

## Editorial

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### Human iPS Cells: Science and Ethics

Induced pluripotent stem (iPS) cells are accessible, multi functional and a tool for many tasks. They have enormous promise for basic research and the development of personalized medicine. In the short-term they can be used as models for reprogramming, pluripotency, development and disease. In the long-term they have the potential to be used as novel and cost-effective substrates for drug-discovery, genomic health analyses, and autologous cell therapy. Compared to embryonic stem (ES) cells, iPS cells are easier to derive not least because their starting material is readily available and involves fewer ethical problems [1].

Despite their promise and attractiveness for both research and clinical medicine, there are important caveats to using iPS cells. First, current methods of derivation and differentiation are inefficient, capricious, and/or fail clinical-compliance. Second, ES cells remain the “gold standard” pluripotent stem cell. Whether or not iPS cells are equivalent or better is the focus of much intensive study and debate, requiring systematic comparison. Third, despite being hailed as an ethical alternative to ES cells, iPS cells do not solve the ethical dilemma entirely, with concerns about procurement of tissue for stem cell derivation and their use in basic and clinical research.

Despite the challenges and excitement surrounding iPS cell technology, the field is rapidly advancing beyond the initial mania towards a more sober and realistic appreciation of the benefits and limitations. Proof-of-concept is now being followed by refinement of strategies for reprogramming, studies of genomic and epigenetic integrity, understanding cellular phenotypes of cell progeny and informed philosophical debate culminating in greater insight, validation and improved application.

This special issue includes 3 reviews canvassing the science and ethics of human iPS cells. The first review by Zhang *et al.* describes the state-of-the-art of human somatic cell reprogramming, encompassing traditional integrative lenti- and retroviral-based methods and more contemporary non-viral-vector-based approaches to clinically-compliant iPS cell derivation [2]. The second review by NG *et al.* explores the question of whether iPS and ES cells are biologically equivalent [3]. Finally, Watt and Kobayashi consider the bioethics of human iPS cells [4]. They conclude that iPS cells will temper but not end the ethical debate.

I trust you will enjoy reading these papers as I did. I offer my gratitude to the reviewers for contributing to this special issue.

### REFERENCES

- [1] Nagy A, Nagy K. The mysteries of induced pluripotency: where will they lead? *Nat Methods* 2010; 7(1): 22-4.
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