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Stem Cell Reviews and Reports: Induced Pluripotent Stem Cells, Embryonic Stem Cells and Development Section

Henning Ulrich [1]

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Embryonic stem (ES) cells are derived from the inner cell mass of developing blastocysts. These cells can be expanded in vitro maintaining their undifferentiated state. They are capable of differentiation into every cell type of the adult body, representing the three germ layers. Induced pluripotent stem (iPS) cells are developed by reprogramming adult somatic cells, originating cells with potentials of proliferation and differentiation similar to those of ES cells. ES and iPS cells form embryoid bodies in vitro, then spontaneously give rise to different tissue types, closely resembling conditions of embryonic development. As simplified models for early development, pluripotent cells have gained importance in drug and toxicity screening and observing the impact of mutations and pathological processes in development. For ethical reasons, and since sources for obtaining human ES cells are scarce, iPS cells have been principally used for modeling mechanisms of differentiation and diseases with origin in development, including autism and other brain disorders. Reprogramming of primary cancer cell lines into pluripotency will help to understand the character of cancer stem cells and the initiation and progression of human tumor and to develop novel treatment options. Gene editing is used for manipulating target protein function involved in disease development. The possibility of directed differentiation of pluripotent stem cells has revealed promising applications in cell replacement therapy. In this regard, much effort is put into effective and secure transplantation of iPS cells for tissue repair.

The section on induced pluripotent stem cells, embryonic stem cells and development provides a forum for the exchange of ideas and results from areas pertaining to the biology and applications of stem cells and development with particular attention to:

- protocols and mechanisms of pluripotent stem cell differentiation into distinct cellular phenotypes and embryonic development;
- iPS cells for developmental disease modeling;
- iPS cells – advances towards regenerative medicine;
- clinical trials in a dish – safety and efficacy tests with human tissue
- iPS cells for modeling tumor progression

We are excited to hear about your opinion on the reorganized structure of *SCRR* and look forward to receiving your high-quality contributions to the new section in our journal.

✉ Henning Ulrich
henning@iq.usp.br

[1] Department of Biochemistry, Instiute of Chemistry, University of São Paulo, Av. Professor Lineu Prestes 748, São Paulo 05508-000, SP, Brazil