Letter to the Editor

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Pancreatic lipase assays: time for a change towards immunoassays?

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To the Editor,

With interest we read the paper by Pasqualetti et al. [1] regarding the care of the laboratory community of pancreatic lipase.

The authors highlight the importance of the recipe in the standardisation of lipase assays. However, it should be noted that, from a physicochemical perspective, lipase (EC 3.1.1.3) is a unique and challenging enzyme to measure, where standardisation approaches cannot overcome all issues related to the contemporary, automated lipase assays.

First, lipase acts at the interphase area between water and the substrate [2, 3], whereby also the cuvette surface will play a role in kinetic lipase assays, especially in present-day miniaturised cuvettes. The physical properties of present-day commercial cuvettes show important differences in chemical composition, surface/volume ratio, contact angles, and total surface energy [2]. Cattoir et al. [4] demonstrated that serum lipase activities not only depend on substrate and enzyme concentrations, but also on the chemical composition of the reaction cuvette used. Since the chemical composition of the cuvette is determined by the choice of the analytical platform, inter-laboratory comparison of serum or plasma lipase results is a difficult task.

Second, Vogel et al. [5] and Oyaert et al. [6] reported about non-linearity within the primary measurement range of different lipase assays. Consequently, even when all lipase standardisation issues would have been completely solved, it is to be expected that discrepant results will remain when lipase assays are applied on different chemistry analyzers equipped with different cuvettes and different measurement cycles. This is also illustrated by the fact that assays from vendors, making use of the same supplier of bulk lipase reagent, cannot be categorized in the same external quality control method group. The methodological variation potentially leads to incorrect interpretation of lipase test results.

Of note, serum may contain three enzymes that have lipolytic activity: L1 and L2, which are pancreatic isoenzymes or isoforms of lipase (EC 3.1.1.3), and L3, which is probably pancreatic carboxyl esterase (EC 3.1.1.13) [7]. The presence of non-pancreatic isoenzymes reduces the specificity of currently used lipase assays as a pancreatic test.

Although lipase immunoassays are not a perfect diagnostic solution [8], these promising ELISA assays disappeared prematurely from the market when the practical colorimetric lipase methods were introduced approximately 30 years ago. At that time, rapid immunoassays were not yet available in the routine laboratory. In contrast to some other clinically used diagnostic enzymes, macromolecular bound lipases (macro-lipases) are rare, which facilitates test interpretation [9]. Furthermore, the lipase isoforms L1 and L2 are immunochemically distinct from isoform L3, which increases the diagnostic specificity of lipase immunoassays [7].

As colorimetric lipase assays are facing numerous analytical problems which are very hard to solve, we share the view of Pasqualetti et al. [1] that we should encourage IVD manufacturers to use their modern immunochemistry technology for the development of a reliable lipase immunoassay that can provide clinicians with rapid lipase results of high quality.

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