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# Retraction notice to "In vitro and in vivo evaluation of degradation, toxicity, biodistribution, and clearance of silica nanoparticles as a function of size, porosity, density, and composition" [Journal of Controlled Release 311–312 (2019) Pages 1–15]

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This article has been retracted: please see Elsevier Policy on Article Withdrawal (https://www.elsevier.com/about/our-business/policies/article-withdrawal).

This article has been retracted at the request of the corresponding author.

Subsequent to the publication of the article Journal of Controlled Release 311–312 (2019) 1–15, in follow up studies in 2021, the corresponding author's lab members noticed significant discrepancies in reproducibility of some of the results reported in this manuscript. A detailed investigation in the lab was launched, and by retrieving the raw data available at the core facility pertaining to this manuscript, the following discrepancies were discovered that provide the basis for this retraction. These discrepancies have been reported to the University of Utah Research Integrity and Compliance Office by the corresponding author. The co-authors have been made aware of these discrepancies and of the decision of the corresponding author to retract.

The corresponding author believes that the subject matter of this article, detailed analysis of the degradation of silica nanoparticles as a function of their physicochemical properties in relevant biological media in vitro, and in vivo, is significant. For successful utility of these particles in drug delivery applications their detailed biological fate needs to be examined. The significant discrepancies and lack of reproducibility of the reported data however is very unfortunate and the author hopes that this does not cast a doubt on the need for more detailed examination of the biological fate of silica nanoparticles in the future for their successful application in controlled release.

In Vitro Data (Fig. 3)

- Actual dissolution reaction volume was 2.5 mL (confirmed by reviewing the lab notebook of the first author during the investigation) vs 3.5 mL reported in the manuscript.
- Sample volume was not used in the calculation to convert Inductively Coupled Plasma Mass Spectrometry (ICPMS) data to mg of silicon retrieved which is needed to calculate % degradation (needed to multiply data by 0.1 due to 0.1 mL sample volumes).
- Our investigation revealed a 20% “matrix effect with fluids” was communicated by ICPMS core facility person to the first author that was not addressed in the manuscript.
- All data is different when calculating % degradation, not just by a factor of 10 due to not calculating for the 100 ml sample volume.
- Raw data during our investigation after publication, obtained from ICPMS facility, and not noted in the lab notebook, for day 28 of simulated lysosomal fluid (SLF) reveals $n = 1$ and no data points for Stober100. In the manuscript however, error bars are shown for all particles at this time point and for the data for Stober100.

Intracellular Degradation (Fig. 5)

- Extremely high background with control causing negative % degradation for Disulfide Meso 100 from retrieved ICPMS data from core facility after publication, but manuscript shows ~1.25% degradation.
- All other calculated % degradation based on retrieved data from ICPMS facility during the investigation after publication, do not match reported data in the paper.
- Paper claims $n = 6$, but raw data received from ICPMS facility during investigation (after publication) is clearly $n = 3$.

In Vivo Degradation (Fig. 6)

ICPMS data retrieved during the investigation after publication for control mice showed extremely high background, and probably were not used in the calculations reported in this manuscript because it would have led to negative silicon contents for a few samples.

Urine ICPMS data from the core facility was not available during investigation after publication, and cannot be retrieved from the first author’s lab notebook. Hence its validity cannot be ascertained.

There may be other discrepancies in the manuscript that have gone unnoticed. However, the Editor-in-Chief agrees that the above is significant enough to warrant retraction of the manuscript.