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Free defined culture by a polycistronic lentiviral vector

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The iPSc have great potentials for regenerative medicine, fundamental and translational research. However, serious concerns have been restricted to use the iPSc in the clinics due to the conventional viral-mediated reprogramming strategy can lead to multiple transgene integrations into the genome. Second, exposure of iPSc to animal products from feeder layers and serum-containing media may increase the risk of xeno contamination. Hence, the full elimination of viral integrations, the animal-sourced ingredients and the use of serum free media are necessary. In this study, a polycistronic lentiviral vector encoding Yamanaka factors was used to reprogram mouse fibroblasts into iPSc in feeder- and xeno free culture environment. The generated iPSc exhibited morphology and self-renewal properties of ES cells, expression of ES cells specific pluripotent markers and potentials to differentiate into the 3-major distinct specialized germ layers in vitro. The iPSc were also shown to have the potential to differentiate into neural precursor and neurons in culture with greater than 95% of nestin, Pax6 and βIII-tubulin expression. Although the safety profile of the cells was not analyzed, this body of work describes the successful generation of iPSc from mouse cells without the requirement of serum and a feeder layer.

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