

# Scientific Presentations: Paper, Poster & Lecture

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PD Dr. Albert Braeuning



# Why?

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Your careers will be determined largely by how well you speak, how well you write, and the quality of your ideas. In that order.

P.H. Winston (MIT professor)



# Overview

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- How to write a paper
  - Planning phase
  - Where do I publish?
  - Structure of a paper
- Posters and oral presentations
  - General considerations
  - Structure of posters and oral presentations
  - **Layout and design**



# Planning Phase (I)

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- Brainstorming:



# Planning Phase (II)

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- Brainstorming:
  - How did I approach the project?
  - What is the experimental design?
  - What problems have arisen? How were they solved?
  - Is the analysis / interpretation of the results correct and justified?



# Planning Phase (III)

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- Brainstorming:
  - Why does my work matter?
  - How can my work be applied?



# Planning Phase (IV)

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- Organize and sort out information / data
  - Group common pieces of information
  - Rank your data (important, good, not necessary)



# Choice of journal (I)

- Ask supervisor
- Impact factor
- How good are my results?
  - Would additional experiments qualify my paper for a higher impact journal?
- Are they of general interest?
- Whom do I want to address?
- Have similar studies been published in the journal?
  - Have we published in the journal previously?
- Do we know the editor?
- Other political reasons

20%

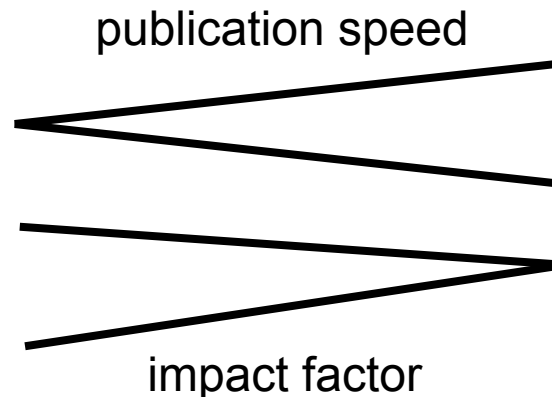
80%





# Choice of journal (II)

- Do I want to be fast?
- Do I need to be fast?
  - Competitors!



- After choice of journal:
  - get the latest version of the „*instruction for authors*“



# Sections in a paper (I)

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- Title
  - title of the project
  - authors' names and institutional affiliations
- Abstract
  - 150-400 words, structure depending on journal
  - as informative as possible
  - no meaningless phrases
  - ~~— („the relevance of these findings will be discussed“)~~
- Introduction
  - background information
  - aim of the project



# Sections in a paper (II)

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- Materials and Methods
  - Length depends on journal
  - Often too short to allow others to reproduce the data
- Results
  - Start with figures and tables
  - Then arrange text accordingly
  - Discuss only minor points, if at all
  - Use „significant“ only if tested for significance



# Sections in a paper (III)

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- Discussion
  - Places your results in a framework of others' results
    - What fits? What differs? Why does it differ?
    - Read read read read read!
    - Try to define all relevant points which should be discussed
  - Be concise and logical
  - Avoid over-interpretation of your data
  - Not too speculative
  - Short communications: Results/Discussion combined



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# Scientific Presentations: Poster & Lecture



# General considerations

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- Poster presentations
  - Posters must stand alone
  - Presenter will
    - guide the reader
    - provide background information
    - answer questions
- Oral presentations
  - Speaker conveys all the information
  - Visual aids just support



# Agenda

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- Planning Phase
- Preparation of
  - Posters
  - Lectures
- Design and layout:
  - Use of color
  - Typography and text
  - Figures and images
  - Animation



# Planning Phase (I)

- Brainstorming:
  - What is the aim of my project?
  - Has someone done related experiments?
  - How did I approach the problem?
  - What is the experimental design?
  - What problems have I encountered? How were they solved?
- What are my results?
  - What is new?
  - Is the analysis and interpretation of the results correct and in line with the aim?
  - Why is my work matter?
  - How can my work be applied?

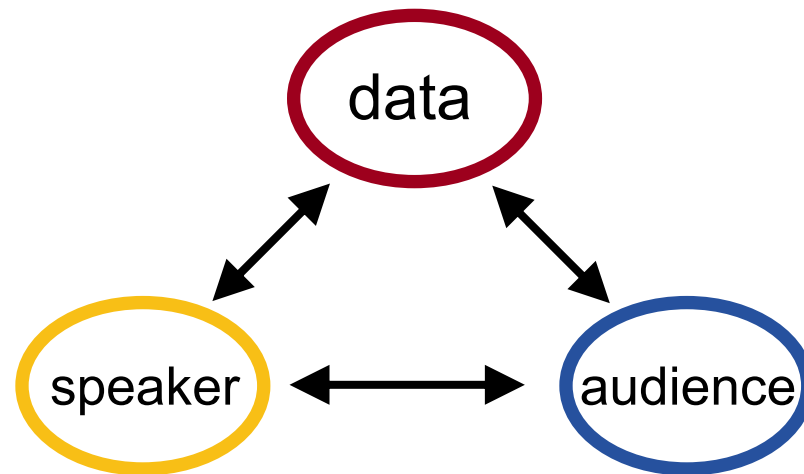
Similar to paper





# Planning Phase (II)

- Deciding on the content
  - What are you trying to achieve by the presentation?  
→ type of content
  - Who will be attending the presentation?  
→ tone of the presentation



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# Preparation of posters





# What makes your CELLS tick?

Coordination of cell proliferation and cell-type specification in vertebrate embryos: the role of dynamic regulation of the cdc25 phosphatases.



## ABSTRACT

The generation of a multicellular embryo from a single-celled zygote requires coordinating cell proliferation with mechanisms that regulate cell-type specification and cell movement. It is therefore essential that the rate of cell proliferation is variable for different populations of embryonic cells and different developmental stages. Following early, rapid, synchronous cell divisions, dynamic spatiotemporal regulation of cell proliferation is observed. We are interested in the molecular mechanisms that produce this spatiotemporal control in the embryo of a vertebrate, the zebrafish *Danio rerio*. Due to its rapid development, large transparent embryos, and genetic tractability, zebrafish is the ideal vertebrate model for these studies. In all eukaryotic organisms, the cdc25 tyrosine phosphatase plays a major role in cell cycle progression via activation of Mitosis Promoting Factor (MPF). Most higher metazoan genomes contain more than one gene encoding cdc25 phosphatases. To determine whether dynamic transcription of cdc25 is an important mechanism for spatiotemporal control of cell proliferation, as is the case in the *Drosophila* embryos, we are isolating the zebrafish genes encoding cdc25 by PCR. We have identified the zebrafish cdc25A gene and examined its spatiotemporal expression in developing embryos by *in situ* hybridization. Expression of cdc25A is observed in only a subset of proliferating cells of the developing nervous system and mesoderm. In some of these cells, namely the precursors of primary motor neurons (PMN) and retinal ganglion cell (RGC), expression appears to be restricted to the terminal mitosis. Future work will focus on analyzing the coordination of cdc25A transcription with the mechanisms that control differentiation of these cells, and on isolation and expression analysis of additional cdc25 genes.

## INTRODUCTION

With knowledge of the cell cycle and its' regulators in other experimented organisms, we may be able to discern how certain aspects of processes, morphogenesis and pattern formation, are regulated at a molecular level in the zebrafish. In early embryonic cells, the cell cycle is synchronous and consists of two phases: mitosis (M) and synthesis (S). A two-subunit phosphoprotein of Cdk and cyclin, known as Mitosis Promoting Factor (MPF), is responsible for the entry to Mitosis. At later stages, the cell cycle experiences a transition (mid-blastula stage) from maternal mRNA control to zygotic mRNA control, synchronous to asynchronous cell division, and entrance of G1 and G2 phase. According to research on *Drosophila* flies, the MPF for the progression through G2 phase is activated through steps of phosphorylation/dephosphorylation on the Cdk subunit: (1) phosphorylation at residues Threonine-161, Tyrosine-15, and Threonine-14 by a particular set of enzymes, and (2) dephosphorylation of Thr 14 and Tyr 15 by an Cdc25 enzyme (called *string*) (Voet & Voet, 1995). Identifying Cdc25 in zebrafish will allow us to understand the cell-to-cell interaction occurring at the cell cycle for most higher metazoan genomes.

## METHODS:

to isolate cdc25, I made primer pairs from an expressed sequence tag (EST), which is homologous to cdc25. Then I was able to clone Cdc25 from cDNA library (of zebrafish) through PCR reaction and expression vectors. After isolation, I determined when and where the gene is expressed through *in-situ* hybridization.

## RESULTS

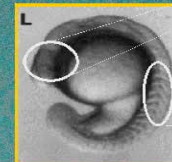


Figure 1: Expression of the CDC25 in the Retinal Ganglion Cells at the Terminal Mitosis Stage.

Figure 2: Expression of the CDC25 in the Primary Motor Neurons at the Terminal Mitosis Stage.

## Selected Sources:

- Gilbert, S. F. (1997). *Developmental Biology* (5th ed.). Sunderland: Simauer Associates.
- Kimmel et al. (1995). *Developmental Dynamics* 103:253-310. New York: Wiley & Sons. <http://zfin.org>
- Lehner, C., and Lane, M.E. (1997) *Journal of Cell Science* 110, 523-528. Great Britain: The Company of Biologists Limited.
- Voet, D., & Voet, J. G. (1995). *Biochemistry* (2nd ed.). New York: John Wiley & Sons.

Please feel free to contact



# VITAMIN C: THE MULTIFUNCTIONAL ANTIOXIDANT

## BACKGROUND

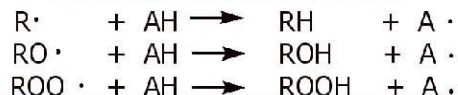
Vitamin C (Ascorbic Acid) is an essential nutrient discovered in 1932 by Albert Szent-Györgyi, who isolated the antiscorbutic factor as pure crystalline material from lemon juice. In the past 25 years, much of the vitamin's biochemical functions have been elucidated, inducing vitamin C to the treatment of viral infections, diabetes, and even cancer prevention. Today, scientists' growing knowledge of ascorbic acid uncovers the significance of its antioxidant property, making its organic synthesis one of high demand for research and public consumption.

## ANTIOXIDANT PROTECTION

- Stability of antioxidant free radicals
- Resonance delocalization
- Further oxidation of antioxidant radicals
- Reduction of radical species

## REACTION MECHANISMS

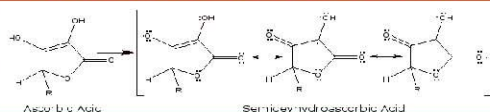
### Antioxidant Radical Formation



### Radical Chain Termination

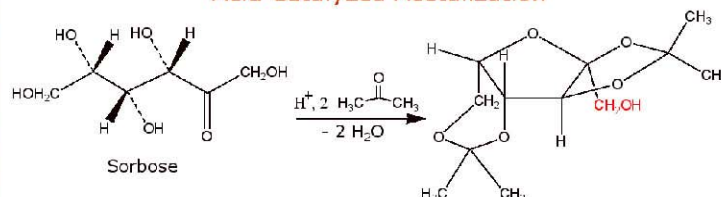


## ANTIOXIDANT RADICAL STABILITY

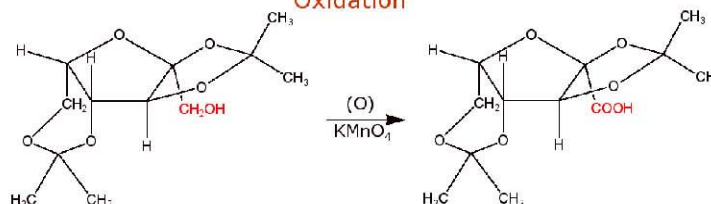


## ORGANIC SYNTHESIS OF VITAMIN C

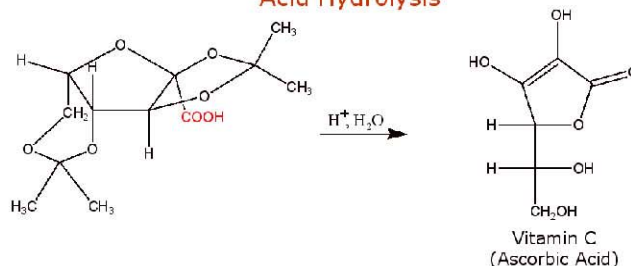
### Acid Catalyzed Acetalization



### Oxidation



### Acid Hydrolysis



## CHEMICAL FUNCTIONS

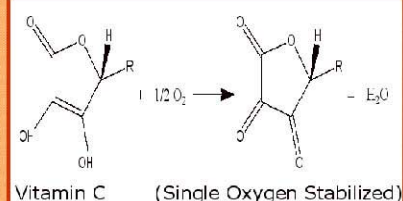
### Antioxidant

- Hydrogen donation to lipid radicals
- Removal of molecular O
- Quenching of singlet O
- Regeneration of tocopherol radicals

### Prooxidant

- Reduction of Fe<sup>3+</sup> to Fe<sup>2+</sup>

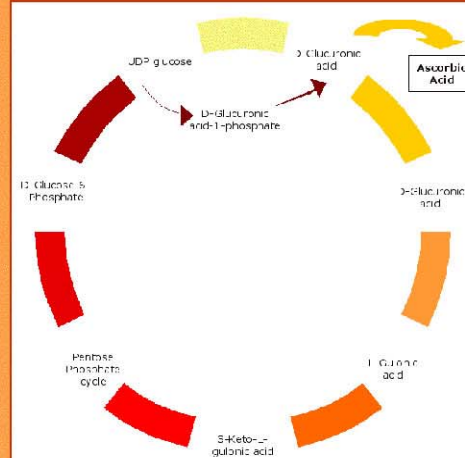
## OXYGEN SCAVENGER



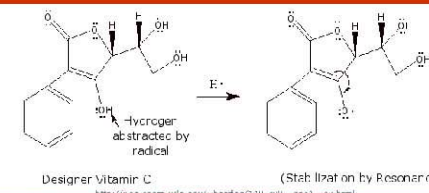
## BIOLOGICAL BENEFITS

- Defense against common cold
- Collagen formation
- Absorption of inorganic iron
- Metabolism of folic acid, amino acids, and hormones
- Protection of DNA, cell membranes, and critical molecules from radicals

## BIOSYNTHESIS

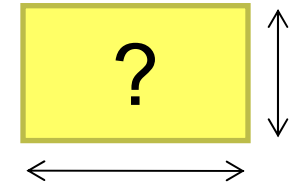


## DESIGNER VITAMIN C



# Poster Preparation

- Determine the maximum size allowed

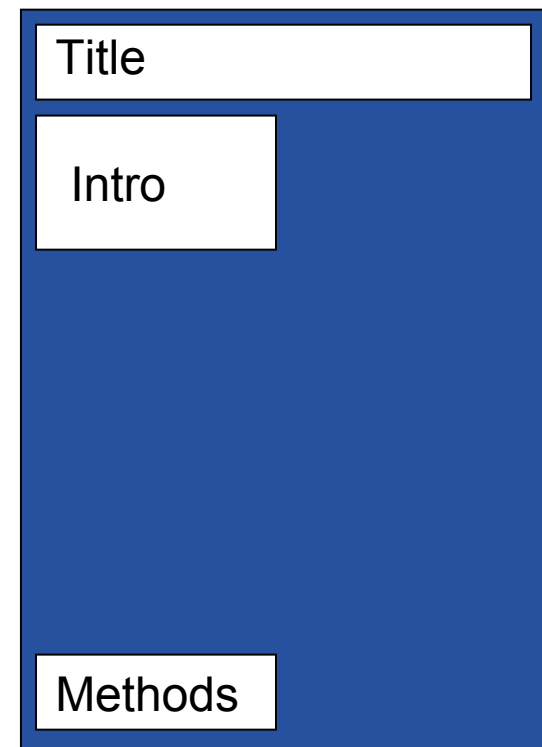


- Plan it
- Sketch it out
- Try several different arrangements
- Edit ruthlessly
  - If it doesn't fit, shorten it, don't reduce size
  - Most common error: too much text



# Sections in a poster (I)

- Title
  - title of the project
  - authors' names and institutional affiliations
  - logos
- Introduction
  - background information
  - aim of the project
- Methods
  - experimental approach
  - techniques used



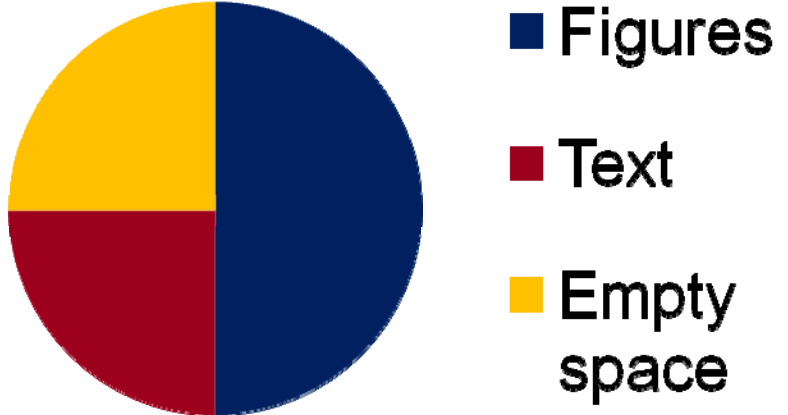
# Sections in a poster (II)

- Results
  - Visual presentation of data
  - Figures: images & graphs
  - Text: legends & headings
- Summary & Conclusion
  - Key findings & main results
  - Interpretation & discussion
- Acknowledgments
- optional: Outlook, References

Title	
Intro	Results
Results	Results
Results	Summary
Methods	Misc



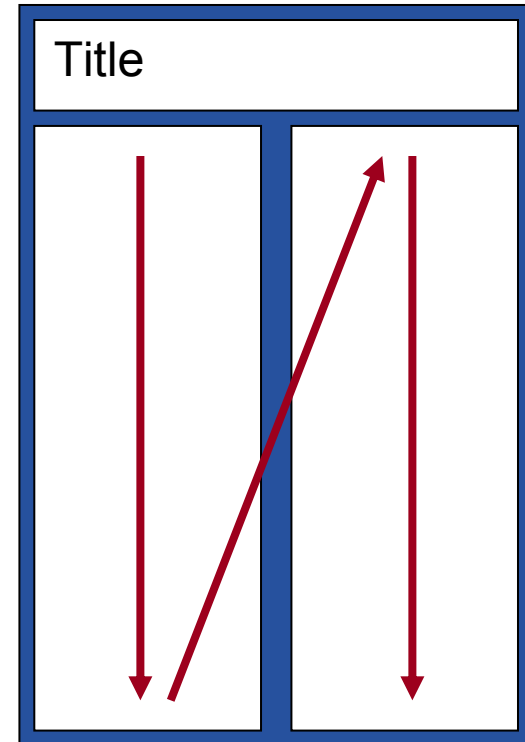
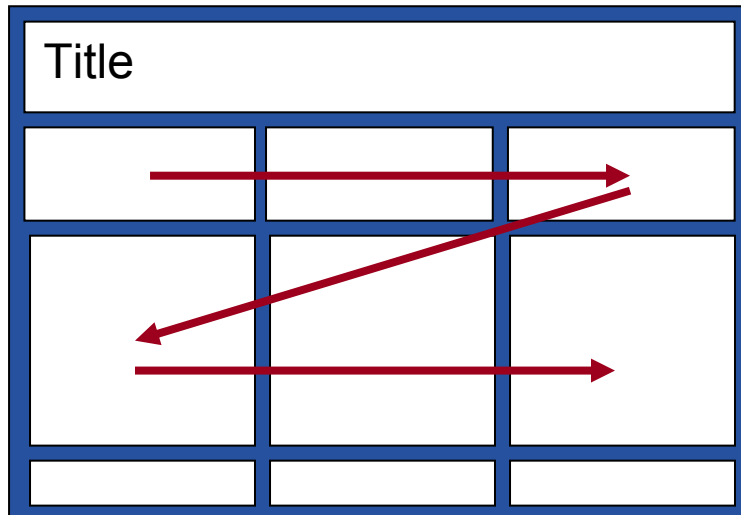
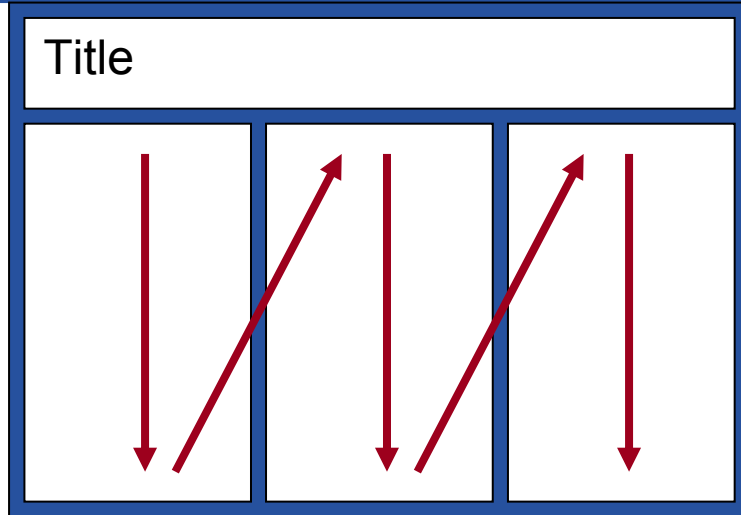
# Posters must be lean and clean

- Use highly legible text
  - Font size: text: 30pt, headings: 36-48pt, title: >90pt
- Use self-explanatory graphics
  - Size, axes labels, direct data labels
- No vast tables of data
- No excessive details
- Optimal composition:
  - Figures
  - Text
  - Empty space
- KISS principle (Keep it simple & stupid!!!)





# Examples for Poster Layout



# Final Stage

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- Check draft print-out for
  - Grammar & spelling
  - Legibility
  - *Consistent* formatting
- Obtain the opinion of colleagues etc.
- Practice
  - to summarize your poster in 3 sentences
  - to explain it within 2 min
  - Anticipate questions



# Oral Presentations

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Plan, practice, and present



# Structure

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- Introduce
  - Give background information necessary to understand your talk
- Substantiate
  - Support important ideas with data or examples
  - Not too many results
- Summarize
  - Take-home-messages



# Know the Background of Your Talk

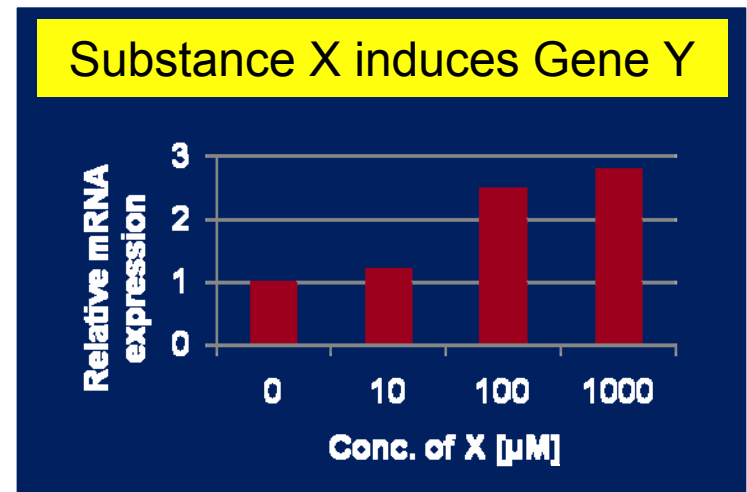
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- Know your audience
  - Level of knowledge
- Know the purpose of your talk
  - Research report
  - Teaching
- Know the format of your talk
  - specified periods of time for lecture and discussion
  - environment (meeting/conference, chairperson)
  - equipment available (overhead, computer)



# Clarity, Clarity, Clarity: Visual aids

- One point per slide only
  - 1-2 min / 150-200 spoken words per slide
- People have to read and understand it
  - Meaningful title
  - Not too much text
  - Graphs should be obvious
  - Optional: Conclusion



# Practice Makes Perfect

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- Practice, practice, practice
  - Stand up and give the talk
  - Optimal: 3 times
- Discover problems before they matter
  - Find the right words
  - Do I actually understand what I'm trying to explain?
- Memorize the first few lines of the talk, but don't over rehearse or memorize the whole talk



# Are you compatible?

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- Bring your own equipment (usually not possible) and make sure it works
  - laptop, projector, cables
- Make sure your medium / file is compatible
  - Operating system, software version
  - Fonts & animation techniques
  - Embedded objects: movies etc.
  - File size
  - Data storage medium: USB stick / CDRROM
- Bring transparencies as a backup?





# Layout & Design

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# Have a visual theme

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- Consistent environment focuses on the information given
- Define master slides for title, text, and graph slides:
  - layout & background
  - font sizes, colors used
  - graphical elements
- Avoid using Powerpoint templates



# Choosing colors

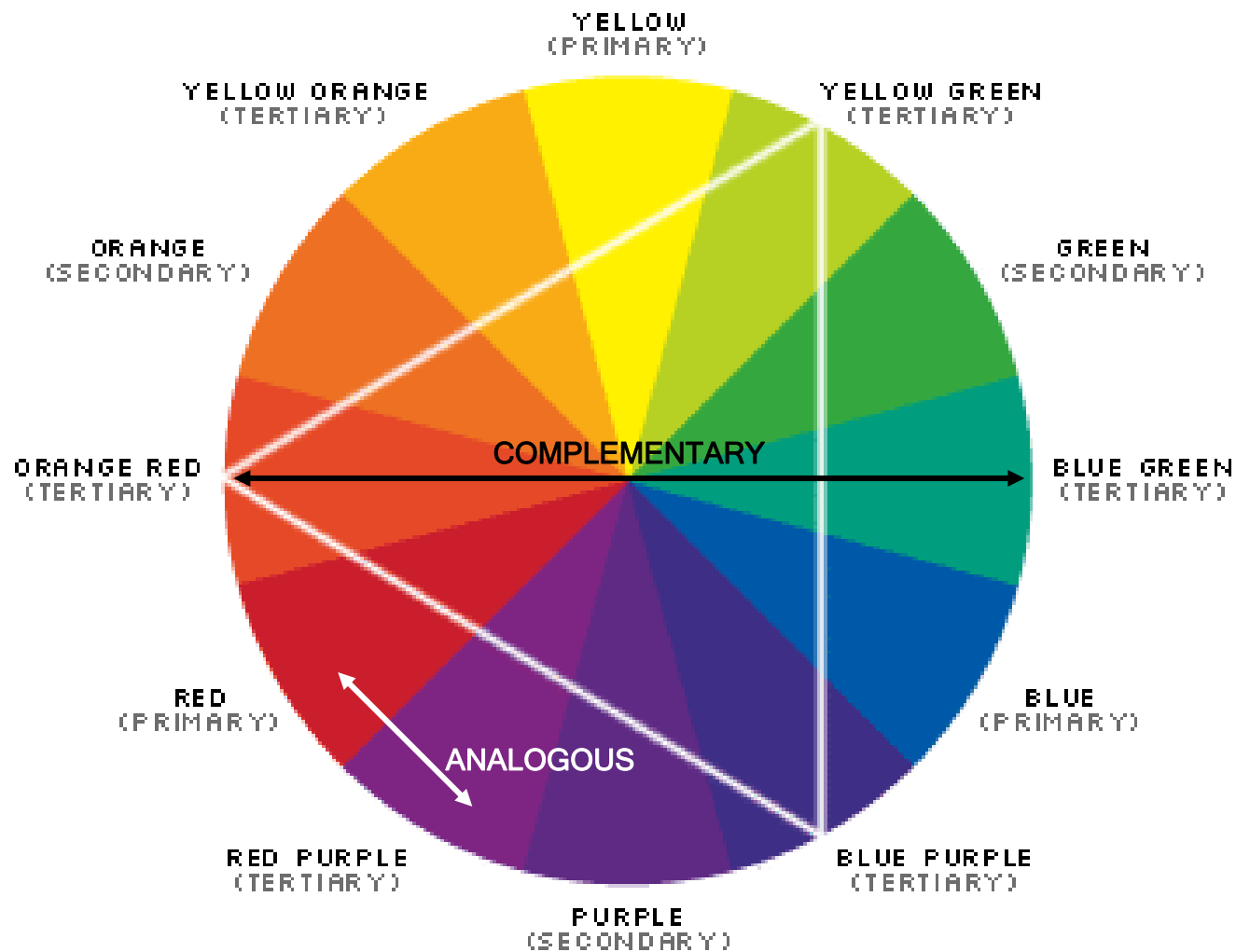
- Use color consistently
- Choose only 3 colors (triads)
- Use highly contrasting color
  - especially for text and background
- Avoid complementary colors
- Avoid red and blue text

Text

Text



# Choosing colors



### YELLOW-GREEN

monochromatic



analogous



triadic



complementary



### BLUE

monochromatic



analogous



triadic



complementary



### RED-PURPLE

monochromatic



analogous



triadic



complementary



### ORANGE

monochromatic



analogous



triadic



complementary



### GREEN

monochromatic



analogous



triadic



complementary



### BLUE-PURPLE

monochromatic



analogous



triadic



complementary



### RED

monochromatic



analogous



triadic



complementary



### YELLOW-ORANGE

monochromatic



analogous



triadic



complementary



### BLUE-GREEN

monochromatic



analogous



triadic



complementary



### PURPLE

monochromatic



analogous



triadic



complementary



### ORANGE-RED

monochromatic



analogous



triadic



complementary



### YELLOW

monochromatic



analogous



triadic

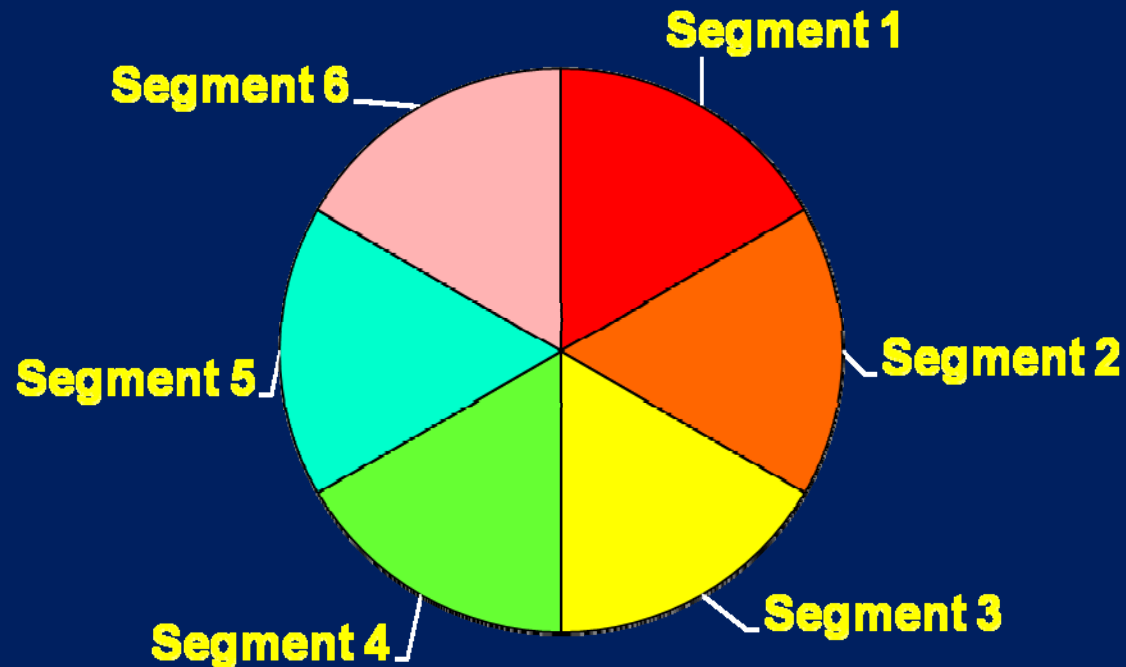


complementary



# Dark background with light text and graphics

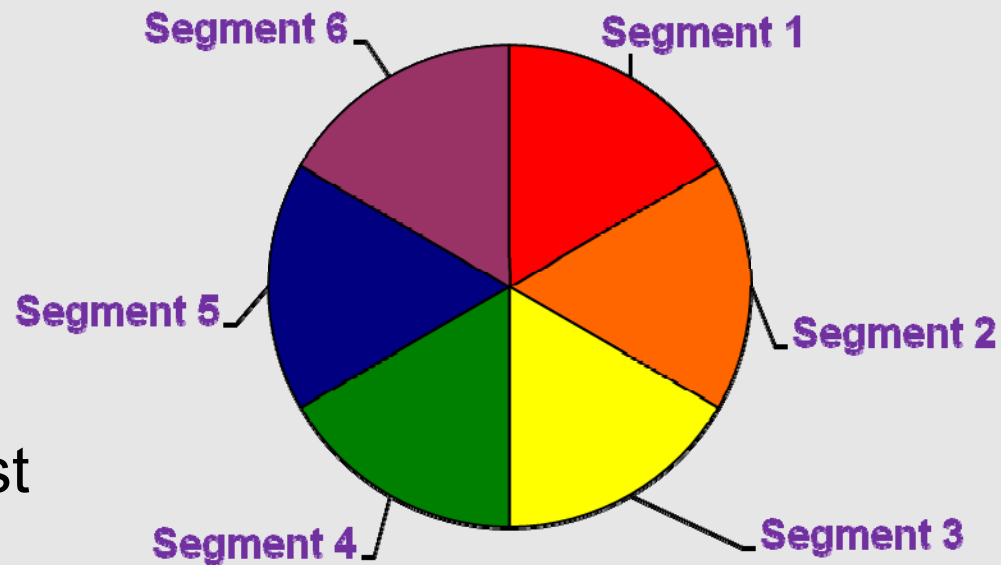
- **Background:** dark blue (navy) or purple
- **Text & graphics:** white or yellow
- **Accent colors:** red, orange, lime green, light blue



## Light background with dark text and graphics

### Suggestion of a Color Scheme

- Background: white or light-colored
- Text and graphics: black, dark blue or dark purple
- Accent colors: almost all colors possible



# Selection of type face

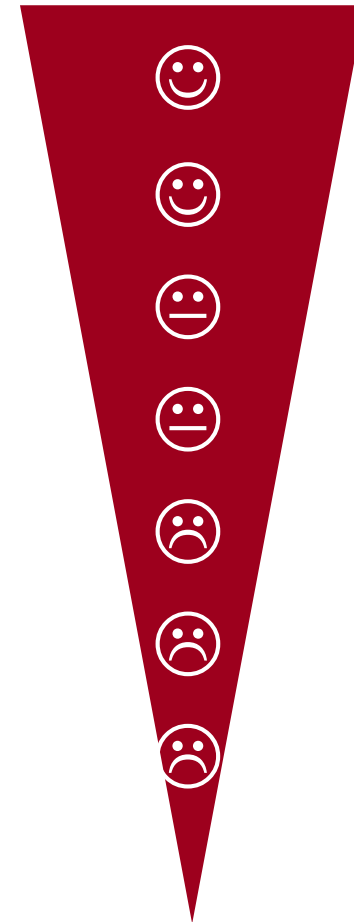
- Selection of type font:
  - Serifed fonts: tradition, stability; best readability
  - Sans-serif fonts: modern, progressive
- Do not use more than two type fonts
- Do not use two similar type fonts:  
Times New - Garamond - Book Antiqua
- Use common fonts only
  - Times New Roman, Arial
  - Συμβολ, ☼, ☾, ■, ♀, ♂, ☼, ■, ♀, ♦ (Wingdings)





# Highlighting Text

- Font **size**
- Font **weight**
- Font **color**
- Font *style*
- Letter s p a c i n g
- Underlined
- ALL CAPITALS



**Legibility  
Effect size**



# Pathologie & Pathohistologie des Gastrointestinaltrakts

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- **DRÜSENMAGEN (Fundus, Pylorusabschnitt)**  
relativ unauffällig bei Industriechemikalien – adaptiver Zellschutz (z.B. pH-Wert: Differenz durch Mucusbarriere)  
In Toxizitätsstudien werden, bedingt durch die hohe Dosierung unspezifische Wirkungen deutlich (Säureproduktion, Hypoxie, Reflux, Zellkinetik): Erosion, Ulcus (z.B. hyperosmolare Glukose)  
NSAIDs u.a. zytotoxisch für Schleimzellen (Desquamation);  
Speziesdifferenz sehr ausgeprägt (Hund>Ratte>Primaten)  
Halbwertszeit, enterohepatischer Kreislauf
- Indomethacin >1xAppl.: 6h Erosion, 24h Ulcus, 72 Perforation.  
Unterschiedliche Lokalisationen (ad lib. Vs. restricted feeding)  
Alkohol bewirkt u.a. Barriere- und Gefäßschäden > Hämorrhagie  
Steroide bewirken u.a. Barrierschäden

# Design guidelines for text-based slides

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- Limited amount of text:
  - $\leq 7$  key points / lines per slide
  - $\leq 7$  words per line
- Short phrases only, no entire sentences
- Big font size: title: 36 pt., text: 28 pt.
- Optional: bold font style, with drop shadows
- Left-aligned, no justification
- Bulleted lists
  - with indentations
- No busy background



# Drugs in Surface Water

	<b>Danube</b>	<b>Rhine</b>	<b>Neckar</b>	<b>Körsch</b>
<b>Metoprolol</b>	<10-320	<10-13	26-47	120-260
<b>Sotalol</b>	13-40	<10-62	64-130	310-760
<b>Diclofenac</b>	<10-65	<10-150	24-200	550-900
<b>Ibuprofen</b>	<10-19	<10-72	<10-92	35-140
<b>Carbamazepine</b>	<10-82	70-180	52-290	210-1200
<b>Sulfamethoxazole</b>	<10-26	<10-20	41-160	42-220
<b>Iopamidol</b>	<10-280	70-210	140-710	37-1500
<b>Diatrizoic acid</b>	<10-110	<10-56	150-740	60-660

All concentrations are given in ng / L

# Sequence comparison of cellular proto-oncogenes and viral oncogenes

Gene	Codons in c-onc	Codons in v-onc	Amino acid exchanges	Deletion
myc	417	417	2	none
H-ras	189	189	3	none
K-ras	189	189	7	none
mos	369	369	11	none
sis	220	220	18	none
src	533	514	16	C-terminal
fms	980	930	20	C-terminal
myb	640	372	11	N-/C-terminal
erbB	1210	600	99	N-/C-terminal

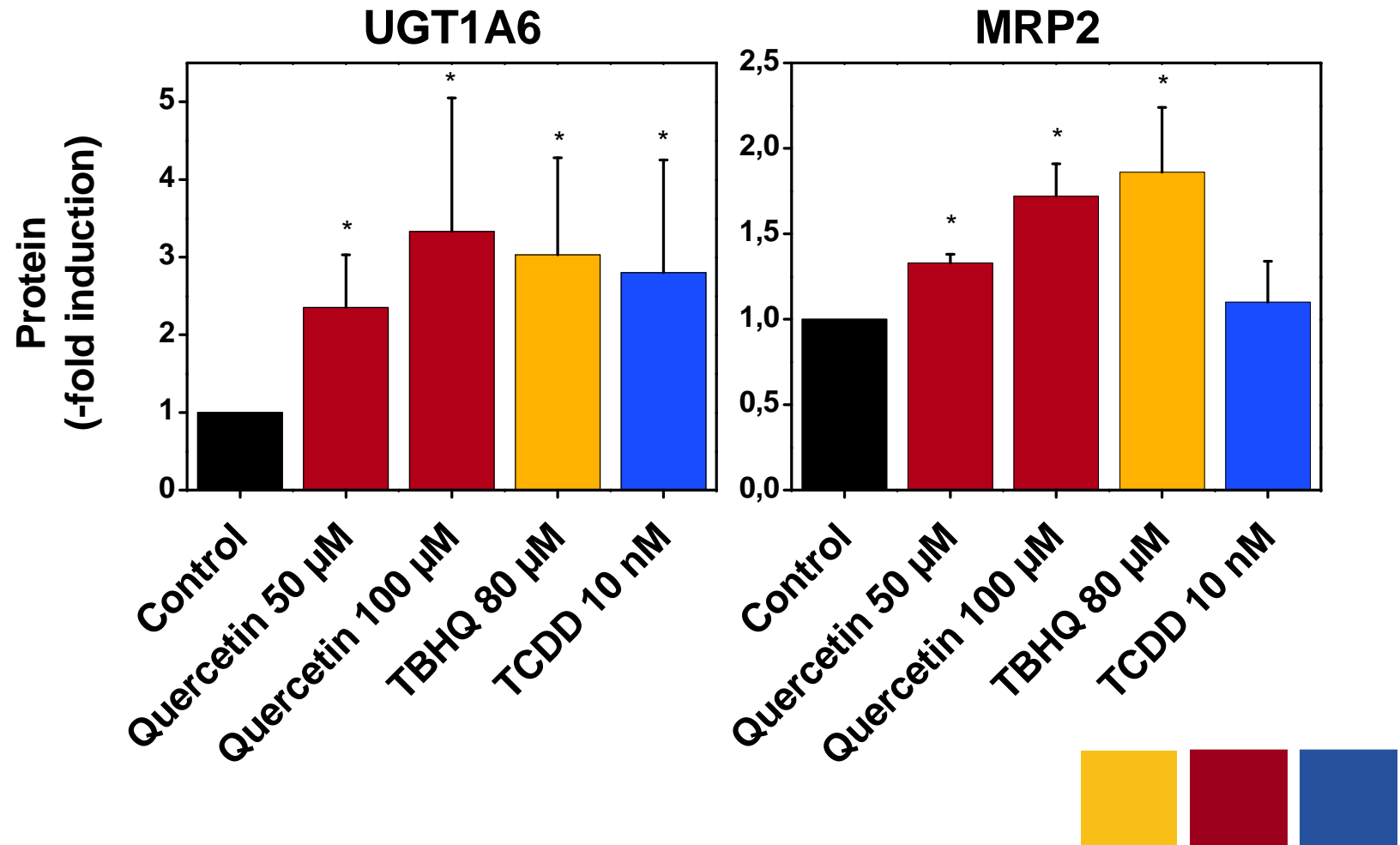
# Use of diagrams

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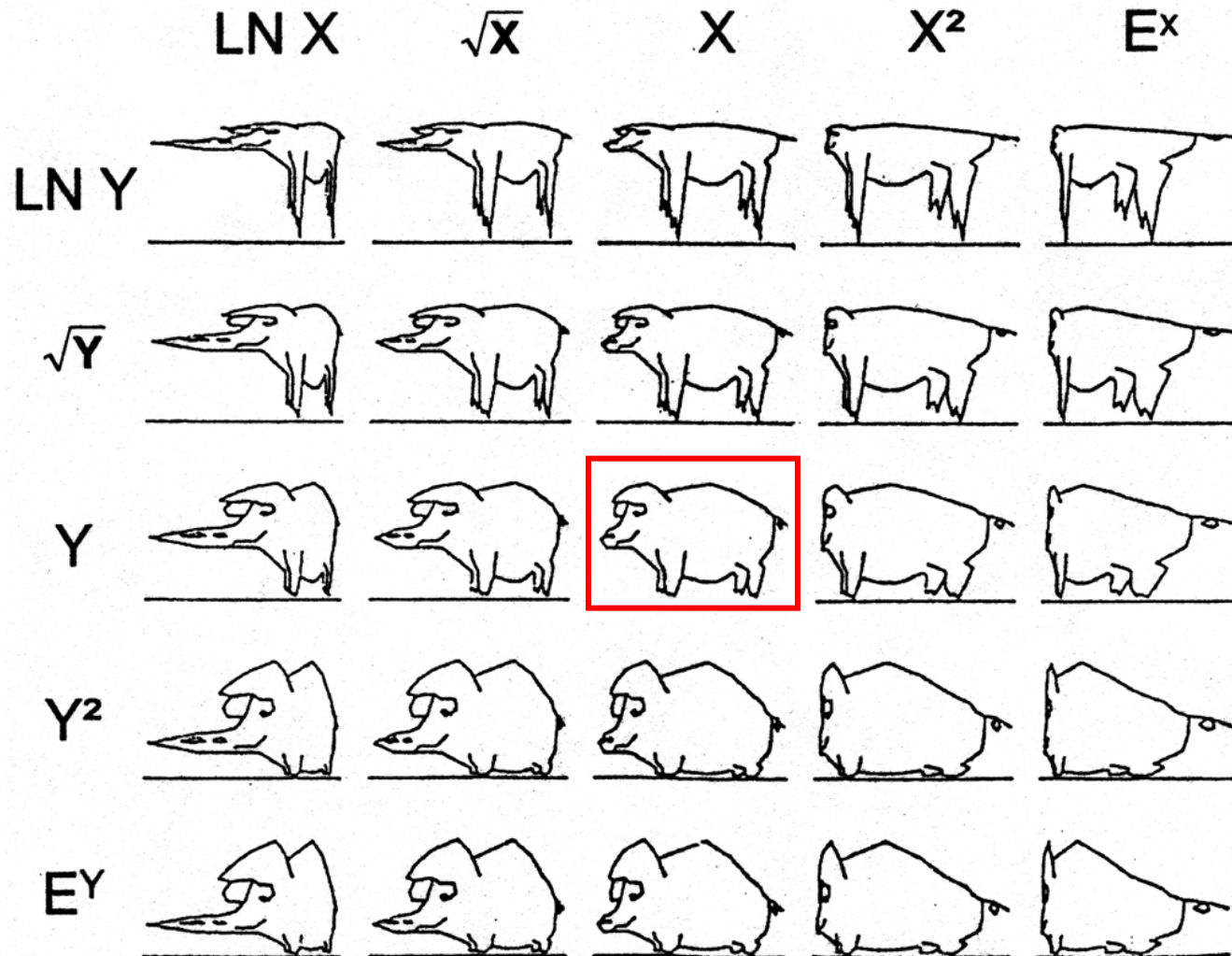
- Keep it simple: only 1 diagram per page
- Diagram should be obvious
  - Big labels on both axes
  - Prefer direct data labels to legends
- Use frames, but no grid lines
- Increase weight of all lines
- Diagram type
  - Absolute/ relative values – bar chart
  - Trend / time course – line chart
  - Percentage – pie chart



# UGT1A6 and MRP2 induction by antioxidants and TCDD as determined by Western blotting

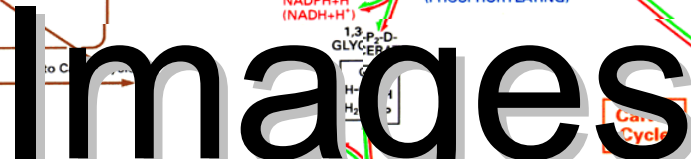


# Make a mess by axis transformation!!!





activator of plasminogen. Polymerization of fibrin react monomers stimulates tPA activity. Fibrin provides the 110 Possi binding epitopes for plasminogen and sc-/tc-PA. react



# Types of computer graphics

	Bitmapped Graphs	Vector-based Graphs
Definition of the image by	Array of individual color points (pixels)	Collection of mathematical objects described by equations
Effect of scaling	Loss of quality: becomes blurry	No loss of quality
Sources	Scanners, cameras, internet	All drawing programs
Software to use	Photoshop, Photopaint, PaintShop, etc.	Draw

**Conversion possible**



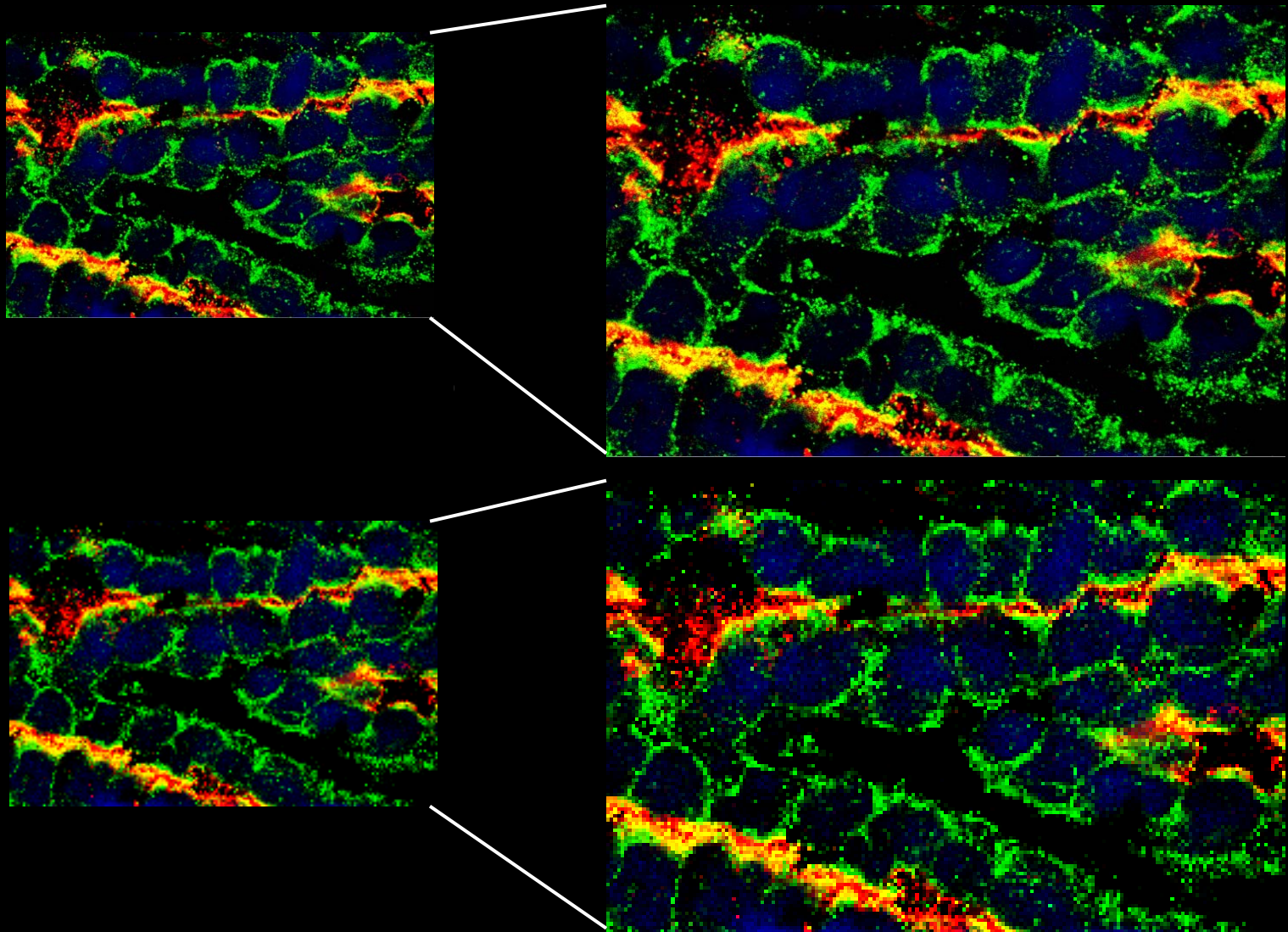
# The Use of Bitmaps

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- Big images need huge amounts of memory and slow down presentation
- Projectors usually work at a resolution of 1024 x 768px (XGA)
  - for high quality: multiply by factor 1.4 – 2.0
- Scale images
  - to an appropriate size
  - by image processor software, not by Powerpoint
- Save images in an appropriate format
  - JPEG, not BMP, TIFF

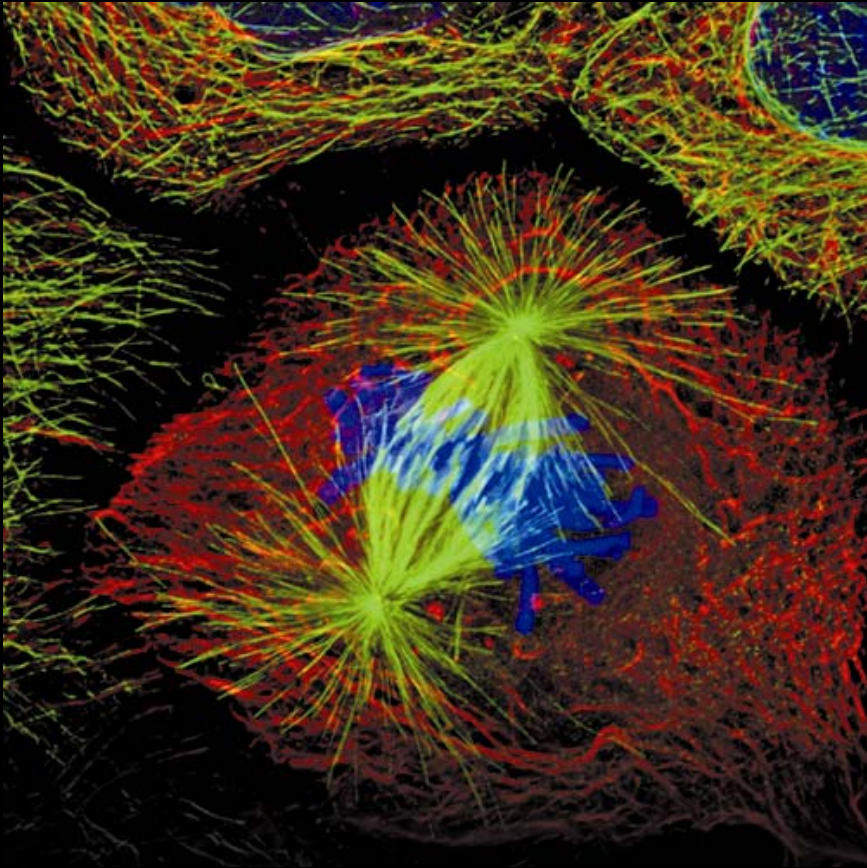


# Localization of MRP2 in Caco-2 cells

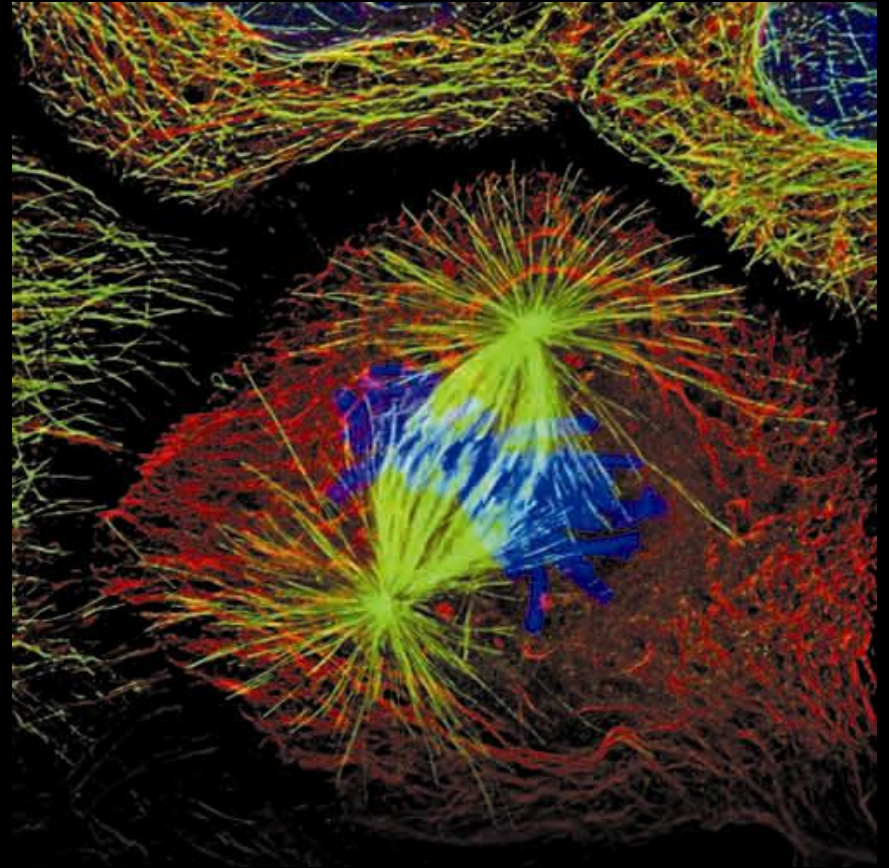




# Cell Division: Metaphase



BMP, 985 kB

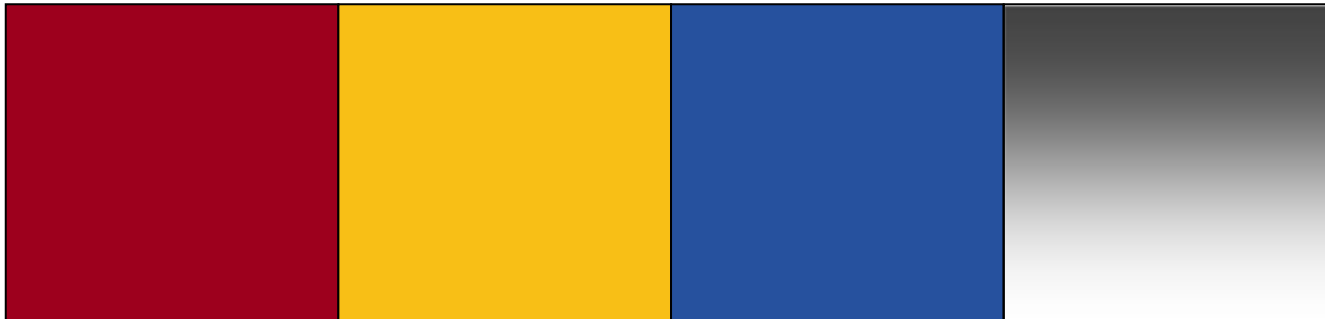


JPEG, 96 kB

# User-defined Animation in Microsoft Powerpoint

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- Slide transitions
- Animation of objects:
  - Show
  - Highlight
  - Hide
  - Move



# Use of animation effects

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- Do not try to use every feature your software offers
- Use animation effects with caution
  - Animation speed: always ,fast‘
- Use progressive building
  - Will help audience concentrate on what you are saying
  - Will prevent audience from reading ahead
  - Will help you keep your presentation focused



# Einbringen genetisch veränderter ES-Zellen in die Keimbahn der Maus



Embryonale  
Stadien

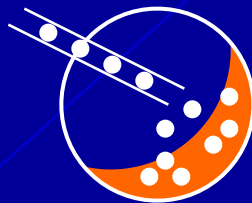


**Each animation step consists of:**

- **Group of objects**
- **Effect: Pop-Up**
- **Event: On Click**



Injektion in  
Blastocyste



Einpflanzung in  
Leihmutter





# Computer Presentations

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- Keep it simple and stupid (KISS)
- Use large fonts
- Use contrasting colors
- Include good combination of
  - text
  - graphics and images
- Limit animation effects
- Do not include audio, internet access
- Experiment !

