

Maximizing Deoxyribonucleic Acid Yield from Dried Blood Spots

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Abstract

Background:

One source of deoxyribonucleic acid (DNA) for genetic studies is the utilization of dried blood spots stored on paper cards (Guthrie cards) collected shortly after birth. These cards represent an important source of material for epidemiologic and population-based genetic studies. Extraction of DNA from these cards can lead to variable amounts of recovered DNA. We report here results of our efforts to maximize yield from this valuable, but nonrenewable, resource.

Method:

Commercial methods of DNA extraction from blood cards were used, and protocol modifications were introduced that enhanced DNA yield.

Results:

Use of a commercial solvent prior to DNA extraction steps gave greater yields than extraction without the solvent. Modification of the elution step by use of prewarmed extraction buffer and a soaking step at an elevated temperature increased yield by 6- to 10-fold.

Conclusions:

The modified DNA extraction method yielded as much as 660 ng of DNA from a single 5-mm-diameter punch of a blood spot card. The DNA performed well in downstream, polymerase chain reaction-based applications.

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Abbreviations: (DNA) deoxyribonucleic acid, (HLA) human leukocyte antigen, (PCR) polymerase chain reaction, (SNPs) single nucleotide polymorphisms, (WGA) whole genome amplification

Keywords: blood spot, DNA sample preparation, Guthrie card, HLA genotyping

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