Stem Cells & Genomics: From Precision Medicine to Clinical Trials in Dish

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Human induced pluripotent stem cell (iPSC) platforms are valuable for biomedical and pharmaceutical research by providing tissue-specific human cells that retain patients' genetic integrity and display disease phenotypes in a dish. Combining iPSC phenotyping platforms with genomic and screening technologies will pave new directions for precision medicine, including genetic prediction, visualization, and treatment of heart disease. Given their capacity to recapitulate disease- and mutation-level phenotypes, the application of iPSC-derived cells in genomics enables direct differentiation of pathogenic mutations from background genetic noise, identification of novel variants, genotype- and phenotype-guided risk stratification, and patient-specific drug responses.