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Genetics and lifestyle have a strong impact on biomarkers for inflammation and cancer

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In a new study published in *Nature Communications*, research scientists from Uppsala University present for the first time a large-scale study of the significance of genetic, clinical and lifestyle factors for protein levels in the bloodstream. The results of the study show that genetics and lifestyle are determining factors for protein levels, a discovery which greatly influences the possibilities for using more biomarkers to identify disease.

Biomarkers used for diagnosing disease should preferably indicate variations in protein levels only for those individuals who are suffering from a particular disease. Nor should they vary for reasons which have nothing to do with the disease. By analysing 92 protein biomarkers for cancer and inflammation in a clinical study of 1,000 healthy individuals, researchers at Uppsala University have for the first time surveyed the significance of genetic, clinical and lifestyle factors for protein levels in the bloodstream. The results of the study show that hereditary factors play a significant role for more than 75 per cent of the proteins, and a detailed genetic analysis demonstrates 16 genes with a strong effect on protein levels.

"These results are important, as they show which variables are significant for variations in the measurable values. If these factors are known, we have a greater possibility of seeing variations and we get clearer breakpoints between elevated values and normal values. By extension this may lead to the possibility of using more biomarkers clinically," explains Stefan Enroth, researcher at the Department of

Immunology, Genetics and Pathology at Uppsala University.

According to the study, genetics and lifestyle together account in some cases for more than 50 per cent of variations in protein levels among healthy individuals. This means that information about both genetic and lifestyle factors must be taken into account in order for protein biomarkers to be used effectively.

More information: "Strong effects of genetic and lifestyle factors on biomarker variation and use of personalized cutoffs", Enroth et al. *Nat. Commun*. 5:4684, DOI: 10.1038/ncomms5684 (2014)

Provided by Uppsala University