Induced pluripotent stem cells (iPSCs) in the gastroenterology and hepatology: from basic research to clinical applications

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Aims & Scope:

The discovery of induced pluripotent stem cells (iPSCs) and mature cell reprogramming, for which John Gurdon and Shinya Yamanaka were jointly awarded 2012 Nobel Prize in Physiology and Medicine, has opened a novel potential avenue for developing more specific and potent approaches to combat various gastrointestinal and liver diseases including cancers.

Cellular reprogramming is a powerful technology by that normal somatic cells can be induced into pluripotent stem cells (iPSCs) through resetting the epigenetic makeups. On the other hand, de-differentiation of cancer cells back to approximate normal phenotype has also been attempted and proved possible. For examples, forced expression of hepatocyte nuclear factor-4alpha (HNF4α), a key molecule for the regulation of hepatocyte phenotype, was able to revert aggressive liver cancer toward a less invasive phenotype, possibly through inhibition of the well-known four transcription factors (Oct3/4, Sox2, Klf4, and c-Myc). These inducing factors have also been suggested as therapeutic targets. Retroviral-mediated introduction of iPSC genes into gastrointestinal cancer cells led to slow proliferation, increased sensitivity to differentiation-inducing treatment (RA, and CD3) and chemotherapy (5-FU), and reduced tumorigenesis in mice. Apparently, iPSC technology and induced cell reprogramming hold a great potential in the management of advanced gastrointestinal and liver cancers.

In this special issue of CURRENT STEM CELL RESEARCH & THERAPY, the following topics will be discussed:

1. Advances in the techniques of cellular reprogramming
2. Potential applications of iPSCs in the modeling of gastrointestinal disorders
3. Potential applications of iPSCs in hepatology research and clinical practice
4. Current status on the epigenetic regulation of iPSCs in cell fate specification and maturation.
5. Impact of immune response on the use of iPSCs in disease modeling

(may have more topics)

Key words: Pluripotent stem cells; liver diseases, gastrointestinal disorders, stem cell biology, clinical application

Schedule:

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