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LETTER TO EDITOR

Biotechnological Potential of Chicken Stem Cells

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SUMMARY

Stem cell research is well known in clinics to treat diseases as huge research has resulted in successful isolation, maintenance and manipulation of stem cells *in vitro*. Much information regarding molecular biology of number of cells/stem cells is known and have shown a promising potential in biotechnology. Biotechnologist have used novel approaches in last decade for the production of human compatible recombinant proteins and recently, stem cells have been considered as potential biotechnological agents. Focus should be done to engineer cells for specific trait production such as germ cells. It also has been shown that maintenance of germ cells is not an easy task but successful trans-differentiation of other multipotent stem cells such as mesenchymal stem cells toward germ cell linages have opened the opportunities to engineer MSC and then trans-differentiate towards germ like-cells which can be used to develop transgenic animals. Focus should be done on cell based biotechnological productions to revolutionize health biotechnology.

Keywords: chicken stem cell, biotechnological applications, protein production

Dear Editor,

Stem cells, such as Spermatogonial stem cells(SSCs), are responsible to fulfil the proliferative demand of the testis so that millions of sperms are daily produced [1]. These cells have been considered as pluripotent stem cells because they are capable of differentiating into almost all cell types in the body [2]. Their pluripotent potential attracted interest of a number of researchers focusing the optimal conditions for their derivation and *in vitro* maintenance. Breakthroughs in stem cell research have shown that stem cells can be transdifferentiated from one type to another. Mesenchymal stem cells (MSCs) are well characterized stem cells having a multipotent differentiation potential [3-6]. In several reports, mesenchymal stem cells have been adapted to express molecular markers of primordial germ cells (PGCs), spermatogonial stem cells (SSCs) and spermatogonia [7-9]. Such potentials of mesenchymal stem cells made them good candidates for the generation of germ cell lineages with possible applications in germ cell related disorders like male infertility, transgenic technologies in industrial animals like poultries and survival of rare or almost extinct species. Biotechnology has witnessed significant breakthroughs in recent decades, culminating in the development of

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recombinant products from transgenic organisms. Different strategies to produce transgenic chickens have been applied, including direct modification of embryos with DNA or viral vectors, cell based protocols, and genetic modifications in blastodermal cells (BDCs), embryonic stem cells (ESCs), primordial germ cells (PGCs) or spermatogonial stem cells (SSCs) [10-13]. Some reports have also shown positive results in production of transgenic chickens using retroviral based gene transfer techniques [14-17]. SSCs are pluripotent cells which, have recently been considered as a valuable tool for transgenesis [13] and the major challenge that is being faced while working with SSCs is difficulties in SSCs isolation and manipulation [18, 19]. Alternative strategies for obtaining SSCs have also been introduced such as differentiation of MSCs to SSC-like cells [7, 9, 20]. Recently, we successfully could isolate and maintain SSCs in laboratory conditions and could determine their molecular signatures and their differentiation potential [21, 22]. Understanding the stem cell differentiation mechanisms and their maintenance *in vitro* will help to the scientific community to produce transgenic animals by manipulating stem cells easily with a great biotechnology potential.

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Conflict of Interest:

We declared that we don't have any kind of conflict of interest regarding this manuscript.

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