

TITLE: A Stem Cell Tactic to Promote Personalized Medicine

FACULTY MENTOR NAME, EMAIL, PHONE NUMBER: Naohiro Terada, MD, PhD
Email terada@pathology.ufl.edu
Phone 392-2696

FACULTY MENTOR DEPARTMENT

Pathology

RESEARCH PROJECT DESCRIPTION (brief overview of background, hypothesis, methods, role of medical student, funding and relevant publications)

Recent advances in DNA sequencing technologies and subsequent progress in genome wide association studies (GWAS) are rapidly changing the landscape of human diseases. Our knowledge on disease-gene linkage has been exponentially growing, and soon we will obtain complete maps of single nucleotide polymorphisms (SNPs) linked to nearly all major disease conditions. These studies will undoubtedly lead us to a more comprehensive understanding of how multiple genetic modifications link to human pathobiology. But what comes next after we discover these genetic linkages? In order to truly understand mechanisms of how polygenic modifications identified through GWAS lead to disease conditions, we need an experimental interface to study their pathobiological effects. Here, induced pluripotent stem cells (iPSCs), retaining all the genetic information from patients, will likely serve as a powerful resource. Using patient iPSCs, we are now actively working on decoding mechanisms underlying how personal genetic variations alter susceptibility to diseases and/or drug responses. Potential summer projects will be to edit SNPs using CRISPR/Cas9 technology within iPSCs for the direction.

Hankowski KE, Hamazaki T, Umezawa A, Terada N (2011) Induced pluripotent stem cell as a next generation biomedical interface. *Lab. Invest.* 91:972-977

Biel NM, Santostefano KE, DiVita BB, El Rouby N, Carrasquillas S, Simmons C, Nakanishi M, Cooper-DeHoff RM, Johnson JA, Terada N (2015) Vascular smooth muscle cells from hypertensive patient-derived induced pluripotent stem cells to advance hypertension pharmacogenomics. *Stem Cells Transl. Med. In press*