Determination of Urea and Creatinine Concentrations in Urine Using Two-Electrode Sensor System Combined with Two-Compartment Cell

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The concentrations of urea and creatinine in human urine were simultaneously determined using a two-electrode sensor system equipped with a two-compartment cell. A small and a large compartment, whose volumes were 0.5 and 19.5 ml, respectively, were separated by a glass filter (pore size < 0.25 mm). An amperometric creatinine-sensing electrode was inserted into the small compartment; urea-sensing, Ag/AgCl reference and auxiliary electrodes were inserted into the large compartment. A drop of urine (5 µl), which contained a high concentration of urea (ca. 0.3 M) and a relatively low concentration of creatinine (ca. 10 mM), was injected into the small compartment. The creatinine concentration was first measured in the small compartment with a low dilution factor for the sample; then the sample diffused into the large compartment and the urea electrode response at a higher dilution factor could be obtained. The concentrations of the two components could be determined within 3.5 min.

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