



Made to Stick

Delivering scientific presentations and posters for **impact**



CLIMB

Collaborative Learning and
Integrated Mentoring
in the Biosciences

Steve Lee, PhD

Assistant Director
Northwestern University
Fall 2012

Deliver your presentations for **impact**

But why?

Because reviewers are considering impact

NIH criteria

Overall Impact: Reviewers will provide an overall impact/priority score to reflect their assessment of the likelihood for the project *to exert a sustained, powerful influence* on the research fields involved

NSF criteria

- Intellectual Merit
- Broader Impact

Let's start with 2 activities

In these activities, what helps and what makes it difficult to remember?

- 1. Memorize as many letters as possible**
- 2. Remember as much of the text as possible**

What are some challenges in scientific presentations and posters?

**What are some strategic advantages
in scientific presentations?**

We will address:

1. Principles of Effective Communication

- challenges in communication
- ideas that “stick”
- speaking in different communication styles

2. Some Practical Suggestions

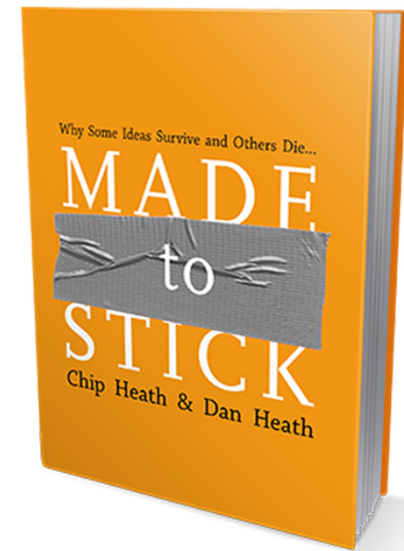
- tips for creating slides
- good and poor examples
- sample video



Part 1: Principles of Effective Communication

What's a "sticky" idea?

A sticky idea is understood and remembered, and has lasting impact to change people's opinions or behavior



**Similar to the NIH
definition for impact**

The project must exert a
sustained, powerful influence

Why is it so hard to communicate effectively? Because of **The Curse of Knowledge**

- **Research at Stanford with tappers and listeners**
 - tapper was given a popular song
 - listener had to guess the song
 - beforehand, tapper was asked to predict the % of songs that would be guessed correctly
 - tappers predicted: ~50%
 - actual: 3% (!)
- **The Curse: those with knowledge (tappers) are cursed with not understanding the audience's (listeners) perspective**

telling ≠ effective communication

Instead, transform your ideas to

stick

Transform your ideas to **stick**

Use as many of these 6 key principles as possible:

Simple: find and share the core message

Unexpected: get their attention – surprise or twist

Concrete: help people understand – be specific

Credible: help people believe – give evidence

Emootional: help people to care – inspire

Stories: share ideas to simulate and inspire

Speak to a broad audience using the Myers-Briggs types

How do you prefer:

- to relate to people?
 - Extroverts
 - Introverts
- to gather information?
 - Sensors
 - Intuitors
- to make decisions?
 - Thinkers
 - Feelers
- to relate to the outside world?
 - Judgers
 - Perceivers

Apply a mix of communication styles

	<u>Communication strengths</u>	<u>Potential problems</u>
S-types	<ul style="list-style-type: none">○ visual and audio info○ concrete <u>information</u>○ details; real experiences○ realistic; grounded	<ul style="list-style-type: none">○ dry or flat○ random details○ lack meaning
N-types	<ul style="list-style-type: none">○ <u>inspirational</u>○ stories; visionaries○ big picture & patterns○ significance; analogies	<ul style="list-style-type: none">○ vague○ ambiguous○ not concrete

Communicate to inform and inspire your audience!

Part 2: Some Practical Suggestions

How do you start?

- **What core messages need to “stick”?**
 - **prioritize your messages**
- **Don't just try to compress a longer talk**
- **Don't just “get through the material”**

Craft a scientific story

- **the classic elements of a story are:**
 - thesis – intro characters, context, significance
 - antithesis – problem or question
 - synthesis – wrap up and conclusions
- **set your story with clear rhetorical markers**
 - context and significance
 - complication
 - question or problem
 - hypothesis or proposal

One challenge is to go broad *and* deep

Speak to broad audiences: use analogies and illustrations



Speak to experts:
use 1 or 2 examples
in depth

Creating Slides

- **Plan to spend 1-2 minutes per slide**
 - 10 min talk: 6-9 slides
 - 30 min talk: 15-20 slides
 - etc
- **Maximize the “info to ink ratio”**

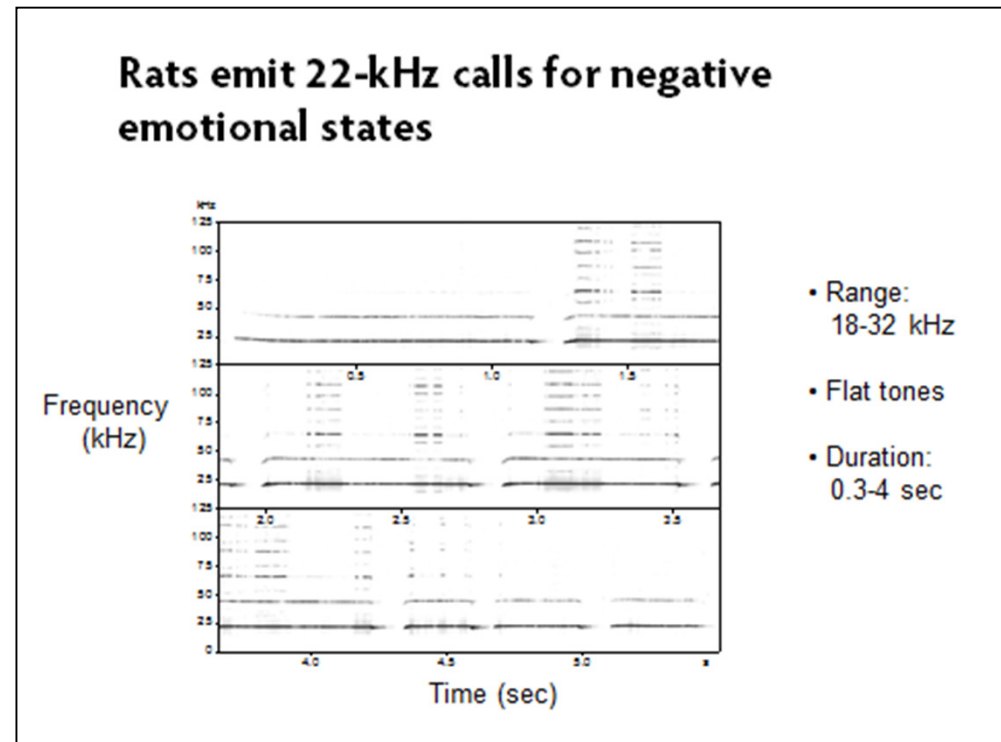
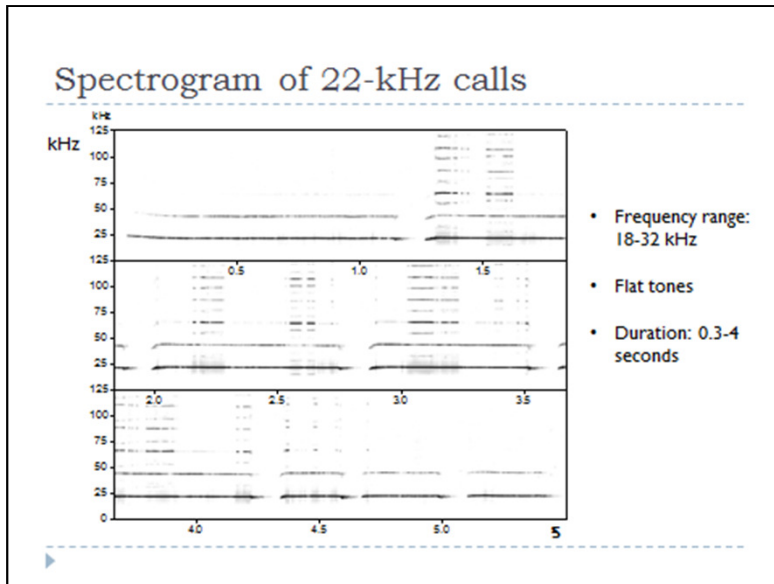
$$\frac{\text{info}}{\text{ink}}$$

Use “message” titles

“Topic” titles only give the topic of the slide.

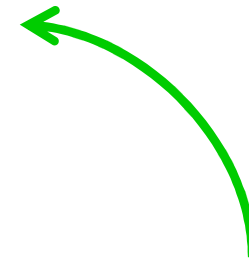
“Message” titles deliver your whole message.

Studies show more people remember content in message titles.



Or use “question” titles

INTRODUCTION	METHODS	RESULTS	DISCUSSION	CONCLUSION	ETHICS
What about sensation?					
<ul style="list-style-type: none">• We can output movements from brain activity, but what about inputting information, like about sensation?• Without sensory capabilities, even the most sophisticated motor control system cannot reach its full potential. <p><i>How do you shake a friend's hand without feedback about pressure exertion?</i></p> <p><i>How do you lift a glass if you don't know how tight your grip on it is?</i></p> <p>A prosthetic hand that can move but cannot feel may easily bring harm to 1) objects, 2) the user, 3) others, 4) itself</p>					



**Also, good use
of outline**

Convert bullet lists into word tables (if possible)

bullet lists

#1: How do you prefer to relate to people?

- Extroverts:
 - gain energy by interacting with many other people
 - are sociable and outgoing
 - generally have multiple friendships
 - talk easily about themselves; are expressive
 - think out loud
 - generally prefer to initiate
- When working with an extrovert:
 - be social and respond to their expressiveness
 - give them feedback – verbal and nonverbal
 - allow them to think out loud; be a sounding board
 - talk with them in person
- Under stress, extroverts:
 - react with increased activity
 - can be impatient during lengthy, solitary activities

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word tables

#1: How do you prefer to relate to people?

Extroverts:	<ul style="list-style-type: none">• gain energy by interacting with many other people• are sociable and outgoing• generally have multiple friendships• talk easily about themselves; are expressive• think out loud• generally prefer to initiate
When working with an extrovert:	<ul style="list-style-type: none">• be social and respond to their expressiveness• give them feedback – verbal and nonverbal• allow them to think out loud; be a sounding board• talk with them in person
Under stress, extroverts:	<ul style="list-style-type: none">• react with increased activity• can be impatient during lengthy, solitary activities

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**better use of space
with larger fonts**

Here's a good example of word tables

Key criteria to keep in mind

You as a Candidate	This includes your past accomplishments and unique attributes you bring.
Your Scientific Development	Tied to scientific goals
Your Mentor & Environment	How suitable for your development
Your Training Plan	How well developed will it be

main intro slide

Key criteria to keep in mind

You as a Candidate	The focus is on your past accomplishments and unique attributes you bring.
Your Scientific Development	Both tied to scientific goals and your training plan
Your Mentor & Environment	Even kind of want to be in that environment
Your Training Plan	Tends to be the most underdeveloped and fatal flaw

Key criteria to keep in mind

You as a Candidate	Start stage
Your Scientific Development	Evolve design
Your Mentor & Environment	Concrete paper
Your Training Plan	Achieve something

Key criteria to keep in mind

You as a Candidate	Especially aware
Your Scientific Development	Realistic
Your Mentor & Environment	Not everyone gets
Your Training Plan	One play

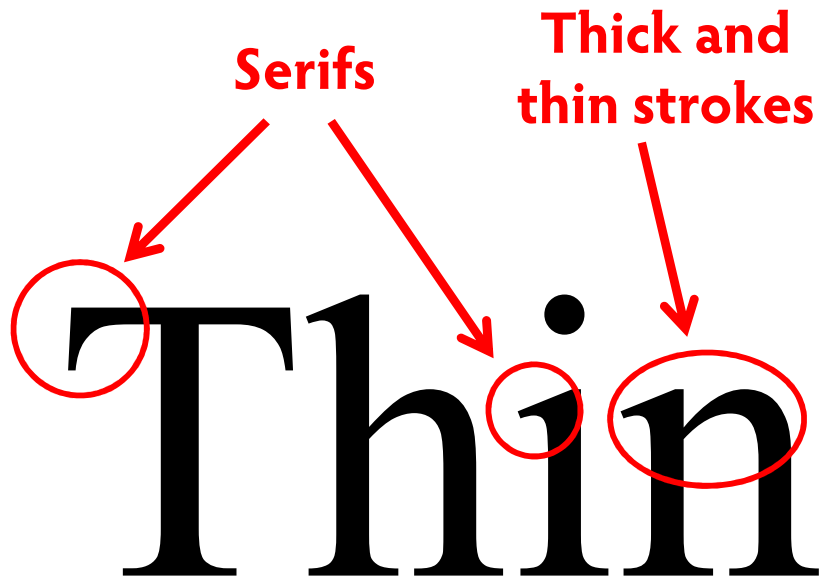
Key criteria to keep in mind

You as a Candidate	Tends to be the most underdeveloped and fatal flaw
Your Scientific Development	Usually looking for very concrete plan and evidence that with the fellowship you will really get something special that not everyone gets
Your Mentor & Environment	In some, especially NSF, strong expectation of much higher level of independence afforded by fellowship
Your Training Plan	Can be a rub if mentor agrees on paper but not in practice – can be challenging if resources are required to move in new directions

subsequent slides

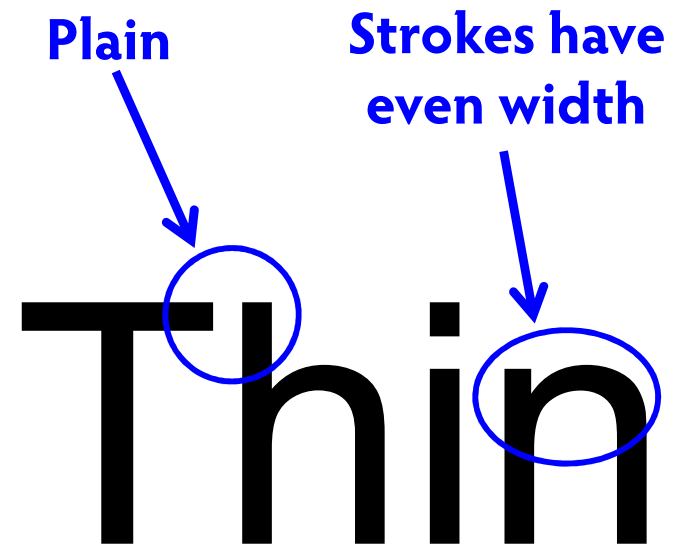
Only use sans serif fonts

Serif Font



Times New Roman

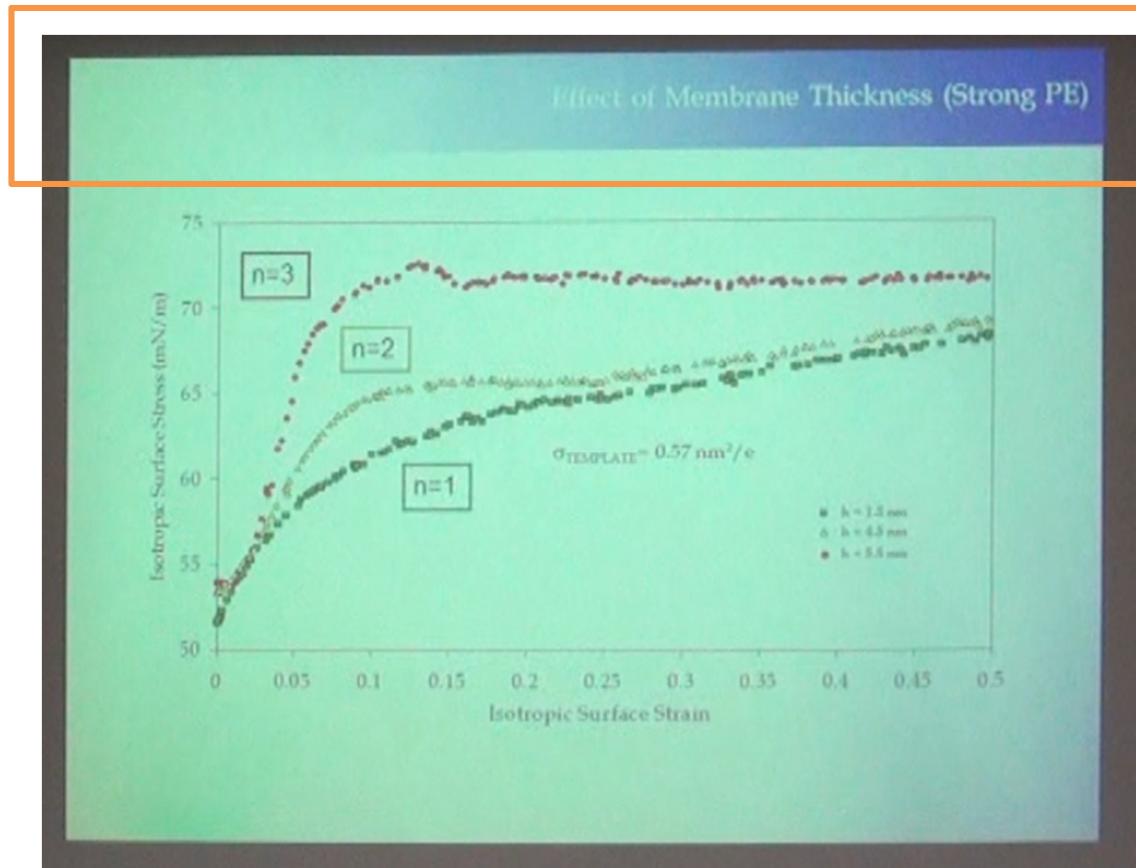
Sans Serif Font



Arial

easier to read

Avoid using color gradients



tough to read

What you see on your monitor is not what the audience sees on the screen.

Additional tips for creating slides

- **Organize experiments for clear communication**
 - trials done in lab
 - trial A; trial B; trial C; trial D – last trial works
 - during a presentation
 - chronological order: A, B, C, D
 - better order: D and then A, B, C (briefly)
 - don't drag the audience through useless information
- **To minimize slides, place extra content on slides or handouts for afterwards.**

Suggestions for delivering your talk

- **If you get nervous, try memorizing your introduction.** (more tips on handout)
- **Eye contact helps to relate with your audience.**
- **Connect your spoken words with the slides.**
- **Your physical posture ...**
 - affects the audience's *perception* of you
 - and your *performance* as well
- **Practice and get feedback – early and often**

Make your poster "skimmable"

Analysis of Parenchymal Texture Properties in Breast Tomosynthesis Images

Despina Kontos, Predrag R. Bakic and Andrew D.A. Maidment

Department of Radiology, University of Pennsylvania, 3400 Spruce St., Philadelphia, PA 19104

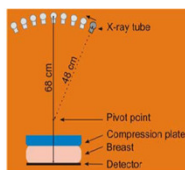
Purpose

We are studying parenchymal texture in Digital Breast Tomosynthesis (DBT) as a measure of Cancer Risk. We compare to standard Mammography¹.

Long-term goal: Test the hypothesis that DBT can provide more accurate measures of Cancer Risk.

Digital Breast Tomosynthesis (DBT)

A novel 3D x-ray imaging technique in which 3D tomographic images of the breast are reconstructed from multiple 2D x-ray source projection images².



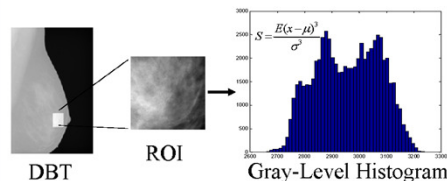
DBT geometry

DBT advantage over projection Mammography:

- Superior normal tissue and lesion visualization
- Superimposition of non-adjacent tissue is avoided

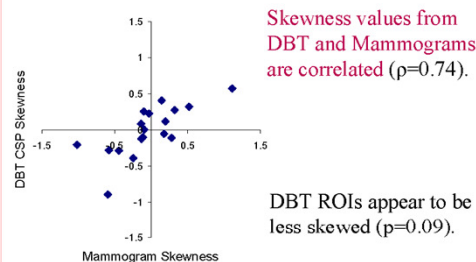
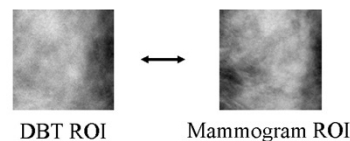
Methods: Texture Analysis

We computed the skewness S of the gray-level histogram for 256x256 retroareolar ROIs² in the Source Projection images acquired from 9 women.



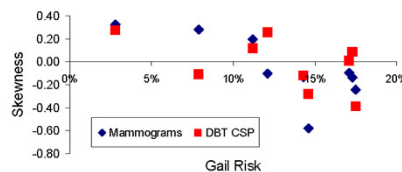
Results: DBT comparison to Mammograms

We compared skewness from DBT Central Source Projections (CSP) and corresponding Mammograms.



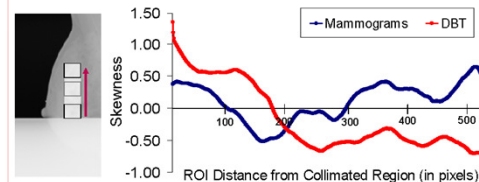
DBT ROIs appear to be less skewed ($p=0.09$).

DBT skewness follows similar trends as in Mammograms when plotted versus the Gail breast cancer risk values for the contralateral breasts.



Results: Effect of Scatter in DBT

At acute angles, our DBT geometry is such that the x-ray collimator is visualized³. We selected an ROI near the collimator and translated its position over 512 pixels.



The skewness is greater for DBT images near the collimated region due to the spatial dependence of the scatter near the boundary of the x-ray field.

Conclusions

Texture in DBT differs from Mammograms. This can be attributed to differences in image acquisition:

- Scatter effect
- Less compression force
- Lower radiation dose

We are investigating the potential of DBT to provide Cancer Risk biomarkers for tailoring individual treatment and forming preventive strategies.

Acknowledgement

This work was funded by the Agfa/RSNA Research Fellowship in Basic Radiologic Sciences FBRS0601.

References

1. Li H, et al, Academic Radiology 2005; 12:863-873
2. Niklason LT, et al., Radiology 1997; 205:399-406
3. Carton AK, et al, Physics of Medical Imaging SPIE 2006

Contact Info: Despina.Kontos@uphs.upenn.edu

Avoid lazy conversions of papers or slides into a poster, or a "data dump"

Arachidonic acid affects aardvark affer

Anna N. Mus

Department of Integrative Science, The University of Texas-Pan American

Introduction

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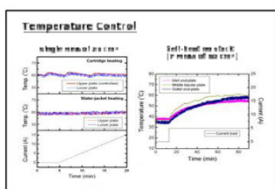
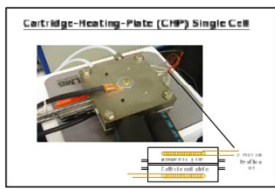
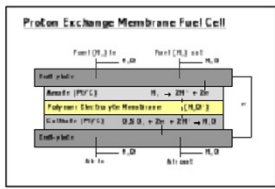
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IUPUI

Fuel Cell
Joan-Ho Koh, Vincent Liaw, and



George Mason University
USGS
science for a changing world

Assessment of Metal Concentrations in Aβ-Rich Regions of the Hippocampus, Entorhinal Cortex and Perivascular Areas in Alzheimer Diseased Brains using Synchrotron X-Ray Fluorescence (μSXF)

UCIrvine
University of California, Irvine
NLSL
NATIONAL SYNCHROTRON LIGHT SOURCE

Flinn, J.M.¹, Linkous, D.H.¹, Kesslak, J.P.², Head, E.², Lanzitrotti, A.^{3,4}, Rao, W.³, Jones, B.F.⁵, Bertsch, P.⁶, & Frederickson, C.J.⁷

¹George Mason University, Fairfax, VA; ²Institute for Brain Aging & Dementia, University of California, Irvine; ³National Synchrotron Light Source, Brookhaven National Laboratory, Upton, NY; ⁴University of Chicago, CARS, Chicago, IL; ⁵United States Geological Survey, Reston, VA; ⁶Savannah River Ecology Lab, University of Georgia, Aiken, SC; ⁷NeuroBioTex, Galveston, TX

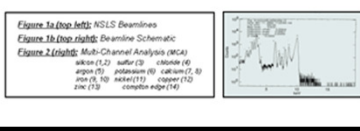
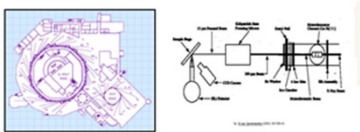
Introduction

Brain levels of Fe, Cu, and Zn have been observed in plaques and adjacent tissue from Alzheimer's diseased brains (Looi, et al., 1996). It is thought that these metals increase in the aging brain and have a causative role in the formation of plaques (Smith, 2002). Microprobe-synchrotron x-ray fluorescence (μSXF) allows the detection and mapping of trace metals in unstained, cryofrozen sections. Ten cases were examined that included 6 AD cases (Mean age = 85.8 years, Range 6: 80-93) and 4 control cases (Mean age = 88.8 years, Range 6: 80-93). Cryofrozen brain sections were assessed at 0.01 μm steps for x-ray intensities of Fe, Cu, Zn, Mn, Ca, Ti, V, Cr, Ni, Pb, Fe, Ni, Cu, and Zn. Additional sections were immunolabeled with antibodies directed against Aβ (1-42 or Aβ 1-40). Additional sections were labeled with Thioflavin-S.

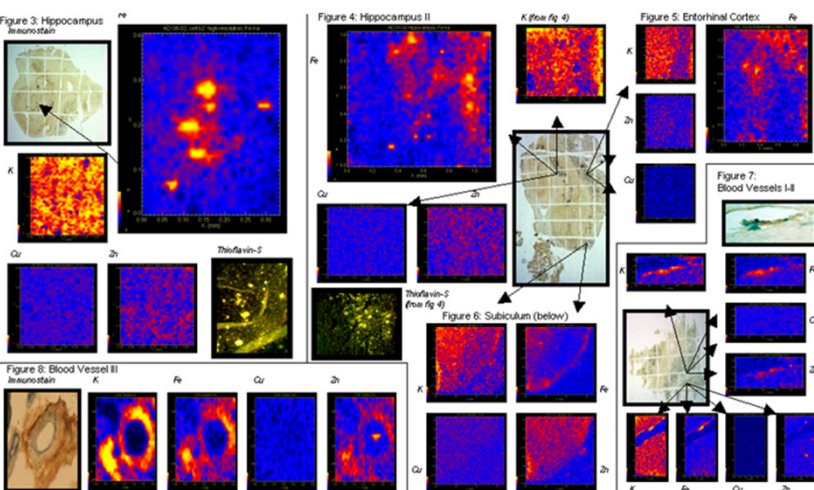
Methods

This was obtained from the Institute for Brain Aging & Dementia, Department of Neurology, University of CA, Irvine. 6 AD cases (Mean age = 85.8 yrs, Range 6: 80-93) and 4 control cases (Mean age = 88.8 yrs, Range 6: 80-93) were examined. Fresh frozen blocks including the hippocampus were sectioned at 20 μm on a cryostat. Sections for x-ray fluorescence (μSXF) were mounted on silica wafer-like slides. Additional sections were immunolabeled with antibodies directed against either p-amyloid (Aβ 1-42 or Aβ 1-40). Additional sections were stained with Thioflavin-S. Double labeled sections were also used to compare the distribution of both species of Aβ. These sections were used to identify individual plaque types for synchrotron studies.

Analysis was conducted at the NSLS Beamline at the National Synchrotron Light Source, Brookhaven National Laboratory (Figure 1). The incident x-ray beam was tuned to 10 keV using a Si (111) channel-cut monochromator beam is collimated to 300 μm in diameter with a kapton slit and focused to 10 μm in diameter using Pt-coated microchannel mirrors in a Kirkpatrick-Baez type geometry. Energy dispersive x-ray fluorescence data were collected using a Canberra CL30165 CA (Si) detector. Detection limits for most of the elements analyzed here vary between 0.1 to 10 ppm. For two-dimensional composition mapping, counting times of 1000 sec were used, with the size of 10 μm being each pixel. Data for all metals were collected at each pixel (multi-channel analysis) (Figure 2).



Results



Conclusions

μSXF is a useful tool for assessing brain tissue which allows for the simultaneous measurement of a suite of metals. In agreement with previous data, this study shows that the brain levels of Fe and Zn increase in Aβ-rich regions and adjacent tissue in brains of Alzheimer disease patients. Moreover, Fe deposits are the most discrete markers of these areas, and are in most agreement with the histological sections. Levels of both Fe and Zn increase, while in contrast with previous findings, copper elevations were not detected.

Further investigations are needed to fully understand the localization patterns of transition metals in different types of Aβ plaques (e.g., diffuse, core) and brain regions, and how these concentrations may vary with Alzheimer disease pathogenesis. Nonetheless, the μSXF data confirm the important role played by metals in disease pathology.

References and Acknowledgements

The authors would like to thank Aid Frederickson and Ashley Bush for their help and assistance.

Bush, A.J. (2003). The neurobiology of Alzheimer's disease. *Trends in Neurosciences*, 26(4), 207-214.

Looi, B.A., Robertson, J.B., Teesdale, W.J., Campbell, J.L., & Markesbery, W.R. (1996). Copper, iron and zinc in Alzheimer's disease cerebellar plaques. *J. Neurosci. Science*, 108(1), 47-52.

This study was supported by a BNL general user grant for NSLS beamline access (J.M.F.), a George Mason University Research Award (D.H.L.), and a PSC-RI04-0523 (J.P.K.). B.F.J. is the United States Geological Survey (B.F.J.) and the Savannah River Ecology Lab (P.S.). The National Synchrotron Light Source (NSLS) is supported by the U.S. Department of Energy under Contract No. DE-AC02-76-RO0016.

More tips for posters

- **Engage your listener**
 - Ask about their research and interests
- **Viewers won't read paragraphs of text**
 - summarize in word tables or bullet lists
- **Annotate data with your main message**
 - explain the significance of the data
- **Take advantage of your medium**
 - **Give the big, "skimmable" picture**

Resources

- **Chip and Dan Heath's**
Made to Stick



- *Making Oral Presentations: Dealing with Nervousness* (handout)
- Amy Cuddy's Poptech talk
 - Power Poses



Transform your ideas to

