Leading experts offer advice on generating human induced pluripotent stem cell banks

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The ability to make induced pluripotent stem cells (iPSCs) from mature cells in the body holds great potential for improved drug screening, disease modeling, and medical treatments for numerous conditions. Establishing well-characterized panels of iPSC lines that reflect the diversity of the human population and include samples from patients with a wide range of diseases will be key to tapping into the potential of iPSCs. In the October 3 issue of the Cell Press journal *Cell Stem Cell*, leading experts in the field publish several opinion pieces on emerging issues related to generating such iPSC banks, and they provide practical recommendations and creative solutions to address challenges associated with such large-scale efforts.

Dr. Glyn Stacey of the National Institute for Biological Standards and Control, located in the United Kingdom, and his colleagues recommend approaches for utilizing the knowledge of existing, well-established human embryonic stem cell banks and their experience in standardization to promote quality control in iPSC resource centers. "Not all laboratories will have the same level of expertise in cell culture or familiarity with vital quality control procedures. These will be essential to avoid the circulation of iPSC lines that have become contaminated or switched with other cell lines," says Dr. Stacey. "Such events can lead to fundamental flaws in the published literature and a waste of precious research resources."

In another Forum, Dr. Mahendra Rao, who is the director of the intramural Center for Regenerative Medicine at the National Institutes

of Health, reiterates that making iPSC lines and developing the requisite controls and tests is time consuming, expensive, and generally beyond the expertise of any single laboratory. "Fulfilling the expectations for iPSCs and their use will only be possible if we develop a new cost-effective way to share and distribute cell lines. Crowd sourcing is one solution," he says. For the model to be successful, it must be self-sustaining. "Technology holders must buy in to the idea that it will ultimately benefit them as well as the users. It would also be important to ensure that expertise existed in the various repositories to store, characterize, test, and track the cells and their derivatives and that the repositories could do so at costs that were reasonable for the end user," writes Dr. Rao.

Finally, Dr. Ian Wilmut and his colleagues present a piece that addresses important considerations for immune matching between iPSC donors and recipients. They note that while it is possible that iPSC lines could be derived on an individual basis—so that an individual patient would receive his or her own cells as a treatment—it seems unlikely that this method would be used as a source for large numbers of patients in the near future due to time and cost restraints. A more practical solution is to build a bank of stem cell lines from a small pool of individuals that match a majority of the patient population and could be safely transplanted without immune rejection. "Calculations suggest that cells from approximately 150 selected people would provide a useful immunological match for the majority of people," explains Dr. Wilmut. "We propose that an international network of stem cell banks working with common procedures and standards should be established now in order to provide the broadest range of immunological types. This would be a critical step in ensuring widespread availability of high quality cell therapies in the future."

More information: *Cell Stem Cell*, Turner et al.: "Towards The Development of a Global Induced Pluripotent Stem Cell Library."

Cell Stem Cell, Rao et al.: "iPSC Crowdsourcing: A Model for Obtaining Large Panels of Stem Cell Lines for Screening."
Cell Stem Cell, Stacey et al.: "Banking Human Induced Pluripotent Stem Cells: Lessons Learned from Embryonic Stem Cells?"

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