Tips for Creating Effective Posters for Academic Presentation

- Not too Much but Not too Little -

Prepared by
Yusuke Kakizaki

What is Poster Presentation?

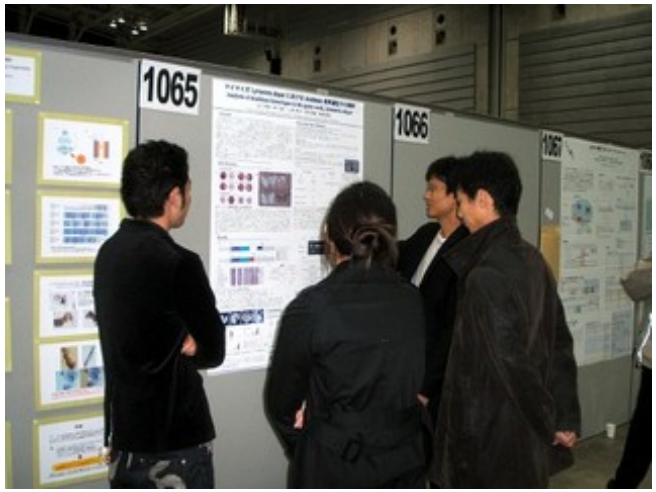
A poster is...

a static, visual medium that you use to communicate your ideas.

A poster vs. an oral presentation

In case of a poster presentation,
you should let your poster do
most of the “talking”.

A poster must convey the essence
of your ideas or messages.

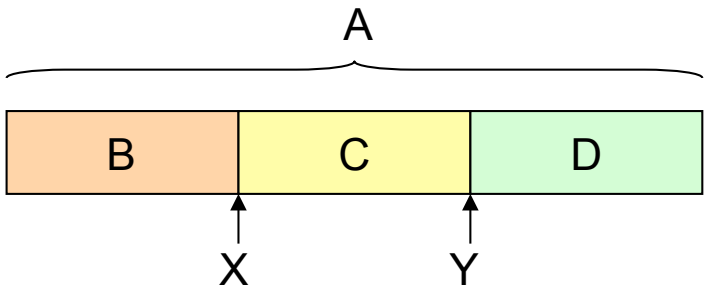


(BMB2007)

A Picture is worth a thousand words

A poster is primarily a “visual” presentation” supported by minimum amount of explanatory text. A poster is not a publication record!

Tip1: Make it simple!!

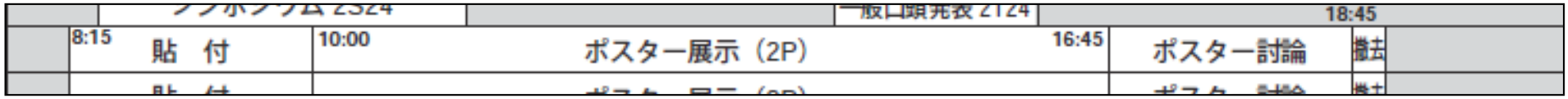


=

A is composed of three fragments, B, C and D. B-C interface is located at position X, and C-D interface is located at position Y. Fragment B and D do not have an interface.

No redundancy. No excessive details. No complication.

A poster should not rely on your verbal explanation. You are not standing by your poster all the time!!



(BMB2008)

Tip2: Make it self-explanatory!!

Things to do before making a poster

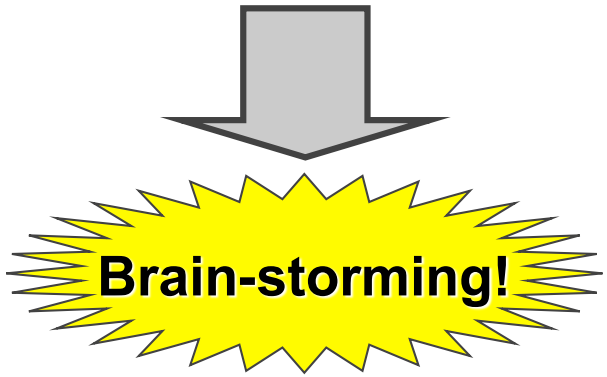
You have to know clear answers to the following two questions.

Q1: What are you trying to achieve by presenting this poster?

Presenting your new findings? Challenging conventional knowledge?

Q2: Who will be attending your presentation?

Specialists? Scientists from various fields?

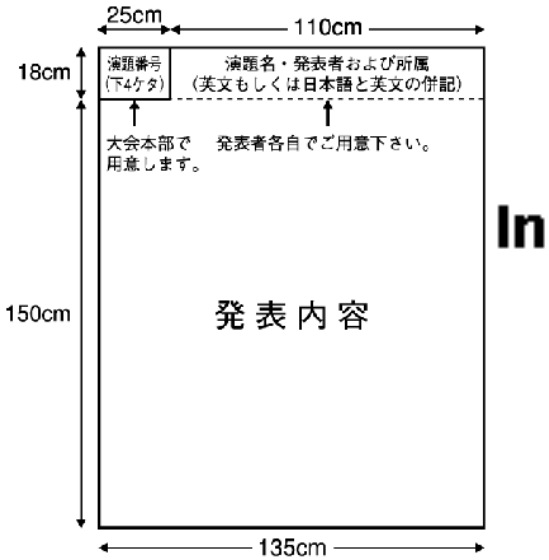


Think again about How's (= materials and methods), What's (=results), and Why's (discussion) of your research work as well as its objective.

Contents of a poster

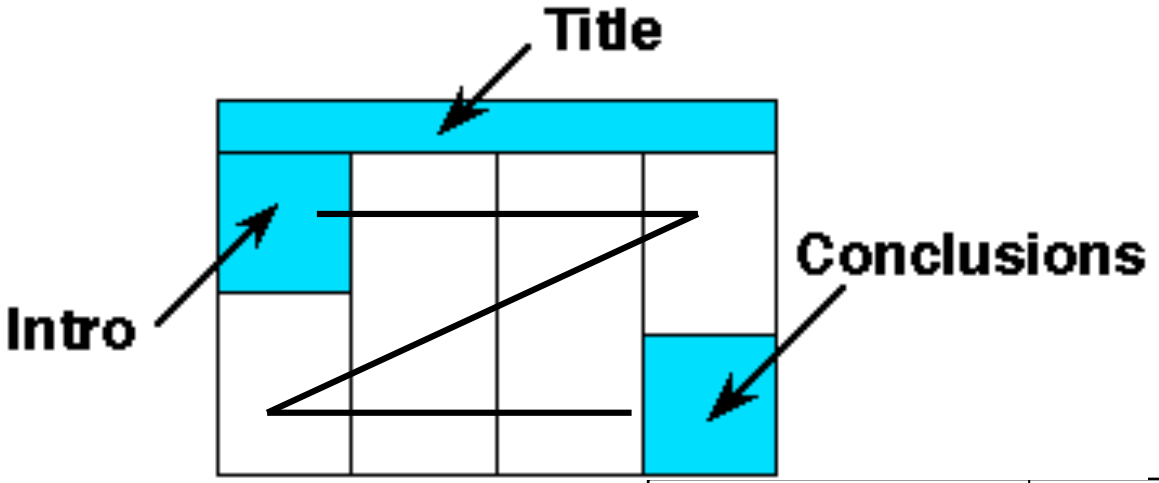
After doing brain-storming, sketch out contents of your poster.

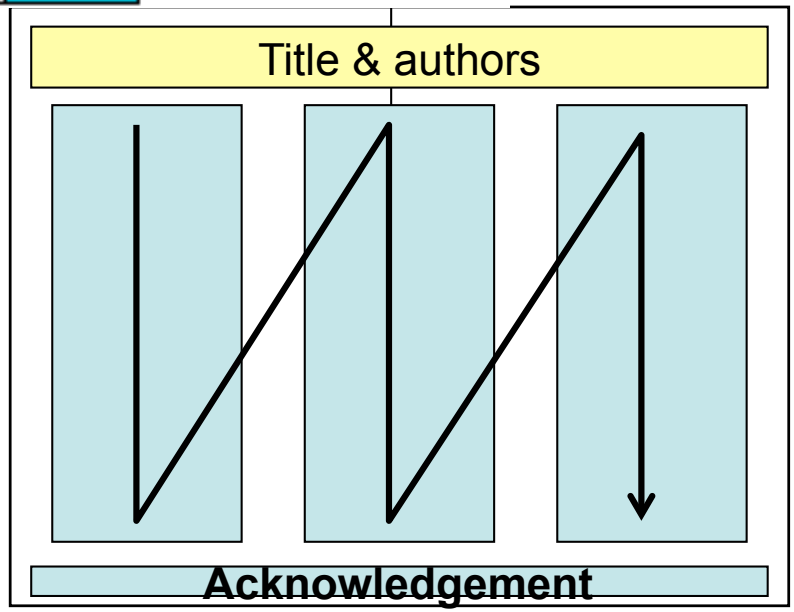
(Check guidelines of poster size and layout first!!)



(BMB2008)

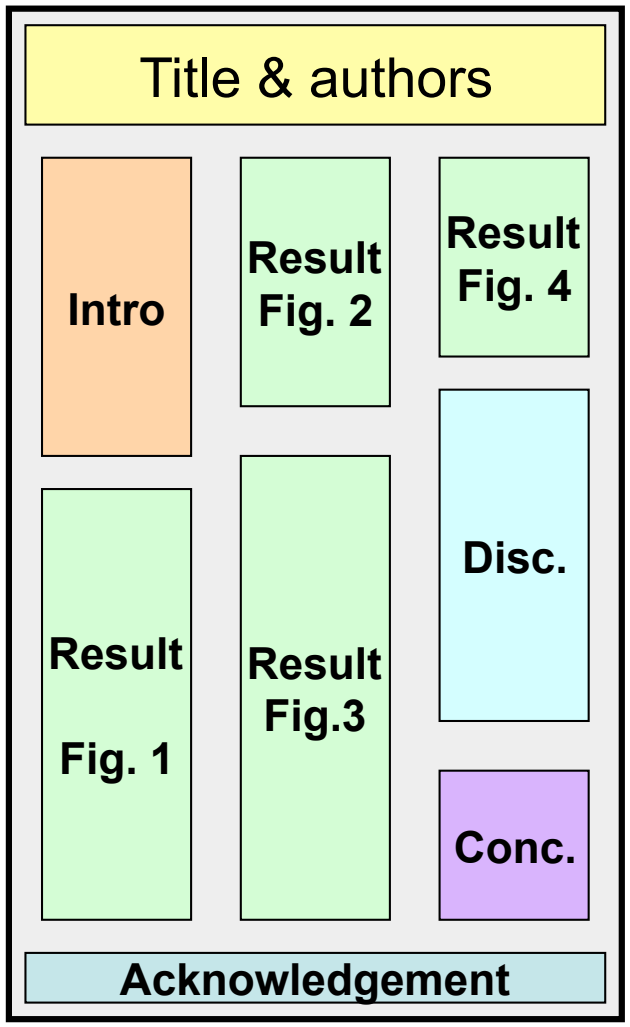
A0 (84.1 x 118.9) is OK.



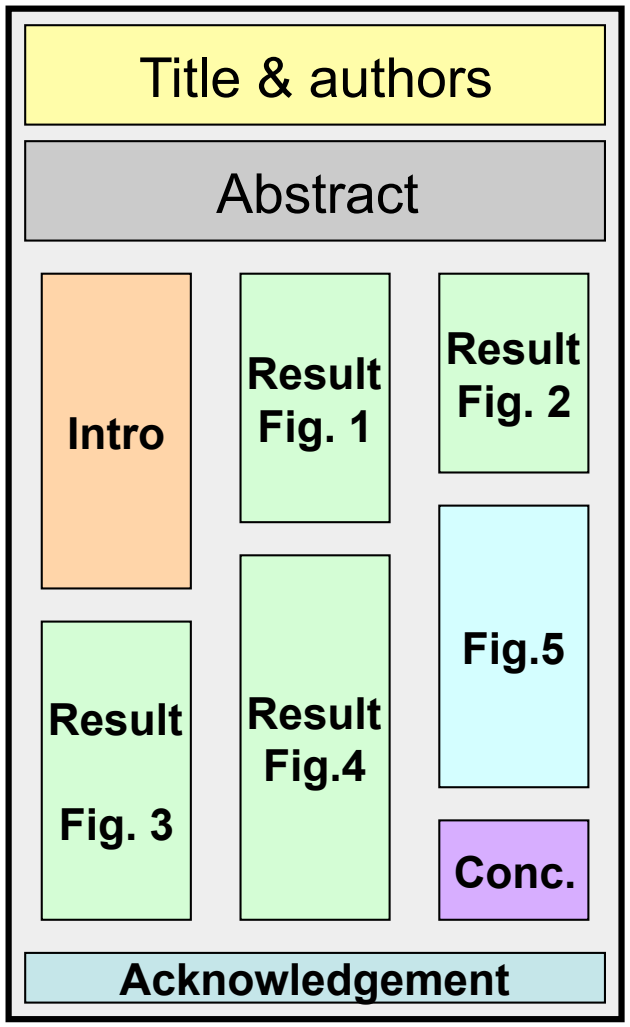


Practical layout of a poster

(Style-1)



(Style-2)



Necessity of abstract is a controversial issue.

Just like contents of regular scientific papers.

Insertion of citation section is unfavorable.

Sections may be numbered.

Organize story of your work and make sequence of sections clear.

SMAP1 is a positive regulator for 2,4-Dichlorophenoxyacetic acid mediated actin degradation and acts independent of known auxin signaling pathway

Maho Takahashi [A] Yutaka Oono [B] Abidur Rahman [A]

(A): Cryobiofrontier Research Center, Iwate University, Morioka, Japan
(B): Radiation-Applied Biology Division, JAEA, Takasaki, Japan

Abstract

2,4-Dichlorophenoxyacetic acid (2,4-D), a chemical analogue of plant hormone auxin, Indole-3-acetic acid (IAA), is widely used as a growth regulator and exogenous source of auxin.Traditionally, it is believed that IAA and 2,4-D share a common signaling pathway. However, recent studies have challenged this idea both at physiological and genetic level. The isolation of a 2,4-D specific mutant *aar1* and identification of the protein SMAP1, which confers specific resistance to 2,4-D, provide evidence that IAA and 2,4-D use partially distinct molecular pathways. Similar to upstream events, 2,4-D and IAA also control the downstream physiological responses differentially. 2,4-D but not IAA, degrades the root actin cell cytoskeleton and inhibits the cell division. To provide a molecular explanation of 2,4-D specific action in Arabidopsis, we characterized the functionally unknown protein SMAP1. The molecular and cell biological analyses revealed that, 1) SMAP1 acts as a positive regulator for 2,4-D induced degradation of actin, cell division and cell elongation processes as the loss of SMAP1 nullify the effect of 2,4-D on all these processes, and 2) SMAP1 acts independent of known ubiquitin-proteasome mediated auxin signaling pathway, as the double mutant of SMAP1 and TIR1, a component of E3 ubiquitin ligase (*aar1-tir1*), in root growth assay, shows complete insensitivity to 2,4-D at the concentration that inhibits eighty percent root growth in respective single mutants. Similarly, the loss of SMAP1 in *tir1* background makes the root actin resistant to 2,4-D mediated degradation. Our results, for the first time, identify a novel 2,4-D specific biologically significant pathway in plants, and also provide a molecular explanation of the difference between IAA and 2,4-D.

Introduction

Previous studies demonstrated that 2,4-Dichlorophenoxyacetic acid (2,4-D), the chemical analogue of plant hormone IAA, use distinct molecular and physiological pathways in regulating the primary root growth of Arabidopsis (Rahman et al., 2006, 2007).

The physiological and cell biological analyses to tease apart the regulators that are involved in controlling the auxin mediated root growth development revealed that 2,4-D and IAA can be put into two different classes based on their effects on cell division, elongation and actin organization (Rahman et al., 2007). IAA inhibited the root growth primarily through reducing the cell length without affecting the cell division, while 2,4-D exerts the same effect largely by affecting the cell division. A similar contrasting effect was also observed in the actin organization, where IAA tends to bundle the actin filaments while 2,4-D does the opposite; degrades the actin (Rahman et al., 2007).

At the molecular level, the characterization of the mutated gene in *aar1*, which shows a 2,4-D specific resistance in root growth, revealed that the 2,4-D specific resistance is conferred by protein SMAP1, and works upstream of auxin signaling pathway (Rahman et al., 2006) However, the function of this protein is unknown and never before implicated in auxin action.

To understand the function of SMAP1, we analyzed the cell division, cell elongation and visualized the actin filaments in *aar1* mutant in presence of 2,4-D. Our results reveal that SMAP1 functions as a positive regulator for 2,4-D in all these processes. In addition, we also provide genetic evidence that SMAP1 acts independent of known auxin signaling pathway. These results, for the first time, provide a biological role of SMAP1 in Arabidopsis.

Result

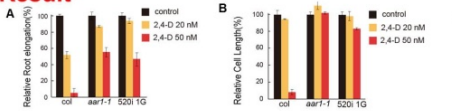


Figure 1. (A) Effect of 2,4-D on primary root elongation (B) Effect of 2,4-D on cortical cell elongation (C) Effect of 2,4-D on cell length and cell production rate

Data are means ± SEM of three replicate experiments. Values in parentheses are the percentage of control for each column. Vertically grown 5-day-old seedlings were exposed to the treatments for 2 days and the measurements reflect the behavior over the second day of treatment. Cortical cell length was measured in matured cells. Cell production rate was calculated by taking the ratio of root elongation rate and average cell length for each individual and averaging over all the roots in the treatment. 520i 1G is a *SMAP1* silencing line.

C

	Treatment	Primary root elongation (mm day^{-1})	Cell length (mm)	Cell production rate (cells day^{-1})
control	DMSO	9.7 ± 0.2 (100)	184 ± 9.2 (100)	50.6 ± 0.9 (100)
	20 nM 2,4-D	5.4 ± 0.4 (52)	174 ± 0.6 (95)	28.9 ± 2.5 (57)
	50nM 2,4-D	0.6 ± 0.3 (5)	16 ± 5.7 (8)	34 ± 3.4 (67)
aar1-1	DMSO	7.9 ± 0.4 (100)	178 ± 6.0 (100)	44.3 ± 1.4 (100)
	20 nM 2,4-D	7.6 ± 0.1 (87)	190 ± 8.2 (106)	40 ± 1.2 (90)
	50 nM 2,4-D	4.2 ± 0.4 (55)	181 ± 2.3 (102)	22.9 ± 2.0 (52)
520i 1G	DMSO	9.8 ± 0.4 (100)	197 ± 6.7 (100)	50.0 ± 1.0 (100)
	20 nM 2,4-D	9.0 ± 0.3 (92)	189 ± 10.7 (96)	48.0 ± 4.4 (95)
	50 nM 2,4-D	5.1 ± 0.1 (52)	169 ± 2.3 (86)	30.6 ± 4.7 (61)

Figure 2. Effect of Latrunculin B on primary root elongation

Data are means ± SEM of three replicate experiments. Vertically grown 5-day-old seedlings were exposed to the treatments for 2 days and the measurements reflect the behavior over the 2 days of treatment.

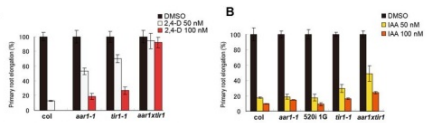


Figure 3. *aar1 x tir1* double mutant shows enhanced resistance to 2,4-D

(A) 2,4-D treatment (B) IAA treatment
Data are means ± SEM of three replicate experiments. Vertically grown 5-day-old seedlings were exposed to the treatments for 2 days and the measurements reflect the behavior over the 2 days of treatment

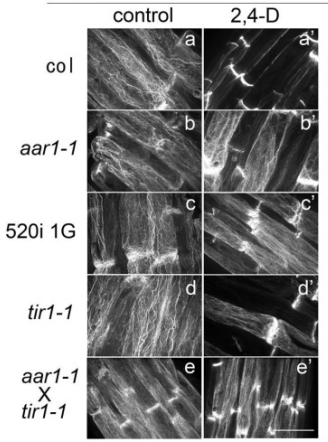


Figure 4. Effect of 2,4-D on filamentous actin: chemical fixation

(a-e) Control
(a') 2,4-D 20 nM
(b'-e') 2,4-D 50 nM
(a,a') columbia
(b,b') *aar1-1*
(c,c') 520i 1G
(d,d') *tir1-1*,
(e,e') *aar1-1 ×tir1-1*

The images are representative of at least three fixation runs, with 5-10 roots per treatment in each run. Vertically grown 5-day-old seedlings were exposed to the 2,4-D treatments for 2 days. Then roots were fixed and actin was localized using immuno-cytochemistry and imaged using confocal laser scanning microscopy. Images are projections of 15-25 optical sections. Scale bar represents 50 µm.

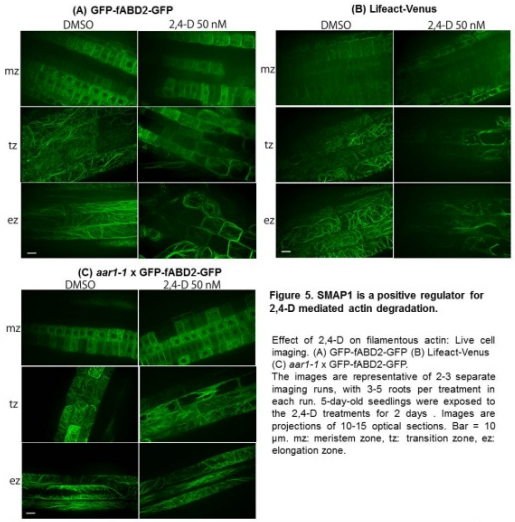


Figure 5. SMAP1 is a positive regulator for 2,4-D mediated actin degradation.

Effect of 2,4-D on filamentous actin: Live cell imaging. (A) GFP-fABD2-GFP (B) Lifeact-Venus (C) *aar1-1* x GFP-fABD2-GFP.
The images are representative of 2-3 separate imaging runs, with 3-5 roots per treatment in each run. 5-day-old seedlings were exposed to the 2,4-D treatments for 2 days . Images are projections of 10-15 optical sections. Bar = 10 µm. mz: meristem zone, tz: transition zone, ez: elongation zone.

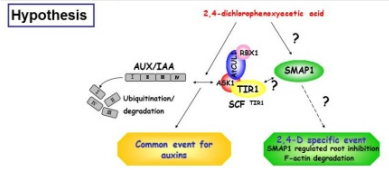


Figure 5. Schematic model explaining the 2,4-D response pathway

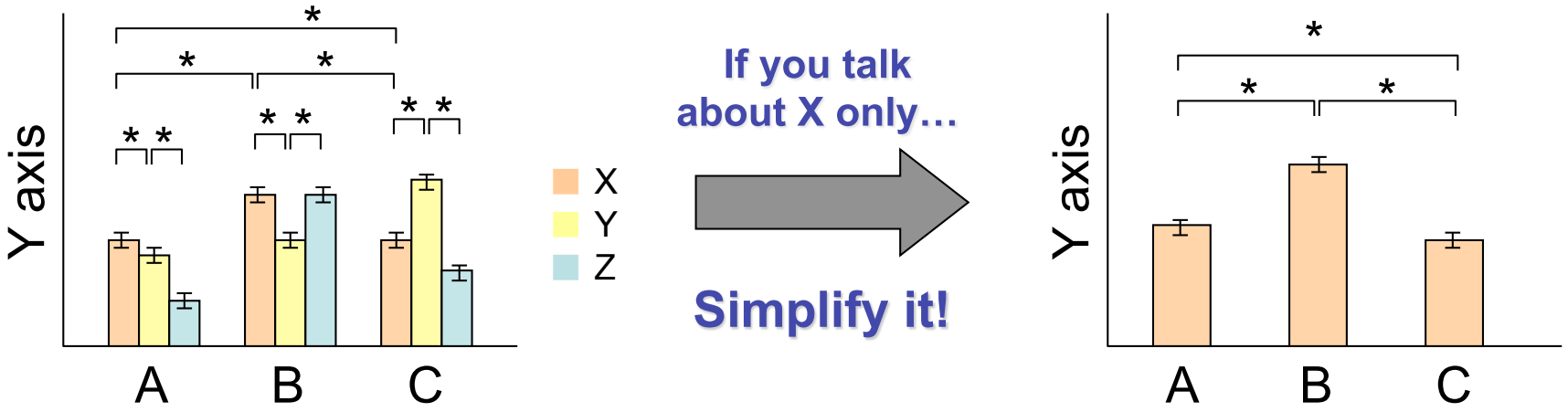
Acknowledgement

We thank Dr. Takashi Ueda (Tokyo University) for Lifeact-Venus.
This work was supported in part by a Grant-in-Aid for Scientific Research (B) from the Ministry of Education,Sports,Culture,Science and Technology of Japan(grant no. 19789246 to A.R.) .

Plant Biology Meeting 2009, Honolulu, Hawaii, USA

Be ruthless to edit self-explanatory figs

Remove all non-essential information from figs and tables.

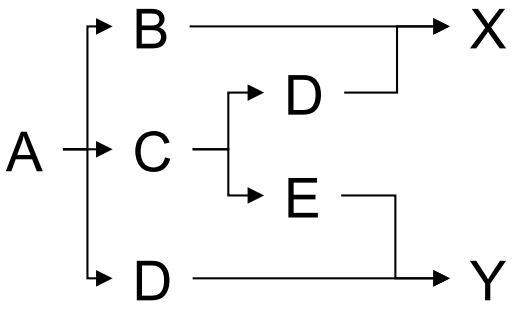


Do not show all traces of your experimental efforts in a poster.

Schematic representation is preferred to text description.

A was fragmented into B, C and D. Then C was further fragmented into D and E. Finally B and D formed X, while D and E formed Y.

Minimize text!

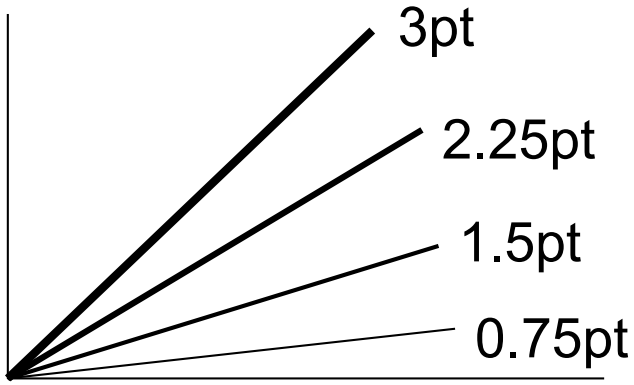


Reader-friendly figure styles

1. Make figs big and appropriately colored.

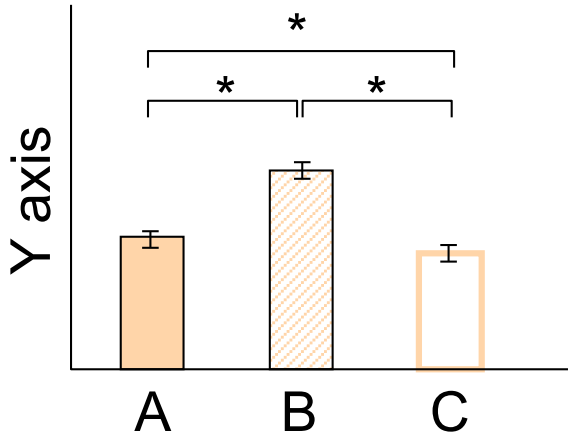
Figs should be recognizable from a few meters away from your poster.

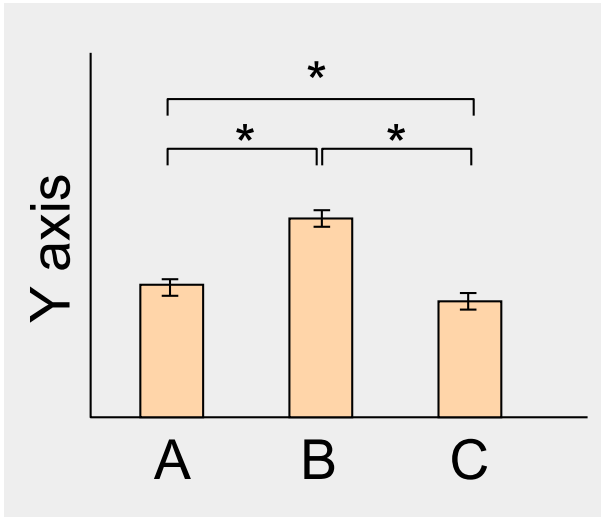
2. Lines should be larger than normal.

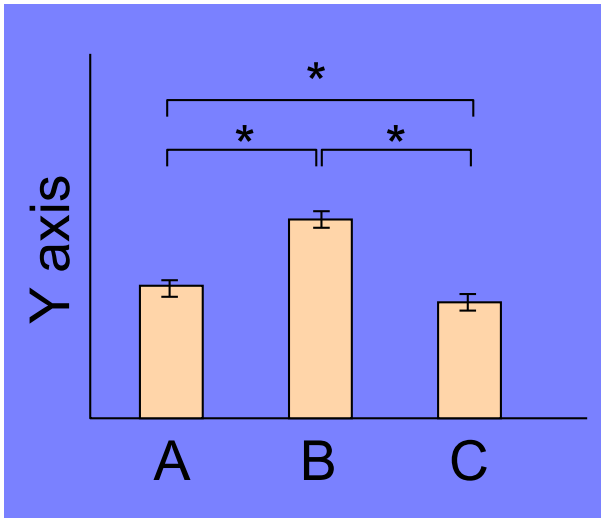


3. No patterned or open bars in histograms.

4. Colored background vs. figs: contrast.







Be critical to your text description

Make storyline of your presentation clear.

Scientific readers are familiar with popular storyline of papers.

= Introduction, Materials and methods, Results and Discussion.

Avoid redundancy in description, citation and filler phrases.

Description: Simplify your text. Use abbreviations.

Citation: Use indispensable citations only.
A Poster does not usually contain a citation section.
Instead, cite references in text like “(Kakizaki et al., 2010)”.

Filler phrases: Avoid phrases like “(See fig. 1)” as much as possible.

Use reader-friendly languages in your text.

Readers may not be scientists in your field.

Reader-friendly text styles

Text should be large enough to be read from 2m away.

Title: 36-42 font size Others: 24-28 font size

Double space is recommended.

Even left or jagged right is easy to read.

Do not **use more than 2 font types.**

Times Roman or Arial is easy on eyes.

Usage of two font styles in a poster is not appropriate.

DO NOT CAPITALIZE OF ALL CHARACTERS IN A SENTENSE.

Do not *overuse font styles* to emphasize a word or a phrase.

Try to use active voice. This is your work!

X was analyzed. ⇒ We have analyzed X.

Check your spelling.

Tips for color usage in posters

Using colors in posters is highly recommended.

Overuse of colors is distracting.

Do not use colors just to impress!

Think contrast. **Think contrast.** **Think contrast.** **Think contrast.**

Soft colors such as pastels or greys may be used on background.

Using a few background colors in relation to context is OK.

Place dark pictures on light background, and vice versa.

Bright colors may be unpleasant under fluorescent lights.

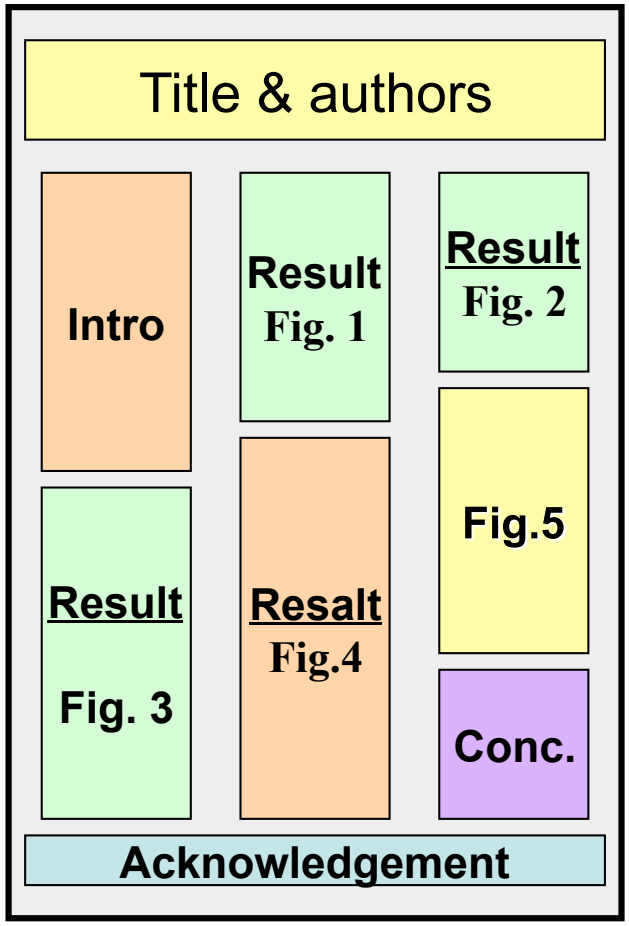
Fluorescent lights intensifies such colors.

Colors are effective if appropriately used.

On editing figures, writing text or designing color usage…

be consistent!!!

Consistency of your poster gives great impression of your work to readers.



What kind of impression are you going to get from this poster?

Before printing out your poster, check for…

1. **mistakes** – Everything correct?
2. **legibility** – Easy to read?
3. **consistency** – Displayed properly?

On presenting a poster…

Stand by your poster during presentation time you have given.

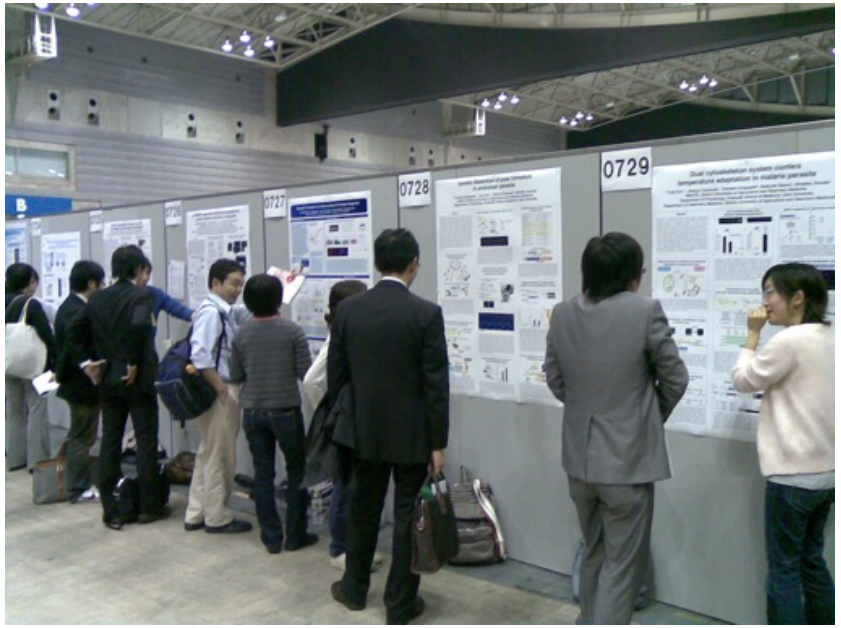
You have to…

answer questions from readers.

give extra or detailed information to readers.

enjoy discussion with other scientists. Be friendly.

So…do not wander too far away from you poster!!



Summary

1. Be ruthless to your poster.
2. Be critical to your poster.
3. Be consistent in your poster.
4. Be reader-friendly in your poster.

Reference

Eastern Kentucky University, USA

http://people.eku.edu/ritchisong/posterpres.html

- This is a course material.

New Castle University, UK

http://lorien.ncl.ac.uk/ming/Dept/Tips/present/posters.htm

American Society of Primatologists

http://www.asp.org/Education/Howto_onPosters.html