



Application number/Title: 30418 - Biomarker profiling by NMR metabolomics for the study of chronic disease risk and underlying risk factors

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Keywords provided by the Applicant PI to describe the research project: biomarkers, metabolomics, pathophysiology, risk-scores

Application Lay Summary:

Biomarkers measured from blood samples are indicative of the risk for many chronic diseases, such as heart disease and diabetes. We intend to measure blood samples from the entire UK Biobank using a novel technology developed by Nightingale Health Ltd that captures >200 biomarker measures, such as lipids and amino acids, from each blood sample. Data analyses will assess how well these biomarker measures can predict future risk for disease onset. The analyses further aim to clarify the molecular roles of the biomarkers in chronic diseases and underlying risk factors, and clarify genetic and lifestyle contributions to the biomarker levels. The results may improve the ability to predict disease onset, which would allow better targeting of prevention efforts. The detailed metabolic profiling also provides an enhanced understanding of the molecular mechanisms leading to onset and progression of chronic diseases, and may hereby identify causal biomarkers and targets for drug treatment. The resource of >200 metabolic biomarker measures will also benefit numerous other research projects, such as studies of molecular intermediates of diet and other lifestyle factors as well as the examinations of the genetic basis of metabolism. We will measure the blood samples by Nightingale Health's proprietary NMR metabolomics platform in Finland. The resulting metabolic biomarker measures will subsequently be analysed statistically for association with disease events (prevalence and incidence of all ICD-10 disease categories) and health factors using so-called phenome-wide association approaches covering subclinical disease markers, other blood biomarkers, life style and dietary data, as well as complete genomic information. We will request blood samples and participant data for the full cohort (~500,000 samples; 85 ul serum needed) and, if possible, also for one follow-up time point (~20,000 blood samples). The metabolomics measurements of the entire UK Biobank are expected to be completed within 18-

24 months from sample arrival to Nightingale's laboratory.