

Next-generation nutritional biomarkers to guide better health care

Emmanuel E. Baetge, Anil Dhawan, Andrew M. Prentice (eds.), 2016 Nestlé Nutrition Institute Workshop Series, vol. 84

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One of the main precision medicine's promises is nutrigenomics; still far from being a widespread attitude for the laypeople, it is certainly one of the most challenging aspect of the near to come health care system based on personalized medicine. Thus, we welcome books like this one that is exploring the pre-requisites to get a better health care in the new millennium, pre-requisites that need to explore the methodologies we will use, who are the end users and the future horizons that the use of 'Next-Generation Nutritional Biomarkers' will allow to explore for a better health care. Before to tell something related to the quality of the book I would like to stress that we must keep in mind how is today (and more and more will be) the demographic structure of the west world populations not forgiving those rapidly growing populations in Africa and Asia: we will face populations made up for at least one quarter of elderly people! From this interesting book, the reader will get clear evidence that nutritional innovations in the food systems (useful for our health care) are likely to come out from new nutritional biomarkers powerful in assessing the quality of the interaction between health and nutrition.

Thus precision, personalized, preventive medicine is not one of the many options we

handle, it is a need. The Editors (*Emmanuel E. Baetge, Lausanne; Anil Dhawan, London; Andrew M. Prentice, London*) rightly point out in their preface several points that I would like to recall: 'There are diverse definitions of what constitutes a biomarker for health and currently used formulae driving health care decisions frequently combine a broad range. For instance, prediction of a patient's 10-year risk of a coronary event might combine measures of age, body mass index, waist circumference, blood pressure, and blood lipids. Such predictions have sufficient predictive value to have been adopted to set qualifying criteria for long-term antihypertensive and statin treatments. The purpose of the Nestlé Nutrition Institute's 84th Workshop on 'Next-Generation Nutritional Biomarkers to Guide Better Health Care', was to take stock of recent developments unleashed by the *omics* sciences and make some over-the-horizon predictions of how these exciting new technologies could be harnessed to drive advances in nutrition-related health care. The potential power of new technologies is breathtaking but, like a wild stallion, the challenges of taming these powers and directing them to useful ends is daunting. Even the most fervent advocates of the new technologies admit that, to date, they have promised more than they have delivered; so it is timely to take stock and ask whether we have reached a takeoff point'.

Five chapters illustrate the methodologies (first part of the book) we currently handle, from systems-level nutritional approaches to define phenotypes to bioinformatics to extract from terabytes of data the next-generation biomarkers of health: the take home message is based on the idea that we have to focus on the biology of *maintaining optimal health*, which radically differs from the biomedical science of

markers to quantify the onset and progress of diseases. Foods and nutrients play a fundamental role in determining the interactions between environment and genome and thus Anil Dhawan, while summarizing the chapters presenting the applications/end users in pediatric liver disease (including those, among others, corresponding to inflammation and fibrosis), biomarkers for iron status and the search for biomarkers after preterm birth useful to assess long-term outcome, call for an integrative view of biomarker development since *in many instances the challenge is to assess existing nutrient status or the state of a diet-related disease so that remedial action can be taken at the individual, group, or even country level*. A final chapter (of five chapters related to the second part of the book) is devoted to the new cardiovascular biomarkers, beyond cholesterol. Quite interesting is the reading of the iron-related problematics by Hal Drakesmith; this is a paradigmatic case where the reader can face the difficult balance between two needs: the threat of infections that iron administration is likely to promote and the need of the administration itself.

The last three chapters deal with the near to come future applications based on the gutome studies and stratified medicine approaches frame-worked within the idea that 'the best health care focuses not on the *post-hoc* treatment of disorders once they have occurred but on optimizing human health throughout the life course' and designed nutrition approaches are at the ground of this philosophy.

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