

Guiding early-career scientists to interactively present their research



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Introductions

Please raise your hand if your are...

- A K-12 teacher
- College/university educator
- An informal educator
- An outreach program coordinator
- Other

Ever had a seminar like this?



Goals for Scientists

- Change science teaching style of future K-16 instructors
- Provide a supportive environment for early-career scientists to explore interactive presentations
- Middle & High School Science Teachers are the perfect group of professional presenters to give early-career scientists feedback

Goals for Science Teachers

- Have current research at UCSF accessible to secondary teachers
- Build teacher community across school sites
- Content transfer to classroom is great, but not the primary goal

Current Science Seminar Series (CSSS)

- Interactive research seminars presented by UCSF early-career scientists for SFUSD secondary science teachers

CSSS – Program Structure

- For Middle & High School Science Teachers
(and select HS students)
- Monthly seminars from 4:30-6:30 pm
 - From November to May
 - First 30 min for dinner & pre-assessment
 - Final 15 min for post-assessment
 - Leaves 60-75 min for:
 - talk, active components and questions
- Requirements for Speakers:
 - meet with SEP staff 1-2 times to practice
 - Recommended – watch a seminar (live or on video) prior to speaker's own seminar

How Do You Prepare Scientists?

Example of the Challenge



Activity – Quick Write

- What challenges did the scientist in the video have while trying to describe his research for a non-expert audience?
- What other challenges may scientists face while trying to describe their research for a non-expert audience?

How We Prepare Speakers

- Speakers workshop to model interactive seminars
- See an interactive seminar
(in person or on DVD)
- Individual practice with each speaker
- Present a seminar
- Receive teacher feedback

Goals for Speakers Workshop

- Think of what their audience can do
(thinking outside of the box)
- Planning actual activities related to their research
- Model some of the active techniques

Activity – Think-Pair-Share

- List general things that an audience can do during an interactive seminar
- They can:

Read

Hear

See

Talk

Draw

Write

Teach

Solve Problems

⇒ Teacher is facilitator

Speakers Workshop

- General Audience Actions lead to planning and sharing ideas for Specific Activities related to their research

Seeing an Interactive Seminar

- In person or on DVD
- See activities done with a group
- Get a flavor for the types of questions
- Learn what not to do

Individual Practice Session

- Each speaker practices their seminar with two program coordinators
- Two weeks before seminar
- A second practice is available if the speaker wants one

Individual Practice Session

- Timing & Pacing
- Appropriate level for audience
- Logical sequence & progression
- Clear figures
- Jargon list
- Challenge: practicing hands-on activities with only 2 coordinators
- Challenge: grouping teachers and students
- Challenge: simulating audience questions

Example Activity – 1



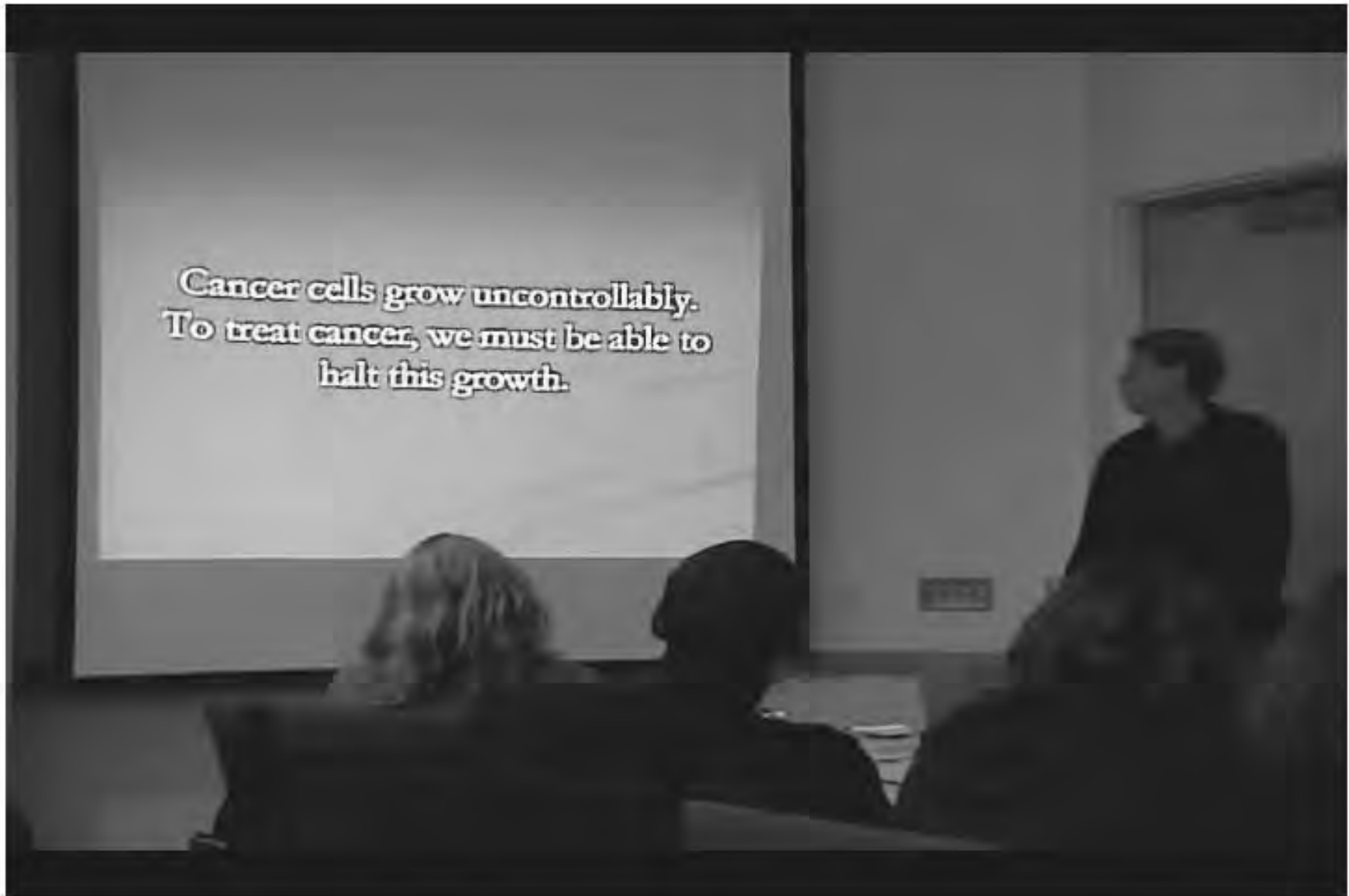
Example Activity – 2



Example Activity – 2

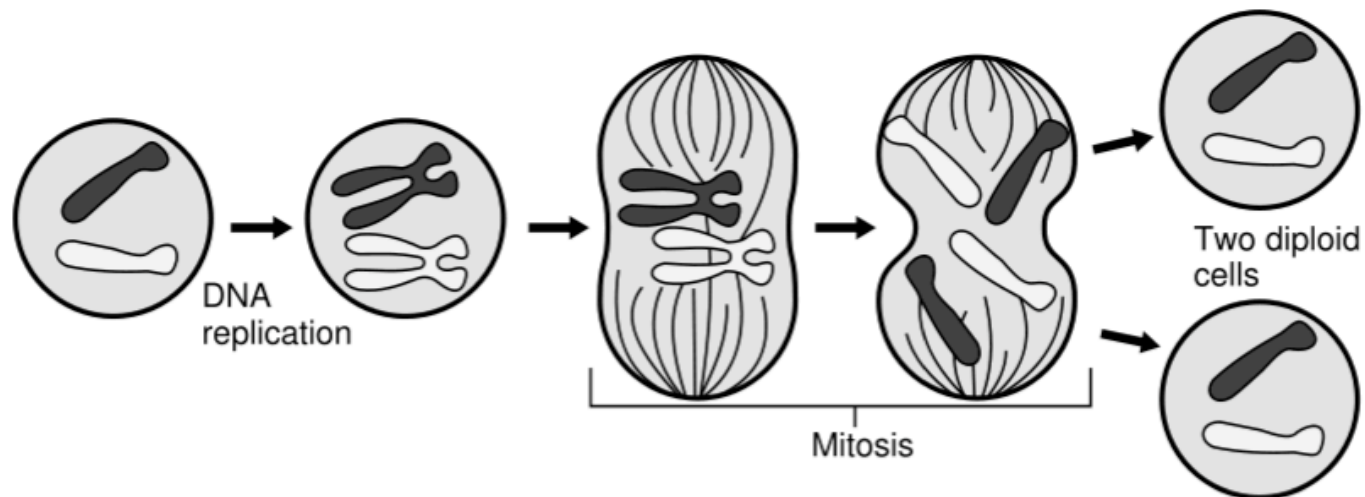


Example Activity – 3



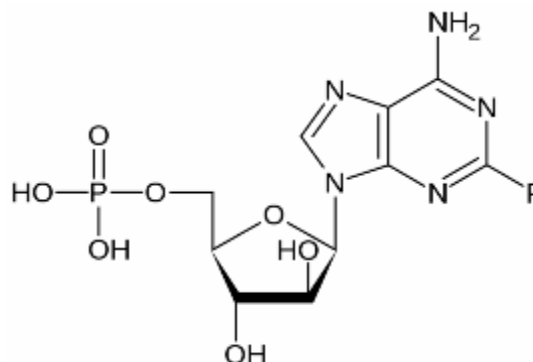
Discussion Questions

- How does this drug block cancer cell division?
- Since the drug is able to stop cancer cell division, why does the treatment so often fail?



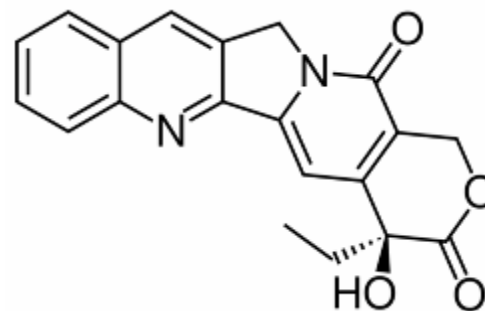
Fludarabine:

- A purine analog that inhibits DNA polymerase
- Used in combination with other drugs to treat some leukemias



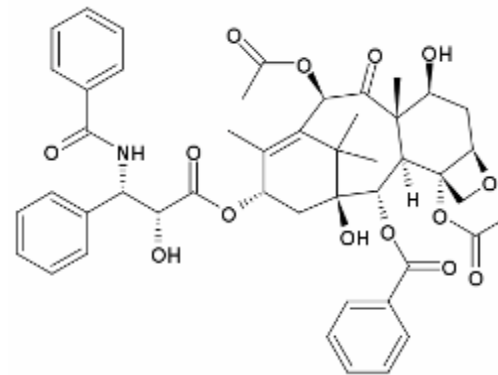
Camptothecin:

- Induces protein complexes on DNA which block the progression of DNA polymerase
- Used for many cancers, including ovarian and lung cancer



Paclitaxel:

- Binds to microtubules and inhibits their normal function
- Used for many cancers, including breast and lung cancer



Example Activity – 3



Example Activity – 4



Feedback from Teachers

- *“I would recommend not trailing off your voice as you finish a sentence ... Spread out the interactive activities to retain participant interest.”*
- *“The microscope breaks were good. The PowerPoint slides were well done and clean. All the hands-on was great. Good, down to earth presentation; I think the kids felt at ease to ask questions and learn!”*
- *“Easy to follow slides and explanations. Willingness to answer all questions. Antigen- switching activity (which I plan to "borrow" for my class!)”*

Outcomes for Teachers

all (n=15) strongly agreed / agreed that

- they better understand the science concepts that underlie the curriculum they teach in their classroom
- the information presented was appropriately targeted to their level of understanding

13/15 plan to participate in a scientist teaching partnership through SEP in the future

Outcomes for Speakers

- **100** % of scientists strongly agreed or agreed that they have **new ideas** for how to **translate current research** to a non-research audience.
- **93** % of scientists strongly agreed or agreed that they have a **better understanding** of how to **adapt their teaching strategies** to diverse populations.
- **100** % of scientists strongly agreed or agreed that they have **gained** new skills or enhanced their skills to effectively **engage an audience** in a lecture-based format.

Outcomes for Speakers (cont.)

- Interactive components added to 2 Ph.D. thesis defenses
- Example of 1 Post-Doc
 - Prior teaching experience = graduate TA
 - Undergraduate lab instructor at USF
 - 10 min practice lecture had an audience poll and a think-pair-share

Speaker's Time Commitment

1.5 hr Speakers workshop

2 hr Watch a presentation

2 hr Practice session

2 hr Give presentation

0.5 hr Teacher feedback

1 hr Speaker's lunch

<10 hrs (not including individual preparation)

SEP – Funding Sources

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- UCSF Chancellor's Office
- UCSF School of Medicine
- Genentech Foundation
- California Science Project
- HHMI
- NIH
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Be Sure Not to Miss!!!

**Partnering Research Scientists and
Secondary Science Teachers**

9:30 am - 10:00 am

Tomorrow!

Plaza Court 2

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