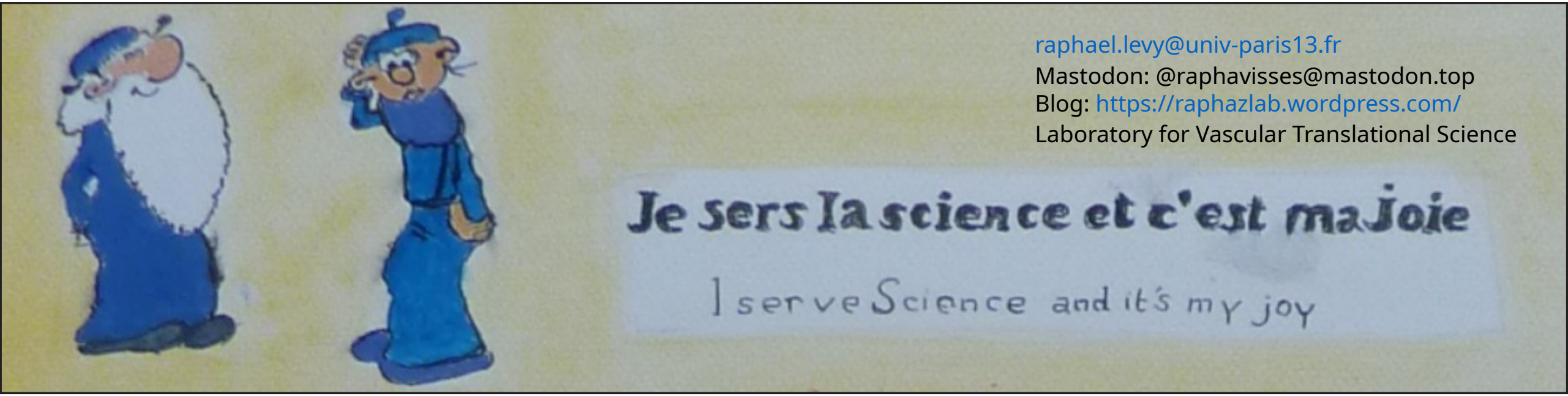
LVTS U1148

Grant agreement no. 951393

Répliquer pour éclaircir une controverse scientifique : quelques enseignements d'une expérience en cours...

04/04/2025, Lyon



Reproduit par Paul Picard à partir des personnages de “Léonard est un génie” par Turk & De Groot

raphael.levy@univ-paris13.fr
Mastodon: @raphavisses@mastodon.top
Blog: https://raphazlab.wordpress.com/
Laboratory for Vascular Translational Science

Pourquoi?

Pourquoi?

faire de la science, être un.e scientifique

Guérir – nouveaux traitements

Solution à des problèmes environnementaux

Curiosité, plaisir de la découverte

Pourquoi?

faire de la science, être un.e scientifique

Guérir – nouveaux traitements

Solution à des problèmes environnementaux

Curiosité, plaisir de la découverte

Pour avoir un travail, progresser dans une carrière, etc…

Pourquoi?

faire de la science, être un.e scientifique

Nos motivations sont variées… et nous travaillons dans un environnement organisationnel qui encourage/valorise certains comportements.

Comment?

faire de la science, être un.e scientifique

Questionnement éthique

Bon pour la science, pour la reproductibilité et le progrès de la connaissance

Bon pour moi, ma visibilité et ma progression de carrière

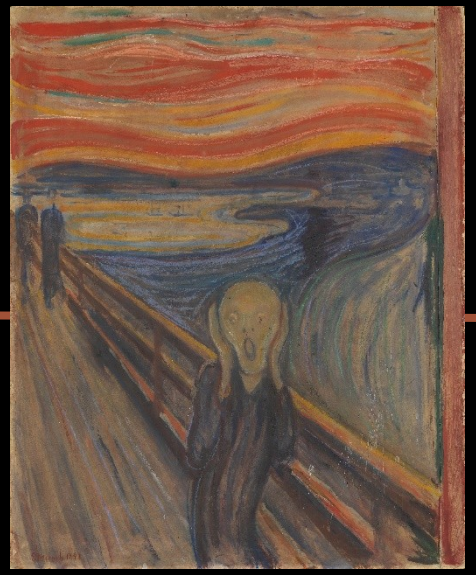
Bon pour la planète, pour contribuer à résoudre les « enjeux environnementaux »

Bon/mauvais pour les participants à la recherche

Comment?

faire de la science, être un.e scientifique

Bon pour la science, pour la reproductibilité et le progrès de la connaissance

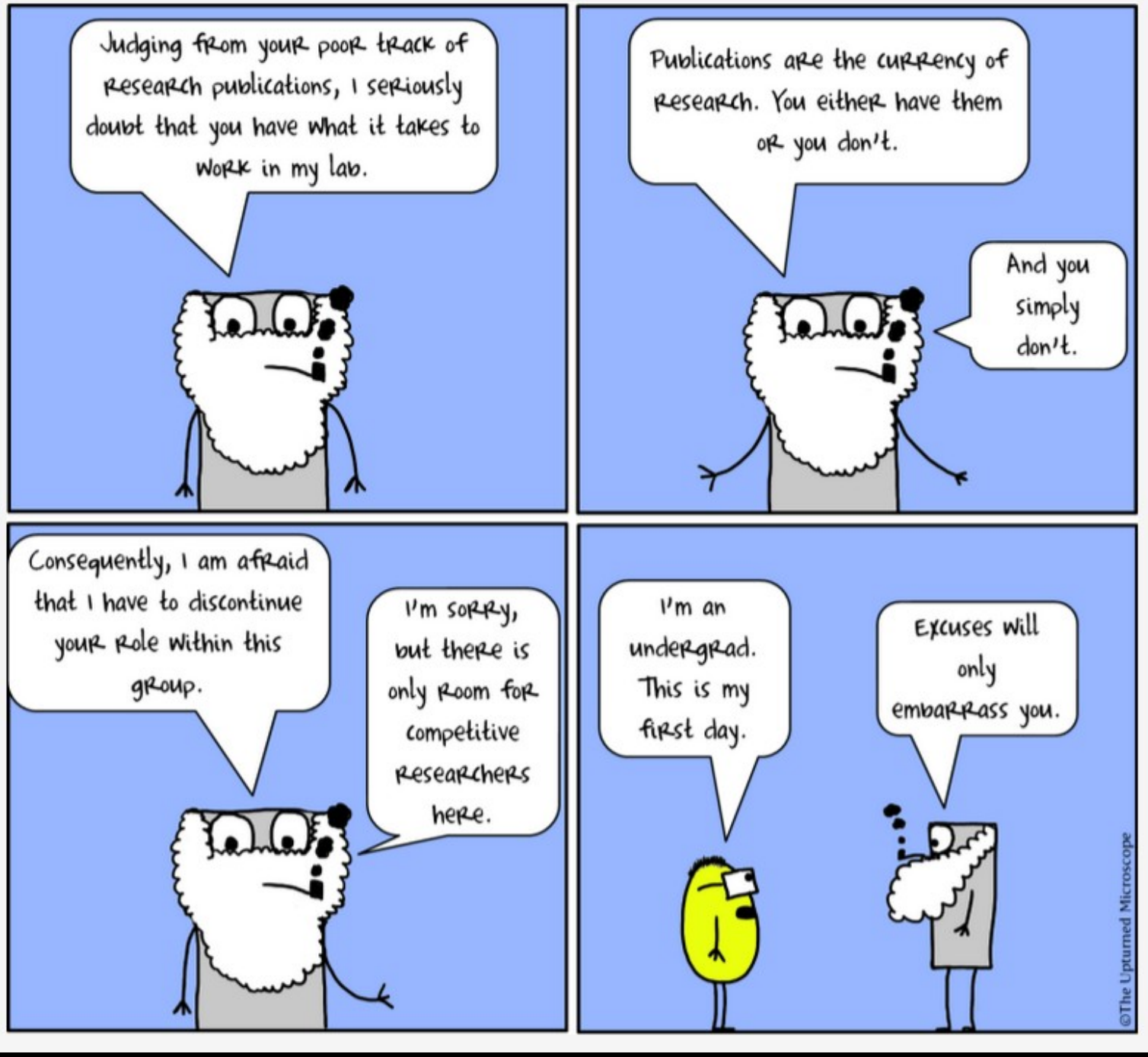


Bon pour moi, ma visibilité et ma progression de carrière

Bon pour la planète, pour contribuer à résoudre les « enjeux environnementaux »

Bon/mauvais pour les participants à la recherche

Edvard Munch, Le Cri, 1893



The Upturned Microscope

Bon pour moi, ma visibilité et ma progression de carrière

↘

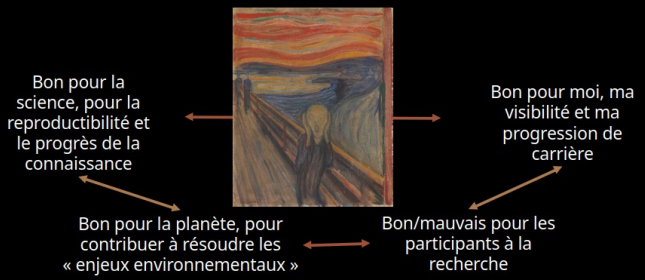
Des articles, si possibles publiés dans des journaux à haut IF, et des contrats

↘

?

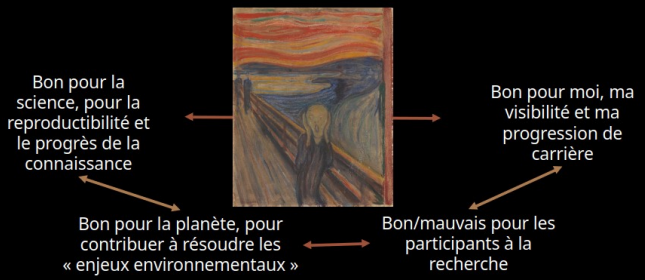
Exagérations, fausses promesses, QRPs, méconduites

Quelques commentaires à propos de points abordés hier



- “Causes de la non reproductibilité : experimental design, manque de formation, QRPs”
- “Communication avec le grand public... et si oui comment”
- “Ce qu’il y a dans les registered reports, c’est digne de confiance”
- “industries pharmaceutiques”

Quelques commentaires à propos de points abordés hier…



- “Causes de la non reproductibilité : experimental design, manque de formation, QRPs”
- “Communication avec le grand public... et si oui comment”
- “Ce qu’il y a dans les registered reports, c’est digne de confiance”
- “industries pharmaceutiques”

Feature » Essay

How an opioid giant deployed a playbook for moulding doctors’ minds

BMJ 2024 ; 385 doi: https://doi.org/10.1136/bmj.q1208 (Published 10 June 2024)
Cite this as: *BMJ* 2024;385:q1208

Article | Related content | Metrics | Responses

Sergio Sismondo [1 2], *Maud Bernisson* [2]

Author affiliations

Correspondence to: S Sismondo sismondo@queensu.ca, M Bernisson maud.bernisson@ru.nl

… abordés hier, ou non

Bulle (scientifique)

Boy Blowing Soap Bubble with Pipe.
Christian Aigens (1870 - 1940)

Métaphore

- Bulle spéculative
- Bulle d’espoirs, d’investissements $$$
- Fragile, surtout si on la gonfle trop

À l’intérieur de la bulle

- *Echo chamber - within the bubble you do not hear (epistemic bubble: no facts) - OR not acknowledge other’s opinions (echo chamber: no trust).*

Max Roßman & Cyrus Mody [NanoBubbles Jan 2023]

Les bulles scientifiques

Cette métaphore décrit fort bien de nombreux domaines scientifiques :

- Nano, COVID, IA, …
- IRM pour Parkinson? Des promesses, des centaines d’articles mais pas d’applications cliniques.
- “Reproductibility crisis”, “Open science” ?!

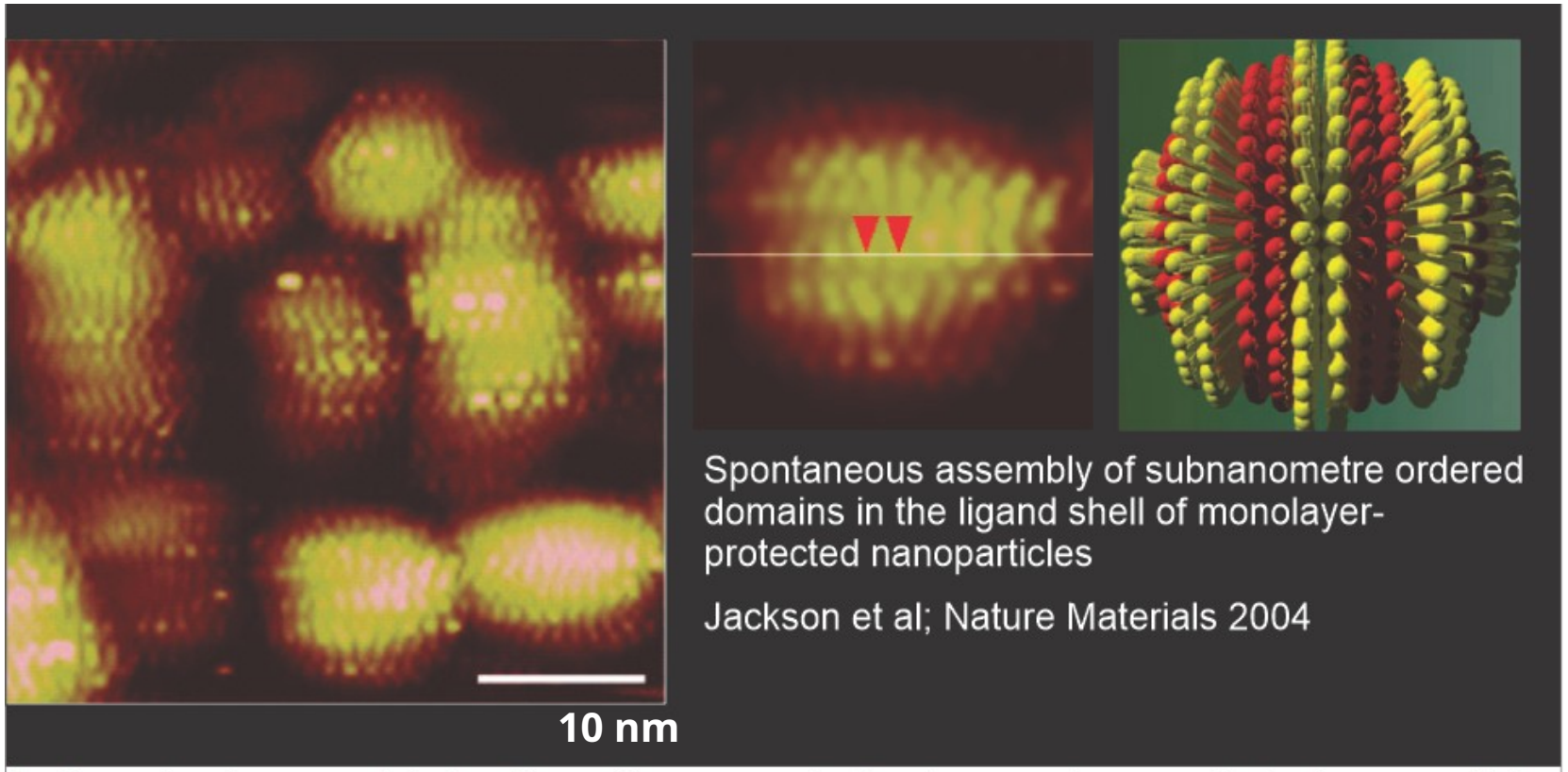
Conséquences?

- Le gâchis de ressources
- L’amplification de recherche non-reproductible
- L’ erreur voire la désinformation scientifique
- Risque de perte de confiance dans la science

Auto-correction de la science

Que se passe-t-il lorsque l’on essaie de corriger la science?

Organised scepticism in practice : what should we do when we identify problems in a scientific article?

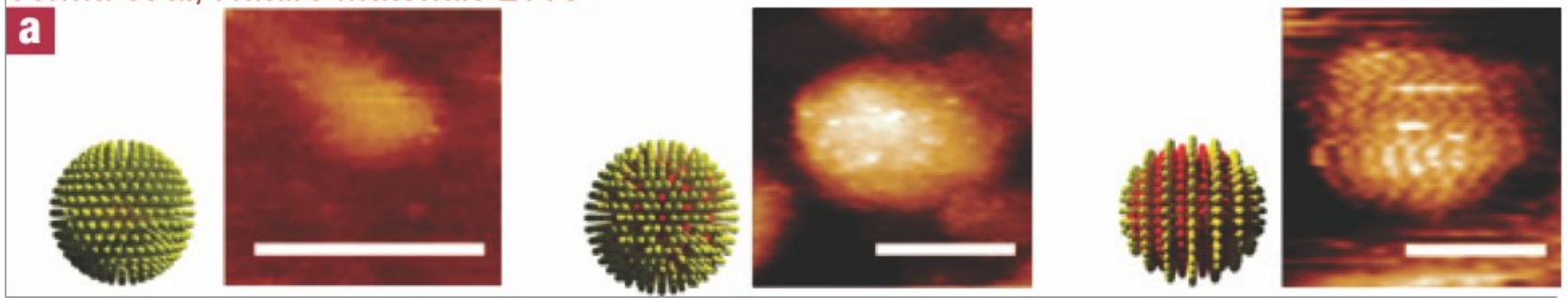


Spontaneous assembly of subnanometre ordered domains in the ligand shell of monolayer-protected nanoparticles

Jackson et al; Nature Materials 2004

Surface-structure-regulated cell-membrane penetration by monolayer-protected nanoparticles

Verma et al; Nature Materials 2008

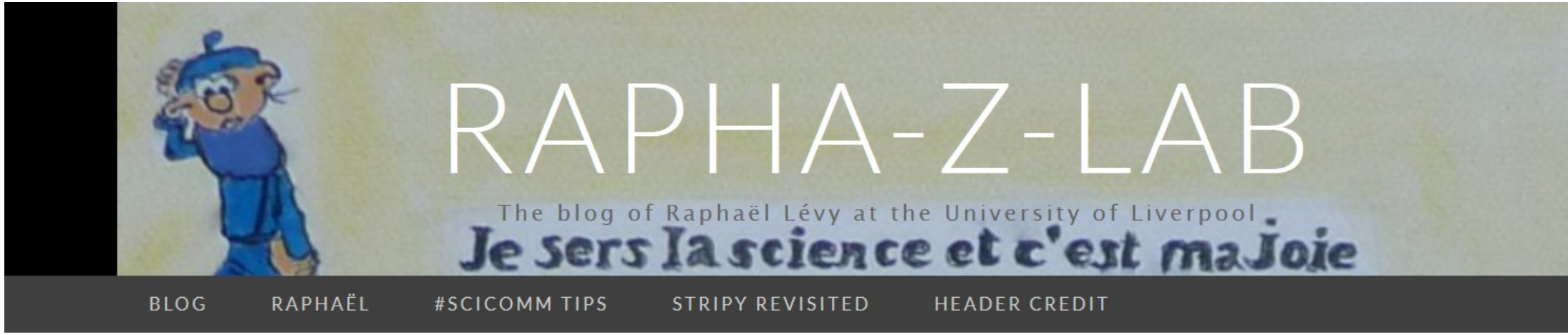


A little later, in 2008…

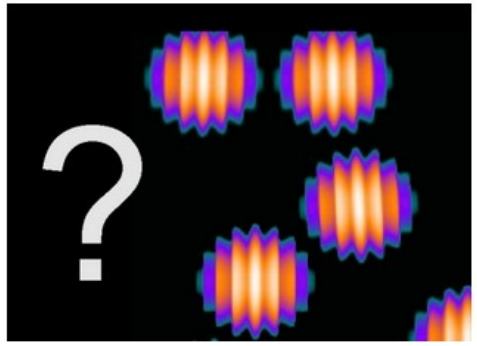
Stripy Nanoparticles Revisited
Submitted 2009

The web offers other spaces where organised (?) skepticism can take place

A blog:
A place where one can discuss articles without having to wait for three years for referees' reports and editors' decisions…



STRIPY NANOPARTICLES REVISITED



Challenging published results is an onerous but necessary task. Today, our article entitled **Stripy Nanoparticles Revisited** has been published in *Small*, three years after its initial submission to this journal (3/12/09) and about three and a half years after the first submission (to Nature Materials, 21/07/09).

As its title indicates, the article challenges the evidence for the existence and properties of "stripy" nanoparticles. The stripy nanoparticle hypothesis was first

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COMMENTS

Raphaël Lévy on What Proportion of Scientific…

Raphaël Lévy on What

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THE Times Higher Education

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HIGHER E

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Breaking news | Politics and Policy | Re

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Stellacci 'stripy nanoparticle' dispute heats up

23 JANUARY 2014 | BY PAUL JUMP

Analysis critical of professor's discovery claim is published on arXiv

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Neuroskeptic

« Psychiatrists From Another Dimension (Part 2)
Medical Journal Apologizes "For The Distress Caused" By A Paper »

Postpublication "Cyberbullying" and the Professional Self

By Neuroskeptic | January 27, 2014 4:47 pm

67

An article in *Science* has been getting a lot of attention this week:
Nano-Imaging Feud Sets Online Sites Sizzling

e 'stripey nanoparticles' debate, which I covered a few weeks
n 2004, Francesco Stellacci and his colleagues published a paper

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E NANOPARTICLES LOST THEIR STRIPES?

s lost their stripes?

physicsfocus

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8th

ARE FLAWS IN PEER REVIEW SOMEONE ELSE'S PROBLEM?

By Philip Moriarty On April 8, 2013

The PubPeer database contains all articles.

title:reproducibility

advanced search

To leave the first comment on a specific article, paste a unique identifier such as a **DOI**, **PubMed ID**, or **arXiv ID** into the search bar.

Login to save this search and receive email alerts

Search publications for: **title:reproducibility**

53 results

4 months ago

Reproducibility and long-term stability of Sn doped MnO2 nanostructures: Practical photocatalytic systems and wastewater treatment applications

S. Panimalar, M. Subash, M. Chandrasekar, R. Uthrakumar, C. Inmozhi, Wedad A. Al-Onazi, Amal M. Al-Mohaimeed, Tse-Wei Chen, J. Kennedy, M. Maaza, K. Kaviyarasu

Chemosphere (2022) 4 comments

5 months ago

Statistical methods for conducting agreement (comparison of clinical tests) and precision (repeatability or reproducibility) studies in optometry and ophthalmology

Colm McAlinden, Jyoti Khadka, Konrad Pesudovs

Mieux comprendre les barrières à la correction de la science : le projet NanoBubbles

NANO BUBBLES

How, when and why science fails to correct itself?

https://nanobubbles.hypotheses.org/

This presentation is part of the project **NanoBubbles: how, when and why does science fail to correct itself?** that has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme.

Grant agreement number ID: 951393

erc European Research Council Established by the European Commission

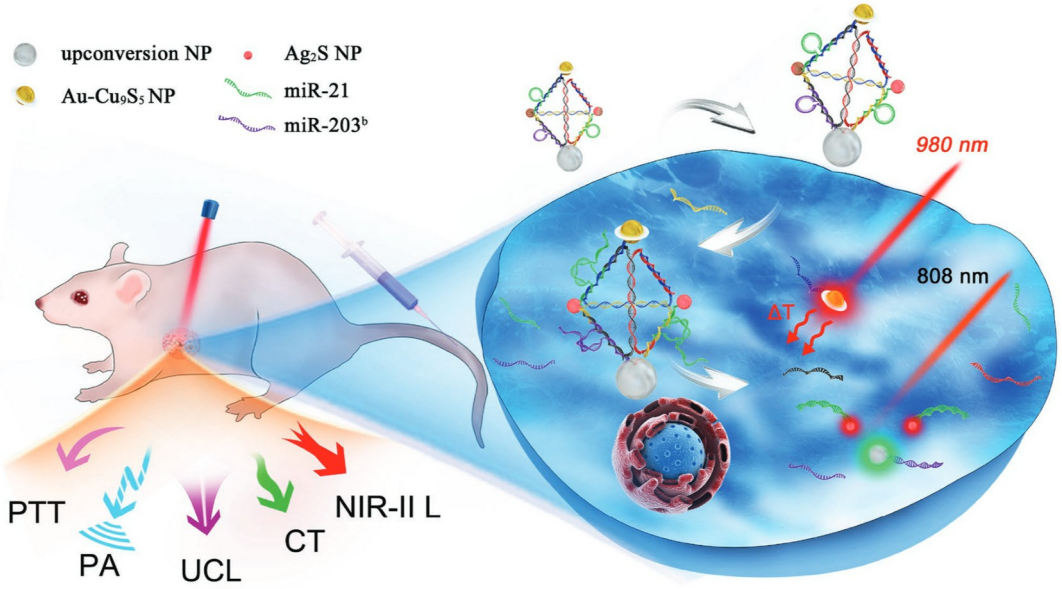
European Commission

Le projet de réplication de NanoBubbles

La « bulle » : l'utilisation de nanosondes pour la détection intracellulaire

Maha Said et Mustafa Gharib
LVTS, USPN

Les nanoparticules parviennent-elles à s’échapper des endosomes ?



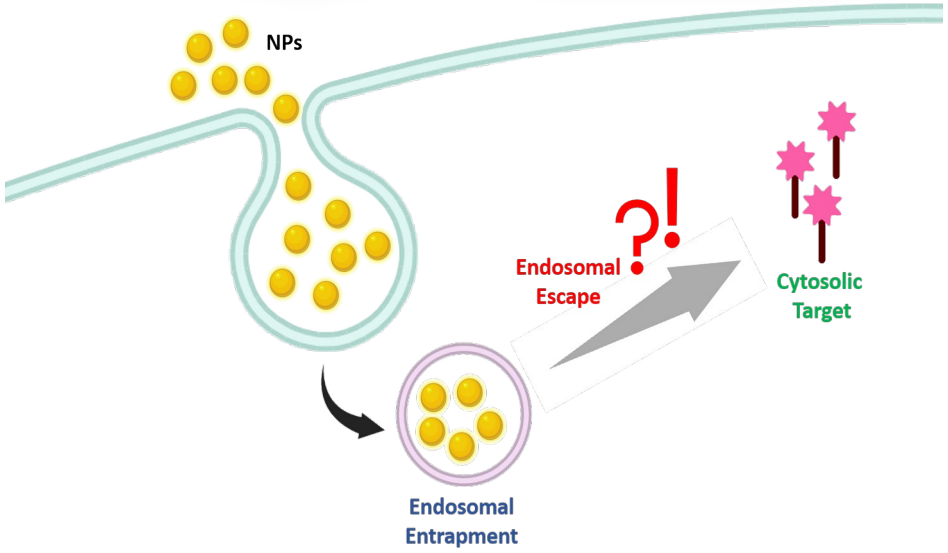
Li, et al. *Advanced Materials*. 2017

Liu, et al. *Analytical chemistry 2018*.

1st Replication Initiative in Nanobiotechnology

Paradox of endosomal escape of NPs?!

Thousands of research articles reporting the use of NPs as probes to detect cytosolic targets where what has been known is that the majority of NPs are entrapped inside endosomes!!



Process

How much of the endocytosed nanoparticles escape the endosome?

Does endosomal escape occur in studies reporting cytosolic sensing?

Inclusion criteria for selected studies:
1-Detected by a defined query
2-Have average citation per year of 14 or more
3-Belong to the 3 most common type of nanoparticles in our corpus.
4-Feasibility

Article 1 : 2-8, 8-9 in progress
Article 2 : 2-6, 6 in progress

Collaboration
Samia Zrig
ITODYS, UPC

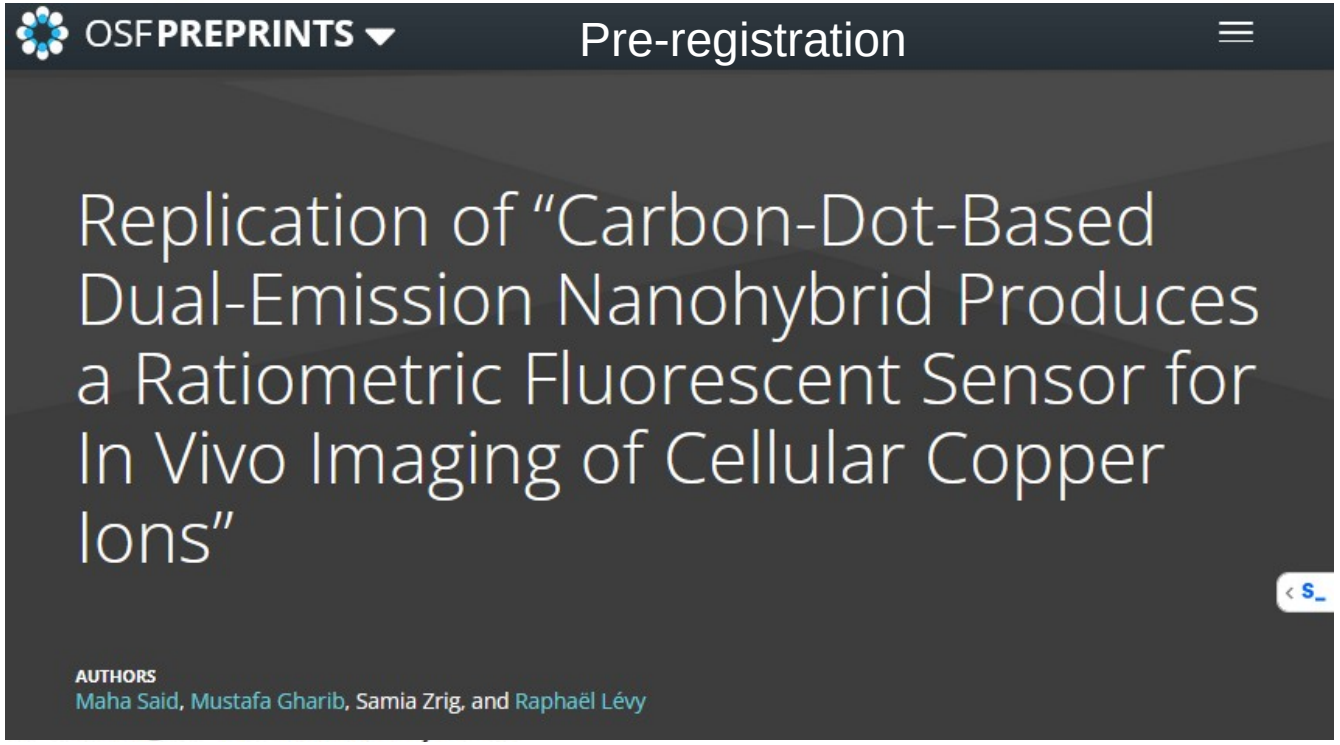
Replication #1: pre-registration

Communication

Carbon-Dot-Based Dual-Emission Nanohybrid Produces a Ratiometric Fluorescent Sensor for In Vivo Imaging of Cellular Copper Ions†

Anwei Zhu, Qiang Qu, Xiangling Shao, Biao Kong, Prof. Dr. Yang Tian

First published: 08 March 2012 | https://doi.org/10.1002/anie.201109089 | Citations: 472





Quelques unes des difficultés :

- Informations manquantes dans l'article original + silence des auteurs
- Planifier l'ensemble du protocole d'expérience et d'analyse
  - ✓ Peut-on synthétiser ces nanosondes?
  - ✓ Détectent-elles les ions cuivres?
  - ✓ Détectent-elles les ions cuivres à l'intérieur des cellules?
  - ✓ … dans un modèle biologique pertinent

Replication #1: pre-registration

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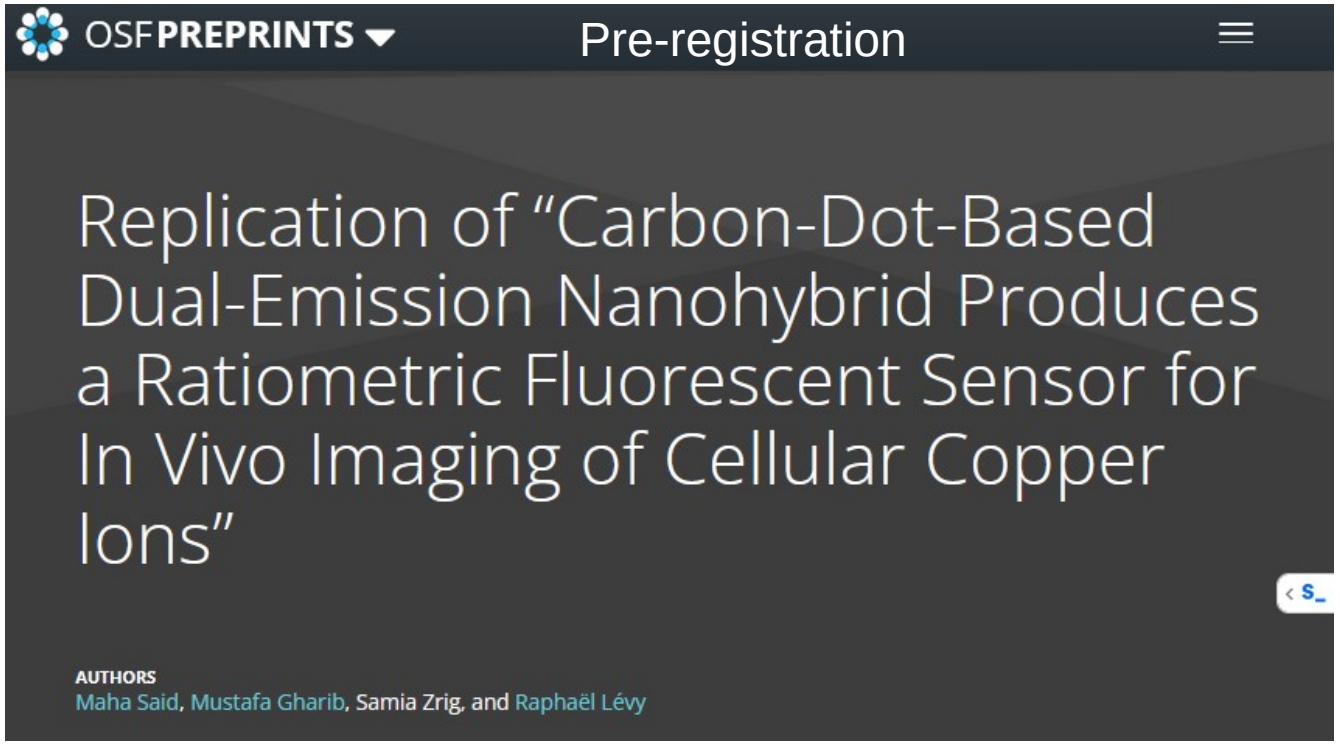
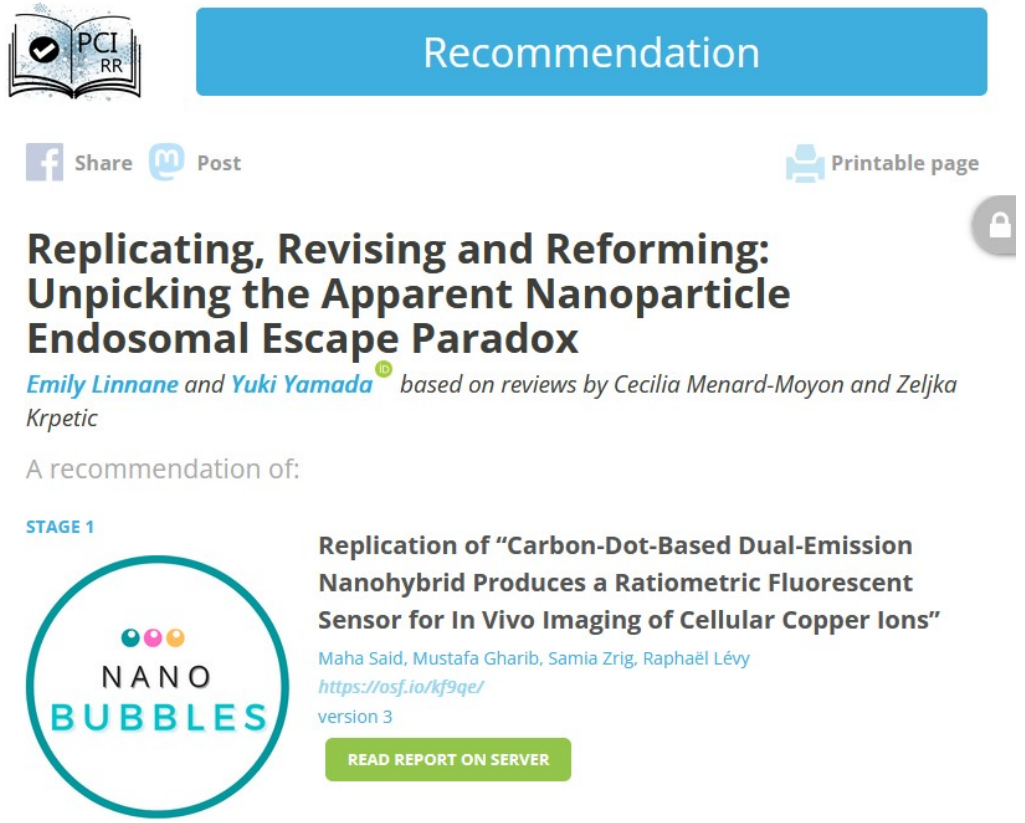
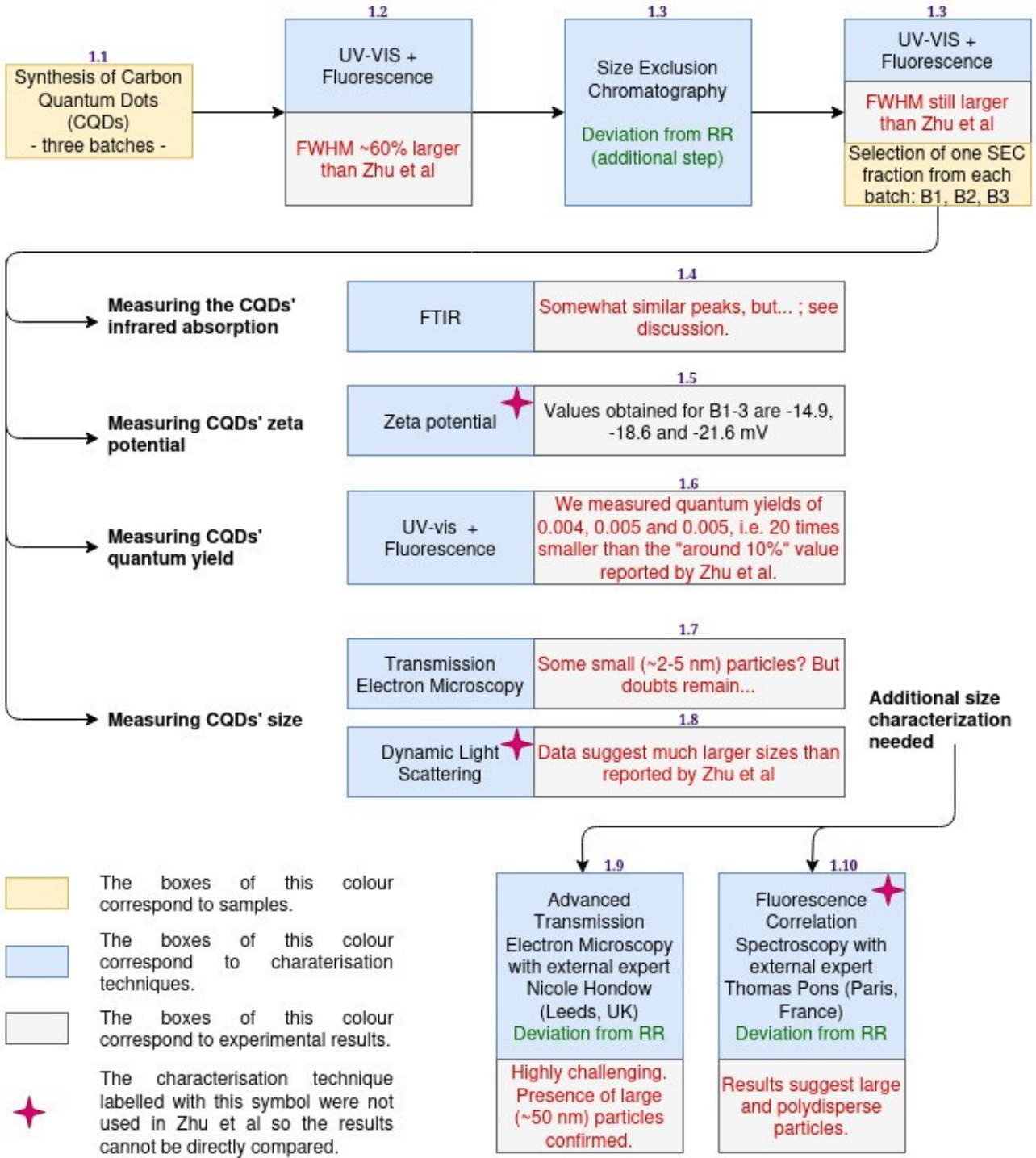




Peut-on synthétiser ces nanosondes? Première étape… les “carbon quantum dots”



Réplication #1 : résultats

- ✓ Peut-on synthétiser ces nanosondes? √
- ✓ Détectent-elles les ions cuivres?
- ✓ Détectent-elles les ions cuivres à l'intérieur des cellules?
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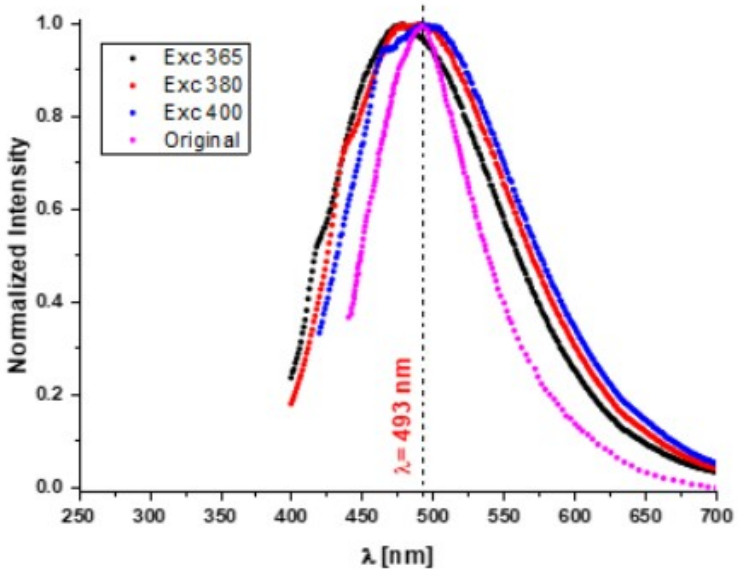

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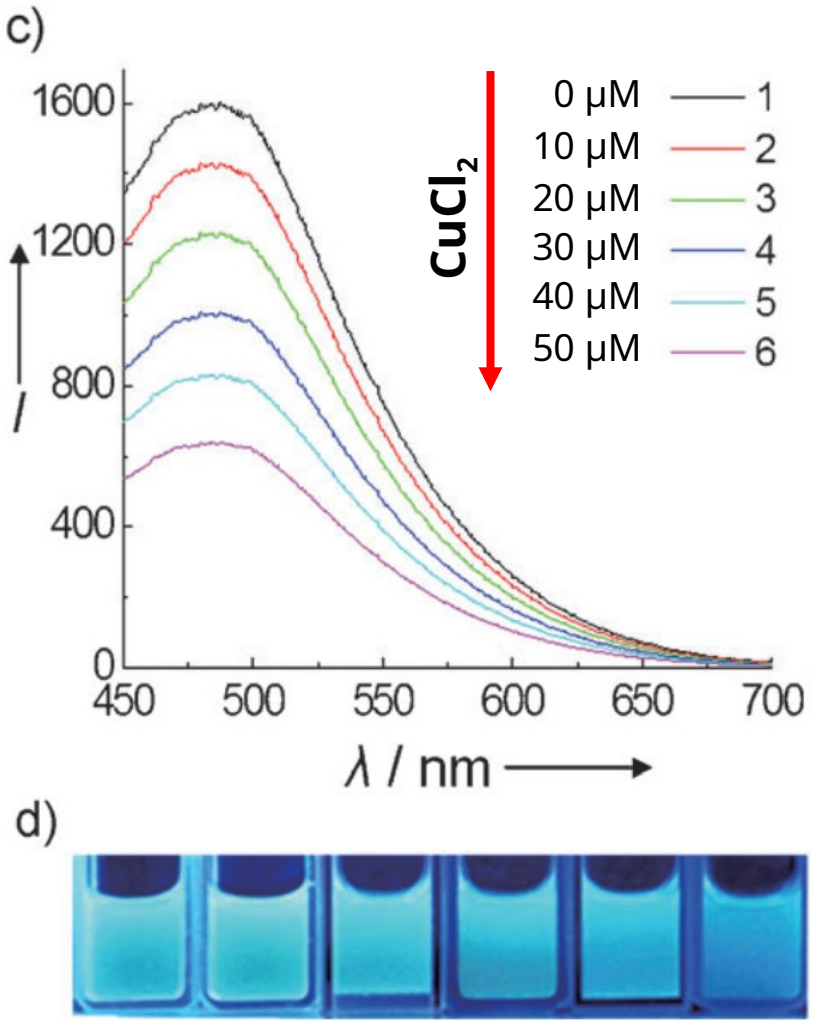
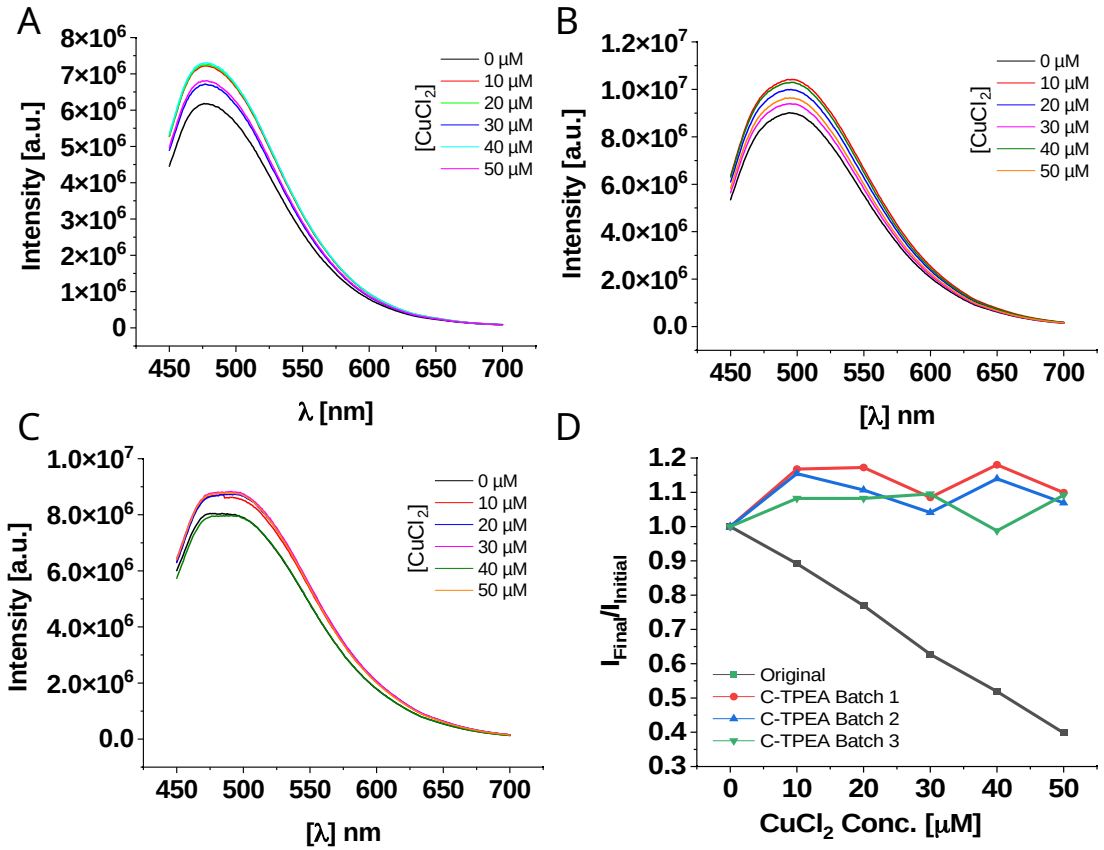
- ✓ … dans un modèle biologique pertinent

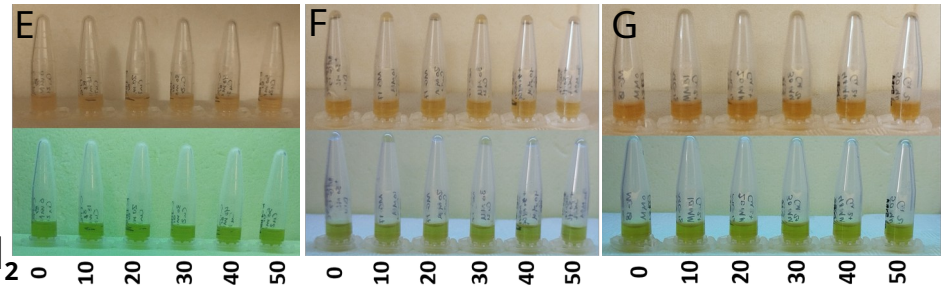
Failure to replicate Cu^{2+} sensing

CQDs-TPEA



Original





NanoBubbles

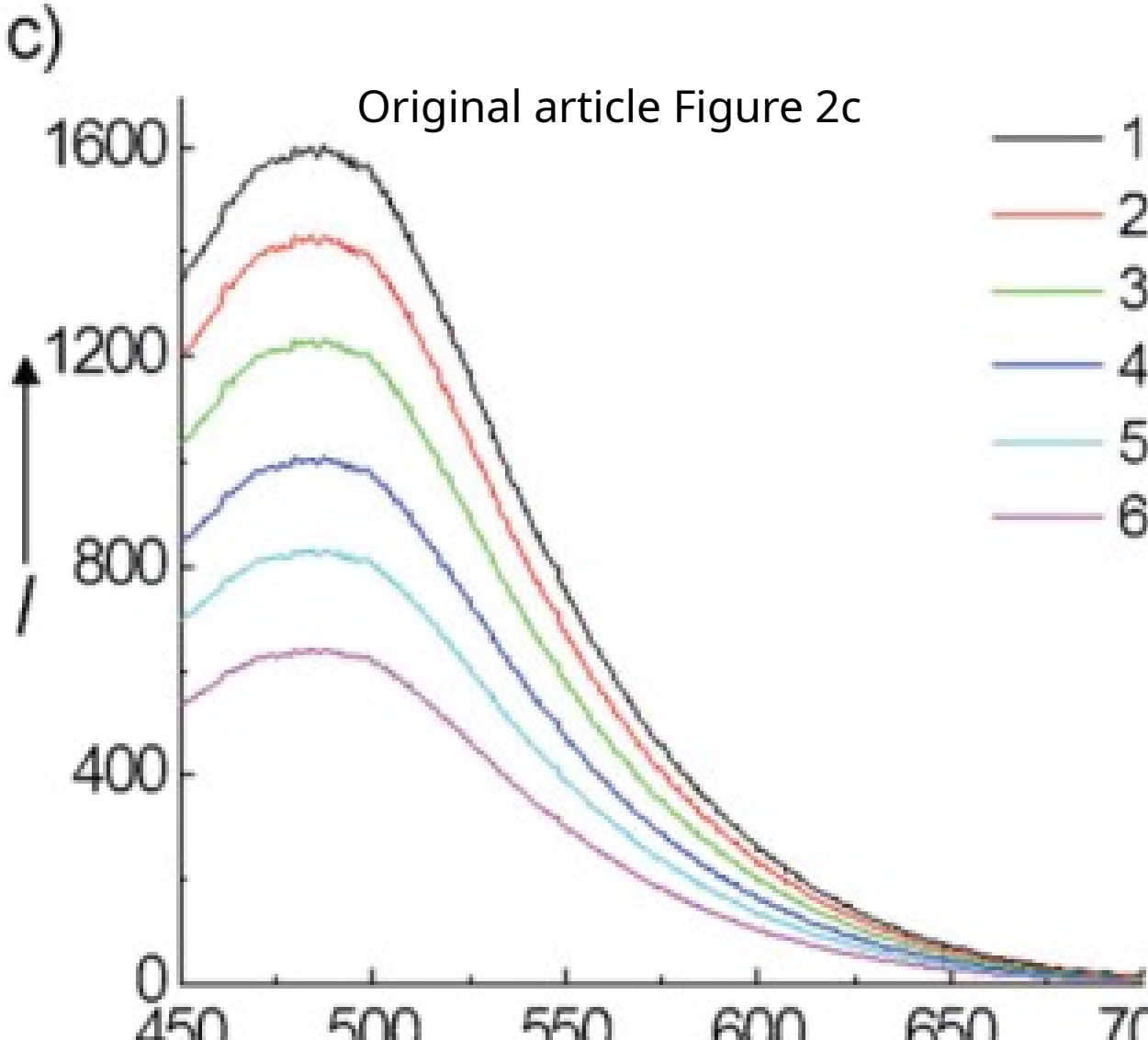
Réplication #1 : résultats

- ✓ Peut-on synthétiser ces nanosondes? √
- ✓ Détectent-elles les ions cuivres? X
- ✓ Détectent-elles les ions cuivres à l'intérieur des cellules?
- ✓ … dans un modèle biologique pertinent

Réplication #1 : résultats

- ✓ Peut-on synthétiser ces nanosondes? √
- ✓ Détectent-elles les ions cuivres? ✗
- ✓ Détectent-elles les ions cuivres à l'intérieur des cellules?
- ✓ … dans un modèle biologique pertinent

Original article Figure 2c



Réplication #1 : publication (à venir…)

- ✓ Peut-on synthétiser ces nanosondes? √
- ✓ Détectent-elles les ions cuivres? ✗
- ✓ Détectent-elles les ions cuivres à l'intérieur des cellules?
- ✓ … dans un modèle biologique pertinent

Aborted replication of…

+

Chemotion Repository

Réplication #2

Nano-Flares: Probes for Transfection and mRNA Detection in Living Cells

Dwight S. Seferos, David A. Giljohann, Haley D. Hill, Andrew E. Prigodich, and Chad A. Mirkin

View Author Information

Cite this: *J. Am. Chem. Soc.* 2007, 129, 50, 15477–15479

Publication Date: November 23, 2007

https://doi.org/10.1021/ja0776529

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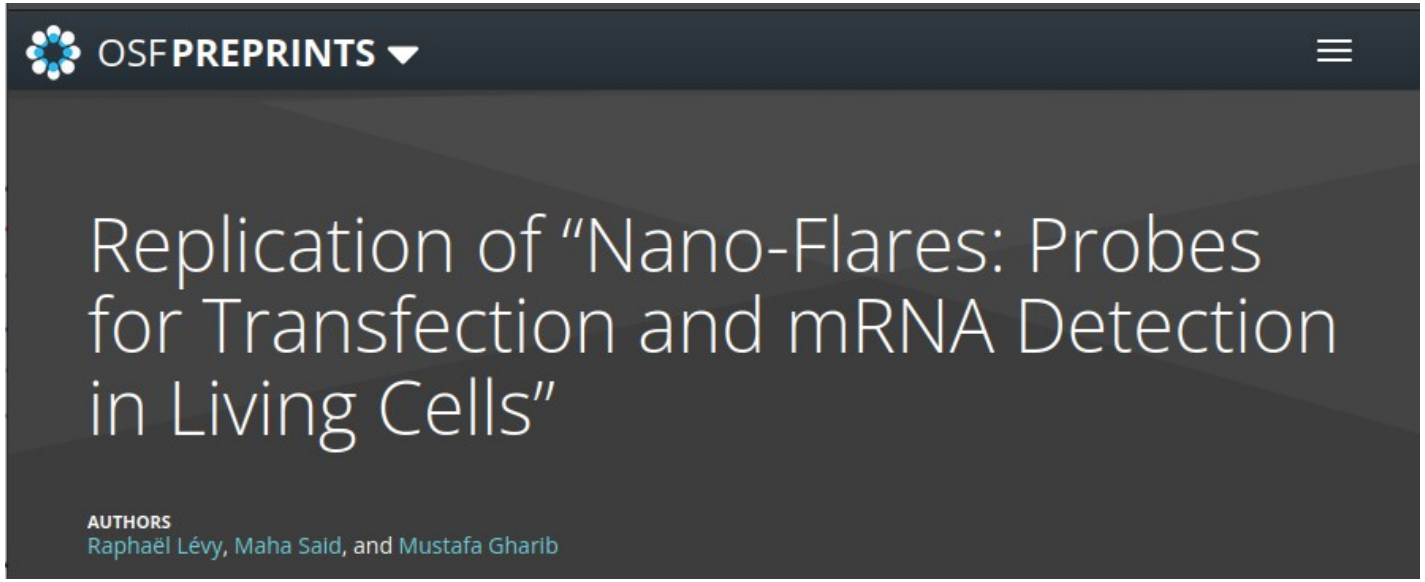
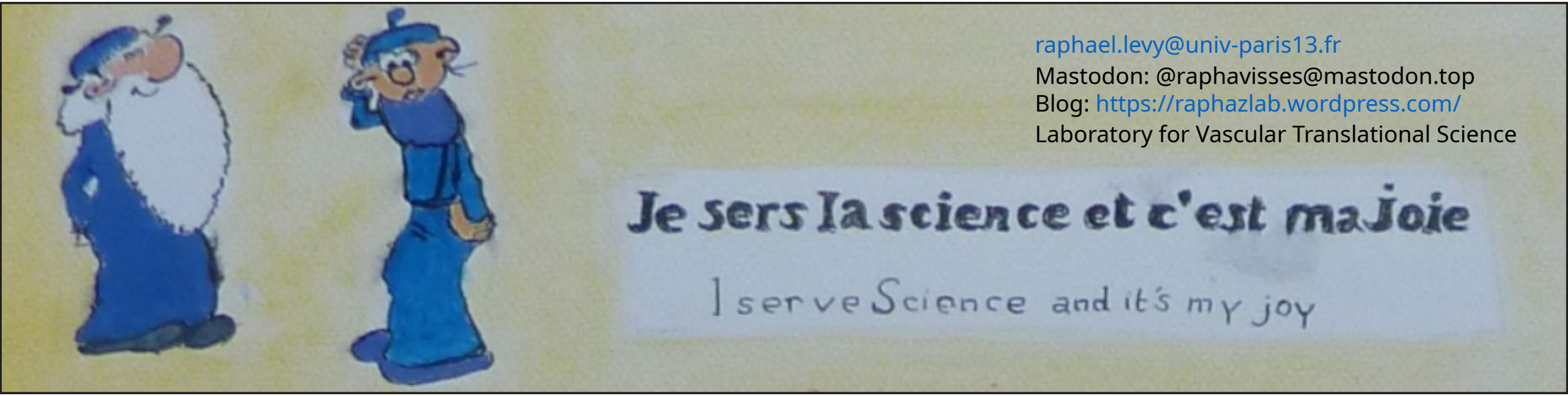


LVTS U1148

Grant agreement no. 951393

Répliquer pour éclaircir une controverse scientifique : quelques enseignements d'une expérience en cours...

04/04/2025, Lyon



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raphael.levy@univ-paris13.fr
Mastodon: @raphavisses@mastodon.top
Blog: https://raphazlab.wordpress.com/
Laboratory for Vascular Translational Science

IP, Aurasense LCC, Aurasense Therapeutics, Exicure, raising millions of dollars of public and private funds.

Particles for detecting intracellular targets

US20100129808A1
United States

Download PDF | Find Prior Art | Similar

Inventor: Chad A. Mirkin, Dwight Seferos, David A. Giljohann

Current Assignee : Northwestern University

Worldwide applications

2008 · EP CN AU CA WO KR MX JP US 2013 · US

Application US12/526,560 events

2007-02-09 • Priority to US90064807P

2008-02-11 • Application filed by Northwestern University

Department of Defense
Department of Health and Human Services

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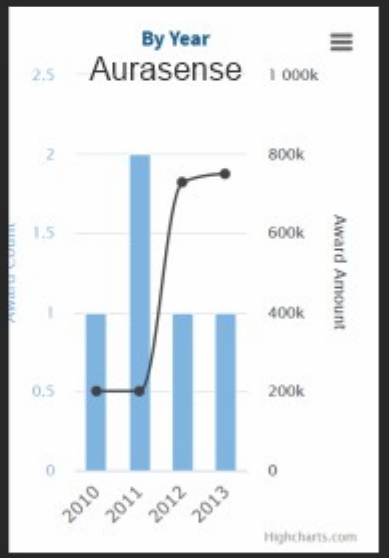

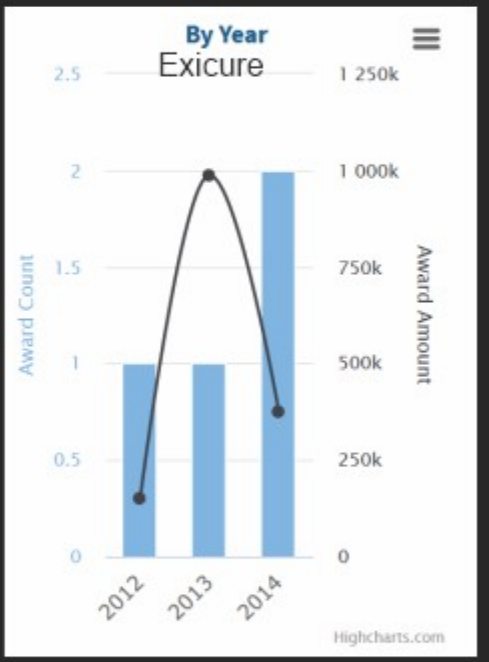

www.prnewswire.com › news-releases › aurasense-thera...

AuraSense Therapeutics Completes $13.6 Million Series C ...

17 Jun 2014 - PRNewswire/ -- **AuraSense** Therapeutics, a Chicago-based biopharmaceutical company commercializing spherical nucleic acid (SNA™) ...

www.americaninno.com › ChicagoInno

AuraSense Raises $18 Million Series C - AmericanInno

6 Feb 2015 - Biotech Startup **AuraSense**, Backed by Bill Gates and Google's Eric ... The company has raised more than $27 **million** since it launched in 2009 ...

www.fiercebiotech.com › biotech › exicure-bags-cash-a...

Exicure raises $11.2M in cash as psoriasis, I-O assets near ...

6 Nov 2017 - China's Luye Pharma led the $11.2 **million** financing with support from ... That work led to the creation of **AuraSense** Therapeutics, which in ...

www.genengnews.com › ... › Gene Therapy

Purdue Pharma, Exicure Launch Up-to-$790M+ SNA

12 Dec 2016 - Agreement gives **Purdue** Pharma options to develop **Exicure** AST-005, three additional targets for psoriasis and other ...

Biotech

Backed by Bill Gates, low-profile Exicure steps into spotlight with a $42M R&D gamble

Prizes. Lots of prizes.

Centenary Prize 2015 Winner

Professor Chad Mirkin
Northwestern University

Awarded for his development of spherical nucleic acids and new nanotechnology-based tools in biomedicine and materials science

About the Winner

Chad Mirkin is the Director of the International Institute for Nanotechnology and the George B Rathmann Professor of Chemistry, Chemical and Biological Engineering, Biomedical Engineering, Materials Science and Engineering, and Medicine at Northwestern University. He is a chemist and a world-renowned nanoscience expert, who is known for his discovery and development of spherical nucleic acids (SNAs) and SNA-based biodetection and therapeutic

Multimodal neuro-nanotechnology: Challenging the existing paradigm in glioblastoma therapy

PNAS Proceedings of the National Academy of Sciences of the United States of America

Sergej Kudruk, Connor M. Forsyth, Michelle Z. Dion, Jenny K. Hedlund Orbeck, Jingqin Luo, Robyn S. Klein, Albert H. Kim, Amy B. Heimberger, Chad A. Mirkin, Alexander H. Stegh, and Natalie Artzi -7 Authors Info & Affiliations

Edited by Catherine Murphy, University of Illinois at Urbana-Champaign, Urbana, IL; received September 20, 2023; accepted December 19, 2023

February 12, 2024 | 121 (8) e2306973121 | https://doi-org.proxy.insermbiblio.inist.fr/10.1073/pnas.2306973121

April 3, 2024 I submit a letter to the Editor in Chief of PNAS

May 3, 2024 Raphael, The statements you have been making are factually false and damaging. You will be hearing from my lawyer next week regarding the defamation and the serious legal consequences for it. Sincerely, Chad Mirkin

May 15, 2024 Dear Dr. Levy, We represent Chad Mirkin. Attached is our Cease and Desist Demand concerning false statements you recently disseminated disparaging Dr. Mirkin. Your attention to this matter is recommended. Sincerely, Phillip Zisook

June 17, 2024 My letter to the Editor in Chief of PNAS is rejected… “it does not meet PNAS's requirements for Letters to address a difference of scientific opinion”

Retraction Watch

Tracking retractions as a window into the scientific process

Exclusive: Kavli prize winner threatens to sue critic for defamation

July 16, 2024

PNAS corrects article by Kavli prize winner who threatened to sue critic

August 6, 2024

ROYAL SOCIETY OF CHEMISTRY

CHEMISTRY WORLD

CELEBRATING TWENTY YEARS

NEWS

Award-winning chemist threatens to sue critic

BY DALMEET SINGH CHAWLA | 14 AUGUST 2024

ER EUGENIE REICH LAW LLC

REPRESENTING WHISTLEBLOWERS

Science

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