

OPINION

Medication Needs to be Considered in Biomarker Discovery

Blood has been used in over 90% of biomarker research, even though urine was proposed to be a better biomarker source because urine has no homeostatic mechanisms and contains lots of changes associated with diseases [1]. Early changes may be removed from blood because of homeostatic mechanisms. Blood can also be used as biomarker source when all the homeostatic mechanisms cannot compensate the changes and new homeostatic point was established in blood in the new pathophysiological condition.

Urine accumulates lots of changes. Its proteome is easily affected by different factors, including medicines [2, 3]. I proposed that in urine biomarker studies, the effect of medication needs to be considered [4]. Most biomarker laboratories have been working on blood proteome of diseases, but not many studies was seen on the effect of medication on blood proteome.

The effect of anticoagulants studies have shown that medication can make changes in blood proteome even though a much bigger changes were seen in urine. In haperin treated group, there were still three proteins changed in blood while in agatroban group there was one protein changed. The changes were not trivial changes even though they may not be as significant as changes in urine. As most of the biomarker studies were done in blood only (instead of what I advocated urine), these changes may be taken as significant changes of the disease without realizing they might be the effect of associated medication. The associations of disease - medication and healthy control - no medication are all strong associations. If the associations were not taken into consideration of the experimental design, big data can not differentiate if the biomarker is disease biomarker or medicine biomarker, no matter how big the data is. Clinical validation of biomarker is not cheap. Flaw in design may lead to wrong candidate. This is devastating.

I propose that the effect of medication should be considered in the clinical biomarker design in blood too. Only when it is considered, the biomarkers discovered are true disease biomarkers instead of medicine biomarkers which are useless. Medicine in blood can be measured directly; it does not need a marker. But studies on effects of medicine are valuable. It helps us to avoid costly phony candidates.

REFERENCE

- [1] Gao Y. Urine - an untapped goldmine for biomarker discovery? *Sci China Life Sci.* 2013; 56(12): 1145-1146.
- [2] Li M, Zhao M, Gao Y. Changes of proteins induced by anticoagulants can be more sensitively detected in urine rather than plasma. *Sci China Life Sci* 2014; 57(7): 649-656.
- [3] Li X, Zhao M, Li M, Jia L, Gao Y. Effects of Three Commonly-used Diuretics on the Urinary Proteome. *Genomics Proteomics Bioinformatics* 2014; 12(3): 120-6
- [4] Gao Y. Are Urinary Biomarkers from Clinical Studies Biomarkers of Disease or Biomarkers of Medicine? *MOJ Proteomics Bioinform* 2014; 1(5): 00028.

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