

User-friendly predictive molecular diagnostic assays for quality control of stem cell derivatives for transplantation and drug discovery

Grant Award Details

User-friendly predictive molecular diagnostic assays for quality control of stem cell derivatives for transplantation and drug discovery

Grant Type: Tools and Technologies III

Grant Number: RT3-07655

Project Objective: We will address these needs for stem cell translation by developing an RNAseq PluriTest2 version that incorporates measures of pluripotency, genomic stability, and safety of stem cells and derivatives. In addition, we will develop several "NeuroTests" for clinical applications, and PluriTest2 HTS for high throughput screening.

Investigator:

Name:	Jeanne Loring
Institution:	Scripps Research Institute
Type:	PI

Name:	Franz-Josef Mueller
Institution:	Zentrum für Integrative Psychiatrie ZIP
Type:	Partner-PI

Disease Focus: Neurological Disorders

Collaborative Funder: Germany

Human Stem Cell Use: Embryonic Stem Cell, iPS Cell

Award Value: \$1,728,390

Status: Closed

Progress Reports

Reporting Period: Year 1

View Report

Reporting Period: Year 3/NCE

View Report

Grant Application Details

Application Title: User-friendly predictive molecular diagnostic assays for quality control of stem cell derivatives for transplantation and drug discovery

Public Abstract: Three years ago, with help from CIRM funding, we developed an assay. This is a genomics-base diagnostic assay, similar to those now used for diagnosing cancers; but in our case, it is designed to analyze human ES and iPS cells. The assay is very simple to use; researchers use microarrays to profile the genes that are active in their cells. They upload the microarray data to the website, and in a few minutes they find out whether or not their cells are pluripotent. Our assay is replacing the old method for proving pluripotency, which involves producing tumors in animals. Our assay has been extremely popular, with 9,386 samples analyzed by 581 research groups in 29 countries so far. In this proposal, we plan to take the same concept and apply it to translational stem cell applications. Our new assay will allow researchers to easily detect DNA damage in their stem cells, and will enable the detection of undifferentiated or other abnormal cells (which potentially could form a tumor) in populations used for cell replacement therapy. We are also designing specific assays for quality control of neuronal cells to be transplanted to Parkinson's disease patients and for other neurological therapies. Finally, with our European partners, we will develop an assay for ensuring reliability of drug screening assays using stem cells. Our tools will greatly simplify translation of hESCs and iPSCs to the clinic.

Statement of Benefit to California: California is at the leading edge of development of stem cell therapies to treat previously untreatable diseases. It is critical at this important stage, when treatments are being transferred from the lab to the clinic, that the cells used for therapy are carefully produced and qualified. Our project combines two of California's best scientific assets: genomics and stem cells. Our quality control assays for stem cell production are based on our long experience in genomic analysis of stem cells and development of genomics-based diagnostic tests. The assays will ensure that stem cells used for therapy are consistently of high quality. This will speed the development of stem cell therapies for Californians.

Source URL: <https://www.cirm.ca.gov/our-progress/awards/user-friendly-predictive-molecular-diagnostic-assays-quality-control-stem-cell>