

Translational value of stem cell science to predictive, preventative, personalized medicine

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Abstract

The stem cell technology landscape is massive, and only accelerating in growth. Valued well in the billions, therapies as much as diagnostic tools are expected to emerge from this sector into clinical practice in staggering numbers over the next few decades. Notably, stem cell technologies hold immense promise to the key themes of PPPM (predictive, preventative, personalized medicine).

While perhaps the most ambitious goal of stem cell manufacturing remains regenerative medicine, for example via on-demand tissue generation, there is actually incredible nuance to the field. Manufacturing practices, philosophies of scale, and basic stem cell science are all simultaneously developing. Meanwhile, new (and possibly even more exciting) opportunities to translational medicine continue to emerge, as with patient-specific, stem cell-derived tissues.

In this discussion, I will present select translational medicine strategies to which I have contributed over the past few years, building from non-biologic drug vector design to more recent work involving both mesenchymal stromal cells and induced pluripotent stem cells. I will also present a few industry examples, in order to contextualize this work within key priorities, and represent future exciting questions. My aim is to cover key benefits and limitations of (i) our understanding of cell identity, (ii) methods of stem cell culture and harvesting therapeutic material, and (iii) potential for next-generation diagnostics.

About the presenter

Thomas Kuncewicz has been working as a freelance biomedical researcher for 8–9 years. He began his undergraduate studies at Brandeis University in Waltham, Massachusetts, before taking leave to join Dr. Jeffrey Karp's laboratory (www.karplab.net) in the Harvard-MIT Division of Health Sciences and Technology, in a full-time position. There, he advanced both industry and academic projects involving mesenchymal stromal cells. For the past 2 years, he has been employed as an Applications Scientist with Thrive Bioscience, a company creating automated cell culture tools in Wakefield, MA. There he has led investigations into induced pluripotent stem cells and mesenchymal stromal cells.