


Bioimages: common problems and pitfalls in publications

FENS Friday webinar series - 10th September 2021

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https://twitter.com/_alpha 

FENS *Friday*



Acknowledgements

FENS Committee for Higher Education and Training (CHET) and the FENS Communication Committee (COMM)

eLife Ambassadors Programme

Meta-Research team: 19 scientists from 9 nations and 5 continents:

Helena Jambor, Alberto Antonietti, Bradly Alicea, Tracy Lynn Audisio, Susann Auer, Vivek Bhardwaj, Steven Burgess, Iuliia Ferling, Małgorzata Anna Gazda, Luke Hoepfner, Vinodh Ilangoan, Hung Lo, Mischa Olson, Salem Yousef Mohamed, Sarvenaz Sarabipour, Aalok Varma, Kaivalya Walavalkar, Erin Wissink, Tracey Weissgerber

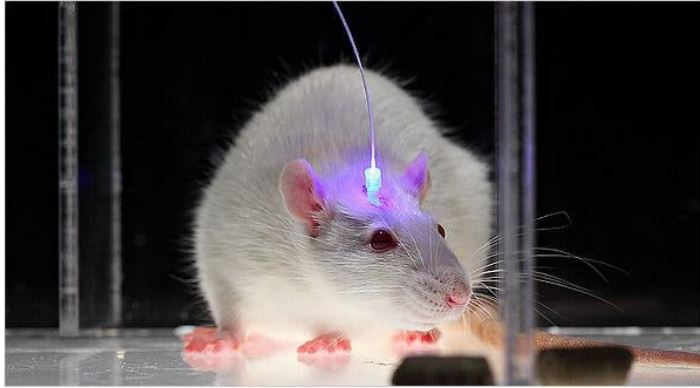
Figures and images are important in scientific publications

- Many scientists, reviewers and editors report that they examine figures first
- Search engines and journal websites often allow readers to examine the figures along with the title and abstract
- Scientists also share image-based figures on posters and social media, and in talks

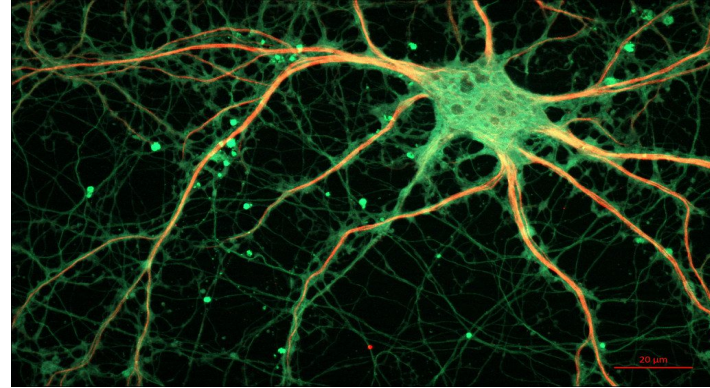
**I
NEVER
READ
I JUST
LOOK
AT
PICTURES**

Andy Warhol

Bioimages (in Neuroscience)



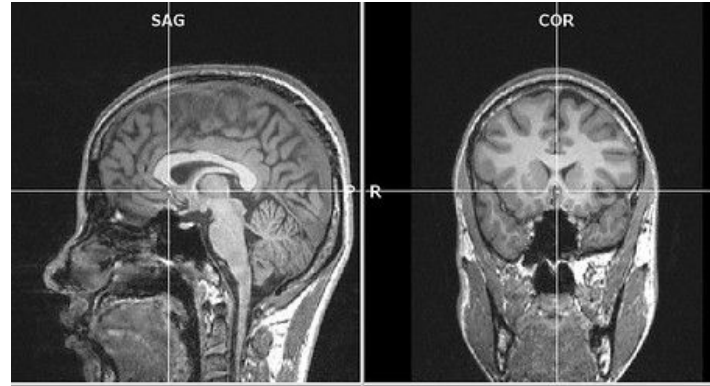
The New York Times, CC BY 2.5



ZEISS Microscopy CC BY 2.0

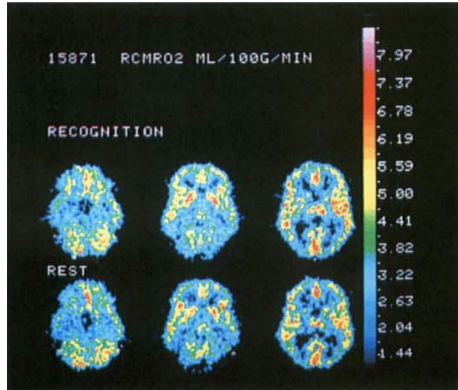


Mikaela Laine, CC BY 4.0

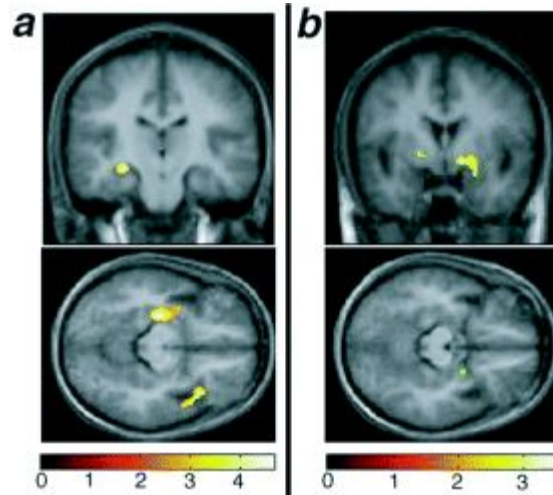


Mohan P J, CC BY-NC-SA 2.0

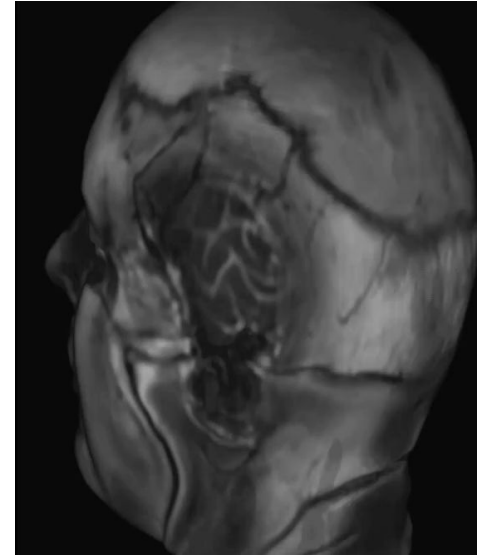
Evolution of Bioimages (in Neuroscience)



Roland et al., EJN, 1989.



Zalla et al., EJN, 2000



Terem et al., MRM, 2021

Bioimages in publications, possible problems

- Image manipulation
- Accidental manipulation
- Legibility
- Low quality of image visualization
- Accessibility

Bioimages in publications, possible problems

- Image manipulation
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- **Legibility**
- **Low quality of image visualization**
- **Accessibility**

Methods: Meta-research

- International team, eLife Ambassadors programme
- “Top” 15 journals (IF)
- Original research articles
- Published in April 2018
- 172 papers for Physiology, 159 papers for Cell Biology
- Protocol, data and codes: <https://osf.io/b5296/>






eLIFE Community
Ambassadors

Full paper here:

 OPEN ACCESS  PEER-REVIEWED

META-RESEARCH ARTICLE

Creating clear and informative image-based figures for scientific publications

Helena Jambor , Alberto Antonietti , Bradly Alicea, Tracy L. Audisio, Susann Auer, Vivek Bhardwaj, Steven J. Burgess, Iuliia Ferling, Małgorzata Anna Gazda, Luke H. Hoepfner, Vinodh Ilangoan, Hung Lo, Mischa Olson, Salem Yousef Mohamed, Sarvenaz Sarabipour, Aalok Varma, Kaivalya Walavalkar, Erin M. Wissink, Tracey L. Weissgerber  [view less]

Version 2

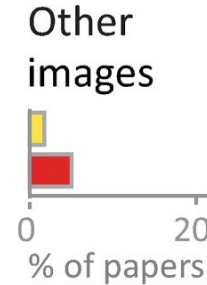
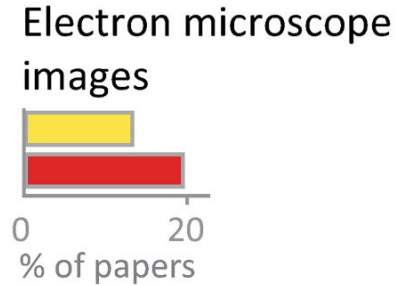
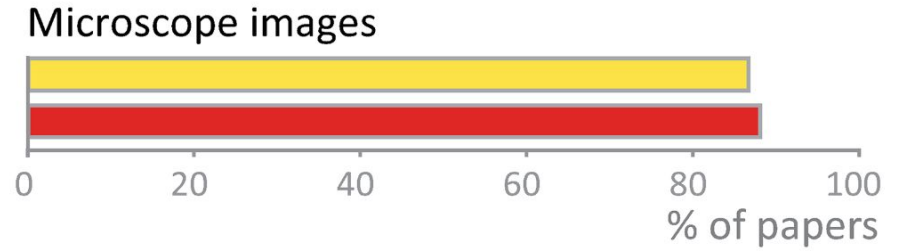
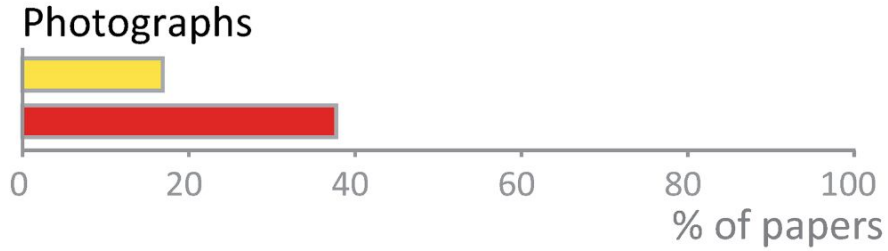


Published: March 31, 2021 • <https://doi.org/10.1371/journal.pbio.3001161>

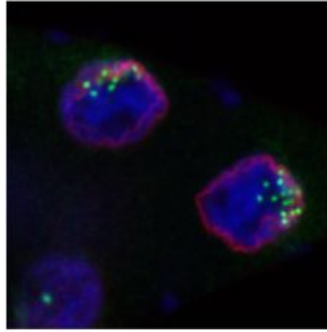
102 Save	0 Citation
11,918 View	246 Share

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3001161>

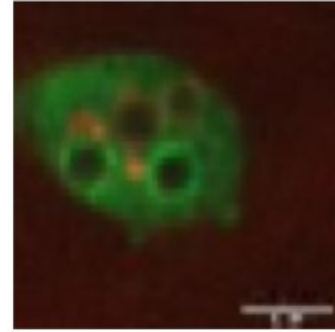
Image types



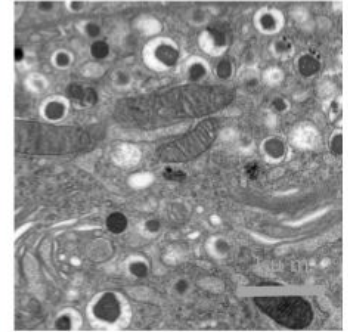
Scale information bad examples



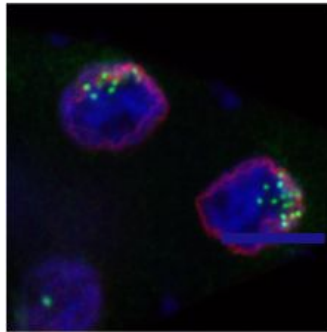
1. No scale bar



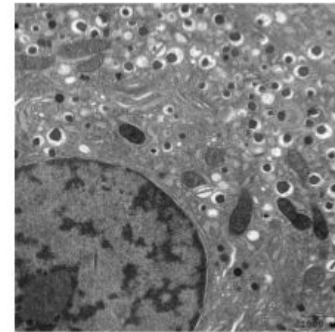
2. Scale bar illegible,
poor compression



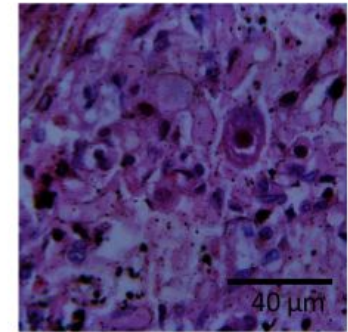
3. Scale bar blends
into the background



4. Scale bar in color



5. Scale bar
too small



6. Scale bar blends
into the background¹¹

Scale information

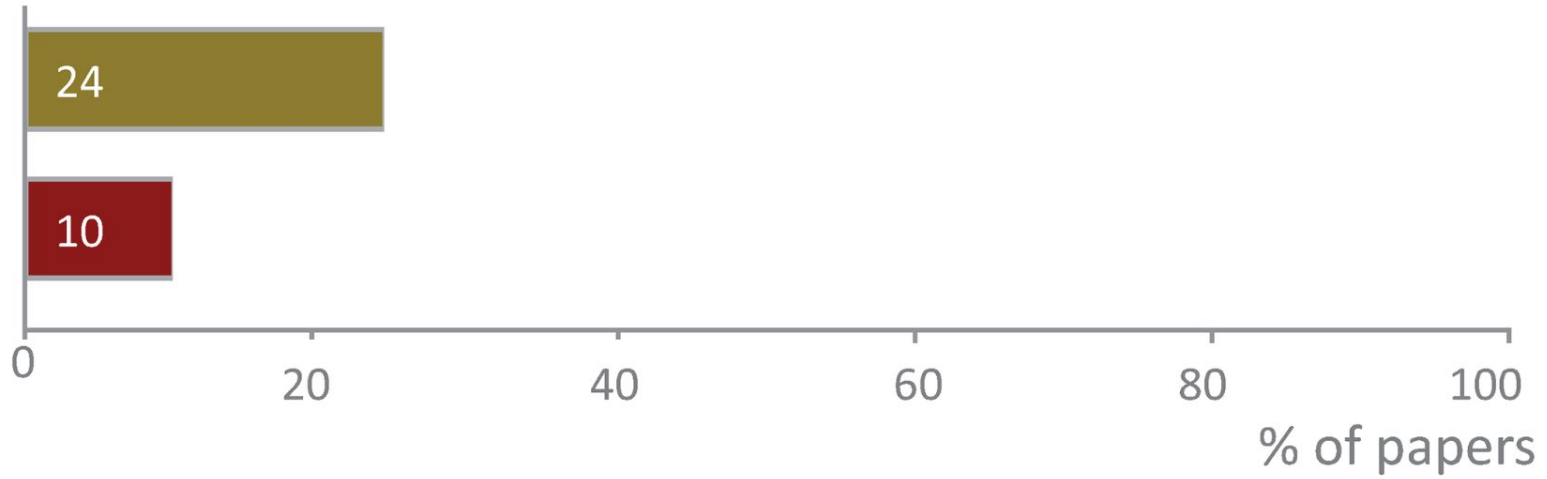
No scale information

Physiology
n= 172

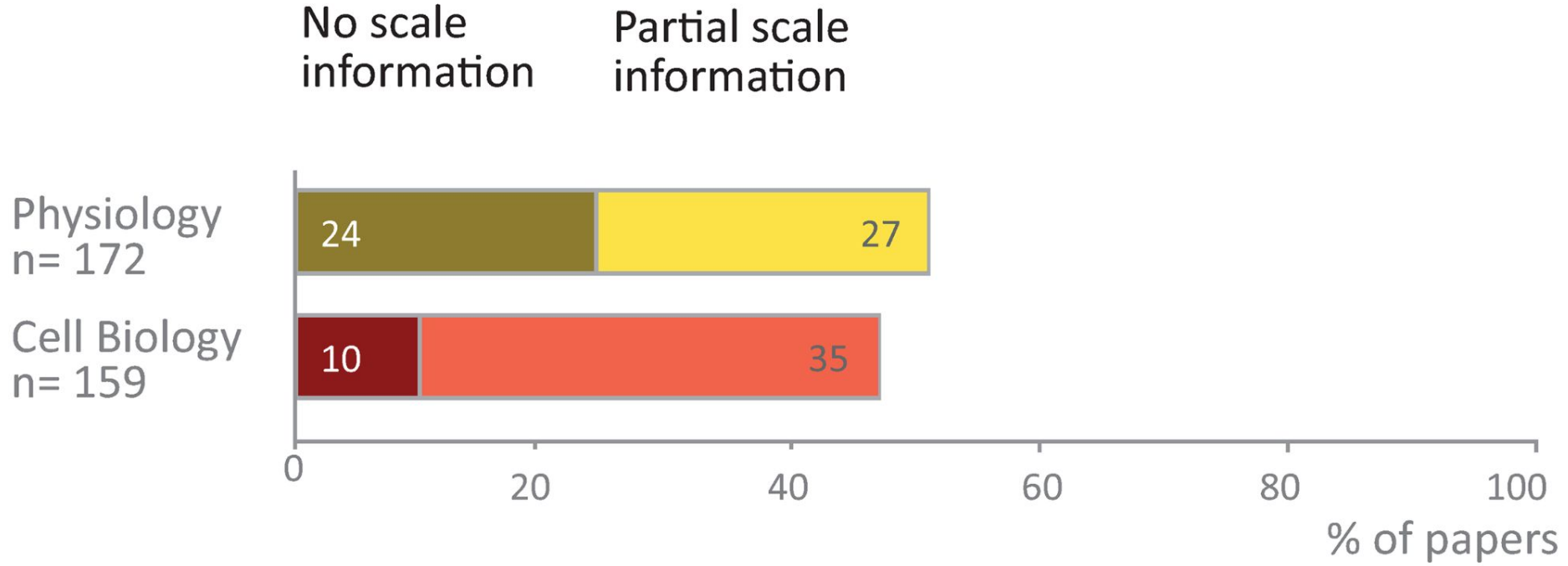
24

Cell Biology
n= 159

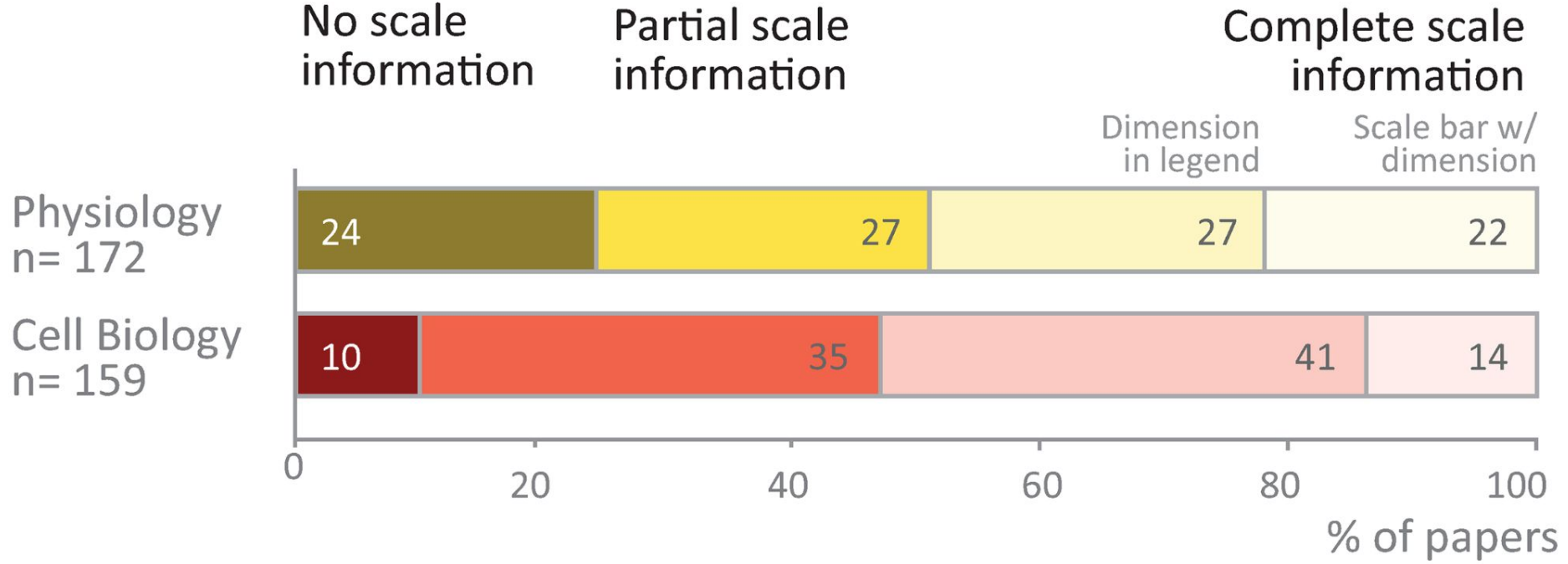
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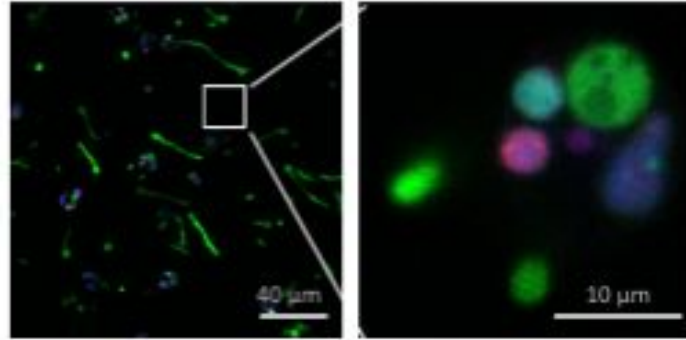
Scale information



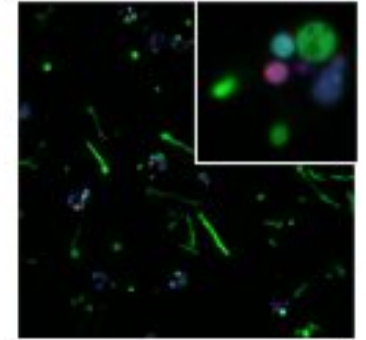
Scale information



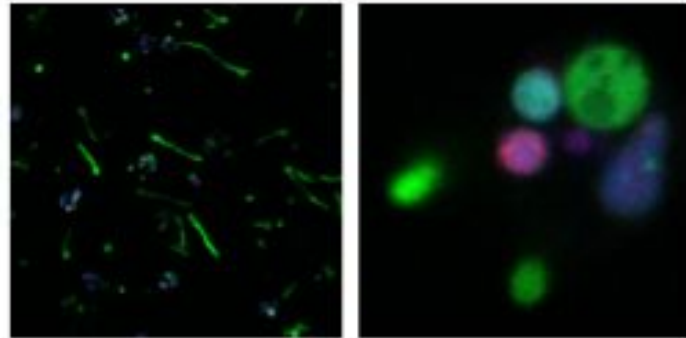
Insets bad examples



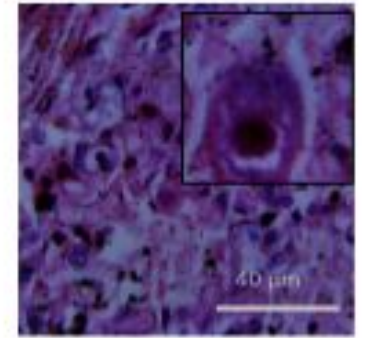
1. Wrongly placed inset
(no cells in marked region)



2. No inset marked,
inset obstructs data



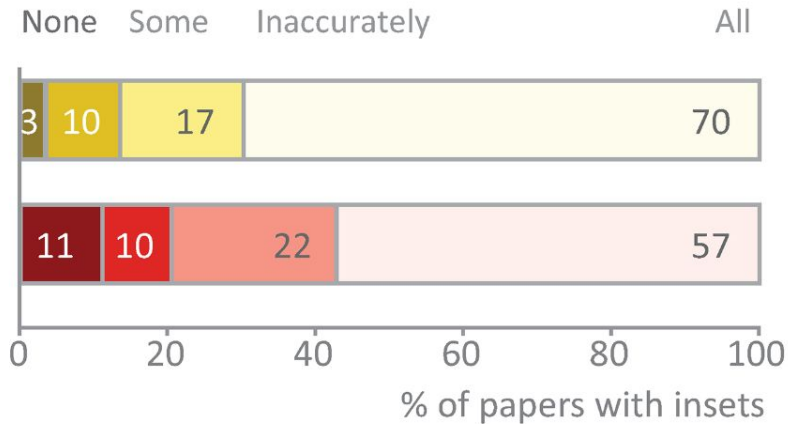
3. Inset origin not marked



4. No inset marked,
inset obstructs data

Insets

Are insets accurately marked in the image?



Are insets clearly described in the image or legend?

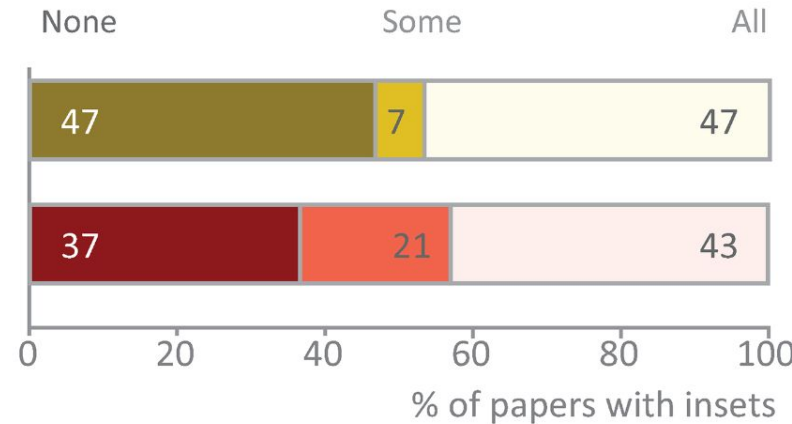
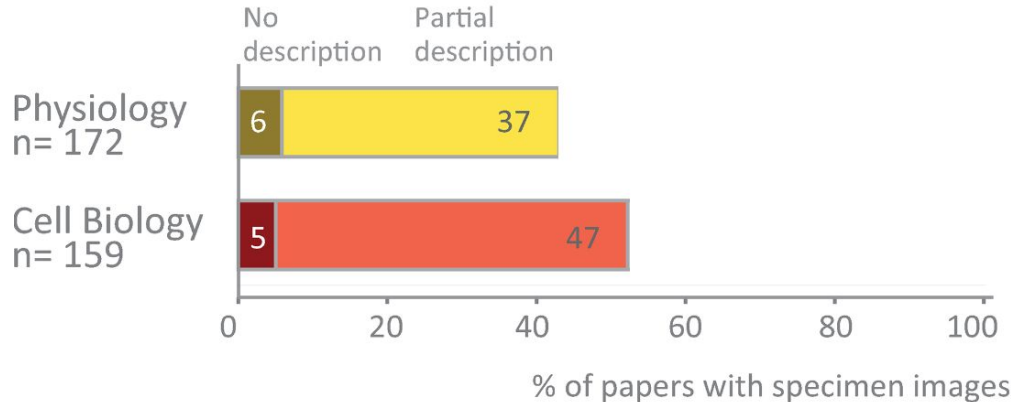


Figure legends

Are species/tissue/object clearly described in the legend?



Are labels and annotations clearly described in the figure or legend?

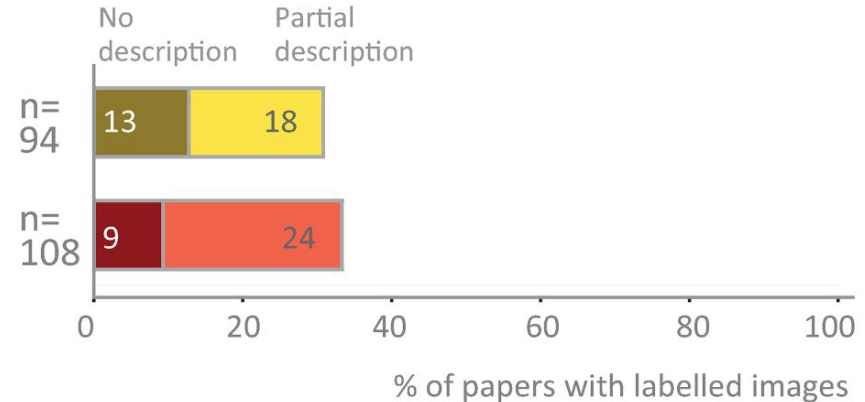
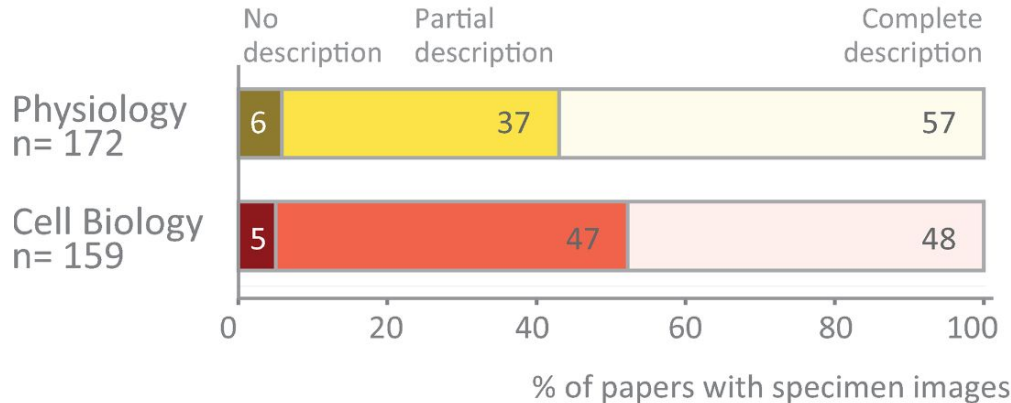
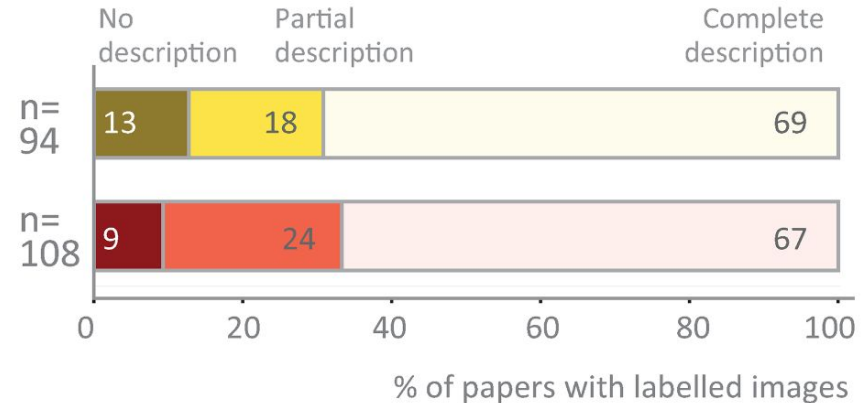


Figure legends

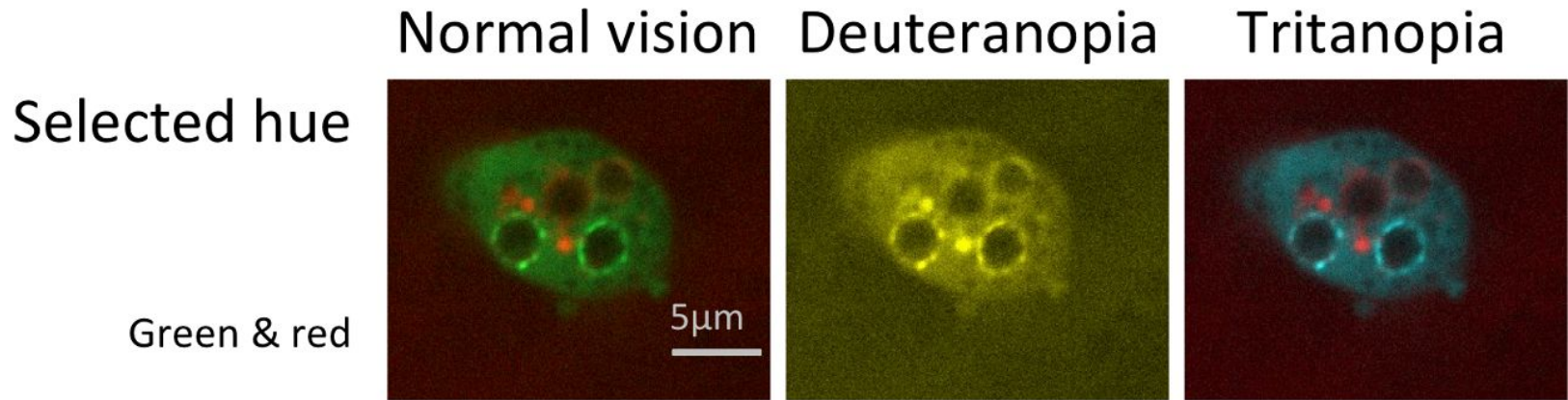
Are species/tissue/object clearly described in the legend?



Are labels and annotations clearly described in the figure or legend?



Colors bad examples



Colors bad examples

Situation

Example

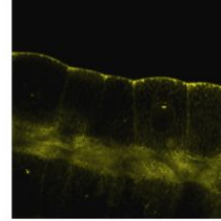
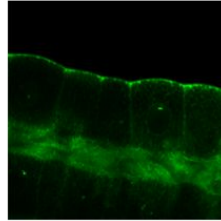
Visibility test

Colorblind
simulation

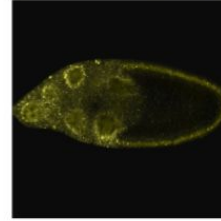
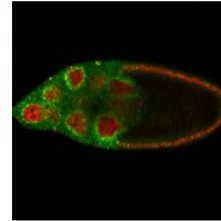
Color photo
e.g. photograph,
tissue staining
with dyes.



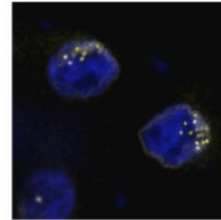
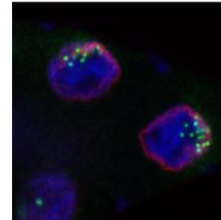
**Microscope image,
1 color**



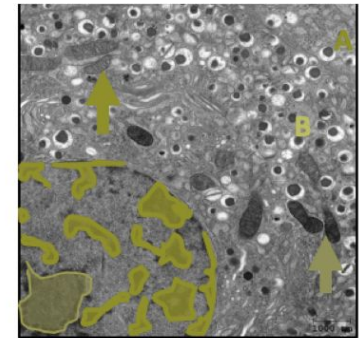
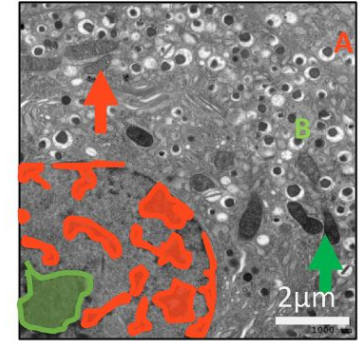
**Microscope image,
2 colors**



**Microscope image,
3 colors**



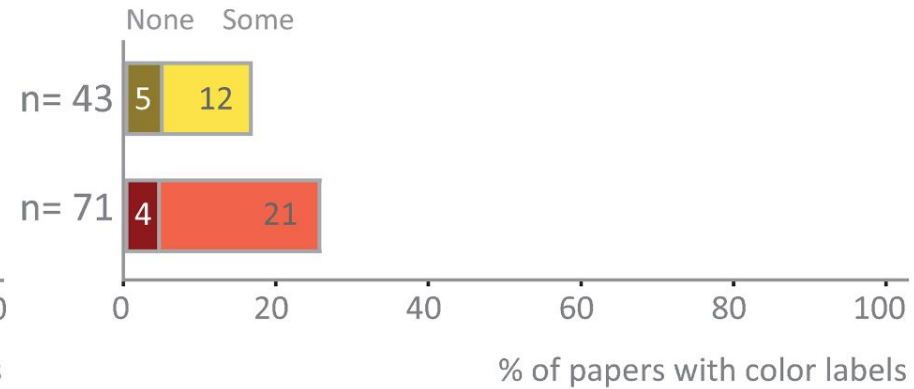
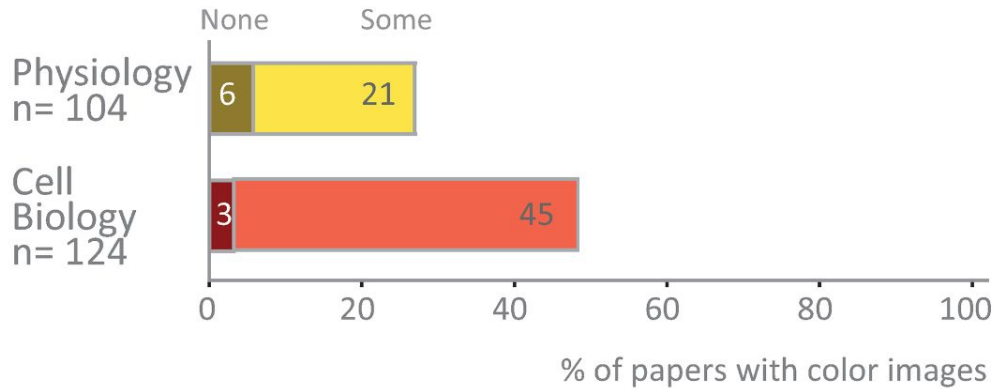
1. Colored annotation,
not colorblind safe



Colors

Are image features visible to colorblind (Deuteranopia) readers?

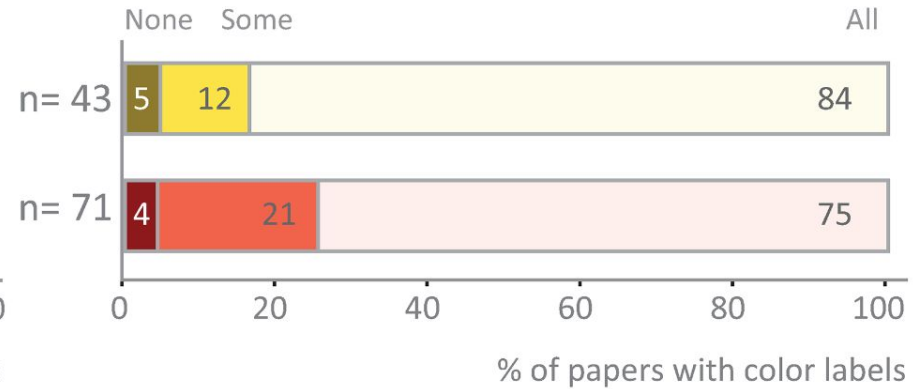
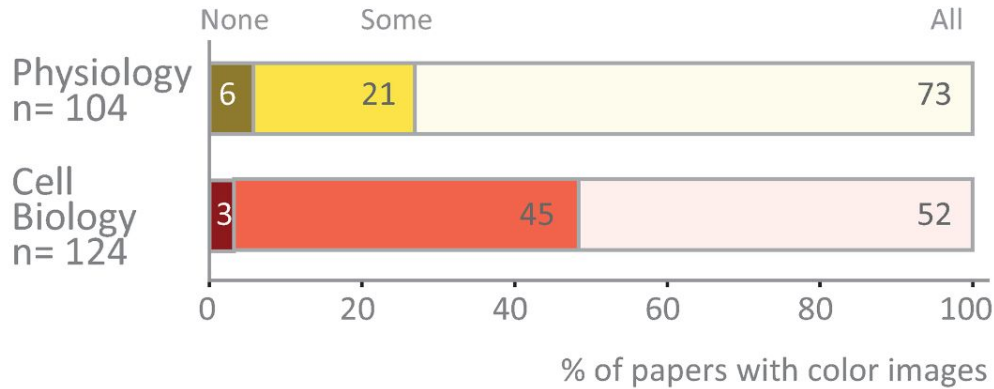
Are labels visible to colorblind (Deuteranopia) readers?



Colors

Are image features visible to colorblind (Deuteranopia) readers?

Are labels visible to colorblind (Deuteranopia) readers?



Summary

- Missing/incomplete **scale information** in ~50% of papers
- ~40% of **insets** not properly marked and ~60% not described
- ~50% of papers with **legends** not reporting the object represented and ~30% not explaining labels and annotations
- ~35% of papers not **colorblind** accessible

Only ~10% of papers met all good practice criteria examined!

BRACE YOURSELF



memegenerator.net

...from our next speaker: Dr. Helena Jambor

Data visualisation scientist at the University hospital Dresden, Department of Hemato-Oncology

Lecturer for bioinformatics at Beuth Hochschule für Technik, Berlin.

Previous: Genome-wide imaging project of RNA localizations.

