**TITLE:** Drug resistant hypertension study using pharmacogenomics and stem cells

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**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 study (GWAS) are rapidly changing the landscape of biomedical research. In particular, pharmacogenomics approaches now start to define genetic predictors for individual drug efficacy and toxicity, thus promoting personalized medicine. However, when we want to truly understand mechanisms underlying how polygenic modifications lead to differential drug responses, we need an experimental interface. Here we propose the use of patient-derived induced pluripotent stem cells (iPSCs), which retain all of the patient's genetic information. In collaboration with Julie Johnson's group (College of Pharmacy), we are currently determining genetic risk factors for becoming resistant to multiple anti-hypertensive drugs and elucidating underlying mechanisms using iPSCs derived from patients. We welcome medical students to join this interdisciplinary project and learn concepts, experimental procedures and data analyses needed for the study.

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

Santostefano KE, Hamazaki T, Biel NM, Jin S, Umezawa A, Terada N:
A practical guide to induced pluripotent stem cell research using patient samples
*Lab. Invest.* In press [PMID:25089770]