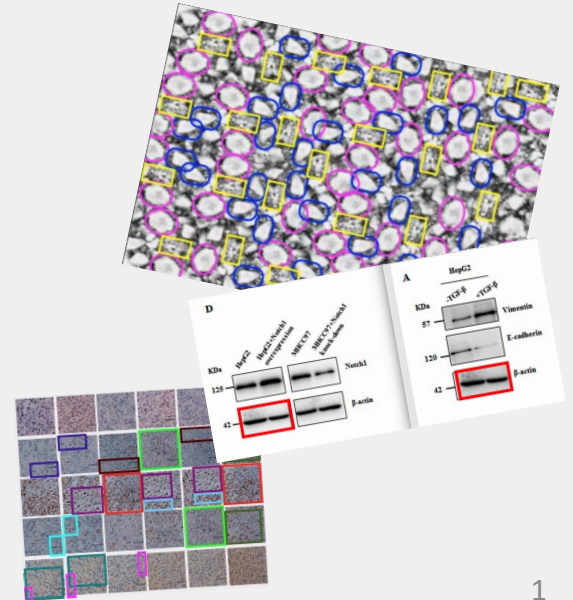


Pre- and Post-Publication Image Screening

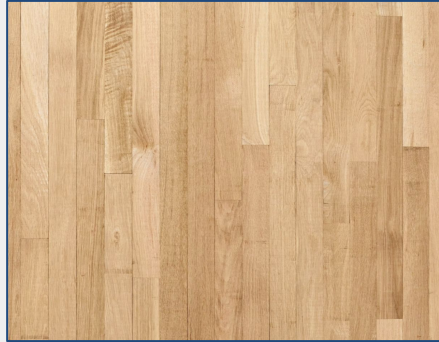
Elisabeth Bik

www.ScienceIntegrityDigest.com

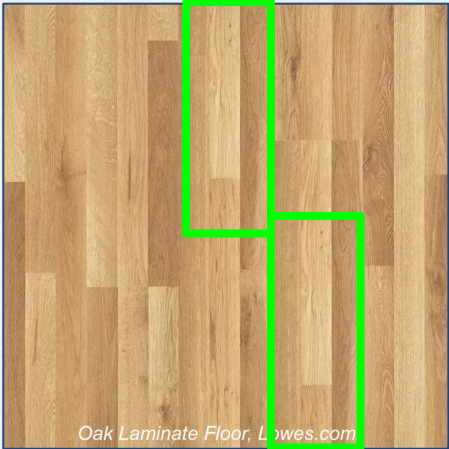
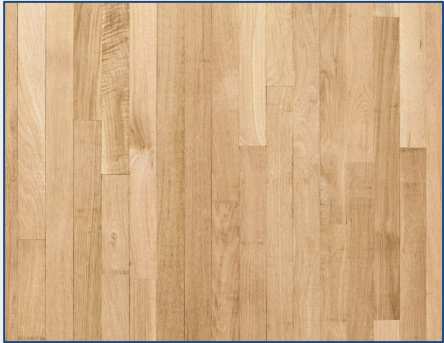
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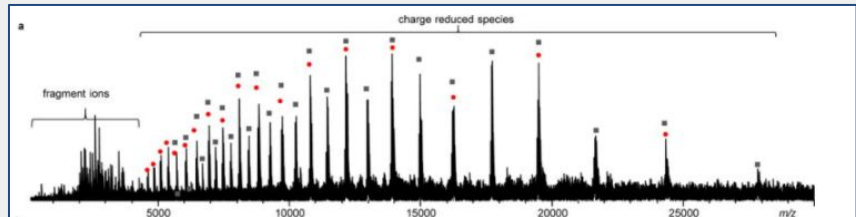
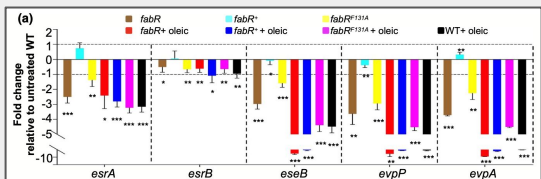
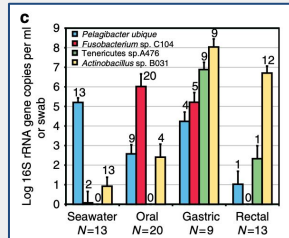
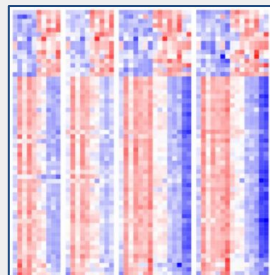
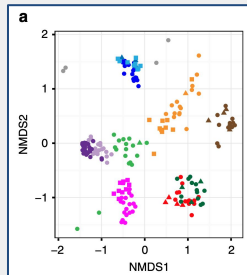
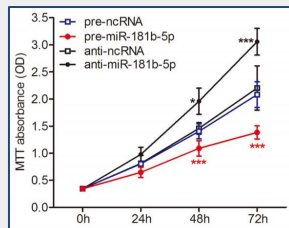


Nature is unique, fakes often repetitive

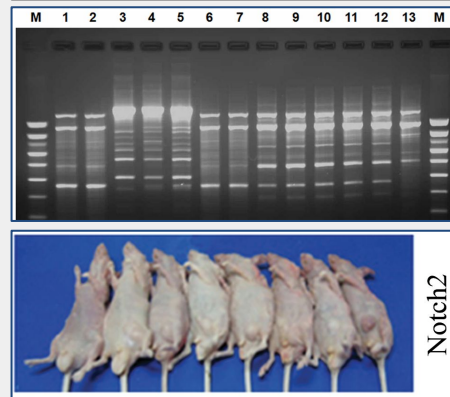
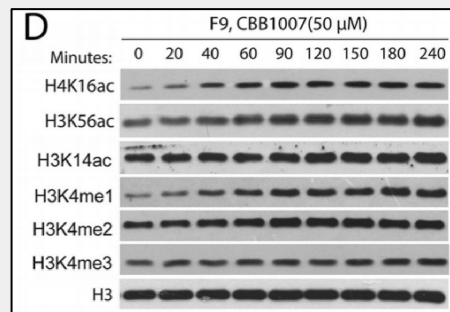
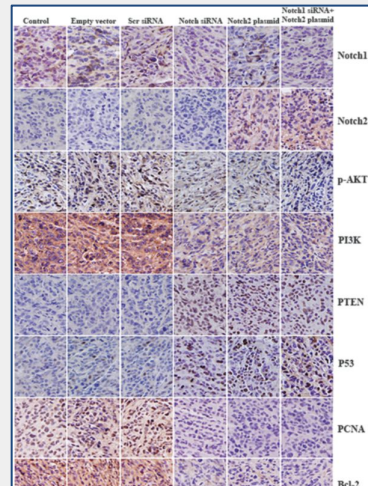
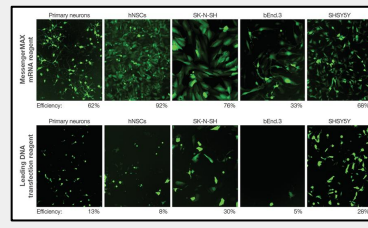


Figures found in biomedical papers

Line graphs

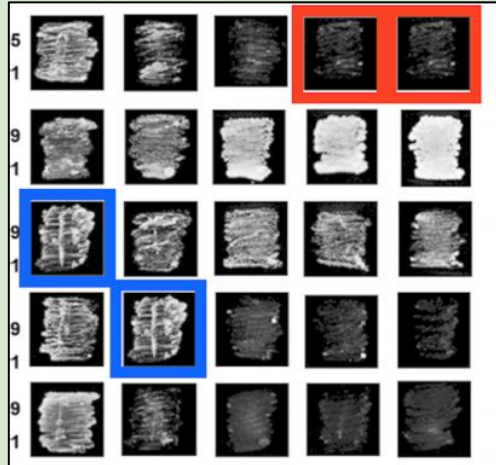


Photos



Inappropriate image duplication

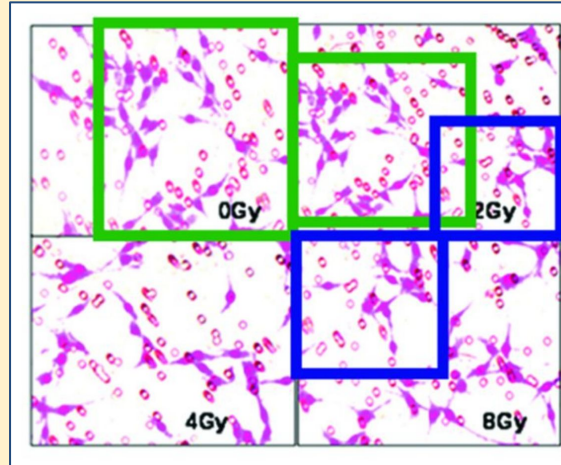
I: Simple



DOI: 10.1128/MCB.00773-15

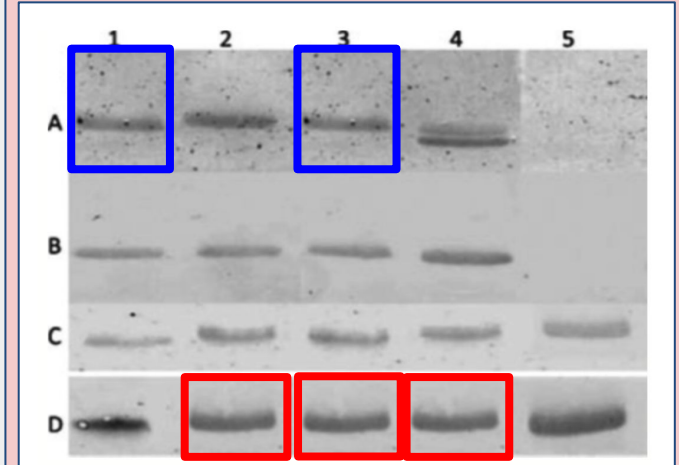
Honest error

II: Repositioned



DOI: 10.1371/journal.pone.0098448

III: Alteration



DOI: 10.1111/j.1469-0691.2011.03607.x

Deliberately



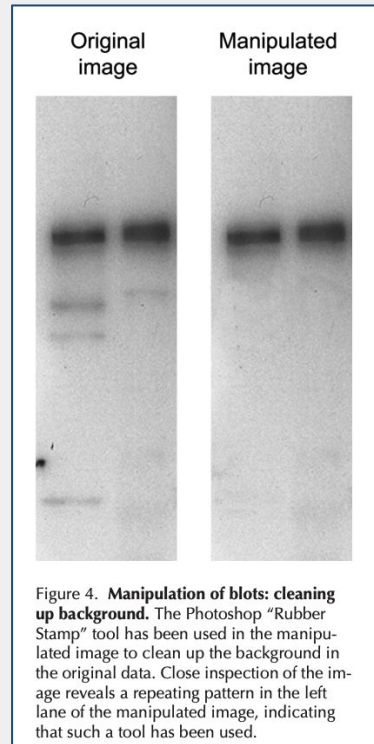
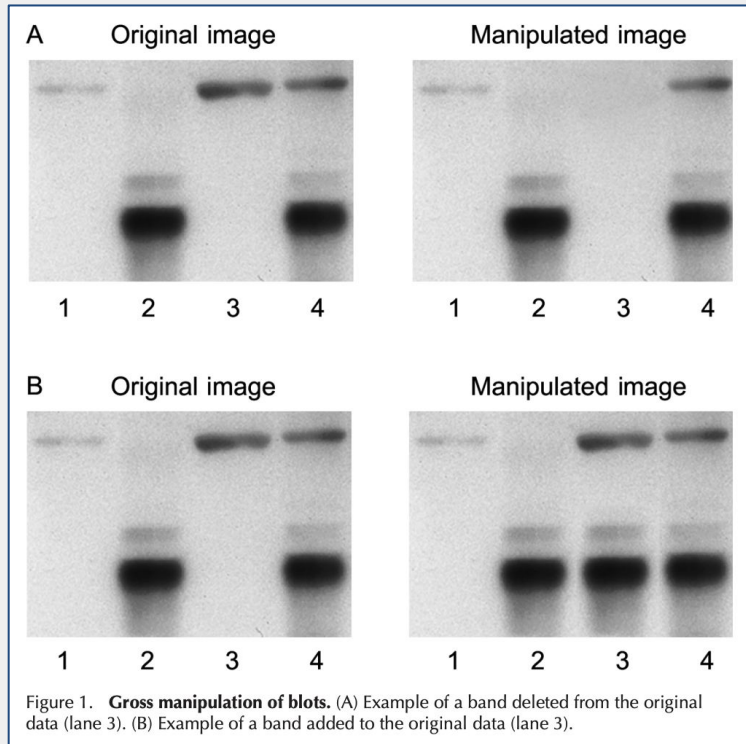
The temptation of image manipulation



Source: @KanaHooo on Weibo
Koreaboo.com

Source: Redbook Magazine, Anna
Holmes, Jezebel / Washington Post

The temptation of image manipulation







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Inappropriate image duplication study (2016)



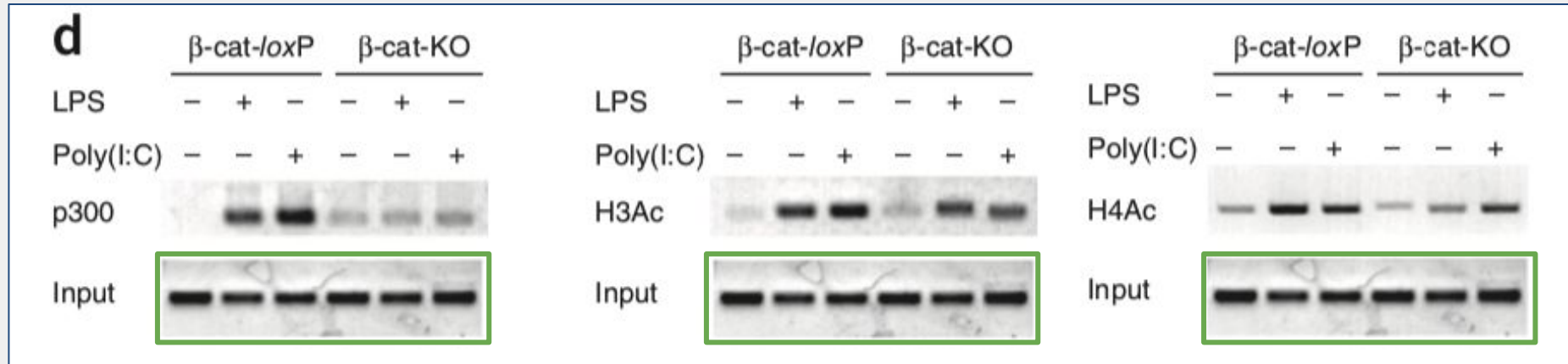
The Prevalence of Inappropriate Image Duplication in Biomedical Research Publications

Elisabeth M. Bik,^a Arturo Casadevall,^{b,c} Ferric C. Fang^d

Department of Medicine, Division of Infectious Diseases, Stanford School of Medicine, Stanford, California, USA^a; Department of Molecular Microbiology and Immunology, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA^b; Department of Medicine, Johns Hopkins School of Medicine, Baltimore, Maryland, USA^c; Departments of Laboratory Medicine and Microbiology, University of Washington School of Medicine, Seattle, Washington, USA^d

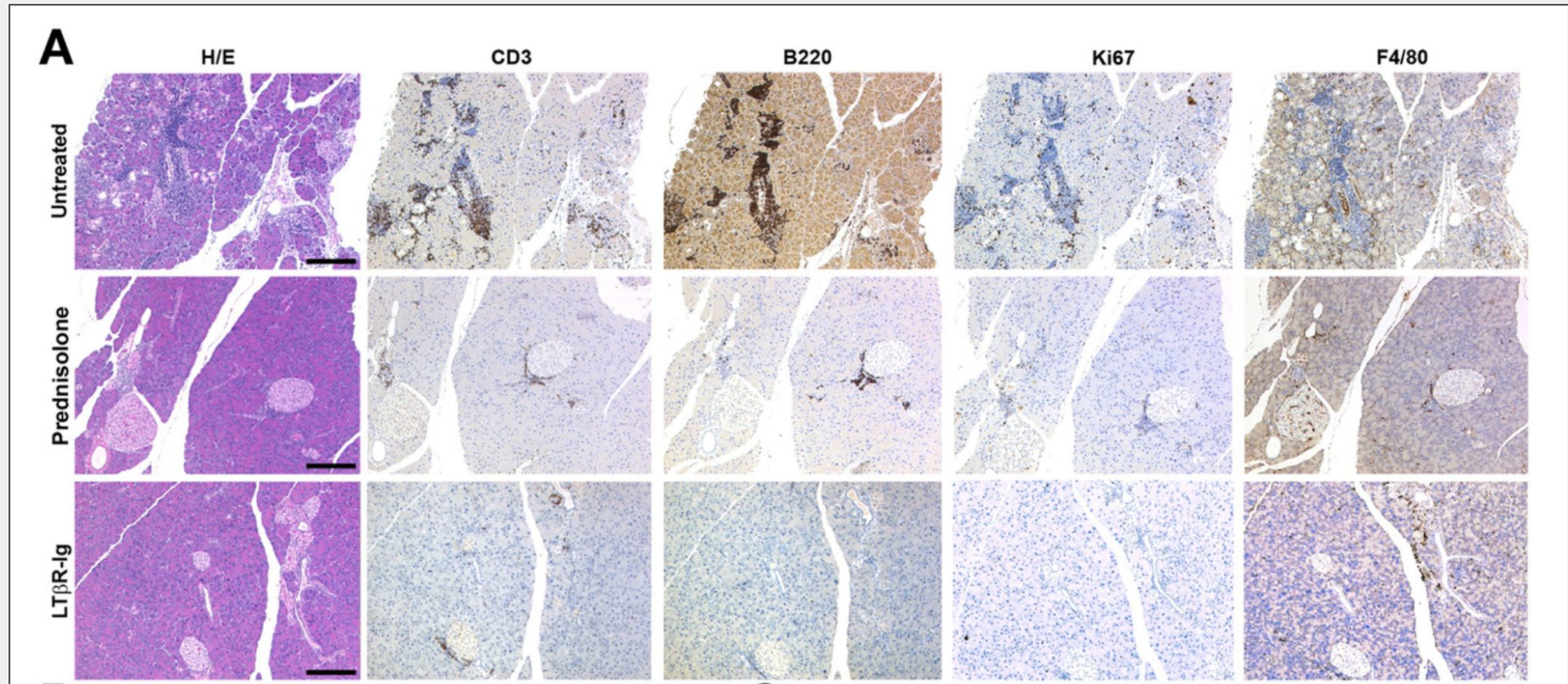
- 20,621 papers from 1995-2014, scanned by eye
- 40 journals from 14 publishers
- Found 782 papers with duplicated figures (4%)
- Not all are misconduct! About half intentional: 2%
- Alteration in other data types much harder to detect
- DOI: 10.1128/mbio.00809-16

Appropriate image duplications - no problem



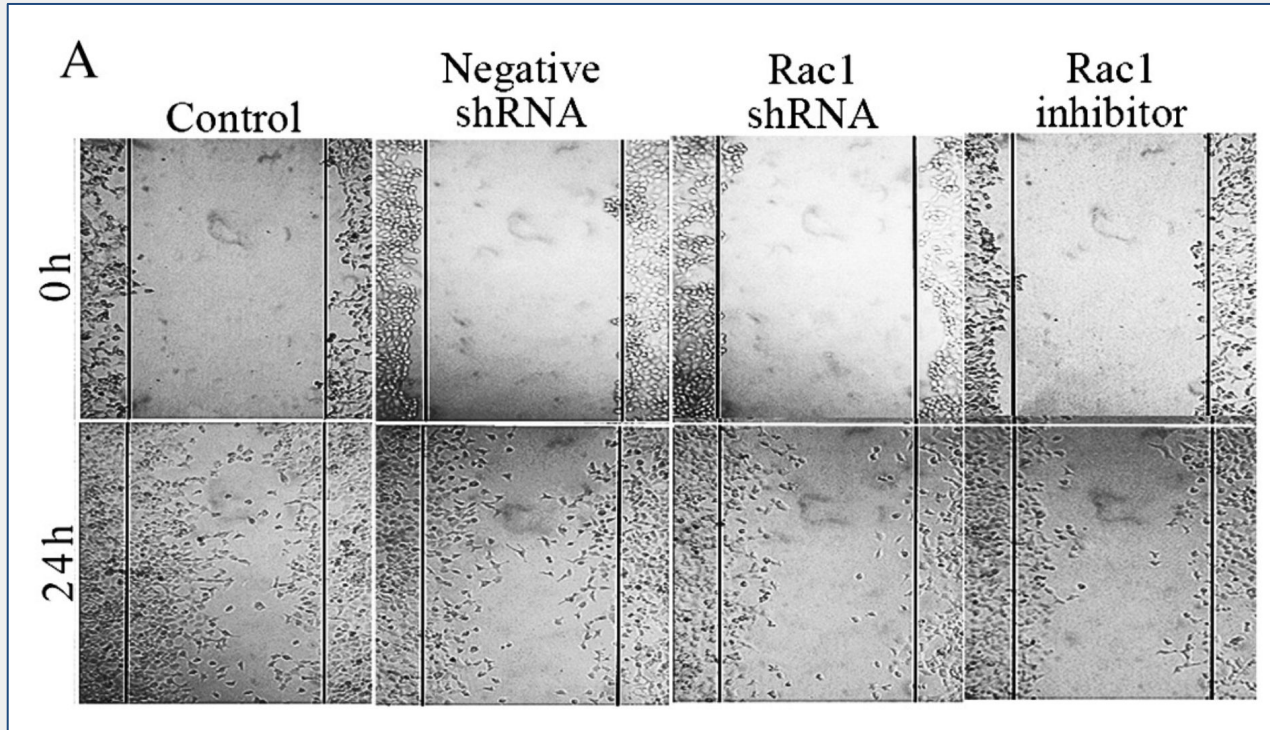
Second Military Medical University, Shanghai, China
Nature Immunology (2010), DOI: 10.1038/ni.1876

Adjacent sections are similar - no problem



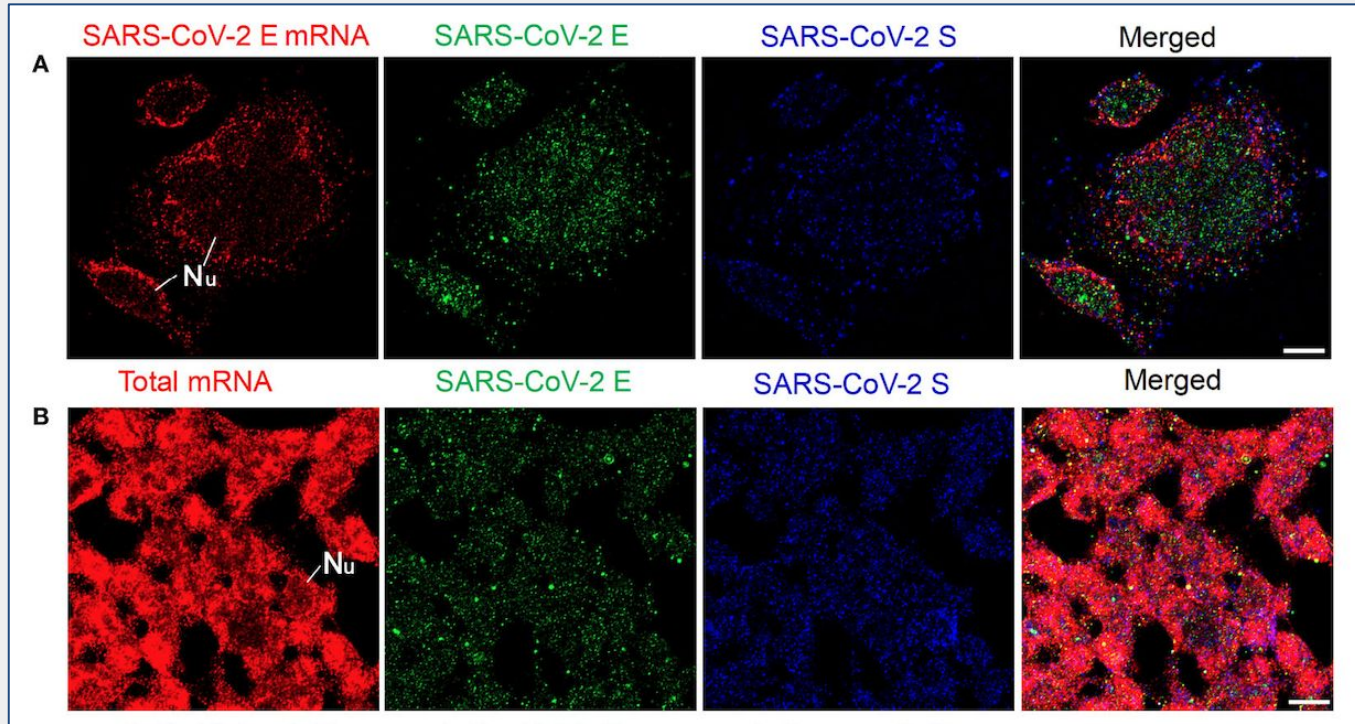
DOI: 10.1053/j.gastro.2012.07.112

Stain on the microscope - no problem



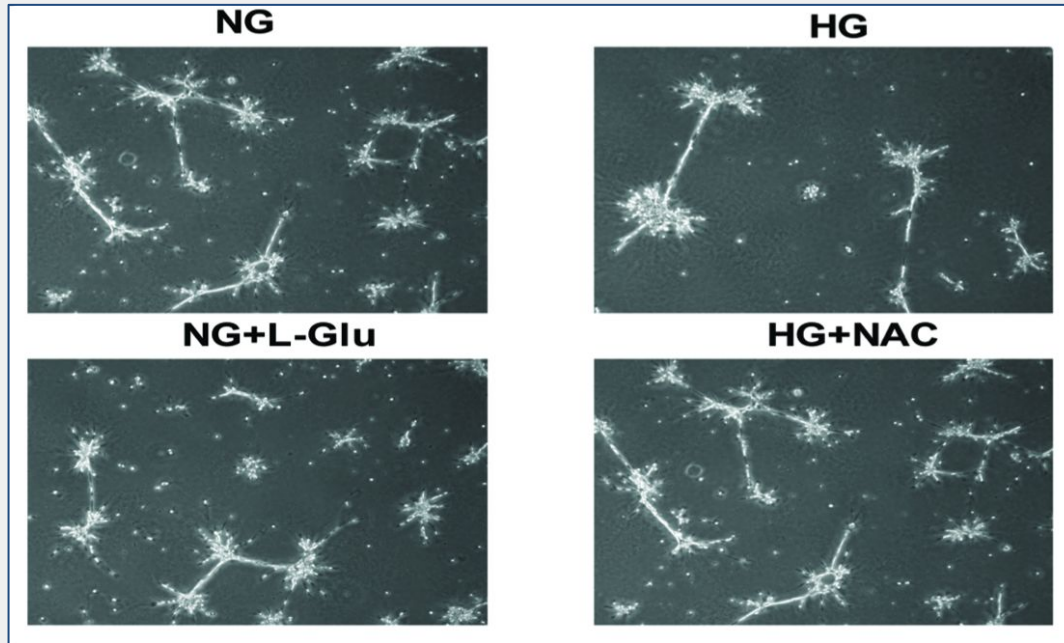
DOI: 10.1016/j.jnutbio.2013.10.004

Appropriate image duplications: no problem



Fluorescence in situ Hybridization, Confocal Microscopy
Front. Cell. Infect. Microbiol. (2022); DOI: 10.3389/fcimb.2022.960938

Type I: Simple Duplication - honest error



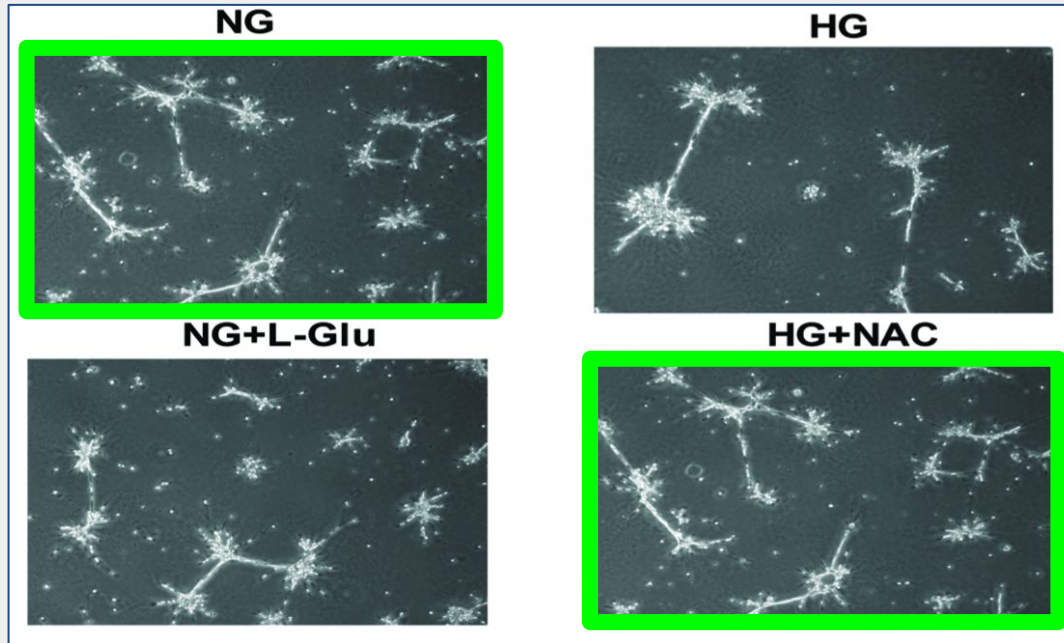
Effect of diabetes on retinal astrocytes

University of Wisconsin School of Medicine and Public Health, USA

PLOS ONE (2014), DOI: 10.1371/journal.pone.0103148

Reported to journal: October 2015. No action yet.

Type I: Simple Duplication - honest error



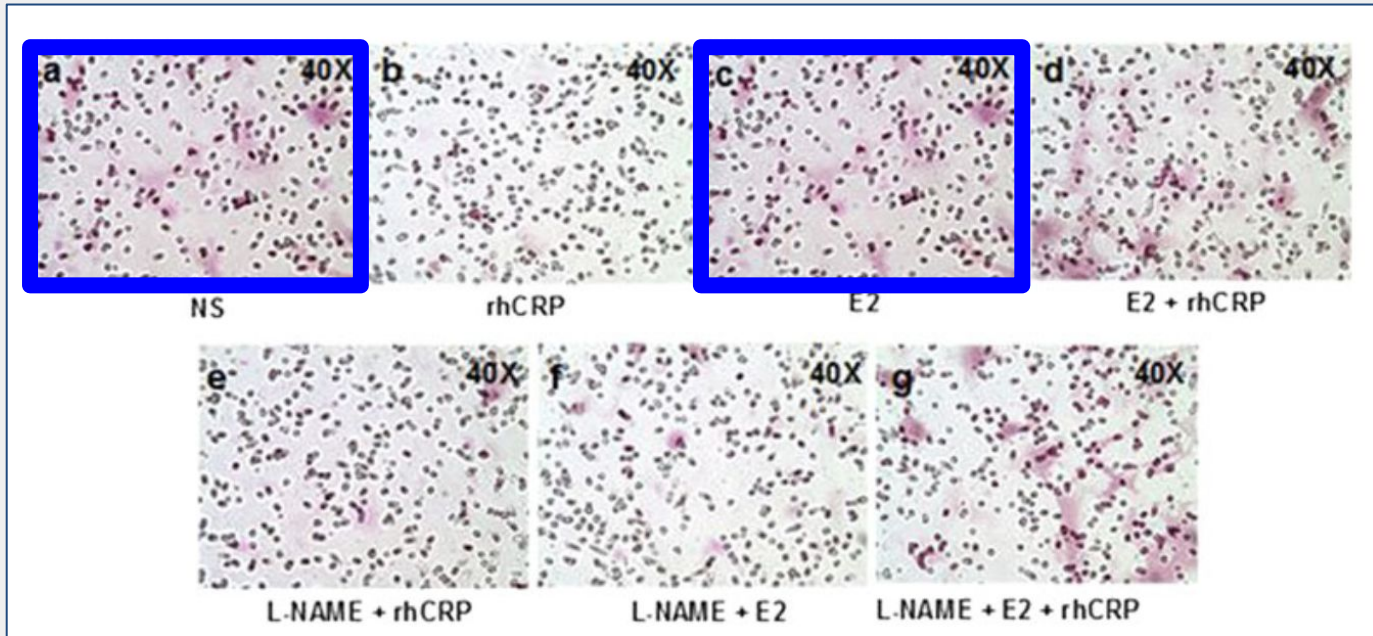
Effect of diabetes on retinal astrocytes

University of Wisconsin School of Medicine and Public Health, USA

PLOS ONE (2014), DOI: 10.1371/journal.pone.0103148

Reported to journal: October 2015. No action yet.

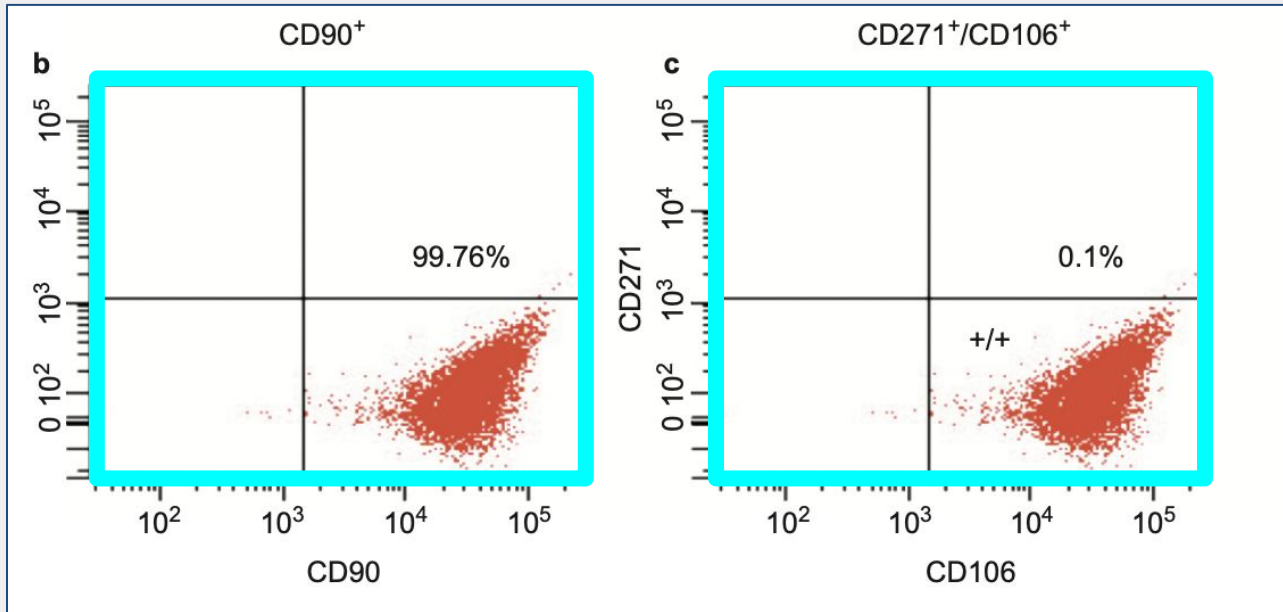
Type I: Simple Duplication - honest error



Estradiol inhibits vascular endothelial cells pro-inflammatory activation
Montreal Heart Institute, Canada

Molecular and Cellular Biochemistry (2013), DOI: 10.1007/s11010-012-1482-9
Reported to journal: October 2015. No action yet.

Type I: Simple Duplication - honest error

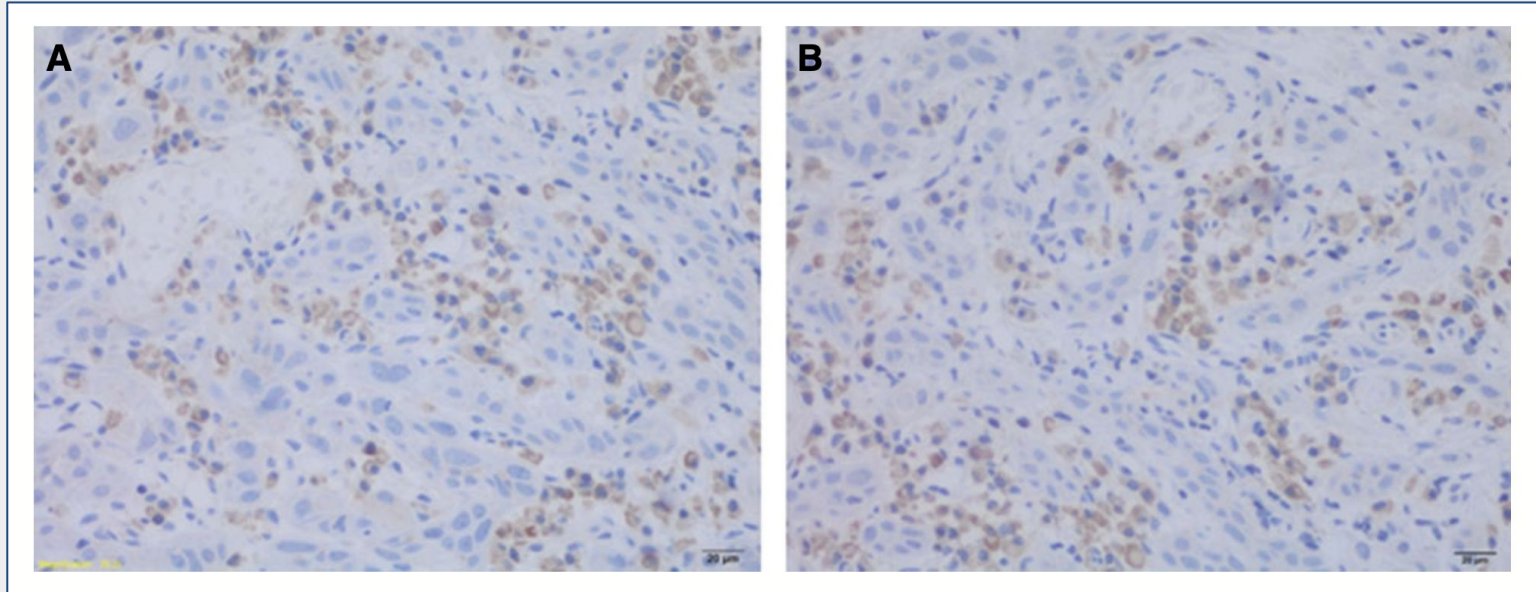


Stem cells surface markers from human dental pulp
School of Dentistry, University of California at Los Angeles, USA
International Journal of Oral Science (2015), DOI: 10.1038/ijos.2015.29
Corrected: 2019

Type II: Duplication with repositioning

Oral Cancer

Buccal Cancer



Department of Head & Neck Surgery, Fudan University Shanghai, China

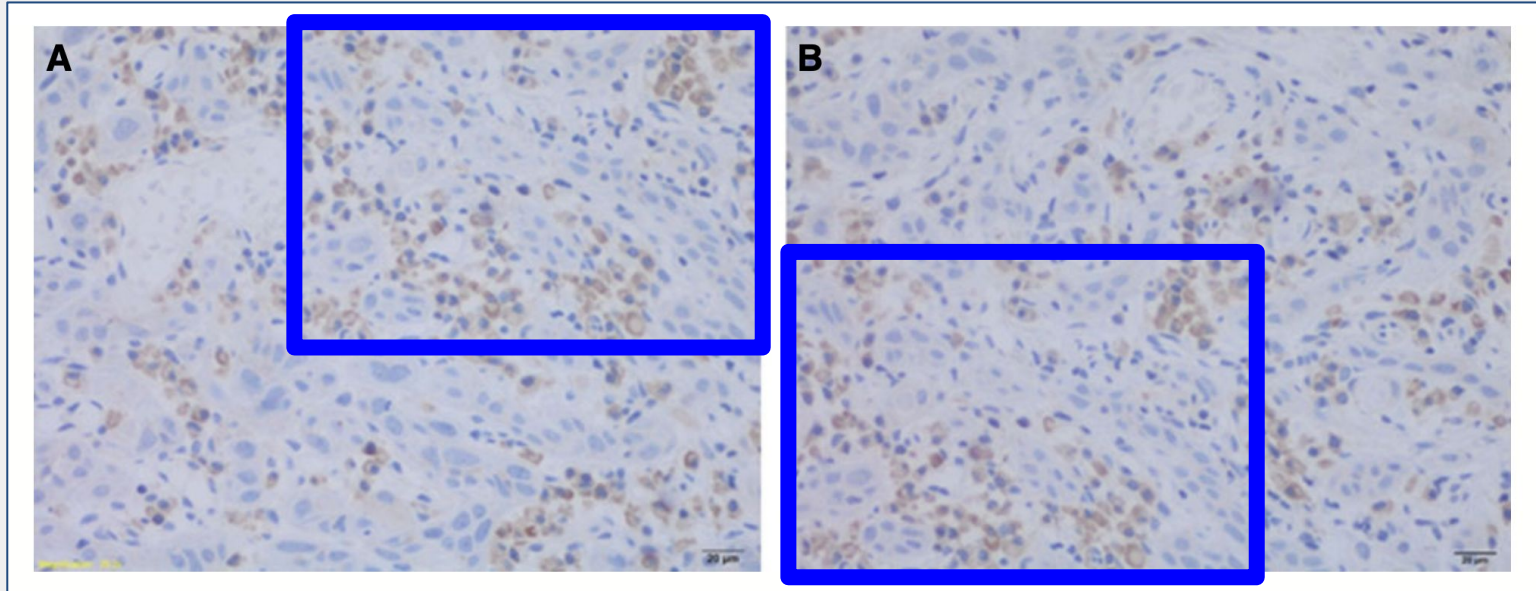
J Oral Pathol Med (2014) - DOI: 10.1111/jop.12189

Reported online November 2011, corrected February 2022

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Oral Cancer

Buccal Cancer

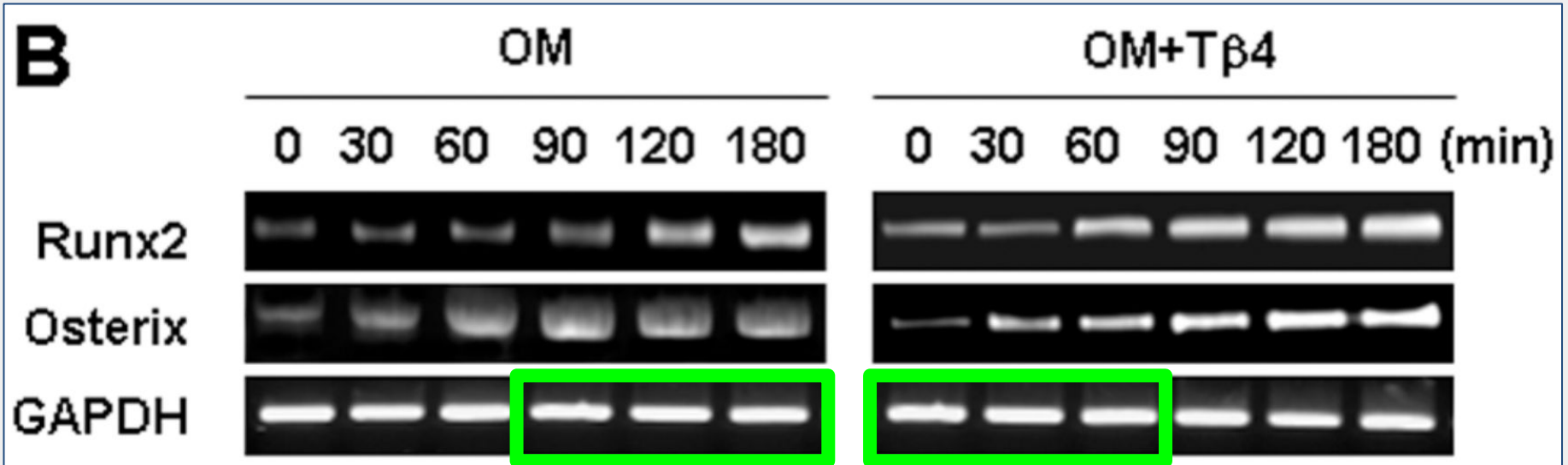


Department of Head & Neck Surgery, Fudan University Shanghai, China

J Oral Pathol Med (2014) - DOI: 10.1111/jop.12189

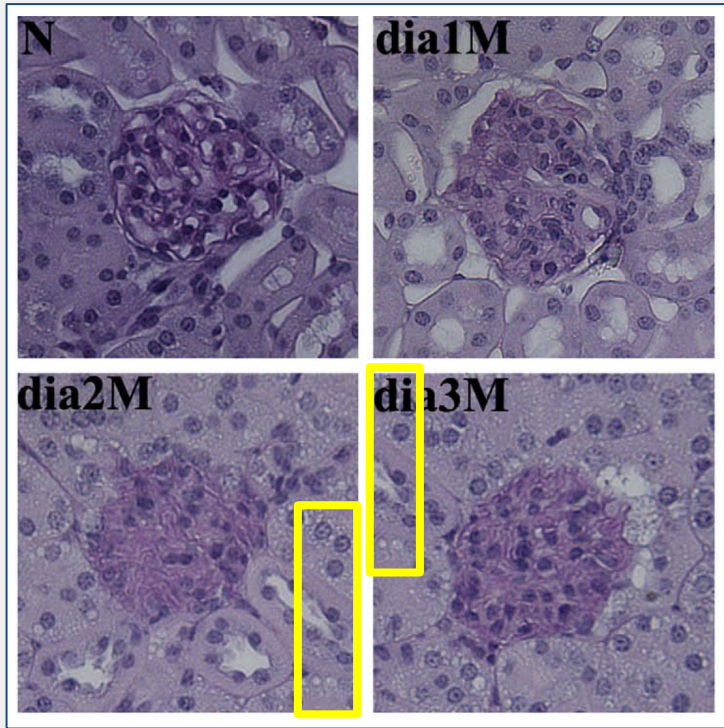
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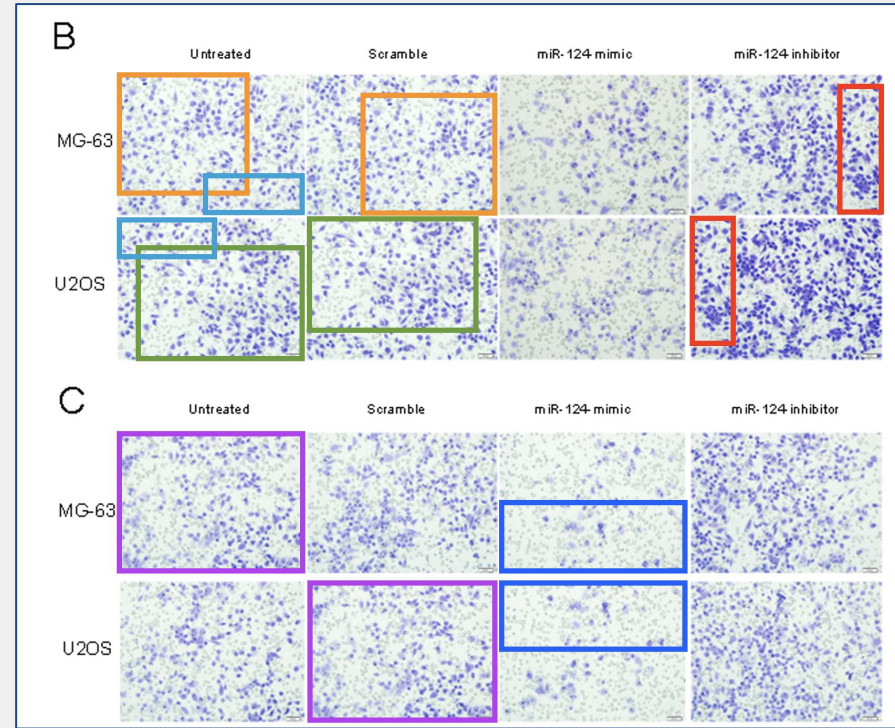
Odontogenic Differentiation in Human Dental Pulp Cells
School of Dentistry, Kyung Hee University, Seoul, Republic of Korea
PLOS ONE (2013), DOI: 10.1371/journal.pone.0061960
Reported to journal October 2015, no action yet

Type II: Duplication with repositioning



Yale School of Medicine, USA

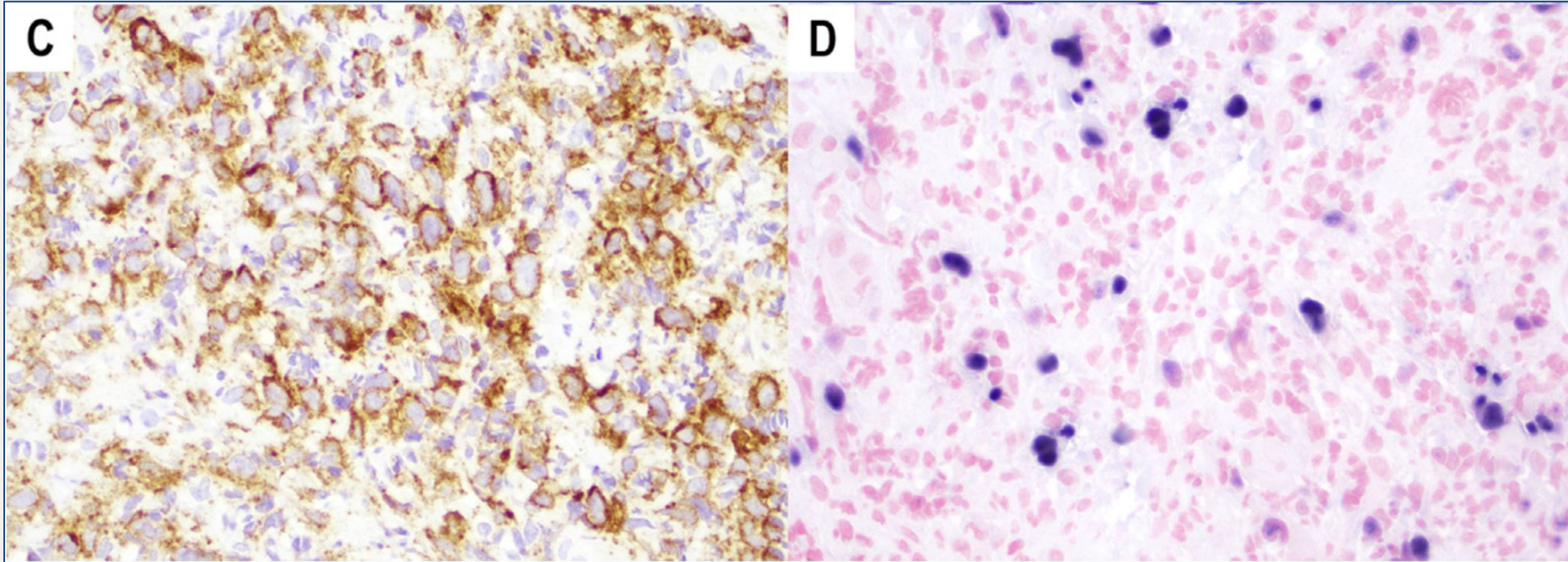
J Autoimmunity (2009), DOI: 10.1016/j.jaut.2008.12.003,
Reported to journal in October 2015, not yet addressed



First Affiliated Hospital of Harbin Medical University, China

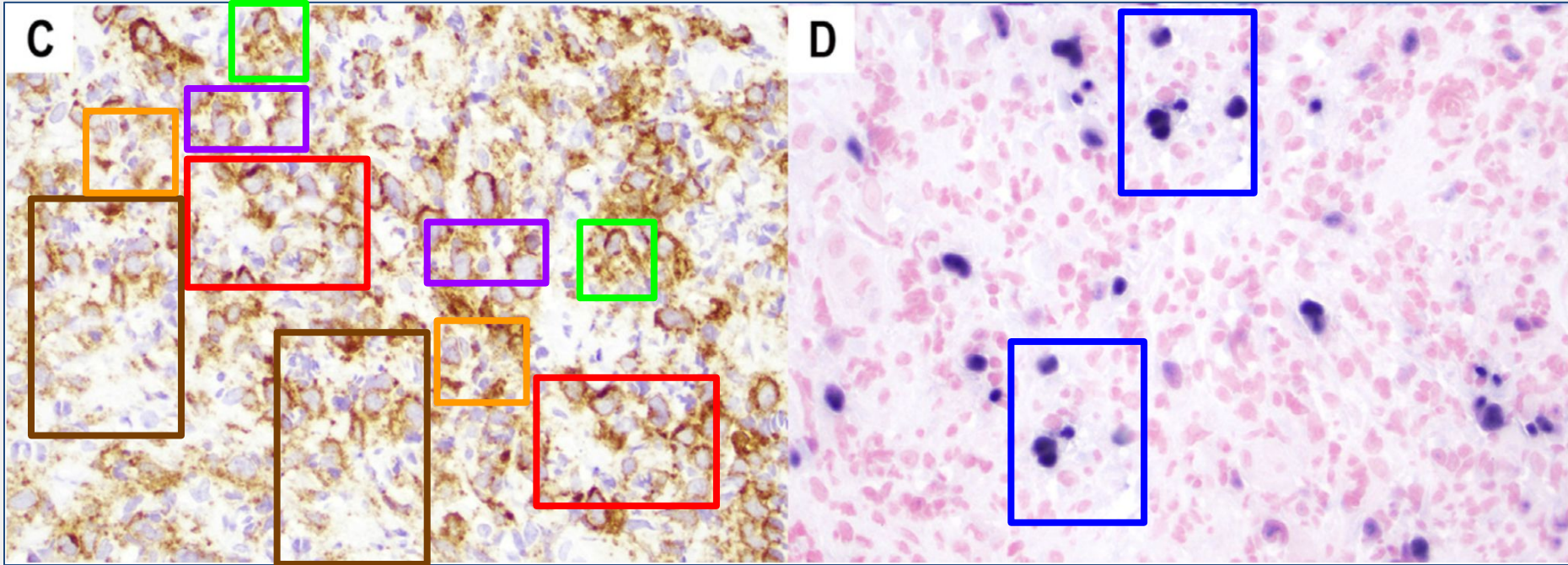
PLOS ONE (2014), DOI: 10.1371/journal.pone.0091566
Reported Oct 2015, retracted March 2019, cited by 27 20

Type III: Duplication with alteration



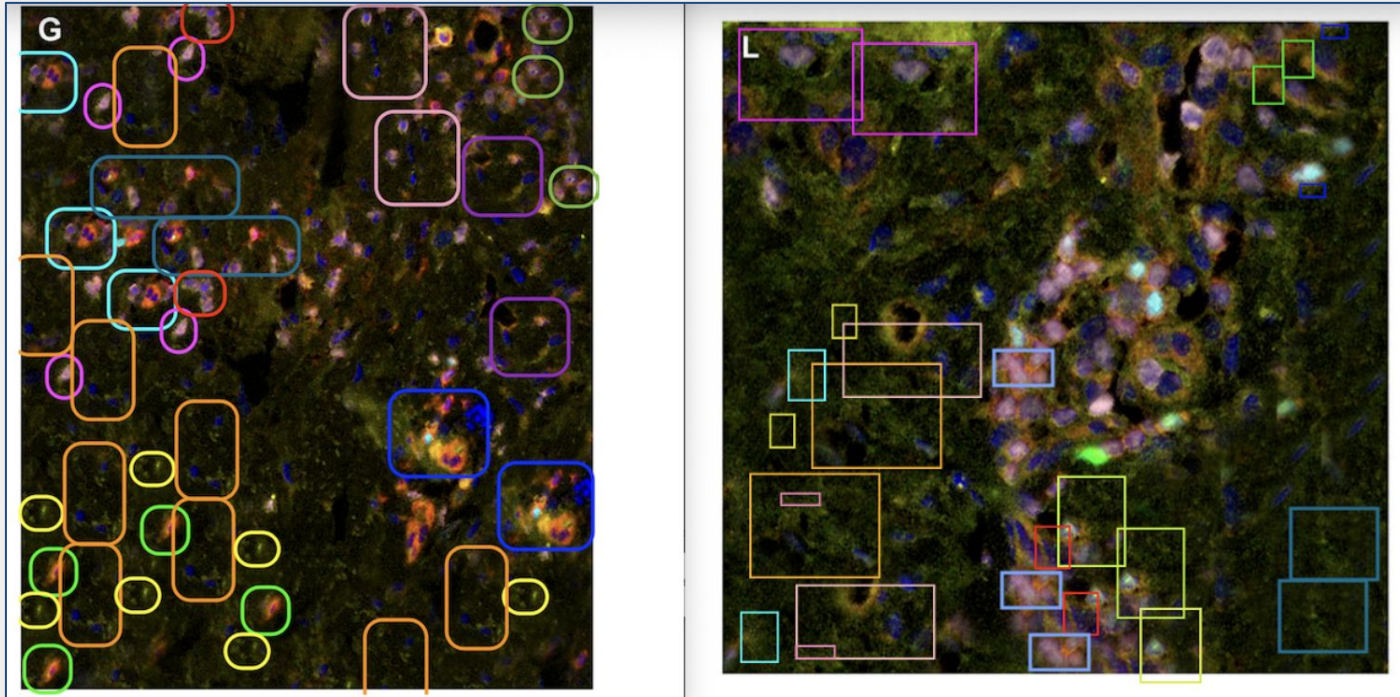
*The University of Texas MD Anderson Cancer Center, Houston, TX,
Pathology (2020), DOI: 10.1016/j.pathol.2019.09.006
Reported online May 2023, no action yet*

Type III: Duplication with alteration



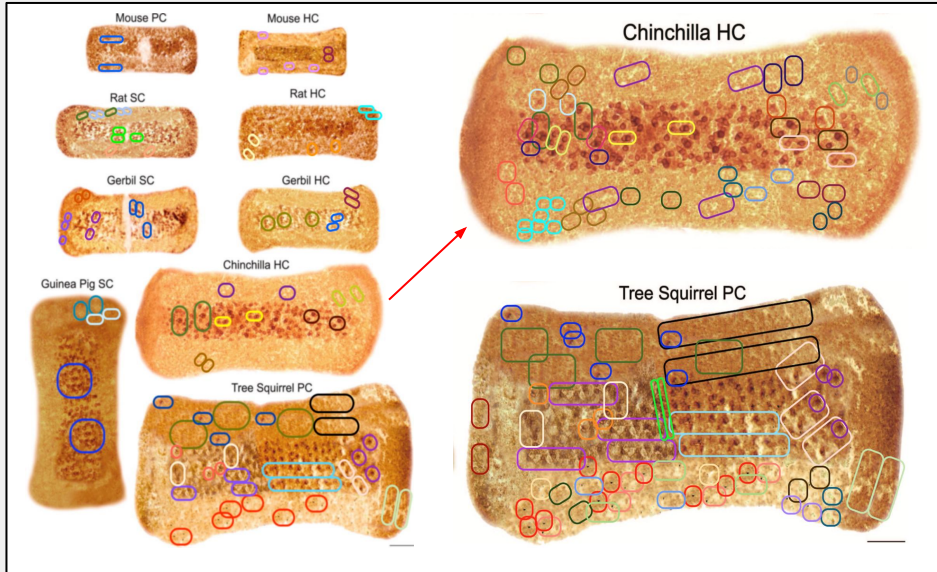
*The University of Texas MD Anderson Cancer Center, Houston, TX,
Pathology (2020), DOI: 10.1016/j.pathol.2019.09.006
Reported online May 2023, no action yet*

Type III: Duplication with alteration

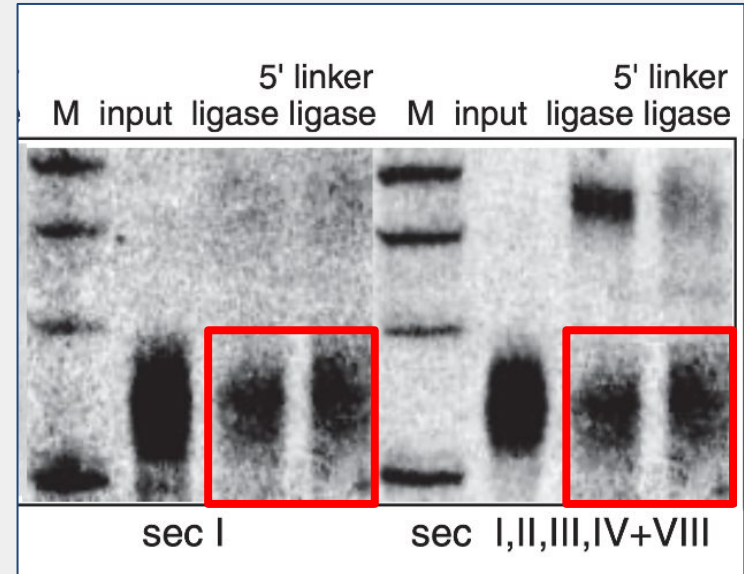


*University of Texas MD Anderson Cancer Center, Houston, TX
Frontiers in Oncology (2021), DOI: 10.3389/fonc.2021.621591.
Reported on PubPeer June 2023*

Type III: Duplication with alteration

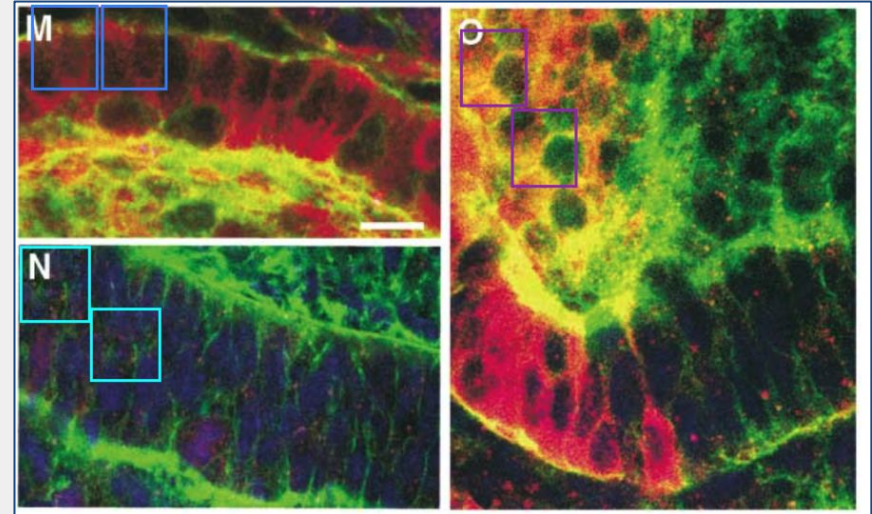
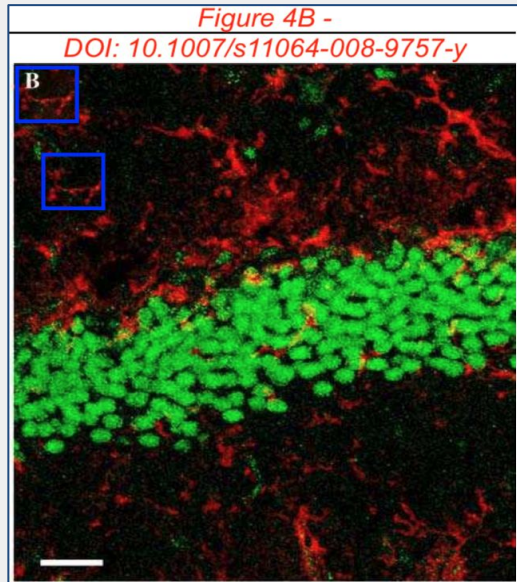
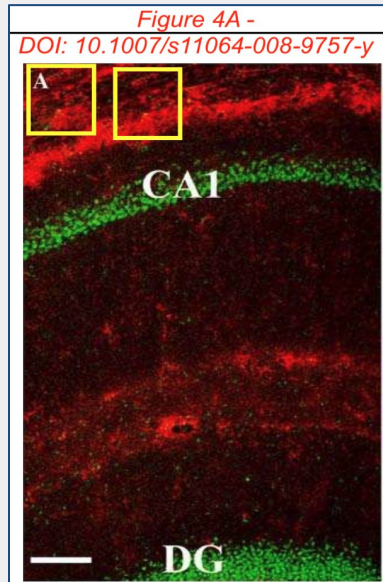


*University of Illinois Chicago, cited 129 times
Journal of Neurophysiology (2005), DOI: 10.1152/jn.00747.2003
Reported to journal editors in June 2020; corrected March 2021*



*Hubrecht Laboratory (NIOB-KNAW), The Netherlands
Science (2007), DOI: 10.1126/science.1136699, cited 342 times
Reported to journal April 2015, retracted November 2020*

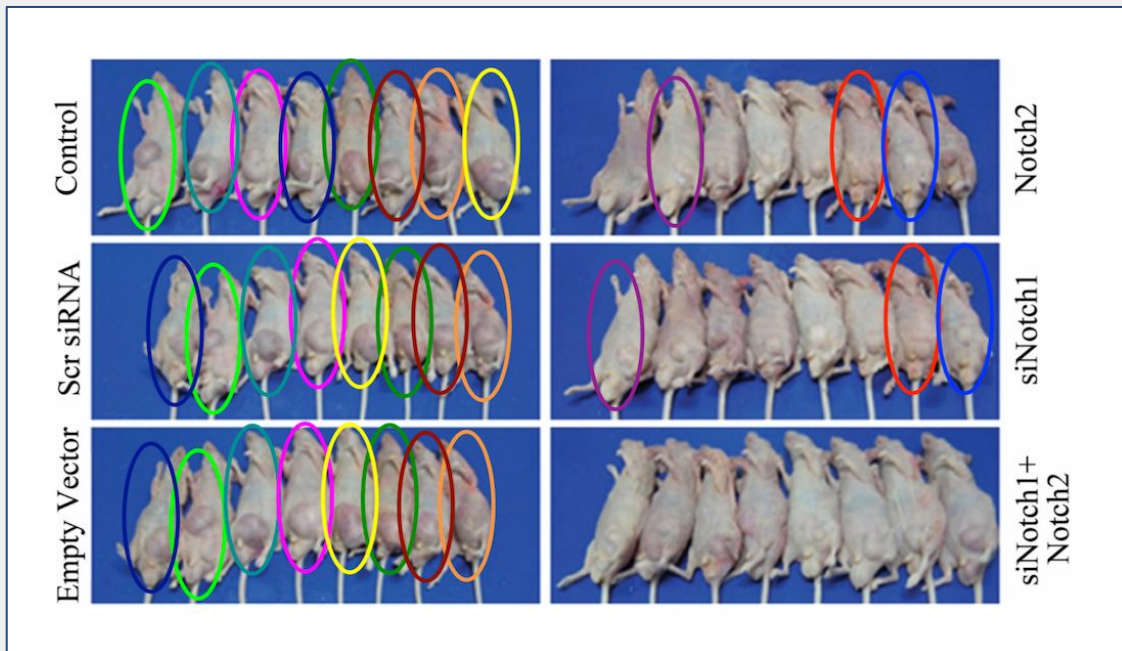
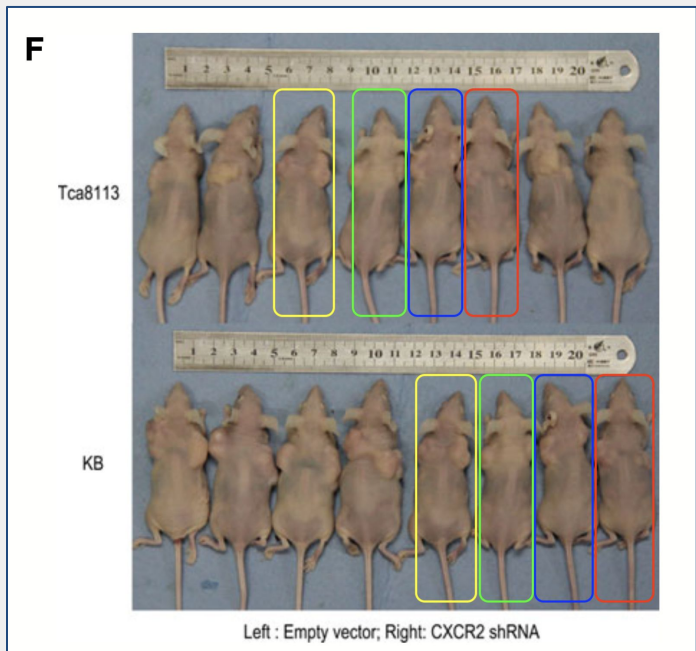
Type III: Corner cloning (to replace labels)



*Nencki Institute of Experimental Biology, Poland
Neurochemical Research (2008)
doi: 10.1007/s11064-008-9757-y*

*Duke University Medical Center, NC, USA
Current Biology (2004) , DOI: 10.1126/science.1136699, cited 342 times
Reported to journal April 2015, retracted November 2020*

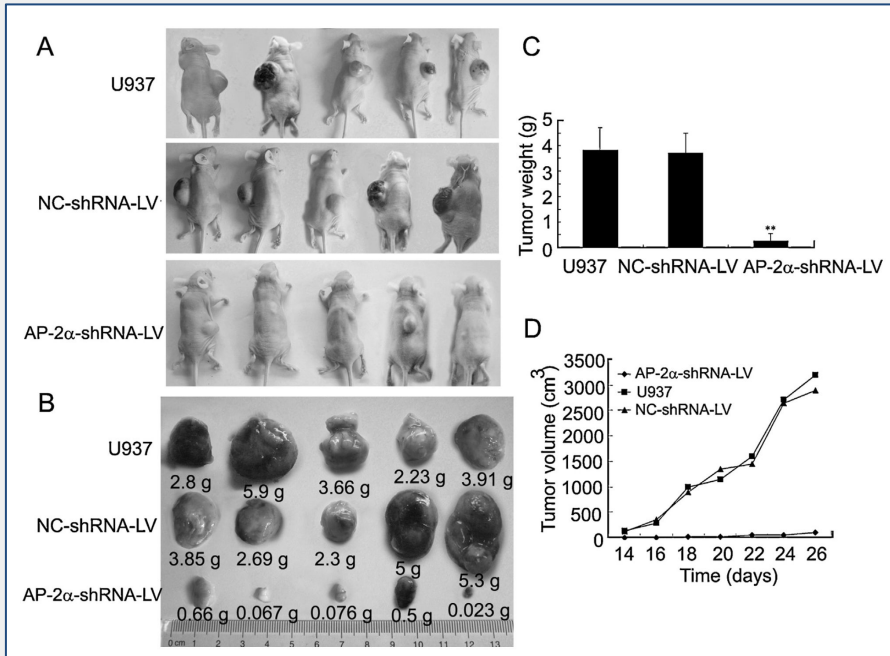
Mouse reshuffling



Fudan University, China
J Oral Path & Med (2014), DOI: 10.1111/jop.12189
Reported online February 2024

Tianjin Medical University General Hospital, China
PLoS ONE (2013), DOI: 10.1371/journal.pone.0053654
Reported to journal May 2014, retracted October 2019

Animal ethics

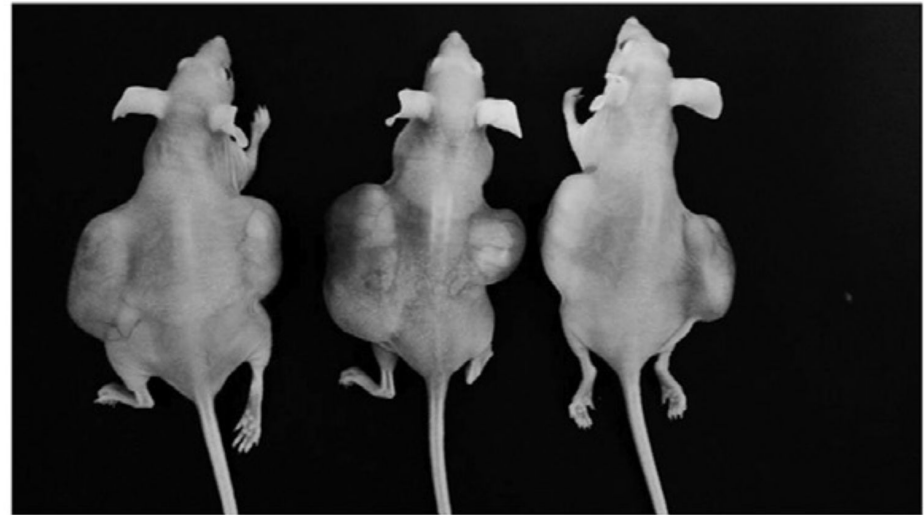


Hunan Normal University, China

Int J Biochem Cell Biol (2013), DOI: 10.1016/j.biocel.2013.04.024

Reported online March 2022, no action yet

MEF1F2-hSWAP-7



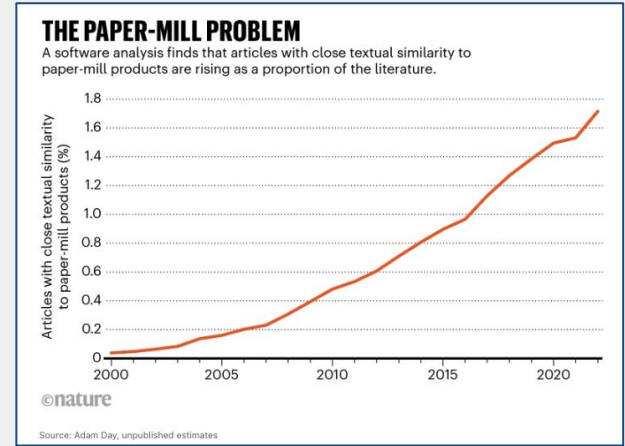
National Health Research Institute, Taiwan

Exp Cell Res (2016), DOI: 10.1016/j.yexcr.2015.06.011

Reported online January 2020, no action yet

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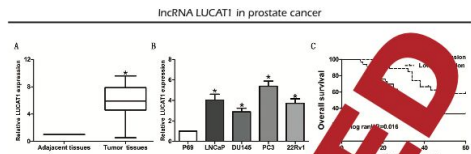


Figure 1. The expression levels of LUCAT1 increased in prostate cancer tissues compared with adjacent tissues. The expression levels of LUCAT1 relative to β -actin were determined in the human prostate cancer cell lines and P69 (two human prostate cancer cell lines) by qRT-PCR. C, High level of LUCAT1 was associated with worse overall survival in prostate cancer patients. Data were presented as the mean \pm standard error of the mean. * $p < 0.05$.

method was performed for evaluating the prognosis. $p < 0.05$ was considered statistically significant.

Results

LUCAT1 Expression in Prostate Cancer Tissues and Cells

qRT-PCR was performed to detect the expression of LUCAT1 in 56 tumor tissues and 56 adjacent tissues. The result revealed that LUCAT1 was significantly upregulated in tumor tissue samples (Figure 1A). Identically, LUCAT1 expression in prostate cancer cells was significantly higher than that of HK-2 (human kidney epithelial cells) (Figure 1B).

LUCAT1 Expression was Related to Overall Survival of Prostate Cancer Patients

After the surgery, Kaplan-Meier method was utilized to analyze the survival time of prostate cancer patients. Prostate cancer patients were divided into two groups, the high-LUCAT1 group and the low-LUCAT1 group, based on the expression level of LUCAT1. The result of Kaplan-Meier analysis showed that prostate cancer patients with low LUCAT1 level had a better overall survival compared to those with high level (Figure 1C).

Overexpression of LUCAT1 Promoted Cell Migration and Invasion of Prostate Cancer Cells

PC3 and DU145 prostate cancer cell lines were chosen in this study. First of all, the transfection efficacy of overexpression lentivirus targeting LUCAT1 was verified (Figure 2A). Moreover, the results of wound healing assay indicated that migrated ability of prostate cancer cells was significantly facilitated after LUCAT1 overexpression (Figure 2B). Furthermore, transwell assay also revealed that the number of

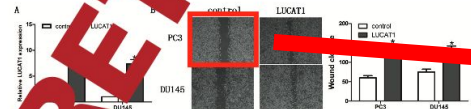


Figure 2. Functional assays showed that silencing CASC15 inhibited PC cell migration and invasion. A, Wound healing assay showed that wound closure was significantly decreased via silencing of CASC15 in PC cells (magnification: 40 \times). B, Transwell assay showed that number of migrated cells was significantly decreased via knockdown of CASC15 in PC cells (magnification: 40 \times). C, Transwell assay showed that provided cells was significantly decreased via knockdown of CASC15 in PC cells (magnification: 40 \times). * $p < 0.05$, as compared with the control cells.

3279

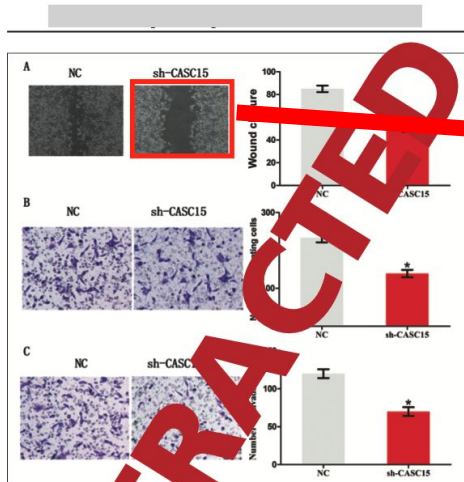
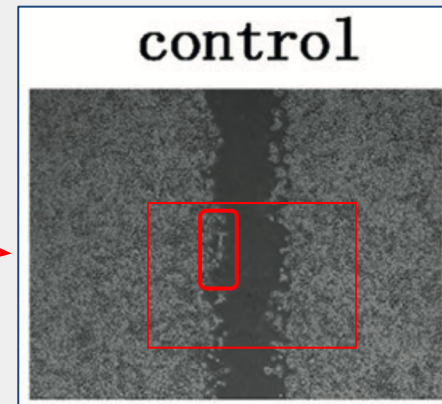
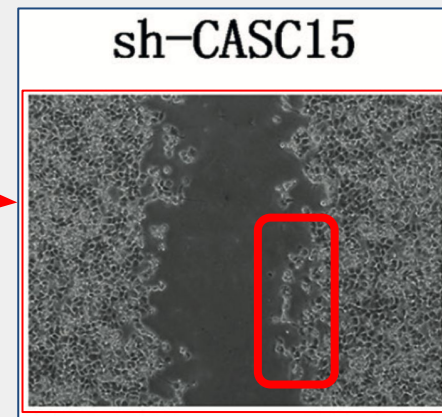


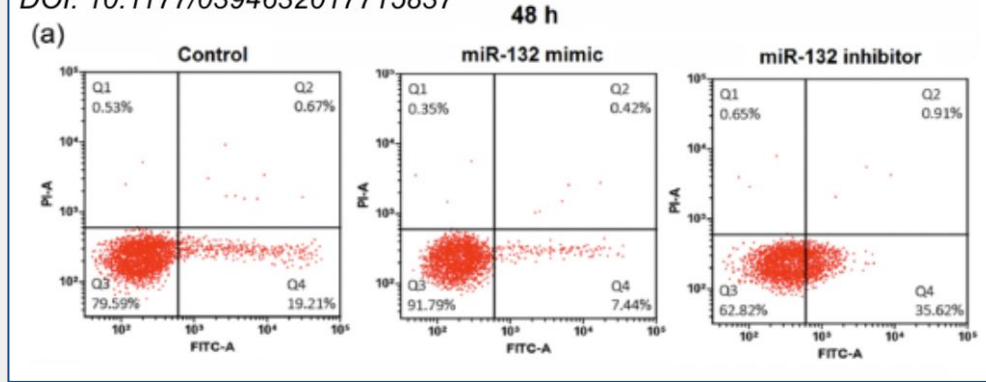
Figure 2. Functional assays showed that silencing CASC15 inhibited PC cell migration and invasion. A, Wound healing assay showed that wound closure was significantly decreased via silencing of CASC15 in PC cells (magnification: 40 \times). B, Transwell assay showed that number of migrated cells was significantly decreased via knockdown of CASC15 in PC cells (magnification: 40 \times). C, Transwell assay showed that provided cells was significantly decreased via knockdown of CASC15 in PC cells (magnification: 40 \times). * $p < 0.05$, as compared with the control cells.

8306

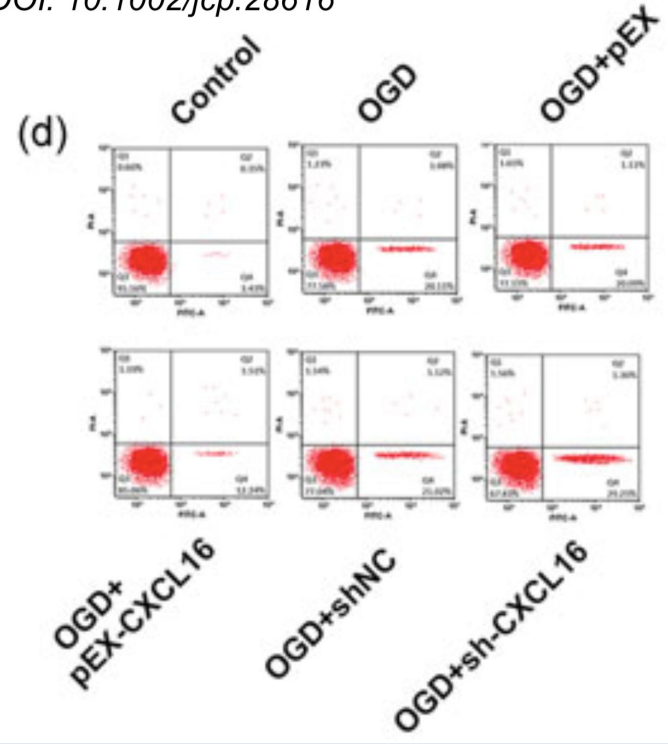


Unrealistic Flow Cytometry panels

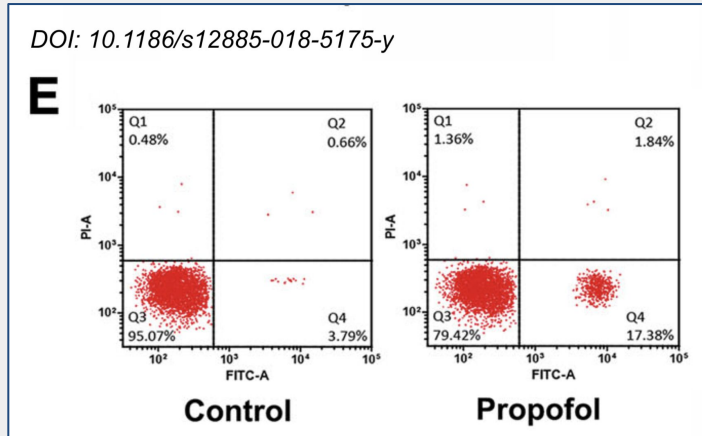
DOI: 10.1177/0394632017715837



DOI: 10.1002/jcp.28616



DOI: 10.1186/s12885-018-5175-y



Artificial intelligence can create fake images

Test Yourself: Which Faces Were Made by A.I.?

New York Times

By Stuart A. Thompson Jan. 19, 2024

Was this made by A.I.?

2/10



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6/10



A.I.

Real



Deepfakes: A new threat to image fabrication in scientific publications?

Liansheng Wang,¹ Lianyu Zhou,¹ Wenxian Yang,² and Rongshan Yu^{1,2,3,*}

¹Department of Computer Science, School of Informatics, Xiamen University, Xiamen, China

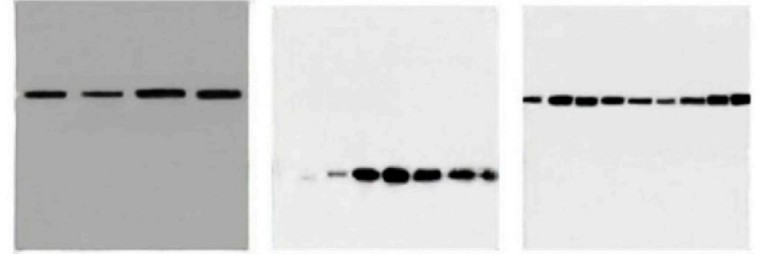
²Aginome Scientific, Xiamen, China

³National Institute for Data Science in Health and Medicine, Xiamen University, Xiamen, China

*Correspondence: rsyu@xmu.edu.cn

<https://doi.org/10.1016/j.patter.2022.100509>

C



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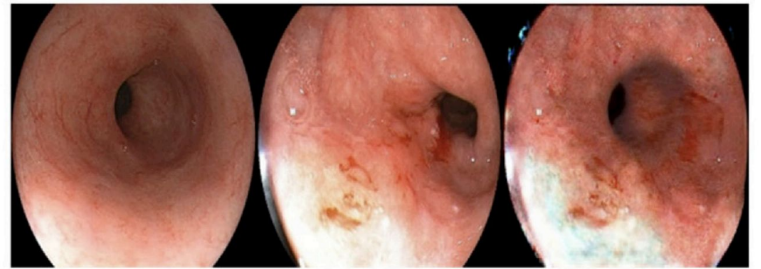


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Richard Van Noorden, Nature (2021)

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Publications

Sijen

Authors: Sijen Tjita, Steiner Florian A., Thijsen Karen L., Pasternak Ronald H. A.

Title: Secondary siRNAs Result from Unprimed RNA Synthesis and Form a Distinct Class

Published: Jan 2007

Links: doi

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1. Figure: Page #3

