Orphan Drug Pricing
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Background
An orphan drug is a pharmaceutical agent for a medical condition so rare that it would not be profitable to produce without government assistance.
- The median annual cost for an orphan drug in 2016 was over $30,000. Some are ridiculously expensive.
- Orphan drugs, treating familial hypercholesterolemia, are priced at $1.2 million per dose.
- It is approved in Europe where this dosage affects 1,200 people. It is not approved in the United States.

The Orphan Drug Act of 1983 was written to spur innovation in rare disease treatment through incentives: tax credits, market exclusivity, tax benefits, clinical subsidies, and exemptions for application fees by the Food and Drug Administration.

A Typology of Pricing Narratives

<table>
<thead>
<tr>
<th>Price</th>
<th>Narrative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Justified</td>
</tr>
<tr>
<td></td>
<td>- Low cost of research and development (R&amp;D) (2)</td>
</tr>
<tr>
<td></td>
<td>- Success in development, few development failures (3)</td>
</tr>
<tr>
<td></td>
<td>- Low cost production after R&amp;D (4)</td>
</tr>
<tr>
<td></td>
<td>- Competition among drugs (5)</td>
</tr>
<tr>
<td>Low</td>
<td>Unjustified</td>
</tr>
<tr>
<td></td>
<td>- Pricing below cost to eliminate competition, referred to as predatory pricing, illegal (6)</td>
</tr>
<tr>
<td>High</td>
<td>Justified</td>
</tr>
<tr>
<td></td>
<td>- High R&amp;D cost (7)</td>
</tr>
<tr>
<td></td>
<td>- Prices support continuing R&amp;D (8)</td>
</tr>
<tr>
<td></td>
<td>- Acquiring company increases price to support continuing R&amp;D and new drug development (9)</td>
</tr>
<tr>
<td></td>
<td>- Acquiring company brings drug to market through cost-spreading (10)</td>
</tr>
<tr>
<td>High</td>
<td>Unjustified</td>
</tr>
<tr>
<td></td>
<td>- Loss of R&amp;D costs and loss of prices charged with acquisition (11)</td>
</tr>
<tr>
<td></td>
<td>- Not even priced justifiably to begin with sometimes due to small drug companies selling to large markets increasing the price between sales (12)</td>
</tr>
</tbody>
</table>

Findings

- **Scenario: Proprio, experienced sales declines due to pricing issues in Brazil.** Prices increased when GSN and Menarini found additional indications, high placebo, aesthetic and cosmetic other (1)..

- **Methylparathion, for hepatic encephalopathy, is losing money in production towards the orphan disease, though profitable due to indications for alternative health conditions (1)…**

- **Dacron, for Daconel muscular dystrophy, was developed by Marathon and priced for its list price despite being $200 or less out of pocket for consumers. The funding force the sale is to a larger drug company that sold the drug for a similar price despite having more flexibility (10)…**

- **Electra, for phenylketonuria, acquired by a larger company, though not making a profit even at the exorbitant marketed price of $20,000 due to competition (10)…**

Findings, continued

- **Ravivi, for aral disease disorders, is quoted at $25,000.** The original developing company was able to develop the drug in record time. However, this increased the cost of the original developing company. The government’s role in assistance program in place and provided many drug companies that did not have insurance or those that took a government-sponsored drug plan. The company was then acquired by a single company, Horizon Pharma providing it with more means to produce more and be capable to lower the price in the long haul which were stated as its intentions when the price was analyzed (2)

Conclusions

A key finding is that some drugs fit justified typologies; however, there are also a few that fit typologies for unjustified high prices. Therefore, we need policy changes. Transparency may be necessary to hold companies accountable and allow the public to learn when prices compromise accessibility. Other reforms include prohibiting “pay for delay” tactics that stagnate the introduction of generics into the market and limiting patent extensions strictly due to an improvement or additional benefit in an altered form of a drug. Defining what constitutes as a rare disease more rigidly and decreasing coverage under the Orphan Drug Act could also result in lower prices. The ultimate solution to inaccessibility of high price drugs is unclear due to the complexity of rare disease pricing. However, there are steps that could be taken to improve the situation.

Much work remains to identify the narratives for orphan drug prices and to apply the typology.

References

This research was supported by the Entergy Workforce Training Grant.
**Immune Profiles of Colorectal Cancer in African American and Caucasian Individuals**

**Introduction**

- Recently, we have shown that African ancestry and pro-inflammatory mediators like the IFN pathway are associated with increased risk of colorectal cancer (CRC).
- We hypothesized that the degree and type of immune infiltration may be different between African American (AA) and Caucasian (CA) individuals.

**Methods**

- Next-Generation Sequencing (NGS): DNA from tumor tissue was subjected to NGS analysis to identify mutations and copy number alterations.
- Immunohistochemistry (IHC): Tumor samples were stained with antibodies against various immune cell markers.
- Flow Cytometry: Peripheral blood mononuclear cells (PBMCs) were stained and analyzed for immune cell populations.

**Results**

- Differential gene expression analysis revealed unique immune signatures in AA vs. CA patients.
- AA patients showed a higher infiltration of T cells and natural killer (NK) cells, whereas CA patients had a more pronounced myeloid component.

**Conclusions**

- Our findings suggest that immune infiltrates may not only serve as indicators of the disease but also as therapeutic targets.
- These differences could inform personalized treatment strategies for CRC patients.

**Acknowledgments**

This research project was supported by the National Institutes of Health (NIH), National Cancer Institute (NCI).
Role of 4E-BP1 and the Unfolded Protein Response in Triple Negative Breast Cancer Cell Survival

Caroline Bickerton¹,², Duane Jeansonne², Francesca Peruzzi²

¹University of Notre Dame, ²LSU Health Sciences Center, Stanley S. Scott Cancer Center

Introduction

Hypothesis

4E-BP1 controls eIF4C expression through IRE1- and eIF2α-dependent translation, enabling survival of TNBC cells under stress

Methods

Results

Figure 1. Silencing of 4E-BP1 causes eIF4C overexpression through IRE1- and eIF2α-dependent translation, resulting in survival of TNBC cells under stress

Figure 2. Knockdown of 4E-BP1 decreases IRE1-dependent translation and protein expression of eIF4C.

Figure 3. The IRE1 is activated in TNBC cells under stress

Figure 4. Knockdown of 4E-BP1 decreases eIF2α phosphorylation and protein expression of eIF4C in TNBC cells.

Figure 5. Knockdown of 4E-BP1 decreases eIF4C-mediated translation and protein expression of eIF4C in TNBC cells.

Conclusions

TNBC cells overexpress eIF4C under stress conditions.

This research project is supported by NIH P20GM121328 and P20GM114732
Health Behavior Differences between African-American and White Breast Cancer Survivors

Angelle Brown, Miranda Li, Yu-Hsiang Kao, PhD, Tung-Sung Tseng, PhD, Hui-Yi Lin, PhD
Louisiana State University Health Science Center, School of Public Health

Background
- Breast cancer is the second most common diagnosed cancer among women in the United States.
- African-American women with breast cancer suffer worse outcomes than White women with breast cancer.

Methods
- Objective: To explore differences in selected health behaviors (physical activity, alcohol consumption, smoking) among African-American and White breast cancer survivors.
- National Health Interview Survey (NHIS) data were used to examine demographic and health behavior differences between different racial/ethnic groups.

Results
- Results are based on data from NHIS, which is a national dataset that includes a representative sample of the U.S. population.
- Significant differences were observed in smoking rates, physical activity levels, and alcohol consumption between African-American and White breast cancer survivors.

Conclusion
- African-American women were more likely to smoke and engage in lower levels of physical activity compared to White women.
- Understanding the factors contributing to these differences is crucial for developing targeted interventions to improve health outcomes.
- This research was supported by the Entergy Workforce Training Grant.
Characterization of Human Amniotic Fluid Stem Cells (hAFSCs)

Ann Byerley, Katelynn Montgomery, Sara Al-Ghadban, Bruce A Bunnell

Introduction

- Amniotic fluid (AF) is an independent and easily accessible source of adult stem cells.
- Human amniotic fluid stem cells (hAFSCs) are now considered a novel stem cell source, due to their ability to differentiate into multiple mesenchymal lineages.
- Stem cells can be derived from amniotic fluid collected at term or after cesarean section.
- Stem cells are determined by adhering to a surface forming material, their ability to differentiate and their ability to differentiate into multiple mesenchymal lineages.

Methodology

- Flow Cytometry
- Colony Forming Unit Assay (CFU)

Results

- Flow Cytometry Analysis shows immunophenotypic profile of hAFSCs.
- Proliferation:
  - Figure 2: hAFSCs at p3 and stained with Alamar blue, show the ability to self-renew and divide exponentially at days 5, 14, and 21 of cell culture.

Conclusions

- The hAFSCs exhibit a wide range of potential use in cellular therapy and regenerative medicine:
  - Immunomodulatory activity with successively increased passages
  - Stem cell markers increase with subsequent passages
  - Cells have a fibroblast-like morphology
- Proliferation assay shows hAFSCs grow exponentially over a 21-day period

Future Direction

- The continued use of the data in show efficiencies by differentiating hAFSCs into osteocytes, adipocytes, and chondrocytes

Acknowledgments

This research was supported by the Entergy Workforce Training grant. Thanks to Katelynn Montgomery and team in Dr. Bruce Bunnell's lab.
A heterogeneous population of ventral tegmental area neurons project to the central amygdala

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Department of Physiology, Louisiana State University Health Sciences Center, New Orleans, LA

Introduction

- 16 million Americans are diagnosed with Alcohol Use Disorder (AUD), according to the NIAAA.
- We believe that the circuit between the ventral tegmental area (VTA) and the central amygdala (CeA) plays a role in alcohol dependence.
- The CeA is a brain region associated with stress and is known to play an important role in alcohol dependence associated behaviors.
- The VTA is implicated in alcohol reward.
- One subpopulation of VTA neurons that projects to the CeA has been shown to become activated during alcohol withdrawal, indicating that this circuit plays a role in dependence.
- However, this circuit remains largely under-characterized.
- The goals of this research are to better characterize the expression profiles of these CeA-projecting VTA neurons.

Hypothesis

- Since early work in our lab has established that only about 30% of CeA-projecting VTA neurons are dopamineergic, it is hypothesized that a substantial amount of glutamatergic CeA-projecting VTA neurons will be observed.

Methods

- Adult male Long Evans rats undergo surgery in which CeA is injected with retrograde tracer, and VTA is verified.
- Brains are sectioned, and immunohistochemistry is performed.
- Neurons are analyzed using fluorescent microscopy.

Mixed populations of VTA neurons project to CeA of naïve rats

SNc

- Figure 1. Acute (40 min) exposure to ethanol (5 g/kg) increased the number of VTA neurons projecting to the CeA. Nuclei are stained in DAPI. Scale bars 100 μm. Bla, lateral amygdala.

VTA

- Figure 2. 48h survival saline (SAL) or saline (SAL) containing 3-(2-carboxyethyl)pyrazine (CEP) 0.1 mg/kg. Figure 3. E-projection profiles of CeA projecting SNc neurons.

SNc

- Figure 4. In 1 mg/kg of 6-OHDA injected into the VTA, SNc neurons are stained in DAPI. Scale bars 100 μm. Bla, lateral amygdala.

Conclusions

- A significantly high number of CeA-projecting neurons were found with medium to large cell bodies, predominantly within the ventromedial and ventrolateral nuclei of the VTA.
- We found that 6-OHDA injection into the VTA significantly reduced the number of SNc-projecting VTA neurons.
- This finding supports the hypothesis that VTA neurons projecting to the CeA are involved in the modulation of alcohol reward.

This research project was supported through the LSU Health Sciences Center, School of Medicine.
Direct evidence of IF1 preserves ATP synthase during hypoxia

LSU Health
NEW ORLEANS
School of Medicine

Introduction

mitoMaLionR is mitochondria specific

ATP production in MEF under normoxia and hypoxia

Methods

Summary and Conclusions

The research project was supported through the LSU Health Sciences Center, School of Medicine.
ALCOHOL-MEDIATED DYSREGULATION OF MITOCHONDRIAL PROTEIN EXPRESSION IN SKELETAL MUSCLE OF SIV-INFECTED FEMALE Rhesus Macaques

JE Elaggar, DE Levitt, PE Molina, L Simion
Department of Physiology, Louisiana State University Health Sciences Center, New Orleans, LA

Background
- Rates of heavy drinking in people living with human immunodeficiency virus (PLWH) is almost twice that in the non-HIV-infected population
- At-risk alcohol use contributes to skeletal muscle dysregulation
- Skeletal muscle is a highly metabolic tissue needed to regulate whole-body energy homestasis
- Mitochondria are essential for skeletal muscle metabolic health
- People are living longer with HIV due to antiretroviral therapy, increasing risk for age-related comorbidities
- Skeletal muscle mitochondrial dysfunction with chronic at-risk alcohol could contribute to metabolic comorbidities in PLWH

Methods
3 mos. 2.5 mos. 9 mos.
CBA/VEH: 13-14 g/kg/week

Preliminary Data
- Chronic binge alcohol dysregulates mitochondrial gene expression in skeletal muscle

Hypothesis
Chronic binge alcohol alters mitochondrial-related protein expression in skeletal muscle from SIV-infected, antiretroviral therapy-treated female rhesus macaques.

Protein Expression

<table>
<thead>
<tr>
<th>Protein</th>
<th>VEH C</th>
<th>ALC C</th>
<th>VEH N</th>
<th>ALC N</th>
</tr>
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<tbody>
<tr>
<td>PGC-1α</td>
<td></td>
<td></td>
<td>91 kDa</td>
<td>52 kDa</td>
</tr>
<tr>
<td>PPARγ</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TFAM</td>
<td></td>
<td></td>
<td>27 kDa</td>
<td>24 kDa</td>
</tr>
<tr>
<td>GRB2</td>
<td></td>
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</tr>
</tbody>
</table>

Cytosolic and Nuclear Fractions

Preliminary Data
- This indicates cytosolic and nuclear-enriched protein fractions
- Histone H3 found in the nucleus
- GAPDH found in the cytosol

Conclusion
- CBA did not alter PGC-1α, PPARγ, or TFAM expression
- Trend for CBA to increase PPARγ in nucleus
- Future studies include:
  - Measuring mitochondrial function including oxygen consumption
  - Measuring the expression of proteins downregulated with TFAM
  - Assessing post-translational modifications of proteins with TFAM

This research was supported by the Entergy Workforce Training Grant and by NIH/NIAAA P01AA079803 (PE)
The Effects of Traumatic Stress on Reactivity to Acoustic Stimuli in Rats with a History of Alcohol Consumption

Trvon M. Eugene, Connor Schratz, Lucas Alberchet-Souza, Nicholas W. Gilpin
Louisiana State University Health Sciences Center, Department of Physiology

Introduction

- Post-traumatic stress disorder (PTSD) is marked by symptoms of re-experiencing, avoidance, and hyperarousal that develop in response to traumatic events.
- Not only are women at risk, but also men who experience stress-related disorders. Those with PTSD also experience different symptoms and comorbidities associated with PTSD.
- Alcohol use disorder (AUD) is currently contraindicated with PTSD, but the prevalence of AUD among individuals with PTSD is high.
- PTSD is also associated with decreased response to treatment as well as a poorer prognosis when compared to individuals with only a single disorder.

Objective

- The goal of this study is to evaluate if exposure to auditory stimuli affects sensitivity to acoustic stimuli in male and female rats exposed to trauma.

Methods

- 2-Bottle Choice: Male and female rats were exposed to alcohol consumption over a period of 3 weeks using an intermittent two-bottle choice procedure. During this period, rats were given access to water and alcohol, and drinkers were monitored during alcohol consumption and measured along with water consumption.
- Conditioned Place Aversion (CPA): Rats were then tested for CPA after treatment with CPA and classified as drinkers or non-drinkers based on their stress sensitivity as measured by avoidance of the aversively conditioned context.

Results

- Reactivity to acoustic stimuli in rats exposed to alcohol and without a history of alcohol drinking.
- Graphs showing reactivity to acoustic stimuli in male and female rats exposed to acoustic stimuli and drinking.

Conclusions

- Sensitivity to acoustic stimuli is demonstrated to increase in rats exposed to alcohol and without a history of alcohol drinking.
- Male rats with a history of alcohol consumption displayed greater sensitivity to acoustic stimuli compared to female rats.
- These findings suggest that exposure to auditory stimuli may affect stress sensitivity in rats. The results support the hypothesis that auditory stimuli may affect stress sensitivity in rats. Further research is needed to explore the mechanisms underlying these effects.
Characterizing Drug Resistant Virus in SIV-Infected Rhesus Macaque Treated with ART

Emma Freeman, Nedra Lacour, Spencer Robichaux, Liz Simon PhD, Angela Amedee PhD.

Department of Microbiology, Immunology, and Parasitology and Comprehensive Alcohol Research Center, LSUHSC, New Orleans, LA

Background and Rationale
- The SIV-infected rhesus macaque exposed to chronic binge alcohol (CBA) has proven to be a highly useful model for elucidating the effects of alcohol misuse on SIV disease.
- The use of antiretroviral therapy (ART) has significantly reduced the morbidity and mortality from HIV infections and now triple drug therapy is commonly used for treatment of people chronically infected with HIV.
- Drug resistant virus has been observed in ART treated SIV infected animals with persistent viremia.
- Characterizing and understanding drug resistance (DR) in ART in the SIV-infected CBA macaque is important for the refinement of our models.

Objective
- The objective of this study was to evaluate viral replication in SIV- infected rhesus macaque model and to determine the development of drug resistance with ART-treated macaques from previous studies.

Study Design
- Antiretroviral Model
- Drug Exposure
- Comparison of Viral Load
- Conclusions and Future Directions
Pharmacokinetics of ASO therapy in a mouse model of Usher syndrome

Introduction

Background
1. Axial Usher syndrome
2. USH1C mouse model
3. 218A-targeted ASO Therapy

Results
4. ASOs improve Ush1c splicing
5. LOMB analysis of ASO

Conclusions

Acknowledgements
Estrogenic Regulation of Lysyl Oxidase in Cardiac Fibroblasts

Tierra Foley, Nicholas Fried, Dr. Jason Gardner

Department of Physiology, Louisiana State University Health Sciences Center

Background

The cardiac fibroblasts were isolated from the atrial tissue of adult Sprague-Dawley rats. The cell culture was maintained in Dulbecco's Modified Eagle Medium (DMEM) supplemented with 10% fetal bovine serum (FBS), penicillin (100 U/mL), and streptomycin (100 µg/mL). The cells were cultured at 37°C in a humidified atmosphere with 5% CO2. The cells were harvested using 0.05% trypsin-EDTA and centrifuged at 1,000 rpm for 5 minutes. The pellet was resuspended in fresh medium and counted using a hemocytometer.

Methods

The cells were cultured in 6-well plates and allowed to reach 80% confluence. The cells were transfected with Loxyl Oxidase (LOX) siRNA using Lipofectamine 2000 according to the manufacturer's instructions. The cells were harvested 24 hours after transfection and used for further analysis.

Ongoing Experiments

The influence of estrogen on the expression of LOX in cardiac fibroblasts was evaluated using real-time PCR. The cells were treated with 17β-estradiol (10 nM) for 24 hours. The cell lysates were prepared and the protein levels of LOX were measured using western blot analysis.

Hypothesis

In the present study, we hypothesize that estrogen treatment will increase the expression of LOX in cardiac fibroblasts.

Interpretation

The results showed a significant increase in LOX expression in the estrogen-treated group compared to the control group. The protein levels of LOX were also increased in the estrogen-treated group. These findings support our hypothesis that estrogen increases the expression of LOX in cardiac fibroblasts.

Conclusion

The results of this study suggest that estrogen increases the expression of LOX in cardiac fibroblasts. This finding has important implications for the development of new therapeutic strategies for the treatment of heart disease.

This research project was supported by grant # 147572 through the National Science Foundation (NSF). Research Experiences for Undergraduates (REU) Program.
Effect of norepinephrine on REST expression and subcellular localization in cerebellar interneurons

Jordyn Fong, Jessica Fawcett-Patel, and Sigqiong June Liu
Department of Cell Biology and Anatomy, LSUHSC New Orleans, LA

INTRODUCTION

RESULTS

METHODS

REFERENCES

SUMMARY

This research project was supported through the LSU Health Sciences Center, School of Medicine.

Hassan A. Hassan, Li Shen MD, PhD

Department of Microbiology, Immunology, & Parasitology, LSU Health Science Center, New Orleans, LA

Abstract

Strains and plasmids used

Cloning Strategy

Map of plasmid

Sequence of the C-terminal

Agarose gel electrophoresis

Results

Conclusion and future work

References

This research project was supported by grant 1-R15 AI-064017 from the National Institute of Allergy and Infectious Diseases (NIAID), Research Experience for Undergraduates (REU) Program and NAI grant U01 AI064017.
Identification of Isoform-Specific Intersectin Mutants in Human Pathogenic Fungus Cryptococcus neoformans.

Haley Hill, Ping Wang.

Department of Microbiology, Immunology, and Parasitology, Louisiana State University Health Sciences Center, New Orleans, LA, USA

Introduction

Cryptococcus neoformans is a pathogenic fungus that infects humans, resulting in serious disease, especially in immunocompromised individuals. The virulence factors that contribute to its pathogenicity are of great interest to researchers. In this study, we aimed to identify isoform-specific intersectin mutants to understand their role in virulence.

III. Virulence Factors

A. Cell Wall: The cell wall of C. neoformans contains mannoproteins and chitin, which play a crucial role in symbiosis and virulence. Mutations in genes encoding these components could affect virulence.

B. Virulence Factors: We screened mutants for alterations in virulence factors such as capsule, polysaccharides, and glycolaldehyde.

C. Intersectin: Intersectin is a key component of the cryptococcal virulence pathway. Mutations in intersectin genes were identified and characterized.

VI. Gel Electrophoresis

A. Gel Electrophoresis: Gel electrophoresis was used to analyze the protein expression profiles of wild-type and mutant strains.

B. Results: Differences in protein expression were observed, indicating changes in the expression of intersectin.

VII. DNA Chromatogram

A. DNA Chromatogram: DNA sequencing was performed to confirm the identification of intersectin mutants.

IV. Homology of Cin1 with ITS1N1

A. Homology Analysis: Homology analysis was performed to compare Cin1 with ITS1N1, a known virulence factor.

B. Results: High homology was observed, suggesting a possible role of Cin1 in virulence.

V. Construction of Cin1-L and Cin1-S

A. Construction: A construct was created to study the function of Cin1-L and Cin1-S in virulence.

B. Results: The construction showed differences in virulence between Cin1-L and Cin1-S.

Conclusion and Future Directions

A. Conclusion: The identification of isoform-specific intersectin mutants provides insights into the virulence mechanisms of C. neoformans.

B. Future Directions: Further studies are needed to understand the role of intersectin mutants and their implications for vaccine development and treatment options.

This research project was supported by grant # 369932 through the National Science Foundation (NSF), Research Experiences for Undergraduates (REEU) Program.
T. cruzi-induced Changes in Cardiac Endothelial Cells

Introduction

T. cruzi induces classic EndMT regulators

Cell-specific/EndMT marker expression

Co-Culture Infection

Conclusions

Acknowledgements

This research was supported by the Entergy Workforce Training Grant.
Arginine-170 is Important in Stabilizing the Active Parkin Oligomer

Kariza Hossain, Jennifer Klein, Virginia Ronchi, Oygul Mirzaliyeva, and Arthur Haas.

Department of Biochemistry & Molecular Biology, Louisiana State University Health Sciences Center, New Orleans, LA

Introduction

Results

Figure 2. Substrate inhibition reveals two I2-ubiquitin binding sites

Materials and Methods

Conclusions

Figure 3. Hypothetical inhibition of Parkin activity by Gossamine BC3

References

This research project was supported in part by NSF through the National Science Foundation (NSF) Research Experiences for Undergraduates (REU) Program.
The Role of HPV & EBV in the Detection of Biopsy-Proven Cervical Dysplasia in HIV+ Patients

Phalyn LaBranche, Amber Trauth, MPH, Annie Talbot, Michael Hagensee, MD, PhD.

NORMAL VS. ABNORMAL PAP SMEAR

CONCLUSIONS

Worst PAP Smear

Percentage of patients with abnormal PAP smears: 5% negative, 30% HPV only, 40% EBV only, 30% both HPV and EBV.

Worst Biopsy

Percentage of patients with abnormal biopsies: 30% negative, 40% HPV only, 20% EBV only, 20% both HPV and EBV.

REFERENCES

This research project was supported by the National Institutes of Health (NIH), National Cancer Institute (NCI).
HPV-related Cancers, HSV, Syphilis, Gonorrhea and Chlamydia Infections among HIV-Positive Patients at the Emergency Department of University Medical Center New Orleans.

Kelsey Lain, Victoria Lulich, Evrim Oral, PhD, Chizoba Ogbuefi, Zion Rouge, Raj Patel, Keyana Varhado MD, Michael Okoronkwo MD, Stacy Rhodes MD, Kanayo Okeke-Ewenu MBBS, MPH, Lisa Moreno-Walton MD, MS, MSCR, FAAEM

UMON Emergency Department, LSUHSC School of Medicine

Introduction

Data & Results

Discussion

This project was supported by the National Institutes of Health (NIH), National Cancer Institute (NCI).
Ethanol dysregulates chondrocyte differentiation via different sources of reactive oxygen species in chondrocyte ATDC5 cells

Jonathan Lewis¹, James Watt² and Martin Ronis².

University of New Orleans Department of Pharmacology, LSU Health Sciences Center

Introduction

Background

Methods

Results

Gene Expression

Conclusion

Figure 3: Gene Expression changes in ATDC5 cells in response to ES/DMSO treatment

This research project was supported by grant 4 MT45 through the National Science Foundations (NSF) Research Experience for Undergraduates (REU) Program and NIEHS K12 A1462801 (KLR)
Exploration of the Role of Indian Hedgehog Signaling in Polychlorinated Biphenyl Toxicity in Skeletal Bone

Shana Littleton, Ashlee Williams, Dr. James Watt, Dr. Martin Ronis
LSUHSC Department of Pharmacology

Background

Aim & Hypothesis

Figure 2: IHH real-time PCR Data of Shaft

Experimental Design

Figure 1: PCR Primer Product Test

Conclusions

From this data, we can see that in the bone samples treated with PC 3-126, Indian Hedgehog is expressed more than animal treated with oil.

PCR MARROW SAMPLES (CYP1A1)

We suspect this induction to play a role in the overall smaller bone size seen in PCR treated animals.

NAR row samples (CYP3A4/2B11)

There is also protection against the induction of IHH in Aryl Hydrocarbon Receptor Knockout mice, showing this is a AHR mediated process.

References

3. J. Wang, P. Andre, L. Ye, Y. Yang, Diabetics, 2011, 7.3;

Acknowledgments

This research project was supported through the LSU Health Sciences Center, School of Medicine, R25GM121889, National Institutes of Health (NIH) R37 AA 088282 [MR].
Voluntary Ethanol Consumption and Alterations in Reward Circuitry in Ethanol Exposed Adolescent Male Mice

Background

Method

Conclusions

This research project was supported through the LSU Health Sciences Center, School of Medicine and NIAAA (K01 MH084822-01)
"Evaluation of the Efficacy of Various Types of Tourniquets Utilizing an Exsanguinating Limb Simulator Model"

1Rimi Mandal, 2Sara Beaulieu, 3Patrick Greiffenstein
1Tulane University, LSU, LSU Health Sciences Center, School of Medicine, Department of Surgery UMC, Section of Trauma/Critical Care Surgery

Background

- Tourniquets are devices that reduce blood flow by tightening around the arterial and venous system.
- Tourniquets have been in use for centuries and present challenges in hemostatic control of hemorrhage and modern trauma applications.
- Different types of tourniquets are:
  - Plumley Emergency Tourniquet (PET)
  - Combat Application Tourniquet (CAT)
  - Israeli Tactical Tourniquet (ITT)
  - Non-Tourniquet

Preliminary Model

Figure 1: Analysis of the preliminary model reveals that the tourniquets reduce blood flow rates and demonstrate effective vascular compression at a limit less than the predetermined threshold. This model aims to incorporate standard and non-tourniquet models. The goal is to evaluate the impact of tourniquets and non-tourniquet models.

Results

- Tourniquet-related complications
- Non-tourniquet-related complications

Experimental Design of the ELS model

Materials and Methods

- The following materials were used to build the ELS model:
  - Tourniquet
  - Non-tourniquet
  - Tourniquet-related complications
  - Non-tourniquet-related complications

- The study participants (N=10) were studied and data were collected on:
  1. Blood flow to the extremities
  2. Bedside monitoring
  3. Sedation levels

Conclusion

- The ELS model was validated for accuracy.
- The tourniquet was effective in reducing blood flow.
- Non-tourniquet use was associated with increased complications.

This research was supported by the Entergy Workforce Training Grant.
Sex Differences in Fat Signaling in Obesity Prone and Obesity Resistant Rats

Corinne Martin & Stefany Primeaux, PhD

Department Of Physiology, Louisiana State University Health Sciences Center, New Orleans

Introduction

Methods and Materials

Gene Expression in OM and SSB Rats

Food intake in OM and SSB Males & Females

Hypotheses

Methods and Materials

Weight gain in OM and SSB Rats

Summary & Conclusion

Results
Sulindac Sulfide’s Apoptotic and Anti-proliferative Effects on Human Colon Cancer Cells

Samuel Martin, Ches’NiQue Phillips PhD, Yaguang Xi MD PhD.

Department of Genetics, Stanley S. Scott Cancer Center, Louisiana State University Health Sciences Center, New Orleans, LA

Introduction

Proposed Mechanism

Materials and Methods

Results

Conclusions

This research project was supported through the LSU Health Sciences Center, School of Medicine, Stanley S. Scott Cancer Center.
Workplace Wellness and Cancer Screening

Alina Mohiuddin1, Douglas LeBlanc2, MPH, Mikal Giancola2, MPH, Donna L Williams2, DrPH
Loyola University New Orleans1, LSUHSC-NO School of Public Health2

Background

Breast cancer and cervical cancer are the leading causes of death among women in Louisiana. The American Cancer Society estimates that 1 in 8 women will develop breast cancer in their lifetime. Cervical cancer is also a significant cause of death in women in Louisiana, with 1 in 100 women being diagnosed with cervical cancer. The Louisiana Cancer Registry reports that in 2016, the age-adjusted death rate for breast cancer was 20.7 per 100,000 women, and the age-adjusted death rate for cervical cancer was 0.6 per 100,000 women.

Methods

This research project was supported through the LSU Health Sciences Center, School of Medicine, Stanley S. Scott Cancer Center.
Electrophysiological Techniques to Study Neurological Activity in the CA1 Region of the Hippocampus

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LSU Health New Orleans
School of Medicine

Introduction

Electrode Fabrication

Behavioral Task

Data Recording

Surgical Implantation

Data Analysis

Results

Conclusion

The research project was supported through the LSU Health Sciences Center, School of Medicine.
Of Mice and Many Repeats:
Tissue Specific Expansion in a Friedreich Ataxia Mouse Model

Introduction
Friedreich Ataxia

Repeat Expansion
DNA repeats expand to cause disease

They Gain in the Brain
YGS Mouse Model Tissues Expand at Various Rates

Ear Today, Growing Tomorrow?
Ears Expand Minimally

Discussion
What We Found

FRDA Mouse Model
The YGS mouse model is useful in studying the role of repeat expansions in the Friedreich Ataxia gene. The goal of our study is to understand the progression of symptoms and improve the quality of life for those affected.

This research was supported by the Entergy Workforce Training Grant.
Expression of Nicotinic Acetylcholine Receptors in Pulmonary Artery Endothelial and Smooth Muscle Cells

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Abstract

Nicotinic acetylcholine receptors (nAChRs) mediate the body's response to a variety of stimuli, including nicotine. Previous studies have shown that nicotine can increase smooth muscle tone and vessel remodeling.

Introduction

About 80 million US adults smoke cigarettes and 7 million smoke and high school students at least once a year, while 20 million people use smokeless tobacco products. Nicotine is a highly addictive substance and is present in many different forms, including cigarettes, chewing tobacco, and even electronic cigarettes.

Methods

1. S/MAR gene gPCR Method
2. Inductively coupled plasma mass spectrometry

Results

Figure 2: Immunofluorescence of nAChR expression in different cell types.

Future Directions

Explore the functional role of both nicotine and nAChR in pulmonary artery remodeling.

Summary

Nicotine and nAChR are both involved in pulmonary artery remodeling, and further research is needed to fully understand their roles.
Application of Machine Learning to Biomarker Discovery and Outcome Prediction in Colon Cancer using Genomic Data

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Introduction

Tumor vs Normal

Materials and Methods

Results from Tumor vs Normal

Conclusions

One classifier performed reasonably well, with the VTD model achieving an accuracy of 97% on the test set.
Low Clinic Attendance Rates for Hepatitis C Appointments at UMCNO

Chizoba Ogbuefi, Kanayo Okeke-Eweni MBBS, MPH, Michael Okoronkwo MD, Stacey Rhodes MD, Evrim Oral PhD, Lisa Moreno-Walton MD, MS, MSCR, FAAEM

UMCNO Emergency Department, LSUHSC School of Medicine

Introduction

Purpose

Methods

Demographics

Results

Linkages to Care

Conclusion

This research project was supported through the LSU Health Sciences Center School of Medicine.
Neighborhood Concentrated Disadvantage and Smoking among Young Adults in Greater New Orleans

Sheera Rahman, Stephen Kantrow, MD, Ryan Keen, MD, Denise Danos, PhD

Introduction

Objective

Data and Methods

Results

Discussion

This research was supported by the Entergy Workforce Training Grant.
PLA2G6 and α-synuclein Interaction in Human RPE Cells

Catherine Rockwell¹, Sophia Marathonitis², Sayantani Bhattacharjee³, Jorgelina Calandria³.

Introduction

MO-ATG1 increased the expression of PLA2G6 and PLA3D4A mRNAs

Dysregulation of PLA2G6 activity affects its colocalization with SNCA

Conclusions

- MO-ATG1, but not MO-ATG2, increases the expression of PLA2G6.
- PLA2G6 is inhibited by both MO-ATG1 and MO-ATG2.
- MO-ATG1 induces the formation of pATG6, decreases the expression of PLA2G6, and increases the colocalization of PLA2G6 and SNCA.

References

This research project was supported through the LSU Health Sciences Center, School of Medicine.
Purification and Functional Analysis of Monoclonal Antibodies Protection Against C. auris Invasive Infections
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Introduction

Disseminated candidiasis is a life-threatening opportunistic infection, and is a leading cause of nosocomial infections affecting immunocompromised patients in the United States. Despite the advancements of antifungal therapies, the mortality rate remains exceedingly high. Due to the high mortality rate and refugia in the fungal cell, novel approaches are critical to defeat fungal infection. Among medically important fungal pathogens, Candida auris, a multi-drug resistant yeast species, has emerged as a significant threat in recent years. This fungal species is a global pandemic and has been identified over 140 cases in the United States as of July 2018. C. auris' ability to survive in diverse environments, including healthcare settings, has made it a formidable pathogen. The limited therapeutic options and the high mortality rate associated with C. auris infections highlight the urgency for developing new therapeutic strategies.

Methods

Cell Culture and Immunofluorescence Assays
- Cell culture of C. auris using RPMI 1640 medium
- Immunofluorescence staining to detect fungal biomass

Results

- Flow Cytometry and Fluorescent Staining
- Scanning Electron Microscopy (SEM)

Conclusions

- Development of novel monoclonal antibodies for the treatment of C. auris infections
- Evaluation of antibody efficacy in vitro and in vivo models

This research project was supported by grant # 1409752 through the National Science Foundation (NSF). Research Experiences for Undergraduates (REU) 2017-2018.
Dieting Apps: What’s Under the Hood?

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Introduction

Results

Monetization Features

Data Sources vs. Plant-Based Apps

Conclusion

This research was supported by the Entergy Workforce Training Grant.
Disparities in Motor Vehicle Collision (MVC) among Pediatric Patients

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Introduction

Motor vehicle collisions are collisions between a vehicle and a pedestrian, animal, road device, or another vehicle. Each year 1.25 million people were treated in motor vehicle crashes (MVC). An estimated 4.3 million people were severely injured or died in a motor vehicle collision in 2019. Motor vehicle crashes are one of the three leading causes of death in pediatric patients in the United States. The goal of this study is to discover trends in demographics and information regarding the use of protective devices, severity of injuries, surgery rates, and length of stay in the University Medical Center New Orleans (UMCNO). The research can potentially lower disparities in motor vehicle collision rates, length of stay, and trends in imaging (X-rays, CT scans, and MRIs).

Methods

The Louisiana Trauma region was used to collect information on patients ages of birth to 18 years who seek care in both MVC that meet the criteria for level I trauma activation at UMCNO. The charts for patients meeting criteria were reviewed in EPIC. Variables collected included age, sex, race, age of admission and discharge, and co-morbidities. Injury severity was graded using the Abbreviated Injury Scale (AIS) at level I trauma centers. Data was identified using the statistical analysis system (SAS) for Microsoft Excel. The study’s primary and secondary outcomes were assessed using Pearson’s chi-square or Fisher’s exact test.

Objectives

To assess the severity of injury in pediatric patients involved in a Motor Vehicle Collision (MVC).
To assess injury rates across age, sex, and race.
To assess hospital length of stay across Pediatric MVC patient groups.
To assess the use of protective devices in pediatric motor vehicle collision patients.

Results

Demographics

Surgery Rates

Comparing Surgery by Race

Comparing Surgery by Age

Protective Devices

Restraint Usage by Race, Gender, and Age

Conclusions

This research was supported by the Energy Workforce Training-Grant.
Retinal Sensitivity in Hormonally Modulated Hyla cinerea Using Electrophysiological Techniques

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Introduction

Results: Relative Spectral Sensitivity

Discussion and Future Experiments on Endocrine Modulation

Acknowledgments

References
The Protein S LG1+2 Domain Contributes Significantly to Inhibition of Factor IXα

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Introduction

Circular Dichroism (CD)

Isothermal Titration Calorimetry (ITC)

ITC Data

Conclusion

Objective

Which of the two Cameron S-like domains—if not both—are responsible for binding to and inhibiting Factor IXα?

This research project was supported by grant #169752 through the National Science Foundation (NSF), Research Experiences for Undergraduates (REU) Program.
Neuroadaptations in Estrogen Signaling in an Animal Model of Complex Regional Pain Syndrome & Alcoholic Neuropathy

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Tulane University

Introduction

Behavioral Analysis

Alterations in Progesterone Signaling

Conclusions

Alterations in Estrogen Signaling

Future Directions

- Behavioral data demonstrate that chronic alcohol intake increased pain sensitivity in our model of CRPS.
- Although the difference in the expression of several estrogen receptors was not statistically significant, there was a general trend for alcohol to increase the expression of total ER and GPER.
- Alcohol treatment led to an increase in progesterone receptor phosphorylated at Ser294 in the trigeminal nuclei.

- Future analysis will investigate other pain-related brain regions, including the prefrontal cortex and central amygdala.
- Acute pain and motor information travel contralaterally, indicating that alcohol may modulate neurotransmitter release in the cortex to enhance pain transmission to the thalamus.
Mechanisms of Nicotine-dependent Activation of Cardiac Fibroblasts

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Introduction
- Electronic cigarette (e-cig) use has been gaining popularity among adolescents and young adults but combustible tobacco products.
- E-cigs are often advertised as “safer” than combustible tobacco products.
- While cigarette smoke exposure has been well established, it is now known to be exposed to inhaled nicotine.
- Investment from tobacco companies and variability in e-liquid composition reinforces the need to understand the physiological effects of nicotine use.

Materials and Methods
- Culture conditions: Fibroblasts are grown in DMEM with 10% FBS, 1% N 2, penicillin, streptomycin, gentamicin, and amphotericin. Fibroblasts used for functional assays will be switched to media with 1% FBS, penicillin, streptomycin, and amphotericin 24 hours before treatment with nicotine.
- Nicotine exposure: Nicotine stock in D 2 O water will be diluted to 3 μg/ml. Nicotine will be administered to treatment groups and equal volume of D 2 O water will be administered to control groups.

Future Directions
- Study for treatment of nicotine addiction in clinical settings.
- Study for treatment of nicotine dependence in the fibroblasts.
- Study for treatment of nicotine-related diseases.

Expected Results
- Increased mRNA expression of cathepsin, aparelhagelut, and collagen I and III.
- Fibrillogenesis in wound healing areas resulting from increased expression of nicotine-related proteins.

Experimental Workflow

Previous Research
- Embryonic pulmonary fibroblasts exposed to nicotine transdifferentiate into myofibroblasts (Rehan, ALP Lung, 2005).
- Cardiac fibroblast proliferation and collagen production increased due to nicotine exposure, but not when the α7 nicotinic acetylcholine receptor (nAChR) is inhibited (Vang, ALP Lung, 2011).

Hypothesis
- In vitro nicotine exposure of cardiac fibroblasts increases the production of collagen I and III, as well as the collagen-crosslinking enzyme, lysyl oxidase (LOX).

References

This research project was supported through the LSU Health Sciences Center, School of Medicine, National Institute of Health.
Differences in Patient-Provider Communication Between Smokers and Non-smokers

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Michael D. Celestin, Jr., MA, CHES, NCTTS
Louisiana State University Health Science Center, School of Public Health

Introduction

- Smoking behavior is a major cause of injury and disease and increases the risk of chronic illness and early death.
- Smoking is the number one preventable cause of death in the United States.
- Smoking is associated with a wide range of negative health outcomes, including lung cancer, heart disease, stroke, and respiratory problems.

Methods

- The study was conducted using a cross-sectional design.
- Patient-provider communication was assessed using a validated questionnaire.
- The sample included 500 patients who had visited their primary care provider in the past 12 months.

Results

- Figure 1: Gender
- Figure 2: Race
- Figure 3: Age
- Figure 4: Education
- Figure 5: Smoking Status
- Figure 6: Age of Quitting

Results (cont.)

- Table 1: Descriptive statistics of patient-provider communication
- Table 2: Associations between smoking status and patient-provider communication

Conclusion

- Patients who smoke report lower levels of patient-provider communication compared to non-smokers.
- Effective patient-provider communication is essential in improving a patient's prevention and management of smoking-related diseases.
Higher SIV Levels Are Observed in Blood and Tissue Reservoirs of ART-Treated Female Macaques Exposed to Chronic Binge Alcohol

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INTRODUCTION

HYPOTHESIS

STUDY DESIGN & METHODS

RESULTS

Comparisons of mean DNA and RNA levels

CONCLUSION & FUTURE DIRECTIONS

This research project was supported through the LSU Health Sciences Center, School of Medicine, National Institutes of Health (NIH) & LSU-OSU-CARC.
Effect of Fasting on the Distribution of Immune Cells In the Mouse Adrenal Gland

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Introduction

The adrenal gland is a neuroendocrine organ that releases hormones that maintain homeostasis, including the control of blood glucose levels. The gland has two parts, the cortex and the medulla. The cells of the cortex secrete hormones regulating metabolism and fetal development. There are two types of hormones released during the light to dark transition in mice. The pituitary gland produces adrenocorticotropic hormone, which stimulates the production of glucocorticoids, mineralcorticoids, and sex hormones. The role of these hormones is to maintain homeostasis and help the body adapt to stress.

The adrenal gland also serves as a primary source of adrenocorticotropic hormone, which is secreted in response to stress. The aim of this project was to determine whether stress-induced changes in the adrenal gland would lead to a change in the number of distribution of immune cells in the adrenal gland.

Materials & Methods

Methods

1. Harvest immune cells from adrenal glands from fasted mice.
2. Isolate the cells and resuspend in RPMI-1640.
3. Add 2% FBS to the cell mixture and incubate for 24 hours.
4. Count cell suspensions in a hemocytometer and wash the cells 3 times with PBS.
5. Place the cells in RPMI-1640, and wash the cells 3 times with PBS.
6. Count cell suspensions in a hemocytometer and wash the cells 3 times with PBS.
7. Mount sections on slides and add DAPI to the slides.
8. Count the number of cells per section.

This research was supported by the EASy Workforce Training Grant.
"Suppression of Dendritic Cell Maturation by Triple-Negative Breast Cancer Exosomes"

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