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Abstract

Clinical Metabolomics: the next stage of clinical biochemistry

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Abstract:
Centuries of scientific advances have paved the way for the relatively recent great strides in clinical biochemistry, a field which mainly relies upon biochemical analyses of various body fluids, prime amongst which are urinel, blood and cerebrospinal fluid2. Technological innovation, through the introduction of cutting edge instrumentation has enabled decades of substantial improvements in the field of standard analytical chemistry in the clinical setting.At its dawn, clinical biochemistry relied on rudimental approaches, such as in the case of Richard Bright's (1789-1858) test for proteinuria in cases of suspected renal disease, in which a candle flame was used to heat urine in a tablespoon3.Only minor technological improvements could date back to the early twentieth century. As reported by Olukoga et al.4, the equipment of a clinical pathology laboratory within a 200-bedded American hospital in 1920 listed "a centrifuge, a urinometer, two monocular microscopes, two small substage microscope lights, a Bunsen burner, a Dubosq colorimeter, a basal metabolic rate machine, an electro-cardiograph, a microtome, a knife, a paraffin bath, a few antisera and an assortment of test tubes, beakers and pipettes".The dawn of blood collectionOther than testing, collection of blood samples was challenging as well, since only small blood volumes could be obtained by finger prick or either collected by "cut-down" to expose the vein, with subsequent venesection and cupping6. Indeed, the first hypodermic needle was created in 1840s by Francis Rynd for local injection of opiate in the treatment of neuralgia7: it was made of steel and accompanied by a hard rubber hub. Subsequent strides in the field of blood collection are to be attributed to the introduction of new syringe materials for the collection tube, since the rubber was replaced with glass to allow syringes to be reused. Finally, the Luer-Lok syringe provided a convenient method of attaching and removing the hypodermic needle from the glass syringe4. Collection tubes containing small volumes of additives (e.g. anticoagulants) have represented a standard in blood collection procedures since their first appearance in the 1950s. Along the last fifty years, manufacturers have introduced only minor modifications to collection tubes, including the use of plastic as the primary tube component, and the addition of polymer gel or clot activator.

Biography:

Laila M. Montaser, MD is Professor of Clinical Pathology. She is Chair, of Stem Cell, Regenerative Medicine, Nanotechnology and Tissue Engineering (SRNT) Research Group. ... She is the nominator of Council of Menoufia University to TWAS prize in Medical Sciences and to award of Nano Science Research Excellence.

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