytic question. Sometimes the noise is internal from our own biases, so you have to be creative in your approach, but also seek advice from your clinical or research team to see the problem more clearly. Finally, this cosmic show reminds us to appreciate the bigger picture. Yes, this alignment is just a coincidence of orbital mechanics, but it can still bring the Passion, Beauty, and Joy that makes science a human endeavor – what scientist & larger-than-life personality Bill Nye calls the "PB&J." Bill has many great one-liners, but I'll just end with "Science rules!"

d's Dais

This week we received the first images from NASA's James Webb Space Telescope, a spacecraft that was plagued by delays, technical roadblocks, cost overruns, and was almost killed off by bureaucrats several times. But NASA persisted, and now we have an insanely powerful space astronomy craft that will be used to solve many secrets of the universe, including questions we don't even know to ask yet. You might have heard of a similar story with Hubble, which was also beset with problems including a critical flaw in the mirror that had to be fixed in space. But once NASA overcame these difficulties, Hubble unexpectedly revealed the accelerating expansion of the universe, resulting in Nobel Prizes and a new understanding of reality. I expect JWST will do no less. Will we find dark matter? Exoplanets with oxygen? Planet Dune?

My favorite image from JWST is of the Carina Nebula for its grandeur and scale. In the center stellar system are two massive stars known as Eta Carinae which have an interesting story. Currently the system appears a weak single point of light to unaided eye (visible only in the Southern hemisphere). However in the 1800s, the point swelled to become the second brightest star in the sky for several days before slowly fading away over months. How strange that must have been for people of the time, knowing nothing about stellar evolution and assuming all stars were fixed & eternal. Were they inspired or frightened? Did opportunists immediately publish scrolls stating 'Ye End is Nigh!' Now we know that the star system erupted and blew out 30 solar masses worth of material, creating another nebula inside the bigger one. Eta Carinae is at the end of life, and one day soonish will explode into a supernova to brighten our sky once again. In the process it will form massive amounts carbon, oxygen and the heavier elements to seed the next generation on many other pale blue dots. "Modern science has been a voyage into the unknown, with a lesson in humility waiting at every stop." - Carl Sagan

Scientific Wordles

6/6/22
Acronym for a spectrum of scientific fields of study

6/7/22
A marker of success for scientific literature, perhaps

6/9/22
An important type of hemoglobin

6/14/22
Relating to the ultimate human filter

6/16/22
Cells that counterbalance action of insulin

6/21/22
Text that links you to another site

6/23/22
A part of CRISPR

6/28/22
It's a good way to start career as an MD/PhD

6/30/22
This 'bump' modifcation is a loophole around an illegal automatic rifle

7/5/22
A central tenant of nursing theory?

7/7/22
Can be found in a microbiome

7/12/22
Your point at which you night seek outside help

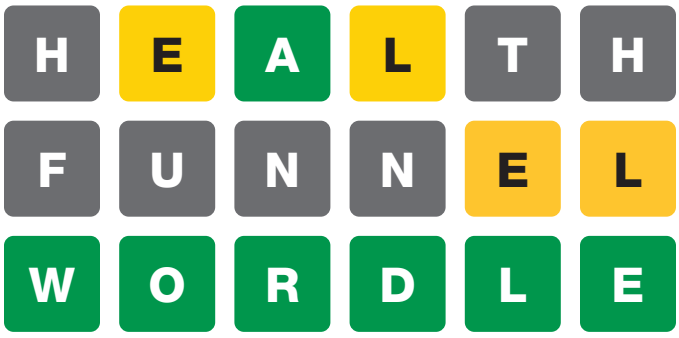
7/14/22
Sometimes lost during COVID

7/19/22
Another important bodily fluid

7/21/22
Mindfulness can be a personal type of this

7/26/22
Early mechanism of delivering gene therapy

7/28/22
People with Down's syndrome have this chromosome



VIRTUAL MENTOR LUNCH

WEDNESDAY JULY 13TH
12PM VIA ZOOM

SSRP UPDATES AND CHECK-IN

SHARE RESOURCES AND STRATEGIES FOR SUCCESS

Summer Student Research Program

Focusing on our diversity

FOOD IS ON US!

CHECK YOUR EMAIL FOR A GIFT CARD TO PANERA COURTESY OF SSRP

Weekly Journal Clubs

Research

JAMA Surgery | Original Investigation

Association of Surgeon-Patient Sex Concordance With Postoperative Outcomes

Christopher J. D. Wallis, MD, PhD; Angela Jerath, MD, MSc; Natalie Coburn, MD, MPH; Zachary Klaassen, MD, MSc; Amy N. Luckenbaugh, MD; Diana E. Magee, MD, MSc, MPH; Amanda E. Hird, MD, MSc; Kathleen Armstrong, MD, MSc; Bheeshma Ravi, MD, PhD; Nestor F. Esnaola, MD; Jonathan C. A. Guzman, MD; Barbara Bass, MD; Allan S. Detsky, MD, PhD, CM; Raj Satkunasivam, MD, MS

Invited Commentary

Supplemental content

IMPORTANCE Surgeon sex is associated with differential postoperative outcomes, though the mechanism remains unclear. Sex concordance of surgeons and patients may represent a potential mechanism, given prior associations with physician-patient relationships.

OBJECTIVE To examine the association between surgeon-patient sex discordance and postoperative outcomes.

DESIGN, SETTING, AND PARTICIPANTS In this population-based, retrospective cohort study, adult patients 18 years and older undergoing one of 21 common elective or emergent surgical procedures in Ontario, Canada, from 2007 to 2019 were analyzed. Data were analyzed from November 2020 to March 2021.

EXPOSURES Surgeon-patient sex concordance (male surgeon with male patient, female surgeon with female patient) or discordance (male surgeon with female patient, female surgeon with male patient), operationalized as a binary (discordant vs concordant) and 4-level categorical variable.

MAIN OUTCOMES AND MEASURES Adverse postoperative outcome, defined as death, readmission, or complication within 30-day following surgery. Secondary outcomes assessed each of these metrics individually. Generalized estimating equations with clustering at the level of the surgical procedure were used to account for differences between procedures, and subgroup analyses were performed according to procedure, patient, surgeon, and hospital characteristics.

RESULTS Among 1 320 108 patients treated by 2937 surgeons, 602 560 patients were sex concordant with their surgeon (male surgeon with male patient, 509 634; female surgeon with female patient, 92 926) while 717 548 were sex discordant (male surgeon with female patient, 667 279; female surgeon with male patient, 50 269). A total of 189 390 patients (14.9%) experienced 1 or more adverse postoperative outcomes. Sex discordance between surgeon and patient was associated with a significant increased likelihood of composite adverse postoperative outcomes (adjusted odds ratio [aOR], 1.07; 95% CI, 1.04-1.09), as well as death (aOR, 1.07; 95% CI, 1.02-1.13), and complications (aOR, 1.09; 95% CI, 1.07-1.11) but not readmission (aOR, 1.02; 95% CI, 0.98-1.07). While associations were consistent across most subgroups, patient sex significantly modified this association, with worse outcomes for female patients treated by male surgeons (compared with female patients treated by female surgeons: aOR, 1.15; 95% CI, 1.10-1.20) but not male patients treated by female surgeons (compared with male patients treated by male surgeons: aOR, 0.99; 95% CI, 0.95-1.03) (*P* for interaction = .004).

CONCLUSIONS AND RELEVANCE In this study, sex discordance between surgeons and patients negatively affected outcomes following common procedures. Subgroup analyses demonstrate that this is driven by worse outcomes among female patients treated by male

Research

JAMA Pediatrics | Original Investigation

Positive Childhood Experiences and Adult Mental and Relational Health in a Statewide Sample

Associations Across Adverse Childhood Experiences Levels

Christina Bethell, PhD, MBA, MPH; Jennifer Jones, MSW; Narangerel Gombojav, MD, PhD; Jeff Linkenbach, EdD; Robert Sege, MD, PhD

Supplemental content

IMPORTANCE Associations between adverse childhood experiences (ACEs) and risks for adult depression, poor mental health, and insufficient social and emotional support have been documented. Less is known about how positive childhood experiences (PCEs) co-occur with and may modulate the effect of ACEs on adult mental and relational health.

OBJECTIVE To evaluate associations between adult-reported PCEs and (1) adult depression and/or poor mental health (D/PMH) and (2) adult-reported social and emotional support (ARSES) across ACEs exposure levels.

DESIGN, SETTING, AND PARTICIPANTS Data were from the cross-sectional 2015 Wisconsin Behavioral Risk Factor Survey, a random digit-dial telephone survey of noninstitutionalized Wisconsin adults 18 years and older (n = 6188). Data were weighted to be representative of the entire population of Wisconsin adults in 2015. Data were analyzed between September 2016 and January 2019.

MAIN OUTCOMES AND MEASURES The definition of D/PMH includes adults with a depression diagnosis (ever) and/or 14 or more poor mental health days in the past month. The definition of PCEs includes 7 positive interpersonal experiences with family, friends, and in school/the community. Standard Behavioral Risk Factor Survey ACEs and ARSES variables were used.

RESULTS In the 2015 Wisconsin Behavioral Risk Factor Survey sample of adults (50.7%

Author Affiliations: Johns Hopkins Bloomberg School of Public Health and Child and Adolescent Health Measurement Initiative, Baltimore, Maryland (Bethell, Gombojav); Alliance for Strong Families and Communities, Milwaukee, Wisconsin (Jones); The Montana Institute, Bozeman, Montana (Linkenbach); Institute for Clinical Research and Health Policy Studies, Tufts Medical Center, Boston, Massachusetts (Sege).

Corresponding Author: Christina Bethell, PhD, MBA, MPH, Bloomberg School of Public Health, Johns Hopkins University, 615 N Wolfe St, Room E4152, Baltimore, MD 21205 (cbethell@jhu.edu).

1/10

JAMA Network Open

Original Investigation | Environmental Health

Residential Green Space and Cognitive Function in a Large Cohort of Middle-Aged Women

Marcia P. Jimenez, MSc, MA, PhD; Elise G. Elliott, PhD; Nicole V. DeVille, PhD; Francine Laden, ScD; Jaime E. Hart, ScD; Jennifer Weuve, ScD; Francine Grodstein, ScD; Peter James, ScD

Abstract

IMPORTANCE Green space can decelerate cognitive decline by supporting physical activity, psychological restoration, or reducing exposure to air pollution. However, existing studies on the association of green space with cognitive decline are limited.

OBJECTIVE To examine whether residential green space was associated with cognitive function in middle-aged women.

DESIGN, SETTING, AND PARTICIPANTS Starting in 1989, the Nurses' Health Study II enrolled 116 429 female nurses aged 25 to 42 years residing in the US. In 2014 to 2016, 40 082 women were invited to complete an online cognitive battery. This cohort study analyzed women who had data on both green space exposure and cognitive measures. Data analysis was conducted from June to October 2021.

EXPOSURES Residential exposure to green space was assessed using the Normalized Difference Vegetation Index, a satellite-derived indicator of the quantity of ground vegetation. Landsat satellite data at 270-m and 1230-m buffers around each participants' residential addresses in 2013 were used.

MAIN OUTCOMES AND MEASURES In 2014 to 2016, cognitive function was measured using a self-administered online battery, the Cogstate Brief Battery, consisting of 4 tasks measuring psychomotor speed, attention, learning, and working memory; 3 composite scor... together all tasks, psychomotor speed/attention, and learning/working memory, we... evaluated potential mediators, including air pollution, depression,...

RESULTS The analytical sample included 13 594 women, of who... (SD) age was 61.2 (4.6) years. In models adjusted for age at asse... and neighborhood socioeconomic status, green space was asso... global Cogstate composite (mean difference per IQR in green sp... psychomotor speed/attention (mean difference in score, 0.05... This difference in scores is similar to the difference observed i... By contrast, there was no association between green space a... difference, 0.0300; 95% CI, −0.0003 to 0.0500).

CONCLUSIONS AND RELEVANCE These findings suggest t... may be associated with modest benefits in cognition in mid...

JAMA Network Open. 2022;5(4):e229306. doi:10.1001/jamanetworkop...

Key Points

Question Is there an association between exposure to green space and cognitive function throughout middle age?

Findings In this cohort study that included 13 594 women, increasing green space was associated with higher scores of overall cognition and psychomotor speed/attention. In contrast, there was no association between green space and learning/working memory.

Meaning These findings suggest that green space exposure should be investigated as a potential population-level approach to improve cognitive function.

Supplemental content

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No One Size Fits All: A Qualitative Study of Clerkship Medi... Perceptions of Ideal Supervisor Responses to Microaggre...

Justin L. Bullock, MD, MPH, Meghan T. O'Brien, MD, MBE, Prabhjot K. Minhas, Alicia Fernandez, MD, Katherine L. Lupton, MD, and Karen E. Hauer, MD, PhD

Abstract

Purpose
This study explores medical students' perspectives on the key features of ideal supervisor responses to microaggressions targeting clerkship medical students.

Method
This single-institution, qualitative focus group study, based in an interpretivist paradigm, explored clerkship medical students' perceptions in the United States, 2020. During semistructured focus groups, participants discussed 4 microaggression scenarios. The authors employed the framework method of thematic analysis to identify considerations and characteristics of ideal supervisor responses and explored differences in ideal response across microaggression types.

Results
Thirty-nine students participated in 7 focus groups, lasting 80 to 92 minutes per group. Overall, students felt that supervisors' responsibility began before a microaggression occurred, through anticipatory discussions ("pre-brief") with all students to identify preferences. Students felt that effective bystander responses should acknowledge student preferences, patient context, interpersonal dynamics in the room, and the microaggression itself. Microaggressions necessitated an immediate response. After a microaggression, students preferred a brief one-on-one check-in wit... the most su... whether fur... be helpful.

Conclusio...
Students de... supervisor b... incorporate... and the mi... are best re... discussion. Bystander Guide as a... preferred... response... Effective in... educational safety and shift power dynamics to empower the brief student target.

Diversity is an essential characteristic of successful institutions.[1] In medicine, diversity enhances educational experiences in training, promotes social equity, and improves patient health outcomes.[2–4] Institutions with an advanced understanding of the importance of diversity move beyond mere demographic representation of multiple social identity groups to drive institutional culture toward meaningful inclusion where diversity is prioritized as fundamental to institutional excellence.[1] However, medical institutions fall short of these ideals, with learning environments that are not inclusive of diverse individuals. In particular, students of color experience biases in assessment and advancement, decreased social capital, racism, and microaggressions that negatively impact their learning and performance.[5–8] Despite harmful consequences of frequent racial and gender microaggressions in medicine, a gap remains in our collective understanding of how best to address microaggressions to improve the clinical learning environment.[9–11]

Microaggressions are verbal, behavioral, or environmental indignities that communicate hostility or negativity—whether intentional or unintentional—toward a target's identity(ies).[12] Patients, providers, peers, and the learning environment itself are all common sources of microaggressions, which pervade the clinical learning environment to the detriment of learners, providers, and patients.[9,10,13–15] Sue and colleagues characterized 3 types of interpersonal microaggressions: microassaults, microinsults, and microinvalidations[6,12] (see Table 1). Microassaults, the most egregious form, are verbal or nonverbal attacks that offend the target (e.g., patient refusing care from minority providers due to race).[16] Microinsults are subtle remarks which demean the target, even if unintended by the perpetrator (e.g., calling a female doctor a nurse). Finally, microinvalidations negate or dismiss the target's lived experience (e.g., saying that minority students these days are too sensitive to microaggressions). Microaggressions may cause both psychological and physiological distress. They are associated with depressive symptoms, anxiety, and alcohol use and may alter diurnal cortisol secretion.[17–19] Medical students report that microaggressions trigger and exacerbate racial/ethnic stereotype threat, a process in which fear of fulfilling negative stereotypes about one's group results in lower performance.[10,20,21] Stereotype threat, in turn, triggers negative emotions and increases students' cognitive load, and is associated with lower core clerkships grades.[10,22]

We use the terms "source," "target," and "bystander" to refer to the microaggressor, recipient of the microaggression, and witness to a microaggression, respectively.[23] Critical race theory (CRT), with its focus on

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THE SCIENCE OF RESEARCH ON RACIAL/ETHNIC DISCRIMINATION AND HEALTH

The Influence of Implicit Bias on Treatment Recommendations for 4 Common Pediatric Conditions: Pain, Urinary Tract Infection, Attention Deficit Hyperactivity Disorder, and Asthma

Janice A. Sabin, PhD, MSW, and Anthony G. Greenwald, PhD

Objectives. We examined the association between pediatricians' attitudes about race and treatment recommendations by patients' race.

Methods. We conducted an online survey of academic pediatricians (n = 86). We used 3 Implicit Association Tests to measure implicit attitudes and stereotypes about race. Dependent variables were recommendations for pain management, urinary tract infections, attention deficit hyperactivity disorder, and asthma, measured by case vignettes. We used correlational analysis to assess associations among measures and hierarchical multiple regression to measure the interactive effect of the attitude measures and patients' race on treatment recommendations.

Results. Pediatricians' implicit (unconscious) attitudes and stereotypes were associated with treatment recommendations. The association between unconscious bias and patient's race was statistically significant for prescribing a narcotic medication for pain following surgery. As pediatricians' implicit pro-White bias increased, prescribing narcotic medication decreased for African American patients but not for the White patients. Self-reported attitudes about race were associated with some treatment recommendations.

Conclusions. Pediatricians' implicit attitudes about race affect pain management. There is a need to better understand the influence of physicians' unconscious beliefs about race on pain and other areas of care. (*Am J Public Health.* 2012;102:988–995. doi:10.2105/AJPH.2011.300621)

Management of asthma, attention deficit hyperactivity disorder (ADHD), urinary tract infection (UTI), and pain are common conditions routinely treated by pediatricians. The childhood prevalence of asthma, the most common chronic pediatric illness, is 10% (n = 7 million), with 8% of White children, 8% of Hispanic children, and 17% of non-Hispanic Black children currently diagnosed with asthma.[1] African American children experience the highest rates of asthma hospitalization and asthma mortality relative to other racial and ethnic groups, and this disparity is widening.[2] ADHD is diagnosed in 4.1% of all children, with the greatest prevalence among White children (5.1%). However, among male children, prevalence of ADHD by race is 3% for Hispanics, 4.3% for Whites, and 5.65% for African Americans.[3] A meta-analysis to determine prevalence of UTI in children found that UTIs accounted for 5% to 14% of all pediatric emergency room visits annually and for 7% of infants presenting with fevers.[4]

Racial and ethnic disparities are found in asthma care, medication use for ADHD, children's timely and appropriate receipt of medication, pain management, and quality of primary care.[2,5–8] For asthma, the rate of emergency department visits is 3 times higher for minority children than for nonminority children and use of daily anti-inflammatory medication is lower.[9] African American and Hispanic children are more likely to have a potentially avoidable asthma hospitalization.[9] African American and Hispanic children with asthma in the Military Health System are less likely to see a specialist than White children with asthma,[9] even though specialist care for asthma is more likely than primary care to follow recommended guidelines.[10] Minority children have lower likelihood of receiving a diagnosis of ADHD and of receiving

medication for ADHD.[11] For the current research, we adopted the following National Institutes of Health definition of "race" (derived from a more detailed definition by the National Research Council):

> a continuously evolving social construct used to categorize individuals into groups that have typically been based on the physical characteristics (e.g. skin color, hair texture or other distinctive characteristics, etc.) of an individual or their ancestors.[12]

We used the following Institute of Medicine definition of "ethnicity": "a concept referring to a shared culture and way of life."[5(p523)]

Pain management is an area in which racial and ethnic disparities are well documented and persist.[8,13] In a national study of hospital emergency departments that measured pain medication–prescribing patterns over a 13-year period (1993–2005), White patients were more likely to receive an opioid analgesic than African American, Hispanic, or Asian patients.[8] Differential treatment, which was found among adults and children for all types of pain, was greater as severity of pain increased, and the disparities did not decrease over time.[8]

Compared with research on adult pain, there is less research on racial and ethnic disparities in pain management for children, although pain is generally undertreated in children.[14] One study in a pediatric hospital setting showed that Latino children received 30% less opioid analgesics than did White children for early postoperative pain.[7]

It is not uncommon for minority patients or parents to report discrimination in health care.[15–20] Parents of minority children report lower scores on interpersonal relationship with primary care providers, lower scores for provider communication, and less participatory

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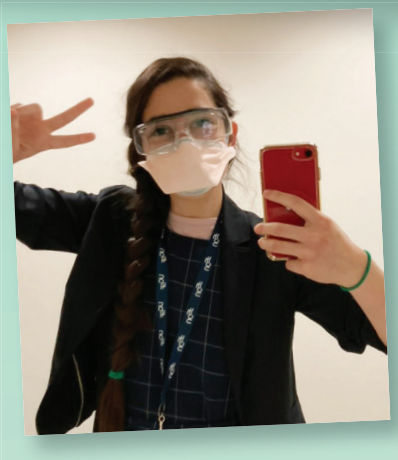
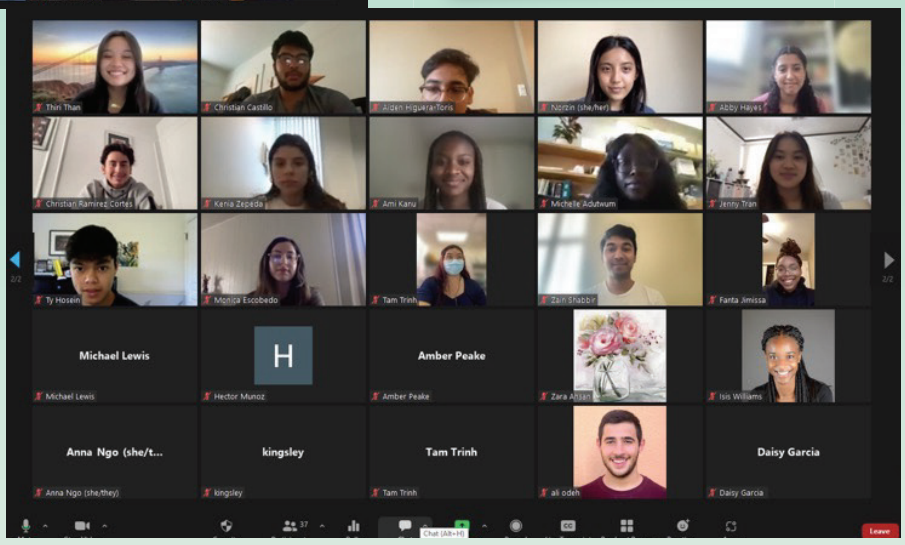
Summer Students 2022


UNMASKING
YOUR FUTURE IN SCIENCE

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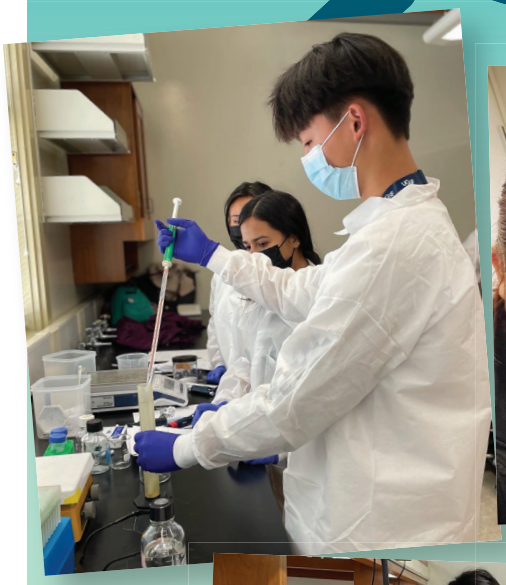


Summer Students 2022

Michelle Adutwum

Engineering CRISPR based Technologies Using MBD3

Mentor: James Nuñez, PhD
Contributing Author: Izaiah Ornelas, BS

My name is Michelle Adutwum and I am an incoming freshman at Johns Hopkins University. I plan on majoring in Molecular and Cellular Biology. My initial interest in science started with designing experiments in my seventh-grade science class. Science allows me to satisfy my ever-growing curiosity. In the future, I aspire to join the medical field as a physician to improve the treatment of patients from under-resourced communities. I want to ensure that more people have equitable access to quality healthcare. CHORI SSRP has allowed me to learn more about the infinite amount of possibilities science offers. I am thankful to my mentors, Dr. James Nuñez and Izaiah Ornelas, for helping me through this experience. Thank you to the entire Nuñez lab for their constant support. With the help of CHORI SSRP, I now have a clearer image of my future in science.

INTRODUCTION

CRISPR, a gene editing tool, has been developed into different technologies, including a new method called CRISPRoff and CRISPRon. It can silence or activate genes by editing the “epigenetic” chemistry of DNA and the proteins that DNA wraps around.

Our lab recently harnessed the activity of Methyl-CpG-Binding-Domain Protein 3, also known as MBD3, as a way to perform epigenome editing. MBD3 is the smallest within the MBD nuclear protein family and acts as a transcriptional repressor, making it attractive for use as a programmable epigenetic editor with CRISPR.

OBJECTIVE

We hypothesize that by shortening the MBD3 region, we can minimize the size of our CRISPR-MBD3 epigenetic editor and makes it more amenable for delivery into human stem cells where it will continue to act as a transcriptional repressor.

METHODS

We plan to modify the epigenome with MBD3. First, we will design primers that correspond with the MBD3 fragments and fuse each fragment to catalytically dead Cas9. Then, a restriction enzyme digest will be performed, creating three linear DNA pieces. Afterwards, we will conduct PCR amplification. Later, a Gibson Reaction will be used to combine five plasmids with varying MBD3 regions. The plasmids will be placed into human stem cells to observe the transcriptional actions of MBD3. Finally, the results will be analyzed through flow cytometry.

ANTICIPATED RESULTS

We anticipate that the full length MBD3 fragment will work the best as a transcriptional repressor, compared to smaller fragments, in human stem cells.

SIGNIFICANCE OF THE PROJECT

We hope to learn how to use MBD3 as an epigenetic editor and increase the number available epigenome editing technologies. By regulating the actions of MBD3 in the epigenome, that will allow us to engineer a CRISPR based technology that can deactivate transcription in certain genes, especially those that are pathogenic in nature.

Zara Ahsan

Association Between Hydroxyurea Use and Self-Report of Cognitive Functioning and Barriers to Hydroxyurea in Adult with Sickle Cell Disorders

Mentor: Judy Cavazos, PhD
Contributing Authors: Marsha Treadwell, PhD; Wendy Santos-Modesitt, PhD

I'm Zara Ahsan, a rising junior at Skyline High. I've gone from the 2nd grader who dressed as Marie Curie for a school project, whose first "experiment" was trying to become nocturnal for a week, to a bright- eyed intern at UCSF BCH Oakland. My image of science was always NASA, particle accelerators, and rockets. It's been challenging to connect that to understanding how to make tangible differences in the systems around me. I'm driven by making those differences. I've worked on projects across Oakland that are important to me like student mental health during quarantine and Oakland youth representation in district-wide decision-making, and state wide campaigns for legislative fossil fuel divestment. I strive to better my community through changing the systems around me. My time at Children's, with my mentor, Dr. Cavazos, has given me a way to bring these motivations together and explore science through a community lens.

INTRODUCTION

In sickle cell disease (SCD), the body's red blood cells curve or sickle--blocking blood flow and triggering severe pain episodes. SCD can lead to significant neurocognitive challenges due to restricted blood flow to the brain. One treatment used for SCD is hydroxyurea (HU), which increases fetal hemoglobin, subsequently reducing hospitalizations and pain episodes. This study examined the relationship between self-reported neurocognitive challenges and adherence to HU as well as barriers to adherence.

OBJECTIVE

Primary Hypothesis: There is an association between reports of worse cognitive function and lower adherence to taking HU.

Secondary Hypothesis: Worry or focus on possible negative side effects of HU is associated with lower adherence to the medication. Findings are expected to align with research the Sickle Cell Disease Implementation Consortium (SCDIC) has conducted on barriers to SCD care and HU.

METHODS

213 participants (18 – 45 years) in the SCDIC Registry completed surveys that included self-reports of cognitive function (attention, memory, and visual spatial reasoning), barriers to care (worry about HU or other barriers (e.g., forgetting to take it), and adherence with HU (from 0 to 7 days in the past week).

Descriptive statistics were utilized to characterize the population, and t-tests were used to evaluate differences between the means for cognitive function based on group membership (adherent vs not adherent).

ANTICIPATED RESULTS

Participants were 59.5% female; 95.9% Black; mean age 28.3 +/- 8.5; primarily with SCD-SS (72%); 50% of the 68 people who were prescribed HU reported they were completely adherent. We found that participants who reported better cognitive function had significantly better adherence. We also found that worry about HU, as well as other barriers, was associated with lower HU adherence.

SIGNIFICANCE OF THE PROJECT

Ensuring that patients have the tools to be adherent with treatment recommendations is critical for optimal care and improved quality of life and health outcomes. This study, to our knowledge, is the first population.

Tiana Bishop

Impact of Shank3 Mutation on Repetitive Behavior and BLA activity

Mentors: Gina Williams, Rose Larios, PhD, Devanand Manoli, MD, PhD

I am currently going to California State East Bay as a junior, and I am studying Cell and Molecular Biology. I have always enjoyed science. When I was in elementary school, I wanted to be an astronaut. I love space and the topic of unexplained mysteries such as the void. It was middle school when I decided I wanted to work in health. My mom was diagnosed with lupus, and I told myself that one day I would find a cure. Now I just want to help people who are less fortunate than me. I believe that human beings at heart, have the desire to do good, and help their fellow man. I have the power and responsibility to help push people in that direction.

INTRODUCTION

Social behaviors are significant in human culture. They are derived from our most basic instincts to survive and reproduce. Connection is important for human civilization, and when a person has a deficit in social behaviors, as is the case with many psychiatric disorders, it can lead to negative results in their life and society. Studies have been done exploring specific genes that correlate with human disorders characterized by social deficits, including the study of the SHANK3 gene when exploring Autism Spectrum Disorder (ASD).

OBJECTIVE

This study will work to better understand the mechanisms of Shank3 underlying deficits in social behaviors seen in individuals with a SHANK3 mutation and an ASD diagnosis, using prairie voles as a model organism. The hypothesis is that the Shank3 mutation will increase repetitive, compulsive behavior in voles, and show an increase in neural activity in the BLA in mutants compared to wildtype siblings.

METHODS

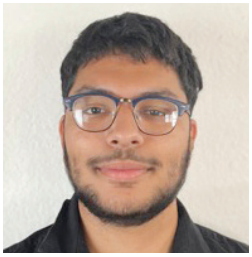
There will be 22 prairie voles. Two of them will be placed in a container, and their interaction will be recorded for an hour. Assays of paired same-sex interactions were recorded and will be manually scored for grooming behavior using the software BORIS. Processed images of cFos expression in the BLA post-interaction will be annotated to mark the region of interest, and each cell will be counted.

ANTICIPATED RESULTS

We expect to see a significant increase in BLA activity for prairie voles with the Shank3 gene mutation, as well as a significant increase of grooming behavior during their peer interactions, compared to the wildtype controls.

SIGNIFICANCE OF THE PROJECT

The hope with this study is to gain a deeper understanding of how Shank3 mutations impact brain activity underlying social and repetitive behaviors to lead to the development of targeted therapies for children with ASD.



Christian Castillo

The Effects of Sociodemographic Factors have on the Participants of the MACS/ WIHS Combine Cohort Study

Mentor: Jennifer Price, MD PhD
Contributing Author: Leyla Ghaffari

Hello! My name is Christian Castillo and I am a rising sophomore at Haverford College. So far, I plan on majoring in Chemistry and minoring in Health Studies and Spanish. I have always seen myself working towards increasing the quality of life in Oakland, I just do not really know how yet. With the various summer experiences, I've bounced from wanting to be a biomedical researcher to a trauma surgeon to a social worker and now I'm aiming for general medicine. While also practicing medicine in one of the various non-profit clinics around Oakland. I'd also like to thank Dr. Price for showing me how she interacts with the community by seeing patients while also supporting various studies/ outreach programs around the bay area. She has shown me a new way to support Oakland outside of a clinic setting and having that dynamic is something I'd like to acquire.

INTRODUCTION

The MACS/ WIHS Combined Cohort Study (MWCCS) is the combination of two previous human immunodeficiency virus (HIV) studies, the Multicenter AIDS Cohort Study (MACS) and the Women's Interagency HIV Study (WIHS). MWCCS integrates these two longitudinal studies through the re-enrollment of participants at the 13 MACS/ WIHS clinical research studies found across the United States while also recruiting new participants with and without HIV. The overall aim for MWCCS is to understand and reduce the impact of chronic health conditions currently affecting people who have HIV. The study attempts to better understand these conditions while also focusing on the comorbidities among those living with HIV. Retention of former MACS and WIHS participants is critical to the success of the MWCCS.

OBJECTIVE

We hypothesize that geography, income, and other sociodemographic factors impact ongoing participation in a large prospective cohort study.

METHODS

This was a secondary analysis of the data gathered by the MWCCS study. Participants offrom the San Francisco/Bay Area site of the former WIHS study were offered enrollment into the MWCCS. Participants were classified as re-enrolled or not and were plotted on the map of Oakland. Their income and HIV status were recorded and placed into categories and counted using Excel.

ANTICIPATED RESULTS

Re-enrollment rates were similar regardless of income with Those living within >75000 salary waslesslikely to re-enroll into the study compared to those in a higher income.With those with <$75,000 income year and those with ≥75,000/year re-enrolling at a rate of 65%and67%, respectively. We found that those living in Downtownand NorthOakland were morelikely to re-enroll inthe study(North having 83% and Downtown having 60% re-enroll rate)whereas East and West Oakland were less likely(East having 42% and West having 43% re-enroll rate).

SIGNIFICANCE OF THE PROJECT

Understanding whether geographic and income differences affect re-enrollment and our ability to enroll new participants could provideus with strategies to ensure that we are recruiting and retaining participants to meet this goal.

Levi Cervantez

Food insecurity and binge eating disorder in children 9-11 years old: a prospective cohort study

Mentor: Jason Nagata, MD
Contributing Authors: Jason Nagata, Jonathan Chu, MD

I am Levi Cervantez, a rising senior at Sacred Heart Cathedral Preparatory in San Francisco. I was first introduced to the medical field when my brother suffered a traumatic brain injury in 2016. On the cusp of death, doctors at UCSF Benioff Children's Hospital performed an emergency brain surgery to save him, and eventually helped him make a full recovery. Following this event, I became deeply interested in the medical field which soon led me to my new passion, nutrition and food-based health disparities among race and socioeconomic levels. As a Latino-American, this subject struck deeply with me, having multiple family members who have died or are sick with diabetes, a disease that disproportionately affects Latinos. Thanks to the CHORI program and my brilliant mentor Jason Nagata, I was able to pursue this newfound passion with research on food insecurity and hope to continue such important work in the future.

INTRODUCTION

Emerging evidence suggests a longitudinal relationship between food insecurity and binge eating behaviors, though studies are mostly regional and have yet to examine the diagnosis of binge eating disorder in children and adolescents.

OBJECTIVE

This study aims to determine the prospective associations between food insecurity and binge eating disorder in a national (U.S.) cohort of 9-11 year-old-children.

METHODS

We analyzed prospective cohort data from the Adolescent Brain Cognitive Development (ABCD) Study (N=10,258, 2016-2020). Logistic regression analyses were estimated to determine the associations between self-reported food insecurity at baseline, year one, or year two (exposure) and binge eating symptoms, subclinical binge eating disorder (Other Specified Feeding and Eating Disorder-Binge-Eating Disorder [OSFED-BED]), and binge eating disorder (BED) (outcome) based on the Kiddie Schedule for Affective Disorders and Schizophrenia (KSADS-5) at two-year follow-up.

ANTICIPATED RESULTS

The prevalence of food insecurity during the study period was 14.0%. At two-year follow-up, 1.34% of the sample received a diagnosis of either BED or OSFED-BED, while 7.31% reported any form of binge eating symptoms. Food insecurity at baseline, one-year follow-up, or two-year follow-up was associated with 1.86 higher odds of BED or OSFED-BED (95% CI 1.21-2.85) and 1.33 higher odds of binge eating symptoms (95% CI 1.05-1.69) after adjusting for covariates.

SIGNIFICANCE OF THE PROJECT

Food insecurity in early adolescence is associated with higher odds of developing future binge eating symptoms and related eating disorders. Clinicians should assess for food insecurity and binge eating in children and adolescents and provide support in accessing appropriate food resources.

Danissa Barrios Coffey

Adolescent Knowledge and Attitudes Regarding Access to Emergency Contraception and Medication Abortion

Mentor: Lela Bachrach, MD, MS
Contributing Authors: Daniel Grossman, MD; Antonia Biggs, PhD; Eleanor Bimla Schwarz, MD, MS; Katherine Ehrenreich, MSc

Hello! My name is Danissa Barrios Coffey (she/they/ella), and I'm entering my senior year as an evolutionary biology undergraduate and am a community college transfer student. During my first year of college, I became frustrated by structural inequities–especially those impacting my Mexican/Latinx and LGBTQ+ communities. I aspire to continue advancing health equity through advocacy, authenticity, community engagement, and mentorship by becoming a physician, educator, and health disparities researcher. I have the joy of being an SSRP alumni mentor and working alongside Dr. Lela Bachrach, my mentor. I would love to thank her for the opportunity to shadow primary care physicians and contribute to increasing equitable access to reproductive healthcare for Bay Area adolescents. A huge thanks to my mentors and sponsors for believing in me–particularly Dr. Ellen Fung and Dr. David Killilea. Last but certainly not least, a massive shout-out to my parents for being my sources of strength, for all their sacrifices, and for always rooting for me.

INTRODUCTION

Abortion access is an essential component of healthcare and bodily autonomy. Studies show that patients who receive a wanted abortion experience better health, economic, and family outcomes. Despite these findings, in June of 2022, the U.S. Supreme Court overturned Roe vs. Wade, erasing the constitutional right to safe and legal abortion care nationwide. This decision will disproportionately impact young people, communities of color, and people with low-incomes, compounding systemic racism, misogyny, and coercive policies. This study focuses on emergency contraception, which prevents an undesired pregnancy, and medication abortion, which terminates a pregnancy through a safe and effective oral regimen of mifepristone followed by misoprostol.

OBJECTIVE

We aim to survey youth of color from low-income and historically marginalized backgrounds to elucidate their knowledge and attitudes regarding access to emergency contraception (EC) and medication abortion (MAB).

METHODS

A convenience sample of 150 patients assigned female at birth aged 14-25 years seeking health care at UCSF Benioff Children's Hospital Oakland clinics serving adolescents will complete an anonymous Qualtrics survey in English or Spanish covering demographics, sexual history, and thoughts about access to reproductive health services. Participants will receive a gift card upon survey completion. Descriptive analyses will be used to interpret the data.

ANTICIPATED RESULTS

We anticipate that participants will have mixed knowledge levels regarding EC and MAB, with older adolescents being more likely to have heard of or used EC and MAB. We expect that sexually active participants will express interest in advance prescription of EC and MAB. We hypothesize that patients will be interested in accessing MAB at school-based health centers and via their primary care provider's clinic, a familiar, trusted, and convenient option.

SIGNIFICANCE OF THE PROJECT

This study elucidates the perspectives of youth that have faced systemic oppression and can inform future efforts to enhance equitable access to patient-centered health care services for vulnerable youth.

Eric Connelly

Investigating the Effects of Flame Retardants on Human Placental Development Using a Primary Human Cytotrophoblast (CTB) Model and Transcriptomics

Mentor: Joshua Robinson, PhD
Contributing Authors: Sena Aksel, MD, Dr. Joshua Robinson

My name is Eric Connelly and I'm a rising sophomore at Vanderbilt University studying Human and Organizational Development and Medicine, Health, and Society. Whether it was leading my 5th-grade squid dissection, standing in front of a sign that said "I will be the next Nobel Laureate in…" with a whiteboard that read "medicen" instead of "medicine", or researching thalassemia in high school through CHORI, I've always been passionate about science. This summer I've learned new scientific topics from inspiring speakers, developed new research skills, and shared countless moments of laughter with peers, mentors, and program leaders that I'll always cherish. Through the CHORI summer program, I've gained a greater understanding of reproductive science. Thank you to my mentor, Dr. Joshua Robinson, and Dr. Sena Aksel for their incredible guidance, my family, CHORI leaders, and my grandfather, Francisco DeOsuna, for motivating me to pursue a career in pediatrics assisting underserved communities.

INTRODUCTION

Flame retardants (FRs) are applied in consumer goods to prevent or slow fires. Consequently, FRs leach from products and are released into indoor environments leading to human exposures. The placenta is a key organ for fetal development and impairment in function is linked to poor developmental outcomes. Placental trophoblasts play integral roles in nutrient exchange between the mother and fetus and endovascular remodeling of the maternal arteries. Studies suggest that FRs sequester in the placenta and induce toxicity, contributing to placental dysfunction and pregnancy complications. In culture, primary human trophoblast progenitors (cytotrophoblasts; CTBs) display relevant characteristics of their properties in vivo and can be used to assess chemicals in their ability to induce placental toxicity.

OBJECTIVE

This study aims to profile FRs in their ability to perturb gene pathways that mediate FR-induced placental dysfunction in a primary human placental CTB model.

METHODS

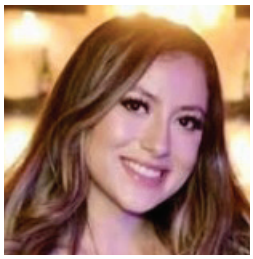
We will leverage transcriptomic data of primary 2nd trimester human placental CTBs exposed to one of five FRs—*tetrabromobisphenol A* (5μM), *isopropylated phenyl phosphate* (10μM), *2,2',4,4'-tetrabromodiphenyl ether* (10μM), *Firemaster 550* (10μM), *trimethyl phenyl phosphate* (10μM)—or vehicle control (*dimethyl sulphoxide* (0.1%)). We will employ bioinformatic analyses to explore if FRs impact global gene expression, focusing on molecules involved in stress and signaling pathways important for placental development and toxicity. We will identify genes differentially expressed (DE) by each FR and the overlap in DE genes across FRs. We will interrogate the function of DE genes by performing Gene Ontology analysis using Functional Annotation Bioinformatics Microarray Analysis. After analyses, select genes will be validated to confirm FR effects using real-time polymerase chain reaction in CTBs from independent placentas.

ANTICIPATED RESULTS

We anticipate that FRs will impair placental CTBs function by inducing stress and modulating key signaling pathways important for placental development.

SIGNIFICANCE OF THE PROJECT

This research links particular FR exposures to perturbations in placental development, which will inform scientists aiming to elucidate mechanistic pathways that connect environmental contaminants with adverse pregnancy outcomes. In addition, this information may guide regulators in removing certain FRs to be used in consumer products, thus, reducing toxic exposures to pregnant women and subsequent disease.



Monica Escobedo

Multinational Assessment of Readmission Rates for Vaso-occlusive Pain Crisis in Adolescents and Adults with Sickle Cell Disease

Mentor: Carolyn Hoppe, MD

Hello! My name is Monica Escobedo, and I am from the Mojave Desert. By the end of high school, I graduated with associate's degrees from Antelope Valley College. Now, I am a rising senior at UC Berkeley majoring in Molecular and Cell Biology with an emphasis in Biochemistry. At Cal, I deepened my connection to Latinx students by volunteering with Hermanas Unidas in service projects for the unhoused community, supported plant and microbial biology research projects for two years as a lab assistant, and facilitated mentorship pairings for students as a co-coordinator for the Biology Scholars Program. This summer, I am interning at Global Blood Therapeutics and learning much about clinical trials for sickle cell disease. It has expanded my interest in translational science as an aspiring physician! I thank SSRP and Carolyn Hoppe, my mentor, for this fantastic opportunity.

INTRODUCTION

Sickle cell disease (SCD) is an inherited red blood cell disorder characterized by chronic hemolysis, inflammation, and vaso-occlusion that clinically manifests as recurrent painful vaso-occlusive crises (VOCs). Acute VOCs are the most common reason for admission to a healthcare facility. In the United States (US), 33% of patients are re-admitted to a healthcare facility for a VOC within 30 days, and approximately 50% of patients are re-admitted within 90 days; however, information on readmission rates for VOCs outside of the US (OUS) is lacking. Preliminary findings from a retrospective medical record review conducted at selected sites participating in the phase 3 clinical trial (GBT2104-132) in the US, Italy, Lebanon, Egypt, Nigeria, and Brazil indicate similar readmission rates across regions.

OBJECTIVE

To supplement our findings from the medical record review, we performed a systematic literature review of country-specific rates of admission and readmission rates for VOC in patients with SCD.

METHODS

Biomedical literature databases (MEDLINE, Embase, CENTRAL) were searched using the terms: vaso-occlusive crises, sickle cell disease, admission, hospital, healthcare facility, and frequency.

Inclusion criteria:

1) Diagnosis of SCD
2) Age ≥ 12 years
3) Admission to a healthcare facility for a VOC requiring treatment with parenteral pain medications

Descriptive statistics were used to summarize the frequency of admissions and readmissions and evaluate country-specific differences.

ANTICIPATED RESULTS

We anticipate that rates of readmission for VOCs are similar across geographic regions and plan to extend our study to more sites and collect additional information on factors that contribute to these high rates of readmission.

SIGNIFICANCE OF THE PROJECT

Frequent admissions for VOC indicate severe disease and are associated with early mortality in SCD. High re-admission rates place an enormous burden on patients, caregivers, and the healthcare system, underscoring the need to formulate interventions to reduce these admissions. Readmission rates in the US SCD population may not extend to SCD populations OUS. A greater understanding of regional differences and factors influencing admission rates for VOCs will help inform potential interventions to reduce the frequency of admissions.

Jalen Evans

Response of Esophageal Fibroblasts to Bile Acid Exposure

Mentor: Matthew Stachler, MD PhD

Hi! My name is Jalen Evans and I am a rising sophomore at the Massachusetts Institute of Technology majoring in Biological Engineering. As far as I can remember, I have loved learning about things we experience in our lives that we take for granted. As such, when I began studying biology, and learning about things such as what causes flu symptoms and how vaccines combat this, I was hooked. This fascination has inspired me to pursue a career in research, specifically studying the development of therapeutics to combat diseases. To pursue this career, I hope to eventually obtain a PhD in Pharmacology. Participating in SSRP this summer has been an amazing experience, as I have not only gained invaluable wet lab experience, but also practiced other essential research skills, such as writing a proposal and giving oral presentations about my research. I would like to thank my mentor, Dr. Stachler, for the time he invested into teaching me and for integrating me into his research in a way where I felt welcomed, supported, and valued.

INTRODUCTION

Barrett's esophagus (BE) occurs when stomach and bile acid frequently flow into the esophagus. This exposure can cause the squamous epithelial cells that typically line the lower esophagus to be replaced by columnar epithelial cells, which are typically found in the stomach. Although this is not life threatening, cases of BE can develop into esophageal adenocarcinoma (EAC). What causes this progression is unknown. However, fibroblast cells are known to act in close conjunction with these esophageal epithelial cells, and recent research has shown that fibroblasts found in EAC tissue are transcriptionally distinct from fibroblasts found in normal esophagus tissue. Thus, we believe these fibroblasts could play an important role in driving the progression from BE to EAC.

OBJECTIVE

Determine if direct bile acid exposure induces epigenetic and transcription reprogramming in primary esophageal fibroblasts derived from patients with Barrett's esophagus.

METHODS

To study esophageal fibroblasts' response to bile acid exposure, we will culture fibroblasts derived from normal esophagus tissue and EAC tissue from two patients. We will then expose these cells to bile acid for one hour everyday for four weeks. Finally, we will submit the cells to RNA sequencing for transcriptome analysis, and to Bisulfite DNA sequencing for methylation analysis.

ANTICIPATED RESULTS

We anticipate that subjecting fibroblasts derived from normal esophagus tissue to daily exposure of bile acid for one hour for four weeks will induce them to undergo epigenetic and transcription reprogramming to express pro-inflammatory mediators and, with chronic exposure, to more resemble cancer associated fibroblasts.

SIGNIFICANCE OF THE PROJECT

Fewer than 20% of patients diagnosed with EAC survive past 5 years, giving it one of the lowest survival rates of any cancer in the United States. As such, understanding what drives the progression from BE to EAC is critical, as it will allow us to better identify and treat patients who are at risk of developing EAC. Utilizing this information, we can enact preventative measures, drastically reducing this cancer's mortality rate.

Daisy Garcia Orozco

Assessing Complement-C3 in Lipoprotein Particles

Mentors: Ronald Krauss, MD; Sarah King, PhD
Contributing Author: Sonali Pfile

My name is Daisy Garcia Orozco and I am a rising senior at Berkeley High School. I have always been interested in my science courses, but it wasn't until my junior year Biotechnology class, that I started to believe that I could actually pursue a career in science. As a first-generation Mexican American, I have seen firsthand how the lack of representation in the medical and science field has affected my family through misinformation and healthcare inequities. It further motivated me to be a part of making a difference in my community. I am beyond grateful to have been given the opportunity to participate in the CHORI Student Summer Research program this summer, it has truly been an amazing experience. I would like to thank my mentors, Dr. Sarah King and Dr. Ronald Krauss, as well as Sonali Pfile for their support and guidance this summer!

INTRODUCTION

Lipoproteins are particles consisting of proteins and lipids that carry triglycerides and cholesterol through the bloodstream. There is an established association between levels of certain lipoproteins and cardiovascular disease (CVD) risk. Lipoproteins are heterogeneous in size; LDL particles are 18.0-23.3 nm in diameter and HDL particles containing the apoAI protein are 7.65-14.5 nm in size. Particles with size between HDL and LDL ("midzone", 14.5 -18.0 nm) have recently been correlated independently with CVD and mortality. In addition to lipoprotein levels, inflammation plays a key role in CVD. The complement system is a component of the innate immune system which generates inflammation. Previous studies have found complement C3 (coC3) to correlate with cardiovascular complications which makes it of particular interest (Hertle et al. 2012). Preliminary data from the Krauss lab has indicated that coC3 is particularly abundant in particles in the midzone region. Additionally, in a study of healthy humans from the Krauss lab, we found that levels of ApoA1- associated coC3 (AAC3) were correlated with percent body fat. Since adipose tissue has inflammatory effects, this further suggests that AAC3 may be a factor linking lipoproteins and inflammation to CVD.

OBJECTIVE

We hypothesize that a fraction of the ApoA1-containing HDL particles contain coC3; we aim to pull down these HDL- associated coC3 particles using an ApoA1 enrichment procedure.

METHODS

We will use a column capture method to separate the ApoA1 containing particles from plasma, and we will validate the protocol using antibody detection. Furthermore, we will use ion mobility to characterize the size distribution of the captured particles.

ANTICIPATED RESULTS

We expect the column to pull down at least 50% of ApoA1-associated lipoprotein particles. We expect to detect coC3 in the eluate, and determine if it is enriched in midzone particles.

SIGNIFICANCE OF THE PROJECT

There is a relationship between coC3, inflammation, and CVD. This project will establish a protocol for determining plasma levels of AAC3 as a potential new marker of CVD risk. Future studies can use our methodology to evaluate the effect of body fat, diet, and other factors on this novel particle complex.

Abby Hayes

Impact of Pain Planson Healthcare and Opioid Utilization in Pediatric and Young Adult-Patients with Sickle Cell Disease and Vaso-Occlusive Episodes

Mentors: Anu Agarwal and Dipti Kamath
Contributing Authors: Madhav Vissa and Stephen Long

My name is Abby Hayes, and I am a rising sophomore at Yale University. Although I plan to pursue a career in medicine, I am a history major concentrating in Empires and Colonialism. I chose to major in something outside of the sciences because the human aspect of medicine has always been really important to me. This became especially clear to me after I had the privilege of participating in SSRP in 2020, at which point I became really interested in health disparities and the connections that exist between medicine and the humanities. After graduation, I plan to pursue a Masters in Public Health and attend medical school with the goal of working to make medicine more accessible and equitable. I would like to extend my deepest gratitude to my mentors this summer, Dr. Anu Agrawal and Dr. Dipti Kamath, as well as the SSRP leadership.

INTRODUCTION

Sickle cell disease (SCD) stems from an amino acid substitution that causesthe formation of hemoglobin S (HbS). The membrane of HbS becomes irreversibly injured as a result of deoxygenation-induced polymerization and reoxygenation induced-depolymerization, resulting insickled cells. These sickled cells can obstruct blood, causingvaso-occlusive crisis (VOC), which are the most common manifestation of SCD and the most common reasonfor Emergency Department (ED) visits and admissions. Benioff Children's Hospital-Oakland(BCH) implemented pain plans to avoid ineffective pain management at the beginning of admissions, set an expectation for weaning, and get patients discharged in a reasonable period of time.

OBJECTIVE

Our objective was to investigate the impact of individualized pain plans on EDvisits, admissions, length of hospital stay, and opioid use.

METHODS

This was a retrospective analysis of patient records spanning the three years pre-and post-implementation of pain plans. We included all patients with individualized pain plans that have been treated at BCH in the three years before and after implementation and that received all of their care at BCH. For each patient, the following information was collected: sickle cell genotype (i.e., SS, SC, S/beta); biological sex;age at implementation of pain plan; number of annual ED visits in the threeyears pre-and post-intervention; number of admissions and length of each hospital stay in the threeyears pre-and post-intervention; and opioids utilized with each ED visit and hospitalization pre-and post-intervention. All opioids were converted into morphine equivalents and then calculated as mg/kg/h based on time in ED and hospital length of stay.

ANTICIPATED RESULTS

We expect to find that the implementation ofindividualized pain plans decreased the annual number of ED visits, admissions, length of hospital stay, and opioid use.

SIGNIFICANCE OF THE PROJECT

SCD patients cite the care received in the ED as the area of their health care in most need of improvement. Individualized pain plans have the ability to improve this area of care, and this project enables us to determine their impact.

Aiden Higuera-Toris

Pediatric Graves Disease during COVID-19 Pandemic

Mentors: Jennifer Olson, MD; Hannah Chesser, MD

Hi, my name is Aiden Higuera-Toris. I am from Oakland, California. I am soon starting my senior year and I am extremely excited. I enjoy reading, specifically about science and mythology as a hobby. This brings me to my love for science. During my preschool ceremony I was the kid that introduced himself and announced to the world that one day I would be a scientist. I was around 4 years old and I am not sure why I loved it then, but the idea stuck with me until now. Ever since then science has been my favorite subject, the more I learned about Biology the more I realized how much I wanted to make a career out of it. 8 years ago, when I was diagnosed with Type 1 Diabetes, I felt stronger about medicine and continued to feel that this is my passion and hopefully become a surgeon.

INTRODUCTION

During the recent COVID-19 Pandemic there has been a noticeable spike in pediatric Graves' Disease. My mentors, Dr. Chesser and Dr. Olson, and I are working together to find a link between COVID and Graves' Disease.

OBJECTIVE

The reason we are researching this is to find out if the spike in Graves' Disease is merely a coincidence or something about the COVID virus that may actually cause an imbalance in thyroid function.

METHODS

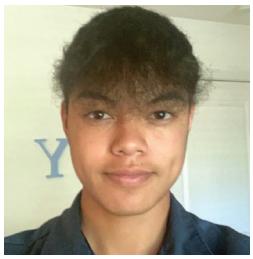
Patient charts are a huge part of the project as they will be used to locate specific trends and similarities. We have chosen to study charts from approximately 100 patients who were referred to the Endocrinology Department at the UCSF Benioff's Children's Hospital after they presented with symptoms of Graves' Disease and Hyperthyroidism. We chose to study patients that were seen at the hospital over a 4-year time period, 2 years prior to March 2020, and then March 2020 to present day.

ANTICIPATED RESULTS

I anticipate that there is definitely a link between COVID and Graves' Disease. During this research something that has struck my attention is that many of the children presenting symptoms of hyperthyroidism also have chromosomal disorders such as Trisomy 21.

SIGNIFICANCE OF THE PROJECT

If the project proves that there is a link between the two, then this will further our knowledge of both COVID, and also Graves' Disease. This is extremely beneficial to the public so we can hopefully catch this disease at an early stage in pediatrics or maybe even prevent it altogether.



Ty Hosein

Using a novel composite indicator to assess vitamin B12 status among non-pregnant women of reproductive age in Punjab, India

Mentor: Christine McDonald, PhD
Contributing Authors: Christine McDonald, PhD; Yvonne Goh, PhD; Mari Manger, PhD McDonald

My name is Ty Hosein, and I will be an incoming freshman at Stanford University in the Fall, studying Human Biology. From a young age, my grandparents have regaled me with stories of their grueling upbringings: my grandfather's poverty-stricken childhood in Trinidad, and my grandmother's experience as an African American in Jim Crow Texas. They have told me of the hardships and health disparities that their families endured, the same disparities that still stand today, and that motivate me to succeed in the medicinal field, so that I may work to provide health equity to the less fortunate. SSRP has provided me with a leaping point, off which I hope to expand my scientific horizons and ultimately succeed. I want to express my deepest gratitude to Dr. Yvonne Goh, Dr. Mari Manger, and Dr. Christine McDonald for their unending guidance and support throughout this program.

INTRODUCTION

Vitamin B_{12} is an essential micronutrient for proper hematological and neurological function. As vitamin B_{12} is mainly consumed through animal-source foods, vitamin B_{12} deficiency (along with other micronutrient (MN) deficiencies) may be prevalent among resource-limited, vegetarian populations. As part of formative research, a dietary and biochemical assessment of 100 non-pregnant women of reproductive age (NPWRA) in Punjab, India was conducted to measure the prevalence of MN deficiencies and inform the design of an upcoming trial of multiply-fortified salt (MFS). To overcome limitations associated with the individual biomarkers of vitamin B_{12} status, a composite indicator was used to provide a more accurate measurement.

OBJECTIVE

To use a composite B_{12} indicator (cB_{12}) to assess B_{12} status, and compare the prevalence of deficiency/insufficiency according to this cB_{12} versus individual B_{12} biomarkers. B_{12} status defined by cB_{12} will also be compared with B_{12} dietary intake.

METHODS

In phase 1 of the MFS study, fasting blood samples were obtained from 100 NPWRA in Punjab, India. Serum B_{12} and homocysteine (tHcy) were analyzed in the laboratory at PGIMER, while holoTC and MMA were analyzed at St. John's Research Institute.

With statistical analysis using SAS software, we utilized all four biomarkers, along with participant age, to calculate the composite vitamin B_{12} indicator using the following formula: $cB_{12} = \log10[(\text{holoTC} \times B_{12})/(\text{MMA} \times \text{tHcy})] - [3.79/(1 + [\text{age}/230]^{2.6})]$. Measurements taken with tHcy were corrected ($cB_{12} = cB_{12}^{Hcy} + [1.1e^{(-\text{folate}/3)}]$) if folate measurements were significantly low (serum folate < 10 nmol/L). The composite indicator will be compared with the individual B_{12} biomarkers using chi-square and correlation analysis.

ANTICIPATED RESULTS

Our final composite measurement should be more accurate as compared to individual measurements. Recent studies have reported a lower prevalence of B_{12} deficiency when the composite indicator of vitamin B12 is used, however we still expect high deficiency/insufficiency prevalence, due to the dietary habits of our study population, which is severely lacking in animal products.

SIGNIFICANCE OF THE PROJECT

The analysis will provide information pertaining to the efficacy of cB_{12} as an alternative and potentially optimal measurement of vitamin B_{12} status in populations at high risk of deficiency.

Sia'h Fanta Jimissa

Pilot Study of Milk Type in Toddlers (MILK TOT)

Mentor: Lorrene Ritchie, PhD RD
Contributing Author: Anisha Patel, PhD

My name is Fanta Jimissa. I am a rising junior at UC Berkeley and intend to major in Public Health. I aspire to become a physician who works at the intersection of healthcare and government to promote health equity in low-income populations. My identity as a low-income, first-generation American and college student motivates me to help others with similar backgrounds. Overall, SSRP has made me more confident in my abilities and exposed me to diverse career paths in public health. I am incredibly grateful to Dr. Lorrene D Ritchie, Nicole Vital, and the rest of the Milk-TOT Pilot Study team for welcoming me onto the project and giving me the chance to learn.

INTRODUCTION

Current guidelines suggest that children drink whole milk (3.25% fat) until they turn 2 years old, when they should switch to low-fat (1%) or non-fat (<0.5%) milk. The recommendation is based on the belief that the consumption of higher-fat milk results in higher energy and saturated fat intake and higher adiposity and cardiovascular disease risk over time. However, in observational studies, adiposity has an inverse relationship with the fat content in the milk that children consume, meaning those who drink whole milk tend to be less overweight and obese than children who drink lower fat milk. Our pilot study will explore the impact of milk type on child weight and other health outcomes.

OBJECTIVE

The objective of this study is to evaluate how milk impacts the adiposity, blood lipids, vitamin D levels, neurocognitive development, and gut microbia of children aged 1-3 years old.

METHODS

Participants are assigned and provided with a milk type to drink for 3 months. The baseline and follow-up measures collected include a non-fasting blood draw, stool sample, dietary data, anthropometrics, and neurocognitive developmental survey. The measures are collected once a child enters the study and after they finish their 3-month regimen of milk.

ANTICIPATED RESULTS

The purpose of the pilot study is not necessarily to explore our hypothesis, but rather to get the experience of recruiting participants for this trial and collecting the necessary data. We expect to see similar trends to those found in observational studies that we referenced which revealed an inverse relationship between milk fat content and adiposity in children. We will also learn about the challenges and issues that participants in our larger trial might face, which will help us adjust our approach to be better prepared.

SIGNIFICANCE OF THE PROJECT

This study is significant because milk is an integral part of the average American child's diet and these study results will help inform what is the healthiest option. This is especially important because the U.S. has the highest levels of childhood obesity globally. The results will impact nutrition policies for children and national food programs.

Amarachi Kanu

The effect of mitochondrial retention on reactive oxygen species and oxygen consumption rate in red blood cells of a sickle cell disease mouse model

Mentor: Angela Rivers, MD PhD
Contributing Author: Hart Horneman

My name is Amarachi Kanu, and I am a rising third year Neuroscience major and Spanish minor at The Ohio State University. After college, I plan to go to medical school to become a physician and researcher. I want to use my love for science to make a difference in people's lives and contribute to equity in healthcare. Furthermore, I see the direct impact research has on improving medicine, but I also see shortcomings as it relates to health disparities. As a Nigerian American woman pursuing medicine, I am committed to being the change I want to see by increasing the diversity of medicine and research. I am so grateful for the opportunity to participate in this program as I pursue my goals. Thank you to my mentors, Dr. Angela Rivers and Hart Horneman, Mikail Alejandro, and the SSRP program leadership for all their guidance, support, and teaching this summer.

INTRODUCTION

Sickle Cell Disease (SCD) is an inherited blood disorder that affects millions of people worldwide, and causes patients to experience chronic hemolytic anemia, painful crises, multisystem organ damage, and a shorter lifespan. SCD is caused by a point mutation of the beta-globin gene. This mutation forms sickle hemoglobin (HbS) by polymerizing when deoxygenated. Typical maturation of red blood cells (RBCs) involves the removal of mitochondria from the cell. The Rivers lab has reported the presence of retained mitochondria in mature RBCs of sickle cell patients. Previous measurements of peripheral blood RBCs showed significantly higher levels of reactive oxygen species (ROS) and oxygen consumption rate (OCR) in SCD humans and mice compared to control. Increased ROS could cause RBCs to hemolyze, and increased OCR could lead to more cell sickling. Therefore, further investigation of retained mitochondria is warranted.

OBJECTIVE

The overall goal of this experiment was to determine if mitochondria in RBCs increase ROS and OCR.

METHODS

Peripheral blood samples were collected from 3 HbSS (sickle cell) mice. The RBCs were stained with MitoSOX™Red and CD71-PE antibody. Separation of positive or negative mitochondria fractions, as well as of RBCs and reticulocytes, was carried out by fluorescent activated cell sorting. ROS levels were measured by utilizing the commercially available cellular ROS probe CM-H2DCFDA. OCR was measured using a Seahorse XFe24-extracellular flux analyzer.

ANTICIPATED RESULTS

We anticipate SCD RBCs with mitochondria to have increased ROS and OCR compared to SCD RBCs without mitochondria.

SIGNIFICANCE OF THE PROJECT

The results of this study show that mitochondria retention increases ROS and OCR. Therefore, mitochondrial inhibition would be a new therapeutic strategy for SCD.

Kai Lam Kingsle U

Development of a multi-camera fluorescence imaging setup for the imaging of Langendorff-perfused hearts

Mentor: Jan Lebert, MS, Jan Christoph, PhD

Greetings! My name is Kai, although I usually go by Kingsley. I'm currently a rising senior at Lowell high school, and I plan to major in a biology related sector, such as bioengineering or biochemistry! I figured I always found biology to be cool from the TV shows I watched, but my late Grandfather's acute myeloid leukemia drove an interest in diseases and conditions in the human body. I also fostered an interest in engineering through hands-on involvement in my school's FIRST Robotics Team, CardinalBotics. Through my summer in SSRP, I discovered the challenges of performing research, but also how rewarding the process of discovery and problem-solving can be. I would like to thank the wonderful CHORI staff, Dr. Jan Christoph and Jan Lebert, as well as everyone else in the Christoph lab for their immense support in making my project possible this summer.

INTRODUCTION

Heart rhythm disorders are difficult to diagnose and the development of new diagnostic techniques involves studying heart rhythm disorders ex-vivo.Dr. Christoph's lab specializes in developing techniques for measuring action potential wavesand heart muscle mechanics in intact isolated beating hearts.

OBJECTIVE

To generate imaging data and measure action potential waves as they propagate across a beating rabbit heart using high-speed cameras and numerical motion tracking.

METHODS

a. The three-dimensional surface of the moving rabbit heart will be reconstructed using Python,OpenCV, Open3D, NumPy, & Scipy. Epipolar & Matplotlib assets are imported to facilitate the synthesis of the 3-dimensional image. We data provided by the stereo cameras and calibrate the camera in accordance with the angle, returning two-dimensional data points for triangulation. Using triangulation, we take 2 equivalent epipointsto create a three-dimensional epipoint.

b. Acomplex tetrahedron is designed to hold 24 separate cameras. We employ Onshape CAD Software toconfigurea 3-part design for 24 watertight gates holding the camera and LED lights. The 3-part design includes self-drilling screws, an external clamp, glass-pane, and O-ring.

ANTICIPATED RESULTS

This study will assist in the development of a specialized imaging chamber, methods to analyze voltage-sensitive fluorescence imaging videos, and the reconstruction of the three-dimensional heart surface from stereo images using triangulation. This research will help understand the interplay between cardiac electrophysiology and tissue mechanics, guiding the development of novel diagnostic imaging technology.

SIGNIFICANCE OF THE PROJECT

We've calibrated identical points on 2 stereo rabbit heart imagesusingstereotriangulation to calculate corresponding epipoints along epilines. We'vealso been successful in designing a watertight ring, and anticipate the watertight chamber to adapt this new design successfully. We anticipate generatinga 3D ventricular surface of the entire heart using >2 cameras, through the stereo calibration of sets of 2D images, triangulating 3D points along their epilines.

Michael Lewis

Does Access to an Online Educational Resource Change Practice for Orthopedic Surgeons in Low-and-Middle-Income Countries (LMICs)?

Mentor: Coleen Sabatini, MD MPH

Hi, my name is Michael Lewis, and I am a rising-sophomore biology major on the pre-med track at Morehouse College. I have been interested in orthopedics for as long as I can remember. In elementary school, my friends and I constantly got hurt on the playground, and I was always so fascinated by figuring out what was injured and finding the best way to fix it. Years later, I learned this field is called orthopedics. Orthopedics is a category of medicine specifically focusing on the musculoskeletal system. In addition to conducting research with Dr. Colleen Sabatini, I was also able to shadow Dr. Nirav Pandya on his weekly surgeries and clinical rounds. This experience alongside these two remarkable surgeons has inspired me and significantly strengthened my interest in pursuing a career in this field. I want to make a difference in people's lives.

INTRODUCTION

Many surgeons in LMICs have disadvantages accessing educational resources. Educational materials can be difficult to access in low-resource regions. Many online resources require an expensive membership which is manageable for most US-based surgeons; however, many other surgeons in other countries cannot afford the annual fee.

OBJECTIVE

To determine what resources are utilized and needed by surgeons in LMICs and what resources will positively impact the practice of orthopedic surgeons in low and middle-income countries.

METHODS

Ten teaching institutions across a range of LMICs were selected for participation in the study. Trainees and surgeons at all sites were sent a pre-intervention survey via Qualtrics to obtain data on the current use of learning resources they feel would improve their practice. Five of the ten institutions were granted access to an online educational website for 12 months. After 12 months, all participants received a second survey asking about their educational resource usage and its effect on their practice.

ANTICIPATED RESULTS

There were 85 respondents to the pre-survey, 23 practicing surgeons and 61 trainees; Seventy-five men and 8 women. Twenty-eight from Afghanistan, 41 East Africa, 5 Southeast Asia, and 8 West Africa. Participants in Africa selected that their most commonly used educational resources are books and journal articles (both printed and digital); whilst participants in Southeast Asia and Afghanistan deemed their most commonly used resources as printed books/articles and their teachers. They recognize that the resources accessible to them may not be the most effective and they all desire access to new resources. Forty percent (31/77) of respondents indicated reliable internet access in their homes, and 33% (25/75) indicated reliable access in their hospital. Cost, location, and internet connectivity are the most prominent barriers impeding their access to better resources.

SIGNIFICANCE OF THE PROJECT

All humans deserve access to the best possible healthcare. Location should not determine whether or not an injury is correclty treated or leads to a chronic disability. With this research, we are assessing whether access to particular online resources improve healthcare and thus, quality of life for people in low-resource regions.

Norzin Lhadon

Recreating the Human Neural Stem Cell Niche in vitro Using DNA-Directed Patterning

Mentor: Stephanie Eberly, PhD Candidate

My name is Norzin Lhadon, and I am a rising first-year at Columbia University. Herbal medicine was always present in my life growing up as my parents were traditional Tibetan herbal medicine practitioners. However, at school, I was taught about Western medicine, and it was very different from what I learned at home. Intrigued, I paid even more attention in science class, and it quickly became my favorite subject because it answered my questions about the world we live in and fueled my desire to know more. It is this curiosity that makes me excited for the CHORI SSRP because it is an opportunity to learn more about my interests and contribute to research. Lastly, I would like to express my gratitude to the CHORI staff and my mentor, Stephanie Eberly, for her support, guidance, and compassion.

INTRODUCTION

Stem cells are cells that have the ability to either renew themselves or become specialized cells that have specific functions. In the adult central nervous system, neural stem cells (NSCs) are found in two different locations in the brain including the subventricular zone (SVZ) of the lateral ventricles. As humans age, there is a significant decrease in neurogenesis. This is because of a depletion of the NSCs within their niches as NSCs adopt a quiescent state and perform more asymmetric divisions.

OBJECTIVE

This project is part of a bigger research project which seeks to figure out how cell-to-cell communication in aging neurogenic niches affects NSC fate decisions. This will be done by recreating the SVZ niche microenvironment *in vitro.*

METHODS

DNA-directed patterning will be used which allows for the spatial placement of cells into a specific pattern. Using AutoCAD and images taken in vivo, a photolithography mask will be designed that recapitulates the pinwheel cellular pattern present in the SVZ NSC niche. The photolithography mask allows for the selective exposure of areas of a glass slide onto which single-stranded DNA oligos will adhere. Then, cell types of interest tagged with the complementary oligo will be flowed across the slide surface and will hybridize where the complementary DNA strands were photolithographically positioned. Through this manner, the cellular positioning and composition of the NSC niche will be recreated *in vitro.*

ANTICIPATED RESULTS

This project will build an *in vitro* 2D model that recreates the spatial placement of cells within the human NSC niche. The results will be validated by using IXM confocal images which can be cross referenced to images taken within the human brain.

SIGNIFICANCE OF THE PROJECT

Results of this project will aid in the research of the niche's control of neurogenesis in the adult brain, why cells go dormant, and how to induce proliferation. Overall, this project has the potential to help in the development of therapies for neurodegenerative diseases and age-related cognitive decline.

Emily Loo

Are Germline Mutations in The MUTYH Gene Associated With the Development of Pediatric CNS Tumors?

Mentors: Christina Coleman Abadi, MD; Jennifer Michlitsch, MD

Hello, my name is Emily Loo, and I am a rising junior at the University of California, Berkeley majoring in molecular biology with an emphasis in biochemistry. First and foremost, I wanted to express my gratitude to Dr. Fung, Dr. Killilea, Dr. Coleman Abadi, and Dr. Michlitsch, who have provided me with such a life-changing opportunity. From a young age, I have known what I wanted to be: a pediatric neurooncologist. My desire to delve into this field stems from the devastating loss of my grandmother to metastatic breast cancer. Before she died, I made her a promise that I would find a way to help cancer's most innocent victims: children. However, during my first semester of college, I decided I wanted to be a physician-scientist due to my love for the lab and the medical field. I hope to pursue an MD/Ph.D. track with the Caltech/USC combined program.

INTRODUCTION

Currently, a direct relationship between the development of pediatric CNS (central nervous system) tumors and mutations in the MUTYH gene, a tumor suppressor gene, has not been established. Gene mutations are changes in our DNA sequences, or genes, that code for proteins. In this case, mutations in our MUTYH gene lead to either low-functional or

non-functional MYH glycosylase, an enzyme involved in DNA repair. Because this enzyme cannot function properly, cells begin to multiply uncontrollably, and a tumor may eventually form. In the context of this research, we are examining germline MUTYH gene mutations. Germline mutations are inherited because they occur in the reproductive cells (egg and sperm).

Monoallelic mutations only happen in one allele (copy of the gene) inherited by either the mother or the father. So, there will still be a copy of the normal allele in the offspring's cells. Therefore, it is difficult for us to establish a causal relationship between MUTYH gene mutation and the development of pediatric CNS tumors.

OBJECTIVE

Germline mutations in the MUTYH gene may be correlated with the development of pediatric CNS tumors.

METHODS

To carry out the proposed research, the investigators will use data collected from the UCSF 500 test to identify the type of MUTYH variant found in a specific tumor case. Upon doing so, the pathogenic nature of the variant will be further analyzed to determine exactly how it affects the synthesis of MYH glycosylase. Pathology data will be used to evaluate background information on the tumor. Depending on the tumor diagnosis, a variety of mutations will be found. More aggressive tumors and their mutations will help determine the connection between the monoallelic mutations and the formation of different tumors.

ANTICIPATED RESULTS

It is anticipated that the cases in this research will provide evidence of a connection between germline MUTYH mutations and the development of high-grade CNS tumors as opposed to establishing a cause-and-effect relationship between the two variables.

SIGNIFICANCE OF THE PROJECT

By discovering the potential link between the germline MUTYH gene mutation and increased risk of pediatric brain tumors, the investigators hope to provide more evidence of a newly proposed relationship to establish better screening guidelines for patients presenting MUTYH mutations.

Adriana Medina

Characterization of activation states of maternal intervillous monocytes and fetal placental macrophages in placental malaria

Mentors: Stephanie Gaw, MD PhD; Nida Ozarslan, MD

Hello! My name is Adriana Medina and I'm a rising senior at Acalanes High School. I have been interested in science for as long as I can remember, but medicine became my focus in elementary school when I used a homemade first aid kit to tend to a friend, and discovered the best way to feed my curiosity while emphasizing my compassion towards others. I plan to pursue this interest in medicine throughout college, and ultimately hope to become an OB/GYN. The UCSF Summer Student Research Program has given me an amazing opportunity to work in a lab specializing in obstetrics, gynecology, and reproductive health, and I am forever grateful. Many thanks to my mentors Dr. Stephanie Gaw and Dr. Nida Ozarslan who have patiently guided me throughout our project and given me the chance to enhance my understanding of the research that will become my career.

INTRODUCTION

Placental malaria (PM) is harmful to pregnant people as it directly impacts the barrier between mother and fetus. PM occurs when infected red blood cells (RBCs) bind to the syncytiotrophoblast layer and sequester in the intervillous space. PM can be characterized in 2 distinct groups: active PM when the Plasmodium parasite is present within the placenta, and chronic PM when there is only malaria pigment (hemozoin) accumulation in the tissue. PM triggers an inflammatory response to combat the disease. Macrophages play an important role in the inflammatory response, and their activation states are divided into two categories: M1 and M2. M1 are the pro-inflammatory while M2 are the anti-inflammatory macrophages.

OBJECTIVE

We hypothesize that the activation states of maternal intervillous monocytes (MIM) and fetal Hofbauer cells (HBC) are different within the placenta in relation to the parasite burden in placental malaria.

METHODS

We will identify the activation states of the MIMs and HBCs in the placenta using RNAScope HiPlex v2 in situ hybridization. Formalin fixed paraffin embedded (FFPE) placental sections will be hybridized with probes. Imaging will be conducted via confocal microscope and results will be analyzed through ImageJ software.

ANTICIPATED RESULTS

To overcome the autofluorescence (AF) of RBCs we performed photobleaching at different durations and incubated the slides with an FFPE reagent. Our results revealed that the FFPE reagent was reducing the AF but also lead to decreased signal overall. Optimal results were obtained with photobleaching however there was no difference between 48 hours and 72 hours, thus we decided to proceed with 48h photobleaching. We anticipate to visualize the localization, activation states and abundance of MIMs and HBCs in regions of the placenta that have either active or chronic PM and compare with healthy controls.

SIGNIFICANCE OF THE PROJECT

Our study will complete the first of two aims to ultimately provide the first high resolution analysis of the inflammatory response to Placental malaria in both the maternal monocytes and fetal macrophages. The data from our study will serve as the foundation of future studies on the placental cell populations that are believed to play significant role in PM pathogenesis.

Hector Munoz

Role of Incentive to Provide Glucometer and readings in Adolescents with Type 2 Diabetes

Mentor: June Tester, MD MPH
Contributing Author: Kenia Zepeda

Hello, my name is Hector Munoz, I am a rising senior at John F. Kennedy High School. I first got interested in science when I was younger and learned about cells and how they build upon each other to make up multi-cellular organisms. I was fascinated with the idea that I have millions of cells in my body all working to keep me alive and well. Science quickly became my favorite subject because it answered questions about our world, like "Why the sky was blue". My drive for obtaining knowledge is what excited me to join the CHORI SSRP I could develop skills that will help me as an aspiring doctor. I want to thank Dr. June Tester for her great mentorship and all the CHORI staff that has been able to support the students in this program so well.

INTRODUCTION

There are 2 types of diabetes. Type 1 diabetes is typically due to the pancreas being unable to produce adequate amounts of insulin due to autoimmune destruction. However, type 2 diabetes starts with insulin resistance but can also get to the point where patients require insulin injections. Patients with diabetes come in every 3 months for routine visits. They are instructed to check their glucose levels at various times: fasting, immediately before a meal if they use insulin, and in the evening, 2 hours after dinner ("post-prandial"). Many patients, especially those who are not needing to check glucose levels in order to decide on insulin dosing, do not regularly check their glucose levels as instructed. We want to observe how a financial incentive influences a person's ability to record their fasting and postprandial glucose.

OBJECTIVE

We hypothesize that we can increase the collection of post-prandial glucose in adolescents with type 2 diabetes by using financial incentives.

METHODS

Patients received a call before their routine diabetes appointments and were informed of an optional research opportunity. The patients are told if they bring in their glucometer with readings of their fasting and postprandial glucose as well as finish a 24-hour diet recall, they will receive a $15 Target gift card.

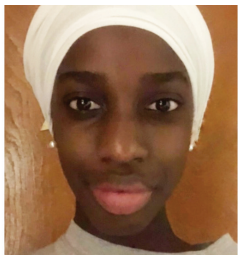
We will use two-sample t-tests. The first sample will be a comparison from other previous patients (historical comparison) and will be compared to patients called beforehand who are informed of the incentive.

ANTICIPATED RESULTS

We expect to see that patients who were called about the incentives will provide their postprandial glucose and fasting glucose more often than patients who were not incentivized.

SIGNIFICANCE OF THE PROJECT

This pilot data will help Dr. Tester in future studies and research proposals on diabetes patients. If an increase in adherence is found, we can use that to help patients check their glucose as instructed and prevent complications.



Marietou Ndiaye

What are the outcomes and vaccination rates for children with sickle cell less than 3 admitted due to fever?

Mentor: Anurag Agarwal, MD

Hello! My name is Marietou Ndiaye. I am a rising junior at Oakland Technical high school. My love for helping others whenever I could started at a very young age through my community and family. I saw firsthand how helping others, whether in big or small ways, can change lives. I plan to one day become a physician specializing in high-risk pregnancies and ultimately open a clinic in Senegal to make the journey of pregnancy as safe, affordable, and as comfortable as possible for women who don't have access to hospitals or safe environments at one of the most critical times of their lives. I want to thank CHORI SSRP, their staff, and the Doris Duke Charitable Foundation for this unique opportunity. A special thanks to My mentor Dr. Anurag Agrawal for supporting me throughout my research and allowing me to learn from his years of experience.

INTRODUCTION

For people with sickle cell disease, a genetic mutation, turns healthy red blood cells into sticky rods which clot together and block blood vessels. Due to the danger of this disease hospital visits can be common, and can add up quickly in younger people. For patients at UCSF, under three, emergency hospital visits can happen due to a fever and there is a good reason behind this. There is a higher possibility that the fever is a symptom of a bacterial infection which is especially deadly for patients with sickle cell disease due to their weakened immune system which makes them highly susceptible to these infections. That is why I and my mentor are researching to find out how many of these hospital visits for children under the age of three turn out to be bacterial infections and are vaccinations lowering the rate of infection.

OBJECTIVE

This study focuses on children under the age of three who have sickle cell disease, to determine exactly how many of these cases were deadly bacterial infections and if vaccinations lowered the risk.

METHODS

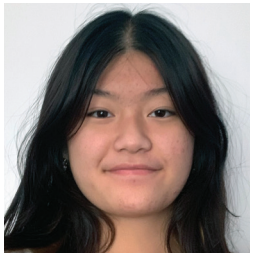
This will be a retrospective review of data to be collected analyzing the rate of bacteremia. To find the answer to our question we will analyze patients that have been treated exclusively at UCSF Benioff children's hospital in the Hematology/Oncology department while under the age of three. Our selection will be from October 1st 2013-now.

ANTICIPATED RESULTS

We anticipate the rate of bacterial infections will be low. When we looked at previous studies done similar to ours the rate of bacterial infection was significantly lower than expected. We also expect that children who are vaccinated against these bacterial infections will have the lowest rate of fevers related to bacterial infections.

SIGNIFICANCE OF THE PROJECT

We want to make the Policy regarding children with sickle cell disease under the age of three based on science and research. By analyzing the data we get and finding the answer, this study will assist UCSF policymakers to make better decisions. Ultimately we will know whether or not we should reduce the frequent hospital visits at USCF.



Uyen (Anna) Ngo

The Utility of Low-Dose Sex Steroids with Gonadotropin-Releasing Hormone Agonist Therapy in Transgender and Gender-Diverse Youth with Low Bone Mineral Density Prior to Puberty Suppression

Mentor: Janet Lee, MD MPH MAS
Contributing Author: Siobhan O'Neill

Hi! My name is Uyen Ngo, and I am a rising senior at Lowell High School. Growing up, I have always loved to solve puzzles. Whether it's trying to decode a sudoku book or crack my way through a complex math problem, I have always had a fascination with finding a solution to the (then) unknown. It is one of the reasons why I got so interested in medicine. There will always be more things I can learn and more things I can do. The CHORI SSRP has allowed me to not only explore my interests, but also find the motivation to pursue a career in medicine and clinical research. I am so grateful to have been granted this opportunity to work with Dr. Lee and other UCSF staff this summer, and I cannot wait to see where this path takes me next.

INTRODUCTION

Around 0.7-2.7% of American teenagers identify as transgender and gender-diverse (TGD). To alleviate gender dysphoria that could occur with pubertal onset, TGD youth may receive gonadotropin-releasing hormone agonists (GnRHa) to suppress puberty and allow further gender exploration without unwanted development.

However, puberty is a critical period for acquiring peak bone mass, a major predictor of future fracture risk. Prior to medical treatment, TGD youth have been reported to have a high prevalence of low bone mineral density (BMD). GnRHa therapy is also known to slow bone mass accrual.

At the UCSF Child and Adolescent Gender Center (CAGC), "bone-protective" low-dose sex steroids are used with GnRHa in TGD youth with low BMD. Our study will compare BMD Z-score, body mass index (BMI) Z-score, height velocity, and pubertal trajectories of TGD youth treated with low-dose sex steroids and GnRHa and with GnRHa alone.

OBJECTIVE

BMD Z-scores will decrease less and height velocities of TGD youth will be greater when treated with low-dose sex steroids and GnRHa than with GnRHa alone. We expect some pubertal progression in TGD youth who receive low-dose sex steroids.

METHODS

We performed a retrospective longitudinal chart review of UCSF CAGC patients in early puberty starting GnRHa who had at least 2 dual-energy X-ray absorptiometry (DXA) scans from the same site before 07/01/2022. For DXA scans on HOLOGIC machines, we calculated height Z-score adjusted BMD Z-scores for sex designated at birth per the BMD in Childhood Study. We determined height velocity, BMI Z-scores, and pubertal status.

ANTICIPATED RESULTS

BMD Z-scores will decrease less and height velocities will be greater in TGD youth treated with low-dose sex steroids and GnRHa than with GnRHa alone. TGD youth who receive low-dose sex steroids will have some pubertal progression.

SIGNIFICANCE OF THE PROJECT

This is the first study systematically evaluating effects of low-dose sex steroids on bone mass accrual in TGD youth with low BMD before GnRHa therapy. Should we find this intervention to be effective, clinicians will have an additional tool to address low BMD in TGD youth eligible for GnRHa.

Ali Odeh

Effects of Hyperuricemia on Kidney Function in Patients with Sickle Cell Disease at Benioff Children's Hospital

Mentor: Robert Hagar, MD

Hello! My name is Ali Odeh, and I am a rising junior at Stanford University majoring in Human Biology. My desire to get into research this summer stems from my involvement in health-centered extracurriculars thus far in my academic career. Over the past two years, I have volunteered at a student-organized free clinic, committed to connecting underserved patient populations with primary care services, specialty referrals, and affordable medications. Additionally, I had the opportunity to shadow an occupational health physician and interact with every member of the patient care team. These experiences inspired me to become a part of the innovation that fuels the technological advancements and medical practices I was witnessing, namely, clinical research. This summer I worked at UCSF Benioff Children's Hospital with the generous support of Dr. Ward Hagar in the hematology division. After graduation, I wish to pursue a career in medicine, and I believe becoming a UCSF SSRP intern was a valuable step in that journey.

INTRODUCTION

Sickle Cell Disease (SCD) is a recessive heritable blood disease that affects roughly 100,000 people in the US. This disease causes polymerization of deoxygenated hemoglobin resulting in abnormally rigid red blood cells. Affected individuals experience vaso-occlusion-induced tissue hypoxia leading to pain crisis. While recent advancements in medical care have extended the lifespan of SCD patients, chronic kidney disease (CKD) is the leading cause of death and morbidity for adult sickle cell patients.

OBJECTIVE

The primary aim of this investigation is to examine the effects of elevated serum uric acid (hyperuricemia) on CKD in patients with SCD. Renal function will be measured by changes in longitudinal glomerular filtration rate (eGFR). It is hypothesized that SCD patients with hyperuricemia will experience worse CKD.

METHODS

Patient data was collected for clinical care in the hospital's electronic medical record over the past five years. Patient demographics such as age, sickle cell type, zip codes, along with laboratory markers for sickle cell disease activity, renal function, and transfusion status will be abstracted. Renal function over time will be assessed. Clinical and laboratory values will be investigated for their effect on long-term renal functioning.

ANTICIPATED RESULTS

Sickle cell patients with hyperuricemia may experience more rapid worsening of CKD. This is shown by a decline of about 7 units of eGFR for every one unit rise in uric acid by linear regression, even when gender and sickle cell disease type are controlled for. Interestingly, survival analysis shows a smaller percentage decline in renal function in the hyperuricemia cohort. Some explanations being explored are whether the study cohort is representative of the general sickle cell population or whether the hyperuricemia cohort has had prior renal decline, making changes less noticeable.

SIGNIFICANCE OF THE PROJECT

The findings of this investigation can have an immediate impact on the health of patients with SCD. If hyperuricemia does in fact accelerate CKD, there are safe and widely used drugs capable of reducing uric acid levels. One such drug is losartan, an angiotensin receptor blocker (ARBs).

Amber Peake

Aging, Cancer, and Myeloid Derived Suppressor Cells

Mentor: Mary Helen Barcellos-Hoff, PhD
Contributing Author: Lin Ma, PhD

Hello! My name is Amber Peake and I recently graduated from community college at Diablo Valley College. I am a rising junior transferring to UC Berkeley in the fall with the intention of majoring in Public Health. Following completion of my studies at UC Berkeley, I am planning to pursue a career in medicine and a Masters of Public Health with a focus on underrepresented communities and women and children. I grew up in a small rural town in North Carolina where healthcare access was limited and women struggled to find reproductive healthcare and care for their children. I hope to attend medical school and make healthcare more accessible to underrepresented communities and women and children. I am forever grateful for CHORI, the wonderful SSRP staff, and my brilliant mentor Dr. Mary Helen Barcellos-Hoff for an amazing opportunity to explore my career path through research and medicine.

INTRODUCTION

Cancer is more common in older humans and in people exposed to ionizing radiation. Aging and radiation exposure also affect the immune system. Aging has been shown to skew hematopoiesis towards myeloid lineages, reduce immune cell function, and elicit a pro-inflammatory state that contribute to cancer and frailty. This state, called inflammaging, has a significant impact on the ability to fight off infection and may promote disease, such as cancer.

OBJECTIVE

We hypothesize that radiation exposure accelerates inflammaging. If radiation skews systemic immunity by promoting myeloid lineage commitment, then aging will be accelerated.

METHODS

The Mary Helen Barcellos-Hoff lab completed a 700-mouse study of mammary carcinogenesis as a function of age at radiation exposure and treatment with aspirin to block inflammation. Completion of analysis of tumor incidence and type showed that radiation exposure increased ‘cold’ tumors devoid of lymphocytes but rich in MDSCs, but that treating irritated mice with aspirin prevented this. Blood was collected at four ages that will now be the point of focus. Circulating immune cells will be stained with conjugated antibodies for specific cell markers and analyzed by multispectral flow cytometry to quantify population frequency as a function of age and treatment.

ANTICIPATED RESULTS

It is anticipated that the analysis of the blood from irradiated mice will have more immunosuppressive myeloid cells and that aspirin treatment will prevent this.

SIGNIFICANCE OF THE PROJECT

Aging has significant socioeconomic impacts since it is associated with a range of diseases, such as cancer. Understanding how radiation affects the skewing of immune cells during the aging process and how this affects disease progression could benefit the elderly community and the socioeconomic impacts of aging.

Christian Ramirez Cortes

Evaluation Of Celiac Autoantibody Testing In A Population Of Down's Syndrome Children

Mentor: Mala Setty, MD
Contributing Authors: James Su, MD, Priscella Chan, MD

My name is Christian Ramirez Cortes, and I was born in San Francisco. I am the son of immigrants. I will be a freshman at Emory University this fall where I look to pursue nursing. Science has been a passion of mine for as long as I can remember. Throughout middle school and high school, I kept myself surrounded by science. I knew I was passionate about it, but I did not know what to do with it. All through high school, I volunteered and did community service. I loved helping others, so nursing became the perfect match for me. I want to thank CHORI SSRP for giving me this wonderful opportunity through which I was able to gain valuable connections and truly unmask my future in science. I also want to thank Dr. Mala Setty for bringing me in and allowing me to have an incredible experience.

INTRODUCTION

Celiac disease is an autoimmune disease that occurs in genetically predisposed people where the ingestion of gluten leads to damage in the small intestine. Down syndrome, or Trisomy 21, is a condition in which a person has an extra chromosome. Babies with Down syndrome have an extra copy of one of these chromosomes, chromosome 21. For most people, the best way to test for celiac disease is with the Tissue Transglutaminase IgA antibody (tTG-IgA), plus an IgA antibody.

OBJECTIVE

The objective is to retrospectively assess the current testing standards and prevalence of celiac autoantibodies in a Down syndrome population over a 5 year period and evaluate the outcomes of these evaluations. Specific aims are to retrospectively assess the practice of autoantibody screening for celiac disease in a Down syndrome population, and to assess the significance of positive celiac autoantibody expression in a subpopulation of Down syndrome patients.

METHODS

We will look through data from EPIC/Apex retrieved via computer algorithm that searches for admissions and ambulatory visits from 2015 to 2021 associated with International Classification of Disease ninth or tenth revision codes for Down syndrome. All data is already present in EPIC.

ANTICIPATED RESULTS

By looking into this data, we will be able to assess the practice of autoantibody screening for celiac disease conducted in our Down syndrome population, as well as gather prevalence data for abnormal celiac autoantibodies within this population. Through this project, we will be adding real world practice data while evaluating the screening protocol. Recent studies have shown that people with Down syndrome are more likely to develop celiac disease at some point in their lives. We can contribute towards ensuring the Down syndrome population is properly and more routinely screened.

SIGNIFICANCE OF THE PROJECT

Individuals with Down syndrome are at risk for serious comorbidities ranging from respiratory failure to dementia. Current reports indicate increased prevalence of celiac disease in this group, from 0-19% increased risk of celiac disease as compared to only 1% with the general population. Symptom based screening strategies have noted delayed diagnosis rates as compared to routine screening by up to 6 years (Du, et al., 2017).

Zain Shabbir

NRC Health Patient Experience by Race, Ethnicity, and Language at Benioff Children's Hospital

Mentors: Henry Ocampo & Marsha Treadwell, PhD

Hello everyone! My name is Zain Shabbir and I'm a rising sophomore at UC Berkeley's College of Chemistry studying chemical biology. As a first-generation Pakistani American who's spent the last 10 years living in the East Bay, much of my worldview has been shaped by my experiences locally and abroad. An aspiring surgeon passionately curious about the intersection of healthcare, technology, and global systemic inequities, I'm especially grateful for the opportunity to work with Mr. Henry Ocampo and Dr. Marsha Treadwell of the UCSF Benioff Children's Hospital's Diversity, Equity, Inclusion, and Anti-Racism Council as part of the CHORI SSRP program. Together, we are working to understand racial, ethnic, and lingual disparities in the patient and family healthcare experiences by analyzing patient survey data to influence provider and staff practices. Ultimately, utilizing a quantitative and qualitative analysis of data from fiscal year 2021 and 2022, we aim to influence provider and staff interactions with patients and their families to inform best practices and improve the overall patient care experience at Benioff Children's Hospital. I'm personally excited for the opportunity to expand upon previous research and shadowing experiences in the hospital setting abroad and gain further competencies to inform my future career.

INTRODUCTION

There are significant health disparities that affect Black, Indigenous & People of Color (BIPOC) communities. The history of racism has driven health inequities and puts BIPOC communities at greater risk for poorer health outcomes and negative experiences within healthcare systems. We aimed to analyze discrepancies in healthcare experiences dependent on patient race, ethnicity, and language (REAL) at Benioff Children's Hospital (BCH).

OBJECTIVE

Based on previous literature, it was hypothesized that there would be disparities in healthcare experiences based on REAL at BCH.

METHODS

NRC Health Patient Experience surveys were completed by 5069 patients/caregivers seen at BCH between July 1, 2021 – June 7, 2022. This analysis focused on the question of courtesy/respect. Overall experiences on the courtesy/respect question were rated from 0 (poor) to 10 (excellent). Scores of 0–5 (N=487) were considered "detractors" – patients/families were grossly dissatisfied by care at BCH. Survey responses were stratified by REAL. The comments were then qualitatively analyzed (via thematic analysis) for common themes in patient complaints within each race and between races.

ANTICIPATED RESULTS

Quantitative analysis of the Patient Experience survey data revealed disparities in healthcare experiences at BCH based on race, with Asian (-6 from average) and Black (-5.4 from average) patients/families reporting significantly more negative experiences than White (+0.3 over average) patients. Thematic analysis segregated data into two overarching categories: systemic (e.g., wait times, hygiene) and non-systemic/interaction-based experiences. Non-systemic/interaction-based complaints were further subdivided into 4 categories: discrimination on racial/ethnic characteristics, language-based discrimination, disrespect, and demeanor. These four categories provided greater understanding of patient complaints.

SIGNIFICANCE OF THE PROJECT

Results from our quantitative and qualitative analyses suggest that targeted education to address health care providers' implicit biases and support the practice of cultural humility, and education on the appropriate use of interpreter services, is needed to improve experiences of BIPOC patients and families seen at BCH.

Nabila Siddiqui

Determine development of human visual cortex myelo- and cytoarchitecture via ex vivo histology

Mentors: Alex Rezai, PhD and Mercedes Paredes, MD PhD
Contributing Authors: Alex Rezai, PhD, Mercedes Paredes, MD PhD

Hi, my name is Nabila Siddiqui and I am a rising sophomore at UC Berkeley where I am majoring in intended public health and minoring in bioengineering. Throughout my life I have explored science a lot, researching in labs through high school and continuing in my time at UC Berkeley. I have learned so much, but it has all been in the same area of science so, when I heard about CHORI I was excited because it was an opportunity for me to explore science beyond what I have already seen and go deeper into the world of research. This experience is so helpful to be able to see science in a more multifaceted way! Experiences like these will help me in my future and pursuing an MD-PhD. Thank you CHORI and the Paredes Lab!

INTRODUCTION

After birth, humans are exposed to novel visual stimuli. However, the ability to perceive and distinguish ecologically relevant visual stimuli like faces and places is crucial for an infant to successfully navigate their world. This calls to question the nature/nurture argument. Is facial and spatial perception innate or dependent on experience? Are the areas of the brain that are specific to facial perception static across postnatal development or do they evolve as face perception is acquired?

To further examine this, we used human samples from the Fusiform Gyrus, (the Calcarine Sulcus) and scene-selective cortex in the Collateral Sulcus to see which factors of overall cellular organization (i.e. microstructure) remain static after birth, and which change as infants experience the world outside of the womb.

OBJECTIVE

To see if the cellular composition differs between the primary and associative visual areas in the human brain and if the cellular composition of the visual cortex changes postnatally.

METHODS

We obtain and process pediatric tissue samples containing the Calcarine and Collateral Sulci. Then we use immunohistochemistry to stain the 30 micron cryosections at 1 millimeter intervals along each sample for DAPI, ALDH1L1, NeuN, and Olig2. DAPI labels all cell nuclei, ALDH1L1 is a marker for astrocytes, NeuN is a marker for mature neurons, and Olig2 is a marker for oligodendrocytes.

ANTICIPATED RESULTS

Our data suggests that there is developmental cell death in the brain and there is also an increase in Oligodendrocyte numbers in the brain however the timeline for this differs across brain regions. Another result was that a lot of the gross microstructure of the areas that are expected is the same at birth and as adults.

SIGNIFICANCE OF THE PROJECT

This is evidence that the brain does undergo changes after birth which means that there are some biological events that would allow the brain to adapt according to experience. This also shows that the general organization of cells stays the same from birth to adulthood, there is just some overturn of neuron populations.

Maryam Suratwala

Mutation accumulation in C. elegans with deletions in mtss-1 gene

Mentor: Samantha Lewis, PhD
Contributing Authors: Jackie Lanzalotto, Jessica Leslie, Samantha C Lewis

Hi! My name is Maryam Suratwala and I'm a rising freshman at the University of California Davis majoring in Neurobiology Physiology and Behavior. Since childhood I have always been fascinated by life under the microscope and often observed strands of my own hair and ants during my free time. This summer at SSRP I am so excited to continue observing living things under the microscope, and create the stepping stone for further research on mitochondrial diseases in humans. Having had no experience in a wet-lab before, I am so grateful for the opportunity to explore the world of research and perform significant experiments on C. elegans. I would like to thank Dr. Samantha Lewis, the entire Lewis Lab, CIRM as well as the SSRP staff for their support and guidance to helping me achieve my goals.

INTRODUCTION

In humans, energy in the form of ATP is generated by mitochondria, which contain a DNA blueprint called mitochondrial DNA (mtDNA). Mutations in mitochondrial DNA during mtDNA replication cause devastating metabolic diseases in humans. Using the model nematode *Caenorhabditis elegans,* we study how mtDNA mutations arise, discover ways to target these mutations, and devise screening or intervention measures for the mutations. For our experiment, we wondered whether perturbing an essential mtDNA replication protein, mtss-1, would lead to more mtDNA mutations in *C. elegans.*

OBJECTIVE

Our objective is to determine the role of SSBP1 protein, the product of the mtss-1 gene, in mtDNA integrity. We strive to understand how random mutations arise in the mtss-1 mutant worms compared to the wild type worms, if the mtss-1 mutation will alter the mtDNA packaging, and if the mtss-1 mutation impacts how many progeny *C. elegans* have.

METHODS

We performed a mutation accumulation experiment comparing mtss-1 gene mutant *C. elegans*, and the control N2 wildtype *C. elegans* over 10 generations. We then performed PCR on the control and mutant *C. elegans*, amplifyed the DNA, and performed gel electrophoresis to observe if mtDNA deletions occurred in the mutant worms. Then, we sent the DNA for sequencing to determine the specific gene locations of the deletions.

ANTICIPATED RESULTS

We expect that the native function of the mtss-1 gene is to suppress mtDNA mutation frequency by inhibiting secondary structure formation of single-stranded DNA during replication. We expect to observe more deletions in the mutant C. elegans compared to the control type *C. elegans*, unique mtDNA packing in the mutant *C. elegans*, and less progeny for the mutant *C. elegans*.

SIGNIFICANCE OF THE PROJECT

mtDNA mutations cause mitochondrial diseases and are linked to conditions including cancer, cardiovascular diseases, and neurodegeneration. With further research on mtDNA mutations leading to mitochondrial diseases, we can develop a refined list of targets for mitochondrial disease therapeutics and drugs that target the human homolog of mtss-1.

Ngoc Tam Trinh

The impact of the automated dispensing machine (ADC) Pyxis MedStation ES along with Pyxis CIISafe system on controlled medication in the inpatient hospital setting

Mentors: Kimery Leong, PharmD; Quang Bui, PharmD

Hi everyone, welcome to my post! My name is Ngoc Tam Trinh. I'm a rising Pharmaceutical Chemistry junior at UC Davis and an alumnus of our program from 2021 SSRP. Growing up with small arguments between my grandma's Chinese remedies and my mom's western medicine whenever I feel unwell, has sparked my inspiration and curiosity about pharmacy. After 4 years since I immigrated to the US, I finally have the courage to shift my major completely from business to pursue pharmaceuticals. In the summer of 2022, it is a pleasure for me to come back and had such a unique experience with our UCSF Benioff's Children Hospital In-patient Pharmacy team as well as connect with other future scientists. A huge thanks to Dr. Leong Kimery-my mentor, and Ms. Elsie along with everyone in the team for giving me a chance to experience real-life in-patient pharmacy, and broaden my knowledge about adapting new technology - auto-dispensing machines for controlled medication into the pharmacy/hospital settings.

INTRODUCTION

The Pyxis MedStation ES is an automated medication dispensing system supporting decentralized medication management. Pyxis CIISafe system enhances the value of MedStation ES by storing, tracking, and monitoring the replenishment of controlled substance inventory within the hospital. The technology consolidates documentation from the pharmacy to the nursing floor, virtually eliminating time-consuming and error-prone manual recordkeeping. It also makes it easier to spot discrepancies or signs of diversion (BD Catalog).

There is one Pyxis CIISafe located inside the pharmacy. It will monitor Pyxis MedStations ES, located in 13 different units throughout UCSF Benioff Children's Hospital Oakland site. CII Safe will alert our pharmacist about discrepancies occurring with these locations. The person in charge of each unit will try to solve the discrepancies and give out an explanation for each of them.

OBJECTIVE

Improve dispensing errors by decreasing missing dose/waste, missing count/type, and missing order of the inventory with controlled medication in all units.

METHODS

From April-July 2022, we use discrepancies data from Acudose Rx System (old system) and compare those with Pyxis CIISafe and Pyxis MedStation. This study focuses on 3 main discrepancy categories:

- Misdose/miswaste: when the amount of controlled medication given or wasted by the nurse's staff does not match the doctor's order. Due to the Acudose Rx System's design, there is no separate discrepancy report between misdose and miswaste.
- Miscount/mistype: when the amount of controlled medication in the Acudose or Pyxis MedStation does not match with pharmacy inventory.
- Misorder: controlled medication is removed without the doctor's order.

ANTICIPATED RESULTS

Expected result to reduce 50% misdoses/miswaste, 30% miscount/mistype, and 30% misorder.

SIGNIFICANCE OF THE PROJECT

Analyzing the effectiveness of auto-dispensing machines in in-patient hospital settings will help prevent manual errors, keep controlled medications secure, and increase the effectiveness of pharmacy workflow in general.

Thiri Than

Antibiotic Use in Children with Urinary Tract Infections

Mentor: Prachi Singh, DO

My name is Thiri Than, and I am a rising sophomore and Fiat Lux Scholar studying public health at the University of California, Berkeley. My interest in public health stemmed from the healthcare disparities my family and I experienced as first generation low income Americans. I was frustrated by the underrepresentation of Burmese people in data and in the medical profession. I further explored my interest in public health through my time at UC Berkeley, finding my passion for infectious diseases. In the future, I strive to pursue a career in immunology and dream of exploring the intersectionalities of cultivating a healthy environment. I wholeheartedly thank my mentor, Dr. Prachi Singh, for her guidance and CHORI SSRP for empowering me on my journey!

INTRODUCTION

Urinary Tract Infections (UTI) are one of the most common infections in children. Antibiotic treatment for UTIs is often started empirically in the emergency department based on pyuria on urinalysis, but can lead to an overuse in antibiotics. This study evaluates the use of antibiotics in children discharged with presumptive diagnosis of UTI who did not meet definitive diagnosis based on urine cultures.

OBJECTIVE

More than 20% of patients who do not meet definitive diagnosis of UTI are prescribed antibiotics for greater than 7 days.

METHODS

We will conduct a retrospective chart review of all children ages 0-21 years old diagnosed

with a UTI seen at UCSF Benioff's emergency department from 2019-2022. We have defined UTI in accordance with the American Academy of Pediatrics as a uropathogen colony count of >100,000 colony forming units per milliliter. We will use descriptive statistics to identify the number of patients prescribed antibiotics without a UTI diagnosis, and conduct chi square and t-tests to find significance with $\alpha = 0.05$ and $\alpha = 0.2$.

ANTICIPATED RESULTS

Out of 224 patients, 89% of patients without a UTI were prescribed antibiotics for an average of 7 days. A total of 822 extra days on antibiotics were prescribed to patients without a UTI. Inflammation is highly correlated with presence of infection.

SIGNIFICANCE OF THE PROJECT

Prolonged and overuse of antibiotics leads to adverse effects such as clostridium difficile, alterations in the gut microbiome, and antimicrobial resistance. This project seeks to decrease antibiotic resistance and influence for better hospital management and care at UCSF Benioff.

Jenny Tran

Comparison of intracellular lipid accumulation between iPSCs from NAFLD patients versus healthy controls

Mentors: Marisa Medina, PhD, Dylan Chhetri, Yu-Ling Huang, PhD

My name is Jenny Tran, I am a raising senior at Arroyo High School. In my sophomore year, uncertain with all the career options presented, I decided to take a class called Principles of Biomedical Science. `Not only did I fall in love with the hands-on work but I fell in love with science. Science is filled with the unknown, being able to discover and research something that no one has seen before, or attempting to find a cure is a thrill that I hope to chase. Because of CHORI and my amazing mentors Dr. Marisa Medina and Dylan Chhetri I have had the ability to get a glimpse of what the thrill actually consists of. I aspire to work in the health field in hopes to become a doctor in the future, this program and the amazing people I've meant this year have brought me one step closer.

INTRODUCTION

Nonalcoholic fatty liver disease (NAFLD) is characterized as the accumulation of fat within the liver (steatosis), and is the leading cause of chronic liver disease globally. Induced pluripotent stem cells (iPSC) are created by reprogramming somatic cells into pluripotent cells. The California Institute of Regenerative Medicine has created a collection of iPSCs from NAFLD patients and healthy controls.The Medina laboratory has previously shown that iPSCs can be used to model the impact of genetic variation on cellular steatosis, with cell lines from donors with NAFLD genetic risk variants showing greater fatty acid induced steatosis than cell lines without these risk variants.

OBJECTIVE

iPSCs from NAFLD patients will have greater oleate induced intracellular lipid accumulation than iPSCs from healthy patients.

METHODS

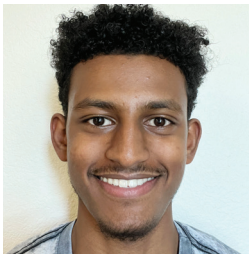
iPSCs from 6 donors (NAFLD patients or case controls) will be cultured in mTeSR plus media and after reaching 80% confluency, will be incubated with either 100uM oleate or an equivalent volume of BSA as a control. After 24 hours, cells will be stained with Nile Red and the level of fluorescence will be quantified by flow cytometry. Cellular steatosis will be determined by the fold change of fluorescence in the oleate vs. BSA treated cell lines.

ANTICIPATED RESULTS

All 6 of the cell lines demonstrated greater intracellular lipid levels upon oleate exposure increasing on average 2.02 ± 0.19 fold, p=0.005. We expect higher oleate-induced lipid accumulation in iPSCs from NAFLD patients compared to iPSCs from patients with no history of NAFLD. Analyses are pending.

SIGNIFICANCE OF THE PROJECT

We aim to determine the threshold values of intracellular lipid accumulation that distinguish NAFLD cases from controls. This research may inform the creation of a noninvasive test to predict individual level risk of NAFLD. As there is currently no directed therapeutic to treat NAFLD, identification of high individual level risk may help those stay compliant with diet and lifestyle techniques to mitigate disease onset and progression.



Siem Tsegay

Examining the Relationship between Tamsulosin Levels & Lower Urinary Tract Symptoms (LUTS) Severity

Mentor: Akinyemi Oni-Orisan, PharmD PhD
Contributing Author: Janille Miranda, PharmD Candidate

My name is Siem Tsegay, and I am a rising sophomore at Macalester College. I am currently undecided but hope to pursue a career in medicine. For as long as I can remember, I have been enamored with medicine for three simple reasons: I am fascinated by the complexities of the human body. Secondly, medicine gives me the ability to make a long-lasting impact on a patient during their lowest moment. Lastly, medicine allows me to address health disparities. My experience with CHORI has been transformative, opening my eyes to various health professions and providing me with a community of other medical enthusiasts who I can rely on for support. I would like to thank my mentor, Dr. Oni-Orisan, for allowing me to acquire invaluable clinical research experience. I also want to show my appreciation to Janille Miranda for her time and willingness to answer my endless questions!

INTRODUCTION

Lower urinary tract symptoms (LUTS) such as nocturia, intermittent urination, and urinary urgency are common health conditions affecting more than 50% of men above 70 years in the United States. Tamsulosin is a selective alpha-1 blocker that is commonly prescribed to alleviate LUTS. However, Tamsulosin has been shown to contribute to polypharmacy and increase the risk of falls and psychological distress. The main side effects of this medication are orthostatic hypotension and dizziness. Although not all men benefit from taking it, tamsulosin is often prescribed indefinitely, leading to unnecessary exposure to the risk of side effects. This study will inform patients if this drug is working for them or not.

OBJECTIVE

Primary Objective: To determine the relationship between concentration levels of tamsulosin in the body and LUTS severity

Secondary Objective: Determine the half-life of tamsulosin

METHODS

We will recruit 20 men receiving chronic tamsulosin therapy for LUTS, and these participants will be scheduled to obtain 3 blood draws. Patients will discontinue therapy before their last two blood draws to measure half-life. Each blood sample will undergo centrifugation and aliquoting to isolate the plasma component of the blood. Plasma samples will be sent to the University of California, San Francisco (UCSF) Drug Research Unit for quantification of drug levels in the blood. For each patient, we will create a scatter plot and obtain the r-squared value (using Pearson's correlation coefficient) showing concentration levels of tamsulosin and LUTS severity. Half-life will be calculated from the three blood concentrations using various formulas.

ANTICIPATED RESULTS

We anticipate a strong inverse relationship between concentration levels of tamsulosin in the body and LUTS severity. We expect the half-life to be around 8 hours but to vary moderately across individuals.

SIGNIFICANCE OF THE PROJECT

LUTS is a significant health problem in older men and the use of tamsulosin with current prescribing patterns is harmful. This study will investigate the relationship between tamsulosin levels in the body and LUTS severity, which will optimize tamsulosin therapy by discovering possible biomarkers for tamsulosin and improving prescribing decisions for healthcare providers.

Isis Williams

Impact on Pain and Cognitive Functioning on Individuals with Sickle Cell Disease

Mentor: Marsha Treadwell, PhD

Hello! My name is Isis Williams and I am a graduating senior at Florida A&M University (FAMU) majoring in Allied Health with a concentration in Pre-Occupational Therapy, with plans to pursue my Master's in Occupational Therapy this coming fall. Science and healthcare have always been a large part of my life, and they have greatly influenced my academic path. Growing up as an athlete, I was always intrigued by the body and its' chemical processes in relation to pain and injury. This paired with my desire to make an influence on my community is what led me to study Occupational Therapy. If there is one thing that SSRP has taught me, it's that science and medicine are multidimensional subjects, and there is so much to learn and discover. The lessons and memories I have made thus far are something that I will carry into my life and my career.

INTRODUCTION

Sickle cell disease (SCD) is a multiorgan disease that has been shown to be associated with lower health related quality of life (HRQoL), with health outcomes correlated to patients' productivity and functionality in everyday life. Our study analyzes changes in these health outcomes for adolescents and adults with SCD with implementation of a program, Networking California for Sickle Cell Care (NCSCC) at BCH Oakland that aims to improve access and quality of care.

OBJECTIVE

We hypothesized that cognitive functioning will improve and pain outcomes will improve over time across measures of severity, frequency and impact. Our secondary hypothesis is that as improvements in pain experience are reported, improvements in cognitive function will also be reported.

METHODS

Individuals with SCD, ages 15 – 45 years, completed surveys in 2017-18 as part of a Registry enrollment. Follow-up surveys were obtained in 2020. Standardized questions asked about cognitive functioning and pain experiences. Data was entered into a centralized database and was extracted to analyze changes over time.

ANTICIPATED RESULTS

The n = 163 respondents were 64% female; 96% Black; 6% LatinX; mean age 29.5 years (SD = 8.5); primarily with SCD-SS (72%). Participants had significantly decreased pain severity (T score at follow-up 49.8 ± 9.9 vs. 51.3 ± 8.8 at enrollment, $p < .05$) but greater pain frequency at follow-up (53.2 ± 6.8 vs. enrollment 51.9 ± 8.9, $p < .05$); with no change in pain impact or cognitive functioning. Regression analyses showed that the strongest associations for pain frequency, severity and impact at follow-up were the same variables at enrollment, with no associations found with cognitive functioning.

SIGNIFICANCE OF THE PROJECT

SCD pain can seriously impact HRQoL, yet within the healthcare community, there is much prejudice impressed upon the primarily Black and Brown SCD populations. It is important to make sure that pain experiences are validated and heard, in a world where some will deem SCD populations as drug seekers. We hope to see improvements in outcomes with NCSCC interventions in place for a longer period.

Charles-Anthony Woodfork

The Importance of Resilience Strategies to Combat ACEs (Balancing asking About Adversity with Resiliency)

Mentor: Neeta Thakur and Dayna Long, MD
Contributing Authors: Cindy Curiel, Cherri Harris, Robert Mok, Neeta Thakur

My name is Charles-Anthony Woodfork, and I am an incoming second-year pre-med human nutrition student and Dowdy Scholar at North Carolina A&T State University. After witnessing how ailments like cancer, hypertension, and diabetes have negatively impacted those I love, I became interested in the impacts of resource availability and attainability (or more specifically the lack thereof) on health at the community level and the disparities created by these inconsistencies. I aim to pursue a dual MD/MPH degree in order to bridge the gap between clinical practice, research, and health education in order to drive more equitable health outcomes for historically underserved populations as a physician. I am dually excited by my chosen career as it will present me with the opportunity to not only live a life of continued learning and servitude but also allow for me to positively impact those around me both immediately and for generations to come.

INTRODUCTION

Between January 2020 and June 2021, nearly one million individuals had been screened for ACEs and trauma in California. This project attempts to identify these resilience factors in a pediatric population in hopes of mitigating the long-term effects of ACEs by identifying them early and presenting resilience strategies.

OBJECTIVE

- Collect and record 40-60 screeners
- Perform thematic analysis of data to observe themes
- Review and assess data to better understand the correlation between family strengths and resiliency in the backdrop of trauma

METHODS

First the patient is screened using the PEARLS tool. Then, screeners were collected from the clinic, recorded in RedCap, and analyzed for themes alongside clinic monthly reports. This was done by comparing the prevalence of ACEs before the resiliency questionnaire was added with prevalence data from those who have since completed the screener and disclosed resilience strategies. I then categorized responses based on themes I observed during analysis.

ANTICIPATED RESULTS

Quantitative Data: 44% or 204 well child checks were screened over the time that I collected compared to 43% a month before (303 records collected). I retrieved 69 records and disclosure (PEARLS score) did increase slightly after resiliency questions were added.

Qualitative Data: The most common responses when asked about favorite attributes of the child (or self in the case of the teens) primarily referenced personal characteristics (i.e. funny, honest, etc.). And to the question about resilience strategies, the most common response was to utilize leisure activities.

SIGNIFICANCE OF THE PROJECT

This project may have large ramifications on the future of medical practice due to the effects of racism and discrimination on health impacts. This project was a pilot study in one clinic and future studies may include a larger sample size to determine if the noted increase is statistically significant.

Angela Xiong

The Effects of *TMEM55B* on Intracellular Lipid Accumulation

Mentors: Yuanyuan Qin, PhD and Marisa Medina, PhD

Hello! My name is Angela Xiong and I am a rising senior at Mission San Jose High School. I am passionate about public health and medicine; in the future, I aspire to practice Pediatric Oncology while conducting research and serving underprivileged populations. As a first-generation student coming from a low-income background, pursuing a career in science and medicine sometimes felt like being stranded at sea, with no one to reach out to. However, participating in the CHORI this summer has introduced me to dedicated mentors, passionate healthcare professionals, and supportive friends – empowering me in my journey toward medicine. I am incredibly grateful to the CHORI program and my mentors, Dr. Qin and Dr. Medina for this life-changing experience.

INTRODUCTION

Nonalcoholic fatty liver disease (NAFLD) is estimated to be the most common cause of chronic liver disease both in the US and globally. NAFLD is characterized by excess lipid accumulation in liver cells which can progress from simple steatosis to nonalcoholic steatohepatitis (NASH), cirrhosis, and ultimately liver cancer or liver failure. The Medina lab has previously shown that transmembrane protein 55B (*TMEM55B*) regulates multiple aspects of lipid metabolism, and that loss of TMEM55B causes NAFLD in murine models. Additionally, they found that induced pluripotent stem cell-derived hepatocyte-like cells (iPSC-Heps) from NASH patients had lower levels of *TMEM55B* expression than those of healthy controls.

OBJECTIVE

To evaluate whether the loss of *TMEM55B* causes intracellular lipid accumulation in iPSCs established from healthy donors.

METHODS

iPSCs from 3 donors will be cultured in mTeSR1 media at 37° at 5% CO_2. iPSCs will be nucleofected with plasmids containing CAS9, a neomycin resistance gene, EGFP, and guide RNA (gRNA) targeting *TMEM55B* or a scrambled gRNA to create TMEM55B knockout cell lines. iPSCs will undergo a neomycin selection and GFP-positive cells isolated by fluorescence-activated cell sorting. *TMEM55B* transcript levels will be quantified with qPCR to confirm the loss of *TMEM55B*. Next, iPSCs will be incubated with 100⌠M BSA-conjugated oleic acid or a BSA control. After 24 hours, cells will be stained with Nile red for neutral lipids, and the level of Nile red intensity will be quantified by FACS.

ANTICIPATED RESULTS

iPSCs treated with plasmids containing *TMEM55B* gRNA will have reduced expression of *TMEM55B* and greater intracellular triglyceride accumulation compared to the controls.

SIGNIFICANCE OF THE PROJECT

Currently there are no targeted therapeutics for the treatment of NAFLD. Identifying molecular factors that impact disease onset or progression can aid in the development of preventative strategies and novel treatments to alleviate this disease. Our research also highlights the utility of using undifferentiated iPSCs as a cellular model for NAFLD.

Erika Zagni

Magnetogenetics to control dopaminergic neural progenitors derived from hiPSCs in Parkinson's Disease

Mentor: Miriam Hernandez-Morales, PhD

Hello! My name is Erika Zagni and I am a first year student at UC Irvine. I originally was not interested at all in research. This mindset changed during a previous program I attended, a speaker described research as discovering something no one else has discovered ever before. He then talked about his research, where he blasted cells with a laser and stuffed them with mitochondria as a potential way to treat mitochondrial diseases. I was hooked and wanted nothing more than to do my own research. That's where I found SSRP. This program has been life-changing for me. After doing stem cell research this summer, I want to focus on microbiology and get my Ph.D. to continue discovering what no one else has ever discovered before. Special thanks to my mentor, Dr. Hernandez-Morales, and my colleagues for giving me an amazing first research experience and all their infinite patience.

INTRODUCTION

Parkinson's Disease (PD) is caused by the death of dopaminergic (DA) neurons in the substantia nigra causing bradykinesia, rigidity, resting tremors, and gait impairment. The PD pharmacological therapy increases the brain's dopamine levels, but it progressively decreases its efficiency. Recently, diverse therapies that use human-induced pluripotent stem cells (hiPSCs) to replace the lost DA neurons, have been developed to treat PD. However, intrastriatal transplantation of DA progenitors has had limited success. This is because only a small fraction of transplanted neurons survive and integrate into the striatal circuits. My research is part of a project that aims to manipulate the activity of the DA neuronal progenitors derived from hiPSC to improve the restoration of PD circuits.

OBJECTIVE

Controlling the intracellular Ca^{2+} activity using magnetogenetics will improve the differentiation, maturation, and synaptic connection of dopaminergic neuronal progenitors derived from hiPSCs.

METHODS

hiPSCs were differentiated into DA progenitors and next transfected with $TRPV4^{FeRIC}$, an ion channel permeable to Ca^{2+} which is activated with radiofrequency (RF) magnetic fields. The $TRPV4^{FeRIC}$-DA progenitors were stimulated with RF to activate Ca^{2+} activity during the differentiation. The mature DA neurons were subjected to immunoassays to evaluate markers for differentiation, maturation, and synaptic connectivity. Two DA progenitors groups were analyzed, the control not stimulated and those RF stimulated.

ANTICIPATED RESULTS

RF stimulation of DA progenitors expressing $TRPV4^{FeRIC}$ will improve the survival, differentiation, maturation, and synaptic connectivity of the DA neurons.

SIGNIFICANCE OF THE PROJECT

Replacing the lost DA neurons with DA progenitors that can be stimulated with RF to activate Ca^{2+} activity can be a viable treatment for Parkinson's disease. This project may help to improve the design of the current cell-based therapies for Parkinson's disease.

Nebeyat Zekaryas

Use of Tat-beclin in a sickle cell mouse model

Mentor: Angela Rivers, MD PhD
Contributing Authors: Annie Gallivan, Hart Horneman, Mikail Alejandro

My name is Nebeyat Desta Zekaryas and I am a pre-nursing student at Diablo Valley College. I am currently going through the transfer process to a 4-year university to obtain my BSN. This year I have been lucky enough to work with Dr. Angela Rivers for a second summer as an intern in her lab investigating the pathology of sickle cell disease as well as potential future treatments. The importance of service to others was instilled in me early on by my grandparents and mother and I hope to one day provide healthcare to communities that have been neglected by the disparities in this country's health care system. The UCSF SSRP has absolutely solidified my desire for a career in research and I want to express my gratitude to Dr. Rivers and Hart Horneman for sharing their time, knowledge, and experience with me.

INTRODUCTION

Sickle cell disease (SCD) is a group of blood disorders caused by the inheritance of mutated hemoglobin. Individuals with SCD suffer from chronic hemolytic anemia, painful crises, and multisystem organ damage. The Rivers lab has established that RBCs in SCD patients retain mitochondria and that RBCs with retained mitochondria had elevated levels of reactive oxygen species (ROS). Tat-beclin 1 D-11 (Tat-beclin) is an ideal candidate drug to investigate its ability to eliminate retained mitochondria in SCD terminal stage reticulocytes and matured RBCs. Tat-beclin is a cell-penetrating autophagy-inducing peptide drug derived from Beclin 1 linked to Tat protein which has been demonstrated to induce autophagy via binding to autophagy suppressor GAPR-1/GLIPR229.

OBJECTIVE

Determine whether Tat-beclin can correct the effect of mitochondrial retention on ROS levels in RBCs of peripheral blood, and erythrocyte precursors from bone marrow, and spleens of an SCD mouse model.

METHODS

We will administer 30 or 60 mg/kg of Tat-beclin for 8 weeks to SCD mice. Peripheral blood will be collected weekly, stained with tetramethylrhodamine, methyl ester or TMRM (mitochondria), CD71(reticulocytes), and CM-H2DCFDA20 (ROS) and measured by fluorescence activated flow cytometry (FACs). Bone marrow and spleen cells will be collected at the end of the 8th week and we will measure ROS and mitochondrial content in RBC precursors via FACs.

ANTICIPATED RESULTS

The expected results are that Tat-beclin treatment will reduce mitochondrial content and ROS in peripheral blood cells and normalize mitochondrial changes in SCD precursors.

SIGNIFICANCE OF THE PROJECT

This research will help the Rivers lab work toward our long-term goal of translating findings regarding the role of erythrocyte mitochondrial retention in SCD into a therapeutic target to manage SCD.

Kenia Zepeda

Hitting the Sweet Spot: Analyzing the Correlation Between Postprandial Blood Glucose Levels, HbA1C, and Diet Recall Data in Adolescent Type 2 Diabetic Patients

Mentor: June Tester, MD MPH

Hello! I'm Kenia Zepeda and I will start my third year at Stanford University as a Human Biology major with a concentration in Community Health and Health Policy. Upon graduation, I plan on becoming a trauma surgeon and receiving a Master's in Public Health to aid in my path of providing healthcare that is culturally sensitive and accessible. Having encountered a myriad of health disparities through my own experiences and those of close family members, I am motivated to address these systemic issues through research, healthcare, and engagement with health policies. I would like to thank SSRP directors and staff for giving me this opportunity to engage with passionate individuals and a huge thanks to my mentor for guiding and supporting me through more than just research. Having had this experience, I'm confident I can succeed in my future endeavors, as a caregiver and researcher!

INTRODUCTION

The cells of a type 2 diabetic have become "resistant" to insulin, a hormone central to modulating blood glucose levels, leading to a cascade of health problems. Nonetheless, type 2 diabetes can be managed with medications, a nutritious diet, and exercise. While high-sugar and high starch foods elevate blood glucose levels significantly, high-fiber foods have been repeatedly shown to decrease postprandial glucose – blood glucose concentrations 2 hours after a meal – in hundreds of studies. It's important that diabetics manage their glucose levels to avoid the immediate consequences of extreme fluctuations in blood glucose levels and maintain good health overall.

OBJECTIVE

We will examine the correlation between self-gathered postprandial glucose, HbA1C, and patient-reported 24-hour diet recall in adolescent diabetic patients. Additionally, we will report on means of key nutrient outcomes (i.e., calories, carbohydrates) and food group (added sugars, whole and refined grains).

METHODS

Patients will measure their blood glucose levels, using their glucometers/glucose sensors twice: 1) 2 hours after dinner of the night before their appointment. 2) while fasting on the morning of their appointment. After their visit, a researcher will guide them through a 24-hour diet recall survey.

ANTICIPATED RESULTS

We anticipate that postprandial glucose levels and HbA1c in adolescent diabetic patients will highly correlate with the quality of their dinner meal. We also expect that patients with a greater consumption of whole grains and fiber will have lower postprandial glucose levels after their dinner meal.

SIGNIFICANCE OF THE PROJECT

The data from this pilot study will inform planned research that can combines "real-world" diet intervention with patient-gathered data on post-prandial glucose. Much existing research about post-prandial glucose is from feeding studies in a laboratory setting (e.g., after eating a standardized grain cereal). However, this study increases the ability to study the impact of intervention foods on subsequent glucose levels in the real-world setting, increasing the ecological validity and generalizability.

41st Annual Summer Student Research Program Symposium

National Institutes of Health (NIH) Scholars


Tiana Bishop


Christian Castillo


Danissa Coffey


Jalen Evans


Abby Hayes


Sia'h Fanta Jimissa


Amarachi Kanu


Michael Lewis


Emily Loo

Ali Odeh


Amber Peake


Zain Shabbir


Nabila Siddiqui


Thiri Than


Isis Williams


Charles-Anthony Woodfork

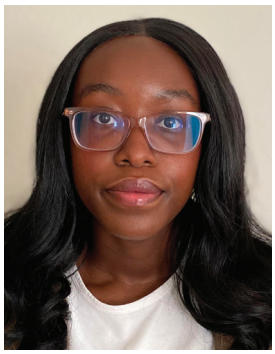

Nebeyat Zekaryas


Kenia Zepeda

This group of undergraduate students was funded by the National Institutes of Health (NIH), STIMULUS grant, Science & Technology IMmersion for Underrepresented Learners in the US. The students were selected from a competitive pool of undergraduates from all over the United States. Each NIH funded student developed their own hypothesis driven project, carried out this project during the 9-week one-on-one mentored program, presented a brief 'flash talk' about their work to their peers, created a detailed goal setting individual development plan (IDP), participated in weekly journal clubs, scientific and educational enrichment activities and will be presenting the findings of the results from their project in both oral and poster presentation formats during the SSRP symposium sessions.

41st Annual Summer Student Research Program Symposium

California Institute for Regenerative Medicine (CIRM) Scholars



Michelle Adutwum

Norzin Lhadon

Maryam Suratwala

Jenny Tran

Angela Xiong

Erika Zagni

This group of students was funded by the California Institute for Regenerative Medicine (CIRM)- Supporting Underrepresented STEM Adapting to Change: Summer Program to Accelerate Regenerative Medicine Knowledge: Sustain-A-SPARK. Their summer research project's focused primarily on stem / progenitor cell or translational research. In addition, they engaged in patient focused activities, maintained Pen Pal correspondence with a patient recovering from a bone marrow transplant throughout the summer, blogged about their research activities, and attended numerous additional education activities regarding stem and bone marrow transplant. These students will have the opportunity to present their results twice, at the CIRM-SPARK annual conference with the other CIRM SPARK trainees from California, and again at our SSRP research symposium.

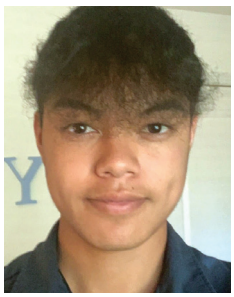
41st Annual Summer Student Research Program Symposium

Doris Duke Charitable Foundation (DDCF) Scholars

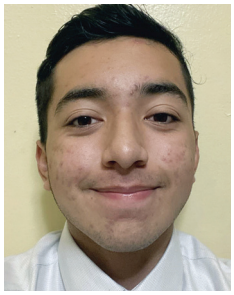

Zara Ahsan

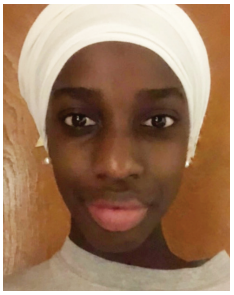

Levi Cervantez


Aiden Higuera-Toris


Ty Hosein


Kai Lam Kingsle U


Hector Munoz


Marietou Ndiaye


Uyen (Anna) Ngo


Christian Ramirez Cortes


Adriana Medina


Eric Connelly
Undergraduate DDCF Alumni

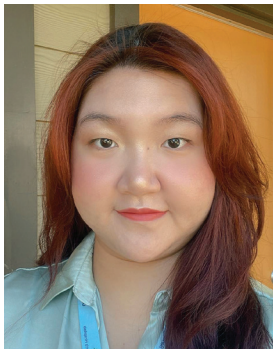

Siem Tsegay
Undergraduate DDCF Alumni

These students were funded by a grant from the Doris Duke Charitable Foundation, SUSTAIN grant, SSRP Supporting Underrepresented STEM Adapting to Change. Both high school and returning SSRP DDCF Scholars who are now undergraduate students are funded under this program. All students are interested in pursuing careers in bioscience and/or health care. Each DDCF funded student developed their own hypothesis driven project with the assistance of their mentor, carried out this project over our 9-week program, created a detailed goal setting individual development plan (IDP), presented a brief 'flash talk' about their work to their peers, and participated in weekly journal clubs, scientific and educational enrichment activities. Each student is presenting the results of the findings from their project in both oral and poster presentation formats during the SSRP symposium sessions.

41st Annual Summer Student Research Program Symposium

Scholars Supported by the Bertram Lubin Scholarship, National Science Foundation and Global Blood Therapeutics

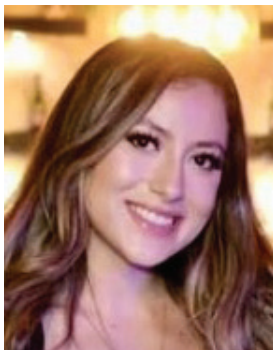
Daisy Garcia Orozco
Bertram Lubin Scholarship



Ngoc Tam Trinh
National Science Foundation

Funded by the Bertram Lubin Scholarship Fund & The National Science Foundation

These high school and undergraduate students were funded by the Bertram Lubin Scholarship Fund and the National Science Foundation. These students were selected from a competitive pool of applicants from all over the United States. Each funded student developed their own hypothesis driven project, carried out this project during the 9-week one-on-one mentored program, created a detailed goal setting individual development plan (IDP), presented a brief 'flash talk' about their work to their peers, and participated in weekly journal clubs, scientific and educational enrichment activities. Each student is presenting the results of the findings from their project in both oral and poster presentation formats during the SSRP symposium sessions.



Monica Escobedo

Global Blood Therapeutics (GBT) Intern

For the first time this summer, SSRP developed a joint internship with the San Francisco based pharmaceutical company, GBT. GBT is a leader in developing novel therapies for hemoglobin disorders, such as for patients with Sickle Cell Disease. This student conducted her research in the Clinical Therapeutics Division of GBT, while also participating in the weekly SSRP curriculum. This successful joint program has opened up the possibility of partnering with other local pharmaceutical or biomedical companies in the coming years

Zoe Fung

SSRP Marketing Intern

The SSRP marketing intern was tasked with translating interns' projects to the broader community through regular newsletters, social media posts, website reconstruction, and marketing slide decks. She documented aspects of interns' research by visiting students in their research 'habitats' and capturing 'research in action'. New this year, the marketing intern highlighted the work of SSRP alumni on the SSRP Instagram Page: #chorissrp.

This Year's Mentors

Mentor	Department, Division	Location
Akinyemi Oni-Orisan, PharmD PhD	Clinical Pharmacy	UC San Francisco
Alex Rezai, BA	Neurology	UCSF Mission Bay
Angela Rivers, MD PhD	Pediatrics, Hematology	UCSF Benioff Children's Hospital Oakland
Anu Argawal, MD	Pediatrics, Hematology/Oncology	UCSF Benioff Children's Hospital Oakland
Ayotola Ajayi, MD	Pediatrics, Hematology/Oncology	UCSF Benioff Children's Hospital Oakland
Carolyn Hoppe, MD	Senior Medical Director	Global Blood Therapeutics
Christine McDonald, ScD MD	Pediatrics, Gastroenterology	MLK Research Building, UCSF
Coleen Sabatini, MD MPH	Orthopaedic surgery	UC San Francisco
Dayna Long, MD	Pediatrics	Claremont Clinic
Devanand Manoli, MD PhD	Psychiatry	UCSF Mission Bay
Dipti Kamath, MD	Pediatrics, Hematology/Oncology	UCSF Benioff Children's Hospital Oakland
Dylan Chhetri, BA	Pediatrics	MLK Research Building, UCSF
Gina Williams, PhD Candidate	Neuroscience	UCSF Mission Bay
Hart Horneman, BS	Pediatrics, Hematology	MLK Research Building, UCSF
Henry Ocampo, MPH	Office of Diversity, Equity, Inclusion	UCSF Benioff Children's Hospital Oakland
James Nunez, PhD	Molecular & Cell Biology	UC Berkeley
Jan Christof, PhD	Cardiology	UCSF Mission Bay
Janet Lee, MD MPH MAS	Pediatrics, Endocrinology	UCSF Mission Bay
Jason Nagata, MD	Pediatrics	UCSF Mission Bay
Jennifer Michlitsch, MD	Pediatrics, Hematology/Oncology	UCSF Benioff Children's Hospital Oakland
Jennifer Price, MD PhD	Hepatology & Liver Transplant	UCSF Parnassus
Jenny Olson, MD FAAP	Pediatrics, Endocrinology	UCSF Benioff Children's Hospital Oakland
Jonathan Chu, MD	Pediatrics	UCSF Mission Bay
Josh Robinson, PhD	Reproductive Sciences	UCSF Parnassus
Judy Cavazos, PhD	Psychology	UCSF Benioff Children's Hospital Oakland
Julia Chu, MD MPH	Pediatrics, Hematology/Oncology	UCSF Benioff Children's Hospital Oakland
June Tester, MD MPH	Pediatrics, Endocrinology	UCSF Benioff Children's Hospital Oakland
Kimery Leong, PharmD	Pharmacy	UCSF Benioff Children's Hospital Oakland
Koyam Morales Weil, PhD	Molecular Cell Biology	UC Berkeley

This Year's Mentors

Mentor	Department, Division	Location
Lela Bachrach, MD MS	Pediatrics, Adolescent Health	UCSF Benioff Children's Hospital Oakland
Lorrene Ritchie, PhD RD	Nutrition Policy Institute	UC Berkeley
Lydia Sohn, PhD	Mechanical Engineering	UC Berkeley
Manjiree Karandikar, MD	Pediatrics, Infectious Diseases	UCSF Benioff Children's Hospital Oakland
Mari Manger, PhD	Deputy Director	International Zinc Nutrition Consultative Group
Marisa Medina, PhD	Pediatrics	MLK Research Building, UCSF
Marsha Treadwell, PhD	Pediatrics, Psychology	UCSF Benioff Children's Hospital Oakland
Mary Helen Barcellos-Hoff, PhD	Molecular Oncology	UCSF Parnassus
Matthew Stachler, MD PhD	Molecular Pathology	UCSF Parnassus
Mercedes Paredes, MD PhD	Neurology	UCSF Mission Bay
Nida Ozarslan, MD	Reproductive Sciences	UCSF Parnassus
Prachi Singh, DO FAAP	Pediatrics, Infectious Diseases	UCSF Benioff Children's Hospital Oakland
Robert Ward Hagar, MD	Hematology/Oncology	UCSF Benioff Children's Hospital Oakland
Ron Krauss, MD	Pediatrics, Cardiology	MLK Research Building, UCSF
Samantha Lewis, PhD	Molecular & Cell Biology	UC Berkeley
Sarah King, PhD	Pediatrics, Cardiology	MLK Research Building, UCSF
Scarleth Chalen, BA	Molecular & Cell Biology	UC Berkeley
Stephanie Eberly, PhD Candidate	Mechanical Engineering	UC Berkeley
Stephanie Gaw, MD PhD	Reproductive Sciences	UCSF Mission Bay
Wendy Santos-Modesitt, PhD	Neurospsychology	UCSF Benioff Children's Hospital Oakland
Yu-Lin Kuang, PhD	Pediatrics	MLK Research Building, UCSF
Yuanyuan Qin, PhD	Pediatrics	MLK Research Building, UCSF
Yvonne Goh, PhD	Pediatrics, Gastroenterology	UCSF

Notes

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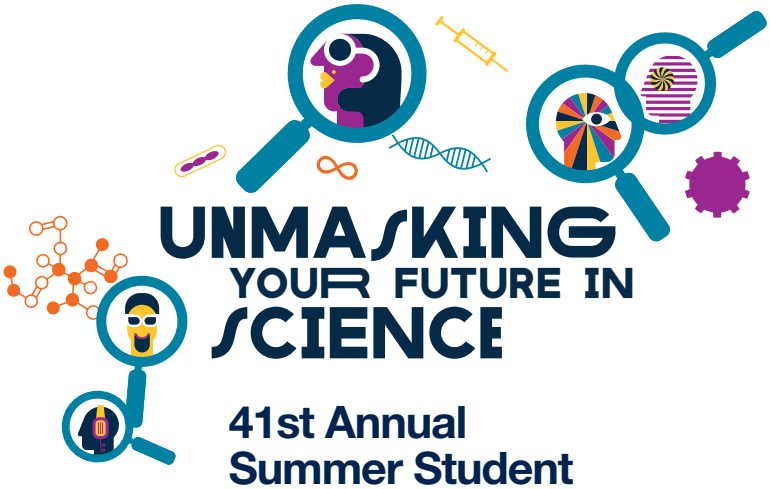
Summer Students 2022



41st Annual Summer Student Research Program Symposium

FRIDAY, AUGUST 5, 2022

Summer Student Research Program
5700 Martin Luther King Jr. Way
Oakland, CA 94609
summerstudents.ucsf.edu