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ABL90 FLEX PLUS creatinine – avoiding interference

Creatinine in historical review

The first method for detecting creatinine was based on the reaction described by **Jaffe** in 1886 and is known to be the oldest clinical biochemistry method still in use [1]. Creatinine reacts with alkaline picrate to form a stable orange-red complex that can be measured photometrically. Unfortunately, alkaline picrate reacts with other endogenous substances (called pseudo-creatinine chromogens) present in blood, reducing the specificity of the Jaffe reaction for creatinine and resulting in falsely raised creatinine values. Over the years the Jaffe method has been refined to improve specificity.

Later, the discovery of the enzyme creatininase [1] led to the development of automated enzymatic creatinine methods, which are less prone to interference from endogenous substances, although interference is now reported from exogenous substances [2-6].

The newest technology: enzymatic amperometry sensors on the ABL90 FLEX PLUS analyzer were developed to avoid some of the most critical interferents by applying an interference removal layer consisting of cellulose acetate. The combination of the cellulose acetate layer with an optimized calibration system and specialized algorithms for interference corrections has eliminated or reduced interference from some of the most common interferents identified in the literature, summarized in *Table 1* below.

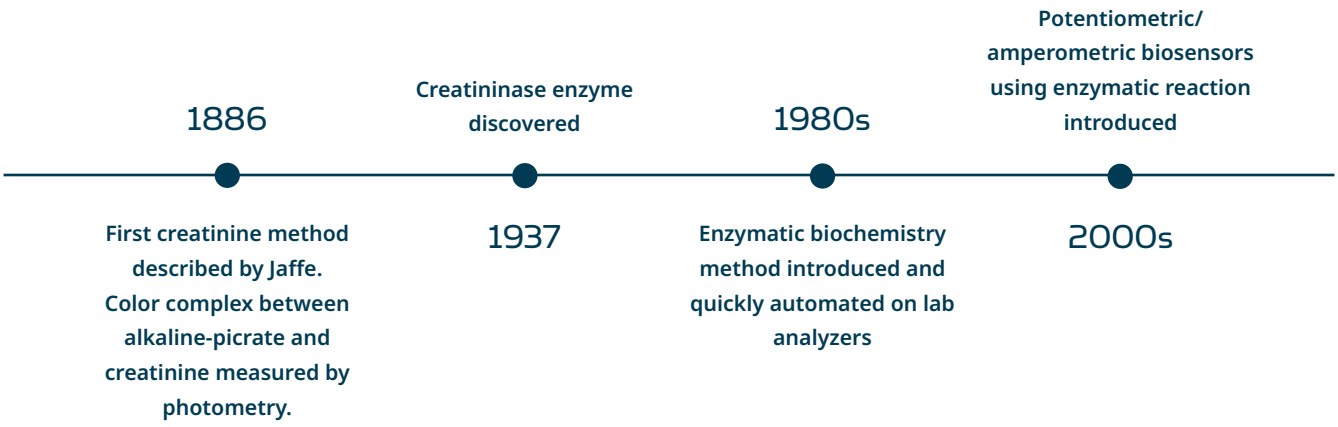

Figure 1: Historical review of creatinine measurement

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Literature findings on creatinine interference

According to literature, the most frequently mentioned interferents, representing some of the most vulnerable patient groups, are listed in *TABLE 1* below.

	Likely to interfere with		
Interferent (Endogenous substances)	***Jaffe* methods (compensated or non-compensated)**	**Enzymatic creatinine assays**	**ABL90 FLEX PLUS analyzer (enzymatic amperometry)**
Bilirubin	**Yes** (both neg/pos bias) [9, 10, 11]	Less significant if any	**No interference** at a concentration of 342 µM (20 mg/dL) conjugated and unconjugated bilirubin [7]
Glucose	**Yes** (positive bias) [12, 13, 14, 15]	Less significant if any	**No interference** at a concentration of 55 mM (990 mg/dL) glucose [7]
Acetone	**Yes** (positive bias) [12, 16]	Less significant if any	Not tested
Acetoacetate	**Yes** (both pos/neg bias) [12, 16, 17]	Less significant if any	Not tested
β-hydroxybutyrate	Less significant if any [12, 16, 17]	Less significant if any	**No interference** at a concentration between 2.5 – 10 mM [7]
Total protein	**Yes** (both neg/pos bias) [14, 18]	Less significant if any	**Interference** (< 10%) observed at concentrations > 107 g/L [7]
Immunoglobulins (IgM and IgG)	Less significant if any	**Yes** (both neg/pos) [19, 20, 21, 22]	Not tested
Interferent (Exogenous substances)			
Dobutamine (hydrochloride)	Less significant if any	**Yes** (negative bias seen in samples collected from indwelling catheters) [3, 4, 23]	**No interference** at a concentration of 3 µM dobutamine [7]
Dopamine (hydrochloride)	Less significant if any	**Yes** (negative bias seen in samples collected from indwelling catheters) [3, 4, 23]	**No interference** at a concentration of 5.9 µM dopamine [7]
N-acetylcysteine (NAC)	Less significant if any	**Yes** (negative concentration dependent bias) [2, 6]	**No interference** at various concentrations of NAC [2] No interference at 10 mM [8]

Table 1. Most frequently reported interferents in creatinine methods.

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