

# Human induced pluripotent stem cell on DAS nanocrystalline graphene for feeder-free culture system

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## Abstract

The maintenance of undifferentiated human pluripotent stem cells (hPSC) under xeno-free condition requires the use of human feeder cells or extracellular matrix (ECM) coating. However, human-derived sources may cause human pathogen contamination by viral or non-viral agents to the patients. Here we demonstrate feeder-free and xeno-free culture system for hPSC expansion using diffusion assisted synthesis-grown nanocrystalline graphene (DAS-NG), a synthetic non-biological nanomaterial which completely rule out the concern of human pathogen contamination. DAS-NG exhibited advanced biocompatibilities including surface nanoroughness, oxygen containing functional groups and hydrophilicity. hPSC cultured on DAS-NG could maintain pluripotency in vitro and in vivo, and especially cell adhesion-related gene expression profile was comparable to those of cultured on feeders, while hPSC cultured without DAS-NG differentiated spontaneously with high expression of somatic cell enriched adhesion genes. This feeder-free and xeno-free culture method using DAS-NG will facilitate the generation of clinical-grade hPSC.

## References

[1] Hyunah Lee,\* , Donggyu Nam,\* , Jae-Kyung Choi, Marcos J. Araúzo-Bravo, Soon-Yong Kwon, Holm Zaehres, Taehee Lee, Chan Young Park, Hyun-Wook Kang, Hans R. Schöler & Jeong Beom Kim, SCIENTIFIC REPORTS, (2016 Feb) **5**;6:20708. doi: 10.1038/srep20708.

## Figures

