

How to create an effective poster

Nadiya Dragneva

March 2014

Two ways to make a poster:

- ✓ to have someone else do it 😊
- ✓ make your own!



An **effective** poster will help you

- ✓ engage colleagues in conversation
- ✓ get your main points across to as many people as possible

An **effective** poster is

Focused: on a single message

Graphic: lets graphs and images tell the story

Ordered: keeps the sequence well-ordered and obvious

Ineffective posters suffer from easy-to-fix problems

- ✓ objective(s) and main point(s) hard to find
- ✓ text too small
- ✓ poor organization
- ✓ poor graphics
- ✓ ...



Poster Design

- ✓ Keep it simple; emphasize with visual effects
- ✓ Catchy title, prominent by-line (logos)
- ✓ Use bullets, not sentences
- ✓ Three columns for maximum flow
- ✓ Strong contrast between text and background

Poster Elements

- ✓ Abstract (NO abstract or only bullets)
- ✓ Introduction (Background)
- ✓ Objectives (clearly stated)
- ✓ Methods (minimal; use a diagram)
- ✓ Results (prominent and visual)
- ✓ Discussion (not necessary; minimize)
- ✓ Conclusions (prominent)
- ✓ Acknowledgements (very important)

O⁶-Benzylguanine Inhibits Tamoxifen Resistant Breast Cancer Cell Growth and Resensitizes Breast Cancer Cells to Anti-Estrogen Therapy

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Abstract

Endocrine therapies using anti-estrogens are least toxic and very effective for breast cancers, however, tumor resistance to tamoxifen remains a stumbling block for successful therapy. Based on our recent study on the involvement of the DNA repair protein MGMT in tamoxifen resistant (TAM^r) breast cancer cells, we have investigated whether MGMT overexpression mediates tamoxifen resistance. Specifically, we determined whether administration of MGMT inhibitor O⁶-benzylguanine (BG) at a non-toxic dose alone or in combination with tamoxifen (TAM) resensitized tamoxifen resistant breast cancer cells to tamoxifen using tamoxifen resistant cell line.

MGMT expression was found to be increased in tamoxifen resistant breast epithelial cells. Also, MGMT levels were significantly higher in tamoxifen resistant breast cancer cells compared to parental MCF-7 cells. We also observed an inverse correlation between MGMT and p53 transcriptional activity. Tamoxifen resistance was accompanied by increased MGMT expression. Other epigenetic alterations such as methylation of MGMT promoter and/or histone acetylation were not observed. However, all these treatments increased the p21^{waf1} mRNA and protein expression significantly. BG inhibited tamoxifen resistant breast cancer growth in a dose-dependent manner and it also resensitized resistant breast cancer cells to anti-estrogen therapy (TAM/ICI). These combinations also enhanced the cytochrome C release and the PARP cleavage, indicative of apoptosis. In breast cancer xenografts, BG alone or a combination of BG with tamoxifen or fulvestrant caused significant tumor growth delay and immunohistochemistry revealed that BG inhibited the expression of MGMT, ER- α , Ki-67 and increased p21^{waf1} staining. These findings suggest that MGMT inhibition may provide a novel and effective approach for overcoming tamoxifen resistance.

Introduction

Recent advances in breast cancer research have identified key pathways involved in the repair of DNA damage induced by chemotherapeutic agents. The ability of cancer cells to recognize DNA damage and initiate DNA repair is an important mechanism for therapeutic resistance and has a negative impact on therapeutic efficacy. A number of DNA-damaging alkylating agents attack the nucleophilic O⁶ position on guanine, forming mutagenic and highly cytotoxic interstrand DNA crosslinks. The DNA repair enzyme O⁶-alkylguanine DNA alkyltransferase (AGT), encoded by the gene MGMT, repairs alkylation at this site and is responsible for protecting both tumor and normal cells from alkylating agents. MGMT is expressed constitutively in normal cells and in tumor cells. In normal cells, MGMT levels are up to 4-fold higher than in the normal breast. In tamoxifen resistant breast cancer cells, MGMT levels are up to 10-fold higher than in the parental MCF-7 cells. O⁶-benzylguanine (BG) inhibited AGT and p53 transcriptional activity. In a series of important observations, BG inhibited AGT activity. They showed that BG binds AGT, transferring the benzyl moiety to the active-site cysteine [26]. The reaction is very rapid and more potent than any other previously reported DNA alkylating agents. In living cells and reacts directly with both cytoplasmic and nuclear MGMT which results in the covalent transfer of benzyl group to the active-site cysteine [26]. This stoichiometric reaction mechanism effectively depletes the AGT content in tumors and the associated repair of alkylation damage. BG is currently undergoing clinical trials in various cancer types.

Interestingly, several observations suggest that MGMT and p53 tumor suppressor protein where wild-type p53 suppresses transcription of MGMT gene expression. Unfortunately, p53 function is often inactivated or suppressed in human cancers, therefore, restoring p53 activity is essential for the success of some treatments. However, whether or not this is mediated by suppression of MGMT expression has yet to be determined. To date, the cross-talk between MGMT and ER- α (and the link to p53 expression) has not been explored in drug (i.e., tamoxifen) resistant breast tumors. The anti-estrogen tamoxifen is the most commonly used treatment for patients with estrogen receptor positive breast cancer. Although many patients benefit from tamoxifen in the adjuvant and metastatic settings, resistance to this endocrine therapeutic agent is an important clinical problem. The primary goal of present study was to investigate the mechanisms of anti-estrogen drug resistance and to design new therapeutic strategies for circumventing this resistance. The results show that MGMT expression is increased in TAM-resistant breast cancers and inhibition of MGMT by BG significantly improves TAM-sensitivity.

Results

Prolonged Treatment of Tamoxifen Increases MGMT Expression: We developed a tamoxifen resistant MCF-7 cell line by using prolonged treatment of tamoxifen on the parental ER-positive breast cancer cell line, MCF-7. Tamoxifen-resistant MCF-7 cells proliferate at rates similar to the parental MCF-7. Prolonged treatment of tamoxifen onto MCF-7 cells increased MGMT expression compared to parental MCF-7 cells by 2 fold (Fig.1).

Knocking Down ER α Enhances MGMT Expression in Tamoxifen Resistant Breast Cancer Cells: It is not known whether ER α and MGMT transcriptionally regulate each other in tamoxifen resistant breast cancer cells. We therefore investigated whether down regulation of ER α has any effect on endogenous MGMT expression in these cells. As expected, downregulation of ER α using specific siRNA significantly reduced ER α protein levels in these cells. Western blot analysis was performed and the results in the left panel (Fig. 2A) shows that silencing of ER α increases MGMT expression in these cells, and interestingly, the results in the right panel (Fig. 2B) show increased MGMT mRNA levels were increased as assessed by qRT-PCR. These data suggest that ER α -mediated signaling functions to repress MGMT gene expression in breast cancer cells.

Transcriptional Regulation between MGMT and p53: Previously, it was reported that p53 negatively regulates MGMT in breast cancer cells. Therefore, we addressed whether or not silencing the p53 enhances endogenous MGMT transcription. Tamoxifen resistant MCF-7 cells were transfected with either p53 siRNA (p53-KD) (Fig. 2C) or MGMT siRNA (MGMT-KD) (Fig. 2D) along with Non-specific siRNA (NS). MGMT expression was consistently increased in p53 knock down cells, with different experiments showing a ~ 3 fold augmentation (Fig. 2A) and as expected, knocking down MGMT decreased MGMT transcription where as p53 siRNA levels were unaffected in MGMT knockdown cells (Fig. 2D). These results confirm that p53 can regulate MGMT at the transcriptional level.

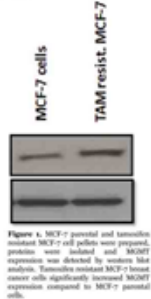


Figure 1. MCF-7 parental and tamoxifen resistant MCF-7 cell cultures were prepared. Protein levels were induced and MGMT expression was determined by Western blot analysis. Tamoxifen resistant MCF-7 breast cancer cells significantly increased MGMT expression compared to MCF-7 parental cells.

O⁶-Benzylguanine Plays a Dual Role in Tamoxifen Resistant MCF-7 Cells: Contrasting with the experiments above, next, we studied whether or not knocking down MGMT has any effect on ER α transcription. As expected, knocking down MGMT decreased MGMT gene transcripts. However, it was interesting to find that ER α gene transcription was also reduced after MGMT silencing (Fig. 2E). These data demonstrate that BG has the ability to attenuate the not only the MGMT, but also the ER α transcription, indicating a possible dual role for MGMT blockers in these breast cancer cells.

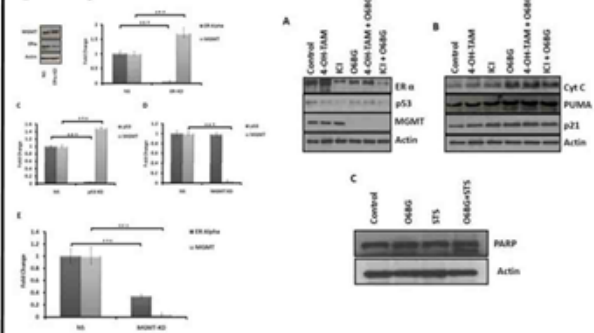


Figure 2. (A) Tamoxifen resistant MCF-7 breast cancer cells were treated with ER α siRNA (ER α -KD) and Non-specific siRNA (NS) for 48 hours. (B) MCF-7 breast cancer cells were treated with MGMT siRNA (MGMT-KD) and Non-specific siRNA (NS) for 48 hours. (C) Total RNA was isolated from non-specific siRNA (NS) (control) and MGMT siRNA (MGMT-KD) knock down cells. (D) Total RNA was isolated from non-specific siRNA (NS) (control) and p53 siRNA (p53-KD) knock down tamoxifen resistant MCF-7 breast cancer cells. (E) Total RNA was isolated from non-specific siRNA (NS) (control) and MGMT siRNA (MGMT-KD) knock down tamoxifen resistant MCF-7 breast cancer cells. MGMT and p53 transcription was determined by qRT-PCR. There is an inverse correlation between MGMT and p53 in tamoxifen resistant breast cancer cells (C & D).

O⁶-Benzylguanine Modulates p53 Down-Stream Targeted Protein Expressions: Encouraged by the results reported, we investigated the effect of combination therapy on endogenous MGMT, p53, and ER α protein expressions. As expected, BG decreased MGMT expression, while combination therapy (4-OH-TAM or ICI combined with BG) significantly decreased both MGMT and ER α expressions. BG alone or in combination with tamoxifen or ICI decreased ER α expression, whereas tamoxifen alone and ICI alone increased and decreased the same respectively (Fig. 3A). p53 expression was slightly altered after ICI treatment. The reduction in p53 expression by ICI alone was reversed when BG was combined (Fig. 3A). We investigated the effect of BG on proteins which are involved in cell cycle regulation, apoptosis in tamoxifen resistant breast cancer cells. All these treatments significantly increased the p21^{waf1} protein expression (Fig. 3B). PUMA expression was also increased with these treatments. Hence, PUMA may have translocated to the mitochondria, cytochrome C is released (Fig. 3C), and apoptosis was triggered in these cells in presence of combination therapy. PARP cleavage is seen in BG treated cells in presence of staurosporin as an indicative of apoptosis (Fig. 3C). Therefore, this data suggest that BG promotes cell cycle arrest and can induce apoptosis by modulating p53 function.

O⁶-Benzylguanine Modulated Transcriptional Targets in Tamoxifen Resistant Breast Cancer Cells: The effect of combination therapy on endogenous MGMT mRNA levels was also studied. Quantitative real-time PCR (qRT-PCR) revealed that anti-estrogen (TAM/ICI) increased the MGMT expression while the combination therapy decreased it compared to control levels. ER α transcription was decreased compared to controls with all these treatments (Fig. 4A). Surprisingly, p21 and PUMA mRNA was significantly increased in the presence of combination treatments (Fig. 4B & C). These results suggest that p53 mediated target gene transcription is enhanced by combination therapy.

O⁶-Benzylguanine Enhances p21 Transcriptional Activity in Tamoxifen Resistant Breast Cancer Cells: In order to investigate the effect of BG on p53 function, we performed luciferase reporter assays. Tamoxifen resistant MCF-7 breast cancer cells were transfected with p21 luciferase reporter construct in presence or absence of BG (large amount of p53). These results clearly demonstrate that BG significantly enhanced p21 transcriptional activity by 2 fold in these cells (Fig. 4D).

Figure 4. Tamoxifen resistant MCF-7 breast cancer cells were treated in presence or absence of BG (100 μ M) for 48h and later 4-OH tamoxifen and ICI (400nM) were either alone or in combination with BG and high later cells were harvested and total RNA was isolated. (A) MGMT and ER α (B) p21 transcription (C) PUMA transcription was determined by qRT-PCR. 4-OH tamoxifen and ICI induces MGMT transcription. BG induced PUMA and p21 transcription. (D) Tamoxifen resistant MCF-7 breast cancer cells were transfected with p21 luciferase reporter and later treated with BG and high later cells were harvested. p21 transcriptional activity was significantly increased by BG in these cells.

O⁶-Benzylguanine Inhibits Tamoxifen Resistant Breast Cancer Cell Growth and Increase Resistant Breast Cancer Cell Sensitivity to Anti-Estrogen Therapy (TAM/ICI): Detailed xenograft revealed that all the mice had tumors in the breast. The data summarized in Table 1 show the daily BG alone or in combination with twice weekly tamoxifen/ICI significantly decreased median tumor volume and weight as compared with that seen in tamoxifen treated and control mice. The combination of BG with tamoxifen or ICI produced the greatest decrease in median tumor volume as compared with control mice (85.99 mm³, 9.35 mm³ (TAM-BG), respectively; p < 0.0001, 0.0003, 99 mm³, 31.60 mm³ (ICI-BG), respectively; p < 0.0001). Tumor weight was also significantly reduced in all groups with combination therapy as compared with control mice (18.23 mg, 22.30 mg, 17.33 mg, respectively; p < 0.0001, 0.0001, 22.30 mg, 17.33 mg, respectively; p < 0.0001). Body weight was not changed among all treatment groups as compared with control mice. No visible liver metastases were present (microscope) in all treatment groups.

Bioluminescence Imaging and the in vivo effects of BG (alone or in combination) with tamoxifen/ICI: Tumors harvested from different treatment groups were processed for routine histological and IHC analysis. Tumors from mice treated with BG alone or in combination with tamoxifen/ICI exhibited a significant decrease in MGMT, ER α , Ki-67 as compared with tumors treated with tamoxifen/ICI alone or control group. p53 expression was not much altered in these treatment groups. In sharp contrast, the expression of p21 was significantly increased in tumors from mice treated with BG either alone or in combination with tamoxifen/ICI. The images were analyzed by ImageJ (NIH) and MGMT, ER α , p53, p21 and Ki-67 expressions were quantified by the Immunostain Ratio plugin (Fig. 5).

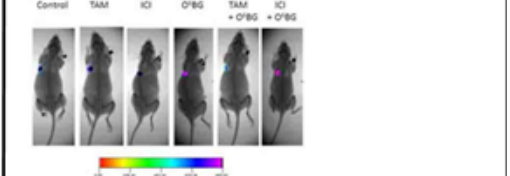
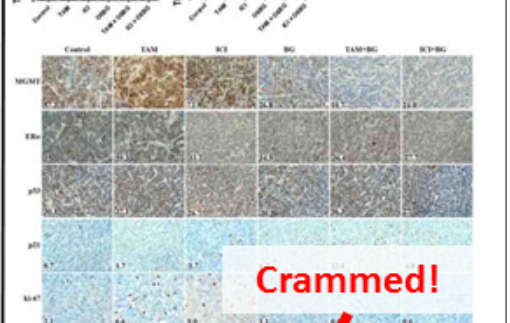


Figure 5. Tumors were harvested from control mice and mice treated with tamoxifen/ICI, BG, or both tamoxifen/ICI and BG. The sections were immunostained for expression of MGMT, ER α , p53, p21 and Ki-67. Tumors from mice treated with p53, p21 and Ki-67 in combination with tamoxifen or ICI had a significant decrease in the expression of MGMT, ER α and Ki-67. p53 expression was not much altered in these treatment groups. In sharp contrast, expression of p21 was significantly increased in all these treatment groups compared to controls. Representative samples (40X) are shown.



Conclusions

- In the present study, we observed that prolonged treatment with anti-estrogens causes drug resistance by inducing the DNA repair protein O⁶-methylguanine DNA methyltransferase (MGMT).
- Decreasing the expression of MGMT by exposing breast cancer cells to BG sensitized these cells to anti-estrogen therapy (tamoxifen and ICI) (82, 78%).
- We also observed that combination therapy of anti-estrogen and MGMT blockers not only overcome the MGMT derived drug (tamoxifen and ICI) resistance but also increased the efficacy of anti-estrogen therapy by decreasing estrogen receptor expression and restoring the functional activity of p53 in tamoxifen-resistant breast cancer cells.
- Combination therapy inhibited tamoxifen resistant breast tumor growth in vivo.

Acknowledgements

We would like to thank the Florida Department of Health, Breast/End-Cancer Research Program (CRR) to be the funding of this project.

Posters rarely need abstracts

Text dissolves into intimidating, boring gray

Too small and too much

Caption not aligned with figure

Crammed!

Crammed!

Too much text, poor organization, boring

Title, formatted in sentence case (Not Title Case and NOT ALL CAPS), that hints at an interesting issue and/or methodology, doesn't spill onto a third line (ideally), and isn't hot pink

Colin Purrington

666 Teipai Street, Posterville, PA 19801, USA

Introduction

Your reader was mildly intrigued by the title, but you have exactly two sentences to hook them into reading more. So describe exactly what your interesting question is and why it really needed to be addressed. Gratuitous background information will cause them to walk away.

Typography research has shown that text is easier to read if you use a serif font such as Times. But use a non-serif font for title, headings, etc., to subtly tag them as different. Research has also shown that fully justified text (like this paragraph) is harder to read, so don't do this, even if it seems cool and professional looking.



Figure 1. A catchy photograph can help lure people to your otherwise boring poster. Yes, I missed my life getting this shot.

Materials and methods

Few people really want to know the gruesome details of what you've been up to, so be brief. And be visual. Use a photograph, drawing, or flow chart if possible, supplemented with only a brief overview of your procedure.

If you can somehow attach an object, an iPad, etc., that can involve viewers in active way, do so. Refer to the companion website (see bottom right section) for more ideas if you are creatively challenged.



Figure 2. Hand-drawn illustrations are preferable to computer-generated ones. Just to be or flirt with an artist to get them to help you out. A photograph of you actually doing something might be nice.

Literature cited

Hender, D.J., E.M. Hayes, and R.M. Brigham. 1996. Lunar condition influenza response (Cassio Jarvis) bowling. *American Mallard Quarterly* 136:413-417.

Brooks, L.D. 1988. The evolution of recombination rates. Pages 87-103 in *The Evolution of Sex*, edited by R.E. Michod and B.R. Levin. Sinauer, Sunderland, MA.

Scott, R.C. 2003. Evolution vs. Creationism: an Introduction.

Results

The overall layout in this area should be visually compelling, with clear cues on how a reader should travel through the components. You might want a large map with most graphs. Or have questions on left and answers with supporting graphs on right. Be sure to separate figures from other figures by generous use of white space. When figures are too cramped, viewers get confused about which figures to read first and which legend goes with which figure. Cramped content just looks bad, too. The big thing to remember is that a Results section on a poster does not need to look like a Results section on a manuscript, so feel free to be creative.

If you can add small drawings or icons to your figures, do so — those visual cues can be priceless aids in orienting viewers. And use colored arrows or callouts to focus attention on important parts of graphs. You can even put text annotations next to arrows to tell reader what's going on that's interesting in relation to the hypothesis test. E.g., "This outlier was most likely caused by contamination when I sneezed into tube." Also, don't be afraid of using colored connector lines to show how one part of a figure relates to another figure.

Figures are preferred but tables are sometimes unavoidable, like death. If you must include one, go to great efforts to make it look professional. Look in a respected journal and emulate the layout, line types, line thickness, text alignment, etc., exactly. A table looks best when it is first composed within Microsoft Word, then inserted as an Object. Use colored text or arrows to draw attention to important parts of the table.

Paragraph format is fine, but so are bullet lists of results:

- 9 out of 12 brainexamined rats survived
- Brainexamined rats are less
- Control rats completed more faster, on average, than rats without brains

This sample results section is way too wordy, in case you were wondering.

Do treatments differ in their effects?

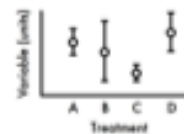


Figure 3. Legends can describe the experiment, answer the question, and even include statistics if you so choose (unlike a manuscript figure legend). And be brief.

Do As and Bs respond differently to X?

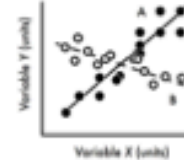


Figure 4. Label elements instead of relying on annoying keys that are defaults on most software. Add pictures of A and B if they are actually things (e.g., icons of aster and begonia flowers).

Are medians of treatment A and D different?



Figure 5. For the love of God, don't be tempted to reduce font size in figure legends, axes labels, etc. Your viewers are probably more interested in reading your figures and legends.

Conclusions

Conclusions should not be mere reminders of your results—that would be boring. You want to guide the reader through what you have concluded from the results, and you need to make the first several sentences understandable on their own and interesting...because many conference attendees will start reading this section first. If you don't hook them, they'll walk. These first several sentences should refer back, explicitly, to the burning issue mentioned in the introduction. (If you didn't mention a burning issue in the introduction, go back and fix that.)

A good conclusion will also explain how your conclusions fit into the literature on the topic. E.g., how exactly does your research add to what is already published on the topic? It's important to be humble and generous in this section, so assume that authors of previous literature may be at the conference, and further assume they are credible and influential. You can also draw upon less formal types of contact such as conversations you have had with smart and important people (God, personal communication).

Finally, you want to tell readers who have lasted this long what needs to be done next, and who should do it. E.g., are you taking the next logical step, or should another discipline follow up on your amazing result? It's OK to put a bit of personality into this ending because viewers expect posters to be personal, and if you're not actually standing there to convey your enthusiasm, your poster should be doing that for you.

If you have a graphical way to express the next iteration of your hypothesis, by all means include it. For example, you might make a graph of hypothetical data that shows an expected result in a future experiment. That's something you couldn't do in a traditional manuscript, but it's totally fine for a poster.

If you're curious, this poster has 876 words (just look in File Properties to get this statistic). Aim for 500 words. If you are above 1000 words, your poster will be avoided.

Further information

More tips can be found on "Designing conference posters," at <http://colinpurrington.com/tips/wacacmic/poster-design>. Note that URLs should always be stripped of any automatic hypertext formatting (right-click, then "remove hypertext").

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Acknowledgments

We thank I. Grier for laboratory assistance, Mary Juana for seeds, and Herb beside for greenhouse care. Funding for this project was provided by the Department of Theology. (If you want to clutter your poster with annoying logos, shrink them down so that they can fit inside this area without smothering text) too much. Note that people's titles are omitted...this is TMI.

Modelling Molecular Mechanisms of Biocompatibility of Synthetic Materials

N. Dragieva, W. B. Flanagan, D. Sauter, R.C. Mawhinney, M. Ulanova, S. French, Y. MacKinnon, G. Fanchini, G. Rubel



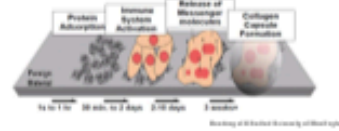
Thunder Bay Regional Research Institute, 260 Munro St, Thunder Bay, ON, Canada
 Lakehead University, 930 Oliver Road, Thunder Bay, ON, Canada
 Northern Ontario School of Medicine - West Campus, 881 Oliver Road, Thunder Bay, ON, Canada
 Thunder Bay Regional Health Sciences Centre, 880 Oliver Road, Thunder Bay, ON, Canada
 *Registered, 260 Munro St, Thunder Bay, ON, Canada
 *Physic & Astronomy, University of Western Ontario, 1187 Richmond St, London, ON, Canada



INTRODUCTION



Biocompatibility = Protein + Surface Interaction



Graphene as a biomaterial

1. Functionalization (chemical groups)
2. Easily manufacturable, low cost
3. Flexibility
4. Great strength
5. Adaptability to irregular surfaces
6. Antibacterial properties
7. Biocative (as natural growth factor: G - ideal material for experiment with adherent cells (osteoblasts) due to strong noncovalent binding abilities of G)

However: inconclusive evidence of Graphene toxicity

Material	In vitro	In vivo
G	No cell attachment No cell aggregation High generation of ROS	No cell attachment No cell aggregation No inflammatory response
GO	No significant apoptosis Decrease of cell adhesion Cell apoptosis	No cell changes No cell aggregation Apoptosis, strong and fast
rGO	Reduced cellular aggregation Reduction of cell toxicity	Less effective in general Apoptosis

OBJECTIVES

METHODS

Objectives: Understanding of biocompatibility and bioadhesion mechanisms of biomolecules at the surface of Graphene at atomic level
 Methods: YASARA package, Molecular Dynamics: AMBER03 force field
 Computational resources: Feynman - 296 CPU Linux cluster

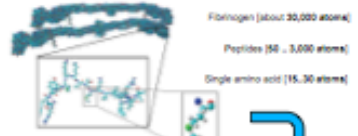
$$E_{tot} = \sum_{i,j} \left[\frac{1}{r_{ij}} - \frac{1}{r_{ij}^{12}} \right] + \sum_{i,j,k} \left[\frac{1}{r_{ij}^2} - \frac{1}{r_{ij}^6} \right] + \sum_{i,j,k,l} \left[\frac{1}{r_{ij}^3} - \frac{1}{r_{ij}^{12}} \right] + \sum_{i,j,k,l} \left[\frac{1}{r_{ij}^4} - \frac{1}{r_{ij}^{12}} \right]$$



$$E_{tot} = (E_{tot})_{total} - (E_{tot})_{natural} - (E_{tot})_{natural}$$

RESULTS DISCUSSION

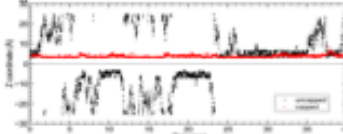
Graphene-amino acids in vacuum/water



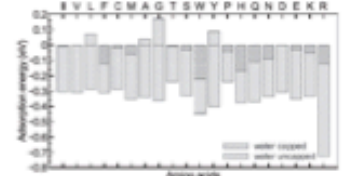
1. Modeled uncapped and capped amino acids.
2. To mimic the behavior of amino acids as a part of a peptide chain, the ends of the amino acids were terminated.
3. Modeling amino acids at the surface of Graphene in explicit water environment provides a more realistic description of biomolecular interactions with artificial surfaces.
4. Obtained results are attributed to a desolvation effect, which is generally expected to reduce the affinity of amino acids to a surface in the presence of solvents.

Simulation conditions:
 T = 317°C
 NaCl 0.9%
 pH 7.0
 Pressure control

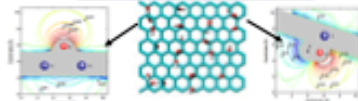
Distance of Capped vs Uncapped amino acids from Graphene surface



Adsorption energies for Capped vs Uncapped amino acids



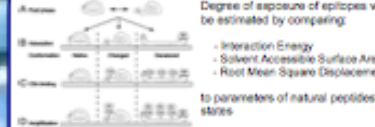
Graphene Oxide Charge Model



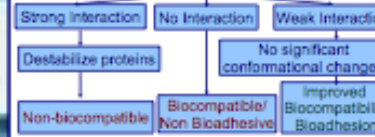
1. The analysis shows that the stability of amino acids on Graphene Oxide is highly dependent on the chosen charge model.
2. The results for the adsorption energies for 20 amino acids correlate with experimental values.

FUTURE WORK

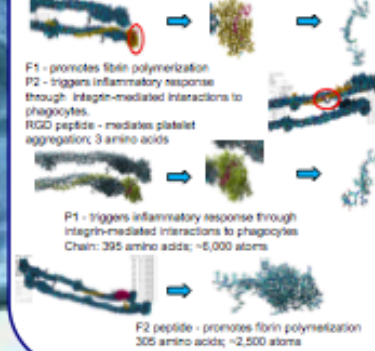
Biocompatibility of Graphene and Graphene Oxide



Conformational Changes



Reasons for implant rejection at the atomic level



SUMMARY

Results:
 1. The interaction of proteinogenic amino-acids with Graphene surface has to be simulated in the presence of explicit solvent [Dragieva et al. J. Chem. Phys. **139**, 174711 (2013)]

2. The charge model based on ab initio electrostatic potential of -O and -OH functional groups at the surface of Graphene Oxide was obtained. As well as the interaction of 20 amino acids and Graphene Oxide was described. [manuscript is ready to submit]

Future work:
 1. Model the behavior of Fibrinogen functional peptides at the surface of Graphene and Graphene Oxide sheets
 2. Compare results to experimental evidence: 1) adsorption to hydrophobic and 2) no-interaction at hydrophilic surfaces.



Define your message

- ✓ All visuals and text should relate to message
- ✓ convey a clear message and support it with a combination of images and short blocks of text.
- ✓ Focus on your message
- ✓ Be bold & be explicit
- ✓ If you have an interesting result ->in the title
- ✓ Not repeating the results, state interpretations in the conclusion

Visual Grammar

- ✓ shows, not tells
- ✓ avoids visual chaos that distract the viewer
- ✓ uses a visual logic, with an hierarchical structure that emphasizes the main points
- ✓ displays the essential content in the title, main headings and graphics
- ✓ All elements, including figure legends, are visible from 4 feet away
- ✓ The main headings explain the points, rather than merely stating "results"

Headings

- ✓ to orient readers
- ✓ summarize your work in large letters. A hurried reader should be able to get the main points from the headings alone.
- ✓ organize: good headings are part of the visual grammar that helps move readers through your poster.
- ✓ Be hierarchical: the more important the point, the larger the type.
- ✓ Be Bold: make the strongest statements your research allows.

Planning

- What's my message? You must be able to state your main point(s) and conclusion(s) clearly.
- How much room do I have? Determine specific size requirements.
- What milestones should I establish? Allow time for peer review and heavy editing.

Planning



When

What

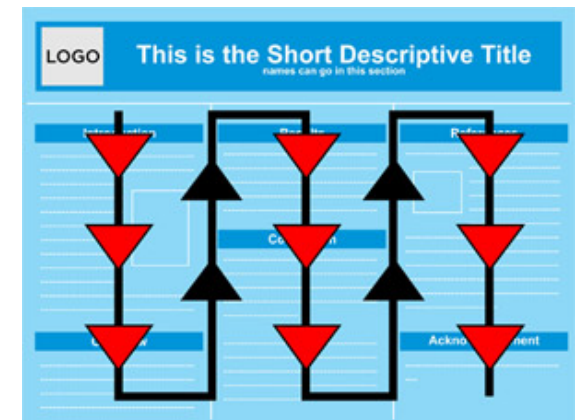
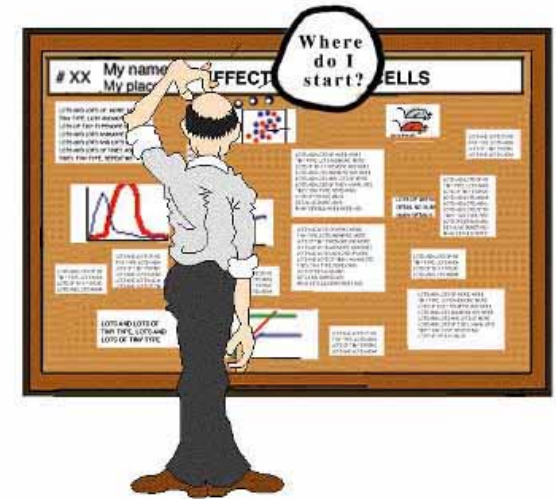
- 0 Present poster
- 1 week Final print
- 1 week Make changes suggested by peers
- 1 week Distribute draft for peer review (round 2)
- 2 weeks Make changes suggested by peers
- 2 weeks Distribute draft for peer review (round 1)
- 3 weeks Edit your draft ruthlessly
- 3 weeks Create first draft of poster
- 4 weeks Plan out poster on scratch paper
- 4 weeks Define message and write an abstract (if you haven't already done so)

Focus

- ✓ Stay focused on your message. Simple messages are more memorable.
Details distract from the main point, and can be supplied in person as needed.
- ✓ which details are absolutely essential for conveying your message. The most common problem is too much focus on methods.
- ✓ Edit text carefully, reduce sentence complexity.

Layout

- ✓ column format to make -> easier to read in a crowd
- ✓ organization cues to guide readers through poster
- ✓ "reader gravity" which pulls the eye from top to bottom and left to right
- ✓ balance the placement of text and graphics to create visual appeal
- ✓ white space creatively -> define the flow of information



Repetition priming of faces depends on attentional load and emotional valence at encoding

Alejandro de la Vega & Marie Banich
Department of Psychology and Neuroscience



Background

Emotional information is prioritized...

- Fast & interferes with perception
- Produces involuntary responses

... but is it processed automatically?

- "Independently of attention"
- Traditional view – emotional processing is automatic
 - Amygdala activation (marker of emotional processing) not modulated by spatial attention (task relevant vs irrelevant) for fearful faces¹
- Alternative view – some attention is necessary
 - If attentional resources are fully exhausted, amygdala activation abolished²

Need more behavioral measures of processing

- Brain activation overly relied to infer processing³
- Term "processing" is not well characterized
- In particular, how is future behavior affected by unattended emotional stimuli?

Repetition priming (RP) – candidate measure

- Facilitation in the processing of a stimulus following previous processing of the stimulus
- Can reflect "subattentive" processing
- Informs on future behavior

Present Study

Aims

- Determine degree to which emotional distractors are processed automatically and how this depends on attentional load
 - Use repetition priming as processing measure
- What type of processing is affected by a previous exposure to a stimulus?
- Modulate attentional load using bar orientation task & test future behavior using judgment

Experiment 1 - (n=24) Judgment

- Basic superficial judgment

Experiment 2 - (n=22) Smartness rating (1-7 scale)

- "High level" subjective rating

Methods



Experiment 1 Results

- More negative RT % change for fearful faces than neutral faces
 - -2% (fearful) vs -43% (neutral)
 - Follow up did not replicate
- Limitations:
 - Small cell size (12)
 - Low overall repetition priming
 - Too many total trials (144)
 - Task too low level
- In Experiment 2:
 - Increased cell size to 16
 - Lower total trials to 114
 - Changed RP task

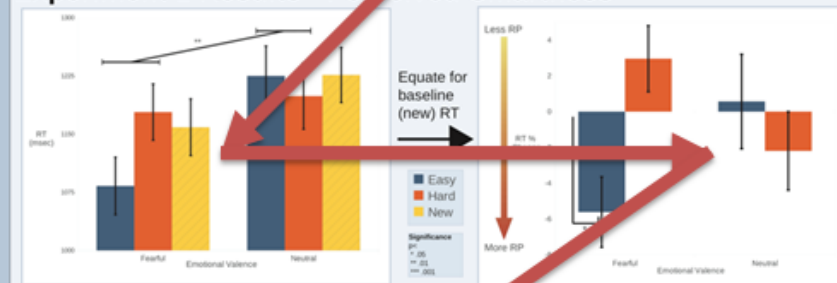
Population Check

- Excluded subjects with:
 - Accuracy over 75% on Hard blocks
 - Difference between Easy & Hard accuracies < 25%
 - RT for Hard trials (600ms) > Easy trials (560ms)***
 - Task difficulty successfully manipulated
 - Same for both experiments

Preprocessing - Repetition Priming

- Outliers - Excluded cells with Cook's D > 4/n
- Adjusted for baseline differences between emotional conditions in RP task
 - RT % Change = (Old RT - New RT) / New RT
 - Ex: (Fearful/Easy RT - Fearful/New RT) / Fearful/New RT

Experiment 2 Results - Perceived Smartness



RT: Subjects were faster to rate fearful faces than neutral faces**

- Emotion x Difficulty interaction*
- Rating: Fearful faces were rated as less smart (3.2) than neutral (4.1)***
- No main effect of load or interaction with emotion

After equating for baseline differences +

- Emotion x Difficulty interaction*
- Post-hoc t-test - only fearful easy condition > 0*
- Only fearful faces in easy condition faster than baseline

Conclusions

- High load - distractors *not* processed enough to change future processing
- Low load - very little processing of distractors occurs, but leftover resources -> fearful faces processed
 - Not very deep processing - responses are unmodulated
- Processing of emotional distractors is modulated by attentional load
 - At least some aspects of their processing is *not* automatic

Acknowledgements

Luka Ristic - scripts, design, adaptive staircase
Alex Anderson - assistance with design
Tim Curran - advice

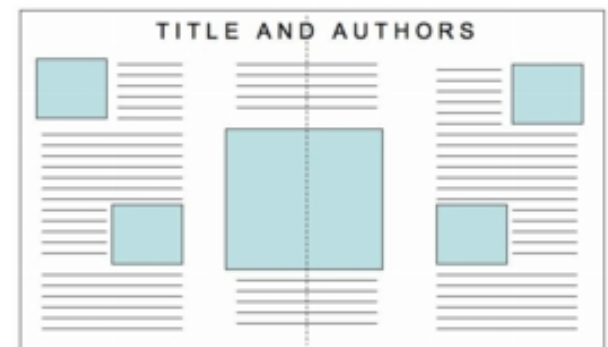
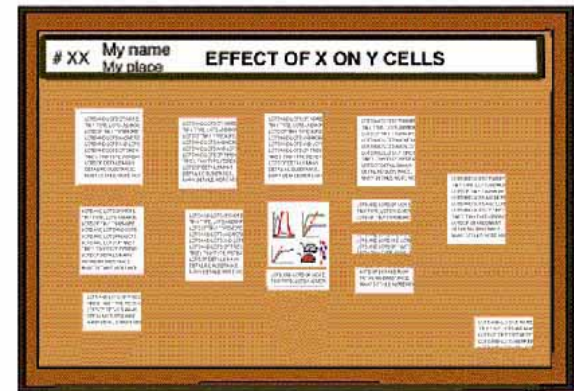
References

1. Pessoa, L., Padmanabhan, V., & McLeod, B. L. (2002). Brain activity associated with automatic fearful faces in the amygdala is modulated by task demands. *Journal of Cognitive Neuroscience*, 14(12), 1815-1828.
2. Yeshenko, S., Aron, A. R., & Smith, C. J. (2010). Effects of attention and emotion on face processing in the human brain. *NeuroImage*, 50(2), 1014-1024.
3. Ochsner, K. N., & Gross, J. J. (2005). The cognitive control of emotion. *Trends in cognitive sciences*, 9(2), 142-6.

contact: delavega@colorado.edu

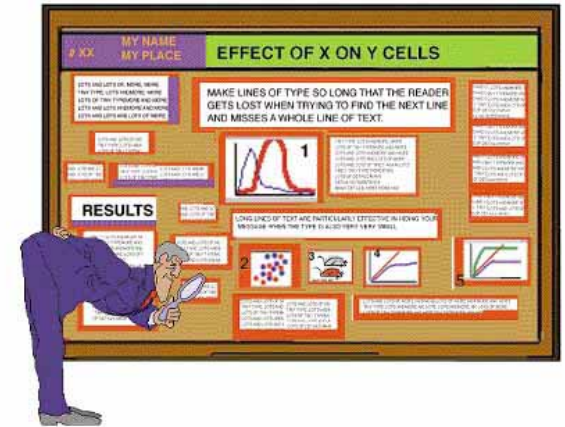
Graphics

- simple and clean
- explanations directly on figures, instead of referencing from elsewhere
- Use simple 2-dimensional line graphs, bar charts, pie charts
- Text on graphs must be visible too



Text

- ✓ Minimize text - use images and graphs
- ✓ Keep text elements to 50 words or fewer
- ✓ Phrases rather than full sentences
- ✓ Use an active voice, avoid jargon
- ✓ Left-justify text; avoid centering and right-justifying text.
Use a serif font (e.g., Times) easier to read
- ✓ Text should be at least 24 point in text, 36 for headings
- ✓ text size in figures - it must also be large
- ✓ Title should be at least 5cm tall
- ✓ you, who are familiar with the material, should easily read it from 6 feet



Color

- ✓ Use a light color background and dark color letters for contrast
- ✓ Avoid dark backgrounds with light letters - very tiring to read
- ✓ Stick to a theme of 2 or 3 colors - much more will overload and confuse viewers
- ✓ Overly bright colors will attract attention - and then wear out readers' eyes
- ✓ Consider people who have problems differentiating colors, especially when designing graphics (inability to tell green from red)

No contrast, mixed up

**INSERT YOUR POSTER TITLE
ON THESE LINES HERE**

Name of Author
Department Name and Institution Name can go here

BACKGROUND

- Insert your text here. You can change the font size to fit your text.
- You can also make this text shrink or grow with the amount of text. Simply double click this text box, go to the "Text Box" tab, and check the option "Resize AutoShape to fit text".
- The background of this template may appear blue on your screen, but it does print lavender.
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RESULTS

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MATERIALS AND METHODS

Title One
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Title Two
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Title Three
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PURPOSE

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CONCLUSIONS

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REFERENCES

1. Reference here
2. Second reference
3. Third reference

Improved



Medical Research Poster: Looking Good

Nancy Doright
Department of Nursing, GoodHeart Hospital



BACKGROUND

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- Title Three**
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Your caption can go here.



Your caption can go here.

Title Can Go Here

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RESULTS

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CONCLUSIONS

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REFERENCES

1. Reference here
 2. Second reference
 3. Third reference
- Insert your acknowledgments here. This research supported by...



Ryedale Flood Research Group

Poster 4: Floods – have we never had it so bad?



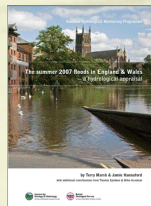
Flood histories – a national perspective

1998, 1999, 2000, 2001, 2003, 2004, 2007, 2008 ...and on and on and on. We seem to be living in a period of unprecedented flood risk, one related to climate change:

Prime Minister's Question Time on the 25th July 2007, immediately in the aftermath of the Central England flooding (Hansard, Volume 463, Part 130, Column 834) -

Sir Menzies Campbell: "The Prime Minister was responsible for the establishment of the Stern review, which he will recall pointed out the severe economic consequences of climate change. Is it not clear from the events of the past few weeks that we cannot afford not to take the necessary steps or indeed, not to spend the necessary money, in order to mitigate the effects of climate change?"

The Prime Minister: "The right hon. and learned Gentleman is right. The Stern report, which the Treasury commissioned, said that global warming is very likely to intensify the water cycle and increase the risk of floods. It is an accepted part of the Stern recommendations that we have to do more..."



**Or are we?
How does this stand up to scrutiny?**

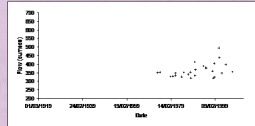
A day to remember: Pickering – 26th June, 2007. A boy surveys the flooding at the bottom of Park Street. Is this the worst it has ever been? And is climate change causing it?
(Photo by Rita Bagh)



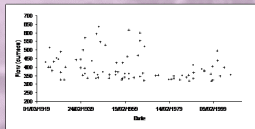
© Mike High 2007, *Walking On Water*, Pickering

Records from water recorders

The River Severn Record from 1965 to present suggests a rising trend →



The full River Severn Record - things were much worse before 1965 →



The data problem

The plots above illustrate a serious problem, which influences our perception of flooding and flood risk. Only c. 7% of our rain gauge records go back to before 1960. Our data is biased to a flood poor period. This is probably why the current wave of flooding seems so bad.

Evidence from other sources of data

The possibility that, until the late 1990s, we had become used to living in a flood poor period is supported by other evidence, such as historical accounts, if we allow them to be used in analyses. For instance, the British Hydrological Society has a register of historical flood events that runs into the 1940s, based upon reported flooding (e.g. in newspapers). These data suggest that we go through runs of flood rich periods and runs of flood poor periods.

This shows us that there are other dimensions to the story, such as those to be found in historical and contemporary accounts of what it was like to live with floods. In this respect, 1947 & 2007 make an interesting comparison in that they were both years when the nation, as opposed to regions or districts, experienced flood risk ...

1947 versus 2007: 60 years of social change

Looking back over this period, we find evidence of how our approach to floods has changed. In particular, two government publications, one called *Harvest Home*, published in 1947 by the then Ministry of Agriculture and Fisheries, the other from the Review of the 2007 flood events led by Sir Michael Pitt, serve to illustrate this →

Living with floods in 1947 Evidence from <i>Harvest Home</i>	Living with floods in 2007 Evidence from the Pitt Review
"Every stretch of floodbank is assigned two or three men who live near by – many of them volunteers – whose task is simply that of any patrol in a battle, to give warning of movement by the enemy."	"In 1947 were the last floods, and with modern technology there shouldn't be any floods round here..." (Householder, Doncaster)
"Not long after, the order went out 'Patrol!'. On every river bank the patrolmen set out from their homes, which some were not to see again for a couple of days or more"	"It's entirely the council's responsibility to prevent and deal with flooding." (Business, Hull)
"So there remained only the mess to clear up ... Typical was the action of the W.V.S at Reading, which organized voluntary 'flying squads of Mrs. Mops' to go rounds and help clean up the houses that had been flooded ..."	"... what do I pay my council tax for? Why isn't someone actually doing this? Why do I, myself, have to do it, if there's nobody out there digging that brook deeper and draining it out? Why have I got to do it?" (Householder, Gloucester)

This shows how society has changed ... from one where, during what is widely known as 'Austerity Britain', flooding was something to be lived with by doing something personally, to one where technology should have stopped flooding and what flooding remains should be managed by other people.

Why do things seem to be bad?

1. We have had an unusually flood poor period from the 1960s to the 1990s
2. We are much less able and prepared to live with flood risk

Searching further back ...

We can search even further back to appreciate better our relationship with flooding. In this respect, besides what can be found in local histories, the British Hydrological Society's *Chronology of British Hydrological Events* provides a wealth of material:

A southern example, around Bath ...

1739 - major floods in Bristol and Bath; 1774 - major flood; 1809 - great areas of the city under water; 1840 - major flooding, including at the site of the new GWR station; 1875 - enormous summer storms over much of England; 1894 - major Autumn floods, hundreds of homes evacuated; 1932 - major floods in Wiltshire, Somerset, adjoining counties; 1947 - Bath flooded following the thaw after the severe Winter; 1960 - worst floods since 1947; 1968, 1979, 1993 and 2000 - major floods ...

A northern example, around Leeds ...

1768 - major floods, following heavy rains and snow; 1790 - major flood after a sudden thaw, rivers higher than in the great flood of 1775; 1822 - big flood, many roads inundated and properties damaged; 1866 - great flood, prompting the Town Council to replace the old bridge; 1900 - extraordinary summer thunderstorm, many lives lost and much property damaged; 1948 - a very wet summer, with major flooding, prompting worries about the capacity of the sewers and storm drainage; 1968 - great summer storm, with serious flooding; 2000 - major floods, as in much of the U.K. ...

In summary, national trends in flooding are not so tractable to expressions of 'the worst ever' as one might believe. In particular, we seem to have moved from a 'flood poor' period, roughly between 1960 and 1990, to a 'flood rich' period, but it is not clear that this is any worse than has been experienced in Britain over past centuries.

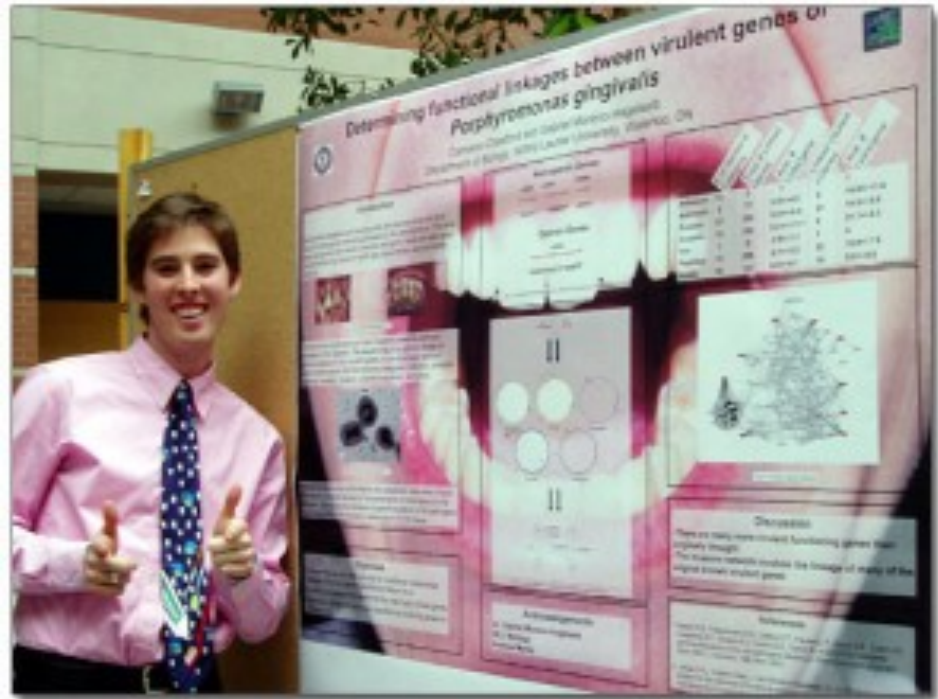
Backdrop: Pickering, floods in 1931, a car stranded in at the bottom of the Market Place; photograph by Sidney Smith, © Sidney Smith, by kind permission of the Beck Isle Museum, Pickering, joint custodians of the collection

Color

- ✓ Colors that do not compete with your data, that look good once printed
- ✓ Proper contrast will reduce eye strain and make the poster more legible and interesting visually. (careful: too much contrast is hard on the eyes and can distract the reader from your data)
- ✓ Adding light color backgrounds to your figures can make the poster attractive (eyecatching)
- ✓ Colors on the monitor are usually not the same on the final printed poster

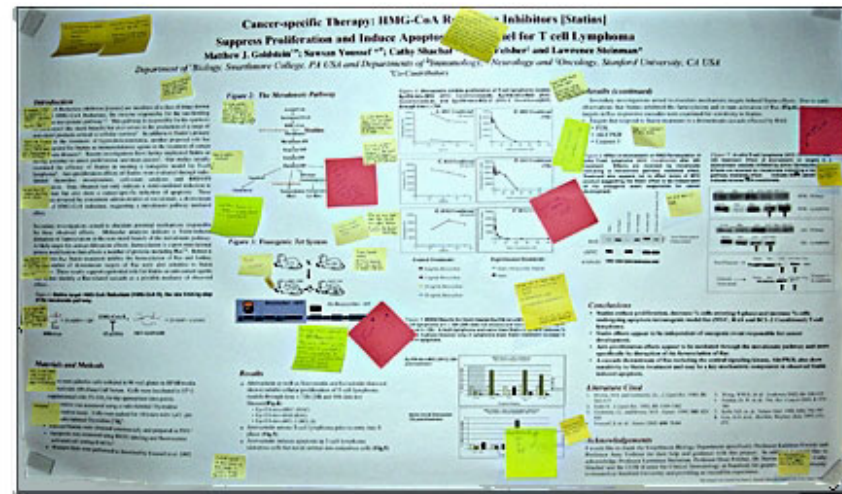
Color

- If you are obsessive compulsive and have a large wardrobe, try to choose your clothes to match your poster color. (Research has shown that your poster will be visited more if you match it 😊)



Editing

- ✓ Edit to reduce text (simplify verbiage, to reduce sentence complexity, and to delete details) If it's not relevant to your message, remove it.
- ✓ Have colleagues comment on draft



Present your poster

- ✓ Don't read it
- ✓ Prepare 0.5-, 2-, & 5- minute tours of your poster.
- ✓ Tell viewers ... the context of your problem and why it is important (Introduction), your objective and what you did (Objective & Methods), what you discovered (Results), and what the answer means in terms of the context (Discussion).
- ✓ Use the graphics on your poster to support conversations with colleagues.

Present your poster

- ✓ only 11 seconds to grab and retain your audience's attention so make the punchline prominent and brief.
- ✓ Most of your audience is going to absorb only the punchline.
- ✓ you can afford to leave out all the details and tell those who are really interested later.

Helpful Questions

- ✓ What's the research question?
- ✓ Why is this question important?
- ✓ What strategy is used?
- ✓ What are the results?
- ✓ Why are these results unique/important
- ✓ How does this relate to other research?
- ✓ What research comes next?

Summary

1) People have to read it

- ✓ big letters: fonts are 36 or 48 for text and 72 – titles
- ✓ 4 feet away, and the title - at least 10 feet away

2) Don't challenge people's eyes

- ✓ a light colored background and dark letters for contrast
- ✓ avoid dark backgrounds with light letters - very tiring to read
- ✓ don't make small pictures really big – distracting
- ✓ don't use funky font, Times New Roman and Arial are easy to read

3) Don't read the poster to the audience

- ✓ give the big picture of what you did
- ✓ explain why the subject is important
- ✓ use the graphics to illustrate and support your key points

4) Balance the placement of text and graphics

- ✓ use white space creatively
- ✓ column format
- ✓ graphs should look professional and have labels

5) Take time in your creation

- ✓ This is a poster about something you have taking the time to study, take the time to present your information professionally.
- ✓ Spell Check. Proofread. Get feedback before printing.
- ✓ practice a poster

Abstract

- Explain why your work is important
- Describe the objective(s) of your work. What are you adding to current knowledge?
- Briefly explain the methods. Unless the research is about methods, this should not be a major focus of your abstract (or your poster).
- Succinctly state results, conclusions, and recommendations. – tell what you found and recommend!
- do not recommend including an abstract on your poster. A poster is already a succinct description of your work. An abstract can also serve as an outline for your poster, which can be thought of as an illustrated abstract.