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Differentiation of human pluripotent stem cells to primordial germ cells *in vitro*

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Fundamental processes in an embryogenesis of human primordial germ cells (hPGCs) are poorly scrutinized and weakly understood, due to inaccessibility of early human embryos and lack of proper *in vitro* models for studying initial stages of germ cell development. Based on this, we have succeeded to develop a model of hPGCs differentiation from human embryonic stem cells (hESCs) and human induced pluripotent stem cells (hiPSCs) in an adhesive cell culture and embryonic bodies (EBs). We have shown that, in an adhesive culture condition it was important to adjust proper cell colony size and colonies dispersion. Such approach gave more differentiating early hPGCs and provided a field them to migrate and occupy large space for building up large cytoplasm to nucleus ratio. On the other hand, in 3D conditions (EBs) the small cell number per embryonic body increases the amount of differentiated early PGCs. Based on our differentiation protocol, firstly, using Activin A hESCs and hiPSCs were pushed toward early mesodermal fate, and then robustly followed with BMP4 induction to obtain human early hPGCs, bearing cell-surface marker SSEA1, by which we have purified hPGCs with fluorescent cell sorter from heterogeneous differentiated cell population. After sorting SSEA1 positive cells remained viable and proliferated for several passages. This *in vitro* model of differentiation of human pluripotent stem cells to PGCs will provide wide perspectives to elucidate molecular and epigenetic mechanisms regulating specification and differentiation of hPGCs at early stages of development. Moreover, this method allows us modeling infertility associated diseases *in vitro*.

Biography

Abdyyev V is currently a PhD student at Lomonosov Moscow State University, Russia.

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