

## CORRECTION

[View Article Online](#)  
[View Journal](#) | [View Issue](#)



Cite this: *Mater. Adv.*, 2022, 3, 6069

DOI: 10.1039/d2ma90066a

rsc.li/materials-advances

## Correction: Green and effective synthesis of gold nanoparticles as an injectable fiducial marker for real-time image gated proton therapy

Haoran Liu,<sup>a</sup> Naoki Miyamoto,<sup>bc</sup> Mai Thanh Nguyen,<sup>a</sup> Hiroki Shirato<sup>cd</sup> and Tetsu Yonezawa<sup>\*a</sup>

Correction for 'Green and effective synthesis of gold nanoparticles as an injectable fiducial marker for real-time image gated proton therapy' by Haoran Liu et al., *Mater. Adv.*, 2022, <https://doi.org/10.1039/d2ma00172a>.

The authors regret that there was an error in Section 2.5. During the preparation of samples for X-ray visualization tests,  $\text{Ca}^{2+}$  solution (1.8 mM) was added to facilitate the gelation of alg-Au NPs. The corrected Section 2.5 is given below:

In order to evaluate the X-ray visualization of samples, the X-ray visualization tests were conducted at the Central Institute of Isotope Science, Hokkaido University. Fig. S3 (ESI<sup>†</sup>) shows the schematic diagram of the X-ray visualization test. The samples were injected into jelly and 1 mL  $\text{CaCl}_2$  solution (1.8 mM, physiological concentration) was reinjected for the gelation of each sample (alg-Au NPs). The gelated samples were taken out and irradiated with X-rays generated from an X-ray tube (UD-150-B40, Shimadzu). Gold ball markers (99.99% Au) with diameters of 1.5 and 2.0 mm were chosen as the control. The size and shape of the marker were determined to be suitable for pattern recognition during marker tracking.<sup>54</sup> The X-rays passed through the samples would be detected by the Flat Panel Detector (PaxScan 3030, Varian Medical System). Besides, acrylic resins that have an X-ray attenuation property close to the human body were placed between the samples and the detector,<sup>55</sup> and the visualization ability was evaluated by the pattern matching scores quantified by the detector. The pattern matching scores were calculated according to a previous study.<sup>56</sup>

The authors confirm that the missing information does not affect the scientific conclusions drawn from the work.

The Royal Society of Chemistry apologises for these errors and any consequent inconvenience to authors and readers.

<sup>a</sup> Division of Materials Science and Engineering, Faculty of Engineering, Hokkaido University, Kita 13 Nishi 8, Kita-ku, Sapporo, Hokkaido 060-8628, Japan.  
E-mail: [tetsu@eng.hokudai.ac.jp](mailto:tetsu@eng.hokudai.ac.jp)

<sup>b</sup> Division of Quantum Science and Engineering, Faculty of Engineering, Hokkaido University, Kita 13 Nishi 8, Kita-ku, Sapporo, Hokkaido 060-8628, Japan

<sup>c</sup> Department of Medical Physics, Hokkaido University Hospital, Kita 14 Nishi 5, Kita-ku, Sapporo, Hokkaido 060-8648, Japan

<sup>d</sup> Global Station of Quantum Medical Science and Engineering, Global Institution for Collaborative Research and Education, Hokkaido University, Kita 15 Nishi 7, Kita-ku, Sapporo, Hokkaido 060-8638, Japan

