



Real-time PCR evaluation of cell-free DNA subjected to various storage and shipping conditions

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ABSTRACT. In this study, we attempted to explore the factors affecting the yield of cell-free fetal DNA (cffDNA) obtained from maternal blood samples, including the use of different types of collection tubes, the interval between sample processing, and sample shipping under extreme weather conditions. Blood samples were drawn into K₃EDTA tubes and cell-stabilizing tubes (Streck blood collection tube, BCT) from women pregnant with male fetuses. Real time PCR was used to amplify a *β-actin* gene fragment to measure the total plasma cell-free DNA concentration, while an *SRY* gene fragment was used to quantify the cffDNA. The samples in the K₃EDTA tubes revealed a decreased quantity of *SRY* after 5 days of transportation, with a median of 25.9 copies/mL ($P < 0.01$); however, the value remained stable at 33.4 copies/mL in the BCT tubes. We observed a statistically significant increase in stability of the amount of total DNA in the

blood samples stored in K₃EDTA tubes ($P < 0.01$) and transported under extreme outdoor temperatures (-20°-0°C) than that of the control values. These results indicate that it could be possible to avoid the presence of excess maternal DNA in samples shipped under extreme weather conditions for no more than 2 days, by collecting the blood samples in BCT tubes.

Key words: Maternal plasma; Cell-free DNA; Yield; Temperature