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Preliminary *in vivo* magnetofection data using magnetic calcium phosphate nanoparticles immobilizing DNA and iron oxide nanocrystals

Quazi T.H. Shubhra [a,*], Ayako Oyane [a,*], Maki Nakamura [a], Sandra Puentes [b], Aiki Marushima [c], Hideo Tsurushima [a,c]

[a] *Nanomaterials Research Institute, National Institute of Advanced Industrial Science and Technology (AIST), Central 5, 1-1-1 Higashi, Tsukuba 305–8565, Japan*
[b] *Department of Intelligent Interaction Technologies, Faculty of Engineering, Information and Systems, University of Tsukuba, 1-1-1 Tennodai, Tsukuba, Ibaraki 305–8575, Japan*
[c] *Department of Neurosurgery, Faculty of Medicine, University of Tsukuba, 1-1-1 Tennodai, Tsukuba, Ibaraki 305–8575, Japan*

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ABSTRACT

The data reported herein are in association with our research article entitled "Rapid one-pot fabrication of magnetic calcium phosphate nanoparticles immobilizing DNA and iron oxide nanocrystals using injection solutions for magnetofection and magnetic targeting" (Shubhra et al. 2017) [1]. This article reports morphological and gene delivery (*in vitro* and preliminary *in vivo*) data of those calcium phosphate (CaP) naonparticles (NPs) with various iron oxide (IO) contents, named as CaP-Fe(1), CaP-Fe(2), CaP-Fe(3), CaP-Fe(4), and CaP-Fe(5), which were prepared *via* coprecipitation in supersaturated CaP solutions with nominal Fe concentrations 6.97, 13.94, 27.87, 55.74, and 139.35 μg/mL, respectively. Morphological data of four different NPs: CaP-Fe(1), CaP-Fe(2), CaP-Fe(4), and CaP-Fe(5) are shown here. Data of the luciferase reporter gene expression assay show the effects of the coprecipitation time and the dosage of the CaP-Fe(3) NPs on gene expression levels of CHO-K1 cells transfected by the NPs without external magnetic field. It is demonstrated using digital and microscopic images that the CaP-

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* Corresponding authors.
E-mail addresses: shubhro.du@gmail.com (Q.T.H. Shubhra), a-oyane@aist.go.jp (A. Oyane).

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Fe(3) NPs localize near the periphery of the external magnet that was placed under the cell culture plate. Using the CaP-Fe(3) NPs, animal experiments were conducted to obtain preliminary *in vivo* magnetofection data.

Specifications table

Subject area	*Chemistry*
More specific subject area	*Materials Science, Nanotechnology, Gene Delivery*
Type of data	*Image, Graph, Figure*
How data was acquired	*Scanning electron microscope (SEM; S-4800, Hitachi-High Technologies, Inc.), optical microscope (IX71, Olympus Co.), digital camera, and luminometer (Gene Light 55, Microtec Co., Ltd.)*
Data format	*Raw and calculated data*
Experimental factors	*For SEM observation, samples were pretreated. NPs were washed, dried under vacuum and coated with carbon.*
Experimental features	*Nanoparticles (NPs) were prepared by a coprecipitation process [1–3]; for SEM observation, NPs were pretreated as mentioned above; for in vitro and in vivo assays, they were used after the coprecipitation process without washing.*
Data source location	*AIST, Tsukuba, 305–8565, Japan*
Data accessibility	*Data are available within this article*

Value of the data

- Preliminary *in vivo* magnetofection data using the calcium phosphate (CaP) nanoparticles (NPs) immobilizing DNA and iron oxide (IO) nanocrystals are presented, proving the worth of further *in vitro* and *in vivo* studies on these NPs.
- Detailed animal experimental method for *in vivo* magnetofection is described that will be helpful to design animal experiments for magnetic NPs.
- Magnetic attraction and the resulting aggregation of the NPs around the periphery of the external magnet (placed under the well) are visualized, that accounts for the unsuccessful magnetofection (magnetically enhanced gene delivery) in the standard 2D plate culture system.
- The luciferase assay data present the effects of coprecipitation time for NP preparation and dosage of the NPs on gene expression level of cells transfected by the NPs, which are useful for optimization of a similar CaP-based gene delivery system.

1. Data

Fig. 1 shows scanning electron microscopy (SEM) images of four different DNA-IO-CaP NPs with various IO contents (CaP-Fe(1), CaP-Fe(2), CaP-Fe(4), and CaP-Fe(5)) [1].

Fig. 2 shows the effect of the coprecipitation time in the supersaturated CaP solution (the solution used for CaP-Fe(3)), whereas Fig. 3 shows that of the dosage of the CaP-Fe(3) NPs on the luciferase activity of the CHO-K1 cells transfected by NPs without external magnetic field.

Fig. 4 shows the DNA-IO-CaP (CaP-Fe(3) NPs; brown due to the immobilized IO nanocrystals) gathering and aggregating around the periphery of the external magnet that was placed under the well of a 6-well plate seeded with CHO-K1 cells.