CaSS | Forensic and Scientific Services

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Questions regarding DNA IQ™

29 October 2007

Queensland Government
Queensland Health

Fact sheet

- A fact sheet on DNA IQ™ technology was sent out electronically by Vanessa on 24 October 2007 in order to help understanding of the system.
- Submissions of questions and concerns were invited.
- We have reviewed the questions and commented on each point.

About DNA IQ™

- Designed specifically for trace forensic samples.
- Uses a novel magnetic particle capture technique that binds DNA and allows removal of inhibitors and impurities via washing steps.
- The system is more efficient as sample size decreases (Mandrekar et al., 2001).

- Some of the labs that perform automated DNA IQ™:
  - Royal Canadian Mounted Police (Canada)
  - Armed Forces DNA Identification Laboratory (MD, USA)
  - PathWest (WA)
  - Virginia Department of Forensic Science (VA, USA)

Manual DNA IQ™ protocol

Cut or punch out sample (see Table 2) and place in a microcentrifuge tube.

Add prepared Lysis Buffer (see Column 2 of Table 2) and heat at 95°C for 30 minutes.

Transfer Lysis Buffer and sample into Spin Basket. Centrifuge for 2 minutes at room temperature.

Remove Spin Basket. Vortex stock Resin botttle for 10 seconds. Add 7µl resuspended Resin to sample. Vortex for 3 seconds and incubate at room temperature for 5 minutes.

Vortex for 2 seconds. Place on Magnetic Stand and carefully discard solution without disturbing Resin.

Wash once with 100µl prepared Lysis Buffer (see Column 3 of Table 2) by vortexing for 2 seconds. Place tube in Magnetic Stand. Carefully remove and discard solution.

Wash with 100µl 1X Wash Buffer by vortexing for 2 seconds. Place tube in Magnetic Stand and carefully discard solution. Repeat for a total of three washes

With lids open, air-dry 5 minutes at room temperature on the Magnetic Stand.

Add Elution Buffer and close lids. Vortex for 2 seconds and heat at 65°C for 5 minutes.

Remove tubes from heat, immediately vortex for 2 seconds and place on Magnetic Stand.

Remove DNA solution and place in container of choice.

Mix the appropriate amounts of liquid sample, prepared Lysis Buffer (see Column 2 of Table 2), and Resin. Vortex for 3 seconds. Incubate at room temperature for 5 minutes.

Vortex for 2 seconds. Place on Magnetic Stand and carefully discard solution without disturbing Resin.

Wash once with 100µl prepared Lysis Buffer (see Column 3 of Table 2) by vortexing for 2 seconds.

Wash with 100µl 1X Wash Buffer by vortexing for 2 seconds. Place tube in Magnetic Stand and carefully discard solution without disturbing Resin. Repeat for a total of three washes

With lids open, air-dry 5 minutes at room temperature in Magnetic Stand.

Add Elution Buffer and close lids. Vortex for 2 seconds. Heat at 65°C for 5 minutes.

Remove tubes from heat and immediately vortex for 2 seconds and place in Magnetic Stand.

Remove DNA solution and place in container of choice.

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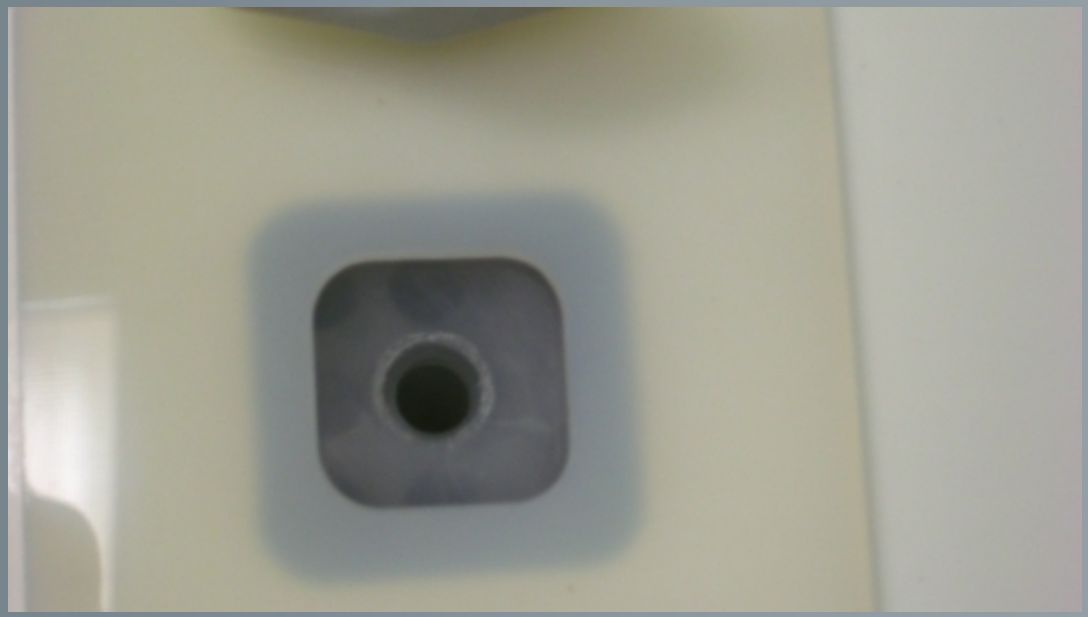
For tapelifts, what do samplers request?	Request NUCC as per usual and these will be processed using the Nucleospin Cells method.
What are the implications in the cases where supernatant is to be retained and is this not possible with NUCC?	Supernatant is retained after Prot K digest, so the amylase enzyme would be degraded. Phadebas testing needs to be performed prior to extraction.
Can we keep supernatant with new method, i.e. breast and penile swabs? Implications for pooling with wet/dry swabs of same – supernatant retention for both.	Supernatant is retained as part of the automated DNA IQ™ protocol.
Supernatant is also used for physical evidence analysis on occasion (not just amylase).	There is around 1.5mL of supernatant.
Will a normal tapelift fit within Slicprep?	Current tapelifts are not processed using DNA IQ™. An investigation into hydrophilic tapelifts will commence.

Where is the validation data located?	The final version will be available shortly in the Quality compactus.
Why not listed in change management? If it is, where is it to be found?	DNA IQ™ validation was initiated prior to the change management process.
In reference to swabs for cells, what do we do when the swab is wet and the outer layer is therefore not dry to cut off (e.g. AP tested vulval swab)?	DNA IQ™ can process both dry and wet samples (e.g. liquid whole blood).
Wet/dry swabs – are we going to have to pool (with 'phantom' barcodes) these in the future? Complicates case management and creates more room for error.	Does this require discussion with QPS?
Is there any literature to show that within the inner layer of swabs there is no DNA? Can we be certain if outer layer only is to be cut that the cells are trapped only there? Does it make a difference if ethanol or water are used?	No literature as far as we can tell (same for the opposite situation). By cutting the swab, we are also increasing sample surface area available for contact with Prot K in buffer.

How is the workflow to be organised? Who does the wiping of storstar entail and are the environmental studies as part of the investigations able to be viewed?	

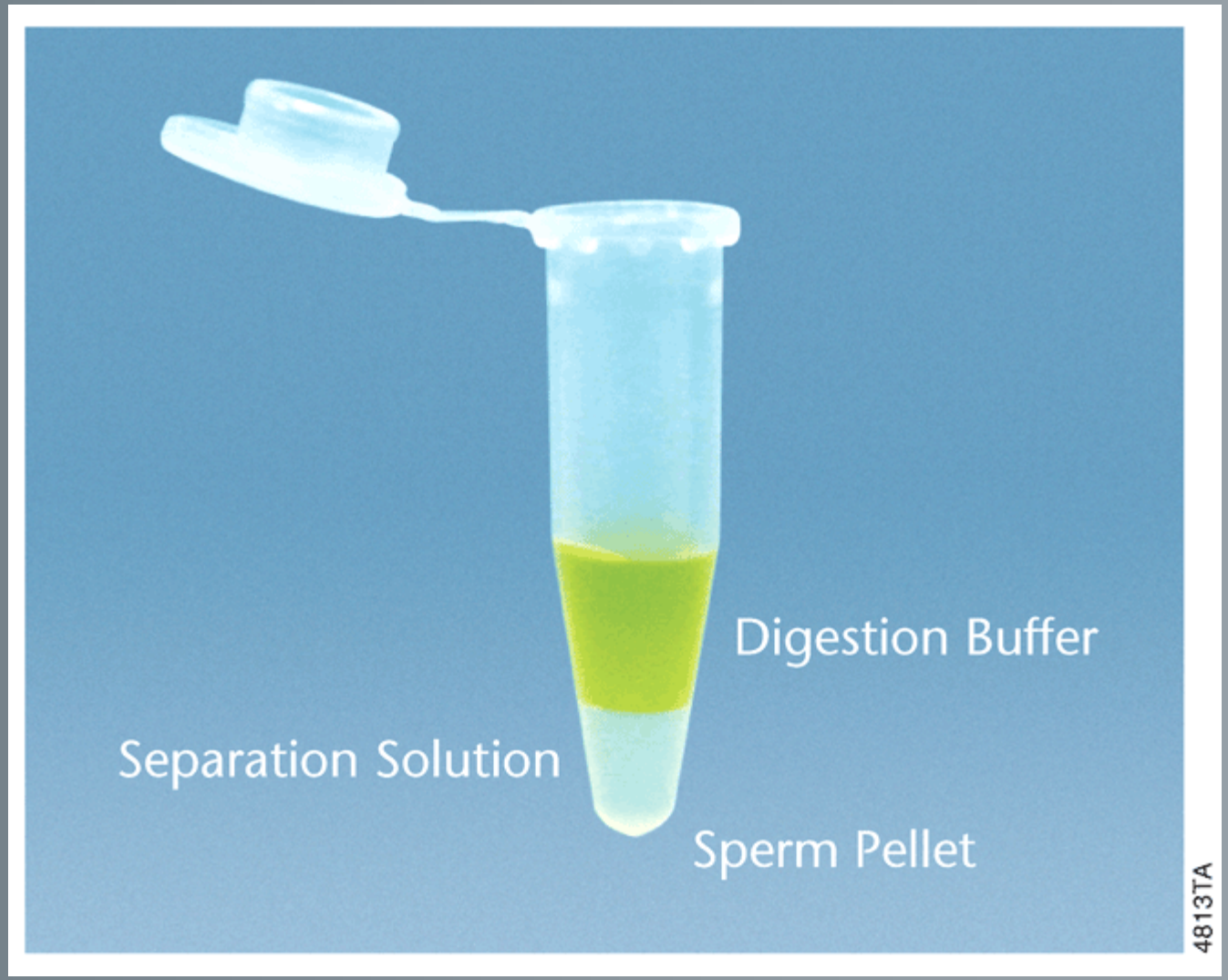


It is best practice to have disposable forceps for each sample.	We use 10% bleach and 100% ethanol to sterilise stainless steel forceps, followed by flaming, as per current protocols.
Can all reporting scientists observe the process of transferring from sampling tubes to SlicPrep?	Yes. Please arrange with Tom.
At what point in the process is the decontamination carried out and what is the potential for bleach/ethanol contamination of the tubes within storstar?	Between each sample transferred, forceps and mini spatula are decontaminated in 10% bleach and 100% ethanol prior to flaming, as per current protocols.
Is there suction between the SlicPrep and receptical meaning when the top is taken off, there is potential dripping?	No suction. Centrifugation is performed prior to removing the SlicPrep basket.

SlicPrep™ during digestion, without collar, **prior** to centrifugation

SlicPrep™ **after** centrifugation, with collar

What will the process be for fingernails/scrapings - these can be very fiddly and will be difficult to transfer to SlicPrep? Consider menstruating female – small amount of blood on fingernail scraping – can we be certain that all specimen will be transferred to the slicprep tube?	Fingernail scrapings will go into SlicPrep and processed using DNA IQ.
What is the future for hairs?	Validation of a DNA IQ™ hair protocol will commence shortly.
What is the future for DLYS?	Evaluation of an automated Differex® and DNA IQ™ protocol will commence shortly.


Digestion Buffer
Separation Solution
Sperm Pellet
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