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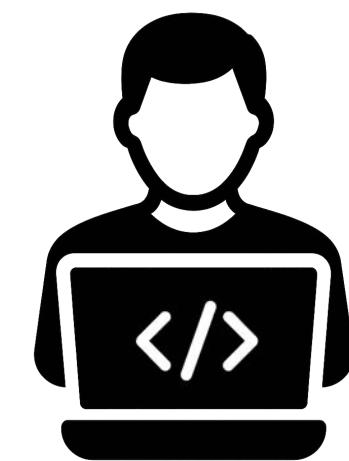
peerreviewcongress.org  
2025

# Characterizing Problematic Images in Retracted Scientific Articles

João Cardenuto<sup>1</sup>, Daniel Moreira<sup>2</sup>, Anderson Rocha<sup>1</sup>



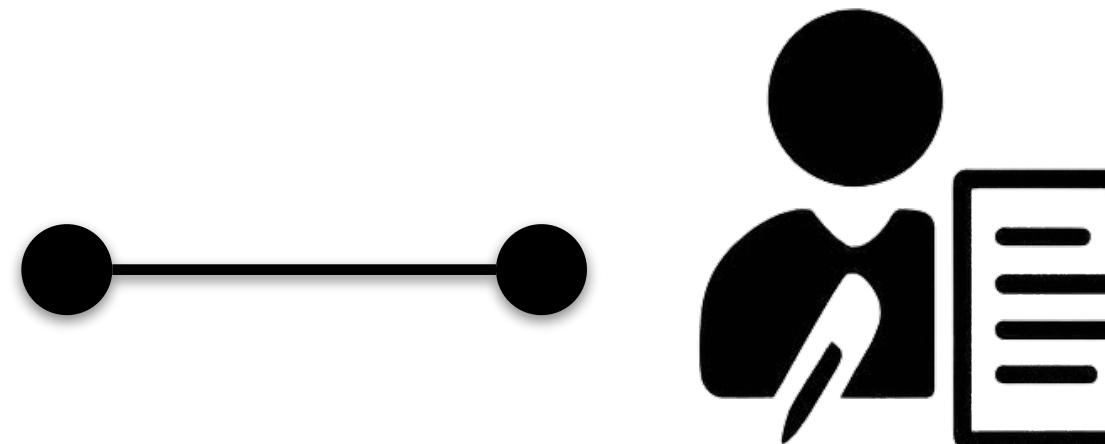
# Scientific Integrity



CS R&D



Software Tools



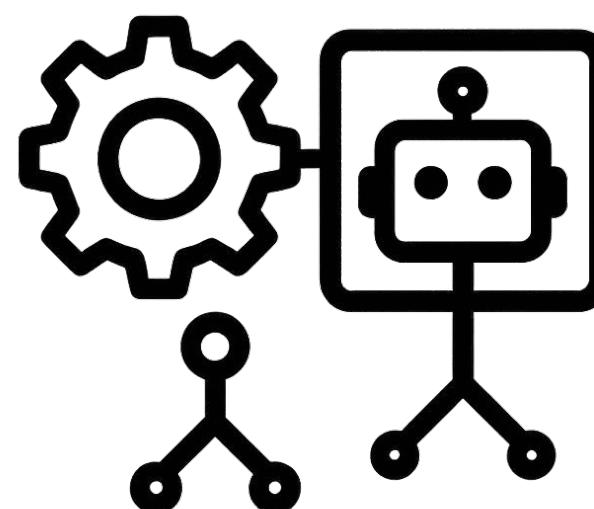
Authors



Reviewers  
and Editors



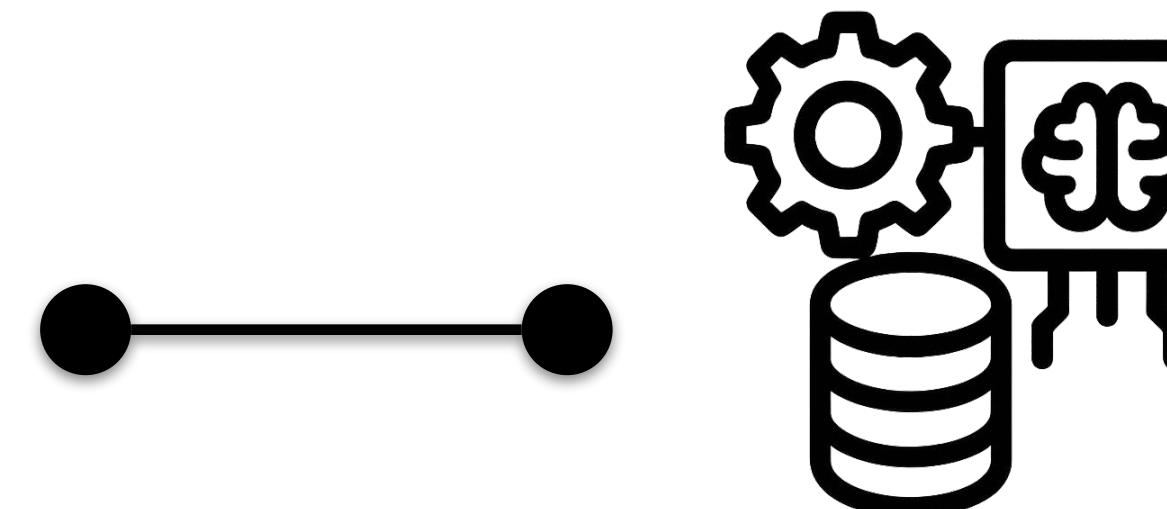
Investigators



Machine Learning



Data-driven Solutions



Training Data



Data Annotation

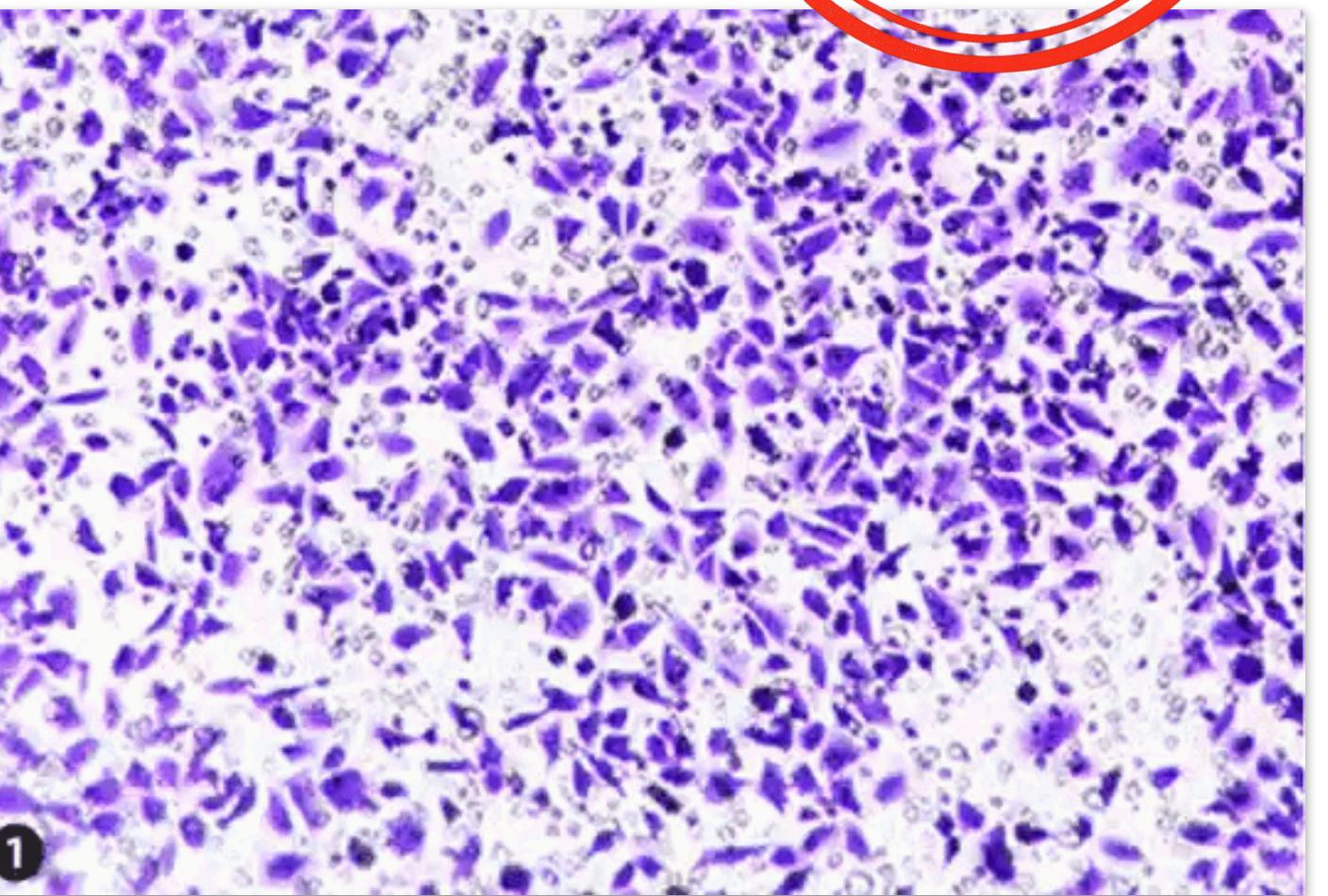
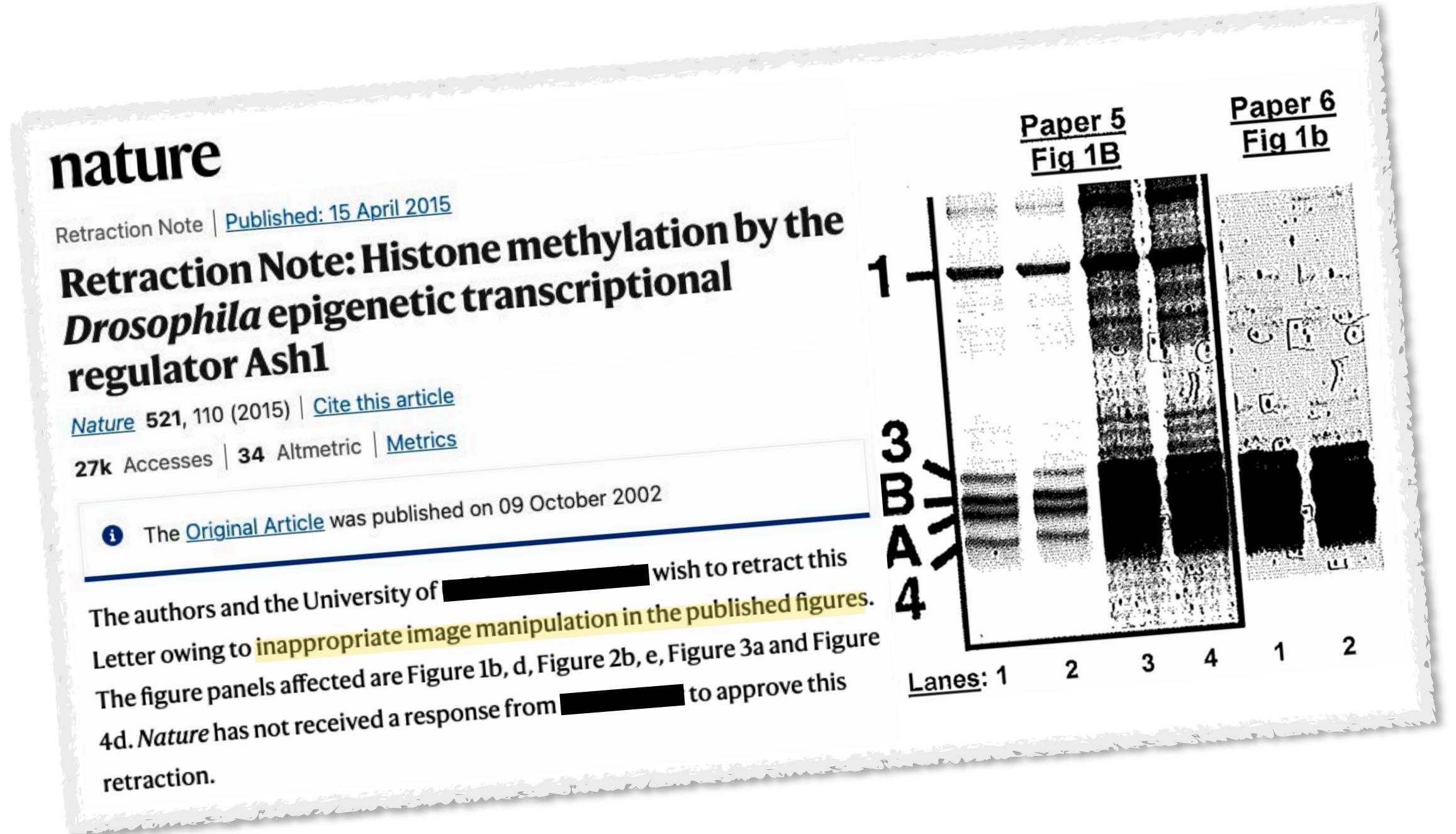


R&D  
Priorities

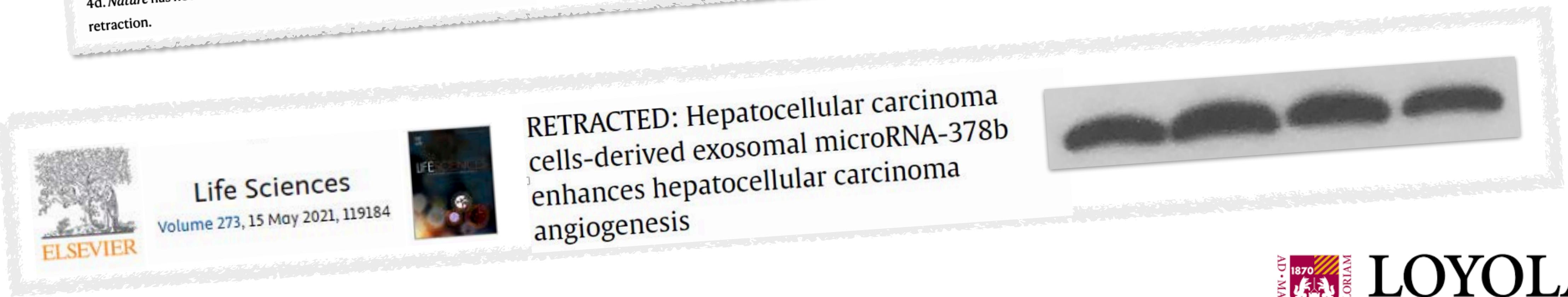


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UNIVERSITY CHICAGO

# Scientific Images



<https://tinyurl.com/4znhmpa6>



# Sources



56,716 entries



8,002 entries

images  
only

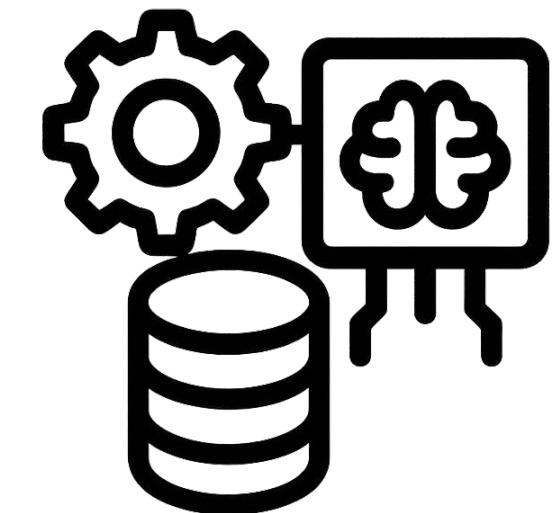


**PUBPEER**  
The online journal club

2,221 entries



with  
discussion



2,078 articles



no  
duplicates

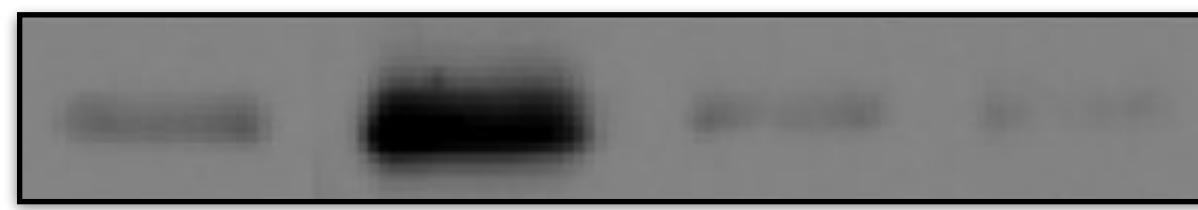
# Characterizing



Image Type

Colony Transwell  
Tumor  
Gel Graphs  
Microscopy  
blots  
Fluorescent

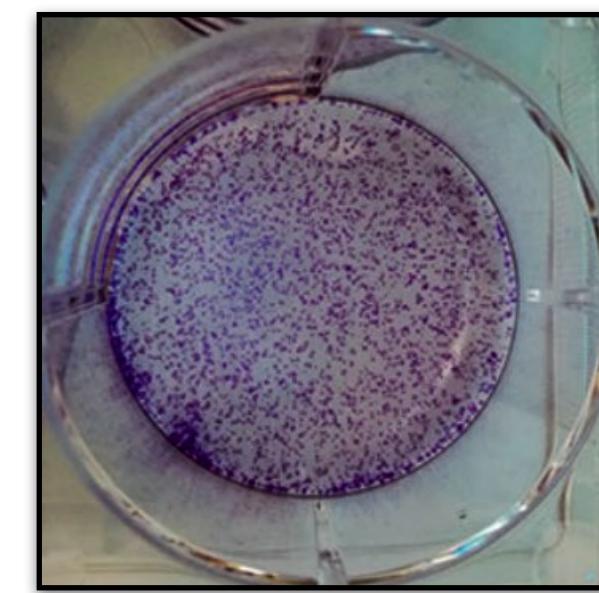
# Image Type



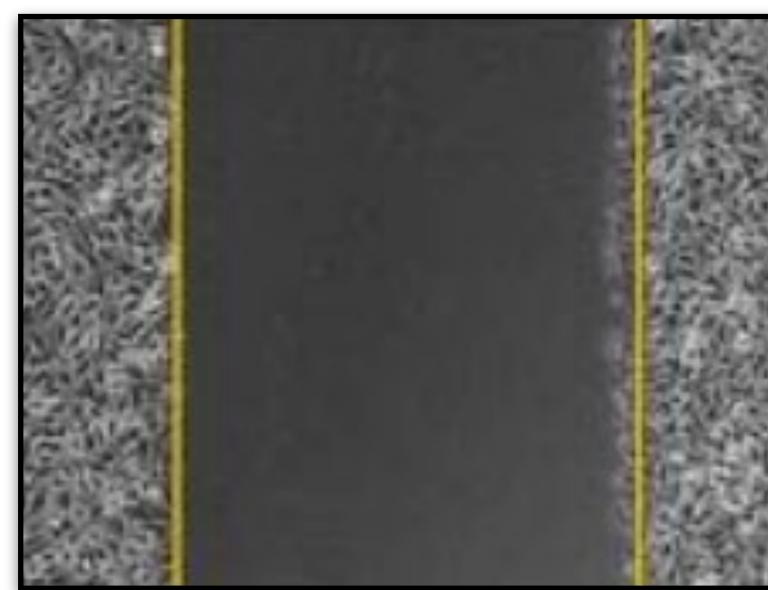
Gel Blots



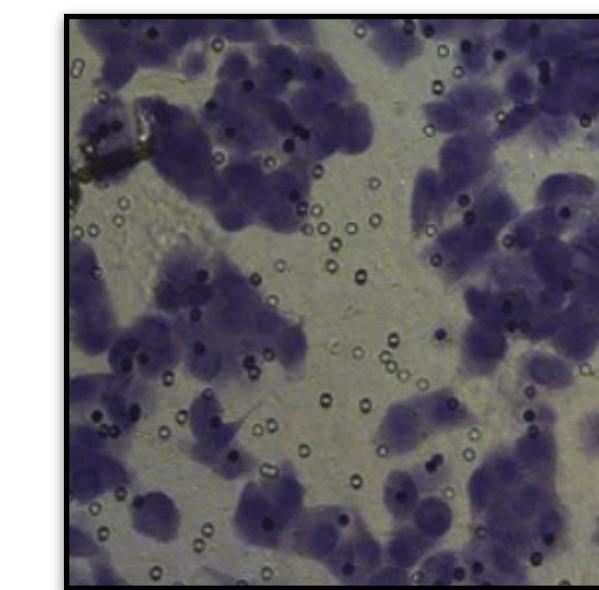
Microscopy



Colony



Wounds Healing

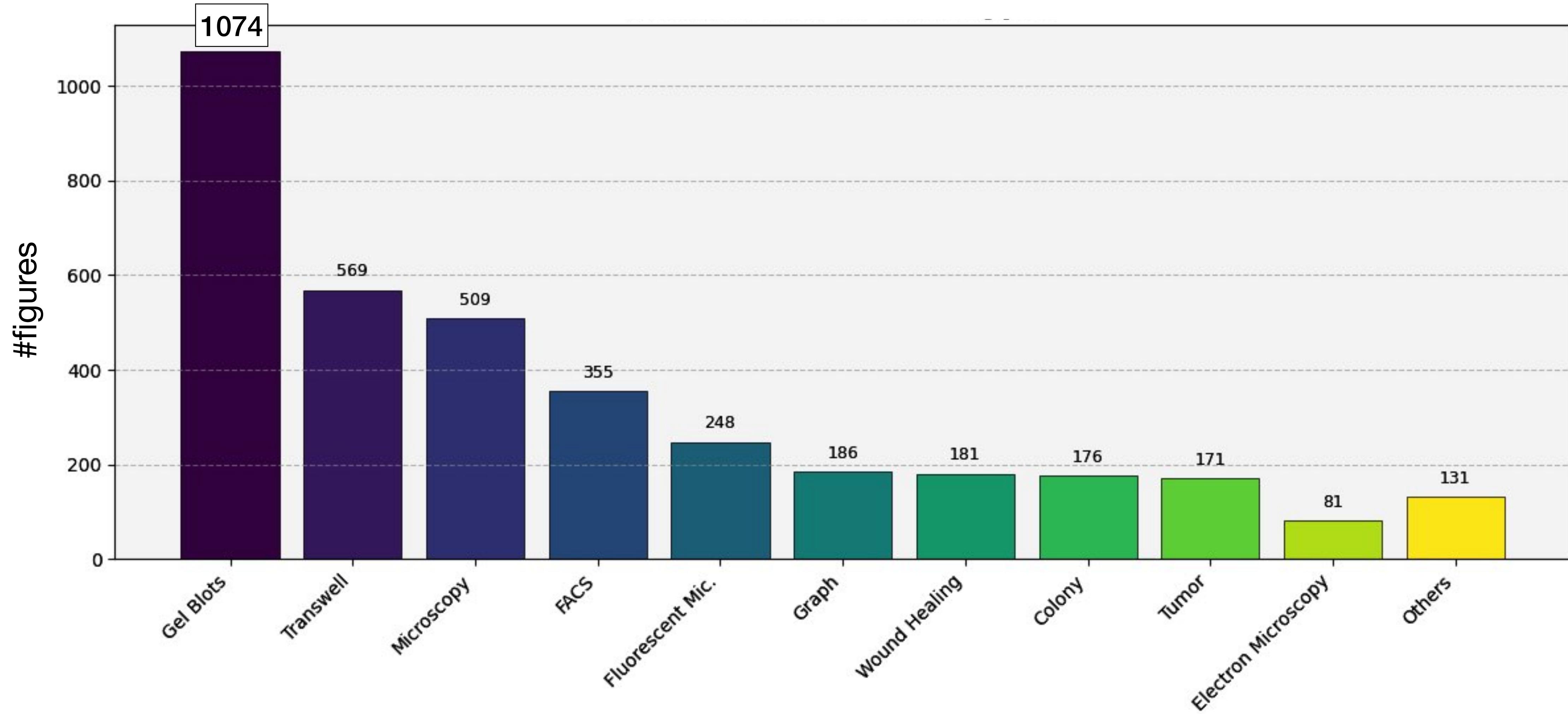


Transwell



Tumor

# Image Type



Taxonomy inspiration: 10.1017/jmje.2025.32

# Characterizing



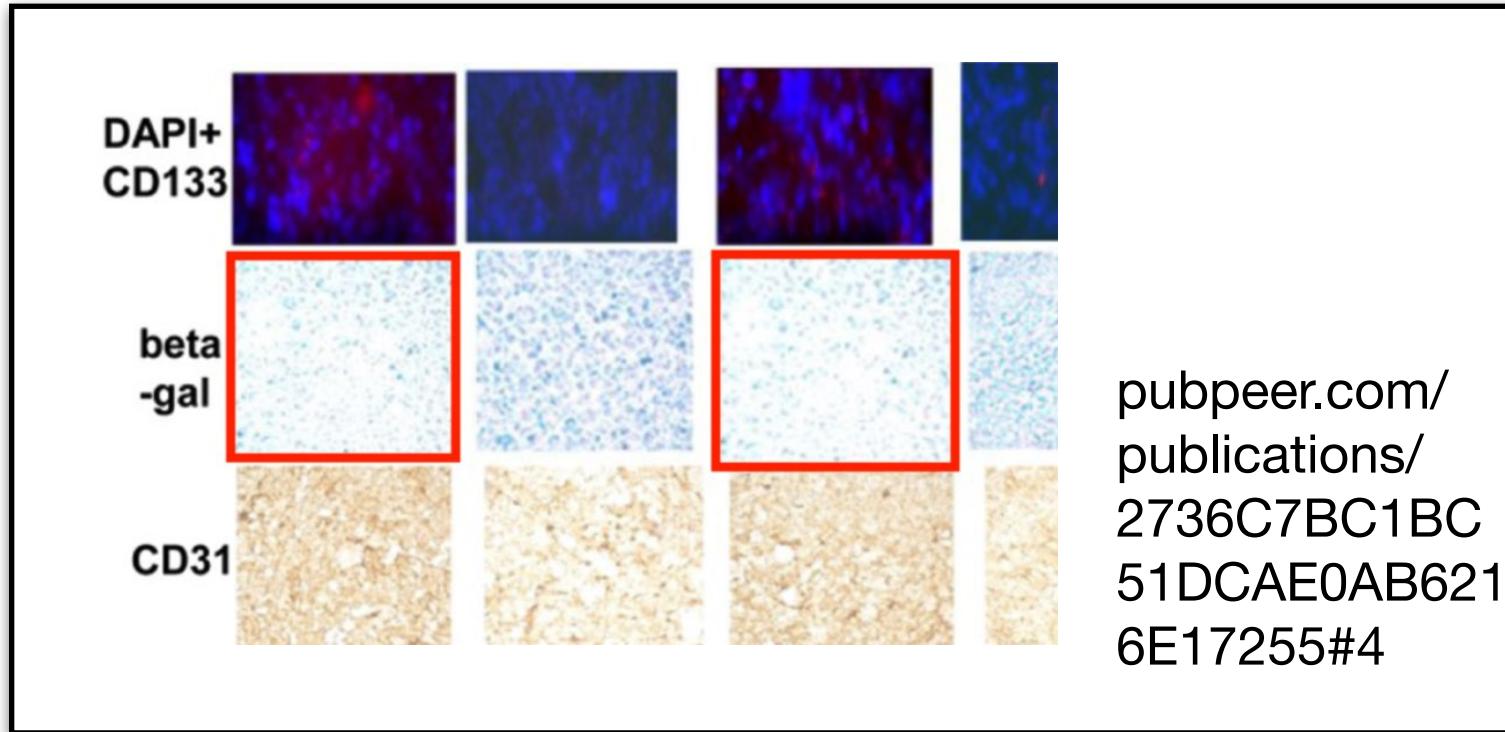
Image Type

Colony Transwell  
Tumor  
Gel Graphs  
Microscopy  
blots  
Fluorescent

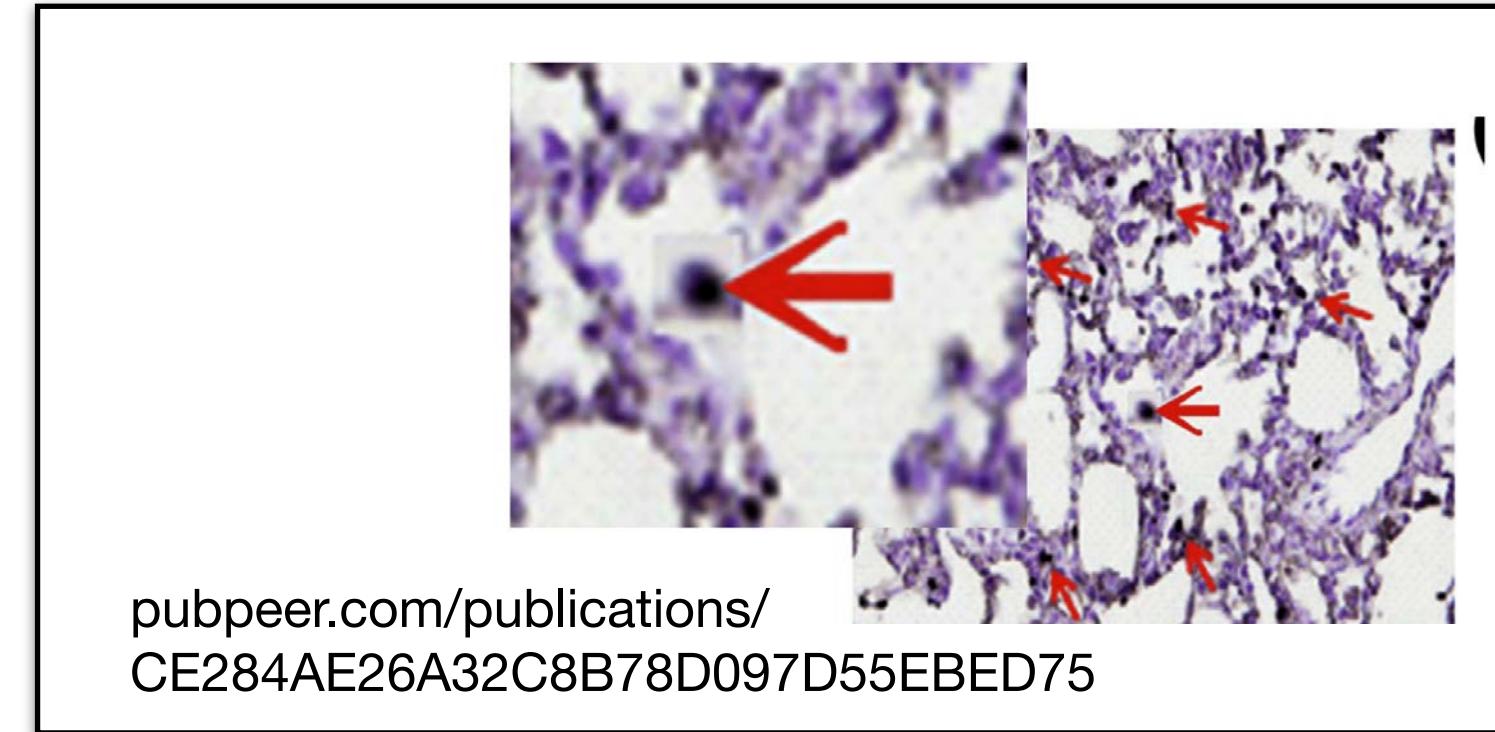
Manipulation Type

Splicing  
AI-  
Generation  
Flipping  
Resizing  
Cropping  
Rotation  
Recoloring

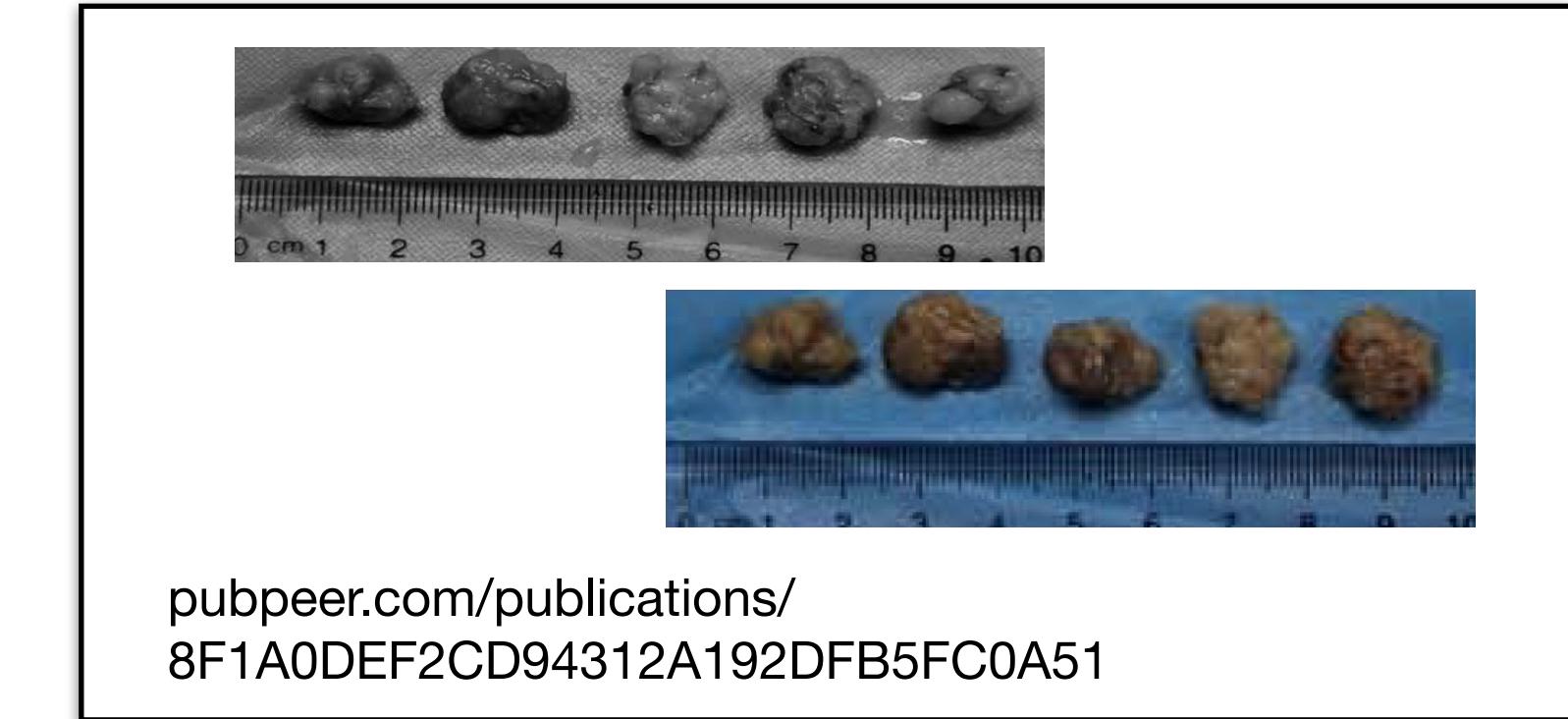
# Manipulation Type



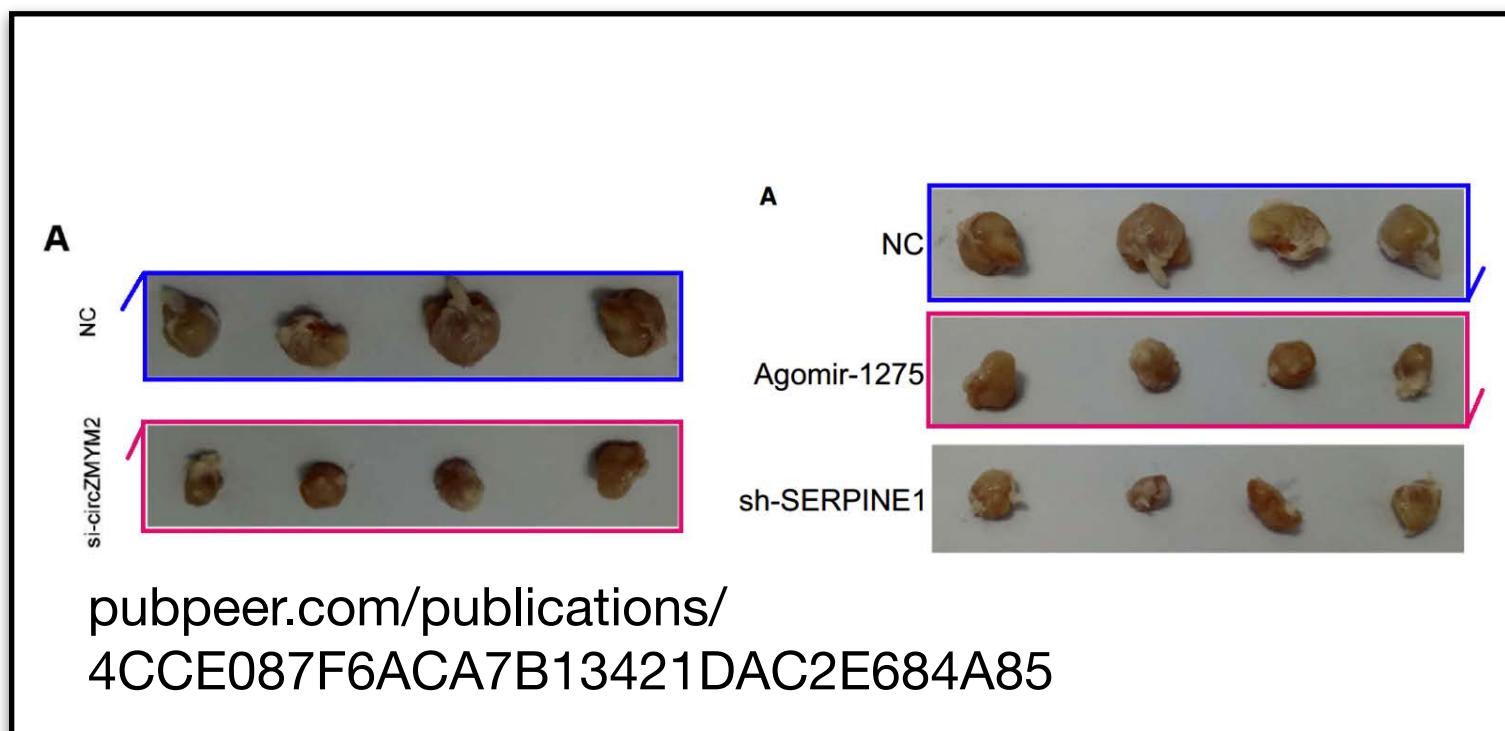
Replication



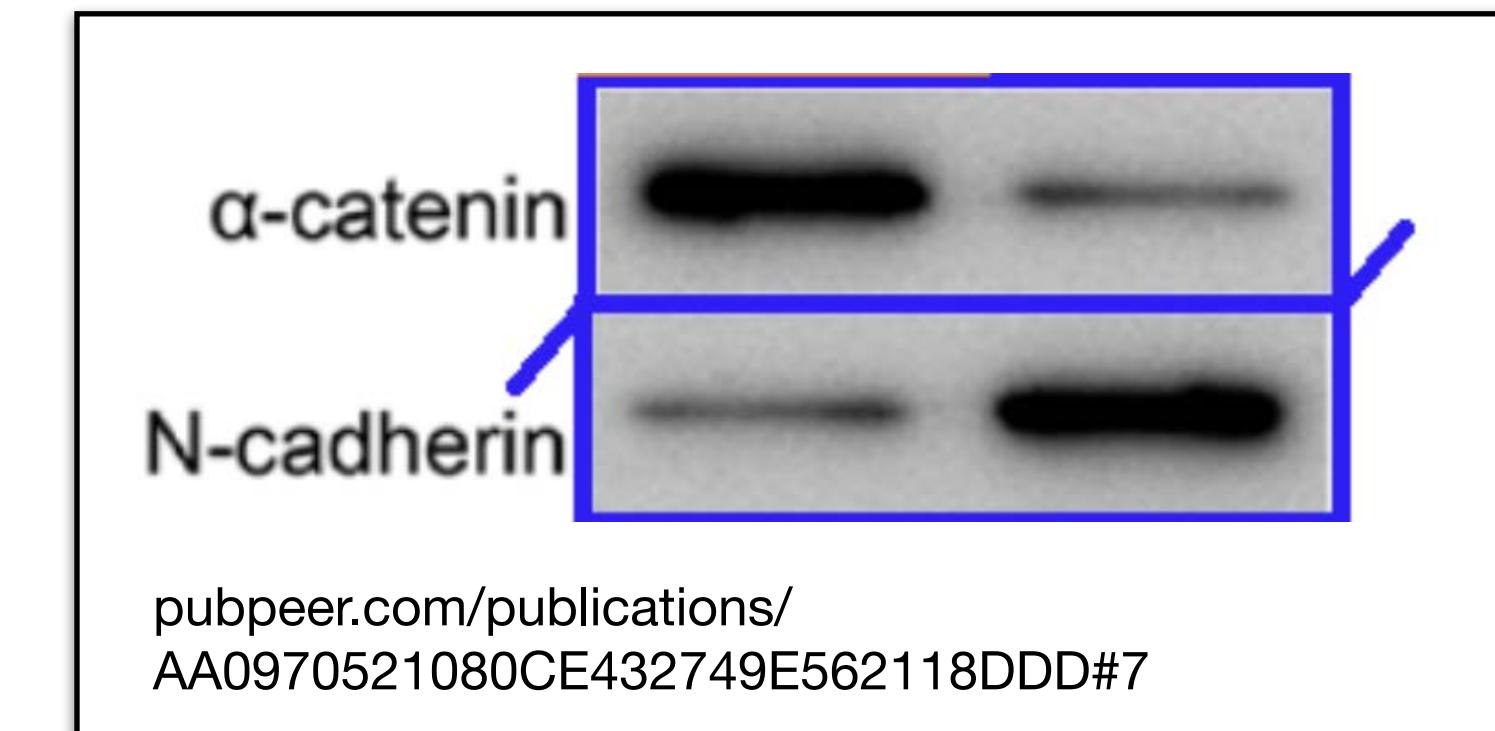
Splicing



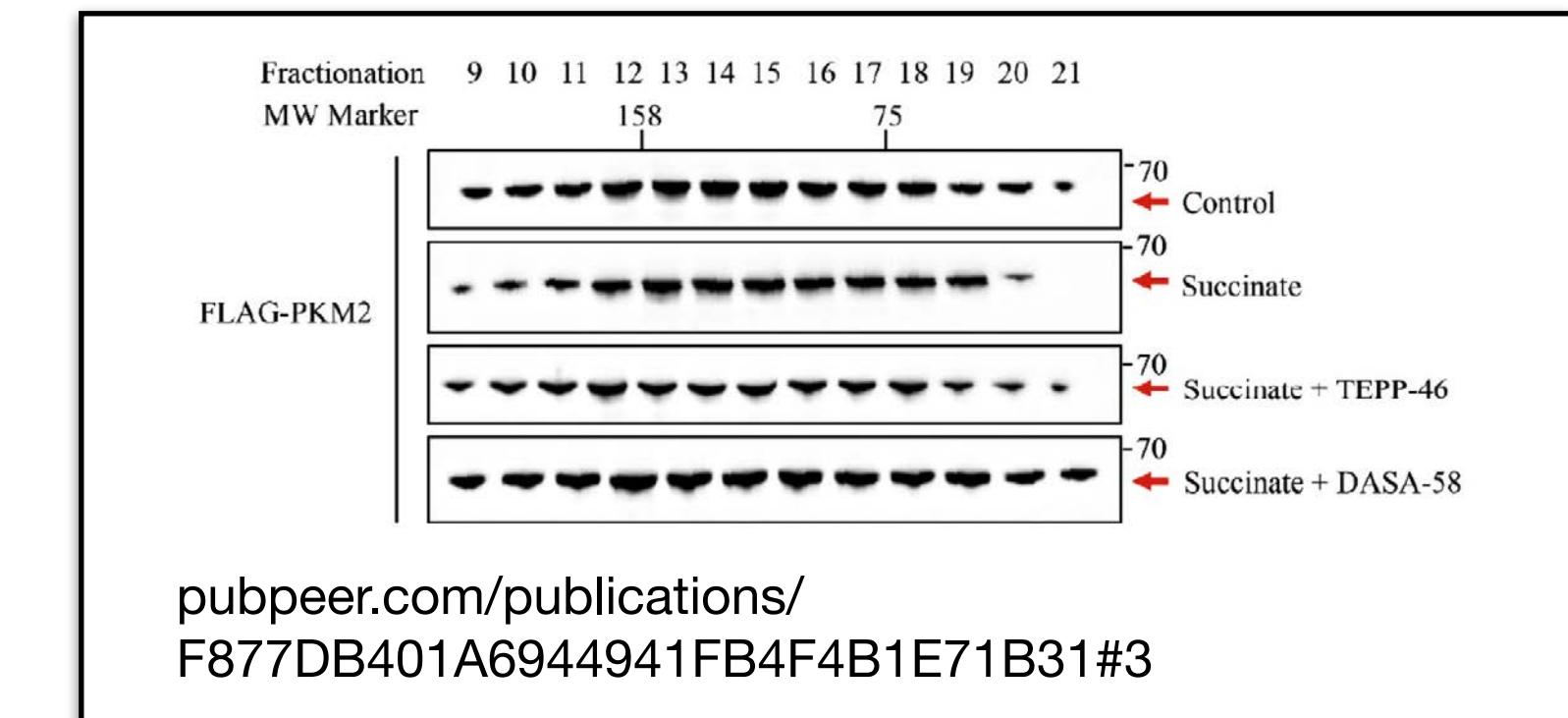
Recoloring



Rotation

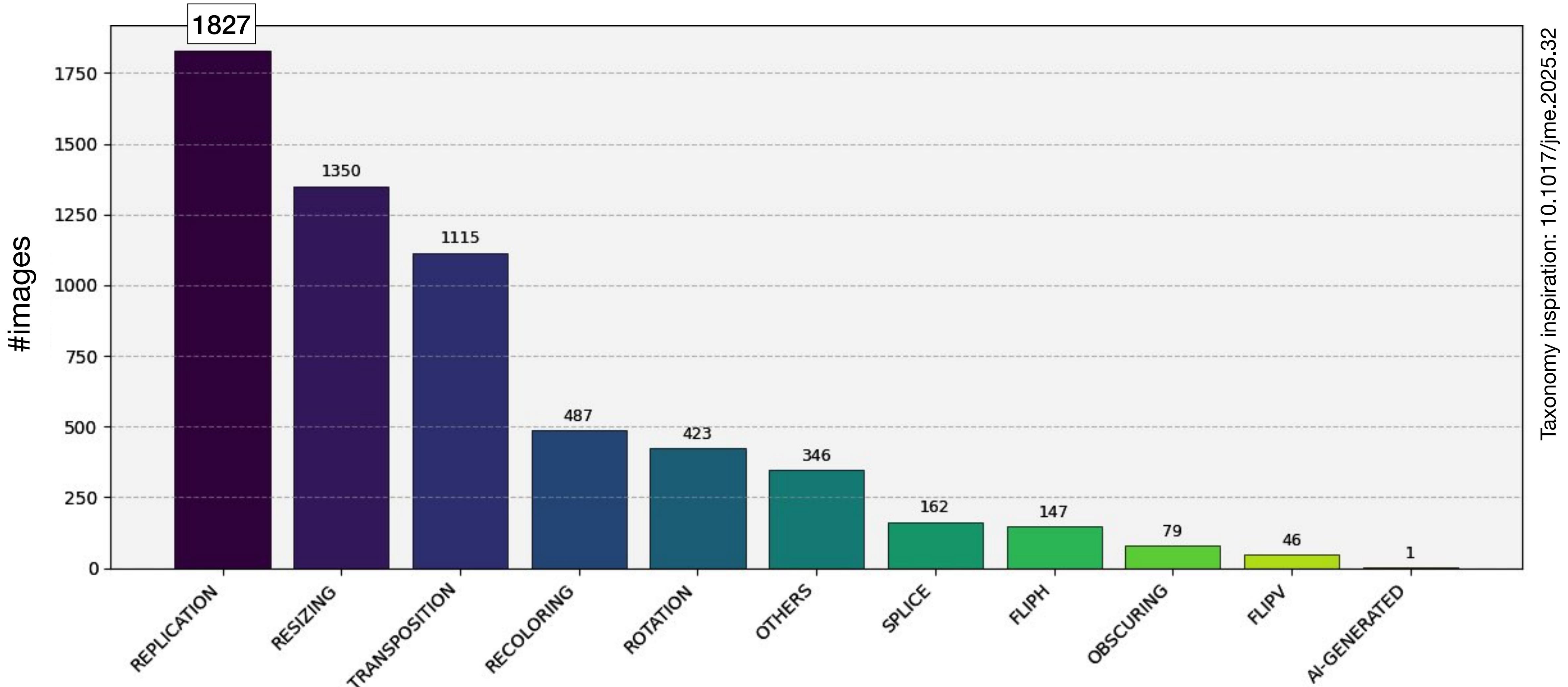


Flipping



AI Generated

# Manipulation Type



# Characterizing



## Image Type

Colony Transwell  
Tumor  
Gel Graphs  
Microscopy  
blots  
Fluorescent

## Manipulation Type

Splicing  
AI-  
Generation  
Flipping  
Resizing  
Cropping  
Rotation  
Recoloring

## Problem Context

### Single Figure

Within Image (Same Panel)

Within Figure (Different Panels)

### Multiple Figures

Between Figures (Same Document)

Between Documents

### Paper Mills

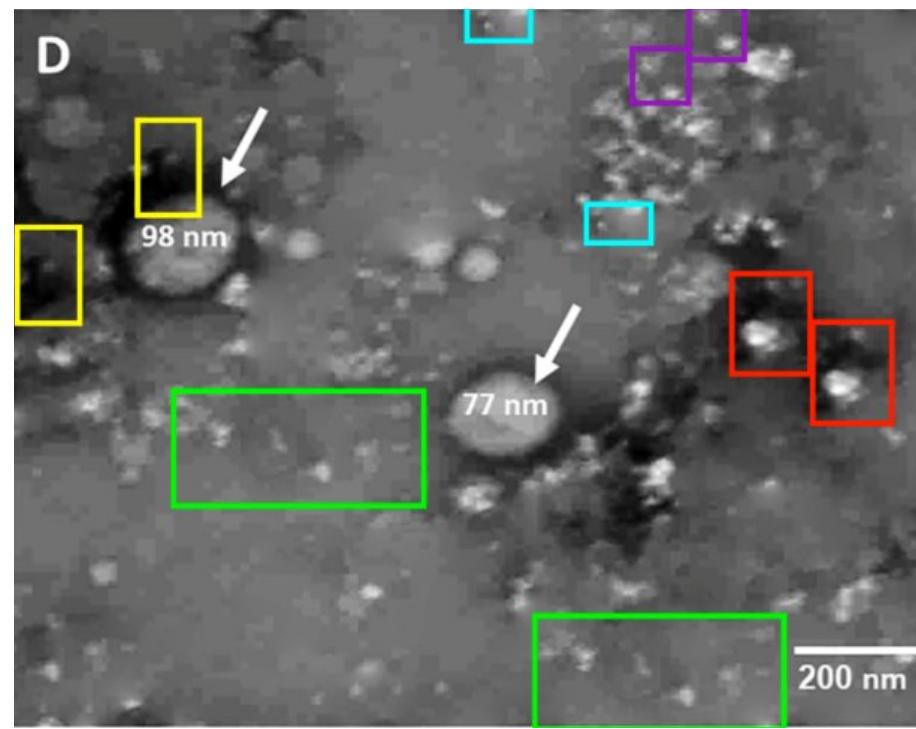


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# Problem Context

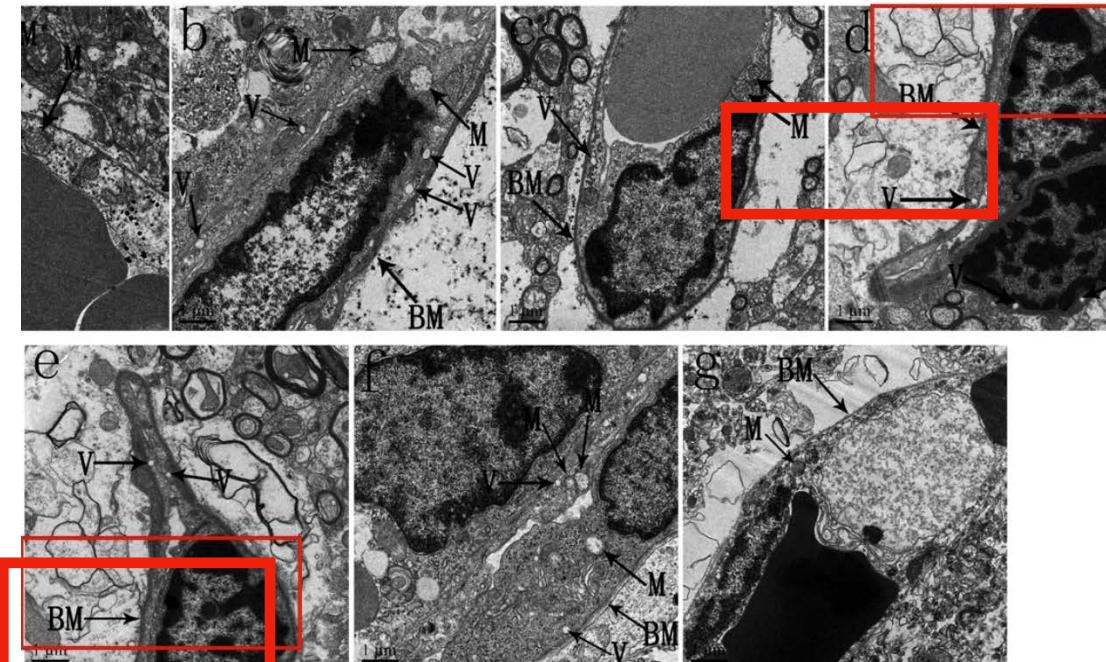
## Single Figure

Within Image (Same Panel)



DOI: 10.1038/s41598-023-36929-0

Within Figure (Different Panels)



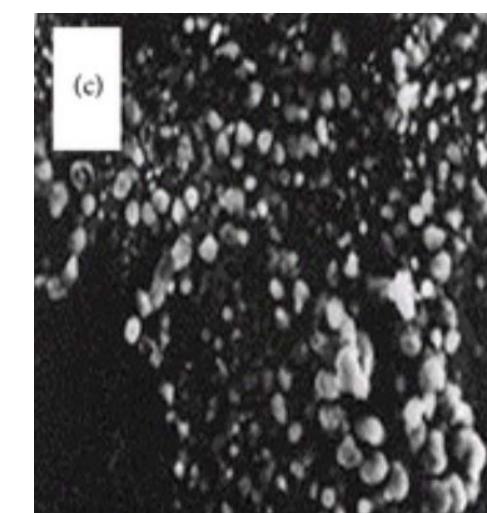
[pubpeer.com/publications/0C79FB06E9FEC17D4A825D0253378B2](https://pubpeer.com/publications/0C79FB06E9FEC17D4A825D0253378B2)

## Multiple Figures

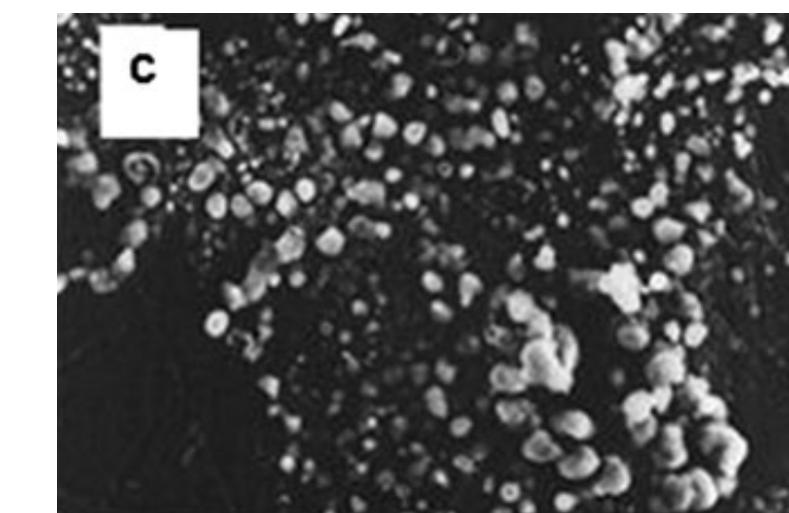
Between Figures (Same Document)

OR

Between Documents



Paper A

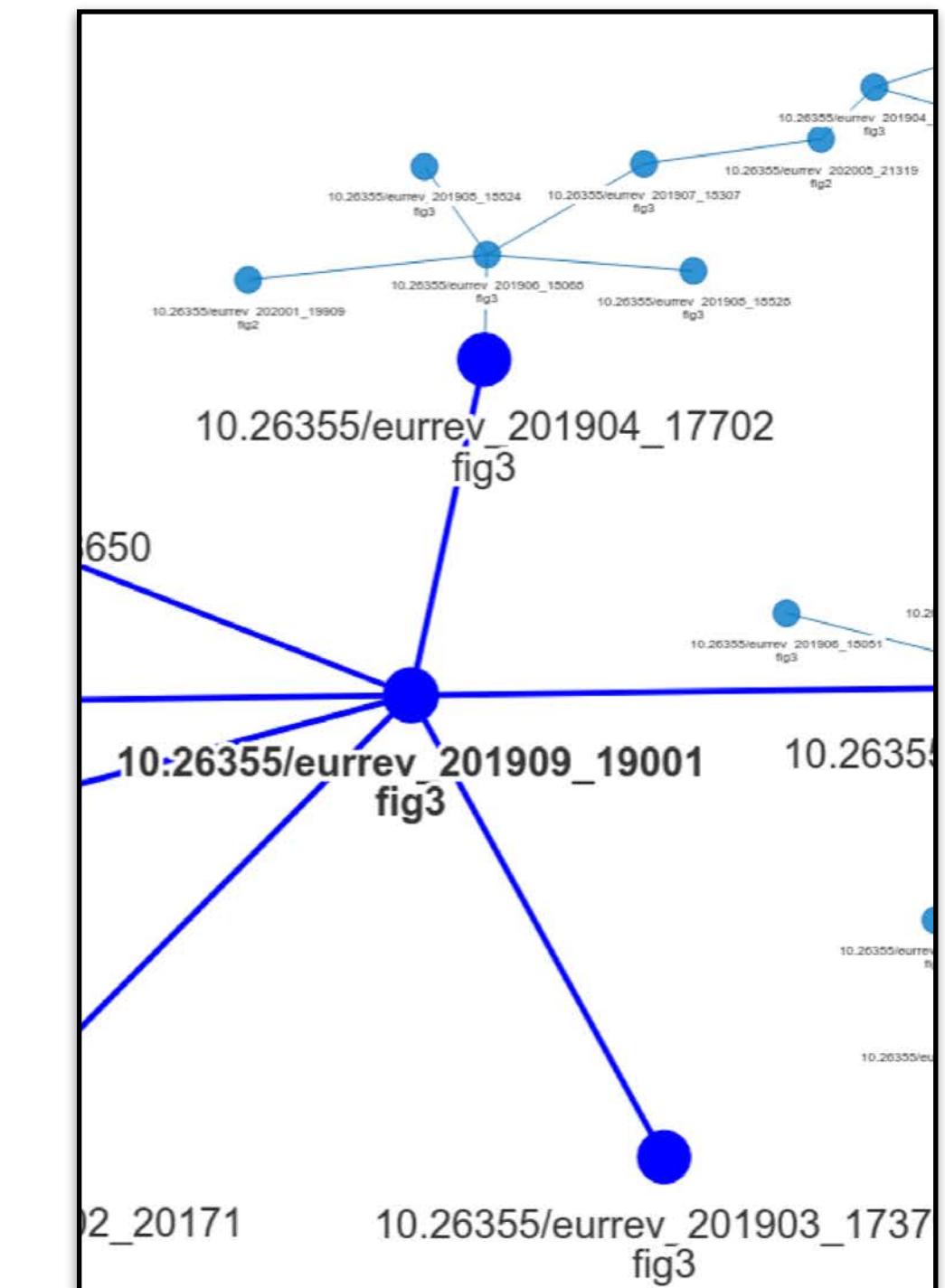


Paper B

[pubpeer.com/publications/F0994A7B125FE32097FE5B223C9678](https://pubpeer.com/publications/F0994A7B125FE32097FE5B223C9678)

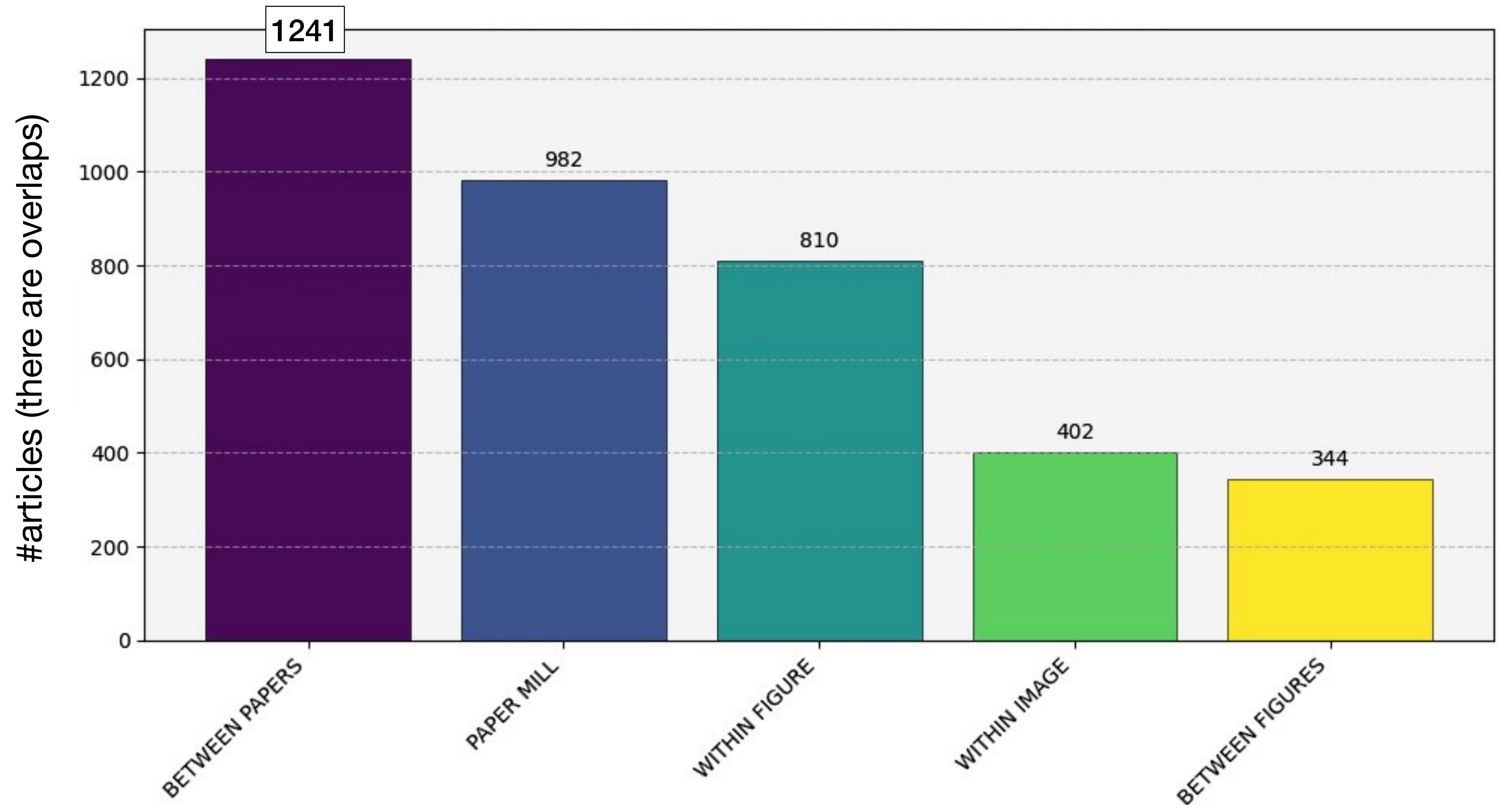
## Paper Mills

Unrelated authors  
Large scale



[doi.org/10.1371/journal.pone.0312666](https://doi.org/10.1371/journal.pone.0312666)

# Problem Context



Taxonomy inspiration: 10.1017/jme.2025.32

# Discussion and Next Steps

Prevalence of problems with gel blots and between-paper image replication.

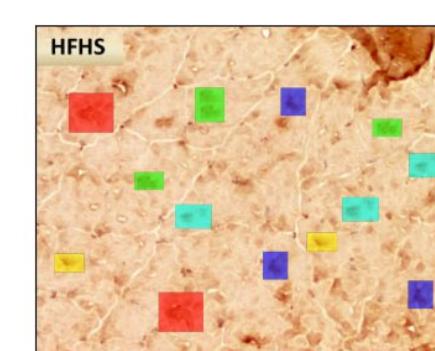
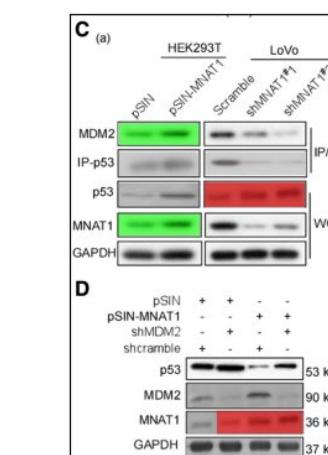
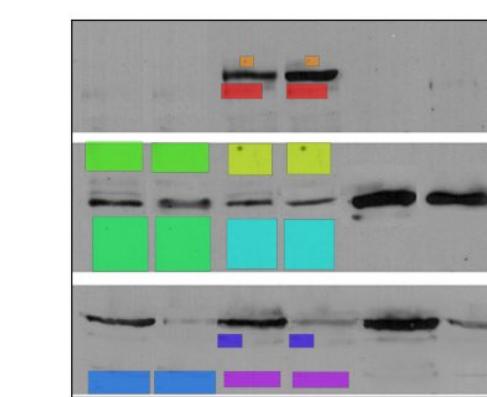
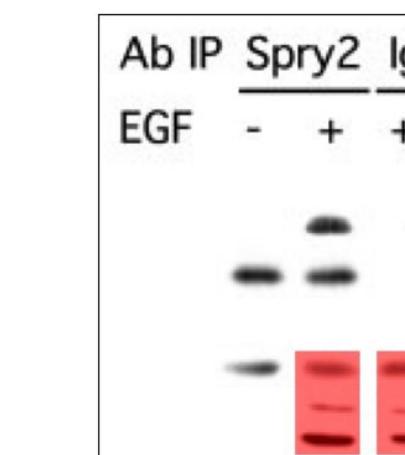
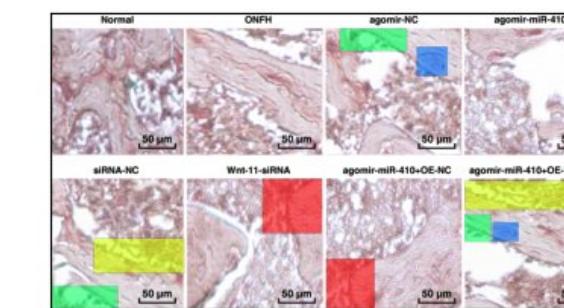
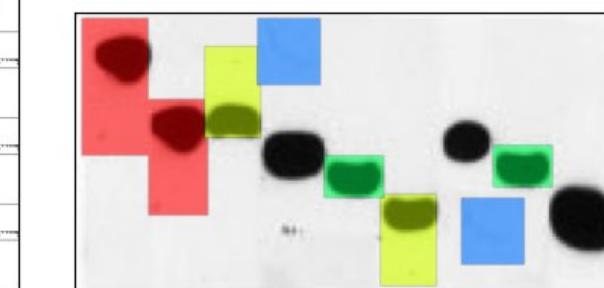
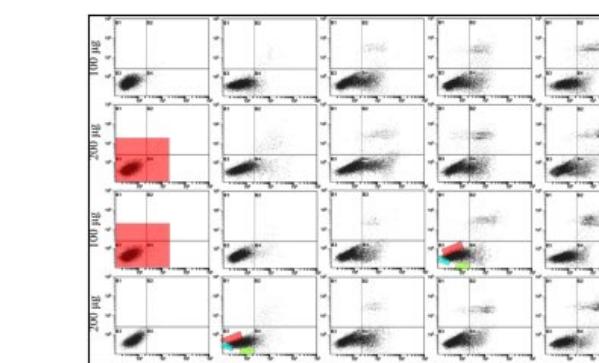
Lack of standardized information in retraction notices.

[Nature 419, 857–862 \(2002\); doi:10.1038/nature01126](#)

The authors and the University of California Riverside wish to retract this Letter owing to inappropriate image manipulation in the published figures. The figure panels affected are Figure 1b, d, Figure 2b, e, Figure 3a and Figure 4d. *Nature* has not received a response from [REDACTED] to approve this retraction.

We need more comprehensive (and computational) retraction notices.

Recent Effort: Copy-move Annotation (and future challenge)



# Questions?



Thank you!

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[danielmoreira.github.io](https://danielmoreira.github.io)