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**Abstract: Stem cell models – hypes and hopes in their potential as replacement for animal testing.**

Animal models of diseases have been used extensively to study the disease process as well as to test therapeutic interventions. However, in many cases animal models do not provide a system, which mimic the human disease completely. Moreover, it is important to reduce the use of animals in medical research and use equally robust *in vitro* model systems. Stem cell research has made significant progress over the last decade, especially in the light of the discovery of induced pluripotent stem cells (Nobel Prize winner in Medicine, 2012, Prof. Shinya Yamanaka). We are now capable of isolating, expanding and differentiating stem cells to tissue specific cell types, like neurons, heart cells and liver cells. Combined with extensive developments in the fields of tissue engineering and various “omics” approaches, it is tempting to conclude that using stem cell based models could be the way to bypass the use of animal models. Indeed human stem cell derived *in vitro* models have some potentials, as it is possible to generating three-dimensional model systems mimicking even whole organ function and even generate disease specific models reflecting the diseased cellular phenotype. Furthermore, cultured cells can be produced relatively rapidly and in large quantities, permitting the development of large-scale genetic and chemical screens for phenotypic modifiers. However, overall, stem cell based and animal disease models have complementary strengths, and both should be utilized for the study of disease mechanisms. Therefore, both hopes and hypes exists that stem cells can replace the use of animal models in medical research and development.