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LETTER TO THE EDITOR

**Toward overcoming the challenges facing
biomedical analyses**



Dear Editor,

Regardless of the different diagnosis methods than can exist,^{1–3} medical diagnosis is a practice based on diverse approaches that aim to find out the causes of a pathology or the underlying reasons of an unhealthy status. A robust diagnosis needs to lie on a variety of approaches that combine elements including questionnaire, imagery and analysis. The biomedical analyses may be the most commonly used approaches in the medical diagnosis, especially for the molecular diagnosis,^{4–6} due to the variety of parameters they cover and the different abnormalities they can reveal.

Biomedical analyses have challenges to overcome, yet standards to respect. Indeed, it is important to select the appropriate biological sample, the time of sampling and the condition under which it is sampled in terms of period, patients' diet, patient's age and the drugs the patients are taking. For instance, to test blood sugar or blood lipids the patients should fast several hours before the blood is drawn, in addition, when interpreting the results the clinician should take into consideration the fact that a patient is taking some drugs like insulin, anti-cholesterol drugs, other medicines or even some types of food or natural products⁷ that interact with the metabolic process which may influence the level of some biological molecules such as glucose, triglycerides and cholesterol.

Furthermore, based on what we are looking for or what we are suspecting, choosing the type of sample and the region to sample represents an important issue. In fact, some false diagnoses can be due to a wrong sampling choice such as searching for a specific antibody in the blood of an immune-deficient patient who will have a limited amount of antibodies instead of searching for other disease markers. This may happen when the pathological status of the patient is not well reported. Another example of a sampling choice in terms of time and region is diagnosing infections where different options may exist including antibody detection, bacterial or inflammatory marker detections and depending on the infection phases and the patients we may base our diagnosis on one or more of those parameters.

The laboratory steps of the medical analysis also represent an important issue. Indeed, the equipment quality and the appropriate use of it, in addition to the selection of the analytical methods along with the use of suitable reagents at the optimum conditions especially those able to react with the live cells are important.⁸ These factors can influence the results based on which a doctor will prescribe a drug, adjust the dosage of treatment, ask for further analysis or recommend a diet for the patient. Thus, the experimental steps of the laboratory should be given more importance and the laboratory personnel need to receive appropriate training. Furthermore, the patients need to be educated regarding the precautions related to the biomedical analysis and need to respect the diet recommended by doctors or clinicians, be punctual for the sampling and report any details that may influence the results such as the disease familial history and an eventual treatment that the patient is taking.

These concepts can also be recommended for similar biological approaches used in scientific research in areas such as pharmacology, genetics and immunology to reach new advances toward new drug development^{9,10} for medical usage. However, in diverse cases the biomedical analysis is not enough for a precise diagnosis and further complementary tests and explorations such as imageries, physiological tests and exploratory surgery are required to map the pathological status of patients. In all cases, the collaboration of all the individuals concerned, starting from clinicians, laboratory assistants, pharmacists and the family members of the patients; is the minimum requirement to optimize the results and the efficiency of the biomedical analysis toward an accurate diagnosis.

Conflict of interest

The author declares that there is no conflict of interest.

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