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DNA Analysis (Forensic Biology) | Forensic & Scientific Services | Queensland Health

The FSS DNA Analysis laboratory made some changes to their existing DNA IQ extraction protocol and asked PerkinElmer to observe and ensure that the liquid handling was optimum. The test was physically set up and run and observed for problems. Following is a list of the steps which required some modifications to the liquid handling settings.

7. TRANSFER LYSIS
   Increase aspirate height and decrease tracking

9. MIX RESIN
   Change aspirate and dispense heights to be equal

13. ADD LYSIS BUFFER
   Decrease dispense height and tracking

17. REMOVE 905UL…
   May require slower aspirate speed, if resin is transferred – customer to check.

20. DISPENSE LYSIS
   Drops and bubbles after dispense, on tip and top of well
   Decrease blowout volume to 5ul, customer to check
   If problem persists, switch to waste mode, with a waste volume of 3-5ul

28. REMOVE LYSIS
   Decrease dispense height and tracking

31. ADD WASH BUFFER
   See response for 20

39. REMOVE WASH BUFFER
   Syringes are not homing during procedure, since it is a custom
   Insert a "Wash Tip" after each remove

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41. ADD WASH
See response for 20

49. REMOVE WASH
See response for 39

51. ADD WASH
See response for 20

59. REMOVE WASH
See response for 39

73. TRANSFER ELUTION
Tiny amount left in tips.
Change System Gap to zero and Transport gap to 5ul.

Where possible, dispense heights were used to allow the liquid to just touch the tip as dispensing ended. For example, if adding 600ul to a well, dispense at 550-600ul from the bottom. This enables any drops to be drawn off of the tip by the liquid in the well.

Using a *post-dispense transport air gap* ensures that any liquid remaining in the tip is drawn back up before the pipetting arm moves in an X or Y direction, thus negating any contamination of neighbouring wells.

Slowing down the *tip retraction speed* also helps to remove droplets from the test. After dispensing, if the tips come out of the liquid at the "usual" speeds (100mm/sec), you can often see drops being pulled out with the tip. This is just due to the surface tension in the well. By slowing down the tip retraction speed, the tip comes out of the liquid slowly, allowing any excess liquid on the outside of the tip to drain off the tip and remain in the well.

While observing the test, the problems were noted and then the modifications done and the DNA Analysis Team was advised to run the test again with the modifications. Actual extraction protocol liquids were used to completely mimic a "real" extraction run. With these modifications, the DNA IQ extraction protocol is a sound, neat protocol.