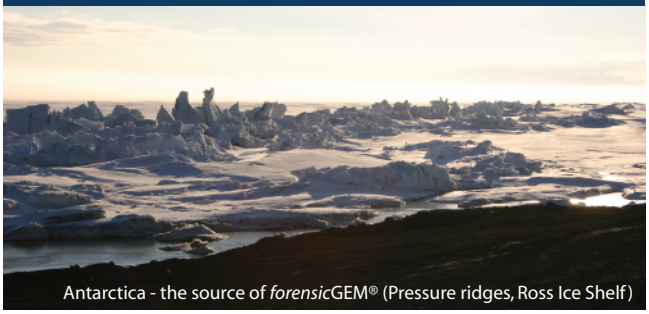

Antarctica - the source of *forensic*GEM® (Pressure ridges, Ross Ice Shelf)

PCR inhibition by adhesive tape

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Introduction

Manipulation of trace forensic samples and hair is complicated by the the small size of the sample and static charge generated by the laboratory environment. To simplify collection and handling, samples are often lifted using 3M Post-It® notes or adhesive tape but as a consequence, the tape and sample become inseparable and must be processed together.

The chemical composition of adhesive tape is complex. Each tape contains a different combination of backing film and glue, so it is important to be aware of any of chemical agents that can cause problems for PCR or forensic profiling.

The purpose of the experiment described here, was to assess the level of PCR inhibition caused by several brands of tape when the tape and sample were processed together using the *forensic*GEM® Tissue one-step DNA extraction kit. To exaggerate the effect of inhibition, extended incubation times were used followed by a PCR inhibition test to obtain a qualitative assessment of inhibition.

Materials and methods

0.25 mm x 0.25 mm sections of adhesive tape (see Figure 1 for tape brands) were cut with a sterile blade and placed into sterile 200 µl PCR tubes. Each sample was washed as follows:

- 200 µl of isopropanol for 5 minutes
- 200 µl of 2.5% Triton X-100 (Merck) for 5 minutes
- 2x washes with DNA/RNA-free water for 5 minutes

The samples were drained and the following extraction reagents added:

1 µl	*forensic*GEM®
5 µl	10 x Buffer GOLD
44 µl	DNA-free H_2O

Samples and reagent blanks were incubated at 75°C for 4 hours and then at 95°C for 15 minutes. Following incubation, samples were centrifuged at 20,000 x g for 5 minutes.

Inhibition PCR

A PCR was performed using Ampli*Taq*® (Applied Biosystems) in a reaction containing 10 ng of *Escherichia coli* DNA. The primers were designed to amplify the full-length 16S rRNA gene. 10 µl of the tape extract was added to a 50 µl PCR reaction. All reactions were performed in duplicate and the products were visualised on a 0.8% agarose gel.

Results and discussion

The results of the experiment are shown in Figure 1.

	Brand
Scotch®	Magic™ Tape 810
Scotch	Crystal Clear Tape
Scotch	Masking Tape (made in Canada)
Scotch	Mailing Tape
Scotch	Storage Freezer Tape
Scotch	Removable Magic™ Tape 811
Scotch	Transparent Tape 550
Scotch	Masking Tape (made in Taiwan)
Sellotape®	Diamond Ultra Clear
Sellotape	Invisible Permanent Write-on
Sellotape	Cellulose Easy Tear Tape
Sellotape	Brown Packaging Tape
Sellotape	Double Sided Tape
ABI®	MicroSeal® Adhesive Film
3M	Post-It® Note
+ control	No tape

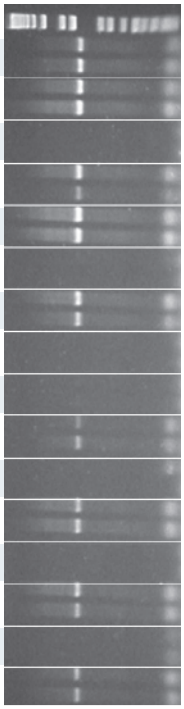

Figure 1: 0.8% agarose gel showing the amplification or failure of a 1450 pb fragment of the *E. coli* 16S rRNA gene. An extended *forensic*GEM extraction was performed using 15 different brands of adhesive tape.

Although most forensic DNA extractions do not require prolonged extractions, longer incubations may be necessary for recalcitrant substrates such as bone, teeth and hair shafts. In these situations, it is evident that a careful choice of adhesive tape should be made.

Interestingly, 3M Post-It Notes are a common choice of forensic scientist for tape lifts. The results of this experiment suggest that other brands may be more effective for one-step rapid DNA extraction procedures.

For more information visit: www.zygem.com
or email: info@zygem.com