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Development and Evaluation of a Reagent Carrier with a New Reaction Sequence for the Determination of Creatinine in Blood, Plasma, Serum and Urine

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Summary: After a short outline of the history of creatinine determination methods we describe the development of a dry-reagent-carrier system for the reflometric determination of the creatinine concentration in blood, plasma, serum and urine (Reflotron® Creatinine (new)). The method is based on a sequence of enzymatically catalyzed reactions producing H_2O_2, but which in contrast to the previously used procedure do not lead to the formation of creatine as an intermediate. Hence, pretreatment of sample material to eliminate endogenous creatine is no longer necessary. In the indicator reaction, use is made of an imidazole derivative as the chromogen. The dye formed in the presence of peroxidase can be measured by reflectance photometry beyond the long-wave absorption bands of haemoglobin and bilirubin at 642 nm. We present in detail the results of the multicentre evaluation of the analytical properties of this new test principle. The data obtained show that Reflotron® Creatinine (new) correlates well with the routine method Creatinine PAP, which was used as a comparison method, with respect to accuracy and precision and even surpasses it with respect to specificity. Advantages over the first generation of Reflotron® Creatinine are: shorter reaction time, longer stability of the reagent carrier, no interference by bilirubin and reduced interference by haemoglobin.

Introduction

Creatinine, an important analyte particularly for assessment of kidney function, was discovered in 1844 by *Max von Pettenkofer* (1). About 30 years later, *Max Jaffé* (2) determined that under alkaline conditions creatinine forms a red-orange dye with picric acid. As the reaction was non-specific, with a great number of other substances also reacting to form this