RESEARCH DAY AT THE CAPITOL POSTER PRESENTATION

Kim Roach

January 15, 2011

WHAT IS RESEARCH DAY AT THE CAPITOL?

- A celebration of the excellent undergraduate student research conducted on Oklahoma's college campuses!

- 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)

- This event is designed to let the legislators know what awesome research students like yourself are doing in the state!

http:www.okepscor.org

WHAT IS EPSCOR?

- Purpose:
  - Promoting Innovative Research

- Central goal:
  - To increase the state's research competitiveness through strategic support of research instruments and facilities, research collaborations and integrated education and research programs.

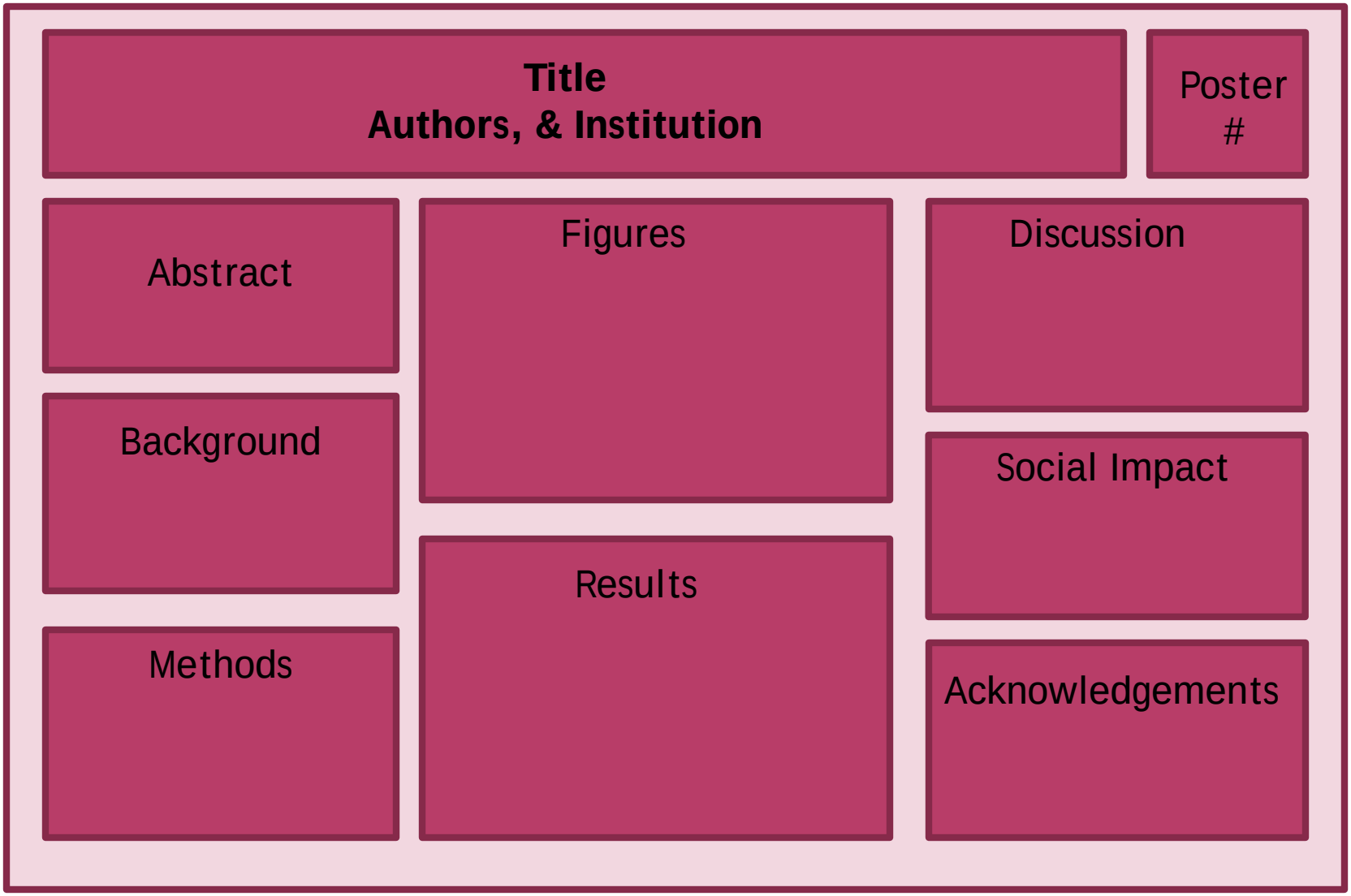
http:www.okepscor.org

CREATING YOUR POSTER

- Create a powerpoint slide with background of choice
  - Do not pick a background that is extremely busy.
  - Do not use a picture
- Format the size of the poster
  - Go to Page Setup
    - Select Width (Standard is 48”)
    - Select Height (Standard is 36”)
  - Check with print shop for any size restrictions
    - Paper or printer size may limit your poster

CREATING YOUR POSTER

- Format of the “general” poster



CREATING YOUR POSTER

- Format of the "general" poster
  - Each project is unique and therefore every poster is different.
  - Keep the flow of the boxes top → bottom, & left →right
    - Some posters require more boxes while others require less
    - Can move boxes around but keep the flow simple

- If you don't like my format…choose something else
  - Google Images has endless possibilities of Research Poster Formats/layouts

CREATING YOUR POSTER

- Font suggestions for each section:(this is what I used)
  - Title – 135
    - If your title is long you may need a smaller font
  - Authors & Institution - 66
  - Headings of boxes - 35
  - Text of boxes - 24
  - Figure legends - 24
  - Acknowledgements - 22

- Draw boxes
  - Insert
    - Shapes
      - Square
        - Inside the square draw text boxes for the title of each box and for the body of each section

CREATING YOUR POSTER

- Title, Authors & Institution

Title
Authors
Institution

Poster #

- Center these lines
- Put your name first; underlined or bolded
- Make sure the title can be read from 4 ft away
- Using a sans-serif font like Arial is best for the title and the headings of each subsequent box
  - I used Century gothic (another sans-serif font)
  - Sans-serif fonts are easier to read from a distance
- In this box is where most put the logo of the institution that you are representing
- Some also acknowledge EPSCOR with a logo or in their Acknowledgements section

- **Be sure to leave space for your exhibit number!!**
- **If you don't your text will get covered**

CREATING YOUR POSTER

- Abstract, Background, & Methods

Abstract

- This should be an overview of your entire poster

Background

- It's a good idea to give through background on your research topic
- Can put the objectives of your research here or in a separate box
  - Not telling the judges WHY you are doing the research will **greatly** count against you

Methods

- This section can be long or short depending on your project.
- I used figures to explain my methods, sometimes having an image to assist you in explaining the science is EXTREMELY helpful

CREATING YOUR POSTER

- Figures, Results & Discussion

- Be sure to put legends that number your figures

Figures

- This can be called Conclusions

Discussion

- Use pictures and images of your results.
- This will help the judges understand your results

Results

- This is where you should clearly explain to the reader what your results indicate
- Explain what your future plans for the project are

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 <u>funding source</u>!
- Other things to acknowledge:
  - Collaborators (big and small)
  - Journal Articles used as references
  - EPSCoR

Acknowledgements

CREATING YOUR POSTER

- Extra tips
  - First impressions are important with the judges
    - So WOW them from the moment they walk up
  - Keep your poster from looking too wordy
  - Use bullets to break up lengthy paragraphs
    - You don't want your poster to look like one super long paragraph, it's extremely uninviting

- Invite your mentor, family and friends!
  - They will be a great support group for you!
  - Having familiar faces will help to keep you calm and collected

Systematic reviews of animal experiments demonstrate poor human clinical and toxicological utility

ATLA: Alternatives to Laboratory Animals. 2007; 35(6): 641-659.

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INTRODUCTION

Trends in laboratory animal use

Annually many millions of animals are used worldwide, and steady increases in the use of genetically modified animals and several large scale chemical testing programs are increasing laboratory animal use.

Claims supporting laboratory animal use

Biomedical research using laboratory animals is highly controversial. Advocates frequently claim such research is vital for preventing, curing or alleviating human diseases (e.g., Brom 2002, Festing 2004a), that the greatest achievements of medicine have been possible only due to the use of animals (e.g., Pawlik 1998), and that the complexity of humans requires nothing less than the complexity of laboratory animals to effectively model during biomedical investigations (e.g., Kjellmer 2002). They even claim that medical progress would be *"severely maimed by prohibition or severe curtailing of animal experiments,"* and that *"catastrophic consequences would ensue"* (Osswald 1992).

The necessity of systematic reviews

The premise that laboratory animal models are generally predictive of human outcomes is the basis for their widespread use in human toxicity testing, and in the safety and efficacy testing of putative chemotherapeutic agents and other clinical interventions. However, the numerous cases of discordance between human and laboratory animal outcomes suggest that this premise may well be incorrect, and that the utility of animal experiments for these purposes may not be assured. On the other hand, only small numbers of experiments are normally reviewed in such case studies, and their selection may be subject to bias. To provide more definitive conclusions, systematic reviews of the human clinical or toxicological utility of large numbers of animal experiments are necessary. Experiments included in such reviews are selected without bias, via randomisation or similarly methodical and impartial means. A growing number of such reviews and meta-analyses have been published, which collectively provide important insights into the human clinical and toxicological utility of animal models. Their identification and examination was the purpose of this review.

METHODS

The 'Scopus' bibliographic biomedical databases—among the world's most comprehensive—were searched for systematic reviews of the human clinical or toxicological utility of animal experiments published in the peer-reviewed biomedical literature. To minimise bias, reviews were included only when systematically conducted using randomisation or similarly methodical and impartial means to select animal studies. Only reviews examining the human toxicological predictivity or utility of animal experiments, or their consistency with or contributions towards the development of prophylactic, diagnostic or therapeutic interventions with clear potential for combating human diseases or injuries, were examined. Reviews focusing only on the contributions of animal experiments towards increased understanding of the aetiological, pathogenesic or other aspects of human diseases, or on the clinical utility of animal experiments in non-human species, for example, were excluded from consideration.

RESULTS & DISCUSSION

As of 1st March 2007, 27 systematic reviews of the utility of animal experiments in the development of clinical interventions (20), or in deriving human toxicity classifications (seven) were located. Authors concluded animal models were substantially consistent with or useful in the development of clinical interventions in only two cases, and the conclusion in one case was contentious. Included were reviews of the clinical utility of experiments expected by ethics committees to lead to medical advances, of highly-cited experiments published in major journals, and of chimpanzee experiments—the species most likely to be predictive of human outcomes. Seven reviews failed to clearly demonstrate utility in predicting human toxicological outcomes such as carcinogenicity and teratogenicity. Consequently, animal data may not generally be assumed to be substantially useful for these purposes.

Causes for the poor human utility of animal models

Biomedical research

Chimpanzees are our closest living relatives, and consequently might be expected to have the greatest likelihood among laboratory species of accurately predicting human outcomes during biomedical research. However, despite great similarity between the structural regions of chimpanzee and human DNA, important differences between the regulatory regions exert an *"avalanche"* effect upon large numbers of structural genes (Bailey 2005). Despite nucleotide difference between chimpanzees and humans of only 1-2%, the results are differences of around 20% in protein expression (Glazko *et al.* 2005), resulting in marked phenotypic differences between the species. These differences include altered susceptibility to, aetiology and progression of diseases; differing absorption, tissue distribution, metabolism, and excretion of chemotherapeutic agents; and differences in the toxicity and efficacy of pharmaceuticals (Bailey 2005, Knight 2007). Such effects appear to be responsible for the demonstrated inability of most chimpanzee research to contribute substantially to the development of methods efficacious in combating human diseases (Knight 2007).

Other laboratory animal species are even less similar to humans, both genetically and phenotypically, and are therefore less likely to accurately model the progression of human diseases or the responses to putative chemotherapeutic agents or toxins.

Toxicity testing

Rodents are by far the most common laboratory animal species used in toxicity studies. Several factors contribute to the demonstrated inability of rodent bioassays to reliably predict human toxicity. The stresses incurred during handling, restraint, other routine laboratory procedures, and particularly, the stressful routes of dose administration common to toxicity tests, alter immune status and disease predisposition in ways which are very difficult to accurately predict, distorting disease progression and responses to putative toxic and chemotherapeutic agents (Balcombe *et al.* 2004, Knight *et al.* 2006b).

Additionally, animals have a broad range of physiological defences against general toxic insults, such as epithelial shedding and inducible enzymes, which commonly prove effective at environmentally relevant doses, but which may be overwhelmed at the high doses common to toxicity assays (Gold *et al.* 1998). Carcinogenicity assays also utilise chronic dosing. These may result in insufficient rest intervals between doses for the effective operation of DNA and tissue repair mechanisms, which, as with the unnatural elevation of cell division rates during *ad libitum* feeding studies, may predispose to mutagenesis and carcinogenesis. Lower doses, greater intervals between exposures, intermittent feeding, or shorter total periods of exposure, which may represent a more realistic model of environmental exposures for most potential toxins, might not result in toxic changes at all (Knight *et al.* 2006b).



Finally, differences in rates of absorption and transport mechanisms between test routes of administration and other important human routes of exposure, and the considerable variability of organ systems in response to toxic insults, between and within species, strains and genders, render attempts to accurately extrapolate human hazards from animal toxicity data profoundly difficult (Knight *et al.* 2006b).

Methodological quality

At least 11 systematic reviews (Horn *et al.* 2001, Lucas *et al.* 2002, Roberts *et al.* 2002 and Mapstone *et al.* 2003 (who described a single review), Lee *et al.* 2003, Macleod *et al.* 2005a, Macleod *et al.* 2005b, van der Worp *et al.* 2005, Wilmot *et al.* 2005a, Willmot *et al.* 2005b, Hackam & Redelmeier 2006, Perel *et al.* 2007) demonstrated the poor methodological quality of many of the animal experiments examined, and no systematic reviews demonstrated good methodological quality of a majority of them.

Common deficiencies included lack of: sample size calculations, sufficient sample sizes, appropriate animal models (particularly, aged animals or those with comorbidities likely with certain diseases), randomised treatment allocation, blinded drug administration, blinded induction of injury, blinded outcome assessment, and conflict of interest statements. Some studies also used anaesthetics that may have altered experimental outcomes, and substantial variation was evident in the parameters assessed.

Raising standards: evidence-based medicine

Evidence-based medicine (EBM) bases clinical decisions on methodologically-sound, prospective, randomised, blinded, controlled clinical trials, and the gold standard for EBM is large prospective epidemiological studies, or meta-analyses of randomised, blinded, controlled clinical trials (Evidence-Based Medicine Working Group 1992). The implementation to animal experiments of EBM standards applied to human clinical trials would make results more robust and broadly applicable (Watters *et al.* 1999, Moher *et al.* 2001, Arlt & Heuwieser 2005, Schulz 2005, Perel *et al.* 2007).

Mechanisms would be needed to ensure compliance with such standards, however. Compliance could, for example, be made prerequisite for research funding, ethics committee approval and publication of results. These measures would require the education and cooperation of funding agencies, ethics committees and journals.

Fundamental constraints on the human utility of animal models

Strategies designed to increase full and impartial examination of existing data before conducting animal studies, to decrease variation in experimental environments and protocols and to increase their methodological quality, would minimise consumption of animal, financial and other resources within experiments of questionable merit and quality, and would increase the potential human utility of animal data. However, while these problems might be minimised with concerted effort, given their widespread nature, the poor human clinical or toxicological utility of many animal experiments is unlikely to result solely from such factors alone. As stated by Perel *et al.* (2007), the failure of animal models to adequately represent human disease may be another fundamental cause, which, in contrast, could be technically and theoretically impossible to overcome.

Genetic modification of animal models through the addition of foreign genes (transgenic animals) or inactivation or deletion of genes (knockout animals) has been proposed as a solution. However, as well as being technically difficult very to achieve, such modification may not allow clear conclusions due to factors such as the intrinsic complexity of living organisms and the redundancy of some metabolic pathways (Houdebine 2007). Furthermore, the animal welfare burdens incurred during the creation and utilisation of GM animals are particularly high (Sauer *et al.* 2006).

Implications for scientific validation of experimental models

Non-animal models are generally required to pass formal scientific validation prior to regulatory acceptance. In contrast, animal models are simply assumed to be predictive of human outcomes. These results demonstrate the invalidity of such assumptions, even for animal models in use for long periods. The consistent application of formal validation studies to all test models is clearly warranted, regardless of their animal, non-animal, historical, contemporary or possible future status, with appropriate consideration also given to animal welfare, ethical, legal, economic and any other relevant factors. Likely benefits would include greater selection of models truly predictive for human outcomes, increased safety of people exposed to chemicals that have passed toxicity tests, increased efficiency during the development of human pharmaceuticals and other therapeutic interventions, and decreased wastage of animal, personnel and financial resources.

CONCLUSIONS

The historical and contemporary paradigm that animal models are generally reasonably predictive of human outcomes provides the basis for their continuing widespread use in toxicity testing and biomedical research aimed at developing cures for human diseases. However, their use persists for historical and cultural reasons, rather than because they have been demonstrated to be scientifically valid. For example, many regulatory officials *"feel more comfortable"* with animal data (O'Connor 1997), and some even believe animal tests are inherently valid, simply because they are conducted in animals (Balls 2004).

However, most existing systematic reviews have demonstrated that animal experiments are insufficiently predictive of human outcomes to provide substantial benefits during the development of human clinical interventions, or in the derivation of human toxicity assessments. Of 20 reviews examining clinical utility, authors concluded that the animal models were substantially consistent with or useful in contributing to the development of clinical interventions in only two cases, and the conclusion in one case was contentious. Seven additional reviews also failed to clearly demonstrate utility in predicting human toxicological outcomes such as carcinogenicity and teratogenicity. Consequently, animal data may not generally be assumed to be of substantial use for these purposes. The poor human clinical and toxicological utility of most animal models for which data exists, in conjunction with their generally substantial animal welfare and economic costs, justify a ban on animal models lacking scientific data clearly establishing their human predictivity or utility.

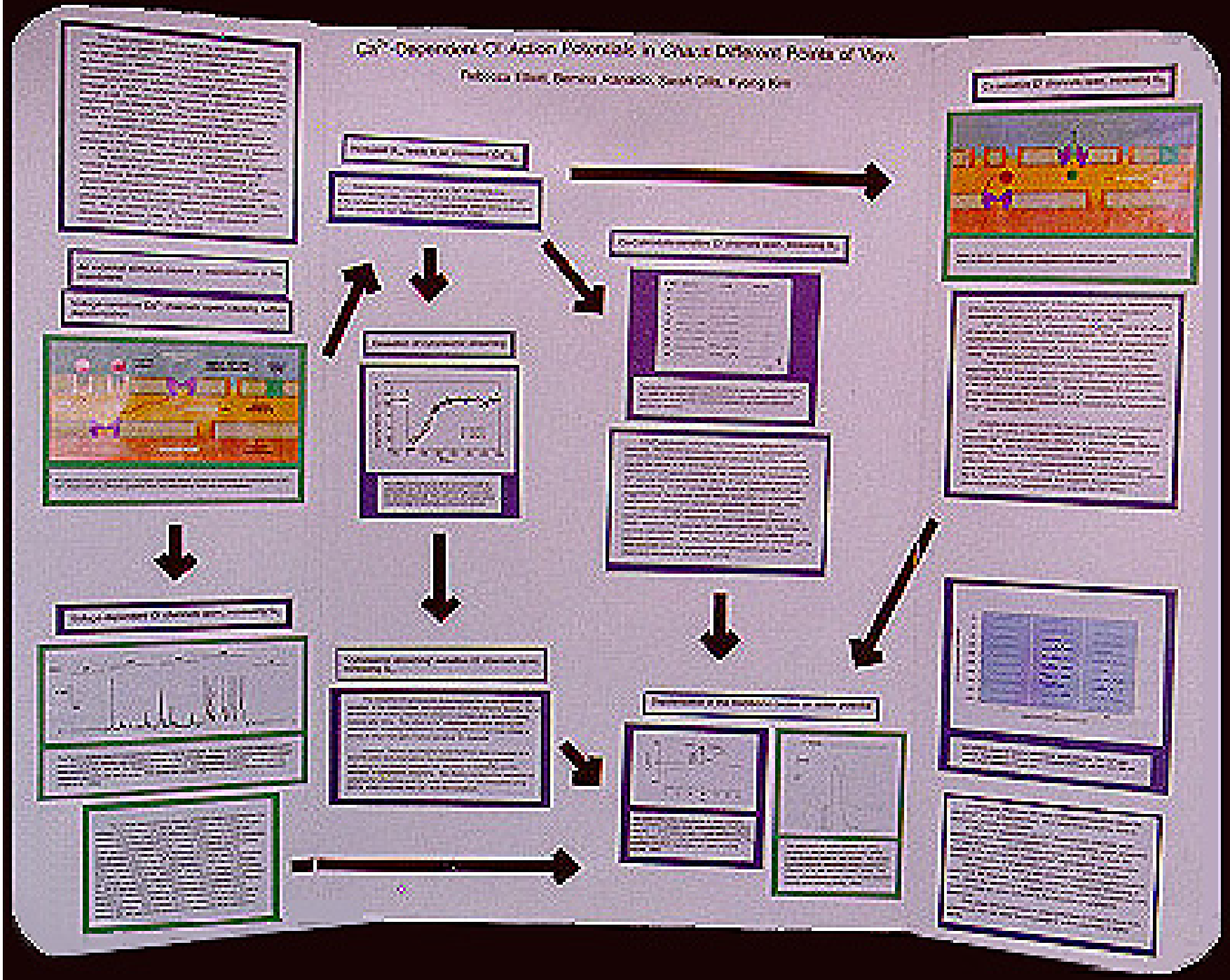
REFERENCES
Available on request.

PHOTO CREDITS
www.AnimalsVoice.com.



An example of why you should NOT use a photo or graphic as your poster background.

Text is impossible to read and potential observers would be too distracted by the image to sort through the information anyway.


Ca2+-Dependent GH Action Potentials in Cells at Different Points of Vpk

Impact of Wastewater Treatment Plant Effluent on Antibiotic Resistance in Aeromonads

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ABSTRACT

Aeromonads, gram-negative bacteria belonging to the genus *Aeromonas*, are ubiquitous in freshwater ecosystems. Some species of aeromonads are opportunistic human pathogens while others have been linked to gastroenteritis in humans. Our objective in this study was to determine whether wastewater treatment plant (WWTP) effluent contributes to antibiotic resistance in aeromonads. Little is known about the impact of WWTP effluent on antibiotic resistance, one of the world's pressing public health problems. In November 2007, Tahlequah Creek water was analyzed for the presence of antibiotics, and bacteria were isolated from creek sediments. Samples were taken upstream and downstream of the Tahlequah wastewater treatment plant. No antibiotics were detected in the water sample taken upstream of the wastewater treatment plant, but four antibiotics were detected at subtherapeutic levels in the downstream water sample: azithromycin, ciprofloxacin, ofloxacin, and trimethoprim. Bacterial isolates from the sediments were identified at least to genus by sequencing their 16S ribosomal RNA genes. Forty-five aeromonad strains were isolated from sediment samples upstream of the WWTP, and twenty-eight aeromonad strains were isolated from sediment samples downstream of the WWTP. These isolates were tested for susceptibility to the antibiotics tetracycline, trimethoprim, and ofloxacin. Seven aeromonads were resistant to trimethoprim (1 upstream, 6 downstream), 6 aeromonads were resistant to tetracycline (2 upstream, 4 downstream), and 4 aeromonads were resistant to ofloxacin (all downstream). Ofloxacin is a second generation fluoroquinolone antibiotic that was approved by the Food and Drug Administration in 1990. We believe that this is the first report of ofloxacin resistance in aeromonads in the United States. Resistance to ofloxacin is of concern because fluoroquinolones are a relatively new class of broad spectrum antibiotics that can be used to treat bacterial infections when older antibiotics fail. We also determined that four of the downstream aeromonad strains exhibited multidrug resistance while none of the upstream strains did. Although the sample size is small, the data indicates a statistically significant increase in the incidence of antibiotic resistance in aeromonads exposed to effluent from the wastewater treatment plant. The Environmental Protection Agency does not currently regulate levels of antibiotics or antibiotic resistant bacteria in effluent released from wastewater treatment plants. Our data indicates that these common components of WWTP effluent may have a significant impact on endemic bacterial populations in these ecosystems.

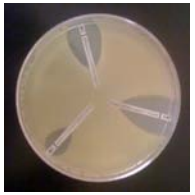
INTRODUCTION

Bacterial diseases are controlled through the use of antibiotics. Not surprisingly, antibiotics have been reported as the second most commonly prescribed class of drugs in the United States. However, antibiotics are often overprescribed or taken inappropriately. Bacteria exposed to antibiotics are constantly evolving. Increased levels of antibiotics in water, the result of widespread use in humans and in agriculture, could lead to the development and spread of antibiotic resistance in bacteria. This would pose problems for infection control and increase healthcare costs. This project examines antibiotic resistance in aeromonads in a freshwater ecosystem that receives effluent from a wastewater treatment plant (WWTP), a potential source of both antibiotics and antibiotic resistant bacteria.

MATERIALS AND METHODS

Coliform test - water

Coliform test - sediment



Antibiotic susceptibility test

Table 1. Most Probable Number Data[1] for Total and Antibiotic Resistant Coliforms in Water Samples from November 2007

				Ampicillin resistant		Ofloxacin resistant		Tetracycline resistant	
Date	Site[2]	Total coliforms	*E. coli*	Total coliforms	*E. coli*	Total coliforms	*E. coli*	Total coliforms	*E. coli*
Nov 07	T	-[3]	29.9 ± 3.1	2,550.0 ± 20.0	10.2 ± 4.5	4.2 ± 1.1	3.6 ± 0.5	1,676.7 ± 408.7	23.6 ± 2.7
	E[4]	3,986.7 ± 445.1	273.3 ± 126.7	1,689.8 ± 245.3	84.8 ± 16.0	30.6 ± 2.0	5.8 ± 0.4	341.6 ± 31.1	65.7 ± 12.9

[1]MPNs were determined in water samples using the Colisure® quantitray system (IDEXX Laboratories). Values are MPN per 100 ml water ± SEM.
[2]T is water from Tahlequah Creek sampled approximately 0.5 miles upstream of the WWTP. E is the effluent from the Tahlequah WWTP.
[3]No data available.
[4]Tahlequah WWTP was undergoing repairs on the date the effluent was sampled.

Table 2. Aeromonads Isolated in November 2007

Location	Number	Identification[1]
Upstream sediment	45	*Aeromonas* spp. *(25)*, *Aeromonas hydrophila (20)*
Downstream sediment	28	*Aeromonas* spp.*(5)*, *A. hydrophila (23)*
WWTP effluent	1	*A. hydrophila (1)*

[1]Identification is based on 16S rDNA sequences. Numbers in parentheses indicate number of isolates.

Table 3. Antibiotic Susceptibility of Aeromonads Isolated in November 2007

Location	Antibiotic	Number	Susceptible / Resistant[1]	Multidrug Resistance
Upstream sediment	Ofloxacin	45	(45 of 45) susceptible ---- 100% *none* resistant --------- 0%	none
	Tetracycline	45	(43 of 45) susceptible --- 95.6% (02 of 45) resistant -------- 4.4%	
	Trimethoprim	45	(44 of 45) susceptible --- 97.8% (01 of 45) resistant -------- 2.2%	
Downstream sediment	Ofloxacin	28	(24 of 28) susceptible --- 85.7% (04 of 28) resistant ------ 14.3%	2-resistant to ofloxacin and trimethoprim
	Tetracycline	28	(24 of 28) susceptible --- 85.7% (04 of 28) resistant ------- 14.3%	1-resistant to tetracycline and trimethoprim
	Trimethoprim	28[2]	(21 of 27) susceptible --- 77.8% (06 of 27) resistant ------- 22.2%	1-resistant to tetracycline, trimethoprim and ofloxacin

[1]E-test strips were used to determine susceptibility to antibiotics based on Clinical Laboratory Standards Institute guidelines.
[2]One isolate has not been tested.

SOCIETAL IMPACT

Antibiotic resistant pathogens are a serious threat to human health. We have determined that wastewater treatment plant effluent, a source of antibiotics and antibiotic resistant bacteria, can contribute to antibiotic resistance in downstream bacterial populations. development of best practices to reduce the amounts of antibiotics and antibiotic resistant bacteria released into the environment may help in preventing the spread of antibiotic resistance in bacteria.

RESULTS

In November 2007 four antibiotics were present in Tahlequah Creek water samples collected downstream of the WWTP: azithromycin (0.042 µg//L), ciprofloxacin (0.006 µg/L), ofloxacin (0.039 µg/L), and trimethoprim (0.024 µg/L). No antibiotics were detected upstream of the WWTP. In addition, antibiotic resistant bacteria were present in Tahlequah Creek water and in WWTP effluent (Table 1). Many bacteria collected from Tahlequah Creek sediments in November 2007 were identified as aeromonads (Table 2). Forty-five aeromonad strains were isolated from sediment samples upstream of the WWTP and 28 aeromonad strains were isolated from sediment samples downstream of the WWTP. Of these, 7 strains were resistant to trimethoprim, 6 strains were resistant to tetracycline and 4 strains were resistant to ofloxacin. Several of the downstream aeromonad isolates were resistant to more than one antibiotic and one downstream aeromonad was resistant to two additional antibiotics (Table 3). Numbers of antibiotic resistant aeromonads were compared using a chi-square contingency test with Yates correction for small sample size. There were significantly more antibiotic resistant aeromonads present in sediments downstream of the WWTP than upstream of the WWTP in November 2007 ($P = 0.011$).

DISCUSSION

- Antibiotics and antibiotic resistant bacteria were both present in this freshwater ecosystem. However, antibiotic resistant aeromonads were more likely to be found downstream than upstream of the WWTP suggesting that WWTP effluent contributes to antibiotic resistance in aeromonads.
- Roughly equal numbers of bacteria were isolated from sediments upstream and downstream of the WWTP, but the ratio of aeromonads to other bacteria was lower in the downstream bacterial population. Therefore, although more likely to be resistant to antibiotics the downstream aeromonad population appeared to be negatively impacted by the WWTP effluent.
- Four aeromonad isolates from downstream of the WWTP were resistant to ofloxacin. To our knowledge, this is the first report of ofloxacin resistance in aeromonads in the United States.

We are currently analyzing the genes responsible for antibiotic resistance in the aeromonad strains. Ultimately, we plan to quantify the rate of occurrence of horizontal transfer of antibiotic resistance in bacteria in the environment, identify the transfer mechanism(s) involved, and assess the impact of environmental reservoirs of antibiotic resistance on human pathogens and disease.

ACKNOWLEDGEMENTS

Funding was provided by the Oklahoma Center for the Advancement of Science and Technology, OHRS award HR07-124, and by NIH NCRR grant P20RR016478-08.

DISPLAYING YOUR POSTER

- Table-top or free standing
- You will be provided with at table, floor length table cloth, and two chairs
  - REMEMBER YOUR OWN PUSH PINS!!
- I chose table-top
  - Bought the easel at Hobby Lobby (around $25)
  - Bought at foam board to pin my poster to
    - Choose the correct size, you want it to look sharp
    - I bought mine at Hobby Lobby (around $5-10)

THE JUDGES

- 4-5 judges
- Judges are WELL educated, but not experts in your field of study
- All will be holding clip boards, one with a stop watch
  - It's a little intimidating, but they are very friendly
- When they walk up:
  - SMILE
  - Introduce yourself
  - Be CONFIDENT! You are the expert of your research
  - Walk them through what you have done!
- You will have 5 minutes with the judges
  - 3 minutes explaining your research
  - 2 minutes for questions

THE JUDGES

- Their questions are to re-affirm or clairfy something you said during your presentation
  - They are NOT to tear you apart!
  - Kinds of questions:
    - Procedural, Social Impacts, Future Aspirations, etc.
- Other tips for your presentation
  - Talk to the judges, don't turn your back
  - Don't chew gum
  - Keep your hands out of your pockets
  - Use more general terms
  - Be ENTHUSIASTIC!! They want to see that you are EXCITED about your research!
  - Speak calmly and clearly!

KNOW YOUR STATE LEGISLATORS!!!!!!

- This is very critical!
- They will stop by your poster and expect you to know who they are
- Explain to them your research in layman's terms making sure to EMPISIZE 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

http://www.capitolconnect.com/oklahoma/default.aspx

THIS COULD BE YOU!

Chancellor Glen D. Johnson
will present the awards at the end of the day!

Things to Remember…

- Be Enthusiastic!
- Drive the Society Impact home!
- Smile and HAVE FUN!!!!
- Judges are looking for someone who has the whole package!
  - You never know when they are watching
  - So arrive early
    - I packed everything the night before!
  - Dress professionally
  - Be prepared and mentally ready
  - Know your legislators!