Application number/Title: 40713 - The association of genomic variation, exogenous female hormones, and statin therapy with the risk of incident and recurrent arterial and venous thrombosis

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Keywords provided by the Applicant PI to describe the research project: estrogens, genetics, myocardial infarction, statins, stroke, venous thrombosis

Application Lay Summary:

Medications that doctors prescribe to their patients do not always work in the same way in each person. For some people, the medication is very helpful at treating the health condition and does not have bad side effects. For other people using the drug, the medication may not be helpful at treating the condition or may have bad side effects.

Identify characteristics of the people who experience beneficial or harmful outcomes as a result of the medications they use will help us learn more about who should be using what type of drug treatment. Characteristics of people include age, sex, weight, eating habit, and so forth. We are interested in genetic information, which is information that is passed from biologic parents to offspring. We are interested in the way people are different genetically and how it affects the health benefits and risks of commonly used medications.

We are interested in 2 classes of medications that may be more or less helpful depending on the genetic characteristics of the user. The first group of medications includes estrogen and progestogen products (female hormones) used by women as birth control or as treatment of the menopause symptoms. For these drugs, there are life-threatening risks association with use, including the development of a potentially deadly conditions, such as pulmonary embolism (blood clots in your lungs), stroke (blood clots or bleeds in your brain), and myocardial infarction (blood clots in your heart). Statins are cholesterol-lowering medications that are highly effective in preventing cardiovascular disease, primarily by reducing the amount of LDL cholesterol in the body.
We have several research questions, primarily questions of gene-drug interactions: (1) Among women users of female hormones, are there genetic differences among the women that increase or decrease the risk of blood clots; (2) Among women and men users of statin therapy, are there genetic differences among the users that increase or decrease the clots?

We are proposing a 3-year project. The product of this research is to identify genetic differences that may be linked with an increased or decreased risk of major cardiovascular conditions. This research could have public health implications. For individuals who are at increased risk of major cardiovascular conditions, such as women initiating oral contraceptive therapy or men and women who have suffered a cardiovascular event, it may one day be worthwhile to screen for genetic differences that are linked with risk.