Letní soustředění vítězů SOČ

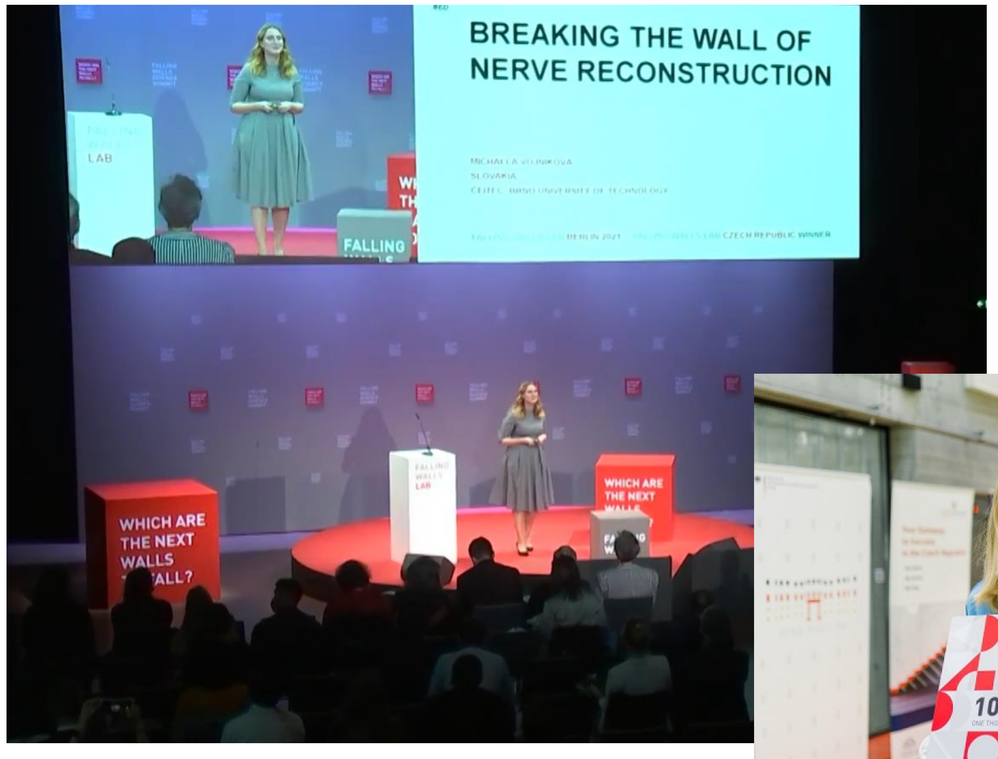
JAK NA PRVOTŘÍDNÍ POSTER?

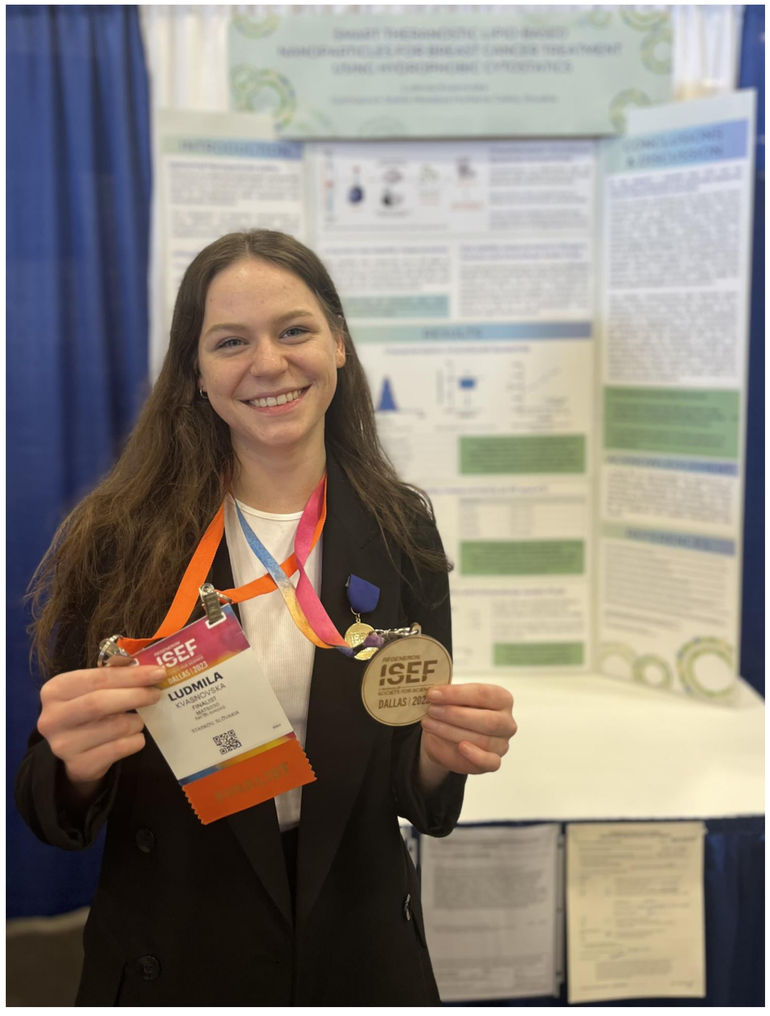
Ing. Michaela Vojníková

Září 2023

KDO JSEM?

- Ing. na FCH VUT (Chemie pro medicínske aplikace)
- PhD na CEITEC VUT (Pokročilé mikro a nanotechnologie)
- Výzkumnice na ÚCB MENDELU, RG Molekulární biologie a nanomedicíny
- Falling Walls Lab výherkyně
- Mentorka výherkyně ISEF 2023
- Mentorka Bc., Mgr./Ing. studentů
- Popularizátorka vědy @chemia_zivota a @chcivedet



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HUB
ENVIRONMENTAL ENGINEERING


Conquering Chaos:
Can Engineering Design Be Applied to
Prove Coin Flips Are Not Random?
ETSD024 – Abigail Hindman
Saint John's School, Houston, Texas, United States of America
ABIGAIL


Comparison of Stomatal Densities in Apple (Malus domestica), Peach (Prunus persica), and Hybrid Pear (Pyrus communis x Pyrus pyrifolia) Genera
Anna Jackson and Adjoa R. Ahedor
Engineering and Science Division, Rose State College, Midwest City, OK 73110
Abstract
Materials
Methodology
Results
Conclusion
References

Literacy in the United States

Abstract

Illiteracy in adults is a significant problem in the United States. Nearly 21% of American adult citizens (age 18 and older) face some level of illiteracy. The root cause of the illiteracy crisis is the unequal access to reading and writing education in the U.S., which we have investigated in our research.

Methods

In order to study the impact of disparate reading education, we traveled to both the highest and lowest overall ranking elementary schools in the state of Indiana, instructing students from kindergarten to 3rd grade. We chose West Lafayette Elementary (highest scoring) and Meuessel Elementary (lowest scoring) based on their certified Niche rankings. Since ages 6 and 7 represent the primary timeframe for language acquisition, we observed kindergarten and first grade classrooms to assess reading and writing instruction practices.

Research Questions

1. How do the teaching styles and practices at these two elementary schools differ?
2. Are there discrepancies in available educational resources? Does this play a significant role in instruction?
3. What are the differences in general classroom environment between the schools? How does this impact student engagement with writing/reading instruction?

Results

Based on our observations, we were able to conclude that student engagement in reading/writing instruction was significantly impacted by the classroom culture established by the instructor, the resources available, and the teaching practices.

Conclusions

The challenge of combating illiteracy in the United States is highly dependent on making overarching policy change in educational institutions. Based on our observations and research, we urge lawmakers to set reading and writing education guidelines in order to regulate the resources students have access to and standardize reading and writing instructional methods.

Acknowledgements:

We would like to acknowledge and thank the International Assessment of Adult Competencies, the National Center for Educational Evaluation and Regional Assistance, and Ginette Delandshere of the Indiana University-Bloomington School of Education.

Doprovodit ústní prezentaci, ale měl by být také schopen **samostatně prezentovat** výzkum.

PROČ POSTER?

Vizuálně znázornit **celkový přehled**, údaje a **nejdůležitější zjištění** výzkumného projektu.

ČEHO SE DRŽET OD ZAČÁTKU?

Efektivní poster by měl mít **přehledné** a konzistentní uspořádání, **zdůrazňovat** výzkumné otázky a výsledky, používat **účelnou grafiku** a vizuální prvky (obrázky, grafy a tabulky) a obsahovat **snadno přístupný** text.

Důležité tipy:

- Důležité informace by měly být **čitelné** ze vzdálenosti přibližně **3 metrů**.
- **Název je krátký** a přitahuje pozornost.
- **Počet slov** přibližně **300 až 800**.
- **Text je jasný a výstižný**.
- Použití odrážek, číslování a nadpisů usnadňuje čtení.
- Efektivní **použití grafiky, barev a písma**.
- Konzistentní a přehledné rozvržení.
- Obsahuje poděkování, vaše jméno a institucionální příslušnost.

JAK ZAČÍT?

POSELSTVÍ

Kdo je vaše **publikum**?

Co se jim snažíte **sdělit**?

Jaká je **hlavní myšlenka**?

PROSTŘEDÍ

Kde bude poster vystaven?

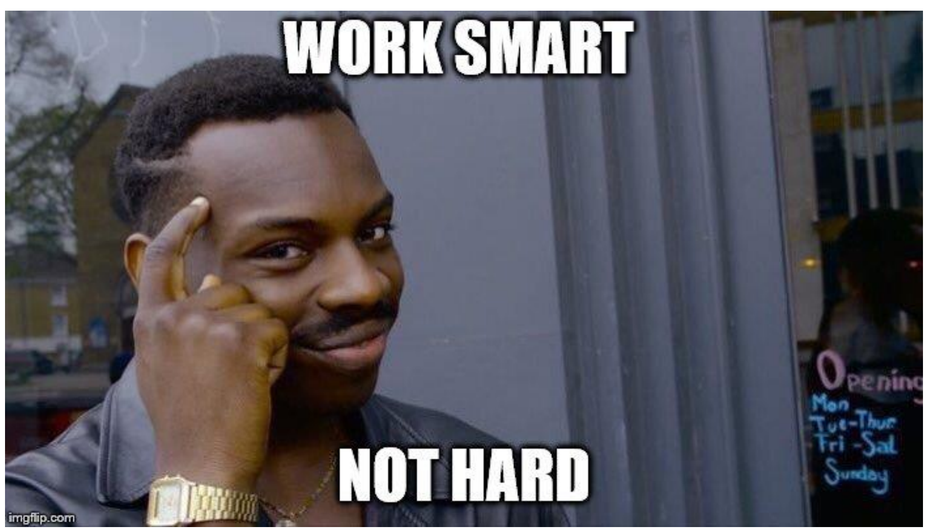
Jak budete prezentovat?

PODSTATA

Jaký **význam** mají data?

Jak je výzkum **relevantní**?

Jaké jsou **benefity** pro společnost?



VŽDY POSLOUCHEJTE MENTORA!

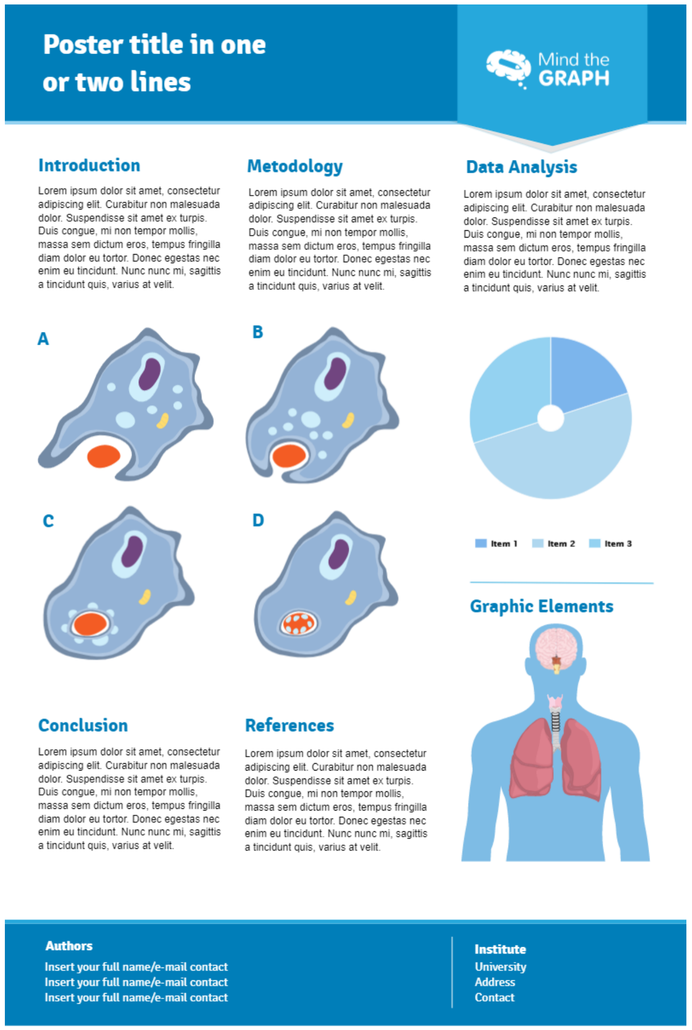
KAŽDÁ SOUTĚŽ MÁ SVÁ PRAVIDLA!

TVORBA POSTERU

Formátování:

- Maximálně dva fonty.
- Čitelná velikost písma (prostředí).
- Rozlišit nadpisy.
- Nebát se zvýrazňovat důležité informace (tučné písmo, změna barvy).
- Jednotné zarovnání.

Volný prostor



TVORBA POSTERU

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Volný prostor

Obrázky ve vysokém rozlišení

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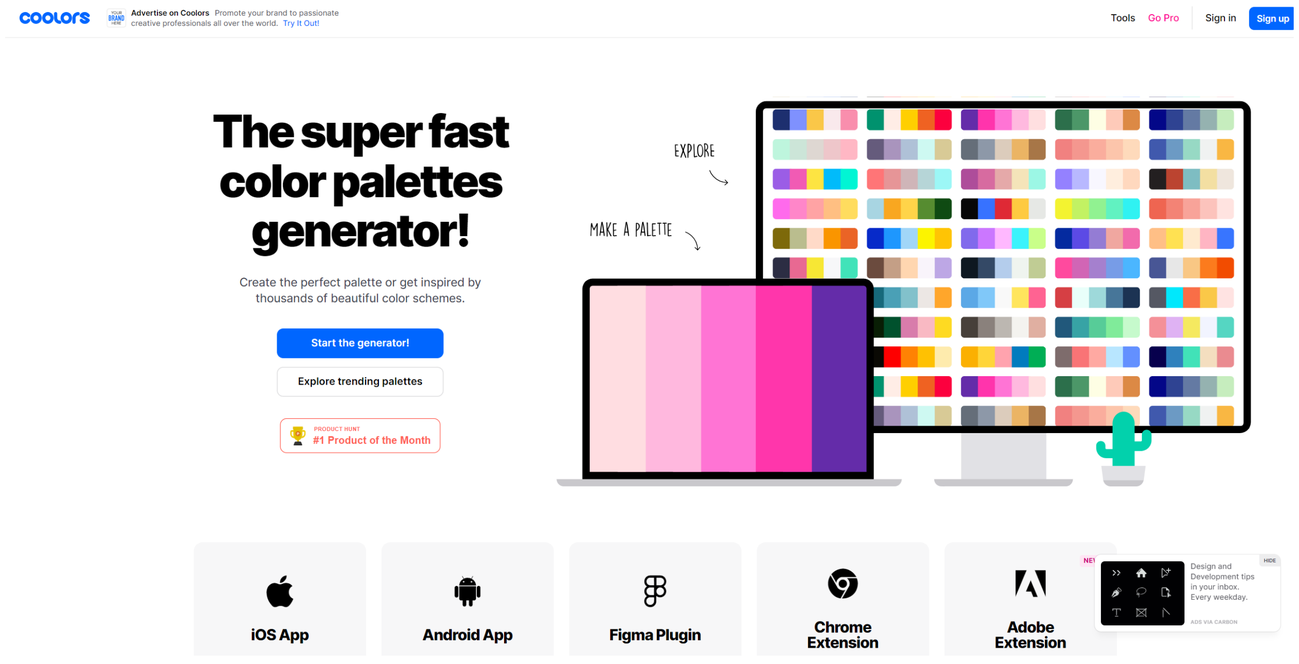
Volný prostor

Obrázky ve vysokém rozlišení

Barevná paletka



TVORBA POSTERU

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- Čitelná velikost písma (prostředí).
- Rozlišit nadpisy.
- Nebát se zvýrazňovat důležité informace (tučné písmo, změna farby).
- Jednotné zarovnání.

Volný prostor

Obrázky ve vysokém rozlišení

Barevná paletka

Kvalitní papír

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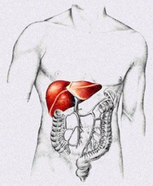
HEPATITE B

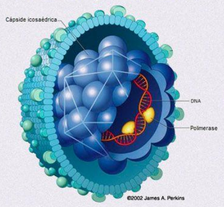
| DA RESISTÊNCIA À EVOLUÇÃO NA TERAPÊUTICA

HEPATITE B...

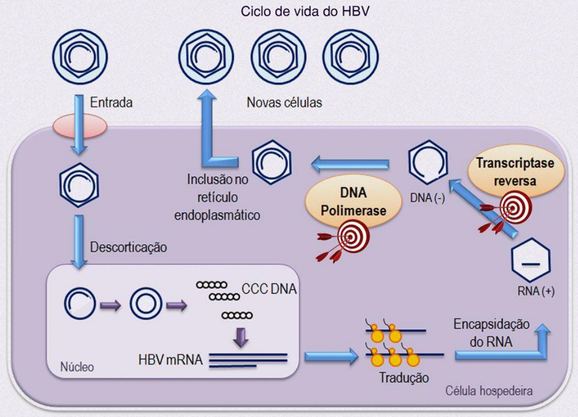
É uma doença inflamatória altamente infecciosa que afeta o fígado, podendo causar cancro do fígado ou cirrose, infectando atualmente cerca de 400 milhões de pessoas no mundo. [1]



Vírus da Hepatite B (HBV)



Ciclo de vida do HBV



- Vírus de DNA
- Família *Hepadnaviridae*
- 8 genomas víricos, parcialmente de cadeia dupla
- Transmissão: contacto com sangue ou fluídos corporais infetados

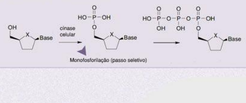
... DA RESISTÊNCIA AOS ANÁLOGOS DE NUCLEÓSIDOS...

A terapêutica mais utilizada nos últimos anos recorre ao uso de análogos de nucleósidos, como o lamivudine e o entecavir.
No entanto, a longa duração do tratamento pode induzir resistência.

Anos 50:
extraídos da esponja marinha *Cryptotethia crypta*

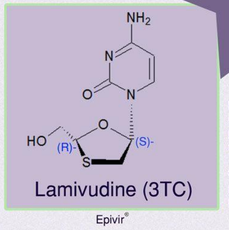
Alvo: HBV polimerase
Transcriptase reversa (TR) | DNA polimerase

Ativados a trifosfatos de nucleótidos pelas cínases celulares



Terminadores de cadeia:
Incorporação do metabolito ativo no DNA vírico

Lamivudine (3TC)



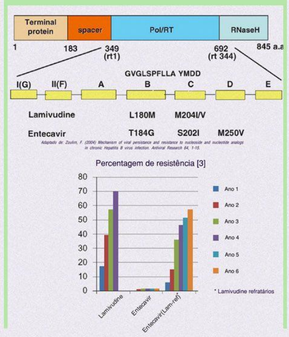
Epivir®

Isómero *cis*: mais ativo e menos tóxico
Análogo da citidina
Base pirimidínica
Formas ativas:
  Lamivudine trifosfato (L-TP)
  Lamivudine monofosfato (L-MP)
Inibidor competitivo da desoxicitidina trifosfato (dCTP)

Resistência resulta de uma **mutação única** a nível da transcriptase reversa na posição 204 desde a metionina até à valina ou isoleucina (rtM204V/I).

Os pacientes com resistência ao lamivudine podem desenvolver uma mutação adicional na posição 180, entre a leucina e metionina (rtL180M).

Mecanismo de resistência: Mutações



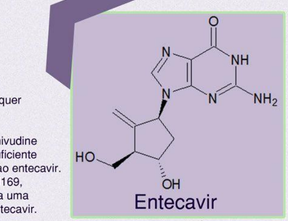
Potência *in vitro* 30 vezes superior ao lamivudine

Análogo da guanosina
Base púrica
Forma ativa: entecavir 5'-trifosfato
Inibidor competitivo da desoxiguanosina trifosfato (dGTP)

O desenvolvimento de resistência requer até **três mutações**.

A mutação verificada no caso do lamivudine (rtM204V/I) é necessária mas não suficiente para que se desenvolva resistência ao entecavir. Mutações adicionais nas posições rtI169, rtT184, rtS202, e rtM250 conduzem a uma diminuição da susceptibilidade do entecavir.

Entecavir

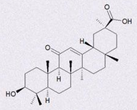


Baraclude®

...À DESCOBERTA DE NOVOS AGENTES ANTIVÍRICOS

Nos últimos anos, os estudos têm vindo a incidir sobre a pesquisa de novos agentes anti-HBV com outros alvos e mecanismos.

Raiz de alcaçuz
Glycyrrhizae glabra



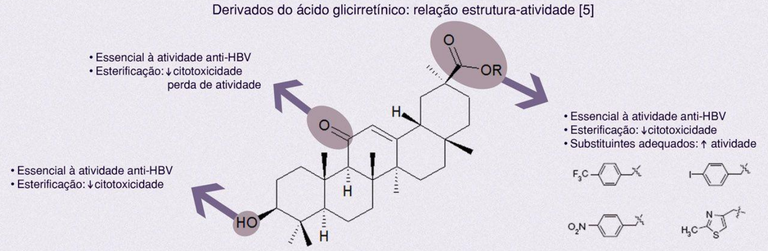
Ácido glicirretínico
Metabolito farmacologicamente ativo
Composto líder
Hepatoprotetor

Potencial antivírico?

NOVOS ANÁLOGOS

- Alvo: hepatócitos
- Inibem a secreção do antigénio de superfície da hepatite B (HBsAg), do antigénio *e* da hepatite B (HBeAg) e a replicação do DNA vírico em hepatócitos

Derivados do ácido glicirretínico: relação estrutura-atividade [5]



Agradecimentos:
Flávio Carvalho
Paulo Rua

Referências:
[1] Glish, R.G.; Lok, A.S.; et al (2007) *Entecavir Therapy for up to 96 Weeks in Patients With HBeAg-Positive Chronic Hepatitis B.* Gastroenterology, 133, 1437-1444.
[2] Yildiz, O.; Aygen, B.; et al (2011) *Lamivudine resistance mutations in patients infected with hepatitis B virus genotype D.* World J Gastroenterol, 17(45), 4987-4992.
[3] Osborn, M. (2011) *Safety and efficacy of entecavir for the treatment of chronic hepatitis B* Infection and Drug Resistance, 4 (2011), 55-64.
[4] Oplo, C.K.; Lee, W.M.; Kirkpatrick, P. (2005) *Entecavir.* Nature Reviews Drug Discovery, 4, 535-536.
[5] Wang, L.J.; Chang-An, J.; et al. (2012) *Synthesis, biological evaluation and structureactivity relationships of glycyrrhetinic acid derivatives as novel anti-hepatitis B virus agents.* Bioorganic & Medicinal Chemistry Letters, 22, 3473-3479.

Secret Box: Augmenting Big Data with Local Data

Presented by Rachel Atherton

Introduction

Data can be dehumanizing (Eubanks, 2018). Divorced from context, big data is easily **manipulated** to back up stories data collectors or purchasers want to tell (Knaflic, 2015), and algorithms that use big data sets often reproduce or reinforce systems of marginalization for already vulnerable populations (Noble, 2017; O'Neill, 2016). Quantitative data's ostensible objectivity obscures these realities, so we must continue bringing to light the material consequences of relying only on big data. In **non-profit settings** specifically, funders' requirements for data collection can negatively impact organizations' efficacy and even cause "data drift," which may precede mission drift — but researchers have shown that funders often prefer easily digestible data narratives and "feel-good quotes" to nuanced analyses (Bopp, Harmon, & Voida, 2017).

Food Finders, a medium-sized non-profit food bank working in Tippecanoe county and the surrounding area, collects a great deal of data about visitors; Food Finders' ability to obtain and maintain funding sources depends on the data they collect being consistent with funders' expectations, but that data isn't always what is most beneficial for clients to share. Based on a pilot study conducted with two other graduate students (Elizabeth Geib and Eliza Gellis) in Fall 2018, where we placed a "secret box" (Punch, 2002) in Food Finders' main pantry waiting area and invited clients to write, I ask:

> **How can Food Finders leverage local knowledges through methods such as a secret box to address inaccuracies or inconsistencies in "objective" quantitative datasets?**

Pilot Study

We implemented a secret box in the waiting area of the pantry in Fall 2018 for approx 3 weeks, with prompt "What is your biggest struggle today?"

- Clients could share anything (i.e., prompt was a suggestion, not a directive) totally anonymously
- Data included a range of responses:
  - Lists of needs/struggles
  - Longer narratives
  - Explicit requests for aid w/name & number
  - Complaints about Food Finders' services
  - Single issues/concerns

The pilot secret box placed in the JP Lisack Food Pantry, Fall 2018

Overall, pilot data suggested a disconnect between quantitative data Food Finders collects and qualitative data clients provided.

- Food Finders' metrics are based on specifically food security levels and factors such as income and number of dependents, but client data suggested other factors impacted food security and necessary resources.
- Open prompt solicited variety of responses, but didn't allow for direct comparison with Food Finders survey data; staff used responses to connect clients with resources at Food Finders and elsewhere, but response data may not be helpful for use with funders.

Food Finders & Aid Landscape

Food Finders' functions include:

- Deliver food to other pantries in the county, conduct mobile pantries
- Distribute food at the JP Lisack Community Food Bank (uses as-needed & choice models)

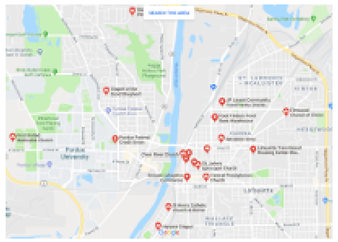
Success metrics are changing:

- Metrics changing from lbs of food distributed to impact on clients
- Demographic and food security data is collected from clients at first visit and subsequent visits, plus extra data for other resources outside pantry, but data practices unsustainable for various reasons

Aid landscape is shifting, to the detriment of nonprofits and clients:

- Client traffic has shifted to Food Finders' pantry, resulting in closure of many pantries pictured at right
- Food Finders cannot sustain current growth — need more funding, potentially larger space, etc.

Increases in food security and self-sufficiency reported from 2016 to 2017. Figure from Food Finders, Inc. *Food Resource and Education Center Impact Report 2016-2017*, 2017.

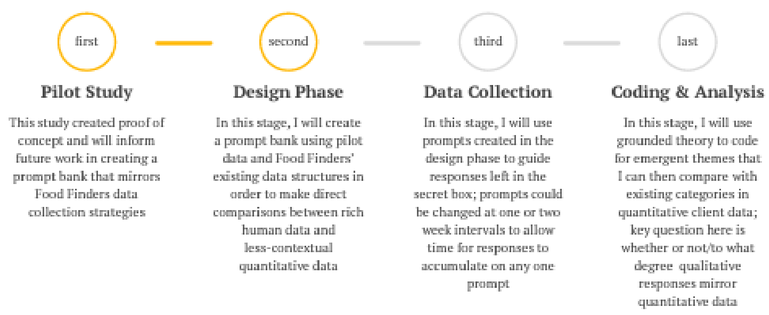


Google map of food pantries in Greater Lafayette — some of these are permanently closed or will soon be closed.

Study Design - Next Steps

To carry the pilot study forward in a way that is useful for Food Finders, next steps would include:

- Implement a set of prompts for the secret box at the JP Lisack Community Food Pantry that mirror the questions Food Finders staff and volunteers use to measure clients' self-sufficiency on official forms, which should elicit the same kinds of local, particular, personal data we found in the pilot study.
- Code for emergent themes in the secret box data, using a grounded theory approach, and compare these with standard client data
- Work with Food Finders staff to compare the interventions that are happening based on each kind of data, both for individual clients and for larger funding narratives



Secret Box Method

The secret box works because it:

- Offers anonymous space to share thoughts and feelings
- Avoids barriers to entry like need for smartphone (QR code) or facility with technology (survey on tablet)
- Leaves almost total agency with participants, since box is anonymous and prompt is optional

Other secret box users include:

- Punch (2002), where secret box augmented focus groups and various kinds of task-based interviews with adolescents ages 13-14
  - Emphasized that secret box helped mitigate uneven power distributions between young participants and adult researchers
  - Anonymity allowed participants to express thoughts and feelings they were unable or unwilling to share in group interviews or out loud where their responses would be associated with them (experiences of sexual abuse, for instance)
  - Suggested secret boxes as part of a larger group of methods in studies where power dynamics are unequal (like working with vulnerable populations at Food Finders, for instance)
- Lyndon (2018) based her work on Punch (2002).
  - Participants were adults, unlike Punch, but power dynamics still existed in focus groups, and secret box was used to allow participants to share thoughts they were unwilling to share in front of others

Projected Takeaways

- Since big, quantitative data is often dehumanizing, agency-denying, and marginalizing, especially to already vulnerable populations, being mindful of how we collect data from participants in settings such as non-profits is crucial.
- Methods such as the secret box, which are anonymous, have a low barrier to entry (as compared to digital surveys, for instance), and suggest but do not require a given prompt can empower participants to give data they want to share and hold onto data they don't.
- Non-profits usually cannot avoid participating in big data collection, but using qualitative methods to collect thick, rich data from individual clients can help augment fragmented quantitative data and avoid "data drift" and other negative impacts
- Ultimately, data that clients have more power over is data that helps nonprofits better serve clients.

Looking for a bibliography and further reading? Scan for my one-pager!

HelmholtzZentrum münchen
German Research Center for Environmental Health

Department of Radiation Sciences
Institute of Radiation Biology

Exosomes promote survival in squamous head and neck cancer cells after ionizing radiation

Lisa Mutschelknaus[1], Carsten Peters[2], Klaudia Winkler[1], Ramesh Yentrapalli[1], Theresa Heider[1], Michael J. Atkinson[1], Simone Moertl[1]

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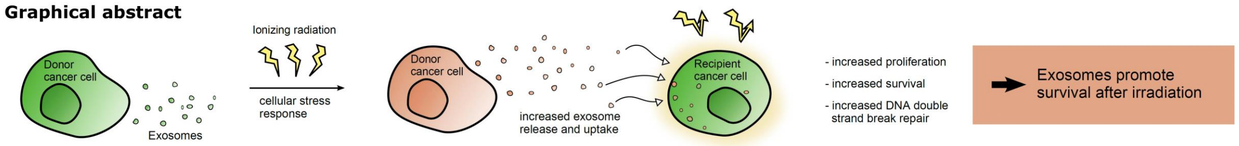
Introduction & Aim: Exosomes are nanometer-sized extracellular vesicles with functions in intercellular communication within tumor tissues and may serve as biomarkers for therapy monitoring during treatment with ionizing radiation. Here, we show that exosomes are able to modify the radiation response of the head and neck cancer cell line BHY.

Material & Methods: Exosomes were isolated from the conditioned medium of irradiated as well as non-irradiated BHY cells by serial ultracentrifugation and quantified by using NanoSight technology. To test whether the released exosomes influence the radiation response, exosomes isolated from non-irradiated and irradiated donor cells were transferred to non-irradiated and irradiated recipient cells.

Graphical abstract



1. Exosome release after ionizing radiation

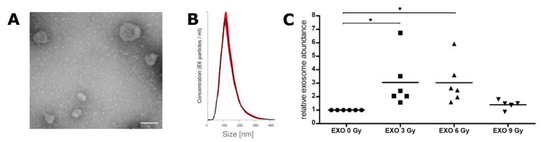


Figure 1. (A) Electron microscopy image of exosomes isolated from the cell culture supernatant of 3 Gy irradiated BHY cells [scale 100 nm]. **(B)** Exosome size in nm. **(C)** Relative exosome abundance after isolation from the culture supernatant of 0, 3, 6 and 9 Gy irradiated BHY cells.

2. Uptake of exosomes by recipient cells after ionizing radiation

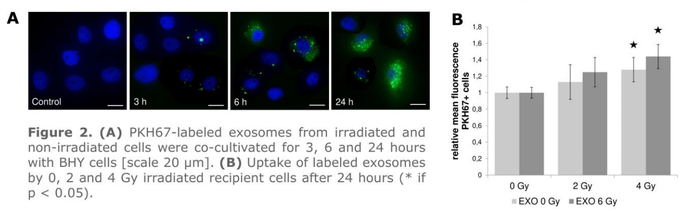


Figure 2. (A) PKH67-labeled exosomes from irradiated and non-irradiated cells were co-cultivated for 3, 6 and 24 hours with BHY cells [scale 20 µm]. **(B)** Uptake of labeled exosomes by 0, 2 and 4 Gy irradiated recipient cells after 24 hours (* if $p < 0.05$).

3. Exosomes sustain proliferation, colony formation and clonogenic survival

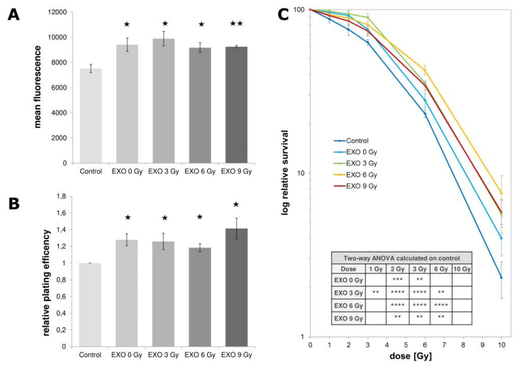


Figure 3. Cultivation of BHY cells with exosomes isolated from irradiated or non-irradiated cells.**(A)** Proliferation **(B)** Plating efficiency **(C)** Clonogenic survival (* if $p < 0.05$, ** if $p < 0.01$, *** if $p < 0.001$ and **** if $p < 0.0001$).

4. Exosomes modulate the repair of DNA double strand breaks in irradiated recipient cells

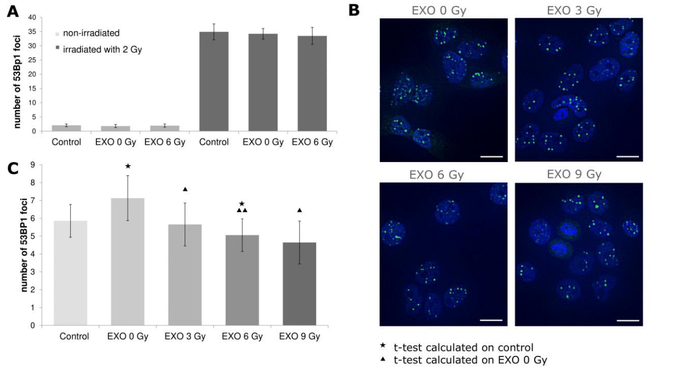


Figure 4. (A) Number of 53BP1 foci in BHY cells 1 hour after irradiation with 0 and 2 Gy and transfer of BHY exosomes isolated after irradiation with 0 and 6 Gy **(B + C)** 53BP1 foci in BHY cells 6 hours after 2 Gy and transfer of BHY exosomes isolated after irradiation with 0, 3, 6 or 9 Gy [scale 20 µm] (*/▲ if $p < 0.05$, **/▲▲ if $p < 0.001$).

Conclusion & Outlook: Our results demonstrate that radiation increases exosome abundance and influences their effect on recipient cells. Exosomes transmit prosurvival effects by promoting the proliferative and radioresistant phenotype of head and neck cancer cells. Future experiments shall analyze if the exosomal effects are caused by a change in exosomal composition after ionizing radiation.
This study indicates a functional role for exosomes in the response of tumor cells to therapeutic radiation exposure, elucidates that radiotherapy influences the cancer progression and encourages that exosomes might be a useful tool to improve therapy strategies.

Reference: Mutschelknaus L, Peters C, Winkler K, Yentrapalli R, Heider T, Atkinson MJ, et al. (2016) Exosomes Derived from Squamous Head and Neck Cancer Promote Cell Survival after Ionizing Radiation. PLoS ONE 11(3): e0152213. doi:10.1371/journal.pone.0152213

Assessing Entrepreneurial Identity

Victoria E. Ruiz | Ruiz56@purdue.edu

Abstract

In response to Welter et al.'s (2017) call for research to embrace entrepreneurial diversity, this project explores a broadened definition of entrepreneurial identity suggesting that the persona is – and should be – understood as separate from what it means to be an entrepreneur. Analysis of *New York Times* articles on Elizabeth Holmes renders empirical findings on the media's casting of entrepreneurial identity. The data was used to assess a 3-dimensional heuristic, derived from a multidisciplinary approach, probing understandings of variables that constitute entrepreneurial identity. In sum, the project attempts to bridge language used to articulate entrepreneurial research across fields.

Literature Review

Identity

- My work takes up an intersectional approach to identity offering an inclusionary space for all individuals (Crenshaw, 1991; Collins 1990).
- "Identity exists by how it is defined," (Saldaña, 2016).

Entrepreneurship

- There's a general disagreement on *what* entrepreneurship is and *how* to talk about it in relation to identity (Gartner, 1990; Essers et al., 2017; Elliot, 2011; Cerulo 1997).

Literacy

- A main quality of entrepreneurial identity, I argue, is the execution of literacy practices which people use in their daily transitions within their ascribed roles and chosen domains – at home, work, and with other outside third party organizations.
- In this work, I follow Barton's (1994) delineation of literacy as a social event, fostering thinking about this concept in terms of the ecology of literacy.

Transfer

- For this work, I take up a broad understanding of transfer that extends beyond reading/writing skills (Royer et al., 2005).

Methods

Research Questions

1. ***How is entrepreneurial identity performed?***
   a. What are the qualities of an entrepreneurial identity?
   b. In what ways do entrepreneurial identities capitalize on the transfer and application of literacies across discourse communities/communities of practice?
2. ***Can the cubed identity concept effectively describe entrepreneurial identities?***
   a. Which cube panels are most directly represented in media portrayals of entrepreneurial identity?
   b. How does this speak to the power dynamics that underlie the cube's presentation?

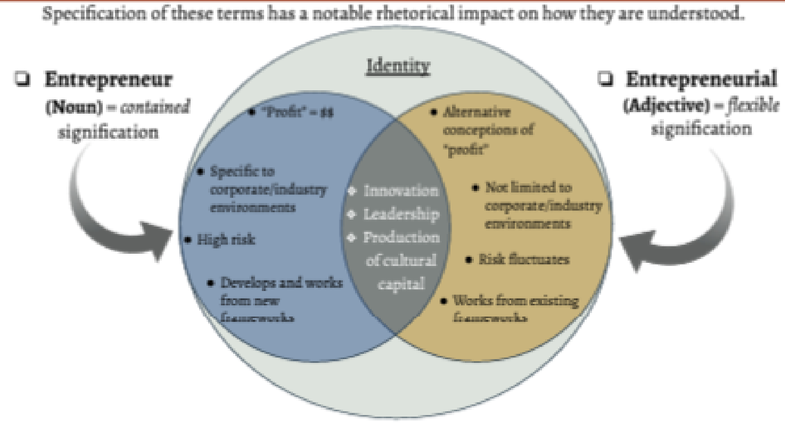
Data Collection

- An initial search on the *New York Times* for "Theranos" renders 176 results (ranging in relevance) dated July 9, 2010 to recent mentions in 2019.
- These entries are tagged in 'Dealbook', 'Technology', 'Business Day', 'Fashion' , 'Health' and 'Op. Editorial' — 6 of 20 different sections of the online *Times*, including the homepage.
- I reviewed and analyzed 5 of these articles, one from each of the sections offered.

Coding Process

Entrepreneur vs. Entrepreneurial Archetype

Specification of these terms has a notable rhetorical impact on how they are understood.



Contribution

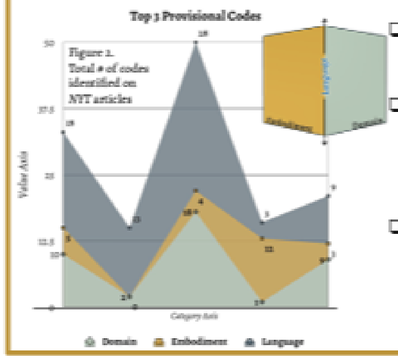
Figure 1. A 3-Dimensional model of entrepreneurial identity variables

- This project offers a 3-dimensional heuristic that probes a nuanced understanding of the qualities and performance of entrepreneurial identity.
- Each panel of the cube represents the qualities that constitute the entrepreneurial identity profile.
- Application of the cube concept dictates that what can be observed and analyzed about entrepreneurial identity, from any situation, is only that information which pertains to the panel that is forward-facing, depending on the angle.
- The greatest strength of this heuristic is that it places attention on the inherent socio-cultural power dynamics at play that foreground certain facets of entrepreneurial identities in context while hiding others.

Case Study: Elizabeth Holmes

- At nineteen years old Elizabeth Holmes dropped out of Stanford, fashioned herself as the biomedical version of Steve Jobs, and began her own startup company — Theranos.
- Established in 2003, the startup sought to make blood testing convenient, promising clients the production of a hypodermic needle that could be drawn from home and also uploaded to perform a full range of blood tests in walk-in clinics.
- Holmes and Theranos raised hundreds of millions of dollars from investors, but the promises of revolutionary technology were built on a foundation of lies.

Findings



- The media's casting of entrepreneurial identity foregrounds a priority on language, embodiment, and domain.
- As a result, panels including Covey's matrix, digital literacy, role, and the process-based trajectory remain hidden; alternate forms of data collection are required to test the validity of these panels on the proposed heuristic.
- During the coding process, a new category emerged. It may be worthwhile to explore revision of the cube's panels to include a side dedicated to the product, service, and/or consumable capital produced by the participant under observation.

ESTIMATING THE POSSIBLE CAUSE OF ILL-DEFINED MORTALITY USING

VERBAL AUTOPSY PROCEDURE

Azahadi O, Shubash SG, MFuad MA, Chandrika J
Institute for Public Health

INTRODUCTION

The recently released mortality data for the year 2008 showed that almost 60% of non-medically certified deaths (NMCD) in Malaysia were coded as "ill-defined conditions"[1]. This gave very limited information on the real cause of deaths in Malaysia. **Verbal Autopsy (VA)** is widely being used in many countries as a method of ascertaining the causes of deaths in places where the majority of deaths occur without medical supervision[2].

OBJECTIVE

To determine the possible cause of ill-defined mortality of NMCD using verbal autopsy (VA) procedure.

METHODOLOGY

This was a cross-sectional study conducted in 2014 using the 2013 deaths as the study population.

A probability proportionate to size (i.e.: number of deaths) approach was used to randomly select 19 districts and all deaths in these district were selected as sample.

Paramedics visited the family members of the deceased and conducted the VA procedure via face to face interview using a standardized questionnaire.

Completed questionnaire were reviewed by a medical officer or specialist who assigned the cause-of-death (COD).

ICD10

Assistant Medical Record Officers then coded the COD using ICD10 rules and guideline for mortality coding.

RESULTS

The proportion of deaths reported as *"symptoms and ill-defined conditions"* were reduced from 66.4% to 25.1% (a reduction of 41.3%; these were subsequently reallocated)

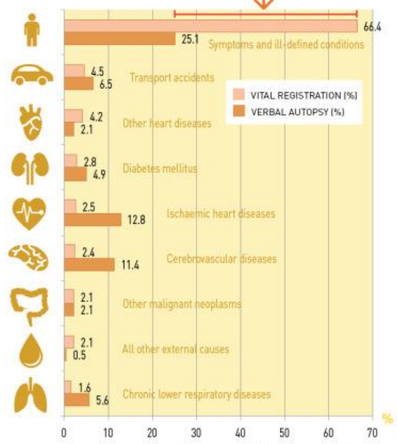


Fig 1: Changes in the top 10 causes of deaths using Verbal Autopsy Procedure

Among **males**, top 5 reallocation diagnoses of "symptoms and ill-defined conditions" were ischaemic heart disease (13.3%), cerebrovascular diseases (11.8%), chronic lower respiratory diseases (8.8%), pneumonia (5.5%) and diabetes mellitus (4.7%).

Among **females**, similar pattern was seen with the top 5 reallocation diagnoses were also among those 5 diagnoses (with slight differences in the percentages).

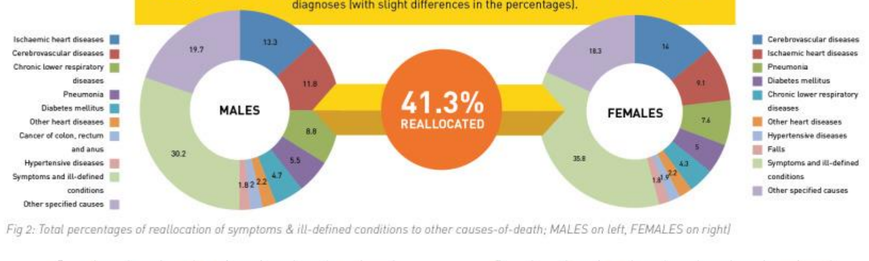


Fig 2: Total percentages of reallocation of symptoms & ill-defined conditions to other causes-of-death; MALES on left, FEMALES on right)

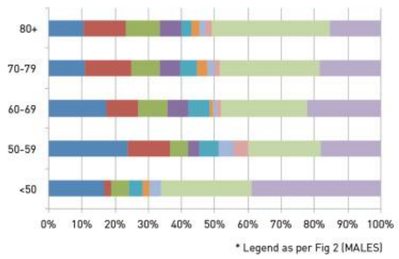


Fig 3: Percentages of reallocation of symptoms & ill-defined conditions (MALES, BROKEN DOWN BY AGE GROUP)

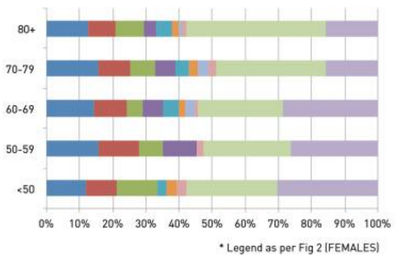


Fig 4: Percentages of reallocation of symptoms & ill-defined conditions (FEMALES, BROKEN DOWN BY AGE GROUP)

DISCUSSION

Cause-of-death data derived from VA are increasingly used for health planning, priority setting, monitoring and evaluation[2].

VA procedure was able to reduce more than 40% of ill-defined CODs in this study.

More than 20% of reallocation were into cardiovascular diseases. A similar pattern was also reported by VA study in Thailand[3].

Almost a quarter of cause-of-deaths were still recorded as ill-defined. This is slightly higher than reported by a study in Vietnam (around 10%)[4].

The inability of VA to ascertain the specific cause-of-deaths may be due to the absence of clear symptom patterns in these cases[3].

CONCLUSION

1. The development and application of VA methods are an important step toward the improvement of data quality from vital registration.
2. Verbal Autopsy should routinely be used to determine the cause of non-medically certified deaths.

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1. Institute for Public Health (2012). The second burden of disease and injury study 2008. Kuala Lumpur.
2. Nadia S, Daniel C, Kenji S (2006). Verbal autopsy : Current practices and challenges. Buletion of the World Health Organization; 84:239-245.
3. Warangkana P, Chalapati R, Timothy A, et al (2010). Cause-of-death ascertainment for deaths that occur outside hospitals in Thailand : Application of verbal autopsy methods. Population Health Metrics; 8:13.
4. Anh DN, Chalapati R, Nguyen PH, et al (2010). Mortality patterns in Vietnam, 2006 : Findings from a national verbal autopsy survey. BMC Research Notes; 3:78.

ACKNOWLEDGEMENT

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UJAT Universidad Juárez Autónoma de Tabasco "Estudio en la duda. Acción en la fe"

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Legado UJAT

Diagnóstico situacional de riesgos y daños de ENFERMEDADES INFLAMATORIAS CRÓNICO SISTÉMICAS en Profesores Investigadores de la Universidad Juárez Autónoma de Tabasco.

Autores: Dra. Celorio Méndez Karla del Socorro, Romero Armijo Arie Gabrielle y Ruiz Jiménez Hannia Ivette.

INTRODUCCIÓN

Las **enfermedades crónicas no transmisibles** engloban un conjunto de padecimientos no ocasionados por microorganismos infecciosos, sino que se derivan de la condición del cuerpo mismo que varía en cada individuo.

METODOLOGÍA

Objetivo general. Determinar los riesgos y daños causados por dichas enfermedades en nuestra comunidad.

Objetivos específicos. consisten en determinar el tipo y magnitud de esos riesgos y establecer sus diferencias por grupos.

Justificación. Padecer enfermedades crónico-inflamatorias aumenta el riesgo de secuelas que disminuyen la calidad de vida y la aparición de otras enfermedades más susceptibles a las complicaciones.

Hipótesis de trabajo. Las publicaciones pseudocientíficas y el constante bombardeo de publicidad que ha aparecido a partir de los años 70s ha desplazado la dieta rural y orgánica, reemplazada por una alta ingesta de carbohidratos y alimentos procesados.

Tipo de estudio. Observacional, transversal y analítico.

Universo de trabajo, métodos y forma de muestreo. Convocatoria voluntaria de profesores del *Cuestionario de riesgos y daños Permutter modificado*, aplicado a través de *Google Forms*.

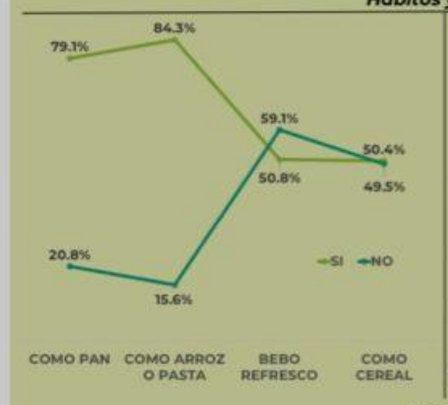
DISCUSIÓN

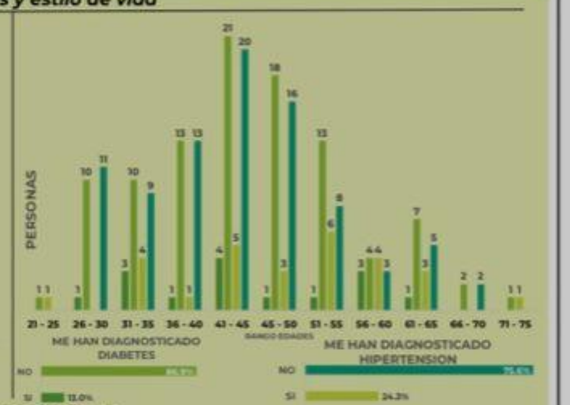
Como lo menciona David Perlmutter en *Cerebro de pan*, la industria alimentaria ha alterado los alimentos, pues la dieta rural y natural ha sido reemplazada por los alimentos procesados y artificiales que han tenido su auge desde los años 70s.

Así, la propaganda y las publicaciones pseudo científicas promueven el consumo de lo dañino.

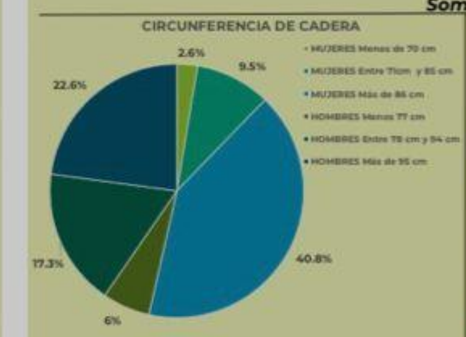
RESULTADOS

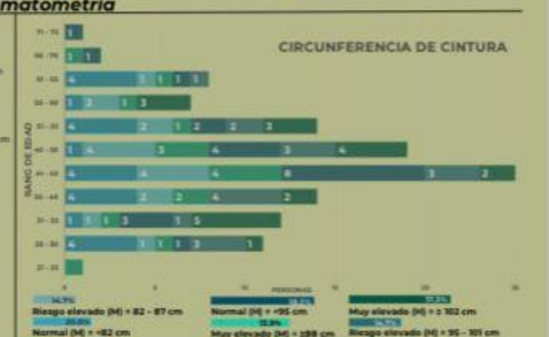
Hábitos y estilo de vida

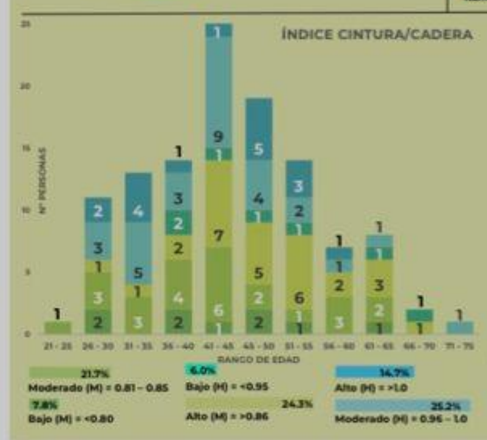


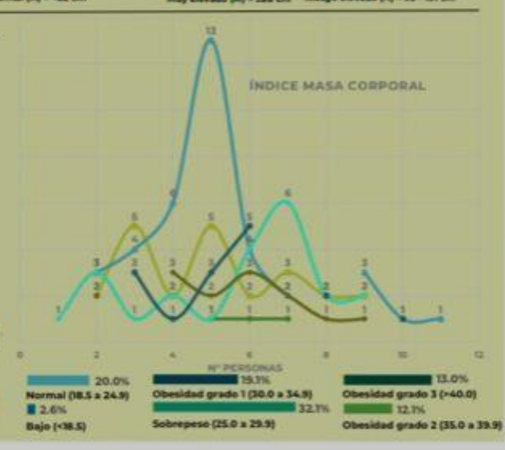


Somatometría









CONCLUSIÓN

Se comprueba que, quienes ahora representan el grupo de adultos mayores, mantienen una alimentación menos procesada, y que el impacto de la propaganda de hábitos alimenticios poco saludables tiene mayor impacto en las nuevas generaciones. Es importante conservar una dieta basada en alimentos sanos naturales y no alterados genéticamente; así como mantener actividad física para evitar enfermedades crónico inflamatorias y sus consecuencias.

Referencias y bibliografía

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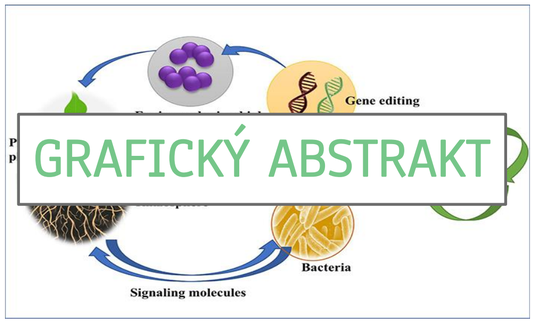
Teléfonos: 9932404306 y 9931567570.

POUTAVÝ NÁZEV

Vaše jméno

Instituce

ÚVOD



GRAFICKÝ ABSTRAKT

Stručný abstrakt

- 2-3 věty
- Kritické shrnutí problematiky (např. 1 věta obecně co se používa, 2 věta co je na tom nedostačující)
- Váš návrh řešení.

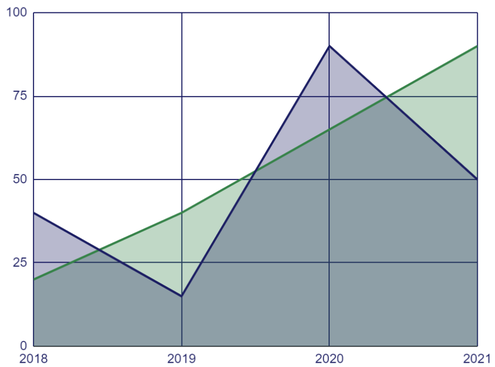
CÍLE

- Jednoducho si stanovit 2-3 cíle.
- Úloha mentora.

VÝZKUM

MATERIÁLY A METODIKA

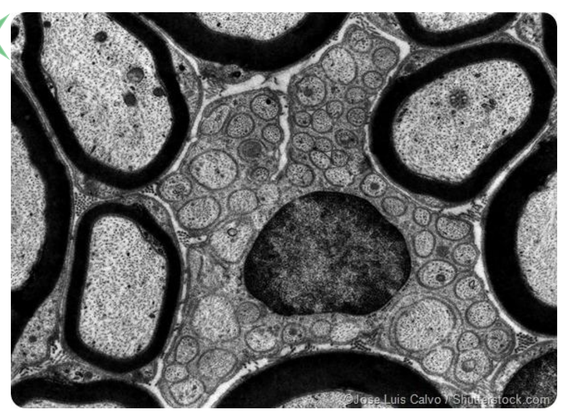
- Stručný popis!
- Vyhnout se detailům měření.
- Zmínit schému je bonusem.



VÝSLEDKY

- Zaměřit se na grafiku místo textu.
- Zahrnout pouze hlavní výsledky, vedlejší mohou být spracováný na dodatečních dokumentech.
- Každá grafika obsahuje popisek zarovnaný na šířku grafiky.

	MERCURY	JUPITER
TOPIC 1	25	96
TOPIC 2	66	32
TOPIC 3	18	8
TOPIC 4	25	96
TOPIC 5	66	32



ZÁVĚR

- Odpovědět na cíle.
- Jak to přispělo k problematice?
- Plány na budouci výzkum.

CITACE

PODĚKOVÁNÍ

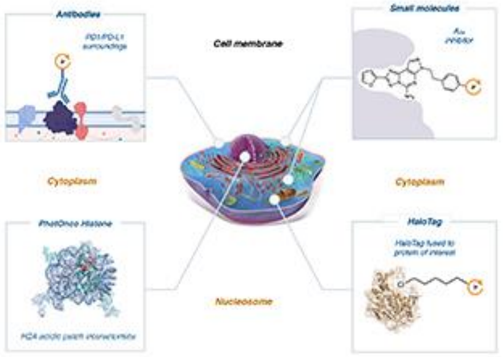
- Z čeho byl výzkum hrazen?
- Instituce/vedoucí/mentor

KONTAKT?

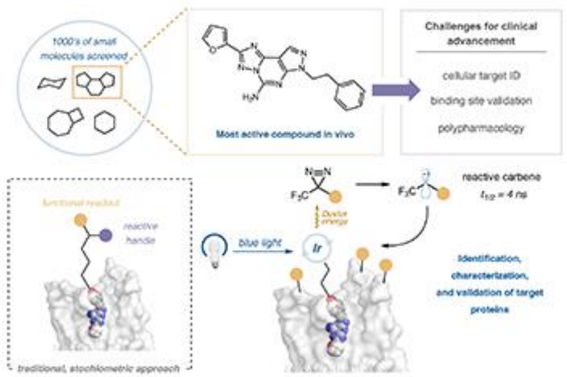
Mapping the Intracellular Microenvironment via Photocatalytic Proximity Labeling

Ciaran P. Seath, Aaron D. Trowbridge, Anthony Burton (Muir), Barbara Dul (Muir), Beryl Li, Sean Huth, James Oakley, Alice Li, Jacob B. Geri, and David W.C. MacMillan

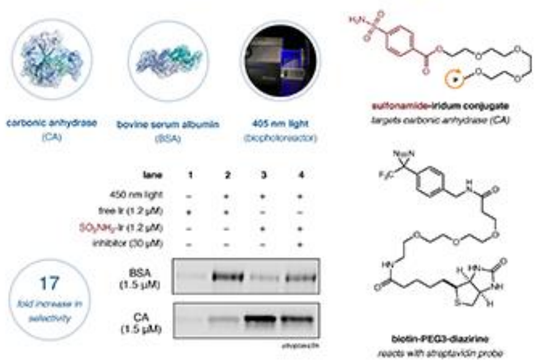
Localization motifs beyond antibodies



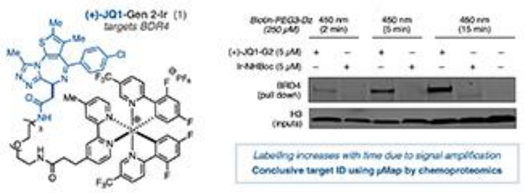
Small molecule proximity labeling



Proof-of-concept: in vitro CA/BSA labeling



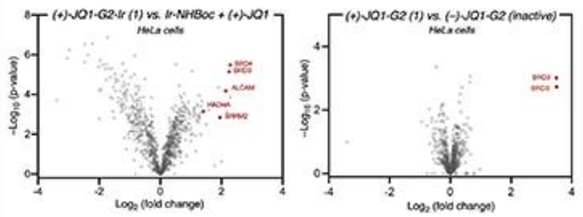
Using JQ1-Ir conjugate as photoaffinity probe



JQ1–Ir conjugate

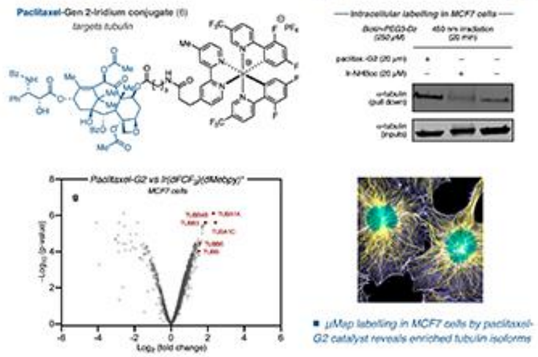
- therapeutic in NUT midline carcinoma (NMC)
- induced the suppression of tumor growth and improved survival of NMC xenograft models

Chemoproteomic method to identify JQ1 targets



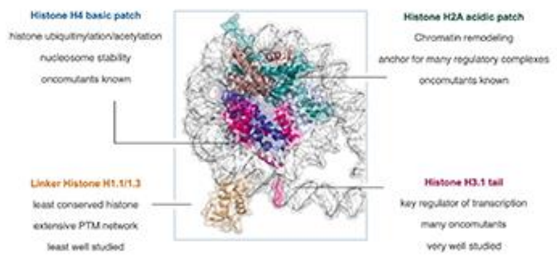
- Identified known (+)-JQ1 off-targets (HADHA, SRRM2)
- previously unknown interactors also highly enriched (ALCAM)
- BRD proteins are only highly enriched using active (+)-JQ1

μMap Target ID of microtubules using paclitaxel-G2-Ir conjugate



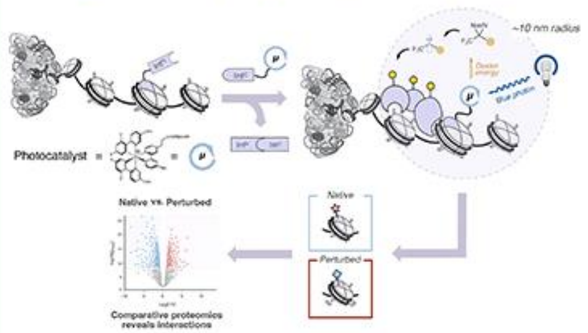
- μMap labeling in MCF7 cells by paclitaxel-G2 catalyst reveals enriched tubulin isoforms

PhotOncoHistone Interactomics



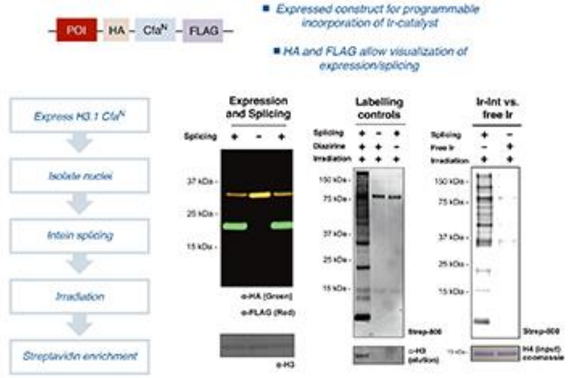
Can we generate unique interactomes for these important nucleosomal epitopes using μMap?

Using intein trans-splicing to incorporate μMap catalyst



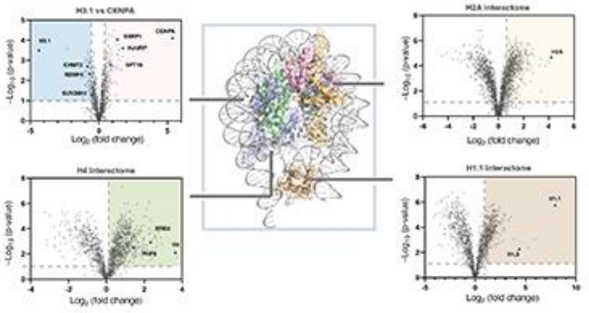
Selective incorporation of an Ir-catalyst into chromatin could facilitate short range labelling via energy transfer

Conjugating Ir-catalyst via nuclear splicing



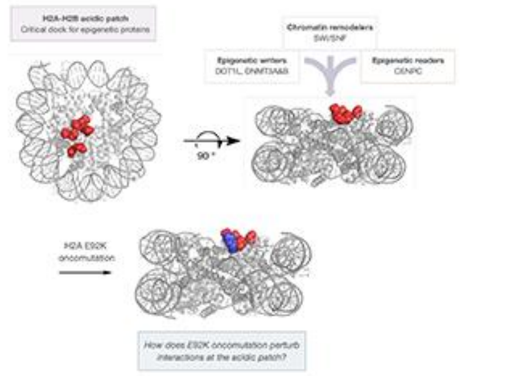
- Expressed construct for programmable incorporation of Ir-catalyst
- HA and FLAG allow visualization of expression/splicing

Unique interactome generated for each histone

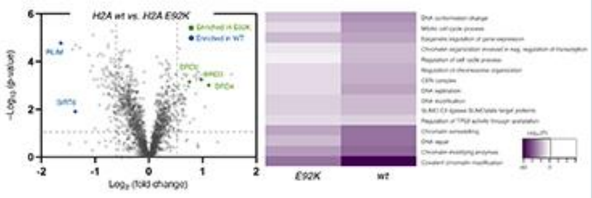


μMap can generate unique interactomes for each component of the nucleosome

H2A acidic patch



H2A E92K mutation interactome

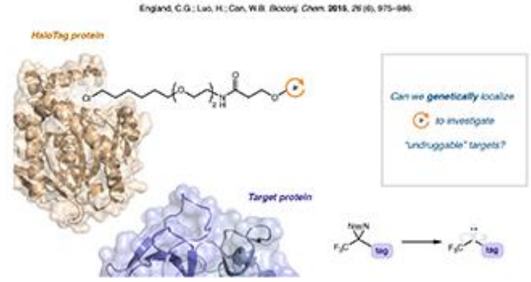


- H2A E92K is correlated with esophageal and stomach cancers
- Charge swap induced in critical acidic patch motif
- Gene ontology (GO) analysis shows diminished enrichment of proteins associated with chromatin modification and reorganization

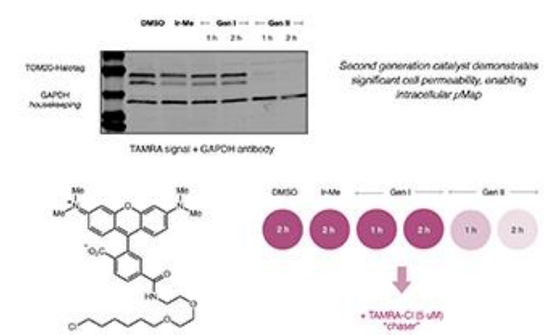
Genetically-localized proximity labeling

- Haloalkane dehalogenase enzyme which forms covalent linkage with substrate
- Can be expressed as fusion proteins with targets under standard procedures

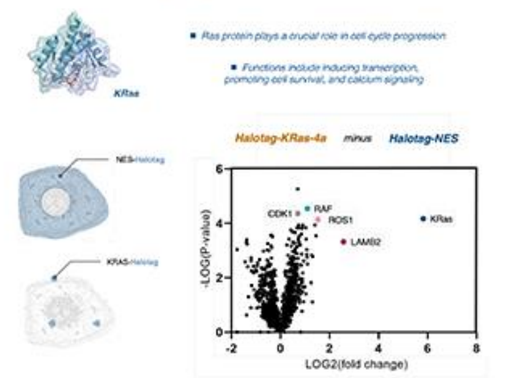
England, C.G.; Luo, H.; Cai, W.B. *Bioconj. Chem.* **2015**, *26* (6), 975–986.



Assessing "Gen II" Ir cell membrane permeability



Investigating KRas interactome



Team PhotoChemBio

Chemical composition of cookstove emissions

Laboratory tests and real-world use of traditional and improved stoves

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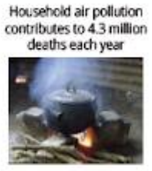
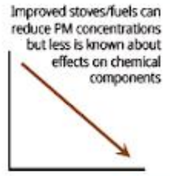
❖ Introduction





How does stove type affect chemical composition of emissions?

How does household $PM_{2.5}$ composition change with stove use patterns?

Traditional

Improved

❖ Methods

Stoves: Semi-gasifier stoves were developed in cooperation with residents at the study sites.[1] "Other" stoves include electric hot plates and liquefied petroleum gas (LPG) stoves.

Laboratory sampling: Emissions tests were conducted at Tsinghua University. Samples were collected on 47mm Teflon and quartz fiber filters using a dilution sampling system. Five samples were selected for chemical analysis (1 from the traditional stove, 1 from the semi-gasifier burning wood pellets, and 3 from the semi-gasifier burning straw pellets).

Household sampling: The households where stove use and $PM_{2.5}$ were monitored were part of a clean energy intervention study.[2-4] Stove use was monitored quantitatively using data logged by temperature sensors attached to each stove (Fig. 1). $PM_{2.5}$ samples were collected on 37mm Teflon filters using either a cyclone and aluminum filter cassette or a Personal Exposure Monitor.[5]

Figure 1. Stove use monitor (temperature sensor) on a traditional stove

Chemical analysis: All samples were kept frozen after collection. Teflon filters were weighed before and after sampling to determine $PM_{2.5}$ mass. Laboratory and household samples were analyzed using a suite of techniques (Table 1), including:

- Optical black carbon (**BC**)
- Thermal-optical analysis of elemental and organic carbon (**ECOC**)
- Water-soluble organic carbon (**WSOC**)
- Water-soluble ions using ion chromatography (**IC**)
- Organic molecular markers using gas chromatography-mass spectrometry (**GCMS**)
- Trace and major elements using inductively coupled plasma mass spectrometry (**ICPMS**)

	Emissions tests	Household
Mass	✓	✓
BC		✓
WSOC	✓	✓
ECOC	✓	
IC	✓	✓
GCMS	✓	✓
ICPMS		✓

Table 1. Overview of chemical analyses by sample type

❖ Laboratory emissions tests

Traditional stove $PM_{2.5}$ emissions were mostly carbonaceous, while $PM_{2.5}$ from semi-gasifier stoves was mostly inorganic

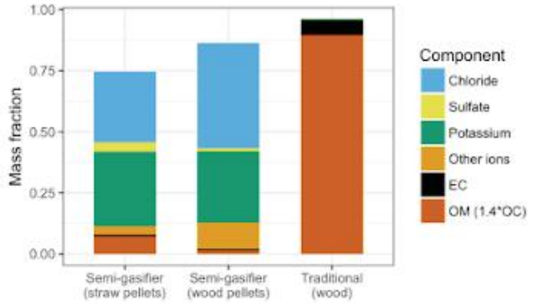


Figure 2. Composition of household $PM_{2.5}$ by group as a fraction of $PM_{2.5}$ mass. Each bar represents one sample (wood, wood pellets) or the average of there samples (straw pellet). "Other ions" is comprised of Ca^{2+}, Na^+, NH_4^+, and NO_3^-.

OC from both types of stoves was mostly water-insoluble

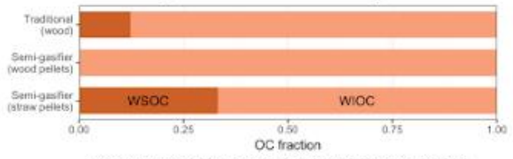


Figure 3. Water-soluble (WSOC) and water-insoluble organic carbon (WIOC) fractions of OC.

Traditional stove emissions had higher PAH content than semi-gasifier emissions relative to $PM_{2.5}$, but lower relative to OC

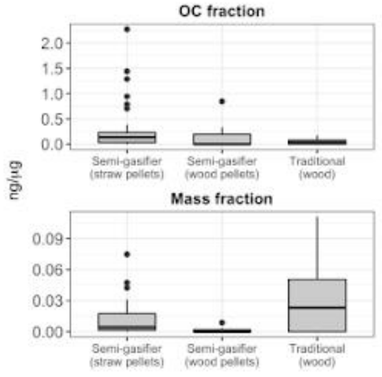


Figure 4. Organic carbon- (OC) and mass-normalized concentrations of selected PAHs (benzo[a / e]pyrene, benzo[b / j / k]fluoranthene, benzo[ghi]perylene, indeno(1,2,3-cd)pyrene, dibenz[ah]anthracene, dibenzo[ae]pyrene, picene, coronene).

❖ Household stove use

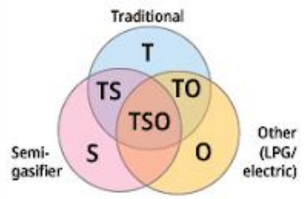


Figure 5. Stove use groups assigned to household $PM_{2.5}$ samples based on stove use monitors (see Figure 1). Overlap of circles indicates use of both or all stoves.

$PM_{2.5}$ in homes using exclusively LPG/electric stoves had more inorganic content, while homes using semi-gasifier and traditional stoves had more carbonaceous $PM_{2.5}$

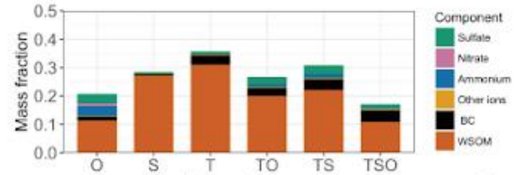


Figure 6. Composition of household $PM_{2.5}$ by group as a fraction of $PM_{2.5}$ mass. Each bar represents an average of three samples. "Other ions" is comprised of Ca^{2+}, Na^+, K^+, and Cl^-.

Household $PM_{2.5}$ reached nearly 250 µg/m³, and was typically higher with traditional stove use

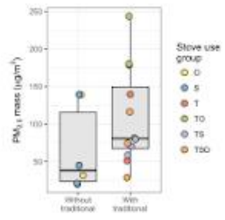


Figure 7. $PM_{2.5}$ concentrations, grouped by traditional stove use. Colors indicate stove use group (see Figure 5; n = 3 for each group)

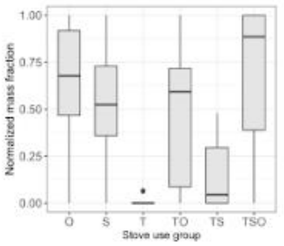


Figure 8. Mass fractions of selected transition metals (Cr, Mn, Fe, Co, Ni, Cu, Mo, Rh, Pd, Ag, W, Pt), normalized to the range of values for each element (min = 0, max = 1).

Transition elements were present at higher levels (relative to each element's range) in homes using semi-gasifier and LPG/electric stoves

PAH levels were higher with traditional stove use, in terms of both concentration and $PM_{2.5}$ fraction

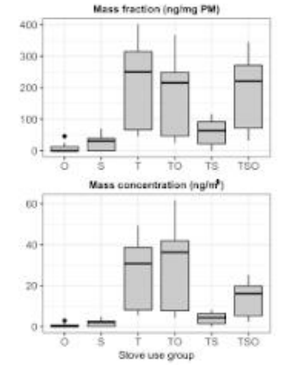


Figure 9. Mass- and volume-normalized concentrations of selected PAHs (same compounds as in Figure 4).

Conclusions: In laboratory testing, traditional and semi-gasifier stove $PM_{2.5}$ emissions had very different compositions (more carbonaceous vs. inorganic, respectively). Difference in $PM_{2.5}$ composition between traditional and improved stoves – semi-gasifier, LPG, or electric – was less pronounced in household $PM_{2.5}$. However, trends were similar to the laboratory results: improved stoves had more inorganic $PM_{2.5}$ content.

Implications: Fuel and/or stove changes can alter $PM_{2.5}$ composition, making chemical composition an important metric to consider in intervention studies. Trends observed in laboratory emissions tests may be less apparent in field performance.

References:
(1) Shan, M et al. A User-Centered, Iterative Engineering Approach for Advanced Biomass Cookstove Design and Development. Environ. Res. Lett. 2017, 12 (9), 095009.
(2) Carter, E. et al. Seasonal and Diurnal Air Pollution from Residential Cooking and Space Heating in the Eastern Tibetan Plateau. Environ. Sci. Technol. 2016, 50 (15), 8353–8361.
(3) Clark, S. et al. Adoption and Use of a Semi-Gasifier Cooking and Water Heating Stove and Fuel Intervention in the Tibetan Plateau, China. Environ. Res. Lett. 2017, 12 (7), 075004.
(4) Ni, K.; Carter, E. et al. Seasonal Variation in Outdoor, Indoor, and Personal Air Pollution Exposures of Women Using Wood Stoves in the Tibetan Plateau: Baseline Assessment for an Energy Intervention Study. Environ. Int. 2016, 94, 449–457.
(5) Demokritou, P. et al. Development and laboratory performance evaluation of a personal/multipollutant sampler for simultaneous measurements of particulate and gaseous pollutants. Aerosol Sci. Technol. 2001, 35, 741–752.

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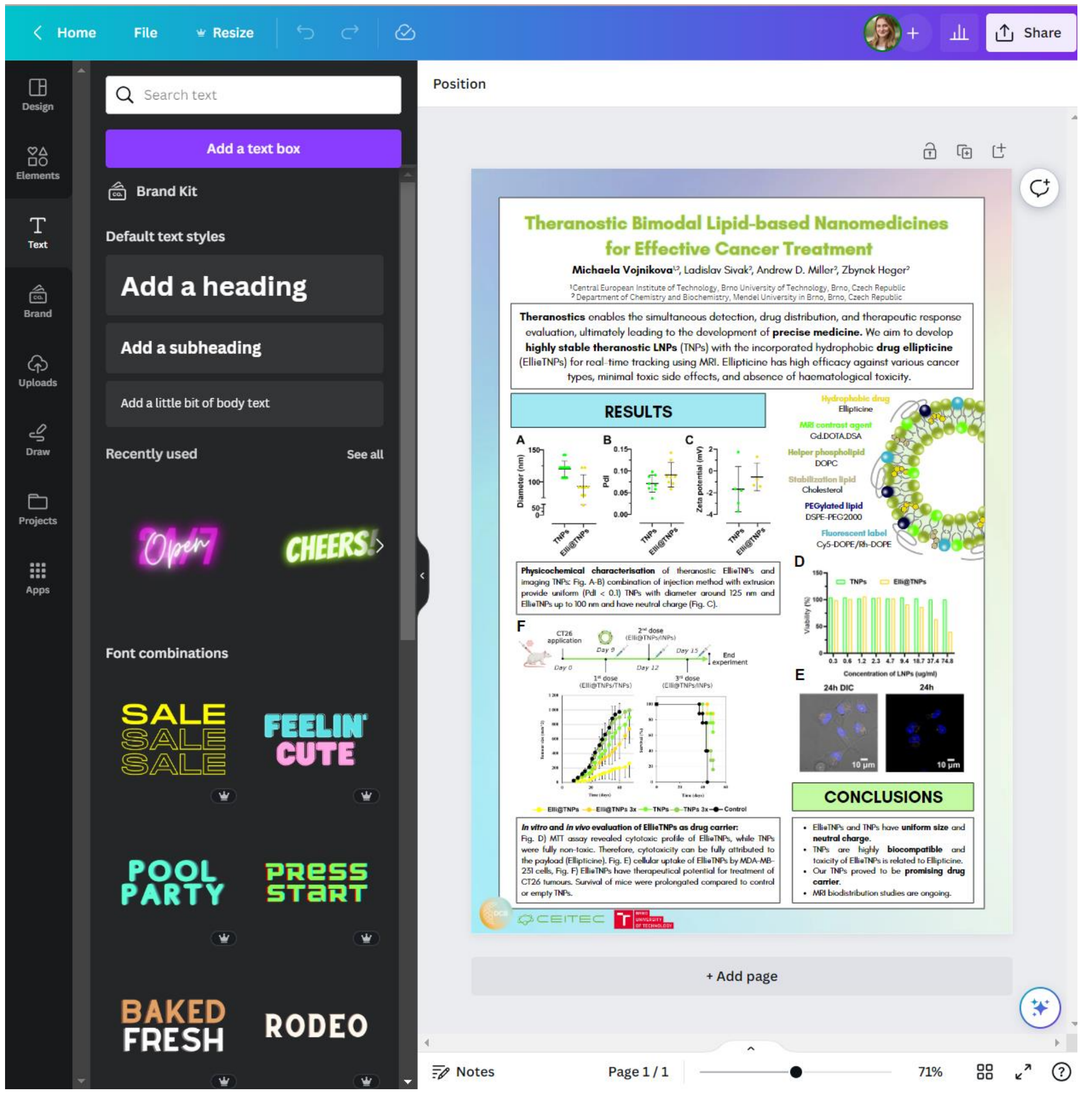

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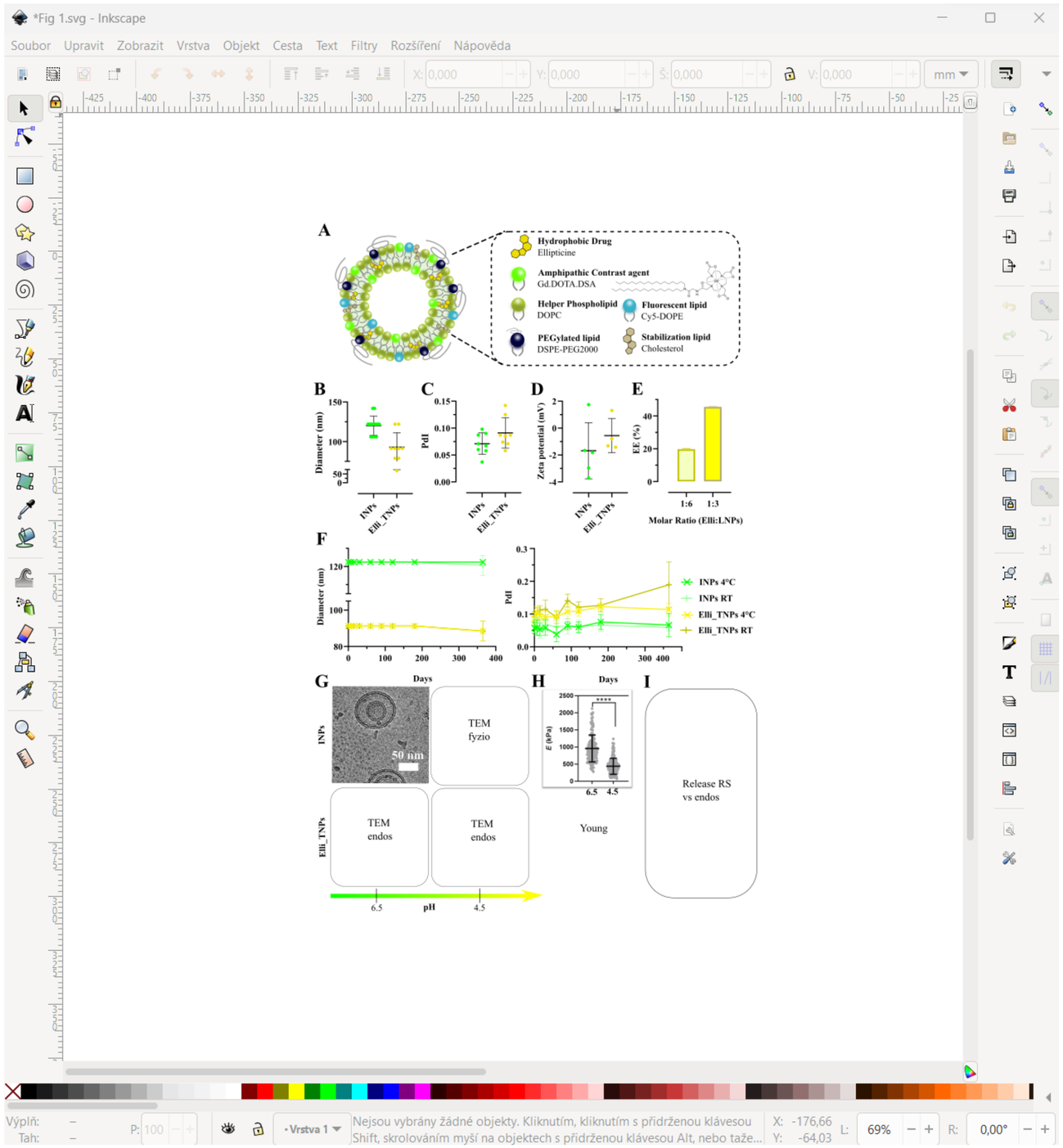
INKSCAPE



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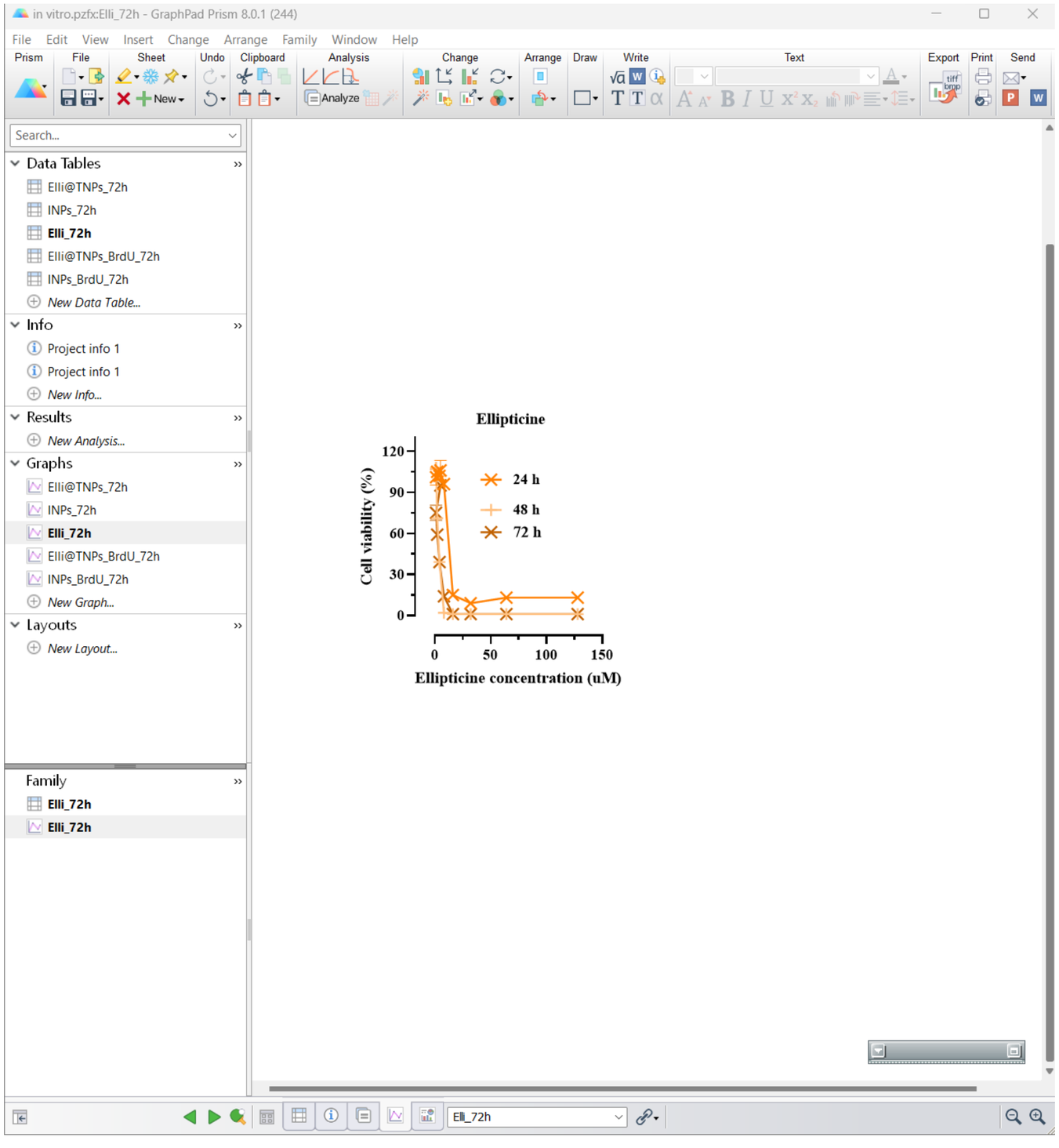
Prism



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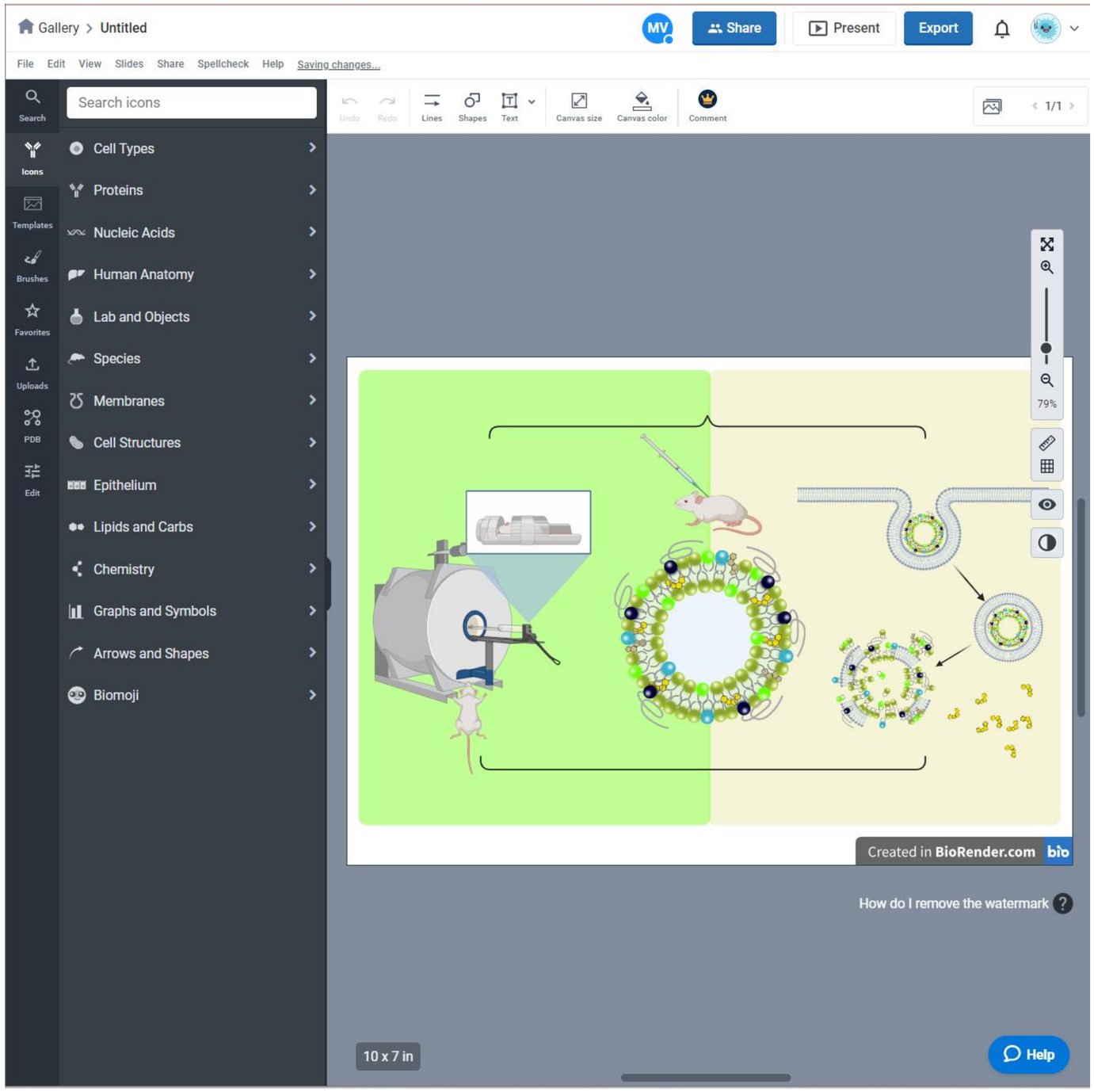

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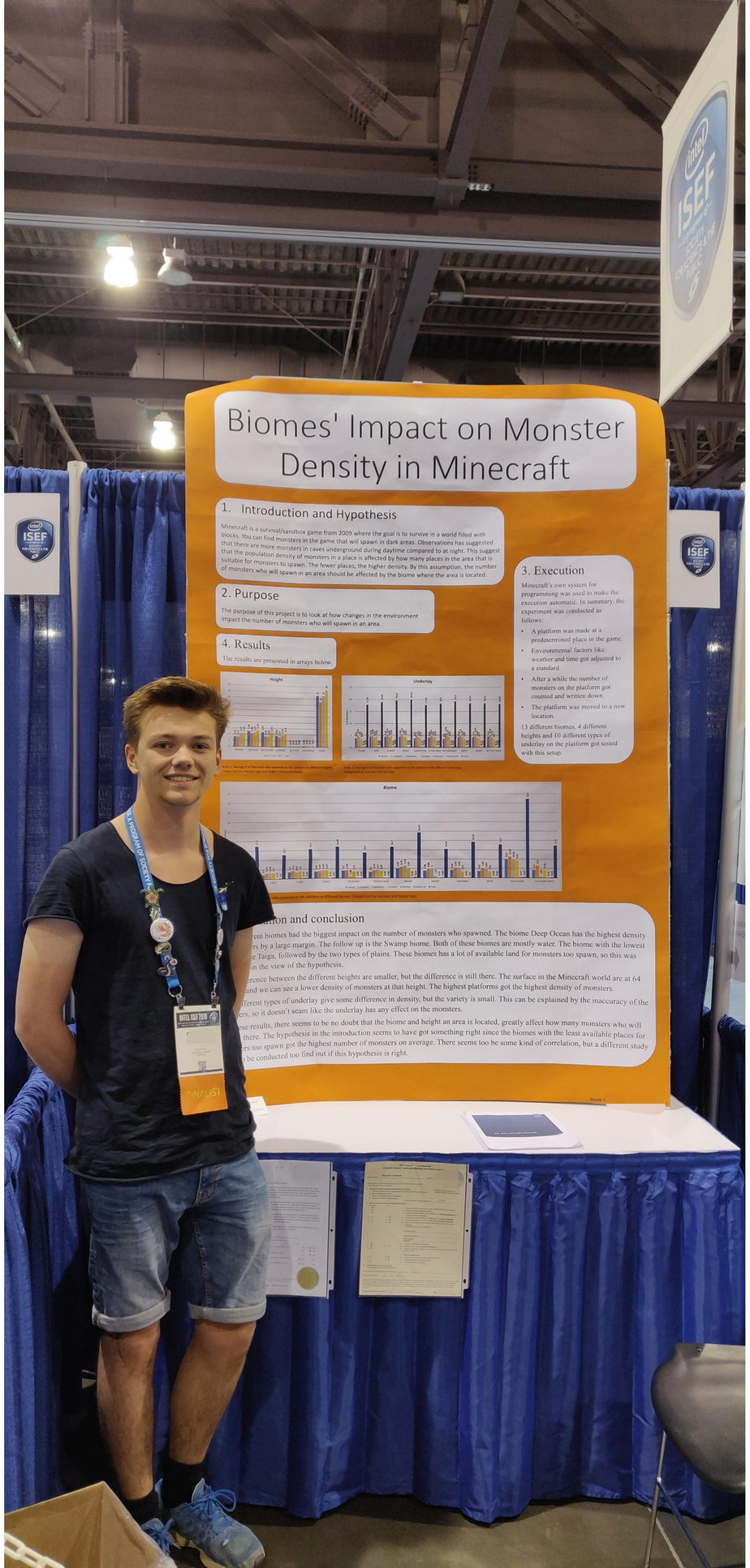
JDEME HODNOTIT ISEF!


Secret Sounds of Bees: Analysis of Honey Bee Vibroacoustics Using Hidden Markov Models
Background
Methods
Model Accuracy
Discussion
Future Directions
Results
Beekeeping Application
References


Biomes' Impact on Monster Density in Minecraft
1. Introduction and Hypothesis
Minecraft is a survival/sandbox game from 2009 where the goal is to survive in a world filled with blocks. You can find monsters in the game that will spawn in dark areas. Observations has suggested that there are more monsters in caves underground during daytime compared to at night. This suggest that the population density of monsters in a place is affected by how many places in the area that is suitable for monsters to spawn. The fewer places, the higher density. By this assumption, the number of monsters who will spawn in an area should be affected by the biome where the area is located.
2. Purpose
The purpose of this project is to look at how changes in the environment impact the number of monsters who will spawn in an area.
4. Results
The results are presented in arrays below.
Height
Underlay
Biome
3. Execution
Minecraft's own system for programming was used to make the execution automatic. In summary, the experiment was conducted as follows:
A platform was made at a predetermined place in the game.
Environmental factors like weather and time got adjusted to a standard.
After a while the number of monsters on the platform got counted and written down.
The platform was moved to a new location.
13 different biomes, 4 different heights and 10 different types of underlay on the platform got tested with this setup.
on and conclusion
rent biomes had the biggest impact on the number of monsters who spawned. The biome Deep Ocean has the highest density
rs by a large margin. The follow up is the Swamp biome. Both of these biomes are mostly water. The biome with the lowest
e Taiga, followed by the two types of plains. These biomes has a lot of available land for monsters too spawn, so this was
in the view of the hypothesis.
rence between the different heights are smaller, but the difference is still there. The surface in the Minecraft world are at 64
and we can see a lower density of monsters at that height. The highest platforms got the highest density of monsters.
ferent types of underlay give some difference in density, but the variety is small. This can be explained by the inaccuracy of the
rs, so it doesn't seam like the underlay has any effect on the monsters.
ese results, there seems to be no doubt that the biome and height an area is located, greatly affect how many monsters who will
there. The hypothesis in the introduction seems to have got something right since the biomes with the least available places for
rs too spawn got the highest number of monsters on average. There seems too be some kind of correlation, but a different study
be conducted too find out if this hypothesis is right.
FINALIST

Temperature-Independent, Portable, and Rapid Field Detection of Ebola via a Silk-Derived Lateral-Flow System

Summary

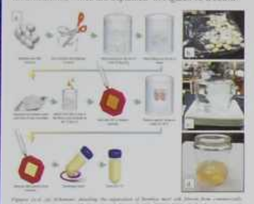
Up to 90% of Ebola victims will die without early diagnosis and medical intervention, which can reduce fatalities by 50% and are critical to preventing future epidemics. Current detection methods are expensive, time-consuming and utilize complex instrumentation and chemicals that require uninterrupted refrigeration. Successfully maintaining the reagent's "cold-chain" from laboratory to point of use is highly problematic in regions with poor infrastructure, where Ebola is most common. This research sought to devise a rapid, simple and inexpensive Ebola detection platform that can be stored and transported without refrigeration. To begin, current Ebola ELISA reagents were embedded in silk fibroin, which possesses stabilizing properties, allowing storage of otherwise refrigerated reagents at room temperature. To confirm ELISA colorimetric detection of Ebola after prolonged, non-refrigerated storage of the kit's reagents, the Ebola ELISA was conducted in a 96-well-plate format (A_{450nm}) at 0-7days from initial mixing and dilutions. Results indicate Ebola ELISA detection is viable in water dilutions only on the day of mixing. For silk-embedded reagents, successful detection was realized for up to one week of RoomTemp-storage. Silk-fibre embedded Ebola ELISA reagents were used to construct a four-channel, paper-based, Ebola detection card, with colorimetric reagents positioned to create timed, visible detection of Ebola antigens. In this new device, that is stable and stored at room temperature, 30µl drops of water were used to dissolve silk-embedded reagents, initiating a timed-flow towards a center detection zone, where a positive (colored) result confirmed the presence of 500pg/ml Ebola (+control) antigens in 30min, at a cost of $25.

Engineering Goal

This research seeks to create a "stable and stored at room temperature" Ebola Assay Card, that will allow for water-activated detection of Ebola antigens, with detection limits that are analogous to current sandwich ELISA techniques. This Ebola Assay Card (EAC) will allow for shipment without refrigeration, and provide detection of the Ebola viral antigens based on color change in as little as 30 minutes.

Fabrication of Silk Fibroin Solution

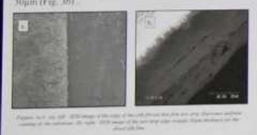
Bombyx mori silk fibroin was separated from commercially available silk cocoons as per Rockwood et. al., with minor modifications, which are explained in Figures 1a-d below.



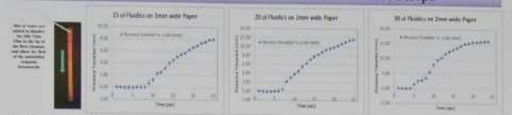
Fabrication of Silk Fibroin Thin Film Test Strips

To create silk fibroin thin film test strips on 102 filter paper, for design of micro-fluidic channels for the EAC, 2mm strips of filter paper were dipped into the silk fibroin solution for 5 sec, hung vertically, and allowed to air-dry for 20 minutes. ATR-FTIR analysis of the solution versus the thin film (on filter paper) illustrates uniform coverage of silk fibroin, that is chemically stable.

SEM analysis of the dried silk fibroin thin film test strips further supports uniform coating of the filter paper substrate (Fig. 3a, right side), with an average thickness of 30µm (Fig. 3b) .



Channel-fluidics of Silk Fibroin Thin Film Test Strips



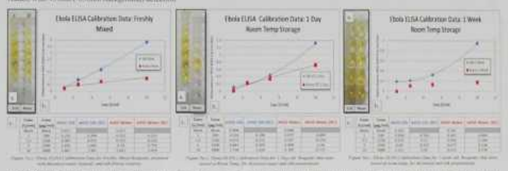
2mm filter paper test strips (with photographic paper backing) consisting of "pink-ink embedded" 2x4mm silk-fibroin dried films were used to study the dissolution of silk, and the subsequent fluidic motion of the ink (and, later, reagents) through the channel. Time-lapse mode of a Smartphone was used to create distance traveled versus time for the addition of 15, 20, and 30 µl droplets (Figs. 4b-d). 30µl droplets were most effective, with the farthest delivery of reagents (15 mm) in ~20 seconds.

Flow channel SEMs, after the silk fibroin film has dissolved (Fig. 5a), and after the reagents have passed (Fig. 5b) demonstrate minimal residual silk fibroin to inhibit flow. Fig 5 SEMs are compared to Fig 3a (left), for new filter paper.

Stabilization of Ebola ELISA Detection via Silk Fibroin Encasement

The Ebola Human Anti-ZEBOV NP IgG ELISA kit (AE-320030-1; Alpha Diagnostic International) used in this study is typical of a sandwich ELISA, whose methodology is shown in Figure 6. Ebola antigens contained in the patient's sample adhere to primary antibodies (Fig. 6b), followed by sandwich with a secondary, detection antibody (Fig. 6c). A horseradish peroxidase complex binds to the detection antibody (Fig. 6d), and finally a TMB substrate is added (Fig. 6e) to enable detection typically at 450 nm. In the Ebola Human Anti-ZEBOV NP IgG ELISA kit, a positive result is indicated by a yellow solution.

Ebola Human Anti-ZEBOV ELISA kit reagents were freshly prepared, as per instruction where all dilutions are made with deionized water. Additionally, the same dilutions were carried out in the (prepared) silk fibroin solution. ELISA detection of 1, 2.5, 5, and 10 U/ml (500, 1250, 2500, & 5000 pg/ml) calibration standards, as well as a positive control sample, were carried out in a 96-well-plate format using a Molecular Devices V_{max} plate reader, with 450nm (-650nm background) detection.



Fresh Preparation: For the freshly prepared reagents, both water and silk dilutions demonstrated expected (well-fit) calibration curves, the +control (a ~11U/ml or 500 pg/ml sample) was easily detectable (Fig. 7a-c). It is important to note that the silk-prepared standards produced deeper, more easily recognized color, relative to the water. This will be especially helpful for visible detection in the proposed EAC.

1 Day: These reagents were stored at room temperature, and the same data collection was performed in new wells after 1-day (Fig 8a-c). Both preparations demonstrated well-fit calibrations, however, for the water samples, the 1U/ml (or 500 pg/ml) standard, which is the same as the +control threshold, was no longer detectable (A_{450} <0.009), rendering the water kit unusable.

1 Week: Following 1 week of storage at room temperature, repeated run of the ELISA kit on new wells highlights the continued well-fit response for the reagents prepared in silk fibroin solution, including detection of the 1U/ml +control, with an A_{450} of 0.193 (Fig 9a-c). Conversely, the calibration for the water-diluted reagents is no longer linear, and the 1U/ml +control is once again undetectable.

Design of a Silk Fibroin Thin Film Lateral Flow Ebola Detection System

For initial conceptual design of the Ebola Assay Card (Fig. 10), 102 filter paper is affixed to photographic card stock, to prevent seepage and encourage flow in the cut flow channels. Ebola primary antibodies are embedded in silk fibroin, and added to the center detection window, to mimic coating of the 96-wellplate in a typical ELISA assay. Anti-human IgG HRP, TMB, and Stop solution reagents are similarly embedded in silk fibroin at positions 2-4, and wet with 30µl water. Following the addition of human serum (samples), for the timed dissolution and delivery of ELISA reagents to the detection window. A positive result is indicated by a yellow color change.

Unless otherwise noted, all images and graphs were taken or created by the student researcher

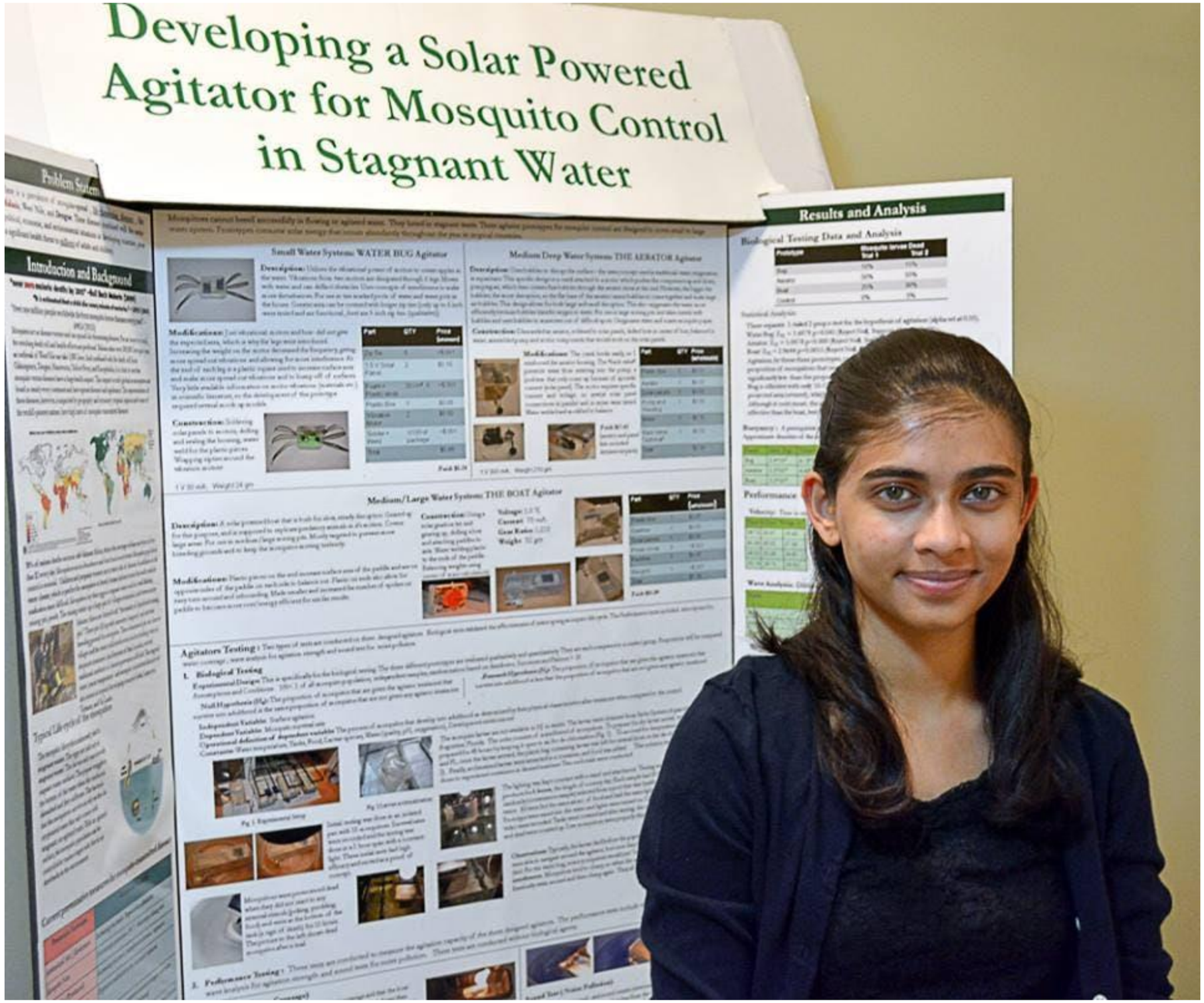
Discussion of Results

1. Fabrication & Test of Flow-Channel Test Strips:
2mm wide filter paper strips were cut and dipped in 3ml of 60-minute cooked silk fibroin solution, containing water soluble purple ink. 60-minute cook time was selected, as it provided rapid dissolution and release of embedded reagents. The silk fibroin tips, with 30um dried thin films, were trimmed to measure 2x8mm, and the dissolution and subsequent fluidic motion of the embedded reagents was determined for 15, 20, and 30 µl droplets. Results demonstrate that 30ul (droplets) traveled farthest (13 mm) in ~20 seconds, and was chosen as the optimal volume going forward. SEM images of filter paper after silk thin film dissolution, and subsequent passage of reagents, indicate minimal silk residue that would impede flow.

2. Stabilization of Ebola ELISA Reagents in Silk Fibroin Thin Films:
Ebola Human Anti-ZEBOV NP IgG ELISA kit reagents were diluted (as per kit instructions) in deionized water, and separately in (60min) silk fibroin solution. For each reagent set, the A_{450} sandwich assay was conducted immediately after for 1, 2.5, 5, and 10 U/ml calibration standards, and a +control. Water and silk reagents were then stored at room temperature, and the assay was run again at 1 day and 1 week time. Calibration results, and that of the +control, demonstrate that aqueous ELISA reagents are unstable only immediately after preparation. Of special note, the +control (1U/ml), which serves as the threshold for positive detection, is undetectable after 1day of room temp. storage. Also, the correlation of the aqueous calibration standards is lost after 1 week. Conversely, +control detection, and correlation of the silk-embedded cal. standards remains after 1 week of room temperature storage. Also, the color response of the cal. standards and +control remain consistently higher than water, allowing for easier visual interpretation of results.

3. Design of Silk Fibroin Thin Film Lateral Flow EAC:
Having demonstrated prolonged stability of Ebola ELISA reagents in silk fibroin, a lateral flow Ebola detection system was envisioned, where ELISA reagents are embedded in [illegible] thin films at the end of 4 flow channels. Upon addition of a droplet of water, the dissolution of silk fibroin would initiate "timed" flow of reagents (via capillary action) towards the center detection window, to mimic the colorimetric ELISA [illegible] (Fig 10). Timed fluidic motion of [illegible] established with water-soluble [illegible] strips (Fig 11), and later for [illegible]. Finally, the final flow channel [illegible] channels, and odd shapes for [illegible]

4. EAC Prototype E[illegible]
To verify function [illegible] was embedded in [illegible] detection center [illegible] freshly made silk [illegible] ELISA reagents [illegible] (or saliva/urine) [illegible] $CH_3OH:HO$, [illegible] H1ml +control [illegible] STOP solution [illegible] signifying [illegible] Ebola [illegible]


Developing a Solar Powered Agitator for Mosquito Control in Stagnant Water
Problem Statem
Introduction and Background
Small Water System: WATER BUG Agitator
Medium Deep Water System: THE AERATOR Agitator
Medium/Large Water System: THE BOAT Agitator
Agitators Testing
Results and Analysis
Biological Testing Data and Analysis
Performance