

Searching for Freedom: An Investigation of Form in Japanese Storytelling and Animation

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Introduction

This project investigated characteristics of storytelling within Japanese animation known as anime, specifically looking at *Attack on Titan*. The story follows Eren and his childhood friends, Mikasa and Armin after their home is invaded by man eating Titans. In efforts to save humanity, the trio join the Scout Regiment, an elite military force.

This research was important to help fill the gap between identifiable story characteristics within the Japanese visual medium from a filmmakers perspective and the plethora of existing scholarship solely focused on a theoretical frame work.

The knowledge gained by this analysis will then be used in my creative activity, resulting in pre-production for a short film.

Methodology

Qualitative Research & Textual Analysis

Attack on Titan Season 1 (25 episodes)

1. Round 1: identified major themes, character development, and story structure
2. Round 2: Analyzed & time stamped specific findings from existing scholarship

Historical Research Methods



Saturn Goya — western influences to *AOT*

Acknowledgements

The McNair Scholars Program of
Southern Illinois University,
Carbondale
The Department of Cinema
Photos courtesy of dailydot.com
and Pinterest.com

Findings



The Trio



Hope — Eren in Titan Form

Fight — Mikasa

Cruelty - Death of Eren's Mother

Analysis revealed that *Attack on Titan* presented three significant story themes along with other characteristics based on Japanese folklore and eastern and western art influences.

Themes

1. Cruelty, Oppression of man and world
2. Searching and Fighting for freedom against the cruel world
3. Hope, doubt, and defeat

Art Influences

1. Asymmetrical
2. Nature is large, men are small

Japanese Folklore Influences

1. Emphasis on spirituality
2. Religious elements
3. Fantastical elements



Fantastical Titan Transformation



Hokusai Wave— eastern influences to *AOT*



Application to Creative Activity

Influence on short story: *Épousée*

Story premise: Oppression breeds rebellion
Story longline: Violet, a young woman obsessed with her high status, threatens to be destroyed by her hidden sentiments.



Mood board

Conclusion

- Through textual analysis and historical research methods, *AOT* presented three significant story themes, a strong influence of folklore and eastern and western art that contribute to the story structure and aesthetics elements of the anime story which was then applied to my creative activity.
- This project brought a better understanding of the traditions of Japanese storytelling within anime and influenced by creative process for my short film.
- Further research can be done on manga (Japanese graphic novels) to better research story elements of Japanese visual storytelling mediums.

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Politics Prevails: A Comparative Analysis of Trump and Biden's Executive Actions on Mexican Asylum Seekers

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Background

The Trump Administration (Issued more than 400 immigration policies)

- Zero Tolerance Policy
- Building a Wall
- Family Separation

The Biden Administration (Issued 300 and Overtured 254 Trump-era policies)

- Build, Strengthen, and Expand Central and North American countries
- Facilitate the reunification of families, eliminate barriers to immigration benefits and citizenship, and pausing construction on the southern border wall.

Previous Studies

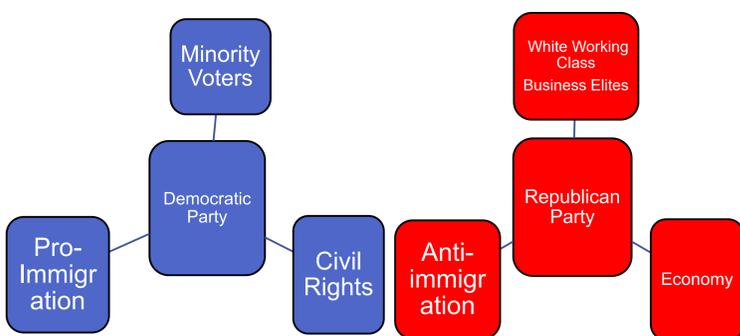
- Political ideology influences who is admitted into the country (Miller, Holmes, Keith 2020)
 - Republican Presidents admit less asylees than Democratic presidents.
- Conservatives were supportive of family separation (Rowatt et. all 2020)
- Immigration benefits the economy (Lin and Weiss 2019; Gerber et al. 2017)

Key Terms

Dual Labor Market Theory: Analyzes how race, gender, and institutional factors affect the labor market.

Neoclassical Theory: Assumes immigrants are knowledgeable about the labor market of their host country and their decisions are primarily based on these factors.

World systems theory: Analyzes the power dynamic between industrialized and underdeveloped countries, as well as exploitation of resources from less developed countries.



The focus of the Democratic and Republican parties

Methodology

- Developed Spreadsheet of Trump and Biden's Executive Orders & Proclamations
- Analyzed of Government Documents, Newspaper Articles & Immigration Laws

Immigration Laws

Name	Summary
The Refugee Act of 1980	Set annual maximum of 50,000 refugees
Immigration Act of 1990	Established Temporary Protected Status to immigrants who were unable to return to their home country
Illegal Immigration Reform and Responsibility Act of 1996	Established a safeguard for any non-citizen who faced "forced abortion or involuntary sterilization, or persecution for failure or refusal to undergo such a procedure for other resistance to coercive population control
Convention Against Torture of 1994	No country shall return a person to their home country if they have a credible fear of persecution.

Findings

Order Date: 03/24/20 87 FR 19941	Order Suspending Introduction of Persons from Countries Where a Communicable Disease Exists
What?	<ul style="list-style-type: none"> • Implemented at the height of the pandemic; prohibits individuals without travel documentation from entering the country • Many health experts say the policy had no scientific backing
Political Parties	<ul style="list-style-type: none"> • Opportunity for Trump & the Republican party to restrict immigration • The Democrats are pro-immigration, however, public health was their primary concern
Ideology	A federal judge appointed by Trump has blocked Biden's ability to lift the Title 42 (citing a need to prevent "illegal migration and drug trafficking)
Public Opinion	While Biden's immigration policies are inclusive, he continued to enforce the Title 42 for the public's health & public approval during the height of the pandemic

Proclamation Date: 04/27/20 85 FR 23441	Suspension of Entry of Immigrants Who Continue to Present a Risk to the United States Labor Market During the Economic Recovery
What?	Suspension on entry to those who are outside of the US who don't have an immigrant visa and no travel documentation
Political Parties	<ul style="list-style-type: none"> • Part of Trump's zero tolerance policy • Contradicts the Democratic Party's platform
Ideology	<ul style="list-style-type: none"> • Trump: Immigrants harm the labor market by taking jobs away from Americans and using government resources • Biden: Believe immigrants benefit the labor market
Public Opinion	<ul style="list-style-type: none"> • Trump: Made a promise to implement restrictive laws • Biden: Made a promise to overturning Trump-era policies during his campaign; Revoked this policy

Acknowledgements

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Source: Associated Press, Migrants, many who were returned to Mexico under the Trump administration's Remain in Mexico," program wait in line to get a meal in an encampment near the Gateway International Bridge in Matamoros, Mexico.

Conclusion

Both political parties use the economy as an excuse for their decision-making on immigration policies.

Political factors such as (political parties, ideology, and public opinion) influence immigration policy more than the economy.

Trump's "Suspension of Entry of Immigrants Who Continue to Present a Risk to the United States" & "Suspension of Entry of Immigrants Who Will Financially Burden the Health Care System" contain false claims

- Undocumented immigrants contribute billions of dollars to the economy
- Many undocumented immigrants are not eligible for government assistance including Medicaid

Republicans are more likely to support restrictive immigration policies regardless of the state of the economy

- If the economy was their primary concern, then Republicans would be more open to immigration.

Democrats are more likely to support pro-immigration policies

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“ ‘Cause any Bronc Could Be Your Last”: Chloé Zhao’s take on the Mythical West in *The Rider* (2017)

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Introduction & Background

- This project examines Chloé Zhao’s 2017 film *The Rider* and its place within the vast Western film genre.
- Using genre theory, I will categorize the film into the Western and post-western genres.
- From Billy the Kid to The Marlboro Man, the masculine cowboy image has been ingrained in American culture. The cowboy was set up to be the hero of the mythical West and Western films played a major role in the popularization of the legend.
- Stetsons, jeans, and boots became the iconic cowboy image and his quest to tame the wild frontier became what has been termed “Frontier Mythology” or the belief that the West could be tamed by strong self-willed individuals.
- The “post-Western” film reacts in opposition to this Western myth and showcases its ramifications in contemporary times.
- *The Rider* acts as an example of both genres and in turn should not be labeled as one or the other, but instead compared in relation.

Methodology

- To successfully analyze *The Rider*, I will perform a qualitative textual analysis by selecting key scenes, repeated imagery, and themes from the film and discussing how these elements relate to the Western or Post-Western genres.
- The film was viewed a total of four times, which allowed for me to thoroughly assess the elements of the film.
- Some of the key factors I identified were the themes of cowboy masculinity, family, and the portrayal of the mythic qualities of the West.
- Other surface elements I will discuss will be the film’s handling of its setting, clothing, cinematic style, and character types.

Acknowledgements

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Screenshots and photos courtesy of alexanderstreet.com and gilcrease.org

Findings



The film often includes elements (clothing, character types, settings) that are related to the greater iconography of Western art and culture. Pictured *Left* is a scene from the film in which a group of cowboys share stories around a campfire, a common trope within the Western genre. Pictured *Right* is Charles Marion Russell’s late nineteenth century painting, *Cowboys Around Campfire at Night*.



Masculinity is not only a major theme in *The Rider*, but the Western genre as a whole. Classical Westerns tended to solely focus on the issues and power dynamics of men. *The Rider* does not stray far from this as the film contains scenes in which Brady, recovering from his recent injury, must deal with feelings of inadequacy as he is no longer able to participate in Rodeo. Pictured *Left* is a scene in which injured Brady challenges a young boy to a wrestling match that turns violent. *Right* provides an example of gun imagery within the film, a common symbol of masculinity within the Western genre.



The clash of mythical Western imagery and the film’s contemporary setting is major element of the film that carries the ideas of the post-Western. The film often juxtaposes images of the magic hour landscapes of the Badlands *Left* with the coldly lit interiors of Brady’s trailer, or the sanitized interiors of a hospital room *Right*.

A Transnational Approach

- *The Rider* setting and characters provide an example of “Frontera” or a reservation “where races and cultures not only meet but are mixed and acculturated to the point of indistinction” (Mayer).
- In Zhao’s film, the cowboys are Native American and vice versa. This portrayal differs from the Western’s often stereotypical portrayal of the hard line between cowboys and natives.



Conclusion

- Chloé Zhao’s take on the mythic West does not seem bound to the genre’s past tropes and plot devices, but still participates in Western themes and imagery.
- The film’s contemporary Western setting, questioning of Western legacies, and non-linear plot places it alongside films of the post-Western genre.
- The transnational element of the film is important within the wider context of the Western genre.
- Chloé Zhao’s film, while an intimate and seemingly singular story, reminds us of the importance of the Western, a genre that directly deals with the complex and often mythologized history of America.

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Mapping Gene Flow and Biodiversity Across the Mississippi River Using Landscape Genetics and DNA Barcoding of Formicidae

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Abstract

The ability to quickly propagate as well as engineer the nutrient flow and other qualities of ecosystems makes ants excellent models of the diversity present in an environment. Using landscape genetics, we can visualize how the physical barriers of a location can affect the genetic diversity present by blocking or promoting gene flow. In the Mississippi River, landscape genetics has observed the river as both a hindrance and boon to the migration of different genes among populations. By looking at ants of the *Camponotus* genus we can assess another perspective of how the river and the recent human development around it affect the biodiversity. Ants were collected from different locations in Southern Illinois and Southeastern Missouri. This is done by extracting and amplifying the Cytochrome Oxidase I (COI gene of the mitochondrial genomes and comparing their relatedness or diversity across the different locales they originated. We expect to see high diversity across the three different states connected to the Mississippi which confirms the notion of how large bodies of water can limit the migration of species.

Background

Landscape Genetics combines techniques from Landscape Ecology and Population genetics to answer questions regarding how a physical environment can affect gene flow and diversity. Ants can serve as a model for the diversity of other organisms such as plants and invertebrates. Organisms in the Mississippi River have been the subject of several studies in this area, but none have looked at the Middle Mississippi region which has high microbial diversity. Rivers have proven to be barriers to migration, but in some cases can also have no effect. *Camponotus* was chosen as it is commonly found in both Missouri and Illinois. This genus of ants that nest inside wood have been found to be both structural pests as well as beneficial to nutrient flow in agriculture and forest ecosystems. The objective of the study is to determine the effectivity of the Mississippi as a barrier to gene flow for these ants.

Methodology

- 60 ants were collected in sites around Southern Illinois and Missouri
- Coordinates of collections sites were mapped in Arc GIS
- DNA was extracted using the ThermoFisher DNA Purification Kit
- COI gene was amplified using DNA PCR
- COI was sent to the Roy J Carver Institute of Biotechnology for low-throughput sequencing
- Sequence data was visualized in Geneious
- Species were identified by matching COI sequences with data from GenBank and other gene databases
- Genetic distance was compared with ant populations on both sides of the river to determine if it influences diversity



Figure 1 Ant sample collected in Paducah KY



Figure 2. Ant sample collected in Carbondale IL

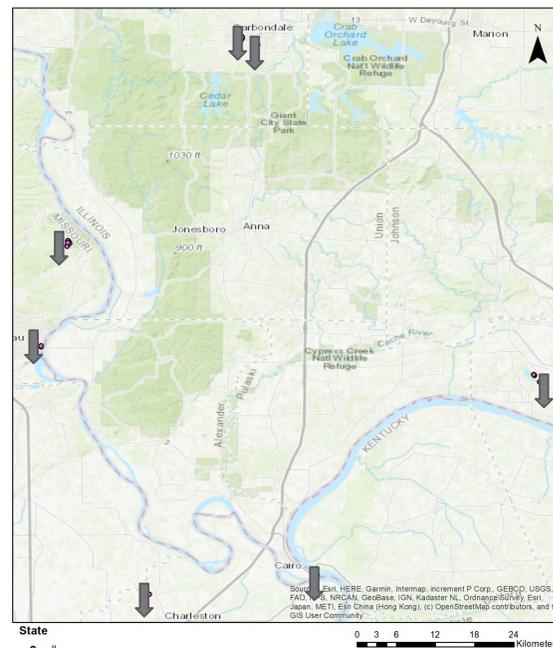


Figure 3. Map of collection sites in Illinois and Missouri

Results

Throughout the different sites, we were able to collect and preemptively identify several species using morphology. After testing different tissue combinations of tissue DNA extractions, we determined that using either the legs or abdomen of a sample was enough to obtain a sufficient concentration of DNA while maintaining most identifying features for a voucher specimen. We also were successful in amplifying the COI region of the mitochondrial DNA using a primer originally intended for Lepidopteran DNA (LepF1). We expect to receive results from sequencing that confirm the hypothesis that the Mississippi River acts as a barrier to terrestrial diversity similar to the results of a study investigating army ants *Eciton burchelli* in Panama by Perez-Espona et al in 2012.

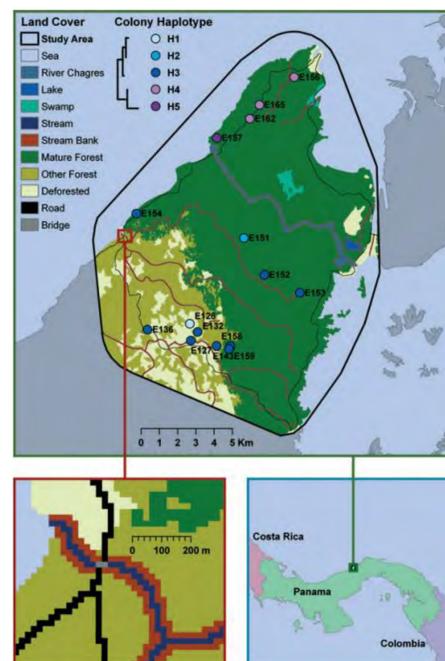


Figure 4. Map from Perez-Espona et al 2012 showing the sites from which ants were collected and which haplotypes were found in those sites.

Conclusion

The majority of the samples collected we can conclude were from the *Camponotus* genus. We also may have collected samples from *Crematogaster* or *Solenopsis*. Due to the ambiguity that can be found with morphology of the ants we can not fully conclude specific species. With the inconclusive identification we can argue for the importance for barcoding of species in this genus. One of the sites we collected from was a state park which did not have exact identifications of the different ants found in their grounds. We hope that the data will help educate tourists and visitors to the area.



Figure 5. Three ants believed to be *Camponotus pensylvanicus* collected from IL, MO, and KY from left to right

Future Modifications

- Increase sample size by sampling per colony rather than per location
- Extend study to Kentucky to evaluate effect of Ohio River and Confluence
- Extend study further north and south along the Mississippi River
- Investigate using Cytochrome Oxidase II as a barcoding region
- Look at using Control Region for population genetics study
- Investigate the possible application of microsatellites or Single Nucleotide Polymorphisms into population diversity study

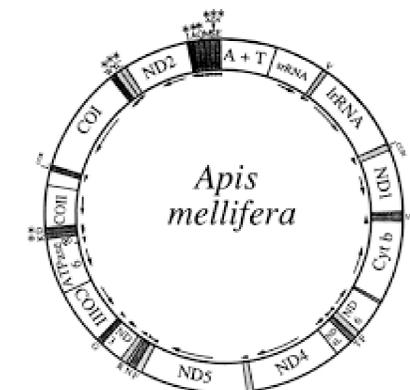


Figure 6. Diagram of Hymenopteran mitochondrial genome from a honeybee

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The Relationship between Remediation, Self EAQ Practice, and Assigned EAQ with the HESI Specialty Scores.

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Abstract

Passing the NCLEX-RN (National Council Licensure Examination for Registered Nurses) is the final and most important step in becoming a Registered Nurse. Many nursing schools use the program HESI (Health Education Systems, Inc.) to help students prepare for successful completion of this exam. This exam is a strong indicator of a student's ability to pass the NCLEX. This project examined the relationship between remediation, self EAQ and assigned EAQ, and HESI scores. This research presupposes that Nursing students that have higher scores on the HESI and spend more time studying will have a greater execution than the ones who took less time to prepare.

Introduction

- The goal of this study is to be able to focus on the variables Self EAQ Practice, remediation, and assigned EAQ practice to see the relationships with each student's specialty HESI score at the end of the course.
- Specialty HESI score is an examination given at the end of each course to predict if the student is in a good standing to pass the given information on their licensure exam.
- Elsevier Adaptive quizzing (EAQ)
- Remediation is practice given to students after their first attempt at the HESI score focused on their feeble knowledge on specific topics
- Viewing relationships that can help a student perform better is important to expand further knowledge on those variables.
- HESI specialty scores are significant since they are a predictor whether the student is at a good standing to be able to take their licensure exam.
- Licensure is important in the Nursing career because if you can't receive your registered license then you cannot practice in nursing.

Methodology

Study Area

The present study compares the relationships from data that was collected from Southern Illinois University Carbondale BSN Nursing Program. Access to the students assigned EAQ scores, remediation, and self study time was granted. A descriptive statistic approach was taken assess average scores on each variable.

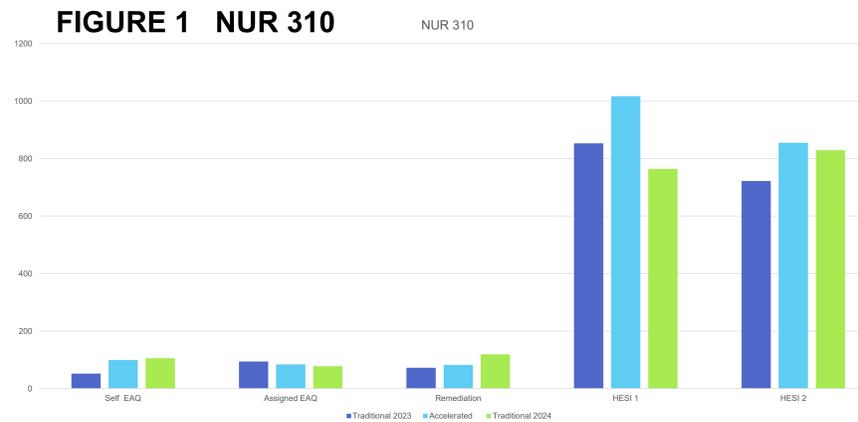
Participants

The targeted participants were taken from SIU's Accelerated Program Class of 22, Traditional Program Class of 2023 and Traditional Program Class of 2024.

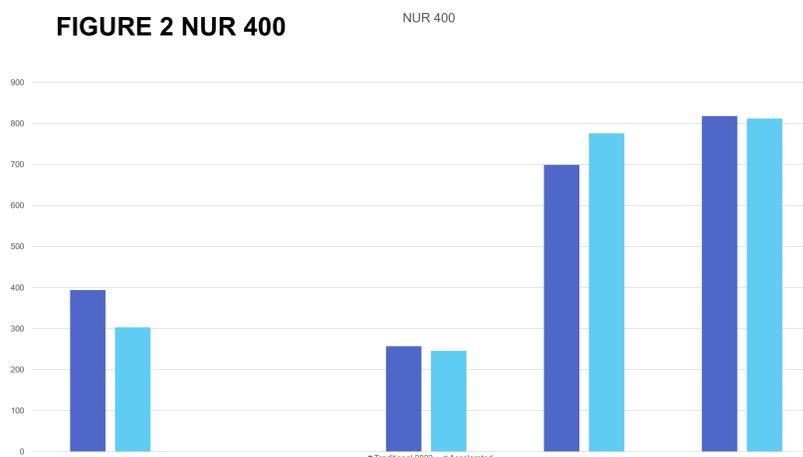
Demographics

Class of 2023 total of 23 students (19 Females, 4 Males).
Class of 2022 total of 18 students (15 females, 3 males).
Class of 2024 total of 30 students (29 females, 1 male)

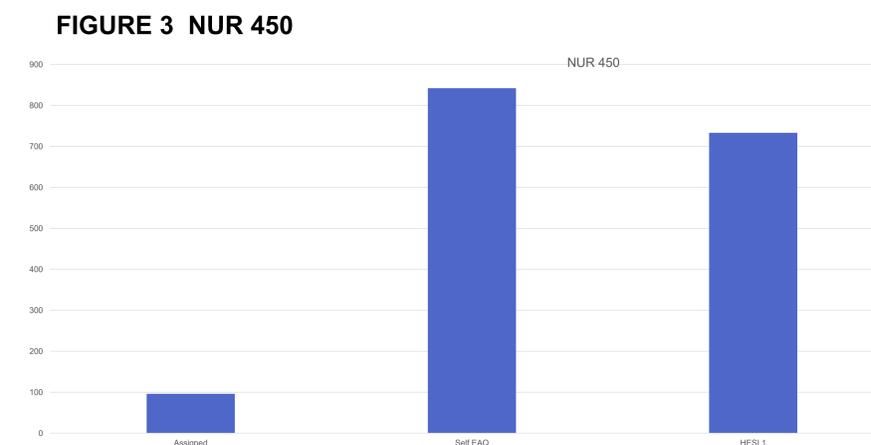
Results



This chart is focused on the course NUR 310 and demonstrates the average of two specialty scores given with the factors which are Self EAQ, Assigned EAQ, and remediation.



This chart is focused on the course NUR 400 and demonstrates the average of two specialty scores given with the factors which are Self EAQ, Assigned EAQ, and remediation.



This chart is focused on the course NUR 450 and demonstrates the average of one specialty score given with the factors which are Self EAQ, Assigned EAQ.

Discussion

- The results from Figure 1 demonstrated that Class of 23 and the Accelerated Program scored lower on their second attempt while Class of '24 showed improvement between HESI 1 and HESI 2. Possible reasons for scoring lower could include the students first score was high enough for the grade they wanted in the course, which decreased their drive on the second attempt.
- Figure 2: This course was focused on Class of '23 and Accelerated Program and they both improved their scores on the second attempt. It is likely that HESI 2 scores increased due to faculty encouragement to compete remediation and self EAQ. Assigned EAQ were not used by faculty in this cycle.

Conclusion

- The mean and the average were taken to compare the time spent preparing for the specialty score at the end of the courses.
- The results of the study suggest that the more time that is taken preparing the course and completing the given material, the higher you tend to score.
- Some classes took less time spent studying and were able to score higher than the rest. There is not enough evidence to suggest that it guarantees you a high score but does intend for you to receive more practice.
- Results also demonstrated that not always did students score higher in the second opportunity. This could relate to the students achieving the HESI recommended score (900 or above) and not trying their second opportunity or simply deciding not to retake it. As new faculty are hired, they are encouraged to use the resources available to assist the students prepare for the HESI.

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Abstract

For more than 400 years, the legacy of slavery has been deeply embedded in the U.S. healthcare system creating disparities that gravely affect African American women. Before the Civil War, race, gender, and social status subjected enslaved Black women to poor health, sexual exploitation, and medical experimentation. This study carefully examines maternal mortality, and the role institutional racism plays in Black women controlling their own bodies. It also suggests ways in which they can navigate the healthcare system to receive fair and equitable medical treatment.

Objective

To identify and explain health disparities, reproductive oppression, and maternal mortality among Black women.

Introduction

- Since the inception of American slavery, most enslaved Black women labored tirelessly in the fields from sun-up to sundown and without consideration from the slave owner for their health.
- Dietary deficiencies, lack of food, despicable living conditions and no medical care contributed further to poor health leading to illness and often death, especially during pregnancy.
- In the twenty-first century as in slave era, inadequate healthcare for Black women continues to negatively impact their lives in three ways: the refusal of many White medical practitioners to professionally address the symptoms described by the patient, being treated in a condescending manner, and losing the right to make decisions about their bodies.



Figure 1
The term "institutional racism" describes societal patterns and structures that impose oppressive or otherwise negative conditions on identifiable groups on the basis of race or ethnicity. Oppression may come from business, the government, the health care system, the schools, or the court, among other institutions.

Methodology

- In the completion of this study, primary sources included slave narratives, government documents, reports, newspaper clippings, documentaries, interviews, and an autobiography. Secondary sources for the project consisted of scholarly books, journal articles, and biographies.

Findings



Figure 2

→ African captive Ottobah Cugoano stated: *It was common for the dirty filthy sailors to take the African women and lie upon their bodies.*

- ◆ Crew members regularly raped enslaved African women who were unable to protect themselves. Women who were impregnated and survived the Middle Passage realized that they had no control of their bodies as they were forced to bear children.



Figure 3

→ Thomas Jefferson wrote, "I consider a woman who brings a child every two years as more profitable than the best man of the farm. What she produces is an addition to the capital"

- ◆ Prior to the British outlawing the Atlantic slave trade in 1808 making the importation of slaves illegal, enslaved men were preferred. Slave owners introduced slave breeding to acquire more slaves and to increase their wealth. The women became more valuable, because of their reproductive ability.



Figure 4

→ Dr. James Marion Sims states, "Then I made this proposition to the owners of the negroes: If you will give me Anarcha and Betsey for experiment, I agree to perform no experiment or operation on either of them to endanger their lives, and will not charge a cent for keeping them, but you must pay their taxes and clothe them."

- ◆ He used female slaves to advance reproductive medicine and enslavers used physicians for methods to insure enslaved Black women produced a labor force.



Figure 5

→ The *Relf v. Weinberger* complaint reads "It was the next morning that both children, Minnie and Alice, were placed under a general anesthetic and surgically sterilized. At no point prior to the operation did a physician discuss the nature and consequences of the surgery with their parents to which they were about to be subjected."

- ◆ Sterilizations took away Black women's right to choose to have children.



Figure 6

→ Cori Bush says, "Everyday Black women die because the system denies our humanity."

- ◆ During two pregnancies, she informed each doctor about experiencing pain, but was brushed off. The first doctor said, "Oh, You're fine. Go home and I'll see you next time." The baby was born premature, but survived. The second pregnancy revealed the same complications. The other doctor, said, "Just go home. Let it abort. You can get pregnant again because that's what you people do."

Conclusion

- Laws enacted on the state and federal levels of government have resulted in reproductive abuses against Black women thereby affecting their maternal well-being.
- Institutional racism allowed for the bodies of Black women to fuel the nation's economy during slavery, creating an implicit bias among White medical professionals about the reproductive health of these women two centuries later.

Recommendations

- Increasing the number of Black midwives and preferably female physicians specializing in OBGYN.
- Organizing and facilitating efforts to educate stakeholders, the public, and medical providers on how to improve the healthcare of black women and to combat cases of maternal mortality.
- National awareness of *The Black Maternal Health Momnibus Bill* should be publicized to allow Black women to take advantage of the programs and services available.

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Introduction

Mechanotransduction describes the ability of cells to detect, integrate, and convert mechanical stimuli into biochemical signals that directly influence biological functions. Mechanosensitive ion channels (MSCs) are well characterized biological force sensing systems that initiate a process of mechanotransduction. Recent publications have shown that the human bodies physiological response and processes more influenced by mechanosensors, proteins on the cellular membrane that relay messages to regulate function and control through, more than we have previously observed (1).

Piezo1 is an MSC that has just recently been cloned, making it available for elucidation of its molecular properties and physiological roles in the body. Previous studies have shown neuroinflammation to regulate Piezo1 and cause neurodegenerative diseases or injuries to these systems. While in this condition of neuroinflammation, support cells to the neurons physiological functions are affected (2-4). Our approach is to replicate the previous results caused by neuroinflammation and introduce a new Novel Activator to modulate Piezo1 functionality (5).

We hypothesize that our new migration method will yield more precise images and results. We also predict treating Piezo1 will hinder astrocyte migration in both LPS and Novel activator treatments.

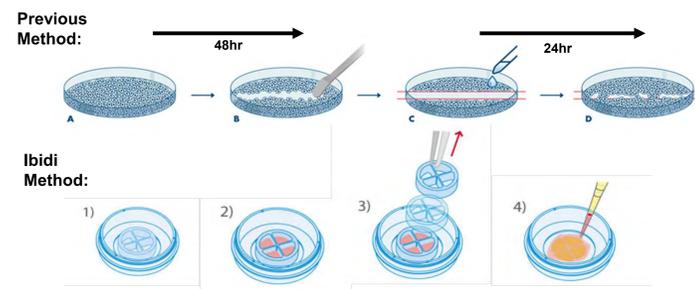
(1) Bertrand et al., 2010, (2) Mirko et al., 2018, (3) Bae et al., 2012,

(4) Jayasi et al., 2021, (5) Womac et al., 2022, (6) Arnedo et al., 2020

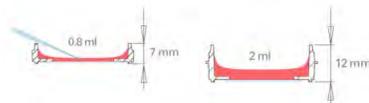
Materials & Methods

Cell Culturing: C8-S (ATCC® CRL-2535™) astrocyte cells were grown in a T-25cm³ culture flask with Lonza™ BioWhittaker™ DMEM with 4.5 g/L Glucose, with L-Glutamine (Catalog number: BW12-604F) supplemented with 10% FBS and incubated at 37°C under 5% CO₂. For cell migration experiments the cells were seeded in a micro-Insert 4 Well chamber in a μ-Dish 35 mm from Ibidi (Cat.No:80406) and the dishes were coated with poly-d-lysine (PDL) and cultured for 6-8 hours in the incubator.

Wound Healing Assay



Treatment: After second media wash the C8-S astrocytes were treated with 100 ng/ml of Lipopolysaccharide (LPS) and 1.4g/ml of Novel Piezo1 activator (NPA).



Cell Migration Analysis: Using the *Wound Healing Size Tool ImageJ* Plugin as presented by (6) we were able to compute the gap width in μm. Astrocyte migration velocity was found using the following formula: $(W_{0h} - W_{24h})/t_f$, where W_{0h} = gap width at 0h, W_{24h} = gap width at 24hr, and t_f = time of when the last image was taken (in hrs). In our case t_f = 24hrs.

Statistical Analysis: Data analysis was performed with GraphPad Prism 9 between two groups using unpaired t-test. * p<0.05, ** p<0.01, and *** p<0.001 is considered significant.

Previous Results #1: Effects of Piezo1 activator on C8-S astrocyte migration

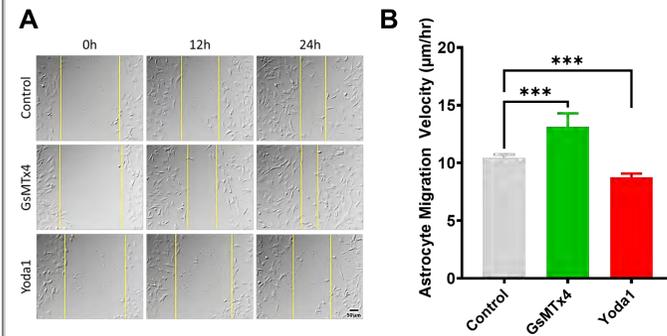


Figure 1. A) Representative images of wound healing assay after treatment of inhibitor (GsMTx4) or traditional activator (Yoda1) of Piezo1 MSC for 0h, 12h, and 24h. **B)** Summary of experiments. Treatment of GsMTx4 or Yoda1 increased and decreased cell migration, respectively.

Previous Results #2: Effects of LPS on C8-S astrocyte migration

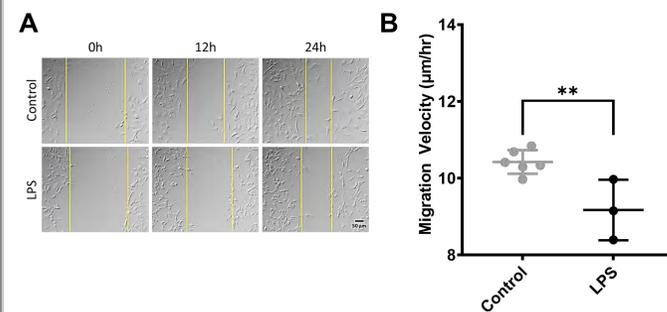


Figure 2. C8-S astrocyte migration under neuroinflammation condition. A) Representative images after LPS treatment for 0h, 12h, and 24h. **B)** Summary of experiments. Treatment of LPS decreased C8-S astrocyte migration.

Results

New method for C8-S astrocyte migration

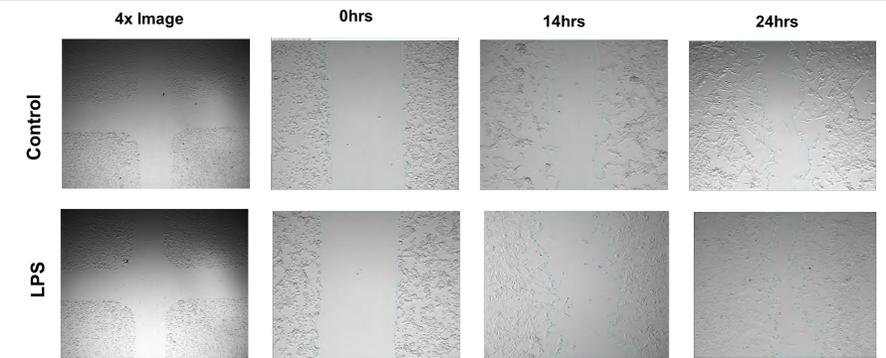


Figure 3. Ibidi method for C8-S astrocyte migration. Representative images of wound healing assay for 0h, 14h, and 24hr using Ibidi 4-wall chamber.

Effect of Novel Piezo1 activator on C8-S astrocyte migration

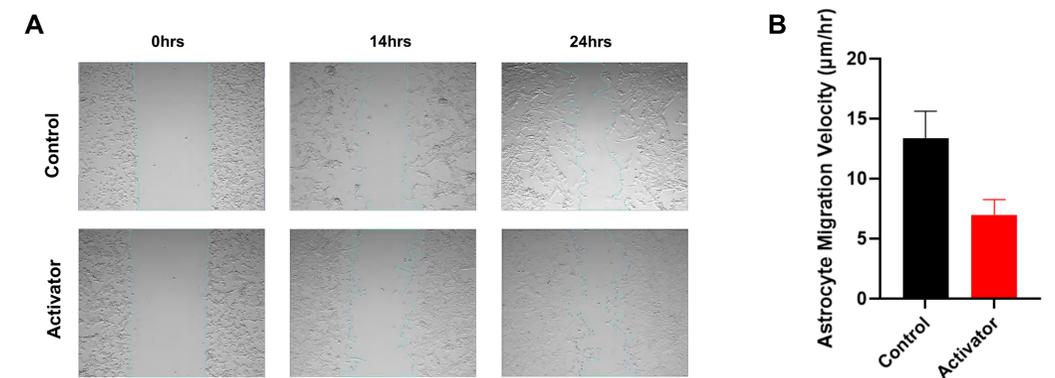


Figure 4. A) Representative images of C8-S astrocyte migration under treatment of novel Piezo1 MSC activator. **B)** Summary of experiments. Novel Piezo1 activator inhibits astrocyte migration.

Summary & Conclusions

We tested the new approach of cell migration by using Ibidi culture-insert 4 well in μ-Dish 35mm:

- To verify the effect of LPS on C8-S astrocyte migration.
- To discover the effect of Novel Piezo1 activator on C8-S astrocyte migration.

We found that:

- Ibidi yielded better cell quantity and higher precision measurements.
- Like traditional Piezo1 activator, Yoda1, astrocytic motility is reduced by novel Piezo1 activator.

These results suggest that new Piezo1 activator plays a key role in astrocyte migration.

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Funding: SIUC McNair Scholars Program, Dr. Chilman Bae's SIU Faculty Start-Up Fund

Expression Patterns of the Cilia Protein, RPGRIP1L, During Pituitary Gland Development

Aaryana Stringfellow, Biological Sciences
Buffy Ellsworth Ph.D., Department of Physiology, SIU School of Medicine

Introduction

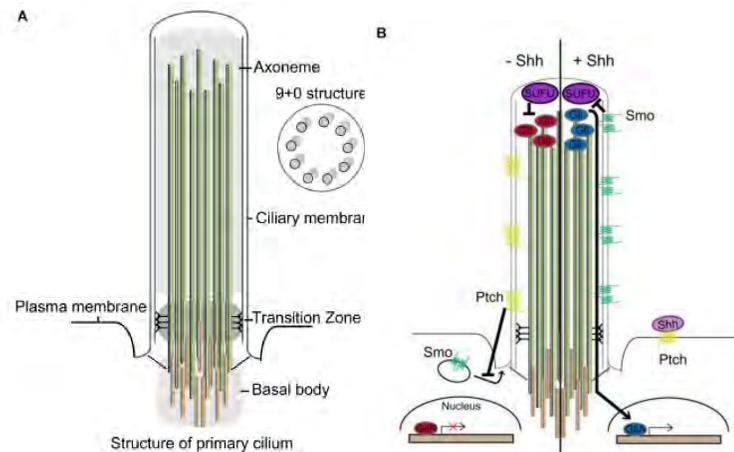


Figure 1
Image A shows the structure of the primary cilia and B shows the SHH signaling in the primary cilia. Primary cilia play a role in transducing or regulating signaling pathways. These pathways are important to the development of many essential organs such as the liver, eyes, and kidneys. RPGRIP1L is a protein located in primary cilia at the transition zone. An important signaling pathway in primary cilia is the Sonic Hedgehog signaling pathway. When SHH does not happen in the primary cilia it can lead to severe brain defects. (Park, Jang, & Lee, 2019). RPGRIP1L has been found to have a role in regulating proteasomal activity exclusively at primary cilia. RPGRIP1L also acts as part of the gate for cytoplasmic proteins into the primary cilia, but it only has a minor role in the retention of ciliary proteins.

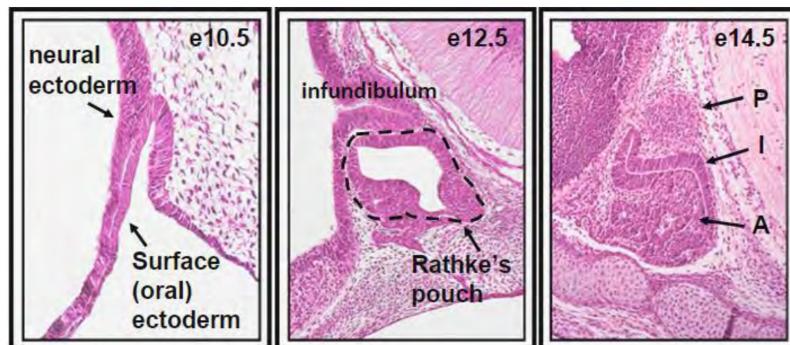
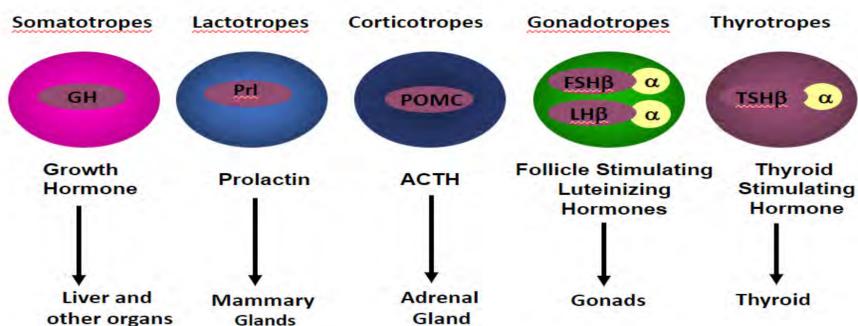


Figure 2
The pituitary gland is a gland in the brain which primary function is to regulate growth, reproduction, and other endocrine functions. It also helps to relay signals from the hypothalamus to other target organs. The emergence of the different pituitary cell types is marked by the expression of different proteins such as Tshb in the emergence of thyrotropes at e14.5, and Gh for the differentiation of the somatotrophs. The SHH protein can act as a morphogen to induce different cell fates, and it is likely that SHH plays a role in cell proliferation and cell-type determination

Purpose of Study

RPGRIP1L is a cilia protein that plays a role in regulation of primary cilia. We are determining the expression patterns of this protein in the pituitary gland. This experiment will focus on the spatial and temporal expression patterns.

Methodology

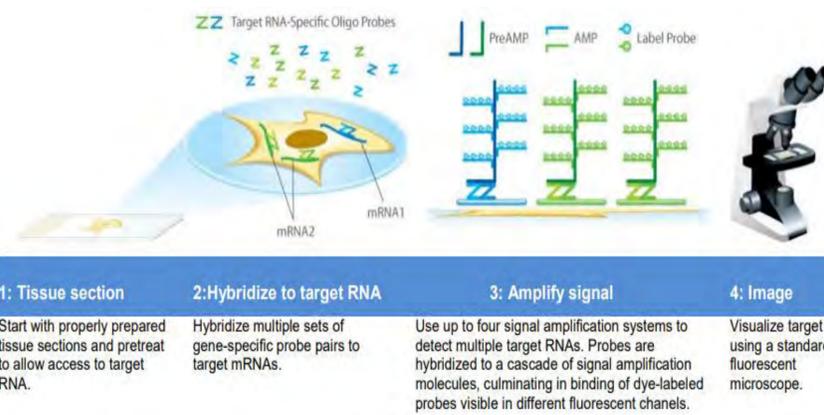


Figure 3
This figure shows how the RNAscope in situ hybridization works, and the general procedure that was followed from the RNAscope kit. Image borrowed from the RNAscope® Fluorescent Multiplex Kit User Manual.

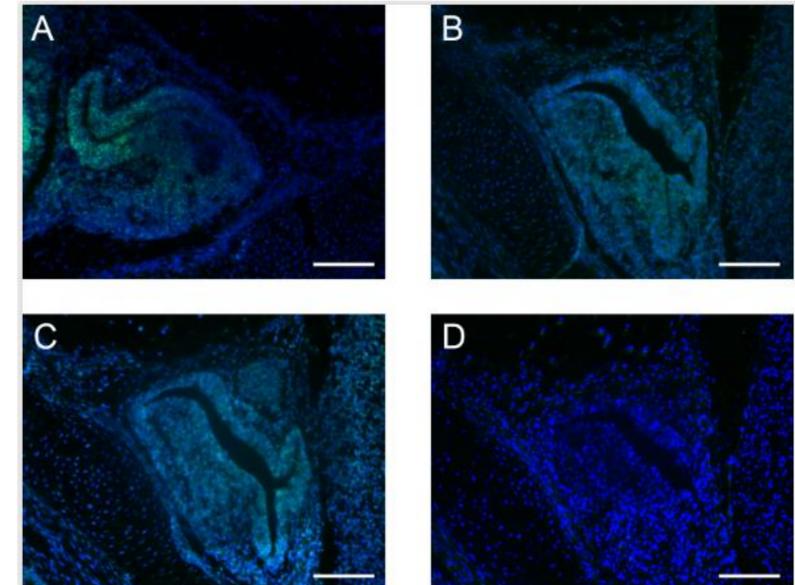


Figure 5
A) Sagittal section of a mouse pituitary gland at e14.5 with a magnification of 20X. B) Sagittal section of a mouse pituitary gland at e16.5 with a magnification of 20X. C) Positive control and D) negative control images from a e16.5 mouse embryo. In A and B the images *Rpgrip11* is indicated by the green color. In C and D the positive control is represented by the green color.

Discussion

- ❖ Transcript for the cilia protein RPGRIP1L was found at embryonic ages e14.5 and e16.5. The mRNA was also found mainly in the anterior lobe of the pituitary gland.
- ❖ RPGRIP1L, is found in primary cilia, and one of the important regulatory pathways in primary cilia is the SHH signaling pathway, which is also in the pituitary gland
- ❖ SHH in the pituitary gland participates in functions such as determining cell fates, and cell proliferation.
- ❖ During pituitary gland development, it is at embryonic ages e14.5-e16.5 that the pituitary cell types begin to differentiate and express the cell type markers for the individual cell type
- ❖ The protein RPGRIP1L most likely plays a role in regulating cell differentiation during pituitary gland development.
- ❖ In the primary cilia RPGRIP1L serves a function of establishing a ciliary gate to allow signaling proteins to enter and could possibly play that role in the pituitary gland

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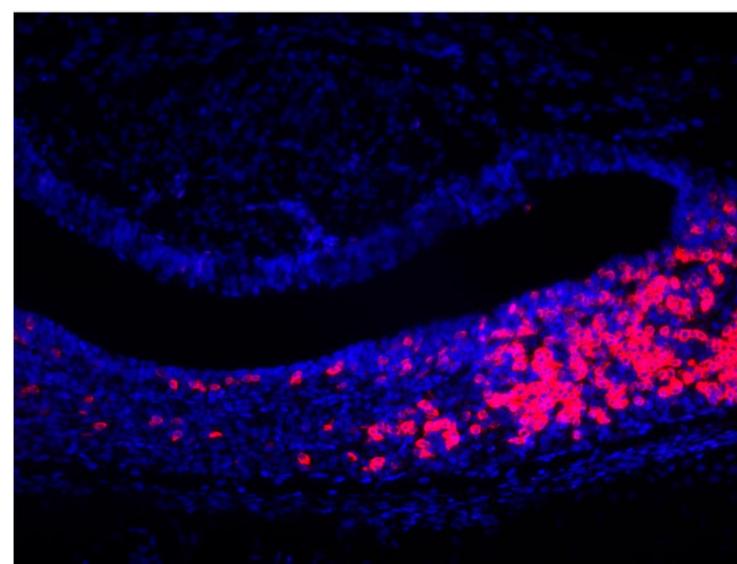


Figure 4
An image of an e16.5 mouse embryo stained for growth hormone. The growth hormone is localized in the anterior lobe and is indicated with the red color.