2005 UWEB Communications Workshop

Presenting a Scientific Talk
(and an Introduction to Scientific Research)
Jennifer Patterson
June 22, 2005
Assessment Results

- Graphics programs such as PhotoShop
- Spreadsheet programs such as Excel
- Word processing programs such as Word
- Presentation programs such as Powerpoint
- General oral presentation skills
- Scientific presentation skills
- General writing (i.e. grammar)
- Scientific writing
- Scientific literature searches
- Statistics
- Data analysis
- Laboratory techniques
- Experiment design (smaller scale)
- Research project design (larger scale)
Topics Covered

- Graphics programs such as Photoshop
  - July 13
- Spreadsheet programs such as Excel
  - Today and June 29
- Word processing programs such as Word
  - Not needed
- Presentation programs such as Powerpoint
  - Today and June 29
- General oral presentation skills
  - Today and June 29
- Scientific presentation skills
  - Today and June 29
- General writing
  - Not covered specifically
Topics Covered

- Scientific writing
  - July 6 and 13
- Scientific literature searches
  - July 6
- Statistics
  - Some today, ask your mentor
- Data analysis
  - Some today, ask your mentor
- Laboratory techniques
  - Ask your mentor
- Experiment design (smaller scale)
  - Some today, ask your mentor
- Research project design (larger scale)
  - Some today, ask your mentor
Special Requests

- Movies, animations, sound in presentations (June 29)
- Making text in presentations bearable and making presentations entertaining (today and June 29)
- How to manipulate figures or pictures in Photoshop (July 13)
- Freehand and Origin (not covered)
- Etiquette for authorship of papers (July 6)
- Poster examples (see 4th floor Bagley halls)
- Coming up with project ideas/hypotheses
Regenerative Matrices for Oriented Bone Growth in Craniofacial and Dental Repair

Jennifer Patterson
June 22, 2005
Regenerating Good Quality Bone is Essential for Mechanical Properties

- Woven
- Lamellar
Our goal is to improve the quality of the regenerated bone

- Bone orientation will follow patterns established by the developing vasculature
- Ordered angiogenesis can be induced by controlled spatial and temporal release of vascular endothelial growth factor (VEGF) within a hydrogel scaffold
Trabecular bone orientation will follow patterns established by the vasculature.

**Specific Aim 1**
Design and characterize hyaluronic acid hydrogel scaffolds for temporal control of protein release.

**Specific Aim 2**
Develop a rat calvarial critical size defect model for evaluation of early angiogenesis during bone regeneration in living animals.

**Specific Aim 3**
Test the effects of uniformly distributed VEGF on vessel orientation and mineralization in the bone defect model.

**Specific Aim 4**
Evaluate the effects of controlled spatial and temporal release of VEGF and/or osteoinductive factors on angiogenesis and bone growth.
Uniformly distributed VEGF in HA hydrogels may affect angiogenesis and mineralization

- **Hypotheses**
  - VEGF delivered from a HA hydrogel can induce angiogenic ingrowth into the scaffold
  - Bone mineralization will follow angiogenic ingrowth

- **Rationale**
  - VEGF enhances bone regeneration (Street *et al.*, 2002; Murphy *et al.*, 2004) but delivery from HA hydrogel scaffolds has not been tested

- **Approach**
  - Traditional rat calvarial critical size defect model
VEGF delivery from HA hydrogel results in partial closure of defect.

- Empty Defect
- Unloaded Hydrogel
- VEGF Hydrogel
- BMP-2 Hydrogel

- Decalcified sections stained with Masson’s trichrome
VEGF delivery from HA hydrogel results in some mineralization in defect model

- Extent of mineralization measured by X-ray
Extent of mineralization increases with treatment of defect with scaffold.
However, this effect is not statistically significant.

$$p=0.53 \quad p=0.34 \quad p=0.11$$
How to improve statistical significance

- Increase the sample size
- Perform a power analysis
  - Uses estimates of error and difference of means between treatment groups to determine sample size needed
- For a power = 0.8
  - Need n=4 for BMP-2 hydrogel
  - Need n=17 for VEGF hydrogel
  - Need n=65 for control hydrogel
Some statistics references


- [http://www.stat.ucla.edu](http://www.stat.ucla.edu)
- [http://www.statistics.com/content/javastat.html](http://www.statistics.com/content/javastat.html)
The Oral Presentation

- First chance to associate name with face
- One shot to communicate ideas effectively

“The skill of presenting an engaging and well-structured seminar often determines our professional reputation and future success…”

- Robert R. H. Anholt, Dazzle ‘Em With Style
Significance

- People remember 10% of what they hear
- Short-term memory retains 5-7 ideas

Visual learners → Auditory learners

Appeal to both and get your point across

**Adapted from Buddy Ratner’s “Effective communication: the art of oral presentation”**
Preparation

- Know what you are getting into
  - Audience, time limits, focus of talk
- Create good slides
  - Easier said than done
- Practice
  - Alone and with an audience
- Revise, revise, revise
- Anticipate questions
  - The sign of a good presentation
Know Your Audience

- What you want
  - Understands your subject
  - Eager to hear your presentation
  - Courteous and respectful
  - Wide awake

- What you get
  - Does not know you or your subject
  - Planning where to be next
  - Focused on their own talk
  - Forgot to turn off cell phone or beeper
  - Sleepy, inattentive
Pleasing Your Audience

- Create a favorable impression
  - Look and act professional
  - Show enthusiasm for topic (it’s OK to smile)
  - Stay within time limit
  - Prepare and exciting presentation

- How to offend an audience
  - Inappropriate behavior (dress, manner of speech)
  - Arrogance or over-confidence
  - Poor delivery of presentation
  - Running over time
Keeping On Time

- Know the time
  - Bring a watch or timer if there is no clock in room
- If you start running short on time
  - Avoid by practicing final talk several times
  - Speed up talking
  - Only present most important findings and skip over details
  - Skip slides if necessary
- But do not panic
  - Do not skip everything and go right to the conclusion
Content and Organization

- **Introduction (15-30%)**
  - Title slide (include title, authors, organization)
  - “Outline” slide only for long presentations
  - Background (previous work, significance)
  - Objectives (hypothesis and specific aims)

- **Main Body (50-75%)**
  - Materials and methods
    - Figures or flow charts
  - Results and discussion

- **Conclusions (10-20%)**
  - Future work and implications
  - Acknowledgments
    - Funding, people who contributed to work
Repetition Is A Good Thing

- Tell them what you’re going to tell them

**Introduction**

- Tell them

**Main Body**

- Tell them what you’ve told them

**Conclusions**
Introduction

- Get the attention of the audience
  - Motivation - 2 minutes to capture attention
  - Your motivation needs to become the audience’s motivation to pay attention
- Start general and narrow to focus
- Present background material
- State hypothesis and objective of study
Main Body

- Materials and methods
  - Clearly explain the experimental procedures
  - Do not give every little detail
  - A picture is worth a thousand words

- Results
  - Present and explain the data
  - Highlight important findings
Conclusions

- Summarize work
- Relate main findings to hypothesis and overall work in the field
- List future directions of work
  - Specific next steps
  - Implications of results
- Acknowledgements
Creating Good Slides

- Comprehend in less than 1 minute
- Specific purpose or conclusion for each slide
- Contains all essential information
- Visually stimulating
  - Graphics and images in addition to text
  - Good use of space
- Minimize text on slide (bullets)
  - Prevents reading of slide

**Adapted from Allan Hoffman’s “Anatomy of a technical presentation”**
Slide Format - Templates

- Unifying image for presentation
  - Too much can be distracting
  - Typically small graphic or subtle background pattern
- In Powerpoint: Format → Slide Design
  - Select from pre-loaded templates
- Can modify or create your own
  - View → Slide Master
- Include organization or company logo
  - Can be a starting point for color scheme
Slide Format - Color Scheme

- Also provides unifying and professional image
  - In Powerpoint: Format → Slide Color Scheme
    - Sets text, background, and accent colors for all slides

- Contrast shows up best
  - Dark on light OR

- Consider room lighting
  - Dark on light better for well-lit rooms

- Consider material you will be presenting
  - Fluorescence micrographs look better on dark background
Slide Format - Font

- Use one font throughout presentation
  - Could use second font as highlight
  - Common choices: Arial, Times, Helvetica

- Choose font size large enough to see in back of room
  - 44 point, 36 point, 28 point, 24 point, 20 point, 18 point, 16 point, 14 point, 12 point, 10 point, 8 point
  - Don’t forget about text in figures

- Highlight with **bold**, *italic*, underline, shadow, or color
  - Latin phrases in italics (*in vitro, et al.*)
Text Versus Images

Text - MINIMIZE USE
- Use bullet points instead of sentences
- Make slide titles useful and informative
  - Active titles
- Consider graphs instead of large tables

Images - MAXIMIZE USE
- Images or graphs of data
- Schematics, flow charts or cartoons
- Animation or movies
  - Don’t overuse
  - Practice first!
Formatting Figures

- **Graphs**
  - Check font size for all labels
  - Don’t include too much data on one graph
  - Include error bars where appropriate
    - Be careful with trendlines

- **Images**
  - Include a scale bar and labels
  - Avoid enlarging picture too much
    - Pixelation or fuzziness
  - Reduce resolution of picture in Photoshop to avoid large file sizes
A Bad Graph

Hydrogel Swelling in Water After 195 Hours

Swelling Ratio = Ws/Wd

Degree of Substitution (%)

Hydrogel Swelling in Water After 195 Hours

Swelling Ratio = Ws/Wd

Degree of Substitution (%)
A Better Graph

Hydrogel Swelling in Water after 195 Hours

Degree of Substitution (%) vs. Swelling Ratio ($W_s/W_d$)
Working with Excel

- Choose correct type of plot
  - Scatterplot versus bar graph

- Present data as averages with error bars (standard deviation)
  - =AVERAGE(A1:A5)
  - =STDEV(A1:A5)

- Plot using chart wizard
  - Format axes to change font sizes
  - Format data series to add error bars
    - Can be fixed percentage or custom
  - Chart → Add trendline
    - Select proper regression type - not always linear

- Insert as picture (paste special)
Citations

- Cite ALL material and data from others
- Minimum
- More complete
Revisions

- Focus on content
  - Eliminate extraneous slides

- Practice
  - Friends or colleagues who will give honest criticism

- Spend time on background and color choices at beginning of process
  - Prevents having to reformat slides

- Proofread!
Delivery

- Posture - stand up straight; don’t fidget, sway, bounce
- Gestures - use, but don’t overuse (i.e. laser pointer)
- Voice - loud enough, face audience, steady pace
- Eye contact - look at audience members, don’t focus on one spot
- AV - know the equipment; get there early and check
- Confidence - anxious but excited; don’t apologize

Audience wants you to be entertaining & informative

RELAX, RELAX, RELAX

**Adapted from Buddy Ratner’s “Effective communication: the art of oral presentation”**
Handling Questions

- Leave time for questions
- Always repeat the question
  - Also allows others to hear the question
- For clarification questions, answer directly and simply
- For hypothetical or significance questions, don’t guess or mislead
- Acknowledge the validity of the question
  - “That is a very good question”
  - Gives you a few seconds to compose an answer