How to Prepare & Present a Scientific Poster

Lacy Brame

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College of Public Health

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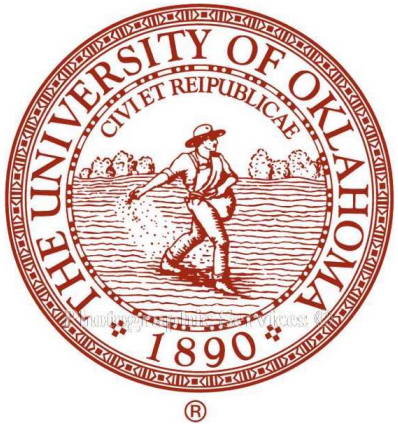


The UNIVERSITY of OKLAHOMA
Health Sciences Center
College of Public Health

What is Research Day at the Capitol?

- Why were you chosen...

- To celebrate excellent undergraduate student research being conducted on Oklahoma's college campuses!

- To attend an annual event sponsored by the Oklahoma State Regents for Higher Education, the National Science Foundation, and the Oklahoma Experimental Program to Stimulate Competitive Research (EPSCoR)

- To let your legislators know about outstanding undergraduate student researchers like yourself!

Objectives of Scientific Posters & Presentations

- Disseminate research findings to peers and public.
- Posters are commonly used at scientific and professional conferences to share research findings.
- Posters are intended to be a hybrid of a published paper and an oral presentation.

Formatting Posters

- Create PowerPoint slide with background of choice
  - Choose a simple background - not busy and not a photo
- Format the size of the poster

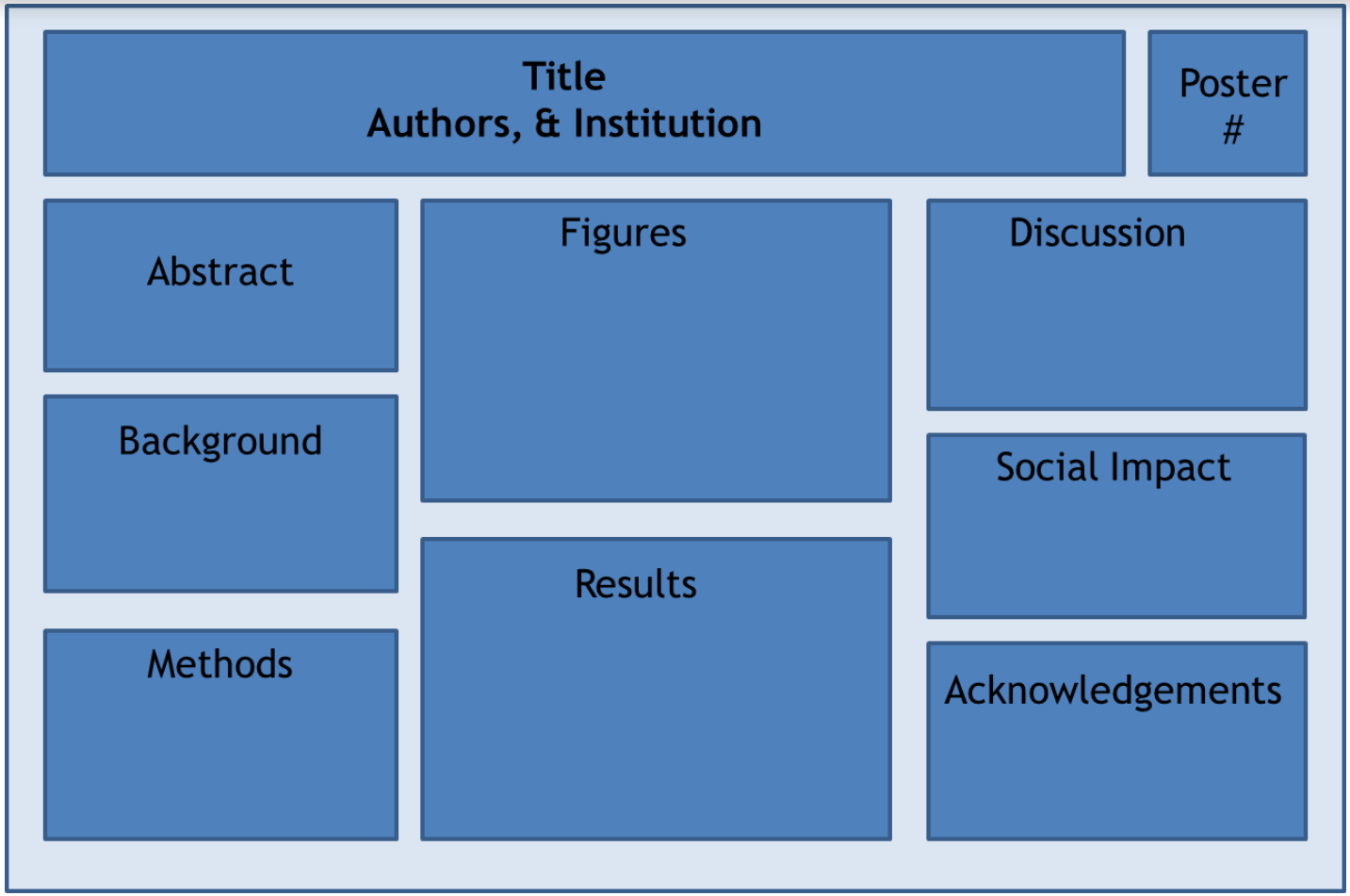
Before formatting:
Check with your print shop to determine
any size constraints that they may impose.

- Go to page set up → slide size in PowerPoint

  Select Width (Standard is 48”)

  Select Height (Standard is 36”)

General Poster Format



Poster Specifications

- Every poster should be custom made/tailored to the event you are presenting for.
- Conferences require certain criteria to be addressed in your posters and abstracts.
- Keep the flow of the sections top ↓ bottom, & left → right.
- Include all essential information and keep writing concise.
- Your EPSCoR poster is NOT necessarily for a scientific crowd, it is for the general public.
- Make sure your poster can be understood by the non-scientific community and that you present your findings in layman's terms.

Poster Format

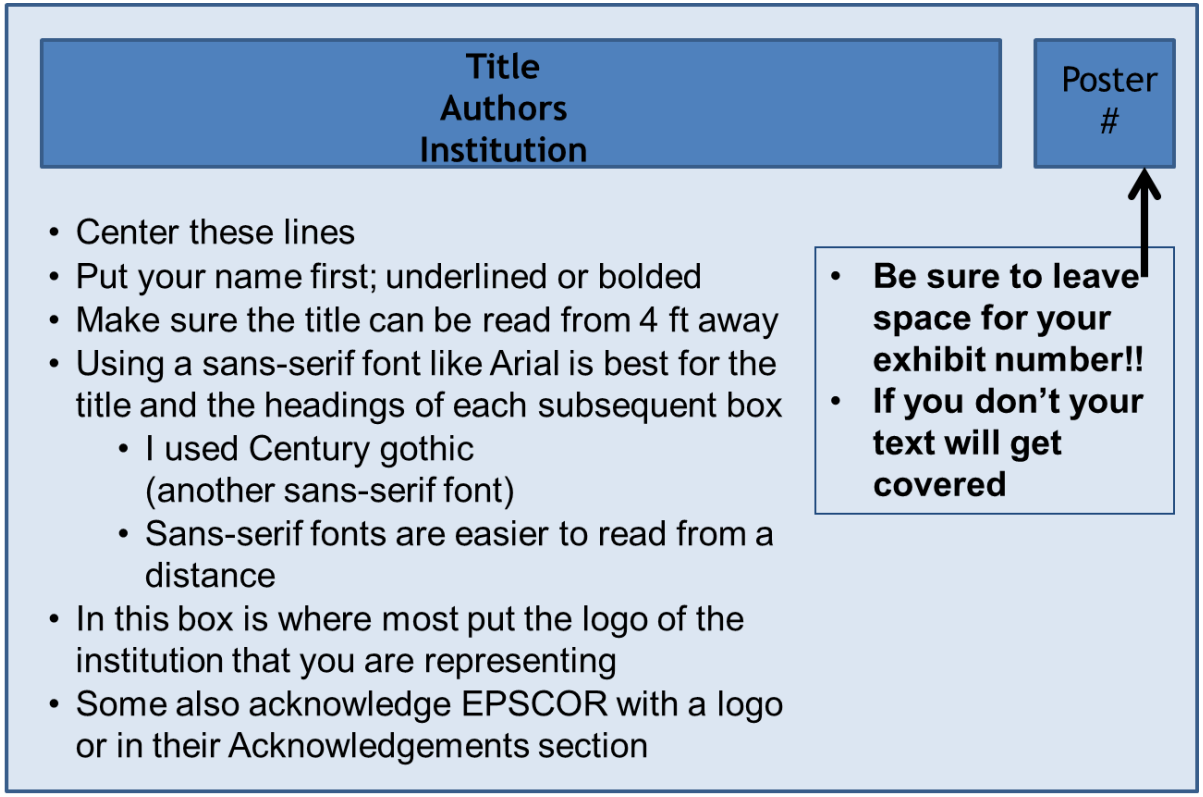
- Font suggestions for each section
  - Use clear, simple fonts - e.g. Times Roman Numeral, Arial
  - Title – 60
  - Authors & Institution - 38
  - Headings of boxes/sections - 42
  - Text of boxes/section – 26-32
  - Figure legends -32
  - Acknowledgements – 26-32
  - Adjust fonts as needed to fill your poster

Format of Posters

- Self-explanatory graphics
  - ❖ X and Y-axes should be labeled
  - ❖ Graphs should have meaningful titles
- Minimal text to supplement the graphics
  - ❖ Be concise in your wording
- Text on poster should be visible from 6 feet away
- Careful use of color (2-3 colors maximum)

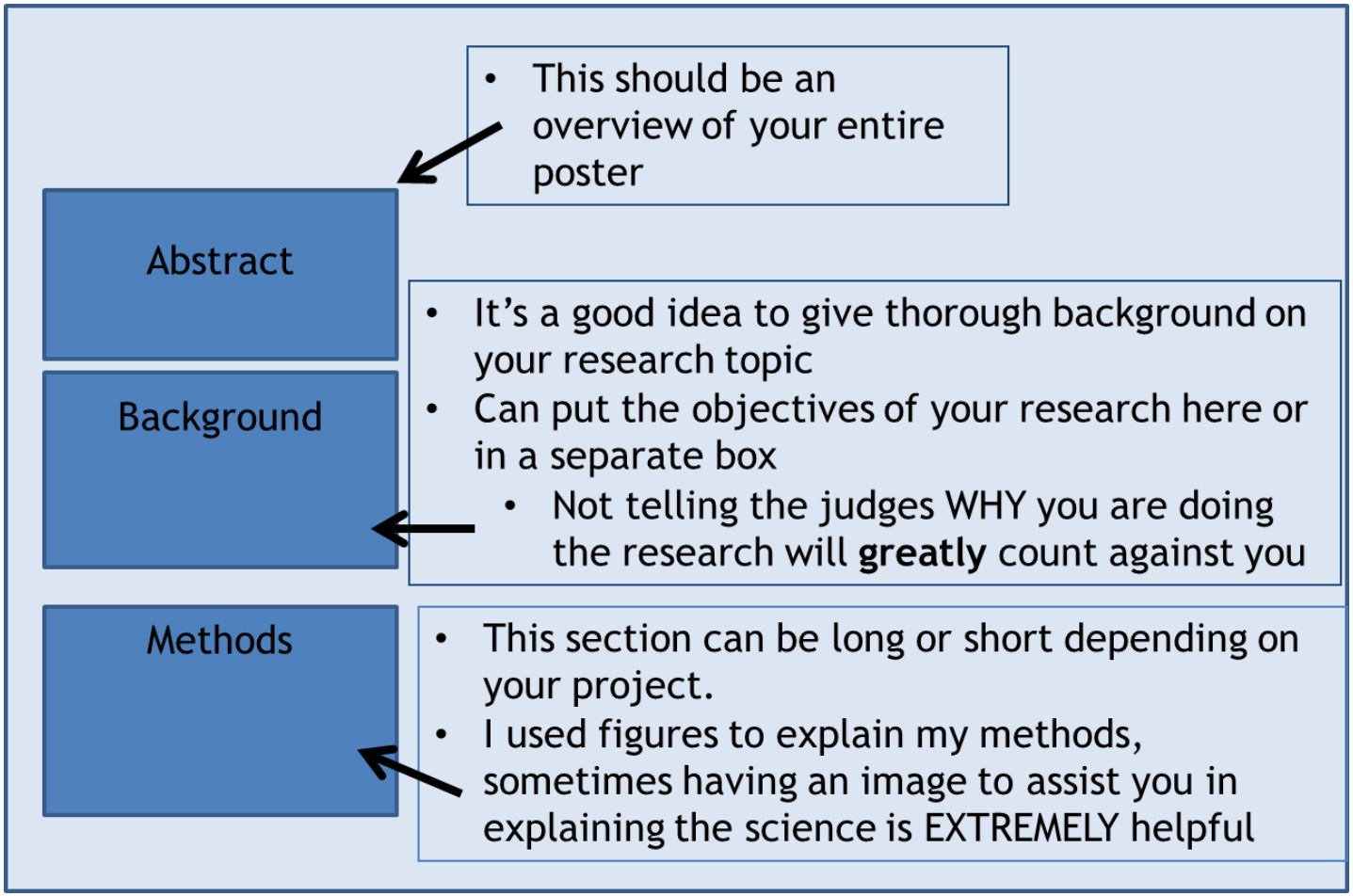
Creating Your Poster

- Title - Keep it simple & concise
- Authors – List all that were involved
- Institution – Campus <u>you are representing</u>
- White space for exhibit number – 4.5” x 5.5” (# provided morning of event)



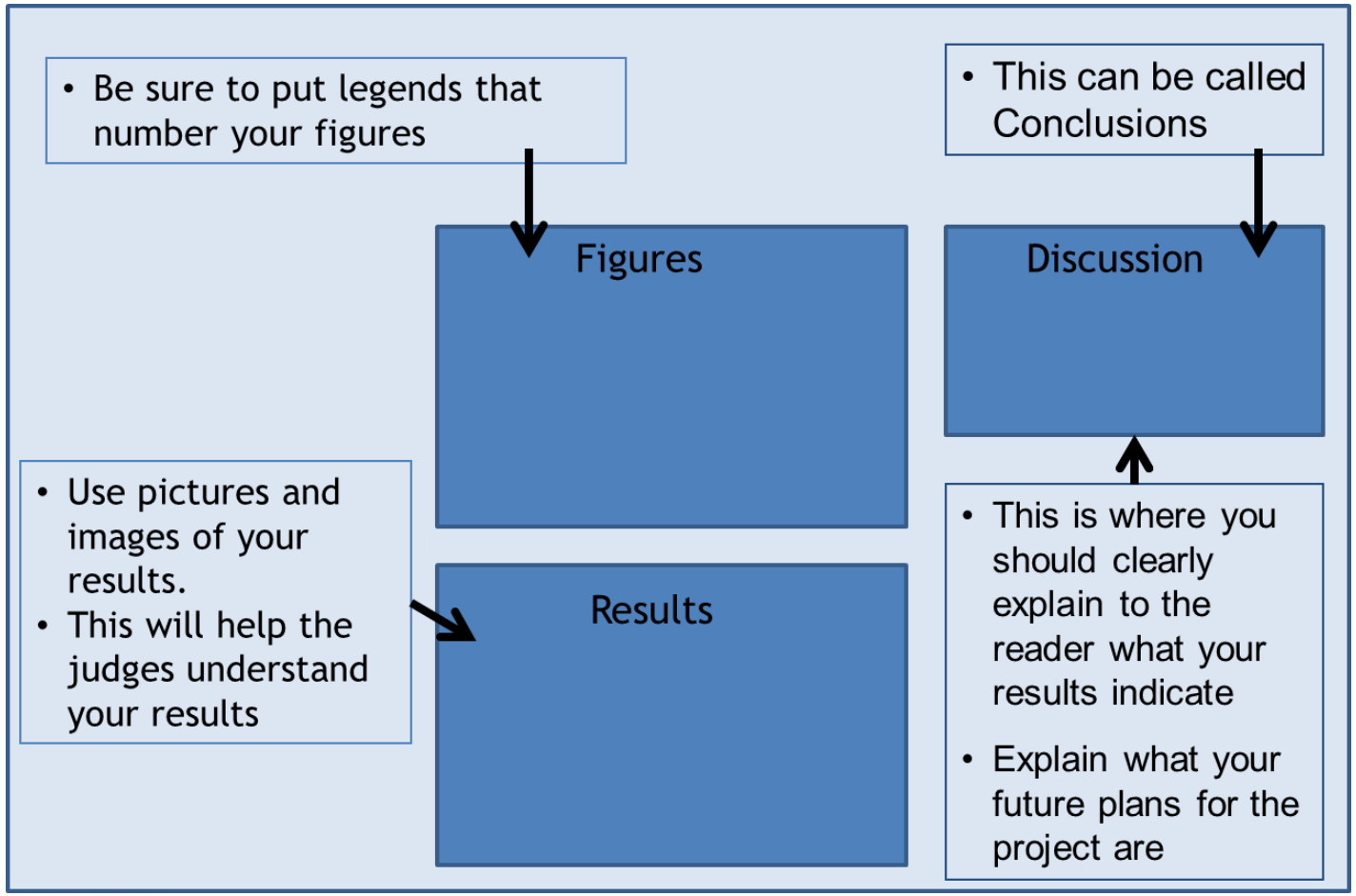
Creating Your Poster

Abstract, Background, & Methods



Creating Your Poster

Figures, Results, & Discussion



Creating Your Poster

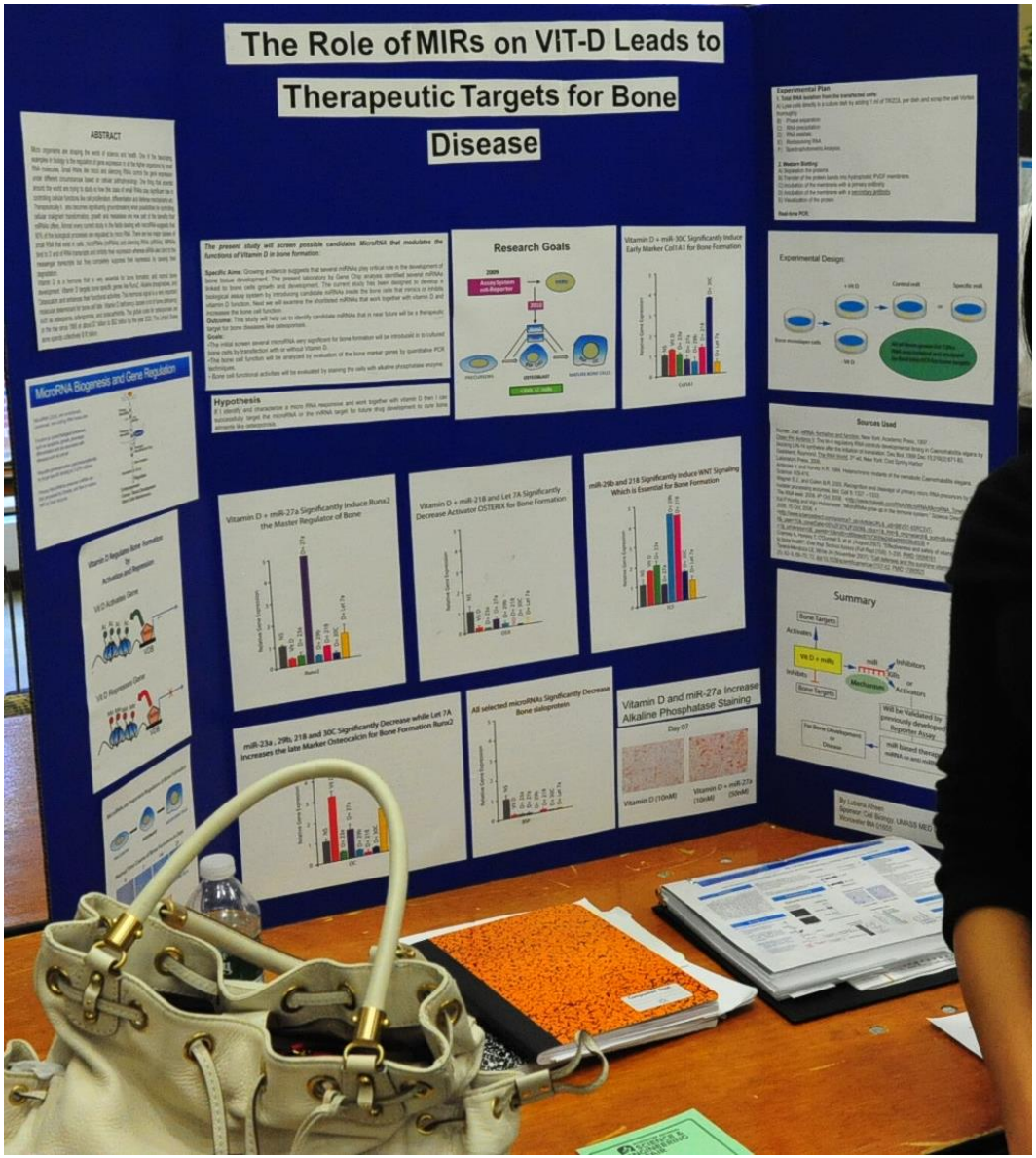
Societal Impact & Acknowledgements

- **DO NOT OVERLOOK THIS SECTION!!!!**
- This is probably the MOST important section of your poster!
- You don't have to cure cancer, but you need know the benefits of your research and be able to explain them in layman's terms
- 2-3 sentences is all that is needed if they are concise and to the point

Social Impact

- It is VERY important that you acknowledge your funding source!
- Other things to acknowledge:
  - Collaborators (big and small)
  - Journal Articles used as references
  - EPSCoR

Acknowledgements



- Professionally print your poster
- Do not cut and/or glue papers to a poster board
- Keep your presentation space neat and professional
- Models and props for demonstration are fine to leave on the table
- Personal items should be stowed away under the table

- Note the purse & water bottle on the table….the clutter is distracting and unprofessional.

Cognitive Dysfunction in Multiple Sclerosis and Sjögren's Syndrome

Farhat Husain, M.D.[1,2], Lacy Brame, B.A.[1,2], Dustin Fife, Ph.D.[1], Jim Scott, Ph.D.[3], Julio Molineros, Ph.D.[1], Amy Thiessen, M.Ed.[1,2], Shaun Chacko, B.S.[1,2], Kathy Sivils, Ph.D.[1], Astrid Rasmussen, M.D., Ph.D.[1] .

[1]Arthritis & Clinical Immunology, Oklahoma Medical Research Foundation, Oklahoma City, Oklahoma, United States, 73104; [2]MS Center of Excellence, Oklahoma Medical Research Foundation, Oklahoma City, Oklahoma, United States, 73104; [3]Psychiatry and Behavioral Sciences, The University of Oklahoma College of Medicine, Oklahoma City, Oklahoma, United States, 73104.

Introduction

- Cognitive dysfunction affecting memory and information processing speed is frequently reported in patients with multiple sclerosis (MS) and Sjögren's syndrome.
- Both MS and Sjögren's syndrome are autoimmune diseases that can affect cognition in a similar manner although the pathophysiology is different.
- Establishing cognitive dysfunction in MS and Sjögren's patients, when compared to controls, could afford earlier intervention and management of distressing symptoms.

Objectives

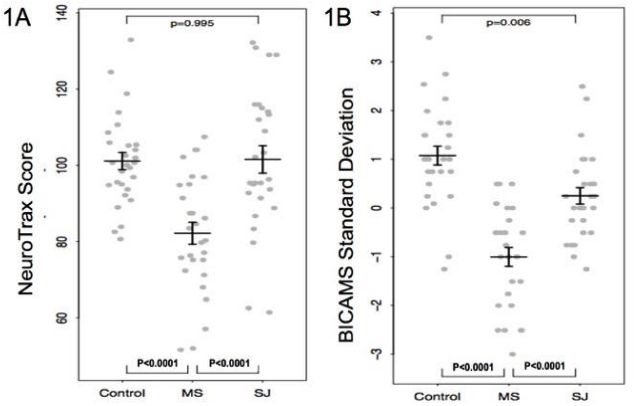
- To assess cognitive dysfunction in MS patients and primary Sjögren's syndrome patients compared to healthy controls.
- To utilize two test batteries: NeuroTrax Mindstreams and BICAMS to measure cognitive dysfunction.

Methods

- All Sjögren's subjects were evaluated through the Oklahoma Sjogren's Research Clinic and met AECG criteria for classification with primary Sjögren's.
- MS patients were collected from the MS Center of Excellence at the Oklahoma Medical Research Foundation.
- 28 MS and 28 Sjögren's patients were age-matched to 28 controls in the study and adjusted for education, gender and age using propensity scores.
- Of the participants, the mean ages for the MS, Sjögren's, and control cohorts were 41.5, 60.3, and 40.3 respectively. There were 5 males in the MS cohort, 2 males in the Sjögren's cohort, and 7 males in the control cohort.
- We utilized two tests, computerized cognitive testing (NeuroTrax) and the BICAMS test battery, to evaluate differences in cognitive dysfunction between MS, Sjögren's, and controls.
- Results from other cognitive modalities were measured and information processing speed (IPS), verbal memory, and non-verbal memory were selected for comparison between MS, Sjögren's, and controls.
- The NeuroTrax test comprises three levels of timed arithmetic problem sets to measure IPS. The Symbol Digit Modalities Test (SDMT) from the BICAMS battery was used to evaluate IPS.
- The CVLT-II and BVMT-R components of the BICAMS test were used to assess verbal and non-verbal memory.

Results

Figures 1A and 1B: **Information processing speed** of Controls, MS patients and SS patients via NeuroTrax (1A) and BICAMS (1B). The results are shown as the means, standard errors, and corresponding p-values adjusted via Tukey's HSD.



Figures 2A and 2B: **Verbal memory** of Controls, MS patients and SS patients via NeuroTrax (2A) and BICAMS (2B). The results are shown as means, standard errors, and corresponding p-values adjusted via Tukey's HSD for Neurotrax and Dunn's Multiple Comparisons for BICAMS.

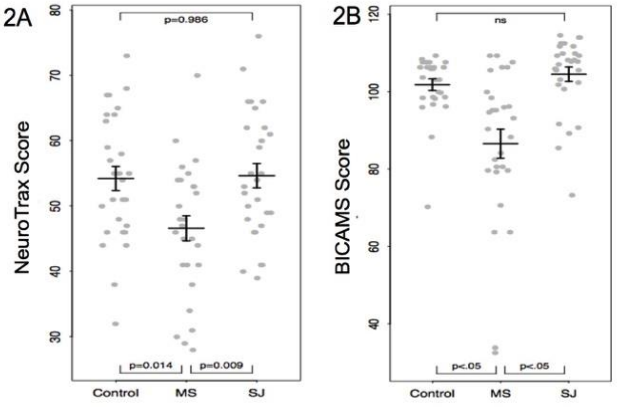
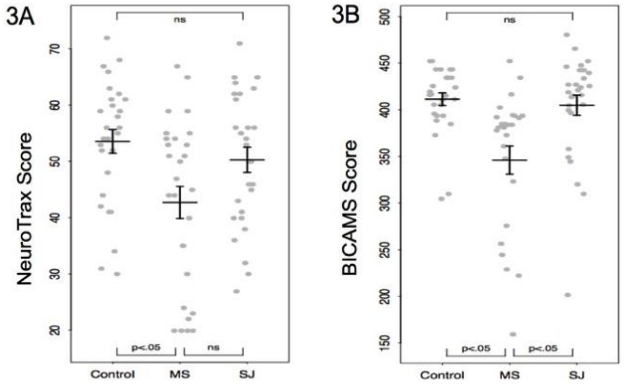


Figure 3a and 3b: **Non-verbal memory** of Controls, MS patients and SS patients via NeuroTrax (3A) and BICAMS (3B). The results are shown as means, standard errors, and corresponding p-values adjusted via Dunn's Multiple Comparisons.



Conclusions

- Data were analyzed using multivariate analysis of variance (MANOVA) and p-values were adjusted using Tukey's HSD for NeuroTrax and Dunn's test for BICAMS.
- MS patients had significantly lower performance on all domains and both tests compared to the controls ($p<0.05$ to <0.0001) and compared to Sjögren's ($p<0.01$ to <0.0001) except for non-verbal memory on Neurotrax.
- Sjögren's patients performed as well as controls in all domains except for information processing speed on the BICAMS test ($p=0.006$, figure 1B).
- Our study is unique due to the utilization of both the BICAMS and NeuroTrax tests and the comparison of multiple sclerosis patients and Sjögren's patients to controls.
- The study reveals significant differences in information processing speed, verbal memory, and non-verbal memory domains between multiple sclerosis and Sjögren's patients compared to controls as demonstrated by the BICAMS and NeuroTrax tests.
- These findings could be instrumental in the design of early intervention strategies aimed at delaying disability in multiple sclerosis and Sjögren's Syndome patients.

References

1. Chiaravalloti, N. D., & DeLuca, J. (2008). Cognitive impairment in multiple sclerosis. *Lancet Neurol, 7(12), 1139-1151.*
2. Doniger, Glen. (2013). NeuroTraxTM Computerized Cognitive Tests: Test Descriptions. *NeuroTrax Corporation. 1 (1), 1-16.*
3. Langdon, D. W., Amato, M. P., Boringa, J., Brochet, B., Foley, F., Fredrikson, S., Benedict, R. H. (2012). Recommendations for a Brief International Cognitive Assessment for Multiple Sclerosis (BICAMS). *Mult Scler, 18(6), 891-898.*
4. Segal BM, Pogatchnik B, Holker E, et al. Primary Sjogren's syndrome: cognitive symptoms, mood, and cognitive performance. *Acta Neurologica Scandinavica.* 2012;125(4):272–278.

Characterization of a humanized Friedreich ataxia transgenic mouse model

Aniruddha C. Parikh[1], Tamara T. Hughes[1], Yogesh K. Chutake[1], and Sanjay I. Bidichandani[1, 2]
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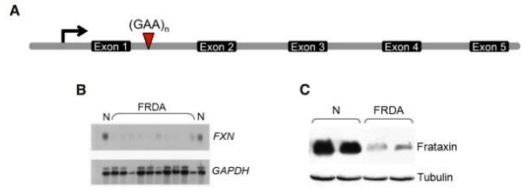
COLLEGE OF MEDICINE PEDIATRICS HEALTH SCIENCES CENTER

SURE Summer Undergraduate Research Experience

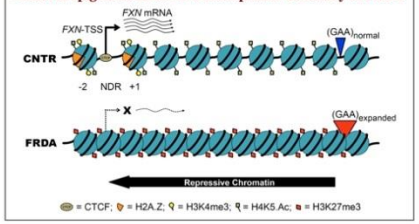
INTRODUCTION

- Friedreich ataxia (FRDA) is caused by homozygous expansion of GAA triplet repeat (GAA-TR) mutation in intron 1 of the *FXN* gene
- Normal alleles ≤ 30 triplets; Expanded alleles = 100-1300 triplets
- Phenotypic severity is repeat length dependent
- Transcriptional silencing of the *FXN* gene is predominantly due to epigenetic promoter silencing[1,2]

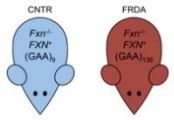


(A) Schematic representation of the *FXN* gene showing location of GAA trinucleotide repeat sequence. (B) RNase protection assay showing deficiency of the *FXN* mRNA in FRDA patients[3] (C) Western blot showing deficiency of frataxin in FRDA patients[4].

Model of epigenetic defect & transcriptional deficiency in FRDA



Humanized transgenic mouse model of FRDA

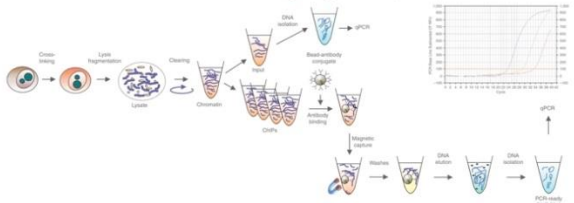


OBJECTIVE

To characterize the humanized transgenic mouse model of Friedreich ataxia and determine if it mimics the molecular defect seen in FRDA patient-derived cells

METHODS

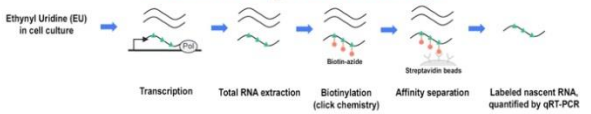
Chromatin Immunoprecipitation (ChIP)



Modified from Dahl and Collas, *Nat Protoc*. (2008)

METHODS – CONT'D

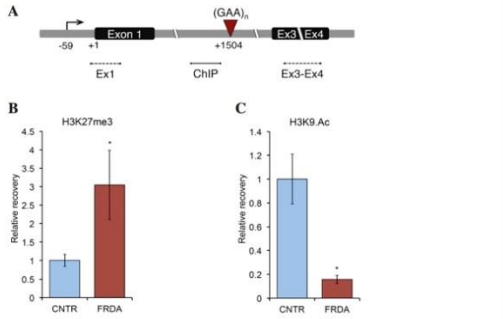
Metabolic labeling of nascent transcripts



Modified from Tani and Akimitsu, *RNA Biol*. (2012)

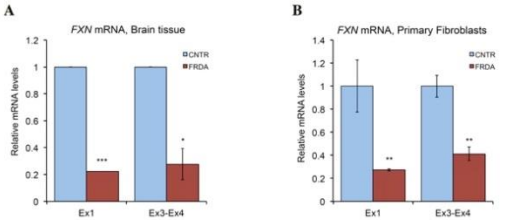
RESULTS

Figure 1: Transcriptionally repressive chromatin upstream of the expanded GAA-TR in the humanized FRDA mouse model



(A) A schematic of the *FXN* gene is shown, with the GAA-TR sequence in intron 1, and the transcription start site (at -59). The region depicted as a solid line was analyzed by ChIP. Regions depicted as dotted lines were analyzed by quantitative RT-PCR. All location numbers are relative to the A (+1) in the initiation codon. ChIP showing (B) enrichment for H3K27me3, and (C) hypoacetylation of H3K9 in the region upstream of the expanded GAA-TR mutation. These data represent the cumulative results from two complete experiments using two FRDA and two non-FRDA (CNTR) brain tissues, each assayed in triplicate. Error bars represent +/-SEM. * = P<0.05.

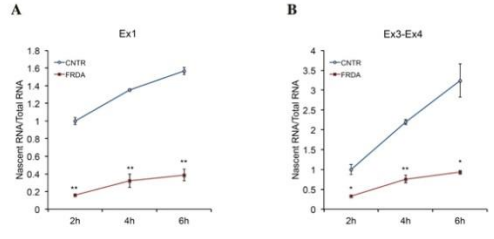
Figure 2: Reduced transcriptional activity upstream of the expanded GAA-TR in the humanized FRDA mouse model



Quantitative RT-PCR data showing significantly reduced amounts of *FXN* mRNA upstream (Ex1 region in Fig. 1A) and downstream (Ex3-Ex4 region in Fig. 1A) of the GAA-TR in (A) mouse brain and (B) primary fibroblasts derived from the humanized mouse model of FRDA. All graphs represent the cumulative data from two complete experiments using two FRDA and two non-FRDA (CNTR) mouse brain tissues and primary fibroblasts, each assayed in triplicate. Error bars represent +/-SEM. * = p<0.05, ** = P<0.01, *** = P<0.001.

RESULTS – CONT'D

Figure 3: Metabolic labeling of nascent *FXN* transcript in living cells showing deficiency of transcriptional initiation in the humanized FRDA mouse model



Quantitative RT-PCR of metabolically labeled nascent transcript for the indicated incubation times (2h 4h & 6h) is shown for *FXN* mRNA (A) upstream (Ex1 region in Fig. 1A) and (B) downstream (Ex3-Ex4 region in Fig. 1A) of the GAA-TR in intron 1. The FRDA mouse-derived primary fibroblasts showed 3-6 fold less nascent *FXN* mRNA compared with non-FRDA cells (CNTR) at the time points assayed. All graphs represent cumulative data from two complete experiments done in duplicate using FRDA, and non-FRDA (CNTR) mouse-derived primary fibroblasts, each assayed in triplicate. Error bars represent +/-SEM. * = P<0.05, ** = P<0.01.

CONCLUSIONS

- The humanized mouse model of FRDA shows characteristic repressive chromatin in the vicinity of the expanded GAA-TR and deficient *FXN* transcriptional initiation
- These data show that this humanized mouse model is a legitimate animal model to study the molecular defect and to screen for potential therapeutic molecules for Friedreich ataxia

REFERENCES

1) Chutake *et al*., *J. Biol. Chem*. (2014)
2) Kumari *et al*., *J. Biol. Chem*. (2011)
3) Bidichandani *et al*., *Am. J. Hum. Genet*. (1998)
4) De Biase *et al*. unpublished data

ACKNOWLEDGEMENTS

- This research was made possible by a grant from the National Institutes of Health (NIH/NINDS) to S.I.B.
- SURE program, the University of Oklahoma Health Sciences Center
- We thank Dr. Mark Pook, Brunel University, UK for providing cells & tissues from the humanized mouse model

A Novel Assay to Predict Cancer Resistance to Cisplatin

Lacy Brame[1], Vengatesh Ganapathy[1], Ilangovan Ramachandran[1], Lurdes Queimado[1-5]

Departments of [1]Otorhinolaryngology, [2]Cell Biology and [3]Pediatrics; [4]The Oklahoma Tobacco Research Center and [5]The Peggy and Charles Stephenson Cancer Center, The University of Oklahoma Health Sciences Center, Oklahoma City, OK 73104, USA.

Introduction

- Cisplatin is widely used as chemotherapy drug that induces DNA damage and ultimately triggers apoptosis. However, therapeutic resistance and tumor relapse remains a significant clinical problem.
- Recently, our laboratory developed an assay (Fig. 1) called primer anchored DNA damage detection assay (PADDA) that screens genomic areas for DNA damage[1]. PADDA has been shown to detect a dose-dependent increase in DNA damage caused by genotoxic agent (Fig. 2).
- We hypothesized that PADDA will discriminate the ability of cancer cells to repair damage induced by cisplatin, and therefore predict cancer resistance to cisplatin.

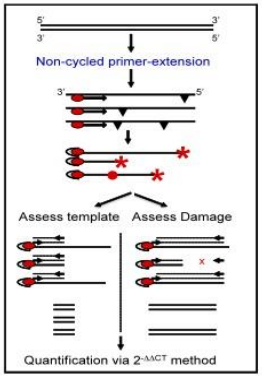


Figure 1. Diagram of PADDA. A single strand-specific non-cycled primer extension performed with a 5'-biotin-tagged primer and Vent exo- DNA polymerase identifies damaged nucleotides (inverted triangles), and generates a pool of highly specific biotin-tagged extended products, each of them derived from one strand of a single DNA molecule. Each extended product has a stop, which represents replicative arrest by a damaged nucleotide or nick. Some extended products will contain misincorporations that represent polymerase lesion by-pass with misincorporation. After several purification steps, the strand-specific, biotin-bound extended products can be used for damage quantification on a high throughput setting q-PADDA).

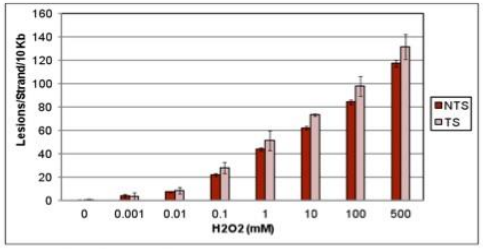


Figure 2. Quantification of induced DNA damage after *in vitro* exposure to a dose escalation of H_2O_2. Strand-specific DNA damage was quantified by q-PADDA. Lesion frequency was estimated via Poisson equation. NTS, non-transcribed strand; TS, transcribed strand; Data represents Mean ± S.E.M

Aim

To define the levels of DNA damage induced at p53 nucleotides by cisplatin treatment and to measure the ability of cancer cells to repair damage induced by cisplatin.

Materials & Methods

PADDA was used on a high-throughput setting to quantify DNA damage in human oral cancer cells (SCC-1) exposed to different doses of cisplatin. Cell viability was determined by 3-[4,5-dimethylthiazol-2-yl]-2,5 diphenyl tetrazolium bromide (MTT) assay. Data was analyzed by Student's *t*-test.

Results

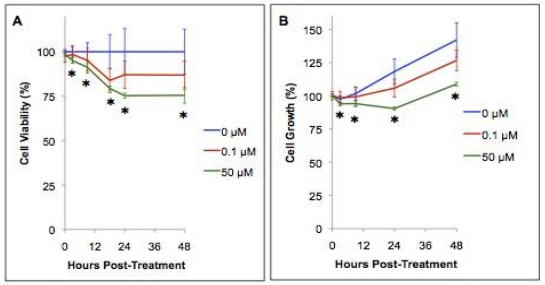


Figure 3. Cell viability assay and cell growth. SCC-1 cells were treated with 0 µM, 0.1 µM, 50 µM concentrations of cisplatin and allowed to repair damage for 0, 3, 9, 18, 24 & 48 hour time intervals. Cell viability (A) and cell growth (B) were determined by MTT assay. Data shown as Mean ± S.D. * $p<0.01$.

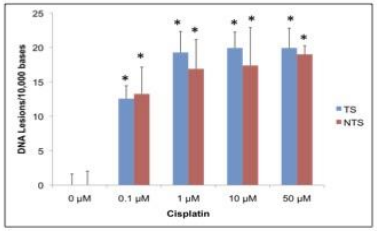


Figure 4. DNA damage measured by q-PADDA in SCC-1 cells exposed to cisplatin for 3 hours. Damage was quantified by q-PADDA in both transcribed (TS) and non-transcribed (NTS) strands. Data shown as Mean ± S.E.M. * $p<0.01$.

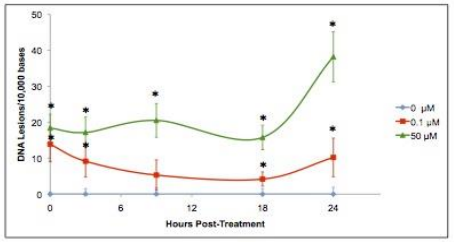


Figure 5. DNA damage measured by q-PADDA in SCC-1 cells after exposure to cisplatin. SCC-1 cells were treated with 0 µM, 0.1 µM, 50 µM concentrations of cisplatin and allowed to repair damage for 0, 3, 9, 18 & 24 hour time intervals. Data shown as Mean ± S.E.M. * $p<0.01$.

Conclusion & Societal Impact

- PADDA was able to quantify DNA damage and repair after cisplatin treatment. This information will allow us to determine if resistance to cisplatin is due to effective damage removal or to damage tolerance. This data would facilitate the development of strategies targeting the mechanism of drug resistance.
- This observation has **significant clinical importance** as it can be used to predict treatment response and direct treatment selection in cancer patients.

Future Directions

- This assay has potential to elucidate the differential efficacy of cisplatin as a chemotherapy drug and act as a preliminary screening method to determine differential cisplatin resistance.
- This project can be extended to determine the genotoxicity and resistance of cisplatin in other head and neck cancer cell lines.
- PADDA can be used to determine if patients will respond or become resistant to not only platinum-based chemotherapy treatments, but also to other treatments that induce DNA damage.

Acknowledgement

Funding was provided by the Oklahoma Tobacco Research Center and the Oklahoma Center for the Advancement of Science and Technology. Dr. Queimado holds a Presbyterian Health Foundation Endowed Chair in Otorhinolaryngology.

References

[1]Reis AM, Mills WK, Ramachandran I, Friedberg EC, Thompson D and Queimado L. Targeted detection of *in vivo* endogenous DNA base damage reveals preferential base excision repair in the transcribed strand. Nucleic Acids Res. 40(1): 206-219, 2012.

Tips on Presenting

- The best way to improve your presentation skills is to present.
- Record yourself presenting and play back your recording to notice and fix your mistakes.
- Practice presenting to a non-science friend and listen to their feedback on your presentation.
- Practice presenting in an empty room and practice talking at the volume you plan on speaking at and the hand gestures you will use (pointing to figures/text on poster).
- Maintain natural eye contact with your audience in order to keep them engaged.
- Emphasize the importance of your societal impact. Make them feel that your scientific findings are important.

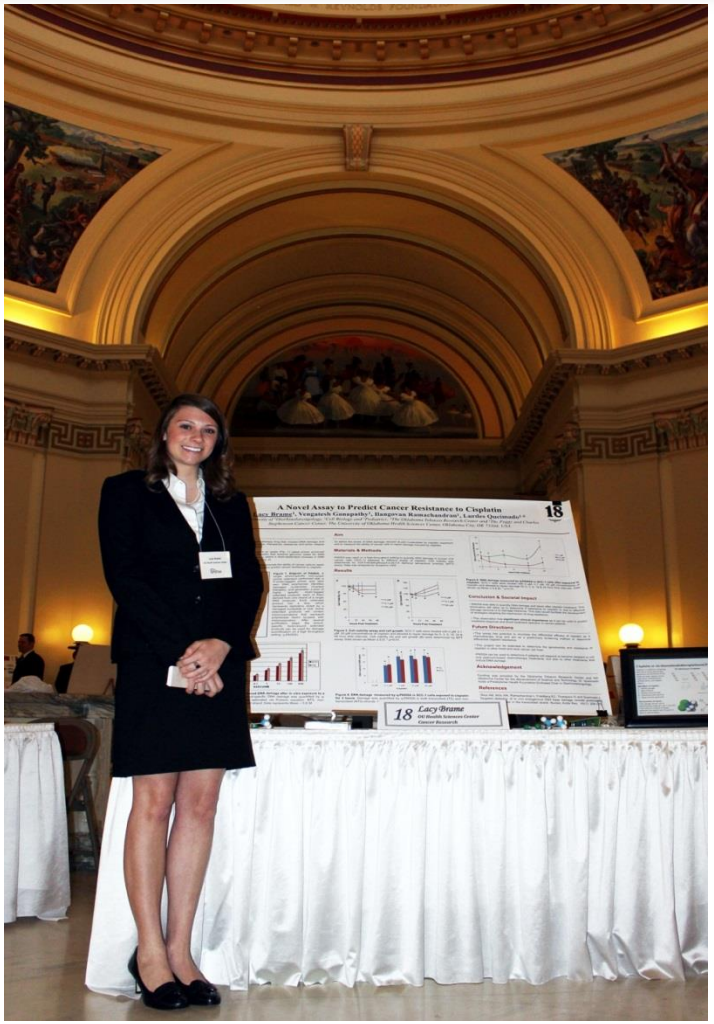
Tips on Presenting

- **Time yourself to make sure you can present in the 3 minutes given.**
- If you are asked a question that you do not know the answer to it is acceptable to say you don't know. Do NOT make up an answer.
- If you forget your next point do not panic. Calmly recollect yourself and keep moving.
- Anything on your poster is eligible for questioning so BE FAMILIAR with all components of your poster.
- Smile and be warm to the judges. They are spending their time listening to you talk. Be gracious.
- Repetition is the key to presentation success.

Displaying Your Poster

The Display

- Table-top or free standing
  (You bring this with you.)
- Provided: table, floor length table cloth, and 2 chairs
- Things to bring: YOUR POSTER!!!! EASEL, PUSH PINS or clips to attach poster, backing for your poster (foam board), and any visual aids (small enough to set on your table)
- I chose table-top – easel (~$25) & foam board (~$10) from Hobby Lobby



The Judges

Judging

- 4-5 judges - WELL educated, but not experts in your field of study
- 1 judge will be timing you, all others will have clipboards & be taking notes
- When they walk up - SMILE, introduce yourself, be confident (this is your project, you are your own expert on the matter), walk them through what you have done - using your poster as a guide or reference.
- You will have 5 minutes with the judges: 3 min. to explain your research & 2 min. for questions.

The Judging of Posters

❖ **Posters will be judged on the following criteria:**

1. Abstract (format, clarity, societal impact, objective of study, results, conclusions, etc.)
2. Scientific presentation

(Clear purpose, hypothesis, background info, results, impact, further study expected)

3. Student's ability to explain project
4. Visual appearance
5. Clarity for general audiences
6. Societal impact statement

The Judges

- Questions are usually to re-affirm or clarify something about your presentation
  - Kinds of questions - Procedural, social impacts, future aspirations, etc.
- Other Tips for your presentation
  - Eye contact is important, face them as you reference your poster
  - No gum & keep your hands out of your pockets
  - Use more general terms to clarify complex terms
  - PRACTICE, PRACTICE, PRACTICE - try not to say “um” or “like”
  - Be ENTHUSIASTIC about your project yet speak calmly, clearly, and with confidence

KNOW Your State Legislators

- This is highly important!
  - They will stop by your poster & expect you to know who they are
  - Explain to them your research in layman's terms making sure to EMPHASIZE your societal impact!
  - Each of you have a Home Representative and Home Senator based on which district you live in
  - You may also have a different School Representative and School Senator
  - www.capitolconnect.com/oklahoma/default.aspx

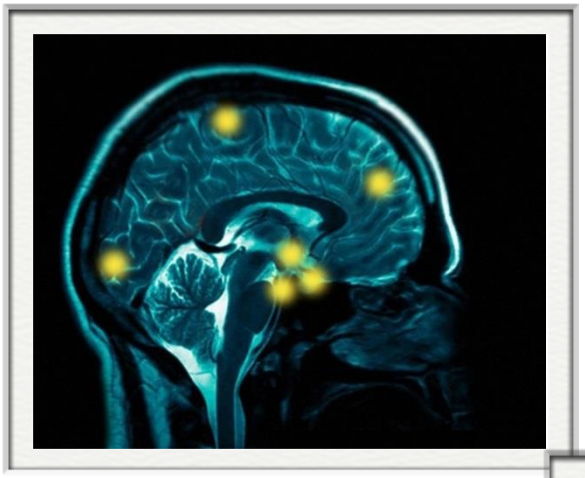
Previous Winners of Research Day at the Capitol

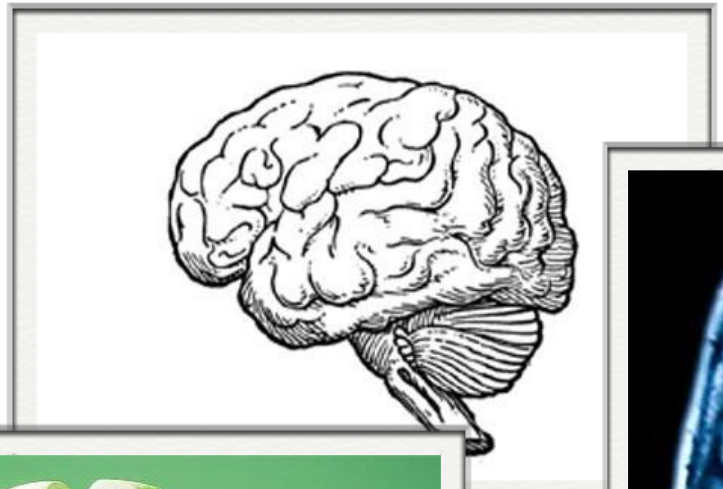
2013 1st Place Award Recipient
Regional College Category

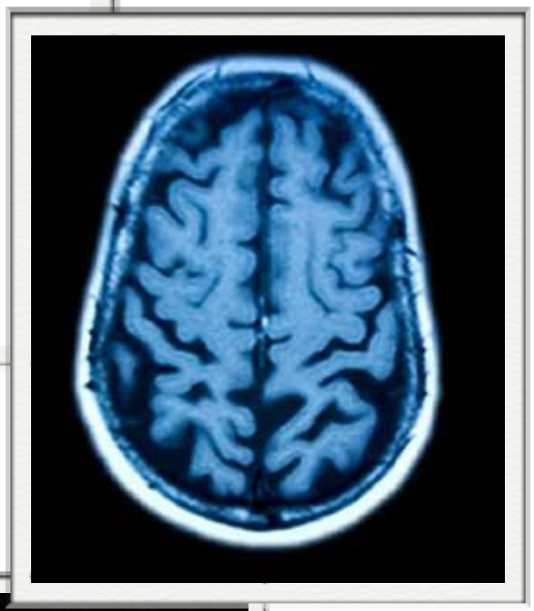
2014 Overall Grand Prize Winner

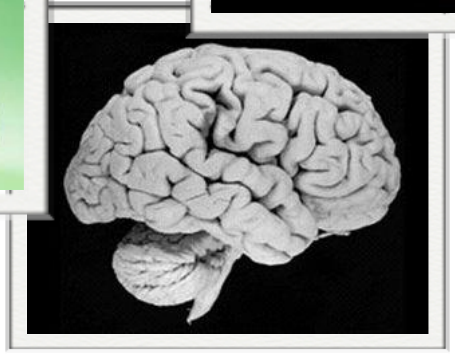
Things to Remember

- You were chosen for a REASON!
  - Be Enthusiastic, friendly, and SMILE
  - EMPHASIZE your societal impact!
  - Judges are looking for someone who has the total package!
  - Be prepared and mentally ready
  - Dress professionally and be punctual
  - Know your legislators!









Any Questions?